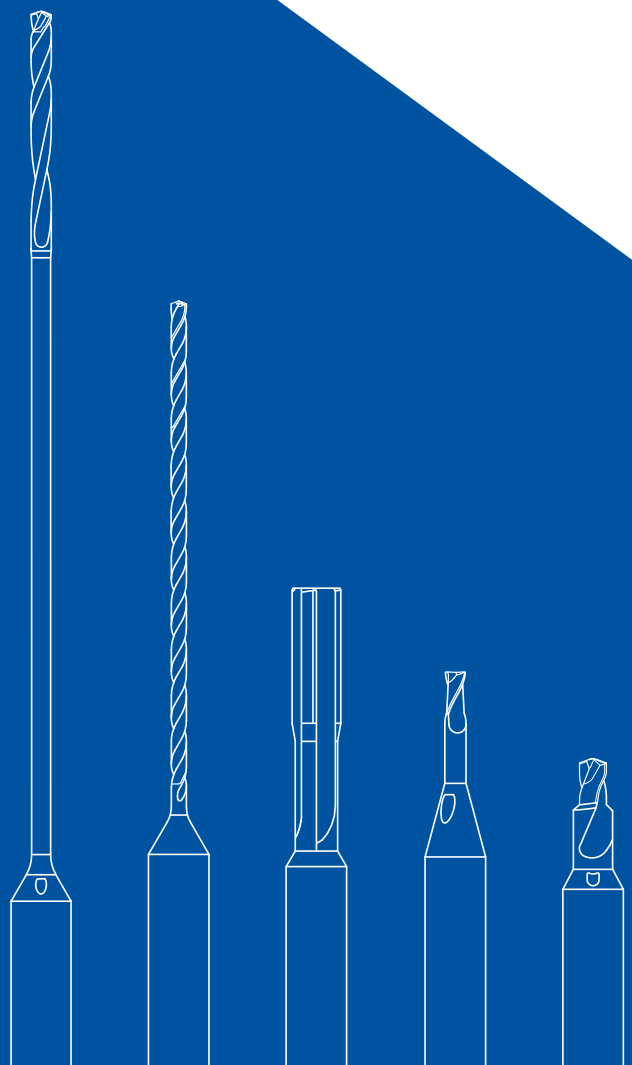
MIKRON TOOL

crazy about cool tools

CUTTING SOLUTIONS



2020

crazy about cool tools

MIKRON TOOL

WHY MIKRON TOOL

NEWS 01

TECHNICAL SUPPORT & TECHNOLOGY CENTER 02

MEDICAL TOOLS 03

CENTERING TOOLS 04

PILOT DRILLING AND SHORT DRILLING TOOLS 05

DRILLING TOOLS 06

MILLING TOOLS 07

DEBURRING TOOLS 08

TURNING TOOLS 09

REAMING TOOLS 10

MULTIFUNCIONAL TOOLS 11

REGRINDING 12

STAINLESS STEEL & CO. 13

TECHNICAL INFORMATION 14

GENERAL INFORMATION & ITEMS INDEX 15





crazy about cool challenges



WE LOVE CHALLENGES

Tools are our passion, small dimensions are our specialty and hard-to-machine materials are our challenge. The everyday life of Mikron Tool is built on these pillars.

Mikron Tool emerged from the former tool department of the transfer-machine manufacturer Mikron SA Agno. The result is decades of experience in the development and production of cutting tools.

Started as an independent company with 25 employees in 1998, we are now a globally active tool supplier with our main office in Switzerland (Agno Ticino), a branch office with sales and manufacturing in Germany (Rottweil), and sales offices in the USA and China.

235 employees are working daily to satisfy the needs of our customers; a worldwide sales network with partner companies ensures world-wide customer support.


6 ±0,1
12 ±0,1



crazy about small dimensions



TOP PERFORMANCE IN SMALL DIMENSIONS

It is important to us that we are highly competent in everything we do. We make this possible by specializing in a core area. Our strength is machining in the small diameter range with a focus on difficult-to-machine materials. To this end, we always offer new, maximizing solutions to our customers.

Various awards for our trend-setting new developments in the drilling and milling sector prove that we are on the right track with our strategy.

Standardized tools at Mikron Tool means the highest performance, the best quality, and the highest precision directly from stock. Our product line includes tools for centering, drilling, milling, and deburring in the diameter range of 004" to 1/4" (0.1 mm to 6.35 mm).

Our customized tools range from those for centering and chamfering to those for drilling, milling, turning, reaming, and deburring all the way up to complex combination tools in the diameter range of .004" to 1.26" (0.1 mm to 32.0 mm).

Mikron Tool has extended its portfolio to include two partner product lines specially suited for the USA.

- Threading tools from the Swiss manufacturer **DC Swiss SA** (www.dcswiss.com)
- Milling tools from the Japanese producer **NS Tool** (www.ns-tool.com/english)

Interested? Request our corresponding catalogues.



crazy about competence



COMPETENCE INCLUDED

The Mikron Tool specialists have extensive knowledge and many years of experience in the use of tools with the most diverse types of machine tools, such as CNC machining centers, lathes, and transfer machines. They work together with the customer to define the ideal tool for each application.

When purchasing high-performance tools from Mikron Tool, customers don't just receive a standard tool, they get a complete service. This includes a machining strategy, cutting parameters, processes, and information on the clamping equipment, cooling, etc. It enables the customer to produce their parts with the highest performance and precision.

OUR STRONG COMPETENCE:

- **Extensive machining knowledge**
  The tool engineers at Mikron Tool are specialists in designing tools and defining operating parameters.

- **Repeated precision in the µm range**
  State-of-the-art production equipment and measuring instruments guarantee tools with a precision of up to +/- .00002" (0.0005 mm). Our clearly defined and monitored manufacturing process allow 100% repeatability.

- **Top performance**
  High machining speed and high process reliability for outstanding results.

- **Materials which are difficult to machine**
  For years, we have been focused on routinely launching new and unique tools for the processing of materials which are traditionally difficult to machine.


MIKRON TOOL
MENU
TOOL FINDER
TOOL FINDER
FIND YOUR TOOL
QUICK FINDER
Search by article code
Search by product family
HOME / TOOL FINDER
TOOL FINDER
Search your product
NEW
Please insert your parameters and find your product.
MM INCH
Machining type
choose
Can't find what you need? Contact us!
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crazy about online tools

MIKRON TOOL ONLINE

Mikron Tool is present online at **www.mikrontool.com** with an homepage.

The focus of the internet page is the customer. The topics are a variety of useful information on the company, its history, the services provided as well as worldwide contacts. Each product has its own detailed description with its characteristics and advantages together with numerous concrete application examples. Naturally all technical data is included.

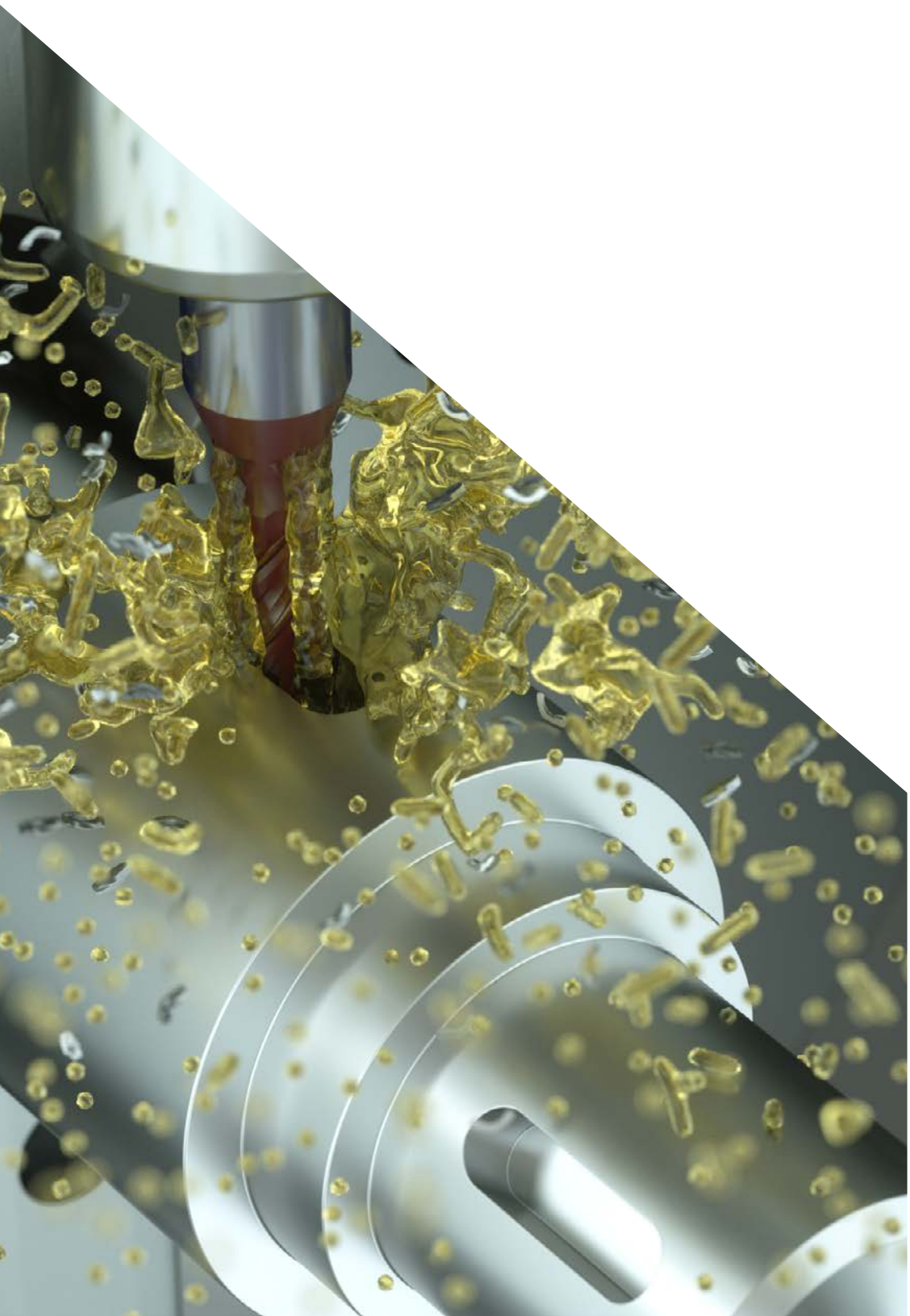
TOOL FINDER:
The simple to operate Tool Finder helps to find the right tool quickly.

Proceed as follows:

- Chose the desired operation (e.g. drilling).
- Enter consecutively the corresponding diameter, service length and material.
- Now the Tool Finder proposes the best suitable tool for the required machining operation. At the same time important data for the machining process and for the ideal peripherals (machines, clamping and lubricating coolant) is provided.

If in spite of the large product offerings no suitable tool from stock is available, Mikron Tool can be reached directly from the Tool Finder in order to obtain a quotation for a customer specific tool.ability for outstanding results.

crazy about new things



TOOL OVERVIEW 14

UPGRADE DIAMETER RANGE 16
Upgrade of some families with smaller and larger diameters

FRACTIONAL INCHES DIAMETER RANGE 16
New nominal diameters in fractional inches for a large range of CrazyDrill and CrazyMill families

CRAZYMILL COOL P&S 18
New 3 flutes end-mill with integrated cooling for plunge and slot milling

CRAZYMILL COOL BALL - Z4 20
New ball 4 flutes end-mill with integrated cooling

CRAZYDRILL HEXALOBE / CRAZYMILL HEXALOBE 22
New combined drill and micro end-mill for drilling, chamfering, milling and deburring your "Torx®" socket

CRAZYMILL COOL SQUARE / CORNER RADIUS - Z4 24
New square and corner radius 4 flute end-mill with integrated cooling

CRAZYDRILL COOL SST-INOX UP TO 40 X D 26
High performance drill up to 40 x d with new cooling technology, geometry, coating

NEW Tool overview

7 NEW PRODUCTS

Products

CRAZYMILL Cool	Plunge&Slot	
CRAZYMILL Cool	Ball - Z4	
CRAZYMILL Cool	Square - Z4	
CRAZYMILL Cool	Corner radius - Z4	
CRAZYMILL Hexalobe	Hexalobe	
CRAZYDRILL Hexalobe		
CRAZYDRILL Cool SST-Inox		

RECOMMENDATION FOR USE

● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

ø - range [mm]	max. depth	Cooling	P Unalloyed and alloyed steel	M Stainless steel	K Cast iron	N Non ferrous metals	S_1 Super alloys	S_2 Titanium (pure and alloyed)	S_3 CrCo alloys	H_1 Hardened steel <55 HRC	H_2 Hardened steel ≥55 HRC	Page
1.0 – 8.0 **.039" – .315"**	2.5 x d 5 x d		●	●	●	●	●	●	●	⊠	⊠	**18**
1.0 – 8.0 **.039" – .315"**	2 x d 3 x d 3.5 x d 4.5 x d 5 x d		●	●	●	●	●	●	●	●	⊠	**20**
1.0 – 8.0 **.039" – .315"**	2 x d 3 x d 4 x d 5 x d		●	●	●	●	●	●	●	⊠	⊠	**24**
1.0 – 8.0 **.039" – .315"**	2 x d 3 x d 4 x d 5 x d		●	●	●	●	●	●	●	⊠	⊠	**24**
0.2 – 1.0 **.008" – .039"** (T4 – T30)	3.5 x d 5 x d		⊠	●	⊠	⊠	⊠	●	⊠	⊠	⊠	**22**
0.9 – 3.8 **.035" – .150"** (T4 – T30)	As required + Chamfer 120°		⊠	●	⊠	⊠	⊠	●	⊠	⊠	⊠	**22**
1.0 – 6.35 **.039" – 1/4"**	6 x d 10 x d 15 x d 20 x d 30 x d 40 x d		⊠	●	⊠	⊠	●	⊠	●	⊠	⊠	**26**

NEW Upgrades and factional inches

5 UPGRADINGS - MANY FRACTIONAL INCHES

Upgrades

CRAZYDRILL Pilot SST-Inox	
CRAZYDRILL Flexpilot STEEL	
CRAZYDRILL SST- Inox	
CRAZYDRILL Flex STEEL	
CRAZYDRILL Flex SST-Inox	

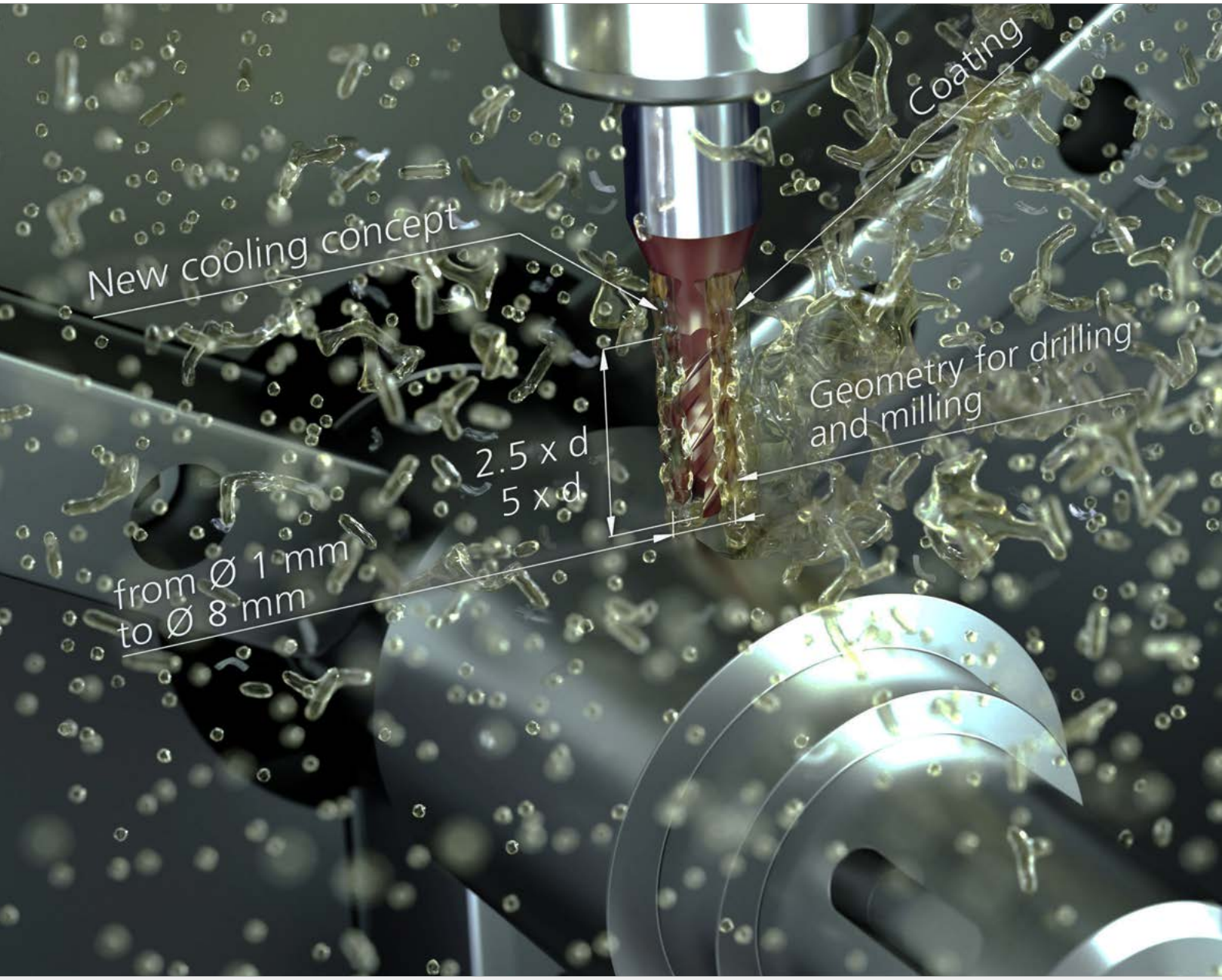
Fractional inches

CrazyMill Cool Square / Corner radius - Z4
CrazyMill Cool Square / Corner radius - Z2
CrazyMill Cool P&S - Z3
CrazyMill Cool Ball - Z4
CrazyMill Cool Ball - Z2
CrazyDrill Cool SST-Inox
CrazyDrill Flex SST-Inox
CrazyDrill Flex Steel - Coated
CrazyDrill Cool XL
CrazyDrill Cool - Coated
CrazyDrill SST-Inox
CrazyDrill Steel
CrazyDrill Coolpilot
CrazyDrill Pilot SST-Inox
CrazyDrill Flexpilot Steel - Coated
CrazyDrill Crosspilot
CrazyDrill Pilot

Version	Current dimensions	New dimensions	Page
-	ø 0.3 mm (**.012"**) - ø 2.0 mm (**.079"**)	ø 0.2 mm (**.008"**) - ø 2.0 mm (**.079"**)	**149**
■ Steel coated	ø 0.2 mm (**.008"**) - ø 1.2 mm (**.047"**)	ø 0.2 mm (**.008"**) - ø 2.0 mm (**.079"**)	**129**
■ Type IK and Type IN	ø 0.3 mm (**.012"**) - ø 2.0 mm (**.079"**)	ø 0.2 mm (**.008"**) - ø 2.0 mm (**.079"**)	**279**
■ 50 x d coated	ø 0.3 mm (**.012"**) - ø 1.2 mm (**.047"**)	ø 0.3 mm (**.012"**) - ø 2.0 mm (**.079"**)	**415**
■ 30 x d	ø 0.3 mm (**.012"**) - ø 1.2 mm (**.047"**)	ø 0.2 mm (**.008"**) - ø 2.0 mm (**.079"**)	**435**
■ 50 x d	ø 0.3 mm (**.012"**) - ø 1.2 mm (**.047"**)	ø 0.3 mm (**.012"**) - ø 2.0 mm (**.079"**)	**441**

1/64"	1/32"	1/16"	3/32"	1/8"	5/32"	3/16"	7/32"	1/4"	Page
		●	●	●	●	●	●	●	**502**
●	●	●	●	●	●	●	●	●	**468**
		●	●	●	●	●	●	●	**549**
		●	●	●	●	●	●	●	**611**
●	●	●	●	●	●	●	●	●	**581**
		●	●	●	●	●	●	●	**370**
●	●	●							**435**
●	●	●							**399**
		●	●	●	●	●	●		**331**
	●	●	●	●	●	●	●		**297**
●	●	●							**279**
●	●	●	●	●	●	●	●	●	**239**
		●	●	●	●	●	●	●	**189**
●	●	●							**149**
●	●	●							**129**
●	●	●	●	●	●	●	●	●	**175**
●	●	●	●	●	●	●	●	●	**161**

NEW CrazyMill Cool P&S



NEW

01

CRAZYMILL Cool

PLUNGE MILL FOR SLOTS AND POCKETS IN MINIMAL SPACES



What's new: CrazyMill Cool P&S is a new 3-flute milling cutter from Mikron Tool, specially developed for the rough and finish milling of many materials, with emphasis on stainless steels, titanium, super alloys and CrCo alloys. With the capacity to plunge perpendicular into the material, this tool is well adapted for the milling of slots, pockets and sides in minimal spaces. An example of these application is the keyway that can be found in transmission shafts.

The features: A special cutting edge geometry provides a stable and vibration-free "Drilling" (perpendicular plunging). A correction in the center stabilizes the web (no breakout), reduces penetration force and helps increase tool life. Due to the specially designed chip space in the head of the tool, chips are evacuated into the flutes when plunging. The design of the flutes creates enough space for perfect chip evacuation and simultaneously guarantees robust stability for the lateral milling process.

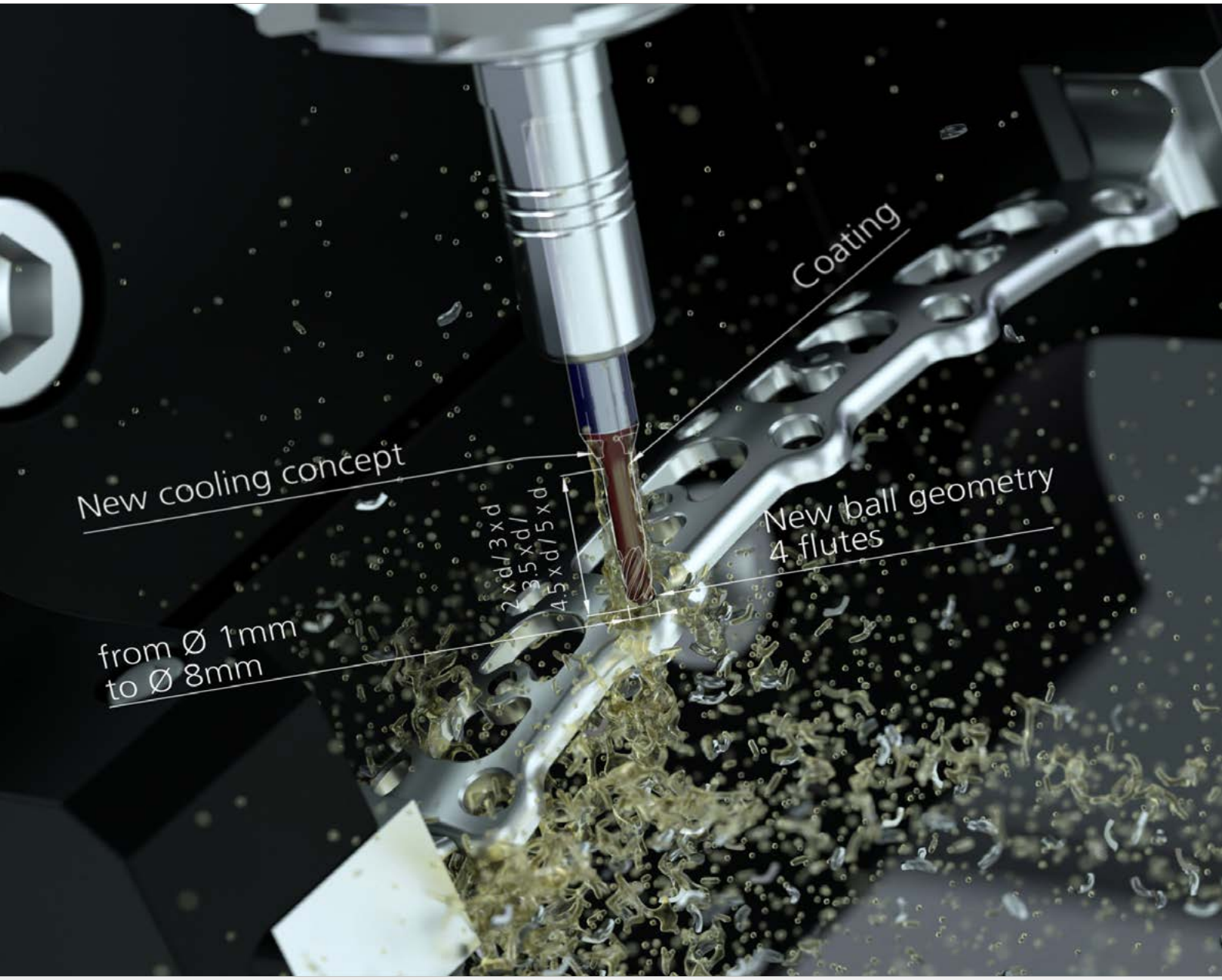
In the shank, integrated ducts provide a constant and massive coolant flow instrumental for an efficient chip evacuation from the milling area. This concept is ideally suited to machine groves, slots and pockets since chips are flushed out even from tight and angled spaces. The surface quality improves significantly and reaches finishing quality when milling into solid material. Moreover, the cooling prevents an over-heating of the cutting edges and thus guarantee long tool life and significantly higher chip removal rates compared to conventional milling.

The CrazyMill Cool P&S impresses with its speed, output, performance as well as the high tool life and surface quality.

Diameter range: .039" to .315" (1 mm to 8 mm)
Milling depth: Type A – 2.5 x d, type C – 5 x d
Coating: eXedur SNP
Number of flutes: 3

For product details see page 540

NEW CrazyMill Cool Ball - Z4



NEW

01

CRAZYMILL Cool

A FINISHING MILL FOR DIFFICULT TO MACHINE MATERIALS



What's new: CrazyMill Cool Ball with 4-flute is an innovative end mill, developed by Mikron Tool, for finishing operations in stainless steels, titanium alloys, CrCo and super alloys. In the shank integrated coolant ducts guarantee a constant and massive cooling of the cutting edges. This technology allows to reach highest cutting speeds and provides high chip removal rates.

The features: The new cutting edge geometry is specially designed to reduce vibrations and improve process time and surface quality during the milling operation.

With progressive flutes in the versions M (3.5 x d) and N (4.5 x d) these characteristics are once more significantly increased. The cutting length of these two versions is extended in order to allow machining on the radius as well as the cylindrical section of the tool. The outcome is a very versatile milling cutter.

The new high performance coating, which is specially suitable for finishing operations, improves tool life and milling performance.

The end mill sets new benchmarks compared to conventional milling tools regarding copy and side milling with its high cutting speed and cutting depth a_p, increased tool life and improved surface quality.

Diameter range: .039" to .315" (1 mm to 8 mm)
Milling depth: Type A – 2 x d; Type B – 3 x d; Type C – 5 x d; Type M – 3.5 x d; Type N – 4.5 x d
Coating: eXedur SNP
Number of flutes: 4

For product details see page 604

NEW CrazyDrill Hexalobe / CrazyMill Hexalobe



NEW

01

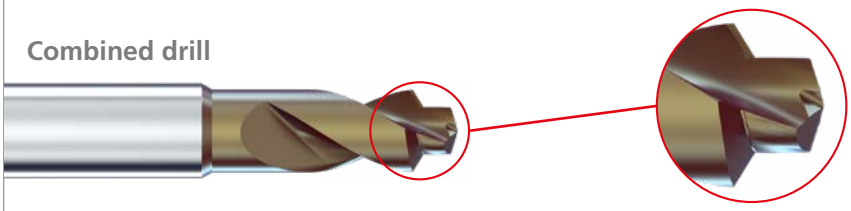
THE NEW CONCEPT FOR MACHINING YOUR "TORX®" SOCKET

New concept

- Drilling - Chamfering - Milling - Deburring: Four operations in three steps with two tools.
- High efficient machining in shorter time for titanium and stainless steel.

CRAZYDRILL Hexalobe

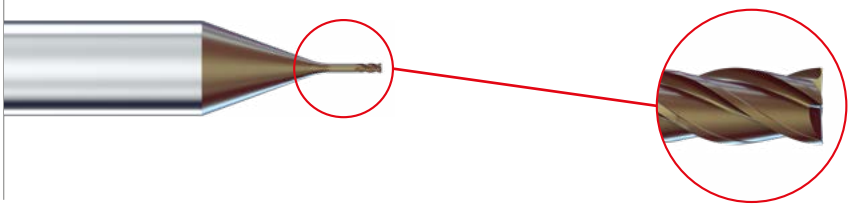
Combined drill



Drilling and chamfering in one step

CRAZYMILL Hexalobe

Micro endmill



Micro endmill with special micro-grain carbide for high stiffness and edge chipping resistence

Performance features

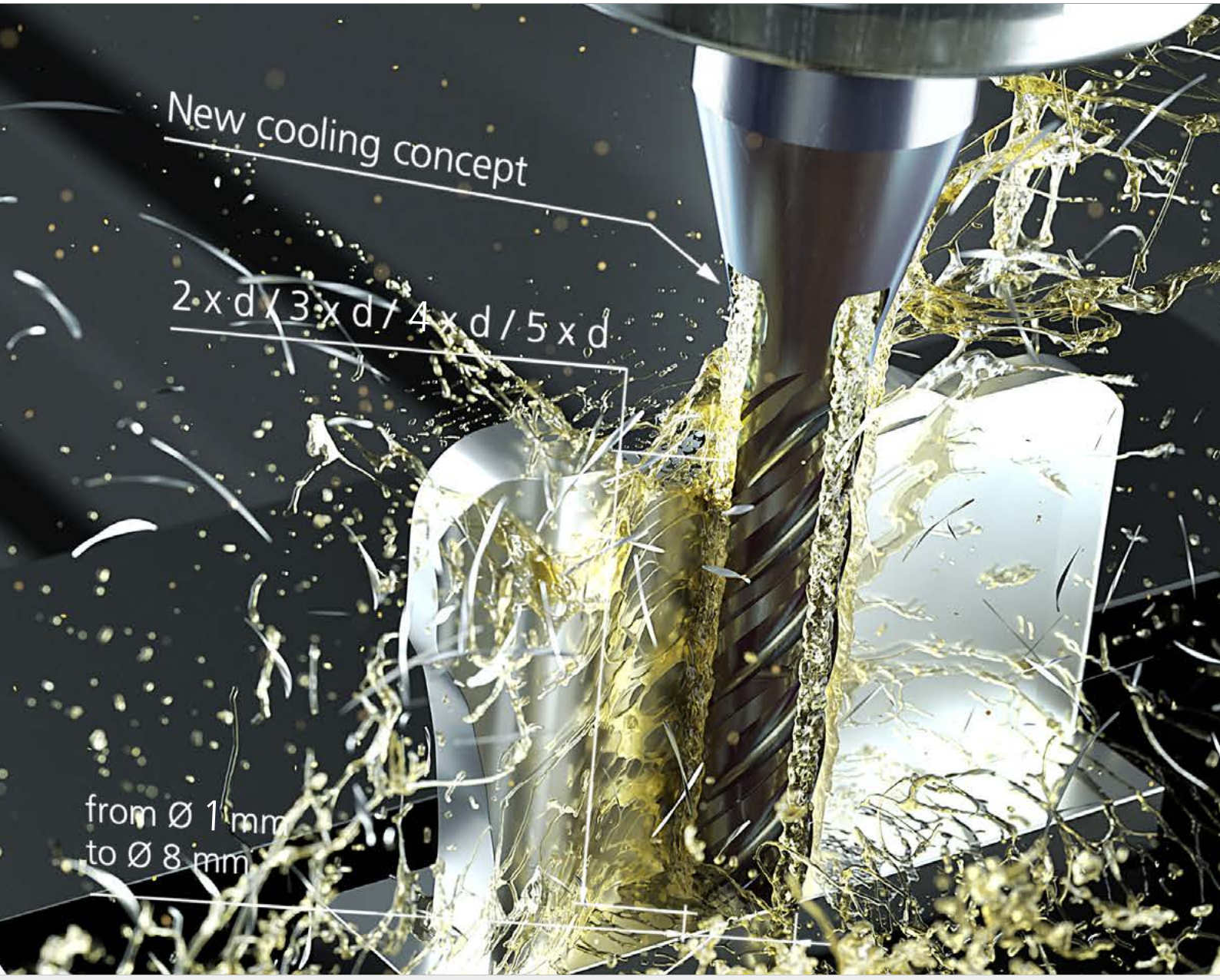
- Highest stiffness
- New cutting geometry

Your advantages

- Shorter milling process
- Highest profile precision
- Excellent surface quality
- Minimal burr

For product details see page 196 / 528

NEW CrazyMill Cool Square / Corner radius - Z4



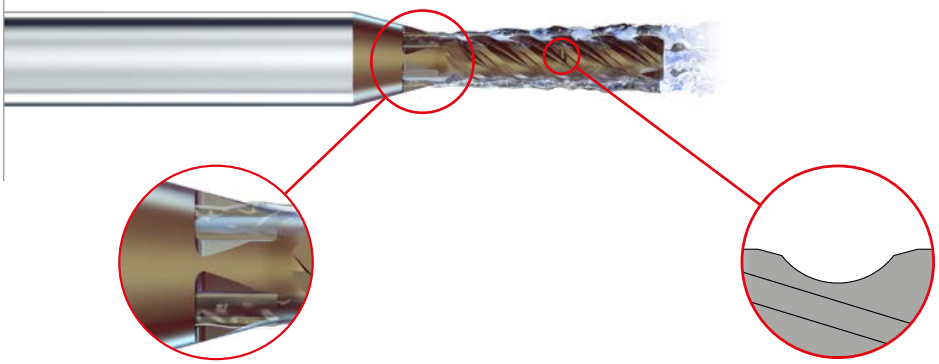
NEW

01

CRAZYMILL Cool

MILLING TOOL FOR PRE-MACHINING AND FINISHING DIFFICULT MATERIALS

CrazyMill Cool Square / Corner radius with four flutes is an innovative end mill, developed by Mikron Tool, for machining stainless steels, titanium alloys, CrCo and super alloys.
It is available in the diameter range from 1 mm to 8 mm and a maximal milling depth of 5 x d.



Integrated cooling
Constant and massive cooling of the cutting edges

New chip-splitting concept
Optimized to guarantee short chips and a perfect evacuation

Performance features

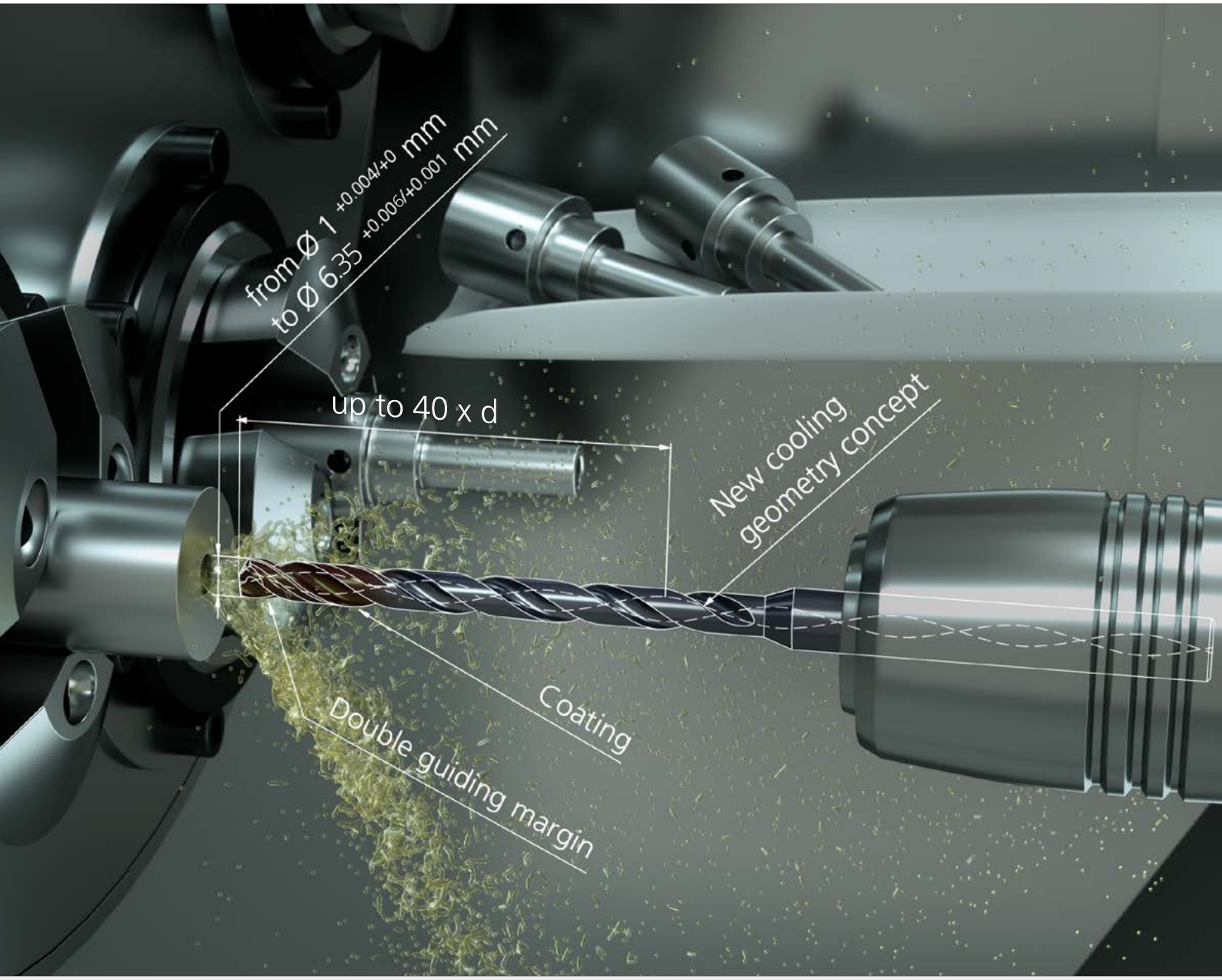
- Highest speed and feed
- Integrated cooling
- Pre-machining and finishing with one tool
- New chip-splitting concept

Your advantages

- Time and cost saving
- Excellent surface quality
- Reliable process
- Perfect chip control

For product details see page 490

NEW CrazyDrill Cool SST-Inox



NEW

01

CRAZYDRILL Cool SST-Inox

DEEP HOLE DRILLING OF STAINLESS STEEL & CO. IN ONE STEP



What's new: CrazyDrill Cool SST-Inox is now also available for drilling depths of 15 x d, 20 x d, 30 x d and 40 x d. This drill has been specifically developed for rustproof, acid- and heat resistant steels as well as CrCo alloys. Previously unreached performance is now possible based on a new cutting edge geometry and a new coolant duct shape, which provide massive cooling of the cutting edges. The new high performance coating is wear resistant and assures continuous chip evacuation.

The features: The bore up to a maximum depth of 40 x d is performed in a single feed stroke. Thanks to the new cutting edge geometry and the flute profile optimal chip breaking and chip evacuation are guaranteed.

The newly conceived helical, drop shaped coolant ducts deliver the highest coolant effect (one to four times larger coolant quantity reaches the tip of the tool, compared to round shaped ducts). Hence better feed, speed and tool life are guaranteed.

Diameter range: .039" to 1/4" (1 mm to 6.35 mm)
Drilling depth: 6 x d, 10 x d, 15 x d, 20 x d, 30 x d and 40 x d
Coating: eXedur SNP

For product details see page 358

crazy about competence



TECHNICAL SUPPORT & TECHNOLOGY CENTER

02

TECHNICAL SUPPORT 30
At Mikron Tool included in the sales process is also comprehensive technical support

COMPREHENSIVE ENGINEERING 32
From the machining strategy of a work-piece to the perfect application of the tools. Mikron Tool delivers the best solution for the customer

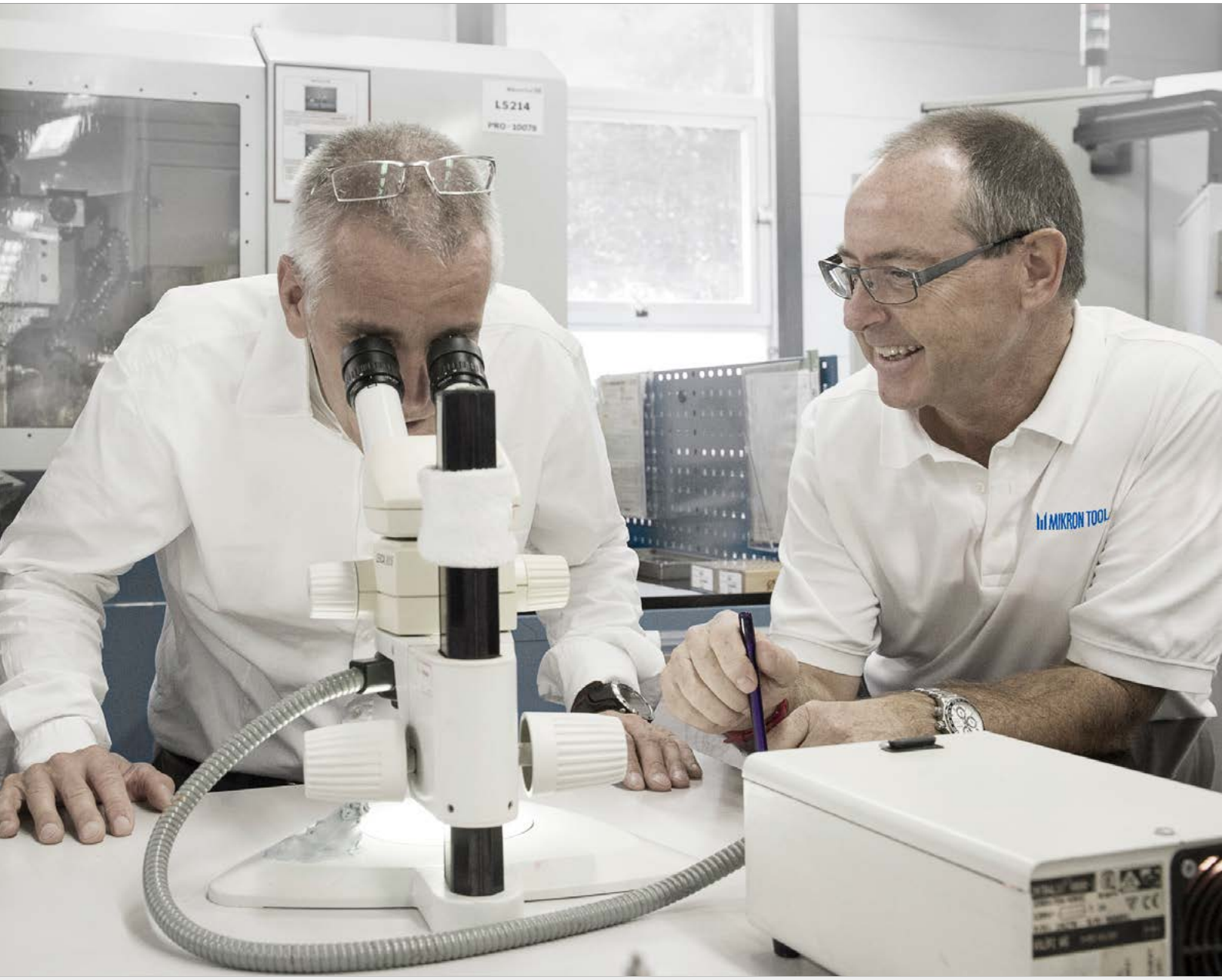
WHERE THE FUTURE IS HAPPENING TODAY 34
From in-house testing to customer specific solutions

DEVELOPMENTS 36
Where the future is created

TOOL TRIALS AND PROJECTS 38
More than just a tool, a complete solution

TRAINING 40
Investment for the future

Technical support



MORE THAN JUST A TOOL CATALOG

Many questions... competent advices

Our experience shows that a customer is only satisfied when he has not just bought a good tool, but when the bottom-line is correct: included must be a good price-performance ratio together with professional and competent advice when buying the tool and the local support when tooling up the machine.

Good advice starts with questions, for instance:

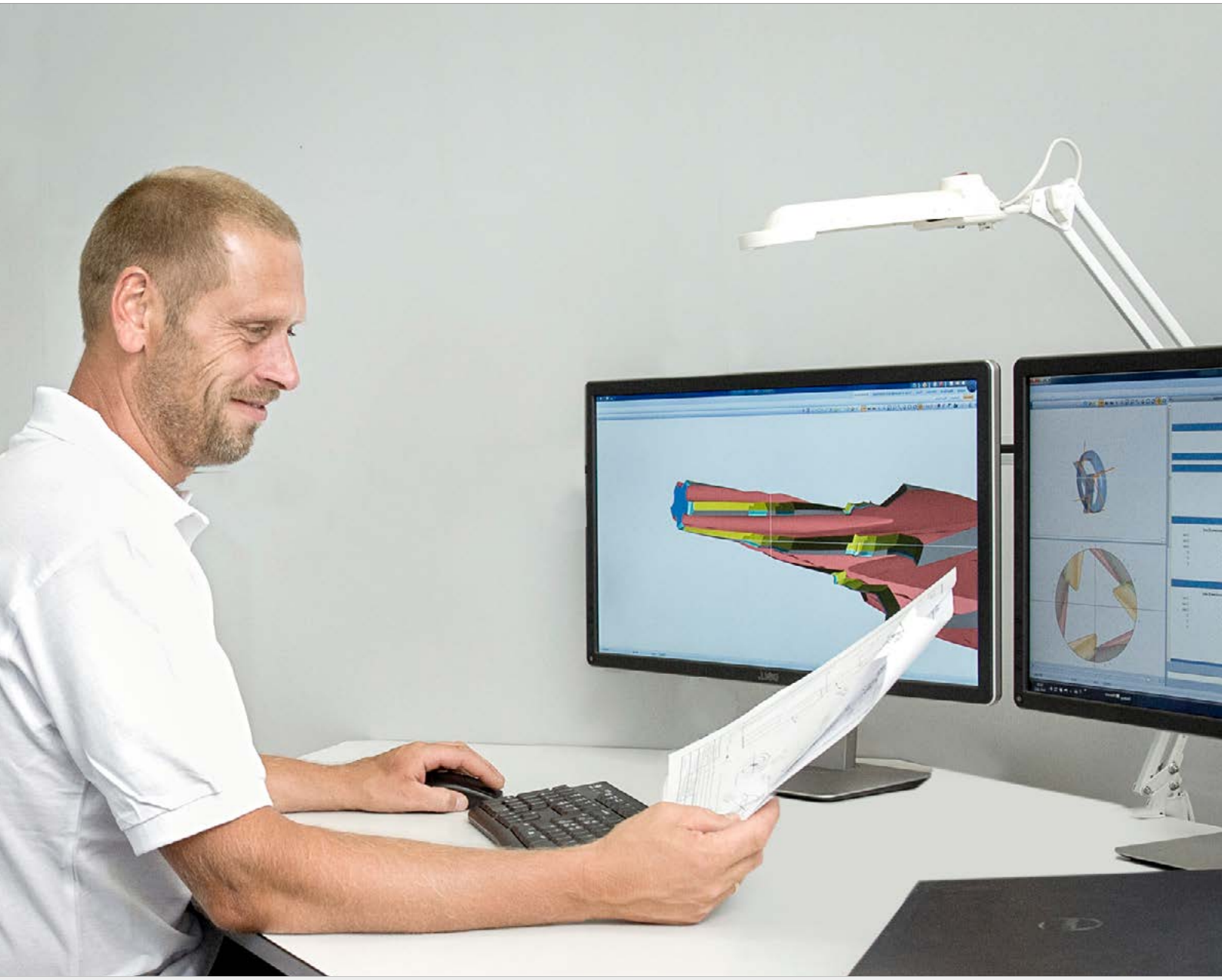
- Which kind of material are you machining?
- Which coolant are you using?
- Which is the maximum spindle speed on your machine?

Then there are also questions regarding the desired or requested results:

- Which is the tolerance range of the bore?
- Which is the quantity of parts to be machined?

Competent advice is in demand and exactly here is the strength of the tool specialists at Mikron Tool. They have comprehensive knowledge on chip removal technology and a solid education in the use of their "crazy" tools on the most diverse machine tools like CNC Machining Centers, single- and multispindle automatic lathes or Transfer Machines. They are familiar with the necessary requirements regarding type of coolant, coolant pressure, fixturing and spindles and are thus qualified to create the best conditions to achieve an optimal result.

Comprehensive engineering



THE PARTNER FOR GREAT PROJECTS

From the project to the finished tool

The first contact with the customer happens often when he presents a work-piece which he wants to produce on his machine. At this point starts the challenge for Mikron Tool. Now is the moment to profit from the know-how of the specialist.

Each Sales Engineer understands the needs of the customer. He is able to pair the processes with the right tools, to apply them to the machine and to define the optimal cutting parameters. He is very familiar with carbides and coatings, with tool geometries and chips, he has experience with the most diverse materials to be machined.

Competence at the service of machine builders

Since decades Mikron Tool works in cooperation with Machine Tool builders, whenever top competence in all chip removal technologies is in demand.

Pre requisites for a high production process quality and profitability when producing precision components are optimal tools, which are perfectly attuned to the machining systems used. Factors like cycle time, maximum number of tools used, tolerance requirements, desired production output per days or week play all an important role. What Mikron Tool has to offer to machine builders goes from trials of different chip removal options to complete tooling layouts for a component production.

Your advantage: you profit from many years of experience in the segment of machine equipment plus from a large variety of innovative chip removal solutions.

Where the future is happening today



FROM IN-HOUSE TESTING TO THE CUSTOMERS SOLUTION

What began more than 10 years ago with a test machine for new developments is now a proud division of Mikron Tool and significant contributor to the success of the CrazyDrill, "the world's craziest small drill."

A team of 7 people, 4 engineers and 3 precision machinining specialists, are dedicated exclusively to technologically challenging projects.

- New products are developed here, new materials are tested here, and optimal cutting parameters are determined here.
- The customers are provided with important information how to optimize tool usage.
- Feasibility studies are performed and entire projects are developed on behalf of the customer.

Moreover, the center serves as a platform for internal and external training. Employees, sales partners and customers are provided with the technical expertise required to optimally use our products.

Developments



WHERE THE FUTURE IS CREATED

All of the new Mikron Tool products are developed at the Technology Center in Agno / Switzerland. It goes without saying that even crazy ideas are sometimes presented to us here.

Nothing is left to chance before a new tool hits the market. New geometries, new materials, and new coatings are tested in real application scenarios. It is not until the tools are considered outstanding and unique by our development engineers that they are given the "CrazyTool" name.

All of the parameters specified in the cutting-data tables result from practical tests. Based on real trials with the actual tool dimensions. This data guarantees optimal use with the corresponding materials.

The continuous optimization of the existing product line is one of the tasks of the development team. New discoveries in machining, new coatings, and new carbides grades are incorporated in product improvements to ensure that every Mikron Tool product is still up-to-date even years after its launch on the market.

Tool trials and projects



MORE THAN JUST A TOOL FOR THE CUSTOMER

Testing new carbide drills before going into commercial production or redefining the parameters in order to reduce the cycle times, extend the tool life, and find the right tool for new materials. Manufacturing plants rarely have free capacities on their machines for tool testing.

Mikron Tool actively supports customers in improving their production by offering trials and result analysis with customized tools. We are always seeking the best solution for optimal production, adapted to the customer's own manufacturing conditions. On request, customers also receive test reports and videos to assist in deciding on how to use these tools.

"Turnkey" pilot projects

State of the art machinery enables Mikron Tool to implement ground-breaking pilot projects with the customer.

This can include the test production of a workpiece to be newly manufactured before the customer begins commercial production. Mikron Tool supplies a first series of finished parts in limited quantity accompanied by a corresponding quality analysis.

Mikron Tool supports the customer with turnkey solutions, even for particularly extensive new projects. A complete package: from the feasibility study to the right processes with the suitable tools and optimal cutting parameters all the way up to the processing times and costs with a final quality analysis.

Training



INVEST IN THE FUTURE

An important task of the Technology Centers is the training of employees, sales partners, and customers. Internal and external courses on the most diverse topics are held here in specially equipped rooms.

On one hand, we provide technical training for sales partners. They are trained by Mikron Tool on technical solutions with the goal of ultimately being able to expertly advise our customers.

Another important function is the advanced training of our own employees. They must be able to provide technical advice to our customers at all times, and not only on the topic of tools. They must master all of the aspects of successful processing: Cooling, lubricants, tool holders, materials, etc.

This exchange of new technical possibilities and new knowledge is a tremendous gain for all participants.

Tool demonstrations in practical applications at the CNC machining centers are an integral component of every training course. This allows the theory learned to be immediately put into practice. What is more effective than seeing a tool in actual use with the ideal cutting parameters? What is more impressive than directly experiencing the limits of feasibility and thus see the broken tip of a drill fly into the air along with the chips?

crazy about medical applications



03

MEDICAL TECHNOLOGY AND ITS APPLICATIONS	**44**
ORTHO – PROTHESIS	46
BONE SCREWS	48
SURGICAL INSTRUMENTS	50
DENTAL	54

Medical technology and its applications



IN MEDICAL TECHNOLOGY ARE QUALITY AND PRECISION A VITAL FACTOR

Material

Regarding the material used in medical tecnology some features are important: purity, durability and biocompatibility. For this reason mainly stainless steels, titanium or chrome-cobalt alloys are used in this field, each with its own features.

Mikron Tool is familiar with difficult-to-machine materials, because we have been developing tools for many years for machining these materials (see also Chapter 13: Inox & Co.).

Requirements

When machining medical parts, special care must be taken to ensure burr-free, high surface quality and precision on machining.

Due the complexity to change the process and production condictions as well as the high requirements for a certification in medical field, the producion of a new parts requires from the beginning the best process with the right tools.

Mikron Tool not only offers the right tools, but also the technical know-how for an optimal solution.
In addition, we can define the optimal tools, develop prototypes, test and prove new processes in our technology center.

Segments

Where are tools of Mikron Tool used? More or less everywhere where machining takes place, be it from a machine center, a Swiss-type automatic lathes or based on 3D printing; be it for single part, for small or large series or for mass production.

Some of our experiences so far:

- **Ortho - Prothesis:** Bone plates for various parts of the body, hip and shoulder implants, bone screws.
- **Surgical instruments:** Surgical needles, catheters, phaco tips, endoscopes, arthroscopy devices.
- **Dental:** Dental implants, crowns, bridges

Ortho - Prothesis

Shoulder base plate



Operations

Milling, drilling and chamfering

Material

Stainless steel

Tools

CrazyMill Cool P&S - Z3



CrazyMill Cool Square / Corner radius - Z4



CrazyDrill Pilot SST-Inox



Customized multifunctional tool



Advantages

- Minimal cutting forces hence less vibrations, improved accuracy and stability.
- Perfect chip control thanks to the milling strategy.
- Burr-free part.

Bone plate



Operations

Milling, drilling, deburring and threading

Material

Titanium

Tools

CrazyMill Cool Ball - Z4



CrazyMill Cool Square / Corner radius - Z2



CrazyMill Cool Ball - Z2



CrazyMill Cool P&S - Z3





CrazyDrill Crosspilot



CrazyDrill Flexpilot Titanium



CrazyDrill customized for titanium



Customized threadig tool



Advantages

- Excellent surface quality.
- Reduction of the cycle time due the improvements in the machining strategy and the performance of tools.

Bone screws

THE NEW CONCEPT FOR MACHINING YOUR "TORX®" SOCKET



Hexalobular sockets



Operations

Drilling, Chamfering, Milling and Deburring

Material

Stainless steel, Titanium

Tools

CrazyDrill Hexalobe



CrazyMill Hexalobe



Advantages

- Shorter milling process
- Highest profile precision
- Excellent surface quality
- Minimal burr

For product details see page 196 / 528

Surgical instruments

Hemostatic clamp



Operations

Milling and deburring

Material

Stainless steel

Tools

CrazyMill Cool P&S - Z3



CrazyMill Cool Square / Corner radius - Z4



CrazyMill Cool Ball - Z4



CrazyMill Radiuschamfer



Advantages

- Excellent surface quality
- Reduction of the cycle time
- Burr-free part

Phaco tip



Operations

Milling, short drilling and deep hole drilling

Material

Titanium

Tools

CrazyMill Cool Square / Corner radius - Z4



CrazyMill Cool Ball - Z4



CrazyDrill Crosspilot



CrazyDrill Flexpilot Titanium



CrazyDrill Flex Titanium

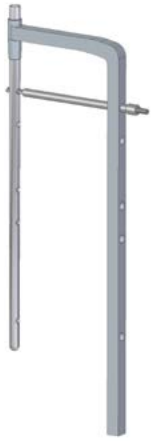


Advantages

- Deep hole drilling in small diameters
- Excellent straightness of the hole
- Reduction of the cycle time

Surgical instruments

Nailing system



Operation

Deep hole drilling

Material

Stainless steel

Tools

CrazyDrill Coolpilot



CrazyDrill Cool SST-Inox



Advantages

- High surface quality Rz = 118µin (3µm)
- Small chips dimension with perfect evacuation on lathe
- Higher performance compared to conventional deep hole drills

Endoscopic forceps



Operations

Drilling and milling

Material

Stainless steel

Tool

CrazyMill Cool P&S - Z3

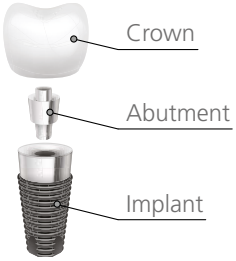


Advantages

- Excellent surface quality
- Reduction of the cycle time due the performance of tool

Dental

Abutment



Operations

Drilling and deburring

Material

Stainless steel, Titanium, Cobalt-Chrome

Tools

CrazyDrill customized for drilling



CrazyMill customized for deburring



Advantages

- Excellent surface quality
- Burr-free part

Crown



Operations

Milling: Roughing and finishing

Material

Stainless steel, Titanium, Cobalt-Chrome

Tools

CrazyMill Cool Corner radius - Z4



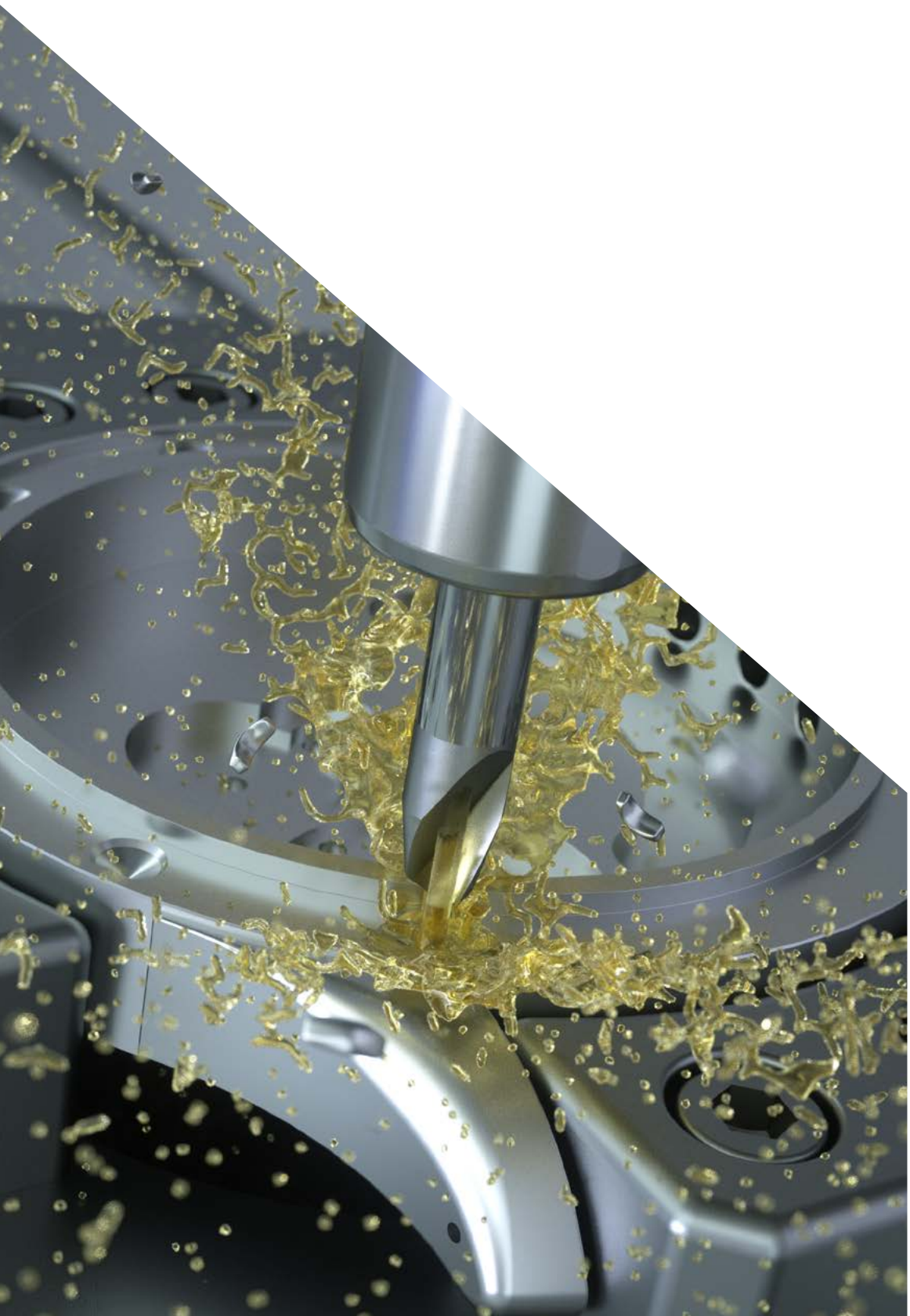
CrazyMill Cool Ball - Z4



Advantages

- Excellent surface quality
- Reduction of the cycle time due the performance of tool

crazy about centering



CENTERING TOOLS

04

OVERVIEW **58**

CODIFICATION KEY 60

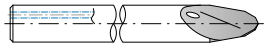
MIQUDRILL CENTRO 62
Ø 0.5 mm - 6.0 mm | **.020" – .236"**

CRAZYDRILL TWICENTER 78
Ø 0.3 mm - 10.0 mm | **.012" – .394"**

CUSTOMIZED CENTER DRILLS 96

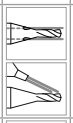
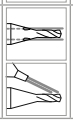
Overview

CUTTING TOOL SOLUTIONS

MIQUDRILL by Mikron Tool Centro	
CRAZYDRILL by Mikron Tool Twicenter	
Customized center drills	

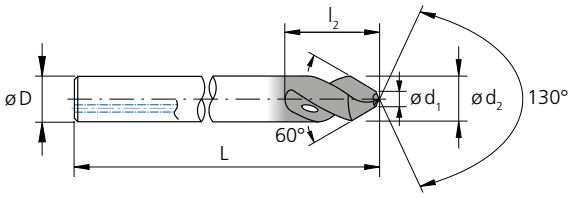
RECOMMENDATION FOR USE

● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

ø - range [mm] | [inch]	max. depth	Cooling	P Unalloyed and alloyed steel	M Stainless steel	K Cast iron	N Non ferrous metals	S_1 Super alloys	S_2 Titanium (pure and alloyed)	S_3 CrCo alloys	H_1 Hardened steel <55 HRC	H_2 Hardened steel ≥55 HRC	Page
0.5 – 6.0 **.020" – .236"**	–		◐	○	◐	◐	⊠	◐	⊠	◐	⊠	**62**
0.3 – 10.0 **.012" – .394"**	–		●	●	●	●	●	●	●	●	⊠	**78**
0.1 – 32.0 **.004" – 1.26"**	–		●	●	●	●	●	●	●	●	●	**96**

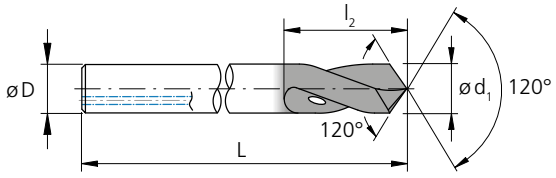
Codification key

ITEM NUMBER EASY TO UNDERSTAND



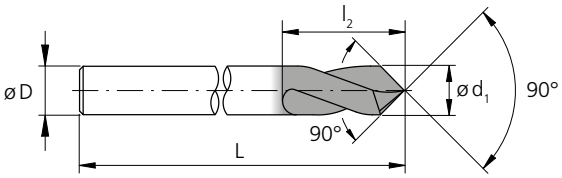
2.CC.60100.60

- **Division number**
  - 2 = Mikron Tool SA Agno
- **Family**
  - CrazyDrill Twicenter
- **Cutting diameter d_1**
  - 60 = Ø 6 mm (.236")
- **Second diameter d_2**
  - 100 = Ø 10 mm (.394")
- **Chamfer angle**
  - 60 = 60°
  - 90 = 90°



2.CC.00400.120

- **Division number**
  - 2 = Mikron Tool SA Agno
- **Family**
  - CrazyDrill Twicenter
- **Cutting diameter d_1**
  - 00400 = Ø 4 mm (.157")
- **Chamfer angle**
  - 120 = 120°



2.MC.090300.1

Division number
- 2 = Mikron Tool SA Agno

Family
- MiquDrill Centro

Tip angle
- 090 = 90°
- 120 = 120°

Cutting diameter d_1
- 300 = Ø 3 mm (.118")

Coating
- 1 = Coated
- 0 = Uncoated

MiquDrill Centro



MIQUDRILL Centro

TO START IN THE RIGHT POSITION



Centering and simultaneously creating a 90° or 120° chamfer, this is the challenge of MiquDrill Centro. The centering drill is available in the diameter range of .020" to .236" (0.5 mm to 6.0 mm) (for drilling diameters from .004" (0.1 mm)) and in a coated and uncoated version.

This centering drill is the perfect solution for the production of small and medium batch sizes with process accuracy and highest quality. It centers perfectly even for the smallest drilling diameters from .004" (0.1 mm) and guarantees highest position accuracy for the follow-up drill, e.g. MiquDrill 200 / 210. MiquDrill Centro is universally applicable for steels (alloyed and unalloyed), cast iron, nonferrous metals and in the coated version also for hardened steel < 55 HRC.

MIQUDRILL by Mikron Tool Centro

Accurate and quick centering

FOR A PRECISELY POSITIONED FOLLOW-UP HOLE

Centering and simultaneously creating a 90° or 120° chamfer, this is the challenge of MiquDrill Centro. The centering drill is available in the diameter range of .020" to .236" (0.5 mm to 6.0 mm) (for drilling diameters from .004" (0.1 mm)) and in a coated and uncoated version.

- MiquDrill Centro with tip angle and chamfer of 90°, coated or uncoated
- MiquDrill Centro with tip angle and chamfer of 120°, coated or uncoated

Uncoated

- Chamfer 90° or 120°
- External cooling



Page 73

Coated

- Chamfer 90° or 120°
- External cooling



Page 69

1 | SOLID CARBIDE
The use of a newest generation's solid carbide allows high machining feeds. For example, in spite of similar feed rates as HSS drills, due to its higher cutting speed, drilling with MiquDrill is considerably faster.

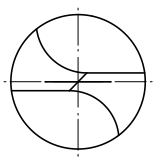
2 | SHAFT
The accurately ground shaft guarantees high concentricity and therefore highest position accuracy.

3 | COATING
The coated version of the drill is also adapted for difficult-to-machine materials and hardened steels < 55 HRC and reaches even a better tool life.

4 | TIP ANGLE
Optionally with 90° or 120° tip angle for drilling and simultaneously creating a correspondent chamfer.

5 | POSITION ACCURACY
Accurate centering for highest position accuracy of the follow-up hole in smallest diameter ranges (from .004" (0.1 mm)).

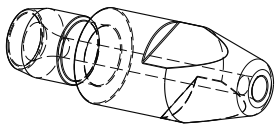
Tip drill



Benefits and applications

FITS EVERY APPLICATION

- **HIGH DEGREE OF PROCESS RELIABILITY** | due to higher quality
- **HIGH DEGREE OF PRECISION** | due to small tolerances
- **LOW PRODUCTION COSTS** | due to the low cost of tool



COMPONENT
Welding nozzle

MATERIAL
CuZn39Pb3 / 2.0401 / UNS 38500

MACHINING
- Centering and chamfering 120°
- d = 2.5 mm **| .098"**

DRILLING TOOL
Mikron Tool - MiquDrill Centro - coated

DATA	MIKRON TOOL
Tool type	MiquDrill Centro - Carbide - Coated - External cooling
Item number	2.MC.120300.1
Cutting data	v_c = 50 m/min **| 164 SFM** f = 0.08 mm/rev **| .0032 IPR**




APPLICATION DOMAINS	COMPONENTS EXAMPLES
Automotive industry	Components for gasoline direct injection
Mechanical engineering	Particle of engine Cylinder

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S2 Titanium (pure and alloyed)	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

MiquDrill Centro 90° / 120° - coated

CENTER WITH EXTERNAL COOLING



90° / 120°

The coated version of MiquDrill Centro is universally applicable for steels (alloyed and unalloyed), hardened steel < 55 HRC), cast iron, nonferrous metals (e.g. aluminum with high silicon content). In the diameter range with max. chamfer diameter of .020" to .236" (0.5 mm to 6.0 mm), the drill is applicable follow-up drilling starting at .004" (0.1 mm). Simultaneously a chamfer of 90° / 120° is created.

Its strengths: Centering / Chamfering 90° / 120° in one step. Compared to "MiquDrill Centro uncoated" this drill is the solution for higher demand on tool life. As centering drill for MiquDrill 200 / 210 it guarantees high position accuracy.

Coolant type, pressure and filtration

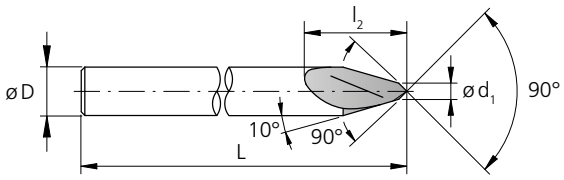
Recommendations for coolant type, pressure and filtration are on page "centering process".

Please note

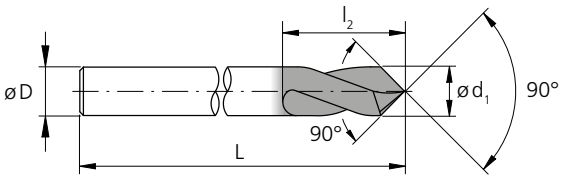
You couldn't find your suitable version of the MiquDrill Centro 90° / 120° - coated (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

90°



Execution: d_1 = .020" and .039" (0.5 and 1.0 mm)

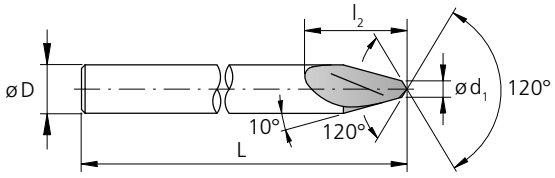


Execution: d_1 = .079" to .236" (2.0 to 6.0 mm)

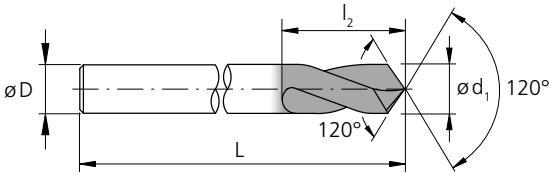
d_1 [inch]	d_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer	Item number	Availability
.020	0.5	4.5	2	**1.18**	30	90°	2.MC.090050.1	■
.039	1.0	4.5	2	**1.18**	30	90°	2.MC.090100.1	■
.079	2.0	6.0	2	**1.18**	30	90°	2.MC.090200.1	■
.118	3.0	8.0	3	**1.57**	40	90°	2.MC.090300.1	■
.157	4.0	10.0	4	**1.77**	45	90°	2.MC.090400.1	■
.197	5.0	12.0	5	**1.97**	50	90°	2.MC.090500.1	■
.236	6.0	15.0	6	**2.36**	60	90°	2.MC.090600.1	■

■ Stock item, packing unit of 3 pcs.

120°



Execution: d_1 = .020" and .039" (0.5 and 1.0 mm)



Execution: d_1 = .079" to .236" (2.0 to 6.0 mm)

d_1 [inch]	d_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer	Item number	Availability
.020	0.5	4.5	2	**1.18**	30	120°	2.MC.120050.1	■
.039	1.0	4.5	2	**1.18**	30	120°	2.MC.120100.1	■
.079	2.0	6.0	2	**1.18**	30	120°	2.MC.120200.1	■
.118	3.0	8.0	3	**1.57**	40	120°	2.MC.120300.1	■
.157	4.0	10.0	4	**1.77**	45	120°	2.MC.120400.1	■
.197	5.0	12.0	5	**1.97**	50	120°	2.MC.120500.1	■
.236	6.0	15.0	6	**2.36**	60	120°	2.MC.120600.1	■

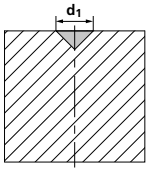
■ Stock item, packing unit of 3 pcs.

MIQUDRILL by Mikron Tool Centro

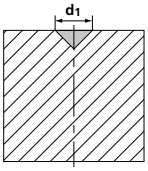
MiquDrill Centro 90° / 120° - coated

CENTERING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





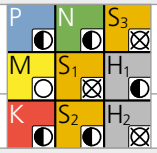
90°



120°

Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	20 – 80 | **66 – 262**
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	20 – 80 | **66 – 262**
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	20 – 60 | **66 – 197**
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	20 – 80 | **66 – 262**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	20 – 60 | **66 – 197**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	20 – 50 | **66 – 164**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	20 – 80 | **66 – 262**
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	50 – 100 | **164 – 328**
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	50 – 100 | **164 – 328**
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	50 – 100 | **164 – 328**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	50 – 100 | **164 – 328**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	50 – 100 | **164 – 328**
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	50 – 100 | **164 – 328**
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	20 – 50 | **66 – 164**
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20 – 50 | **66 – 164**
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	20 – 50 | **66 – 164**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] **| [IPR]**

Ød1							
0.5 mm **| .020"**	1.0 mm **| .039"**	2.0 mm **| .079"**	3.0 mm **| .118"**	4.0 mm **| .158"**	5.0 mm **| .197"**	6.0 mm **| .236"**
f	**f**	**f**	**f**	**f**	**f**	**f**
0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.120 **| .0047**	0.130 **| .0051**
0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.120 **| .0047**	0.130 **| .0051**
0.020 **| .0008**	0.030 **| .0012**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.080 **| .0031**
0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
0.020 **| .0008**	0.030 **| .0012**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.080 **| .0031**
0.020 **| .0008**	0.030 **| .0012**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.080 **| .0031**
0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.120 **| .0047**

MiquDrill Centro 90° / 120° - uncoated

CENTERING WITH EXTERNAL COOLING



90° / 120°

The uncoated version of MiquDrill Centro is universally applicable for steels (alloyed and unalloyed), cast iron, nonferrous metals (e.g. copper, brass). In the diameter range with max. chamfer diameter of .020" to .236" (0.5 mm to 6.0 mm), the drill is applicable for follow-up drilling starting at .004" (0.1 mm). Simultaneously a chamfer of 90° / 120° is created.

Its strengths: Cost-efficient centering / chamfering 90° / 120° in one step. As centering drill for MiquDrill 200 / 210 it guarantees high position accuracy.

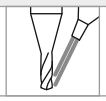
Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "centering process".

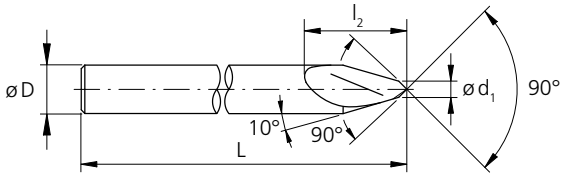
Please note

You couldn't find your suitable version of the MiquDrill Centro 90° / 120° - uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

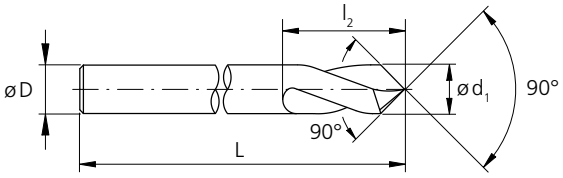
Regrinding: This product is not suitable for regrinding.

Carbide | Z2 |  | Uncoated

90°



Execution: d_1 = .020" and .039" (0.5 and 1.0 mm)

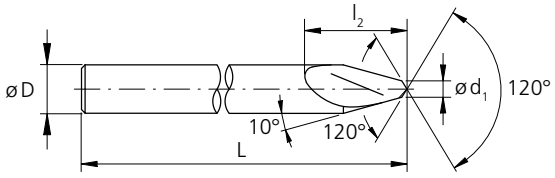


Execution: d_1 = .079" to .236" (2.0 to 6.0 mm)

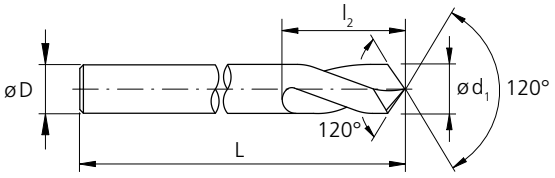
d_1 [inch]	d_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer	Item number	Availability
.020	0.5	4.5	2	**1.18**	30	90°	2.MC.090050.0	■
.039	1.0	4.5	2	**1.18**	30	90°	2.MC.090100.0	■
.079	2.0	6.0	2	**1.18**	30	90°	2.MC.090200.0	■
.118	3.0	8.0	3	**1.57**	40	90°	2.MC.090300.0	■
.157	4.0	10.0	4	**1.77**	45	90°	2.MC.090400.0	■
.197	5.0	12.0	5	**1.97**	50	90°	2.MC.090500.0	■
.236	6.0	15.0	6	**2.36**	60	90°	2.MC.090600.0	■

■ Stock item, packing unit of 3 pcs.

120°



Execution: d_1 = .020" and .039" (0.5 and 1.0 mm)



Execution: d_1 = .079" to .236" (2.0 to 6.0 mm)

d_1 [inch]	d_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer	Item number	Availability
.020	0.5	4.5	2	**1.18**	30	120°	2.MC.120050.0	■
.039	1.0	4.5	2	**1.18**	30	120°	2.MC.120100.0	■
.079	2.0	6.0	2	**1.18**	30	120°	2.MC.120200.0	■
.118	3.0	8.0	3	**1.57**	40	120°	2.MC.120300.0	■
.157	4.0	10.0	4	**1.77**	45	120°	2.MC.120400.0	■
.197	5.0	12.0	5	**1.97**	50	120°	2.MC.120500.0	■
.236	6.0	15.0	6	**2.36**	60	120°	2.MC.120600.0	■

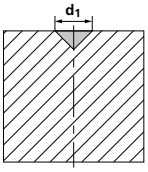
■ Stock item, packing unit of 3 pcs.

MIQUDRILL by Mikron Tool Centro

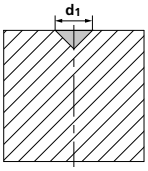
MiquDrill Centro 90° / 120° - uncoated

CENTERING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





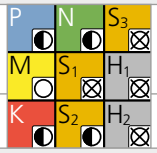
90°



120°

Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	20 – 50 | **66 – 164**
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	20 – 50 | **66 – 164**
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	20 – 40 | **66 – 131**
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	20 – 50 | **66 – 164**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	20 – 40 | **66 – 131**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	15 – 25 | **49 – 82**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	20 – 50 | **66 – 164**
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	40 – 80 | **131 – 262**
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	40 – 80 | **131 – 262**
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40 – 80 | **131 – 262**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40 – 80 | **131 – 262**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	40 – 80 | **131 – 262**
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	40 – 80 | **131 – 262**
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	15 – 25 | **49 – 82**
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	15 – 25 | **49 – 82**
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] **| [IPR]**

	Ød1						
	0.5 mm **| .020"**	1.0 mm **| .039"**	2.0 mm **| .079"**	3.0 mm **| .118"**	4.0 mm **| .158"**	5.0 mm **| .197"**	6.0 mm **| .236"**
	f	**f**	**f**	**f**	**f**	**f**	**f**
	0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
	0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.120 **| .0047**	0.130 **| .0051**
	0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.120 **| .0047**	0.130 **| .0051**
	0.020 **| .0008**	0.030 **| .0012**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.080 **| .0031**
	0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
	0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
	0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
	0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
	0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
	0.030 **| .0012**	0.050 **| .0020**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.150 **| .0059**	0.150 **| .0059**
	0.020 **| .0008**	0.030 **| .0012**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.080 **| .0031**
	0.020 **| .0008**	0.030 **| .0012**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.080 **| .0031**
	Recommended: MiquDrill Centro 90° / 120° - coated						



Centering process MiquDrill Centro

ACCURATE AND QUICK CENTERING AND CHAMFERING

Coolant type, pressure and filtration

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

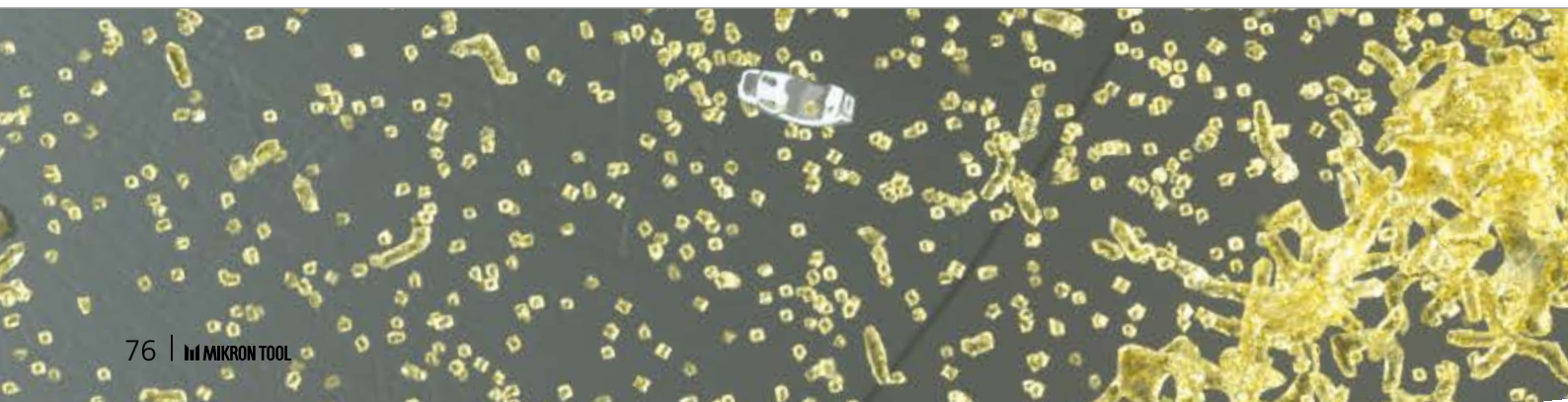
For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the coolant fluid is directed to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical Information".

Center drilling is the base of drilling

Center drilling with MiquDrill Centro is the base of highly accurate drilling. The tool's sturdy construction and its accuracy guarantee highest position accuracy for the follow-up drill, e.g. MiquDrill 200 / 210. For centering and follow-up drilling with MiquDrill 200 / 210, we recommend the use of the same tip angle (120°). Thus higher process accuracy and tool life are assured.

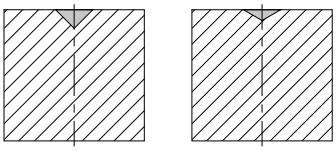


CENTERING PROCESS

Centering and chamfering in one step

1 | CENTER DRILLING

- With MiquDrill Centro in one step.

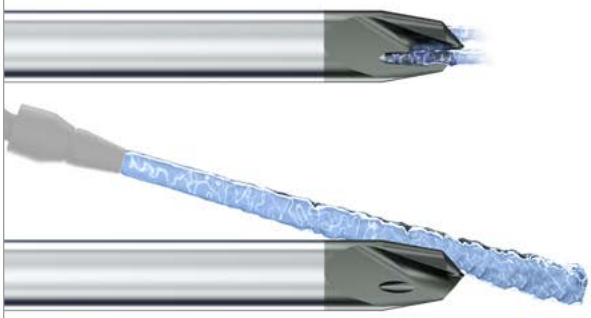


CrazyDrill Twicenter



CRAZYDRILL Twicenter

TWICE UNIQUE



With its CrazyDrill Twicenter, Mikron Tool is offering a center drill for difficult to machine materials to the highest standards in the diameter range of .012" to .236" (0.3 up to 6.0 mm) for centering and .039" to .394" (1.0 mm up to 10.0 mm) for chamfering.

The CrazyDrill Twicenter is an optimal solution for large high-quality batches of components or generally whenever challenging materials are involved, such as titanium and non-corrosive materials. It prepares the follow up drill, e.g., the CrazyDrill SST-Inox, with the highest degree of positioning accuracy.

This center drill has two unique features:

- Two straight cooling channels orienting the coolant to the tip and guarantee constant cooling and lubrication.This guarantees a long tool life. A remarkable advantage for materials with poor heat conductivity, such as stainless steels or titanium.

- The extremely short chisel edge and the "double tip" in chamfers of 60° and 90° with an additional tip angle of 130° ensure stability and good chip flow.

Even without an internal coolant supply (with external coolant supply), the CrazyDrill Twicenter is an outstanding center drill.

"Cool" centering

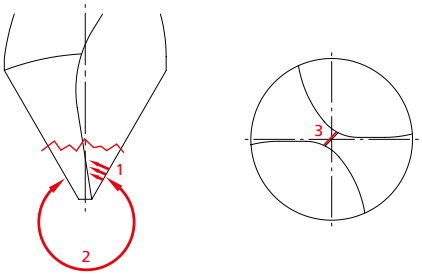
THE CENTER DRILL WITH TWICE THE ADVANTAGE

With its CrazyDrill Twicenter, Mikron Tool is offering a center drill for difficult to machine materials to the highest standards in the diameter range of .012" to .236" (0.3 to 6.0 mm) for centering and .039" to .394" (1.0 mm to 10.0 mm) for chamfering.

- CrazyDrill Twicenter for chamfer 60° with tip angle 130°, with through shaft coolant channels
- CrazyDrill Twicenter for chamfer 90° with tip angle 130°, with through shaft coolant channels
- CrazyDrill Twicenter for chamfer 120° (tip angle 120°), with through shaft coolant channels

The comparison:

■ Traditional Centering

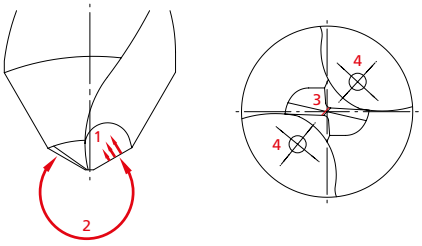


1 | Poor chip evacuation equals jamming risk.

2 | 60° / 90° tip angle results in insufficient cutting speed and high pressure on the tip: risk of breakage.

3 | Large web requires high penetration force and causes high pressure on the tip: risk of breakage.

■ Centering with CrazyDrill Twicenter



1 | 130° tip angle favors chip evacuation.

2 | 130° tip angle reduces the pressure on the tip.

3 | Short web reduces penetration force on the tip.

4 | Through tool coolant supply guarantees optimal cooling and lubrication.

Type 60°	Type 90°	Type 120°
■ Chamfer 60° ■ Internal cooling	■ Chamfer 90° ■ Internal cooling	■ Chamfer 120° ■ Internal cooling
		
		
Page 85	Page 85	Page 89

1 | SHAFT
A sturdy carbide shaft guarantees high concentricity, high positioning accuracy, and thus top drilling precision.

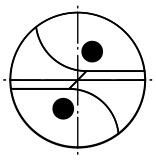
2 | CARBIDE
The use of latest generation of carbide grades allows highest machining speeds and feed.

3 | COATING
High-performance coating guarantees a long tool life.

4 | INTEGRATED COOLING CHANNELS
The through coolant delivers coolant through the flutes directly to the tool tip, providing optimal cooling performance and lubrication, even in places which are difficult to reach.

5 | DOUBLE TIP
The tip angle of 130° or 120° and a short chisel edge ensure high process reliability since less pressure is applied, and allows free chip flow.The secondary angle defines the desired chamfer (60° or 90°).

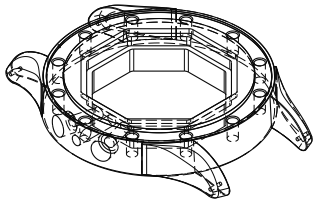
6 | SHORT CHISEL EDGE
Reduces the penetration force and the pressure on the tip. Reduces wear and cutting edge breakage.

Point drill 

Benefits and applications

EVEN CENTERING CAN BE COOL

- **SHORT MACHINING TIME** | centering + chamfering in one step
- **LONG TOOL LIFE** | due to efficient coolant
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to internal coolant
- **HIGH DEGREE OF PRECISION** | due to small tolerances



COMPONENT
Watch housing

MATERIAL
X2CrNiMo 18-14-3 / 1.4435 / AISI 316L

MACHINING
- Centering and chamfering 90°
- d1 = 0.5 mm **| .020"**

DRILLING TOOL
Mikron Tool - CrazyDrill Twicenter 90°

DATA	MIKRON TOOL
Tool type	CrazyDrill Twicenter - Carbide - Coated - Internal cooling
Item number	2.CC.05014.90
Cutting data	v_c = 50 m/min **| 164 SFM** f = 0.09 mm/rev **| .0035 IPR**
Tool life	4'180 Holes



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Aerospace industry	Engine components
Medical technology	Implant, bone plate Surgical plier
Mold making	Die forging mould
Automotive industry	Components for gasoline direct injection
Watches	Watch housing Watch crown
Food industry	Glass moulds
Hydraulics / Pneumatics	Valve housing

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4016	X6Cr17	430 / S43000
	1.4034	X46Cr13	420C
	1.4545	X5CrNiCuNb 15-5	15-5 PH
	1.4435	X2CrNiMo 18-14-3	316L
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S1 Super alloys	2.4665	NiCr22Fe18Mo	Hastelloy X
Group S2 Titanium (pure and alloyed)	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

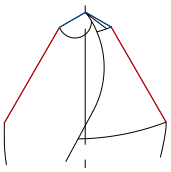
CrazyDrill Twicenter 60° / 90°

CENTERING WITH INTEGRATED COOLING

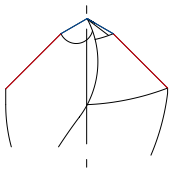


60° 90°

Integrated cooling channels in the shaft and a double angle on the tip make the CrazyDrill Twicenter unique. The optimal cooling orientation makes it perfect for mass production and materials which are difficult to be machined, such as stainless steels or titanium. The through coolant features remarcable benefits, even when machining occurs in difficult to reach locations.



Chamfer 60°
Tip angle 130°



Chamfer 90°
Tip angle 130°

The additional tip angle of 130° and the small chisel edge provide the center drill good stability and also ensure good chip flow. The second angle is used to create a 60° / 90° chamfer.

Even without an internal coolant supply (with external coolant supply), the CrazyDrill Twicenter is an outstanding center drill.

It is the perfect solution for the centering and chamfering of deep holes, e.g. with CrazyDrill SST-Inox.

Coolant type, pressure and filtration

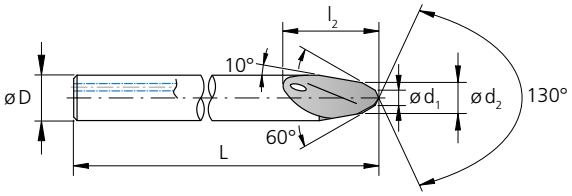
Recommendations for coolant type, pressure and filtration are on page "centering process".

Please note

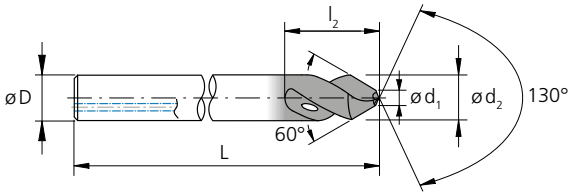
You couldn't find your suitable version of the CrazyDrill Twicenter 60° / 90° (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .039" (1.0 mm).

60°



Execution: d_1 = .012" to .039" (0.3 to 1.0 mm)

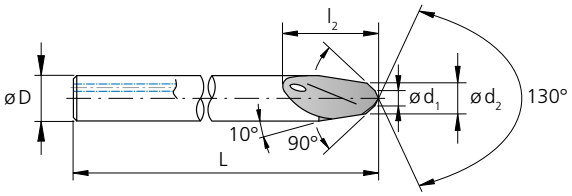


Execution: d_1 = .059" to .236" (1.5 to 6.0 mm)

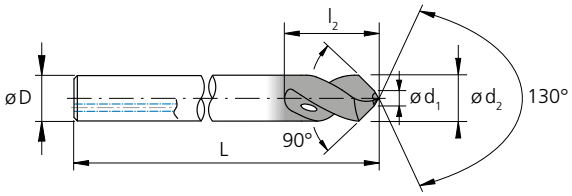
d_1 [inch]	d_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer	Item number	Availability
.012	0.3	1.0	6.4	3	**1.57**	40	60°	2.CC.03010.60	■
.020	0.5	1.4	6.3	3	**1.57**	40	60°	2.CC.05014.60	■
.039	1.0	2.0	6.3	3	**1.57**	40	60°	2.CC.10020.60	■
.059	1.5	3.0	6.3	3	**1.57**	40	60°	2.CC.15030.60	■
.079	2.0	4.0	8.0	4	**1.97**	50	60°	2.CC.20040.60	■
.118	3.0	6.0	12.0	6	**2.36**	60	60°	2.CC.30060.60	■
.157	4.0	8.0	16.0	8	**2.76**	70	60°	2.CC.40080.60	■
.236	6.0	10.0	20.0	10	**3.15**	80	60°	2.CC.60100.60	■

■ Stock item

90°



Execution: d_1 = .012" to .039" (0.3 to 1.0 mm)



Execution: d_1 = .059" to .236" (1.5 to 6.0 mm)

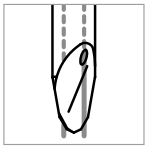
d_1 [inch]	d_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer	Item number	Availability
.012	0.3	1.0	6.4	3	**1.57**	40	90°	2.CC.03010.90	■
.020	0.5	1.4	6.0	3	**1.57**	40	90°	2.CC.05014.90	■
.039	1.0	2.0	6.2	3	**1.57**	40	90°	2.CC.10020.90	■
.059	1.5	3.0	6.3	3	**1.57**	40	90°	2.CC.15030.90	■
.079	2.0	4.0	8.0	4	**1.97**	50	90°	2.CC.20040.90	■
.118	3.0	6.0	12.0	6	**2.36**	60	90°	2.CC.30060.90	■
.157	4.0	8.0	16.0	8	**2.76**	70	90°	2.CC.40080.90	■
.236	6.0	10.0	20.0	10	**3.15**	80	90°	2.CC.60100.90	■

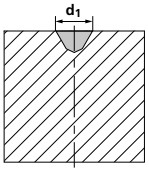
■ Stock item

CRAZYDRILL by Mikron Tool Twicenter

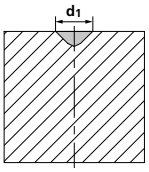
CrazyDrill Twicenter 60° / 90°

CENTERING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW





60°



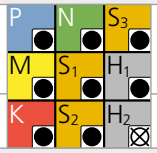
90°



Note:
In case of external cooling reduce v_c and f of 20%

Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 | **394**
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	80 | **262**
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | **197**
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	50 | **164**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | **197**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	50 | **164**
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	50 | **164**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	100 | **328**
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	150 | **492**
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	100 | **328**
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	100 | **328**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	80 | **262**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	100 | **328**
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	80 | **262**
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	10 – 30 | **33 – 98**
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	25 | **82**
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	25 | **82**
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	40 – 50 | **131 – 164**
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	40 | **131**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



	f [mm/rev] **| [IPR]**							
	Ød1							
	0.3 mm **| .012"**	0.5 mm **| .020"**	1.0 mm **| .039"**	1.5 mm **| .059"**	2.0 mm **| .079"**	3.0 mm **| .118"**	4.0 mm **| .158"**	6.0 mm **| .236"**
	f	**f**	**f**	**f**	**f**	**f**	**f**	**f**
	0.030 **| .0012**	0.050 **| .0020**	0.080 **| .0031**	0.100 **| .0039**	0.120 **| .0047**	0.150 **| .0059**	0.200 **| .0079**	0.250 **| .0098**
	0.030 **| .0012**	0.050 **| .0020**	0.080 **| .0031**	0.100 **| .0039**	0.120 **| .0047**	0.150 **| .0059**	0.200 **| .0079**	0.250 **| .0098**
	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.120 **| .0047**	0.180 **| .0071**	0.230 **| .0091**
	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.120 **| .0047**	0.150 **| .0059**
	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.120 **| .0047**	0.180 **| .0071**	0.230 **| .0091**
	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.070 **| .0028**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**
	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.070 **| .0028**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**
	0.030 **| .0012**	0.040 **| .0016**	0.050 **| .0020**	0.070 **| .0028**	0.090 **| .0035**	0.110 **| .0043**	0.150 **| .0059**	0.200 **| .0079**
	0.040 **| .0016**	0.060 **| .0024**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**	0.180 **| .0071**	0.230 **| .0091**	0.300 **| .0118**
	0.040 **| .0016**	0.060 **| .0024**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**	0.180 **| .0071**	0.230 **| .0091**	0.300 **| .0118**
	0.040 **| .0016**	0.060 **| .0024**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**	0.180 **| .0071**	0.230 **| .0091**	0.300 **| .0118**
	0.040 **| .0016**	0.060 **| .0024**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**	0.160 **| .0063**	0.180 **| .0071**	0.200 **| .0079**
	0.040 **| .0016**	0.060 **| .0024**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**	0.160 **| .0063**	0.180 **| .0071**	0.200 **| .0079**
	0.040 **| .0016**	0.060 **| .0024**	0.090 **| .0035**	0.100 **| .0039**	0.130 **| .0051**	0.160 **| .0063**	0.180 **| .0071**	0.200 **| .0079**
	0.015 **| .0006**	0.025 **| .0010**	0.030 **| .0012**	0.040 **| .0016**	0.050 **| .0020**	0.070 **| .0028**	0.090 **| .0035**	0.110 **| .0043**
	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.070 **| .0028**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**
	0.030 **| .0012**	0.040 **| .0016**	0.070 **| .0028**	0.090 **| .0035**	0.110 **| .0043**	0.140 **| .0055**	0.180 **| .0071**	0.220 **| .0087**
	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.110 **| .0043**	0.130 **| .0051**
	0.010 **| .0004**	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.050 **| .0020**	0.060 **| .0024**	0.070 **| .0028**	0.080 **| .0031**

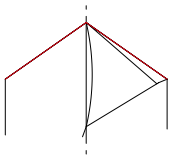
CrazyDrill Twicenter 120°

CENTERING WITH INTEGRATED COOLING



120°

Integrated cooling channels in the shaft makes the CrazyDrill Twicenter unique. The optimal cooling orientation makes it perfect for mass production and materials which are difficult to be machined, such as stainless steels or titanium. The through coolant features remarcable benefits, even when machining occurs in difficult to reach locations.



The sturdy tip angle of 120° and the small chisel edge provide the center drill good stability and also ensure good chip flow.
At the same time, it is used to create a 120° chamfer.

Chamfer /
Tip angle 120°

Even without an internal coolant supply (with external coolant supply), the CrazyDrill Twicenter is an outstanding center drill.

It is the perfect solution for the centering and chamfering of deep holes.

Coolant type, pressure and filtration

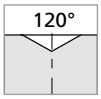
Recommendations for coolant type, pressure and filtration are on page "centering process".

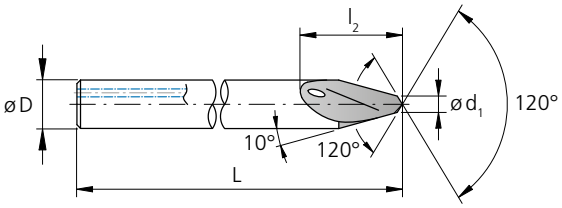
Please note

You couldn't find your suitable version of the CrazyDrill Twicenter 120° (diameter, length, cutting direction…)? Ask us about our customized versions!

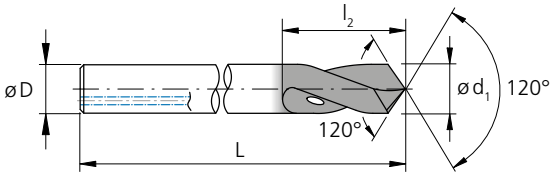
Regrinding: This product can be reground starting from Ø .079" (2.0 mm).

Carbide | 120° | Z2 | eXedur RIP





Execution: d_1 = .020" to .078" (0.5 to 2.0 mm)



Execution: d_1 = .118" to .394" (3.0 to 10.0 mm)

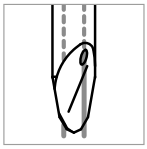
d_1 [inch]	d_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer	Item number	Availability
.020	0.5	7.0	3	**1.57**	40	120°	2.CC.00050.120	■
.039	1.0	6.15	3	**1.57**	40	120°	2.CC.00100.120	■
.079	2.0	6.0	3	**1.57**	40	120°	2.CC.00200.120	■
.118	3.0	8.0	3	**1.57**	40	120°	2.CC.00300.120	■
.157	4.0	10.0	4	**1.97**	50	120°	2.CC.00400.120	■
.236	6.0	15.0	6	**2.36**	60	120°	2.CC.00600.120	■
.315	8.0	17.0	8	**2.76**	70	120°	2.CC.00800.120	■
.394	10.0	21.0	10	**3.15**	80	120°	2.CC.01000.120	■

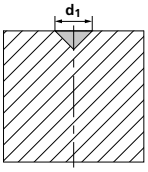
■ Stock item

CRAZYDRILL by Mikron Tool Twicenter

CrazyDrill Twicenter 120°

CETERING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW





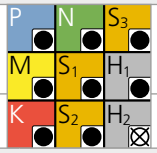
120°



Note:
In case of external cooling reduce v_c and f of 20%

Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 | **394**
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	80 | **262**
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | **197**
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	50 | **164**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | **197**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	50 | **164**
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	50 | **164**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	100 | **328**
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	150 | **492**
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	100 | **328**
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	100 | **328**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	80 | **262**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	100 | **328**
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	80 | **262**
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	10 – 30 | **33 – 98**
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	25 | **82**
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	25 | **82**
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	40 – 50 | **131 – 164**
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	40 | **131**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1							
0.5 mm | **.020"**	1.0 mm | **.039"**	2.0 mm | **.079"**	3.0 mm | **.118"**	4.0 mm | **.158"**	6.0 mm | **.236"**	8.0 mm | **.315"**	10.0 mm | **.394"**
f	**f**	**f**	**f**	**f**	**f**	**f**	**f**
0.030 | **.0012**	0.050 | **.0020**	0.080 | **.0031**	0.100 | **.0039**	0.120 | **.0047**	0.150 | **.0059**	0.200 | **.0079**	0.250 | **.0098**
0.030 | **.0012**	0.050 | **.0020**	0.080 | **.0031**	0.100 | **.0039**	0.120 | **.0047**	0.150 | **.0059**	0.200 | **.0079**	0.250 | **.0098**
0.020 | **.0008**	0.030 | **.0012**	0.040 | **.0016**	0.060 | **.0024**	0.080 | **.0031**	0.120 | **.0047**	0.180 | **.0071**	0.230 | **.0091**
0.020 | **.0008**	0.030 | **.0012**	0.040 | **.0016**	0.060 | **.0024**	0.080 | **.0031**	0.100 | **.0039**	0.120 | **.0047**	0.150 | **.0059**
0.020 | **.0008**	0.030 | **.0012**	0.040 | **.0016**	0.060 | **.0024**	0.080 | **.0031**	0.120 | **.0047**	0.180 | **.0071**	0.230 | **.0091**
0.020 | **.0008**	0.030 | **.0012**	0.040 | **.0016**	0.060 | **.0024**	0.070 | **.0028**	0.090 | **.0035**	0.110 | **.0043**	0.130 | **.0051**
0.020 | **.0008**	0.030 | **.0012**	0.040 | **.0016**	0.060 | **.0024**	0.070 | **.0028**	0.090 | **.0035**	0.110 | **.0043**	0.130 | **.0051**
0.030 | **.0012**	0.040 | **.0016**	0.050 | **.0020**	0.070 | **.0028**	0.090 | **.0035**	0.110 | **.0043**	0.150 | **.0059**	0.200 | **.0079**
0.040 | **.0016**	0.060 | **.0024**	0.090 | **.0035**	0.110 | **.0043**	0.130 | **.0051**	0.180 | **.0071**	0.230 | **.0091**	0.300 | **.0118**
0.040 | **.0016**	0.060 | **.0024**	0.090 | **.0035**	0.110 | **.0043**	0.130 | **.0051**	0.180 | **.0071**	0.230 | **.0091**	0.300 | **.0118**
0.040 | **.0016**	0.060 | **.0024**	0.090 | **.0035**	0.110 | **.0043**	0.130 | **.0051**	0.180 | **.0071**	0.230 | **.0091**	0.300 | **.0118**
0.040 | **.0016**	0.060 | **.0024**	0.090 | **.0035**	0.110 | **.0043**	0.130 | **.0051**	0.160 | **.0063**	0.180 | **.0071**	0.200 | **.0079**
0.040 | **.0016**	0.060 | **.0024**	0.090 | **.0035**	0.110 | **.0043**	0.130 | **.0051**	0.160 | **.0063**	0.180 | **.0071**	0.200 | **.0079**
0.040 | **.0016**	0.060 | **.0024**	0.090 | **.0035**	0.100 | **.0039**	0.130 | **.0051**	0.160 | **.0063**	0.180 | **.0071**	0.200 | **.0079**
0.015 | **.0006**	0.025 | **.0010**	0.030 | **.0012**	0.040 | **.0016**	0.050 | **.0020**	0.070 | **.0028**	0.090 | **.0035**	0.110 | **.0043**
0.020 | **.0008**	0.030 | **.0012**	0.040 | **.0016**	0.060 | **.0024**	0.070 | **.0028**	0.090 | **.0035**	0.110 | **.0043**	0.130 | **.0051**
0.030 | **.0012**	0.040 | **.0016**	0.070 | **.0028**	0.090 | **.0035**	0.110 | **.0043**	0.140 | **.0055**	0.180 | **.0071**	0.220 | **.0087**
0.020 | **.0008**	0.030 | **.0012**	0.040 | **.0016**	0.060 | **.0024**	0.080 | **.0031**	0.100 | **.0039**	0.110 | **.0043**	0.130 | **.0051**
0.010 | **.0004**	0.020 | **.0008**	0.030 | **.0012**	0.040 | **.0016**	0.050 | **.0020**	0.060 | **.0024**	0.070 | **.0028**	0.080 | **.0031**



Centering process CrazyDrill Twicenter

QUICK AND ACCURATE CENTERING AND CHAMFERING

Coolant type, pressure, filtration and flowrate

Cooling with internal coolant supply

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

Filter: The large cooling channels permit the use of a standard filter. Filter quality ≤ 0.050 mm (.0019").

Coolant pressure: At least 218 psi (15 bar) coolant pressure is required for the CrazyDrill Twicenter to achieve reliable drilling. High pressure is generally better for the cooling and flushing effect.

Revolution	[rpm]	≤ 10'000	> 10'000
Minimal pressure	[bar]	15	30
	[psi]	**218**	**435**

Cooling with external coolant supply

It must be noted that with external cooling the coolant is to be directed to the drill tip, where it cools and lubricates the drill perfectly and flushes away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical Information".

Centering as the basis for drilling

The CrazyDrill Twicenter center drill offers the basis for high-precision drilling. The sturdy tool design and its performance enable the highest positioning accuracy for the subsequent drill.

The use of a centering tool for rough or irregular surfaces makes good sense even for tools with a high degree of self-centering capability, such as the CrazyDrill SST-Inox.

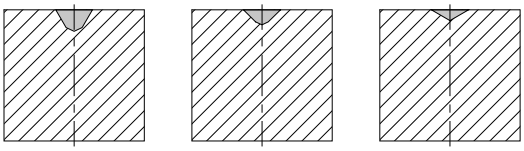
Using the internally cooled center drill with high-performance coating can greatly increase the tool life of the subsequent drill. A chamfer of 60°, 90° or 120° can be generated in the same process.

CENTERING PROCESS

Centering and chamfering in one step

1 | CENTER DRILLING

- Determine the desired cutting depth according to the drilling diameter and chamfer angle or chamfer width.
- Activate internal or external cooling.
- Drill in one step at the recommended feed speeds (see cutting data table).



CRAZYDRILL by Mikron Tool Twicenter

Centering process CrazyDrill Twicenter

QUICK AND ACCURATE CENTERING AND CHAMFERING

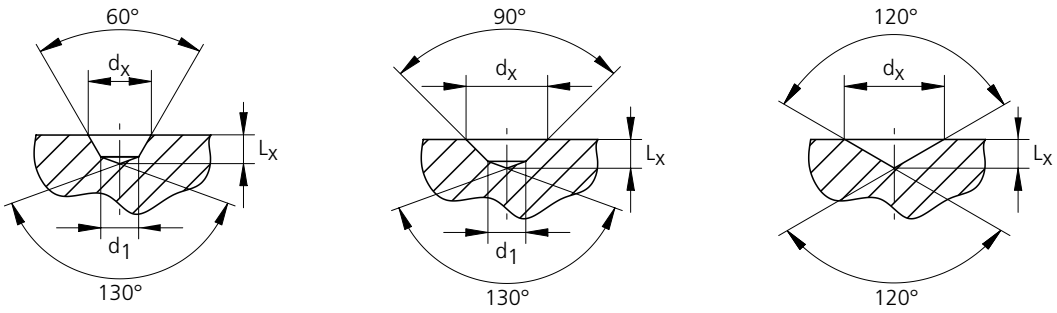


Table for cutting depths

For 60° chamfer angle / 130° tip angle

Ø d_x		L_x															
		2.CC.03010.60 Ød1 0.3 mm | .012"		2.CC.05014.60 Ød1 0.5 mm | .018"		2.CC.10020.60 Ød1 1.0 mm | .039"		2.CC.15030.60 Ød1 1.5 mm | .059"		2.CC.20040.60 Ød1 2.0 mm | .079"		2.CC.30060.60 Ød1 3.0 mm | .118"		2.CC.40080.60 Ød1 4.0 mm | .158"		2.CC.60100.60 Ød1 6.0 mm | .236"	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
0.4	.016	0.16	.0063														
0.8	.032	0.50	.0196	0.38	.0149												
1.0	.039			0.55	.0216												
1.5	.059					0.67	.0263										
2.0	.079							0.78	.0307								
2.5	.098							1.22	.0480	0.90	.0354						
3.0	.118									1.33	.0523						
3.5	.138									1.77	.0696	1.13	.0444				
4.0	.158											1.57	.0618				
5.0	.197											2.43	.0957	1.80	.0709		
6.0	.236													2.66	.1047		
7.0	.276													3.53	.1389	2.26	.0889
8.0	.315															3.13	.1232
9.0	.354															4.00	.1575

For 90° chamfer angle / 130° tip angle

Ø d_x		L_x															
		2.CC.03010.90 Ød1 0.3 mm | .012"		2.CC.05014.90 Ød1 0.5 mm | .018"		2.CC.10020.90 Ød1 1.0 mm | .039"		2.CC.15030.90 Ød1 1.5 mm | .059"		2.CC.20040.90 Ød1 2.0 mm | .079"		2.CC.30060.90 Ød1 3.0 mm | .118"		2.CC.40080.90 Ød1 4.0 mm | .158"		2.CC.60100.90 Ød1 6.0 mm | .236"	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
0.4	.016	0.12	.0047														
0.8	.032	0.32	.0126	0.27	.0106												
1.0	.039			0.37	.0145												
1.5	.059					0.48	.0189										
2.0	.079							0.60	.0236								
2.5	.098							0.85	.0335	0.72	.0283						
3.0	.118									0.97	.0382						
3.5	.138									1.22	.0480	0.95	.0374				
4.0	.158											1.20	.0472				
5.0	.197											1.70	.0669	1.43	.0563		
6.0	.236													1.93	.0760		
7.0	.276													2.43	.0957	1.90	.0748
8.0	.315															2.40	.0945
9.0	.354															2.90	.1142

■ For 120° chamfer angle / 120° tip angle

Ø d_x		L_x															
		2.CC.00050.120 Ød1 0.5 mm | .018"		2.CC.00100.120 Ød1 1.0 mm | .039"		2.CC.00200.120 Ød1 2.0 mm | .079"		2.CC.00300.120 Ød1 3.0 mm | .118"		2.CC.00400.120 Ød1 4.0 mm | .158"		2.CC.00600.120 Ød1 6.0 mm | .236"		2.CC.00800.120 Ød1 8.0 mm | .315"		2.CC.01000.120 Ød1 10.0 mm | .394"	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
0.4	.016	0.12	.0047														
0.5	.020	0.14	.0055														
0.8	.032			0.23	.0091												
1.0	.039			0.29	.0114												
1.5	.059					0.43	.0169										
2.0	.079					0.58	.0228										
2.5	.098							0.72	.0283								
3.0	.118							0.87	.0343								
3.5	.138									1.01	.0398						
4.0	.158									1.15	.0453						
5.0	.197											1.44	.0567				
6.0	.236											1.73	.0681				
7.0	.276													2.02	.0795		
8.0	.315													2.31	.0909		
9.0	.354															2.60	.1024
10.0	.394															2.89	.1138

Formulas

■ For CrazyDrill Twicenter 60°

$$L_x = \frac{1}{2} \cdot \left[\frac{d_1}{\tan(65°)} + \frac{(d_x - d_1)}{\tan(30°)} \right]$$

■ For CrazyDrill Twicenter 90°

$$L_x = \frac{1}{2} \cdot \left[\frac{d_1}{\tan(65°)} + \frac{(d_x - d_1)}{\tan(45°)} \right]$$

■ For CrazyDrill Twicenter 120°

$$L_x = \frac{1}{2} \cdot \left[\frac{d_x}{\tan(60°)} \right]$$

Customized center drills



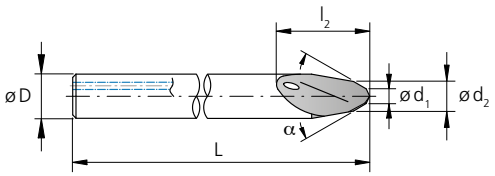
Mikron Tool produces solid carbide center drills according to your needs and requirements and within the following range:

CHARACTERISTICS

- Diameter max: 1.26" (32.0 mm), larger as per specific request
- Maximum tool length: 12.99" (330 mm)
- Number of cutting edges: 1, 2 or 3
- Chamfer and point angle as per customer need
- Direction of rotation: right-hand cut or left-hand cut
- Material for the center drill: tungsten carbide, grade selection depending on application

COATINGS

Many choices according to application



COOLING

- Center drill with spiralized through coolant holes with outlet located on drill tip
- Center drill with through shank coolant channels with outlet located on shank
- Center drill for external coolant supply

TYPE OF SHAFT

- Cylindrical as per DIN 6535 HA
- Cylindrical as per DIN 6535 HE (Whistle Notch)
- Cylindrical as per DIN 6535 HB (Weldon)
- Others on demand

MATERIAL TO BE MACHINED

Center drills for steel, corrosion-resistant steels, i.e. stainless steels, titanium / titanium alloys, super alloys, i.e. heat-resistant alloys such as Inconel or Hastelloy, CrCo alloys, centering drills for hardened steel up to 55HRC, aluminum / aluminum alloys, brass, copper, cast materials, etc.

FINISHING

Cutting edge preparation, polishing of flutes

crazy about pilot drilling



PILOT DRILLING AND SHORT DRILLING TOOLS

05

OVERVIEW **100**

CODIFICATION KEY 102

MIQUDRILL 200 104
Depth up to 2.4 x d, Ø 0.1 mm - 1.5 mm | **.004" – .059"**

CRAZYDRILL FLEXPILOT 122
Depth 3 x d, Ø 0.1 mm - 2.0 mm | **.004" – .079"**

CRAZYDRILL PILOT SST-INOX 142
Depth 3 x d + 90° countersink, Ø 0.2 mm - 2.0 mm | **.008" – .079"**

CRAZYDRILL PILOT 154
Depth 2 x d + 90° countersink, Ø 0.4 mm - 6.35 mm | **1/64" – 1/4"**

CRAZYDRILL CROSSPILOT 168
Depth 2 x d, Ø 0.4 mm - 6.35 mm | **1/64" – 1/4"**

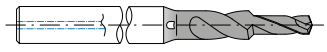
CRAZYDRILL COOLPILOT 182
Depth 3 x d + 90° countersink, Ø 1.0 mm - 6.35 mm | **.039" – 1/4"**

CRAZYDRILL HEXALOBE 196
Pre-hole drilling + 120° chamfer, Ø 0.9 mm - 3.8 mm | **.035" – .150"**

CUSTOMIZED SHORT / PILOT DRILLS 208

Overview

CUTTING TOOL SOLUTIONS

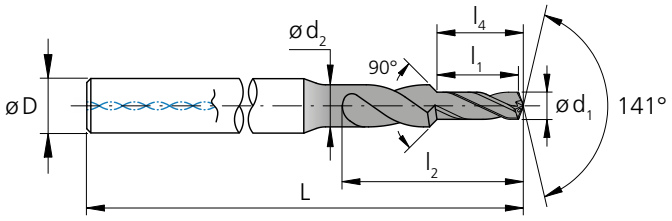
	MIQUDRILL 200	
	CRAZYDRILL Flexpilot	
	CRAZYDRILL Pilot SST-Inox	
	CRAZYDRILL Pilot	
	CRAZYDRILL Crosspilot	
	CRAZYDRILL Coolpilot	
NEW	CRAZYDRILL Hexalobe	
	Customized short / pilot drills	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

ø - range [mm] | [inch]	max. depth	Cooling	P Unalloyed and alloyed steel	M Stainless steel	K Cast iron	N Non ferrous metals	S_1 Super alloys	S_2 Titanium (pure and alloyed)	S_3 CrCo alloys	H_1 Hardened steel <55 HRC	H_2 Hardened steel ≥55 HRC	Page
0.1 – 1.5 **.004" – .059"**	up to 2.4 x d		◐	⊠	◐	◐	⊠	⊠	⊠	◐	⊠	**104**
0.1 – 2.0 **.004" – .079"**	3 x d		●	⊠	●	●	⊠	●	⊠	⊠	⊠	**122**
0.2 – 2.0 **.008" – .079"**	3 x d + Chamfer 90°		⊠	●	⊠	◐	●	⊠	●	⊠	⊠	**142**
0.4 – 6.35 **1/64" – 1/4"**	2 x d + Chamfer 90°		●	◐	●	●	⊠	●	⊠	●	⊠	**154**
0.4 – 6.35 **1/64" – 1/4"**	2 x d		●	◐	●	●	⊠	●	⊠	●	⊠	**168**
1.0 – 6.35 **.039" – 1/4"**	3 x d + Chamfer 90°		⊠	●	⊠	⊠	●	⊠	●	⊠	⊠	**182**
0.9 – 3.8 **.035" – .150"**	variable + Chamfer 90°		⊠	●	⊠	⊠	⊠	●	⊠	⊠	⊠	**196**
0.1 – 32.0 **.004" – 1.26"**	as required		●	●	●	●	●	●	●	●	●	**208**

Codification key

ITEM NUMBER EASY TO UNDERSTAND



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Division number
- 2 = Mikron Tool SA Agno

Pilot family
- CrazyDrill Pilot
- CrazyDrill Crosspilot
- CrazyDrill Pilot SST-Inox
- CrazyDrill Coolpilot

Cutting diameter d_1
- 01000 = Ø 1 mm (.039")

Geometric features
- 090 = 90° Chamfer angle
- 170 = 170° Tip angle

Geometry and coolant information
- IK = Stainless steel geometry with integrated coolant on the shaft
- IC = Stainless steel geometry with through-tool-cooling

2.PFS.01200.0

Division number
- 2 = Mikron Tool SA Agno

Flexpilot family
- PFS = CrazyDrill Flexpilot Steel
- PFT = CrazyDrill Flexpilot Titanium

Cutting diameter d_1
- 01200 = Ø 1.2 mm (.047")

Coating
- 1 = Coated
- 0 = Uncoated

2.MD.200088.1

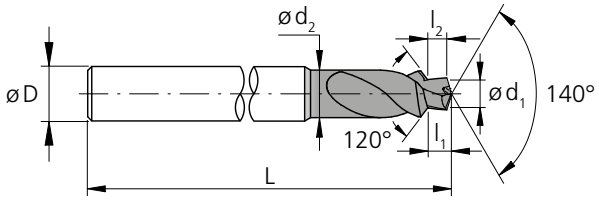
Division number
- 2 = Mikron Tool SA Agno

Family
- MiquDrill

Tool type
- 200 = Short drill

Cutting diameter d_1
- 088 = Ø 0.88 mm (.0346")

Coating
- 1 = Coated
- 0 = Uncoated



2.CD.007100.120.T

Division number
- 2 = Mikron Tool SA Agno

Family
- CrazyDrill

Approximate l_2/d_1 ratio
- 007 = 0.7

Geometry
- T = Titanium
- I = Stainless steel

Chamfer angle
- 120 = 120°

Cutting diameter d_1
- 100 = Ø 1 mm (.039")

2.PD.F316.IK

Division number
- 2 = Mikron Tool SA Agno

Family
- PD = Pilot family
- PFS = Flexpilot Steel family

Cutting diameter in fractional inches d_1
- F316 = Ø 3/16"

Family feature
- 090 = CrazyDrill Pilot
- 170 = CrazyDrill Crosspilot
- IK = CrazyDrill Pilot SST-Inox
- IC = CrazyDrill Coolpilot
- 1 = CrazyDrill Flexpilot Steel Coated

MiquDrill 200



MIQUDRILL 200

GREAT AVAILABILITY IN SMALL DIMENSIONS



MiquDrill 200 is the ideal tool for the perfect execution of a short hole and also guarantees as pilot drill for MiquDrill 210 the accurate preparation of deeper follow-up holes. The short drill is uncoated available in the diameter range from .004" to .059" (0.1 mm to 1.5 mm), in the coated version from .012" to .059" (0.3 mm to 1.5 mm). Both versions are available from stock in very small diameter increments of .0004" (0.01 mm). Its usable lengths are, based on diameter, between 1.4 and 2.4 x d.

This short drill for micro-machining is the optimal solution for the production of small and medium batch sizes or a large range of variants. First class quality and process accuracy are assured. It is universally applicable for steels (alloyed and unalloyed), cast iron, nonferrous metals and in the coated version also for hardened steel < 55 HRC.

Accurate short drilling

FOR SMALL SERIES AND LARGE RANGE OF VARIANTS

MiquDrill 200 is the ideal tool for the perfect execution of a short hole and also guarantees as pilot drill for MiquDrill 210 the accurate preparation of deeper follow-up holes. The short drill is uncoated available in the diameter range from .004" to .059" (0.1 mm to 1.5 mm), in the coated version from .012" to .059" (0.3 mm to 1.5 mm). Both versions are available from stock in very small diameter increments of .0004" (0.01 mm). Its usable lengths are, based on diameter, between 1.4 and 2.4 x d.

- MiquDrill 200, usable length from 1.4 to 2.4 x d, coated and uncoated

Uncoated

Drill with external cooling



Page 111

Coated

Drill with external cooling



Page 111

1 | SHANK
The accurately ground shaft guarantees high concentricity and therefore highest position accuracy

2 | SOLID CARBIDE
The use of latest generation carbide grades allow highest machining speed and feed. For example, in spite of similar feed rates as HSS drills, due to its higher cutting speed, drilling with MiquDrill is considerably faster.

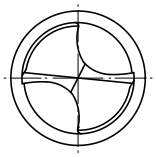
3 | COATING
The coated version of the drill is also adapted for difficult-to-machine materials and hardened steels < 55 HRC and reaches even a better tool life.

4 | HELICAL FLUTE
The geometry of the helical flute guarantees an optimal chip flow.

5 | TIP GEOMETRY
The geometry of the universal drill is an excellent solution for micro-machining. High process accuracy and productivity are guaranteed.

6 | DIAMETER RANGE AND INCREMENTS
Readily available from stock starting of diameters from .0039" (0.1 mm) with increments of .0004" (0.01 mm).

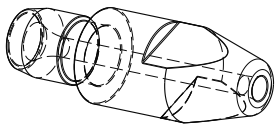
Drill tip



Benefits and applications

FITS EVERY APPLICATION

- **HIGH DEGREE OF PROCESS RELIABILITY** | due to higher quality
- **HIGH DEGREE OF PRECISION** | due to small tolerances
- **LOW PRODUCTION COSTS** | due to the low cost of tool



COMPONENT
Welding nozzle

MATERIAL
CuZn39Pb3 / 2.0401 / UNS 38500

MACHINING
- Short drilling
- d1 = 0.5 mm **| .020"**
- Drilling depth 0.9 mm **| .035"**

DRILLING TOOL
Mikron Tool - MiquDrill 200 - coated

DATA	MIKRON TOOL
Tool type	MiquDrill 200 - Carbide - Coated - External cooling
Item number	2.MD.200050.1
Cutting data	v_c = 45 m/min **| 148 SFM** f = 0.008 mm/rev **| .00031 IPR**

APPLICATION DOMAINS	COMPONENTS EXAMPLES
Automotive industry	Components for gasoline direct injection
Mechanical engineering	Particle of engine Cylinder

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

MiquDrill 200 - coated / uncoated

DRILLING WITH EXTERNAL COOLING



Coated Uncoated

MiquDrill 200 is universally applicable for steel (alloyed and unalloyed), cast iron and nonferrous metals (e.g. aluminum with high silicium level). Available from stock in the diameter range:

- from .012" to .059" (0.3 mm to 1.5 mm) - coated version (eXedur RIP)
- from .004" to .059" (0.1 mm to 1.5 mm) - uncoated version

and smallest increments of .0004" (0.01 mm).

Its strengths: Execution of short holes from 1.4 to 2.4 x d in one step. Compared to uncoated version, "MiquDrill 200 - coated" is the solution for highest requests concerning tool life and the machining of hardened steel < 55 HRC. As pilot drill for MiquDrill 210 it guarantees a high position accuracy and an accurate cylindrical guidance.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note

You couldn't find your suitable version of the MiquDrill 200 - coated / uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

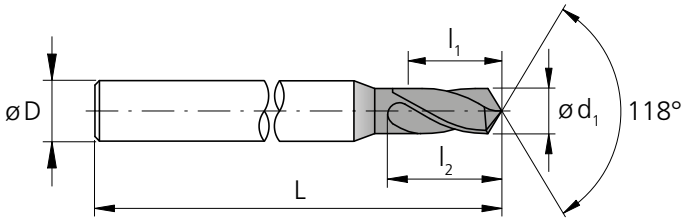
Regrinding: This product is not suitable for regrinding.

Carbide	1.4 - 2.4xd$_1$	118°	Z2

Ø d$_1$	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**0 - .00016"**	0 - 0.004 mm

.1 eXedur RIP

.0 Uncoated



d$_1$ [inch]	d$_1$ [mm]	l$_1$ [inch]	l$_1$ [mm]	l$_2$ [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
.0039	0.10	**.006**	0.15	0.3	1.0	**1.18**	30	2.MD.200010	-	.0	◪
.0043	0.11	**.011**	0.27	0.4	1.0	**1.18**	30	2.MD.200011	-	.0	◪
.0047	0.12	**.010**	0.26	0.4	1.0	**1.18**	30	2.MD.200012	-	.0	◪
.0051	0.13	**.010**	0.25	0.4	1.0	**1.18**	30	2.MD.200013	-	.0	◪
.0055	0.14	**.009**	0.24	0.4	1.0	**1.18**	30	2.MD.200014	-	.0	◪
.0059	0.15	**.009**	0.23	0.4	1.0	**1.18**	30	2.MD.200015	-	.0	◪
.0063	0.16	**.013**	0.34	0.5	1.0	**1.18**	30	2.MD.200016	-	.0	◪
.0067	0.17	**.013**	0.33	0.5	1.0	**1.18**	30	2.MD.200017	-	.0	◪
.0071	0.18	**.013**	0.32	0.5	1.0	**1.18**	30	2.MD.200018	-	.0	◪
.0075	0.19	**.012**	0.31	0.5	1.0	**1.18**	30	2.MD.200019	-	.0	◪
.0079	0.20	**.012**	0.30	0.5	1.0	**1.18**	30	2.MD.200020	-	.0	◪
.0083	0.21	**.017**	0.44	0.7	1.0	**1.18**	30	2.MD.200021	-	.0	◪
.0087	0.22	**.017**	0.43	0.7	1.0	**1.18**	30	2.MD.200022	-	.0	◪
.0091	0.23	**.017**	0.42	0.7	1.0	**1.18**	30	2.MD.200023	-	.0	◪
.0094	0.24	**.016**	0.41	0.7	1.0	**1.18**	30	2.MD.200024	-	.0	◪
.0098	0.25	**.016**	0.40	0.7	1.0	**1.18**	30	2.MD.200025	-	.0	◪
.0102	0.26	**.019**	0.49	0.8	1.0	**1.18**	30	2.MD.200026	-	.0	◪
.0106	0.27	**.019**	0.48	0.8	1.0	**1.18**	30	2.MD.200027	-	.0	◪
.0110	0.28	**.019**	0.47	0.8	1.0	**1.18**	30	2.MD.200028	-	.0	◪
.0114	0.29	**.018**	0.46	0.8	1.0	**1.18**	30	2.MD.200029	-	.0	◪
.0118	0.30	**.018**	0.45	0.8	1.0	**1.18**	30	2.MD.200030	.1	.0	■
.0122	0.31	**.023**	0.59	0.9	1.0	**1.18**	30	2.MD.200031	.1	.0	■
.0126	0.32	**.023**	0.58	0.9	1.0	**1.18**	30	2.MD.200032	.1	.0	■
.0130	0.33	**.022**	0.57	0.9	1.0	**1.18**	30	2.MD.200033	.1	.0	■
.0134	0.34	**.022**	0.56	0.9	1.0	**1.18**	30	2.MD.200034	.1	.0	■
.0138	0.35	**.022**	0.55	0.9	1.0	**1.18**	30	2.MD.200035	.1	.0	■
.0142	0.36	**.025**	0.64	1.0	1.0	**1.18**	30	2.MD.200036	.1	.0	■
.0146	0.37	**.025**	0.63	1.0	1.0	**1.18**	30	2.MD.200037	.1	.0	■
.0150	0.38	**.024**	0.62	1.0	1.0	**1.18**	30	2.MD.200038	.1	.0	■
.0154	0.39	**.024**	0.61	1.0	1.0	**1.18**	30	2.MD.200039	.1	.0	■
.0157	0.40	**.024**	0.60	1.0	1.0	**1.18**	30	2.MD.200040	.1	.0	■
.0161	0.41	**.029**	0.74	1.2	1.0	**1.18**	30	2.MD.200041	.1	.0	■
.0165	0.42	**.029**	0.73	1.2	1.0	**1.18**	30	2.MD.200042	.1	.0	■
.0169	0.43	**.028**	0.72	1.2	1.0	**1.18**	30	2.MD.200043	.1	.0	■
.0173	0.44	**.028**	0.71	1.2	1.0	**1.18**	30	2.MD.200044	.1	.0	■

d$_1$ [inch]	d$_1$ [mm]	l$_1$ [inch]	l$_1$ [mm]	l$_2$ [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
.0177	0.45	**.028**	0.70	1.2	1.0	**1.18**	30	2.MD.200045	.1	.0	■
.0181	0.46	**.033**	0.84	1.3	1.0	**1.18**	30	2.MD.200046	.1	.0	■
.0185	0.47	**.033**	0.83	1.3	1.0	**1.18**	30	2.MD.200047	.1	.0	■
.0189	0.48	**.032**	0.82	1.3	1.0	**1.18**	30	2.MD.200048	.1	.0	■
.0193	0.49	**.032**	0.81	1.3	1.0	**1.18**	30	2.MD.200049	.1	.0	■
.0197	0.50	**.035**	0.90	1.4	1.0	**1.18**	30	2.MD.200050	.1	.0	■
.0201	0.51	**.035**	0.89	1.4	1.0	**1.18**	30	2.MD.200051	.1	.0	■
.0205	0.52	**.035**	0.88	1.4	1.0	**1.18**	30	2.MD.200052	.1	.0	■
.0209	0.53	**.034**	0.87	1.4	1.0	**1.18**	30	2.MD.200053	.1	.0	■
.0213	0.54	**.034**	0.86	1.4	1.0	**1.18**	30	2.MD.200054	.1	.0	■
.0217	0.55	**.033**	0.85	1.4	1.0	**1.18**	30	2.MD.200055	.1	.0	■
.0220	0.56	**.037**	0.94	1.5	1.0	**1.18**	30	2.MD.200056	.1	.0	■
.0224	0.57	**.037**	0.93	1.5	1.0	**1.18**	30	2.MD.200057	.1	.0	■
.0228	0.58	**.036**	0.92	1.5	1.0	**1.18**	30	2.MD.200058	.1	.0	■
.0232	0.59	**.036**	0.91	1.5	1.0	**1.18**	30	2.MD.200059	.1	.0	■
.0236	0.60	**.035**	0.90	1.5	1.0	**1.18**	30	2.MD.200060	.1	.0	■
.0240	0.61	**.039**	0.99	1.6	1.0	**1.18**	30	2.MD.200061	.1	.0	■
.0244	0.62	**.039**	0.98	1.6	1.0	**1.18**	30	2.MD.200062	.1	.0	■
.0248	0.63	**.038**	0.97	1.6	1.0	**1.18**	30	2.MD.200063	.1	.0	■
.0252	0.64	**.038**	0.96	1.6	1.0	**1.18**	30	2.MD.200064	.1	.0	■
.0256	0.65	**.037**	0.95	1.6	1.0	**1.18**	30	2.MD.200065	.1	.0	■
.0260	0.66	**.045**	1.14	1.8	1.0	**1.18**	30	2.MD.200066	.1	.0	■
.0264	0.67	**.044**	1.13	1.8	1.0	**1.18**	30	2.MD.200067	.1	.0	■
.0268	0.68	**.044**	1.12	1.8	1.0	**1.18**	30	2.MD.200068	.1	.0	■
.0272	0.69	**.044**	1.11	1.8	1.0	**1.18**	30	2.MD.200069	.1	.0	■
.0276	0.70	**.043**	1.10	1.8	1.0	**1.18**	30	2.MD.200070	.1	.0	■
.0280	0.71	**.047**	1.19	1.9	1.0	**1.18**	30	2.MD.200071	.1	.0	■
.0283	0.72	**.046**	1.18	1.9	1.0	**1.18**	30	2.MD.200072	.1	.0	■
.0287	0.73	**.046**	1.17	1.9	1.0	**1.18**	30	2.MD.200073	.1	.0	■
.0291	0.74	**.046**	1.16	1.9	1.0	**1.18**	30	2.MD.200074	.1	.0	■
.0295	0.75	**.045**	1.15	1.9	1.0	**1.18**	30	2.MD.200075	.1	.0	■
.0299	0.76	**.049**	1.24	2.0	1.0	**1.18**	30	2.MD.200076	.1	.0	■
.0303	0.77	**.048**	1.23	2.0	1.0	**1.18**	30	2.MD.200077	.1	.0	■
.0307	0.78	**.048**	1.22	2.0	1.0	**1.18**	30	2.MD.200078	.1	.0	■
.0311	0.79	**.048**	1.21	2.0	1.0	**1.18**	30	2.MD.200079	.1	.0	■

■ Stock item, packing unit of 5 pcs.
◪ Stock item only in uncoated version, packing unit of 5 pcs.

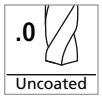
Complementary products

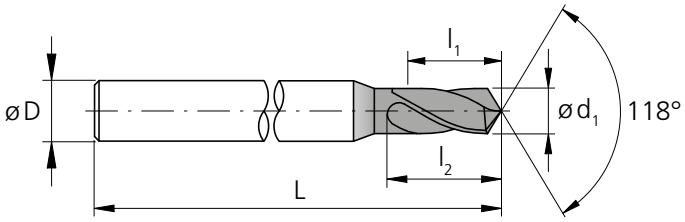
MiquDrill 210 p.223

MiquDrill 200 - coated / uncoated

DRILLING WITH EXTERNAL COOLING

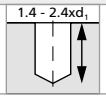
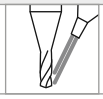






d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
.0315	0.80	**.047**	1.20	2.0	1.5	**1.18**	30	2.MD.200080	.1	.0	■
.0319	0.81	**.051**	1.29	2.1	1.5	**1.18**	30	2.MD.200081	.1	.0	■
.0323	0.82	**.050**	1.28	2.1	1.5	**1.18**	30	2.MD.200082	.1	.0	■
.0327	0.83	**.050**	1.27	2.1	1.5	**1.18**	30	2.MD.200083	.1	.0	■
.0331	0.84	**.050**	1.26	2.1	1.5	**1.18**	30	2.MD.200084	.1	.0	■
.0335	0.85	**.049**	1.25	2.1	1.5	**1.18**	30	2.MD.200085	.1	.0	■
.0339	0.86	**.057**	1.44	2.3	1.5	**1.18**	30	2.MD.200086	.1	.0	■
.0343	0.87	**.056**	1.43	2.3	1.5	**1.18**	30	2.MD.200087	.1	.0	■
.0346	0.88	**.056**	1.42	2.3	1.5	**1.18**	30	2.MD.200088	.1	.0	■
.0350	0.89	**.056**	1.41	2.3	1.5	**1.18**	30	2.MD.200089	.1	.0	■
.0354	0.90	**.055**	1.40	2.3	1.5	**1.18**	30	2.MD.200090	.1	.0	■
.0358	0.91	**.055**	1.39	2.3	1.5	**1.18**	30	2.MD.200091	.1	.0	■
.0362	0.92	**.054**	1.38	2.3	1.5	**1.18**	30	2.MD.200092	.1	.0	■
.0366	0.93	**.054**	1.37	2.3	1.5	**1.18**	30	2.MD.200093	.1	.0	■
.0370	0.94	**.054**	1.36	2.3	1.5	**1.18**	30	2.MD.200094	.1	.0	■
.0374	0.95	**.053**	1.35	2.3	1.5	**1.18**	30	2.MD.200095	.1	.0	■
.0378	0.96	**.061**	1.54	2.5	1.5	**1.18**	30	2.MD.200096	.1	.0	■
.0382	0.97	**.060**	1.53	2.5	1.5	**1.18**	30	2.MD.200097	.1	.0	■
.0386	0.98	**.060**	1.52	2.5	1.5	**1.18**	30	2.MD.200098	.1	.0	■
.0390	0.99	**.059**	1.51	2.5	1.5	**1.18**	30	2.MD.200099	.1	.0	■
.0394	1.00	**.059**	1.50	2.5	1.5	**1.18**	30	2.MD.200100	.1	.0	■
.0398	1.01	**.063**	1.59	2.6	1.5	**1.18**	30	2.MD.200101	.1	.0	■
.0402	1.02	**.062**	1.58	2.6	1.5	**1.18**	30	2.MD.200102	.1	.0	■
.0406	1.03	**.062**	1.57	2.6	1.5	**1.18**	30	2.MD.200103	.1	.0	■
.0409	1.04	**.061**	1.56	2.6	1.5	**1.18**	30	2.MD.200104	.1	.0	■
.0413	1.05	**.061**	1.55	2.6	1.5	**1.18**	30	2.MD.200105	.1	.0	■
.0417	1.06	**.069**	1.74	2.8	1.5	**1.18**	30	2.MD.200106	.1	.0	■
.0421	1.07	**.068**	1.73	2.8	1.5	**1.18**	30	2.MD.200107	.1	.0	■
.0425	1.08	**.068**	1.72	2.8	1.5	**1.18**	30	2.MD.200108	.1	.0	■
.0429	1.09	**.067**	1.71	2.8	1.5	**1.18**	30	2.MD.200109	.1	.0	■
.0433	1.10	**.067**	1.70	2.8	1.5	**1.18**	30	2.MD.200110	.1	.0	■
.0437	1.11	**.074**	1.89	3.0	1.5	**1.18**	30	2.MD.200111	.1	.0	■
.0441	1.12	**.074**	1.88	3.0	1.5	**1.18**	30	2.MD.200112	.1	.0	■
.0445	1.13	**.074**	1.87	3.0	1.5	**1.18**	30	2.MD.200113	.1	.0	■
.0449	1.14	**.073**	1.86	3.0	1.5	**1.18**	30	2.MD.200114	.1	.0	■
.0453	1.15	**.073**	1.85	3.0	1.5	**1.18**	30	2.MD.200115	.1	.0	■

■ Stock item, packing unit of 5 pcs.

Carbide			Z2	

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**0 - .00016"**	0 - 0.004 mm

d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated .1	Uncoated .0	Availability
.0457	1.16	**.072**	1.84	3.0	1.5	**1.18**	30	2.MD.200116	.1	.0	■
.0461	1.17	**.072**	1.83	3.0	1.5	**1.18**	30	2.MD.200117	.1	.0	■
.0465	1.18	**.072**	1.82	3.0	1.5	**1.18**	30	2.MD.200118	.1	.0	■
.0469	1.19	**.071**	1.81	3.0	1.5	**1.18**	30	2.MD.200119	.1	.0	■
.0472	1.20	**.071**	1.80	3.0	1.5	**1.18**	30	2.MD.200120	.1	.0	■
.0476	1.21	**.070**	1.79	3.0	1.5	**1.18**	30	2.MD.200121	.1	.0	■
.0480	1.22	**.070**	1.78	3.0	1.5	**1.18**	30	2.MD.200122	.1	.0	■
.0484	1.23	**.070**	1.77	3.0	1.5	**1.18**	30	2.MD.200123	.1	.0	■
.0488	1.24	**.069**	1.76	3.0	1.5	**1.18**	30	2.MD.200124	.1	.0	■
.0492	1.25	**.069**	1.75	3.0	1.5	**1.18**	30	2.MD.200125	.1	.0	■
.0496	1.26	**.080**	2.04	3.3	1.5	**1.18**	30	2.MD.200126	.1	.0	■
.0500	1.27	**.080**	2.03	3.3	1.5	**1.18**	30	2.MD.200127	.1	.0	■
.0504	1.28	**.080**	2.02	3.3	1.5	**1.18**	30	2.MD.200128	.1	.0	■
.0508	1.29	**.079**	2.01	3.3	1.5	**1.18**	30	2.MD.200129	.1	.0	■
.0512	1.30	**.079**	2.00	3.3	1.5	**1.18**	30	2.MD.200130	.1	.0	■
.0516	1.31	**.078**	1.99	3.3	1.5	**1.18**	30	2.MD.200131	.1	.0	■
.0520	1.32	**.078**	1.98	3.3	1.5	**1.18**	30	2.MD.200132	.1	.0	■
.0524	1.33	**.078**	1.97	3.3	1.5	**1.18**	30	2.MD.200133	.1	.0	■
.0528	1.34	**.077**	1.96	3.3	1.5	**1.18**	30	2.MD.200134	.1	.0	■
.0531	1.35	**.077**	1.95	3.3	1.5	**1.18**	30	2.MD.200135	.1	.0	■
.0535	1.36	**.084**	2.14	3.5	1.5	**1.18**	30	2.MD.200136	.1	.0	■
.0539	1.37	**.084**	2.13	3.5	1.5	**1.18**	30	2.MD.200137	.1	.0	■
.0543	1.38	**.083**	2.12	3.5	1.5	**1.18**	30	2.MD.200138	.1	.0	■
.0547	1.39	**.083**	2.11	3.5	1.5	**1.18**	30	2.MD.200139	.1	.0	■
.0551	1.40	**.083**	2.10	3.5	1.5	**1.18**	30	2.MD.200140	.1	.0	■
.0555	1.41	**.082**	2.09	3.5	1.5	**1.18**	30	2.MD.200141	.1	.0	■
.0559	1.42	**.082**	2.08	3.5	1.5	**1.18**	30	2.MD.200142	.1	.0	■
.0563	1.43	**.081**	2.07	3.5	1.5	**1.18**	30	2.MD.200143	.1	.0	■
.0567	1.44	**.081**	2.06	3.5	1.5	**1.18**	30	2.MD.200144	.1	.0	■
.0571	1.45	**.081**	2.05	3.5	1.5	**1.18**	30	2.MD.200145	.1	.0	■
.0575	1.46	**.092**	2.34	3.8	1.5	**1.18**	30	2.MD.200146	.1	.0	■
.0579	1.47	**.092**	2.33	3.8	1.5	**1.18**	30	2.MD.200147	.1	.0	■
.0583	1.48	**.091**	2.32	3.8	1.5	**1.18**	30	2.MD.200148	.1	.0	■
.0587	1.49	**.091**	2.31	3.8	1.5	**1.18**	30	2.MD.200149	.1	.0	■
.0591	1.50	**.091**	2.30	3.8	2.0	**1.50**	38	2.MD.200150	.1	.0	■

■ Stock item, packing unit of 5 pcs.

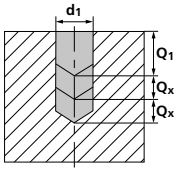
Complementary products

MiquDrill 210 p.223

MiquDrill 200 - coated

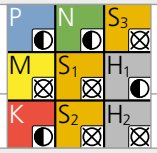
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	40–70 | **131 – 230**	see l_1	-
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	30–40 | **98 – 131**	see l_1	-
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	30–60 | **98 – 197**	see l_1	-
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000			
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C			
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304			
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	30–70 | **98 – 230**	see l_1	-
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	80–150 | **262 – 492**	see l_1	-
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60–100 | **197 – 328**	see l_1	-
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40–70 | **131 – 230**	see l_1	-
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40–70 | **131 – 230**	see l_1	-
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	40–150 | **131 – 492**	see l_1	-
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	30–40 | **98 – 131**	see l_1	-
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67			
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136			
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25			
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	20–40 | **66 – 131**	0.5xd1	0.5xd1
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

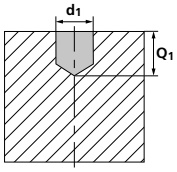


	f [mm/rev] **| [IPR]**		
	Ød1		
	0.3–0.6 mm **| .012"–.024"**	0.6–1.0 mm **| .024"–.039"**	1.0–1.5 mm **| .039"–.059"**
	f	**f**	**f**
	0.009 **| .00035**	0.016 **| .00063**	0.023 **| .00091**
	0.007 **| .00028**	0.011 **| .00043**	0.015 **| .00059**
	0.004 **| .00016**	0.009 **| .00035**	0.014 **| .00055**
	0.007 **| .00028**	0.013 **| .00051**	0.023 **| .00091**
	0.010 **| .00039**	0.023 **| .00091**	0.038 **| .00150**
	0.008 **| .00031**	0.019 **| .00075**	0.030 **| .00118**
	0.008 **| .00031**	0.014 **| .00055**	0.023 **| .00091**
	0.008 **| .00031**	0.014 **| .00055**	0.023 **| .00091**
	0.008 **| .00031**	0.017 **| .00067**	0.030 **| .00118**
	0.007 **| .00028**	0.011 **| .00043**	0.015 **| .00059**
	0.003 **| .00012**	0.004 **| .00016**	0.007 **| .00028**

MiquDrill 200 - uncoated

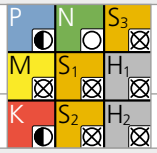
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





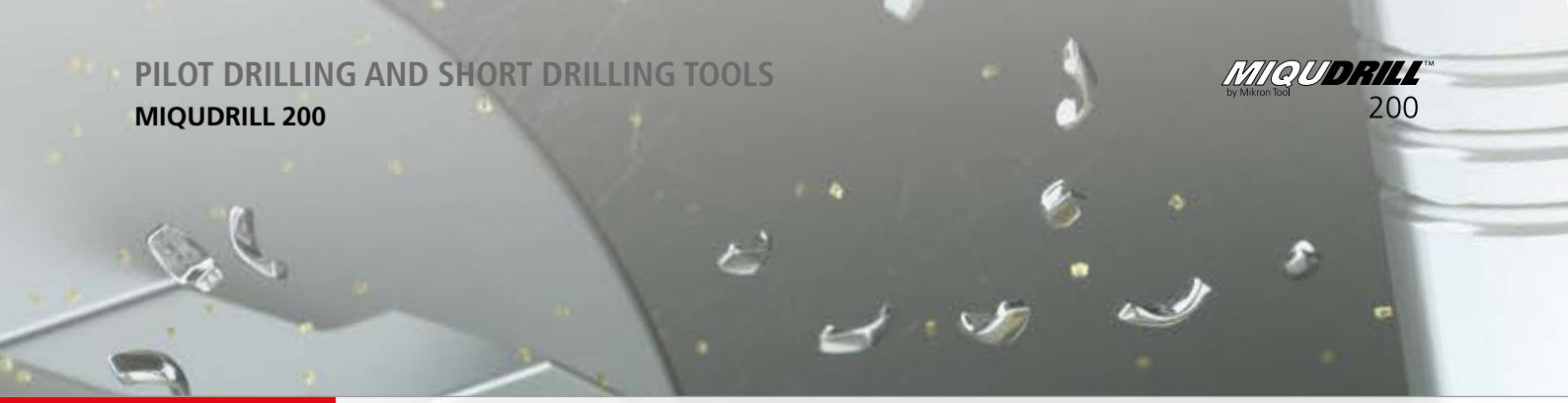
Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	30–60 | **98 – 197**	see l_1
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	25–40 | **82 – 131**	see l_1
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	25–40 | **82 – 131**	see l_1
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	25–60 | **82 – 197**	see l_1
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	50–100 | **164 – 328**	see l_1
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	40–80 | **82 – 262**	see l_1
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	30–50 | **98 – 164**	see l_1
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	30–50 | **98 – 164**	see l_1
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	30–80 | **98 – 262**	see l_1
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	25–40 | **82 – 131**	see l_1
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

	Ød1			
	0.1–0.3 mm	**.004"–.012"**	0.3–0.6 mm	**.012"–.024"**	0.6–1.0 mm	**.024"–.039"**	1.0–1.5 mm	**.039"–.059"**
	f		**f**		**f**		**f**	
	0.003	**.00012**	0.009	**.00035**	0.016	**.00063**	0.023	**.00091**
	0.003	**.00012**	0.007	**.00028**	0.011	**.00043**	0.015	**.00059**
	0.002	**.00008**	0.004	**.00016**	0.009	**.00035**	0.014	**.00055**
	0.003	**.00012**	0.007	**.00028**	0.013	**.00051**	0.023	**.00091**
	0.006	**.00024**	0.010	**.00039**	0.023	**.00091**	0.038	**.00150**
	0.005	**.00020**	0.008	**.00031**	0.019	**.00075**	0.030	**.00118**
	0.004	**.00016**	0.008	**.00031**	0.014	**.00055**	0.023	**.00091**
	0.004	**.00016**	0.008	**.00031**	0.014	**.00055**	0.023	**.00091**
	0.005	**.00020**	0.008	**.00031**	0.017	**.00067**	0.030	**.00118**
	0.003	**.00012**	0.007	**.00028**	0.011	**.00043**	0.015	**.00059**
	Recommended: MiquDrill 200 - coated							



Drilling process MiquDrill 200

ACCURATE AND QUICK DRILLING FROM 1.4 TO 2.4 X D

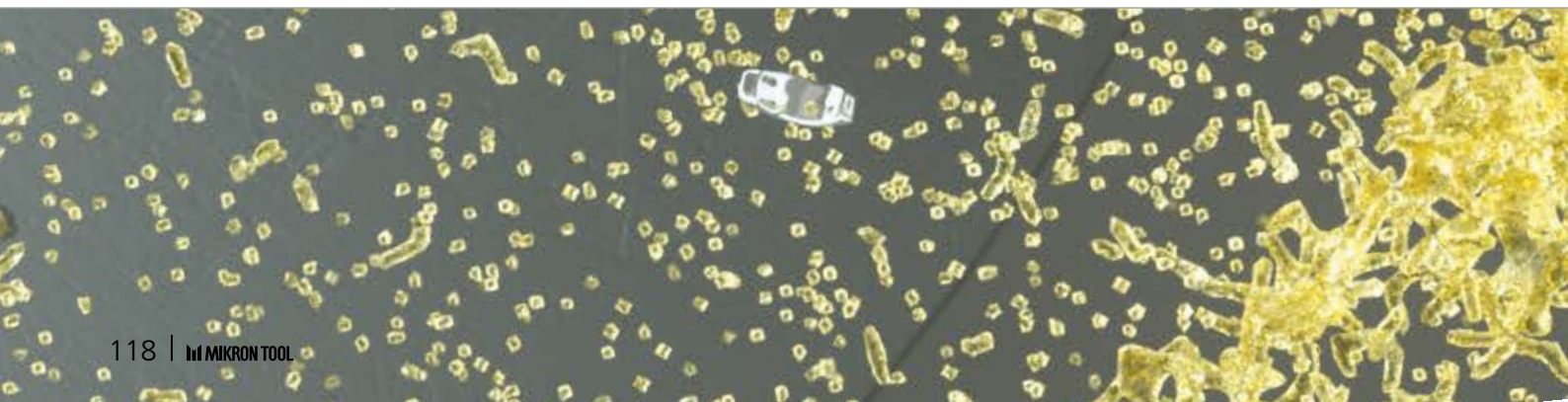
Coolant type, pressure, filtration and flowrate

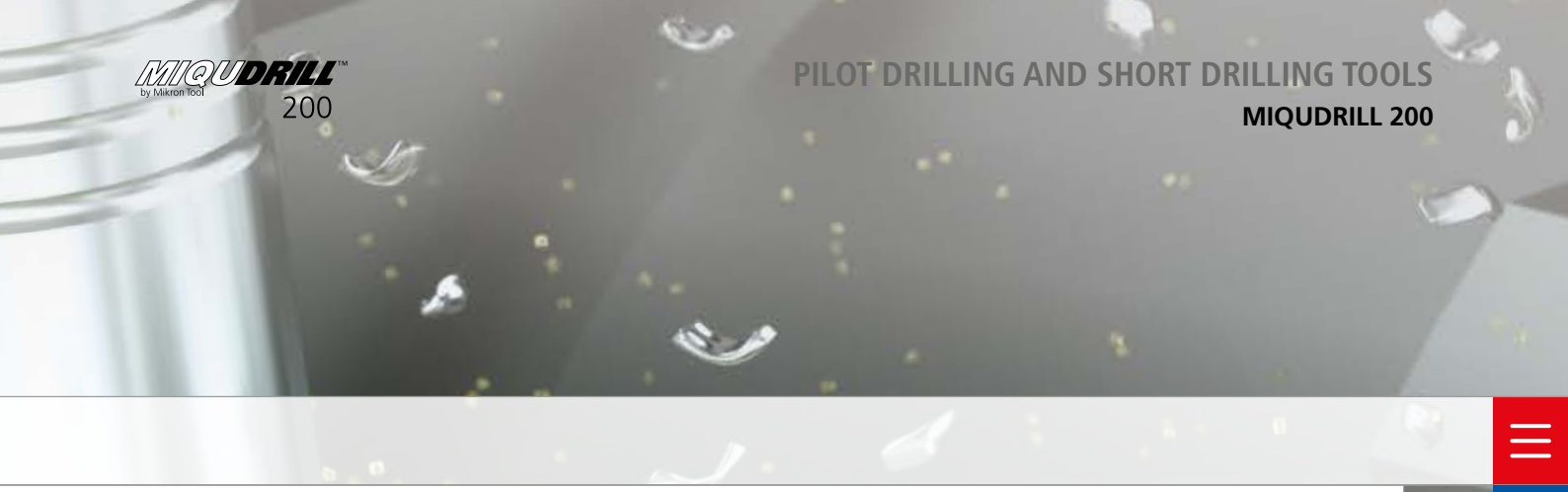
For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the coolant fluid is addressed directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical information".



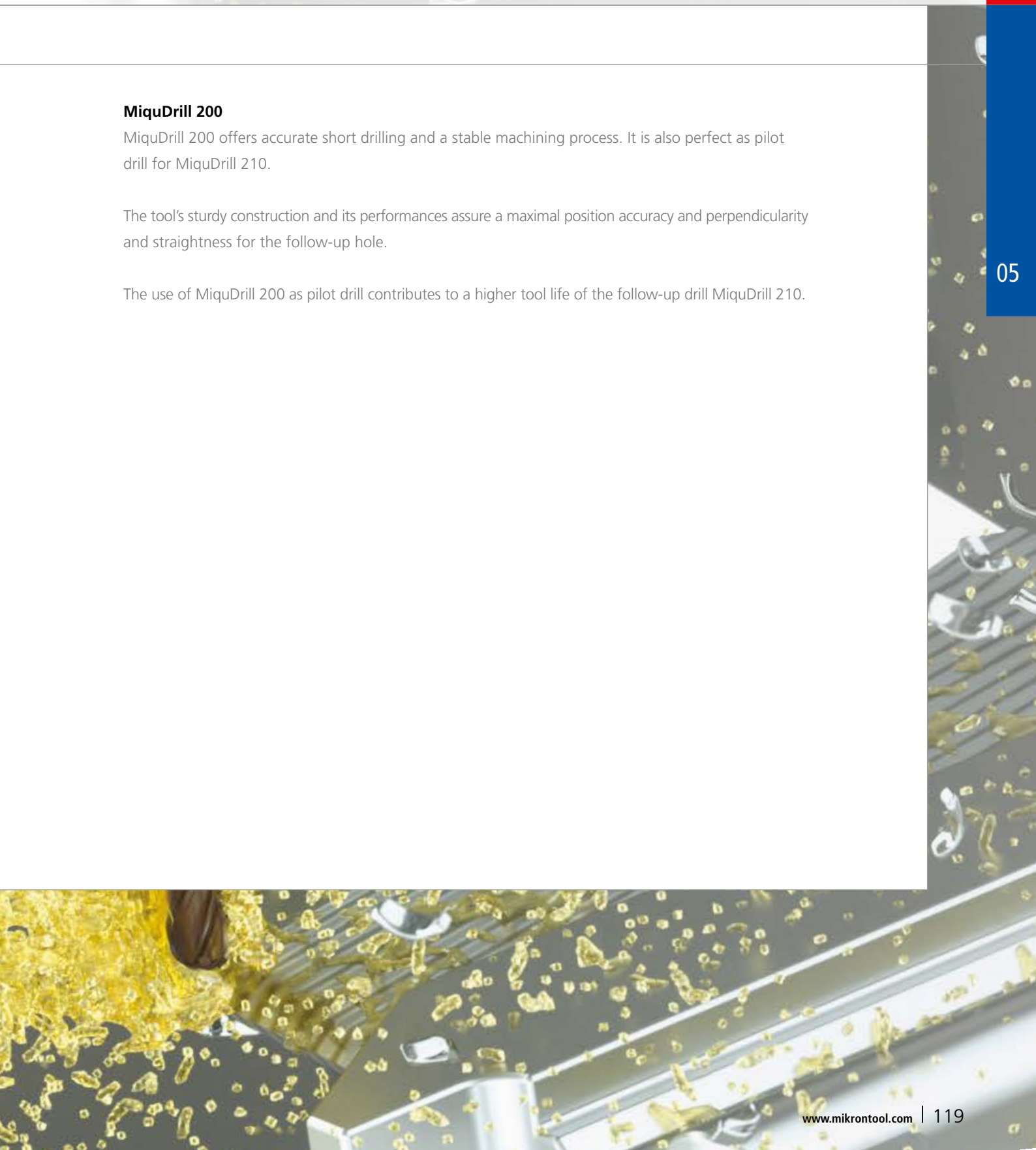


MiquDrill 200

MiquDrill 200 offers accurate short drilling and a stable machining process. It is also perfect as pilot drill for MiquDrill 210.

The tool's sturdy construction and its performances assure a maximal position accuracy and perpendicularity and straightness for the follow-up hole.

The use of MiquDrill 200 as pilot drill contributes to a higher tool life of the follow-up drill MiquDrill 210.

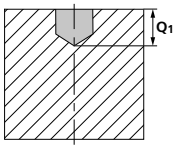


Drilling process MiquDrill 200

DRILLING IN ONE STEP (ALL MATERIALS WITH THE EXCEPTION OF HARDENED STEEL)

1 | PILOT DRILLING OR SHORT DRILLING

- With MiquDrill 200 up to maximum drilling depth Q_1 in one step (see cutting data table).



Note:
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

DRILLING ACCORDING DIN 66025 / PAL (DEPENDING ON MATERIAL, SEE CUTTING DATA CHART)

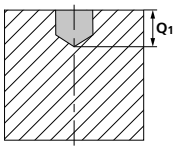
Drilling according DIN 66025 / PAL

G83 deep-drilling cycle with chip break and chip removal (pecks)

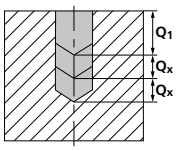
Q = depth of the respective peck

1 | PILOT DRILLING OR SHORT DRILLING

- With MiquDrill 200 up to maximum drilling depth Q_1 (see cutting data table) in one step, afterwards remove chips.



- Additional pecks Qx according to cutting data table, afterwards remove chips.



Note:

Between pecks, take the drill completely out from the hole.

After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

CrazyDrill Flexpilot



CRAZYDRILL Flexpilot

SHORT AND PRECISE: THE PREPARATION OF DEEP HOLES



Mikron Tool offers with CrazyDrill Flexpilot a pilot drill for the preparation of deep-hole drilling with CrazyDrill Flex. With drilling depths up to 3 x d this drill is also adapted for micro-short drilling.

The diameter range from .004" to 079" (0.1 to 2.0 mm) corresponds to the deep-hole drills of the CrazyDrill Flex family.

With CrazyDrill Flexpilot centering and pilot drilling up to 3 x d is done in one single step. The follow-up drill is guided cylindrically in the pilot hole, therefore high straightness of the follow-up drilling is assured. The geometry of this pilot drill corresponds to the various versions of the micro deep-hole drills CrazyDrill Flex (Steel and Titanium) thus assuring the perfect starting position for deep-hole drilling in a wide range of materials.

Optimally matched diameter tolerances and tip angles guarantee accurate deep-hole drilling without measurable transition from pilot to follow-up hole, assure process reliability and increase also substantially tool life of the follow-up drill.

The special high-performance geometry of CrazyDrill Flexpilot ensures high cutting speed, the optimal coating high wear resistance.

Micro-drilling well prepared

FOR PILOT DRILLING OR SHORT DRILLING FROM Ø .004" (0.1 MM)

Mikron Tool offers with CrazyDrill Flexpilot a pilot drill for the preparation of deep-hole drilling with CrazyDrill Flex. With drilling depths up to 3 x d this drill is also adapted for micro-short drilling. The diameter range from .004" to 079" (0.1 to 2.0 mm) corresponds to the deep-hole drills of the CrazyDrill Flex family.

- CrazyDrill Flexpilot Steel, drilling depth 3 x d, external cooling, coated and uncoated
- CrazyDrill Flexpilot Titanium, drilling depth 3 x d, external cooling, uncoated

Steel

- Coated / Uncoated
- External cooling

- Ø .008" - .079" (0.2 - 2.0mm) - coated
  Ø .004" - .047" (0.1 - 1.2mm) - uncoated



Page 129

Titanium

- Uncoated
- External cooling

- Ø .004" - .047" (0.1 - 1.2mm) - uncoated



Page 135

1 | SHANK
The reinforced solid carbide shaft guarantees stability, high concentricity and therefore highest drilling accuracy.

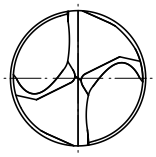
2 | HELICAL FLUTE
The geometry of the flutes is adapted to the materials to be machined (steel or long-chip materials as titanium or copper). Thus guarantees good chip breakage and quick chip evacuation.

3 | COATING
Depending on the version, the drills are coated with eXedur RIP. Especially developed for highest performance, this coating is wear and heat resistant, avoids nesting of chips and ensures chip evacuation. The result is a long tool life.

4 | TIP GEOMETRY
Thanks to the innovative drill point geometry, only a reduced penetration force is necessary for drilling (feed force reduction up to 50%), therefore low heat development and best position accuracy. Highest cutting speed is possible.

5 | CUTTING EDGE PROTECTION / CUTTING GEOMETRY
The solid carbide drill has a special cutting geometry. This permits quick drilling without damaging the cutting edges.

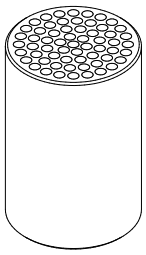
6 | DIAMETER RANGE
Adapted to the diameters of the CrazyDrill Flex family, each deep-hole drill has the proper pilot drill.

Drill tip 

Benefits and applications

THE IDEAL COMPLEMENT TO CRAZYDRILL FLEX STEEL / TITANIUM

- **SHORT MACHINING TIME** | due to the high cutting speed
- **LONG TOOL LIFE** | up to 2 times longer
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to a new cutting geometry
- **HIGH DEGREE OF PRECISION** | due to small tolerances



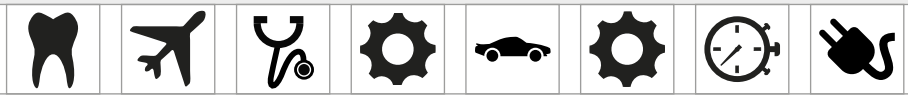
COMPONENT
Filter

MATERIAL
100Cr6 / 1.3505 / AISI 52100

MACHINING
- Pilot drilling
- d = 1 mm **| .039"**
- Drilling depth 3 mm **| .118"**

DRILLING TOOL
Mikron Tool - CrazyDrill Flexpilot Steel - coated

DATA	MIKRON TOOL
Tool type	CrazyDrill Flexpilot - Carbide - Coated - External cooling
Item number	2.PFS.100.1
Cutting data	v_c = 40 m/min **| 131 SFM** f = 0.042 mm/rev **| .0017 IPR**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Dental implant
Aerospace industry	Injection nozzle
Medical technology	Surgical device
Tool and mold making	Air vent hole for glass form mould
Automotive industry	Turned part
Mechanical engineering	Nozzle
Watches	Bracelet components
Electronics / Electrical	Solenoid contactor

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S2 Titanium (pure and alloyed)	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136

Steel - 3 x d - coated / uncoated

DRILLING WITH EXTERNAL COOLING



Coated Uncoated

CrazyDrill Flexpilot Steel is adapted for pilot drilling respectively short drilling and depths up to 3 x d, for steels, cast iron, aluminum alloys, brass and bronze. The pilot drill guides perfectly the follow-up drill CrazyDrill Flex Steel and thus assures straightness for the following deep-hole drilling. Thanks to the robust construction, the pilot drill ensures high position accuracy. Furthermore the drill guarantees a significantly longer tool life to the follow-up drill preventing breakage of cutting edges due to matched tip angles of 140°.

The coated version (eXedur RIP), compared to the uncoated one, is perfect for drilling larger series. Also the surface quality profits by the high-performance coating.

Also as short drill, where the tool reaches high drilling quality thanks to its robust construction (reinforced shaft) and precision, CrazyDrill Flexpilot proved itself. Its innovative drill point geometry guarantees high cutting speed and feed force and process reliability.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note

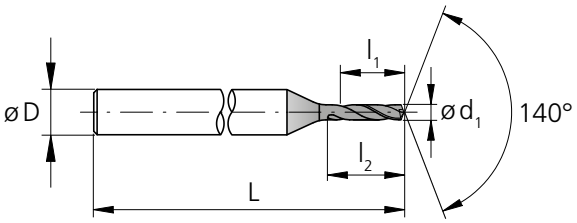
You couldn't find your suitable version of the CrazyDrill Flexpilot Steel - coated / uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide	3xd1	140°	Z2	

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**+ .00012"** **0**	+ 0.003 mm 0





d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.0039	0.10	**.012**	0.30	0.5	3	**1.57**	40	2.PFS.010	-	.0	◪
	.0043	0.11	**.013**	0.33	0.6	3	**1.57**	40	2.PFS.011	-	.0	Δ
	.0047	0.12	**.014**	0.36	0.6	3	**1.57**	40	2.PFS.012	-	.0	Δ
	.0051	0.13	**.015**	0.39	0.7	3	**1.57**	40	2.PFS.013	-	.0	Δ
	.0055	0.14	**.017**	0.42	0.7	3	**1.57**	40	2.PFS.014	-	.0	Δ
	.0059	0.15	**.018**	0.45	0.8	3	**1.57**	40	2.PFS.015	-	.0	◪
	.0063	0.16	**.019**	0.48	0.8	3	**1.57**	40	2.PFS.016	-	.0	Δ
	.0067	0.17	**.020**	0.51	0.9	3	**1.57**	40	2.PFS.017	-	.0	Δ
	.0071	0.18	**.021**	0.54	0.9	3	**1.57**	40	2.PFS.018	-	.0	Δ
	.0075	0.19	**.022**	0.57	1.0	3	**1.57**	40	2.PFS.019	-	.0	Δ
	.0079	0.20	**.024**	0.60	1.0	3	**1.57**	40	2.PFS.020	.1	.0	■
	.0083	0.21	**.025**	0.63	1.1	3	**1.57**	40	2.PFS.021	.1	.0	Δ
	.0087	0.22	**.026**	0.66	1.1	3	**1.57**	40	2.PFS.022	.1	.0	Δ
	.0091	0.23	**.027**	0.69	1.2	3	**1.57**	40	2.PFS.023	.1	.0	Δ
	.0094	0.24	**.028**	0.72	1.2	3	**1.57**	40	2.PFS.024	.1	.0	Δ
	.0098	0.25	**.030**	0.75	1.3	3	**1.57**	40	2.PFS.025	.1	.0	■
	.0102	0.26	**.031**	0.78	1.3	3	**1.57**	40	2.PFS.026	.1	.0	Δ
	.0106	0.27	**.032**	0.81	1.4	3	**1.57**	40	2.PFS.027	.1	.0	Δ
	.0110	0.28	**.033**	0.84	1.4	3	**1.57**	40	2.PFS.028	.1	.0	Δ
	.0114	0.29	**.034**	0.87	1.5	3	**1.57**	40	2.PFS.029	.1	.0	Δ
	.0118	0.30	**.035**	0.90	1.5	3	**1.57**	40	2.PFS.030	.1	.0	■
	.0122	0.31	**.037**	0.93	1.6	3	**1.57**	40	2.PFS.031	.1	.0	Δ
	.0126	0.32	**.038**	0.96	1.6	3	**1.57**	40	2.PFS.032	.1	.0	Δ
	.0130	0.33	**.039**	0.99	1.7	3	**1.57**	40	2.PFS.033	.1	.0	Δ
	.0134	0.34	**.040**	1.02	1.7	3	**1.57**	40	2.PFS.034	.1	.0	Δ
	.0138	0.35	**.041**	1.05	1.8	3	**1.57**	40	2.PFS.035	.1	.0	■
	.0142	0.36	**.043**	1.08	1.8	3	**1.57**	40	2.PFS.036	.1	.0	Δ
	.0146	0.37	**.044**	1.11	1.9	3	**1.57**	40	2.PFS.037	.1	.0	Δ
	.0150	0.38	**.045**	1.14	1.9	3	**1.57**	40	2.PFS.038	.1	.0	Δ
	.0154	0.39	**.046**	1.17	2.0	3	**1.57**	40	2.PFS.039	.1	.0	Δ
1/64	**.0156**	0.396	**.047**	1.20	2.0	3	**1.57**	40	2.PFS.F164	.1	-	◪
	.0157	0.40	**.047**	1.20	2.0	3	**1.57**	40	2.PFS.040	.1	.0	■
	.0161	0.41	**.048**	1.23	2.1	3	**1.57**	40	2.PFS.041	.1	.0	Δ

d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
.0165	0.42	**.050**	1.26	2.1	3	**1.57**	40	2.PFS.042	.1	.0	Δ
.0169	0.43	**.051**	1.29	2.2	3	**1.57**	40	2.PFS.043	.1	.0	Δ
.0173	0.44	**.052**	1.32	2.2	3	**1.57**	40	2.PFS.044	.1	.0	Δ
.0177	0.45	**.053**	1.35	2.3	3	**1.57**	40	2.PFS.045	.1	.0	■
.0181	0.46	**.054**	1.38	2.3	3	**1.57**	40	2.PFS.046	.1	.0	Δ
.0185	0.47	**.056**	1.41	2.4	3	**1.57**	40	2.PFS.047	.1	.0	Δ
.0189	0.48	**.057**	1.44	2.4	3	**1.57**	40	2.PFS.048	.1	.0	Δ
.0193	0.49	**.058**	1.47	2.5	3	**1.57**	40	2.PFS.049	.1	.0	Δ
.0197	0.50	**.059**	1.50	2.5	3	**1.57**	40	2.PFS.050	.1	.0	■
.0201	0.51	**.060**	1.53	2.6	3	**1.57**	40	2.PFS.051	.1	.0	Δ
.0205	0.52	**.061**	1.56	2.6	3	**1.57**	40	2.PFS.052	.1	.0	Δ
.0209	0.53	**.063**	1.59	2.7	3	**1.57**	40	2.PFS.053	.1	.0	Δ
.0213	0.54	**.064**	1.62	2.7	3	**1.57**	40	2.PFS.054	.1	.0	Δ
.0217	0.55	**.065**	1.65	2.8	3	**1.57**	40	2.PFS.055	.1	.0	■
.0220	0.56	**.066**	1.68	2.8	3	**1.57**	40	2.PFS.056	.1	.0	Δ
.0224	0.57	**.067**	1.71	2.9	3	**1.57**	40	2.PFS.057	.1	.0	Δ
.0228	0.58	**.069**	1.74	2.9	3	**1.57**	40	2.PFS.058	.1	.0	Δ
.0232	0.59	**.070**	1.77	3.0	3	**1.57**	40	2.PFS.059	.1	.0	Δ
.0236	0.60	**.071**	1.80	3.0	3	**1.57**	40	2.PFS.060	.1	.0	■
.0240	0.61	**.072**	1.83	3.1	3	**1.57**	40	2.PFS.061	.1	.0	Δ
.0244	0.62	**.073**	1.86	3.1	3	**1.57**	40	2.PFS.062	.1	.0	Δ
.0248	0.63	**.074**	1.89	3.2	3	**1.57**	40	2.PFS.063	.1	.0	Δ
.0252	0.64	**.076**	1.92	3.2	3	**1.57**	40	2.PFS.064	.1	.0	Δ
.0256	0.65	**.077**	1.95	3.3	3	**1.57**	40	2.PFS.065	.1	.0	■
.0260	0.66	**.078**	1.98	3.3	3	**1.57**	40	2.PFS.066	.1	.0	Δ
.0264	0.67	**.079**	2.01	3.4	3	**1.57**	40	2.PFS.067	.1	.0	Δ
.0268	0.68	**.080**	2.04	3.4	3	**1.57**	40	2.PFS.068	.1	.0	Δ
.0272	0.69	**.081**	2.07	3.5	3	**1.57**	40	2.PFS.069	.1	.0	Δ
.0276	0.70	**.083**	2.10	3.5	3	**1.57**	40	2.PFS.070	.1	.0	■
.0280	0.71	**.084**	2.13	3.6	3	**1.57**	40	2.PFS.071	.1	.0	Δ
.0283	0.72	**.085**	2.16	3.6	3	**1.57**	40	2.PFS.072	.1	.0	Δ
.0287	0.73	**.086**	2.19	3.7	3	**1.57**	40	2.PFS.073	.1	.0	Δ
.0291	0.74	**.087**	2.22	3.7	3	**1.57**	40	2.PFS.074	.1	.0	Δ

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

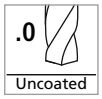
Complementary products
CrazyDrill Flex Steel p.399

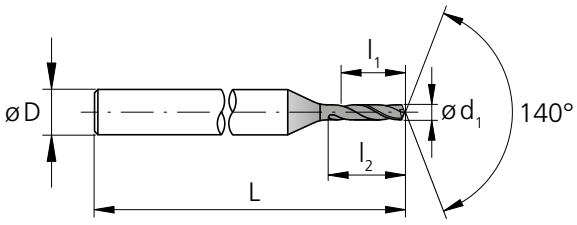
CRAZYDRILL by Mikron Tool Flexpilot

Steel - 3 x d - coated / uncoated

DRILLING WITH EXTERNAL COOLING







d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated .1	Uncoated .0	Availability
	.0295	0.75	**.089**	2.25	3.8	3	**1.57**	40	2.PFS.075	.1	.0	■
	.0299	0.76	**.090**	2.28	3.8	3	**1.57**	40	2.PFS.076	.1	.0	Δ
	.0303	0.77	**.091**	2.31	3.9	3	**1.57**	40	2.PFS.077	.1	.0	Δ
	.0307	0.78	**.092**	2.34	3.9	3	**1.57**	40	2.PFS.078	.1	.0	Δ
	.0311	0.79	**.093**	2.37	4.0	3	**1.57**	40	2.PFS.079	.1	.0	Δ
1/32	**.0312**	0.793	**.094**	2.40	4.0	3	**1.57**	40	2.PFS.F132	.1	-	◪
	.0315	0.80	**.094**	2.40	4.0	3	**1.57**	40	2.PFS.080	.1	.0	■
	.0319	0.81	**.096**	2.43	4.1	3	**1.57**	40	2.PFS.081	.1	.0	Δ
	.0323	0.82	**.097**	2.46	4.1	3	**1.57**	40	2.PFS.082	.1	.0	Δ
	.0327	0.83	**.098**	2.49	4.2	3	**1.57**	40	2.PFS.083	.1	.0	Δ
	.0331	0.84	**.099**	2.52	4.2	3	**1.57**	40	2.PFS.084	.1	.0	Δ
	.0335	0.85	**.100**	2.55	4.3	3	**1.57**	40	2.PFS.085	.1	.0	■
	.0339	0.86	**.102**	2.58	4.3	3	**1.57**	40	2.PFS.086	.1	.0	Δ
	.0343	0.87	**.103**	2.61	4.4	3	**1.57**	40	2.PFS.087	.1	.0	Δ
	.0346	0.88	**.104**	2.64	4.4	3	**1.57**	40	2.PFS.088	.1	.0	Δ
	.0350	0.89	**.105**	2.67	4.5	3	**1.57**	40	2.PFS.089	.1	.0	Δ
	.0354	0.90	**.106**	2.70	4.5	3	**1.57**	40	2.PFS.090	.1	.0	■
	.0358	0.91	**.107**	2.73	4.6	3	**1.57**	40	2.PFS.091	.1	.0	Δ
	.0362	0.92	**.109**	2.76	4.6	3	**1.57**	40	2.PFS.092	.1	.0	Δ
	.0366	0.93	**.110**	2.79	4.7	3	**1.57**	40	2.PFS.093	.1	.0	Δ
	.0370	0.94	**.111**	2.82	4.7	3	**1.57**	40	2.PFS.094	.1	.0	Δ
	.0374	0.95	**.112**	2.85	4.8	3	**1.57**	40	2.PFS.095	.1	.0	■
	.0378	0.96	**.113**	2.88	4.8	3	**1.57**	40	2.PFS.096	.1	.0	Δ
	.0382	0.97	**.115**	2.91	4.9	3	**1.57**	40	2.PFS.097	.1	.0	Δ
	.0386	0.98	**.116**	2.94	4.9	3	**1.57**	40	2.PFS.098	.1	.0	Δ
	.0390	0.99	**.117**	2.97	5.0	3	**1.57**	40	2.PFS.099	.1	.0	Δ
	.0394	1.00	**.118**	3.00	5.0	3	**1.57**	40	2.PFS.100	.1	.0	■
	.0398	1.01	**.119**	3.03	5.1	3	**1.57**	40	2.PFS.101	.1	.0	Δ
	.0402	1.02	**.120**	3.06	5.1	3	**1.57**	40	2.PFS.102	.1	.0	Δ
	.0406	1.03	**.122**	3.09	5.2	3	**1.57**	40	2.PFS.103	.1	.0	Δ
	.0409	1.04	**.123**	3.12	5.2	3	**1.57**	40	2.PFS.104	.1	.0	Δ
	.0413	1.05	**.124**	3.15	5.3	3	**1.57**	40	2.PFS.105	.1	.0	■

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Carbide | 3xd1 | 140° | Z2

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**+ .00012"** **0**	+ 0.003 mm 0

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.0417	1.06	**.125**	3.18	5.3	3	**1.57**	40	2.PFS.106	.1	.0	Δ
	.0421	1.07	**.126**	3.21	5.4	3	**1.57**	40	2.PFS.107	.1	.0	Δ
	.0425	1.08	**.128**	3.24	5.4	3	**1.57**	40	2.PFS.108	.1	.0	Δ
	.0429	1.09	**.129**	3.27	5.5	3	**1.57**	40	2.PFS.109	.1	.0	Δ
	.0433	1.10	**.130**	3.30	5.5	3	**1.57**	40	2.PFS.110	.1	.0	■
	.0437	1.11	**.131**	3.33	5.6	3	**1.57**	40	2.PFS.111	.1	.0	Δ
	.0441	1.12	**.132**	3.36	5.6	3	**1.57**	40	2.PFS.112	.1	.0	Δ
	.0445	1.13	**.133**	3.39	5.7	3	**1.57**	40	2.PFS.113	.1	.0	Δ
	.0449	1.14	**.135**	3.42	5.7	3	**1.57**	40	2.PFS.114	.1	.0	Δ
	.0453	1.15	**.136**	3.45	5.8	3	**1.57**	40	2.PFS.115	.1	.0	■
	.0457	1.16	**.137**	3.48	5.8	3	**1.57**	40	2.PFS.116	.1	.0	Δ
	.0461	1.17	**.138**	3.51	5.9	3	**1.57**	40	2.PFS.117	.1	.0	Δ
	.0465	1.18	**.139**	3.54	5.9	3	**1.57**	40	2.PFS.118	.1	.0	Δ
	.0469	1.19	**.141**	3.57	6.0	3	**1.57**	40	2.PFS.119	.1	.0	Δ
	.0472	1.20	**.142**	3.60	6.0	3	**1.57**	40	2.PFS.120	.1	.0	■
	.0492	1.25	**.148**	3.75	6.3	3	**1.57**	40	2.PFS.125	.1	-	◪
	.0512	1.30	**.154**	3.90	6.5	3	**1.57**	40	2.PFS.130	.1	-	◪
	.0531	1.35	**.159**	4.05	6.8	3	**1.57**	40	2.PFS.135	.1	-	◪
	.0551	1.40	**.165**	4.20	7.0	3	**1.57**	40	2.PFS.140	.1	-	◪
	.0571	1.45	**.171**	4.35	7.3	3	**1.57**	40	2.PFS.145	.1	-	◪
	.0591	1.50	**.177**	4.50	7.5	3	**1.57**	40	2.PFS.150	.1	-	◪
	.0610	1.55	**.183**	4.65	7.8	3	**1.57**	40	2.PFS.155	.1	-	◪
1/16	**.0625**	1.587	**.189**	4.80	8.0	3	**1.57**	40	2.PFS.F116	.1	-	◪
	.0630	1.60	**.189**	4.80	8.0	3	**1.57**	40	2.PFS.160	.1	-	◪
	.0650	1.65	**.195**	4.95	8.3	3	**1.57**	40	2.PFS.165	.1	-	◪
	.0669	1.70	**.201**	5.10	8.5	3	**1.57**	40	2.PFS.170	.1	-	◪
	.0689	1.75	**.207**	5.25	8.8	3	**1.57**	40	2.PFS.175	.1	-	◪
	.0709	1.80	**.213**	5.40	9.0	3	**1.57**	40	2.PFS.180	.1	-	◪
	.0728	1.85	**.219**	5.55	9.3	3	**1.57**	40	2.PFS.185	.1	-	◪
	.0748	1.90	**.224**	5.70	9.5	3	**1.57**	40	2.PFS.190	.1	-	◪
	.0768	1.95	**.230**	5.85	9.8	3	**1.57**	40	2.PFS.195	.1	-	◪
	.0787	2.00	**.236**	6.00	10.0	3	**1.57**	40	2.PFS.200	.1	-	◪

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products

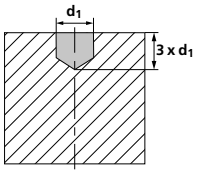
CrazyDrill Flex Steel p.399

CRAZYDRILL by Mikron Tool Flexpilot

Steel - 3 x d - coated / uncoated

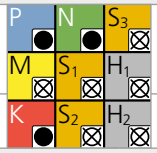
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	5 – 40 | **16 – 131**	40 – 60 | **131 – 197**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	5 – 25 | **16 – 82**	25 – 50 | **82 – 164**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	5 – 20 | **16 – 66**	20 – 35 | **66 – 115**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	5 – 40 | **16 – 131**	50 – 100 | **164 – 328**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		40 – 80 | **131 – 262**
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	5 – 40 | **16 – 131**	60 – 120 | **197 – 394**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	5 – 40 | **16 – 131**	50 – 80 | **164 – 262**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100		
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	5 – 40 | **16 – 131**	60 – 100 | **197 – 328**
		2.102	CuSn6	UNS C51900		40 – 60 | **131 – 197**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] **| [IPR]**

0.1 mm **| .004"** **f**	0.2 mm **| .008"** **f**	0.3 mm **| .012"** **f**	**Ød1 1/64"** 0.4 mm **| .016"** **f**	0.6 mm **| .024"** **f**	**1/32"** 0.8 mm **| .032"** **f**	1.0–1.2 mm **| .039"–.047"** **f**	**1/16"** 1.5–2.0 mm **| .059"–.079"**
0.002 **.00008**	0.005 **.0002**	0.010 **.0004**	0.015 **.0006**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**
0.002 **.00008**	0.003 – 0.005 **.00012 – .00020**	0.008 – 0.010 **.0003 – .0004**	0.012 – 0.015 **.0005 – .0006**	0.020 – 0.025 **.0008 – .0010**	0.035 **.0014**	0.050 **.0020**	0.070 **.0028**
0.0005 **.00002**	0.004 **.00016**	0.008 **.0003**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**	0.060 **.0024**
0.002 **.00008**	0.005 **.0002**	0.010 **.0004**	0.015 **.0006**	0.020 **.0008**	0.035 **.0014**	0.050 **.0020**	0.070 **.0028**
0.003 **.00012**	0.015 **.0006**	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**	0.150 **.0059**
0.003 **.00012**	0.015 **.0006**	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**	0.150 **.0059**
Recommended: CrazyDrill Flexpilot Titanium							
0.004 **.00016**	0.010 **.0004**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
0.002 **.00008**	0.004 **.00016**	0.006 **.0002**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**	0.060 **.0024**
Recommended: CrazyDrill Flexpilot Titanium							
Recommended: CrazyDrill Flexpilot Titanium							

Titanium - 3 x d

DRILLING WITH EXTERNAL COOLING



CrazyDrill Flexpilot Titanium is adapted for pilot drilling respectively short drilling and depths up to 3 x d, for long-chip materials as titanium, titanium alloys and copper. The pilot drill guides perfectly the follow-up drill CrazyDrill Flex Titanium and thus assures straightness for the following deep-hole drilling. Thanks to the robust construction, the pilot drill ensures high position accuracy. Furthermore the drill guarantees a significantly longer tool life to the follow-up drill preventing breakage of cutting edges due to matched tip angles of 140°.

Also as short drill, where the tool reaches high drilling quality thanks to its robust construction (reinforced shaft) and precision, CrazyDrill Flexpilot proved itself. Its innovative drill point geometry guarantees high cutting speed and feed force and process reliability.

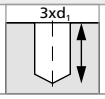
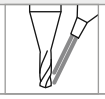
Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

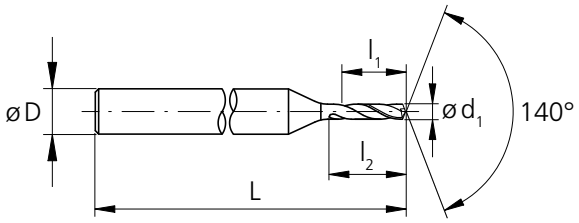
Please note

You couldn't find your suitable version of the CrazyDrill Flexpilot Titanium (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide			Z2		Uncoated

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**+ .00012"** **0**	+ 0.003 mm 0



d_1 [inch]	d_1 [mm]	**l_1** [inch]	l_1 [mm]	l_2 [mm]	**D (h6)** [mm]	**L** [inch]	**L** [mm]	**Item number**	Availability
.0039	0.10	**.012**	0.30	0.5	3	**1.57**	40	2.PFT.010.0	■
.0043	0.11	**.013**	0.33	0.6	3	**1.57**	40	2.PFT.011.0	Δ
.0047	0.12	**.014**	0.36	0.6	3	**1.57**	40	2.PFT.012.0	Δ
.0051	0.13	**.015**	0.39	0.7	3	**1.57**	40	2.PFT.013.0	Δ
.0055	0.14	**.017**	0.42	0.7	3	**1.57**	40	2.PFT.014.0	Δ
.0059	0.15	**.018**	0.45	0.8	3	**1.57**	40	2.PFT.015.0	■
.0063	0.16	**.019**	0.48	0.8	3	**1.57**	40	2.PFT.016.0	Δ
.0067	0.17	**.020**	0.51	0.9	3	**1.57**	40	2.PFT.017.0	Δ
.0071	0.18	**.021**	0.54	0.9	3	**1.57**	40	2.PFT.018.0	Δ
.0075	0.19	**.022**	0.57	1.0	3	**1.57**	40	2.PFT.019.0	Δ
.0079	0.20	**.024**	0.60	1.0	3	**1.57**	40	2.PFT.020.0	■
.0083	0.21	**.025**	0.63	1.1	3	**1.57**	40	2.PFT.021.0	Δ
.0087	0.22	**.026**	0.66	1.1	3	**1.57**	40	2.PFT.022.0	Δ
.0091	0.23	**.027**	0.69	1.2	3	**1.57**	40	2.PFT.023.0	Δ
.0094	0.24	**.028**	0.72	1.2	3	**1.57**	40	2.PFT.024.0	Δ
.0098	0.25	**.030**	0.75	1.3	3	**1.57**	40	2.PFT.025.0	■
.0102	0.26	**.031**	0.78	1.3	3	**1.57**	40	2.PFT.026.0	Δ
.0106	0.27	**.032**	0.81	1.4	3	**1.57**	40	2.PFT.027.0	Δ
.0110	0.28	**.033**	0.84	1.4	3	**1.57**	40	2.PFT.028.0	Δ
.0114	0.29	**.034**	0.87	1.5	3	**1.57**	40	2.PFT.029.0	Δ
.0118	0.30	**.035**	0.90	1.5	3	**1.57**	40	2.PFT.030.0	■
.0122	0.31	**.037**	0.93	1.6	3	**1.57**	40	2.PFT.031.0	Δ
.0126	0.32	**.038**	0.96	1.6	3	**1.57**	40	2.PFT.032.0	Δ
.0130	0.33	**.039**	0.99	1.7	3	**1.57**	40	2.PFT.033.0	Δ
.0134	0.34	**.040**	1.02	1.7	3	**1.57**	40	2.PFT.034.0	Δ
.0138	0.35	**.041**	1.05	1.8	3	**1.57**	40	2.PFT.035.0	■
.0142	0.36	**.043**	1.08	1.8	3	**1.57**	40	2.PFT.036.0	Δ
.0146	0.37	**.044**	1.11	1.9	3	**1.57**	40	2.PFT.037.0	Δ

d_1 [inch]	d_1 [mm]	**l_1** [inch]	l_1 [mm]	l_2 [mm]	**D (h6)** [mm]	**L** [inch]	**L** [mm]	**Item number**	Availability
.0150	0.38	**.045**	1.14	1.9	3	**1.57**	40	2.PFT.038.0	Δ
.0154	0.39	**.046**	1.17	2.0	3	**1.57**	40	2.PFT.039.0	Δ
.0157	0.40	**.047**	1.20	2.0	3	**1.57**	40	2.PFT.040.0	■
.0161	0.41	**.048**	1.23	2.1	3	**1.57**	40	2.PFT.041.0	Δ
.0165	0.42	**.050**	1.26	2.1	3	**1.57**	40	2.PFT.042.0	Δ
.0169	0.43	**.051**	1.29	2.2	3	**1.57**	40	2.PFT.043.0	Δ
.0173	0.44	**.052**	1.32	2.2	3	**1.57**	40	2.PFT.044.0	Δ
.0177	0.45	**.053**	1.35	2.3	3	**1.57**	40	2.PFT.045.0	■
.0181	0.46	**.054**	1.38	2.3	3	**1.57**	40	2.PFT.046.0	Δ
.0185	0.47	**.056**	1.41	2.4	3	**1.57**	40	2.PFT.047.0	Δ
.0189	0.48	**.057**	1.44	2.4	3	**1.57**	40	2.PFT.048.0	Δ
.0193	0.49	**.058**	1.47	2.5	3	**1.57**	40	2.PFT.049.0	Δ
.0197	0.50	**.059**	1.50	2.5	3	**1.57**	40	2.PFT.050.0	■
.0201	0.51	**.060**	1.53	2.6	3	**1.57**	40	2.PFT.051.0	Δ
.0205	0.52	**.061**	1.56	2.6	3	**1.57**	40	2.PFT.052.0	Δ
.0209	0.53	**.063**	1.59	2.7	3	**1.57**	40	2.PFT.053.0	Δ
.0213	0.54	**.064**	1.62	2.7	3	**1.57**	40	2.PFT.054.0	Δ
.0217	0.55	**.065**	1.65	2.8	3	**1.57**	40	2.PFT.055.0	■
.0220	0.56	**.066**	1.68	2.8	3	**1.57**	40	2.PFT.056.0	Δ
.0224	0.57	**.067**	1.71	2.9	3	**1.57**	40	2.PFT.057.0	Δ
.0228	0.58	**.069**	1.74	2.9	3	**1.57**	40	2.PFT.058.0	Δ
.0232	0.59	**.070**	1.77	3.0	3	**1.57**	40	2.PFT.059.0	Δ
.0236	0.60	**.071**	1.80	3.0	3	**1.57**	40	2.PFT.060.0	■
.0240	0.61	**.072**	1.83	3.1	3	**1.57**	40	2.PFT.061.0	Δ
.0244	0.62	**.073**	1.86	3.1	3	**1.57**	40	2.PFT.062.0	Δ
.0248	0.63	**.074**	1.89	3.2	3	**1.57**	40	2.PFT.063.0	Δ
.0252	0.64	**.076**	1.92	3.2	3	**1.57**	40	2.PFT.064.0	Δ
.0256	0.65	**.077**	1.95	3.3	3	**1.57**	40	2.PFT.065.0	■

■ Stock item

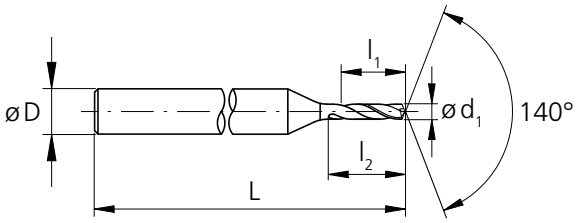
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products

CrazyDrill Flex Titanium p.423

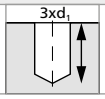
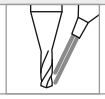
Titanium - 3 x d

DRILLING WITH EXTERNAL COOLING



d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.0260	0.66	**.078**	1.98	3.3	3	**1.57**	40	2.PFT.066.0	Δ
.0264	0.67	**.079**	2.01	3.4	3	**1.57**	40	2.PFT.067.0	Δ
.0268	0.68	**.080**	2.04	3.4	3	**1.57**	40	2.PFT.068.0	Δ
.0272	0.69	**.081**	2.07	3.5	3	**1.57**	40	2.PFT.069.0	Δ
.0276	0.70	**.083**	2.10	3.5	3	**1.57**	40	2.PFT.070.0	■
.0280	0.71	**.084**	2.13	3.6	3	**1.57**	40	2.PFT.071.0	Δ
.0283	0.72	**.085**	2.16	3.6	3	**1.57**	40	2.PFT.072.0	Δ
.0287	0.73	**.086**	2.19	3.7	3	**1.57**	40	2.PFT.073.0	Δ
.0291	0.74	**.087**	2.22	3.7	3	**1.57**	40	2.PFT.074.0	Δ
.0295	0.75	**.089**	2.25	3.8	3	**1.57**	40	2.PFT.075.0	■
.0299	0.76	**.090**	2.28	3.8	3	**1.57**	40	2.PFT.076.0	Δ
.0303	0.77	**.091**	2.31	3.9	3	**1.57**	40	2.PFT.077.0	Δ
.0307	0.78	**.092**	2.34	3.9	3	**1.57**	40	2.PFT.078.0	Δ
.0311	0.79	**.093**	2.37	4.0	3	**1.57**	40	2.PFT.079.0	Δ
.0315	0.80	**.094**	2.40	4.0	3	**1.57**	40	2.PFT.080.0	■
.0319	0.81	**.096**	2.43	4.1	3	**1.57**	40	2.PFT.081.0	Δ
.0323	0.82	**.097**	2.46	4.1	3	**1.57**	40	2.PFT.082.0	Δ
.0327	0.83	**.098**	2.49	4.2	3	**1.57**	40	2.PFT.083.0	Δ
.0331	0.84	**.099**	2.52	4.2	3	**1.57**	40	2.PFT.084.0	Δ
.0335	0.85	**.100**	2.55	4.3	3	**1.57**	40	2.PFT.085.0	■
.0339	0.86	**.102**	2.58	4.3	3	**1.57**	40	2.PFT.086.0	Δ
.0343	0.87	**.103**	2.61	4.4	3	**1.57**	40	2.PFT.087.0	Δ
.0346	0.88	**.104**	2.64	4.4	3	**1.57**	40	2.PFT.088.0	Δ
.0350	0.89	**.105**	2.67	4.5	3	**1.57**	40	2.PFT.089.0	Δ
.0354	0.90	**.106**	2.70	4.5	3	**1.57**	40	2.PFT.090.0	■
.0358	0.91	**.107**	2.73	4.6	3	**1.57**	40	2.PFT.091.0	Δ
.0362	0.92	**.109**	2.76	4.6	3	**1.57**	40	2.PFT.092.0	Δ
.0366	0.93	**.110**	2.79	4.7	3	**1.57**	40	2.PFT.093.0	Δ

■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Carbide			Z2		Uncoated

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**+ .00012"** **0**	+ 0.003 mm 0

d_1 **[inch]**	d_1 [mm]	l_1 **[inch]**	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L **[inch]**	L [mm]	Item number	Availability
.0370	0.94	**.111**	2.82	4.7	3	**1.57**	40	2.PFT.094.0	Δ
.0374	0.95	**.112**	2.85	4.8	3	**1.57**	40	2.PFT.095.0	■
.0378	0.96	**.113**	2.88	4.8	3	**1.57**	40	2.PFT.096.0	Δ
.0382	0.97	**.115**	2.91	4.9	3	**1.57**	40	2.PFT.097.0	Δ
.0386	0.98	**.116**	2.94	4.9	3	**1.57**	40	2.PFT.098.0	Δ
.0390	0.99	**.117**	2.97	5.0	3	**1.57**	40	2.PFT.099.0	Δ
.0394	1.00	**.118**	3.00	5.0	3	**1.57**	40	2.PFT.100.0	■
.0398	1.01	**.119**	3.03	5.1	3	**1.57**	40	2.PFT.101.0	Δ
.0402	1.02	**.120**	3.06	5.1	3	**1.57**	40	2.PFT.102.0	Δ
.0406	1.03	**.122**	3.09	5.2	3	**1.57**	40	2.PFT.103.0	Δ
.0409	1.04	**.123**	3.12	5.2	3	**1.57**	40	2.PFT.104.0	Δ
.0413	1.05	**.124**	3.15	5.3	3	**1.57**	40	2.PFT.105.0	■
.0417	1.06	**.125**	3.18	5.3	3	**1.57**	40	2.PFT.106.0	Δ
.0421	1.07	**.126**	3.21	5.4	3	**1.57**	40	2.PFT.107.0	Δ
.0425	1.08	**.128**	3.24	5.4	3	**1.57**	40	2.PFT.108.0	Δ
.0429	1.09	**.129**	3.27	5.5	3	**1.57**	40	2.PFT.109.0	Δ
.0433	1.10	**.130**	3.30	5.5	3	**1.57**	40	2.PFT.110.0	■
.0437	1.11	**.131**	3.33	5.6	3	**1.57**	40	2.PFT.111.0	Δ
.0441	1.12	**.132**	3.36	5.6	3	**1.57**	40	2.PFT.112.0	Δ
.0445	1.13	**.133**	3.39	5.7	3	**1.57**	40	2.PFT.113.0	Δ
.0449	1.14	**.135**	3.42	5.7	3	**1.57**	40	2.PFT.114.0	Δ
.0453	1.15	**.136**	3.45	5.8	3	**1.57**	40	2.PFT.115.0	■
.0457	1.16	**.137**	3.48	5.8	3	**1.57**	40	2.PFT.116.0	Δ
.0461	1.17	**.138**	3.51	5.9	3	**1.57**	40	2.PFT.117.0	Δ
.0465	1.18	**.139**	3.54	5.9	3	**1.57**	40	2.PFT.118.0	Δ
.0469	1.19	**.141**	3.57	6.0	3	**1.57**	40	2.PFT.119.0	Δ
.0472	1.20	**.142**	3.60	6.0	3	**1.57**	40	2.PFT.120.0	■

■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products

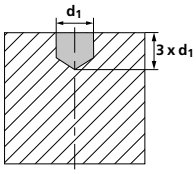
CrazyDrill Flex Titanium p.423

CRAZYDRILL by Mikron Tool Flexpilot TITANIUM

Titanium - 3 x d

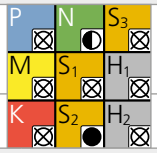
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





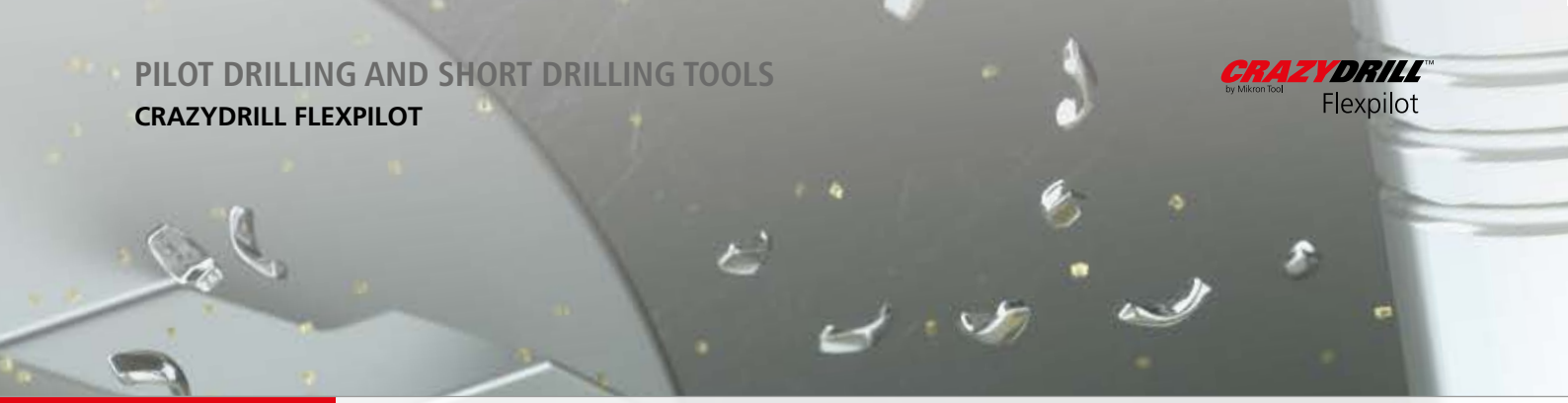
Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010		
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310		
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2		
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30		
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351		
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380		
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	5 – 40 | **16 – 131**	20 – 40 | **66 – 131**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500		
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000		
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1						
0.1 mm | **.004"**	0.2 mm | **.008"**	0.3 mm | **.012"**	0.4 mm | **.016"**	0.6 mm | **.024"**	0.8 mm | **.032"**	1.0 – 1.2 mm | **.039" – .047"**
f	**f**	**f**	**f**	**f**	**f**	**f**
Recommended: CrazyDrill Flexpilot Steel						
Recommended: CrazyDrill Flexpilot Steel						
Recommended: CrazyDrill Flexpilot Steel						
0.005 **.00020**	0.020 **.0008**	0.040 **.0016**	0.060 **.0024**	0.120 **.0047**	0.180 **.0071**	0.200 **.0079**
Recommended: CrazyDrill Flexpilot Steel						
0.002 **.00008**	0.005 **.00020**	0.007 **.0003**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.035 **.0014**
0.002 **.00008**	0.010 **.00039**	0.015 **.0006**	0.020 **.0008**	0.050 **.0020**	0.090 **.0035**	0.140 **.0055**



Drilling process CrazyDrill Flexpilot

SHORT DRILLING UP TO 3 X D

Coolant type, pressure and filtration

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the cooling medium is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

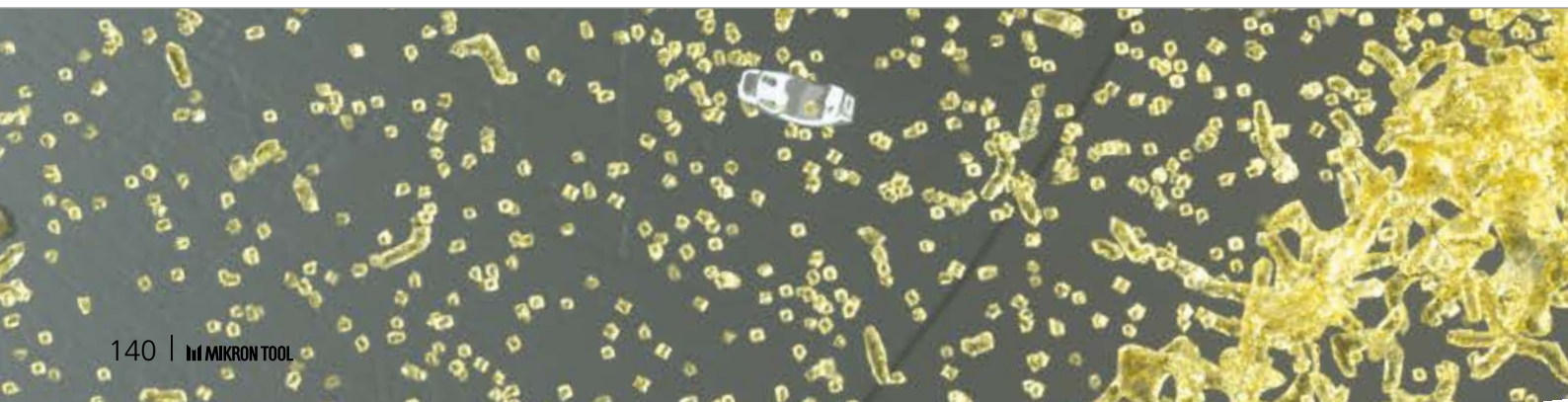
For detailed indications for tool holders see chapter "Technical information".

Pilot drilling and short drilling

Pilot drilling with CrazyDrill Flexpilot is the perfect preparation for accurate drilling (position and alignment accuracy) and stable machining process.

Drilling quality (position and alignment accuracy) and stable machining process are assured due to matched diameters of the tools.

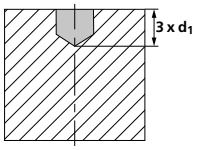
CrazyDrill Flexpilot not only is the perfect preparation of deep follow-up holes with CrazyDrill Flex. Concurrently it is a short drill for highly precise and quick drilling up to 3 x d.



DRILLING PROCESS

1 | PILOT DRILLING OR SHORT DRILLING

- Drilling in one step with recommended cutting speed and feed rate (see cutting data table).



Note:
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

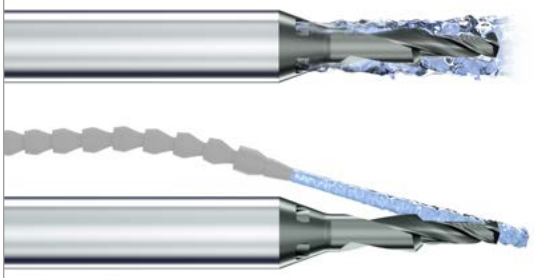
PATENTED

CrazyDrill Pilot SST-Inox



CRAZYDRILL Pilot SST-Inox

THE MICRO PILOT OR SHORT DRILL FOR STAINLESS STEEL, HRSA AND CR-CO ALLOYS



With CrazyDrill Pilot SST-Inox, Mikron Tool introduces a pilot and short drill for stainless steels, heat-resistant and CrCo alloys in the diameter range of .008" to .079" (0.2 mm to 2.0 mm) and for drilling depths of up to 3 x d. All short drills are coated, have integrated cooling and a cutting edge for 90° chamfer.

Even without an integrated coolant supply (with external coolant supply), the CrazyDrill Pilot SST-Inox is an outstanding pilot drill.

This is the perfect preparation for the deep and precise drilling with CrazyDrill SST-Inox and CrazyDrill Flex SST-Inox. The digressive helical flute, the cooling channels, the coating and the possibility of adding a 90° countersink make it an extremely efficient pilot or short drill.

PATENTED

Preparing precise deep holes

EFFICIENT PILOT OR SHORT DRILLING IN STAINLESS STEEL

With CrazyDrill Pilot SST-Inox, Mikron Tool introduces a pilot and short drill for stainless steels, heat-resistant and CrCo alloys in the diameter range of .008" to .079" (0.2 mm to 2.0 mm) and for drilling depths of up to 3 x d. All short drills are coated, have integrated cooling and a cutting edge for 90° chamfer.

- CrazyDrill Pilot SST-Inox, drilling depth 3 x d, with coolant channels in the shaft, countersink 90°

CrazyDrill Pilot SST-Inox

- Coated
- External cooling





Page 149

- Coated
- Integrated cooling





Page 149

1 | SHANK
The robust solid carbide shank guarantees stable vibration-free machining.

2 | NEW COOLING CONCEPT
The integrated cooling channels guarantee regular and significant cooling of the cutting edges starting from 15 bar (218 psi). The result is greater process reliability and higher productivity. This tool can also be used with external coolant supply.

3 | CARBIDE
Due to the high degree of toughness and thermal shock resistance, the carbide developed for SST-Inox products perfectly meets the requirements for the machining of stainless steels, heat-resistant and CrCo alloys.

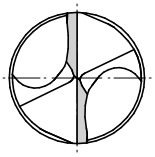
4 | COATING
The high-performance eXedur RIP coating provides thermal and wear protection against heat and abrasion. Extremely smooth and consistent coating exhibits low adhesion to work materials and prevents from cutting edge chipping. The result is a long tool life even in the smallest diameter sizes.

5 | CUTTING EDGE FOR 90° CHAMFER
A 90° countersink can be placed simultaneously with the drilling.

6 | DIGRESSIVE HELICAL FLUTE - PATENTED
The digressive helical flute with a new and patented geometry guarantees a high degree of tool stability. The front part ensures good chip breaking, while the rear ensures rapid chip removal.

7 | TIP GEOMETRY
The tip geometry is developed for stainless, acid-resistant and heat-resistant steels:
- High degree of cutting edge stability
- Self-centering
- Short chips

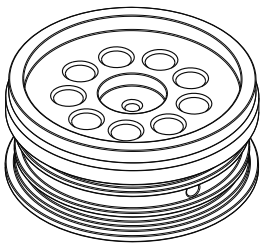
Drill tip



Benefits and applications

SUITABLE FOR EACH APPLICATION

- **SHORT MACHINING TIME** | drilling 3 x d + 90° countersink in one step
- **LONG TOOL LIFE** | due to innovative cooling concept
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to a new cutting geometry
- **HIGH DEGREE OF PRECISION** | due to tight tolerances



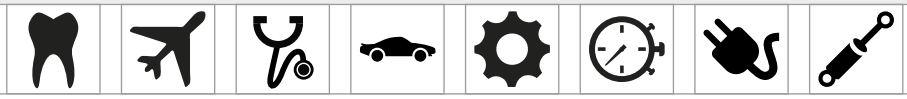
COMPONENT
Injection component - automotive

MATERIAL
X5CrNi 18-10 / 1.4301 / AISI 304

MACHINING
- Pilot drilling and chamfering 90°
- d = 0.9 mm **| .035"**
- Drilling depth 2.9 mm **| .114"**

DRILLING TOOL
Mikron Tool - CrazyDrill Pilot SST-Inox

DATA	MIKRON TOOL
Tool type	CrazyDrill Pilot SST-Inox - Carbide - Coated - Integrated cooling
Item number	2.PD.00900.090.IK
Cutting data	v_c = 40 m/min **| 131 SFM** f = 0.030 mm/rev **| .0012 IPR**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Dental implants
Aerospace industry	Engine parts Spherical joint
Medical technology	Eye surgical device
Automotive industry	Components for gasoline direct injection
Mechanical engineering	Locking bolt
Watches	Watch housing
Electronics / Electrics	Neon Pin
Hydraulics / Pneumatics	Hydraulic valve

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4542	X5CrNiCuNb 16-4	630
	1.4435	X2CrNiMo 18-14-3	316L
Group N Copper and Brass lead free	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25

CrazyDrill Pilot SST-Inox - 3 x d - 90° countersink

DRILLING WITH INTEGRATED COOLING



The pilot and short drill was developed for stainless steels, heat-resistant and CrCo alloys. It has integrated cooling as well as a digressive helical flute and, as a pilot drill, is the ideal complement of CrazyDrill SST-Inox and CrazyDrill Flex SST-Inox.

CrazyDrill Pilot SST-Inox was developed as a pilot and short drill with an integrated bevel cutting edge. What is special about this drill are the integrated cooling channels, which ensure an efficient coolant jet starting from 15 bar (218 psi), flush away the chips from the drill and keep the temperature under control. The result is significantly longer tool life.

It is suitable just as well for the preparation of deep holes as for short drilling up to a drilling depth of 3 x d. An additional cutting edge for 90° chamfer also allows the placement of a 90° countersink in the same drilling step.

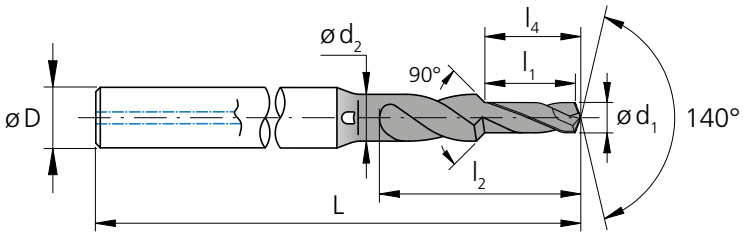
Coolant type, pressure and filtration
Detailed recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note
You couldn't find your suitable version of the CrazyDrill Pilot SST-Inox (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide | 3xd1 | 90° | 140° | Z2 | eXedur RIP

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**+ .00024"** **+ .00008"**	+ 0.006 mm + 0.002 mm



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	l_4 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0079	0.20	**.024**	0.60	0.50	1.7	0.63	3	**1.77**	45	2.PD.00200.090.IK	■
	.0098	0.25	**.030**	0.75	0.50	2.1	0.79	3	**1.77**	45	2.PD.00250.090.IK	■
	.0118	0.30	**.035**	0.90	0.60	2.5	0.95	3	**1.77**	45	2.PD.00300.090.IK	■
	.0138	0.35	**.041**	1.05	0.70	2.8	1.11	3	**1.77**	45	2.PD.00350.090.IK	■
1/64	**.0156**	0.396	**.047**	1.20	0.80	3.2	1.26	3	**1.77**	45	2.PD.F164.IK	■
	.0157	0.40	**.047**	1.20	0.80	3.2	1.26	3	**1.77**	45	2.PD.00400.090.IK	■
	.0177	0.45	**.053**	1.35	0.90	3.6	1.42	3	**1.77**	45	2.PD.00450.090.IK	■
	.0197	0.50	**.059**	1.50	1.00	4.0	1.58	3	**1.89**	48	2.PD.00500.090.IK	■
	.0217	0.55	**.065**	1.65	1.00	4.4	1.74	3	**1.89**	48	2.PD.00550.090.IK	■
	.0236	0.60	**.071**	1.80	1.10	4.7	1.90	3	**1.89**	48	2.PD.00600.090.IK	■
	.0256	0.65	**.077**	1.95	1.10	5.1	2.05	3	**1.89**	48	2.PD.00650.090.IK	■
	.0276	0.70	**.083**	2.10	1.30	5.5	2.21	4	**2.05**	52	2.PD.00700.090.IK	■
	.0295	0.75	**.089**	2.25	1.40	5.8	2.37	4	**2.05**	52	2.PD.00750.090.IK	■
1/32	**.0312**	0.793	**.094**	2.40	1.40	6.2	2.53	4	**2.05**	52	2.PD.F132.IK	■
	.0315	0.80	**.094**	2.40	1.40	6.2	2.53	4	**2.05**	52	2.PD.00800.090.IK	■
	.0335	0.85	**.100**	2.55	1.50	6.5	2.68	4	**2.05**	52	2.PD.00850.090.IK	■
	.0354	0.90	**.106**	2.70	1.50	6.9	2.84	4	**2.05**	52	2.PD.00900.090.IK	■
	.0374	0.95	**.112**	2.85	1.50	7.2	3.00	4	**2.05**	52	2.PD.00950.090.IK	■
	.0394	1.00	**.118**	3.00	1.70	7.5	3.16	4	**2.17**	55	2.PD.01000.090.IK	■
	.0413	1.05	**.124**	3.15	1.70	7.9	3.32	4	**2.17**	55	2.PD.01050.090.IK	■
	.0433	1.10	**.130**	3.30	1.70	8.2	3.47	4	**2.17**	55	2.PD.01100.090.IK	■
	.0453	1.15	**.136**	3.45	1.80	8.5	3.63	4	**2.17**	55	2.PD.01150.090.IK	■
	.0472	1.20	**.142**	3.60	1.80	8.8	3.79	4	**2.17**	55	2.PD.01200.090.IK	■
	.0492	1.25	**.148**	3.75	2.00	9.2	3.95	4	**2.17**	55	2.PD.01250.090.IK	■
	.0512	1.30	**.154**	3.90	2.00	9.5	4.11	4	**2.17**	55	2.PD.01300.090.IK	■
	.0531	1.35	**.159**	4.05	2.00	9.8	4.26	4	**2.17**	55	2.PD.01350.090.IK	■
	.0551	1.40	**.165**	4.20	2.25	10.1	4.42	4	**2.17**	55	2.PD.01400.090.IK	■
	.0571	1.45	**.171**	4.35	2.25	10.4	4.58	4	**2.17**	55	2.PD.01450.090.IK	■
	.0591	1.50	**.177**	4.50	2.25	10.7	4.74	4	**2.17**	55	2.PD.01500.090.IK	■
	.0610	1.55	**.183**	4.65	2.25	10.9	4.89	4	**2.17**	55	2.PD.01550.090.IK	■
1/16	**.0625**	1.587	**.189**	4.80	2.25	11.2	5.05	4	**2.17**	55	2.PD.F116.IK	■
	.0630	1.60	**.189**	4.80	2.25	11.2	5.05	4	**2.17**	55	2.PD.01600.090.IK	■
	.0650	1.65	**.195**	4.95	2.25	11.5	5.21	4	**2.17**	55	2.PD.01650.090.IK	■
	.0669	1.70	**.201**	5.10	2.60	11.8	5.37	6	**2.17**	55	2.PD.01700.090.IK	■
	.0689	1.75	**.207**	5.25	2.60	12.0	5.53	6	**2.17**	55	2.PD.01750.090.IK	■
	.0709	1.80	**.213**	5.40	2.60	12.3	5.68	6	**2.17**	55	2.PD.01800.090.IK	■
	.0728	1.85	**.219**	5.55	2.60	12.6	5.84	6	**2.17**	55	2.PD.01850.090.IK	■
	.0748	1.90	**.224**	5.70	2.60	12.8	6.00	6	**2.17**	55	2.PD.01900.090.IK	■
	.0768	1.95	**.230**	5.85	2.60	13.1	6.16	6	**2.17**	55	2.PD.01950.090.IK	■
	.0787	2.00	**.236**	6.00	3.10	13.3	6.32	6	**2.17**	55	2.PD.02000.090.IK	■

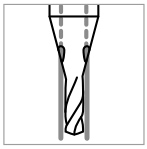
■ Stock item

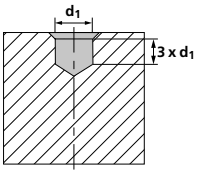
Complementary products

CrazyDrill SST-Inox p.279
CrazyDrill Flex SST-Inox p.435

CrazyDrill Pilot SST-Inox - 3 x d - 90° countersink

DRILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW



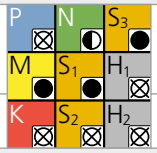




Note:
In case of external cooling reduce v_c and f of 20%

Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	35 – 50 | **115 – 164**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	35 – 50 | **115 – 164**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	35 – 50 | **115 – 164**
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	30 – 45 | **98 – 148**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40 – 100 | **131 – 328**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40 – 100 | **131 – 328**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	15 – 30 | **49 – 98**
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	40 – 50 | **131 – 164**
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1	0.2 mm | .008"	1/64" 0.5 mm | .020"	1/32" 0.8 mm | .032"	1.0 mm | .039"	1.2 mm | .047"	1.4 mm | .055"	1/16" 1.6 mm | .063"	1.8 mm | .071"	2.0 mm | .079"
	f	f	f	f	f	f	f	f	f
	0.015 | .0006	0.020 | .0008	0.030 | .0012	0.035 | .0014	0.040 | .0016	0.050 | .0020	0.055 | .0022	0.060 | .0024	0.070 | .0028
	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.055 | .0022	0.060 | .0024	0.070 | .0028	0.075 | .0030	0.080 | .0031	0.100 | .0039
	0.015 | .0006	0.020 | .0008	0.025 | .0010	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.055 | .0022	0.060 | .0024	0.070 | .0028
	0.010 | .0004	0.020 | .0008	0.025 | .0010	0.030 | .0012	0.035 | .0014	0.045 | .0018	0.050 | .0020	0.055 | .0022	0.060 | .0024
	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.120 | .0047	0.140 | .0055	0.160 | .0063	0.180 | .0071
	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.120 | .0047	0.140 | .0055	0.160 | .0063	0.180 | .0071
	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.022 | .0009	0.025 | .0010	0.035 | .0014	0.037 | .0015	0.045 | .0018	0.055 | .0022
	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.055 | .0022	0.060 | .0024	0.070 | .0028	0.075 | .0030	0.080 | .0031	0.100 | .0039

Drilling process CrazyDrill Pilot SST-Inox

SHORT DRILLING 3 X D AND 90° COUNTERSINK

Coolant type, pressure and filtration

Coolant type

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

Filtration: The large cooling channels permit the use of a standard filter. Filter quality ≤ .0019" (0.050 mm).

Coolant pressure: At least 15 bar (218 psi) coolant pressure is required for the CrazyDrill Pilot SST-Inox to achieve reliable drilling. High pressure is generally better for the cooling and flushing effect.

Revolution	[rpm]	≤ 10'000	> 10'000
Minimal pressure	[bar]	15	30
	[psi]	**218**	**435**

Cooling with external coolant supply

For tools with external cooling must be ensured that the coolant fluid is addressed directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical information".

Pilot drilling and short drilling

Pilot drilling with CrazyDrill Pilot SST-Inox is the perfect preparation for accurate drilling (position and alignment accuracy) and stable machining process for deep holes drilling with CrazyDrill SST-Inox and CrazyDrill Flex SST-Inox.

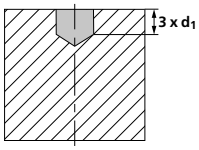
Drilling quality (position and alignment accuracy, no measurable transition from pilot to follow-up hole) and stable machining process are assured due to matched diameters of the tools.

CrazyDrill Pilot SST-Inox not only is the perfect preparation of deep follow-up holes. Concurrently it is a short drill for highly precise and quick drilling up to 3 x d + 90° countersink.

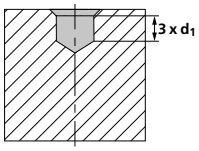
DRILLING PROCESS

1 | PILOT DRILLING OR SHORT DRILLING

- Turn on internal or external coolant.
- Drilling in one step with recommended cutting speed and feed rate (see cutting data table).

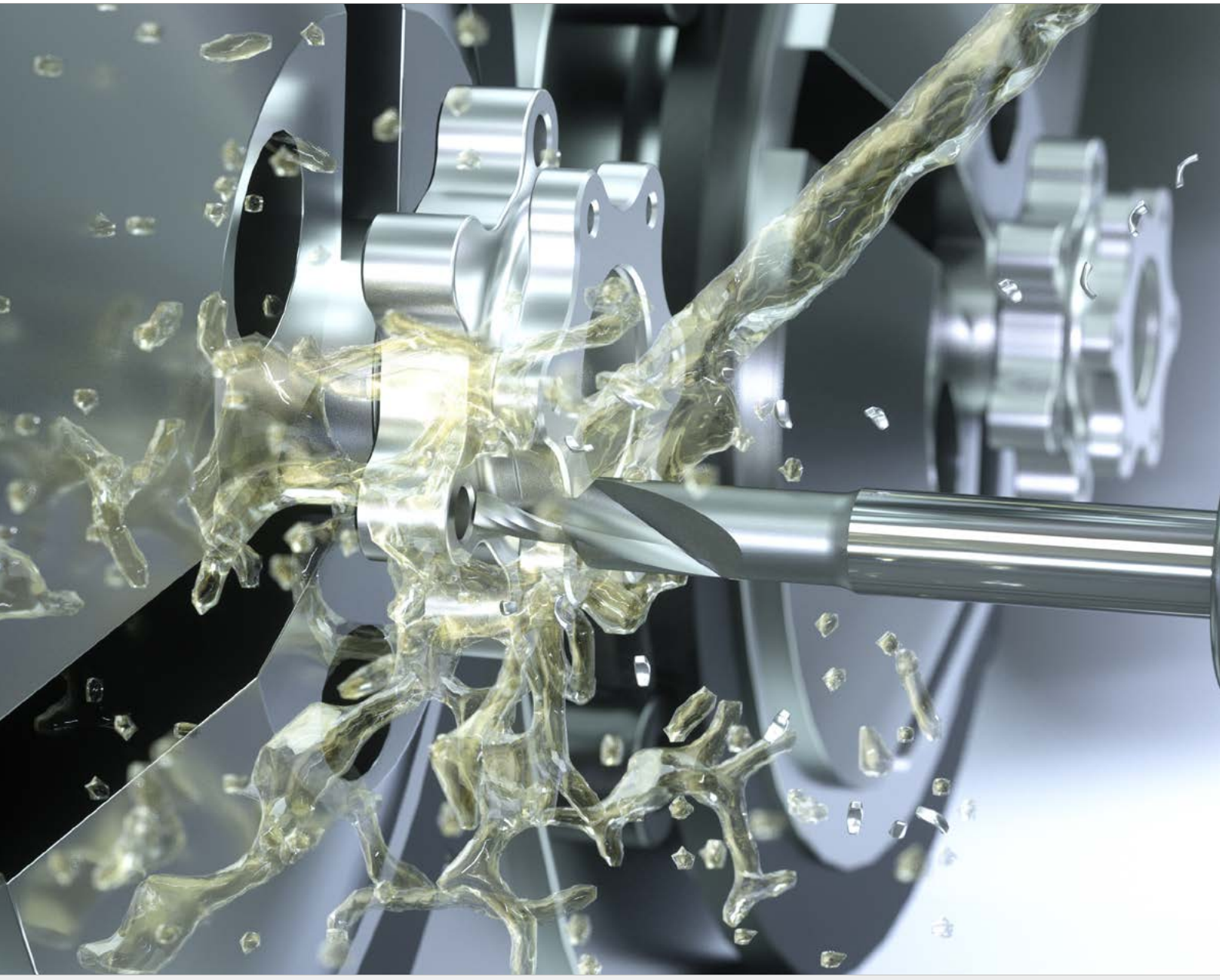


- If needed, after the desired cutting depth of 3 x d is reached, a chamfer angle of 90° can be realized.



Note:
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

CrazyDrill Pilot



CRAZYDRILL Pilot

AN UNIVERSAL PILOT DRILL / SHORT DRILL



Mikron Tool offers with CrazyDrill Pilot a short drill, respectively pilot drill including countersinking. It's not only useful for short drilling but it's also a perfect drilling preparation for highly precise position accuracy and straightness when deep-hole drilling above 6 x d.

The drill is available from stock in diameters of .016" to 1/4" (0.4 mm to 6.35 mm) and for a maximum drilling depth up to 2 x d. All short drills are coated and have a chamfer angle of 90°.

With CrazyDrill Pilot centering and pilot drilling up to 2 x d is done in one single step. The follow-up drill is guided cylindrically in the pilot hole, therefore high straightness of the follow-up drilling is assured. Furthermore, with the same tool can be realized directly a chamfer of 90° at the hole. This way tool change positions can be saved and shorter cycle times are possible. The digressive helical flute assures constant cutting conditions from drilling to countersinking.

Optimally matched diameter tolerances and tip angles guarantee accurate deep-hole drilling without measurable transition from pilot to follow-up hole, assure process reliability and increase also substantially tool life of the follow-up drill. The special high-performance geometry of CrazyDrill Pilot ensures high cutting speed, the optimal coating results in high wear resistance.

Ideal preparation for deep holes

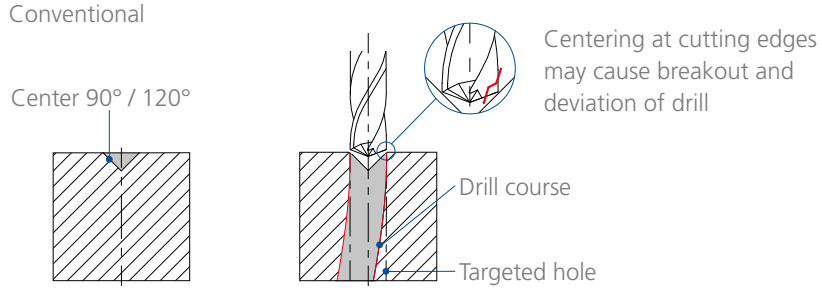
CENTERING, PILOT DRILLING AND COUNTERSINKING IN ONE STEP

Mikron Tool offers with CrazyDrill Pilot a short drill, respectively pilot drill including countersinking. It's not only useful for short drilling but it's also a perfect drilling preparation for highly precise position accuracy and straightness when deep-hole drilling above 6 x d. The drill is available from stock in diameters of .016" to 1/4" (0.4 mm to 6.35 mm) and for a maximum drilling depth up to 2 x d. All short drills are coated and have a chamfer angle of 90°.

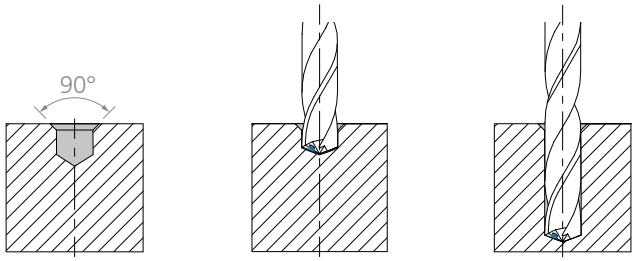
■ CrazyDrill Pilot, drilling depth up to 2 x d, with external cooling, countersink 90°

The comparison

■ Conventional



■ Mikron Tool



STEP 1
CrazyDrill Pilot

STEP 2
Drill guided in pilot hole

STEP 3
Drilling of deep holes without noticeable diameter difference between pilot hole and bore

CrazyDrill Pilot

- Coated
- Drill with external cooling



1 | SHANK
The reinforced solid carbide shaft guarantees stability, high concentricity and therefore highest drilling accuracy.

2 | SOLID CARBIDE
A special solid carbide assures high machining speed

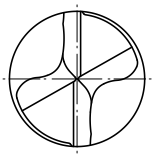
3 | COATING
Optimal coating protects the solid carbide drill from wear and increases its tool life.

4 | DEGRESSIVE HELICAL FLUTE
For optimal and constant cutting conditions from drilling to chamfering of 90°. The result: Higher process reliability and tool life.

5 | 90° CHAMFER
Enables a chamfer of 90° in one single operation step.

6 | DRILL TIP GEOMETRY
High cutting speed and feed rates thanks to special drill tip geometry. Tip angle of 140° and mutually adapted tolerance increase tool life of follow-up drill.

7 | DIAMETER RANGE
Matched to the dimensions of the CrazyDrill family, each deep-hole drill has the adapted pilot drill. Due to matched tolerances no measurable transition from pilot to follow-up hole.

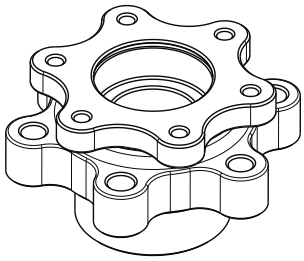
Drill tip 

Page 161

Benefits and applications

CENTERING AND PILOT HOLE DRILLING IN ONE STEP

- **SHORT MACHINING TIME** | drilling 2 x d +90° countersink with one tool
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to robust tool design
- **HIGH DEGREE OF PRECISION** | due to small tolerances that prevent the deviations



COMPONENT
wheel hub

MATERIAL
AlMg 1 SiCu / 3.3211 / ASTM B211

MACHINING
- Short drilling and chamfering 90°
- d = 3 mm **| .118"**
- Drilling depth 6.2 mm **| .244"**

DRILLING TOOL
Mikron Tool - CrazyDrill Pilot

DATA	MIKRON TOOL
Tool type	CrazyDrill Pilot - Carbide - Coated - External cooling
Item number	2.PD.03000.090
Cutting data	v_c = 160 m/min **| 525 SFM** f = 0.16 mm/rev **| .0063 IPR**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Dental implants
Aerospace industry	Components for airplane
Medical technology	DHS screws
Automotive industry	Valve housing
Mechanical engineering	Guide bushing
Hydraulics / Pneumatics	Pneumatic valve

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4301	X5CrNi 18-10	304
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S2 Titanium (pure and alloyed)	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

CrazyDrill Pilot - 2 x d - 90° coutersink

DRILLING WITH EXTERNAL COOLING



CrazyDrill Pilot centers and realizes a pilot hole up to a drilling depth of 2 x d. The follow-up drill is perfectly guided in the pilot hole, thus ensuring the straightness of the deep hole. Because of the sturdy design, the pilot drill achieves high position accuracy. Furthermore, it guarantees to the follow-up drill a significantly longer tool life since cutting edge breakage is prevented by the two mutually adapted tip angles of 140°.

CrazyDrill Pilot also proves its worth used as short drill where it achieves long tool life and good hole quality due to its stable design (reinforced shaft) and ideal coating. Thanks to its tip geometry, high cutting speed and feed rates are achieved. The degressive helical flute guarantees constant cutting conditions from drilling to process reliable realizing of a 90° chamfer angle.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

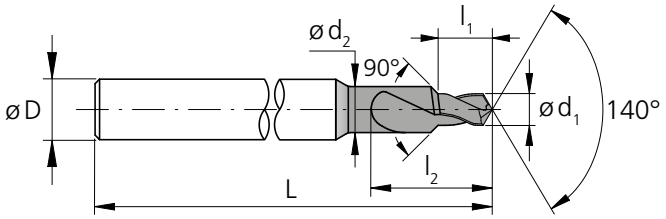
Please note

You couldn't find your suitable version of the CrazyDrill Pilot (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

	Carbide	2xd1	90°	140°	Z2		eXedur RI/RIP

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)		**.240" - .394"** (6.1 - 10.0 mm)	
Tolerance	**+ .00024"** **+ .00008"**	+ 0.006 mm + 0.002 mm	**+ .00035"** **+ .00016"**	+ 0.009 mm + 0.004 mm	**+ .00047"** **+ .00024"**	+ 0.012 mm + 0.006 mm



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
1/64	**.0156**	0.396	**.031**	0.8	1.00	2.8	4	**1.83**	46.5	2.PD.F164.090	■
	.0157	0.40	**.031**	0.8	1.00	2.8	4	**1.83**	46.5	2.PD.00400.090	■
	.0177	0.45	**.035**	0.9	1.00	2.9	4	**1.83**	46.5	2.PD.00450.090	■
	.0197	0.50	**.039**	1.0	1.20	3.4	4	**1.85**	47.0	2.PD.00500.090	■
	.0217	0.55	**.043**	1.1	1.20	3.5	4	**1.85**	47.0	2.PD.00550.090	■
	.0236	0.60	**.047**	1.2	1.50	4.2	4	**1.89**	48.0	2.PD.00600.090	■
	.0256	0.65	**.051**	1.3	1.50	4.3	4	**1.89**	48.0	2.PD.00650.090	■
	.0276	0.70	**.055**	1.4	1.75	4.9	4	**1.93**	49.0	2.PD.00700.090	■
	.0295	0.75	**.059**	1.5	1.75	5.0	4	**1.93**	49.0	2.PD.00750.090	■
1/32	**.0312**	0.793	**.063**	1.6	2.00	5.6	4	**1.93**	49.0	2.PD.F132.090	■
	.0315	0.80	**.063**	1.6	2.00	5.6	4	**1.93**	49.0	2.PD.00800.090	■
	.0335	0.85	**.067**	1.7	2.00	5.7	4	**1.93**	49.0	2.PD.00850.090	■
	.0354	0.90	**.071**	1.8	2.00	5.8	4	**1.93**	49.0	2.PD.00900.090	■
	.0374	0.95	**.075**	1.9	2.00	5.9	4	**1.93**	49.0	2.PD.00950.090	■
	.0394	1.00	**.079**	2.0	2.50	7.0	4	**2.01**	51.0	2.PD.01000.090	■
	.0413	1.05	**.083**	2.1	2.50	7.1	4	**2.01**	51.0	2.PD.01050.090	■
	.0433	1.10	**.087**	2.2	2.50	7.2	4	**2.01**	51.0	2.PD.01100.090	■
	.0453	1.15	**.091**	2.3	2.50	7.3	4	**2.01**	51.0	2.PD.01150.090	■
	.0472	1.20	**.094**	2.4	2.50	7.4	4	**2.01**	51.0	2.PD.01200.090	■
	.0492	1.25	**.098**	2.5	2.50	7.5	4	**2.01**	51.0	2.PD.01250.090	■
	.0512	1.30	**.102**	2.6	2.50	7.6	4	**2.01**	51.0	2.PD.01300.090	■
	.0531	1.35	**.106**	2.7	2.50	7.7	4	**2.01**	51.0	2.PD.01350.090	■
	.0551	1.40	**.110**	2.8	2.50	7.8	4	**2.01**	51.0	2.PD.01400.090	■
	.0571	1.45	**.114**	2.9	2.50	7.9	4	**2.01**	51.0	2.PD.01450.090	■
	.0591	1.50	**.118**	3.0	3.00	9.0	4	**2.09**	53.0	2.PD.01500.090	■
	.0610	1.55	**.122**	3.1	3.00	9.1	4	**2.09**	53.0	2.PD.01550.090	■
1/16	**.0625**	1.587	**.126**	3.2	3.00	9.2	4	**2.09**	53.0	2.PD.F116.090	■
	.0630	1.60	**.126**	3.2	3.00	9.2	4	**2.09**	53.0	2.PD.01600.090	■
	.0650	1.65	**.130**	3.3	3.00	9.3	4	**2.09**	53.0	2.PD.01650.090	■
	.0669	1.70	**.134**	3.4	3.00	9.4	4	**2.09**	53.0	2.PD.01700.090	■
	.0689	1.75	**.138**	3.5	3.00	9.5	4	**2.09**	53.0	2.PD.01750.090	■
	.0709	1.80	**.142**	3.6	3.00	9.6	4	**2.09**	53.0	2.PD.01800.090	■
	.0728	1.85	**.146**	3.7	3.00	9.7	4	**2.09**	53.0	2.PD.01850.090	■
	.0748	1.90	**.150**	3.8	3.00	9.8	4	**2.09**	53.0	2.PD.01900.090	■

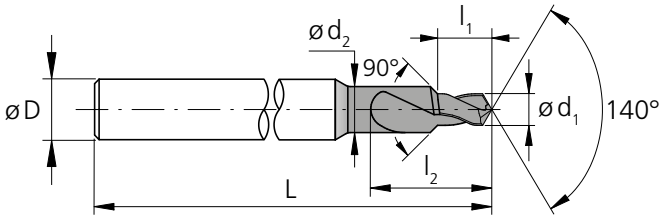
■ Stock item

Complementary products

CrazyDrill Steel	p.245
CrazyDrill Alu	p.261
CrazyDrill Cool	p.297
CrazyDrill Cool XL	p.331

CrazyDrill Pilot - 2 x d - 90° coutersink

DRILLING WITH EXTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0768	1.95	**.154**	3.9	3.00	9.9	4	**2.09**	53.0	2.PD.01950.090	■
	.0787	2.00	**.157**	4.0	3.50	11.0	4	**2.17**	55.0	2.PD.02000.090	■
	.0807	2.05	**.161**	4.1	3.50	11.1	4	**2.17**	55.0	2.PD.02050.090	■
	.0827	2.10	**.165**	4.2	3.50	11.2	4	**2.17**	55.0	2.PD.02100.090	■
	.0846	2.15	**.169**	4.3	3.50	11.3	4	**2.17**	55.0	2.PD.02150.090	■
	.0866	2.20	**.173**	4.4	3.50	11.4	4	**2.17**	55.0	2.PD.02200.090	■
	.0886	2.25	**.177**	4.5	3.50	11.5	4	**2.17**	55.0	2.PD.02250.090	■
	.0906	2.30	**.181**	4.6	3.50	11.6	4	**2.17**	55.0	2.PD.02300.090	■
	.0925	2.35	**.185**	4.7	3.50	11.7	4	**2.17**	55.0	2.PD.02350.090	■
3/32	**.0937**	2.381	**.189**	4.8	3.50	11.8	4	**2.17**	55.0	2.PD.F332.090	■
	.0945	2.40	**.189**	4.8	3.50	11.8	4	**2.17**	55.0	2.PD.02400.090	■
	.0965	2.45	**.193**	4.9	3.50	11.9	4	**2.17**	55.0	2.PD.02450.090	■
	.0984	2.50	**.197**	5.0	3.80	12.6	4	**2.24**	57.0	2.PD.02500.090	■
	.1004	2.55	**.201**	5.1	3.80	12.7	4	**2.24**	57.0	2.PD.02550.090	■
	.1024	2.60	**.205**	5.2	3.80	12.8	4	**2.24**	57.0	2.PD.02600.090	■
	.1043	2.65	**.209**	5.3	3.80	12.9	4	**2.24**	57.0	2.PD.02650.090	■
	.1063	2.70	**.213**	5.4	3.80	13.0	4	**2.24**	57.0	2.PD.02700.090	■
	.1083	2.75	**.217**	5.5	3.80	13.1	4	**2.24**	57.0	2.PD.02750.090	■
	.1102	2.80	**.220**	5.6	3.80	13.2	4	**2.24**	57.0	2.PD.02800.090	■
	.1122	2.85	**.224**	5.7	3.80	13.3	4	**2.24**	57.0	2.PD.02850.090	■
	.1142	2.90	**.228**	5.8	3.80	13.4	4	**2.24**	57.0	2.PD.02900.090	■
	.1161	2.95	**.232**	5.9	3.80	13.5	4	**2.24**	57.0	2.PD.02950.090	■
	.1181	3.00	**.236**	6.0	3.80	13.6	4	**2.24**	57.0	2.PD.03000.090	■
	.1201	3.05	**.240**	6.1	4.50	15.1	6	**2.40**	61.0	2.PD.03050.090	■
	.1220	3.10	**.244**	6.2	4.50	15.2	6	**2.40**	61.0	2.PD.03100.090	■
	.1240	3.15	**.248**	6.3	4.50	15.3	6	**2.40**	61.0	2.PD.03150.090	■
1/8	**.1250**	3.175	**.252**	6.4	4.50	15.4	6	**2.40**	61.0	2.PD.F18.090	■
	.1260	3.20	**.252**	6.4	4.50	15.4	6	**2.40**	61.0	2.PD.03200.090	■
	.1280	3.25	**.256**	6.5	4.50	15.5	6	**2.40**	61.0	2.PD.03250.090	■
	.1299	3.30	**.260**	6.6	4.50	15.6	6	**2.40**	61.0	2.PD.03300.090	■
	.1319	3.35	**.264**	6.7	4.50	15.7	6	**2.40**	61.0	2.PD.03350.090	■
	.1339	3.40	**.268**	6.8	4.50	15.8	6	**2.40**	61.0	2.PD.03400.090	■
	.1358	3.45	**.272**	6.9	4.50	15.9	6	**2.40**	61.0	2.PD.03450.090	■
	.1378	3.50	**.276**	7.0	4.50	16.0	6	**2.40**	61.0	2.PD.03500.090	■

■ Stock item

Carbide | 2xd1 | 90° | 140° | Z2 | eXedur RI/RIP

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00024" + .00008"	+ 0.006 mm + 0.002 mm	+ .00035" + .00016"	+ 0.009 mm + 0.004 mm	+ .00047" + .00024"	+ 0.012 mm + 0.006 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.1398	3.55	**.280**	7.1	5.30	17.7	6	**2.52**	64.0	2.PD.03550.090	■
	.1417	3.60	**.283**	7.2	5.30	17.8	6	**2.52**	64.0	2.PD.03600.090	■
	.1437	3.65	**.287**	7.3	5.30	17.9	6	**2.52**	64.0	2.PD.03650.090	■
	.1457	3.70	**.291**	7.4	5.30	18.0	6	**2.52**	64.0	2.PD.03700.090	■
	.1476	3.75	**.295**	7.5	5.30	18.1	6	**2.52**	64.0	2.PD.03750.090	■
	.1496	3.80	**.299**	7.6	5.30	18.2	6	**2.52**	64.0	2.PD.03800.090	■
	.1516	3.85	**.303**	7.7	5.30	18.3	6	**2.52**	64.0	2.PD.03850.090	■
	.1535	3.90	**.307**	7.8	5.30	18.4	6	**2.52**	64.0	2.PD.03900.090	■
	.1555	3.95	**.311**	7.9	5.30	18.5	6	**2.52**	64.0	2.PD.03950.090	■
5/32	**.1562**	3.968	**.315**	8.0	5.30	18.6	6	**2.52**	64.0	2.PD.F532.090	■
	.1575	4.00	**.315**	8.0	5.30	18.6	6	**2.52**	64.0	2.PD.04000.090	■
	.1614	4.10	**.323**	8.2	6.00	20.2	6	**2.76**	70.0	2.PD.04100.090	■
	.1654	4.20	**.331**	8.4	6.00	20.4	6	**2.76**	70.0	2.PD.04200.090	■
	.1693	4.30	**.339**	8.6	6.00	20.6	6	**2.76**	70.0	2.PD.04300.090	■
	.1732	4.40	**.346**	8.8	6.00	20.8	6	**2.76**	70.0	2.PD.04400.090	■
	.1772	4.50	**.354**	9.0	6.00	21.0	6	**2.76**	70.0	2.PD.04500.090	■
	.1811	4.60	**.362**	9.2	6.00	21.2	6	**2.76**	70.0	2.PD.04600.090	■
	.1850	4.70	**.370**	9.4	6.00	21.4	6	**2.76**	70.0	2.PD.04700.090	■
3/16	**.1875**	4.762	**.378**	9.6	6.00	21.6	6	**2.76**	70.0	2.PD.F316.090	■
	.1890	4.80	**.378**	9.6	6.00	21.6	6	**2.76**	70.0	2.PD.04800.090	■
	.1929	4.90	**.386**	9.8	6.00	21.8	6	**2.76**	70.0	2.PD.04900.090	■
	.1969	5.00	**.394**	10.0	6.00	22.0	6	**2.76**	70.0	2.PD.05000.090	■
	.2008	5.10	**.402**	10.2	8.00	26.2	8	**3.15**	80.0	2.PD.05100.090	■
	.2047	5.20	**.409**	10.4	8.00	26.4	8	**3.15**	80.0	2.PD.05200.090	■
	.2087	5.30	**.417**	10.6	8.00	26.6	8	**3.15**	80.0	2.PD.05300.090	■
	.2126	5.40	**.425**	10.8	8.00	26.8	8	**3.15**	80.0	2.PD.05400.090	■
	.2165	5.50	**.433**	11.0	8.00	27.0	8	**3.15**	80.0	2.PD.05500.090	■
7/32	**.2189**	5.560	**.441**	11.2	8.00	27.2	8	**3.15**	80.0	2.PD.F732.090	■
	.2205	5.60	**.441**	11.2	8.00	27.2	8	**3.15**	80.0	2.PD.05600.090	■
	.2244	5.70	**.449**	11.4	8.00	27.4	8	**3.15**	80.0	2.PD.05700.090	■
	.2283	5.80	**.457**	11.6	8.00	27.6	8	**3.15**	80.0	2.PD.05800.090	■
	.2323	5.90	**.465**	11.8	8.00	27.8	8	**3.15**	80.0	2.PD.05900.090	■
	.2362	6.00	**.472**	12.0	8.00	28.0	8	**3.15**	80.0	2.PD.06000.090	■
1/4	**.2500**	6.350	**.500**	12.7	8.00	28.7	8	**3.15**	80.0	2.PD.F14.090	■

■ Stock item

Complementary products

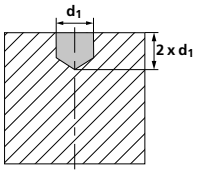
CrazyDrill Steel	p.245
CrazyDrill Alu	p.261
CrazyDrill Cool	p.297
CrazyDrill Cool XL	p.331

CRAZYDRILL by Mikron Tool Pilot

CrazyDrill Pilot - 2 x d - 90° coutersink

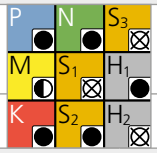
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





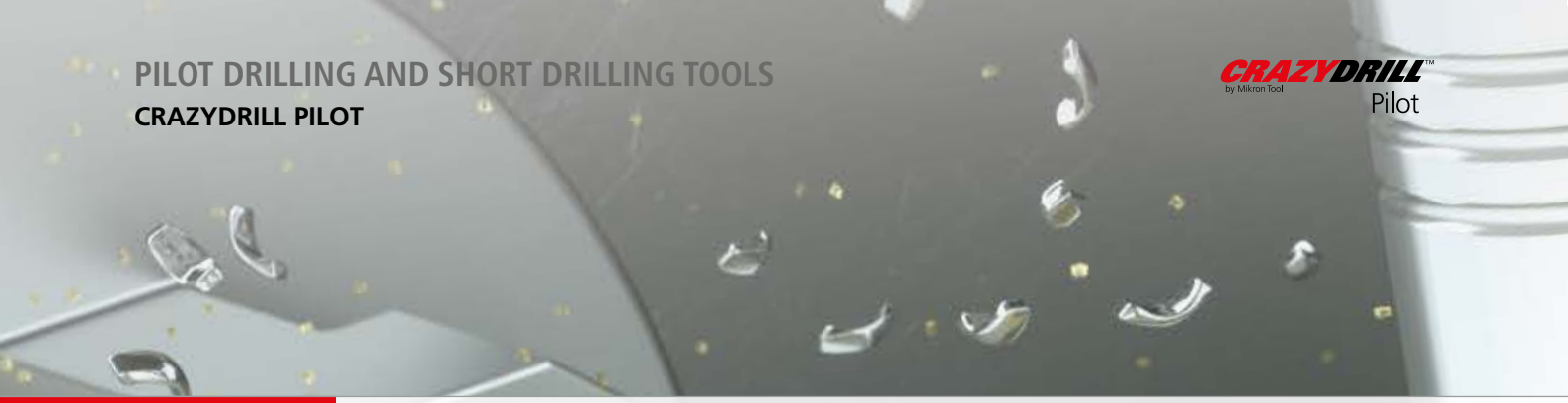
Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	32 – 64 | **105 – 210**
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	32 – 64 | **105 – 210**
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	24 – 48 | **79 – 158**
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	20 – 40 | **66 – 131**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	24 – 48 | **79 – 158**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	16 – 32 | **53 – 105**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	40 – 80 | **131 – 263**
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	80 – 160 | **263 – 525**
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	64 – 120 | **210 – 394**
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40 – 80 | **131 – 263**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40 – 80 | **131 – 263**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	56 – 120 | **184 – 394**
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	32 – 56 | **105 – 184**
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	10 – 32 | **32 – 105**
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	10 – 44 | **32 – 144**
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	16 – 32 | **53 – 105**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Excellent | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1	1/64" 0.4 mm | .016"	1/32" 0.8 mm | .032"	1.0 mm | .039"	1/16" 1.5 mm | .059"	2.0 mm | .079"	3/32" 2.5 mm | .098"	1/8" 3.0 mm | .118"	5/32" 4.0 mm | .158"	3/16" - 7/32" 5.0 mm | .197"	1/4" 6.0 mm | .236"
	f	f	f	f	f	f	f	f	f	f
	0.008 | .00031	0.044 | .0017	0.064 | .0025	0.112 | .0044	0.144 | .0057	0.168 | .0066	0.192 | .0076	0.224 | .0088	0.248 | .0098	0.272 | .0107
	0.008 | .00031	0.044 | .0017	0.064 | .0025	0.096 | .0038	0.120 | .0047	0.136 | .0054	0.152 | .0060	0.176 | .0069	0.192 | .0076	0.208 | .0082
	0.008 | .00031	0.016 | .0006	0.040 | .0016	0.064 | .0025	0.088 | .0035	0.104 | .0041	0.120 | .0047	0.144 | .0057	0.160 | .0063	0.176 | .0069
	0.008 | .00031	0.009 | .00035	0.024 | .0009	0.048 | .0019	0.064 | .0025	0.072 | .0028	0.080 | .0031	0.096 | .0038	0.104 | .0041	0.112 | .0044
	0.008 | .00031	0.016 | .0006	0.040 | .0016	0.064 | .0025	0.088 | .0035	0.104 | .0041	0.120 | .0047	0.144 | .0057	0.160 | .0063	0.176 | .0069
	0.008 | .00031	0.009 | .00035	0.016 | .0006	0.040 | .0016	0.056 | .0022	0.064 | .0025	0.072 | .0028	0.088 | .0035	0.096 | .0038	0.104 | .0041
	0.008 | .00031	0.040 | .0016	0.064 | .0025	0.096 | .0038	0.120 | .0047	0.120 | .0047	0.120 | .0047	0.160 | .0063	0.160 | .0063	0.160 | .0063
	0.008 | .00031	0.040 | .0016	0.080 | .0031	0.096 | .0038	0.120 | .0047	0.160 | .0063	0.160 | .0063	0.200 | .0079	0.200 | .0079	0.200 | .0079
	0.012 | .0005	0.064 | .0025	0.088 | .0035	0.128 | .0050	0.160 | .0063	0.200 | .0079	0.200 | .0079	0.224 | .0088	0.224 | .0088	0.224 | .0088
	0.012 | .0005	0.024 | .0009	0.048 | .0019	0.064 | .0025	0.080 | .0031	0.112 | .0044	0.128 | .0050	0.144 | .0057	0.160 | .0063	0.176 | .0069
	0.016 | .0006	0.032 | .0013	0.064 | .0025	0.080 | .0031	0.096 | .0038	0.128 | .0050	0.144 | .0057	0.160 | .0063	0.176 | .0069	0.192 | .0076
	0.012 | .0005	0.048 | .0019	0.080 | .0031	0.096 | .0038	0.120 | .0047	0.160 | .0063	0.160 | .0063	0.200 | .0079	0.200 | .0079	0.200 | .0079
	0.008 | .00031	0.040 | .0016	0.064 | .0025	0.080 | .0031	0.096 | .0038	0.120 | .0047	0.120 | .0047	0.160 | .0063	0.160 | .0063	0.160 | .0063
	0.008 | .00031	0.024 | .0009	0.032 | .0013	0.048 | .0019	0.056 | .0022	0.064 | .0025	0.064 | .0025	0.080 | .0031	0.080 | .0031	0.096 | .0038
	0.008 | .00031	0.064 | .0025	0.072 | .0028	0.088 | .0035	0.096 | .0038	0.100 | .0039	0.104 | .0041	0.112 | .0044	0.120 | .0047	0.120 | .0047
	0.008 | .00031	0.006 | .00024	0.008 | .00031	0.012 | .0005	0.016 | .0006	0.020 | .0008	0.024 | .0009	0.032 | .0013	0.040 | .0016	0.048 | .0019



Drilling process CrazyDrill Pilot

SHORT DRILLING UP TO 2 X D WITH 90° COUNTERSINK

Coolant type, pressure and filtration flowrate

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the cooling medium is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

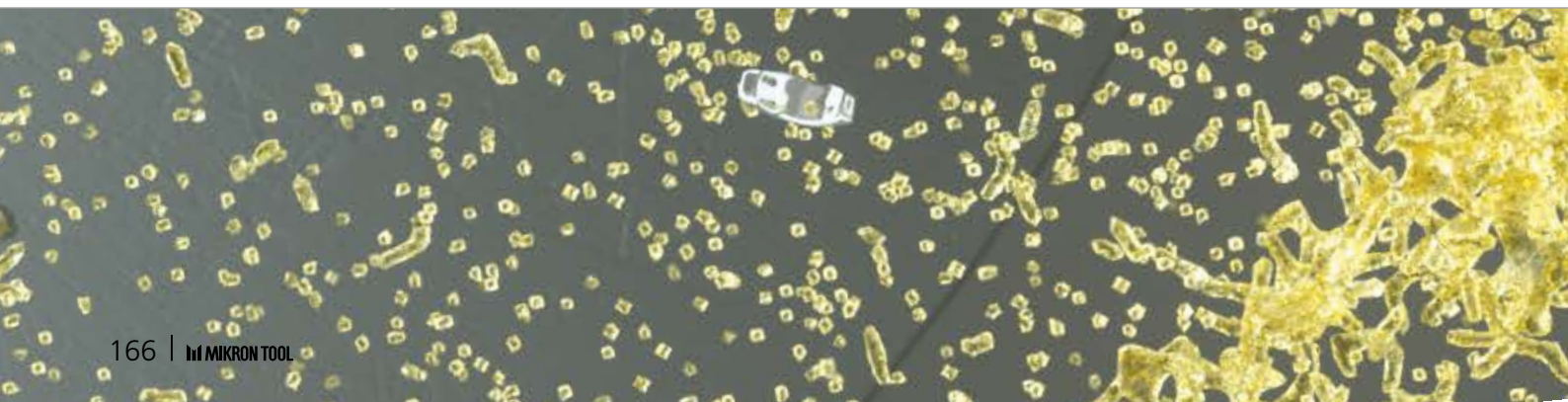
For detailed indications for tool holders see chapter "Technical information".

Pilot drilling and short drilling

Pilot drilling with CrazyDrill Pilot is the perfect preparation for accurate drilling (position and alignment accuracy) and stable machining process.

Drilling quality (position and alignment accuracy, no measurable transition from pilot to follow-up hole) and stable machining process are assured due to matched diameters of the tools.

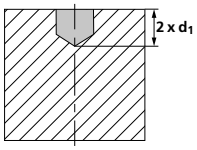
CrazyDrill Pilot not only is the perfect preparation of deep follow-up holes. Concurrently it is a short drill for highly precise and quick drilling up to 2 x d + 90° countersink.



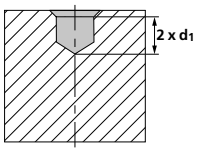
DRILLING PROCESS

1 | PILOT DRILLING OR SHORT DRILLING

- Drilling in one step with recommended cutting speed and feed rate (see cutting data table).

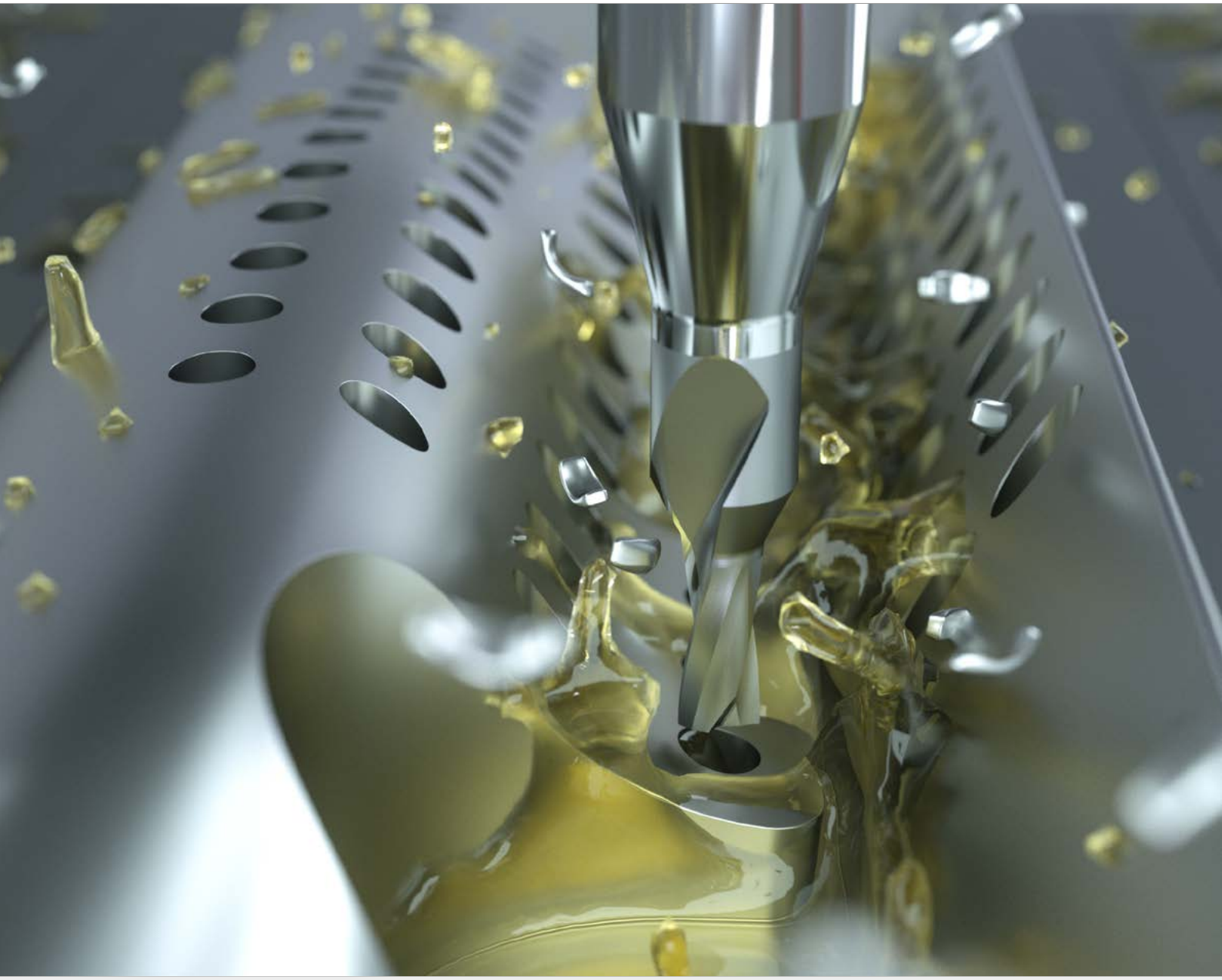


- If needed, after the desired cutting depth of 2 x d is reached, a chamfer angle of 90° can be realized.



Note:
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

CrazyDrill Crosspilot



CRAZYDRILL Crosspilot

A PILOT DRILL FOR INCLINED SURFACES UP TO 60°



Mikron Tool offers with CrazyDrill Crosspilot a coated solid carbide pilot drill for direct drilling on inclined surfaces up to a maximum inclined angle of 60°. The drill is available from stock in diameters of .016" to 1/4" (0.4 mm to 6.35 mm).

Producing pilot holes directly on inclined surfaces, means to reduce the three steps needed up to now "milling – centering – drilling" to two steps "pilot drilling – drilling".

The compact and sturdy design of CrazyDrill Crosspilot provides for good position accuracy. The drill with a 170° tip angle affords the follow-up drill a perfect centering and cylindrical guidance. Highest degree of precision and straightness is assured. Perfectly matched diameter tolerances guarantee accurate deep hole drilling on inclined surfaces.

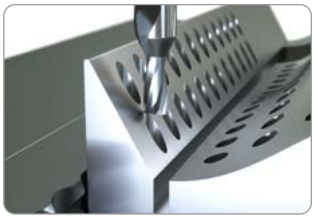
Perfect pilot drill for holes on inclined surfaces

DRILLING ON INCLINED, CONVEX AND CONCAVE SURFACES

Mikron Tool offers with CrazyDrill Crosspilot a coated solid carbide pilot drill for direct drilling on inclined surfaces up to a maximum inclined angle of 60°. The drill is available from stock in diameters of .016" to 1/4" (0.4 mm to 6.35 mm).

- CrazyDrill Crosspilot, drilling depth up to 2 x d (nominal),with external cooling

CrazyDrill Crosspilot is used for:



Inclined holes with angle up to 60° on flat surfaces.



Inclined holes with angle up to 60° on convex surfaces.



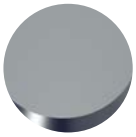
Eccentric holes on convex surfaces.



Inclined holes with angle up to 60° on concave surfaces.

CrazyDrill Crosspilot

- Coated
- External cooling





1 | SHAFT
The reinforced shaft with its sturdy design counteracts lateral forces and guarantees highest position.

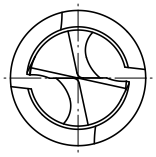
2 | SOLID CARBIDE
A special solid carbide assures high drilling speed.

3 | COATING
An optimal coating protects the solid carbide drill from wear and increases its tool life.

4 | GUIDING MARGINS
No lateral catching due to guiding margins and therefore higher process reliability.

5 | TIP ANGLE GEOMETRY
The special tip angle geometry of 170° minimizes radial forces and enables drilling up to a maximum inclined angle of 60°. Concurrently, the geometry assures a good centering and prevents cutting edge breakage of the follow-up drill.

Drill tip



Page 175

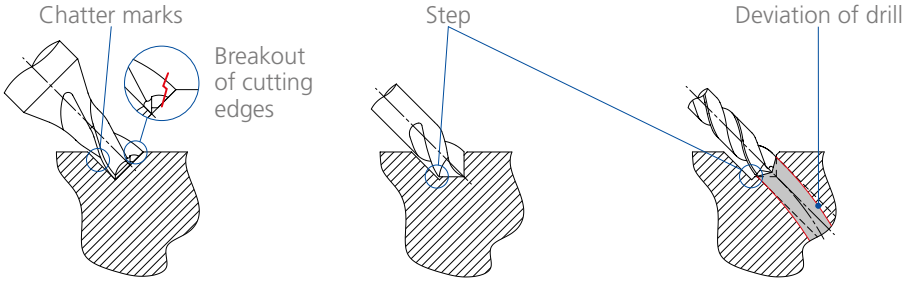
Benefits and applications

PERFECT FOR HOLES ON INCLINED SURFACES

- **SHORT MACHINING TIME** | pilot hole directly on inclined surfaces
- **HIGH PROCESS RELIABILITY** | due to an innovative tool design
- **HIGH DEGREE OF PRECISION** | due to small tolerances
- **LOW PRODUCTION COSTS** | savings of one tool: two instead of three work steps

The comparison

■ Machining of inclined holes with traditional method



Step 1: flat milling
Tool: Milling cutter

Step 2: centering
Tool: NC spot drill

Step 3: flat milling
Tool: Twist drill

■ Inclined hole, performed with CrazyDrill Crosspilot



Step 1: inclined spot drilling with Mikron Tool pilot drill
Tool: CrazyDrill Crosspilot

Step 2: long, inclined hole
Tool: Twist drill



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Dental implants
Aerospace industry	Spherical joint
Medical technology	Component for measuring instrument
Mold making	Mould for blister packaging
Automotive industry	Injector body
Mechanical engineering	Hub with inclined holes
Hydraulics / Pneumatics	Safety screw

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4301	X5CrNi 18-10	304
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S2 Titanium (pure and alloyed)	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

CrazyDrill Crosspilot - 2 x d (nominal)

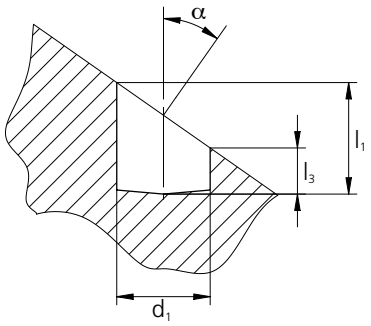
DRILLING WITH EXTERNAL COOLING



The coated solid carbide drill for steel, stainless steel materials, titanium and nonferrous metals is an unique specialist for holes on inclined, convex and concave surfaces. It produces pilot holes directly in surfaces with up to a maximum inclined angle of 60°. CrazyDrill Crosspilot reduces by one operation the traditional centering process.

The compact and sturdy design of CrazyDrill Crosspilot provides for good position accuracy, its geometry is designed for extreme applications. Its 170° tip angle affords good centering, reduction of radial forces and prevents cutting edge breakage of the follow-up drill. Pilot drilling with CrazyDrill Crosspilot assures a cylindrical guidance of the follow-up drill. The result: process reliability, highest position and alignment accuracy.

The formula: $l_3 = 2 \times d_1 - d_1 \times \tan(\alpha)$



The example:
Inclination angle 35°, bore diameter .079" (2 mm).

$l_3 = 2 \times .079" - .079" \times (\tan 35°) = .102"$ (2.6 mm)

With an inclination angle of 35° and a depth of .158" (4 mm) (2 x d_1) on long side, the hole depth on the short side becomes .102" (2.6 mm) (1.3 x d_1).

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

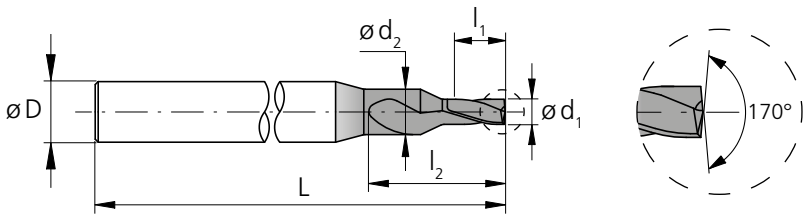
Please note

You couldn't find your suitable version of the CrazyDrill Crosspilot (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

Carbide | 2xd1 | 170° | Z2 | eXedur RI/RIP

Ø d1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00024" 0	+ 0.006 mm 0	+ .00035" + .00004"	+ 0.009 mm + 0.001 mm	+ .00039" + .00004"	+ 0.010 mm + 0.001 mm



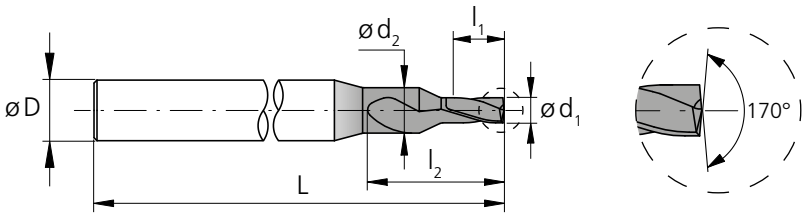
d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	d2 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
1/64	**.0156**	0.396	**.031**	0.8	1.0	2.6	4	**1.97**	50	2.PD.F164.170	■
	.0157	0.40	**.031**	0.8	1.0	2.6	4	**1.97**	50	2.PD.00400.170	■
	.0177	0.45	**.035**	0.9	1.0	2.8	4	**1.97**	50	2.PD.00450.170	■
	.0197	0.50	**.039**	1.0	1.2	3.2	4	**1.97**	50	2.PD.00500.170	■
	.0217	0.55	**.043**	1.1	1.2	3.3	4	**1.97**	50	2.PD.00550.170	■
	.0236	0.60	**.047**	1.2	1.5	4.0	4	**1.97**	50	2.PD.00600.170	■
	.0256	0.65	**.051**	1.3	1.5	4.1	4	**1.97**	50	2.PD.00650.170	■
	.0276	0.70	**.055**	1.4	1.5	4.2	4	**1.97**	50	2.PD.00700.170	■
	.0295	0.75	**.059**	1.5	1.5	4.3	4	**1.97**	50	2.PD.00750.170	■
1/32	**.0312**	0.793	**.063**	1.6	1.7	4.8	4	**1.97**	50	2.PD.F132.170	■
	.0315	0.80	**.063**	1.6	1.7	4.8	4	**1.97**	50	2.PD.00800.170	■
	.0335	0.85	**.067**	1.7	1.7	4.9	4	**1.97**	50	2.PD.00850.170	■
	.0354	0.90	**.071**	1.8	1.7	5.0	4	**1.97**	50	2.PD.00900.170	■
	.0374	0.95	**.075**	1.9	1.7	5.1	4	**1.97**	50	2.PD.00950.170	■
	.0394	1.00	**.079**	2.0	2.0	5.7	4	**2.17**	55	2.PD.01000.170	■
	.0413	1.05	**.083**	2.1	2.0	5.8	4	**2.17**	55	2.PD.01050.170	■
	.0433	1.10	**.087**	2.2	2.0	6.0	4	**2.17**	55	2.PD.01100.170	■
	.0453	1.15	**.091**	2.3	2.0	6.1	4	**2.17**	55	2.PD.01150.170	■
	.0472	1.20	**.094**	2.4	2.0	6.2	4	**2.17**	55	2.PD.01200.170	■
	.0492	1.25	**.098**	2.5	2.5	7.2	4	**2.17**	55	2.PD.01250.170	■
	.0512	1.30	**.102**	2.6	2.5	7.3	4	**2.17**	55	2.PD.01300.170	■
	.0531	1.35	**.106**	2.7	2.5	7.4	4	**2.17**	55	2.PD.01350.170	■
	.0551	1.40	**.110**	2.8	2.5	7.5	4	**2.17**	55	2.PD.01400.170	■
	.0571	1.45	**.114**	2.9	2.5	7.6	4	**2.17**	55	2.PD.01450.170	■
	.0591	1.50	**.118**	3.0	3.0	8.6	4	**2.17**	55	2.PD.01500.170	■
	.0610	1.55	**.122**	3.1	3.0	8.7	4	**2.17**	55	2.PD.01550.170	■
1/16	**.0625**	1.587	**.126**	3.2	3.0	8.8	4	**2.17**	55	2.PD.F116.170	■
	.0630	1.60	**.126**	3.2	3.0	8.8	4	**2.17**	55	2.PD.01600.170	■
	.0650	1.65	**.130**	3.3	3.0	8.9	4	**2.17**	55	2.PD.01650.170	■
	.0669	1.70	**.134**	3.4	3.0	9.1	4	**2.17**	55	2.PD.01700.170	■
	.0689	1.75	**.138**	3.5	3.0	9.2	4	**2.17**	55	2.PD.01750.170	■
	.0709	1.80	**.142**	3.6	3.5	10.1	4	**2.17**	55	2.PD.01800.170	■
	.0728	1.85	**.146**	3.7	3.5	10.3	4	**2.17**	55	2.PD.01850.170	■
	.0748	1.90	**.150**	3.8	3.5	10.4	4	**2.17**	55	2.PD.01900.170	■

■ Stock item

Complementary products
All "CrazyDrill" family

CrazyDrill Crosspilot - 2 x d (nominal)

DRILLING WITH EXTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0768	1.95	**.154**	3.9	3.5	10.5	4	**2.17**	55	2.PD.01950.170	■
	.0787	2.00	**.157**	4.0	3.5	10.6	6	**2.56**	65	2.PD.02000.170	■
	.0807	2.05	**.161**	4.1	3.5	10.7	6	**2.56**	65	2.PD.02050.170	■
	.0827	2.10	**.165**	4.2	3.5	10.8	6	**2.56**	65	2.PD.02100.170	■
	.0846	2.15	**.169**	4.3	3.5	10.9	6	**2.56**	65	2.PD.02150.170	■
	.0866	2.20	**.173**	4.4	4.5	12.8	6	**2.56**	65	2.PD.02200.170	■
	.0886	2.25	**.177**	4.5	4.5	12.9	6	**2.56**	65	2.PD.02250.170	■
	.0906	2.30	**.181**	4.6	4.5	13.0	6	**2.56**	65	2.PD.02300.170	■
	.0925	2.35	**.185**	4.7	4.5	13.1	6	**2.56**	65	2.PD.02350.170	■
3/32	**.0937**	2.381	**.189**	4.8	4.5	13.2	6	**2.56**	65	2.PD.F332.170	■
	.0945	2.40	**.189**	4.8	4.5	13.2	6	**2.56**	65	2.PD.02400.170	■
	.0965	2.45	**.193**	4.9	4.5	13.4	6	**2.56**	65	2.PD.02450.170	■
	.0984	2.50	**.197**	5.0	4.5	13.5	6	**2.56**	65	2.PD.02500.170	■
	.1004	2.55	**.201**	5.1	4.5	13.6	6	**2.56**	65	2.PD.02550.170	■
	.1024	2.60	**.205**	5.2	4.5	13.7	6	**2.56**	65	2.PD.02600.170	■
	.1043	2.65	**.209**	5.3	5.0	14.7	6	**2.56**	65	2.PD.02650.170	■
	.1063	2.70	**.213**	5.4	5.0	14.8	6	**2.56**	65	2.PD.02700.170	■
	.1083	2.75	**.217**	5.5	5.0	14.9	6	**2.56**	65	2.PD.02750.170	■
	.1102	2.80	**.220**	5.6	5.0	15.0	6	**2.56**	65	2.PD.02800.170	■
	.1122	2.85	**.224**	5.7	5.0	15.1	6	**2.56**	65	2.PD.02850.170	■
	.1142	2.90	**.228**	5.8	5.0	15.2	6	**2.56**	65	2.PD.02900.170	■
	.1161	2.95	**.232**	5.9	5.0	15.4	6	**2.56**	65	2.PD.02950.170	■
	.1181	3.00	**.236**	6.0	6.0	17.2	6	**2.76**	70	2.PD.03000.170	■
	.1201	3.05	**.240**	6.1	6.0	17.3	6	**2.76**	70	2.PD.03050.170	■
	.1220	3.10	**.244**	6.2	6.0	17.4	6	**2.76**	70	2.PD.03100.170	■
	.1240	3.15	**.248**	6.3	6.0	17.5	6	**2.76**	70	2.PD.03150.170	■
1/8	**.1250**	3.175	**.252**	6.4	6.0	17.7	6	**2.76**	70	2.PD.F18.170	■
	.1260	3.20	**.252**	6.4	6.0	17.7	6	**2.76**	70	2.PD.03200.170	■
	.1280	3.25	**.256**	6.5	6.0	17.8	6	**2.76**	70	2.PD.03250.170	■
	.1299	3.30	**.260**	6.6	6.0	17.9	6	**2.76**	70	2.PD.03300.170	■
	.1319	3.35	**.264**	6.7	6.0	18.0	6	**2.76**	70	2.PD.03350.170	■
	.1339	3.40	**.268**	6.8	6.0	18.1	6	**2.76**	70	2.PD.03400.170	■
	.1358	3.45	**.272**	6.9	6.0	18.2	6	**2.76**	70	2.PD.03450.170	■
	.1378	3.50	**.276**	7.0	6.0	18.3	6	**2.76**	70	2.PD.03500.170	■

■ Stock item

Carbide | 2xd1 | 170° | Z2 | eXedur RI/RIP

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00024" 0	+ 0.006 mm 0	+ .00035" + .00004"	+ 0.009 mm + 0.001 mm	+ .00039" + .00004"	+ 0.010 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.1398	3.55	.280	7.1	6.0	18.4	6	2.76	70	2.PD.03550.170	■
	.1417	3.60	.283	7.2	6.0	18.6	6	2.76	70	2.PD.03600.170	■
	.1437	3.65	.287	7.3	6.0	18.7	6	2.76	70	2.PD.03650.170	■
	.1457	3.70	.291	7.4	6.0	18.8	6	2.76	70	2.PD.03700.170	■
	.1476	3.75	.295	7.5	6.0	18.9	6	2.76	70	2.PD.03750.170	■
	.1496	3.80	.299	7.6	6.0	19.0	6	2.76	70	2.PD.03800.170	■
	.1516	3.85	.303	7.7	6.0	19.1	6	2.76	70	2.PD.03850.170	■
	.1535	3.90	.307	7.8	6.0	19.2	6	2.76	70	2.PD.03900.170	■
	.1555	3.95	.311	7.9	6.0	19.4	6	2.76	70	2.PD.03950.170	■
5/32	.1562	3.968	.315	8.0	6.0	19.5	6	2.76	70	2.PD.F532.170	■
	.1575	4.00	.315	8.0	6.0	19.5	6	2.76	70	2.PD.04000.170	■
	.1614	4.10	.323	8.2	6.0	21.3	6	2.76	70	2.PD.04100.170	■
	.1654	4.20	.331	8.4	6.0	21.4	6	2.76	70	2.PD.04200.170	■
	.1693	4.30	.339	8.6	6.0	21.6	6	2.76	70	2.PD.04300.170	■
	.1732	4.40	.346	8.8	6.0	21.7	6	2.76	70	2.PD.04400.170	■
	.1772	4.50	.354	9.0	8.0	27.0	8	3.15	80	2.PD.04500.170	■
	.1811	4.60	.362	9.2	8.0	27.1	8	3.15	80	2.PD.04600.170	■
	.1850	4.70	.370	9.4	8.0	27.3	8	3.15	80	2.PD.04700.170	■
3/16	.1875	4.762	.378	9.6	8.0	27.4	8	3.15	80	2.PD.F316.170	■
	.1890	4.80	.378	9.6	8.0	27.4	8	3.15	80	2.PD.04800.170	■
	.1929	4.90	.386	9.8	8.0	27.6	8	3.15	80	2.PD.04900.170	■
	.1969	5.00	.394	10.0	8.0	27.7	8	3.15	80	2.PD.05000.170	■
	.2008	5.10	.402	10.2	8.0	27.9	8	3.15	80	2.PD.05100.170	■
	.2047	5.20	.409	10.4	8.0	28.0	8	3.15	80	2.PD.05200.170	■
	.2087	5.30	.417	10.6	8.0	28.1	8	3.15	80	2.PD.05300.170	■
	.2126	5.40	.425	10.8	8.0	28.3	8	3.15	80	2.PD.05400.170	■
	.2165	5.50	.433	11.0	8.0	28.4	8	3.15	80	2.PD.05500.170	■
7/32	.2189	5.560	.441	11.2	8.0	28.6	8	3.15	80	2.PD.F732.170	■
	.2205	5.60	.441	11.2	8.0	28.6	8	3.15	80	2.PD.05600.170	■
	.2244	5.70	.449	11.4	8.0	28.7	8	3.15	80	2.PD.05700.170	■
	.2283	5.80	.457	11.6	8.0	28.9	8	3.15	80	2.PD.05800.170	■
	.2323	5.90	.465	11.8	8.0	29.0	8	3.15	80	2.PD.05900.170	■
	.2362	6.00	.472	12.0	8.0	29.1	8	3.15	80	2.PD.06000.170	■
1/4	.2500	6.350	.500	12.7	8.0	29.6	8	3.15	80	2.PD.F14.170	■

■ Stock item

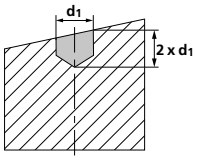
Complementary products
All "CrazyDrill" family

CRAZYDRILL by Mikron Tool Crosspilot

CrazyDrill Crosspilot - 2 x d (nominal)

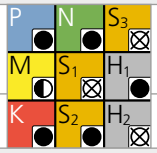
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





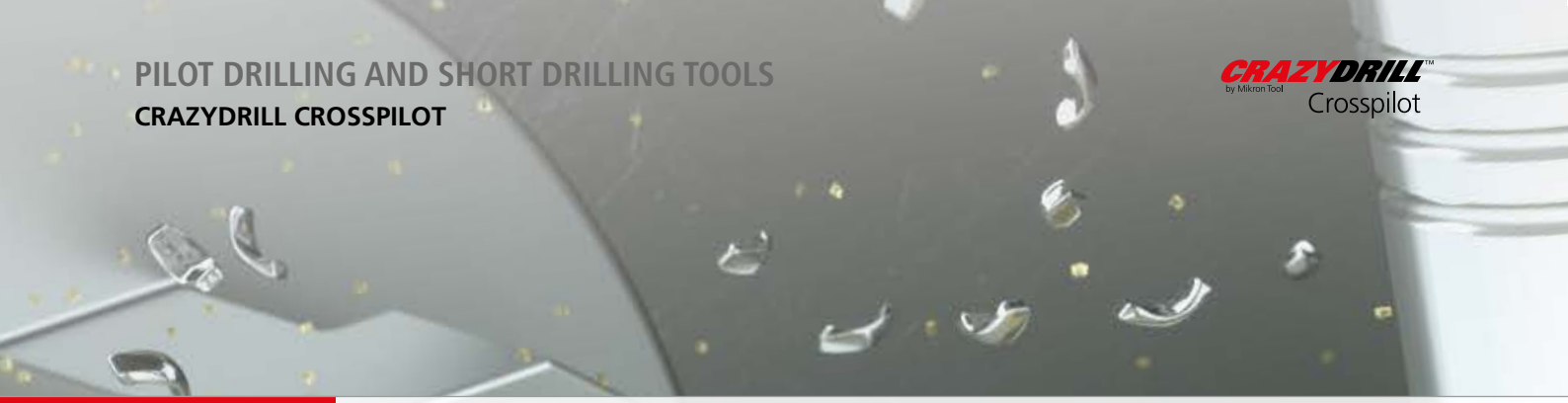
Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	80 | **262**
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | **197**
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	50 | **164**
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	40 | **131**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	50 | **164**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	30 | **98**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	80 | **262**
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	125 | **410**
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	125 | **410**
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	80 | **262**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	80 | **262**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	100 | **328**
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	80 | **262**
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	25 | **82**
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	25 | **82**
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	20 | **66**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1	1/64" 0.4 mm | .016" f	1/32" 0.8 mm | .032" f	1.0 mm | .039" f	1/16" 1.5 mm | .059" f	2.0 mm | .079" f	1/8" 3.0 mm | .118" f	5/32" 4.0 mm | .158" f	3/16" - 7/32" 5.0 mm | .197" f	1/4" 6.0 mm | .236" f
	0.005 | .00020	0.011 | .00043	0.013 | .0005	0.020 | .0008	0.027 | .0011	0.040 | .0016	0.053 | .0021	0.067 | .0026	0.080 | .0031
	0.004 | .00016	0.008 | .00031	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024
	0.004 | .00016	0.008 | .00031	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024
	0.002 | .00008	0.004 | .00016	0.005 | .0002	0.008 | .0003	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.025 | .0010	0.030 | .0012
	0.004 | .00016	0.008 | .00031	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024
	0.002 | .00008	0.004 | .00016	0.005 | .0002	0.008 | .0003	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.025 | .0010	0.030 | .0012
	0.004 | .00016	0.008 | .00031	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024
	0.008 | .00031	0.016 | .00063	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047
	0.008 | .00031	0.016 | .00063	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047
	0.004 | .00016	0.008 | .00031	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024
	0.004 | .00016	0.008 | .00031	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024
	0.008 | .00031	0.016 | .00063	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047
	0.004 | .00016	0.008 | .00031	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024
	0.004 | .00016	0.008 | .00031	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024
	0.004 | .00016	0.008 | .00031	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024
	0.001 | .00004	0.003 | .00012	0.003 | .00012	0.005 | .00020	0.007 | .00028	0.010 | .0004	0.013 | .0005	0.017 | .0007	0.020 | .0008



Drilling process CrazyDrill Crosspilot

SHORT DRILLING ON INCLINED SURFACES UP TO 60°

Coolant type, pressure, filtration and flowrate

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the cooling medium is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

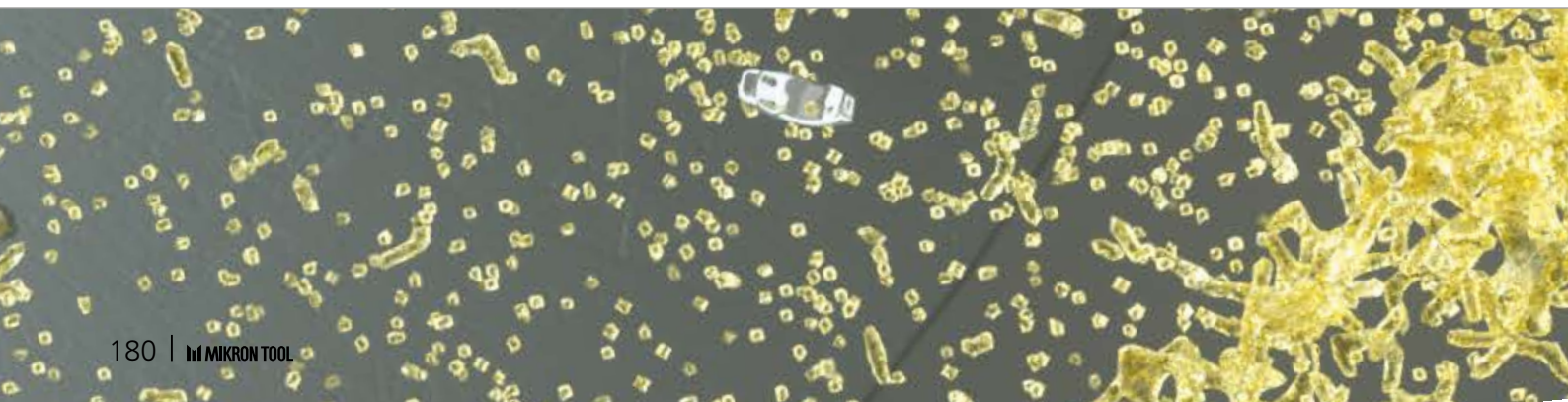
For detailed indications for tool holders see chapter "Technical information".

Pilot drilling and short drilling

CrazyDrill Crosspilot, combined with deep hole drills of the CrazyDrill family, is the perfect solution when drilling on inclined, concave or convex surfaces.

Drilling quality (position and alignment accuracy) and stable machining process are assured due to matched diameter tolerances of the tools.

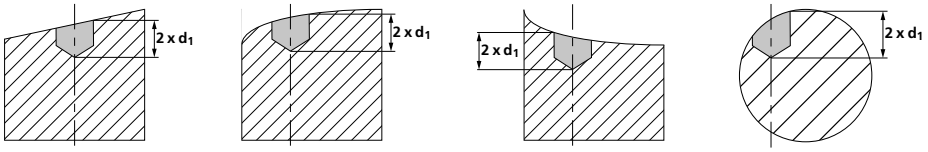
CrazyDrill Crosspilot not only is the perfect preparation of deep follow-up holes. Concurrently it is a short drill for highly precise and quick drilling on concave, convex and inclined surfaces up to a maximum inclined angle of 60°.



DRILLING PROCESS

1 | PILOT DRILLING OR SHORT DRILLING

- Drilling in one step with recommended cutting speed and feed rate (see cutting data table).



Note:
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

CrazyDrill Coolpilot



CRAZYDRILL Coolpilot

PILOT OR SHORT DRILL WITH INNOVATIVE THROUGH-TOOL COOLING



With CrazyDrill Coolpilot, Mikron Tool introduces a pilot and short drill for stainless steels, heat-resistant and CrCo alloys in the diameter range of .039" to 1/4" (1.0 mm to 6.35 mm) and for a drilling depth of up to 3 x d. All short drills are coated, have through-tool cooling and a cutting edge for 90° chamfer.

The new features are the tip geometry, the shape of the cooling channels, which allow up to four times more flowrate, the flute profile for perfect chip breaking and the coating. CrazyDrill Coolpilot is the perfect starter drill for deep drilling with CrazyDrill Cool SST-Inox.

CRAZYDRILL by Mikron Tool Coolpilot

Maximum precision even in difficult materials

EFFICIENT PILOT AND SHORT DRILLING IN STAINLESS MATERIALS

With CrazyDrill Coolpilot, Mikron Tool introduces a pilot and short drill for stainless steels, heat-resistant and CrCo alloys in the diameter range of .039" to 1/4" (1.0 mm to 6.35 mm) and for a drilling depth of up to 3 x d.

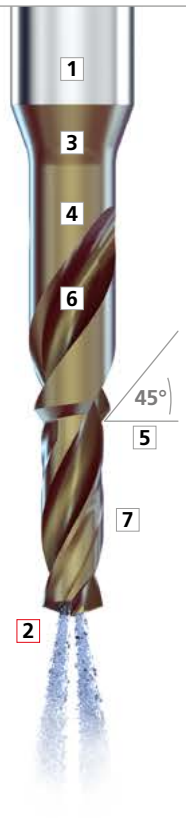
- CrazyDrill Coolpilot, drilling depth 3 x d, with through-tool cooling, countersink 90°

CrazyDrill Coolpilot

- Coated
- Through-tool cooling







Page 189

1 | SHANK
The reinforced solid carbide shank guarantees stability, high degree of concentricity and hence maximum drilling precision.

2 | NEW: WITH COOLING CHANNELS
Due to a newly designed shape of helical cooling channels, up to four times more coolant volume reaches the drill tip. The result is continuous and efficient chip removal as well as constant and substantial cooling of cutting edges. A Powerchamber additionally guarantees sufficiently strong coolant flow for smaller diameters of up to Ø .116" (2.95 mm).

3 | CARBIDE
A specially developed micro-grain solid carbide allows machining at high speeds.

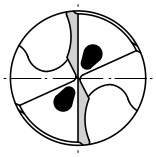
4 | NEW COATING
The high-performance coating eXedur SNP is heat-resistant and wear-resistant, prevents build up edges and promotes uniform chip flushing. The result is long tool life.

5 | 90° CHAMFER CUTTING EDGE
A 90° countersink can be placed simultaneously with the drilling.

6 | NEW CHIP FLUTE PROFILE
Divided into two areas:
- **Front chip flute area:** a special chip breaker shape ensures compact, short and curved chips.
- **Rear chip flute area:** an extended flute shape ensures perfect chip removal.

7 | DOUBLE GUIDING MARGIN
The narrow guiding chamfer ensures the highest degree of precision (straightness) and surface quality.

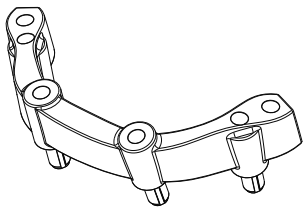
Drill tip



Benefits and applications

FOR A PROCESS RELIABLE, PRECISE AND FAST PILOT DRILLING

- **SHORT MACHINING TIME** | drilling 3 x d + 90° countersink with one tool
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to greater coolant flow
- **HIGH DEGREE OF PRECISION** | due to double margin



COMPONENT
Pontic (dental)

MATERIAL
CrCoMo28 / ASTM F1537

MACHINING
- Short drilling and chamfering 90°
- d = 4 mm **| .158"**
- drilling depth 12.1 mm **| .476"**

DRILLING TOOL
Mikron Tool - CrazyDrill Coolpilot

DATA	MIKRON TOOL
Tool type	CrazyDrill Coolpilot - Carbide - Coated - Internal cooling
Item number	2.PD.04000.090.IC
Cutting data	v_c = 70 m/min **| 230 SFM** f = 0.12 mm/rev **| .0047 IPR**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Dental implants
Aerospace industry	Engine parts Spherical joint
Medical technology	Component for endoscope
Automotive industry	Components for gasoline direct injection
Mechanical engineering	Locking bolt
Watches	Watch housing
Hydraulics / Pneumatics	Hydraulic valve

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4542	X5CrNiCuNb 16-4	630
	1.4435	X2CrNiMo 18-14-3	316L
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25

CrazyDrill Coolpilot - 3 x d - 90° countersink

DRILLING WITH THROUGH-TOOL COOLING



CrazyDrill Coolpilot was developed as a pilot and short drill with an integrated cutting edge for 90° chamfer for stainless steels, heat-resistant and CrCo alloys. This makes it the ideal complement to CrazyDrill Cool SST-Inox. It has helical drop-shaped cooling channels up to the cutting edges as well as a chip breaker flute profile. The new, copper-red coating provides low adhesion to work materials and facilitates an efficient drilling process.

Pilot drilling or short drilling up to 3 x d is executed in one step. The follow-up drill is optimally guided through the pilot hole, thus guaranteeing a high degree of hole straightness. A 90° countersink can be added simultaneously due to the integrated cutting edge for chamfer. Reduced tool changes therefore result in shorter machining times.

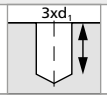
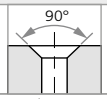
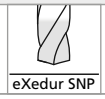
Coolant type, pressure and filtration

Detailed recommendations for coolant type, pressure and filtration are on page "drilling process".

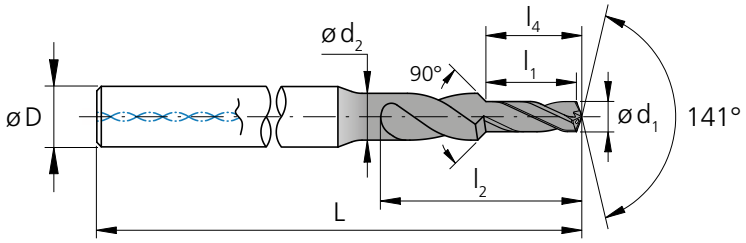
Please note

You couldn't find your suitable version of the CrazyDrill Coolpilot (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

Carbide				Z2		

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)		**.240" - .394"** (6.1 - 10.0 mm)	
Tolerance	**+ .00024"** **+ .00008"**	+ 0.006 mm + 0.002 mm	**+ .00035"** **+ .00016"**	+ 0.009 mm + 0.004 mm	**+ .00047"** **+ .00024"**	+ 0.012 mm + 0.006 mm



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	l_4 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	**.118**	3.00	1.60	6.5	3.20	4	**1.97**	50	2.PD.01000.090.IC	■
	.041	1.05	**.124**	3.15	1.60	6.8	3.30	4	**1.97**	50	2.PD.01050.090.IC	■
	.043	1.10	**.130**	3.30	1.60	7.1	3.50	4	**1.97**	50	2.PD.01100.090.IC	■
	.045	1.15	**.136**	3.45	1.60	7.5	3.60	4	**1.97**	50	2.PD.01150.090.IC	■
	.047	1.20	**.142**	3.60	1.90	7.8	3.80	4	**1.97**	50	2.PD.01200.090.IC	■
	.049	1.25	**.148**	3.75	1.90	8.1	4.00	4	**1.97**	50	2.PD.01250.090.IC	■
	.051	1.30	**.154**	3.90	1.90	8.4	4.10	4	**1.97**	50	2.PD.01300.090.IC	■
	.053	1.35	**.159**	4.05	1.90	8.8	4.30	4	**1.97**	50	2.PD.01350.090.IC	■
	.055	1.40	**.165**	4.20	1.90	9.1	4.40	4	**1.97**	50	2.PD.01400.090.IC	■
	.057	1.45	**.171**	4.35	2.25	10.4	4.60	4	**1.97**	50	2.PD.01450.090.IC	■
	.059	1.50	**.177**	4.50	2.25	10.7	4.70	4	**1.97**	50	2.PD.01500.090.IC	■
	.061	1.55	**.183**	4.65	2.25	10.9	4.90	4	**1.97**	50	2.PD.01550.090.IC	■
1/16	**.0625**	1.587	**.189**	4.80	2.25	11.2	5.10	4	**1.97**	50	2.PD.F116.IC	■
	.063	1.60	**.189**	4.80	2.25	11.2	5.10	4	**1.97**	50	2.PD.01600.090.IC	■
	.065	1.65	**.195**	4.95	2.25	11.5	5.20	4	**1.97**	50	2.PD.01650.090.IC	■
	.067	1.70	**.201**	5.10	2.60	11.8	5.40	4	**2.09**	53	2.PD.01700.090.IC	■
	.069	1.75	**.207**	5.25	2.60	12.1	5.50	4	**2.09**	53	2.PD.01750.090.IC	■
	.071	1.80	**.213**	5.40	2.60	12.3	5.70	4	**2.09**	53	2.PD.01800.090.IC	■
	.073	1.85	**.219**	5.55	2.60	12.6	5.80	4	**2.09**	53	2.PD.01850.090.IC	■
	.075	1.90	**.224**	5.70	2.60	12.8	6.00	4	**2.09**	53	2.PD.01900.090.IC	■
	.077	1.95	**.230**	5.85	2.60	13.1	6.20	4	**2.09**	53	2.PD.01950.090.IC	■
	.079	2.00	**.236**	6.00	3.10	13.3	6.30	4	**2.17**	55	2.PD.02000.090.IC	■
	.081	2.05	**.242**	6.15	3.10	13.6	6.50	4	**2.17**	55	2.PD.02050.090.IC	■
	.083	2.10	**.248**	6.30	3.10	13.9	6.60	4	**2.17**	55	2.PD.02100.090.IC	■
	.085	2.15	**.254**	6.45	3.10	14.1	6.80	4	**2.17**	55	2.PD.02150.090.IC	■
	.087	2.20	**.260**	6.60	3.10	14.4	7.00	4	**2.17**	55	2.PD.02200.090.IC	■
	.089	2.25	**.266**	6.75	3.10	14.7	7.10	4	**2.17**	55	2.PD.02250.090.IC	■
	.091	2.30	**.272**	6.90	3.50	14.9	7.30	4	**2.24**	57	2.PD.02300.090.IC	■

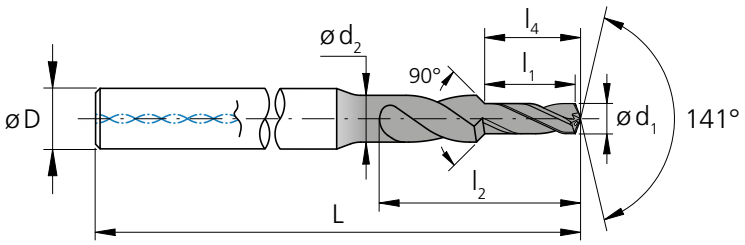
■ Stock item

Complementary products

CrazyDrill Cool SST-Inox p.370

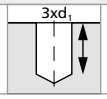
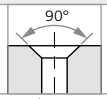
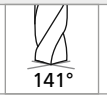
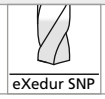
CrazyDrill Coolpilot - 3 x d - 90° countersink

DRILLING WITH THROUGH-TOOL COOLING



d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	d2 [mm]	l2 [mm]	l4 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.093	2.35	**.278**	7.05	3.50	15.2	7.40	4	**2.24**	57	2.PD.02350.090.IC	■
3/32	**.0937**	2.381	**.283**	7.20	3.50	15.6	7.60	4	**2.24**	57	2.PD.F332.IC	■
	.094	2.40	**.283**	7.20	3.50	15.6	7.60	4	**2.24**	57	2.PD.02400.090.IC	■
	.096	2.45	**.289**	7.35	3.50	15.9	7.70	4	**2.24**	57	2.PD.02450.090.IC	■
	.098	2.50	**.295**	7.50	3.50	16.2	7.90	4	**2.24**	57	2.PD.02500.090.IC	■
	.100	2.55	**.301**	7.65	3.50	16.5	8.10	4	**2.24**	57	2.PD.02550.090.IC	■
	.102	2.60	**.307**	7.80	4.00	16.9	8.20	4	**2.24**	57	2.PD.02600.090.IC	■
	.104	2.65	**.313**	7.95	4.00	17.2	8.40	4	**2.24**	57	2.PD.02650.090.IC	■
	.106	2.70	**.319**	8.10	4.00	17.5	8.50	4	**2.24**	57	2.PD.02700.090.IC	■
	.108	2.75	**.325**	8.25	4.00	17.8	8.70	4	**2.24**	57	2.PD.02750.090.IC	■
	.110	2.80	**.331**	8.40	4.00	18.2	8.80	4	**2.24**	57	2.PD.02800.090.IC	■
	.112	2.85	**.337**	8.55	4.00	18.5	9.00	4	**2.24**	57	2.PD.02850.090.IC	■
	.114	2.90	**.343**	8.70	4.00	18.8	9.20	4	**2.24**	57	2.PD.02900.090.IC	■
	.116	2.95	**.348**	8.85	4.00	19.1	9.30	4	**2.24**	57	2.PD.02950.090.IC	■
	.118	3.00	**.354**	9.00	4.70	19.5	9.50	6	**2.56**	65	2.PD.03000.090.IC	■
	.120	3.05	**.360**	9.15	4.70	19.8	9.60	6	**2.56**	65	2.PD.03050.090.IC	■
	.122	3.10	**.366**	9.30	4.70	20.1	9.80	6	**2.56**	65	2.PD.03100.090.IC	■
	.124	3.15	**.372**	9.45	4.70	20.4	10.00	6	**2.56**	65	2.PD.03150.090.IC	■
1/8	**.1250**	3.175	**.378**	9.60	4.70	20.8	10.10	6	**2.56**	65	2.PD.F18.IC	■
	.126	3.20	**.378**	9.60	4.70	20.8	10.10	6	**2.56**	65	2.PD.03200.090.IC	■
	.128	3.25	**.384**	9.75	4.70	21.1	10.30	6	**2.56**	65	2.PD.03250.090.IC	■
	.130	3.30	**.390**	9.90	4.70	21.4	10.40	6	**2.56**	65	2.PD.03300.090.IC	■
	.132	3.35	**.396**	10.05	4.70	21.7	10.60	6	**2.56**	65	2.PD.03350.090.IC	■
	.134	3.40	**.402**	10.20	4.70	22.1	10.70	6	**2.56**	65	2.PD.03400.090.IC	■
	.136	3.45	**.407**	10.35	4.70	22.4	10.90	6	**2.56**	65	2.PD.03450.090.IC	■
	.138	3.50	**.413**	10.50	5.40	22.7	11.10	6	**2.68**	68	2.PD.03500.090.IC	■
	.140	3.55	**.419**	10.65	5.40	23.0	11.20	6	**2.68**	68	2.PD.03550.090.IC	■
	.142	3.60	**.425**	10.80	5.40	23.4	11.40	6	**2.68**	68	2.PD.03600.090.IC	■
	.144	3.65	**.431**	10.95	5.40	23.7	11.50	6	**2.68**	68	2.PD.03650.090.IC	■
	.146	3.70	**.437**	11.10	5.40	24.0	11.70	6	**2.68**	68	2.PD.03700.090.IC	■

■ Stock item

Carbide				Z2		

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)		**.240" - .394"** (6.1 - 10.0 mm)	
Tolerance	**+ .00024"** **+ .00008"**	+ 0.006 mm + 0.002 mm	**+ .00035"** **+ .00016"**	+ 0.009 mm + 0.004 mm	**+ .00047"** **+ .00024"**	+ 0.012 mm + 0.006 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	l_4 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.148	3.75	**.443**	11.25	5.40	24.3	11.80	6	**2.68**	68	2.PD.03750.090.IC	■
	.150	3.80	**.449**	11.40	5.40	24.7	12.00	6	**2.68**	68	2.PD.03800.090.IC	■
	.152	3.85	**.455**	11.55	5.40	25.0	12.20	6	**2.68**	68	2.PD.03850.090.IC	■
	.154	3.90	**.461**	11.70	5.40	25.3	12.30	6	**2.68**	68	2.PD.03900.090.IC	■
	.156	3.95	**.467**	11.85	5.40	25.6	12.50	6	**2.68**	68	2.PD.03950.090.IC	■
5/32	**.1562**	3.968	**.472**	12.00	5.40	26.0	12.60	6	**2.68**	68	2.PD.F532.IC	■
	.157	4.00	**.472**	12.00	5.40	26.0	12.60	6	**2.68**	68	2.PD.04000.090.IC	■
	.161	4.10	**.484**	12.30	6.00	26.6	12.90	6	**2.83**	72	2.PD.04100.090.IC	■
	.165	4.20	**.496**	12.60	6.00	27.2	13.30	6	**2.83**	72	2.PD.04200.090.IC	■
	.169	4.30	**.508**	12.90	6.00	27.9	13.60	6	**2.83**	72	2.PD.04300.090.IC	■
	.173	4.40	**.520**	13.20	6.00	28.5	13.90	6	**2.83**	72	2.PD.04400.090.IC	■
	.177	4.50	**.531**	13.50	6.00	29.2	14.20	6	**2.83**	72	2.PD.04500.090.IC	■
	.181	4.60	**.543**	13.80	6.00	29.8	14.50	6	**2.83**	72	2.PD.04600.090.IC	■
	.185	4.70	**.555**	14.10	7.00	30.5	14.80	8	**2.95**	75	2.PD.04700.090.IC	■
3/16	**.1875**	4.762	**.567**	14.40	7.00	31.1	15.20	8	**2.95**	75	2.PD.F316.IC	■
	.189	4.80	**.567**	14.40	7.00	31.1	15.20	8	**2.95**	75	2.PD.04800.090.IC	■
	.193	4.90	**.579**	14.70	7.00	31.8	15.50	8	**2.95**	75	2.PD.04900.090.IC	■
	.197	5.00	**.591**	15.00	7.00	32.4	15.80	8	**2.95**	75	2.PD.05000.090.IC	■
	.201	5.10	**.602**	15.30	7.50	33.1	16.10	8	**2.95**	75	2.PD.05100.090.IC	■
	.205	5.20	**.614**	15.60	7.50	33.7	16.40	8	**2.95**	75	2.PD.05200.090.IC	■
	.209	5.30	**.626**	15.90	7.50	34.4	16.70	8	**2.95**	75	2.PD.05300.090.IC	■
	.213	5.40	**.638**	16.20	8.00	35.0	17.10	8	**3.15**	80	2.PD.05400.090.IC	■
	.217	5.50	**.650**	16.50	8.00	35.7	17.40	8	**3.15**	80	2.PD.05500.090.IC	■
7/32	**.2189**	5.560	**.661**	16.80	8.00	36.3	17.70	8	**3.15**	80	2.PD.F732.IC	■
	.220	5.60	**.661**	16.80	8.00	36.3	17.70	8	**3.15**	80	2.PD.05600.090.IC	■
	.224	5.70	**.673**	17.10	8.00	37.0	18.00	8	**3.15**	80	2.PD.05700.090.IC	■
	.228	5.80	**.685**	17.40	8.00	37.6	18.30	8	**3.15**	80	2.PD.05800.090.IC	■
	.232	5.90	**.697**	17.70	8.00	38.3	18.60	8	**3.15**	80	2.PD.05900.090.IC	■
	.236	6.00	**.709**	18.00	8.00	38.9	18.90	8	**3.15**	80	2.PD.06000.090.IC	■
1/4	**.2500**	6.350	**.750**	19.05	8.00	41.2	20.05	8	**3.15**	80	2.PD.F14.IC	■

■ Stock item

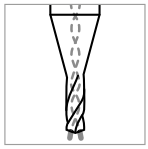
Complementary products

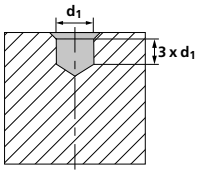
CrazyDrill Cool SST-Inox p.370

CRAZYDRILL by Mikron Tool Coolpilot

CrazyDrill Coolpilot - 3 x d - 90° countersink

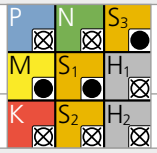
DRILLING WITH THROUGH-TOOL COOLING | CUTTING DATA OVERVIEW





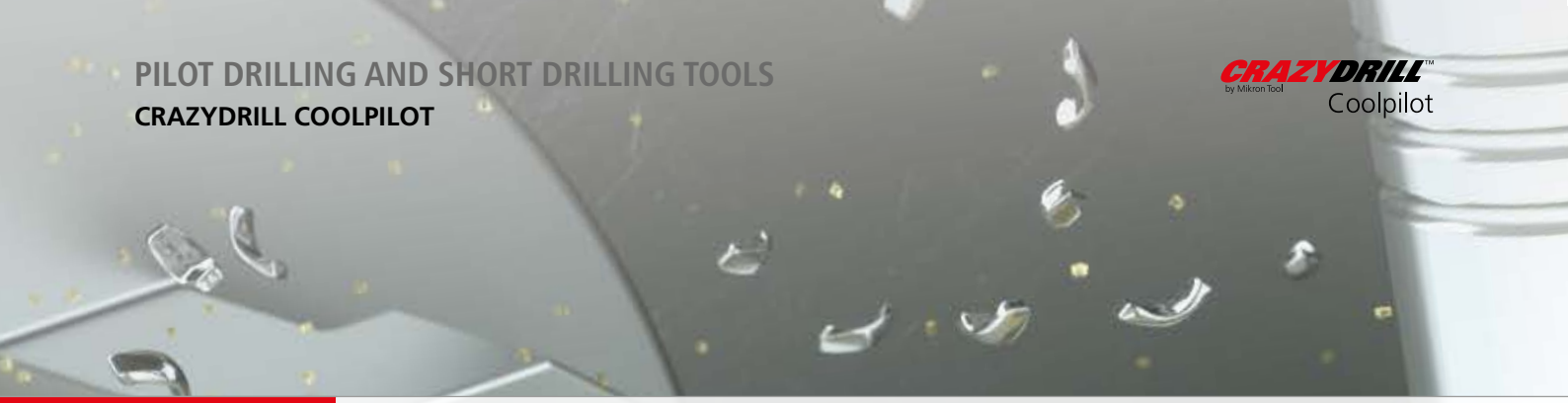
Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Low	Mid	High
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010			
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310			
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2			
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | **197**	80 | **262**	100 | **328**
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | **197**	80 | **262**	100 | **328**
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | **197**	80 | **262**	100 | **328**
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | **197**	80 | **262**	100 | **328**
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30			
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351			
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380			
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100			
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400			
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500			
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000			
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625	30 | **98**	40 | **131**	50 | **164**
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67			
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136			
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	50 | **164**	70 | **230**	90 | **295**
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1			
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1																											
1.0 mm | **.039"**			1.25 mm | **.049"**			1.5 mm | **.059"**			2.0 mm | **.079"**			2.5 mm | **.098"**			3.0 mm | **.118"**			4.0 mm | **.158"**			5.0 mm | **.197"**			6.0 mm | **.236"**		
Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High
0.010 **.0004**	0.020 **.0008**	0.030 **.0012**	0.013 **.0005**	0.025 **.0010**	0.038 **.0015**	0.015 **.0006**	0.030 **.0012**	0.045 **.0018**	0.020 **.0008**	0.040 **.0016**	0.060 **.0024**	0.025 **.0010**	0.050 **.0020**	0.075 **.0030**	0.030 **.0012**	0.060 **.0024**	0.090 **.0035**	0.040 **.0016**	0.080 **.0031**	0.120 **.0047**	0.050 **.0020**	0.100 **.0039**	0.150 **.0059**	0.060 **.0024**	0.120 **.0047**	0.180 **.0071**
0.030 **.0012**	0.040 **.0016**	0.050 **.0020**	0.038 **.0015**	0.050 **.0020**	0.063 **.0025**	0.045 **.0018**	0.060 **.0024**	0.075 **.0030**	0.060 **.0024**	0.080 **.0031**	0.100 **.0039**	0.075 **.0030**	0.100 **.0039**	0.125 **.0049**	0.090 **.0035**	0.120 **.0047**	0.150 **.0059**	0.120 **.0047**	0.160 **.0063**	0.200 **.0079**	0.150 **.0059**	0.200 **.0079**	0.250 **.0098**	0.180 **.0071**	0.240 **.0094**	0.300 **.0118**
0.020 **.0008**	0.030 **.0012**	0.040 **.0016**	0.025 **.0010**	0.038 **.0015**	0.050 **.0020**	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.075 **.0030**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**	0.080 **.0031**	0.120 **.0047**	0.160 **.0063**	0.100 **.0039**	0.150 **.0059**	0.200 **.0079**	0.120 **.0047**	0.180 **.0071**	0.240 **.0094**
0.020 **.0008**	0.030 **.0012**	0.040 **.0016**	0.025 **.0010**	0.038 **.0015**	0.050 **.0020**	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.075 **.0030**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**	0.080 **.0031**	0.120 **.0047**	0.160 **.0063**	0.100 **.0039**	0.150 **.0059**	0.200 **.0079**	0.120 **.0047**	0.180 **.0071**	0.240 **.0094**
0.010 **.0004**	0.015 **.0006**	0.020 **.0008**	0.013 **.0005**	0.019 **.0007**	0.025 **.0010**	0.015 **.0006**	0.023 **.0009**	0.030 **.0012**	0.020 **.0008**	0.030 **.0012**	0.040 **.0016**	0.025 **.0010**	0.038 **.0015**	0.050 **.0020**	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.075 **.0030**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**
0.020 **.0008**	0.030 **.0012**	0.040 **.0016**	0.025 **.0010**	0.038 **.0015**	0.050 **.0020**	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.075 **.0030**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**	0.080 **.0031**	0.120 **.0047**	0.160 **.0063**	0.100 **.0039**	0.150 **.0059**	0.200 **.0079**	0.120 **.0047**	0.180 **.0071**	0.240 **.0094**



Drilling process CrazyDrill Coolpilot

SHORT DRILLING 3 X D AND 90° COUNTERSINK

Coolant type, pressure and filtration

Coolant type

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

Filtration: Good filter quality is very important when using through coolant drills. Dirt particles or residual chips can clog the coolant holes and consequently reduce dramatically the flowrate.
The following filter qualities must be adhered especially in small diameters:

- Drill with Ø < .078" (2 mm) filter quality ≤ .0004" (0.010 mm).
- Drill with Ø < .118" (3 mm) filter quality ≤ .0008" (0.020 mm).
- Drill with Ø < 1/4" (6.35 mm) filter quality ≤ .0020" (0.050 mm).

Coolant pressure: At least the coolant pressure mentioned in the chart is required for the CrazyDrill Coolpilot to achieve reliable drilling. High pressure is generally better for the cooling and flushing effect.

Ø d_1 Tool	[mm] **| [inch]**	1.0 mm - 2.0 mm **| .039" - .079"**	2.0 mm - 4.0 mm **| .079" - .156"**	4.0 mm - 6.35 mm **| .156" - 1/4"**
Minimal pressure	[bar]	40	30	25
	[psi]	**580**	**435**	**363**

Tool holders

For detailed indications for tool holders see chapter "Technical information".

Pilot drilling and short drilling

Pilot drilling with CrazyDrill Coolpilot is the perfect preparation for accurate drilling (position and alignment accuracy) and stable machining process.

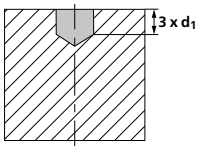
Drilling quality (position and alignment accuracy, no measurable transition from pilot to follow-up hole) and stable machining process are assured due to matched diameters of the tools.

CrazyDrill Coolpilot not only is the perfect preparation of deep follow-up holes. Concurrently it is a short drill for highly precise and quick drilling up to 3 x d + 90° countersink.

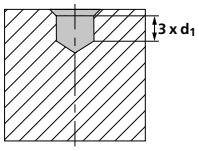
DRILLING PROCESS

1 | PILOT DRILLING OR SHORT DRILLING

- Turn on internal coolant.
- Drilling in one step with recommended cutting speed and feed rate (see cutting data table).



- If needed, after the desired cutting depth of 3 x d is reached, a chamfer angle of 90° can be realized.



Note:
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

NEW CrazyDrill Hexalobe



NEW

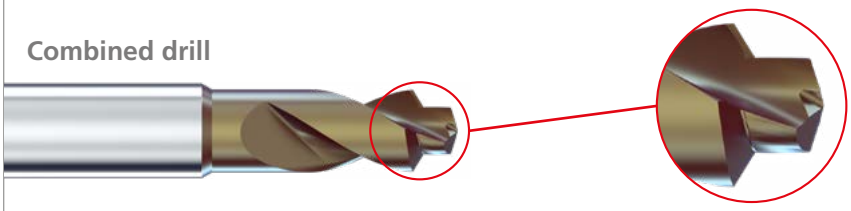
THE NEW CONCEPT FOR MACHINING YOUR "TORX®" SOCKET

New concept

- Drilling - Chamfering - Milling - Deburring: Four operations in three steps with two tools.
- High efficient machining in shorter time for titanium and stainless steel.

CRAZYDRILL Hexalobe

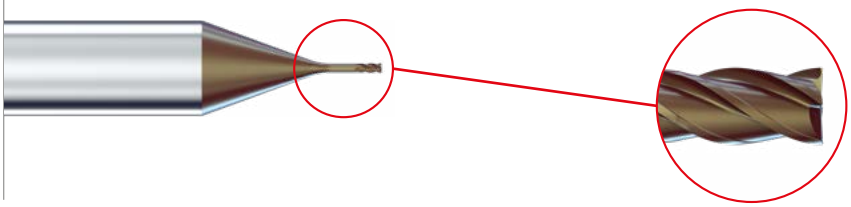
Combined drill



Drilling and chamfering in one step

CRAZYMILL Hexalobe

Micro endmill



Micro endmill with special micro-grain carbide for high stiffness and edge chipping resistence

Performance features

- Highest stiffness
- New cutting geometry

Your advantages

- Shorter milling process
- Highest profile precision
- Excellent surface quality
- Minimal burr

CRAZYDRILL by Mikron Tool Hexalobe

NEW Best performance on hexalobular sockets

TURNKEY SOLUTION FOR TITANIUM AND STAINLESS STEEL



Material

■ Titanium

S2

Ti Gr.5 ELI
TiAl6V4 ELI
3.7165

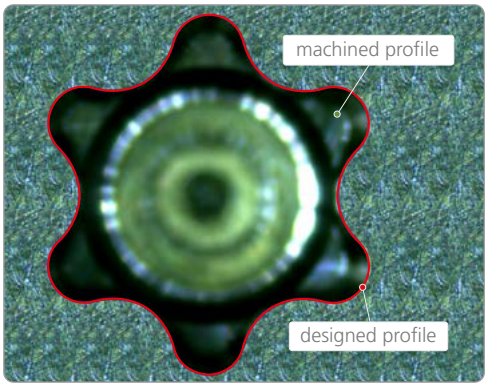
■ Stainless Steel

M

316 LM
X2CrNiMo18-15-3
1.4441

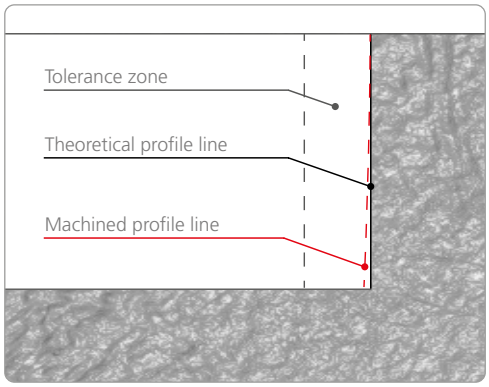
Shape precision

■ Nearly perfect profile



Perfect profile matching.

■ Perpendicularity

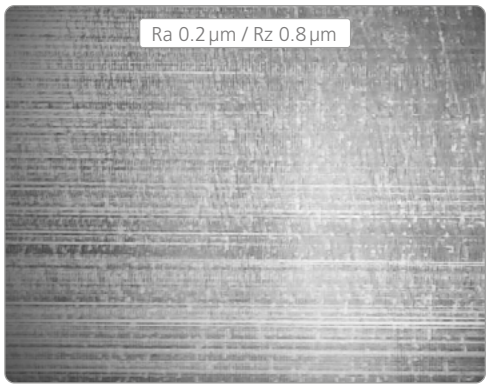


Guaranteed profile geometry.

NEW

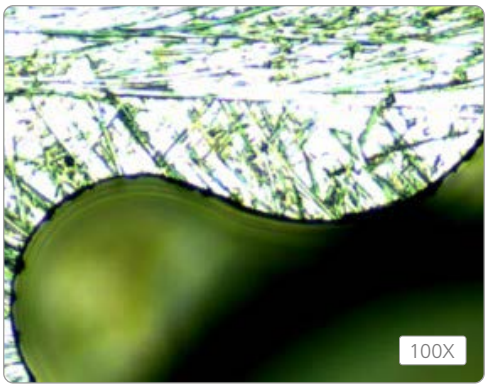
Quality and performance

Surface quality



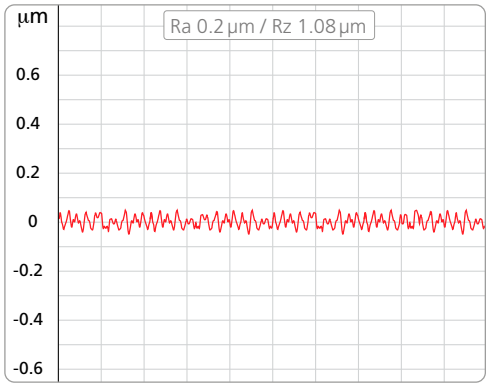
Excellent surface quality.*1

Nearly burr free



Machining profile with minimal burrs.

Chamfer roughness



Lowest roughness on chamfer surface.*1

Milling cycle time

Torx type	Time [s]
T6	27
T8	24
T10	22
T15	22
T20	21
T25	20

Machined on titanium with version 3.5 x d and p = 0.4 x d.*1

Note *1: The quality and cycle time depends on cutting parameters and machine conditions.

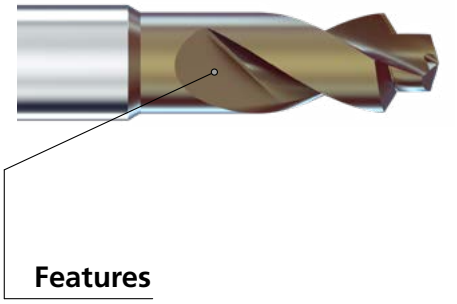
CRAZYDRILL by Mikron Tool Hexalobe

NEW High efficient drilling hexalobular socket

THE COMBINED DRILL

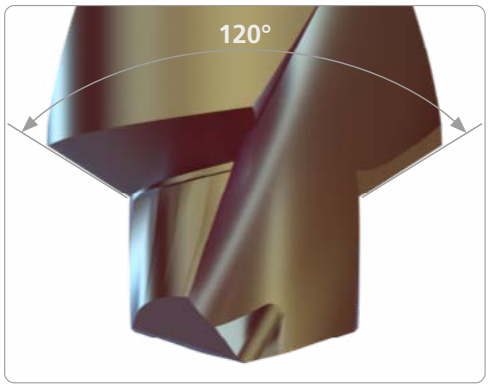
CrazyDrill Hexalobe

The new combined drill for "Torx®" socket machining



Features

■ **Two in one**



The pre-hole and a 120° chamfer are combined in one single operation.

■ **Two cutting geometries**

Two types of drills have been developed for best machining titanium and stainless steel.

■ **Diameter range**

Standard diameters for pre-hole drilling "Torx®" socket from T4 to T30.

■ **On request**

Special sizes available on request.

■ **Coating**

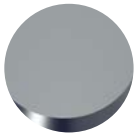
Cr Chrome free coating to avoid cross contamination on medical parts.

Regrinding: This product is not suitable for regrinding.

CrazyDrill Hexalobe

Titanium

- Coated
- External cooling

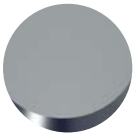




Page 204

SST-Inox

- Coated
- External cooling





Page 204

NEW

1 | SHANK
The reinforced solid carbide shank guarantees stability, high degree of concentricity and hence maximum drilling precision.

2 | CARBIDE
The specially developed micro-grain carbide meets all requirements in terms of mechanical properties.

3 | NEW COATING
The high-performance coating eXedur SNP is heat-resistant and super wear-resistant, prevents buildup edges and promotes uniform chip flushing. The result is long tool life.

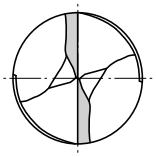
4 | 120° CHAMFER
The pre-hole and a 120° chamfer are combined on one single operation.

5 | CUTTING GEOMETRY
Two specific geometries have been developed for the machining of:
- **Titanium**
- **Stainless steel**

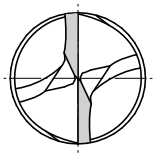
Good chip breaking and quick chip removal are guaranteed.

Drill tip

Titanium



SST-Inox



CRAZYDRILL by Mikron Tool Hexalobe

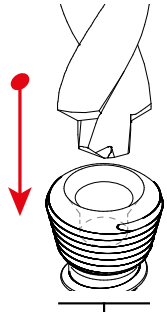
NEW Machining process

HELICAL INTERPOLATION FOR TITANIUM

Step 1

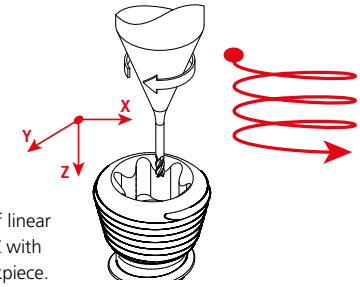
Pre-hole drilling with 120° chamfer

Ti
S2



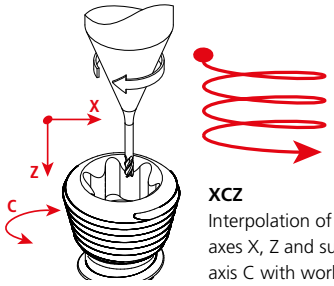
Step 2

Helical interpolation XYZ



XYZ
Interpolation of linear axes X, Y and Z with stationary workpiece.

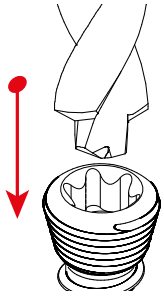
Helical interpolation XCZ



XCZ
Interpolation of linear axes X, Z and subspindle axis C with workpiece on rotation.

Step 3

Deburring



Repeat chamfering to clean the burrs

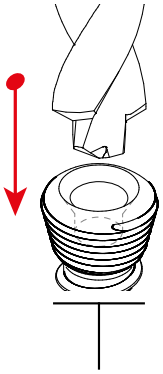
Note: Helical interpolation process is optimal for titanium, saving up to 20% of cycle time in comparison to side milling process.

NEW

SIDE MILLING FOR TITANIUM AND STAINLESS STEEL

Step 1

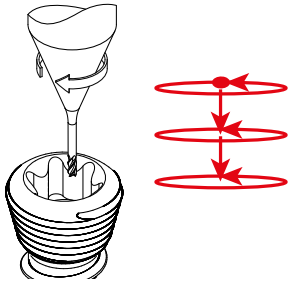
Pre-hole drilling with 120° chamfer



Ti S2 | SST M

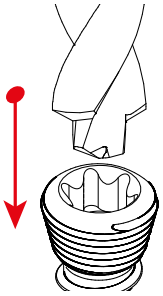
Step 2

Side milling



Step 3

Deburring



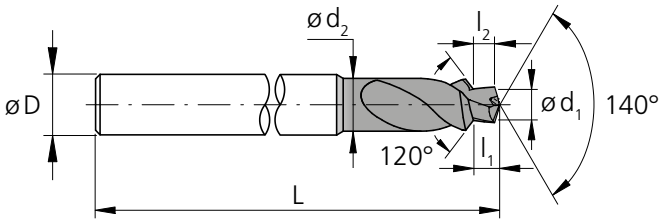
Repeat chamfering to clean the burrs

CRAZYDRILL by Mikron Tool Hexalobe

NEW CrazyDrill Hexalobe

DRILLING WITH EXTERNAL COOLING

Dimensions related to ISO 10664



Torx type	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Titanium	SST-Inox	Availability
T4	**.035**	0.9	**.028**	0.70	1.7	0.56	3	**1.57**	40	2.CD.006090.120	.T	.I	■
T5	**.039**	1.0	**.034**	0.87	2.0	0.72	3	**1.57**	40	2.CD.007100.120	.T	.I	■
T5	**.039**	1.0	**.030**	0.75	2.0	0.59	3	**1.57**	40	2.CD.006100.120	.T	.I	■
T6	**.047**	1.2	**.042**	1.06	2.2	0.88	3	**1.57**	40	2.CD.007120.120	.T	.I	■
T6	**.047**	1.2	**.034**	0.86	2.2	0.67	3	**1.57**	40	2.CD.006120.120	.T	.I	■
T7	**.055**	1.4	**.041**	1.05	3.0	0.83	3	**1.57**	40	2.CD.006140.120	.T	.I	■
T7	**.055**	1.4	**.040**	1.01	3.0	0.79	3	**1.57**	40	2.CD.005140.120	.T	.I	■
T8	**.063**	1.6	**.055**	1.40	3.0	1.15	3	**1.57**	40	2.CD.007160.120	.T	.I	■
T8	**.063**	1.6	**.041**	1.05	3.0	0.81	3	**1.57**	40	2.CD.005160.120	.T	.I	■
T10	**.075**	1.9	**.056**	1.42	4.0	1.13	4	**1.57**	40	2.CD.005190.120	.T	.I	■
T15	**.091**	2.3	**.070**	1.78	4.0	1.42	4	**1.97**	50	2.CD.006230.120	.T	.I	■
T20	**.106**	2.7	**.083**	2.12	5.0	1.70	6	**1.97**	50	2.CD.006270.120	.T	.I	■
T25	**.122**	3.1	**.112**	2.84	6.0	2.36	6	**1.97**	50	2.CD.007310.120	.T	.I	■
T30	**.150**	3.8	**.139**	3.52	6.0	2.93	6	**1.97**	50	2.CD.008380.120	.T	.I	■
T30	**.150**	3.8	**.120**	3.04	6.0	2.45	6	**1.97**	50	2.CD.007380.120	.T	.I	■

■ Stock item

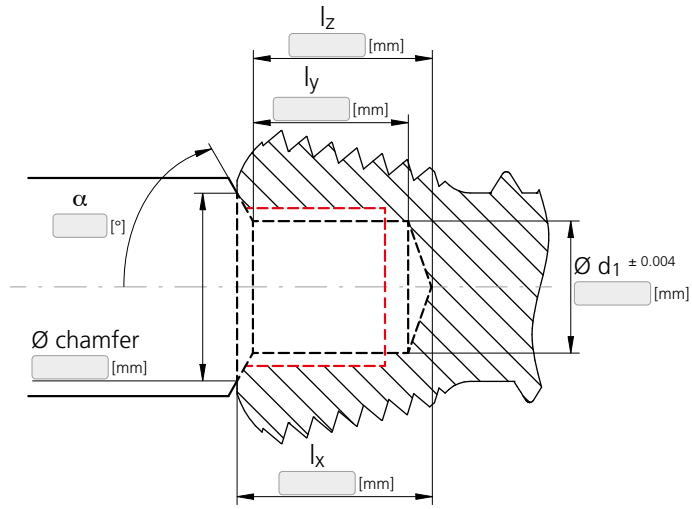
Complementary products

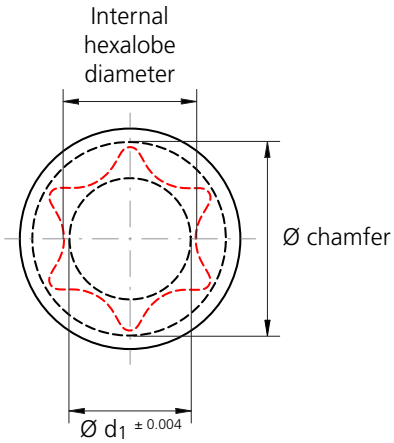
CrazyMill Hexalobe p.536

Regrinding: This product is not suitable for regrinding.

Carbide	120°	140°	Z2		eXedur SNP
Ø d_1			**.035" - .150"** (0.9 - 3.8 mm)		
Tolerance			**0 - .00031"**	0 - 0.008 mm	

Customized combined drill





■■■ Pre-hole shape
■■■ Milling shape

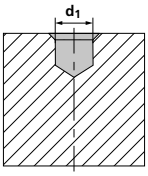
Mikron Tool has an international team of cutting technology experts who are pleased to meet your specific needs and requirements.
You can contact us at **mto@mikron.com**

CRAZYDRILL by Mikron Tool Hexalobe

NEW Pre-hole drilling

DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW

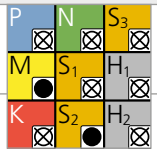




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [SFM] | [m/min]
M	Stainless steel austenitic	1.4435	X2CrNiMo 18-14-3	AISI 316L	**82 – 115** 25 – 35
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
S_2	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	**66 – 98** 20 – 30
		9.9367	TiAl6Nb7	ASTM F1295	

v_c **[SFM] |** [m/min]
f **[IPR] |** [mm/rev]

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



	T4 Ød1 **.039" |** 0.9 mm f	T5 Ød1 **.039" |** 1.0 mm f	T6 Ød1 **.047" |** 1.2 mm f	T7 Ød1 **.055" |** 1.4 mm f	T8 Ød1 **.063" |** 1.6 mm f	T10 Ød1 **.075" |** 1.9 mm f	T15 Ød1 **.091" |** 2.3 mm f	T20 Ød1 **.106" |** 2.7 mm f	T25 Ød1 **.122" |** 3.1 mm f	T30 Ød1 **.150" |** 3.8 mm f
	.0008 - .0012 0.02 - 0.03	**.0008 - .0012** 0.02 - 0.03	**.0012 - .0016** 0.03 - 0.04	**.0012 - .0016** 0.03 - 0.04	**.0012 - .0016** 0.03 - 0.04	**.0020 - .0024** 0.05 - 0.06	**.0020 - .0024** 0.05 - 0.06	**.0024 - .0028** 0.06 - 0.07	**.0028 - .0032** 0.07 - 0.08	**.0028 - .0032** 0.07 - 0.08
	.00039 - .00059 0.010 - 0.015	**.00039 - .00059** 0.010 - 0.015	**.00047 - .00071** 0.012 - 0.018	**.00055 - .00079** 0.014 - 0.020	**.00059 - .00098** 0.015 - 0.025	**.00079 - .00118** 0.020 - 0.030	**.00098 - .00138** 0.025 - 0.035	**.00098 - .00157** 0.025 - 0.040	**.00118 - .00177** 0.030 - 0.045	**.00177 - .00276** 0.045 - 0.070

Coolant type, pressure, filtration and flowrate

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the cooling medium is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical information".

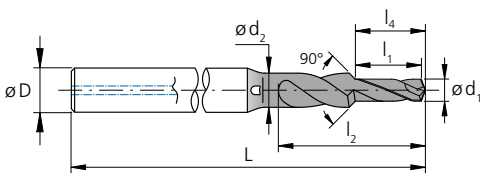
Customized short / pilot drills



Mikron Tool produces solid carbide pilot and short drills according to your needs and requirements and within the following range:

CHARACTERISTICS

- Diameter min.: .0039" (0.1 mm)
- Diameter max.: 1.26" (32.0 mm), please contact us for larger diameters
- Maximum tool length: 16.34" (415 mm)
- Tool diameter tolerance max.: ± 20 µin (0.5 µm)
- Chamfer and point angle as per customer need
- Step drill: see customer-specific step drill
- Concentricity between shank and diameters max.: ≤ 79 µin (2 µm)
- Number of cutting edges: 1, 2 or 3
- Cutting direction: right-hand drill or left-hand drill
- Conical and cylindrical drill
- Direction of rotation: right-hand cutting or drill left-hand cutting
- Drill material: tungsten carbide, grade selection depending on application



COATINGS

Many choices according to application

COOLING

- Drill with internal coolant helix shape holes to the tip of the drill
- Drill with internal coolant straight holes through the shank
- Drill for external coolant supply

TYPE OF SHAFT

- Cylindrical as per DIN 6535 HA
- Cylindrical as per DIN 6535 HE (Whistle Notch)
- Cylindrical as per DIN 6535 HB (Weldon)
- More upon request

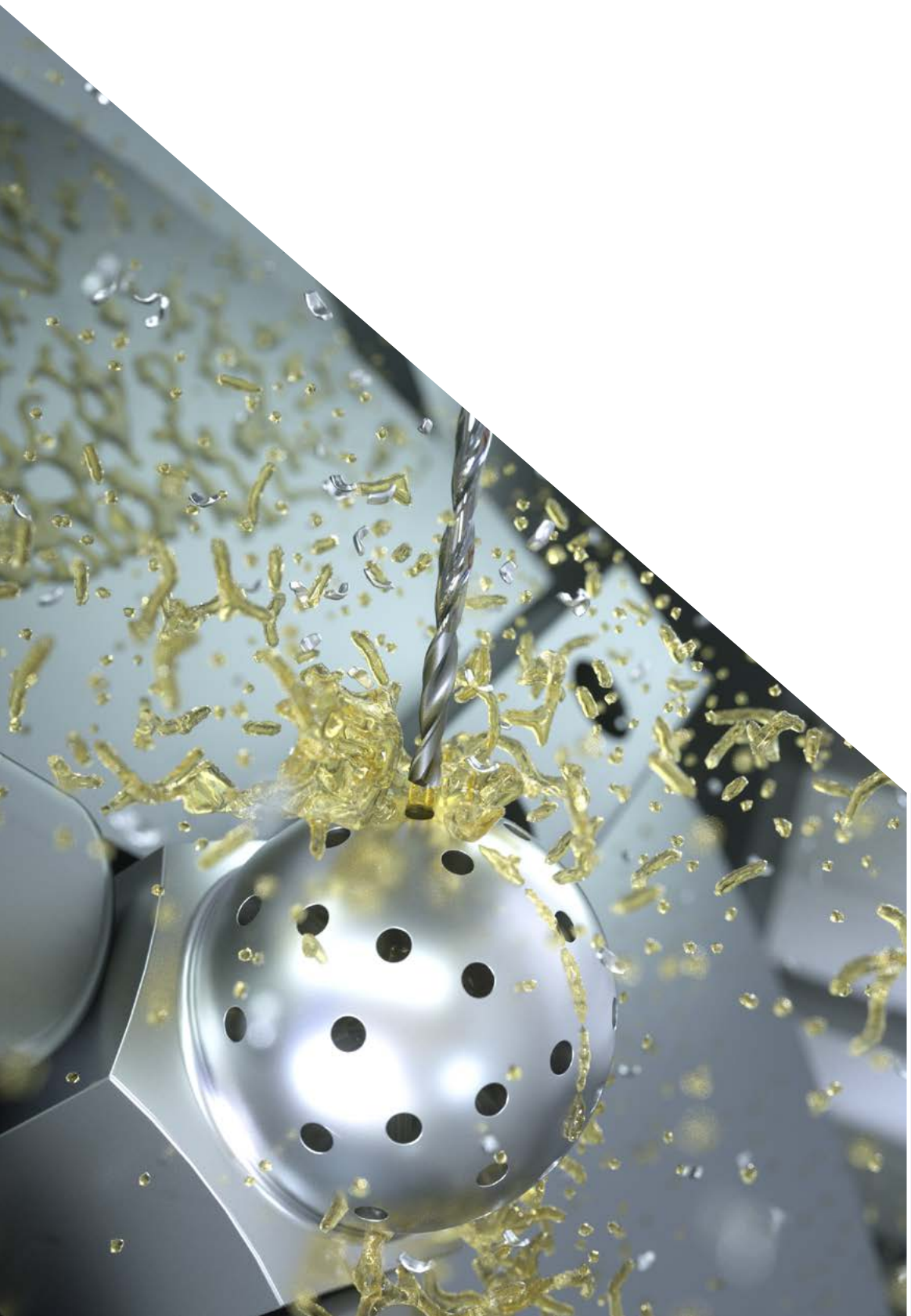
MATERIAL TO BE MACHINED

Drills for steel, corrosion-resistant steels, i.e. stainless steels, titanium / titanium alloys, super alloys or heat-resistant alloys such as Inconel or Hastelloy, CrCo alloys, drills for hardened steel up to 55HRC, aluminum / aluminum alloys, brass, copper, cast materials, etc.

TREATMENTS

Cutting edge preparation, polishing of flutes

crazy about drilling



06

OVERVIEW **212**

CODIFICATION KEY 214

MIQUDRILL 210 216
Depth up to 8 x d, Ø 0.1 mm - 3.0 mm | **.004" – .118"**

CRAZYDRILL STEEL 232
Depth up to 7 x d, Ø 0.4 mm - 6.35 mm | **1/64" – 1/4"**

CRAZYDRILL ALU 254
Depth up to 10 x d, Ø 0.4 mm - 3.0 mm | **.016" – .118"**

CRAZYDRILL SST-INOX 272
Depth up to 12 x d, Ø 0.2 mm - 2.0 mm | **.008" – .079"**

CRAZYDRILL COOL 290
Depth up to 15 x d, Ø 0.75 mm - 6.0 mm | **.030" – .236"**

CRAZYDRILL COOL XL 324
Depth up to 40 x d, Ø 1.0 mm - 6.0 mm | **.039" – .236"**

CRAZYDRILL COOL SST-INOX 358
Depth up to 40 x d, Ø 1.0 mm - 6.35 mm | **.039" – 1/4"**

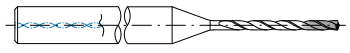
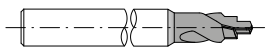
CRAZYDRILL FLEX 390
Depth up to 50 x d, Ø 0.1 mm - 2.0 mm | **.004" – .079"**

CUSTOMIZED DRILLS 450

CUSTOMIZED STEP DRILLS 452

Overview

CUTTING TOOL SOLUTIONS

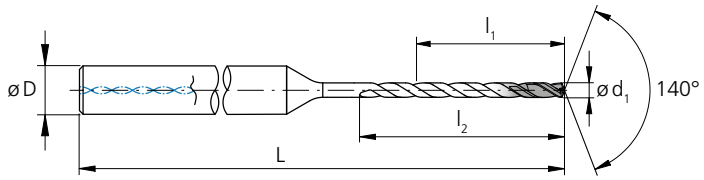
	MIQUDRILL 210	
	CRAZYDRILL Steel	
	CRAZYDRILL Alu	
	CRAZYDRILL SST-Inox	
	CRAZYDRILL Cool	
	CRAZYDRILL Cool XL	
NEW	CRAZYDRILL Cool SST-Inox	
	CRAZYDRILL Flex	
	Customized drills	
	Customized step drills	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

ø - range [mm] | [inch]	max. depth	Cooling	P Unalloyed and alloyed steel	M Stainless steel	K Cast iron	N Non ferrous metals	S_1 Super alloys	S_2 Titanium (pure and alloyed)	S_3 CrCo alloys	H_1 Hardened steel <55 HRC	H_2 Hardened steel ≥55 HRC	Page
0.1–3.0 **.004"–.118"**	up to 8 x d		◐	⊠	◐	◐	⊠	⊠	⊠	◐	⊠	**216**
0.4–6.35 **1/64"–1/4"**	4 x d 6 - 7 x d		●	⊠	●	◐	○	○	○	◐	⊠	**232**
0.4–3.0 **.016"–.118"**	5 x d 10 x d		⊠	⊠	⊠	●	⊠	⊠	⊠	⊠	⊠	**254**
0.3–2.0 **.012"–.079"**	8 x d 12 x d		⊠	●	⊠	◐	●	⊠	●	⊠	⊠	**272**
0.75–6.0 **.030"–.236"**	6 x d 10 x d 15 x d		●	◐	●	◐	◐	○	◐	●	⊠	**290**
1.0–6.0 **.039"–.236"**	15 x d 20 x d 30 x d 40 x d		●	○	●	●	⊠	◐	○	◐	⊠	**324**
1.0–6.35 **.039"–1/4"**	6 x d 10 x d 15 x d 20 x d 30 x d 40 x d		⊠	●	⊠	⊠	●	⊠	●	⊠	⊠	**358**
0.1–2.0 **.004"–.079"**	20 x d 30 x d 50 x d		●	●	●	●	●	●	●	⊠	⊠	**390**
0.1–32.0 **.004"–1.26"**	as required		●	●	●	●	●	●	●	●	●	**450**
0.1–32.0 **.004"–1.26"**	as required		●	●	●	●	●	●	●	●	●	**452**

Codification key

ITEM NUMBER EASY TO UNDERSTAND



2.CD.100200.IC

Division number
- 2 = Mikron Tool SA Agno

Family
- CrazyDrill

Cutting length l_1
- 100 = 10 x d_1

Cutting diameter d_1
- 200 = Ø 2 mm

Geometry and coolant information
- S = Steel geometry
- A = Aluminium geometry
- IK = Stainless steel geometry with integrated coolant in the shaft
- IN = Stainless steel geometry with external coolant
- IC = Stainless steel geometry with through-tool-cooling
- CS = Steel geometry with through-tool-cooling
- CA = Geometry for non ferrous metals with through-tool-cooling
- XL = Deep hole drilling geometry

2.CFI.50100.IK.1

Division number
- 2 = Mikron Tool SA Agno

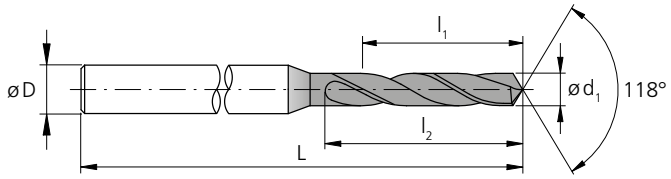
Family
- CFI = CrazyDrill Flex SST-Inox
- CFS = CrazyDrill Flex Steel
- CFT = CrazyDrill Flex Titanium

Cutting length l_1
- 50 = 50 x d_1

Coating
- 1 = coated
- 0 = uncoated

Coolant system information
- IK = Integrated coolant on the shaft

Cutting diameter d_1
- 100 = Ø 1 mm



2.MD.210285.0

Division number
- 2 = Mikron Tool SA Agno

Family
- MiquDrill

Tool type
- 210 = drill

Cutting diameter d_1
- 285 = Ø 2.85 mm

Coating
- 1 = coated
- 0 = uncoated

2.CD.040F116.S

Division number
- 2 = Mikron Tool SA Agno

Family
- CD = CrazyDrill
- CFS = CrazyDrill Flex Steel
- CFI = CrazyDrill Flex SST-Inox

Cutting length l_1
- 040 = 4 x d_1

Family feature
- S = CrazyDrill Steel
- IK = CrazyDrill SST-Inox Type IK
- IN = CrazyDrill SST-Inox Type IN
- IC = CrazyDrill Cool SST-Inox
- CS = CrazyDrill Cool Coated
- XL = CrazyDrill Cool XL

Cutting diameter in fractional inches d_1
- F116 = Ø 1/16"

MiquDrill 210



MIQUDRILL 210

A SMALL DRILL WITH GREAT AVAILIBILITY



Mikron Tool offers with MiquDrill 210 a drill for micro-machining. In the uncoated version it's available in the diameter range from .004" to .118" (0.1 mm to 3.0 mm), in the coated version from .012" to .118" (0.3 mm to 3.0 mm). Its usable lengths are, based on diameter, between 2.4 x d and 8 x d. Both versions are available from stock in smallest increments of .0004" (0.01 mm) up to Ø.079" (2.0 mm) and of .002" (0.05 mm) up to Ø.118" (3.0 mm).

This precision drill for micro-machining is the optimal solution for the production of small and medium batch sizes or a large range of variants. First class quality and process accuracy are assured. It is universally applicable for steels (alloyed and unalloyed), cast iron, nonferrous metals and in the coated version also for hardened steel < 55 HRC.

Accurate micro-machining

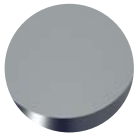
FOR SMALL SERIES AND LARGE RANGE OF MATERIALS

Mikron Tool offers with MiquDrill 210 a drill for micro-machining. In the uncoated version it's available in the diameter range from .004" to .118" (0.1 mm to 3.0 mm), in the coated version from .012" to .118" (0.3 mm to 3.0 mm). Its usable lengths are, based on diameter, between 2.4 x d and 8 x d. Both versions are available from stock in smallest increments of .0004" (0.01 mm) up to Ø.079" (2.0 mm) and of .002" (0.05 mm) up to Ø.118" (3.0 mm).

- MiquDrill 210, usable length from 2.4 to 8 x d, coated and uncoated

Uncoated

- External cooling
- Ø .004" - .118" (0.1 - 3.0 mm)

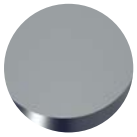




Page 223

Coated

- External cooling
- Ø .012" - .118" (0.3 - 3.0 mm)





Page 223

1 | SHAFT
The accurately grinded shaft guarantees high concentricity and therefore highest position accuracy.

2 | SOLID CARBIDE
The use of latest generation carbide grades allows highest machingn speed and feed if compared with HSS tools, drilling with MiquDrill is considerably faster.

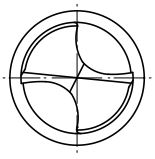
3 | COATING
The coated version of the drill is adapted for hardened steels < 55 HRC and reaches even a better tool life.

4 | HELICAL FLUTE
The geometry of the helical flute guarantees an optimal chip flow. No chip removal necessary.

5 | TIP GEOMETRY
The geometry of the universal drill is especially adapted for micro-machining. High process accuracy and productivity are guaranteed.

6 | DIAMETER RANGE AND INCREMENTS
Available from stock in diameters from .004" (0.1 mm) and in smallest diameter increments of .0004" (0.01 mm), respectively of .0019" (0.05 mm) starting from Ø .079" (2.0 mm).

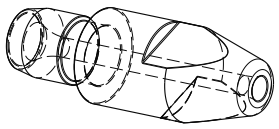
Tip drill



Benefits and applications

FITS EVERY APPLICATION

- **HIGH DEGREE OF PROCESS RELIABILITY** | due to high quality
- **HIGH DEGREE OF PRECISION** | due to small tolerances
- **LOW PRODUCTION COSTS** | due to the low cost of tool



COMPONENT
Welding nozzle

MATERIAL
CuZn39Pb3 / 2.0401 / UNS 38500

MACHINING
- Drilling
- d = 2 mm **| .079"**
- Drilling depth 6 mm **| .236"**

DRILLING TOOL
Mikron Tool - MiquDrill 210 - coated

DATA	MIKRON TOOL
Tool type	MiquDrill 210 - Carbide - Coated - External cooling
Item number	2.MD.210200.1
Cutting data	v_c = 80 m/min **| 263 SFM** f = 0.048 mm/rev **| .00189 IPR** Q_1 = 4 mm **| .158"** Q_x = 2 mm **| .079"**

APPLICATION DOMAINS	COMPONENTS EXAMPLES
Automotive industry	Components for gasoline direct injection
Mechanical engineering	Bearings

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

MiquDrill 210 - coated / uncoated

DRILLING WITH EXTERNAL COOLING



Coated Uncoated

MiquDrill 210 is universally applicable for steel (alloyed and unalloyed), cast iron and nonferrous metals (e.g. aluminum with high silicium level). Available from stock in the diameter range:

- from .012" to .118" (0.3 mm to 3.0 mm) - coated version (eXedur RIP)
- from .004" to .118" (0.1 mm to 3.0 mm) - uncoated version

with the following increment:

- .0004" (0.01 mm) in the diameter range from .004" to .079" (0.1 mm to 2.0 mm)
- .0020" (0.05 mm) from .079" to .118" (2.0 mm to 3.0 mm)

Compared to uncoated version, "MiquDrill 210 coated" is the solution for higher requirements concerning tool life and/or shorter machining times, the machining of hardened steel < 55 HRC and also for difficult-to-machine materials.

The geometry of Miqudrill 210, the tool with good price / performance ratio, is especially designed for micro-machining of drilling depths between 2.4 and 8.0 x d. These depths are reached with few chip pecking cycles.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note

You couldn't find your suitable version of the MiquDrill 210 - coated / uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

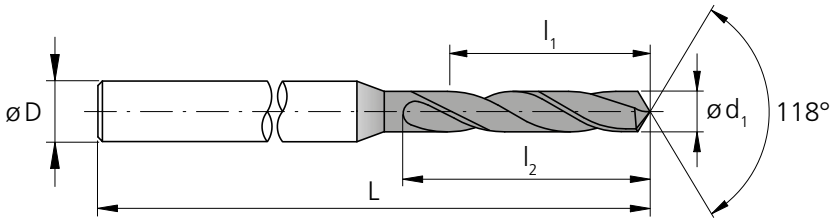
Regrinding: This product is not suitable for regrinding.

Carbide	2.4 - 8xd$_1$	118°	Z2

Ø d$_1$	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**0 - .00016"**	0 - 0.004 mm

.1 eXedur RIP

.0 Uncoated



d$_1$ [inch]	d$_1$ [mm]	l$_1$ [inch]	l$_1$ [mm]	l$_2$ [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
.0039	0.10	**.020**	0.50	0.6	1.0	**1.18**	30	2.MD.210010	-	.0	◪
.0043	0.11	**.019**	0.49	0.6	1.0	**1.18**	30	2.MD.210011	-	.0	◪
.0047	0.12	**.019**	0.48	0.6	1.0	**1.18**	30	2.MD.210012	-	.0	◪
.0051	0.13	**.026**	0.67	0.8	1.0	**1.18**	30	2.MD.210013	-	.0	◪
.0055	0.14	**.026**	0.66	0.8	1.0	**1.18**	30	2.MD.210014	-	.0	◪
.0059	0.15	**.026**	0.65	0.8	1.0	**1.18**	30	2.MD.210015	-	.0	◪
.0063	0.16	**.033**	0.84	1.0	1.0	**1.18**	30	2.MD.210016	-	.0	◪
.0067	0.17	**.033**	0.83	1.0	1.0	**1.18**	30	2.MD.210017	-	.0	◪
.0071	0.18	**.032**	0.82	1.0	1.0	**1.18**	30	2.MD.210018	-	.0	◪
.0075	0.19	**.032**	0.81	1.0	1.0	**1.18**	30	2.MD.210019	-	.0	◪
.0079	0.20	**.031**	0.80	1.0	1.0	**1.18**	30	2.MD.210020	-	.0	◪
.0083	0.21	**.031**	0.79	1.0	1.0	**1.18**	30	2.MD.210021	-	.0	◪
.0087	0.22	**.031**	0.78	1.0	1.0	**1.18**	30	2.MD.210022	-	.0	◪
.0091	0.23	**.030**	0.77	1.0	1.0	**1.18**	30	2.MD.210023	-	.0	◪
.0094	0.24	**.030**	0.76	1.0	1.0	**1.18**	30	2.MD.210024	-	.0	◪
.0098	0.25	**.030**	0.75	1.0	1.0	**1.18**	30	2.MD.210025	-	.0	◪
.0102	0.26	**.029**	0.74	1.0	1.0	**1.18**	30	2.MD.210026	-	.0	◪
.0106	0.27	**.029**	0.73	1.0	1.0	**1.18**	30	2.MD.210027	-	.0	◪
.0110	0.28	**.028**	0.72	1.0	1.0	**1.18**	30	2.MD.210028	-	.0	◪
.0114	0.29	**.028**	0.71	1.0	1.0	**1.18**	30	2.MD.210029	-	.0	◪
.0118	0.30	**.047**	1.20	1.5	1.0	**1.18**	30	2.MD.210030	.1	.0	■
.0122	0.31	**.047**	1.19	1.5	1.0	**1.18**	30	2.MD.210031	.1	.0	■
.0126	0.32	**.046**	1.18	1.5	1.0	**1.18**	30	2.MD.210032	.1	.0	■
.0130	0.33	**.046**	1.17	1.5	1.0	**1.18**	30	2.MD.210033	.1	.0	■
.0134	0.34	**.046**	1.16	1.5	1.0	**1.18**	30	2.MD.210034	.1	.0	■
.0138	0.35	**.045**	1.15	1.5	1.0	**1.18**	30	2.MD.210035	.1	.0	■
.0142	0.36	**.045**	1.14	1.5	1.0	**1.18**	30	2.MD.210036	.1	.0	■
.0146	0.37	**.044**	1.13	1.5	1.0	**1.18**	30	2.MD.210037	.1	.0	■
.0150	0.38	**.044**	1.12	1.5	1.0	**1.18**	30	2.MD.210038	.1	.0	■
.0154	0.39	**.044**	1.11	1.5	1.0	**1.18**	30	2.MD.210039	.1	.0	■
.0157	0.40	**.063**	1.60	2.0	1.0	**1.18**	30	2.MD.210040	.1	.0	■
.0161	0.41	**.063**	1.59	2.0	1.0	**1.18**	30	2.MD.210041	.1	.0	■
.0165	0.42	**.062**	1.58	2.0	1.0	**1.18**	30	2.MD.210042	.1	.0	■
.0169	0.43	**.062**	1.57	2.0	1.0	**1.18**	30	2.MD.210043	.1	.0	■
.0173	0.44	**.061**	1.56	2.0	1.0	**1.18**	30	2.MD.210044	.1	.0	■

d$_1$ [inch]	d$_1$ [mm]	l$_1$ [inch]	l$_1$ [mm]	l$_2$ [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
.0177	0.45	**.120**	3.05	3.5	1.0	**1.18**	30	2.MD.210045	.1	.0	■
.0181	0.46	**.120**	3.04	3.5	1.0	**1.18**	30	2.MD.210046	.1	.0	■
.0185	0.47	**.119**	3.03	3.5	1.0	**1.18**	30	2.MD.210047	.1	.0	■
.0189	0.48	**.119**	3.02	3.5	1.0	**1.18**	30	2.MD.210048	.1	.0	■
.0193	0.49	**.138**	3.51	4.0	1.0	**1.18**	30	2.MD.210049	.1	.0	■
.0197	0.50	**.138**	3.50	4.0	1.0	**1.18**	30	2.MD.210050	.1	.0	■
.0201	0.51	**.137**	3.49	4.0	1.0	**1.18**	30	2.MD.210051	.1	.0	■
.0205	0.52	**.137**	3.48	4.0	1.0	**1.18**	30	2.MD.210052	.1	.0	■
.0209	0.53	**.137**	3.47	4.0	1.0	**1.18**	30	2.MD.210053	.1	.0	■
.0213	0.54	**.156**	3.96	4.5	1.0	**1.18**	30	2.MD.210054	.1	.0	■
.0217	0.55	**.156**	3.95	4.5	1.0	**1.18**	30	2.MD.210055	.1	.0	■
.0220	0.56	**.155**	3.94	4.5	1.0	**1.18**	30	2.MD.210056	.1	.0	■
.0224	0.57	**.155**	3.93	4.5	1.0	**1.18**	30	2.MD.210057	.1	.0	■
.0228	0.58	**.154**	3.92	4.5	1.0	**1.18**	30	2.MD.210058	.1	.0	■
.0232	0.59	**.154**	3.91	4.5	1.0	**1.18**	30	2.MD.210059	.1	.0	■
.0236	0.60	**.154**	3.90	4.5	1.0	**1.18**	30	2.MD.210060	.1	.0	■
.0240	0.61	**.173**	4.39	5.0	1.0	**1.18**	30	2.MD.210061	.1	.0	■
.0244	0.62	**.172**	4.38	5.0	1.0	**1.18**	30	2.MD.210062	.1	.0	■
.0248	0.63	**.172**	4.37	5.0	1.0	**1.18**	30	2.MD.210063	.1	.0	■
.0252	0.64	**.172**	4.36	5.0	1.0	**1.18**	30	2.MD.210064	.1	.0	■
.0256	0.65	**.171**	4.35	5.0	1.0	**1.18**	30	2.MD.210065	.1	.0	■
.0260	0.66	**.171**	4.34	5.0	1.0	**1.18**	30	2.MD.210066	.1	.0	■
.0264	0.67	**.170**	4.33	5.0	1.0	**1.18**	30	2.MD.210067	.1	.0	■
.0268	0.68	**.194**	4.92	5.6	1.0	**1.18**	30	2.MD.210068	.1	.0	■
.0272	0.69	**.193**	4.91	5.6	1.0	**1.18**	30	2.MD.210069	.1	.0	■
.0276	0.70	**.193**	4.90	5.6	1.0	**1.18**	30	2.MD.210070	.1	.0	■
.0280	0.71	**.193**	4.89	5.6	1.0	**1.18**	30	2.MD.210071	.1	.0	■
.0283	0.72	**.192**	4.88	5.6	1.0	**1.18**	30	2.MD.210072	.1	.0	■
.0287	0.73	**.192**	4.87	5.6	1.0	**1.18**	30	2.MD.210073	.1	.0	■
.0291	0.74	**.191**	4.86	5.6	1.0	**1.18**	30	2.MD.210074	.1	.0	■
.0295	0.75	**.191**	4.85	5.6	1.0	**1.18**	30	2.MD.210075	.1	.0	■
.0299	0.76	**.226**	5.74	6.5	1.0	**1.18**	30	2.MD.210076	.1	.0	■
.0303	0.77	**.226**	5.73	6.5	1.0	**1.18**	30	2.MD.210077	.1	.0	■
.0307	0.78	**.225**	5.72	6.5	1.0	**1.18**	30	2.MD.210078	.1	.0	■
.0311	0.79	**.225**	5.71	6.5	1.0	**1.18**	30	2.MD.210079	.1	.0	■

■ Stock item, packing unit of 5 pcs.
◪ Stock item only in uncoated version, packing unit of 5 pcs.

Complementary products

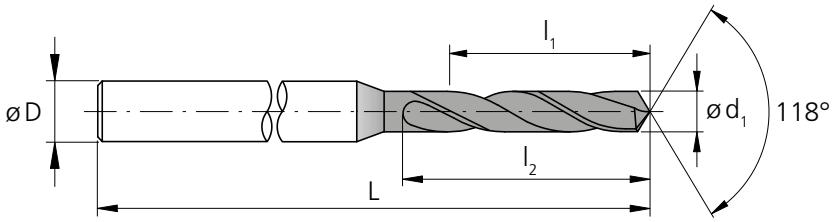
MiquDrill Centro	p.69
MiquDrill 200	p.111
CrazyDrill Crosspilot	p.175

MiquDrill 210 - coated / uncoated

DRILLING WITH EXTERNAL COOLING

.1 eXedur RIP

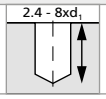
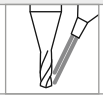
.0 Uncoated



d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated .1	Uncoated .0	Availability
.0315	0.80	**.224**	5.70	6.5	1.5	**1.18**	30	2.MD.210080	.1	.0	■
.0319	0.81	**.224**	5.69	6.5	1.5	**1.18**	30	2.MD.210081	.1	.0	■
.0323	0.82	**.224**	5.68	6.5	1.5	**1.18**	30	2.MD.210082	.1	.0	■
.0327	0.83	**.223**	5.67	6.5	1.5	**1.18**	30	2.MD.210083	.1	.0	■
.0331	0.84	**.223**	5.66	6.5	1.5	**1.18**	30	2.MD.210084	.1	.0	■
.0335	0.85	**.222**	5.65	6.5	1.5	**1.18**	30	2.MD.210085	.1	.0	■
.0339	0.86	**.242**	6.14	7.0	1.5	**1.18**	30	2.MD.210086	.1	.0	■
.0343	0.87	**.241**	6.13	7.0	1.5	**1.18**	30	2.MD.210087	.1	.0	■
.0346	0.88	**.241**	6.12	7.0	1.5	**1.18**	30	2.MD.210088	.1	.0	■
.0350	0.89	**.241**	6.11	7.0	1.5	**1.18**	30	2.MD.210089	.1	.0	■
.0354	0.90	**.240**	6.10	7.0	1.5	**1.18**	30	2.MD.210090	.1	.0	■
.0358	0.91	**.240**	6.09	7.0	1.5	**1.18**	30	2.MD.210091	.1	.0	■
.0362	0.92	**.239**	6.08	7.0	1.5	**1.18**	30	2.MD.210092	.1	.0	■
.0366	0.93	**.239**	6.07	7.0	1.5	**1.18**	30	2.MD.210093	.1	.0	■
.0370	0.94	**.239**	6.06	7.0	1.5	**1.18**	30	2.MD.210094	.1	.0	■
.0374	0.95	**.238**	6.05	7.0	1.5	**1.18**	30	2.MD.210095	.1	.0	■
.0378	0.96	**.277**	7.04	8.0	1.5	**1.18**	30	2.MD.210096	.1	.0	■
.0382	0.97	**.277**	7.03	8.0	1.5	**1.18**	30	2.MD.210097	.1	.0	■
.0386	0.98	**.276**	7.02	8.0	1.5	**1.18**	30	2.MD.210098	.1	.0	■
.0390	0.99	**.276**	7.01	8.0	1.5	**1.18**	30	2.MD.210099	.1	.0	■
.0394	1.00	**.315**	8.00	9.0	1.5	**1.18**	30	2.MD.210100	.1	.0	■
.0398	1.01	**.315**	7.99	9.0	1.5	**1.18**	30	2.MD.210101	.1	.0	■
.0402	1.02	**.314**	7.98	9.0	1.5	**1.18**	30	2.MD.210102	.1	.0	■
.0406	1.03	**.314**	7.97	9.0	1.5	**1.18**	30	2.MD.210103	.1	.0	■
.0409	1.04	**.313**	7.96	9.0	1.5	**1.18**	30	2.MD.210104	.1	.0	■
.0413	1.05	**.313**	7.95	9.0	1.5	**1.18**	30	2.MD.210105	.1	.0	■
.0417	1.06	**.313**	7.94	9.0	1.5	**1.18**	30	2.MD.210106	.1	.0	■
.0421	1.07	**.312**	7.93	9.0	1.5	**1.18**	30	2.MD.210107	.1	.0	■
.0425	1.08	**.312**	7.92	9.0	1.5	**1.18**	30	2.MD.210108	.1	.0	■
.0429	1.09	**.311**	7.91	9.0	1.5	**1.18**	30	2.MD.210109	.1	.0	■
.0433	1.10	**.311**	7.90	9.0	1.5	**1.18**	30	2.MD.210110	.1	.0	■
.0437	1.11	**.311**	7.89	9.0	1.5	**1.18**	30	2.MD.210111	.1	.0	■
.0441	1.12	**.310**	7.88	9.0	1.5	**1.18**	30	2.MD.210112	.1	.0	■
.0445	1.13	**.310**	7.87	9.0	1.5	**1.18**	30	2.MD.210113	.1	.0	■
.0449	1.14	**.309**	7.86	9.0	1.5	**1.18**	30	2.MD.210114	.1	.0	■
.0453	1.15	**.309**	7.85	9.0	1.5	**1.18**	30	2.MD.210115	.1	.0	■

d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated .1	Uncoated .0	Availability
.0457	1.16	**.309**	7.84	9.0	1.5	**1.18**	30	2.MD.210116	.1	.0	■
.0461	1.17	**.308**	7.83	9.0	1.5	**1.18**	30	2.MD.210117	.1	.0	■
.0465	1.18	**.308**	7.82	9.0	1.5	**1.18**	30	2.MD.210118	.1	.0	■
.0469	1.19	**.347**	8.81	10.0	1.5	**1.18**	30	2.MD.210119	.1	.0	■
.0472	1.20	**.346**	8.80	10.0	1.5	**1.18**	30	2.MD.210120	.1	.0	■
.0476	1.21	**.346**	8.79	10.0	1.5	**1.18**	30	2.MD.210121	.1	.0	■
.0480	1.22	**.346**	8.78	10.0	1.5	**1.18**	30	2.MD.210122	.1	.0	■
.0484	1.23	**.345**	8.77	10.0	1.5	**1.18**	30	2.MD.210123	.1	.0	■
.0488	1.24	**.345**	8.76	10.0	1.5	**1.18**	30	2.MD.210124	.1	.0	■
.0492	1.25	**.344**	8.75	10.0	1.5	**1.18**	30	2.MD.210125	.1	.0	■
.0496	1.26	**.344**	8.74	10.0	1.5	**1.18**	30	2.MD.210126	.1	.0	■
.0500	1.27	**.344**	8.73	10.0	1.5	**1.18**	30	2.MD.210127	.1	.0	■
.0504	1.28	**.343**	8.72	10.0	1.5	**1.18**	30	2.MD.210128	.1	.0	■
.0508	1.29	**.343**	8.71	10.0	1.5	**1.18**	30	2.MD.210129	.1	.0	■
.0512	1.30	**.343**	8.70	10.0	1.5	**1.18**	30	2.MD.210130	.1	.0	■
.0516	1.31	**.342**	8.69	10.0	1.5	**1.18**	30	2.MD.210131	.1	.0	■
.0520	1.32	**.342**	8.68	10.0	1.5	**1.18**	30	2.MD.210132	.1	.0	■
.0524	1.33	**.400**	10.17	11.5	1.5	**1.18**	30	2.MD.210133	.1	.0	■
.0528	1.34	**.400**	10.16	11.5	1.5	**1.18**	30	2.MD.210134	.1	.0	■
.0531	1.35	**.400**	10.15	11.5	1.5	**1.18**	30	2.MD.210135	.1	.0	■
.0535	1.36	**.399**	10.14	11.5	1.5	**1.18**	30	2.MD.210136	.1	.0	■
.0539	1.37	**.399**	10.13	11.5	1.5	**1.18**	30	2.MD.210137	.1	.0	■
.0543	1.38	**.398**	10.12	11.5	1.5	**1.18**	30	2.MD.210138	.1	.0	■
.0547	1.39	**.398**	10.11	11.5	1.5	**1.18**	30	2.MD.210139	.1	.0	■
.0551	1.40	**.398**	10.10	11.5	1.5	**1.18**	30	2.MD.210140	.1	.0	■
.0555	1.41	**.397**	10.09	11.5	1.5	**1.18**	30	2.MD.210141	.1	.0	■
.0559	1.42	**.397**	10.08	11.5	1.5	**1.18**	30	2.MD.210142	.1	.0	■
.0563	1.43	**.396**	10.07	11.5	1.5	**1.18**	30	2.MD.210143	.1	.0	■
.0567	1.44	**.396**	10.06	11.5	1.5	**1.18**	30	2.MD.210144	.1	.0	■
.0571	1.45	**.396**	10.05	11.5	1.5	**1.18**	30	2.MD.210145	.1	.0	■
.0575	1.46	**.395**	10.04	11.5	1.5	**1.18**	30	2.MD.210146	.1	.0	■
.0579	1.47	**.395**	10.03	11.5	1.5	**1.18**	30	2.MD.210147	.1	.0	■
.0583	1.48	**.394**	10.02	11.5	1.5	**1.18**	30	2.MD.210148	.1	.0	■
.0587	1.49	**.394**	10.01	11.5	1.5	**1.18**	30	2.MD.210149	.1	.0	■
.0591	1.50	**.413**	10.50	12.0	2.0	**1.50**	38	2.MD.210150	.1	.0	■
.0594	1.51	**.413**	10.49	12.0	2.0	**1.50**	38	2.MD.210151	.1	.0	■

■ Stock item, packing unit of 5 pcs.

Carbide			Z2	

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**0 - .00016"**	0 - 0.004 mm

d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated .1	Uncoated .0	Availability
.0598	1.52	**.413**	10.48	12.0	2.0	**1.50**	38	2.MD.210152	.1	.0	■
.0602	1.53	**.412**	10.47	12.0	2.0	**1.50**	38	2.MD.210153	.1	.0	■
.0606	1.54	**.412**	10.46	12.0	2.0	**1.50**	38	2.MD.210154	.1	.0	■
.0610	1.55	**.411**	10.45	12.0	2.0	**1.50**	38	2.MD.210155	.1	.0	■
.0614	1.56	**.411**	10.44	12.0	2.0	**1.50**	38	2.MD.210156	.1	.0	■
.0618	1.57	**.411**	10.43	12.0	2.0	**1.50**	38	2.MD.210157	.1	.0	■
.0622	1.58	**.410**	10.42	12.0	2.0	**1.50**	38	2.MD.210158	.1	.0	■
.0626	1.59	**.410**	10.41	12.0	2.0	**1.50**	38	2.MD.210159	.1	.0	■
.0630	1.60	**.409**	10.40	12.0	2.0	**1.50**	38	2.MD.210160	.1	.0	■
.0634	1.61	**.409**	10.39	12.0	2.0	**1.50**	38	2.MD.210161	.1	.0	■
.0638	1.62	**.409**	10.38	12.0	2.0	**1.50**	38	2.MD.210162	.1	.0	■
.0642	1.63	**.408**	10.37	12.0	2.0	**1.50**	38	2.MD.210163	.1	.0	■
.0646	1.64	**.408**	10.36	12.0	2.0	**1.50**	38	2.MD.210164	.1	.0	■
.0650	1.65	**.407**	10.35	12.0	2.0	**1.50**	38	2.MD.210165	.1	.0	■
.0654	1.66	**.407**	10.34	12.0	2.0	**1.50**	38	2.MD.210166	.1	.0	■
.0657	1.67	**.407**	10.33	12.0	2.0	**1.50**	38	2.MD.210167	.1	.0	■
.0661	1.68	**.406**	10.32	12.0	2.0	**1.50**	38	2.MD.210168	.1	.0	■
.0665	1.69	**.406**	10.31	12.0	2.0	**1.50**	38	2.MD.210169	.1	.0	■
.0669	1.70	**.406**	10.30	12.0	2.0	**1.50**	38	2.MD.210170	.1	.0	■
.0673	1.71	**.405**	10.29	12.0	2.0	**1.50**	38	2.MD.210171	.1	.0	■
.0677	1.72	**.405**	10.28	12.0	2.0	**1.50**	38	2.MD.210172	.1	.0	■
.0681	1.73	**.404**	10.27	12.0	2.0	**1.50**	38	2.MD.210173	.1	.0	■
.0685	1.74	**.404**	10.26	12.0	2.0	**1.50**	38	2.MD.210174	.1	.0	■
.0689	1.75	**.404**	10.25	12.0	2.0	**1.50**	38	2.MD.210175	.1	.0	■
.0693	1.76	**.403**	10.24	12.0	2.0	**1.50**	38	2.MD.210176	.1	.0	■
.0697	1.77	**.403**	10.23	12.0	2.0	**1.50**	38	2.MD.210177	.1	.0	■
.0701	1.78	**.402**	10.22	12.0	2.0	**1.50**	38	2.MD.210178	.1	.0	■
.0705	1.79	**.402**	10.21	12.0	2.0	**1.50**	38	2.MD.210179	.1	.0	■
.0709	1.80	**.402**	10.20	12.0	2.0	**1.50**	38	2.MD.210180	.1	.0	■
.0713	1.81	**.401**	10.19	12.0	2.0	**1.50**	38	2.MD.210181	.1	.0	■
.0717	1.82	**.401**	10.18	12.0	2.0	**1.50**	38	2.MD.210182	.1	.0	■
.0720	1.83	**.400**	10.17	12.0	2.0	**1.50**	38	2.MD.210183	.1	.0	■
.0724	1.84	**.400**	10.16	12.0	2.0	**1.50**	38	2.MD.210184	.1	.0	■
.0728	1.85	**.400**	10.15	12.0	2.0	**1.50**	38	2.MD.210185	.1	.0	■
.0732	1.86	**.399**	10.14	12.0	2.0	**1.50**	38	2.MD.210186	.1	.0	■
.0736	1.87	**.399**	10.13	12.0	2.0	**1.50**	38	2.MD.210187	.1	.0	■

d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated .1	Uncoated .0	Availability
.0740	1.88	**.398**	10.12	12.0	2.0	**1.50**	38	2.MD.210188	.1	.0	■
.0744	1.89	**.398**	10.11	12.0	2.0	**1.50**	38	2.MD.210189	.1	.0	■
.0748	1.90	**.398**	10.10	12.0	2.0	**1.50**	38	2.MD.210190	.1	.0	■
.0752	1.91	**.397**	10.09	12.0	2.0	**1.50**	38	2.MD.210191	.1	.0	■
.0756	1.92	**.397**	10.08	12.0	2.0	**1.50**	38	2.MD.210192	.1	.0	■
.0760	1.93	**.396**	10.07	12.0	2.0	**1.50**	38	2.MD.210193	.1	.0	■
.0764	1.94	**.396**	10.06	12.0	2.0	**1.50**	38	2.MD.210194	.1	.0	■
.0768	1.95	**.396**	10.05	12.0	2.0	**1.50**	38	2.MD.210195	.1	.0	■
.0772	1.96	**.395**	10.04	12.0	2.0	**1.50**	38	2.MD.210196	.1	.0	■
.0776	1.97	**.395**	10.03	12.0	2.0	**1.50**	38	2.MD.210197	.1	.0	■
.0780	1.98	**.394**	10.02	12.0	2.0	**1.50**	38	2.MD.210198	.1	.0	■
.0783	1.99	**.394**	10.01	12.0	2.0	**1.50**	38	2.MD.210199	.1	.0	■
.0787	2.00	**.394**	10.00	12.0	3.0	**1.50**	38	2.MD.210200	.1	.0	■
.0807	2.05	**.392**	9.95	12.0	3.0	**1.50**	38	2.MD.210205	.1	.0	■
.0827	2.10	**.390**	9.90	12.0	3.0	**1.50**	38	2.MD.210210	.1	.0	■
.0846	2.15	**.388**	9.85	12.0	3.0	**1.50**	38	2.MD.210215	.1	.0	■
.0866	2.20	**.386**	9.80	12.0	3.0	**1.50**	38	2.MD.210220	.1	.0	■
.0886	2.25	**.384**	9.75	12.0	3.0	**1.50**	38	2.MD.210225	.1	.0	■
.0906	2.30	**.382**	9.70	12.0	3.0	**1.50**	38	2.MD.210230	.1	.0	■
.0925	2.35	**.380**	9.65	12.0	3.0	**1.50**	38	2.MD.210235	.1	.0	■
.0945	2.40	**.378**	9.60	12.0	3.0	**1.50**	38	2.MD.210240	.1	.0	■
.0965	2.45	**.376**	9.55	12.0	3.0	**1.50**	38	2.MD.210245	.1	.0	■
.0984	2.50	**.374**	9.50	12.0	3.0	**1.50**	38	2.MD.210250	.1	.0	■
.1004	2.55	**.372**	9.45	12.0	3.0	**1.50**	38	2.MD.210255	.1	.0	■
.1024	2.60	**.370**	9.40	12.0	3.0	**1.50**	38	2.MD.210260	.1	.0	■
.1043	2.65	**.368**	9.35	12.0	3.0	**1.50**	38	2.MD.210265	.1	.0	■
.1063	2.70	**.366**	9.30	12.0	3.0	**1.50**	38	2.MD.210270	.1	.0	■
.1083	2.75	**.364**	9.25	12.0	3.0	**1.50**	38	2.MD.210275	.1	.0	■
.1102	2.80	**.362**	9.20	12.0	3.0	**1.50**	38	2.MD.210280	.1	.0	■
.1122	2.85	**.360**	9.15	12.0	3.0	**1.50**	38	2.MD.210285	.1	.0	■
.1142	2.90	**.358**	9.10	12.0	3.0	**1.50**	38	2.MD.210290	.1	.0	■
.1161	2.95	**.356**	9.05	12.0	3.0	**1.50**	38	2.MD.210295	.1	.0	■
.1181	3.00	**.354**	9.00	12.0	3.0	**1.50**	38	2.MD.210300	.1	.0	■

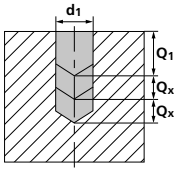
■ Stock item, packing unit of 5 pcs.

Complementary products	
MiquDrill Centro	p.69
MiquDrill 200	p.111
CrazyDrill Crosspilot	p.175

MiquDrill 210 - coated

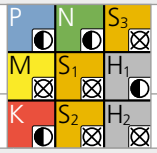
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	40 – 70 | **131 – 230**	2xd1	1xd1
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	30 – 40 | **98 – 131**	2xd1	1xd1
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	30 – 60 | **98 – 197**	2xd1	1xd1
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000			
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C			
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304			
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	30 – 70 | **98 – 230**	2xd1	1xd1
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	80 – 150 | **262 – 492**	2xd1	1xd1
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60 – 100 | **197 – 328**	2xd1	1xd1
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40 – 70 | **131 – 230**	2xd1	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40 – 70 | **131 – 230**	2xd1	1xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	40 – 150 | **131 – 492**	2xd1	1xd1
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	30 – 40 | **98 – 131**	2xd1	1xd1
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67			
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136			
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25			
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	20 – 40 | **66 – 131**	0.5xd1	0.5xd1
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



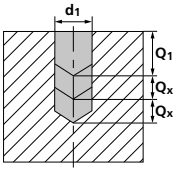
f [mm/rev] | **[IPR]**

Ød1				
0.3–0.6 mm | **.012"–.024"**	0.6–1.0 mm | **.024"–.039"**	1.0–1.5 mm | **.039"–.059"**	1.5–2.0 mm | **.059"–.079"**	2.0–3.0 mm | **.079"–.118"**
f	**f**	**f**	**f**	**f**
0.009 | **.00035**	0.016 | **.00063**	0.023 | **.00091**	0.033 | **.00130**	0.045 | **.00177**
0.007 | **.00028**	0.011 | **.00043**	0.015 | **.00059**	0.023 | **.00091**	0.035 | **.00138**
0.004 | **.00016**	0.009 | **.00035**	0.014 | **.00055**	0.020 | **.00079**	0.028 | **.00110**
0.007 | **.00028**	0.013 | **.00051**	0.023 | **.00091**	0.030 | **.00118**	0.045 | **.00177**
0.010 | **.00039**	0.023 | **.00091**	0.038 | **.00150**	0.050 | **.00197**	0.070 | **.00276**
0.008 | **.00031**	0.019 | **.00075**	0.030 | **.00118**	0.045 | **.00177**	0.060 | **.00236**
0.008 | **.00031**	0.014 | **.00055**	0.023 | **.00091**	0.030 | **.00118**	0.045 | **.00177**
0.008 | **.00031**	0.014 | **.00055**	0.023 | **.00091**	0.030 | **.00118**	0.045 | **.00177**
0.008 | **.00031**	0.017 | **.00067**	0.030 | **.00118**	0.045 | **.00177**	0.065 | **.00256**
0.007 | **.00028**	0.011 | **.00043**	0.015 | **.00059**	0.023 | **.00091**	0.035 | **.00138**
0.003 | **.00012**	0.004 | **.00016**	0.007 | **.00028**	0.009 | **.00035**	0.009 | **.00035**

MiquDrill 210 - uncoated

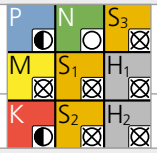
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	30 – 60 | **98 – 197**	2xd1	1xd1
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	25 – 40 | **82 – 131**	2xd1	1xd1
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	25 – 40 | **82 – 131**	2xd1	1xd1
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000			
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C			
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304			
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	25 – 60 | **82 – 197**	2xd1	1xd1
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	50 – 100 | **164 – 328**	2xd1	1xd1
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	40 – 80 | **82 – 262**	2xd1	1xd1
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	30 – 50 | **98 – 164**	2xd1	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	30 – 50 | **98 – 164**	2xd1	1xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	30 – 80 | **98 – 262**	2xd1	1xd1
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	25 – 40 | **82 – 131**	2xd1	1xd1
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67			
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136			
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25			
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1			
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1					
0.1–0.3 mm | **.004"–.012"**	0.3–0.6 mm | **.012"–.024"**	0.6–1.0 mm | **.024"–.039"**	1.0–1.5 mm | **.039"–.059"**	1.5 –2.0 mm | **.059"–.079"**	2.0–3.0 mm | **.079"–.118"**
f	**f**	**f**	**f**	**f**	**f**
0.003 | **.00012**	0.009 | **.00035**	0.016 | **.00063**	0.023 | **.00091**	0.033 | **.00130**	0.045 | **.00177**
0.003 | **.00012**	0.007 | **.00028**	0.011 | **.00043**	0.015 | **.00059**	0.023 | **.00091**	0.035 | **.00138**
0.002 | **.00008**	0.004 | **.00016**	0.009 | **.00035**	0.014 | **.00055**	0.020 | **.00079**	0.028 | **.00110**
0.003 | **.00012**	0.007 | **.00028**	0.013 | **.00051**	0.023 | **.00091**	0.030 | **.00118**	0.045 | **.00177**
0.006 | **.00024**	0.010 | **.00039**	0.023 | **.00091**	0.038 | **.00150**	0.050 | **.00197**	0.070 | **.00276**
0.005 | **.00020**	0.008 | **.00031**	0.019 | **.00075**	0.030 | **.00118**	0.045 | **.00177**	0.060 | **.00236**
0.004 | **.00016**	0.008 | **.00031**	0.014 | **.00055**	0.023 | **.00091**	0.030 | **.00118**	0.045 | **.00177**
0.004 | **.00016**	0.008 | **.00031**	0.014 | **.00055**	0.023 | **.00091**	0.030 | **.00118**	0.045 | **.00177**
0.005 | **.00020**	0.008 | **.00031**	0.017 | **.00067**	0.030 | **.00118**	0.045 | **.00177**	0.065 | **.00256**
0.003 | **.00012**	0.007 | **.00028**	0.011 | **.00043**	0.015 | **.00059**	0.023 | **.00091**	0.035 | **.00138**
Recommended: MiquDrill 210 - coated					



Drilling process MiquDrill 210

QUICK AND ACCURATE DRILLING FROM 2.4 TO 8 X D

Coolant type, pressure, filtration and flowrate

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the cooling medium is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical information".

MiquDrill 210

Due to the excellent self-centering of MiquDrill 210, a center or pilot drill is not obligatory on regular and straight surfaces.

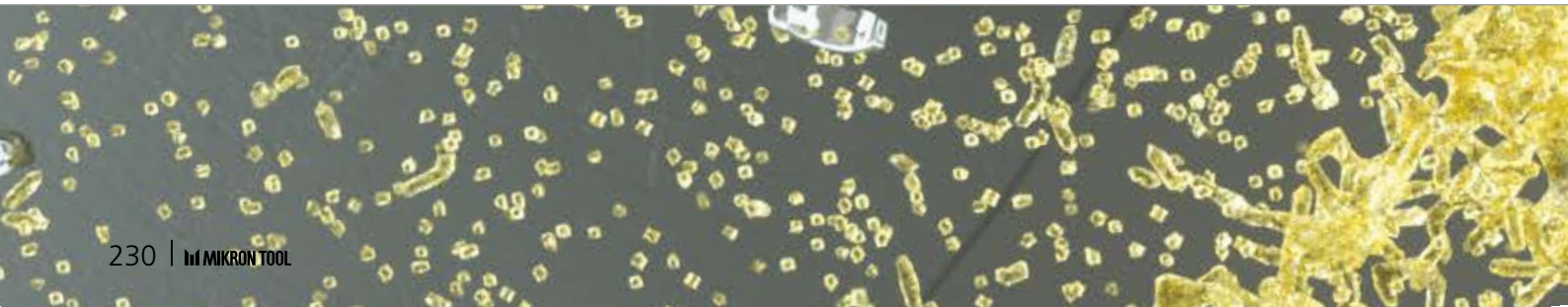
Center drilling / pilot drilling and drilling

Higher requirements: On irregular and rough or inclined surfaces or for highest position accuracy and in general for drilling, Mikron Tool recommends:

- **MiquDrill Centro 90° / 120°** as centering drill
- **MiquDrill 200** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill on inclined surfaces (from Ø 0.4 mm (.016"))

Pilot drilling with MiquDrill 200 or centering with MiquDrill Centro is the perfect starting position for precise drilling (position and alignment accuracy) and a stable machining process. The same does the pilot drill CrazyDrill Crosspilot when drilling on inclined surfaces.

The quality of drilling (position and alignment accuracy and stable machining process) are assured.



DRILLING PROCESS

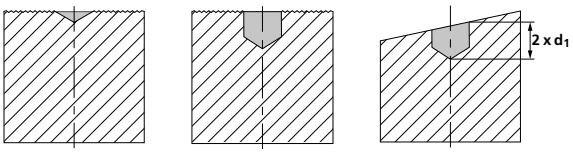
Drilling according DIN 66025 / PAL

G83 deep-drilling cycle with chip break and chip removal (pecks)

Q = depth of the respective peck

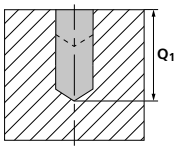
1 | CENTER OR PILOT DRILLING (ONLY IF NECESSARY)

- With MiquDrill Centro 90° / 120° or MiquDrill 200 (irregular or rough surfaces) or CrazyDrill Crosspilot (inclined surfaces).

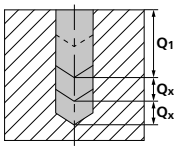


2 | DRILLING

- With MiquDrill 210 up to maximum drilling depth Q_1 (see cutting data table) in one step, afterwards remove chips.



- Additional pecks Q_X according to cutting data table, afterwards remove chips.

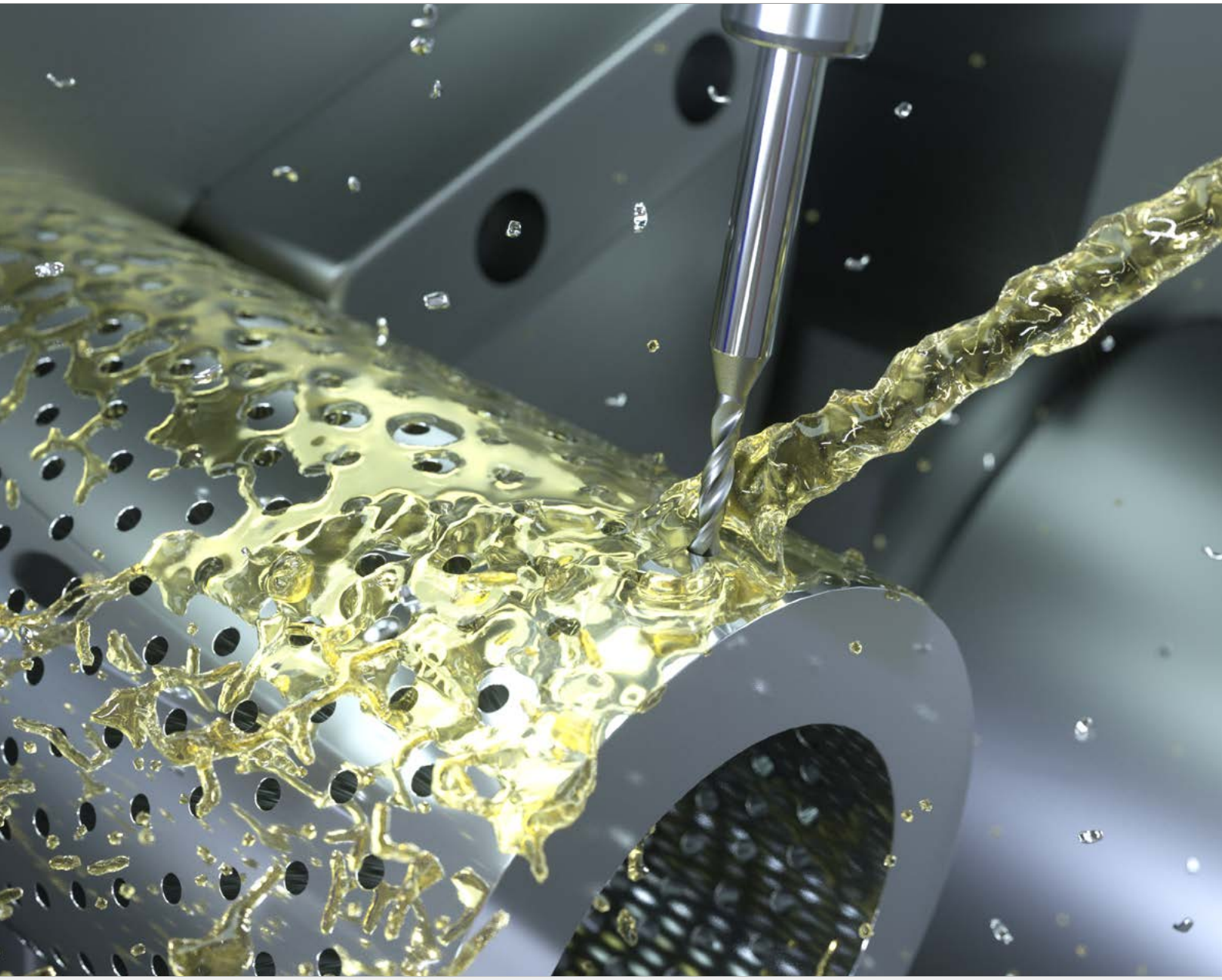


Note:

Between pecks, take the drill completely out of the hole.

After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

CrazyDrill Steel



CRAZYDRILL Steel

FAST AND PRECISE DRILLING UP TO 7 X D



Mikron Tool offers with CrazyDrill Steel a small drill for drilling in steel for max. drilling depths up to 7 x d and in a diameter range from 1/64" up to 1/4" (0.4 up to 6.35 mm).

Quicker and deeper – these are the typical attributes of this solid carbide drill. CrazyDrill Steel creates small holes with the performance and accuracy that amaze every user. Due to the combination of its chisel "s"-form and tip angle of 140° the drill is self-centering and reaches the highest drilling speeds. Its excellent tool life, the high hole and surface quality and the hole roundness make this cutting tool to a reliable partner.

No wonder the term "hole punching" was invented for this drill. It drills through the material at the highest feed rates, chip removal is unnecessary in most cases.

Quick and accurate

A SMALL DRILL FOR HIGHEST REQUIREMENTS IN STEEL

Mikron Tool offers with CrazyDrill Steel a small drill for drilling in steel for max. drilling depths up to 7 x d and in a diameter range from 1/64" to 1/4" (0.4 to 6.35 mm).

- CrazyDrill Steel, drilling depths 4 x d / 6 - 7 x d

4 x d

- External cooling
- Coated



Page 239

6 - 7 x d

- External cooling
- Coated



Page 245

1 | SHAFT
The robust carbide shaft guarantees a high degree of concentricity accuracy and therefore highest drilling reliability.

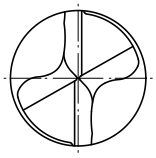
2 | SOLID CARBIDE
The use of a newest generation's solid carbide allows high machining feeds.

3 | COATING
The high-performance coating eXedur RI / RIP guarantees a long tool life and excellent surface quality.

4 | HELICAL FLUTE
The geometry of the helical flute provides optimal chip flow, only minimal chip removal (pecking) is requested.

5 | CUTTING GEOMETRY
- Optimized cutting geometry with cutting edge preparation prevent from premature wear.
- Highest drilling speeds are possible with high process reliability.
- The solid carbide drill is self-centering due to its chisel "s"-form and guarantees a high position accuracy.

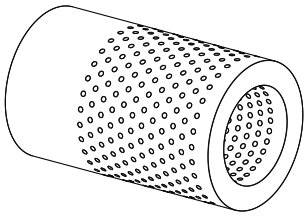
Tip drill



Benefits and applications

A SMALL DRILL FOR THE HIGHEST DEGREE OF PERFORMANCE COST-EFFECTIVENESS

- **SHORT MACHINING TIME** | due to high feeds
- **LONG TOOL LIFE** | from 10 to 20 times longer than HSS drills
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to high quality
- **HIGH DEGREE OF PRECISION** | due to good self-centering



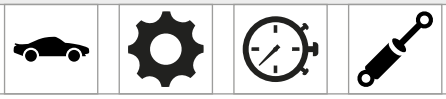
COMPONENT
Filter screen

MATERIAL
90MnCrV8 / 1.2842 / AISI O2

MACHINING
- 500 holes
- d = 0.8 mm **| .032"**
- Drilling depth 4.5 mm **| .177"**

DRILLING TOOL
Mikron Tool - CrazyDrill Steel - 6 x d

DATA	MIKRON TOOL
Tool type	CrazyDrill Steel - Carbide - Coated - External cooling
Item number	2.CD.070080.S
Cutting data	v_c = 80 m/min **| 263 SFM** f = 0.030 mm/rev **| .0012 IPR** Q_1 = 4.5 mm **| .177"**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Automotive industry	Components for gasoline direct injection
Mechanical engineering	Particle of engine Mounting bracket
Watches	Watch housing
Hydraulics / Pneumatics	Solenoid valve

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

CrazyDrill Steel 4 x d

DRILLING WITH EXTERNAL COOLING



Drilling steel with highest speed, highest process reliability and accuracy. These are the typical attributes of the coated drill CrazyDrill Steel. It is designed for unalloyed and alloyed steels, for cast iron, aluminum and brass and other metals. In the majority of cases the drill reaches the complete drilling depth in one step. Only in long-chipping materials a minimal pecking ensures a high degree of reliability.

For the short version with drilling depths of 4 x d centering is not necessary, with its tip angle of 140° and its chisel "s"-form the drill has a good self-centering. We recommend a pilot drilling only on inclined surfaces. In this case CrazyDrill Crosspilot is adapted for an inclined angle up to a maximum of 60°. For details see drilling process.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

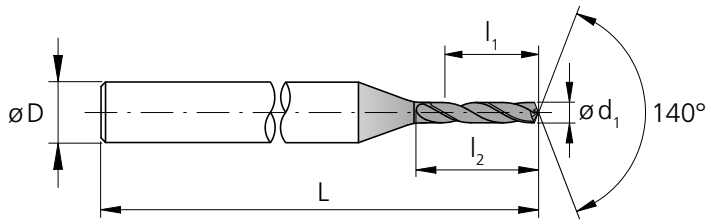
Please note

You couldn't find your suitable version of the CrazyDrill Steel (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

Carbide | 4xd1 | 140° | Z2 | eXedur RI/RIP

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00016" 0	+ 0.004 mm 0	+ .00024" + .00004"	+ 0.006 mm + 0.001 mm	+ .00028" + .00004"	+ 0.007 mm + 0.001 mm



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
1/64	**.0156**	0.396	**.063**	1.60	2.3	3	**1.65**	42.0	2.CD.040F164.S	■
	.0157	0.40	**.063**	1.60	2.3	3	**1.65**	42.0	2.CD.040040.S	■
	.0177	0.45	**.071**	1.80	2.6	3	**1.65**	42.0	2.CD.040045.S	■
	.0197	0.50	**.079**	2.00	2.9	3	**1.65**	42.0	2.CD.040050.S	■
	.0217	0.55	**.087**	2.20	3.2	3	**1.65**	42.0	2.CD.040055.S	■
	.0236	0.60	**.094**	2.40	3.5	3	**1.71**	43.5	2.CD.040060.S	■
	.0256	0.65	**.102**	2.60	3.8	3	**1.71**	43.5	2.CD.040065.S	■
	.0276	0.70	**.110**	2.80	4.1	3	**1.71**	43.5	2.CD.040070.S	■
	.0295	0.75	**.118**	3.00	4.4	3	**1.71**	43.5	2.CD.040075.S	■
1/32	**.0312**	0.793	**.126**	3.20	4.6	3	**1.71**	43.5	2.CD.040F132.S	■
	.0315	0.80	**.126**	3.20	4.6	3	**1.71**	43.5	2.CD.040080.S	■
	.0335	0.85	**.134**	3.40	4.9	3	**1.71**	43.5	2.CD.040085.S	■
	.0354	0.90	**.142**	3.60	5.2	3	**1.71**	43.5	2.CD.040090.S	■
	.0374	0.95	**.150**	3.80	5.5	3	**1.71**	43.5	2.CD.040095.S	■
	.0394	1.00	**.157**	4.00	5.8	3	**1.73**	44.0	2.CD.040100.S	■
	.0413	1.05	**.165**	4.20	6.1	3	**1.73**	44.0	2.CD.040105.S	■
	.0433	1.10	**.173**	4.40	6.3	3	**1.73**	44.0	2.CD.040110.S	■
	.0453	1.15	**.181**	4.60	6.6	3	**1.73**	44.0	2.CD.040115.S	■
	.0472	1.20	**.189**	4.80	7.0	3	**1.77**	45.0	2.CD.040120.S	■
	.0492	1.25	**.197**	5.00	7.3	3	**1.77**	45.0	2.CD.040125.S	■
	.0512	1.30	**.205**	5.20	7.6	3	**1.77**	45.0	2.CD.040130.S	■
	.0531	1.35	**.213**	5.40	7.9	3	**1.77**	45.0	2.CD.040135.S	■
	.0551	1.40	**.220**	5.60	8.2	3	**1.81**	46.0	2.CD.040140.S	■
	.0571	1.45	**.228**	5.80	8.6	3	**1.81**	46.0	2.CD.040145.S	■
	.0591	1.50	**.236**	6.00	8.7	3	**1.81**	46.0	2.CD.040150.S	■
	.0610	1.55	**.244**	6.20	9.1	3	**1.81**	46.0	2.CD.040155.S	■
1/16	**.0625**	1.587	**.252**	6.40	9.5	3	**1.85**	47.0	2.CD.040F116.S	■
	.0630	1.60	**.252**	6.40	9.5	3	**1.85**	47.0	2.CD.040160.S	■
	.0650	1.65	**.260**	6.60	9.7	3	**1.85**	47.0	2.CD.040165.S	■
	.0669	1.70	**.268**	6.80	10.0	3	**1.85**	47.0	2.CD.040170.S	■
	.0689	1.75	**.276**	7.00	10.3	3	**1.85**	47.0	2.CD.040175.S	■
	.0709	1.80	**.283**	7.20	10.8	3	**1.89**	48.0	2.CD.040180.S	■
	.0728	1.85	**.291**	7.40	11.0	3	**1.89**	48.0	2.CD.040185.S	■
	.0748	1.90	**.299**	7.60	11.2	3	**1.89**	48.0	2.CD.040190.S	■

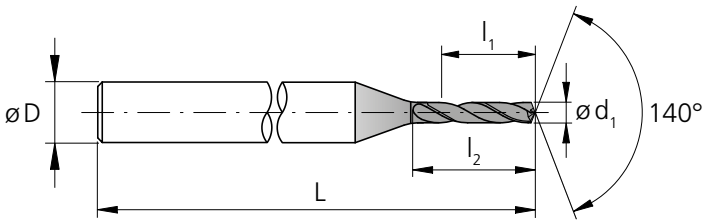
■ Stock item

Complementary products
CrazyDrill Crosspilot p.175

CRAZYDRILL by Mikron Tool Steel

CrazyDrill Steel 4 x d

DRILLING WITH EXTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0768	1.95	**.307**	7.80	11.4	3	**1.89**	48.0	2.CD.040195.S	■
	.0787	2.00	**.315**	8.00	11.9	4	**2.17**	55.0	2.CD.040200.S	■
	.0807	2.05	**.323**	8.20	12.1	4	**2.17**	55.0	2.CD.040205.S	■
	.0827	2.10	**.331**	8.40	12.3	4	**2.17**	55.0	2.CD.040210.S	■
	.0846	2.15	**.339**	8.60	12.6	4	**2.17**	55.0	2.CD.040215.S	■
	.0866	2.20	**.346**	8.80	13.0	4	**2.20**	56.0	2.CD.040220.S	■
	.0886	2.25	**.354**	9.00	13.3	4	**2.20**	56.0	2.CD.040225.S	■
	.0906	2.30	**.362**	9.20	13.6	4	**2.20**	56.0	2.CD.040230.S	■
	.0925	2.35	**.370**	9.40	13.9	4	**2.20**	56.0	2.CD.040235.S	■
3/32	**.0937**	2.381	**.378**	9.60	14.2	4	**2.24**	57.0	2.CD.040F332.S	■
	.0945	2.40	**.378**	9.60	14.2	4	**2.24**	57.0	2.CD.040240.S	■
	.0965	2.45	**.386**	9.80	14.6	4	**2.24**	57.0	2.CD.040245.S	■
	.0984	2.50	**.394**	10.00	14.7	4	**2.24**	57.0	2.CD.040250.S	■
	.1004	2.55	**.402**	10.20	15.1	4	**2.24**	57.0	2.CD.040255.S	■
	.1024	2.60	**.409**	10.40	15.5	4	**2.28**	58.0	2.CD.040260.S	■
	.1043	2.65	**.417**	10.60	15.7	4	**2.28**	58.0	2.CD.040265.S	■
	.1063	2.70	**.425**	10.80	16.0	4	**2.28**	58.0	2.CD.040270.S	■
	.1083	2.75	**.433**	11.00	16.3	4	**2.28**	58.0	2.CD.040275.S	■
	.1102	2.80	**.441**	11.20	16.8	4	**2.32**	59.0	2.CD.040280.S	■
	.1122	2.85	**.449**	11.40	17.0	4	**2.32**	59.0	2.CD.040285.S	■
	.1142	2.90	**.457**	11.60	17.2	4	**2.32**	59.0	2.CD.040290.S	■
	.1161	2.95	**.465**	11.80	17.4	4	**2.32**	59.0	2.CD.040295.S	■
	.1181	3.00	**.472**	12.00	17.6	4	**2.32**	59.0	2.CD.040300.S	■
	.1201	3.05	**.480**	12.20	17.8	4	**2.36**	60.0	2.CD.040305.S	■
	.1220	3.10	**.488**	12.40	18.1	4	**2.36**	60.0	2.CD.040310.S	■
	.1240	3.15	**.496**	12.60	18.4	4	**2.36**	60.0	2.CD.040315.S	■
1/8	**.1250**	3.175	**.504**	12.80	18.7	4	**2.36**	60.0	2.CD.040F18.S	■
	.1260	3.20	**.504**	12.80	18.7	4	**2.36**	60.0	2.CD.040320.S	■
	.1280	3.25	**.512**	13.00	19.0	4	**2.36**	60.0	2.CD.040325.S	■
	.1299	3.30	**.520**	13.20	19.3	4	**2.36**	60.0	2.CD.040330.S	■
	.1319	3.35	**.528**	13.40	19.6	4	**2.36**	60.0	2.CD.040335.S	■
	.1339	3.40	**.535**	13.60	19.9	4	**2.36**	60.0	2.CD.040340.S	■
	.1358	3.45	**.543**	13.80	20.2	4	**2.36**	60.0	2.CD.040345.S	■
	.1378	3.50	**.551**	14.00	20.5	4	**2.36**	60.0	2.CD.040350.S	■

■ Stock item

Carbide | 4xd1 | 140° | Z2 | eXedur RI/RIP

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00016" 0	+ 0.004 mm 0	+ .00024" + .00004"	+ 0.006 mm + 0.001 mm	+ .00028" + .00004"	+ 0.007 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.1398	3.55	**.559**	14.20	20.8	4	**2.36**	60.0	2.CD.040355.S	■
	.1417	3.60	**.567**	14.40	21.1	4	**2.54**	64.5	2.CD.040360.S	■
	.1437	3.65	**.575**	14.60	21.4	4	**2.54**	64.5	2.CD.040365.S	■
	.1457	3.70	**.583**	14.80	21.6	4	**2.54**	64.5	2.CD.040370.S	■
	.1476	3.75	**.591**	15.00	21.9	4	**2.54**	64.5	2.CD.040375.S	■
	.1496	3.80	**.598**	15.20	22.2	4	**2.54**	64.5	2.CD.040380.S	■
	.1516	3.85	**.606**	15.40	22.5	4	**2.54**	64.5	2.CD.040385.S	■
	.1535	3.90	**.614**	15.60	22.8	4	**2.54**	64.5	2.CD.040390.S	■
	.1555	3.95	**.622**	15.80	23.1	4	**2.54**	64.5	2.CD.040395.S	■
5/32	**.1562**	3.968	**.630**	16.00	23.4	6	**2.76**	70.0	2.CD.040F532.S	■
	.1575	4.00	**.630**	16.00	23.4	6	**2.76**	70.0	2.CD.040400.S	■
	.1614	4.10	**.646**	16.40	24.0	6	**2.76**	70.0	2.CD.040410.S	■
	.1654	4.20	**.661**	16.80	24.6	6	**2.76**	70.0	2.CD.040420.S	■
	.1693	4.30	**.677**	17.20	25.2	6	**2.76**	70.0	2.CD.040430.S	■
	.1732	4.40	**.693**	17.60	25.7	6	**2.76**	70.0	2.CD.040440.S	■
	.1772	4.50	**.709**	18.00	26.3	6	**2.76**	70.0	2.CD.040450.S	■
	.1811	4.60	**.724**	18.40	26.9	6	**2.76**	70.0	2.CD.040460.S	■
	.1850	4.70	**.740**	18.80	27.5	6	**2.76**	70.0	2.CD.040470.S	■
3/16	**.1875**	4.762	**.756**	19.20	28.1	6	**2.76**	70.0	2.CD.040F316.S	■
	.1890	4.80	**.756**	19.20	28.1	6	**2.76**	70.0	2.CD.040480.S	■
	.1929	4.90	**.772**	19.60	28.7	6	**2.76**	70.0	2.CD.040490.S	■
	.1969	5.00	**.787**	20.00	29.2	6	**2.76**	70.0	2.CD.040500.S	■
	.2008	5.10	**.803**	20.40	29.8	6	**2.76**	70.0	2.CD.040510.S	■
	.2047	5.20	**.819**	20.80	30.4	6	**2.95**	75.0	2.CD.040520.S	■
	.2087	5.30	**.835**	21.20	31.0	6	**2.95**	75.0	2.CD.040530.S	■
	.2126	5.40	**.850**	21.60	31.6	6	**2.95**	75.0	2.CD.040540.S	■
	.2165	5.50	**.866**	22.00	32.2	6	**2.95**	75.0	2.CD.040550.S	■
7/32	**.2189**	5.560	**.882**	22.40	32.8	6	**2.95**	75.0	2.CD.040F732.S	■
	.2205	5.60	**.882**	22.40	32.8	6	**2.95**	75.0	2.CD.040560.S	■
	.2244	5.70	**.898**	22.80	33.3	6	**2.95**	75.0	2.CD.040570.S	■
	.2283	5.80	**.913**	23.20	33.9	6	**2.95**	75.0	2.CD.040580.S	■
	.2323	5.90	**.929**	23.60	34.5	6	**2.95**	75.0	2.CD.040590.S	■
	.2362	6.00	**.945**	24.00	35.1	6	**2.95**	75.0	2.CD.040600.S	■
1/4	**.2500**	6.350	**1.00**	25.40	37.1	8	**2.95**	75.0	2.CD.040F14.S	■

■ Stock item

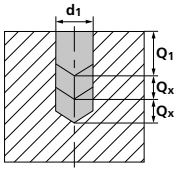
Complementary products

CrazyDrill Crosspilot p.175

CrazyDrill Steel 4 x d

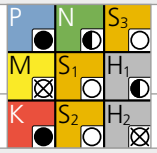
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 | **394**	4xd1	–
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	80 | **262**	4xd1	–
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | **197**	4xd1	–
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000			
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C			
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304			
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	150 | **492**	4xd1	–
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	220 | **722**	4xd1	–
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | **656**	4xd1	–
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	120 | **394**	1.5xd1	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	150 | **492**	1.5xd1	1xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	100 | **328**	1.5xd1	1xd1
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	100 | **328**	4xd1	–
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625	40 | **131**	1xd1	0.25xd1
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	40 | **131**	1xd1	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20 | **66**	1xd1	0.3xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	30 | **98**	4xd1	–
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	30 | **98**	4xd1	–
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1	1/64" 0.4 mm | .016"	1/32" 0.8 mm | .032"	1.0 mm | .039"	1.25 mm | .049"	1/16" 1.5 mm | .059"	2.0 mm | .079"	3/32" 2.5 mm | .098"	1/8" 3.0 mm | .118"	5/32" 4.0 mm | .158"	3/16" - 7/32" 5.0 mm | .197"	1/4" 6.0 mm | .236"
	f	f	f	f	f	f	f	f	f	f	f
	0.040 | .0016	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.200 | .0079	0.250 | .0098	0.270 | .0106	0.350 | .0138	0.370 | .0146	0.390 | .0154	0.400 | .0157
	0.015 | .0006	0.030 | .0012	0.080 | .0031	0.120 | .0047	0.160 | .0063	0.200 | .0079	0.230 | .0091	0.250 | .0098	0.270 | .0106	0.300 | .0118	0.320 | .0126
	0.020 | .0008	0.070 | .0028	0.120 | .0047	0.150 | .0059	0.200 | .0079	0.250 | .0098	0.280 | .0110	0.300 | .0118	0.320 | .0126	0.340 | .0134	0.350 | .0138
	0.040 | .0016	0.150 | .0059	0.200 | .0079	0.250 | .0098	0.300 | .0118	0.350 | .0138	0.400 | .0157	0.450 | .0177	0.470 | .0185	0.490 | .0193	0.500 | .0197
	0.045 | .0018	0.060 | .0024	0.080 | .0031	0.095 | .0037	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.180 | .0071	0.190 | .0075	0.210 | .0083	0.250 | .0098
	0.040 | .0016	0.055 | .0022	0.075 | .0030	0.085 | .0033	0.100 | .0039	0.120 | .0047	0.140 | .0055	0.170 | .0067	0.180 | .0071	0.200 | .0079	0.240 | .0094
	0.030 | .0012	0.050 | .0020	0.060 | .0024	0.065 | .0026	0.075 | .0030	0.080 | .0031	0.095 | .0037	0.110 | .0043	0.130 | .0051	0.160 | .0063	0.200 | .0079
	0.030 | .0012	0.050 | .0020	0.065 | .0026	0.070 | .0028	0.075 | .0030	0.090 | .0035	0.110 | .0043	0.140 | .0055	0.160 | .0063	0.200 | .0079	0.220 | .0087
	0.035 | .0014	0.055 | .0022	0.070 | .0028	0.080 | .0031	0.090 | .0035	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.180 | .0071	0.220 | .0087	0.240 | .0094
	0.015 | .0006	0.025 | .0010	0.035 | .0014	0.050 | .0020	0.060 | .0024	0.075 | .0030	0.095 | .0037	0.110 | .0043	0.130 | .0051	0.160 | .0063	0.220 | .0087
	0.002 | .0001	0.004 | .0002	0.005 | .0002	0.006 | .0002	0.007 | .0003	0.010 | .0004	0.012 | .0005	0.015 | .0006	0.020 | .0008	0.025 | .0010	0.030 | .0012
	0.012 | .0005	0.024 | .0009	0.030 | .0012	0.040 | .0016	0.045 | .0018	0.060 | .0024	0.075 | .0030	0.090 | .0035	0.120 | .0047	0.150 | .0059	0.180 | .0071
	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.055 | .0022	0.070 | .0028	0.080 | .0031	0.100 | .0039	0.140 | .0055	0.160 | .0063	0.200 | .0079
	0.006 | .0002	0.012 | .0005	0.015 | .0006	0.020 | .0008	0.025 | .0010	0.030 | .0012	0.035 | .0014	0.045 | .0018	0.060 | .0024	0.075 | .0030	0.090 | .0035
	0.005 | .0002	0.007 | .0003	0.010 | .0004	0.011 | .0004	0.012 | .0005	0.015 | .0006	0.020 | .0008	0.025 | .0010	0.030 | .0012	0.035 | .0014	0.040 | .0016

CrazyDrill Steel 6 x d / 7 x d

DRILLING WITH EXTERNAL COOLING



Drilling steel with highest speed, highest process reliability and accuracy. These are the typical attributes of the coated drill CrazyDrill Steel. It is designed for unalloyed and alloyed steels, for cast iron, aluminum and brass and for other metals. In alloyed steels the drill reaches the complete drilling depth of 6 x d / 7 x d in one step. Only in long-chipping materials a minimal pecking ensures a high degree of reliability.

For the long version with drilling depths up to 6 x d / 7 x d centering is not necessary on straight surfaces, with its tip angle of 140° and its chisel "s"-form the drill has a good self-centering. We recommend pilot drilling or centering only on irregular, rough or inclined surfaces, if a high position accuracy is requested and for drilling diameters under Ø .032" (0.8 mm). For details see drilling process.

Coolant type, pressure and filtration flowrate

Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note

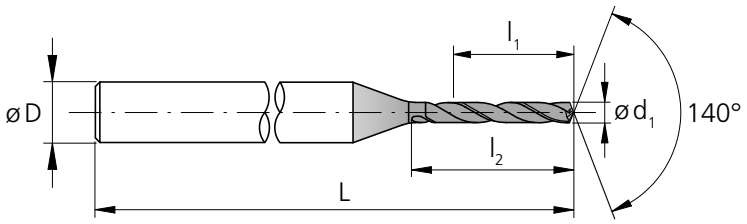
You couldn't find your suitable version of the CrazyDrill Steel (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

Carbide | 140° | Z2 | eXedur RIP

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00016" 0	+ 0.004 mm 0	+ .00024" + .00004"	+ 0.006 mm + 0.001 mm	+ .00028" + .00004"	+ 0.007 mm + 0.001 mm

6xd_1



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
1/64	**.0156**	0.396	**.094**	2.40	3.1	3	**1.65**	42.0	2.CD.070F164.S	■
	.0157	0.40	**.094**	2.40	3.1	3	**1.65**	42.0	2.CD.070040.S	■
	.0177	0.45	**.106**	2.70	3.5	3	**1.65**	42.0	2.CD.070045.S	■
	.0197	0.50	**.118**	3.00	3.9	3	**1.65**	42.0	2.CD.070050.S	■
	.0217	0.55	**.130**	3.30	4.3	3	**1.65**	42.0	2.CD.070055.S	■
	.0236	0.60	**.142**	3.60	4.7	3	**1.71**	43.5	2.CD.070060.S	■
	.0256	0.65	**.154**	3.90	5.0	3	**1.71**	43.5	2.CD.070065.S	■
	.0276	0.70	**.165**	4.20	5.4	3	**1.71**	43.5	2.CD.070070.S	■
	.0295	0.75	**.177**	4.50	5.8	3	**1.71**	43.5	2.CD.070075.S	■
1/32	**.0312**	0.793	**.189**	4.80	6.2	3	**1.77**	45.0	2.CD.070F132.S	■
	.0315	0.80	**.189**	4.80	6.2	3	**1.77**	45.0	2.CD.070080.S	■
	.0335	0.85	**.201**	5.10	6.6	3	**1.77**	45.0	2.CD.070085.S	■
	.0354	0.90	**.213**	5.40	7.0	3	**1.77**	45.0	2.CD.070090.S	■
	.0374	0.95	**.224**	5.70	7.4	3	**1.77**	45.0	2.CD.070095.S	■
	.0394	1.00	**.236**	6.00	7.8	3	**1.81**	46.0	2.CD.070100.S	■
	.0413	1.05	**.248**	6.30	8.1	3	**1.81**	46.0	2.CD.070105.S	■
	.0433	1.10	**.260**	6.60	8.6	3	**1.81**	46.0	2.CD.070110.S	■
	.0453	1.15	**.272**	6.90	8.7	3	**1.81**	46.0	2.CD.070115.S	■

■ Stock item

7xd_1

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0472	1.20	**.331**	8.40	10.9	3	**1.93**	49.0	2.CD.070120.S	■
	.0492	1.25	**.344**	8.75	11.1	3	**1.93**	49.0	2.CD.070125.S	■
	.0512	1.30	**.358**	9.10	11.5	3	**1.93**	49.0	2.CD.070130.S	■
	.0531	1.35	**.372**	9.45	11.9	3	**1.93**	49.0	2.CD.070135.S	■
	.0551	1.40	**.386**	9.80	12.7	3	**1.99**	50.5	2.CD.070140.S	■
	.0571	1.45	**.400**	10.15	12.9	3	**1.99**	50.5	2.CD.070145.S	■
	.0591	1.50	**.413**	10.50	13.4	3	**1.99**	50.5	2.CD.070150.S	■
	.0610	1.55	**.427**	10.85	13.7	3	**1.99**	50.5	2.CD.070155.S	■
1/16	**.0625**	1.587	**.441**	11.20	14.5	3	**2.05**	52.0	2.CD.070F116.S	■
	.0630	1.60	**.441**	11.20	14.5	3	**2.05**	52.0	2.CD.070160.S	■

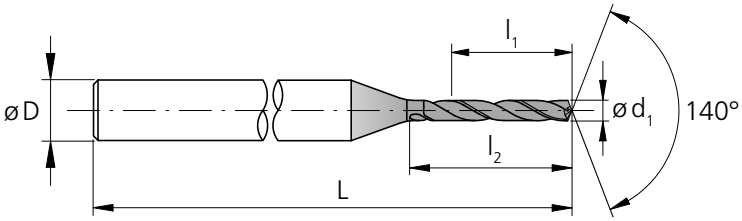
■ Stock item

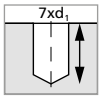
Complementary products

CrazyDrill Pilot p.161
CrazyDrill Crosspilot p.175

CrazyDrill Steel 6 x d / 7 x d

DRILLING WITH EXTERNAL COOLING



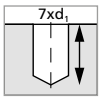


d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0650	1.65	**.455**	11.55	14.7	3	**2.05**	52.0	2.CD.070165.S	■
	.0669	1.70	**.469**	11.90	15.0	3	**2.05**	52.0	2.CD.070170.S	■
	.0689	1.75	**.482**	12.25	15.3	3	**2.05**	52.0	2.CD.070175.S	■
	.0709	1.80	**.496**	12.60	16.3	3	**2.11**	53.5	2.CD.070180.S	■
	.0728	1.85	**.510**	12.95	16.5	3	**2.11**	53.5	2.CD.070185.S	■
	.0748	1.90	**.524**	13.30	16.9	3	**2.11**	53.5	2.CD.070190.S	■
	.0768	1.95	**.537**	13.65	17.1	3	**2.11**	53.5	2.CD.070195.S	■
	.0787	2.00	**.551**	14.00	18.0	4	**2.42**	61.5	2.CD.070200.S	■
	.0807	2.05	**.565**	14.35	18.3	4	**2.42**	61.5	2.CD.070205.S	■
	.0827	2.10	**.579**	14.70	18.7	4	**2.42**	61.5	2.CD.070210.S	■
	.0846	2.15	**.593**	15.05	19.1	4	**2.42**	61.5	2.CD.070215.S	■
	.0866	2.20	**.606**	15.40	20.0	4	**2.48**	63.0	2.CD.070220.S	■
	.0886	2.25	**.620**	15.75	20.3	4	**2.48**	63.0	2.CD.070225.S	■
	.0906	2.30	**.634**	16.10	20.6	4	**2.48**	63.0	2.CD.070230.S	■
	.0925	2.35	**.648**	16.45	20.9	4	**2.48**	63.0	2.CD.070235.S	■
3/32	**.0937**	2.381	**.661**	16.80	21.7	4	**2.54**	64.5	2.CD.070240.S	■
	.0945	2.40	**.661**	16.80	21.7	4	**2.54**	64.5	2.CD.070240.S	■
	.0965	2.45	**.675**	17.15	22.1	4	**2.54**	64.5	2.CD.070245.S	■
	.0984	2.50	**.689**	17.50	22.2	4	**2.54**	64.5	2.CD.070250.S	■
	.1004	2.55	**.703**	17.85	22.6	4	**2.54**	64.5	2.CD.070255.S	■
	.1024	2.60	**.717**	18.20	23.5	4	**2.60**	66.0	2.CD.070260.S	■
	.1043	2.65	**.730**	18.55	23.7	4	**2.60**	66.0	2.CD.070265.S	■
	.1063	2.70	**.744**	18.90	24.0	4	**2.60**	66.0	2.CD.070270.S	■
	.1083	2.75	**.758**	19.25	24.3	4	**2.60**	66.0	2.CD.070275.S	■
	.1102	2.80	**.772**	19.60	25.3	4	**2.66**	67.5	2.CD.070280.S	■
	.1122	2.85	**.785**	19.95	25.5	4	**2.66**	67.5	2.CD.070285.S	■
	.1142	2.90	**.799**	20.30	25.7	4	**2.66**	67.5	2.CD.070290.S	■
	.1161	2.95	**.813**	20.65	25.9	4	**2.66**	67.5	2.CD.070295.S	■
	.1181	3.00	**.827**	21.00	26.2	4	**2.66**	67.5	2.CD.070300.S	■
	.1201	3.05	**.841**	21.35	27.5	4	**2.76**	70.0	2.CD.070305.S	■
	.1220	3.10	**.854**	21.70	27.9	4	**2.76**	70.0	2.CD.070310.S	■
	.1240	3.15	**.868**	22.05	28.4	4	**2.76**	70.0	2.CD.070315.S	■
1/8	**.1250**	3.175	**.882**	22.40	28.8	4	**2.76**	70.0	2.CD.070320.S	■
	.1260	3.20	**.882**	22.40	28.8	4	**2.76**	70.0	2.CD.070320.S	■
	.1280	3.25	**.896**	22.75	29.3	4	**2.76**	70.0	2.CD.070325.S	■
	.1299	3.30	**.909**	23.10	29.7	4	**2.76**	70.0	2.CD.070330.S	■
	.1319	3.35	**.923**	23.45	30.2	4	**2.76**	70.0	2.CD.070335.S	■

■ Stock item

Carbide | 140° | Z2 | eXedur RI/RIP

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00016" 0	+ 0.004 mm 0	+ .00024" + .00004"	+ 0.006 mm + 0.001 mm	+ .00028" + .00004"	+ 0.007 mm + 0.001 mm



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.1339	3.40	.937	23.80	30.6	4	2.76	70.0	2.CD.070340.S	■
	.1358	3.45	.951	24.15	31.1	4	2.95	75.0	2.CD.070345.S	■
	.1378	3.50	.965	24.50	31.5	4	2.95	75.0	2.CD.070350.S	■
	.1398	3.55	.978	24.85	32.0	4	2.95	75.0	2.CD.070355.S	■
	.1417	3.60	.992	25.20	32.4	4	2.95	75.0	2.CD.070360.S	■
	.1437	3.65	1.01	25.55	32.9	4	2.95	75.0	2.CD.070365.S	■
	.1457	3.70	1.02	25.90	33.3	4	2.95	75.0	2.CD.070370.S	■
	.1476	3.75	1.03	26.25	33.8	4	2.95	75.0	2.CD.070375.S	■
	.1496	3.80	1.05	26.60	34.2	4	2.95	75.0	2.CD.070380.S	■
	.1516	3.85	1.06	26.95	34.7	4	2.95	75.0	2.CD.070385.S	■
	.1535	3.90	1.07	27.30	35.1	4	2.95	75.0	2.CD.070390.S	■
	.1555	3.95	1.09	27.65	35.6	4	2.95	75.0	2.CD.070395.S	■
5/32	.1562	3.968	1.10	28.00	36.0	6	3.15	80.0	2.CD.070F532.S	■
	.1575	4.00	1.10	28.00	36.0	6	3.15	80.0	2.CD.070400.S	■
	.1614	4.10	1.13	28.70	36.9	6	3.15	80.0	2.CD.070410.S	■
	.1654	4.20	1.16	29.40	37.8	6	3.15	80.0	2.CD.070420.S	■
	.1693	4.30	1.19	30.10	38.7	6	3.15	80.0	2.CD.070430.S	■
	.1732	4.40	1.21	30.80	39.6	6	3.15	80.0	2.CD.070440.S	■
	.1772	4.50	1.24	31.50	40.5	6	3.35	85.0	2.CD.070450.S	■
	.1811	4.60	1.27	32.20	41.4	6	3.35	85.0	2.CD.070460.S	■
	.1850	4.70	1.30	32.90	42.3	6	3.35	85.0	2.CD.070470.S	■
3/16	.1875	4.762	1.32	33.60	43.2	6	3.35	85.0	2.CD.070F316.S	■
	.1890	4.80	1.32	33.60	43.2	6	3.35	85.0	2.CD.070480.S	■
	.1929	4.90	1.35	34.30	44.1	6	3.35	85.0	2.CD.070490.S	■
	.1969	5.00	1.38	35.00	45.0	6	3.35	85.0	2.CD.070500.S	■
	.2008	5.10	1.41	35.70	45.9	6	3.54	90.0	2.CD.070510.S	■
	.2047	5.20	1.43	36.40	46.8	6	3.54	90.0	2.CD.070520.S	■
	.2087	5.30	1.46	37.10	47.7	6	3.54	90.0	2.CD.070530.S	■
	.2126	5.40	1.49	37.80	48.6	6	3.54	90.0	2.CD.070540.S	■
	.2165	5.50	1.52	38.50	49.5	6	3.54	90.0	2.CD.070550.S	■
7/32	.2189	5.560	1.54	39.20	50.4	6	3.54	90.0	2.CD.070F732.S	■
	.2205	5.60	1.54	39.20	50.4	6	3.54	90.0	2.CD.070560.S	■
	.2244	5.70	1.57	39.90	51.3	6	3.74	95.0	2.CD.070570.S	■
	.2283	5.80	1.60	40.60	52.2	6	3.74	95.0	2.CD.070580.S	■
	.2323	5.90	1.63	41.30	53.1	6	3.74	95.0	2.CD.070590.S	■
	.2362	6.00	1.65	42.00	54.0	6	3.74	95.0	2.CD.070600.S	■
1/4	.2500	6.350	1.75	44.45	57.2	8	3.74	95.0	2.CD.070F14.S	■

■ Stock item

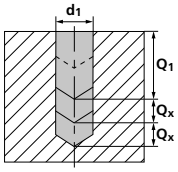
Complementary products

CrazyDrill Pilot p.161
CrazyDrill Crosspilot p.175

CrazyDrill Steel 6 x d / 7 x d

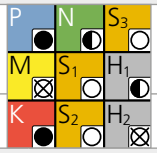
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1 6xd	Q_x 6xd	Q_1 7xd	Q_x 7xd
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 | **394**	6xd1	–	7xd1	–
		1.0401	C15	AISI 1015					
		1.1191	C45E/CK45	AISI 1045					
		1.0044	S275JR	AISI 1020					
		1.0715	11SMn30	AISI 1215					
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	80 | **262**	6xd1	–	7xd1	–
		1.7131	16MnCr5	AISI 5115					
		1.3505	100Cr6	AISI 52100					
		1.7225	42CrMo4	AISI 4140					
		1.2842	90MnCrV8	AISI O2					
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | **197**	6xd1	–	7xd1	–
		1.2436	X210CrW12	AISI D4/D6					
		1.3343	HS6-5-2C	AISI M2 / UNS T11302					
		1.3355	HS18-0-1	AISI T1 / UNS T12001					
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000					
		1.4105	X6CrMoS17	AISI 430F					
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C					
		1.4112	X90CrMoV18	AISI 440B					
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH					
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH					
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304					
		1.4435	X2CrNiMo 18-14-3	AISI 316L					
		1.4441	X2CrNiMo 18-15-3	AISI 316LM					
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L					
K	Cast iron	0.6020	GG20	ASTM 30	150 | **492**	6xd1	–	7xd1	–
		0.6030	GG30	ASTM 40B					
		0.7040	GGG40	ASTM 60-40-18					
		0.7060	GGG60	ASTM 80-60-03					
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	220 | **722**	4xd1	2xd1	4xd1	2xd1
		3.4365	AlZnMgCu1.5	ASTM 7075					
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | **656**	4xd1	2xd1	4xd1	2xd1
		3.2381	GD-AlSi10Mg	UNS A03590					
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	120 | **394**	1.5xd1	1xd1	1.5xd1	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000					
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	150 | **492**	1.5xd1	1xd1	1.5xd1	1xd1
		2.0360	CuZn40 CW509L	UNS C28000					
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	100 | **328**	1.5xd1	1xd1	1.5xd1	1xd1
		2.1020	CuSn6	UNS C51900					
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	100 | **328**	4xd1	2xd1	4xd1	3xd1
		2.0960	CuAl9Mn2	UNS C63200					
S_1	Super alloys	2.4856		Inconel 625	40 | **131**	1xd1	0.25xd1	1xd1	0.25xd1
		2.4668		Inconel 718					
		2.4617	NiMo28	Hastelloy B-2					
		2.4665	NiCr22Fe18Mo	Hastelloy X					
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	40 | **131**	1xd1	0.25xd1	1xd1	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68					
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20 | **66**	1xd1	0.3xd1	1xd1	0.3xd1
		9.9367	TiAl6Nb7	ASTM F1295					
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	30 | **98**	4xd1	0.25xd1	4xd1	0.25xd1
			CrCoMo28	ASTM F1537					
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	30 | **98**	4xd1	1xd1	4xd1	1xd1
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2					

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] **| [IPR]**

Ød1	1/64" 0.4 mm	1/32" 0.8 mm	1.0 mm	1.2 mm	1.25 mm	1/16" 1.5 mm	2.0 mm	3/32" 2.5 mm	1/8" 3.0 mm	5/32" 4.0 mm	3/16" - 7/32" 5.0 mm	1/4" 6.0 mm
	.016"	**.032"**	**.039"**	**.047"**	**.049"**	**.059"**	**.079"**	**.098"**	**.118"**	**.158"**	**.197"**	**.236"**
	f	**f**	**f**	**f**	**f**	**f**	**f**	**f**	**f**	**f**	**f**	**f**
	0.040 | **.0016**	0.100 | **.0039**	0.120 | **.0047**	0.140 | **.0055**	0.150 | **.0059**	0.200 | **.0079**	0.250 | **.0098**	0.270 | **.0106**	0.350 | **.0138**	0.370 | **.0146**	0.390 | **.0154**	0.400 | **.0157**
	0.015 | **.0006**	0.030 | **.0012**	0.080 | **.0031**	0.110 | **.0043**	0.120 | **.0047**	0.160 | **.0063**	0.200 | **.0079**	0.230 | **.0091**	0.250 | **.0098**	0.270 | **.0106**	0.300 | **.0118**	0.320 | **.0126**
	0.020 | **.0008**	0.070 | **.0028**	0.120 | **.0047**	0.140 | **.0055**	0.150 | **.0059**	0.200 | **.0079**	0.250 | **.0098**	0.280 | **.0110**	0.300 | **.0118**	0.320 | **.0126**	0.340 | **.0134**	0.350 | **.0138**
	0.040 | **.0016**	0.150 | **.0059**	0.200 | **.0079**	0.240 | **.0094**	0.250 | **.0098**	0.300 | **.0118**	0.350 | **.0138**	0.400 | **.0157**	0.450 | **.0177**	0.470 | **.0185**	0.490 | **.0193**	0.500 | **.0197**
	0.045 | **.0018**	0.060 | **.0024**	0.080 | **.0031**	0.090 | **.0035**	0.095 | **.0037**	0.110 | **.0043**	0.130 | **.0051**	0.150 | **.0059**	0.180 | **.0071**	0.190 | **.0075**	0.210 | **.0083**	0.250 | **.0098**
	0.040 | **.0016**	0.055 | **.0022**	0.075 | **.0030**	0.080 | **.0031**	0.085 | **.0033**	0.100 | **.0039**	0.120 | **.0047**	0.140 | **.0055**	0.170 | **.0067**	0.180 | **.0071**	0.200 | **.0079**	0.240 | **.0094**
	0.030 | **.0012**	0.050 | **.0020**	0.060 | **.0024**	0.063 | **.0025**	0.065 | **.0026**	0.075 | **.0030**	0.080 | **.0031**	0.095 | **.0037**	0.110 | **.0043**	0.130 | **.0051**	0.160 | **.0063**	0.200 | **.0079**
	0.030 | **.0012**	0.050 | **.0020**	0.065 | **.0026**	0.068 | **.0027**	0.070 | **.0028**	0.075 | **.0030**	0.090 | **.0035**	0.110 | **.0043**	0.140 | **.0055**	0.160 | **.0063**	0.200 | **.0079**	0.220 | **.0087**
	0.035 | **.0014**	0.055 | **.0022**	0.070 | **.0028**	0.075 | **.0030**	0.080 | **.0031**	0.090 | **.0035**	0.110 | **.0043**	0.130 | **.0051**	0.150 | **.0059**	0.180 | **.0071**	0.220 | **.0087**	0.240 | **.0094**
	0.015 | **.0006**	0.025 | **.0010**	0.035 | **.0014**	0.045 | **.0018**	0.050 | **.0020**	0.050 | **.0020**	0.065 | **.0026**	0.085 | **.0033**	0.100 | **.0039**	0.120 | **.0047**	0.150 | **.0059**	0.200 | **.0079**
	0.002 | **.0001**	0.004 | **.0002**	0.005 | **.0002**	0.006 | **.0002**	0.006 | **.0002**	0.007 | **.0003**	0.010 | **.0004**	0.012 | **.0005**	0.015 | **.0006**	0.020 | **.0008**	0.025 | **.0010**	0.030 | **.0012**
	0.012 | **.0005**	0.024 | **.0009**	0.030 | **.0012**	0.035 | **.0014**	0.040 | **.0016**	0.045 | **.0018**	0.060 | **.0024**	0.075 | **.0030**	0.090 | **.0035**	0.120 | **.0047**	0.150 | **.0059**	0.180 | **.0071**
	0.020 | **.0008**	0.030 | **.0012**	0.040 | **.0016**	0.045 | **.0018**	0.050 | **.0020**	0.055 | **.0022**	0.070 | **.0028**	0.080 | **.0031**	0.100 | **.0039**	0.140 | **.0055**	0.160 | **.0063**	0.200 | **.0079**
	0.006 | **.0002**	0.012 | **.0005**	0.015 | **.0006**	0.018 | **.0007**	0.020 | **.0008**	0.025 | **.0010**	0.030 | **.0012**	0.035 | **.0014**	0.045 | **.0018**	0.060 | **.0024**	0.075 | **.0030**	0.090 | **.0035**
	0.005 | **.0002**	0.007 | **.0003**	0.010 | **.0004**	0.011 | **.0004**	0.011 | **.0004**	0.012 | **.0005**	0.015 | **.0006**	0.020 | **.0008**	0.025 | **.0010**	0.030 | **.0012**	0.035 | **.0014**	0.040 | **.0016**



Drilling process CrazyDrill Steel

ACCURATE AND QUICK DRILLING UP TO 7 X D

Coolant type, pressure, filtration and flowrate

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the cooling medium is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical information".





CrazyDrill Steel up to 4 x d

Due to the excellent self-centering of CrazyDrill Steel, centering or pilot drilling is not necessary on regular and straight surfaces up to a maximal drilling depth of 4 x d.

CrazyDrill Steel 6 x d / 7 x d

Due to the excellent self-centering of CrazyDrill Steel, centering or pilot drilling is not necessary for drilling diameters over Ø.032" (0.8 mm) on regular and straight surfaces up to a maximal drilling depth of 7 x d.

Pilot drilling and drilling

Higher requirements: On irregular, rough or inclined surfaces or for highest position accuracy and in general for drilling until 6 x d under diameter Ø.032" (0.8 mm), Mikron Tool recommends:

- **CrazyDrill Pilot** for pilot drilling
- **CrazyDrill Crosspilot** for pilot drilling on inclined surfaces

Pilot drilling with CrazyDrill Pilot is the perfect starting point for accurate drilling (position and alignment accuracy) and a stable machining process. This is also valid for the pilot drill CrazyDrill Crosspilot on inclined surfaces.

The quality of drilling (position and alignment accuracy, no measurable transition from pilot hole to follow-up hole) and a stable machining process are guaranteed by means of a predetermined tool.



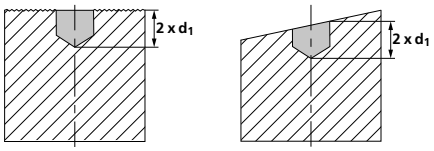


Drilling process CrazyDrill Steel

DRILLING IN ONE STEP (DEPENDING ON MATERIAL, SEE CUTTING DATA CHART)

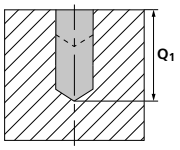
1 | PILOT DRILLING

- CrazyDrill Pilot (irregular or rough surfaces) or CrazyDrill Crosspilot (inclined surfaces).

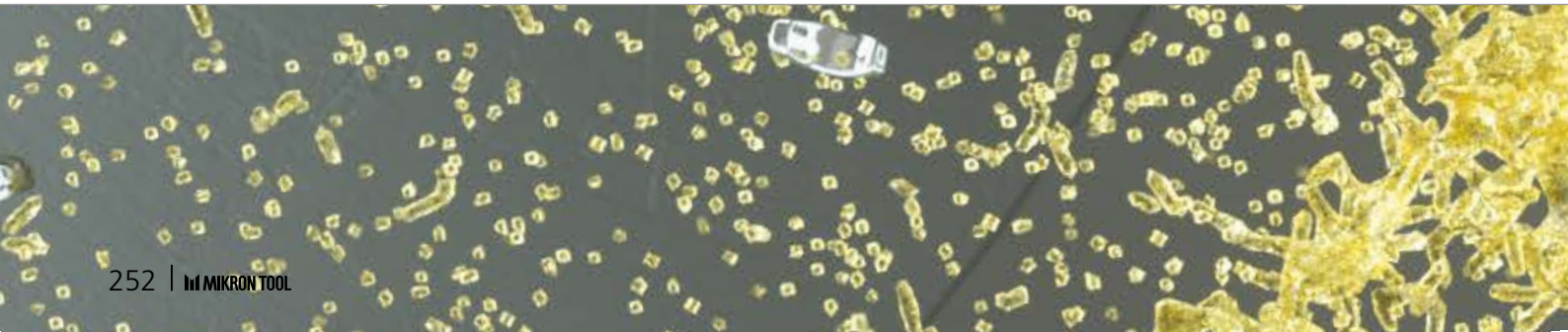


2 | DRILLING

- CrazyDrill Steel up to maximum drilling depth Q_1 in one step.



Note:
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

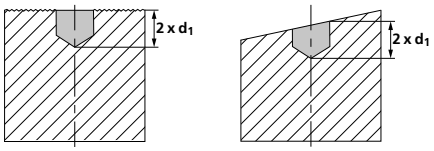


DRILLING AS PER DIN 66025 / PAL (DEPENDING ON MATERIAL, SEE CUTTING DATA CHART)

G83 deep-drilling cycle with chip break and chip removal (pecks)
Q = depth of the respective peck

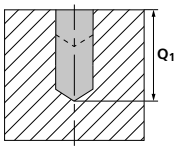
1 | PILOT DRILLING

- With CrazyDrill Pilot (irregular or rough surfaces) or CrazyDrill Crosspilot (inclined surfaces).

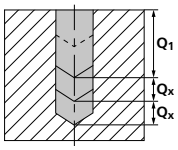


2 | DRILLING

- Drilling with CrazyDrill Steel up to maximum drilling depth Q_1 in one step, with subsequent chip removal.

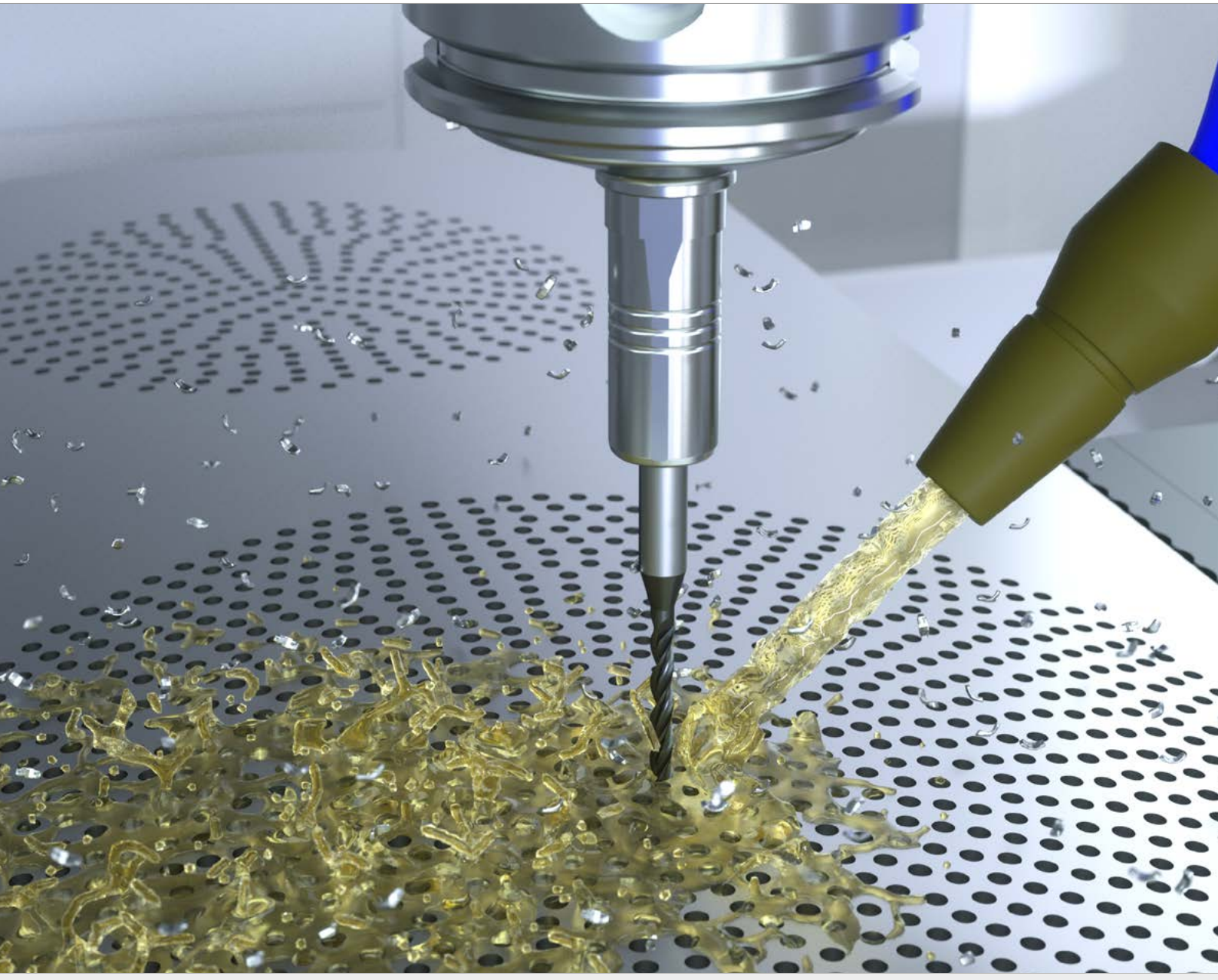


- Further pecks Q_X according to cutting data table, with subsequent chip removal.



Note:
Drill can be retracted completely from the hole between pecks.
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

CrazyDrill Alu



CRAZYDRILL Alu

SPEED, PRECISION AND TOOL LIFE: THREE QUALITIES IN ONE DRILL



Mikron Tool offers with CrazyDrill Alu a program of small coated drills capable of highest performance in all aluminum alloys. The application range covers hole diameters of .016" up to .118" (0.4 mm to 3.0 mm) and depth of cut up to 10 x d.

This solid carbide drill impresses mostly with its extraordinary high drilling speed and tool life. Due to the special coating, it affords a considerably longer tool life not only in pure aluminum but also in aluminum alloys with high silicon content.

With a three flutes and a reduced chisel geometry, self-centering upon tool entry is guaranteed. Spot or pilot drilling are not necessary. Highest hole straightness, roundness and surface quality are guaranteed.

CRAZYDRILL by Mikron Tool Alu

Highest degree of performance in Alu

THREE FLUTES FOR PERFECT SELF-CENTERING

Mikron Tool offers with CrazyDrill Alu a program of small coated drills capable of highest performance in all aluminum alloys. The application range covers hole diameters of .016" up to .118" (0.4 mm to 3.0 mm) and depth of cut up to 10 x d.

- CrazyDrill Alu, depth of cut available in 5 x d and 10 x d.

5 x d

- External cooling
- Coated



Page 261

10 x d

- External cooling
- Coated



Page 265

1 | SHAFT
The robust carbide shaft guarantees a high degree of concentric accuracy and reliability.

2 | SOLID CARBIDE
The use of latest generation carbide grades allows highest machining speed and feed.

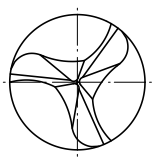
3 | THREE FLUTES WITH REDUCED CHISEL GEOMETRY
Allows stable self-centering, spot drilling or pilot drilling are not necessary.

4 | COATING
The DLC (diamond-like carbon) coating protects the tool from premature wear and guarantees a longer tool life.

5 | HELICAL FLUTE GEOMETRY
Provides optimal chip evacuation, only limited pecking is needed on drilling depths up to 10 x d.

6 | TIP ANGLE OF 130°
Burr free drilling is assured by the 130° tip angle and sharp cutting edges. Highest drilling accuracy is guaranteed.

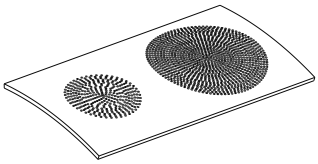
Drill tip



Benefits and applications

REPEAT ACCURACY AND PRODUCTIVITY

- **SHORT MACHINING TIME** | due to highest cutting parameters
- **LONG TOOL LIFE** | due to the high performance DLC coating
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to the high quality
- **HIGH DEGREE OF PRECISION** | due to small tolerances
- **LOW PRODUCTION COSTS** | no pilot drilling or centering needed



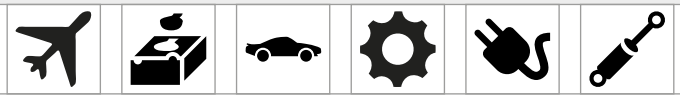
COMPONENT
Speaker cover

MATERIAL
AlMgSi 0.5 / 3.3206 / ASTM B221

MACHINING
- 2'000 holes
- d = 1.2 mm **| .047"**
- Drilling depth 5 mm **| .197"**

DRILLING TOOL
Mikron Tool - CrazyDrill Alu - 5 x d

DATA	MIKRON TOOL
Tool type	CrazyDrill Alu - Carbide - Coated - External cooling
Item number	2.CD.050120.A
Cutting data	v_c = 150 m/min **| 492 SFM** f = 0.07 mm/rev **| .0028 IPR** Q_1 = 5 mm **| .197"**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Aerospace industry	Bracket to aircraft body
Mold making	Drilling of blind holes for various cast aluminum parts
Automotive industry	Component to gearbox
Mechanical engineering	Filter plate
Electronics / Electrics	Contact pin
Hydraulics / Pneumatics	Valve body

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group N Aluminium alloy wrought and cast	3.2315	AlMgSi 1	6351

CrazyDrill Alu 5 x d

DRILLING WITH FLOOD COOLING



This small solid carbide drill specially developed for aluminum, is designed for cast and wrought aluminum alloys. Drilling depths up to 5 x d will not require any centering due to its three flutes and reduced chisel geometry. The tool is self-centering providing a straight hole, best roundness and excellent surface quality. Spot drilling or starter drilling is only recommended on irregular, rough or inclined surfaces. Most notably the drill impresses with its extraordinary high drilling parameters and long tool life. For details see "drilling process".

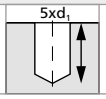
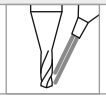
Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

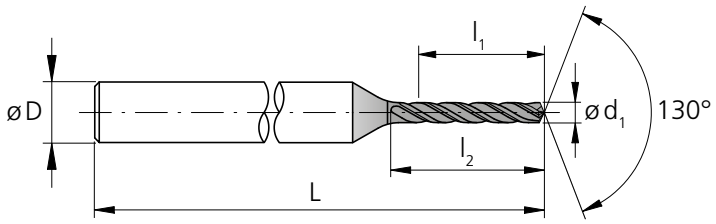
Please note

You couldn't find your suitable version of the CrazyDrill Alu (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

Carbide			Z3		

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0



d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.016	0.40	**.079**	2.00	2.9	3	**1.69**	43.0	2.CD.050040.A	■
.018	0.45	**.089**	2.25	3.3	3	**1.69**	43.0	2.CD.050045.A	■
.020	0.50	**.098**	2.50	3.6	3	**1.69**	43.0	2.CD.050050.A	■
.022	0.55	**.108**	2.75	4.0	3	**1.69**	43.0	2.CD.050055.A	■
.024	0.60	**.118**	3.00	4.3	3	**1.69**	43.0	2.CD.050060.A	■
.026	0.65	**.128**	3.25	4.7	3	**1.69**	43.0	2.CD.050065.A	■
.028	0.70	**.138**	3.50	5.1	3	**1.77**	45.0	2.CD.050070.A	■
.030	0.75	**.148**	3.75	5.4	3	**1.77**	45.0	2.CD.050075.A	■
.031	0.80	**.157**	4.00	5.8	3	**1.77**	45.0	2.CD.050080.A	■
.033	0.85	**.167**	4.25	6.1	3	**1.77**	45.0	2.CD.050085.A	■
.035	0.90	**.177**	4.50	6.5	3	**1.77**	45.0	2.CD.050090.A	■
.037	0.95	**.187**	4.75	6.9	3	**1.81**	46.0	2.CD.050095.A	■
.039	1.00	**.197**	5.00	7.2	3	**1.81**	46.0	2.CD.050100.A	■
.041	1.05	**.207**	5.25	7.6	3	**1.81**	46.0	2.CD.050105.A	■
.043	1.10	**.217**	5.50	8.0	3	**1.81**	46.0	2.CD.050110.A	■
.045	1.15	**.226**	5.75	8.3	3	**1.89**	48.0	2.CD.050115.A	■
.047	1.20	**.236**	6.00	8.7	3	**1.89**	48.0	2.CD.050120.A	■
.049	1.25	**.246**	6.25	9.0	3	**1.89**	48.0	2.CD.050125.A	■
.051	1.30	**.256**	6.50	9.4	3	**1.89**	48.0	2.CD.050130.A	■
.053	1.35	**.266**	6.75	9.8	3	**1.89**	48.0	2.CD.050135.A	■
.055	1.40	**.276**	7.00	10.1	3	**1.89**	48.0	2.CD.050140.A	■
.057	1.45	**.285**	7.25	10.5	3	**1.93**	49.0	2.CD.050145.A	■
.059	1.50	**.295**	7.50	10.9	3	**1.93**	49.0	2.CD.050150.A	■
.061	1.55	**.305**	7.75	11.2	3	**1.99**	50.5	2.CD.050155.A	■
.063	1.60	**.315**	8.00	11.6	3	**1.99**	50.5	2.CD.050160.A	■
.065	1.65	**.325**	8.25	11.9	3	**1.99**	50.5	2.CD.050165.A	■
.067	1.70	**.335**	8.50	12.3	3	**1.99**	50.5	2.CD.050170.A	■

d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.069	1.75	**.344**	8.75	12.7	3	**2.05**	52.0	2.CD.050175.A	■
.071	1.80	**.354**	9.00	13.0	3	**2.05**	52.0	2.CD.050180.A	■
.073	1.85	**.364**	9.25	13.4	3	**2.05**	52.0	2.CD.050185.A	■
.075	1.90	**.374**	9.50	13.7	3	**2.11**	53.5	2.CD.050190.A	■
.077	1.95	**.384**	9.75	14.1	3	**2.11**	53.5	2.CD.050195.A	■
.079	2.00	**.394**	10.00	14.5	4	**2.36**	60.0	2.CD.050200.A	■
.081	2.05	**.404**	10.25	14.8	4	**2.36**	60.0	2.CD.050205.A	■
.083	2.10	**.413**	10.50	15.2	4	**2.36**	60.0	2.CD.050210.A	■
.085	2.15	**.423**	10.75	15.6	4	**2.36**	60.0	2.CD.050215.A	■
.087	2.20	**.433**	11.00	15.9	4	**2.42**	61.5	2.CD.050220.A	■
.089	2.25	**.443**	11.25	16.3	4	**2.42**	61.5	2.CD.050225.A	■
.091	2.30	**.453**	11.50	16.6	4	**2.42**	61.5	2.CD.050230.A	■
.093	2.35	**.463**	11.75	17.0	4	**2.42**	61.5	2.CD.050235.A	■
.094	2.40	**.472**	12.00	17.4	4	**2.44**	62.0	2.CD.050240.A	■
.096	2.45	**.482**	12.25	17.7	4	**2.44**	62.0	2.CD.050245.A	■
.098	2.50	**.492**	12.50	18.1	4	**2.44**	62.0	2.CD.050250.A	■
.100	2.55	**.502**	12.75	18.4	4	**2.48**	63.0	2.CD.050255.A	■
.102	2.60	**.512**	13.00	18.8	4	**2.48**	63.0	2.CD.050260.A	■
.104	2.65	**.522**	13.25	19.2	4	**2.48**	63.0	2.CD.050265.A	■
.106	2.70	**.531**	13.50	19.5	4	**2.48**	63.0	2.CD.050270.A	■
.108	2.75	**.541**	13.75	19.9	4	**2.54**	64.5	2.CD.050275.A	■
.110	2.80	**.551**	14.00	20.3	4	**2.54**	64.5	2.CD.050280.A	■
.112	2.85	**.561**	14.25	20.6	4	**2.54**	64.5	2.CD.050285.A	■
.114	2.90	**.571**	14.50	21.0	4	**2.56**	65.0	2.CD.050290.A	■
.116	2.95	**.581**	14.75	21.3	4	**2.56**	65.0	2.CD.050295.A	■
.118	3.00	**.591**	15.00	21.7	4	**2.56**	65.0	2.CD.050300.A	■

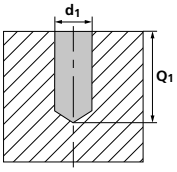
■ Stock item

Complementary products	
CrazyDrill Twicenter	p.85
CrazyDrill Pilot	p.161
CrazyDrill Crosspilot	p.175

CrazyDrill Alu 5 x d

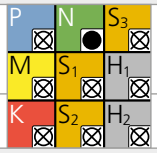
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010		
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310		
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2		
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30		
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	300 | **984**	5xd1
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | **656**	5xd1
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100		
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500		
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000		
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1	0.5 mm | **.020"**	1.0 mm | **.039"**	1.5 mm | **.059"**	2.0 mm | **.079"**	2.5 mm | **.098"**	3.0 mm | **.118"**
	f	**f**	**f**	**f**	**f**	**f**
	0.03 | **.0012**	0.05 | **.0020**	0.10 | **.0039**	0.20 | **.0079**	0.25 | **.0098**	0.30 | **.0118**
	0.10 | **.0039**	0.20 | **.0079**	0.25 | **.0098**	0.30 | **.0118**	0.40 | **.0157**	0.50 | **.0197**

CrazyDrill Alu 10 x d

DRILLING WITH FLOOD COOLING



This small solid carbide drill specially developed for aluminum, is designed for cast and wrought aluminum alloys. Drilling depths up to 10 x d will not require any centering due to its three flutes and reduced chisel geometry. The tool is self-centering providing a straight hole, best roundness and excellent surface quality. Spot drilling or starter drilling is only recommended on irregular, rough or inclined surfaces. Most notably the drill impresses with its extraordinary high drilling parameters and long tool life. For details see "drilling process".

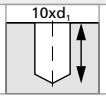
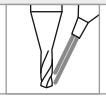
Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

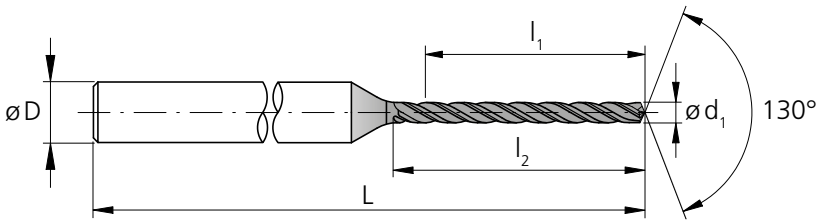
Please note

You couldn't find your suitable version of the CrazyDrill Alu (diameter, length, cutting direction…)?
Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

Carbide			Z3		

Ød_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0



d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.016	0.40	**.157**	4.00	4.9	3	**1.77**	45.0	2.CD.100040.A	■
.018	0.45	**.177**	4.50	5.5	3	**1.77**	45.0	2.CD.100045.A	■
.020	0.50	**.197**	5.00	6.1	3	**1.77**	45.0	2.CD.100050.A	■
.022	0.55	**.217**	5.50	6.7	3	**1.77**	45.0	2.CD.100055.A	■
.024	0.60	**.236**	6.00	7.3	3	**1.85**	47.0	2.CD.100060.A	■
.026	0.65	**.256**	6.50	8.0	3	**1.85**	47.0	2.CD.100065.A	■
.028	0.70	**.276**	7.00	8.6	3	**1.85**	47.0	2.CD.100070.A	■
.030	0.75	**.295**	7.50	9.2	3	**1.93**	49.0	2.CD.100075.A	■
.031	0.80	**.315**	8.00	9.8	3	**1.93**	49.0	2.CD.100080.A	■
.033	0.85	**.335**	8.50	10.4	3	**1.93**	49.0	2.CD.100085.A	■
.035	0.90	**.354**	9.00	11.0	3	**1.93**	49.0	2.CD.100090.A	■
.037	0.95	**.374**	9.50	11.6	3	**1.99**	50.5	2.CD.100095.A	■
.039	1.00	**.394**	10.00	12.2	3	**1.99**	50.5	2.CD.100100.A	■
.041	1.05	**.413**	10.50	12.8	3	**2.05**	52.0	2.CD.100105.A	■
.043	1.10	**.433**	11.00	13.5	3	**2.05**	52.0	2.CD.100110.A	■
.045	1.15	**.453**	11.50	14.1	3	**2.11**	53.5	2.CD.100115.A	■
.047	1.20	**.472**	12.00	14.7	3	**2.11**	53.5	2.CD.100120.A	■
.049	1.25	**.492**	12.50	15.3	3	**2.11**	53.5	2.CD.100125.A	■
.051	1.30	**.512**	13.00	15.9	3	**2.19**	55.5	2.CD.100130.A	■
.053	1.35	**.531**	13.50	16.5	3	**2.19**	55.5	2.CD.100135.A	■
.055	1.40	**.551**	14.00	17.1	3	**2.19**	55.5	2.CD.100140.A	■
.057	1.45	**.571**	14.50	17.7	3	**2.19**	55.5	2.CD.100145.A	■
.059	1.50	**.591**	15.00	18.4	4	**2.54**	64.5	2.CD.100150.A	■
.061	1.55	**.610**	15.50	19.0	4	**2.54**	64.5	2.CD.100155.A	■
.063	1.60	**.630**	16.00	19.6	4	**2.54**	64.5	2.CD.100160.A	■
.065	1.65	**.650**	16.50	20.2	4	**2.54**	64.5	2.CD.100165.A	■
.067	1.70	**.669**	17.00	20.8	4	**2.64**	67.0	2.CD.100170.A	■

d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.069	1.75	**.689**	17.50	21.4	4	**2.64**	67.0	2.CD.100175.A	■
.071	1.80	**.709**	18.00	22.0	4	**2.64**	67.0	2.CD.100180.A	■
.073	1.85	**.728**	18.50	22.6	4	**2.70**	68.5	2.CD.100185.A	■
.075	1.90	**.748**	19.00	23.2	4	**2.70**	68.5	2.CD.100190.A	■
.077	1.95	**.768**	19.50	23.9	4	**2.70**	68.5	2.CD.100195.A	■
.079	2.00	**.787**	20.00	24.5	4	**2.76**	70.0	2.CD.100200.A	■
.081	2.05	**.807**	20.50	25.1	4	**2.76**	70.0	2.CD.100205.A	■
.083	2.10	**.827**	21.00	25.7	4	**2.76**	70.0	2.CD.100210.A	■
.085	2.15	**.846**	21.50	26.3	4	**2.83**	72.0	2.CD.100215.A	■
.087	2.20	**.866**	22.00	26.9	4	**2.83**	72.0	2.CD.100220.A	■
.089	2.25	**.886**	22.50	27.5	4	**2.83**	72.0	2.CD.100225.A	■
.091	2.30	**.906**	23.00	28.1	4	**2.89**	73.5	2.CD.100230.A	■
.093	2.35	**.925**	23.50	28.7	4	**2.89**	73.5	2.CD.100235.A	■
.094	2.40	**.945**	24.00	29.4	4	**2.89**	73.5	2.CD.100240.A	■
.096	2.45	**.965**	24.50	30.0	4	**2.95**	75.0	2.CD.100245.A	■
.098	2.50	**.984**	25.00	30.6	4	**2.95**	75.0	2.CD.100250.A	■
.100	2.55	**1.00**	25.50	31.2	4	**2.95**	75.0	2.CD.100255.A	■
.102	2.60	**1.02**	26.00	31.8	4	**3.01**	76.5	2.CD.100260.A	■
.104	2.65	**1.04**	26.50	32.4	4	**3.01**	76.5	2.CD.100265.A	■
.106	2.70	**1.06**	27.00	33.0	4	**3.01**	76.5	2.CD.100270.A	■
.108	2.75	**1.08**	27.50	33.6	4	**3.07**	78.0	2.CD.100275.A	■
.110	2.80	**1.10**	28.00	34.3	4	**3.07**	78.0	2.CD.100280.A	■
.112	2.85	**1.12**	28.50	34.9	4	**3.07**	78.0	2.CD.100285.A	■
.114	2.90	**1.14**	29.00	35.5	4	**3.15**	80.0	2.CD.100290.A	■
.116	2.95	**1.16**	29.50	36.1	4	**3.15**	80.0	2.CD.100295.A	■
.118	3.00	**1.18**	30.00	36.7	4	**3.15**	80.0	2.CD.100300.A	■

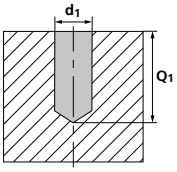
■ Stock item

Complementary products	
CrazyDrill Twicenter	p.85
CrazyDrill Pilot	p.161
CrazyDrill Crosspilot	p.175

CrazyDrill Alu 10 x d

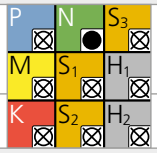
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010			
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310			
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2			
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000			
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C			
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304			
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30			
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	300 | **984**	5xd1	1xd1
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | **656**	5xd1	1xd1
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100			
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400			
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500			
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000			
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67			
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136			
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25			
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1			
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1

0.5 mm | **.020"**	1.0 mm | **.039"**	1.5 mm | **.059"**	2.0 mm | **.079"**	2.5 mm | **.098"**	3.0 mm | **.118"**
f	**f**	**f**	**f**	**f**	**f**
0.03 | **.0012**	0.04 | **.0016**	0.10 | **.0039**	0.20 | **.0079**	0.25 | **.0098**	0.30 | **.0118**
0.07 | **.0028**	0.10 | **.0039**	0.15 | **.0059**	0.25 | **.0098**	0.30 | **.0118**	0.40 | **.0157**



Drilling process CrazyDrill Alu

ACCURATE AND QUICK DRILLING UP TO 10 X D

Coolant type, pressure and filtration

For best results, Mikron Tool recommends the use of cutting oil as coolant. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used as well.

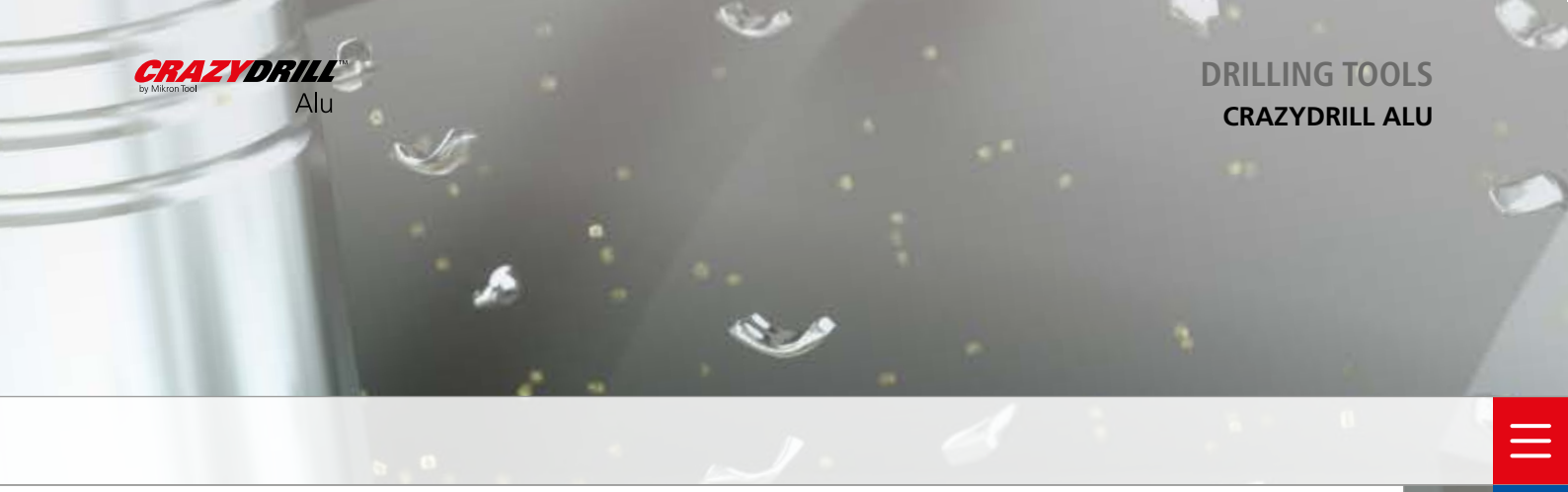
It is necessary that the coolant is well directed to the drill tip, thus cooling and lubricating the drill perfectly and flushing chips.

Flood coolant requires no specific parameters regarding filtration and coolant pressure.

Tool holders

For detailed indications on tool holders see chapter "Technical information".





CrazyDrill Alu up to 5 x d / 10 x d

Due to the excellent self-centering of CrazyDrill Alu, spot drilling or pilot drilling is not necessary on even and flat surfaces up to a maximum drilling depth of 10 x d.

Centering, pilot drilling and drilling

Mikron Tool requirements for rough or inclined surfaces:

- **CrazyDrill Twicenter** for centering
- **CrazyDrill Pilot** for pilot drilling
- **CrazyDrill Crosspilot** for pilot drilling on inclined surfaces

Centering with CrazyDrill Twicenter or pilot drilling with CrazyDrill Pilot is the perfect start for accurate drilling (position and alignment accuracy) and a consistent machining process. This is also valid for CrazyDrill Crosspilot on inclined surfaces.

The quality of drilling (position and alignment accuracy, no measurable transition from pilot hole to the following drilling steps) and a stable machining process is guaranteed by carefully determined tool tolerances.



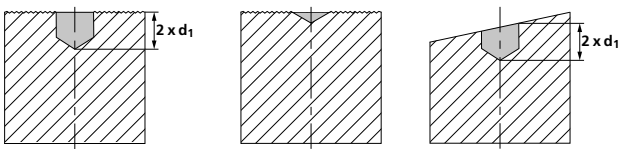


Drilling process CrazyDrill Alu

ONE STEP DRILLING UP TO 5 X D

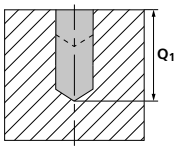
1 | PILOT DRILLING

- With CrazyDrill Pilot or CrazyDrill Twicenter (irregular surfaces) or CrazyDrill Crosspilot (inclined surfaces).

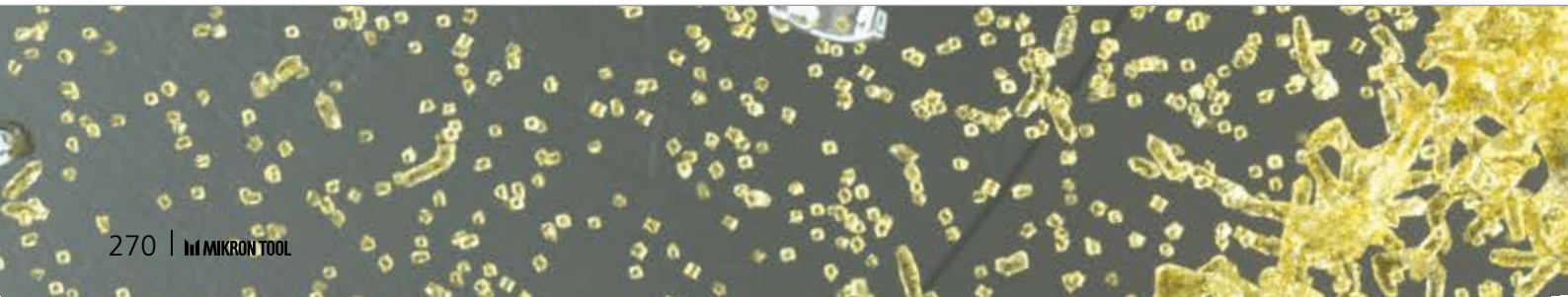


2 | DRILLING

- With CrazyDrill Alu at recommended cutting speed and feet rate in one step.



Note:
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

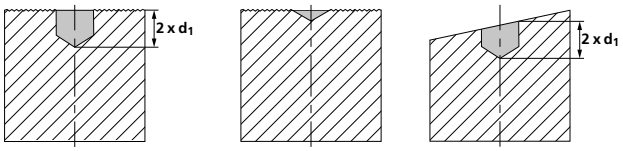


DRILLING UP TO 10 X D AS PER DIN 66025 / PAL

G83 deep-drilling cycle with chip break and chip removal (pecks)
Q = depth of the respective peck

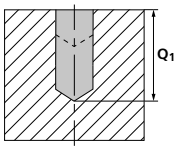
1 | PILOT DRILLING

- With CrazyDrill Pilot or CrazyDrill Twicenter (irregular surfaces) or CrazyDrill Crosspilot (inclined surfaces).

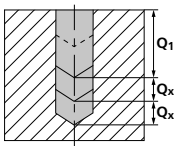


2 | DRILLING

- First step Q_1 with CrazyDrill Alu to maximum drilling depth Q1 in one step, followed by peck to remove chips.



- Additional pecks Q_X as per cutting data chart, afterwards followed by peck to remove chips.



Note:
Drill can be retracted completely from the hole between pecks. However if vibrations occur, we recommend that the drill is not retracted completely from the hole.
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

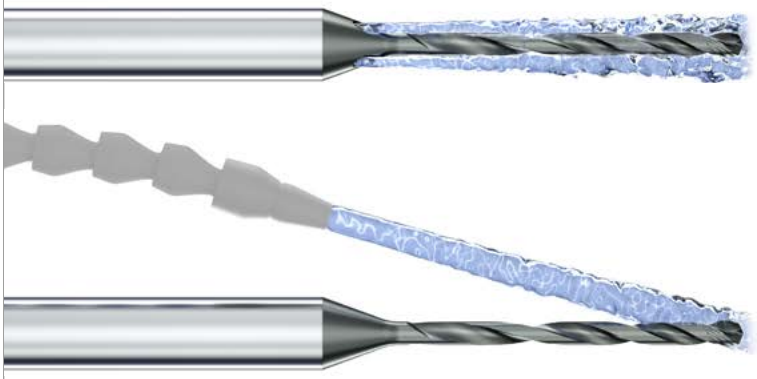
PATENTED

CrazyDrill SST-Inox



CRAZYDRILL SST-Inox

HIGH PROCESS RELIABILITY WITH PATENTED GEOMETRY



With CrazyDrill SST-Inox Mikron Tool offers two exclusive drill types for drilling in stainless steel up to 12 x d in the diameter range of .008" to .079" (0.2 to 2.0 mm).

Both variants of this drill meet the challenge very well for machining of stainless steel, chromium-cobalt alloys or heat resistant steel very well. Their geometry differs significantly from other products available in the market today and guarantees short machining time and process reliability. Cutting parameters are increased with the efficient through-tool cooling.

CRAZYDRILL by Mikron Tool SST-Inox

PATENTED

Revolutionary: Drilling of stainless steel and Co.

2 SOLUTIONS FOR STAINLESS, ACID-RESISTANT AND HEAT-RESISTANT STEELS

With CrazyDrill SST-Inox Mikron Tool offers two exclusive drill types for drilling in stainless steel up to 12 x d in the diameter range of .008" to .079" (0.2 to 2.0 mm).

- CrazyDrill SST-Inox IK, drilling depth 8 x d / 12 x d, integrated cooling.
- CrazyDrill SST-Inox IN, drilling depth 8 x d / 12 x d, external cooling.

Type IN

- External cooling
- Coated



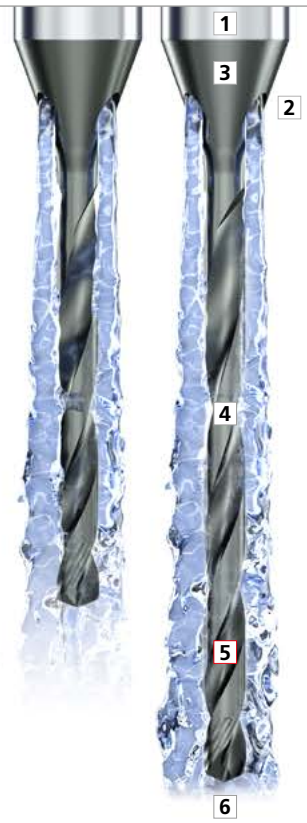


Page 283

Type IK

- Integrated cooling
- Coated





Page 279

1 | SHAFT
The robust carbide shaft allows stable drilling without vibrations.

2 | NEW COOLING CONCEPT
The integrated coolant through the shank provides efficient cooling to the drill tip. The result is a reliable process and an increased productivity.

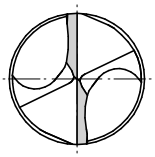
3 | CARBIDE
The carbide especially developed for CrazyDrill SST-Inox fulfills perfectly all requirements for the machining of stainless and heat resistant steel.

4 | COATING
The especially developed high-performance coating eXedur RIP is abrasion and heat resistant. It prevents build up material and supports a smooth chip removal. The result is a long tool life.

5 | DIGRESSIVE FLUTE
The newest patented digressive flute technology guarantees a quick chip evacuation and a high stiffness.

6 | CUTTING GEOMETRY
The drill point geometry is especially developed for stainless and acid resistant steels:
- high cutting edge stability
- short chips
- self-centering

Drill tip

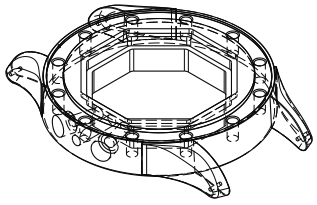


CRAZYDRILL by Mikron Tool SST- Inox

Benefits and applications

FOR MORE PERFORMANCE IN STAINLESS, HEAT AND ACID RESISTANT STEELS

- **SHORT MACHINING TIME** | up to 10 times faster
- **LONG TOOL LIFE** | up to 15 times longer
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to excellent chip evacuation
- **HIGH DEGREE OF PRECISION** | due to small tolerances
- **LOW PRODUCTION COSTS** | quick and reliable processes



COMPONENT
Watch housing

MATERIAL
X2CrNiMo 18-14-3 / 1.4435 / AISI 316L

MACHINING
- Drilling
- d = 0.6 mm **| .024"**
- Drilling depth 3 mm **| .118"**

DRILLING TOOL
Mikron Tool - CrazyDrill SST-Inox IK - 8 x d

DATA	MIKRON TOOL
Tool type	CrazyDrill SST-Inox - Carbide - Coated - Integrated cooling
Item number	2.CD.080060.IK
Cutting data	v_c = 40 m/min **| 131 SFM** f = 0.025 mm/rev **| .00098 IPR** Q_1 = 1.2 mm **| .047"** Q_x = 0.9 mm **| .035"**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Dental implants
Aerospace industry	Engine parts Spherical joint
Medical technology	Component for endoscope
Automotive industry	Components for gasoline direct injection
Mechanical engineering	Locking bolt
Watches	Watch housing
Hydraulics / Pneumatics	Hydraulic valve
Electronics / Electrics	Neon Pin
Food industry	Nozzle
Power industry	Blade

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4542	X5CrNiCuNb 16-4	630
	1.4305	X8CrNiS 18-9	303
	1.4435	X2CrNiMo 18-14-3	316L
Group N Copper and Brass lead free	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25

CRAZYDRILL by Mikron Tool SST- Inox

Type IK 8 x d / 12 x d

DRILLING WITH INTEGRATED COOLING



8xd

12xd

CrazyDrill SST-Inox Type IK 8 x d / 12 x d has 3 - 4 cooling channels going through the shaft which guarantee an efficient coolant jet. This jet keeps the temperature under control and flushes the chips from the hole, the result is a better tool life. Cutting parameters of this drill type increase 20 – 30 % in comparison to externally cooled variants.

The geometry of this solid carbide drill differs significantly from today's standards. The polished tip section with small transverse cutting reduces the feed force and gives the drill good centering properties. The special tip geometry produces short chips even in materials where long chips are the norm and avoids cutting edge breakages. The digressive helical flute is responsible for good chip removal.

CrazyDrill SST-Inox IK 8 x d can be used on regular and straight surfaces without a centering or pilot hole, because of the high degree of self-centering capability.

Mikron Tool recommends:

- **Variant IK 8 x d** - Only for higher requirements: For high-precision position accuracy or irregular surfaces use the centering drill CrazyDrill Twicenter respectively the pilot drill CrazyDrill Pilot SST-Inox or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.
- **Variant IK 12 x d** - Use of the centering drill CrazyDrill Twicenter respectively the pilot drill CrazyDrill Pilot SST-Inox or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

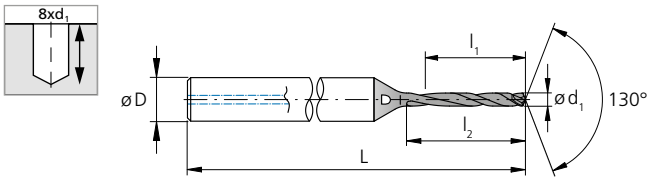
Please note

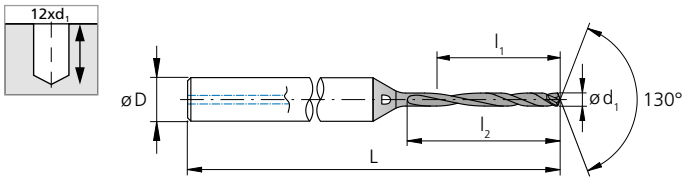
You couldn't find your suitable version of the CrazyDrill SST-Inox IK (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide	130°	Z2	eXedur RIP

Ød_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0





d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.008	0.20	**.063**	1.6	2.0	3	**1.50**	38	2.CD.080020.IK	■
	.010	0.25	**.079**	2.0	2.5	3	**1.50**	38	2.CD.080025.IK	■
	.012	0.30	**.094**	2.4	2.9	3	**1.50**	38	2.CD.080030.IK	■
	.014	0.35	**.110**	2.8	3.4	3	**1.50**	38	2.CD.080035.IK	■
1/64	**.0156**	0.396	**.126**	3.2	3.9	3	**1.50**	38	2.CD.080F164.IK	■
	.016	0.40	**.126**	3.2	3.9	3	**1.50**	38	2.CD.080040.IK	■
	.018	0.45	**.142**	3.6	4.4	3	**1.65**	42	2.CD.080045.IK	■
	.020	0.50	**.157**	4.0	4.9	3	**1.65**	42	2.CD.080050.IK	■
	.022	0.55	**.173**	4.4	5.4	3	**1.65**	42	2.CD.080055.IK	■
	.024	0.60	**.189**	4.8	5.9	3	**1.65**	42	2.CD.080060.IK	■
	.026	0.65	**.205**	5.2	6.4	3	**1.77**	45	2.CD.080065.IK	■
	.028	0.70	**.220**	5.6	6.9	3	**1.77**	45	2.CD.080070.IK	■
	.030	0.75	**.236**	6.0	7.4	3	**1.77**	45	2.CD.080075.IK	■
1/32	**.0312**	0.793	**.252**	6.4	7.8	3	**1.77**	45	2.CD.080F132.IK	■
	.031	0.80	**.252**	6.4	7.8	3	**1.77**	45	2.CD.080080.IK	■
	.033	0.85	**.268**	6.8	8.3	3	**1.77**	45	2.CD.080085.IK	■
	.035	0.90	**.283**	7.2	8.8	3	**1.77**	45	2.CD.080090.IK	■
	.037	0.95	**.299**	7.6	9.3	3	**1.89**	48	2.CD.080095.IK	■
	.039	1.00	**.315**	8.0	9.8	3	**1.89**	48	2.CD.080100.IK	■
	.041	1.05	**.331**	8.4	10.3	3	**1.89**	48	2.CD.080105.IK	■
	.043	1.10	**.346**	8.8	10.8	3	**1.89**	48	2.CD.080110.IK	■
	.045	1.15	**.362**	9.2	11.3	3	**1.89**	48	2.CD.080115.IK	■
	.047	1.20	**.378**	9.6	11.8	3	**1.89**	48	2.CD.080120.IK	■
	.049	1.25	**.394**	10.0	12.3	4	**2.05**	52	2.CD.080125.IK	■
	.051	1.30	**.409**	10.4	12.7	4	**2.05**	52	2.CD.080130.IK	■
	.053	1.35	**.425**	10.8	13.2	4	**2.05**	52	2.CD.080135.IK	■
	.055	1.40	**.441**	11.2	13.7	4	**2.05**	52	2.CD.080140.IK	■
	.057	1.45	**.457**	11.6	14.2	4	**2.05**	52	2.CD.080145.IK	■
	.059	1.50	**.472**	12.0	14.7	4	**2.05**	52	2.CD.080150.IK	■
	.061	1.55	**.488**	12.4	15.2	4	**2.17**	55	2.CD.080155.IK	■
1/16	**.0625**	1.587	**.504**	12.8	15.7	4	**2.17**	55	2.CD.080F116.IK	■
	.063	1.60	**.504**	12.8	15.7	4	**2.17**	55	2.CD.080160.IK	■
	.065	1.65	**.520**	13.2	16.2	4	**2.17**	55	2.CD.080165.IK	■
	.067	1.70	**.535**	13.6	16.7	4	**2.17**	55	2.CD.080170.IK	■
	.069	1.75	**.551**	14.0	17.2	4	**2.17**	55	2.CD.080175.IK	■
	.071	1.80	**.567**	14.4	17.6	4	**2.17**	55	2.CD.080180.IK	■
	.073	1.85	**.583**	14.8	18.1	4	**2.17**	55	2.CD.080185.IK	■
	.075	1.90	**.598**	15.2	18.6	4	**2.17**	55	2.CD.080190.IK	■
	.077	1.95	**.614**	15.6	19.1	4	**2.17**	55	2.CD.080195.IK	■
	.079	2.00	**.630**	16.0	19.6	4	**2.17**	55	2.CD.080200.IK	■

■ Stock item

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.008	0.20	**.094**	2.4	2.8	3	**1.50**	38	2.CD.120020.IK	■
	.010	0.25	**.118**	3.0	3.5	3	**1.50**	38	2.CD.120025.IK	■
	.012	0.30	**.142**	3.6	4.1	3	**1.50**	38	2.CD.120030.IK	■
	.014	0.35	**.165**	4.2	4.8	3	**1.50**	38	2.CD.120035.IK	■
1/64	**.0156**	0.396	**.189**	4.8	5.5	3	**1.50**	38	2.CD.120F164.IK	■
	.016	0.40	**.189**	4.8	5.5	3	**1.50**	38	2.CD.120040.IK	■
	.018	0.45	**.213**	5.4	6.2	3	**1.65**	42	2.CD.120045.IK	■
	.020	0.50	**.236**	6.0	6.9	3	**1.65**	42	2.CD.120050.IK	■
	.022	0.55	**.260**	6.6	7.6	3	**1.65**	42	2.CD.120055.IK	■
	.024	0.60	**.283**	7.2	8.3	3	**1.65**	42	2.CD.120060.IK	■
	.026	0.65	**.307**	7.8	9.0	3	**1.77**	45	2.CD.120065.IK	■
	.028	0.70	**.331**	8.4	9.7	3	**1.77**	45	2.CD.120070.IK	■
	.030	0.75	**.354**	9.0	10.4	3	**1.77**	45	2.CD.120075.IK	■
1/32	**.0312**	0.793	**.378**	9.6	11.0	3	**1.77**	45	2.CD.120F132.IK	■
	.031	0.80	**.378**	9.6	11.0	3	**1.77**	45	2.CD.120080.IK	■
	.033	0.85	**.402**	10.2	11.7	3	**1.77**	45	2.CD.120085.IK	■
	.035	0.90	**.425**	10.8	12.4	3	**1.77**	45	2.CD.120090.IK	■
	.037	0.95	**.449**	11.4	13.1	3	**1.89**	48	2.CD.120095.IK	■
	.039	1.00	**.472**	12.0	13.8	3	**1.89**	48	2.CD.120100.IK	■
	.041	1.05	**.496**	12.6	14.5	3	**1.89**	48	2.CD.120105.IK	■
	.043	1.10	**.520**	13.2	15.2	3	**1.89**	48	2.CD.120110.IK	■
	.045	1.15	**.543**	13.8	15.9	3	**1.89**	48	2.CD.120115.IK	■
	.047	1.20	**.567**	14.4	16.6	3	**1.89**	48	2.CD.120120.IK	■
	.049	1.25	**.591**	15.0	17.3	4	**2.17**	55	2.CD.120125.IK	■
	.051	1.30	**.614**	15.6	17.9	4	**2.17**	55	2.CD.120130.IK	■
	.053	1.35	**.638**	16.2	18.6	4	**2.17**	55	2.CD.120135.IK	■
	.055	1.40	**.661**	16.8	19.3	4	**2.17**	55	2.CD.120140.IK	■
	.057	1.45	**.685**	17.4	20.0	4	**2.17**	55	2.CD.120145.IK	■
	.059	1.50	**.709**	18.0	20.7	4	**2.17**	55	2.CD.120150.IK	■
	.061	1.55	**.732**	18.6	21.4	4	**2.28**	58	2.CD.120155.IK	■
1/16	**.0625**	1.587	**.756**	19.2	22.1	4	**2.28**	58	2.CD.120F116.IK	■
	.063	1.60	**.756**	19.2	22.1	4	**2.28**	58	2.CD.120160.IK	■
	.065	1.65	**.780**	19.8	22.8	4	**2.28**	58	2.CD.120165.IK	■
	.067	1.70	**.803**	20.4	23.5	4	**2.28**	58	2.CD.120170.IK	■
	.069	1.75	**.827**	21.0	24.2	4	**2.28**	58	2.CD.120175.IK	■
	.071	1.80	**.850**	21.6	24.8	4	**2.28**	58	2.CD.120180.IK	■
	.073	1.85	**.874**	22.2	25.5	4	**2.36**	60	2.CD.120185.IK	■
	.075	1.90	**.898**	22.8	26.2	4	**2.36**	60	2.CD.120190.IK	■
	.077	1.95	**.921**	23.4	26.9	4	**2.36**	60	2.CD.120195.IK	■
	.079	2.00	**.945**	24.0	27.6	4	**2.36**	60	2.CD.120200.IK	■

■ Stock item

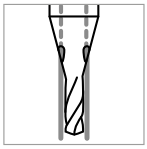
Complementary products

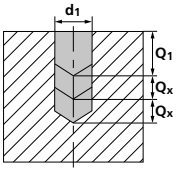
CrazyDrill Twicenter	p.85
CrazyDrill Pilot SST-Inox	p.149
CrazyDrill Crosspilot	p.175

CRAZYDRILL by Mikron Tool SST-Inox

Type IK 8 x d / 12 x d

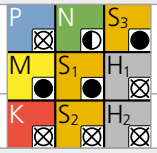
DRILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010		
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310		
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2		
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	35–50 | **115 – 164**	1xd1–4xd1
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	35–50 | **115 – 164**	1xd1–4xd1
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	35–50 | **115 – 164**	1xd1–4xd1
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	30–45 | **98 – 148**	1xd1–4xd1
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30		
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351		
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380		
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40–100 | **131 – 328**	4xd1–8xd1
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40–100 | **131 – 328**	4xd1–8xd1
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500		
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000		
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	15–30 | **49 – 98**	0.5xd1–1xd1
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	40–50 | **131 – 164**	1xd1–4xd1
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Q_x	Ød1 1/64" 0.2–0.5 mm | .008"–.020" f	1/32" 0.6–0.8 mm | .024"–.032" f	0.9–1.1 mm | .035"–.043" f	1.2–1.4 mm | .047"–.055" f	1/16" 1.5–1.7 mm | .059"–.067" f	1.8–2.0 mm | .071"–.079" f
1xd1–2xd1	0.015–0.020 | **.0006–.0008**	0.020–0.030 | **.0008–.0012**	0.030–0.040 | **.0012–.0016**	0.040–0.050 | **.0016–.0020**	0.050–0.060 | **.0020–.0024**	0.060–0.070 | **.0024–.0028**
1xd1–2xd1	0.020–0.030 | **.0008–.0012**	0.030–0.040 | **.0012–.0016**	0.050–0.060 | **.0020–.0024**	0.060–0.070 | **.0024–.0028**	0.070–0.080 | **.0028–.0031**	0.080–0.100 | **.0031–.0039**
1xd1–2xd1	0.015–0.020 | **.0006–.0008**	0.020–0.025 | **.0008–.0010**	0.025–0.035 | **.0010–.0014**	0.040–0.050 | **.0016–.0020**	0.050–0.060 | **.0020–.0024**	0.060–0.070 | **.0024–.0028**
1xd1–2xd1	0.010–0.020 | **.0004–.0008**	0.015–0.025 | **.0006–.0010**	0.025–0.035 | **.0010–.0014**	0.035–0.045 | **.0014–.0018**	0.045–0.055 | **.0018–.0022**	0.055–0.060 | **.0022–.0024**
4xd1	0.040–0.060 | **.0016–.0024**	0.050–0.080 | **.0020–.0031**	0.060–0.100 | **.0024–.0039**	0.080–0.120 | **.0031–.0047**	0.100–0.150 | **.0039–.0059**	0.120–0.180 | **.0047–.0071**
4xd1	0.040–0.060 | **.0016–.0024**	0.050–0.080 | **.0020–.0031**	0.060–0.100 | **.0024–.0039**	0.080–0.120 | **.0031–.0047**	0.100–0.150 | **.0039–.0059**	0.120–0.180 | **.0047–.0071**
0.5xd1	0.010–0.015 | **.0004–.0006**	0.015–0.020 | **.0006–.0008**	0.020–0.025 | **.0008–.0010**	0.025–0.035 | **.0010–.0014**	0.035–0.040 | **.0014–.0016**	0.045–0.055 | **.0018–.0022**
1xd1–2xd1	0.020–0.030 | **.0008–.0012**	0.030–0.040 | **.0012–.0016**	0.050–0.060 | **.0020–.0024**	0.060–0.070 | **.0024–.0028**	0.070–0.080 | **.0028–.0031**	0.080–0.100 | **.0031–.0039**

CRAZYDRILL by Mikron Tool SST- Inox

Type IN 8 x d / 12 x d

DRILLING WITH EXTERNAL COOLING



8xd

12xd

CrazyDrill SST-Inox Type IN 8 x d / 12 x d fits for machines with spindles without integrated cooling.

The geometry of this solid carbide drill differs significantly from today's standards. The polished tip section with small transverse cutting reduces the feed force and gives the drill good centering properties. The special tip geometry produces short chips even in materials where long chips are the norm and avoids cutting edge breakages. The digressive helical flute is responsible for good chip removal.

CrazyDrill SST-Inox IN 8 x d can be used on regular and straight surfaces without a centering or pilot hole, because of the high degree of self-centering capability.

Mikron Tool recommends:

- **Variant IN 8 x d** - Only for higher requirements: For high-precision position accuracy or irregular surfaces use of the centering drill CrazyDrill Twicenter respectively the pilot drill CrazyDrill Pilot SST-Inox or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.
- **Variant IN 12 x d** - Use of the centering drill CrazyDrill Twicenter respectively the pilot drill CrazyDrill Pilot SST-Inox or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

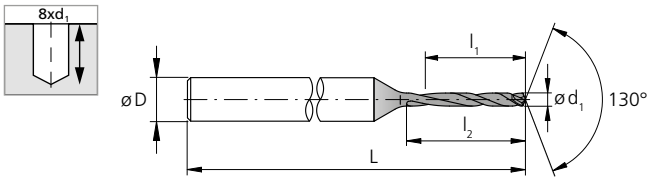
Please note

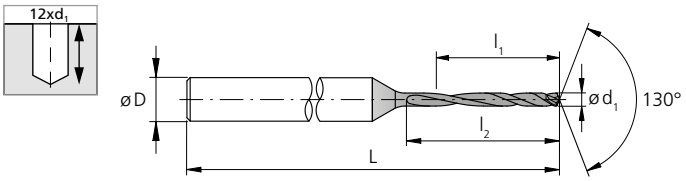
You couldn't find your suitable version of the CrazyDrill SST-Inox IN (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide	130°	Z2	eXedur RIP

Ød_1	**.004" - .118"** (0.1 - 3.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0





d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.008	0.20	**.063**	1.6	2.0	3	**1.50**	38	2.CD.080020.IN	■
	.010	0.25	**.079**	2.0	2.5	3	**1.50**	38	2.CD.080025.IN	■
	.012	0.30	**.094**	2.4	2.9	3	**1.50**	38	2.CD.080030.IN	■
	.014	0.35	**.110**	2.8	3.4	3	**1.50**	38	2.CD.080035.IN	■
1/64	**.0156**	0.396	**.126**	3.2	3.9	3	**1.50**	38	2.CD.080F164.IN	■
	.016	0.40	**.126**	3.2	3.9	3	**1.50**	38	2.CD.080040.IN	■
	.018	0.45	**.142**	3.6	4.4	3	**1.65**	42	2.CD.080045.IN	■
	.020	0.50	**.157**	4.0	4.9	3	**1.65**	42	2.CD.080050.IN	■
	.022	0.55	**.173**	4.4	5.4	3	**1.65**	42	2.CD.080055.IN	■
	.024	0.60	**.189**	4.8	5.9	3	**1.65**	42	2.CD.080060.IN	■
	.026	0.65	**.205**	5.2	6.4	3	**1.77**	45	2.CD.080065.IN	■
	.028	0.70	**.220**	5.6	6.9	3	**1.77**	45	2.CD.080070.IN	■
	.030	0.75	**.236**	6.0	7.4	3	**1.77**	45	2.CD.080075.IN	■
1/32	**.0312**	0.793	**.252**	6.4	7.8	3	**1.77**	45	2.CD.080F132.IN	■
	.031	0.80	**.252**	6.4	7.8	3	**1.77**	45	2.CD.080080.IN	■
	.033	0.85	**.268**	6.8	8.3	3	**1.77**	45	2.CD.080085.IN	■
	.035	0.90	**.283**	7.2	8.8	3	**1.77**	45	2.CD.080090.IN	■
	.037	0.95	**.299**	7.6	9.3	3	**1.89**	48	2.CD.080095.IN	■
	.039	1.00	**.315**	8.0	9.8	3	**1.89**	48	2.CD.080100.IN	■
	.041	1.05	**.331**	8.4	10.3	3	**1.89**	48	2.CD.080105.IN	■
	.043	1.10	**.346**	8.8	10.8	3	**1.89**	48	2.CD.080110.IN	■
	.045	1.15	**.362**	9.2	11.3	3	**1.89**	48	2.CD.080115.IN	■
	.047	1.20	**.378**	9.6	11.8	3	**1.89**	48	2.CD.080120.IN	■
	.049	1.25	**.394**	10.0	12.3	3	**2.05**	52	2.CD.080125.IN	■
	.051	1.30	**.409**	10.4	12.7	3	**2.05**	52	2.CD.080130.IN	■
	.053	1.35	**.425**	10.8	13.2	3	**2.05**	52	2.CD.080135.IN	■
	.055	1.40	**.441**	11.2	13.7	3	**2.05**	52	2.CD.080140.IN	■
	.057	1.45	**.457**	11.6	14.2	3	**2.05**	52	2.CD.080145.IN	■
	.059	1.50	**.472**	12.0	14.7	3	**2.05**	52	2.CD.080150.IN	■
	.061	1.55	**.488**	12.4	15.2	3	**2.17**	55	2.CD.080155.IN	■
1/16	**.0625**	1.587	**.504**	12.8	15.7	3	**2.17**	55	2.CD.080F116.IN	■
	.063	1.60	**.504**	12.8	15.7	3	**2.17**	55	2.CD.080160.IN	■
	.065	1.65	**.520**	13.2	16.2	3	**2.17**	55	2.CD.080165.IN	■
	.067	1.70	**.535**	13.6	16.7	3	**2.17**	55	2.CD.080170.IN	■
	.069	1.75	**.551**	14.0	17.2	3	**2.17**	55	2.CD.080175.IN	■
	.071	1.80	**.567**	14.4	17.6	3	**2.17**	55	2.CD.080180.IN	■
	.073	1.85	**.583**	14.8	18.1	3	**2.17**	55	2.CD.080185.IN	■
	.075	1.90	**.598**	15.2	18.6	3	**2.17**	55	2.CD.080190.IN	■
	.077	1.95	**.614**	15.6	19.1	3	**2.17**	55	2.CD.080195.IN	■
	.079	2.00	**.630**	16.0	19.6	3	**2.17**	55	2.CD.080200.IN	■

■ Stock item

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.008	0.20	**.094**	2.4	2.8	3	**1.50**	38	2.CD.120020.IN	■
	.010	0.25	**.118**	3.0	3.5	3	**1.50**	38	2.CD.120025.IN	■
	.012	0.30	**.142**	3.6	4.1	3	**1.50**	38	2.CD.120030.IN	■
	.014	0.35	**.165**	4.2	4.8	3	**1.50**	38	2.CD.120035.IN	■
1/64	**.0156**	0.396	**.189**	4.8	5.5	3	**1.50**	38	2.CD.120F164.IN	■
	.016	0.40	**.189**	4.8	5.5	3	**1.50**	38	2.CD.120040.IN	■
	.018	0.45	**.213**	5.4	6.2	3	**1.65**	42	2.CD.120045.IN	■
	.020	0.50	**.236**	6.0	6.9	3	**1.65**	42	2.CD.120050.IN	■
	.022	0.55	**.260**	6.6	7.6	3	**1.65**	42	2.CD.120055.IN	■
	.024	0.60	**.283**	7.2	8.3	3	**1.65**	42	2.CD.120060.IN	■
	.026	0.65	**.307**	7.8	9.0	3	**1.77**	45	2.CD.120065.IN	■
	.028	0.70	**.331**	8.4	9.7	3	**1.77**	45	2.CD.120070.IN	■
	.030	0.75	**.354**	9.0	10.4	3	**1.77**	45	2.CD.120075.IN	■
1/32	**.0312**	0.793	**.378**	9.6	11.0	3	**1.77**	45	2.CD.120F132.IN	■
	.031	0.80	**.378**	9.6	11.0	3	**1.77**	45	2.CD.120080.IN	■
	.033	0.85	**.402**	10.2	11.7	3	**1.77**	45	2.CD.120085.IN	■
	.035	0.90	**.425**	10.8	12.4	3	**1.77**	45	2.CD.120090.IN	■
	.037	0.95	**.449**	11.4	13.1	3	**1.89**	48	2.CD.120095.IN	■
	.039	1.00	**.472**	12.0	13.8	3	**1.89**	48	2.CD.120100.IN	■
	.041	1.05	**.496**	12.6	14.5	3	**1.89**	48	2.CD.120105.IN	■
	.043	1.10	**.520**	13.2	15.2	3	**1.89**	48	2.CD.120110.IN	■
	.045	1.15	**.543**	13.8	15.9	3	**1.89**	48	2.CD.120115.IN	■
	.047	1.20	**.567**	14.4	16.6	3	**1.89**	48	2.CD.120120.IN	■
	.049	1.25	**.591**	15.0	17.3	3	**2.17**	55	2.CD.120125.IN	■
	.051	1.30	**.614**	15.6	17.9	3	**2.17**	55	2.CD.120130.IN	■
	.053	1.35	**.638**	16.2	18.6	3	**2.17**	55	2.CD.120135.IN	■
	.055	1.40	**.661**	16.8	19.3	3	**2.17**	55	2.CD.120140.IN	■
	.057	1.45	**.685**	17.4	20.0	3	**2.17**	55	2.CD.120145.IN	■
	.059	1.50	**.709**	18.0	20.7	3	**2.17**	55	2.CD.120150.IN	■
	.061	1.55	**.732**	18.6	21.4	3	**2.28**	58	2.CD.120155.IN	■
1/16	**.0625**	1.587	**.756**	19.2	22.1	3	**2.28**	58	2.CD.120F116.IN	■
	.063	1.60	**.756**	19.2	22.1	3	**2.28**	58	2.CD.120160.IN	■
	.065	1.65	**.780**	19.8	22.8	3	**2.28**	58	2.CD.120165.IN	■
	.067	1.70	**.803**	20.4	23.5	3	**2.28**	58	2.CD.120170.IN	■
	.069	1.75	**.827**	21.0	24.2	3	**2.28**	58	2.CD.120175.IN	■
	.071	1.80	**.850**	21.6	24.8	3	**2.28**	58	2.CD.120180.IN	■
	.073	1.85	**.874**	22.2	25.5	3	**2.36**	60	2.CD.120185.IN	■
	.075	1.90	**.898**	22.8	26.2	3	**2.36**	60	2.CD.120190.IN	■
	.077	1.95	**.921**	23.4	26.9	3	**2.36**	60	2.CD.120195.IN	■
	.079	2.00	**.945**	24.0	27.6	3	**2.36**	60	2.CD.120200.IN	■

■ Stock item

Complementary products

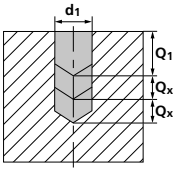
CrazyDrill Twicenter	p.85
CrazyDrill Pilot SST-Inox	p.149
CrazyDrill Crosspilot	p.175

CRAZYDRILL by Mikron Tool SST-Inox

Type IN 8 x d / 12 x d

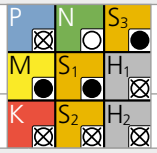
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010		
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310		
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2		
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	30–40 | **98 – 131**	0.5xd1–1xd1
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	30–40 | **98 – 131**	0.5xd1–1xd1
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	30–40 | **98 – 131**	0.5xd1–1xd1
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	25–30 | **82 – 115**	0.5xd1–1xd1
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30		
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351		
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380		
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	30–100 | **98 – 328**	2xd1–4xd1
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	30–100 | **98 – 328**	1xd1–4xd1
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500		
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000		
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	15–25 | **49 – 82**	0.25xd1–0.5xd1
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	25–35 | **82 – 115**	0.5xd1–1xd1
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Q_x	Ød1 1/64" 0.2–0.5 mm | .008"–.020" f	1/32" 0.6–0.8 mm | .024"–.032" f	0.9–1.1 mm | .035"–.043" f	1.2–1.4 mm | .047"–.055" f	1/16" 1.5–1.7 mm | .059"–.067" f	1.8–2.0 mm | .071"–.079" f
0.5xd1	0.010–0.015 | **.0004–.0006**	0.015–0.025 | **.0006–.0010**	0.025–0.030 | **.0010–.0012**	0.030–0.040 | **.0012–.0016**	0.040–0.050 | **.0016–.0020**	0.050–0.060 | **.0020–.0024**
0.5xd1	0.015–0.025 | **.0006–.0010**	0.025–0.035 | **.0010–.0014**	0.035–0.040 | **.0014–.0016**	0.040–0.050 | **.0016–.0020**	0.050–0.060 | **.0020–.0024**	0.060–0.070 | **.0024–.0028**
0.5xd1	0.010–0.015 | **.0004–.0006**	0.015–0.020 | **.0006–.0008**	0.020–0.030 | **.0008–.0012**	0.030–0.040 | **.0012–.0016**	0.040–0.050 | **.0016–.0020**	0.050–0.060 | **.0020–.0024**
0.5xd1	0.010–0.015 | **.0004–.0006**	0.015–0.020 | **.0006–.0008**	0.020–0.030 | **.0008–.0012**	0.030–0.040 | **.0012–.0016**	0.040–0.045 | **.0016–.0018**	0.040–0.060 | **.0016–.0024**
2xd1	0.030–0.060 | **.0012–.0024**	0.040–0.080 | **.0016–.0031**	0.050–0.100 | **.0020–.0039**	0.060–0.120 | **.0024–.0047**	0.070–0.150 | **.0028–.0059**	0.080–0.180 | **.0031–.0071**
1xd1–2xd1	0.030–0.060 | **.0012–.0024**	0.040–0.080 | **.0016–.0031**	0.050–0.100 | **.0020–.0039**	0.060–0.120 | **.0024–.0047**	0.070–0.150 | **.0028–.0059**	0.080–0.180 | **.0031–.0071**
0.25xd1	0.005–0.010 | **.0002–.0004**	0.010–0.015 | **.0004–.0006**	0.015–0.020 | **.0006–.0008**	0.020–0.025 | **.0008–.0010**	0.030–0.035 | **.0012–.0014**	0.030–0.040 | **.0012–.0016**
0.5xd1	0.015–0.025 | **.0006–.0010**	0.025–0.035 | **.0010–.0014**	0.040–0.050 | **.0016–.0020**	0.050–0.060 | **.0020–.0024**	0.060–0.070 | **.0024–.0028**	0.070–0.080 | **.0028–.0031**



Drilling process CrazyDrill SST-Inox

PRECISE AND EFFICIENT DRILLING FROM Ø .008" (0.2 MM)

Coolant type, pressure and filtration

Coolant: For best results, Mikron Tool recommends the use of cutting oil as coolant. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used as well.

Filter: The large cooling channels allow a standard filter with filter quality of ≤ .002" (0.05 mm).

For tools with external cooling no specific parameters have to be considered concerning filter.



Coolant pressure: To ensure a reliable drilling process using tools with through-tool cooling the following minimal pressures are needed (see chart). Higher pressures are needed for smaller drill size diameters. High pressure is generally better for the cooling and flushing effect.

Revolution	[rpm]	≤ 10'000	> 10'000
Minimal pressure	[bar]	15	30
	[psi]	**218**	**435**

For tools with external cooling no specific parameters have to be considered concerning coolant pressure. But it must be ensured that the coolant is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical information".



Drilling process CrazyDrill SST-Inox

PRECISE AND EFFICIENT DRILLING FROM Ø .008" (0.2 MM)

CrazyDrill SST-Inox IK / IN 8 x d

Because of the high degree of self-centering capability, CrazyDrill SST-Inox can be used on regular and straight surfaces without a centering or pilot hole for drilling depths up to 8 x d.

Higher requirements: For irregular respectively rough or inclined surfaces or for the highest degree of position accuracy Mikron Tool recommends:

- **CrazyDrill Pilot SST-Inox** as pilot drill
- **CrazyDrill Twicenter** as center drill
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces

CrazyDrill SST-Inox IK / IN 12 x d

Mikron Tool recommends a pilot hole for CrazyDrill SST-Inox 12 x d:

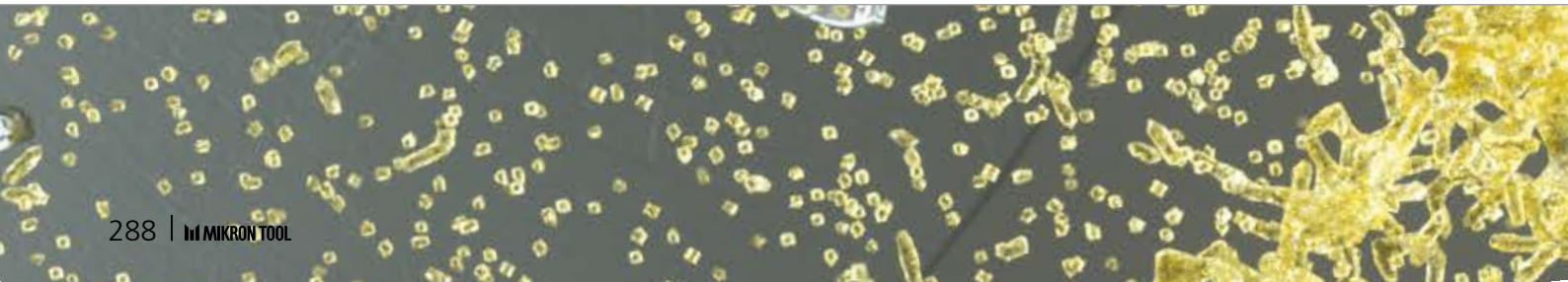
- **CrazyDrill Pilot SST-Inox** as pilot drill
- **CrazyDrill Twicenter** as center drill
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces

Thus highest alignment and process accuracy are guaranteed.

Centering / pilot drilling and drilling

Pilot drilling with CrazyDrill Pilot SST-Inox or centering with CrazyDrill Twicenter are the perfect combination for a precise hole (position and alignment accuracy) and a stable machining process. The pilot drill CrazyDrill Crosspilot does the same when drilling on inclined surfaces.

The drilling quality (position and alignment accuracy, no measurable transition from pilot drilling to follow-up drilling) and a stable machining process are guaranteed due to predetermined tool tolerances.



DRILLING PROCESS

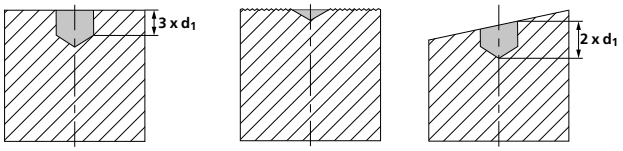
Drilling according DIN 66025 / PAL

G83 deep-drilling cycle with chip break and chip removal (pecks)

Q = depth of the respective peck

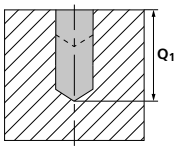
1 | CENTERING OR PILOT DRILLING

- With CrazyDrill Twicenter or CrazyDrill Pilot SST-Inox (irregular or rough surfaces) or CrazyDrill Crosspilot (inclined surfaces) for version 8 x d.
- With CrazyDrill Twicenter or CrazyDrill Pilot SST-Inox (straight surfaces) or CrazyDrill Crosspilot (inclined surfaces) for version 12 x d.

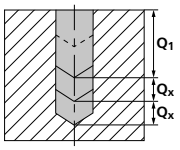


2 | DRILLING

- With CrazyDrill SST-Inox up to maximum drilling depth Q_1 in one step, followed by peck to remove chips.



- Further pecks Q_X according to cutting data table, followed by peck to remove chips.



Note:

Between pecks, take the drill completely out from the bore. After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

CrazyDrill Cool



CRAZYDRILL Cool

HIGH PRECISION FOR DEEP HOLES UP TO 15 X D



Mikron Tool CrazyDrill Cool line offers a through coolant deep-hole drill program for a wide range of materials. The application range covered goes from hole diameters of .030" up to .236" (0.75 mm up to 6.00 mm) and depth of cut up to 15 x d.

Depending on the material to be machined, the drills are available with or without wear protective coating.

Combining Mikron Tool CrazyDrill Pilot (or CrazyDrill Coolpilot e.g. CrazyDrill Pilot SST-Inox for difficult to machine materials) with CrazyDrill Cool allows for accuracy in deep drilling operations. Depending on the material to be machined, a pecking cycle for chip removal may be necessary. By means of fine-tuned tolerances between CrazyDrill Pilot and CrazyDrill Cool, accurate drilling and excellent hole quality are assured with precision alignment and no measurable diameter difference between tools.

The through coolant holes supply adequate and continuous coolant to the tip for constant cooling, lubrication and chip removal. The power chamber reduces pressure loss assureing higher flowrate when drilling even the smallest diameters. High drilling speed and good tool life are the result.

CRAZYDRILL by Mikron Tool Cool

Deep and challenging

CONSISTENT AND ACCURATE DRILLING UP TO 15 X D

Mikron Tool CrazyDrill Cool line offers a through coolant deep-hole drill program for a wide range of materials. The application range covered goes from hole diameters of .030" up to .236" (0.75 mm to 6.00 mm) and depth of cut up to 15 x d.

Depending on the material to be machined, the drills are available with or without wear protective coating.

- CrazyDrill Cool, depth of cut available 6 x d / 10 x d / 15 x d, coated and uncoated.

6 x d	10 x d	15 x d
■ Internal cooling ■ Coated / uncoated	■ Internal cooling ■ Coated / uncoated	■ Internal cooling ■ Coated / uncoated
		
		
		
Page 297	Page 305	Page 313

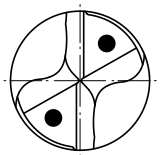
1 | SHAFT
The robust solid carbide shaft guarantees a high degree of concentric accuracy and reliability.

2 | CARBIDE GRADE
The use of latest generation carbide grades allows highest machining speed and feed.

3 | COATING / SURFACE TREATMENT
- **Version CA (uncoated):** Extremely smooth flutes to limit chip jamming risk. Edge preparation provides consistent tool life. Optimal for aluminum, brass and bronze.
- **Version CS (coated):** The additional high-performance eXedur RI/RIP coating provides thermal and wear protection, guaranteeing a longer tool life. Optimal for steels, alloyed steels, cast iron.

4 | THROUGH COOLANT AND POWER CHAMBER
The through coolant holes supply adequate and continuous coolant to the tip for constant cooling, lubrication and chip removal. The power chamber reduces pressure loss and increases flowrate even when drilling smallest diameters.

5 | CUTTING GEOMETRY
The unique CrazyDrill S tip geometry together with the special designed flutes allows highest drilling performance, improves chip evacuation and limits the need for pecking (depending on work material).

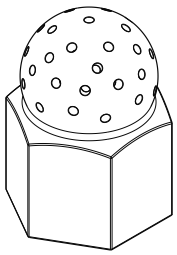
Drill tip 

CRAZYDRILL by Mikron Tool Cool

Benefits and applications

THE SMALL DRILL WITH INTERNAL COOLING FOR DRILLING DEEP HOLES

- **SHORT MACHINING TIME** | due to high feed rates
- **LONG TOOL LIFE** | due to efficient coolant
- **HIGH DEGREE OF PRECISION** | due to small tolerances



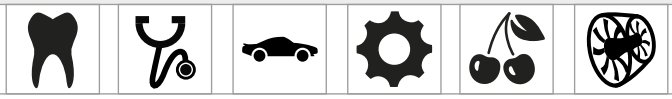
COMPONENT
Spray nozzle

MATERIAL
X2CrMoTiS18-2 / 1.4523 / ASTM 430F

MACHINING
- 50 holes
- d = 1.0 mm **| .039"**
- Drilling depth 15 mm **| .591"**

DRILLING TOOL
Mikron Tool - CrazyDrill Cool - 15 x d - coated

DATA	MIKRON TOOL
Tool type	CrazyDrill Cool - Carbide - Coated - Internal cooling
Item number	2.CD.150100.CS
Cutting data	v_c = 50 m/min **| 164 SFM** f = 0.03 mm/rev **| .0012 IPR** Q_1 = 0.5 mm **| .020"** Q_x = 0.25 mm **| .010"**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Dental implants
Medical technology	Component for measuring device
Automotive industry	Components for injection system
Mechanical engineering	Locking bolt
Food industry	Nozzle
Power industry	Blade

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4034	X46Cr13	420C
	1.4542	X5CrNiCuNb 16-4	630
	1.4301	X5CrNi 18-10	304
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

CrazyDrill Cool 6 x d - coated / uncoated

DRILLING WITH INTERNAL COOLING



Coated Uncoated

CrazyDrill Cool 6 x d is specially engineered for:

- **Coated version** (eXedur RI / RIP) - unalloyed, alloyed and stainless steels, cast iron and even for heat treated steels up to 55HRC.
- **Uncoated version** - non ferrous metals

The through coolant holes supplies constant coolant flow to the tip. For small diameters, an additional power chamber in the shank assures a higher flowrate. Comparatively at same coolant pressure three time flowrate will be supplied to the cutting area. This technology enables high drilling speed with more effective chip removal. For coated version the high-performance eXedur RI / RIP coating provides thermal and wear protection, guaranteeing a longer tool life.

For the version with drilling depths up to 6 x d centering is not necessary on straight surfaces, with its tip angle of 140° and its chisel "s"-form the drill has a good self-centering. We recommend pilot drilling or centering only on irregular, rough or inclined surfaces and if a high position accuracy is requested. For details see "drilling process".

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note

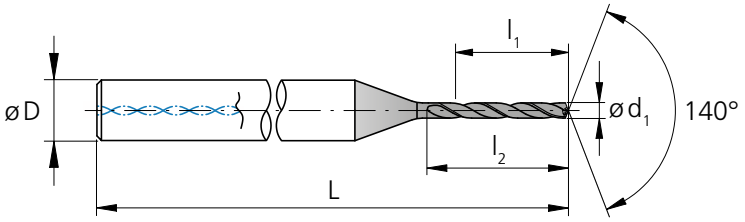
You couldn't find your suitable version of the CrazyDrill Cool - coated / uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

Carbide | 6xd1 | 140° | Z2

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0	**+ .00024"** **+ .00004"**	+ 0.006 mm + 0.001 mm

CS eXedur RI/RIP | CA Uncoated



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.030	0.75	**.177**	4.5	6.8	3	**2.03**	51.5	2.CD.060075	.CS	.CA	■
1/32	**.0312**	0.793	**.189**	4.8	7.2	3	**2.03**	51.5	2.CD.060F132	.CS	-	◪
	.032	0.80	**.189**	4.8	7.2	3	**2.03**	51.5	2.CD.060080	.CS	.CA	■
	.033	0.85	**.201**	5.1	7.7	3	**2.03**	51.5	2.CD.060085	.CS	.CA	■
	.035	0.90	**.213**	5.4	8.1	3	**2.03**	51.5	2.CD.060090	.CS	.CA	■
	.037	0.95	**.224**	5.7	8.6	3	**2.03**	51.5	2.CD.060095	.CS	.CA	■
	.039	1.00	**.236**	6.0	9.0	4	**2.17**	55.0	2.CD.060100	.CS	.CA	■
	.041	1.05	**.248**	6.3	9.5	4	**2.17**	55.0	2.CD.060105	.CS	.CA	■
	.043	1.10	**.260**	6.6	9.9	4	**2.17**	55.0	2.CD.060110	.CS	.CA	■
	.045	1.15	**.272**	6.9	10.4	4	**2.17**	55.0	2.CD.060115	.CS	.CA	■
	.047	1.20	**.283**	7.2	10.8	4	**2.17**	55.0	2.CD.060120	.CS	.CA	■
	.049	1.25	**.295**	7.5	11.3	4	**2.17**	55.0	2.CD.060125	.CS	.CA	■
	.051	1.30	**.307**	7.8	11.7	4	**2.24**	57.0	2.CD.060130	.CS	.CA	■
	.053	1.35	**.319**	8.1	12.2	4	**2.24**	57.0	2.CD.060135	.CS	.CA	■
	.055	1.40	**.331**	8.4	12.6	4	**2.24**	57.0	2.CD.060140	.CS	.CA	■
	.057	1.45	**.343**	8.7	13.1	4	**2.24**	57.0	2.CD.060145	.CS	.CA	■
	.059	1.50	**.354**	9.0	13.5	4	**2.24**	57.0	2.CD.060150	.CS	.CA	■
	.061	1.55	**.366**	9.3	14.0	4	**2.32**	59.0	2.CD.060155	.CS	.CA	■
1/16	**.0625**	1.587	**.378**	9.6	14.4	4	**2.32**	59.0	2.CD.060F116	.CS	-	◪
	.063	1.60	**.378**	9.6	14.4	4	**2.32**	59.0	2.CD.060160	.CS	.CA	■
	.065	1.65	**.390**	9.9	14.9	4	**2.32**	59.0	2.CD.060165	.CS	.CA	■
	.067	1.70	**.402**	10.2	15.3	4	**2.32**	59.0	2.CD.060170	.CS	.CA	■
	.069	1.75	**.413**	10.5	15.8	4	**2.32**	59.0	2.CD.060175	.CS	.CA	■
	.071	1.80	**.425**	10.8	16.2	4	**2.40**	61.0	2.CD.060180	.CS	.CA	■
	.073	1.85	**.437**	11.1	16.7	4	**2.40**	61.0	2.CD.060185	.CS	.CA	■
	.075	1.90	**.449**	11.4	17.1	4	**2.40**	61.0	2.CD.060190	.CS	.CA	■
	.077	1.95	**.461**	11.7	17.6	4	**2.40**	61.0	2.CD.060195	.CS	.CA	■
	.079	2.00	**.472**	12.0	18.0	4	**2.48**	63.0	2.CD.060200	.CS	.CA	■
	.081	2.05	**.484**	12.3	18.5	4	**2.48**	63.0	2.CD.060205	.CS	.CA	■
	.083	2.10	**.496**	12.6	18.9	4	**2.48**	63.0	2.CD.060210	.CS	.CA	■

■ Stock item
◪ Stock item only in one version

Complementary products	
CrazyDrill Pilot	p.161
CrazyDrill Crosspilot	p.175
CrazyDrill Coolpilot	p.189
CrazyDrill Pilot SST-Inox	p.149

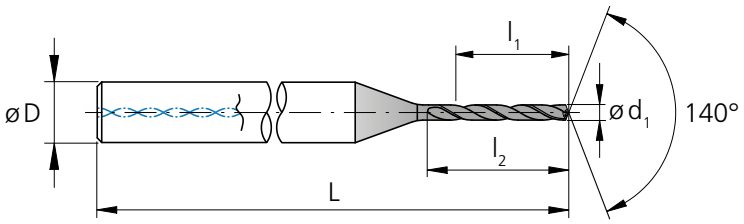
CRAZYDRILL by Mikron Tool Cool

CrazyDrill Cool 6 x d - coated / uncoated

DRILLING WITH INTERNAL COOLING

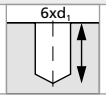
CS eXedur RI/RIP

CA Uncoated



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.085	2.15	**.508**	12.9	19.4	4	**2.48**	63.0	2.CD.060215	.CS	.CA	■
	.087	2.20	**.520**	13.2	19.8	4	**2.48**	63.0	2.CD.060220	.CS	.CA	■
	.089	2.25	**.531**	13.5	20.3	4	**2.48**	63.0	2.CD.060225	.CS	.CA	■
	.091	2.30	**.543**	13.8	20.7	4	**2.56**	65.0	2.CD.060230	.CS	.CA	■
	.093	2.35	**.555**	14.1	21.2	4	**2.56**	65.0	2.CD.060235	.CS	.CA	■
3/32	**.0937**	2.381	**.567**	14.4	21.6	4	**2.56**	65.0	2.CD.060F332	.CS	-	◪
	.094	2.40	**.567**	14.4	21.6	4	**2.56**	65.0	2.CD.060240	.CS	.CA	■
	.096	2.45	**.579**	14.7	22.1	4	**2.56**	65.0	2.CD.060245	.CS	.CA	■
	.098	2.50	**.591**	15.0	22.5	4	**2.56**	65.0	2.CD.060250	.CS	.CA	■
	.100	2.55	**.602**	15.3	22.7	4	**2.56**	65.0	2.CD.060255	.CS	.CA	■
	.102	2.60	**.614**	15.6	23.4	4	**2.62**	66.5	2.CD.060260	.CS	.CA	■
	.104	2.65	**.626**	15.9	23.9	4	**2.62**	66.5	2.CD.060265	.CS	.CA	■
	.106	2.70	**.638**	16.2	24.3	4	**2.62**	66.5	2.CD.060270	.CS	.CA	■
	.108	2.75	**.650**	16.5	24.8	4	**2.70**	68.5	2.CD.060275	.CS	.CA	■
	.110	2.80	**.661**	16.8	25.2	4	**2.70**	68.5	2.CD.060280	.CS	.CA	■
	.112	2.85	**.673**	17.1	25.7	4	**2.70**	68.5	2.CD.060285	.CS	.CA	■
	.114	2.90	**.685**	17.4	26.1	4	**2.70**	68.5	2.CD.060290	.CS	.CA	■
	.116	2.95	**.697**	17.7	26.6	4	**2.70**	68.5	2.CD.060295	.CS	.CA	■
	.118	3.00	**.709**	18.0	27.0	6	**2.87**	73.0	2.CD.060300	.CS	.CA	■
	.120	3.05	**.720**	18.3	27.5	6	**2.87**	73.0	2.CD.060305	.CS	.CA	■
	.122	3.10	**.732**	18.6	27.9	6	**2.87**	73.0	2.CD.060310	.CS	.CA	■
	.124	3.15	**.744**	18.9	28.4	6	**2.87**	73.0	2.CD.060315	.CS	.CA	■
1/8	**.1250**	3.175	**.756**	19.2	28.8	6	**2.87**	73.0	2.CD.060F18	.CS	-	◪
	.126	3.20	**.756**	19.2	28.8	6	**2.87**	73.0	2.CD.060320	.CS	.CA	■
	.128	3.25	**.768**	19.5	29.3	6	**2.87**	73.0	2.CD.060325	.CS	.CA	■
	.130	3.30	**.780**	19.8	29.7	6	**2.97**	75.5	2.CD.060330	.CS	.CA	■
	.132	3.35	**.791**	20.1	30.2	6	**2.97**	75.5	2.CD.060335	.CS	.CA	■
	.134	3.40	**.803**	20.4	30.6	6	**2.97**	75.5	2.CD.060340	.CS	.CA	■
	.136	3.45	**.815**	20.7	31.1	6	**2.97**	75.5	2.CD.060345	.CS	.CA	■
	.138	3.50	**.827**	21.0	31.5	6	**2.97**	75.5	2.CD.060350	.CS	.CA	■
	.140	3.55	**.839**	21.3	32.0	6	**2.97**	75.5	2.CD.060355	.CS	.CA	■
	.142	3.60	**.850**	21.6	32.4	6	**3.05**	77.5	2.CD.060360	.CS	.CA	■

■ Stock item
◪ Stock item only in one version

Carbide			Z2	

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0	**+ .00024"** **+ .00004"**	+ 0.006 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.144	3.65	**.862**	21.9	32.9	6	**3.05**	77.5	2.CD.060365	.CS	.CA	■
	.146	3.70	**.874**	22.2	33.3	6	**3.05**	77.5	2.CD.060370	.CS	.CA	■
	.148	3.75	**.886**	22.5	33.8	6	**3.05**	77.5	2.CD.060375	.CS	.CA	■
	.150	3.80	**.898**	22.8	34.2	6	**3.05**	77.5	2.CD.060380	.CS	.CA	■
	.152	3.85	**.909**	23.1	34.7	6	**3.11**	79.0	2.CD.060385	.CS	.CA	■
	.154	3.90	**.921**	23.4	35.1	6	**3.11**	79.0	2.CD.060390	.CS	.CA	■
	.156	3.95	**.933**	23.7	35.6	6	**3.11**	79.0	2.CD.060395	.CS	.CA	■
5/32	**.1562**	3.968	.945	24.0	36.0	6	**3.11**	79.0	2.CD.060F532	.CS	-	◪
	.157	4.00	**.945**	24.0	36.0	6	**3.11**	79.0	2.CD.060400	.CS	.CA	■
	.161	4.10	**.969**	24.6	35.3	6	**3.17**	80.5	2.CD.060410	.CS	.CA	■
	.165	4.20	**.992**	25.2	36.1	6	**3.17**	80.5	2.CD.060420	.CS	.CA	■
	.169	4.30	**1.02**	25.8	36.1	6	**3.17**	80.5	2.CD.060430	.CS	.CA	■
	.173	4.40	**1.04**	26.4	37.0	6	**3.17**	80.5	2.CD.060440	.CS	.CA	■
	.177	4.50	**1.06**	27.0	37.8	6	**3.17**	80.5	2.CD.060450	.CS	.CA	■
	.181	4.60	**1.09**	27.6	38.6	6	**3.17**	80.5	2.CD.060460	.CS	.CA	■
	.185	4.70	**1.11**	28.2	39.5	6	**3.33**	84.5	2.CD.060470	.CS	.CA	■
3/16	**.1875**	4.762	**1.13**	28.8	40.3	6	**3.33**	84.5	2.CD.060F316	.CS	-	◪
	.189	4.80	**1.13**	28.8	40.3	6	**3.33**	84.5	2.CD.060480	.CS	.CA	■
	.193	4.90	**1.16**	29.4	41.2	6	**3.33**	84.5	2.CD.060490	.CS	.CA	■
	.197	5.00	**1.18**	30.0	42.0	6	**3.33**	84.5	2.CD.060500	.CS	.CA	■
	.201	5.10	**1.20**	30.6	40.8	6	**3.33**	84.5	2.CD.060510	.CS	.CA	■
	.205	5.20	**1.23**	31.2	41.6	6	**3.33**	84.5	2.CD.060520	.CS	.CA	■
	.209	5.30	**1.25**	31.8	42.4	6	**3.33**	84.5	2.CD.060530	.CS	.CA	■
	.213	5.40	**1.28**	32.4	45.4	6	**3.46**	88.0	2.CD.060540	.CS	.CA	■
	.217	5.50	**1.30**	33.0	46.2	6	**3.46**	88.0	2.CD.060550	.CS	.CA	■
7/32	**.2189**	5.560	**1.32**	33.6	47.0	6	**3.46**	88.0	2.CD.060F732	.CS	-	◪
	.220	5.60	**1.32**	33.6	47.0	6	**3.46**	88.0	2.CD.060560	.CS	.CA	■
	.224	5.70	**1.35**	34.2	45.6	6	**3.46**	88.0	2.CD.060570	.CS	.CA	■
	.228	5.80	**1.37**	34.8	46.4	6	**3.46**	88.0	2.CD.060580	.CS	.CA	■
	.232	5.90	**1.39**	35.4	47.2	6	**3.46**	88.0	2.CD.060590	.CS	.CA	■
	.236	6.00	**1.42**	36.0	48.0	6	**3.46**	88.0	2.CD.060600	.CS	.CA	■

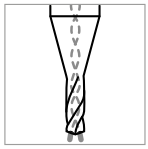
■ Stock item
◪ Stock item only in one version

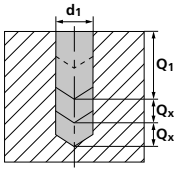
Complementary products	
CrazyDrill Pilot	p.161
CrazyDrill Crosspilot	p.175
CrazyDrill Coolpilot	p.189
CrazyDrill Pilot SST-Inox	p.149

CRAZYDRILL by Mikron Tool Cool

CrazyDrill Cool 6 x d - coated

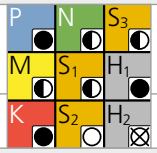
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	80 | 262	6xd1	–
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	80 | 262	6xd1	–
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | 197	6xd1	–
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	50 | 164	0.5xd1	0.25xd1
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	40 | 131	0.5xd1	0.25xd1
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	40 | 131	0.5xd1	0.25xd1
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	40 | 131	0.5xd1	0.25xd1
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	80 | 262	6xd1	–
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	300 | 984	6xd1	–
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | 656	6xd1	–
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	100 | 328	1.5xd1	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 | 459	1xd1	0.5xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	120 | 394	2xd1	1xd1
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	200 | 656	6xd1	–
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625	20 | 66	0.5xd1	0.25xd1
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	20 | 66	0.5xd1	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20 | 66	0.5xd1	0.25xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	20 | 66	0.5xd1	0.25xd1
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	40 | 131	0.5xd1	0.25xd1
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



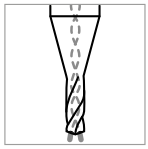
f [mm/rev] **| [IPR]**

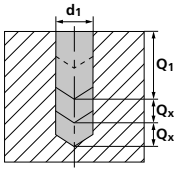
Ød1	1/32" 0.8 mm | .032"		1.0 mm | .039"	1.25 mm | .049"	1/16" 1.5 mm | .059"	2.0 mm | .079"	3/32" 2.5 mm | .098"	1/8" 3.0 mm | .118"	5/32" 4.0 mm | .158"	3/16" - 7/32" 5.0 mm | .197"	6.0 mm | .236"
	f		f	f	f	f	f	f	f	f	f
	0.050 | .0020		0.080 | .0031	0.110 | .0043	0.140 | .0055	0.180 | .0071	0.210 | .0083	0.240 | .0094	0.280 | .0110	0.310 | .0122	0.340 | .0134
	0.050 | .0020		0.080 | .0031	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.170 | .0067	0.190 | .0075	0.220 | .0087	0.240 | .0094	0.260 | .0102
	0.020 | .0008		0.050 | .0020	0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.180 | .0071	0.200 | .0079	0.220 | .0087
	0.011 | .0004		0.030 | .0012	0.045 | .0018	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.120 | .0047	0.130 | .0051	0.140 | .0055
	0.020 | .0008		0.050 | .0020	0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.180 | .0071	0.200 | .0079	0.220 | .0087
	0.010 | .0004		0.020 | .0008	0.030 | .0012	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.110 | .0043	0.120 | .0047	0.130 | .0051
	0.010 | .0004		0.020 | .0008	0.030 | .0012	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.110 | .0043	0.120 | .0047	0.130 | .0051
	0.075 | .0030		0.100 | .0039	0.120 | .0047	0.140 | .0055	0.170 | .0067	0.190 | .0075	0.210 | .0083	0.240 | .0094	0.260 | .0102	0.280 | .0110
	0.050 | .0020		0.060 | .0024	0.070 | .0028	0.080 | .0031	0.090 | .0035	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.180 | .0071	0.220 | .0087
	0.070 | .0028		0.080 | .0031	0.090 | .0035	0.110 | .0043	0.130 | .0051	0.160 | .0063	0.180 | .0071	0.210 | .0083	0.240 | .0094	0.260 | .0102
	0.055 | .0022		0.065 | .0026	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.110 | .0043	0.130 | .0051	0.140 | .0055	0.170 | .0067	0.200 | .0079
	0.055 | .0022		0.065 | .0026	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.110 | .0043	0.130 | .0051	0.140 | .0055	0.170 | .0067	0.200 | .0079
	0.080 | .0031		0.100 | .0039	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.170 | .0067	0.190 | .0075	0.200 | .0079	0.210 | .0083	0.230 | .0091
	0.020 | .0008		0.030 | .0012	0.040 | .0016	0.055 | .0022	0.070 | .0028	0.090 | .0035	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.200 | .0079
	0.009 | .0004		0.012 | .0005	0.014 | .0006	0.017 | .0007	0.020 | .0008	0.022 | .0009	0.024 | .0009	0.034 | .0013	0.039 | .0015	0.044 | .0017
	0.020 | .0008		0.030 | .0012	0.045 | .0018	0.060 | .0024	0.075 | .0030	0.090 | .0035	0.100 | .0039	0.110 | .0043	0.130 | .0051	0.150 | .0059
	0.020 | .0008		0.030 | .0012	0.045 | .0018	0.060 | .0024	0.075 | .0030	0.090 | .0035	0.100 | .0039	0.110 | .0043	0.130 | .0051	0.150 | .0059
	0.009 | .0004		0.012 | .0005	0.014 | .0006	0.019 | .0007	0.024 | .0009	0.029 | .0011	0.034 | .0013	0.039 | .0015	0.044 | .0017	0.054 | .0021
	0.008 | .0003		0.010 | .0004	0.012 | .0005	0.015 | .0006	0.020 | .0008	0.025 | .0010	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024

CRAZYDRILL by Mikron Tool Cool

CrazyDrill Cool 6 x d - uncoated

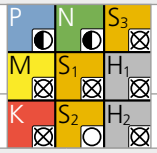
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | 197	6xd1	–
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | 197	6xd1	–
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	40 | 131	6xd1	–
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000			
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C			
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304			
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30			
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	300 | 984	6xd1	–
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | 656	6xd1	–
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	100 | 328	1.5xd1	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 | 459	1xd1	0.5xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	120 | 394	2xd1	1xd1
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	120 | 394	6xd1	–
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	20 | 66	0.5xd1	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20 | 66	0.5xd1	0.25xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25			
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1			
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] **| [IPR]**

	Ød1									
	0.8 mm **| .032"**	1.0 mm **| .039"**	1.25 mm **| .049"**	1.5 mm **| .059"**	2.0 mm **| .079"**	2.5 mm **| .098"**	3.0 mm **| .118"**	4.0 mm **| .158"**	35.0 mm **| .197"**	6.0 mm **| .236"**
	f	**f**	**f**	**f**	**f**	**f**	**f**	**f**	**f**	**f**
	0.040 **| .0016**	0.060 **| .0024**	0.090 **| .0035**	0.120 **| .0047**	0.160 **| .0063**	0.180 **| .0071**	0.220 **| .0087**	0.260 **| .0102**	0.280 **| .0110**	0.300 **| .0118**
	0.030 **| .0012**	0.050 **| .0020**	0.080 **| .0031**	0.100 **| .0039**	0.140 **| .0055**	0.160 **| .0063**	0.180 **| .0071**	0.200 **| .0079**	0.220 **| .0087**	0.240 **| .0094**
	0.020 **| .0008**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.120 **| .0047**	0.140 **| .0055**	0.160 **| .0063**	0.180 **| .0071**	0.200 **| .0079**
	Recommended: CrazyDrill Cool - coated									
	Recommended: CrazyDrill Cool - coated									
	0.050 **| .0020**	0.060 **| .0024**	0.070 **| .0028**	0.080 **| .0031**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**	0.150 **| .0059**	0.180 **| .0071**	0.220 **| .0087**
	0.070 **| .0028**	0.080 **| .0031**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**	0.160 **| .0063**	0.180 **| .0071**	0.210 **| .0083**	0.240 **| .0094**	0.260 **| .0102**
	0.055 **| .0022**	0.065 **| .0026**	0.080 **| .0031**	0.090 **| .0035**	0.100 **| .0039**	0.110 **| .0043**	0.130 **| .0051**	0.140 **| .0055**	0.170 **| .0067**	0.200 **| .0079**
	0.055 **| .0022**	0.065 **| .0026**	0.080 **| .0031**	0.090 **| .0035**	0.100 **| .0039**	0.110 **| .0043**	0.130 **| .0051**	0.140 **| .0055**	0.170 **| .0067**	0.200 **| .0079**
	0.080 **| .0031**	0.100 **| .0039**	0.110 **| .0043**	0.130 **| .0051**	0.150 **| .0059**	0.170 **| .0067**	0.190 **| .0075**	0.200 **| .0079**	0.210 **| .0083**	0.230 **| .0091**
	0.020 **| .0008**	0.030 **| .0012**	0.040 **| .0016**	0.055 **| .0022**	0.070 **| .0028**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**	0.150 **| .0059**	0.200 **| .0079**
	Recommended: CrazyDrill Cool - coated									
	0.020 **| .0008**	0.030 **| .0012**	0.045 **| .0018**	0.060 **| .0024**	0.075 **| .0030**	0.090 **| .0035**	0.100 **| .0039**	0.110 **| .0043**	0.130 **| .0051**	0.150 **| .0059**
	0.020 **| .0008**	0.030 **| .0012**	0.045 **| .0018**	0.060 **| .0024**	0.075 **| .0030**	0.090 **| .0035**	0.100 **| .0039**	0.110 **| .0043**	0.130 **| .0051**	0.150 **| .0059**
	Recommended: CrazyDrill Cool - coated									
	Recommended: CrazyDrill Cool - coated									

CRAZYDRILL by Mikron Tool Cool

CrazyDrill Cool 10 x d - coated / uncoated

DRILLING WITH INTERNAL COOLING



Coated Uncoated

CrazyDrill Cool 10 x d is specially engineered for:

- **Coated version** (eXedur RI / RIP) - unalloyed, alloyed and stainless steels, cast iron and even for heat treated steels up to 55HRc.
- **Uncoated version** - non ferrous material

The through coolant holes supplies constant coolant flow to the tip. For small diameters, an additional power chamber in the shank assures a higher flowrate. Comparatively at same coolant pressure three time flowrate will be supplied to the cutting area. This technology enables high drilling speed with more effective chip removal. For coated version the high-performance eXedur RI / RIP coating provides thermal and wear protection, guaranteeing a longer tool life.

We recommend CrazyDrill Pilot or, for difficult to machine materials CrazyDrill Coolpilot / CrazyDrill Pilot SST-Inox, for hole preparation on flat and even surfaces. In case of inclined surfaces up to 60° we recommend CrazyDrill Crosspilot as pilot drill. Pilot drilling with CrazyDrill Pilot / CrazyDrill Coolpilot / CrazyDrill Pilot SST-Inox / CrazyDrill Crosspilot is the perfect start for an accurate (position and alignment accuracy) and consistent machining process guaranteed by carefully determined tool tolerances. For details see "drilling process".

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note

You couldn't find your suitable version of the CrazyDrill Cool - coated / uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

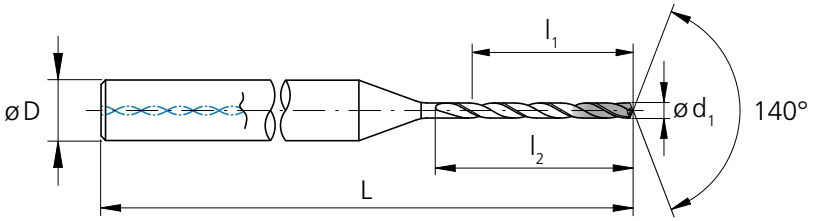
Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

Carbide | 10xd1 | 140° | Z2

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0	**+ .00024"** **+ .00004"**	+ 0.006 mm + 0.001 mm

CS eXedur RI/RIP

CA Uncoated



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.030	0.75	**.295**	7.5	9.8	3	**2.13**	54.0	2.CD.100075	.CS	.CA	■
1/32	**.0312**	0.793	**.315**	8.0	10.4	3	**2.13**	54.0	2.CD.100F132	.CS	-	◪
	.032	0.80	**.315**	8.0	10.4	3	**2.13**	54.0	2.CD.100080	.CS	.CA	■
	.033	0.85	**.335**	8.5	11.1	3	**2.20**	56.0	2.CD.100085	.CS	.CA	■
	.035	0.90	**.354**	9.0	11.7	3	**2.20**	56.0	2.CD.100090	.CS	.CA	■
	.037	0.95	**.374**	9.5	12.4	3	**2.20**	56.0	2.CD.100095	.CS	.CA	■
	.039	1.00	**.394**	10.0	13.0	4	**2.32**	59.0	2.CD.100100	.CS	.CA	■
	.041	1.05	**.413**	10.5	13.7	4	**2.32**	59.0	2.CD.100105	.CS	.CA	■
	.043	1.10	**.433**	11.0	14.3	4	**2.32**	59.0	2.CD.100110	.CS	.CA	■
	.045	1.15	**.453**	11.5	15.0	4	**2.32**	59.0	2.CD.100115	.CS	.CA	■
	.047	1.20	**.472**	12.0	15.6	4	**2.42**	61.5	2.CD.100120	.CS	.CA	■
	.049	1.25	**.492**	12.5	16.3	4	**2.42**	61.5	2.CD.100125	.CS	.CA	■
	.051	1.30	**.512**	13.0	16.9	4	**2.42**	61.5	2.CD.100130	.CS	.CA	■
	.053	1.35	**.531**	13.5	17.6	4	**2.42**	61.5	2.CD.100135	.CS	.CA	■
	.055	1.40	**.551**	14.0	18.0	4	**2.42**	61.5	2.CD.100140	.CS	.CA	■
	.057	1.45	**.571**	14.5	18.9	4	**2.50**	63.5	2.CD.100145	.CS	.CA	■
	.059	1.50	**.591**	15.0	19.5	4	**2.50**	63.5	2.CD.100150	.CS	.CA	■
	.061	1.55	**.610**	15.5	20.2	4	**2.50**	63.5	2.CD.100155	.CS	.CA	■
1/16	**.0625**	1.587	**.630**	16.0	20.8	4	**2.60**	66.0	2.CD.100F116	.CS	-	◪
	.063	1.60	**.630**	16.0	20.8	4	**2.60**	66.0	2.CD.100160	.CS	.CA	■
	.065	1.65	**.650**	16.5	21.5	4	**2.60**	66.0	2.CD.100165	.CS	.CA	■
	.067	1.70	**.669**	17.0	22.1	4	**2.60**	66.0	2.CD.100170	.CS	.CA	■
	.069	1.75	**.689**	17.5	22.8	4	**2.60**	66.0	2.CD.100175	.CS	.CA	■
	.071	1.80	**.709**	18.0	23.4	4	**2.68**	68.0	2.CD.100180	.CS	.CA	■
	.073	1.85	**.728**	18.5	24.1	4	**2.68**	68.0	2.CD.100185	.CS	.CA	■
	.075	1.90	**.748**	19.0	24.7	4	**2.68**	68.0	2.CD.100190	.CS	.CA	■
	.077	1.95	**.768**	19.5	25.0	4	**2.68**	68.0	2.CD.100195	.CS	.CA	■
	.079	2.00	**.787**	20.0	26.0	4	**2.76**	70.0	2.CD.100200	.CS	.CA	■
	.081	2.05	**.807**	20.5	26.7	4	**2.76**	70.0	2.CD.100205	.CS	.CA	■
	.083	2.10	**.827**	21.0	27.3	4	**2.76**	70.0	2.CD.100210	.CS	.CA	■

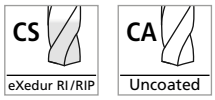
■ Stock item
◪ Stock item only in one version

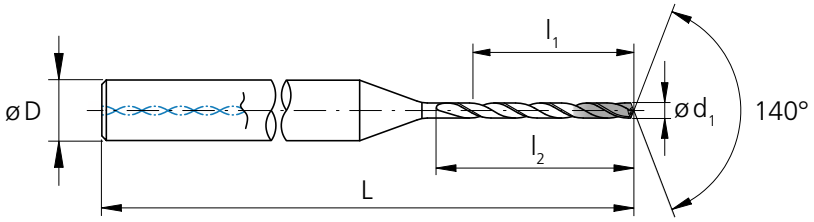
Complementary products	
CrazyDrill Pilot	p.161
CrazyDrill Crosspilot	p.175
CrazyDrill Coolpilot	p.189
CrazyDrill Pilot SST-Inox	p.149

CRAZYDRILL by Mikron Tool Cool

CrazyDrill Cool 10 x d - coated / uncoated

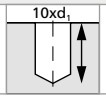
DRILLING WITH INTERNAL COOLING





d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.085	2.15	**.846**	21.5	28.0	4	**2.83**	72.0	2.CD.100215	.CS	.CA	■
	.087	2.20	**.866**	22.0	28.6	4	**2.83**	72.0	2.CD.100220	.CS	.CA	■
	.089	2.25	**.886**	22.5	29.3	4	**2.83**	72.0	2.CD.100225	.CS	.CA	■
	.091	2.30	**.906**	23.0	29.9	4	**2.91**	74.0	2.CD.100230	.CS	.CA	■
	.093	2.35	**.925**	23.5	30.6	4	**2.91**	74.0	2.CD.100235	.CS	.CA	■
3/32	**.0937**	2.381	**.945**	24.0	31.2	4	**2.91**	74.0	2.CD.100F332	.CS	-	◪
	.094	2.40	**.945**	24.0	31.2	4	**2.91**	74.0	2.CD.100240	.CS	.CA	■
	.096	2.45	**.965**	24.5	31.9	4	**2.97**	75.5	2.CD.100245	.CS	.CA	■
	.098	2.50	**.984**	25.0	32.5	4	**2.97**	75.5	2.CD.100250	.CS	.CA	■
	.100	2.55	**1.00**	25.5	33.2	4	**2.97**	75.5	2.CD.100255	.CS	.CA	■
	.102	2.60	**1.02**	26.0	33.8	4	**3.05**	77.5	2.CD.100260	.CS	.CA	■
	.104	2.65	**1.04**	26.5	34.5	4	**3.05**	77.5	2.CD.100265	.CS	.CA	■
	.106	2.70	**1.06**	27.0	35.1	4	**3.05**	77.5	2.CD.100270	.CS	.CA	■
	.108	2.75	**1.08**	27.5	35.8	4	**3.11**	79.0	2.CD.100275	.CS	.CA	■
	.110	2.80	**1.10**	28.0	36.4	4	**3.11**	79.0	2.CD.100280	.CS	.CA	■
	.112	2.85	**1.12**	28.5	37.1	4	**3.11**	79.0	2.CD.100285	.CS	.CA	■
	.114	2.90	**1.14**	29.0	37.7	4	**3.17**	80.5	2.CD.100290	.CS	.CA	■
	.116	2.95	**1.16**	29.5	38.4	4	**3.17**	80.5	2.CD.100295	.CS	.CA	■
	.118	3.00	**1.18**	30.0	39.0	6	**3.35**	85.0	2.CD.100300	.CS	.CA	■
	.120	3.05	**1.20**	30.5	39.7	6	**3.35**	85.0	2.CD.100305	.CS	.CA	■
	.122	3.10	**1.22**	31.0	40.3	6	**3.35**	85.0	2.CD.100310	.CS	.CA	■
	.124	3.15	**1.24**	31.5	41.0	6	**3.41**	86.5	2.CD.100315	.CS	.CA	■
1/8	**.1250**	3.175	**1.26**	32.0	41.6	6	**3.41**	86.5	2.CD.100F18	.CS	-	◪
	.126	3.20	**1.26**	32.0	41.6	6	**3.41**	86.5	2.CD.100320	.CS	.CA	■
	.128	3.25	**1.28**	32.5	42.3	6	**3.41**	86.5	2.CD.100325	.CS	.CA	■
	.130	3.30	**1.30**	33.0	42.9	6	**3.41**	86.5	2.CD.100330	.CS	.CA	■
	.132	3.35	**1.32**	33.5	43.6	6	**3.50**	89.0	2.CD.100335	.CS	.CA	■
	.134	3.40	**1.34**	34.0	44.2	6	**3.50**	89.0	2.CD.100340	.CS	.CA	■
	.136	3.45	**1.36**	34.5	44.9	6	**3.50**	89.0	2.CD.100345	.CS	.CA	■
	.138	3.50	**1.38**	35.0	45.5	6	**3.58**	91.0	2.CD.100350	.CS	.CA	■
	.140	3.55	**1.40**	35.5	46.2	6	**3.58**	91.0	2.CD.100355	.CS	.CA	■
	.142	3.60	**1.42**	36.0	46.8	6	**3.58**	91.0	2.CD.100360	.CS	.CA	■

■ Stock item
◪ Stock item only in one version

Carbide |  |  | Z2 | 

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0	**+ .00024"** **+ .00004"**	+ 0.006 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.144	3.65	**1.44**	36.5	47.5	6	**3.58**	91.0	2.CD.100365	.CS	.CA	■
	.146	3.70	**1.46**	37.0	48.1	6	**3.66**	93.0	2.CD.100370	.CS	.CA	■
	.148	3.75	**1.48**	37.5	48.8	6	**3.66**	93.0	2.CD.100375	.CS	.CA	■
	.150	3.80	**1.50**	38.0	49.4	6	**3.66**	93.0	2.CD.100380	.CS	.CA	■
	.152	3.85	**1.52**	38.5	50.1	6	**3.74**	95.0	2.CD.100385	.CS	.CA	■
	.154	3.90	**1.54**	39.0	50.7	6	**3.74**	95.0	2.CD.100390	.CS	.CA	■
	.156	3.95	**1.56**	39.5	51.4	6	**3.74**	95.0	2.CD.100395	.CS	.CA	■
5/32	**.1562**	3.968	**1.57**	40.0	52.0	6	**3.74**	95.0	2.CD.100F532	.CS	-	◪
	.157	4.00	**1.57**	40.0	52.0	6	**3.74**	95.0	2.CD.100400	.CS	.CA	■
	.161	4.10	**1.61**	41.0	53.3	6	**3.88**	98.5	2.CD.100410	.CS	.CA	■
	.165	4.20	**1.65**	42.0	54.6	6	**3.88**	98.5	2.CD.100420	.CS	.CA	■
	.169	4.30	**1.69**	43.0	54.2	6	**3.88**	98.5	2.CD.100430	.CS	.CA	■
	.173	4.40	**1.73**	44.0	55.4	6	**3.88**	98.5	2.CD.100440	.CS	.CA	■
	.177	4.50	**1.77**	45.0	54.9	6	**3.88**	98.5	2.CD.100450	.CS	.CA	■
	.181	4.60	**1.81**	46.0	56.1	6	**3.88**	98.5	2.CD.100460	.CS	.CA	■
	.185	4.70	**1.85**	47.0	61.1	6	**4.17**	106.0	2.CD.100470	.CS	.CA	■
3/16	**.1875**	4.762	**1.89**	48.0	62.4	6	**4.17**	106.0	2.CD.100F316	.CS	-	◪
	.189	4.80	**1.89**	48.0	62.4	6	**4.17**	106.0	2.CD.100480	.CS	.CA	■
	.193	4.90	**1.93**	49.0	61.7	6	**4.17**	106.0	2.CD.100490	.CS	.CA	■
	.197	5.00	**1.97**	50.0	63.0	6	**4.17**	106.0	2.CD.100500	.CS	.CA	■
	.201	5.10	**2.01**	51.0	64.3	6	**4.17**	106.0	2.CD.100510	.CS	.CA	■
	.205	5.20	**2.05**	52.0	62.4	6	**4.17**	106.0	2.CD.100520	.CS	.CA	■
	.209	5.30	**2.09**	53.0	63.6	6	**4.17**	106.0	2.CD.100530	.CS	.CA	■
	.213	5.40	**2.13**	54.0	70.2	6	**4.47**	113.5	2.CD.100540	.CS	.CA	■
	.217	5.50	**2.17**	55.0	71.5	6	**4.47**	113.5	2.CD.100550	.CS	.CA	■
7/32	**.2189**	5.560	**2.20**	56.0	72.8	6	**4.47**	113.5	2.CD.100F732	.CS	-	◪
	.220	5.60	**2.20**	56.0	72.8	6	**4.47**	113.5	2.CD.100560	.CS	.CA	■
	.224	5.70	**2.24**	57.0	71.8	6	**4.47**	113.5	2.CD.100570	.CS	.CA	■
	.228	5.80	**2.28**	58.0	73.1	6	**4.47**	113.5	2.CD.100580	.CS	.CA	■
	.232	5.90	**2.32**	59.0	72.0	6	**4.47**	113.5	2.CD.100590	.CS	.CA	■
	.236	6.00	**2.36**	60.0	73.2	6	**4.47**	113.5	2.CD.100600	.CS	.CA	■

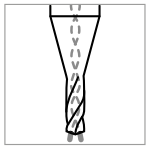
■ Stock item
◪ Stock item only in one version

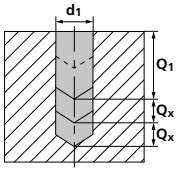
Complementary products	
CrazyDrill Pilot	p.161
CrazyDrill Crosspilot	p.175
CrazyDrill Coolpilot	p.189
CrazyDrill Pilot SST-Inox	p.149

CRAZYDRILL by Mikron Tool Cool

CrazyDrill Cool 10 x d - coated

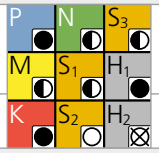
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	80 | 262	6xd1	2xd1
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	80 | 262	6xd1	2xd1
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | 197	6xd1	2xd1
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	50 | 164	0.5xd1	0.25xd1
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	40 | 131	0.5xd1	0.25xd1
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	40 | 131	0.5xd1	0.25xd1
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	40 | 131	0.5xd1	0.25xd1
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	80 | 262	10xd1	–
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	300 | 984	10xd1	–
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | 656	10xd1	–
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	100 | 328	1.5xd1	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 | 459	1xd1	0.5xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	120 | 394	2xd1	1xd1
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	200 | 656	10xd1	–
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625	20 | 66	0.5xd1	0.25xd1
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	20 | 66	0.5xd1	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20 | 66	0.5xd1	0.25xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	20 | 66	0.5xd1	0.25xd1
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	40 | 131	0.5xd1	0.25xd1
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



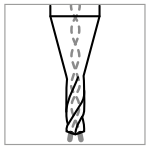
f [mm/rev] **| [IPR]**

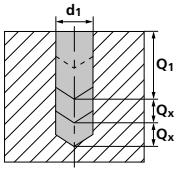
Ød1	1/32" 0.8 mm | .032"		1.0 mm | .039"		1.25 mm | .049"	1/16" 1.5 mm | .059"	2.0 mm | .079"	3/32" 2.5 mm | .098"	1/8" 3.0 mm | .118"	5/32" 4.0 mm | .158"	3/16" - 7/32" 5.0 mm | .197"	6.0 mm | .236"
	f		f		f	f	f	f	f	f	f	f
	0.050 | .0020		0.080 | .0031		0.110 | .0043	0.140 | .0055	0.180 | .0071	0.210 | .0083	0.240 | .0094	0.280 | .0110	0.310 | .0122	0.340 | .0134
	0.050 | .0020		0.080 | .0031		0.100 | .0039	0.120 | .0047	0.150 | .0059	0.170 | .0067	0.190 | .0075	0.220 | .0087	0.240 | .0094	0.260 | .0102
	0.020 | .0008		0.050 | .0020		0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.180 | .0071	0.200 | .0079	0.220 | .0087
	0.011 | .0004		0.030 | .0012		0.045 | .0018	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.120 | .0047	0.130 | .0051	0.140 | .0055
	0.020 | .0008		0.050 | .0020		0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.180 | .0071	0.200 | .0079	0.220 | .0087
	0.010 | .0004		0.020 | .0008		0.030 | .0012	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.110 | .0043	0.120 | .0047	0.130 | .0051
	0.010 | .0004		0.020 | .0008		0.030 | .0012	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.110 | .0043	0.120 | .0047	0.130 | .0051
	0.065 | .0026		0.090 | .0035		0.110 | .0043	0.130 | .0051	0.160 | .0063	0.180 | .0071	0.200 | .0079	0.230 | .0091	0.250 | .0098	0.270 | .0106
	0.040 | .0016		0.050 | .0020		0.060 | .0024	0.075 | .0030	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.140 | .0055	0.170 | .0067	0.200 | .0079
	0.060 | .0024		0.070 | .0028		0.080 | .0031	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.170 | .0067	0.200 | .0079	0.220 | .0087	0.250 | .0098
	0.045 | .0018		0.055 | .0022		0.070 | .0028	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.190 | .0075
	0.045 | .0018		0.055 | .0022		0.070 | .0028	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.190 | .0075
	0.070 | .0028		0.090 | .0035		0.100 | .0039	0.120 | .0047	0.135 | .0053	0.150 | .0059	0.170 | .0067	0.190 | .0075	0.200 | .0079	0.220 | .0087
	0.015 | .0006		0.025 | .0010		0.035 | .0014	0.050 | .0020	0.065 | .0026	0.085 | .0033	0.100 | .0039	0.120 | .0047	0.140 | .0055	0.190 | .0075
	0.007 | .0003		0.010 | .0004		0.012 | .0005	0.015 | .0006	0.018 | .0007	0.020 | .0008	0.022 | .0009	0.032 | .0013	0.037 | .0015	0.042 | .0017
	0.010 | .0004		0.020 | .0008		0.035 | .0014	0.050 | .0020	0.065 | .0026	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.120 | .0047	0.140 | .0055
	0.010 | .0004		0.020 | .0008		0.035 | .0014	0.050 | .0020	0.065 | .0026	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.120 | .0047	0.140 | .0055
	0.007 | .0003		0.010 | .0004		0.012 | .0005	0.017 | .0007	0.022 | .0009	0.027 | .0011	0.032 | .0013	0.037 | .0015	0.042 | .0017	0.052 | .0020
	0.008 | .0003		0.010 | .0004		0.012 | .0005	0.015 | .0006	0.020 | .0008	0.025 | .0010	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024

CRAZYDRILL by Mikron Tool Cool

CrazyDrill Cool 10 x d - uncoated

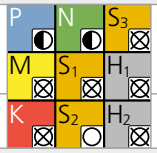
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | 197	6xd1	2xd1
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | 197	6xd1	2xd1
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	40 | 131	6xd1	2xd1
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000			
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C			
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304			
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30			
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	300 | 984	10xd1	–
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | 656	10xd1	–
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	100 | 328	1.5xd1	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 | 459	1xd1	0.5xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	120 | 394	2xd1	1xd1
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	120 | 394	10xd1	–
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	20 | 66	0.5xd1	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20 | 66	0.5xd1	0.25xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25			
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1			
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] **| [IPR]**

	Ød1									
	0.8 mm **| .032"**	1.0 mm **| .039"**	1.25 mm **| .049"**	1.5 mm **| .059"**	2.0 mm **| .079"**	2.5 mm **| .098"**	3.0 mm **| .118"**	4.0 mm **| .158"**	5.0 mm **| .197"**	6.0 mm **| .236"**
	f	**f**	**f**	**f**	**f**	**f**	**f**	**f**	**f**	**f**
	0.055 **| .0022**	0.080 **| .0031**	0.110 **| .0043**	0.140 **| .0055**	0.180 **| .0071**	0.210 **| .0083**	0.240 **| .0094**	0.280 **| .0110**	0.310 **| .0122**	0.340 **| .0134**
	0.055 **| .0022**	0.080 **| .0031**	0.100 **| .0039**	0.120 **| .0047**	0.150 **| .0059**	0.170 **| .0067**	0.190 **| .0075**	0.220 **| .0087**	0.240 **| .0094**	0.260 **| .0102**
	0.020 **| .0008**	0.050 **| .0020**	0.065 **| .0026**	0.080 **| .0031**	0.110 **| .0043**	0.130 **| .0051**	0.150 **| .0059**	0.180 **| .0071**	0.200 **| .0079**	0.220 **| .0087**
	Recommended: CrazyDrill Cool - coated									
	Recommended: CrazyDrill Cool - coated									
	0.040 **| .0016**	0.050 **| .0020**	0.060 **| .0024**	0.075 **| .0030**	0.080 **| .0031**	0.100 **| .0039**	0.120 **| .0047**	0.140 **| .0055**	0.170 **| .0067**	0.200 **| .0079**
	0.060 **| .0024**	0.070 **| .0028**	0.080 **| .0031**	0.100 **| .0039**	0.120 **| .0047**	0.150 **| .0059**	0.170 **| .0067**	0.200 **| .0079**	0.220 **| .0087**	0.250 **| .0098**
	0.045 **| .0018**	0.055 **| .0022**	0.070 **| .0028**	0.080 **| .0031**	0.090 **| .0035**	0.100 **| .0039**	0.110 **| .0043**	0.130 **| .0051**	0.150 **| .0059**	0.190 **| .0075**
	0.045 **| .0018**	0.055 **| .0022**	0.070 **| .0028**	0.080 **| .0031**	0.090 **| .0035**	0.100 **| .0039**	0.110 **| .0043**	0.130 **| .0051**	0.150 **| .0059**	0.190 **| .0075**
	0.070 **| .0028**	0.090 **| .0035**	0.100 **| .0039**	0.120 **| .0047**	0.135 **| .0053**	0.150 **| .0059**	0.170 **| .0067**	0.190 **| .0075**	0.200 **| .0079**	0.220 **| .0087**
	0.015 **| .0006**	0.025 **| .0010**	0.035 **| .0014**	0.050 **| .0020**	0.065 **| .0026**	0.085 **| .0033**	0.100 **| .0039**	0.120 **| .0047**	0.140 **| .0055**	0.190 **| .0075**
	Recommended: CrazyDrill Cool - coated									
	0.010 **| .0004**	0.020 **| .0008**	0.035 **| .0014**	0.050 **| .0020**	0.065 **| .0026**	0.080 **| .0031**	0.090 **| .0035**	0.100 **| .0039**	0.120 **| .0047**	0.140 **| .0055**
	0.010 **| .0004**	0.020 **| .0008**	0.035 **| .0014**	0.050 **| .0020**	0.065 **| .0026**	0.080 **| .0031**	0.090 **| .0035**	0.100 **| .0039**	0.120 **| .0047**	0.140 **| .0055**
	Recommended: CrazyDrill Cool - coated									
	Recommended: CrazyDrill Cool - coated									

CrazyDrill Cool 15 x d - coated / uncoated

DRILLING WITH INTERNAL COOLING



Coated Uncoated

CrazyDrill Cool 15 x d is specially engineered for:

- **Coated version** (eXedur RI / RIP) - unalloyed, alloyed and stainless steels, cast iron and even for heat treated steels up to 55HRC.
- **Uncoated version** - non ferrous material

With drilling depths up to 15 x d, this is a high performance improvement to the time consuming and costly deep-hole drilling methods such as gun drilling.

The through coolant holes supplies constant coolant flow to the tip. For small diameters, an additional power chamber in the shank assures a higher flowrate. Comparatively at same coolant pressure three time flowrate will be supplied to the cutting area. This technology enables high drilling speed with more effective chip removal. For coated version the high-performance eXedur RI / RIP coating provides thermal and wear protection, guaranteeing a longer tool life.

We recommend CrazyDrill Pilot or, for difficult to machine materials CrazyDrill Coolpilot / CrazyDrill Pilot SST-Inox, for hole preparation on flat and even surfaces. In case of inclined surfaces up to 60° we recommend CrazyDrill Crosspilot as pilot drill. Pilot drilling with CrazyDrill Pilot / CrazyDrill Coolpilot / CrazyDrill Pilot SST-Inox / CrazyDrill Crosspilot is the perfect start for an accurate (position and alignment accuracy) and consistent machining process guaranteed by carefully determined tool tolerances. For details see "drilling process".

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note

You couldn't find your suitable version of the CrazyDrill Cool - coated / uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

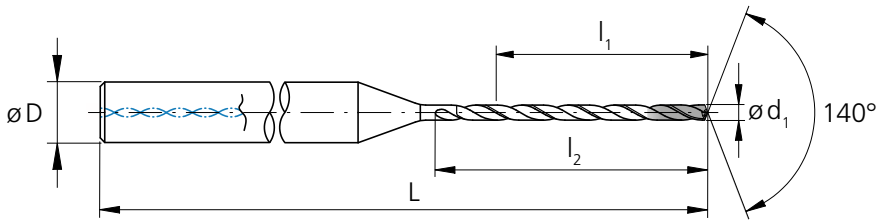
Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

Carbide | 15xd1 | 140° | Z2

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0	**+ .00024"** **+ .00004"**	+ 0.006 mm + 0.001 mm

CS eXedur RI/RIP

CA Uncoated



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.030	0.75	**.443**	11.25	13.5	3	**2.28**	58.0	2.CD.150075	.CS	.CA	■
1/32	**.0312**	0.793	**.472**	12.00	14.4	3	**2.28**	58.0	2.CD.150F132	.CS	-	◪
	.032	0.80	**.472**	12.00	14.4	3	**2.28**	58.0	2.CD.150080	.CS	.CA	■
	.033	0.85	**.502**	12.75	15.3	3	**2.36**	60.0	2.CD.150085	.CS	.CA	■
	.035	0.90	**.531**	13.50	16.2	3	**2.36**	60.0	2.CD.150090	.CS	.CA	■
	.037	0.95	**.561**	14.25	17.1	3	**2.36**	60.0	2.CD.150095	.CS	.CA	■
	.039	1.00	**.591**	15.00	18.0	4	**2.52**	64.0	2.CD.150100	.CS	.CA	■
	.041	1.05	**.620**	15.75	18.9	4	**2.52**	64.0	2.CD.150105	.CS	.CA	■
	.043	1.10	**.650**	16.50	19.8	4	**2.52**	64.0	2.CD.150110	.CS	.CA	■
	.045	1.15	**.679**	17.25	20.7	4	**2.62**	66.5	2.CD.150115	.CS	.CA	■
	.047	1.20	**.709**	18.00	21.6	4	**2.62**	66.5	2.CD.150120	.CS	.CA	■
	.049	1.25	**.738**	18.75	22.5	4	**2.62**	66.5	2.CD.150125	.CS	.CA	■
	.051	1.30	**.768**	19.50	23.4	4	**2.72**	69.0	2.CD.150130	.CS	.CA	■
	.053	1.35	**.797**	20.25	24.3	4	**2.72**	69.0	2.CD.150135	.CS	.CA	■
	.055	1.40	**.827**	21.00	25.2	4	**2.72**	69.0	2.CD.150140	.CS	.CA	■
	.057	1.45	**.856**	21.75	26.1	4	**2.81**	71.5	2.CD.150145	.CS	.CA	■
	.059	1.50	**.886**	22.50	27.0	4	**2.81**	71.5	2.CD.150150	.CS	.CA	■
	.061	1.55	**.915**	23.25	27.9	4	**2.81**	71.5	2.CD.150155	.CS	.CA	■
1/16	**.0625**	1.587	**.945**	24.00	28.8	4	**2.91**	74.0	2.CD.150F116	.CS	-	◪
	.063	1.60	**.945**	24.00	28.8	4	**2.91**	74.0	2.CD.150160	.CS	.CA	■
	.065	1.65	**.974**	24.75	29.7	4	**2.91**	74.0	2.CD.150165	.CS	.CA	■
	.067	1.70	**1.00**	25.50	30.6	4	**2.91**	74.0	2.CD.150170	.CS	.CA	■
	.069	1.75	**1.03**	26.25	31.5	4	**3.01**	76.5	2.CD.150175	.CS	.CA	■
	.071	1.80	**1.06**	27.00	32.4	4	**3.01**	76.5	2.CD.150180	.CS	.CA	■
	.073	1.85	**1.09**	27.75	33.3	4	**3.01**	76.5	2.CD.150185	.CS	.CA	■
	.075	1.90	**1.12**	28.50	34.2	4	**3.11**	79.0	2.CD.150190	.CS	.CA	■
	.077	1.95	**1.15**	29.25	35.1	4	**3.11**	79.0	2.CD.150195	.CS	.CA	■
	.079	2.00	**1.18**	30.00	36.0	4	**3.11**	79.0	2.CD.150200	.CS	.CA	■
	.081	2.05	**1.21**	30.75	36.9	4	**3.21**	81.5	2.CD.150205	.CS	.CA	■
	.083	2.10	**1.24**	31.50	37.8	4	**3.21**	81.5	2.CD.150210	.CS	.CA	■

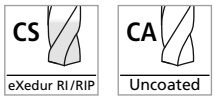
■ Stock item
◪ Stock item only in one version

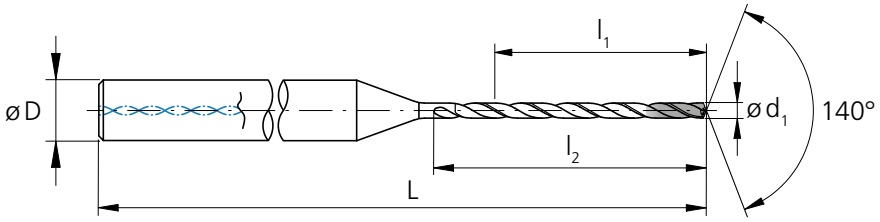
Complementary products	
CrazyDrill Pilot	p.161
CrazyDrill Crosspilot	p.175
CrazyDrill Coolpilot	p.189
CrazyDrill Pilot SST-Inox	p.149

CRAZYDRILL by Mikron Tool Cool

CrazyDrill Cool 15 x d - coated / uncoated

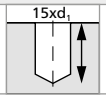
DRILLING WITH INTERNAL COOLING





d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.085	2.15	**1.27**	32.25	38.7	4	**3.21**	81.5	2.CD.150215	.CS	.CA	■
	.087	2.20	**1.30**	33.00	39.6	4	**3.31**	84.0	2.CD.150220	.CS	.CA	■
	.089	2.25	**1.33**	33.75	40.5	4	**3.31**	84.0	2.CD.150225	.CS	.CA	■
	.091	2.30	**1.36**	34.50	41.4	4	**3.31**	84.0	2.CD.150230	.CS	.CA	■
	.093	2.35	**1.39**	35.25	42.3	4	**3.41**	86.5	2.CD.150235	.CS	.CA	■
3/32	**.0937**	2.381	**1.42**	36.00	43.2	4	**3.41**	86.5	2.CD.150F332	.CS	-	◪
	.094	2.40	**1.42**	36.00	43.2	4	**3.41**	86.5	2.CD.150240	.CS	.CA	■
	.096	2.45	**1.45**	36.75	44.1	4	**3.41**	86.5	2.CD.150245	.CS	.CA	■
	.098	2.50	**1.48**	37.50	45.0	4	**3.50**	89.0	2.CD.150250	.CS	.CA	■
	.100	2.55	**1.51**	38.25	45.9	4	**3.50**	89.0	2.CD.150255	.CS	.CA	■
	.102	2.60	**1.54**	39.00	46.8	4	**3.50**	89.0	2.CD.150260	.CS	.CA	■
	.104	2.65	**1.56**	39.75	47.7	4	**3.58**	91.0	2.CD.150265	.CS	.CA	■
	.106	2.70	**1.59**	40.50	48.6	4	**3.58**	91.0	2.CD.150270	.CS	.CA	■
	.108	2.75	**1.62**	41.25	49.5	4	**3.64**	92.5	2.CD.150275	.CS	.CA	■
	.110	2.80	**1.65**	42.00	50.4	4	**3.64**	92.5	2.CD.150280	.CS	.CA	■
	.112	2.85	**1.68**	42.75	51.3	4	**3.72**	94.5	2.CD.150285	.CS	.CA	■
	.114	2.90	**1.71**	43.50	52.2	4	**3.72**	94.5	2.CD.150290	.CS	.CA	■
	.116	2.95	**1.74**	44.25	53.1	4	**3.78**	96.0	2.CD.150295	.CS	.CA	■
	.118	3.00	**1.77**	45.00	54.0	6	**3.94**	100.0	2.CD.150300	.CS	.CA	■
	.120	3.05	**1.80**	45.75	54.9	6	**3.94**	100.0	2.CD.150305	.CS	.CA	■
	.122	3.10	**1.83**	46.50	55.8	6	**3.94**	100.0	2.CD.150310	.CS	.CA	■
	.124	3.15	**1.86**	47.25	56.7	6	**4.06**	103.0	2.CD.150315	.CS	.CA	■
1/8	**.1250**	3.175	**1.89**	48.00	57.6	6	**4.06**	103.0	2.CD.150F18	.CS	-	◪
	.126	3.20	**1.89**	48.00	57.6	6	**4.06**	103.0	2.CD.150320	.CS	.CA	■
	.128	3.25	**1.92**	48.75	58.5	6	**4.06**	103.0	2.CD.150325	.CS	.CA	■
	.130	3.30	**1.95**	49.50	59.4	6	**4.06**	103.0	2.CD.150330	.CS	.CA	■
	.132	3.35	**1.98**	50.25	60.3	6	**4.17**	106.0	2.CD.150335	.CS	.CA	■
	.134	3.40	**2.01**	51.00	61.2	6	**4.17**	106.0	2.CD.150340	.CS	.CA	■
	.136	3.45	**2.04**	51.75	62.1	6	**4.17**	106.0	2.CD.150345	.CS	.CA	■
	.138	3.50	**2.07**	52.50	63.0	6	**4.27**	108.5	2.CD.150350	.CS	.CA	■
	.140	3.55	**2.10**	53.25	63.9	6	**4.27**	108.5	2.CD.150355	.CS	.CA	■
	.142	3.60	**2.13**	54.00	64.8	6	**4.27**	108.5	2.CD.150360	.CS	.CA	■

■ Stock item
◪ Stock item only in one version

Carbide |  |  | Z2 | 

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0	**+ .00024"** **+ .00004"**	+ 0.006 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.144	3.65	**2.16**	54.75	65.7	6	**4.37**	111.0	2.CD.150365	.CS	.CA	■
	.146	3.70	**2.19**	55.50	66.6	6	**4.37**	111.0	2.CD.150370	.CS	.CA	■
	.148	3.75	**2.21**	56.25	67.5	6	**4.37**	111.0	2.CD.150375	.CS	.CA	■
	.150	3.80	**2.24**	57.00	68.4	6	**4.47**	113.5	2.CD.150380	.CS	.CA	■
	.152	3.85	**2.27**	57.75	69.3	6	**4.47**	113.5	2.CD.150385	.CS	.CA	■
	.154	3.90	**2.30**	58.50	70.2	6	**4.47**	113.5	2.CD.150390	.CS	.CA	■
	.156	3.95	**2.33**	59.25	71.1	6	**4.55**	115.5	2.CD.150395	.CS	.CA	■
5/32	**.1562**	3.968	**2.36**	60.00	72.0	6	**4.55**	115.5	2.CD.150F532	.CS	-	◪
	.157	4.00	**2.36**	60.00	72.0	6	**4.55**	115.5	2.CD.150400	.CS	.CA	■
	.161	4.10	**2.42**	61.50	73.8	6	**4.78**	121.5	2.CD.150410	.CS	.CA	■
	.165	4.20	**2.48**	63.00	73.9	6	**4.78**	121.5	2.CD.150420	.CS	.CA	■
	.169	4.30	**2.54**	64.50	75.7	6	**4.78**	121.5	2.CD.150430	.CS	.CA	■
	.173	4.40	**2.60**	66.00	76.6	6	**4.78**	121.5	2.CD.150440	.CS	.CA	■
	.177	4.50	**2.66**	67.50	76.5	6	**4.78**	121.5	2.CD.150450	.CS	.CA	■
	.181	4.60	**2.72**	69.00	78.2	6	**4.78**	121.5	2.CD.150460	.CS	.CA	■
	.185	4.70	**2.78**	70.50	84.6	6	**5.18**	131.5	2.CD.150470	.CS	.CA	■
3/16	**.1875**	4.762	**2.83**	72.00	86.4	6	**5.18**	131.5	2.CD.150F316	.CS	-	◪
	.189	4.80	**2.83**	72.00	86.4	6	**5.18**	131.5	2.CD.150480	.CS	.CA	■
	.193	4.90	**2.89**	73.50	86.2	6	**5.18**	131.5	2.CD.150490	.CS	.CA	■
	.197	5.00	**2.95**	75.00	88.0	6	**5.18**	131.5	2.CD.150500	.CS	.CA	■
	.201	5.10	**3.01**	76.50	88.7	6	**5.18**	131.5	2.CD.150510	.CS	.CA	■
	.205	5.20	**3.07**	78.00	88.4	6	**5.18**	131.5	2.CD.150520	.CS	.CA	■
	.209	5.30	**3.13**	79.50	90.1	6	**5.18**	131.5	2.CD.150530	.CS	.CA	■
	.213	5.40	**3.19**	81.00	97.2	6	**5.57**	141.5	2.CD.150540	.CS	.CA	■
	.217	5.50	**3.25**	82.50	99.0	6	**5.57**	141.5	2.CD.150550	.CS	.CA	■
7/32	**.2189**	5.560	**3.31**	84.00	98.6	6	**5.57**	141.5	2.CD.150F732	.CS	-	◪
	.220	5.60	**3.31**	84.00	98.6	6	**5.57**	141.5	2.CD.150560	.CS	.CA	■
	.224	5.70	**3.37**	85.50	99.2	6	**5.57**	141.5	2.CD.150570	.CS	.CA	■
	.228	5.80	**3.43**	87.00	100.9	6	**5.57**	141.5	2.CD.150580	.CS	.CA	■
	.232	5.90	**3.48**	88.50	100.3	6	**5.57**	141.5	2.CD.150590	.CS	.CA	■
	.236	6.00	**3.54**	90.00	102.0	6	**5.57**	141.5	2.CD.150600	.CS	.CA	■

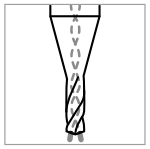
■ Stock item
◪ Stock item only in one version

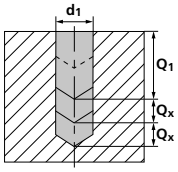
Complementary products	
CrazyDrill Pilot	p.161
CrazyDrill Crosspilot	p.175
CrazyDrill Coolpilot	p.189
CrazyDrill Pilot SST-Inox	p.149

CRAZYDRILL by Mikron Tool Cool

CrazyDrill Cool 15 x d - coated

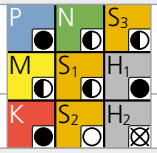
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	80 | 262	6xd1	2xd1
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	80 | 262	6xd1	2xd1
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | 197	6xd1	2xd1
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	50 | 164	0.5xd1	0.25xd1
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	40 | 131	0.5xd1	0.25xd1
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	40 | 131	0.5xd1	0.25xd1
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	40 | 131	0.5xd1	0.25xd1
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	80 | 262	15xd1	–
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	300 | 984	5xd1	1xd1
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | 656	5xd1	1xd1
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	100 | 328	1.5xd1	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 | 459	1xd1	0.5xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	120 | 394	2xd1	1xd1
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	200 | 656	10xd1	5xd1
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625	20 | 66	0.5xd1	0.25xd1
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	20 | 66	0.5xd1	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20 | 66	0.5xd1	0.25xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	20 | 66	0.5xd1	0.25xd1
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	40 | 131	0.5xd1	0.25xd1
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



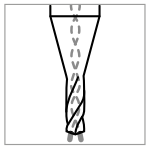
f [mm/rev] **| [IPR]**

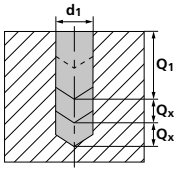
Ød1	1/32" 0.8 mm | .032" f	1.0 mm | .039" f	1.25 mm | .049" f	1/16" 1.5 mm | .059" f	2.0 mm | .079" f	3/32" 2.5 mm | .098" f	1/8" 3.0 mm | .118" f	5/32" 4.0 mm | .158" f	3/16" - 7/32" 5.0 mm | .197" f	6.0 mm | .236" f
	0.050 | .0020	0.080 | .0031	0.110 | .0043	0.140 | .0055	0.180 | .0071	0.210 | .0083	0.240 | .0094	0.280 | .0110	0.310 | .0122	0.340 | .0134
	0.050 | .0020	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.170 | .0067	0.190 | .0075	0.220 | .0087	0.240 | .0094	0.260 | .0102
	0.020 | .0008	0.050 | .0020	0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.180 | .0071	0.200 | .0079	0.220 | .0087
	0.011 | .0004	0.030 | .0012	0.045 | .0018	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.120 | .0047	0.130 | .0051	0.140 | .0055
	0.020 | .0008	0.050 | .0020	0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.150 | .0059	0.180 | .0071	0.200 | .0079	0.220 | .0087
	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.110 | .0043	0.120 | .0047
	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.110 | .0043	0.120 | .0047
	0.055 | .0022	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.170 | .0067	0.190 | .0075	0.220 | .0087	0.240 | .0094	0.260 | .0102
	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.065 | .0026	0.070 | .0028	0.090 | .0035	0.110 | .0043	0.130 | .0051	0.160 | .0063	0.190 | .0075
	0.050 | .0020	0.060 | .0024	0.070 | .0028	0.090 | .0035	0.110 | .0043	0.140 | .0055	0.160 | .0063	0.190 | .0075	0.210 | .0083	0.240 | .0094
	0.035 | .0014	0.045 | .0018	0.060 | .0024	0.070 | .0028	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.120 | .0047	0.140 | .0055	0.180 | .0071
	0.035 | .0014	0.045 | .0018	0.060 | .0024	0.070 | .0028	0.080 | .0031	0.090 | .0035	0.100 | .0039	0.120 | .0047	0.140 | .0055	0.180 | .0071
	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.110 | .0043	0.125 | .0049	0.140 | .0055	0.160 | .0063	0.180 | .0071	0.190 | .0075	0.210 | .0083
	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.045 | .0018	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.110 | .0043	0.130 | .0051	0.180 | .0071
	0.005 | .0002	0.008 | .0003	0.010 | .0004	0.013 | .0005	0.016 | .0006	0.018 | .0007	0.020 | .0008	0.030 | .0012	0.035 | .0014	0.040 | .0016
	0.005 | .0002	0.010 | .0004	0.025 | .0010	0.040 | .0016	0.055 | .0022	0.070 | .0028	0.080 | .0031	0.090 | .0035	0.110 | .0043	0.130 | .0051
	0.005 | .0002	0.010 | .0004	0.025 | .0010	0.040 | .0016	0.055 | .0022	0.070 | .0028	0.080 | .0031	0.090 | .0035	0.110 | .0043	0.130 | .0051
	0.005 | .0002	0.008 | .0003	0.010 | .0004	0.015 | .0006	0.020 | .0008	0.025 | .0010	0.030 | .0012	0.035 | .0014	0.040 | .0016	0.050 | .0020
	0.008 | .0003	0.010 | .0004	0.012 | .0005	0.015 | .0006	0.020 | .0008	0.025 | .0010	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024

CRAZYDRILL by Mikron Tool Cool

CrazyDrill Cool 15 x d - uncoated

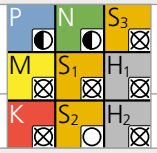
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | 197	6xd1	2xd1
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | 197	6xd1	2xd1
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	40 | 131	6xd1	2xd1
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000			
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C			
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304			
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30			
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	300 | 984	5xd1	1xd1
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | 656	5xd1	1xd1
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	100 | 328	1.5xd1	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 | 459	1xd1	0.5xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	120 | 394	2xd1	1xd1
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	120 | 394	10xd1	5xd1
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	20 | 66	0.5xd1	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20 | 66	0.5xd1	0.25xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25			
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1			
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] **| [IPR]**

Ød1									
0.8 mm **| .032"**	1.0 mm **| .039"**	1.25 mm **| .049"**	1.5 mm **| .059"**	2.0 mm **| .079"**	2.5 mm **| .098"**	3.0 mm **| .118"**	4.0 mm **| .158"**	5.0 mm **| .197"**	6.0 mm **| .236"**
f	**f**	**f**	**f**	**f**	**f**	**f**	**f**	**f**	**f**
0.040 **| .0016**	0.060 **| .0024**	0.090 **| .0035**	0.120 **| .0047**	0.160 **| .0063**	0.180 **| .0071**	0.220 **| .0087**	0.260 **| .0102**	0.280 **| .0110**	0.300 **| .0118**
0.030 **| .0012**	0.050 **| .0020**	0.080 **| .0031**	0.100 **| .0039**	0.140 **| .0055**	0.160 **| .0063**	0.180 **| .0071**	0.200 **| .0079**	0.220 **| .0087**	0.240 **| .0094**
0.020 **| .0008**	0.040 **| .0016**	0.060 **| .0024**	0.080 **| .0031**	0.100 **| .0039**	0.120 **| .0047**	0.140 **| .0055**	0.160 **| .0063**	0.180 **| .0071**	0.200 **| .0079**
Recommended: CrazyDrill Cool - coated									
Recommended: CrazyDrill Cool - coated									
0.030 **| .0012**	0.040 **| .0016**	0.050 **| .0020**	0.065 **| .0026**	0.070 **| .0028**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**	0.160 **| .0063**	0.190 **| .0075**
0.050 **| .0020**	0.060 **| .0024**	0.070 **| .0028**	0.090 **| .0035**	0.110 **| .0043**	0.140 **| .0055**	0.160 **| .0063**	0.190 **| .0075**	0.210 **| .0083**	0.240 **| .0094**
0.035 **| .0014**	0.045 **| .0018**	0.060 **| .0024**	0.070 **| .0028**	0.080 **| .0031**	0.090 **| .0035**	0.100 **| .0039**	0.120 **| .0047**	0.140 **| .0055**	0.180 **| .0071**
0.035 **| .0014**	0.045 **| .0018**	0.060 **| .0024**	0.070 **| .0028**	0.080 **| .0031**	0.090 **| .0035**	0.100 **| .0039**	0.120 **| .0047**	0.140 **| .0055**	0.180 **| .0071**
0.060 **| .0024**	0.080 **| .0031**	0.090 **| .0035**	0.110 **| .0043**	0.125 **| .0049**	0.140 **| .0055**	0.160 **| .0063**	0.180 **| .0071**	0.190 **| .0075**	0.210 **| .0083**
0.010 **| .0004**	0.020 **| .0008**	0.030 **| .0012**	0.045 **| .0018**	0.060 **| .0024**	0.080 **| .0031**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**	0.180 **| .0071**
Recommended: CrazyDrill Cool - coated									
0.005 **| .0002**	0.010 **| .0004**	0.025 **| .0010**	0.040 **| .0016**	0.055 **| .0022**	0.070 **| .0028**	0.080 **| .0031**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**
0.005 **| .0002**	0.010 **| .0004**	0.025 **| .0010**	0.040 **| .0016**	0.055 **| .0022**	0.070 **| .0028**	0.080 **| .0031**	0.090 **| .0035**	0.110 **| .0043**	0.130 **| .0051**
Recommended: CrazyDrill Cool - coated									
Recommended: CrazyDrill Cool - coated									



Drilling process CrazyDrill Cool

ACCURATE AND RAPID DRILLING UP TO 15 X D

Coolant type, filtration and coolant pressure

Coolant type: For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

Filtration: Good filter quality is very important when using through coolant drills. Dirt particles or residual chips can clog the coolant holes and consequently reduce dramatically the flowrate. The following filter qualities must be adhered especially in small diameters:

- Drill with Ø < 2 mm (.078") filter quality ≤ 0.010 mm (.0004").
- Drill with Ø < 3 mm (.118") filter quality ≤ 0.020 mm (.0008").
- Drill with Ø < 6 mm (.236") filter quality ≤ 0.050 mm (.0020").

Coolant pressure: To ensure a reliable drilling process the following minimal pressures are required (see chart). Higher pressures are needed for smaller drill size diameters. High pressure is generally better for the cooling and chip evacuation effectiveness.

Ø d_1 Tool		Minimal pressure	
[mm]	**[inch]**	[bar]	**[psi]**
0.75	**.030**	70	**1015**
3.00	**.118**	40	**580**
6.00	**.236**	30	**435**

Tool holders

For detailed indications for tool holders see chapter "Technical information".





CrazyDrill Cool 6 x d

For drilling depth up to 6 x d we recommend pilot drilling or centering only on irregular, rough or inclined surface and if a high position accuracy is requested.

CrazyDrill Cool 10 x d / 15 x d

For these drilling depths Mikron Tool recommends pilot drilling for CrazyDrill Cool:

- **CrazyDrill Pilot** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces
- **CrazyDrill Coolpilot** as pilot drill for difficult to machine materials
- **CrazyDrill Pilot SST-Inox** as pilot drill for difficult to machine materials

Pilot drilling and drilling

Pilot drilling with CrazyDrill Pilot is the perfect start for an accurate (position and alignment accuracy) and consistent machining process. Inclined surfaces requires the use of CrazyDrill Crosspilot.

The quality of drilling (position and alignment accuracy, no measurable transition from pilot hole to the following drilling steps) and a stable machining process are guaranteed by carefully determined tool tolerances.



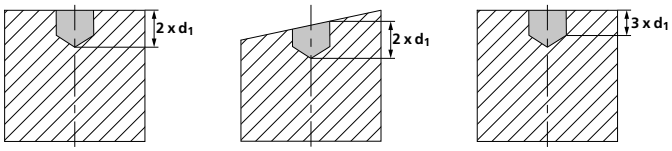


Drilling process CrazyDrill Cool

ONE STEP DRILLING (DEPENDING ON MATERIAL, SEE CUTTING DATA CHART)

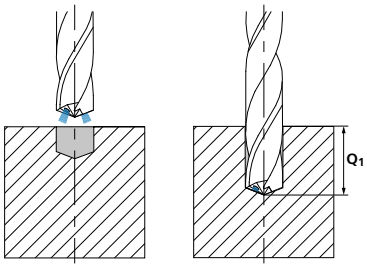
1 | PILOT DRILLING

- With CrazyDrill Pilot / CrazyDrill Coolpilot or CrazyDrill Pilot SST-Inox (straight surfaces) or CrazyDrill Crosspilot (inclined surfaces).



2 | DRILLING

- Turn on coolant of CrazyDrill Cool.
- Drilling with CrazyDrill Cool to full depth Q_1 in one step.



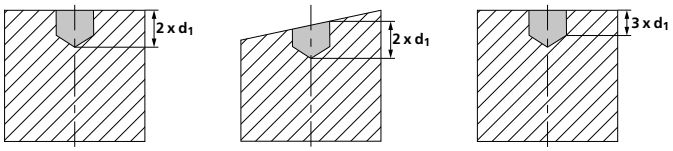
Note:
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

DRILLING AS PER DIN 66025 / PAL (DEPENDING ON MATERIAL, SEE CUTTING DATA CHART)

G83 deep-drilling cycle with chip break and chip removal (pecks)
Q = depth of the respective peck

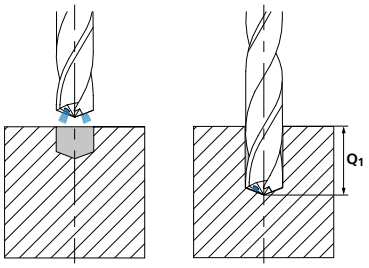
1 | PILOT DRILLING

- With CrazyDrill Pilot / CrazyDrill Coolpilot or CrazyDrill Pilot SST-Inox (straight surfaces) or CrazyDrill Crosspilot (inclined surfaces).

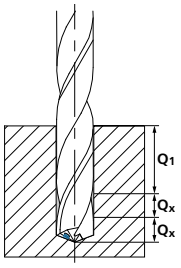


2 | DRILLING

- Turn on coolant of CrazyDrill Cool.
- Drilling with CrazyDrill Cool up to maximum drilling depth (Q_1) in one step, followed by peck to remove chips.

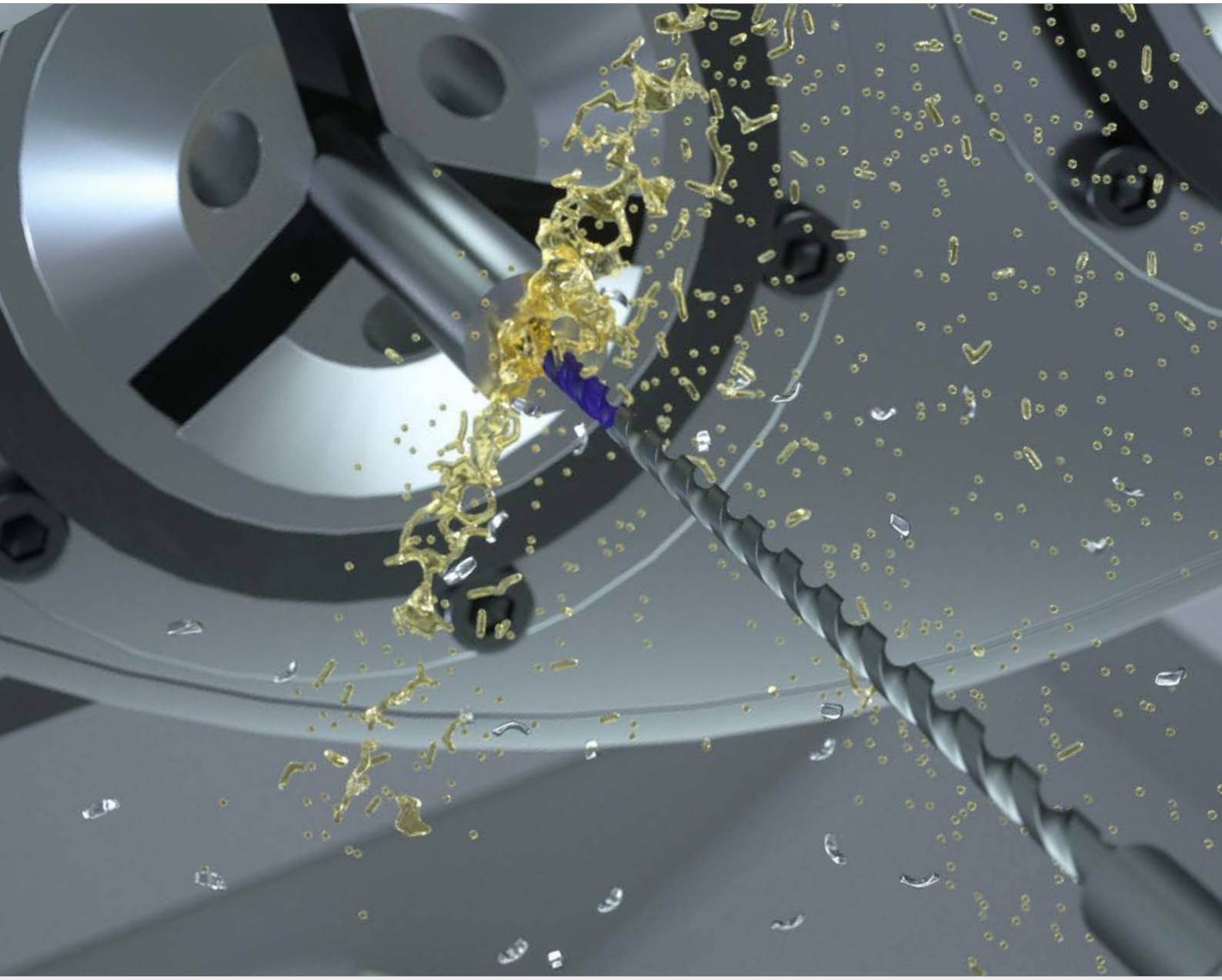


- Additional steps (Q_X) as per cutting data chart, followed by peck to remove chips.



Note:
Drill can be retracted completely from the hole between pecks. However if vibrations occur, we recommend that the drill tip never exits hole to prevent breakage. After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

CrazyDrill Cool XL



CRAZYDRILL Cool XL

DEEP HOLE DRILLING WITH HIGH SPEED AND PRECISION



CrazyDrill Cool XL line offers a solid carbide deep-hole drill in the diameter range of .039" to .236" (1.0 mm to 6.0 mm) for drilling depths up to 40 x d. All drills are coated, have through coolant and are ground with double margin.

Combined use of the CrazyDrill Pilot or CrazyDrill Coolpilot, with CrazyDrill Cool XL is an excellent solution for accurate and deep drilling operations. Thanks to its newly developed geometry, CrazyDrill Cool XL meets the very challenging conditions of drilling deep holes consistently up to 40 x d. The tool produces short chips and drills with constant torque in drilling depths up to 40 x d. High cutting speed and process reliability are given.

CrazyDrill XL is capable of drilling a wide range of materials in one shot (without pecking) at the highest speed and feed.

The through coolant holes supply adequate and continuous coolant to the tip for constant cooling, lubrication and chip removal. The power chamber reduces pressure loss and assure higher flowrate also when drilling even the smallest diameters.

CRAZYDRILL by Mikron Tool Cool XL

Deeper, quicker, more accurate

DRILLING UP TO 40 X D IN ONE SINGLE STEP

CrazyDrill Cool XL line offers a carbide deep-hole drill in the diameter range of .039" to .236" (1.0 mm to 6.0 mm) for drilling depths up to 40 x d. All drills are coated, have through coolant and are ground with double margin.

- CrazyDrill Cool XL, depth of cut available: 15 x d / 20 x d / 30 x d / 40 x d, with internal cooling

15 x d	20 x d	30 x d	40 x d
■ Internal cooling ■ Coated	■ Internal cooling ■ Coated	■ Internal cooling ■ Coated	■ Internal cooling ■ Coated
■ .039" - .236" (Ø1.0 - 6.0 mm)	■ .039" - .236" (Ø1.0 - 6.0 mm)	■ .039" - .236" (Ø1.0 - 6.0 mm)	■ .079" - .236" (Ø2.0 - 6.0 mm)
			
			
			
Page 331	Page 337	Page 343	Page 349

1 | SHAFT
The robust carbide shaft guarantees a high degree of concentric accuracy and reliability.

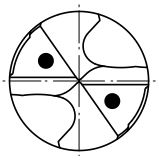
2 | CARBIDE GRADE
The use of latest generation carbide allows highest machining speed and feed.

3 | COATING
The high-performance eXedur SL coating is a thermal and wear protection against heat and abrasion. Extremely smooth and accurate, it exhibits low adhesion to work materials and prevents from cutting edge chipping. The result is controlled chip formation and long tool life.

4 | THROUGH COOLANT AND POWER CHAMBER
The through coolant holes supply adequate and continuous coolant to the tip for constant cooling, lubrication and chip removal. The power chamber reduces pressure loss and increases flowrate even when drilling smallest diameters.

5 | CUTTING AND FLUTES GEOMETRY
The CrazyDrill XL cutting geometry is optimized for short chip formation. With a large chip pocket flute design, jamming risk is significantly reduced and chip evacuation is highly effective through the maximum hole depth. This tool is capable of drilling a wide range of materials in one shot (without pecking) at the highest speeds and feeds (see speed and feed chart for more details on machining approach). The double margin ground on all CrazyDrill XL offers a 4-pints guide for excellent drilling stability and hole straightness.

6 | CUTTING EDGE TREATMENT
The special cutting edge preparation reduces chipping risk and guarantees a consistent drilling process and extends tool life.

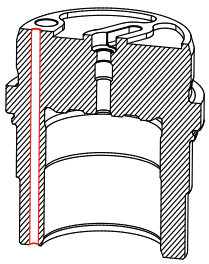
Drill tip 

CRAZYDRILL by Mikron Tool Cool XL

Benefits and applications

EXTRA LONG DRILL WITH INTERNAL COOLING FOR DEEP HOLE DRILLING

- **SHORT MACHINING TIME** | deep hole drilling in one single step
- **LONG TOOL LIFE** | due to efficient coolant
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to short chips
- **HIGH DEGREE OF PRECISION** | due to double margin



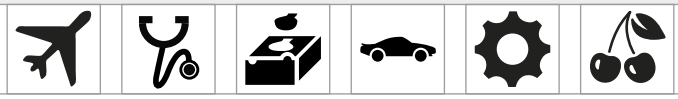
COMPONENT
Injector body

MATERIAL
100Cr6 / 1.3505 / AISI 52100

MACHINING
- Pilot and deep holes drilling
- d = 2.0 mm **| .079"**
- Drilling depth 76 mm **| 2.99"**

DRILLING TOOL
Mikron Tool - CrazyDrill Cool XL - 40 x d

DATA	MIKRON TOOL
Tool type	CrazyDrill Pilot CrazyDrill Cool XL - Carbide - Coated - Internal cooling
Item number	2.CD.400200.XL
Cutting data	v_c = 70 m/min **| 230 SFM** f = 0.08 mm/rev **| .0031 IPR** Q_1 = 76 mm **| 2.99"**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Aerospace industry	Component for aircraft
Medical technology	Component for measuring device
Mold making	Casting mold
Automotive industry	Components for injection system
Mechanical engineering	Locking bolt
Food industry	Injection blow molding

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4034	X46Cr13	420C
	1.4542	X5CrNiCuNb 16-4	630
	1.4301	X5CrNi 18-10	304
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S2 Titanium (pure and alloyed)	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

CrazyDrill Cool XL 15 x d

DRILLING WITH INTERNAL COOLING



The small, through coolant, solid carbide drill CrazyDrill Cool XL 15 x d is available from diameter .039" (1.0 mm) up to .236" (6.0 mm). All drills are coated and feature a double margin.

With drilling depths up to 15 x d, this is a high performance improvement to the time consuming and costly deep-hole drilling methods such as gun drilling.

The through coolant holes supplies constant coolant flow to the tip. For small diameters, an additional power chamber in the shank assures a higher flowrate. Comparatively at same coolant pressure three time flowrate will be supplied to the cutting area. This technology enables high drilling speed with more effective chip removal. High-performance eXedur SL coating provides thermal and wear protection, guaranteeing a longer tool life.

Optimized cutting geometry for short chip formation and large flute pocket design reduces jamming risk and guarantees effective chip evacuation. Maximum drill depth of 15 x d can be reached in one shot (without pecking) at the highest speed and feed.

We recommend Mikron Tool CrazyDrill Pilot or CrazyDrill Coolpilot for hole preparation on flat and even surfaces or CrazyDrill Crosspilot on inclined surfaces up to 60°. Combining CrazyDrill Pilot / Coolpilot / Crosspilot with CrazyDrill Cool XL, enhances hole quality characteristics by means of fine tuned tolerances. For details see drilling process.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

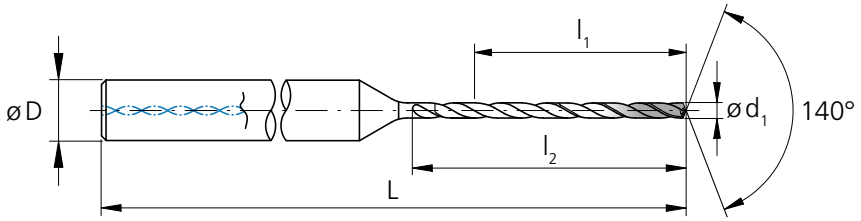
Please note

You couldn't find your suitable version of the CrazyDrill Cool XL (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .057" (1.45 mm).

Carbide | 15xd1 | 140° | Z2 | eXedur SL

Ø d1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)	
Tolerance	+ .00024" 0	+ 0.006 mm 0	+ .00035" + .00004"	+ 0.009 mm + 0.001 mm



d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	.591	15.00	18.0	4	2.28	58	2.CD.150100.XL	■
	.041	1.05	.620	15.75	18.9	4	2.32	59	2.CD.150105.XL	■
	.043	1.10	.650	16.50	19.8	4	2.36	60	2.CD.150110.XL	■
	.045	1.15	.679	17.25	20.7	4	2.40	61	2.CD.150115.XL	■
	.047	1.20	.709	18.00	21.6	4	2.44	62	2.CD.150120.XL	■
	.049	1.25	.738	18.75	22.5	4	2.44	62	2.CD.150125.XL	■
	.051	1.30	.768	19.50	23.4	4	2.48	63	2.CD.150130.XL	■
	.053	1.35	.797	20.25	24.3	4	2.52	64	2.CD.150135.XL	■
	.055	1.40	.827	21.00	25.2	4	2.56	65	2.CD.150140.XL	■
	.057	1.45	.856	21.75	26.1	4	2.60	66	2.CD.150145.XL	■
	.059	1.50	.886	22.50	27.0	4	2.64	67	2.CD.150150.XL	■
	.061	1.55	.915	23.25	27.9	4	2.68	68	2.CD.150155.XL	■
1/16	.0625	1.587	.945	24.00	28.8	4	2.68	68	2.CD.150F116.XL	■
	.063	1.60	.945	24.00	28.8	4	2.68	68	2.CD.150160.XL	■
	.065	1.65	.974	24.75	29.7	4	2.72	69	2.CD.150165.XL	■
	.067	1.70	1.00	25.50	30.6	4	2.76	70	2.CD.150170.XL	■
	.069	1.75	1.03	26.25	31.5	4	2.80	71	2.CD.150175.XL	■
	.071	1.80	1.06	27.00	32.4	4	2.83	72	2.CD.150180.XL	■
	.073	1.85	1.09	27.75	33.3	4	2.87	73	2.CD.150185.XL	■
	.075	1.90	1.12	28.50	34.2	4	2.91	74	2.CD.150190.XL	■
	.077	1.95	1.15	29.25	35.1	4	2.91	74	2.CD.150195.XL	■
	.079	2.00	1.18	30.00	36.0	4	2.95	75	2.CD.150200.XL	■
	.081	2.05	1.21	30.75	36.9	4	2.99	76	2.CD.150205.XL	■
	.083	2.10	1.24	31.50	37.8	4	3.03	77	2.CD.150210.XL	■
	.085	2.15	1.27	32.25	38.7	4	3.07	78	2.CD.150215.XL	■
	.087	2.20	1.30	33.00	39.6	4	3.11	79	2.CD.150220.XL	■
	.089	2.25	1.33	33.75	40.5	4	3.15	80	2.CD.150225.XL	■
	.091	2.30	1.36	34.50	41.4	4	3.15	80	2.CD.150230.XL	■
	.093	2.35	1.39	35.25	42.3	4	3.19	81	2.CD.150235.XL	■

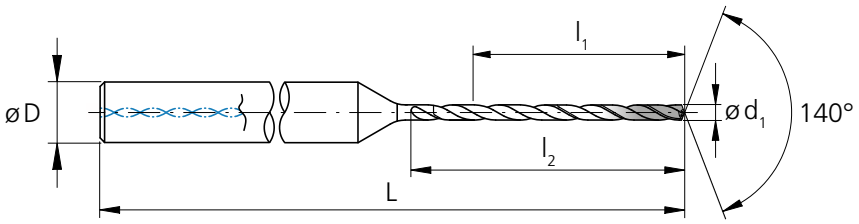
■ Stock item

Complementary products	
CrazyDrill Pilot	p.161
CrazyDrill Coolpilot	p.189
CrazyDrill Crosspilot	p.175

CRAZYDRILL by Mikron Tool Cool XL

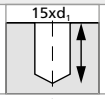
CrazyDrill Cool XL 15 x d

DRILLING WITH INTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
3/32	**.0937**	2.381	**1.42**	36.00	43.2	4	**3.23**	82	2.CD.150F332.XL	■
	.094	2.40	**1.42**	36.00	43.2	4	**3.23**	82	2.CD.150240.XL	■
	.096	2.45	**1.45**	36.75	44.1	4	**3.27**	83	2.CD.150245.XL	■
	.098	2.50	**1.48**	37.50	45.0	4	**3.31**	84	2.CD.150250.XL	■
	.100	2.55	**1.51**	38.25	45.9	4	**3.35**	85	2.CD.150255.XL	■
	.102	2.60	**1.54**	39.00	46.8	4	**3.39**	86	2.CD.150260.XL	■
	.104	2.65	**1.56**	39.75	47.7	4	**3.39**	86	2.CD.150265.XL	■
	.106	2.70	**1.59**	40.50	48.6	4	**3.43**	87	2.CD.150270.XL	■
	.108	2.75	**1.62**	41.25	49.5	4	**3.46**	88	2.CD.150275.XL	■
	.110	2.80	**1.65**	42.00	50.4	4	**3.50**	89	2.CD.150280.XL	■
	.112	2.85	**1.68**	42.75	51.3	4	**3.54**	90	2.CD.150285.XL	■
	.114	2.90	**1.71**	43.50	52.2	4	**3.58**	91	2.CD.150290.XL	■
	.116	2.95	**1.74**	44.25	53.1	4	**3.62**	92	2.CD.150295.XL	■
	.118	3.00	**1.77**	45.00	54.0	4	**3.62**	92	2.CD.150300.XL	■
	.120	3.05	**1.80**	45.75	54.9	6	**3.90**	99	2.CD.150305.XL	■
	.122	3.10	**1.83**	46.50	55.8	6	**3.94**	100	2.CD.150310.XL	■
	.124	3.15	**1.86**	47.25	56.7	6	**3.98**	101	2.CD.150315.XL	■
1/8	**.1250**	3.175	**1.89**	48.00	57.6	6	**4.02**	102	2.CD.150F18.XL	■
	.126	3.20	**1.89**	48.00	57.6	6	**4.02**	102	2.CD.150320.XL	■
	.128	3.25	**1.92**	48.75	58.5	6	**4.02**	102	2.CD.150325.XL	■
	.130	3.30	**1.95**	49.50	59.4	6	**4.06**	103	2.CD.150330.XL	■
	.132	3.35	**1.98**	50.25	60.3	6	**4.09**	104	2.CD.150335.XL	■
	.134	3.40	**2.01**	51.00	61.2	6	**4.13**	105	2.CD.150340.XL	■
	.136	3.45	**2.04**	51.75	62.1	6	**4.17**	106	2.CD.150345.XL	■
	.138	3.50	**2.07**	52.50	63.0	6	**4.21**	107	2.CD.150350.XL	■
	.140	3.55	**2.10**	53.25	63.9	6	**4.25**	108	2.CD.150355.XL	■
	.142	3.60	**2.13**	54.00	64.8	6	**4.25**	108	2.CD.150360.XL	■
	.144	3.65	**2.16**	54.75	65.7	6	**4.29**	109	2.CD.150365.XL	■
	.146	3.70	**2.19**	55.50	66.6	6	**4.33**	110	2.CD.150370.XL	■
	.148	3.75	**2.21**	56.25	67.5	6	**4.37**	111	2.CD.150375.XL	■

■ Stock item

Carbide |  |  | Z2 |  | 

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00024"** **0**	+ 0.006 mm 0	**+ .00035"** **+ .00004"**	+ 0.009 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.150	3.80	**2.24**	57.00	68.4	6	**4.41**	112	2.CD.150380.XL	■
	.152	3.85	**2.27**	57.75	69.3	6	**4.45**	113	2.CD.150385.XL	■
	.154	3.90	**2.30**	58.50	70.2	6	**4.49**	114	2.CD.150390.XL	■
	.156	3.95	**2.33**	59.25	71.1	6	**4.49**	114	2.CD.150395.XL	■
5/32	**.1562**	3.968	**2.36**	60.00	72.0	6	**4.53**	115	2.CD.150F532.XL	■
	.157	4.00	**2.36**	60.00	72.0	6	**4.53**	115	2.CD.150400.XL	■
	.161	4.10	**2.42**	61.50	73.8	6	**4.61**	117	2.CD.150410.XL	■
	.165	4.20	**2.48**	63.00	75.6	6	**4.69**	119	2.CD.150420.XL	■
	.169	4.30	**2.54**	64.50	77.4	6	**4.72**	120	2.CD.150430.XL	■
	.173	4.40	**2.60**	66.00	79.2	6	**4.80**	122	2.CD.150440.XL	■
	.177	4.50	**2.66**	67.50	81.0	6	**4.88**	124	2.CD.150450.XL	■
	.181	4.60	**2.72**	69.00	82.8	6	**4.96**	126	2.CD.150460.XL	■
	.185	4.70	**2.78**	70.50	84.6	6	**5.00**	127	2.CD.150470.XL	■
3/16	**.1875**	4.762	**2.83**	72.00	86.4	6	**5.08**	129	2.CD.150F316.XL	■
	.189	4.80	**2.83**	72.00	86.4	6	**5.08**	129	2.CD.150480.XL	■
	.193	4.90	**2.89**	73.50	88.2	6	**5.16**	131	2.CD.150490.XL	■
	.197	5.00	**2.95**	75.00	90.0	6	**5.24**	133	2.CD.150500.XL	■
	.201	5.10	**3.01**	76.50	91.8	6	**5.28**	134	2.CD.150510.XL	■
	.205	5.20	**3.07**	78.00	93.6	6	**5.35**	136	2.CD.150520.XL	■
	.209	5.30	**3.13**	79.50	95.4	6	**5.43**	138	2.CD.150530.XL	■
	.213	5.40	**3.19**	81.00	97.2	6	**5.47**	139	2.CD.150540.XL	■
	.217	5.50	**3.25**	82.50	99.0	6	**5.55**	141	2.CD.150550.XL	■
7/32	**.2189**	5.560	**3.31**	84.00	100.8	6	**5.63**	143	2.CD.150F732.XL	■
	.220	5.60	**3.31**	84.00	100.8	6	**5.63**	143	2.CD.150560.XL	■
	.224	5.70	**3.37**	85.50	102.6	6	**5.71**	145	2.CD.150570.XL	■
	.228	5.80	**3.43**	87.00	104.4	6	**5.75**	146	2.CD.150580.XL	■
	.232	5.90	**3.48**	88.50	106.2	6	**5.83**	148	2.CD.150590.XL	■
	.236	6.00	**3.54**	90.00	108.0	6	**5.91**	150	2.CD.150600.XL	■

■ Stock item

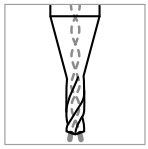
Complementary products

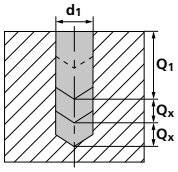
CrazyDrill Pilot	p.161
CrazyDrill Coolpilot	p.189
CrazyDrill Crosspilot	p.175

CRAZYDRILL by Mikron Tool Cool XL

CrazyDrill Cool XL 15 x d

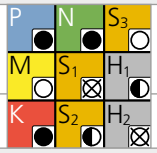
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60–140 | **197–459**	15xd1	–
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	50–130 | **164–427**	15xd1	–
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	40–100 | **131–328**	15xd1	–
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	30–60 | **98–197**	15xd1	–
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	40–80 | **131–262**	15xd1	–
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	30–60 | **98–197**	5xd1	2xd1
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	80–150 | **262–492**	15xd1	–
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	100–200 | **328–656**	15xd1	–
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	80–150 | **262–492**	15xd1	–
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40–80 | **131–262**	2xd1	2xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40–80 | **131–262**	2xd1	2xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	50–120 | **164–394**	15xd1	–
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	40–80 | **131–262**	15xd1	–
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	25–50 | **82–164**	3xd1	1xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20–40 | **66–131**	5xd1	1xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	20–40 | **66–131**	5xd1	2xd1
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	30–60 | **98–197**	5xd1	1xd1
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1	1.0 mm | .039"	1.25 mm | .049"	1/16" 1.5 mm | .059"	2.0 mm | .079"	3/32" 2.5 mm | .098"	1/8" 3.0 mm | .118"	5/32" 4.0 mm | .158"	3/16" - 7/32" 5.0 mm | .197"	6.0 mm | .236"
	f	f	f	f	f	f	f	f	f
	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.120 | .0047	0.160 | .0063	0.180 | .0071	0.200 | .0079
	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.120 | .0047	0.160 | .0063	0.180 | .0071	0.200 | .0079
	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.070 | .0028	0.080 | .0031	0.090 | .0035	0.120 | .0047	0.150 | .0059	0.180 | .0071
	0.020 | .0008	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.130 | .0051	0.150 | .0059	0.200 | .0079	0.220 | .0087
	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.180 | .0071	0.200 | .0079	0.220 | .0087
	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.060 | .0024	0.070 | .0028	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.180 | .0071
	0.050 | .0020	0.060 | .0024	0.070 | .0028	0.080 | .0031	0.090 | .0035	0.160 | .0063	0.200 | .0079	0.250 | .0098	0.300 | .0118
	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.120 | .0047	0.160 | .0063	0.180 | .0071	0.200 | .0079	0.250 | .0098	0.300 | .0118
	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.200 | .0079	0.250 | .0098	0.300 | .0118
	0.025 | .0010	0.045 | .0018	0.065 | .0026	0.085 | .0033	0.110 | .0043	0.140 | .0055	0.160 | .0063	0.180 | .0071	0.200 | .0079
	0.025 | .0010	0.045 | .0018	0.065 | .0026	0.085 | .0033	0.110 | .0043	0.140 | .0055	0.160 | .0063	0.180 | .0071	0.200 | .0079
	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.090 | .0035	0.120 | .0047	0.130 | .0051	0.170 | .0067	0.220 | .0087	0.240 | .0094
	0.025 | .0010	0.045 | .0018	0.065 | .0026	0.085 | .0033	0.110 | .0043	0.120 | .0047	0.160 | .0063	0.200 | .0079	0.220 | .0087
	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.065 | .0026	0.080 | .0031	0.100 | .0039	0.120 | .0047
	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.065 | .0026	0.080 | .0031	0.100 | .0039	0.120 | .0047
	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.065 | .0026	0.080 | .0031	0.100 | .0039	0.120 | .0047
	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.110 | .0043	0.140 | .0055	0.160 | .0063

CrazyDrill Cool XL 20 x d

DRILLING WITH INTERNAL COOLING



The small, through coolant, solid carbide drill CrazyDrill Cool XL 20 x d is available from diameter .039" (1.0 mm) up to .236" (6.0 mm). All drills are coated and feature a double margin.

With drilling depth up to 20 x d, this is a high performance improvement to the time consuming and costly deep-hole drilling methods such as gun drilling.

The through coolant holes supplies constant coolant flow to the tip. For small diameters, an additional power chamber in the shank assures a higher flowrate. Comparatively at same coolant pressure three time flowrate will be supplied to the cutting area. This technology enables high drilling speed with more effective chip removal. High-performance eXedur SL coating provides thermal and wear protection, guaranteeing a longer tool life.

Optimized cutting geometry for short chip formation and large flute pocket design reduces jamming risk and guarantees effective chip evacuation. Maximum drill depth of 20 x d can be reached in one shot (without pecking) at the highest speed and feed.

We recommend Mikron Tool CrazyDrill Pilot or CrazyDrill Coolpilot for hole preparation on flat and even surfaces or CrazyDrill Crosspilot on inclined surfaces up to 60°. Combining CrazyDrill Pilot / Coolpilot / Crosspilot with CrazyDrill Cool XL, enhances hole quality characteristics by means of fine tuned tolerances. For details see drilling process.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

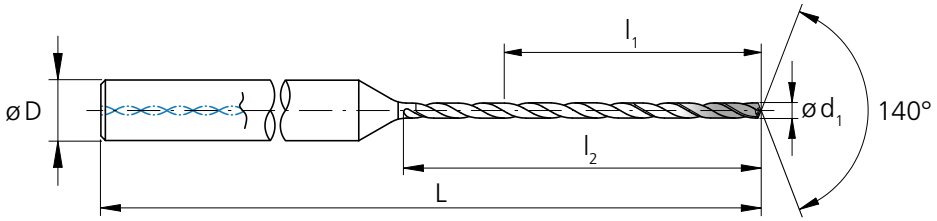
Please note

You couldn't find your suitable version of the CrazyDrill Cool XL (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .057" (1.45 mm).

Carbide | 20xd1 | 140° | Z2 | eXedur SL

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00024"** **0**	+ 0.006 mm 0	**+ .00035"** **+ .00004"**	+ 0.009 mm + 0.001 mm



d_1 **k6** [inch]	**d_1** **k6** [inch]	**d_1** **k6** [mm]	**l_1** [inch]	**l_1** [mm]	**l_2** [mm]	**D** **(h6)** [mm]	**L** [inch]	**L** [mm]	Item number	Availability
	.039	1.00	**.787**	20.0	23.0	4	**2.48**	63	2.CD.200100.XL	■
	.041	1.05	**.827**	21.0	24.2	4	**2.52**	64	2.CD.200105.XL	Δ
	.043	1.10	**.866**	22.0	25.3	4	**2.56**	65	2.CD.200110.XL	■
	.045	1.15	**.906**	23.0	26.5	4	**2.60**	66	2.CD.200115.XL	Δ
	.047	1.20	**.945**	24.0	27.6	4	**2.68**	68	2.CD.200120.XL	■
	.049	1.25	**.984**	25.0	28.8	4	**2.72**	69	2.CD.200125.XL	Δ
	.051	1.30	**1.02**	26.0	29.9	4	**2.76**	70	2.CD.200130.XL	■
	.053	1.35	**1.06**	27.0	31.1	4	**2.80**	71	2.CD.200135.XL	Δ
	.055	1.40	**1.10**	28.0	32.2	4	**2.83**	72	2.CD.200140.XL	■
	.057	1.45	**1.14**	29.0	33.4	4	**2.87**	73	2.CD.200145.XL	Δ
	.059	1.50	**1.18**	30.0	34.5	4	**2.91**	74	2.CD.200150.XL	■
	.061	1.55	**1.22**	31.0	35.7	4	**2.95**	75	2.CD.200155.XL	Δ
1/16	**.0625**	1.587	**1.26**	32.0	36.8	4	**2.99**	76	2.CD.200F116.XL	■
	.063	1.60	**1.26**	32.0	36.8	4	**2.99**	76	2.CD.200160.XL	■
	.065	1.65	**1.30**	33.0	38.0	4	**3.07**	78	2.CD.200165.XL	Δ
	.067	1.70	**1.34**	34.0	39.1	4	**3.11**	79	2.CD.200170.XL	■
	.069	1.75	**1.38**	35.0	40.3	4	**3.15**	80	2.CD.200175.XL	Δ
	.071	1.80	**1.42**	36.0	41.4	4	**3.19**	81	2.CD.200180.XL	■
	.073	1.85	**1.46**	37.0	42.6	4	**3.23**	82	2.CD.200185.XL	Δ
	.075	1.90	**1.50**	38.0	43.7	4	**3.27**	83	2.CD.200190.XL	■
	.077	1.95	**1.54**	39.0	44.9	4	**3.31**	84	2.CD.200195.XL	Δ
	.079	2.00	**1.57**	40.0	46.0	4	**3.35**	85	2.CD.200200.XL	■
	.081	2.05	**1.61**	41.0	47.2	4	**3.39**	86	2.CD.200205.XL	Δ
	.083	2.10	**1.65**	42.0	48.3	4	**3.46**	88	2.CD.200210.XL	■
	.085	2.15	**1.69**	43.0	49.5	4	**3.50**	89	2.CD.200215.XL	Δ
	.087	2.20	**1.73**	44.0	50.6	4	**3.54**	90	2.CD.200220.XL	■
	.089	2.25	**1.77**	45.0	51.8	4	**3.58**	91	2.CD.200225.XL	Δ
	.091	2.30	**1.81**	46.0	52.9	4	**3.62**	92	2.CD.200230.XL	■
	.093	2.35	**1.85**	47.0	54.1	4	**3.66**	93	2.CD.200235.XL	Δ

■ Stock item

Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

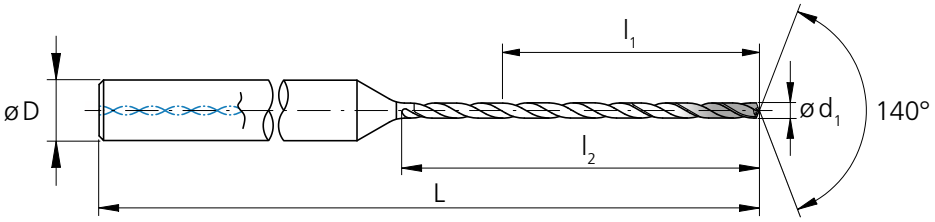
Complementary products

CrazyDrill Pilot	p.161
CrazyDrill Coolpilot	p.189
CrazyDrill Crosspilot	p.175

CRAZYDRILL by Mikron Tool Cool XL

CrazyDrill Cool XL 20 x d

DRILLING WITH INTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
3/32	**.0937**	2.381	**1.89**	48.0	55.2	4	**3.70**	94	2.CD.200F332.XL	■
	.094	2.40	**1.89**	48.0	55.2	4	**3.70**	94	2.CD.200240.XL	■
	.096	2.45	**1.93**	49.0	56.4	4	**3.74**	95	2.CD.200245.XL	Δ
	.098	2.50	**1.97**	50.0	57.5	4	**3.78**	96	2.CD.200250.XL	■
	.100	2.55	**2.01**	51.0	58.7	4	**3.82**	97	2.CD.200255.XL	Δ
	.102	2.60	**2.05**	52.0	59.8	4	**3.90**	99	2.CD.200260.XL	■
	.104	2.65	**2.09**	53.0	61.0	4	**3.94**	100	2.CD.200265.XL	Δ
	.106	2.70	**2.13**	54.0	62.1	4	**3.98**	101	2.CD.200270.XL	■
	.108	2.75	**2.17**	55.0	63.3	4	**4.02**	102	2.CD.200275.XL	Δ
	.110	2.80	**2.20**	56.0	64.4	4	**4.06**	103	2.CD.200280.XL	■
	.112	2.85	**2.24**	57.0	65.6	4	**4.09**	104	2.CD.200285.XL	Δ
	.114	2.90	**2.28**	58.0	66.7	4	**4.13**	105	2.CD.200290.XL	■
	.116	2.95	**2.32**	59.0	67.9	4	**4.17**	106	2.CD.200295.XL	Δ
	.118	3.00	**2.36**	60.0	69.0	4	**4.21**	107	2.CD.200300.XL	■
	.120	3.05	**2.40**	61.0	70.2	6	**4.49**	114	2.CD.200305.XL	Δ
	.122	3.10	**2.44**	62.0	71.3	6	**4.53**	115	2.CD.200310.XL	■
	.124	3.15	**2.48**	63.0	72.5	6	**4.61**	117	2.CD.200315.XL	Δ
1/8	**.1250**	3.175	**2.52**	64.0	73.6	6	**4.65**	118	2.CD.200F18.XL	■
	.126	3.20	**2.52**	64.0	73.6	6	**4.65**	118	2.CD.200320.XL	■
	.128	3.25	**2.56**	65.0	74.8	6	**4.69**	119	2.CD.200325.XL	Δ
	.130	3.30	**2.60**	66.0	75.9	6	**4.72**	120	2.CD.200330.XL	■
	.132	3.35	**2.64**	67.0	77.1	6	**4.76**	121	2.CD.200335.XL	Δ
	.134	3.40	**2.68**	68.0	78.2	6	**4.80**	122	2.CD.200340.XL	■
	.136	3.45	**2.72**	69.0	79.4	6	**4.84**	123	2.CD.200345.XL	Δ
	.138	3.50	**2.76**	70.0	80.5	6	**4.88**	124	2.CD.200350.XL	■
	.140	3.55	**2.80**	71.0	81.7	6	**4.96**	125	2.CD.200355.XL	Δ
	.142	3.60	**2.83**	72.0	82.8	6	**5.00**	126	2.CD.200360.XL	■
	.144	3.65	**2.87**	73.0	84.0	6	**5.04**	128	2.CD.200365.XL	Δ
	.146	3.70	**2.91**	74.0	85.1	6	**5.08**	129	2.CD.200370.XL	■
	.148	3.75	**2.95**	75.0	86.3	6	**5.12**	130	2.CD.200375.XL	Δ

■ Stock item
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

Carbide | 20xd1 | 140° | Z2 | eXedur SL

Ø d1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)	
Tolerance	+ .00024" 0	+ 0.006 mm 0	+ .00035" + .00004"	+ 0.009 mm + 0.001 mm

d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.150	3.80	2.99	76.0	87.4	6	5.16	131	2.CD.200380.XL	■
	.152	3.85	3.03	77.0	88.6	6	5.20	132	2.CD.200385.XL	Δ
	.154	3.90	3.07	78.0	89.7	6	5.24	133	2.CD.200390.XL	■
	.156	3.95	3.11	79.0	90.9	6	5.28	134	2.CD.200395.XL	Δ
5/32	.1562	3.968	3.15	80.0	92.0	6	5.31	135	2.CD.200F532.XL	■
	.157	4.00	3.15	80.0	92.0	6	5.31	135	2.CD.200400.XL	■
	.161	4.10	3.23	82.0	94.3	6	5.43	138	2.CD.200410.XL	■
	.165	4.20	3.31	84.0	96.6	6	5.51	140	2.CD.200420.XL	■
	.169	4.30	3.39	86.0	98.9	6	5.59	142	2.CD.200430.XL	■
	.173	4.40	3.46	88.0	101.2	6	5.67	144	2.CD.200440.XL	■
	.177	4.50	3.54	90.0	103.5	6	5.75	146	2.CD.200450.XL	■
	.181	4.60	3.62	92.0	105.8	6	5.87	149	2.CD.200460.XL	■
	.185	4.70	3.70	94.0	108.1	6	5.94	151	2.CD.200470.XL	■
3/16	.1875	4.762	3.78	96.0	110.4	6	6.02	153	2.CD.200480.XL	■
	.189	4.80	3.78	96.0	110.4	6	6.02	153	2.CD.200480.XL	■
	.193	4.90	3.86	98.0	112.7	6	6.10	155	2.CD.200490.XL	■
	.197	5.00	3.94	100.0	115.0	6	6.22	158	2.CD.200500.XL	■
	.201	5.10	4.02	102.0	117.3	6	6.30	160	2.CD.200510.XL	■
	.205	5.20	4.09	104.0	119.6	6	6.38	162	2.CD.200520.XL	■
	.209	5.30	4.17	106.0	121.9	6	6.46	164	2.CD.200530.XL	■
	.213	5.40	4.25	108.0	124.2	6	6.54	166	2.CD.200540.XL	■
	.217	5.50	4.33	110.0	126.5	6	6.65	169	2.CD.200550.XL	■
7/32	.2189	5.560	4.41	112.0	128.8	6	6.73	171	2.CD.200560.XL	■
	.220	5.60	4.41	112.0	128.8	6	6.73	171	2.CD.200560.XL	■
	.224	5.70	4.49	114.0	131.1	6	6.81	173	2.CD.200570.XL	■
	.228	5.80	4.57	116.0	133.4	6	6.89	175	2.CD.200580.XL	■
	.232	5.90	4.65	118.0	135.7	6	6.97	177	2.CD.200590.XL	■
	.236	6.00	4.72	120.0	138.0	6	7.09	180	2.CD.200600.XL	■

■ Stock item

Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

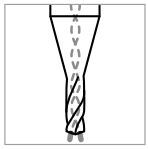
Complementary products

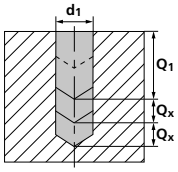
CrazyDrill Pilot	p.161
CrazyDrill Coolpilot	p.189
CrazyDrill Crosspilot	p.175

CRAZYDRILL by Mikron Tool Cool XL

CrazyDrill Cool XL 20 x d

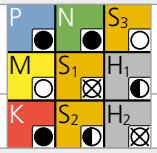
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	50–120 | **164–394**	20xd1	–
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	50–120 | **164–394**	20xd1	–
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	40–100 | **131–328**	20xd1	–
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	30–60 | **98–197**	20xd1	–
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	40–80 | **131–262**	20xd1	–
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	30–60 | **98–197**	5xd1	2xd1
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	100–200 | **328–656**	20xd1	–
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	100–200 | **328–656**	20xd1	–
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	80–150 | **262–492**	20xd1	–
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40–80 | **131–262**	2xd1	2xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40–80 | **131–262**	2xd1	2xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	50–120 | **164–394**	20xd1	–
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	40–80 | **131–262**	20xd1	–
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	25–50 | **82–164**	3xd1	1xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20–40 | **66–131**	5xd1	1xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	20–40 | **66–131**	5xd1	2xd1
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	30–60 | **98–197**	5xd1	1xd1
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1	1.0 mm | .039"	1.25 mm | .049"	1/16" 1.5 mm | .059"	2.0 mm | .079"	3/32" 2.5 mm | .098"	1/8" 3.0 mm | .118"	5/32" 4.0 mm | .158"	3/16" - 7/32" 5.0 mm | .197"	6.0 mm | .236"
	f	f	f	f	f	f	f	f	f
	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.120 | .0047	0.160 | .0063	0.180 | .0071	0.200 | .0079
	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.120 | .0047	0.160 | .0063	0.180 | .0071	0.200 | .0079
	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.070 | .0028	0.080 | .0031	0.090 | .0035	0.120 | .0047	0.150 | .0059	0.180 | .0071
	0.020 | .0008	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.130 | .0051	0.150 | .0059	0.200 | .0079	0.220 | .0087
	0.040 | .0016	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.180 | .0071	0.200 | .0079	0.220 | .0087
	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.060 | .0024	0.070 | .0028	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.180 | .0071
	0.050 | .0020	0.060 | .0024	0.070 | .0028	0.080 | .0031	0.090 | .0035	0.160 | .0063	0.200 | .0079	0.250 | .0098	0.300 | .0118
	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.120 | .0047	0.160 | .0063	0.180 | .0071	0.200 | .0079	0.250 | .0098	0.300 | .0118
	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.200 | .0079	0.250 | .0098	0.300 | .0118
	0.025 | .0010	0.045 | .0018	0.065 | .0026	0.085 | .0033	0.110 | .0043	0.140 | .0055	0.160 | .0063	0.180 | .0071	0.200 | .0079
	0.025 | .0010	0.045 | .0018	0.065 | .0026	0.085 | .0033	0.110 | .0043	0.140 | .0055	0.160 | .0063	0.180 | .0071	0.200 | .0079
	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.090 | .0035	0.120 | .0047	0.130 | .0051	0.170 | .0067	0.220 | .0087	0.240 | .0094
	0.025 | .0010	0.045 | .0018	0.065 | .0026	0.085 | .0033	0.110 | .0043	0.120 | .0047	0.160 | .0063	0.200 | .0079	0.220 | .0087
	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.065 | .0026	0.080 | .0031	0.100 | .0039	0.120 | .0047
	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.065 | .0026	0.080 | .0031	0.100 | .0039	0.120 | .0047
	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.065 | .0026	0.080 | .0031	0.100 | .0039	0.120 | .0047
	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.110 | .0043	0.140 | .0055	0.160 | .0063

CRAZYDRILL by Mikron Tool Cool XL

CrazyDrill Cool XL 30 x d

DRILLING WITH INTERNAL COOLING



The small, through coolant, solid carbide drill CrazyDrill Cool XL 30 x d is available from diameter .039" up to .236" (1.0 mm to 6.0 mm). All drills are coated and feature a double margin. With drilling depth up to 30 x d, this is a high performance improvement to the time consuming and costly deep-hole drilling methods such as gun drilling.

The through coolant holes supplies constant coolant flow to the tip. For small diameters, an additional power chamber in the shank assures a higher flowrate. Comparatively at same coolant pressure three time flowrate will be supplied to the cutting area. This technology enables high drilling speed with more effective chip removal. High-performance eXedur SL coating provides thermal and wear protection, guaranteeing a longer tool life.

Optimized cutting geometry for short chip formation and large flute pocket design reduces jamming risk and guarantees effective chip evacuation. Maximum drill depth of 30 x d can be reached in one shot (without pecking) at the highest speed and feed.

We recommend Mikron Tool CrazyDrill Pilot or CrazyDrill Coolpilot for hole preparation on flat and even surfaces or CrazyDrill Crosspilot on inclined surfaces up to 60°. Combining CrazyDrill Pilot / Coolpilot / Crosspilot with CrazyDrill Cool XL, enhances hole quality characteristics by means of fine tuned tolerances. For details see drilling process.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

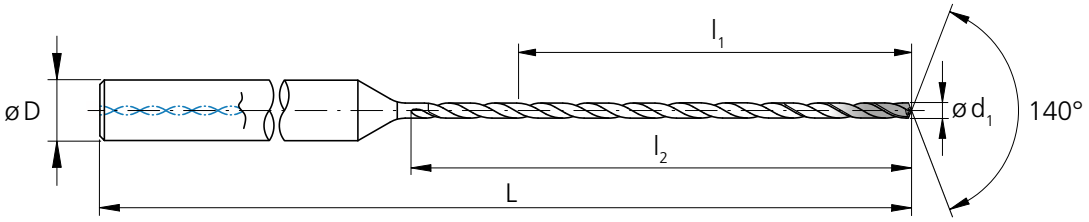
Please note

You couldn't find your suitable version of the CrazyDrill Cool XL (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .057" (1.45 mm).

Carbide | 30xd1 | 140° | Z2 | eXedur SL

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00024"** **0**	+ 0.006 mm 0	**+ .00035"** **+ .00004"**	+ 0.009 mm + 0.001 mm



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	**1.18**	30.0	33.0	4	**2.87**	73	2.CD.300100.XL	■
	.041	1.05	**1.24**	31.5	34.7	4	**2.95**	75	2.CD.300105.XL	Δ
	.043	1.10	**1.30**	33.0	36.3	4	**2.99**	76	2.CD.300110.XL	■
	.045	1.15	**1.36**	34.5	38.0	4	**3.07**	78	2.CD.300115.XL	Δ
	.047	1.20	**1.42**	36.0	39.6	4	**3.15**	80	2.CD.300120.XL	■
	.049	1.25	**1.48**	37.5	41.3	4	**3.19**	81	2.CD.300125.XL	Δ
	.051	1.30	**1.54**	39.0	42.9	4	**3.27**	83	2.CD.300130.XL	■
	.053	1.35	**1.59**	40.5	44.6	4	**3.31**	84	2.CD.300135.XL	Δ
	.055	1.40	**1.65**	42.0	46.2	4	**3.39**	86	2.CD.300140.XL	■
	.057	1.45	**1.71**	43.5	47.9	4	**3.46**	88	2.CD.300145.XL	Δ
	.059	1.50	**1.77**	45.0	49.5	4	**3.50**	89	2.CD.300150.XL	■
	.061	1.55	**1.83**	46.5	51.2	4	**3.58**	91	2.CD.300155.XL	Δ
1/16	**.0625**	1.587	**1.89**	48.0	52.8	4	**3.62**	92	2.CD.300F116.XL	■
	.063	1.60	**1.89**	48.0	52.8	4	**3.62**	92	2.CD.300160.XL	■
	.065	1.65	**1.95**	49.5	54.5	4	**3.70**	94	2.CD.300165.XL	Δ
	.067	1.70	**2.01**	51.0	56.1	4	**3.78**	96	2.CD.300170.XL	■
	.069	1.75	**2.07**	52.5	57.8	4	**3.82**	97	2.CD.300175.XL	Δ
	.071	1.80	**2.13**	54.0	59.4	4	**3.90**	99	2.CD.300180.XL	■
	.073	1.85	**2.19**	55.5	61.1	4	**3.94**	100	2.CD.300185.XL	Δ
	.075	1.90	**2.24**	57.0	62.7	4	**4.02**	102	2.CD.300190.XL	■
	.077	1.95	**2.30**	58.5	64.4	4	**4.09**	104	2.CD.300195.XL	Δ
	.079	2.00	**2.36**	60.0	66.0	4	**4.13**	105	2.CD.300200.XL	■
	.081	2.05	**2.42**	61.5	67.7	4	**4.21**	107	2.CD.300205.XL	Δ
	.083	2.10	**2.48**	63.0	69.3	4	**4.29**	109	2.CD.300210.XL	■
	.085	2.15	**2.54**	64.5	71.0	4	**4.33**	110	2.CD.300215.XL	Δ
	.087	2.20	**2.60**	66.0	72.6	4	**4.41**	112	2.CD.300220.XL	■
	.089	2.25	**2.66**	67.5	74.3	4	**4.45**	113	2.CD.300225.XL	Δ
	.091	2.30	**2.72**	69.0	75.9	4	**4.53**	115	2.CD.300230.XL	■
	.093	2.35	**2.78**	70.5	77.6	4	**4.61**	117	2.CD.300235.XL	Δ

■ Stock item

Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

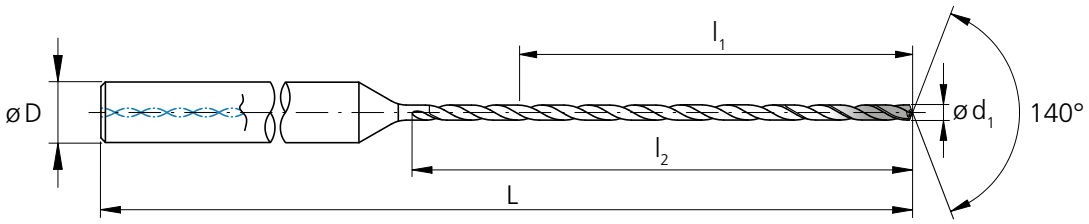
Complementary products

CrazyDrill Pilot	p.161
CrazyDrill Coolpilot	p.189
CrazyDrill Crosspilot	p.175

CRAZYDRILL by Mikron Tool Cool XL

CrazyDrill Cool XL 30 x d

DRILLING WITH INTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
3/32	**.0937**	2.381	**2.83**	72.0	79.2	4	**4.65**	118	2.CD.300F332.XL	■
	.094	2.40	**2.83**	72.0	79.2	4	**4.65**	118	2.CD.300240.XL	■
	.096	2.45	**2.89**	73.5	80.9	4	**4.72**	120	2.CD.300245.XL	Δ
	.098	2.50	**2.95**	75.0	82.5	4	**4.76**	121	2.CD.300250.XL	■
	.100	2.55	**3.01**	76.5	84.2	4	**4.84**	123	2.CD.300255.XL	Δ
	.102	2.60	**3.07**	78.0	85.8	4	**4.92**	125	2.CD.300260.XL	■
	.104	2.65	**3.13**	79.5	87.5	4	**4.96**	126	2.CD.300265.XL	Δ
	.106	2.70	**3.19**	81.0	89.1	4	**5.04**	128	2.CD.300270.XL	■
	.108	2.75	**3.25**	82.5	90.8	4	**5.08**	129	2.CD.300275.XL	Δ
	.110	2.80	**3.31**	84.0	92.4	4	**5.16**	131	2.CD.300280.XL	■
	.112	2.85	**3.37**	85.5	94.1	4	**5.24**	133	2.CD.300285.XL	Δ
	.114	2.90	**3.43**	87.0	95.7	4	**5.28**	134	2.CD.300290.XL	■
	.116	2.95	**3.48**	88.5	97.4	4	**5.35**	136	2.CD.300295.XL	Δ
	.118	3.00	**3.54**	90.0	99.0	4	**5.39**	137	2.CD.300300.XL	■
	.120	3.05	**3.60**	91.5	100.7	6	**5.71**	145	2.CD.300305.XL	Δ
	.122	3.10	**3.66**	93.0	102.3	6	**5.75**	146	2.CD.300310.XL	■
	.124	3.15	**3.72**	94.5	104.0	6	**5.83**	148	2.CD.300315.XL	Δ
1/8	**.1250**	3.175	**3.78**	96.0	105.6	6	**5.91**	150	2.CD.300F18.XL	■
	.126	3.20	**3.78**	96.0	105.6	6	**5.91**	150	2.CD.300320.XL	■
	.128	3.25	**3.84**	97.5	107.3	6	**5.94**	151	2.CD.300325.XL	Δ
	.130	3.30	**3.90**	99.0	108.9	6	**6.02**	153	2.CD.300330.XL	■
	.132	3.35	**3.96**	100.5	110.6	6	**6.06**	154	2.CD.300335.XL	Δ
	.134	3.40	**4.02**	102.0	112.2	6	**6.14**	156	2.CD.300340.XL	■
	.136	3.45	**4.07**	103.5	113.9	6	**6.22**	158	2.CD.300345.XL	Δ
	.138	3.50	**4.13**	105.0	115.5	6	**6.26**	159	2.CD.300350.XL	■
	.140	3.55	**4.19**	106.5	117.2	6	**6.34**	161	2.CD.300355.XL	Δ
	.142	3.60	**4.25**	108.0	118.8	6	**6.38**	162	2.CD.300360.XL	■
	.144	3.65	**4.31**	109.5	120.5	6	**6.46**	164	2.CD.300365.XL	Δ
	.146	3.70	**4.37**	111.0	122.1	6	**6.54**	166	2.CD.300370.XL	■
	.148	3.75	**4.43**	112.5	123.8	6	**6.57**	167	2.CD.300375.XL	Δ

■ Stock item
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

Carbide | 30xd$_1$ | 140° | Z2 | eXedur SL

Ø d$_1$	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00024"** **0**	+ 0.006 mm 0	**+ .00035"** **+ .00004"**	+ 0.009 mm + 0.001 mm

d$_1$ [inch]	d$_1$ [inch]	d$_1$ [mm]	l$_1$ [inch]	l$_1$ [mm]	l$_2$ [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.150	3.80	**4.49**	114.0	125.4	6	**6.65**	169	2.CD.300380.XL	■
	.152	3.85	**4.55**	115.5	127.1	6	**6.73**	171	2.CD.300385.XL	Δ
	.154	3.90	**4.61**	117.0	128.7	6	**6.77**	172	2.CD.300390.XL	■
	.156	3.95	**4.67**	118.5	130.4	6	**6.85**	174	2.CD.300395.XL	Δ
5/32	**.1562**	3.968	**4.72**	120.0	132.0	6	**6.89**	175	2.CD.300F532.XL	■
	.157	4.00	**4.72**	120.0	132.0	6	**6.89**	175	2.CD.300400.XL	■
	.161	4.10	**4.84**	123.0	135.3	6	**7.05**	179	2.CD.300410.XL	■
	.165	4.20	**4.96**	126.0	138.6	6	**7.17**	182	2.CD.300420.XL	■
	.169	4.30	**5.08**	129.0	141.9	6	**7.28**	185	2.CD.300430.XL	■
	.173	4.40	**5.20**	132.0	145.2	6	**7.40**	188	2.CD.300440.XL	■
	.177	4.50	**5.31**	135.0	148.5	6	**7.52**	191	2.CD.300450.XL	■
	.181	4.60	**5.43**	138.0	151.8	6	**7.68**	195	2.CD.300460.XL	■
	.185	4.70	**5.55**	141.0	155.1	6	**7.80**	198	2.CD.300470.XL	■
3/16	**.1875**	4.762	**5.67**	144.0	158.4	6	**7.91**	201	2.CD.300F316.XL	■
	.189	4.80	**5.67**	144.0	158.4	6	**7.91**	201	2.CD.300480.XL	■
	.193	4.90	**5.79**	147.0	161.7	6	**8.03**	204	2.CD.300490.XL	■
	.197	5.00	**5.91**	150.0	165.0	6	**8.19**	208	2.CD.300500.XL	■
	.201	5.10	**6.02**	153.0	168.3	6	**8.31**	211	2.CD.300510.XL	■
	.205	5.20	**6.14**	156.0	171.6	6	**8.43**	214	2.CD.300520.XL	■
	.209	5.30	**6.26**	159.0	174.9	6	**8.54**	217	2.CD.300530.XL	■
	.213	5.40	**6.38**	162.0	178.2	6	**8.66**	220	2.CD.300540.XL	■
	.217	5.50	**6.50**	165.0	181.5	6	**8.82**	224	2.CD.300550.XL	■
7/32	**.2189**	5.560	**6.61**	168.0	184.8	6	**8.94**	227	2.CD.300F732.XL	■
	.220	5.60	**6.61**	168.0	184.8	6	**8.94**	227	2.CD.300560.XL	■
	.224	5.70	**6.73**	171.0	188.1	6	**9.06**	230	2.CD.300570.XL	■
	.228	5.80	**6.85**	174.0	191.4	6	**9.17**	233	2.CD.300580.XL	■
	.232	5.90	**6.97**	177.0	194.7	6	**9.29**	236	2.CD.300590.XL	■
	.236	6.00	**7.09**	180.0	198.0	6	**9.45**	240	2.CD.300600.XL	■

■ Stock item

Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

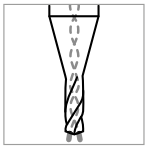
Complementary products

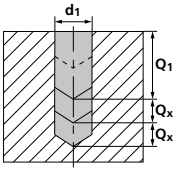
CrazyDrill Pilot	p.161
CrazyDrill Coolpilot	p.189
CrazyDrill Crosspilot	p.175

CRAZYDRILL by Mikron Tool Cool XL

CrazyDrill Cool XL 30 x d

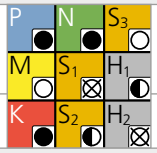
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	50–120 | **164–394**	30xd1	–
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	50–120 | **164–394**	30xd1	–
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	40–100 | **131–328**	30xd1	–
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	30–60 | **98–197**	30xd1	–
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	40–80 | **131–262**	30xd1	–
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	30–60 | **98–197**	5xd1	2xd1
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	100–200 | **328–656**	30xd1	–
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	100–200 | **328–656**	30xd1	–
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	80–150 | **262–492**	30xd1	–
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40–80 | **131–262**	2xd1	2xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40–80 | **131–262**	2xd1	2xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	50–120 | **164–394**	30xd1	–
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	40–80 | **131–262**	30xd1	–
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	25–50 | **82–164**	3xd1	1xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20–40 | **66–131**	5xd1	1xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	20–40 | **66–131**	5xd1	2xd1
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	30–60 | **98–197**	5xd1	1xd1
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1	1.0 mm | .039"	1.25 mm | .049"	1/16" 1.5 mm | .059"	2.0 mm | .079"	3/32" 2.5 mm | .098"	1/8" 3.0 mm | .118"	5/32" 4.0 mm | .158"	3/16" - 7/32" 5.0 mm | .197"	6.0 mm | .236"
	f	f	f	f	f	f	f	f	f
	0.030 | .0012	0.040 | .0016	0.045 | .0018	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.120 | .0047	0.140 | .0055	0.160 | .0063
	0.030 | .0012	0.040 | .0016	0.045 | .0018	0.060 | .0024	0.080 | .0031	0.090 | .0035	0.120 | .0047	0.140 | .0055	0.160 | .0063
	0.025 | .0010	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.075 | .0030	0.100 | .0039	0.120 | .0047	0.150 | .0059
	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.060 | .0024	0.070 | .0028	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.180 | .0071
	0.030 | .0012	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.110 | .0043	0.140 | .0055	0.160 | .0063	0.170 | .0067
	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.060 | .0024	0.070 | .0028	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.180 | .0071
	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.160 | .0063	0.200 | .0079	0.240 | .0094
	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.160 | .0063	0.200 | .0079	0.240 | .0094
	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.160 | .0063	0.200 | .0079	0.240 | .0094
	0.025 | .0010	0.035 | .0014	0.045 | .0018	0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.160 | .0063	0.190 | .0075
	0.025 | .0010	0.035 | .0014	0.045 | .0018	0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.160 | .0063	0.190 | .0075
	0.035 | .0014	0.055 | .0022	0.075 | .0030	0.100 | .0039	0.130 | .0051	0.160 | .0063	0.180 | .0071	0.230 | .0091	0.250 | .0098
	0.025 | .0010	0.035 | .0014	0.045 | .0018	0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.160 | .0063	0.190 | .0075
	0.005 | .0002	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.055 | .0022	0.070 | .0028	0.080 | .0031	0.100 | .0039
	0.005 | .0002	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.055 | .0022	0.070 | .0028	0.080 | .0031	0.100 | .0039
	0.005 | .0002	0.010 | .0004	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.055 | .0022	0.070 | .0028	0.080 | .0031	0.100 | .0039
	0.020 | .0008	0.030 | .0012	0.040 | .0016	0.050 | .0020	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.150 | .0059

CrazyDrill Cool XL 40 x d

DRILLING WITH INTERNAL COOLING



The small, through coolant, solid carbide drill CrazyDrill Cool XL 40 x d is available from diameter .079" up to .236" (2.0 mm to 6.0 mm). All drills are coated and feature a double margin.

With drilling depth up to 40 x d, this is a high performance improvement to the time consuming and costly deep-hole drilling methods such as gun drilling.

The through coolant holes supplies constant coolant flow to the tip. For small diameters, an additional power chamber in the shank assures a higher flowrate. Comparatively at same coolant pressure three time flowrate will be supplied to the cutting area. This technology enables high drilling speed with more effective chip removal. High-performance eXedur SL coating provides thermal and wear protection, guaranteeing a longer tool life.

Optimized cutting geometry for short chip formation and large flute pocket design reduces jamming risk and guarantees effective chip evacuation. Maximum drill depth of 40 x d can be reached in one shot (without pecking) at the highest speed and feed.

We recommend Mikron Tool CrazyDrill Pilot or CrazyDrill Coolpilot for hole preparation on flat and even surfaces or CrazyDrill Crosspilot on inclined surfaces up to 60°. Combining CrazyDrill Pilot / Coolpilot / Crosspilot with CrazyDrill Cool XL, enhances hole quality characteristics by means of fine tuned tolerances. For details see drilling process.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

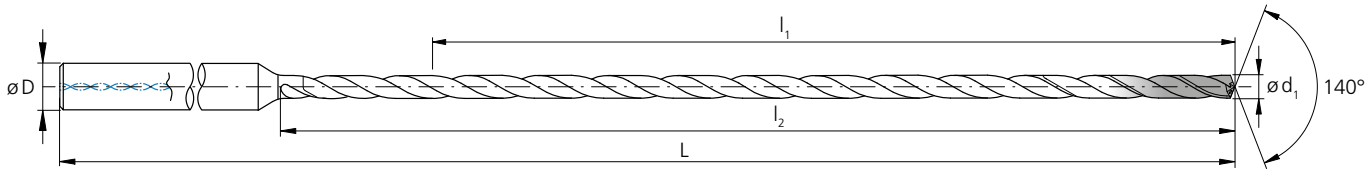
Please note

You couldn't find your suitable version of the CrazyDrill Cool XL (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .079" (2.0 mm).

Carbide | 40xd1 | 140° | Z2 | eXedur SL

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00024"** **0**	+ 0.006 mm 0	**+ .00035"** **+ .00004"**	+ 0.009 mm + 0.001 mm



d_1 **[inch]**	**d_1** **[inch]**	**d_1** [mm]	**l_1** **[inch]**	**l_1** [mm]	**l_2** [mm]	**D** **(h6)** [mm]	**L** **[inch]**	**L** [mm]	**Item number**	Availability
	.079	2.00	**3.15**	80.0	86.0	4	**4.92**	125	2.CD.400200.XL	■
	.081	2.05	**3.23**	82.0	88.2	4	**5.00**	127	2.CD.400205.XL	Δ
	.083	2.10	**3.31**	84.0	90.3	4	**5.12**	130	2.CD.400210.XL	■
	.085	2.15	**3.39**	86.0	92.5	4	**5.20**	132	2.CD.400215.XL	Δ
	.087	2.20	**3.46**	88.0	94.6	4	**5.28**	134	2.CD.400220.XL	■
	.089	2.25	**3.54**	90.0	96.8	4	**5.35**	136	2.CD.400225.XL	Δ
	.091	2.30	**3.62**	92.0	98.9	4	**5.43**	138	2.CD.400230.XL	■
	.093	2.35	**3.70**	94.0	101.1	4	**5.51**	140	2.CD.400235.XL	Δ
3/32	**.0937**	2.381	**3.78**	96.0	103.2	4	**5.59**	142	2.CD.400F332.XL	■
	.094	2.40	**3.78**	96.0	103.2	4	**5.59**	142	2.CD.400240.XL	■
	.096	2.45	**3.86**	98.0	105.4	4	**5.67**	144	2.CD.400245.XL	Δ
	.098	2.50	**3.94**	100.0	107.5	4	**5.75**	146	2.CD.400250.XL	■
	.100	2.55	**4.02**	102.0	109.7	4	**5.83**	148	2.CD.400255.XL	Δ
	.102	2.60	**4.09**	104.0	111.8	4	**5.94**	151	2.CD.400260.XL	■
	.104	2.65	**4.17**	106.0	114.0	4	**6.02**	153	2.CD.400265.XL	Δ
	.106	2.70	**4.25**	108.0	116.1	4	**6.10**	155	2.CD.400270.XL	■
	.108	2.75	**4.33**	110.0	118.3	4	**6.18**	157	2.CD.400275.XL	Δ
	.110	2.80	**4.41**	112.0	120.4	4	**6.26**	159	2.CD.400280.XL	■
	.112	2.85	**4.49**	114.0	122.6	4	**6.34**	161	2.CD.400285.XL	Δ
	.114	2.90	**4.57**	116.0	124.7	4	**6.42**	163	2.CD.400290.XL	■
	.116	2.95	**4.65**	118.0	126.9	4	**6.50**	165	2.CD.400295.XL	Δ
	.118	3.00	**4.72**	120.0	129.0	4	**6.57**	167	2.CD.400300.XL	■

■ Stock item

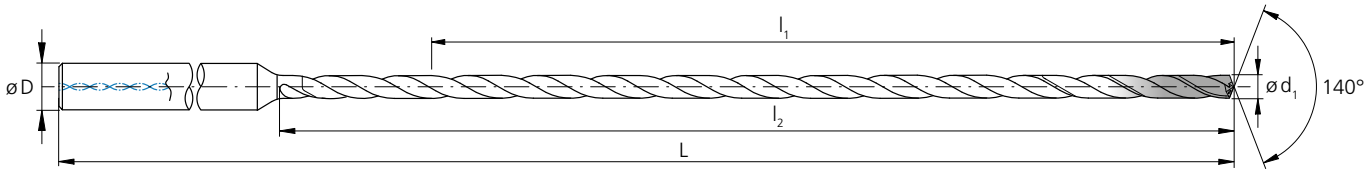
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

Complementary products	
CrazyDrill Pilot	p.161
CrazyDrill Coolpilot	p.189
CrazyDrill Crosspilot	p.175

CRAZYDRILL by Mikron Tool Cool XL

CrazyDrill Cool XL 40 x d

DRILLING WITH INTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.120	3.05	**4.80**	122.0	131.2	6	**6.89**	175	2.CD.400305.XL	Δ
	.122	3.10	**4.88**	124.0	133.3	6	**6.99**	177	2.CD.400310.XL	■
	.124	3.15	**4.96**	126.0	135.5	6	**7.09**	180	2.CD.400315.XL	Δ
1/8	**.1250**	3.175	**5.04**	128.0	137.6	6	**7.17**	182	2.CD.400F18.XL	■
	.126	3.20	**5.04**	128.0	137.6	6	**7.17**	182	2.CD.400320.XL	■
	.128	3.25	**5.12**	130.0	139.8	6	**7.24**	184	2.CD.400325.XL	Δ
	.130	3.30	**5.20**	132.0	141.9	6	**7.32**	186	2.CD.400330.XL	■
	.132	3.35	**5.28**	134.0	144.1	6	**7.40**	188	2.CD.400335.XL	Δ
	.134	3.40	**5.35**	136.0	146.2	6	**7.48**	190	2.CD.400340.XL	■
	.136	3.45	**5.43**	138.0	148.4	6	**7.56**	192	2.CD.400345.XL	Δ
	.138	3.50	**5.51**	140.0	150.5	6	**7.64**	194	2.CD.400350.XL	■
	.140	3.55	**5.59**	142.0	152.7	6	**7.72**	196	2.CD.400355.XL	Δ
	.142	3.60	**5.67**	144.0	154.8	6	**7.80**	198	2.CD.400360.XL	■
	.144	3.65	**5.75**	146.0	157.0	6	**7.91**	201	2.CD.400365.XL	Δ
	.146	3.70	**5.83**	148.0	159.1	6	**7.99**	203	2.CD.400370.XL	■
	.148	3.75	**5.91**	150.0	161.3	6	**8.07**	205	2.CD.400375.XL	Δ
	.150	3.80	**5.98**	152.0	163.4	6	**8.15**	207	2.CD.400380.XL	■
	.152	3.85	**6.06**	154.0	165.6	6	**8.23**	209	2.CD.400385.XL	Δ
	.154	3.90	**6.14**	156.0	167.7	6	**8.31**	211	2.CD.400390.XL	■
	.156	3.95	**6.22**	158.0	169.9	6	**8.39**	213	2.CD.400395.XL	Δ
5/32	**.1562**	3.968	**6.30**	160.0	172.0	6	**8.46**	215	2.CD.400F532.XL	■
	.157	4.00	**6.30**	160.0	172.0	6	**8.46**	215	2.CD.400400.XL	■

■ Stock item
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

Carbide | 40xd$_1$ | 140° | Z2 | eXedur SL

Ø d$_1$	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)	
Tolerance	**+ .00024"** **0**	+ 0.006 mm 0	**+ .00035"** **+ .00004"**	+ 0.009 mm + 0.001 mm

d$_1$ [inch]	d$_1$ [inch]	d$_1$ [mm]	l$_1$ [inch]	l$_1$ [mm]	l$_2$ [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.161	4.10	**6.46**	164.0	176.3	6	**8.66**	220	2.CD.400410.XL	■
	.165	4.20	**6.61**	168.0	180.6	6	**8.82**	224	2.CD.400420.XL	■
	.169	4.30	**6.77**	172.0	184.9	6	**8.98**	228	2.CD.400430.XL	■
	.173	4.40	**6.93**	176.0	189.2	6	**9.13**	232	2.CD.400440.XL	■
	.177	4.50	**7.09**	180.0	193.5	6	**9.29**	236	2.CD.400450.XL	■
	.181	4.60	**7.24**	184.0	197.8	6	**9.49**	241	2.CD.400460.XL	■
	.185	4.70	**7.40**	188.0	202.1	6	**9.65**	245	2.CD.400470.XL	■
3/16	**.1875**	4.762	**7.56**	192.0	206.4	6	**9.80**	249	2.CD.400F316.XL	■
	.189	4.80	**7.56**	192.0	206.4	6	**9.80**	249	2.CD.400480.XL	■
	.193	4.90	**7.72**	196.0	210.7	6	**9.96**	253	2.CD.400490.XL	■
	.197	5.00	**7.87**	200.0	215.0	6	**10.16**	258	2.CD.400500.XL	■
	.201	5.10	**8.03**	204.0	219.3	6	**10.31**	262	2.CD.400510.XL	■
	.205	5.20	**8.19**	208.0	223.6	6	**10.47**	266	2.CD.400520.XL	■
	.209	5.30	**8.35**	212.0	227.9	6	**10.63**	270	2.CD.400530.XL	■
	.213	5.40	**8.50**	216.0	232.2	6	**10.79**	274	2.CD.400540.XL	■
	.217	5.50	**8.66**	220.0	236.5	6	**10.98**	279	2.CD.400550.XL	■
7/32	**.2189**	5.560	**8.82**	224.0	240.8	6	**11.14**	283	2.CD.400F732.XL	■
	.220	5.60	**8.82**	224.0	240.8	6	**11.14**	283	2.CD.400560.XL	■
	.224	5.70	**8.98**	228.0	245.1	6	**11.30**	287	2.CD.400570.XL	■
	.228	5.80	**9.13**	232.0	249.4	6	**11.46**	291	2.CD.400580.XL	■
	.232	5.90	**9.29**	236.0	253.7	6	**11.61**	295	2.CD.400590.XL	■
	.236	6.00	**9.45**	240.0	258.0	6	**11.81**	300	2.CD.400600.XL	■

■ Stock item

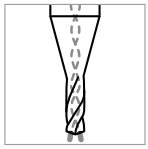
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

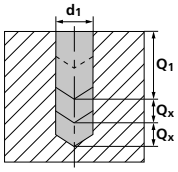
Complementary products

CrazyDrill Pilot	p.161
CrazyDrill Coolpilot	p.189
CrazyDrill Crosspilot	p.175

CrazyDrill Cool XL 40 x d

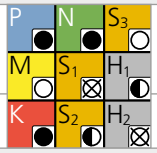
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]	Q_1	Q_x
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	50–100 | **164–328**	40xd1	–
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	50–100 | **164–328**	40xd1	–
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	40–80 | **131–262**	40xd1	–
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	30–60 | **98–197**	40xd1	–
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	40–80 | **131–262**	40xd1	–
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH			
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	30–60 | **98–197**	5xd1	2xd1
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	100–200 | **328–656**	40xd1	–
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	100–200 | **328–656**	40xd1	–
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	80–150 | **262–492**	40xd1	–
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40–80 | **131–262**	2xd1	2xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40–80 | **131–262**	2xd1	2xd1
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	50–120 | **164–394**	40xd1	–
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	40–80 | **131–262**	40xd1	–
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625			
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	25–50 | **82–164**	3xd1	1xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	20–40 | **66–131**	5xd1	1xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	20–40 | **66–131**	5xd1	2xd1
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	30–60 | **98–197**	5xd1	1xd1
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1 2.0 mm | .079" f	3/32" 2.5 mm | .098" f	1/8" 3.0 mm | .118" f	5/32" 4.0 mm | .158" f	3/16" - 7/32" 5.0 mm | .197" f	6.0 mm | .236" f
0.060 | .0024	0.080 | .0031	0.090 | .0035	0.120 | .0047	0.140 | .0055	0.160 | .0063
0.060 | .0024	0.080 | .0031	0.090 | .0035	0.120 | .0047	0.140 | .0055	0.160 | .0063
0.050 | .0020	0.060 | .0024	0.075 | .0030	0.100 | .0039	0.120 | .0047	0.150 | .0059
0.060 | .0024	0.070 | .0028	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.180 | .0071
0.100 | .0039	0.120 | .0047	0.150 | .0059	0.180 | .0071	0.200 | .0079	0.220 | .0087
0.060 | .0024	0.070 | .0028	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.180 | .0071
0.080 | .0031	0.100 | .0039	0.120 | .0047	0.160 | .0063	0.200 | .0079	0.240 | .0094
0.080 | .0031	0.100 | .0039	0.120 | .0047	0.160 | .0063	0.180 | .0071	0.200 | .0079
0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.150 | .0059	0.180 | .0071
0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.160 | .0063	0.190 | .0075
0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.160 | .0063	0.190 | .0075
0.100 | .0039	0.130 | .0051	0.160 | .0063	0.180 | .0071	0.230 | .0091	0.250 | .0098
0.065 | .0026	0.080 | .0031	0.110 | .0043	0.130 | .0051	0.160 | .0063	0.190 | .0075
0.030 | .0012	0.040 | .0016	0.055 | .0022	0.070 | .0028	0.080 | .0031	0.100 | .0039
0.030 | .0012	0.040 | .0016	0.055 | .0022	0.070 | .0028	0.080 | .0031	0.100 | .0039
0.030 | .0012	0.040 | .0016	0.055 | .0022	0.070 | .0028	0.080 | .0031	0.100 | .0039
0.050 | .0020	0.060 | .0024	0.080 | .0031	0.100 | .0039	0.120 | .0047	0.100 | .0039



Drilling process CrazyDrill Cool XL

ACCURATE AND RAPID DRILLING UP TO 40 X D

Coolant type, filtration, coolant pressure and flowrate

Coolant type: For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

Filtration: Good filter quality is very important when using through coolant drills. Dirt particles or residual chips can clog the coolant holes and consequently reduce dramatically the flowrate. The following filter qualities must be adhered especially in small diameters:

- Drill with Ø < .078" (2 mm) filter quality ≤ .0004" (0.010 mm).
- Drill with Ø < .118" (3 mm) filter quality ≤ .0008" (0.020 mm).
- Drill with Ø < .236" (6 mm) filter quality ≤ .0020" (0.050 mm).

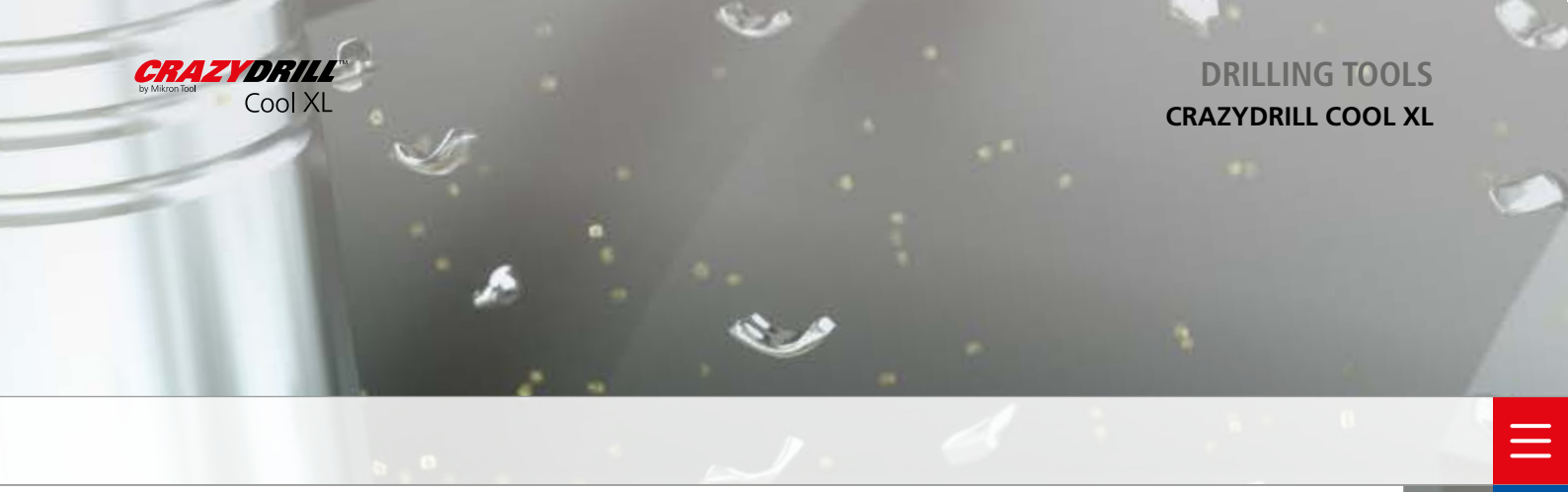
Coolant pressure: To ensure a reliable drilling process the following minimal pressures are required (see chart). Higher pressures are needed for smaller drill size diameters. High pressure is generally better for the cooling and chip evacuation effectiveness.

Ø d_1 Tool		Minimal pressure			
		15 / 20 x d_1		30 / 40 x d_1	
[mm]	**[inch]**	[bar]	**[psi]**	[bar]	**[psi]**
1.0	**.039**	70	**1015**	80	**1160**
2.0	**.079**	50	**725**	70	**1015**
4.0	**.158**	40	**580**	60	**780**
6.0	**.236**	30	**435**	50	**725**

Tool holders

For detailed indications for tool holders see page see chapter "Technical information".





CrazyDrill Cool 15 x d, 20 x d, 30 x d, 40 x d

Mikron Tool recommends CrazyDrill Pilot for all types of CrazyDrill Cool XL:

- **CrazyDrill Pilot** as pilot drill
- **CrazyDrill Coolpilot** as pilot drill for difficult to machine materials
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces

Pilot drilling and drilling

Pilot drilling with CrazyDrill Pilot or CrazyDrill Coolpilot is the perfect start for an accurate (position and alignment accuracy) and consistent machining process. Inclined surfaces requires the use of CrazyDrill Crosspilot.

The quality of drilling (position and alignment accuracy, no measurable transition from pilot hole to the following drilling steps) and a stable machining process are guaranteed by carefully determined tool tolerances.

Note:
With a depth of 40 x d it might be advantageous to use after the pilot drill a 15 x d or 20 x d CrazyDrill Cool XL drill. With this the subsequent 40 x d drill gets even better guidance and protection against bending. Result: an improved tool life.



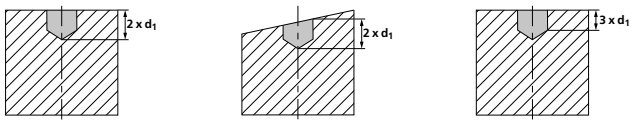


Drilling process CrazyDrill Cool XL

ONE STEP DRILLING (DEPENDING ON MATERIAL, SEE CUTTING DATA CHART)

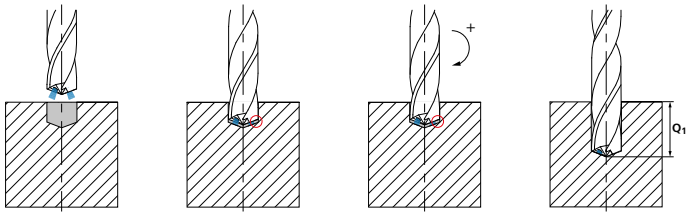
1 | PILOT DRILLING

- With CrazyDrill Pilot or Coolpilot (straight surfaces) or CrazyDrill Crosspilot (inclined surfaces).



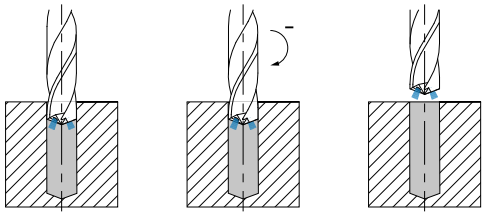
2 | DEEP HOLE DRILLING

- Turn on coolant. Enter the hole at a maximum speed n = 500 rpm and v_f = 1'000 mm/min (39.37 IPM), up to drilling depth 1.8 x d (drill should not touch the bottom of pilot hole).
- Increase speed as per cutting data chart and wait until the desired drilling speed is reached. Program dwell in case of slow spindle acceleration.
- Drill in one step with recommended cutting speed and feed rate.



3 | EXIT FROM BORE

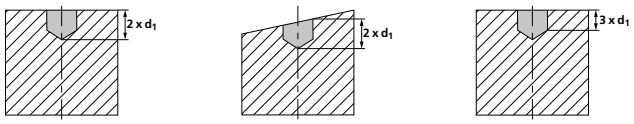
- After the desired drilling depth is reached, return with the drill to drilling depth 2 x d at feed rate or reduced rapid traverse.
- Reduce speed to n = 500 rpm.
- Exit the bore at speed n = 500 rpm and v_f = 39.37 IPM (1'000 mm/min).



DRILLING AS PER DIN 66025 / PAL (DEPENDING ON MATERIAL, SEE CUTTING DATA CHART)

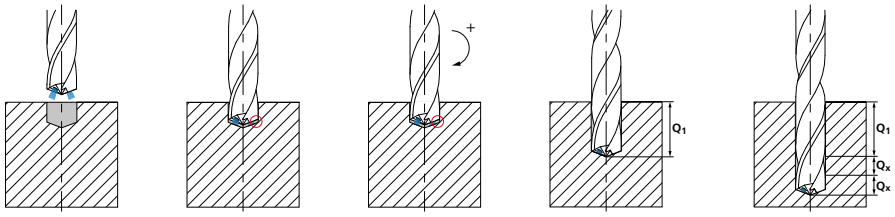
1 | PILOT DRILLING

- With CrazyDrill Pilot or Coolpilot (straight surfaces) or CrazyDrill Crosspilot (inclined surfaces).



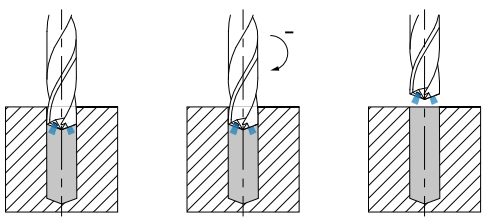
2 | DEEP HOLE DRILLING

- Turn on coolant. Enter the hole at a maximum speed n = 500 rpm and v_f = 39.37 IPM (1'000 mm/min), up to drilling depth 1.8 x d (drill should not touch the bottom of pilot hole).
- Increase speed as per cutting data chart and wait until the desired drilling speed is reached. Program well in case of slow spindle acceleration.
- Drilling with CrazyDrill Cool XL up to maximum drilling depth (Q_1) in one step, afterwards remove chips.
- Single steps (Q_X) as per cutting data chart, afterwards remove chips without taking out the drill completely from the bore.



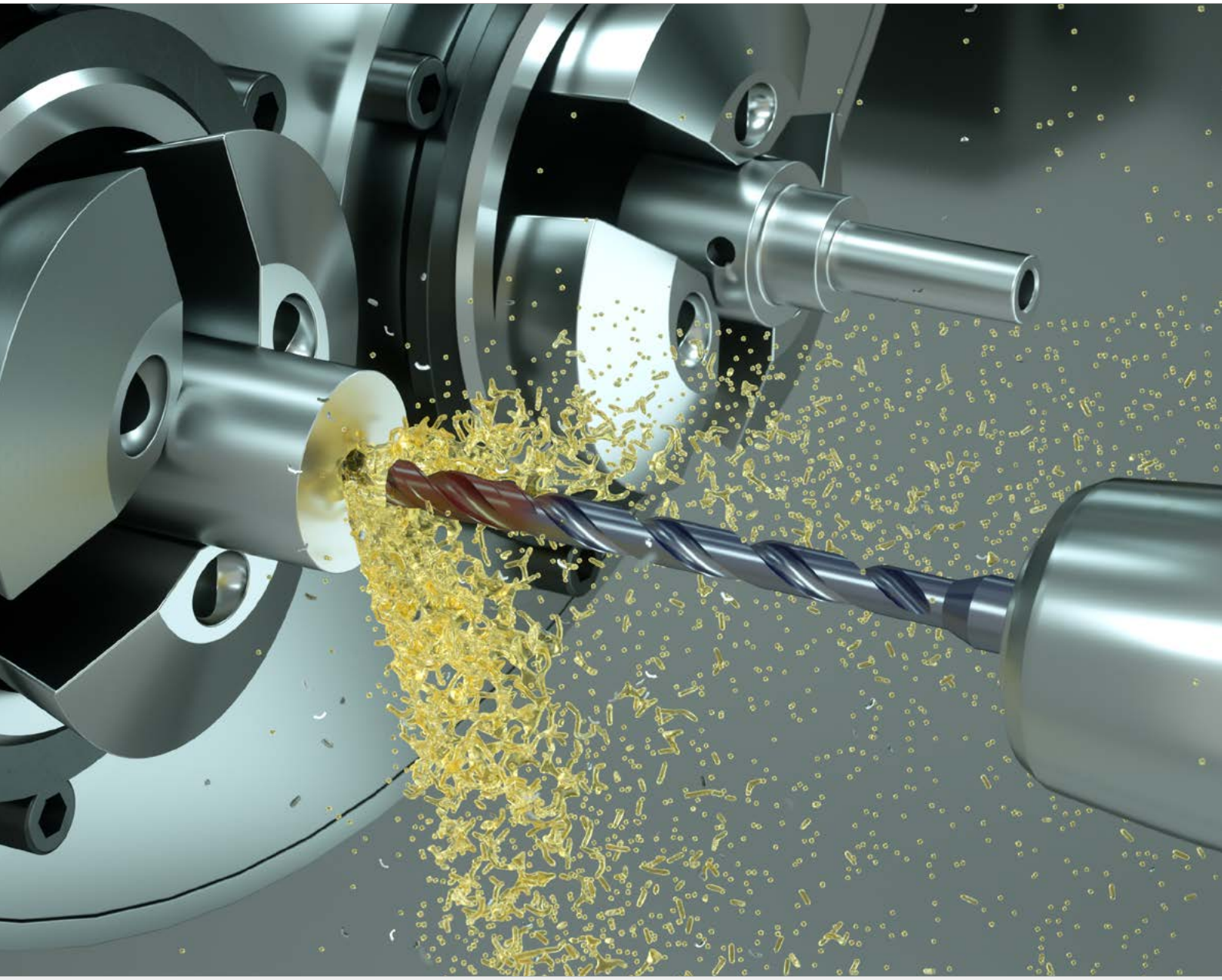
3 | EXIT FROM BORE

- After the desired drilling depth is reached, return with the drill to drilling depth 2 x d at feed rate or reduced rapid traverse.
- Reduce speed to n = 500 rpm.
- Exit the bore at speed n = 500 rpm and vf = 39.37 IPM (1'000 mm/min).



Note: Do not take the drill completely out from the bore between pecks (chattering and consequent break risk). For CrazyDrill Cool XL 15 x d it's possible to enter and drill the pilot hole immediately at the cutting speed and feed recommended on the chart.

NEW CrazyDrill Cool SST-Inox



NEW

CRAZYDRILL Cool SST-Inox

DEEP HOLE DRILLING OF STAINLESS STEEL & CO. IN ONE STEP



With CrazyDrill Cool SST-Inox, Mikron Tool introduces a drill for stainless steels, heat-resistant and CrCo alloys in the diameter range of .039" to 1/4" (1.0 mm to 6.35 mm) and depths of 6 x d, 10 x d, 15 x d, 20 x d, 30 x d or 40 x d.

The new tip and flute geometry as well as the shape of the cooling channels (due to this newly designed shape, up to four times more coolant volume reaches the drill tip), in conjunction with the innovative coating form the foundation for drilling in one single step up to a drilling depth of 40 x d with high performance in terms of quality, tool life and machining time.

CRAZYDRILL™ by Mikron Tool
Cool SST-Inox

NEW

6 x d	10 x d	15 x d	20 x d	30 x d	40 x d
■ Internal cooling ■ Coated	■ Internal cooling ■ Coated	■ Internal cooling ■ Coated	■ Internal cooling ■ Coated	■ Internal cooling ■ Coated	■ Internal cooling ■ Coated
					
					
					
page 370	page 372	page 374	page 376	page 380	page 382

NEW

1 | SHANK
The reinforced solid carbide shank guarantees stability, high degree of concentricity and hence maximum drilling precision.

2 | NEW GENERATION OF COOLING CHANNELS
Due to a newly designed shape of helical cooling channels, up to four times more coolant volume reaches the drill tip. The result is continuous and efficient chip removal as well as constant and substantial cooling of cutting edges. A Powerchamber additionally guarantees sufficiently strong coolant flow for smaller diameters up to Ø .116" (2.95 mm).

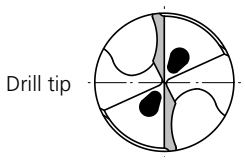
3 | CARBIDE
A specially developed micro-grain solid carbide allows machining at high speeds.

4 | NEW COATING
The high-performance coating eXedur SNP is heat-resistant and wear-resistant, prevents build up edges and promotes uniform chip flushing. A very long tool life is given.

5 | NEW CHIP FLUTE PROFILE
Divided into two areas:
- **Front chip flute area:** a special chip breaker shape ensures compact, short and curved chips.
- **Rear chip flute area:** an extended flute shape ensures perfect chip removal.

6 | POLISHED FLUTES
The polished flutes in versions 15 x d, 20 x d, 30 x d and 40 x d promote uniform chip flushing.

7 | DOUBLE GUIDING MARGIN
The narrow guiding chamfer ensures the highest degree of precision (straightness) and surface quality.



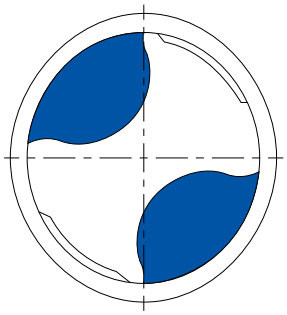
NEW Important features

THE IMPORTANCE OF THE FLUTE PROFILE FOR BEST PERFORMANCE

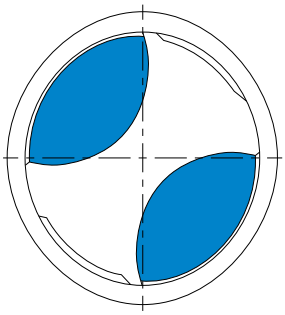
■ **New flute profile for best chip control: CrazyDrill compared to Conventional drill**

CrazyDrill Cool SST-Inox





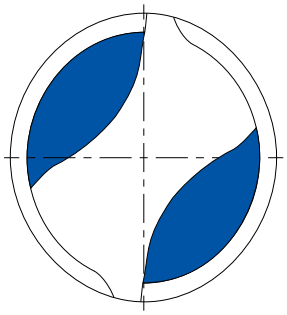
Front chip flute profile
A special chip breaker shape ensures compact, short and curved chips.



Rear chip flute profile
An extended flute shape ensures perfect chips removal.

Conventional drill





One single chip flute profile
A pecking process is necessary due to long chips and difficult evacuation.

■ Short chips for a perfect evacuation

CrazyDrill Cool SST-Inox



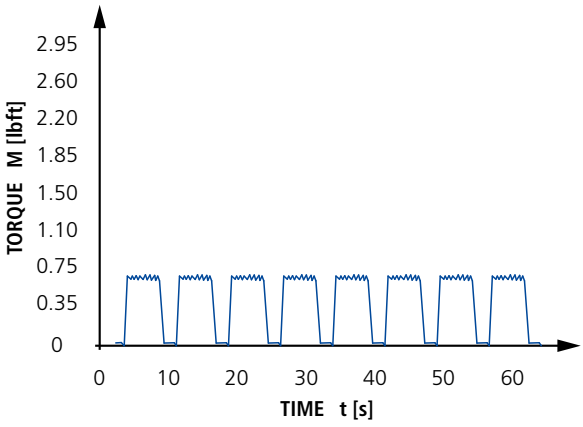
Compact, short and curved chips are easily evacuated and guarantee a long tool life as well as high process reliability.

Conventional drill

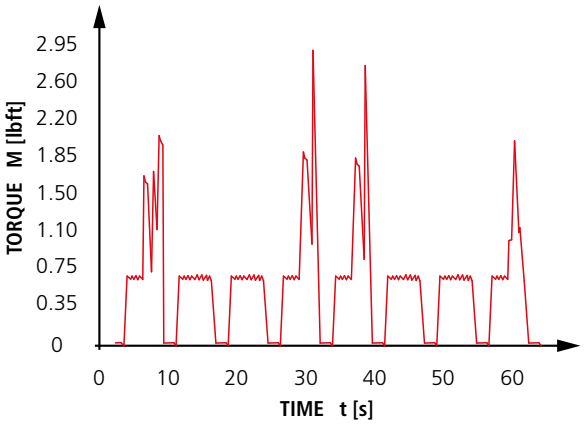


Long chips cause chip jamming and difficult evacuation. This leads to overheating with consequent build up edges. The result is a cutting edge breakout in short time.

■ Costant torque for a long tool life



Conventional drill



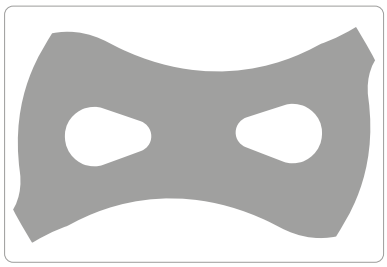
Due to the new flute profile combined with a newly designed shape of helical cooling channels, the torque is kept constant avoiding peaks that lead to unexpected tool breakage. The result is an higher tool life.

NEW Important features

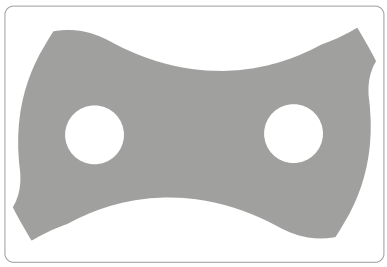
THE IMPORTANCE OF THE COOLING SYSTEM FOR BEST PERFORMANCE

■ Larger cooling channels to avoid overheating

CrazyDrill Cool SST-Inox

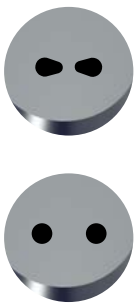


Conventional drill



The development of a new design of helical cooling channels was carried out over a 2-stage design cycle: Flow rate analisys and coolant hole design. We enlarged the section of the cooling channels without affecting the mechanical strength of the drill. Up to four times more coolant volume is reached avoiding overheating of the tool and ensuring a perfect chip removal from the cutting area.

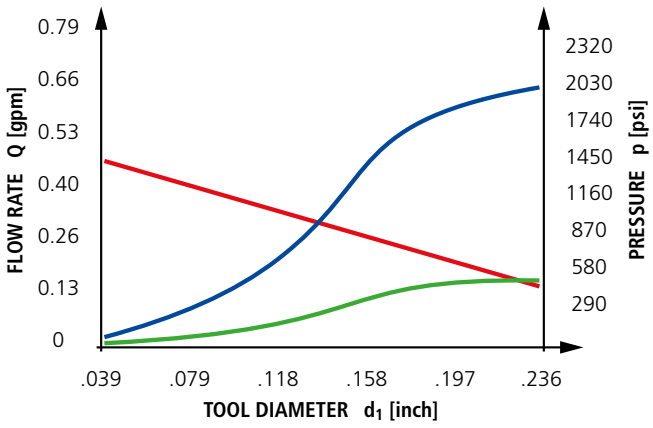
■ New drop shape: up to 4 times more flow rate



Coolant flow rate for new generation channels geometry

Coolant flow rate for conventional channels geometry

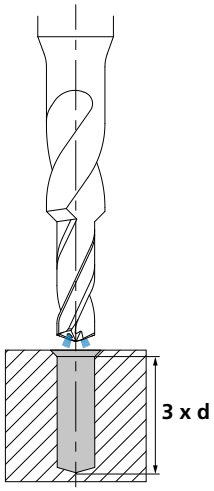
Average pressure needed for the new geometry



Due to the new geometry of the helical cooling channels, up to four times more coolant volume reaches the drill tip.

■ Pre-hole for a perfect alignment

CrazyDrill Coolpilot

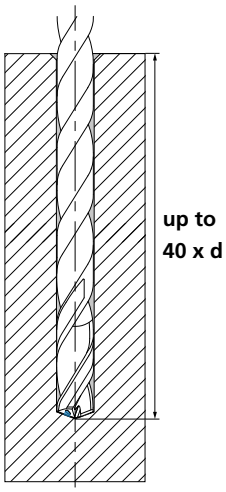


Pilot and short drilling
It is the ideal complement for deep hole drilling.

There is no measurable transition from pilot to follow-up hole due to the perfectly matched tolerance of the tool diameters.

It allows a short drilling up to 3 x d with a simultaneous 90° countersink.

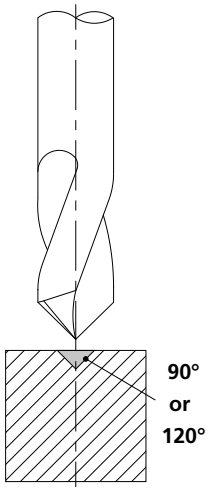
CrazyDrill Cool SST-Inox



Deep hole drilling
The deep hole up to 40 x d is performed in a single feed stroke due to the new cutting edge geometry and the new coolant duct shape.

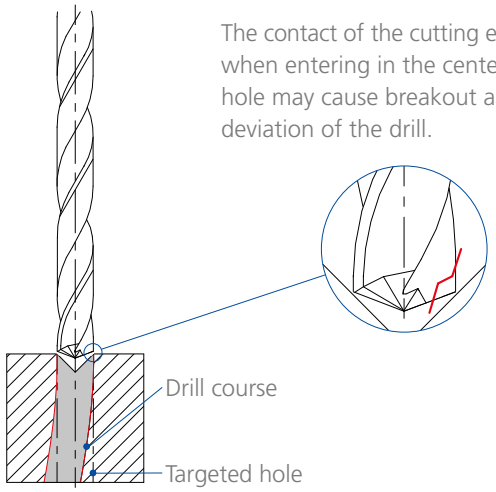
Due to the pre-hole machined with CrazyDrill Coolpilot a high position and alignment accuracy is reached as well as a stable machining process.

Conventional centering tool



Centering
Centering is not the ideal complement to deep hole drilling, because the follow-up hole could be deviated.

The tip angle of the conventional centering tools (90° or 120°) may cause a breakage of cutting edges, when not matching perfectly with deep hole drills.



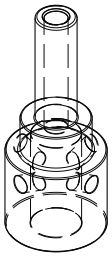
The contact of the cutting edges when entering in the center hole may cause breakout and deviation of the drill.

NEW

Benefits and applications

FOR MORE PERFORMANCE IN STAINLESS STEEL AND SUPERALLOYS

- **SHORT MACHINING TIME** | up to 5 times faster
- **LONG TOOL LIFE** | up to 3 times longer
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to greater coolant flow
- **HIGH DEGREE OF PRECISION** | due to double margin



COMPONENT
Nozzle for food industry

MATERIAL
X5CrNi18-10 / 1.4301 / AISI 304

MACHINING
- Drilling
- d = 2.5 mm **| .098"**
- Drilling depth 26 mm **| 1.02"**

DRILLING TOOL
Mikron Tool - CrazyDrill Cool SST-Inox - 15 x d

DATA	MIKRON TOOL
Tool type	CrazyDrill Cool SST-Inox - Carbide - Coated - Internal cooling
Item number	2.CD.150250.IC
Cutting data	v_c = 80 m/min **| 263 SFM** f = 0.075 mm/rev **| .00295 IPR** Q_1 = 26 mm **| 1.02"**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Dental implant
Aerospace industry	Engine parts Spherical joint
Medical technology	Component for endoscope
Automotive industry	Components for gasoline direct injection
Mechanical engineering	Locking bolt
Watches	Watch housing
Hydraulics / Pneumatics	Hydraulic valve
Food industry	Nozzle
Power industry	Blade

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4542	X5CrNiCuNb 16-4	630
	1.4435	X2CrNiMo 18-14-3	316L
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25

NEW Latest innovation for difficult-to-machine materials

THE DRILL WITH THE REVOLUTIONARY GEOMETRY AND COOLING CONCEPT



CrazyDrill Cool SST-Inox is especially developed for stainless steels, and heat-resistant and CrCo alloys. Previously unattained performance is possible due to a new cutting geometry and a new cooling channel shape that guarantees substantial cooling of cutting edges. The new, copper-red coating provides low adhesion to work materials and facilitates an effective drilling process.

The bore with up to a maximum drilling depth of 40 x d is executed in one single step. The tool thereby guarantees optimal chip breaking and outstanding chip removal due to its new cutting geometry and flute profile. In addition, the newly developed drop-shaped cooling channels afford an extremely efficient coolant supply and optimal chip evacuation. New possibilities in terms of cutting speed and tool life become a reality.

Recommendations of Mikron Tool:

- **Version 6 x d** - centering is not necessary on straight surfaces, with its tip angle of 140° and its chisel "s"-form the drill has good self-centering. We recommend pilot drilling or centering only on irregular, rough or inclined surfaces and if a high position accuracy is requested. For details see "drilling process".
- **Version 10 x d, 15 x d, 20 x d, 30 x d and 40 x d** - we recommend pilot drilling with CrazyDrill Coolpilot or CrazyDrill Crosspilot on inclined surfaces. For details see "drilling process".

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

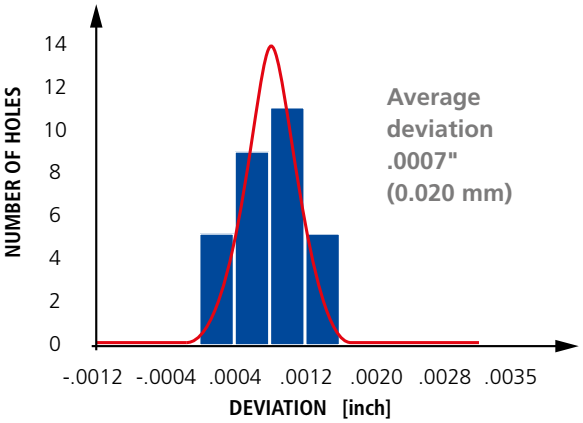
Please note

You couldn't find your suitable version of the CrazyDrill Cool SST-Inox (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

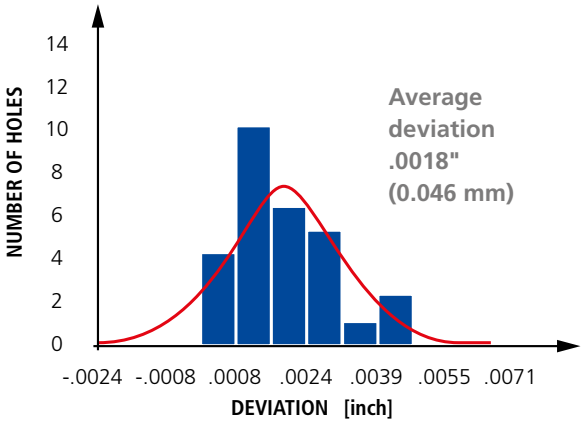
■ Deviation

CrazyDrill Cool SST-Inox 30 x d



Material: X2CrNiMo17-12-2 / 1.4404 / AISI 316L
Diameter: .106" (2.7 mm); Drilling depth: 3.2" (81 mm);
Step: 1; Coolant: oil; Number of holes: 3x30
Cutting data: v_C = 262 SFM (80 m/min);
f = .0032 IPR (0.081 mm/rev)

CrazyDrill Cool SST-Inox 40 x d



Material: X2CrNiMo17-12-2 / 1.4404 / AISI 316L
Diameter: .106" (2.7 mm); Drilling depth: 4.3" (108 mm);
Step: 1; Coolant: oil; Number of holes: 3x30
Cutting data: v_C = 262 SFM (80 m/min);
f = .0032 IPR (0.081 mm/rev)

■ Surface roughness

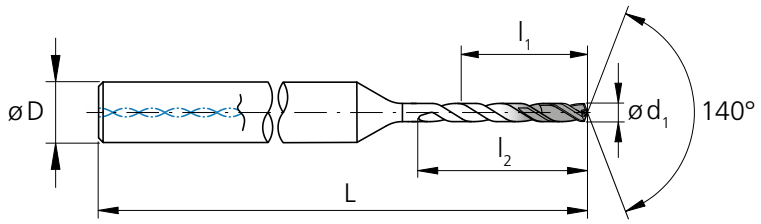
CrazyDrill Cool SST-Inox 40 x d

f **[IPR]** | [mm/rev]	Ra exit **[µin]**	Ra exit [µm]	Rz exit **[µin]**	Rz exit [µm]
.0034 | 0.086	**13.0**	0.331	**106.3**	2.70
.0051 | 0.129	**15.3**	0.388	**129.5**	3.29

Material: X2CrNiMo17-12-2 / 1.4404 / AISI 316L
Diameter: .169" (4.3 mm); Drilling depth: 6.7" (172 mm); Step: 1; Coolant: oil; Pre-hole: CrazyDrill Coolpilot
Cutting data: v_C = 262 SFM (80 m/min); f_{mid} = .0034 IPR (0.086 mm/rev) and f_{high} = .0051 IPR (0.129 mm/rev)

NEW CrazyDrill Cool SST-Inox 6 x d

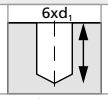
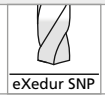
DRILLING WITH INTERNAL COOLING



d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	**.236**	6.0	9.0	4	**2.17**	55	2.CD.060100.IC	■
	.041	1.05	**.248**	6.3	9.5	4	**2.17**	55	2.CD.060105.IC	■
	.043	1.10	**.260**	6.6	9.9	4	**2.17**	55	2.CD.060110.IC	■
	.045	1.15	**.272**	6.9	10.4	4	**2.17**	55	2.CD.060115.IC	■
	.047	1.20	**.283**	7.2	10.8	4	**2.24**	57	2.CD.060120.IC	■
	.049	1.25	**.295**	7.5	11.3	4	**2.24**	57	2.CD.060125.IC	■
	.051	1.30	**.307**	7.8	11.7	4	**2.24**	57	2.CD.060130.IC	■
	.053	1.35	**.319**	8.1	12.2	4	**2.24**	57	2.CD.060135.IC	■
	.055	1.40	**.331**	8.4	12.6	4	**2.24**	57	2.CD.060140.IC	■
	.057	1.45	**.343**	8.7	13.1	4	**2.28**	58	2.CD.060145.IC	■
	.059	1.50	**.354**	9.0	13.5	4	**2.28**	58	2.CD.060150.IC	■
	.061	1.55	**.366**	9.3	14.0	4	**2.28**	58	2.CD.060155.IC	■
1/16	**.0625**	1.587	**.378**	9.6	14.4	4	**2.28**	58	2.CD.060F116.IC	■
	.063	1.60	**.378**	9.6	14.4	4	**2.28**	58	2.CD.060160.IC	■
	.065	1.65	**.390**	9.9	14.9	4	**2.28**	58	2.CD.060165.IC	■
	.067	1.70	**.402**	10.2	15.3	4	**2.36**	60	2.CD.060170.IC	■
	.069	1.75	**.413**	10.5	15.8	4	**2.36**	60	2.CD.060175.IC	■
	.071	1.80	**.425**	10.8	16.2	4	**2.36**	60	2.CD.060180.IC	■
	.073	1.85	**.437**	11.1	16.7	4	**2.36**	60	2.CD.060185.IC	■
	.075	1.90	**.449**	11.4	17.1	4	**2.36**	60	2.CD.060190.IC	■
	.077	1.95	**.461**	11.7	17.6	4	**2.36**	60	2.CD.060195.IC	■
	.079	2.00	**.472**	12.0	18.0	4	**2.48**	63	2.CD.060200.IC	■

d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.081	2.05	**.484**	12.3	18.5	4	**2.48**	63	2.CD.060205.IC	■
	.083	2.10	**.496**	12.6	18.9	4	**2.48**	63	2.CD.060210.IC	■
	.085	2.15	**.508**	12.9	19.4	4	**2.48**	63	2.CD.060215.IC	■
	.087	2.20	**.520**	13.2	19.8	4	**2.48**	63	2.CD.060220.IC	■
	.089	2.25	**.531**	13.5	20.3	4	**2.48**	63	2.CD.060225.IC	■
	.091	2.30	**.543**	13.8	20.7	4	**2.56**	65	2.CD.060230.IC	■
	.093	2.35	**.555**	14.1	21.2	4	**2.56**	65	2.CD.060235.IC	■
3/32	**.0937**	2.381	**.567**	14.4	21.6	4	**2.56**	65	2.CD.060F332.IC	■
	.094	2.40	**.567**	14.4	21.6	4	**2.56**	65	2.CD.060240.IC	■
	.096	2.45	**.579**	14.7	22.1	4	**2.56**	65	2.CD.060245.IC	■
	.098	2.50	**.591**	15.0	22.5	4	**2.56**	65	2.CD.060250.IC	■
	.100	2.55	**.602**	15.3	23.0	4	**2.56**	65	2.CD.060255.IC	■
	.102	2.60	**.614**	15.6	23.4	4	**2.68**	68	2.CD.060260.IC	■
	.104	2.65	**.626**	15.9	23.9	4	**2.68**	68	2.CD.060265.IC	■
	.106	2.70	**.638**	16.2	24.3	4	**2.68**	68	2.CD.060270.IC	■
	.108	2.75	**.650**	16.5	24.8	4	**2.68**	68	2.CD.060275.IC	■
	.110	2.80	**.661**	16.8	25.2	4	**2.68**	68	2.CD.060280.IC	■
	.112	2.85	**.673**	17.1	25.7	4	**2.68**	68	2.CD.060285.IC	■
	.114	2.90	**.685**	17.4	26.1	4	**2.68**	68	2.CD.060290.IC	■
	.116	2.95	**.697**	17.7	26.6	4	**2.68**	68	2.CD.060295.IC	■
	.118	3.00	**.709**	18.0	27.0	6	**2.91**	74	2.CD.060300.IC	■
	.120	3.05	**.720**	18.3	27.5	6	**2.91**	74	2.CD.060305.IC	■

■ Stock item

Carbide |  |  | Z2 |  | 

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)		**.240" - .394"** (6.1 - 10.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0	**+ .00024"** **+ .00004"**	+ 0.006 mm + 0.001 mm	**+ .00028"** **+ .00004"**	+ 0.007 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.122	3.10	**.732**	18.6	27.9	6	**2.91**	74	2.CD.060310.IC	■
	.124	3.15	**.744**	18.9	28.4	6	**2.91**	74	2.CD.060315.IC	■
1/8	**.1250**	3.175	**.756**	19.2	28.8	6	**2.91**	74	2.CD.060F18.IC	■
	.126	3.20	**.756**	19.2	28.8	6	**2.91**	74	2.CD.060320.IC	■
	.128	3.25	**.768**	19.5	29.3	6	**2.91**	74	2.CD.060325.IC	■
	.130	3.30	**.780**	19.8	29.7	6	**2.91**	74	2.CD.060330.IC	■
	.132	3.35	**.791**	20.1	30.2	6	**2.91**	74	2.CD.060335.IC	■
	.134	3.40	**.803**	20.4	30.6	6	**2.91**	74	2.CD.060340.IC	■
	.136	3.45	**.815**	20.7	31.1	6	**2.91**	74	2.CD.060345.IC	■
	.138	3.50	**.827**	21.0	31.5	6	**3.07**	78	2.CD.060350.IC	■
	.140	3.55	**.839**	21.3	32.0	6	**3.07**	78	2.CD.060355.IC	■
	.142	3.60	**.850**	21.6	32.4	6	**3.07**	78	2.CD.060360.IC	■
	.144	3.65	**.862**	21.9	32.9	6	**3.07**	78	2.CD.060365.IC	■
	.146	3.70	**.874**	22.2	33.3	6	**3.07**	78	2.CD.060370.IC	■
	.148	3.75	**.886**	22.5	33.8	6	**3.07**	78	2.CD.060375.IC	■
	.150	3.80	**.898**	22.8	34.2	6	**3.07**	78	2.CD.060380.IC	■
	.152	3.85	**.909**	23.1	34.7	6	**3.07**	78	2.CD.060385.IC	■
	.154	3.90	**.921**	23.4	35.1	6	**3.07**	78	2.CD.060390.IC	■
	.156	3.95	**.933**	23.7	35.6	6	**3.07**	78	2.CD.060395.IC	■
5/32	**.1562**	3.968	**.945**	24.0	36.0	6	**3.07**	78	2.CD.060F532.IC	■
	.157	4.00	**.945**	24.0	36.0	6	**3.07**	78	2.CD.060400.IC	■
	.161	4.10	**.969**	24.6	36.9	6	**3.15**	80	2.CD.060410.IC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.165	4.20	**.992**	25.2	37.8	6	**3.15**	80	2.CD.060420.IC	■
	.169	4.30	**1.02**	25.8	38.7	6	**3.15**	80	2.CD.060430.IC	■
	.173	4.40	**1.04**	26.4	39.6	6	**3.15**	80	2.CD.060440.IC	■
	.177	4.50	**1.06**	27.0	40.5	6	**3.15**	80	2.CD.060450.IC	■
	.181	4.60	**1.09**	27.6	41.4	6	**3.15**	80	2.CD.060460.IC	■
	.185	4.70	**1.11**	28.2	42.3	6	**3.31**	84	2.CD.060470.IC	■
3/16	**.1875**	4.762	**1.13**	28.8	43.2	6	**3.31**	84	2.CD.060F316.IC	■
	.189	4.80	**1.13**	28.8	43.2	6	**3.31**	84	2.CD.060480.IC	■
	.193	4.90	**1.16**	29.4	44.1	6	**3.31**	84	2.CD.060490.IC	■
	.197	5.00	**1.18**	30.0	45.0	6	**3.31**	84	2.CD.060500.IC	■
	.201	5.10	**1.20**	30.6	45.9	6	**3.31**	84	2.CD.060510.IC	■
	.205	5.20	**1.23**	31.2	46.8	6	**3.31**	84	2.CD.060520.IC	■
	.209	5.30	**1.25**	31.8	47.7	6	**3.31**	84	2.CD.060530.IC	■
	.213	5.40	**1.28**	32.4	48.6	6	**3.46**	88	2.CD.060540.IC	■
	.217	5.50	**1.30**	33.0	49.5	6	**3.46**	88	2.CD.060550.IC	■
7/32	**.2189**	5.560	**1.32**	33.6	50.4	6	**3.46**	88	2.CD.060F732.IC	■
	.220	5.60	**1.32**	33.6	50.4	6	**3.46**	88	2.CD.060560.IC	■
	.224	5.70	**1.35**	34.2	51.3	6	**3.46**	88	2.CD.060570.IC	■
	.228	5.80	**1.37**	34.8	52.2	6	**3.46**	88	2.CD.060580.IC	■
	.232	5.90	**1.39**	35.4	53.1	6	**3.46**	88	2.CD.060590.IC	■
	.236	6.00	**1.42**	36.0	54.0	6	**3.46**	88	2.CD.060600.IC	■
1/4	**.2500**	6.350	**1.50**	38.1	57.2	8	**3.54**	90	2.CD.060F14.IC	■

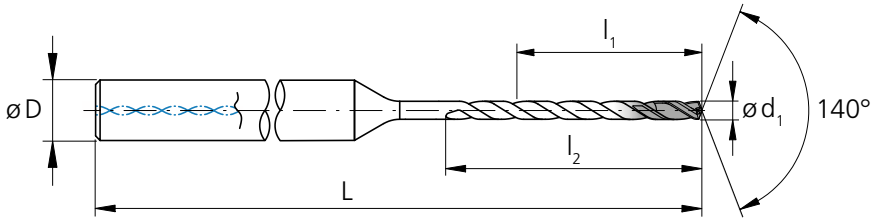
■ Stock item

Complementary products

CrazyDrill Coolpilot p.189
CrazyDrill Crosspilot p.175

NEW CrazyDrill Cool SST-Inox 10 x d

DRILLING WITH INTERNAL COOLING



d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	**.394**	10.0	13.0	4	**2.32**	59	2.CD.100100.IC	■
	.041	1.05	**.413**	10.5	13.7	4	**2.32**	59	2.CD.100105.IC	■
	.043	1.10	**.433**	11.0	14.3	4	**2.32**	59	2.CD.100110.IC	■
	.045	1.15	**.453**	11.5	15.0	4	**2.32**	59	2.CD.100115.IC	■
	.047	1.20	**.472**	12.0	15.6	4	**2.44**	62	2.CD.100120.IC	■
	.049	1.25	**.492**	12.5	16.3	4	**2.44**	62	2.CD.100125.IC	■
	.051	1.30	**.512**	13.0	16.9	4	**2.44**	62	2.CD.100130.IC	■
	.053	1.35	**.531**	13.5	17.6	4	**2.44**	62	2.CD.100135.IC	■
	.055	1.40	**.551**	14.0	18.2	4	**2.44**	62	2.CD.100140.IC	■
	.057	1.45	**.571**	14.5	18.9	4	**2.56**	65	2.CD.100145.IC	■
	.059	1.50	**.591**	15.0	19.5	4	**2.56**	65	2.CD.100150.IC	■
	.061	1.55	**.610**	15.5	20.2	4	**2.56**	65	2.CD.100155.IC	■
1/16	**.0625**	1.587	**.630**	16.0	20.8	4	**2.56**	65	2.CD.100F116.IC	■
	.063	1.60	**.630**	16.0	20.8	4	**2.56**	65	2.CD.100160.IC	■
	.065	1.65	**.650**	16.5	21.5	4	**2.56**	65	2.CD.100165.IC	■
	.067	1.70	**.669**	17.0	22.1	4	**2.64**	67	2.CD.100170.IC	■
	.069	1.75	**.689**	17.5	22.8	4	**2.64**	67	2.CD.100175.IC	■
	.071	1.80	**.709**	18.0	23.4	4	**2.64**	67	2.CD.100180.IC	■
	.073	1.85	**.728**	18.5	24.1	4	**2.64**	67	2.CD.100185.IC	■
	.075	1.90	**.748**	19.0	24.7	4	**2.64**	67	2.CD.100190.IC	■
	.077	1.95	**.768**	19.5	25.4	4	**2.64**	67	2.CD.100195.IC	■
	.079	2.00	**.787**	20.0	26.0	4	**2.76**	70	2.CD.100200.IC	■

d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.081	2.05	**.807**	20.5	26.7	4	**2.76**	70	2.CD.100205.IC	■
	.083	2.10	**.827**	21.0	27.3	4	**2.76**	70	2.CD.100210.IC	■
	.085	2.15	**.846**	21.5	28.0	4	**2.76**	70	2.CD.100215.IC	■
	.087	2.20	**.866**	22.0	28.6	4	**2.76**	70	2.CD.100220.IC	■
	.089	2.25	**.886**	22.5	29.3	4	**2.76**	70	2.CD.100225.IC	■
	.091	2.30	**.906**	23.0	29.9	4	**2.95**	75	2.CD.100230.IC	■
	.093	2.35	**.925**	23.5	30.6	4	**2.95**	75	2.CD.100235.IC	■
3/32	**.0937**	2.381	**.945**	24.0	31.2	4	**2.95**	75	2.CD.100F332.IC	■
	.094	2.40	**.945**	24.0	31.2	4	**2.95**	75	2.CD.100240.IC	■
	.096	2.45	**.965**	24.5	31.9	4	**2.95**	75	2.CD.100245.IC	■
	.098	2.50	**.984**	25.0	32.5	4	**2.95**	75	2.CD.100250.IC	■
	.100	2.55	**1.00**	25.5	33.2	4	**2.95**	75	2.CD.100255.IC	■
	.102	2.60	**1.02**	26.0	33.8	4	**3.15**	80	2.CD.100260.IC	■
	.104	2.65	**1.04**	26.5	34.5	4	**3.15**	80	2.CD.100265.IC	■
	.106	2.70	**1.06**	27.0	35.1	4	**3.15**	80	2.CD.100270.IC	■
	.108	2.75	**1.08**	27.5	35.8	4	**3.15**	80	2.CD.100275.IC	■
	.110	2.80	**1.10**	28.0	36.4	4	**3.15**	80	2.CD.100280.IC	■
	.112	2.85	**1.12**	28.5	37.1	4	**3.15**	80	2.CD.100285.IC	■
	.114	2.90	**1.14**	29.0	37.7	4	**3.15**	80	2.CD.100290.IC	■
	.116	2.95	**1.16**	29.5	38.4	4	**3.15**	80	2.CD.100295.IC	■
	.118	3.00	**1.18**	30.0	39.0	6	**3.43**	87	2.CD.100300.IC	■
	.120	3.05	**1.20**	30.5	39.7	6	**3.43**	87	2.CD.100305.IC	■

■ Stock item

Carbide | 10xd1 | 140° | Z2 | eXedur SNP

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00016" 0	+ 0.004 mm 0	+ .00024" + .00004"	+ 0.006 mm + 0.001 mm	+ .00028" + .00004"	+ 0.007 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.122	3.10	1.22	31.0	40.3	6	3.43	87	2.CD.100310.IC	■
	.124	3.15	1.24	31.5	41.0	6	3.43	87	2.CD.100315.IC	■
1/8	.1250	3.175	1.26	32.0	41.6	6	3.43	87	2.CD.100F18.IC	■
	.126	3.20	1.26	32.0	41.6	6	3.43	87	2.CD.100320.IC	■
	.128	3.25	1.28	32.5	42.3	6	3.43	87	2.CD.100325.IC	■
	.130	3.30	1.30	33.0	42.9	6	3.43	87	2.CD.100330.IC	■
	.132	3.35	1.32	33.5	43.6	6	3.43	87	2.CD.100335.IC	■
	.134	3.40	1.34	34.0	44.2	6	3.43	87	2.CD.100340.IC	■
	.136	3.45	1.36	34.5	44.9	6	3.43	87	2.CD.100345.IC	■
	.138	3.50	1.38	35.0	45.5	6	3.74	95	2.CD.100350.IC	■
	.140	3.55	1.40	35.5	46.2	6	3.74	95	2.CD.100355.IC	■
	.142	3.60	1.42	36.0	46.8	6	3.74	95	2.CD.100360.IC	■
	.144	3.65	1.44	36.5	47.5	6	3.74	95	2.CD.100365.IC	■
	.146	3.70	1.46	37.0	48.1	6	3.74	95	2.CD.100370.IC	■
	.148	3.75	1.48	37.5	48.8	6	3.74	95	2.CD.100375.IC	■
	.150	3.80	1.50	38.0	49.4	6	3.74	95	2.CD.100380.IC	■
	.152	3.85	1.52	38.5	50.1	6	3.74	95	2.CD.100385.IC	■
	.154	3.90	1.54	39.0	50.7	6	3.74	95	2.CD.100390.IC	■
	.156	3.95	1.56	39.5	51.4	6	3.74	95	2.CD.100395.IC	■
5/32	.1562	3.968	1.57	40.0	52.0	6	3.74	95	2.CD.100F532.IC	■
	.157	4.00	1.57	40.0	52.0	6	3.74	95	2.CD.100400.IC	■
	.161	4.10	1.61	41.0	53.3	6	3.94	100	2.CD.100410.IC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.165	4.20	1.65	42.0	54.6	6	3.94	100	2.CD.100420.IC	■
	.169	4.30	1.69	43.0	55.9	6	3.94	100	2.CD.100430.IC	■
	.173	4.40	1.73	44.0	57.2	6	3.94	100	2.CD.100440.IC	■
	.177	4.50	1.77	45.0	58.5	6	3.94	100	2.CD.100450.IC	■
	.181	4.60	1.81	46.0	59.8	6	3.94	100	2.CD.100460.IC	■
	.185	4.70	1.85	47.0	61.1	6	4.13	105	2.CD.100470.IC	■
3/16	.1875	4.762	1.89	48.0	62.4	6	4.13	105	2.CD.100F316.IC	■
	.189	4.80	1.89	48.0	62.4	6	4.13	105	2.CD.100480.IC	■
	.193	4.90	1.93	49.0	63.7	6	4.13	105	2.CD.100490.IC	■
	.197	5.00	1.97	50.0	65.0	6	4.13	105	2.CD.100500.IC	■
	.201	5.10	2.01	51.0	66.3	6	4.13	105	2.CD.100510.IC	■
	.205	5.20	2.05	52.0	67.6	6	4.13	105	2.CD.100520.IC	■
	.209	5.30	2.09	53.0	68.9	6	4.13	105	2.CD.100530.IC	■
	.213	5.40	2.13	54.0	70.2	6	4.41	112	2.CD.100540.IC	■
	.217	5.50	2.17	55.0	71.5	6	4.41	112	2.CD.100550.IC	■
7/32	.2189	5.560	2.20	56.0	72.8	6	4.41	112	2.CD.100F732.IC	■
	.220	5.60	2.20	56.0	72.8	6	4.41	112	2.CD.100560.IC	■
	.224	5.70	2.24	57.0	74.1	6	4.41	112	2.CD.100570.IC	■
	.228	5.80	2.28	58.0	75.4	6	4.41	112	2.CD.100580.IC	■
	.232	5.90	2.32	59.0	76.7	6	4.41	112	2.CD.100590.IC	■
	.236	6.00	2.36	60.0	78.0	6	4.41	112	2.CD.100600.IC	■
1/4	.2500	6.350	2.50	63.5	82.6	8	4.57	116	2.CD.100F14.IC	■

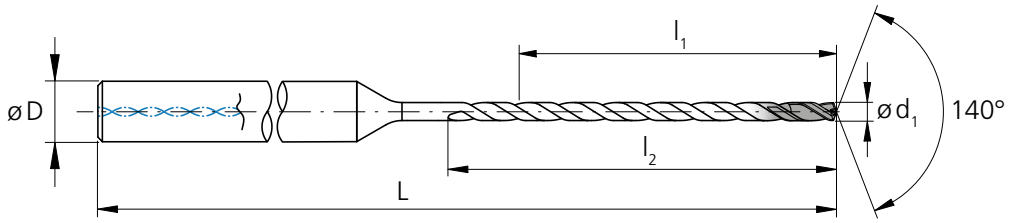
■ Stock item

Complementary products

CrazyDrill Coolpilot p.189
CrazyDrill Crosspilot p.175

NEW CrazyDrill Cool SST-Inox 15 x d

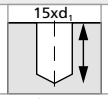
DRILLING WITH INTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	**.591**	15.00	18.5	4	**2.44**	62	2.CD.150100.IC	■
	.041	1.05	**.620**	15.75	19.4	4	**2.44**	62	2.CD.150105.IC	■
	.043	1.10	**.650**	16.50	20.4	4	**2.44**	62	2.CD.150110.IC	■
	.045	1.15	**.679**	17.25	21.3	4	**2.44**	62	2.CD.150115.IC	■
	.047	1.20	**.709**	18.00	22.2	4	**2.52**	64	2.CD.150120.IC	■
	.049	1.25	**.738**	18.75	23.1	4	**2.52**	64	2.CD.150125.IC	■
	.051	1.30	**.768**	19.50	24.1	4	**2.60**	66	2.CD.150130.IC	■
	.053	1.35	**.797**	20.25	25.0	4	**2.60**	66	2.CD.150135.IC	■
	.055	1.40	**.827**	21.00	25.9	4	**2.68**	68	2.CD.150140.IC	■
	.057	1.45	**.856**	21.75	26.8	4	**2.76**	70	2.CD.150145.IC	■
	.059	1.50	**.886**	22.50	27.8	4	**2.76**	70	2.CD.150150.IC	■
	.061	1.55	**.915**	23.25	28.7	4	**2.95**	75	2.CD.150155.IC	■
1/16	**.0625**	1.587	**.945**	24.00	29.6	4	**2.95**	75	2.CD.150F116.IC	■
	.063	1.60	**.945**	24.00	29.6	4	**2.95**	75	2.CD.150160.IC	■
	.065	1.65	**.974**	24.75	30.5	4	**2.95**	75	2.CD.150165.IC	■
	.067	1.70	**1.00**	25.50	31.5	4	**2.99**	76	2.CD.150170.IC	■
	.069	1.75	**1.03**	26.25	32.4	4	**2.99**	76	2.CD.150175.IC	■
	.071	1.80	**1.06**	27.00	33.3	4	**2.99**	76	2.CD.150180.IC	■
	.073	1.85	**1.09**	27.75	34.2	4	**2.99**	76	2.CD.150185.IC	■
	.075	1.90	**1.12**	28.50	35.2	4	**3.15**	80	2.CD.150190.IC	■
	.077	1.95	**1.15**	29.25	36.1	4	**3.15**	80	2.CD.150195.IC	■
	.079	2.00	**1.18**	30.00	37.0	4	**3.15**	80	2.CD.150200.IC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.081	2.05	**1.21**	30.75	37.9	4	**3.15**	80	2.CD.150205.IC	■
	.083	2.10	**1.24**	31.50	38.9	4	**3.15**	80	2.CD.150210.IC	■
	.085	2.15	**1.27**	32.25	39.8	4	**3.35**	85	2.CD.150215.IC	■
	.087	2.20	**1.30**	33.00	40.7	4	**3.35**	85	2.CD.150220.IC	■
	.089	2.25	**1.33**	33.75	41.6	4	**3.35**	85	2.CD.150225.IC	■
	.091	2.30	**1.36**	34.50	42.6	4	**3.39**	86	2.CD.150230.IC	■
	.093	2.35	**1.39**	35.25	43.5	4	**3.39**	86	2.CD.150235.IC	■
3/32	**.0937**	2.381	**1.42**	36.00	44.4	4	**3.39**	86	2.CD.150F332.IC	■
	.094	2.40	**1.42**	36.00	44.4	4	**3.39**	86	2.CD.150240.IC	■
	.096	2.45	**1.45**	36.75	45.3	4	**3.39**	86	2.CD.150245.IC	■
	.098	2.50	**1.48**	37.50	46.3	4	**3.54**	90	2.CD.150250.IC	■
	.100	2.55	**1.51**	38.25	47.2	4	**3.54**	90	2.CD.150255.IC	■
	.102	2.60	**1.54**	39.00	48.1	4	**3.54**	90	2.CD.150260.IC	■
	.104	2.65	**1.56**	39.75	49.0	4	**3.54**	90	2.CD.150265.IC	■
	.106	2.70	**1.59**	40.50	50.0	4	**3.62**	92	2.CD.150270.IC	■
	.108	2.75	**1.62**	41.25	50.9	4	**3.62**	92	2.CD.150275.IC	■
	.110	2.80	**1.65**	42.00	51.8	4	**3.70**	94	2.CD.150280.IC	■
	.112	2.85	**1.68**	42.75	52.7	4	**3.70**	94	2.CD.150285.IC	■
	.114	2.90	**1.71**	43.50	53.7	4	**3.86**	98	2.CD.150290.IC	■
	.116	2.95	**1.74**	44.25	54.6	4	**3.86**	98	2.CD.150295.IC	■
	.118	3.00	**1.77**	45.00	55.5	6	**3.94**	100	2.CD.150300.IC	■
	.120	3.05	**1.80**	45.75	56.4	6	**3.94**	100	2.CD.150305.IC	■

■ Stock item

Carbide |  |  | Z2 |  | 

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)		**.240" - .394"** (6.1 - 10.0 mm)	
Tolerance	**+ .00016"** **0**	+ 0.004 mm 0	**+ .00024"** **+ .00004"**	+ 0.006 mm + 0.001 mm	**+ .00028"** **+ .00004"**	+ 0.007 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.122	3.10	**1.83**	46.50	57.4	6	**4.02**	102	2.CD.150310.IC	■
	.124	3.15	**1.86**	47.25	58.3	6	**4.02**	102	2.CD.150315.IC	■
1/8	**.1250**	3.175	**1.89**	48.00	59.2	6	**4.17**	106	2.CD.150F18.IC	■
	.126	3.20	**1.89**	48.00	59.2	6	**4.17**	106	2.CD.150320.IC	■
	.128	3.25	**1.92**	48.75	60.1	6	**4.17**	106	2.CD.150325.IC	■
	.130	3.30	**1.95**	49.50	61.1	6	**4.17**	106	2.CD.150330.IC	■
	.132	3.35	**1.98**	50.25	62.0	6	**4.17**	106	2.CD.150335.IC	■
	.134	3.40	**2.01**	51.00	62.9	6	**4.17**	106	2.CD.150340.IC	■
	.136	3.45	**2.04**	51.75	63.8	6	**4.17**	106	2.CD.150345.IC	■
	.138	3.50	**2.07**	52.50	64.8	6	**4.25**	108	2.CD.150350.IC	■
	.140	3.55	**2.10**	53.25	65.7	6	**4.25**	108	2.CD.150355.IC	■
	.142	3.60	**2.13**	54.00	66.6	6	**4.33**	110	2.CD.150360.IC	■
	.144	3.65	**2.16**	54.75	67.5	6	**4.33**	110	2.CD.150365.IC	■
	.146	3.70	**2.19**	55.50	68.5	6	**4.41**	112	2.CD.150370.IC	■
	.148	3.75	**2.21**	56.25	69.4	6	**4.41**	112	2.CD.150375.IC	■
	.150	3.80	**2.24**	57.00	70.3	6	**4.57**	116	2.CD.150380.IC	■
	.152	3.85	**2.27**	57.75	71.2	6	**4.57**	116	2.CD.150385.IC	■
	.154	3.90	**2.30**	58.50	72.2	6	**4.57**	116	2.CD.150390.IC	■
	.156	3.95	**2.33**	59.25	73.1	6	**4.57**	116	2.CD.150395.IC	■
5/32	**.1562**	3.968	**2.36**	60.00	74.0	6	**4.57**	116	2.CD.150F532.IC	■
	.157	4.00	**2.36**	60.00	74.0	6	**4.57**	116	2.CD.150400.IC	■
	.161	4.10	**2.42**	61.50	75.9	6	**4.65**	118	2.CD.150410.IC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.165	4.20	**2.48**	63.00	77.7	6	**4.72**	120	2.CD.150420.IC	■
	.169	4.30	**2.54**	64.50	79.6	6	**4.80**	122	2.CD.150430.IC	■
	.173	4.40	**2.60**	66.00	81.4	6	**4.96**	126	2.CD.150440.IC	■
	.177	4.50	**2.66**	67.50	83.3	6	**4.96**	126	2.CD.150450.IC	■
	.181	4.60	**2.72**	69.00	85.1	6	**4.96**	126	2.CD.150460.IC	■
	.185	4.70	**2.78**	70.50	87.0	6	**5.08**	129	2.CD.150470.IC	■
3/16	**.1875**	4.762	**2.83**	72.00	88.8	6	**5.16**	131	2.CD.150F316.IC	■
	.189	4.80	**2.83**	72.00	88.8	6	**5.16**	131	2.CD.150480.IC	■
	.193	4.90	**2.89**	73.50	90.7	6	**5.24**	133	2.CD.150490.IC	■
	.197	5.00	**2.95**	75.00	92.5	6	**5.31**	135	2.CD.150500.IC	■
	.201	5.10	**3.01**	76.50	94.4	6	**5.39**	137	2.CD.150510.IC	■
	.205	5.20	**3.07**	78.00	96.2	6	**5.55**	141	2.CD.150520.IC	■
	.209	5.30	**3.13**	79.50	98.1	6	**5.55**	141	2.CD.150530.IC	■
	.213	5.40	**3.19**	81.00	99.9	6	**5.55**	141	2.CD.150540.IC	■
	.217	5.50	**3.25**	82.50	101.8	6	**5.63**	143	2.CD.150550.IC	■
7/32	**.2189**	5.560	**3.31**	84.00	103.6	6	**5.71**	145	2.CD.150F732.IC	■
	.220	5.60	**3.31**	84.00	103.6	6	**5.71**	145	2.CD.150560.IC	■
	.224	5.70	**3.37**	85.50	105.5	6	**5.79**	147	2.CD.150570.IC	■
	.228	5.80	**3.43**	87.00	107.3	6	**5.94**	151	2.CD.150580.IC	■
	.232	5.90	**3.48**	88.50	109.2	6	**5.94**	151	2.CD.150590.IC	■
	.236	6.00	**3.54**	90.00	111.0	6	**5.94**	151	2.CD.150600.IC	■
1/4	**.2500**	6.350	**3.75**	95.30	117.5	8	**6.18**	157	2.CD.150F14.IC	■

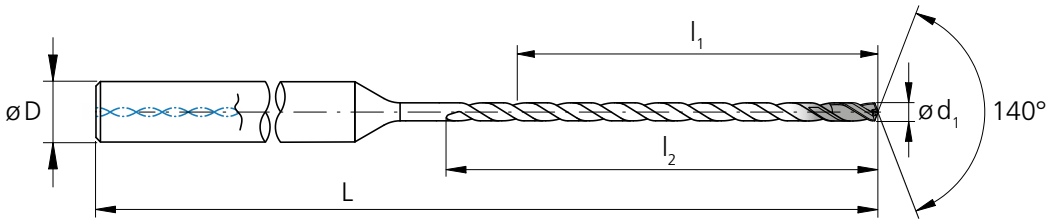
■ Stock item

Complementary products

CrazyDrill Coolpilot p.189
CrazyDrill Crosspilot p.175

NEW CrazyDrill Cool SST-Inox 20 x d

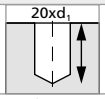
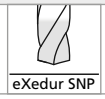
DRILLING WITH INTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	**.787**	20.0	23.5	4	**2.76**	70	2.CD.200100.IC	■
	.041	1.05	**.827**	21.0	24.7	4	**2.76**	70	2.CD.200105.IC	Δ
	.043	1.10	**.866**	22.0	25.9	4	**2.76**	70	2.CD.200110.IC	■
	.045	1.15	**.906**	23.0	27.0	4	**2.76**	70	2.CD.200115.IC	Δ
	.047	1.20	**.945**	24.0	28.2	4	**2.76**	70	2.CD.200120.IC	■
	.049	1.25	**.984**	25.0	29.4	4	**2.76**	70	2.CD.200125.IC	Δ
	.051	1.30	**1.02**	26.0	30.6	4	**2.95**	75	2.CD.200130.IC	■
	.053	1.35	**1.06**	27.0	31.7	4	**2.95**	75	2.CD.200135.IC	Δ
	.055	1.40	**1.10**	28.0	32.9	4	**2.95**	75	2.CD.200140.IC	■
	.057	1.45	**1.14**	29.0	34.1	4	**3.07**	78	2.CD.200145.IC	Δ
	.059	1.50	**1.18**	30.0	35.3	4	**3.07**	78	2.CD.200150.IC	■
	.061	1.55	**1.22**	31.0	36.4	4	**3.07**	78	2.CD.200155.IC	Δ
1/16	**.0625**	1.587	**1.26**	32.0	37.6	4	**3.23**	82	2.CD.200F116.IC	■
	.063	1.60	**1.26**	32.0	37.6	4	**3.23**	82	2.CD.200160.IC	■
	.065	1.65	**1.30**	33.0	38.8	4	**3.23**	82	2.CD.200165.IC	Δ
	.067	1.70	**1.34**	34.0	40.0	4	**3.35**	85	2.CD.200170.IC	■
	.069	1.75	**1.38**	35.0	41.1	4	**3.35**	85	2.CD.200175.IC	Δ
	.071	1.80	**1.42**	36.0	42.3	4	**3.35**	85	2.CD.200180.IC	■
	.073	1.85	**1.46**	37.0	43.5	4	**3.46**	88	2.CD.200185.IC	Δ
	.075	1.90	**1.50**	38.0	44.7	4	**3.46**	88	2.CD.200190.IC	■
	.077	1.95	**1.54**	39.0	45.8	4	**3.46**	88	2.CD.200195.IC	Δ
	.079	2.00	**1.57**	40.0	47.0	4	**3.54**	90	2.CD.200200.IC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.081	2.05	**1.61**	41.0	48.2	4	**3.54**	90	2.CD.200205.IC	Δ
	.083	2.10	**1.65**	42.0	49.4	4	**3.66**	93	2.CD.200210.IC	■
	.085	2.15	**1.69**	43.0	50.5	4	**3.66**	93	2.CD.200215.IC	Δ
	.087	2.20	**1.73**	44.0	51.7	4	**3.74**	95	2.CD.200220.IC	■
	.089	2.25	**1.77**	45.0	52.9	4	**3.74**	95	2.CD.200225.IC	Δ
	.091	2.30	**1.81**	46.0	54.1	4	**3.86**	98	2.CD.200230.IC	■
	.093	2.35	**1.85**	47.0	55.2	4	**3.86**	98	2.CD.200235.IC	Δ
3/32	**.0937**	2.381	**1.89**	48.0	56.4	4	**3.86**	98	2.CD.200F332.IC	■
	.094	2.40	**1.89**	48.0	56.4	4	**3.86**	98	2.CD.200240.IC	■
	.096	2.45	**1.93**	49.0	57.6	4	**3.94**	100	2.CD.200245.IC	Δ
	.098	2.50	**1.97**	50.0	58.8	4	**3.94**	100	2.CD.200250.IC	■
	.100	2.55	**2.01**	51.0	59.9	4	**4.02**	102	2.CD.200255.IC	Δ
	.102	2.60	**2.05**	52.0	61.1	4	**4.09**	104	2.CD.200260.IC	■
	.104	2.65	**2.09**	53.0	62.3	4	**4.09**	104	2.CD.200265.IC	Δ
	.106	2.70	**2.13**	54.0	63.5	4	**4.09**	104	2.CD.200270.IC	■
	.108	2.75	**2.17**	55.0	64.6	4	**4.17**	106	2.CD.200275.IC	Δ
	.110	2.80	**2.20**	56.0	65.8	4	**4.17**	106	2.CD.200280.IC	■
	.112	2.85	**2.24**	57.0	67.0	4	**4.25**	108	2.CD.200285.IC	Δ
	.114	2.90	**2.28**	58.0	68.2	4	**4.25**	108	2.CD.200290.IC	■
	.116	2.95	**2.32**	59.0	69.3	4	**4.33**	110	2.CD.200295.IC	Δ
	.118	3.00	**2.36**	60.0	70.5	6	**4.57**	116	2.CD.200300.IC	■
	.120	3.05	**2.40**	61.0	71.7	6	**4.57**	116	2.CD.200305.IC	Δ

■ Stock item
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

Carbide |  |  | Z2 |  | 

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00016" 0	+ 0.004 mm 0	+ .00024" + .00004"	+ 0.006 mm + 0.001 mm	+ .00028" + .00004"	+ 0.007 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.122	3.10	2.44	62.0	72.9	6	4.65	118	2.CD.200310.IC	■
	.124	3.15	2.48	63.0	74.0	6	4.65	118	2.CD.200315.IC	Δ
1/8	.1250	3.175	2.52	64.0	75.2	6	4.72	120	2.CD.200F18.IC	■
	.126	3.20	2.52	64.0	75.2	6	4.72	120	2.CD.200320.IC	■
	.128	3.25	2.56	65.0	76.4	6	4.72	120	2.CD.200325.IC	Δ
	.130	3.30	2.60	66.0	77.6	6	4.80	122	2.CD.200330.IC	■
	.132	3.35	2.64	67.0	78.7	6	4.80	122	2.CD.200335.IC	Δ
	.134	3.40	2.68	68.0	79.9	6	4.96	126	2.CD.200340.IC	■
	.136	3.45	2.72	69.0	81.1	6	4.96	126	2.CD.200345.IC	Δ
	.138	3.50	2.76	70.0	82.3	6	4.96	126	2.CD.200350.IC	■
	.140	3.55	2.80	71.0	83.4	6	4.96	126	2.CD.200355.IC	Δ
	.142	3.60	2.83	72.0	84.6	6	5.04	128	2.CD.200360.IC	■
	.144	3.65	2.87	73.0	85.8	6	5.04	128	2.CD.200365.IC	Δ
	.146	3.70	2.91	74.0	87.0	6	5.12	130	2.CD.200370.IC	■
	.148	3.75	2.95	75.0	88.1	6	5.12	130	2.CD.200375.IC	Δ
	.150	3.80	2.99	76.0	89.3	6	5.20	132	2.CD.200380.IC	■
	.152	3.85	3.03	77.0	90.5	6	5.20	132	2.CD.200385.IC	Δ
	.154	3.90	3.07	78.0	91.7	6	5.35	136	2.CD.200390.IC	■
	.156	3.95	3.11	79.0	92.8	6	5.35	136	2.CD.200395.IC	Δ
5/32	.1562	3.968	3.15	80.0	94.0	6	5.35	136	2.CD.200F532.IC	■
	.157	4.00	3.15	80.0	94.0	6	5.35	136	2.CD.200400.IC	■
	.161	4.10	3.23	82.0	96.4	6	5.55	141	2.CD.200410.IC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.165	4.20	3.31	84.0	98.7	6	5.63	143	2.CD.200420.IC	■
	.169	4.30	3.39	86.0	101.1	6	5.71	145	2.CD.200430.IC	■
	.173	4.40	3.46	88.0	103.4	6	5.79	147	2.CD.200440.IC	■
	.177	4.50	3.54	90.0	105.8	6	5.94	151	2.CD.200450.IC	■
	.181	4.60	3.62	92.0	108.1	6	5.94	151	2.CD.200460.IC	■
	.185	4.70	3.70	94.0	110.5	6	6.06	154	2.CD.200470.IC	■
3/16	.1875	4.762	3.78	96.0	112.8	6	6.14	156	2.CD.200F316.IC	■
	.189	4.80	3.78	96.0	112.8	6	6.14	156	2.CD.200480.IC	■
	.193	4.90	3.86	98.0	115.2	6	6.22	158	2.CD.200490.IC	■
	.197	5.00	3.94	100.0	117.5	6	6.30	160	2.CD.200500.IC	■
	.201	5.10	4.02	102.0	119.9	6	6.38	162	2.CD.200510.IC	■
	.205	5.20	4.09	104.0	122.2	6	6.54	166	2.CD.200520.IC	■
	.209	5.30	4.17	106.0	124.6	6	6.54	166	2.CD.200530.IC	■
	.213	5.40	4.25	108.0	126.9	6	6.73	171	2.CD.200540.IC	■
	.217	5.50	4.33	110.0	129.3	6	6.81	173	2.CD.200550.IC	■
7/32	.2189	5.560	4.41	112.0	131.6	6	6.89	175	2.CD.200F732.IC	■
	.220	5.60	4.41	112.0	131.6	6	6.89	175	2.CD.200560.IC	■
	.224	5.70	4.49	114.0	134.0	6	6.97	177	2.CD.200570.IC	■
	.228	5.80	4.57	116.0	136.3	6	7.13	181	2.CD.200580.IC	■
	.232	5.90	4.65	118.0	138.7	6	7.13	181	2.CD.200590.IC	■
	.236	6.00	4.72	120.0	141.0	6	7.13	181	2.CD.200600.IC	■
1/4	.2500	6.350	5.00	127.0	149.2	8	7.40	188	2.CD.200F14.IC	■

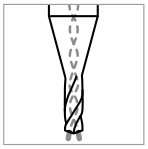
■ Stock item
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

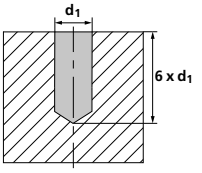
Complementary products

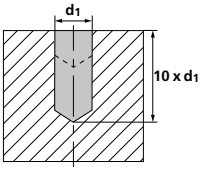
CrazyDrill Coolpilot p.189
CrazyDrill Crosspilot p.175

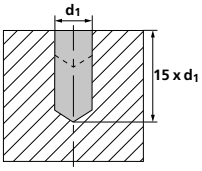
NEW 6 x d - 10 x d - 15 x d - 20 x d

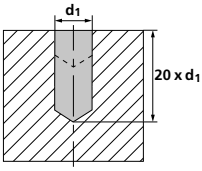
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW





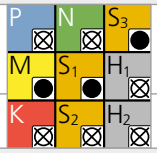






Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Low	Mid	High
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010			
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310			
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2			
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | **197**	80 | **262**	100 | **328**
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | **197**	80 | **262**	100 | **328**
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | **197**	80 | **262**	100 | **328**
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | **197**	80 | **262**	100 | **328**
		1.4435	X2CrNiMo 18-14-3	AISI 316L			
		1.4441	X2CrNiMo 18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30			
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351			
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380			
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.004	Cu-OF / CW008A	UNS C10100			
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400			
		2.036	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500			
		2.102	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000			
		2.096	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625	30 | **98**	40 | **131**	50 | **164**
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67			
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136			
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	50 | **164**	70 | **230**	90 | **295**
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1			
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



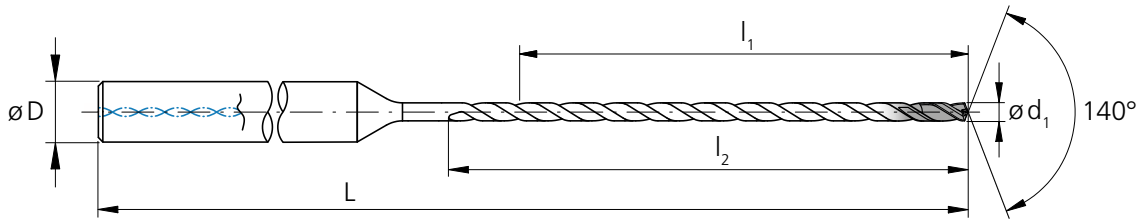
f [mm/rev] | **[IPR]**

Ød1	1.0 mm | .039"			1.25 mm | .049"			1/16" 1.5 mm | .059"			3/32" 2.0 mm | .079"			2.5 mm | .098"			1/8" 3.0 mm | .118"			5/32" 4.0 mm | .158"			3/16" - 7/32" 5.0 mm | .197"			1/4" 6.0 mm | .236"		
	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High
	0.010 **.0004**	0.020 **.0008**	0.030 **.0012**	0.013 **.0005**	0.025 **.0010**	0.038 **.0015**	0.015 **.0006**	0.030 **.0012**	0.045 **.0018**	0.020 **.0008**	0.040 **.0016**	0.060 **.0024**	0.025 **.0010**	0.050 **.0020**	0.075 **.0030**	0.030 **.0012**	0.060 **.0024**	0.090 **.0035**	0.040 **.0016**	0.080 **.0031**	0.120 **.0047**	0.050 **.0020**	0.100 **.0039**	0.150 **.0059**	0.060 **.0024**	0.120 **.0047**	0.180 **.0071**
	0.030 **.0012**	0.040 **.0016**	0.050 **.0020**	0.038 **.0015**	0.050 **.0020**	0.063 **.0025**	0.045 **.0018**	0.060 **.0024**	0.075 **.0030**	0.060 **.0024**	0.080 **.0031**	0.100 **.0039**	0.075 **.0030**	0.100 **.0039**	0.125 **.0049**	0.090 **.0035**	0.120 **.0047**	0.150 **.0059**	0.120 **.0047**	0.160 **.0063**	0.200 **.0079**	0.150 **.0059**	0.200 **.0079**	0.250 **.0098**	0.180 **.0071**	0.240 **.0094**	0.300 **.0118**
	0.020 **.0008**	0.030 **.0012**	0.040 **.0016**	0.025 **.0010**	0.038 **.0015**	0.050 **.0020**	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.075 **.0030**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**	0.080 **.0031**	0.120 **.0047**	0.160 **.0063**	0.100 **.0039**	0.150 **.0059**	0.200 **.0079**	0.120 **.0047**	0.180 **.0071**	0.240 **.0094**
	0.020 **.0008**	0.030 **.0012**	0.040 **.0016**	0.025 **.0010**	0.038 **.0015**	0.050 **.0020**	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.075 **.0030**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**	0.080 **.0031**	0.120 **.0047**	0.160 **.0063**	0.100 **.0039**	0.150 **.0059**	0.200 **.0079**	0.120 **.0047**	0.180 **.0071**	0.240 **.0094**
	0.010 **.0004**	0.015 **.0006**	0.020 **.0008**	0.013 **.0005**	0.019 **.0007**	0.025 **.0010**	0.015 **.0006**	0.023 **.0009**	0.030 **.0012**	0.020 **.0008**	0.030 **.0012**	0.040 **.0016**	0.025 **.0010**	0.038 **.0015**	0.050 **.0020**	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.075 **.0030**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**
	0.020 **.0008**	0.030 **.0012**	0.040 **.0016**	0.025 **.0010**	0.038 **.0015**	0.050 **.0020**	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.075 **.0030**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**	0.080 **.0031**	0.120 **.0047**	0.160 **.0063**	0.100 **.0039**	0.150 **.0059**	0.200 **.0079**	0.120 **.0047**	0.180 **.0071**	0.240 **.0094**

CRAZYDRILL by Mikron Tool
Cool SST-Inox

NEW CrazyDrill Cool SST-Inox 30 x d

DRILLING WITH INTERNAL COOLING



d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.057	1.45	**1.71**	43.5	48.6	4	**3.74**	95	2.CD.300145.IC	Δ
	.059	1.50	**1.77**	45.0	50.3	4	**3.74**	95	2.CD.300150.IC	■
	.061	1.55	**1.83**	46.5	51.9	4	**3.74**	95	2.CD.300155.IC	Δ
1/16	**.0625**	1.587	**1.89**	48.0	53.6	4	**3.94**	100	2.CD.300F116.IC	■
	.063	1.60	**1.89**	48.0	53.6	4	**3.94**	100	2.CD.300160.IC	■
	.065	1.65	**1.95**	49.5	55.3	4	**3.94**	100	2.CD.300165.IC	Δ
	.067	1.70	**2.01**	51.0	57.0	4	**3.94**	100	2.CD.300170.IC	■
	.069	1.75	**2.07**	52.5	58.6	4	**4.13**	105	2.CD.300175.IC	Δ
	.071	1.80	**2.13**	54.0	60.3	4	**4.13**	105	2.CD.300180.IC	■
	.073	1.85	**2.19**	55.5	62.0	4	**4.13**	105	2.CD.300185.IC	Δ
	.075	1.90	**2.24**	57.0	63.7	4	**4.33**	110	2.CD.300190.IC	■
	.077	1.95	**2.30**	58.5	65.3	4	**4.33**	110	2.CD.300195.IC	Δ
	.079	2.00	**2.36**	60.0	67.0	4	**4.33**	110	2.CD.300200.IC	■
	.081	2.05	**2.42**	61.5	68.7	4	**4.53**	115	2.CD.300205.IC	Δ
	.083	2.10	**2.48**	63.0	70.4	4	**4.53**	115	2.CD.300210.IC	■
	.085	2.15	**2.54**	64.5	72.0	4	**4.53**	115	2.CD.300215.IC	Δ
	.087	2.20	**2.60**	66.0	73.7	4	**4.72**	120	2.CD.300220.IC	■
	.089	2.25	**2.66**	67.5	75.4	4	**4.72**	120	2.CD.300225.IC	Δ
	.091	2.30	**2.72**	69.0	77.1	4	**4.72**	120	2.CD.300230.IC	■
	.093	2.35	**2.78**	70.5	78.7	4	**4.92**	125	2.CD.300235.IC	Δ

d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
3/32	**.0937**	2.381	**2.83**	72.0	80.4	4	**4.92**	125	2.CD.300F332.IC	■
	.094	2.40	**2.83**	72.0	80.4	4	**4.92**	125	2.CD.300240.IC	■
	.096	2.45	**2.89**	73.5	82.1	4	**4.92**	125	2.CD.300245.IC	Δ
	.098	2.50	**2.95**	75.0	83.8	4	**5.12**	130	2.CD.300250.IC	■
	.100	2.55	**3.01**	76.5	85.4	4	**5.12**	130	2.CD.300255.IC	Δ
	.102	2.60	**3.07**	78.0	87.1	4	**5.12**	130	2.CD.300260.IC	■
	.104	2.65	**3.13**	79.5	88.8	4	**5.31**	135	2.CD.300265.IC	Δ
	.106	2.70	**3.19**	81.0	90.5	4	**5.31**	135	2.CD.300270.IC	■
	.108	2.75	**3.25**	82.5	92.1	4	**5.43**	138	2.CD.300275.IC	Δ
	.110	2.80	**3.31**	84.0	93.8	4	**5.43**	138	2.CD.300280.IC	■
	.112	2.85	**3.37**	85.5	95.5	4	**5.43**	138	2.CD.300285.IC	Δ
	.114	2.90	**3.43**	87.0	97.2	4	**5.59**	142	2.CD.300290.IC	■
	.116	2.95	**3.48**	88.5	98.8	4	**5.59**	142	2.CD.300295.IC	Δ
	.118	3.00	**3.54**	90.0	100.5	6	**5.71**	145	2.CD.300300.IC	■
	.120	3.05	**3.60**	91.5	102.2	6	**5.83**	148	2.CD.300305.IC	Δ
	.122	3.10	**3.66**	93.0	103.9	6	**5.91**	150	2.CD.300310.IC	■
	.124	3.15	**3.72**	94.5	105.5	6	**5.91**	150	2.CD.300315.IC	Δ
1/8	**.1250**	3.175	**3.78**	96.0	107.2	6	**6.02**	153	2.CD.300F18.IC	■
	.126	3.20	**3.78**	96.0	107.2	6	**6.02**	153	2.CD.300320.IC	■
	.128	3.25	**3.84**	97.5	108.9	6	**6.02**	153	2.CD.300325.IC	Δ

■ Stock item
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

Carbide | 30xd1 | 140° | Z2 | eXedur SNP

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00016" 0	+ 0.004 mm 0	+ .00024" + .00004"	+ 0.006 mm + 0.001 mm	+ .00028" + .00004"	+ 0.007 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.130	3.30	3.90	99.0	110.6	6	6.18	157	2.CD.300330.IC	■
	.132	3.35	3.96	100.5	112.2	6	6.18	157	2.CD.300335.IC	Δ
	.134	3.40	4.02	102.0	113.9	6	6.34	161	2.CD.300340.IC	■
	.136	3.45	4.07	103.5	115.6	6	6.34	161	2.CD.300345.IC	Δ
	.138	3.50	4.13	105.0	117.3	6	6.46	164	2.CD.300350.IC	■
	.140	3.55	4.19	106.5	118.9	6	6.46	164	2.CD.300355.IC	Δ
	.142	3.60	4.25	108.0	120.6	6	6.57	167	2.CD.300360.IC	■
	.144	3.65	4.31	109.5	122.3	6	6.57	167	2.CD.300365.IC	Δ
	.146	3.70	4.37	111.0	124.0	6	6.69	170	2.CD.300370.IC	■
	.148	3.75	4.43	112.5	125.6	6	6.69	170	2.CD.300375.IC	Δ
	.150	3.80	4.49	114.0	127.3	6	6.93	176	2.CD.300380.IC	■
	.152	3.85	4.55	115.5	129.0	6	6.93	176	2.CD.300385.IC	Δ
	.154	3.90	4.61	117.0	130.7	6	6.93	176	2.CD.300390.IC	■
	.156	3.95	4.67	118.5	132.3	6	6.93	176	2.CD.300395.IC	Δ
5/32	.1562	3.968	4.72	120.0	134.0	6	6.93	176	2.CD.300F532.IC	■
	.157	4.00	4.72	120.0	134.0	6	6.93	176	2.CD.300400.IC	■
	.161	4.10	4.84	123.0	137.4	6	7.13	181	2.CD.300410.IC	■
	.165	4.20	4.96	126.0	140.7	6	7.24	184	2.CD.300420.IC	■
	.169	4.30	5.08	129.0	144.1	6	7.40	188	2.CD.300430.IC	■
	.173	4.40	5.20	132.0	147.4	6	7.56	192	2.CD.300440.IC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.177	4.50	5.31	135.0	150.8	6	7.72	196	2.CD.300450.IC	■
	.181	4.60	5.43	138.0	154.1	6	7.72	196	2.CD.300460.IC	■
	.185	4.70	5.55	141.0	157.5	6	7.91	201	2.CD.300470.IC	■
3/16	.1875	4.762	5.67	144.0	160.8	6	8.07	205	2.CD.300F316.IC	■
	.189	4.80	5.67	144.0	160.8	6	8.07	205	2.CD.300480.IC	■
	.193	4.90	5.79	147.0	164.2	6	8.19	208	2.CD.300490.IC	■
	.197	5.00	5.91	150.0	167.5	6	8.31	211	2.CD.300500.IC	■
	.201	5.10	6.02	153.0	170.9	6	8.43	214	2.CD.300510.IC	■
	.205	5.20	6.14	156.0	174.2	6	8.70	221	2.CD.300520.IC	■
	.209	5.30	6.26	159.0	177.6	6	8.70	221	2.CD.300530.IC	■
	.213	5.40	6.38	162.0	180.9	6	8.78	223	2.CD.300540.IC	■
	.217	5.50	6.50	165.0	184.3	6	8.94	227	2.CD.300550.IC	■
7/32	.2189	5.560	6.61	168.0	187.6	6	9.06	230	2.CD.300F732.IC	■
	.220	5.60	6.61	168.0	187.6	6	9.06	230	2.CD.300560.IC	■
	.224	5.70	6.73	171.0	191.0	6	9.17	233	2.CD.300570.IC	■
	.228	5.80	6.85	174.0	194.3	6	9.29	236	2.CD.300580.IC	■
	.232	5.90	6.97	177.0	197.7	6	9.49	241	2.CD.300590.IC	■
	.236	6.00	7.09	180.0	201.0	6	9.49	241	2.CD.300600.IC	■
1/4	.2500	6.350	7.50	190.5	212.7	8	9.92	252	2.CD.300F14.IC	■

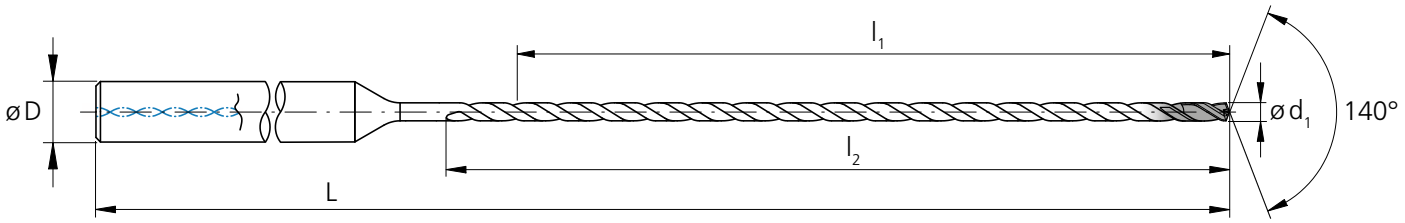
■ Stock item
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

Complementary products

CrazyDrill Coolpilot	p.189
CrazyDrill Crosspilot	p.175

NEW CrazyDrill Cool SST-Inox 40 x d

DRILLING WITH INTERNAL COOLING



d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.079	2.00	**3.15**	80.0	87.0	4	**5.20**	132	2.CD.400200.IC	■
	.081	2.05	**3.23**	82.0	89.2	4	**5.31**	135	2.CD.400205.IC	Δ
	.083	2.10	**3.31**	84.0	91.4	4	**5.31**	135	2.CD.400210.IC	■
	.085	2.15	**3.39**	86.0	93.5	4	**5.43**	138	2.CD.400215.IC	Δ
	.087	2.20	**3.46**	88.0	95.7	4	**5.63**	143	2.CD.400220.IC	■
	.089	2.25	**3.54**	90.0	97.9	4	**5.63**	143	2.CD.400225.IC	Δ
	.091	2.30	**3.62**	92.0	100.1	4	**5.71**	145	2.CD.400230.IC	■
	.093	2.35	**3.70**	94.0	102.2	4	**5.83**	148	2.CD.400235.IC	Δ
3/32	**.0937**	2.381	**3.78**	96.0	104.4	4	**5.83**	148	2.CD.400F332.IC	■
	.094	2.40	**3.78**	96.0	104.4	4	**5.83**	148	2.CD.400240.IC	■
	.096	2.45	**3.86**	98.0	106.6	4	**5.94**	151	2.CD.400245.IC	Δ
	.098	2.50	**3.94**	100.0	108.8	4	**6.14**	156	2.CD.400250.IC	■
	.100	2.55	**4.02**	102.0	110.9	4	**6.14**	156	2.CD.400255.IC	Δ
	.102	2.60	**4.09**	104.0	113.1	4	**6.22**	158	2.CD.400260.IC	■
	.104	2.65	**4.17**	106.0	115.3	4	**6.30**	160	2.CD.400265.IC	Δ
	.106	2.70	**4.25**	108.0	117.5	4	**6.38**	162	2.CD.400270.IC	■
	.108	2.75	**4.33**	110.0	119.6	4	**6.38**	162	2.CD.400275.IC	Δ

d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.110	2.80	**4.41**	112.0	121.8	4	**6.50**	165	2.CD.400280.IC	■
	.112	2.85	**4.49**	114.0	124.0	4	**6.50**	165	2.CD.400285.IC	Δ
	.114	2.90	**4.57**	116.0	126.2	4	**6.77**	172	2.CD.400290.IC	■
	.116	2.95	**4.65**	118.0	128.3	4	**6.77**	172	2.CD.400295.IC	Δ
	.118	3.00	**4.72**	120.0	130.5	6	**7.01**	178	2.CD.400300.IC	■
	.120	3.05	**4.80**	122.0	132.7	6	**7.09**	180	2.CD.400305.IC	Δ
	.122	3.10	**4.88**	124.0	134.9	6	**7.17**	182	2.CD.400310.IC	■
	.124	3.15	**4.96**	126.0	137.0	6	**7.24**	184	2.CD.400315.IC	Δ
1/8	**.1250**	3.175	**5.04**	128.0	139.2	6	**7.32**	186	2.CD.400F18.IC	■
	.126	3.20	**5.04**	128.0	139.2	6	**7.32**	186	2.CD.400320.IC	■
	.128	3.25	**5.12**	130.0	141.4	6	**7.40**	188	2.CD.400325.IC	Δ
	.130	3.30	**5.20**	132.0	143.6	6	**7.48**	190	2.CD.400330.IC	■
	.132	3.35	**5.28**	134.0	145.7	6	**7.56**	192	2.CD.400335.IC	Δ
	.134	3.40	**5.35**	136.0	147.9	6	**7.72**	196	2.CD.400340.IC	■
	.136	3.45	**5.43**	138.0	150.1	6	**7.72**	196	2.CD.400345.IC	Δ
	.138	3.50	**5.51**	140.0	152.3	6	**7.83**	199	2.CD.400350.IC	■
	.140	3.55	**5.59**	142.0	154.4	6	**7.91**	201	2.CD.400355.IC	Δ

■ Stock item
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

Carbide | 40xd1 | 140° | Z2 | eXedur SNP

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00016" 0	+ 0.004 mm 0	+ .00024" + .00004"	+ 0.006 mm + 0.001 mm	+ .00028" + .00004"	+ 0.007 mm + 0.001 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.142	3.60	**5.67**	144.0	156.6	6	**7.99**	203	2.CD.400360.IC	■
	.144	3.65	**5.75**	146.0	158.8	6	**8.07**	205	2.CD.400365.IC	Δ
	.146	3.70	**5.83**	148.0	161.0	6	**8.15**	207	2.CD.400370.IC	■
	.148	3.75	**5.91**	150.0	163.1	6	**8.27**	210	2.CD.400375.IC	Δ
	.150	3.80	**5.98**	152.0	165.3	6	**8.35**	212	2.CD.400380.IC	■
	.152	3.85	**6.06**	154.0	167.5	6	**8.50**	216	2.CD.400385.IC	Δ
	.154	3.90	**6.14**	156.0	169.7	6	**8.50**	216	2.CD.400390.IC	■
	.156	3.95	**6.22**	158.0	171.8	6	**8.50**	216	2.CD.400395.IC	Δ
5/32	**.1562**	3.968	**6.30**	160.0	174.0	6	**8.50**	216	2.CD.400F532.IC	■
	.157	4.00	**6.30**	160.0	174.0	6	**8.50**	216	2.CD.400400.IC	■
	.161	4.10	**6.46**	164.0	178.4	6	**8.82**	224	2.CD.400410.IC	■
	.165	4.20	**6.61**	168.0	182.7	6	**8.98**	228	2.CD.400420.IC	■
	.169	4.30	**6.77**	172.0	187.1	6	**9.13**	232	2.CD.400430.IC	■
	.173	4.40	**6.93**	176.0	191.4	6	**9.29**	236	2.CD.400440.IC	■
	.177	4.50	**7.09**	180.0	195.8	6	**9.49**	241	2.CD.400450.IC	■
	.181	4.60	**7.24**	184.0	200.1	6	**9.49**	241	2.CD.400460.IC	■
	.185	4.70	**7.40**	188.0	204.5	6	**9.84**	250	2.CD.400470.IC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
3/16	**.1875**	4.762	**7.56**	192.0	208.8	6	**10.00**	254	2.CD.400F316.IC	■
	.189	4.80	**7.56**	192.0	208.8	6	**10.00**	254	2.CD.400480.IC	■
	.193	4.90	**7.72**	196.0	213.2	6	**10.16**	258	2.CD.400490.IC	■
	.197	5.00	**7.87**	200.0	217.5	6	**10.28**	261	2.CD.400500.IC	■
	.201	5.10	**8.03**	204.0	221.9	6	**10.51**	267	2.CD.400510.IC	■
	.205	5.20	**8.19**	208.0	226.2	6	**10.67**	271	2.CD.400520.IC	■
	.209	5.30	**8.35**	212.0	230.6	6	**10.67**	271	2.CD.400530.IC	■
	.213	5.40	**8.50**	216.0	234.9	6	**11.02**	280	2.CD.400540.IC	■
	.217	5.50	**8.66**	220.0	239.3	6	**11.18**	284	2.CD.400550.IC	■
7/32	**.2189**	5.560	**8.82**	224.0	243.6	6	**11.34**	288	2.CD.400F732.IC	■
	.220	5.60	**8.82**	224.0	243.6	6	**11.34**	288	2.CD.400560.IC	■
	.224	5.70	**8.98**	228.0	248.0	6	**11.50**	292	2.CD.400570.IC	■
	.228	5.80	**9.13**	232.0	252.3	6	**11.65**	296	2.CD.400580.IC	■
	.232	5.90	**9.29**	236.0	256.7	6	**11.85**	301	2.CD.400590.IC	■
	.236	6.00	**9.45**	240.0	261.0	6	**11.85**	301	2.CD.400600.IC	■
1/4	**.2500**	6.350	**10.00**	254.0	276.2	8	**12.40**	315	2.CD.400F14.IC	■

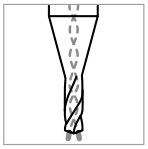
■ Stock item
Δ Delivery term upon request, minimum purchase order quantity 3 pcs.

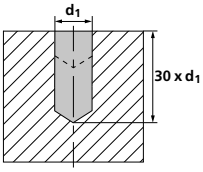
Complementary products	
CrazyDrill Coolpilot	p.189
CrazyDrill Crosspilot	p.175

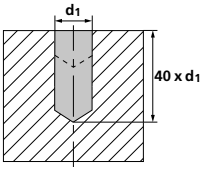
CRAZYDRILL™ by Mikron Tool
Cool SST-Inox

NEW 30 x d - 40 x d

DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW

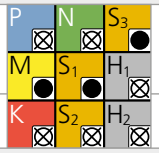






Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Low	Mid	High
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010			
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310			
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2			
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | **197**	80 | **262**	100 | **328**
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | **197**	80 | **262**	100 | **328**
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	60 | **197**	80 | **262**	100 | **328**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	60 | **197**	80 | **262**	100 | **328**
		1.4435	X2CrNiMo18-14-3	AISI 316L			
		1.4441	X2CrNiMo18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30			
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminum alloy wrought	3.2315	AlMgSi1	ASTM 6351			
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminum alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380			
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.0040	Cu-OF / CW008A	UNS C10100			
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400			
		2.0360	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500			
		2.1020	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000			
		2.0960	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625	25 | **82**	35 | **115**	45 | **148**
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67			
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136			
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	50 | **164**	70 | **230**	90 | **295**
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1			
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Ød1	1/16" 1.45 mm | .057"			2.0 mm | .079"			3/32" 2.5 mm | .098"			1/8" 3.0 mm | .118"			5/32" 4.0 mm | .157"			3/16" - 7/32" 5.0 mm | .197"			1/4" 6.0 mm | .236"		
	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High	Low	**Mid**	High
	0.015 **.0006**	0.023 **.0009**	0.030 **.0012**	0.020 **.0008**	0.030 **.0012**	0.040 **.0016**	0.025 **.0010**	0.038 **.0015**	0.050 **.0020**	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.100 **.0039**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**
	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.075 **.0030**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**	0.080 **.0031**	0.120 **.0047**	0.160 **.0063**	0.100 **.0039**	0.150 **.0059**	0.200 **.0079**	0.120 **.0047**	0.180 **.0071**	0.240 **.0094**
	0.015 **.0006**	0.030 **.0012**	0.045 **.0018**	0.020 **.0008**	0.040 **.0016**	0.060 **.0024**	0.025 **.0010**	0.050 **.0020**	0.075 **.0030**	0.030 **.0012**	0.060 **.0024**	0.090 **.0035**	0.040 **.0016**	0.080 **.0031**	0.120 **.0047**	0.050 **.0020**	0.100 **.0039**	0.150 **.0059**	0.060 **.0024**	0.120 **.0047**	0.180 **.0071**
	0.015 **.0006**	0.030 **.0012**	0.045 **.0018**	0.020 **.0008**	0.040 **.0016**	0.060 **.0024**	0.025 **.0010**	0.050 **.0020**	0.075 **.0030**	0.030 **.0012**	0.060 **.0024**	0.090 **.0035**	0.040 **.0016**	0.080 **.0031**	0.120 **.0047**	0.050 **.0020**	0.100 **.0039**	0.150 **.0059**	0.060 **.0024**	0.120 **.0047**	0.180 **.0071**
	0.015 **.0006**	0.023 **.0009**	0.030 **.0012**	0.020 **.0008**	0.030 **.0012**	0.040 **.0016**	0.025 **.0010**	0.038 **.0015**	0.050 **.0020**	0.030 **.0012**	0.045 **.0018**	0.060 **.0024**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.050 **.0020**	0.075 **.0030**	0.100 **.0039**	0.060 **.0024**	0.090 **.0035**	0.120 **.0047**
	0.015 **.0006**	0.030 **.0012**	0.045 **.0018**	0.020 **.0008**	0.040 **.0016**	0.060 **.0024**	0.025 **.0010**	0.050 **.0020**	0.075 **.0030**	0.030 **.0012**	0.060 **.0024**	0.090 **.0035**	0.040 **.0016**	0.080 **.0031**	0.120 **.0047**	0.050 **.0020**	0.100 **.0039**	0.150 **.0059**	0.060 **.0024**	0.120 **.0047**	0.180 **.0071**



NEW Drilling process CrazyDrill Cool SST-Inox

ACCURATE AND QUICK DRILLING UP TO 40 X D

Coolant type, pressure and filtration

Coolant type

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

Filtration: Good filter quality is very important when using through coolant drills. Dirt particles or residual chips can clog the coolant holes and consequently reduce dramatically the flowrate.
The following filter qualities must be adhered especially in small diameters:

- Drill with Ø < .079" (2 mm) filter quality ≤ .0004" (0.010 mm).
- Drill with Ø < .118" (3 mm) filter quality ≤ .0008" (0.020 mm).
- Drill with Ø < 1/4" (6.35 mm) filter quality ≤ .0020" (0.050 mm).

Coolant pressure: At least the coolant pressure mentioned in the chart is required for the CrazyDrill Cool SST-Inox to achieve reliable drilling. High pressure is generally better for the cooling and flushing effect.

Ø d_1 Tool [mm] **| [inch]**		1.0 mm - 2.0 mm **| .039" - .079"**		2.0 mm - 4.0 mm **| .079" - .156"**		4.0 mm - 6.35 mm **| .156" - 1/4"**	
Version		6 - 10 x d	15 - 30 x d	6 - 10 x d	15 - 40 x d	6 - 10 x d	15 - 40 x d
Minimal pressure	[bar]	40	65	30	50	30	40
	[psi]	**580**	**943**	**435**	**725**	**435**	**580**

CrazyDrill Cool SST-Inox 6 x d

Because of the high degree of self-centering capability, CrazyDrill Cool SST-Inox can be used on regular and straight surfaces without a centering or pilot hole.

Higher requirements: For irregular, respectively rough or inclined surfaces or for the highest degree of position accuracy, Mikron Tool recommends:

- **CrazyDrill Coolpilot** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces

CrazyDrill Cool SST-Inox versions 10 x d, 15 x d, 20 x d, 30 x d and 40 x d

We recommend pilot drilling with CrazyDrill Coolpilot or CrazyDrill Crosspilot on inclined surfaces.

Pilot drilling and drilling

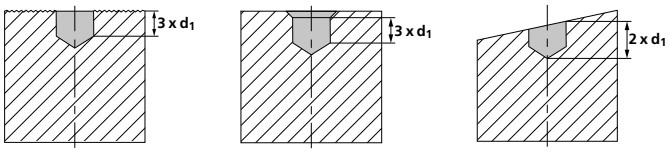
Pilot drilling with CrazyDrill Coolpilot or CrazyDrill Crosspilot (on inclined surfaces) is the perfect starting point for accurate drilling (position and alignment accuracy). The drilling quality (no measurable transition from pilot drilling to follow-up drilling) is guaranteed due to predetermined tool tolerances.

NEW Drilling process CrazyDrill Cool SST-Inox

DRILLING IN ONE STEP 6 X D, 10 X D, 15 X D AND 20 X D

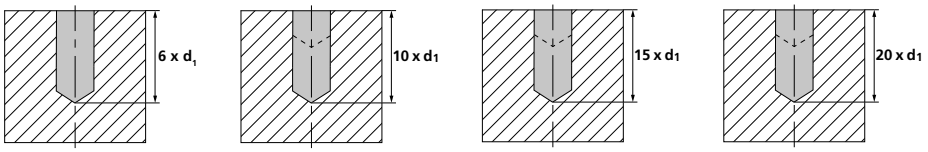
1 | PILOT DRILLING

- Turn on internal coolant.
- With CrazyDrill Coolpilot (irregular or rough surfaces) up to 3 x d with simultaneous chamfer of 90°. With CrazyDrill Crosspilot for all versions on inclined surfaces.



2 | DRILLING

- Turn on internal coolant.
- Drill with CrazyDrill Cool SST-Inox in one step with recommended drilling speed and feed (see cutting data chart).

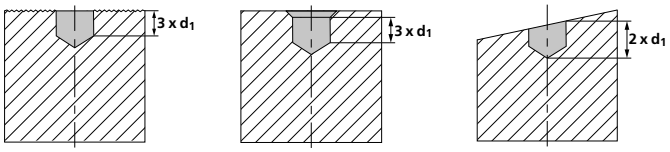


Note:
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position. With CrazyDrill Cool SST-Inox up to 20 x d is possible immediately get into the material and drill using the recommended cutting speed and feed.

DRILLING IN ONE STEP 30 X D AND 40 X D

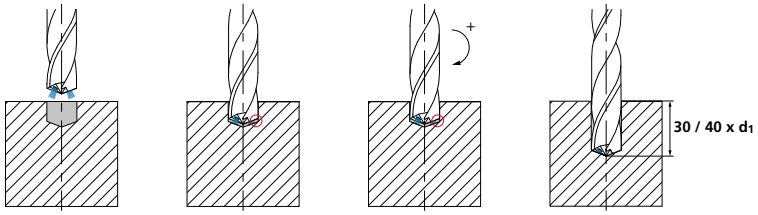
1 | PILOT DRILLING

- Turn on internal coolant.
- With CrazyDrill Coolpilot up to 3 x d with simultaneous chamfer of 90°.
  With CrazyDrill Crosspilot for all versions on inclined surfaces.



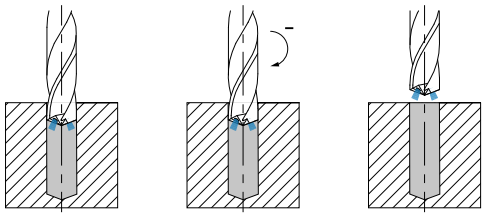
2 | DEEP HOLE DRILLING

- Turn on coolant. Enter the hole at a maximum speed n = 500 rpm and v_f = 39.37 IPM (1'000 mm/min), up to drilling depth 2.8 x d (drill should not touch the bottom of pilot hole).
- Increase speed as per cutting data chart and wait until the desired drilling speed is reached. Program dwell in case of slow spindle acceleration.
- Drill in one step with recommended cutting speed and feed rate.

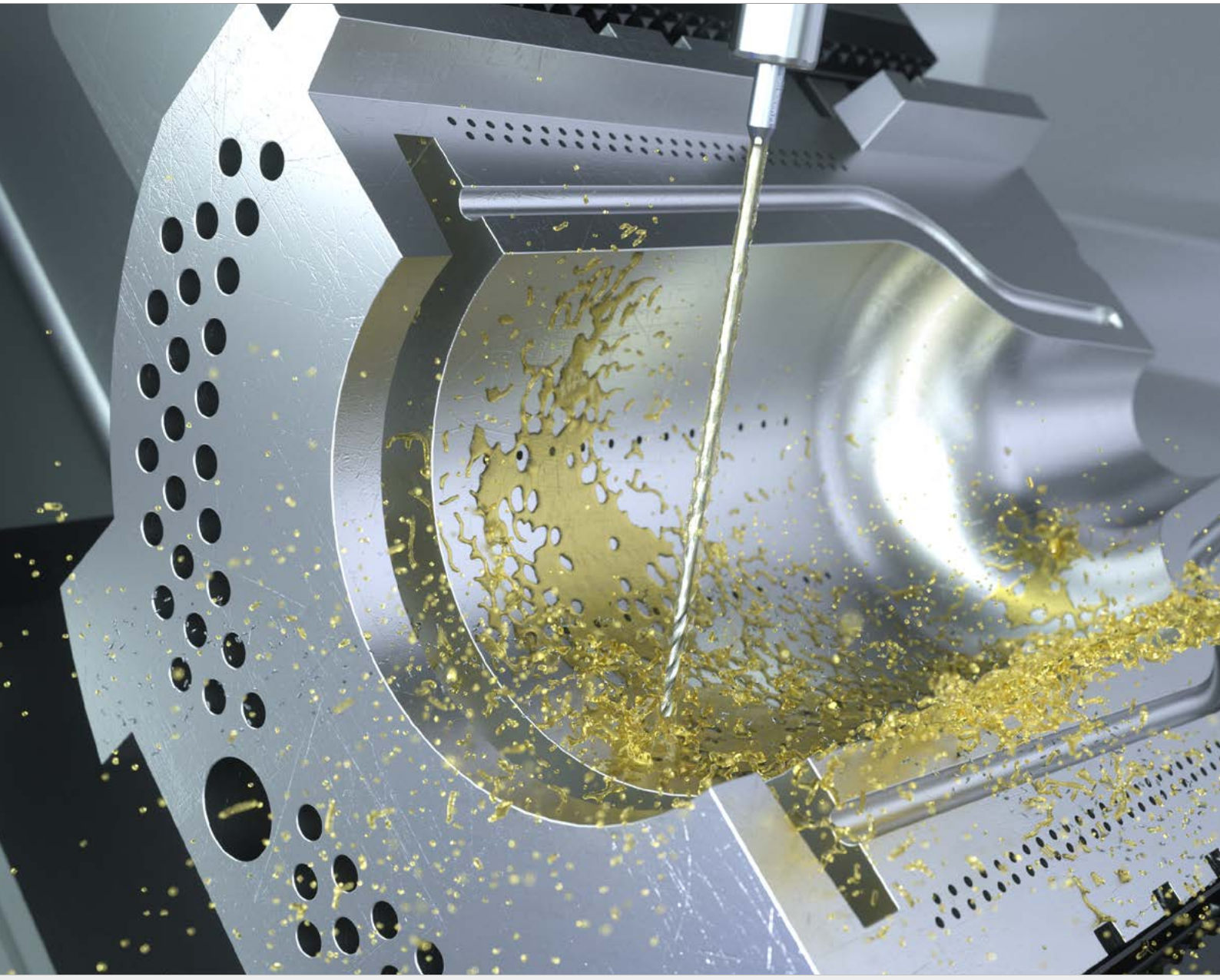


3 | EXIT FROM BORE

- After the desired drilling depth is reached, return with the drill to drilling depth 3 x d at feed rate or reduced rapid traverse.
- Reduce speed to n = 500 rpm.
- Exit the bore at speed n = 500 rpm and v_f = 39.37 IPM (1'000 mm/min).



PATENTED CrazyDrill Flex



CRAZYDRILL Flex

FLEXIBILITY AND SOLID CARBIDE: NO CONTRARIETY



Mikron Tool offers with CrazyDrill Flex a solid carbide drill for deep hole drilling up to 50 x d. Diameter range from .004" to .079" (0.1 to 2.0 mm) with versions for steel, titanium and stainless materials. The drill versions 20 x d and 30 x d (for steel and titanium) are cooled externally. The drill version 50 x d has through coolant channels integrated in the shank same as the version 30 x d for stainless steel (CrazyDrill Flex SST-Inox).

The straight connecting element between the cutting body and the shaft (neck) gives the carbide drill CrazyDrill Flex the length required for drilling deep holes up to a bore depth of 50 x d and makes it very robust. It allows a much shorter drilling time than drilling with single-lip drills, micro-erosion, or laser methods.

Depending on the material processed, one of three variants with their geometries adapted to the respective materials, will work:

- The extended neck ensures the flexibility required in order to enable a reliable drilling process even under difficult conditions. It can compensate a center offset of up to 40% of its diameter. Until now, this was only possible with HSS drills. Thanks to the special web thinning, a feed force reduced by 50% is achieved. An important requirement to realize straight deep hole drilling.
- In the variant for non-corrosive materials, the degressive helical groove ensures good chip breaking and removal. The cutting geometry is specially designed for CrNi alloys. Thanks to the special web thinning, a feed force reduced by up to 50% is achieved. An important requirement to realize straight deep hole drilling.

CRAZYDRILL by Mikron Tool Flex

Flexible and deep

MICRO DEEP HOLE DRILLING UP TO 50 X D

Mikron Tool offers with CrazyDrill Flex a solid carbide drill for deep hole drilling up to 50 x d. Diameter range from .004" to .079" (0.1 to 2.0 mm) with versions for steel, titanium and stainless materials. The drill versions 20 x d and 30 x d (for steel and titanium) are cooled externally. The drill version 50 x d has through coolant channels integrated in the shank same as the version 30 x d for stainless steel (CrazyDrill Flex SST-Inox).

- CrazyDrill Flex Steel, drilling depth 20 x d, 30 x d, 50 x d, external cooling up to 30 x d / intgrated cooling for 50 x d, coated and uncoated
- CrazyDrill Flex Titanium, drilling depth 30 x d, 50 x d, external cooling up to 30 x d / through coolant channels integrated in the shank for 50 x d
- CrazyDrill Flex SST-Inox, drilling depth 30 x d, 50 x d, through coolant channels integrated in the shank

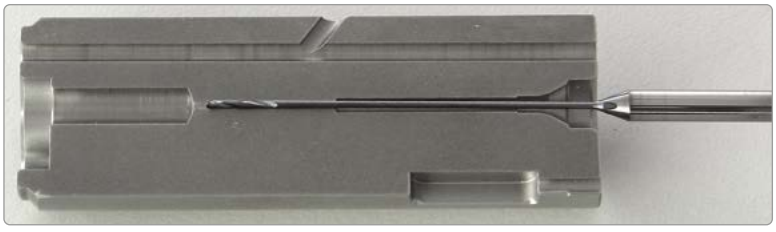
Flexibility

A flexible center piece ensures flexibility. Therefore the drill can compensate center offsets without breaking off.



Drilling up to 50 x d

The unique drill design (web thinning for low feed force, neck without flutes for high stability) enables deep hole drilling up to 50 x d.



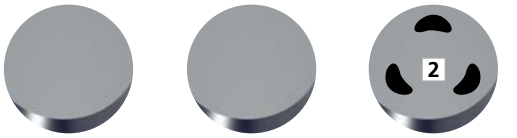
CRAZYDRILL™ by Mikron Tool Flex

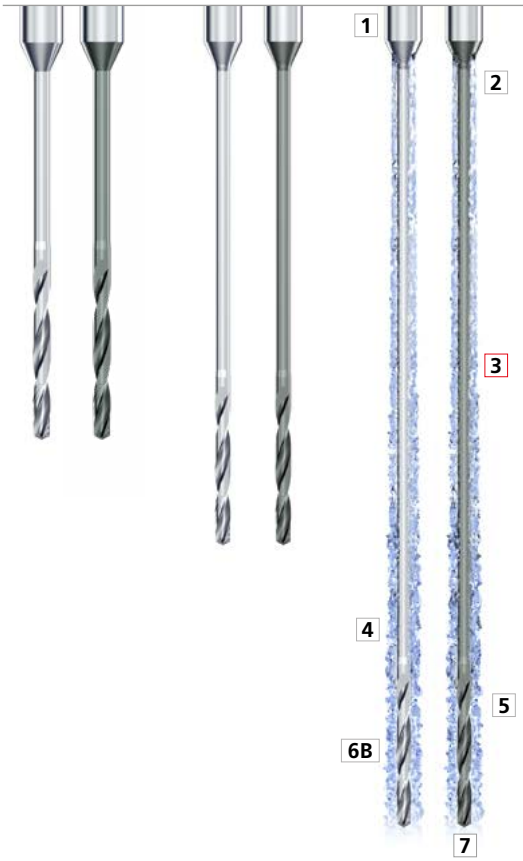
PATENTED

Steel

20 / 30 / 50 x d

- Integrated / External cooling
- Coated / Uncoated
- Ø .008" - 079" (0.2 - 2.0 mm) with coating
  Ø .004" - 047" (0.1 - 1.2 mm) without coating





page 399 | page 407 | page 415

Titanium

30 / 50 x d

- Integrated / External cooling
- Uncoated
- Ø .004" - 047" (0.1 - 1.2 mm)



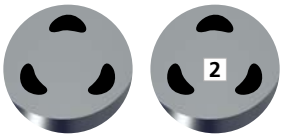


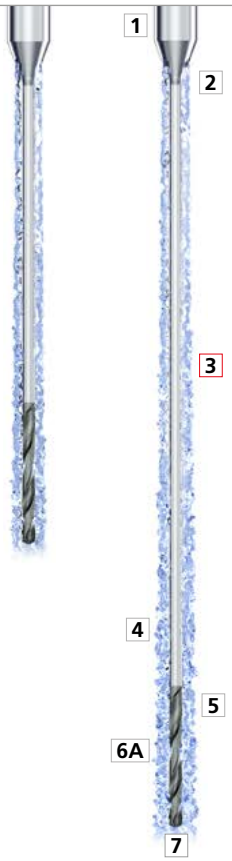
page 423 | page 429

SST-Inox

30 / 50 x d

- Integrated cooling
- Coated
- Ø .008" - 079" (0.2 - 2.0 mm)





page 435 | page 441

1 | SHAFT
The sturdy carbide shaft guarantees high circular accuracy and thus top drilling precision.

2 | COOLING
All of the 50 x d versions and the Flex SST-Inox feature integrated cooling channels in the shaft. These guarantee continuous targeted cooling of the cutting edges from just 15 bar (218 psi). The special arrangement and shape produce a concentrated jet even at high speeds, which guarantees regular and significant cooling of the drill tip and flushes the chips from the flutes.

3 | CENTER PIECE: FLEXIBILITY AND STABILITY - PATENTED
A flexible center piece with a reduced cross-section ensures elasticity (flection) and provides at the same time higher rigidity (torsion/compression) compared to drilling with a through flute. The micro deep-hole drill can easily compensate center offsets of up to 40% of its diameter without breaking off. Until now, this was only possible with HSS tools.

4 | SOLID CARBIDE
The fine grained solid carbide developed for the CrazyDrill Flex is very tough and resistant to heat shock, thus easily meeting the requirements for the machining of steels, titanium, and non-corrosive and heat-resistant alloys.

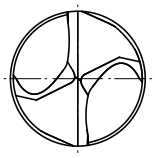
5 | COATING
The high-performance coating eXedur RIP is resistant to heat and wear. It prevents chips from adhering and supports their smooth removal. The result is a long tool life.

6A | DEGRESSIVE HELICAL GROOVE - PATENTED
The degressive helical groove of the CrazyDrill Flex SST-Inox with its unique and patented geometry guarantees high tool stability. It ensures good chip breaking in the front part and quick chip removal in the rear.

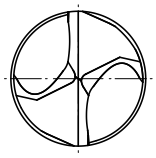
6B | HELICAL GROOVES
The geometry of the helical grooves for the steel and titanium versions are adapted to the materials machined. Good chip breaking and quick chip removal are guaranteed.

7 | GEOMETRY
The tip geometry is specially developed to guarantee high cutting stability, self-centering, and short chips. Thanks to the clever web thinning, less penetration force is required when drilling.

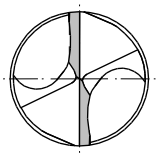
Drill tip



CrazyDrill Flex Steel



CrazyDrill Flex Titanium

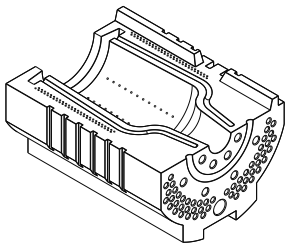


CrazyDrill Flex SST-Inox

Benefits and applications

THE SMALL DRILL WITH INTEGRATED COOLING FOR DRILLING DEEP HOLES

- **SHORT MACHINING TIME** | up to 10 times faster
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to flexible center piece
- **HIGH DEGREE OF PRECISION** | due to small tolerances



COMPONENT
Air vent hole for glass form mould

MATERIAL
CuAl11Fe4Ni4 / 2.0975 / UNS C95800

MACHINING
- 100 air vent holes
- d = 0.5 mm **| .020"**
- Drilling depth 15 mm **| .591"**

DRILLING TOOL
Mikron Tool - CrazyDrill Flex Steel - 30 x d

DATA	MIKRON TOOL
Tool type	CrazyDrill Flex Steel - Carbide - Coated - External cooling
Item number	2.CFS.30050.1
Cutting data	v_c = 40 m/min **| 131 SFM** f = 0.012 mm/rev **| .00047 IPR** Q_1 = 1.25 mm **| .049"** Q_x = 0.25 mm **| .010"**
Machining time	30 min



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Dental implant
Aerospace industry	Injection nozzle
Medical technology	Surgical instrument
Tool and mold making	Air vent hole for glass form mould
Automotive industry	Turned part
Mechanical engineering	Drilling holes in Plexiglass
Watches	Bracelet components
Electronics / Electrical	Solenoid contactor

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X46Cr13	420C
	1.4542	X5CrNiCuNb 16-4	630
	1.4301	X5CrNi 18-10	304
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S2 Titanium (pure and alloyed)	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

Steel - 20 x d - coated / uncoated

DRILLING WITH EXTERNAL COOLING



Coated Uncoated

The solid carbide micro-drill CrazyDrill Flex Steel is mainly designed for steels, cast iron, aluminum alloys, brass and bronze. It has a high flexibility thanks to a long and "flexible" section between the tip and the shaft. So the tool is adapted for drilling with process reliability also under difficult conditions. It is able to flex effortlessly 40% of its diameter. This drill is also perfect for deep hole drilling from diameter .004" (0.2 mm) with a significantly shorter drilling time compared to the single-lip drill, electro-erosion or laser method.

CrazyDrill Flex Steel 20 x d is used with external cooling. The coated version (eXedur RIP), compared to the uncoated one, is perfect for drilling larger series. Also the surface quality profits from the high-performance coating.

We recommend pilot drilling with CrazyDrill Flexpilot Steel or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note

You couldn't find your suitable version of the CrazyDrill Flex Steel - coated / uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

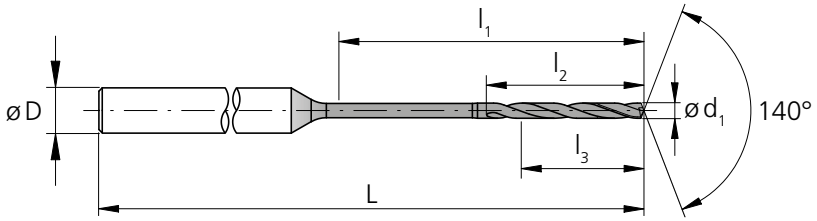
Regrinding: This product is not suitable for regrinding.

Carbide	20xd1	140°	Z2

Ø d_1	**.004" - .047"** (0.1 - 1.2 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm

.1 eXedur RIP

.0 Uncoated



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.0039	0.10	**.079**	2.0	1.1	0.8	3	**1.57**	40	2.CFS.20010	-	.0	◪
	.0043	0.11	**.087**	2.2	1.2	0.9	3	**1.57**	40	2.CFS.20011	-	.0	Δ
	.0047	0.12	**.094**	2.4	1.3	1.0	3	**1.57**	40	2.CFS.20012	-	.0	Δ
	.0051	0.13	**.102**	2.6	1.4	1.0	3	**1.57**	40	2.CFS.20013	-	.0	Δ
	.0055	0.14	**.110**	2.8	1.5	1.1	3	**1.57**	40	2.CFS.20014	-	.0	Δ
	.0059	0.15	**.118**	3.0	1.6	1.2	3	**1.57**	40	2.CFS.20015	-	.0	◪
	.0063	0.16	**.126**	3.2	1.7	1.3	3	**1.57**	40	2.CFS.20016	-	.0	Δ
	.0067	0.17	**.134**	3.4	1.8	1.4	3	**1.57**	40	2.CFS.20017	-	.0	Δ
	.0071	0.18	**.142**	3.6	1.9	1.4	3	**1.57**	40	2.CFS.20018	-	.0	Δ
	.0075	0.19	**.150**	3.8	2.0	1.5	3	**1.57**	40	2.CFS.20019	-	.0	Δ
	.0079	0.20	**.157**	4.0	2.1	1.6	3	**1.77**	45	2.CFS.20020	.1	.0	■
	.0083	0.21	**.165**	4.2	2.2	1.7	3	**1.77**	45	2.CFS.20021	.1	.0	Δ
	.0087	0.22	**.173**	4.4	2.3	1.8	3	**1.77**	45	2.CFS.20022	.1	.0	Δ
	.0091	0.23	**.181**	4.6	2.4	1.8	3	**1.77**	45	2.CFS.20023	.1	.0	Δ
	.0094	0.24	**.189**	4.8	2.5	1.9	3	**1.77**	45	2.CFS.20024	.1	.0	Δ
	.0098	0.25	**.197**	5.0	2.6	2.0	3	**1.77**	45	2.CFS.20025	.1	.0	■
	.0102	0.26	**.205**	5.2	2.7	2.1	3	**1.77**	45	2.CFS.20026	.1	.0	Δ
	.0106	0.27	**.213**	5.4	2.8	2.2	3	**1.77**	45	2.CFS.20027	.1	.0	Δ
	.0110	0.28	**.220**	5.6	2.9	2.2	3	**1.77**	45	2.CFS.20028	.1	.0	Δ
	.0114	0.29	**.228**	5.8	3.0	2.3	3	**1.77**	45	2.CFS.20029	.1	.0	Δ
	.0118	0.30	**.236**	6.0	3.2	2.4	3	**1.77**	45	2.CFS.20030	.1	.0	■
	.0122	0.31	**.244**	6.2	3.3	2.5	3	**1.77**	45	2.CFS.20031	.1	.0	Δ
	.0126	0.32	**.252**	6.4	3.4	2.6	3	**1.77**	45	2.CFS.20032	.1	.0	Δ
	.0130	0.33	**.260**	6.6	3.5	2.6	3	**1.77**	45	2.CFS.20033	.1	.0	Δ
	.0134	0.34	**.268**	6.8	3.6	2.7	3	**1.77**	45	2.CFS.20034	.1	.0	Δ
	.0138	0.35	**.276**	7.0	3.7	2.8	3	**1.77**	45	2.CFS.20035	.1	.0	■
	.0142	0.36	**.283**	7.2	3.8	2.9	3	**1.77**	45	2.CFS.20036	.1	.0	Δ
	.0146	0.37	**.291**	7.4	3.9	3.0	3	**1.77**	45	2.CFS.20037	.1	.0	Δ
	.0150	0.38	**.299**	7.6	4.0	3.0	3	**1.77**	45	2.CFS.20038	.1	.0	Δ
	.0154	0.39	**.307**	7.8	4.1	3.1	3	**1.77**	45	2.CFS.20039	.1	.0	Δ
1/64	**.0156**	0.396	**.315**	8.0	4.2	3.2	3	**1.77**	45	2.CFS.20F164	.1	-	◪
	.0157	0.40	**.315**	8.0	4.2	3.2	3	**1.77**	45	2.CFS.20040	.1	.0	■
	.0161	0.41	**.323**	8.2	4.3	3.3	3	**1.77**	45	2.CFS.20041	.1	.0	Δ
	.0165	0.42	**.331**	8.4	4.4	3.4	3	**1.77**	45	2.CFS.20042	.1	.0	Δ
	.0169	0.43	**.339**	8.6	4.5	3.4	3	**1.77**	45	2.CFS.20043	.1	.0	Δ
	.0173	0.44	**.346**	8.8	4.6	3.5	3	**1.77**	45	2.CFS.20044	.1	.0	Δ
	.0177	0.45	**.354**	9.0	4.7	3.6	3	**1.77**	45	2.CFS.20045	.1	.0	■
	.0181	0.46	**.362**	9.2	4.8	3.7	3	**1.77**	45	2.CFS.20046	.1	.0	Δ

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products

CrazyDrill Flexpilot Steel	p.129
CrazyDrill Crosspilot	p.175

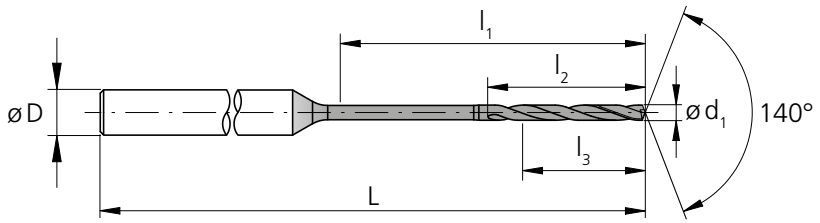
CRAZYDRILL by Mikron Tool Flex STEEL

Steel - 20 x d - coated / uncoated

DRILLING WITH EXTERNAL COOLING

.1 eXedur RIP

.0 Uncoated



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.0185	0.47	**.370**	9.4	4.9	3.8	3	**1.77**	45	2.CFS.20047	.1	.0	Δ
	.0189	0.48	**.378**	9.6	5.0	3.8	3	**1.77**	45	2.CFS.20048	.1	.0	Δ
	.0193	0.49	**.386**	9.8	5.1	3.9	3	**1.77**	45	2.CFS.20049	.1	.0	Δ
	.0197	0.50	**.394**	10.0	5.3	4.0	3	**1.97**	50	2.CFS.20050	.1	.0	■
	.0201	0.51	**.402**	10.2	5.4	4.1	3	**1.97**	50	2.CFS.20051	.1	.0	Δ
	.0205	0.52	**.409**	10.4	5.5	4.2	3	**1.97**	50	2.CFS.20052	.1	.0	Δ
	.0209	0.53	**.417**	10.6	5.6	4.2	3	**1.97**	50	2.CFS.20053	.1	.0	Δ
	.0213	0.54	**.425**	10.8	5.7	4.3	3	**1.97**	50	2.CFS.20054	.1	.0	Δ
	.0217	0.55	**.433**	11.0	5.8	4.4	3	**1.97**	50	2.CFS.20055	.1	.0	■
	.0220	0.56	**.441**	11.2	5.9	4.5	3	**1.97**	50	2.CFS.20056	.1	.0	Δ
	.0224	0.57	**.449**	11.4	6.0	4.6	3	**1.97**	50	2.CFS.20057	.1	.0	Δ
	.0228	0.58	**.457**	11.6	6.1	4.6	3	**1.97**	50	2.CFS.20058	.1	.0	Δ
	.0232	0.59	**.465**	11.8	6.2	4.7	3	**1.97**	50	2.CFS.20059	.1	.0	Δ
	.0236	0.60	**.472**	12.0	6.3	4.8	3	**1.97**	50	2.CFS.20060	.1	.0	■
	.0240	0.61	**.480**	12.2	6.4	4.9	3	**1.97**	50	2.CFS.20061	.1	.0	Δ
	.0244	0.62	**.488**	12.4	6.5	5.0	3	**1.97**	50	2.CFS.20062	.1	.0	Δ
	.0248	0.63	**.496**	12.6	6.6	5.0	3	**1.97**	50	2.CFS.20063	.1	.0	Δ
	.0252	0.64	**.504**	12.8	6.7	5.1	3	**1.97**	50	2.CFS.20064	.1	.0	Δ
	.0256	0.65	**.512**	13.0	6.8	5.2	3	**1.97**	50	2.CFS.20065	.1	.0	■
	.0260	0.66	**.520**	13.2	6.9	5.3	3	**1.97**	50	2.CFS.20066	.1	.0	Δ
	.0264	0.67	**.528**	13.4	7.0	5.4	3	**1.97**	50	2.CFS.20067	.1	.0	Δ
	.0268	0.68	**.535**	13.6	7.1	5.4	3	**1.97**	50	2.CFS.20068	.1	.0	Δ
	.0272	0.69	**.543**	13.8	7.2	5.5	3	**1.97**	50	2.CFS.20069	.1	.0	Δ
	.0276	0.70	**.551**	14.0	7.4	5.6	3	**2.09**	53	2.CFS.20070	.1	.0	■
	.0280	0.71	**.559**	14.2	7.5	5.7	3	**2.09**	53	2.CFS.20071	.1	.0	Δ
	.0283	0.72	**.567**	14.4	7.6	5.8	3	**2.09**	53	2.CFS.20072	.1	.0	Δ
	.0287	0.73	**.575**	14.6	7.7	5.8	3	**2.09**	53	2.CFS.20073	.1	.0	Δ
	.0291	0.74	**.583**	14.8	7.8	5.9	3	**2.09**	53	2.CFS.20074	.1	.0	Δ
	.0295	0.75	**.591**	15.0	7.9	6.0	3	**2.09**	53	2.CFS.20075	.1	.0	■
	.0299	0.76	**.598**	15.2	8.0	6.1	3	**2.09**	53	2.CFS.20076	.1	.0	Δ
	.0303	0.77	**.606**	15.4	8.1	6.2	3	**2.09**	53	2.CFS.20077	.1	.0	Δ
	.0307	0.78	**.614**	15.6	8.2	6.2	3	**2.09**	53	2.CFS.20078	.1	.0	Δ
	.0311	0.79	**.622**	15.8	8.3	6.3	3	**2.09**	53	2.CFS.20079	.1	.0	Δ
1/32	**.0312**	0.793	**.630**	16.0	8.4	6.4	3	**2.09**	53	2.CFS.20F132	.1	-	◪
	.0315	0.80	**.630**	16.0	8.4	6.4	3	**2.09**	53	2.CFS.20080	.1	.0	■
	.0319	0.81	**.638**	16.2	8.5	6.5	3	**2.09**	53	2.CFS.20081	.1	.0	Δ
	.0323	0.82	**.646**	16.4	8.6	6.6	3	**2.09**	53	2.CFS.20082	.1	.0	Δ
	.0327	0.83	**.654**	16.6	8.7	6.6	3	**2.09**	53	2.CFS.20083	.1	.0	Δ

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Carbide | 20xd1 | 140° | Z2

Ø d_1	**.004" - .047"** (0.1 - 1.2 mm)
Tolerance	**- .00012"** - 0.003 mm **- .00024"** - 0.006 mm

d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
.0331	0.84	**.661**	16.8	8.8	6.7	3	**2.09**	53	2.CFS.20084	.1	.0	Δ
.0335	0.85	**.669**	17.0	8.9	6.8	3	**2.13**	54	2.CFS.20085	.1	.0	■
.0339	0.86	**.677**	17.2	9.0	6.9	3	**2.13**	54	2.CFS.20086	.1	.0	Δ
.0343	0.87	**.685**	17.4	9.1	7.0	3	**2.09**	53	2.CFS.20087	.1	.0	Δ
.0346	0.88	**.693**	17.6	9.2	7.0	3	**2.09**	53	2.CFS.20088	.1	.0	Δ
.0350	0.89	**.701**	17.8	9.3	7.1	3	**2.09**	53	2.CFS.20089	.1	.0	Δ
.0354	0.90	**.709**	18.0	9.5	7.2	3	**2.09**	53	2.CFS.20090	.1	.0	■
.0358	0.91	**.717**	18.2	9.6	7.3	3	**2.09**	53	2.CFS.20091	.1	.0	Δ
.0362	0.92	**.724**	18.4	9.7	7.4	3	**2.09**	53	2.CFS.20092	.1	.0	Δ
.0366	0.93	**.732**	18.6	9.8	7.4	3	**2.09**	53	2.CFS.20093	.1	.0	Δ
.0370	0.94	**.740**	18.8	9.9	7.5	3	**2.09**	53	2.CFS.20094	.1	.0	Δ
.0374	0.95	**.748**	19.0	10.0	7.6	3	**2.09**	53	2.CFS.20095	.1	.0	■
.0378	0.96	**.756**	19.2	10.1	7.7	3	**2.09**	53	2.CFS.20096	.1	.0	Δ
.0382	0.97	**.764**	19.4	10.2	7.8	3	**2.09**	53	2.CFS.20097	.1	.0	Δ
.0386	0.98	**.772**	19.6	10.3	7.8	3	**2.09**	53	2.CFS.20098	.1	.0	Δ
.0390	0.99	**.780**	19.8	10.4	7.9	3	**2.09**	53	2.CFS.20099	.1	.0	Δ
.0394	1.00	**.787**	20.0	10.5	8.0	3	**2.36**	60	2.CFS.20100	.1	.0	■
.0398	1.01	**.795**	20.2	10.6	8.1	3	**2.36**	60	2.CFS.20101	.1	.0	Δ
.0402	1.02	**.803**	20.4	10.7	8.2	3	**2.36**	60	2.CFS.20102	.1	.0	Δ
.0406	1.03	**.811**	20.6	10.8	8.2	3	**2.36**	60	2.CFS.20103	.1	.0	Δ
.0409	1.04	**.819**	20.8	10.9	8.3	3	**2.36**	60	2.CFS.20104	.1	.0	Δ
.0413	1.05	**.827**	21.0	11.0	8.4	3	**2.36**	60	2.CFS.20105	.1	.0	■
.0417	1.06	**.835**	21.2	11.1	8.5	3	**2.36**	60	2.CFS.20106	.1	.0	Δ
.0421	1.07	**.843**	21.4	11.2	8.6	3	**2.36**	60	2.CFS.20107	.1	.0	Δ
.0425	1.08	**.850**	21.6	11.3	8.6	3	**2.36**	60	2.CFS.20108	.1	.0	Δ
.0429	1.09	**.858**	21.8	11.4	8.7	3	**2.36**	60	2.CFS.20109	.1	.0	Δ
.0433	1.10	**.866**	22.0	11.6	8.8	3	**2.36**	60	2.CFS.20110	.1	.0	■
.0437	1.11	**.874**	22.2	11.7	8.9	3	**2.36**	60	2.CFS.20111	.1	.0	Δ
.0441	1.12	**.882**	22.4	11.8	9.0	3	**2.36**	60	2.CFS.20112	.1	.0	Δ
.0445	1.13	**.890**	22.6	11.9	9.0	3	**2.36**	60	2.CFS.20113	.1	.0	Δ
.0449	1.14	**.898**	22.8	12.0	9.1	3	**2.36**	60	2.CFS.20114	.1	.0	Δ
.0453	1.15	**.906**	23.0	12.1	9.2	3	**2.36**	60	2.CFS.20115	.1	.0	■
.0457	1.16	**.913**	23.2	12.2	9.3	3	**2.36**	60	2.CFS.20116	.1	.0	Δ
.0461	1.17	**.921**	23.4	12.3	9.4	3	**2.36**	60	2.CFS.20117	.1	.0	Δ
.0465	1.18	**.929**	23.6	12.4	9.4	3	**2.36**	60	2.CFS.20118	.1	.0	Δ
.0469	1.19	**.937**	23.8	12.5	9.5	3	**2.36**	60	2.CFS.20119	.1	.0	Δ
.0472	1.20	**.945**	24.0	12.6	9.6	3	**2.36**	60	2.CFS.20120	.1	.0	■

■ Stock item

Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products

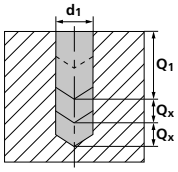
CrazyDrill Flexpilot Steel	p.129
CrazyDrill Crosspilot	p.175

CRAZYDRILL™ by Mikron Tool Flex STEEL

Steel - 20 x d - coated

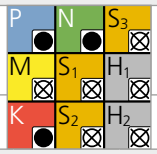
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	5 – 40 | **16 – 131**	40 – 60 | **131 – 197**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	5 – 25 | **16 – 82**	25 – 50 | **82 – 164**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	5 – 20 | **16 – 66**	20 – 35 | **66 – 115**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	5 – 40 | **16 – 131**	50 – 100 | **164 – 328**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		40 – 80 | **131 – 262**
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	5 – 40 | **16 – 131**	60 – 120 | **197 – 394**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	5 – 40 | **16 – 131**	50 – 80 | **164 – 262**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100		
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	5 – 40 | **16 – 131**	60 – 100 | **197 – 328**
		2.102	CuSn6	UNS C51900		40 – 60 | **131 – 197**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



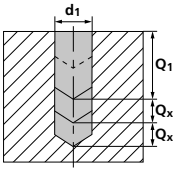
		f [mm/rev] | [IPR]					
		Ød1					
Q_1	Q_x	0.2 mm | **.008"**	0.3 mm | **.012"**	1/64" 0.4 mm | **.016"**	0.6 mm | **.024"**	1/32" 0.8 mm | **.032"**	1.0–1.2 mm | **.039"–.047"**
		f	**f**	**f**	**f**	**f**	**f**
7xd1	0.5xd1	0.005 **.0002**	0.010 **.0004**	0.015 **.0006**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**
7xd1	0.5xd1	0.003 – 0.005 **.00012 – .00020**	0.008 – 0.010 **.0003 – .0004**	0.012 – 0.015 **.0005 – .0006**	0.020 – 0.025 **.0008 – .0010**	0.035 **.0014**	0.050 **.0020**
7xd1	1xd1	0.004 **.00016**	0.008 **.0003**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**
		Recommended: CrazyDrill Flex SST-Inox 30 x d1					
7xd1	1xd1	0.005 **.0002**	0.010 **.0004**	0.015 **.0006**	0.020 **.0008**	0.035 **.0014**	0.050 **.0020**
7xd1	1xd1	0.015 **.0006**	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
7xd1	1xd1	0.015 **.0006**	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
		Recommended: CrazyDrill Flex Titanium 30 x d1					
		Recommended: CrazyDrill Flex SST-Inox 30 x d1					
7xd1	1xd1	0.010 **.0004**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.100 **.0039**
2.5xd1	0.5xd1	0.004 **.00016**	0.006 **.00024**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**
		Recommended: CrazyDrill Flex SST-Inox 30 x d1					
		Recommended: CrazyDrill Flex Titanium 30 x d1					
		Recommended: CrazyDrill Flex Titanium 30 x d1					
		Recommended: CrazyDrill Flex SST-Inox 30 x d1					

CRAZYDRILL™ by Mikron Tool Flex STEEL

Steel - 20 x d - uncoated

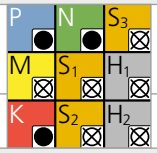
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	5 – 40 | **16 – 131**	40 – 60 | **131 – 197**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	5 – 25 | **16 – 82**	25 – 50 | **82 – 164**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	5 – 20 | **16 – 66**	20 – 35 | **66 – 115**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	5 – 40 | **16 – 131**	50 – 100 | **164 – 328**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		40 – 80 | **131 – 262**
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	5 – 40 | **16 – 131**	60 – 120 | **197 – 394**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	5 – 40 | **16 – 131**	50 – 80 | **164 – 262**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100		
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	5 – 40 | **16 – 131**	60 – 100 | **197 – 328**
		2.102	CuSn6	UNS C51900		40 – 60 | **131 – 197**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

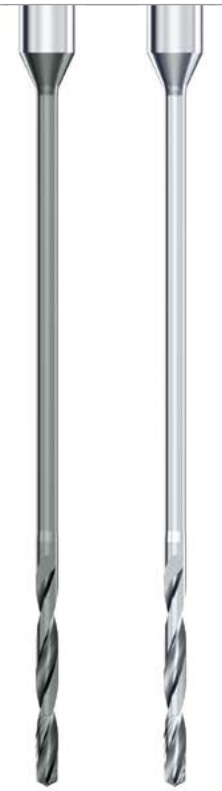


		f [mm/rev] | [IPR]						
Q_1	Q_x	Ød1						
		0.1 mm | **.004"**	0.2 mm | **.008"**	0.3 mm | **.012"**	0.4 mm | **.016"**	0.6 mm | **.024"**	0.8 mm | **.032"**	1.0–1.2 mm | **.039"–.047"**
		f	**f**	**f**	**f**	**f**	**f**	**f**
7xd1	0.5xd1	0.002 **.00008**	0.005 **.0002**	0.010 **.0004**	0.015 **.0006**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**
7xd1	0.5xd1	0.002 **.00008**	0.003 – 0.005 **.00012 – .00020**	0.008 – 0.010 **.0003 – .0004**	0.012 – 0.015 **.0005 – .0006**	0.020 – 0.025 **.0008 – .0010**	0.035 **.0014**	0.050 **.0020**
7xd1	1xd1	0.0005 **.0002**	0.004 **.00016**	0.008 **.0003**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**
		Recommended: CrazyDrill Flex SST-Inox 30 x d1						
7xd1	1xd1	0.002 **.00008**	0.005 **.0002**	0.010 **.0004**	0.015 **.0006**	0.020 **.0008**	0.035 **.0014**	0.050 **.0020**
7xd1	1xd1	0.003 **.00012**	0.015 **.0006**	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
7xd1	1xd1	0.003 **.00012**	0.015 **.0006**	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
		Recommended: CrazyDrill Flex Titanium 30 x d1						
		Recommended: CrazyDrill Flex SST-Inox 30 x d1						
7xd1	1xd1	0.004 **.00016**	0.010 **.0004**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.100 **.0039**
2.5xd1	0.5xd1	0.002 **.00008**	0.004 **.00016**	0.006 **.00024**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**
		Recommended: CrazyDrill Flex SST-Inox 30 x d1						
		Recommended: CrazyDrill Flex Titanium 30 x d1						
		Recommended: CrazyDrill Flex Titanium 30 x d1						
		Recommended: CrazyDrill Flex SST-Inox 30 x d1						

CRAZYDRILL by Mikron Tool Flex STEEL

Steel - 30 x d - coated / uncoated

DRILLING WITH EXTERNAL COOLING



Coated Uncoated

The solid carbide micro-drill CrazyDrill Flex Steel is mainly designed for steels, cast iron, aluminum alloys, brass and bronze. It has a high flexibility thanks to a long and "flexible" section between the tip and the shaft. Therefore the tool is adapted for drilling with process reliability also under difficult conditions. It is able to flex effortlessly 40% of its diameter. This drill is also perfect for deep hole drilling from diameter .004" (0.1 mm) with a significantly shorter drilling time compared to the single-lip drill, electro-erosion or laser method.

CrazyDrill Flex Steel 30 x d is used with external cooling. The coated version (eXedur RIP), compared to the uncoated one, is perfect for drilling larger series. Also the surface quality profits from the high-performance coating.

We recommend pilot drilling with CrazyDrill Flexpilot Steel or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

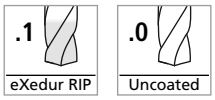
Please note

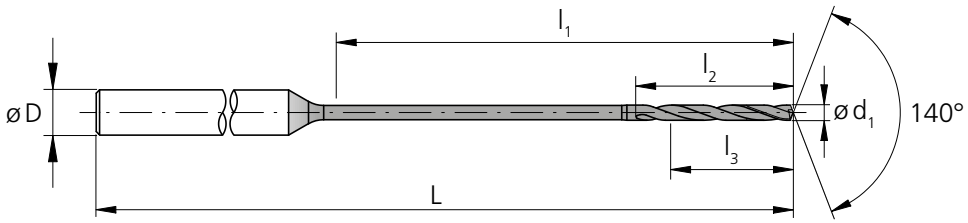
You couldn't find your suitable version of the CrazyDrill Flex Steel - coated / uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide	30xd1	140°	Z2

Ø d_1	**.004" - .047"** (0.1 - 1.2 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm





d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.0039	0.10	**.118**	3.0	1.1	0.8	3	**1.77**	45	2.CFS.30010	-	.0	◪
	.0043	0.11	**.130**	3.3	1.2	0.9	3	**1.77**	45	2.CFS.30011	-	.0	Δ
	.0047	0.12	**.142**	3.6	1.3	1.0	3	**1.77**	45	2.CFS.30012	-	.0	Δ
	.0051	0.13	**.154**	3.9	1.4	1.0	3	**1.77**	45	2.CFS.30013	-	.0	Δ
	.0055	0.14	**.165**	4.2	1.5	1.1	3	**1.77**	45	2.CFS.30014	-	.0	Δ
	.0059	0.15	**.177**	4.5	1.6	1.2	3	**1.77**	45	2.CFS.30015	-	.0	◪
	.0063	0.16	**.189**	4.8	1.7	1.3	3	**1.77**	45	2.CFS.30016	-	.0	Δ
	.0067	0.17	**.201**	5.1	1.8	1.4	3	**1.77**	45	2.CFS.30017	-	.0	Δ
	.0071	0.18	**.213**	5.4	1.9	1.4	3	**1.77**	45	2.CFS.30018	-	.0	Δ
	.0075	0.19	**.224**	5.7	2.0	1.5	3	**1.77**	45	2.CFS.30019	-	.0	Δ
	.0079	0.20	**.236**	6.0	2.1	1.6	3	**1.77**	45	2.CFS.30020	.1	.0	■
	.0083	0.21	**.248**	6.3	2.2	1.7	3	**1.77**	45	2.CFS.30021	.1	.0	Δ
	.0087	0.22	**.260**	6.6	2.3	1.8	3	**1.77**	45	2.CFS.30022	.1	.0	Δ
	.0091	0.23	**.272**	6.9	2.4	1.8	3	**1.77**	45	2.CFS.30023	.1	.0	Δ
	.0094	0.24	**.283**	7.2	2.5	1.9	3	**1.77**	45	2.CFS.30024	.1	.0	Δ
	.0098	0.25	**.295**	7.5	2.6	2.0	3	**1.77**	45	2.CFS.30025	.1	.0	■
	.0102	0.26	**.307**	7.8	2.7	2.1	3	**1.77**	45	2.CFS.30026	.1	.0	Δ
	.0106	0.27	**.319**	8.1	2.8	2.2	3	**1.77**	45	2.CFS.30027	.1	.0	Δ
	.0110	0.28	**.331**	8.4	2.9	2.2	3	**1.77**	45	2.CFS.30028	.1	.0	Δ
	.0114	0.29	**.343**	8.7	3.0	2.3	3	**1.77**	45	2.CFS.30029	.1	.0	Δ
	.0118	0.30	**.354**	9.0	3.2	2.4	3	**1.97**	50	2.CFS.30030	.1	.0	■
	.0122	0.31	**.366**	9.3	3.3	2.5	3	**1.97**	50	2.CFS.30031	.1	.0	Δ
	.0126	0.32	**.378**	9.6	3.4	2.6	3	**1.97**	50	2.CFS.30032	.1	.0	Δ
	.0130	0.33	**.390**	9.9	3.5	2.6	3	**1.97**	50	2.CFS.30033	.1	.0	Δ
	.0134	0.34	**.402**	10.2	3.6	2.7	3	**1.97**	50	2.CFS.30034	.1	.0	Δ
	.0138	0.35	**.413**	10.5	3.7	2.8	3	**1.97**	50	2.CFS.30035	.1	.0	■
	.0142	0.36	**.425**	10.8	3.8	2.9	3	**1.97**	50	2.CFS.30036	.1	.0	Δ
	.0146	0.37	**.437**	11.1	3.9	3.0	3	**1.97**	50	2.CFS.30037	.1	.0	Δ
	.0150	0.38	**.449**	11.4	4.0	3.0	3	**1.97**	50	2.CFS.30038	.1	.0	Δ
	.0154	0.39	**.461**	11.7	4.1	3.1	3	**1.97**	50	2.CFS.30039	.1	.0	Δ
1/64	**.0156**	0.396	**.472**	12.0	4.2	3.2	3	**1.97**	50	2.CFS.30F164	.1	-	◪
	.0157	0.40	**.472**	12.0	4.2	3.2	3	**1.97**	50	2.CFS.30040	.1	.0	■
	.0161	0.41	**.484**	12.3	4.3	3.3	3	**1.97**	50	2.CFS.30041	.1	.0	Δ
	.0165	0.42	**.496**	12.6	4.4	3.4	3	**1.97**	50	2.CFS.30042	.1	.0	Δ
	.0169	0.43	**.508**	12.9	4.5	3.4	3	**1.97**	50	2.CFS.30043	.1	.0	Δ
	.0173	0.44	**.520**	13.2	4.6	3.5	3	**1.97**	50	2.CFS.30044	.1	.0	Δ
	.0177	0.45	**.531**	13.5	4.7	3.6	3	**1.97**	50	2.CFS.30045	.1	.0	■
	.0181	0.46	**.543**	13.8	4.8	3.7	3	**1.97**	50	2.CFS.30046	.1	.0	Δ

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products	
CrazyDrill Flexpilot Steel	p.129
CrazyDrill Crosspilot	p.175

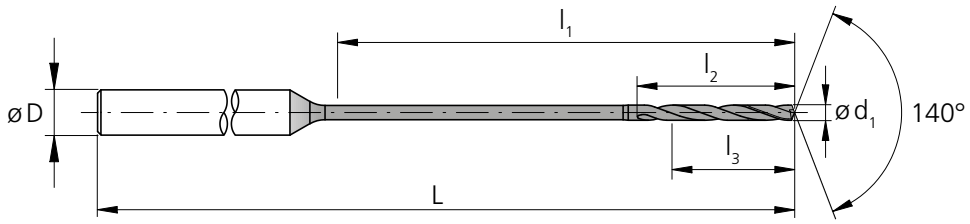
CRAZYDRILL by Mikron Tool Flex STEEL

Steel - 30 x d - coated / uncoated

DRILLING WITH EXTERNAL COOLING

.1 eXedur RIP

.0 Uncoated



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.0185	0.47	**.555**	14.1	4.9	3.8	3	**1.97**	50	2.CFS.30047	.1	.0	Δ
	.0189	0.48	**.567**	14.4	5.0	3.8	3	**1.97**	50	2.CFS.30048	.1	.0	Δ
	.0193	0.49	**.579**	14.7	5.1	3.9	3	**1.97**	50	2.CFS.30049	.1	.0	Δ
	.0197	0.50	**.591**	15.0	5.3	4.0	3	**2.09**	53	2.CFS.30050	.1	.0	■
	.0201	0.51	**.602**	15.3	5.4	4.1	3	**2.09**	53	2.CFS.30051	.1	.0	Δ
	.0205	0.52	**.614**	15.6	5.5	4.2	3	**2.09**	53	2.CFS.30052	.1	.0	Δ
	.0209	0.53	**.626**	15.9	5.6	4.2	3	**2.09**	53	2.CFS.30053	.1	.0	Δ
	.0213	0.54	**.638**	16.2	5.7	4.3	3	**2.09**	53	2.CFS.30054	.1	.0	Δ
	.0217	0.55	**.650**	16.5	5.8	4.4	3	**2.09**	53	2.CFS.30055	.1	.0	■
	.0220	0.56	**.661**	16.8	5.9	4.5	3	**2.09**	53	2.CFS.30056	.1	.0	Δ
	.0224	0.57	**.673**	17.1	6.0	4.6	3	**2.09**	53	2.CFS.30057	.1	.0	Δ
	.0228	0.58	**.685**	17.4	6.1	4.6	3	**2.09**	53	2.CFS.30058	.1	.0	Δ
	.0232	0.59	**.697**	17.7	6.2	4.7	3	**2.09**	53	2.CFS.30059	.1	.0	Δ
	.0236	0.60	**.709**	18.0	6.3	4.8	3	**2.09**	53	2.CFS.30060	.1	.0	■
	.0240	0.61	**.720**	18.3	6.4	4.9	3	**2.09**	53	2.CFS.30061	.1	.0	Δ
	.0244	0.62	**.732**	18.6	6.5	5.0	3	**2.09**	53	2.CFS.30062	.1	.0	Δ
	.0248	0.63	**.744**	18.9	6.6	5.0	3	**2.09**	53	2.CFS.30063	.1	.0	Δ
	.0252	0.64	**.756**	19.2	6.7	5.1	3	**2.09**	53	2.CFS.30064	.1	.0	Δ
	.0256	0.65	**.768**	19.5	6.8	5.2	3	**2.09**	53	2.CFS.30065	.1	.0	■
	.0260	0.66	**.780**	19.8	6.9	5.3	3	**2.09**	53	2.CFS.30066	.1	.0	Δ
	.0264	0.67	**.791**	20.1	7.0	5.4	3	**2.09**	53	2.CFS.30067	.1	.0	Δ
	.0268	0.68	**.803**	20.4	7.1	5.4	3	**2.09**	53	2.CFS.30068	.1	.0	Δ
	.0272	0.69	**.815**	20.7	7.2	5.5	3	**2.09**	53	2.CFS.30069	.1	.0	Δ
	.0276	0.70	**.827**	21.0	7.4	5.6	3	**2.36**	60	2.CFS.30070	.1	.0	■
	.0280	0.71	**.839**	21.3	7.5	5.7	3	**2.36**	60	2.CFS.30071	.1	.0	Δ
	.0283	0.72	**.850**	21.6	7.6	5.8	3	**2.36**	60	2.CFS.30072	.1	.0	Δ
	.0287	0.73	**.862**	21.9	7.7	5.8	3	**2.36**	60	2.CFS.30073	.1	.0	Δ
	.0291	0.74	**.874**	22.2	7.8	5.9	3	**2.36**	60	2.CFS.30074	.1	.0	Δ
	.0295	0.75	**.886**	22.5	7.9	6.0	3	**2.36**	60	2.CFS.30075	.1	.0	■
	.0299	0.76	**.898**	22.8	8.0	6.1	3	**2.36**	60	2.CFS.30076	.1	.0	Δ
	.0303	0.77	**.909**	23.1	8.1	6.2	3	**2.36**	60	2.CFS.30077	.1	.0	Δ
	.0307	0.78	**.921**	23.4	8.2	6.2	3	**2.36**	60	2.CFS.30078	.1	.0	Δ
	.0311	0.79	**.933**	23.7	8.3	6.3	3	**2.36**	60	2.CFS.30079	.1	.0	Δ
1/32	**.0312**	0.793	**.945**	24.0	8.4	6.4	3	**2.36**	60	2.CFS.30F132	.1	-	◪
	.0315	0.80	**.945**	24.0	8.4	6.4	3	**2.36**	60	2.CFS.30080	.1	.0	■
	.0319	0.81	**.957**	24.3	8.5	6.5	3	**2.36**	60	2.CFS.30081	.1	.0	Δ
	.0323	0.82	**.969**	24.6	8.6	6.6	3	**2.36**	60	2.CFS.30082	.1	.0	Δ
	.0327	0.83	**.980**	24.9	8.7	6.6	3	**2.36**	60	2.CFS.30083	.1	.0	Δ

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Carbide | 30xd1 | 140° | Z2

Ø d_1	**.004" - .047"** (0.1 - 1.2 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm

d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
.0331	0.84	**.992**	25.2	8.8	6.7	3	**2.36**	60	2.CFS.30084	.1	.0	Δ
.0335	0.85	**1.00**	25.5	8.9	6.8	3	**2.52**	64	2.CFS.30085	.1	.0	■
.0339	0.86	**1.02**	25.8	9.0	6.9	3	**2.52**	64	2.CFS.30086	.1	.0	Δ
.0343	0.87	**1.03**	26.1	9.1	7.0	3	**2.52**	64	2.CFS.30087	.1	.0	Δ
.0346	0.88	**1.04**	26.4	9.2	7.0	3	**2.52**	64	2.CFS.30088	.1	.0	Δ
.0350	0.89	**1.05**	26.7	9.3	7.1	3	**2.52**	64	2.CFS.30089	.1	.0	Δ
.0354	0.90	**1.06**	27.0	9.5	7.2	3	**2.52**	64	2.CFS.30090	.1	.0	■
.0358	0.91	**1.07**	27.3	9.6	7.3	3	**2.52**	64	2.CFS.30091	.1	.0	Δ
.0362	0.92	**1.09**	27.6	9.7	7.4	3	**2.52**	64	2.CFS.30092	.1	.0	Δ
.0366	0.93	**1.10**	27.9	9.8	7.4	3	**2.52**	64	2.CFS.30093	.1	.0	Δ
.0370	0.94	**1.11**	28.2	9.9	7.5	3	**2.52**	64	2.CFS.30094	.1	.0	Δ
.0374	0.95	**1.12**	28.5	10.0	7.6	3	**2.52**	64	2.CFS.30095	.1	.0	■
.0378	0.96	**1.13**	28.8	10.1	7.7	3	**2.52**	64	2.CFS.30096	.1	.0	Δ
.0382	0.97	**1.15**	29.1	10.2	7.8	3	**2.52**	64	2.CFS.30097	.1	.0	Δ
.0386	0.98	**1.16**	29.4	10.3	7.8	3	**2.52**	64	2.CFS.30098	.1	.0	Δ
.0390	0.99	**1.17**	29.7	10.4	7.9	3	**2.52**	64	2.CFS.30099	.1	.0	Δ
.0394	1.00	**1.18**	30.0	10.5	8.0	3	**2.76**	70	2.CFS.30100	.1	.0	■
.0398	1.01	**1.19**	30.3	10.6	8.1	3	**2.76**	70	2.CFS.30101	.1	.0	Δ
.0402	1.02	**1.20**	30.6	10.7	8.2	3	**2.76**	70	2.CFS.30102	.1	.0	Δ
.0406	1.03	**1.22**	30.9	10.8	8.2	3	**2.76**	70	2.CFS.30103	.1	.0	Δ
.0409	1.04	**1.23**	31.2	10.9	8.3	3	**2.76**	70	2.CFS.30104	.1	.0	Δ
.0413	1.05	**1.24**	31.5	11.0	8.4	3	**2.76**	70	2.CFS.30105	.1	.0	■
.0417	1.06	**1.25**	31.8	11.1	8.5	3	**2.76**	70	2.CFS.30106	.1	.0	Δ
.0421	1.07	**1.26**	32.1	11.2	8.6	3	**2.76**	70	2.CFS.30107	.1	.0	Δ
.0425	1.08	**1.28**	32.4	11.3	8.6	3	**2.76**	70	2.CFS.30108	.1	.0	Δ
.0429	1.09	**1.29**	32.7	11.4	8.7	3	**2.76**	70	2.CFS.30109	.1	.0	Δ
.0433	1.10	**1.30**	33.0	11.6	8.8	3	**2.76**	70	2.CFS.30110	.1	.0	■
.0437	1.11	**1.31**	33.3	11.7	8.9	3	**2.76**	70	2.CFS.30111	.1	.0	Δ
.0441	1.12	**1.32**	33.6	11.8	9.0	3	**2.76**	70	2.CFS.30112	.1	.0	Δ
.0445	1.13	**1.33**	33.9	11.9	9.0	3	**2.76**	70	2.CFS.30113	.1	.0	Δ
.0449	1.14	**1.35**	34.2	12.0	9.1	3	**2.76**	70	2.CFS.30114	.1	.0	Δ
.0453	1.15	**1.36**	34.5	12.1	9.2	3	**2.76**	70	2.CFS.30115	.1	.0	■
.0457	1.16	**1.37**	34.8	12.2	9.3	3	**2.76**	70	2.CFS.30116	.1	.0	Δ
.0461	1.17	**1.38**	35.1	12.3	9.4	3	**2.76**	70	2.CFS.30117	.1	.0	Δ
.0465	1.18	**1.39**	35.4	12.4	9.4	3	**2.76**	70	2.CFS.30118	.1	.0	Δ
.0469	1.19	**1.41**	35.7	12.5	9.5	3	**2.76**	70	2.CFS.30119	.1	.0	Δ
.0472	1.20	**1.42**	36.0	12.6	9.6	3	**2.76**	70	2.CFS.30120	.1	.0	■

■ Stock item

Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products

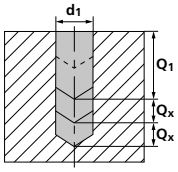
CrazyDrill Flexpilot Steel	p.129
CrazyDrill Crosspilot	p.175

CRAZYDRILL™ by Mikron Tool Flex STEEL

Steel - 30 x d - coated

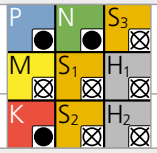
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	5 – 40 | **16 – 131**	40 – 60 | **131 – 197**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	5 – 25 | **16 – 82**	25 – 50 | **82 – 164**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	5 – 20 | **16 – 66**	20 – 35 | **66 – 115**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	5 – 40 | **16 – 131**	50 – 100 | **164 – 328**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		40 – 80 | **131 – 262**
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	5 – 40 | **16 – 131**	60 – 120 | **197 – 394**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	5 – 40 | **16 – 131**	50 – 80 | **164 – 262**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100		
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	5 – 40 | **16 – 131**	60 – 100 | **197 – 328**
		2.102	CuSn6	UNS C51900		40 – 60 | **131 – 197**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



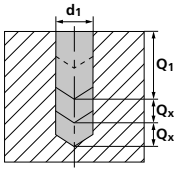
		f [mm/rev] | [IPR]					
Q_1	Q_x	Ød1					
		0.2 mm | **.008"**	0.3 mm | **.012"**	**1/64"** 0.4 mm | **.016"**	0.6 mm | **.024"**	**1/32"** 0.8 mm | **.032"**	1.0–1.2 mm | **.039"–.047"**
		f	**f**	**f**	**f**	**f**	**f**
7xd1	0.5xd1	0.005 **.0002**	0.010 **.0004**	0.015 **.0006**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**
7xd1	0.5xd1	0.003 – 0.005 **.00012 – .00020**	0.008 – 0.010 **.0003 – .0004**	0.012 – 0.015 **.0005 – .0006**	0.020 – 0.025 **.0008 – .0010**	0.035 **.0014**	0.050 **.0020**
7xd1	1xd1	0.004 **.00016**	0.008 **.0003**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**
		Recommended: CrazyDrill Flex SST-Inox 30 x d1					
7xd1	1xd1	0.005 **.0002**	0.010 **.0004**	0.015 **.0006**	0.020 **.0008**	0.035 **.0014**	0.050 **.0020**
7xd1	1xd1	0.015 **.0006**	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
7xd1	1xd1	0.015 **.0006**	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
		Recommended: CrazyDrill Flex Titanium 30 x d1					
		Recommended: CrazyDrill Flex SST-Inox 30 x d1					
7xd1	1xd1	0.010 **.0004**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.100 **.0039**
2.5xd1	0.5xd1	0.004 **.00016**	0.006 **.00024**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**
		Recommended: CrazyDrill Flex SST-Inox 30 x d1					
		Recommended: CrazyDrill Flex Titanium 30 x d1					
		Recommended: CrazyDrill Flex Titanium 30 x d1					
		Recommended: CrazyDrill Flex SST-Inox 30 x d1					

CRAZYDRILL™ by Mikron Tool Flex STEEL

Steel - 30 x d - uncoated

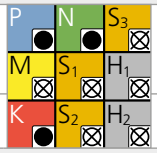
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	5 – 40 | **16 – 131**	40 – 60 | **131 – 197**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	5 – 25 | **16 – 82**	25 – 50 | **82 – 164**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	5 – 20 | **16 – 66**	20 – 35 | **66 – 115**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	5 – 40 | **16 – 131**	50 – 100 | **164 – 328**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		40 – 80 | **131 – 262**
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	5 – 40 | **16 – 131**	60 – 120 | **197 – 394**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	5 – 40 | **16 – 131**	50 – 80 | **164 – 262**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100		
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	5 – 40 | **16 – 131**	60 – 100 | **197 – 328**
		2.102	CuSn6	UNS C51900		40 – 60 | **131 – 197**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

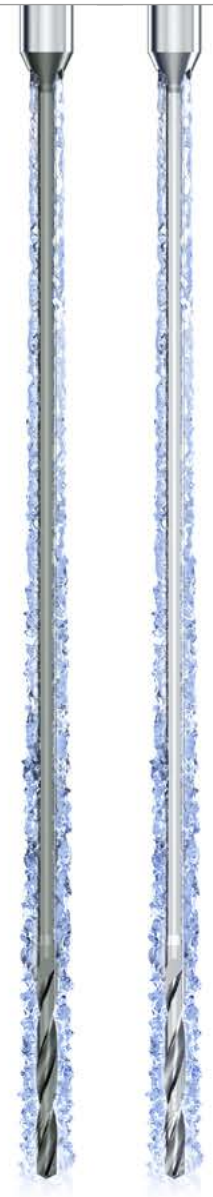
RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



		f [mm/rev] | [IPR]						
		Ød1						
Q_1	Q_x	0.1 mm | .004"	0.2 mm | .008"	0.3 mm | .012"	0.4 mm | .016"	0.6 mm | .024"	0.8 mm | .032"	1.0–1.2 mm | .039" – .047"
		f	f	f	f	f	f	f
7xd1	0.5xd1	0.002 **.00008**	0.005 **.0002**	0.010 **.0004**	0.015 **.0006**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**
7xd1	0.5xd1	0.002 **.00008**	0.003 – 0.005 **.00012 – .00020**	0.008 – 0.010 **.0003 – .0004**	0.012 – 0.015 **.0005 – .0006**	0.020 – 0.025 **.0008 – .0010**	0.035 **.0014**	0.050 **.0020**
7xd1	1xd1	0.0005 **.0002**	0.004 **.00016**	0.008 **.0003**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**
		Recommended: CrazyDrill Flex SST-Inox 30 x d1						
7xd1	1xd1	0.002 **.00008**	0.005 **.0002**	0.010 **.0004**	0.015 **.0006**	0.020 **.0008**	0.035 **.0014**	0.050 **.0020**
7xd1	1xd1	0.003 **.00012**	0.015 **.0006**	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
7xd1	1xd1	0.003 **.00012**	0.015 **.0006**	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
		Recommended: CrazyDrill Flex Titanium 30 x d1						
		Recommended: CrazyDrill Flex SST-Inox 30 x d1						
7xd1	1xd1	0.004 **.00016**	0.010 **.0004**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.100 **.0039**
2.5xd1	0.5xd1	0.002 **.00008**	0.004 **.00016**	0.006 **.00024**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**
		Recommended: CrazyDrill Flex SST-Inox 30 x d1						
		Recommended: CrazyDrill Flex Titanium 30 x d1						
		Recommended: CrazyDrill Flex Titanium 30 x d1						
		Recommended: CrazyDrill Flex SST-Inox 30 x d1						

Steel - 50 x d - coated / uncoated

DRILLING WITH INTEGRATED COOLING



Coated Uncoated

The solid carbide micro-drill CrazyDrill Flex Steel is mainly designed for steels, cast iron, aluminum alloys, brass and bronze. It has a high flexibility thanks to a long and "flexible" section between the tip and the shaft. Therefore the tool is adapted for drilling with process reliability also under difficult conditions. It is able to flex effortlessly 40% of its diameter. This drill is also perfect for deep hole drilling from diameter .012" (0.3 mm) with a significantly shorter drilling time compared to the single-lip drill, electro-erosion or laser method.

CrazyDrill Flex Steel 50 x d has through coolant channels integrated in the shank which guarantee a constant, solid cooling on the drill tip. The temperature is constantly under control, chips are flushed away from the helical flute and hole and better tool life is achieved. Compared to the uncoated version the coated version is designed for drilling of large series. Also the surface quality profit by the high-performance coating.

We recommend pilot drilling with CrazyDrill Flexpilot Steel or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note

You couldn't find your suitable version of the CrazyDrill Flex Steel - coated / uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

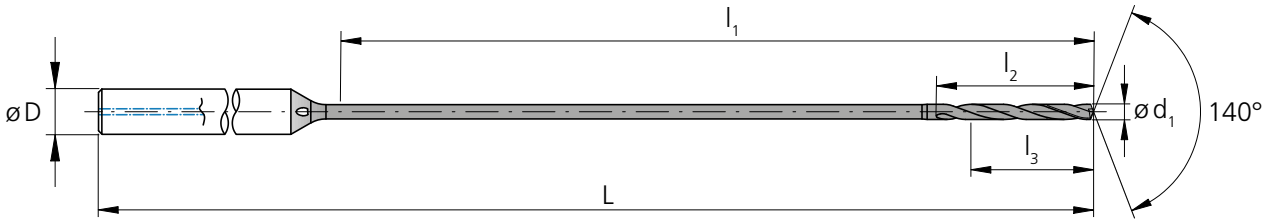
Regrinding: This product is not suitable for regrinding.

Carbide	50xd1	140°	Z2	

Ø d_1	**.012" - .079"** (0.3 - 2.0 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm

.1 eXedur RIP

.0 Uncoated



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.0118	0.30	**.591**	15.0	3.1	2.4	3	**2.09**	53	2.CFS.50030.IK	.1	.0	■
	.0122	0.31	**.610**	15.5	3.2	2.5	3	**2.09**	53	2.CFS.50031.IK	.1	.0	Δ
	.0126	0.32	**.630**	16.0	3.3	2.6	3	**2.09**	53	2.CFS.50032.IK	.1	.0	Δ
	.0130	0.33	**.650**	16.5	3.4	2.6	3	**2.09**	53	2.CFS.50033.IK	.1	.0	Δ
	.0134	0.34	**.669**	17.0	3.5	2.7	3	**2.09**	53	2.CFS.50034.IK	.1	.0	Δ
	.0138	0.35	**.689**	17.5	3.7	2.8	3	**2.36**	60	2.CFS.50035.IK	.1	.0	■
	.0142	0.36	**.709**	18.0	3.8	2.9	3	**2.36**	60	2.CFS.50036.IK	.1	.0	Δ
	.0146	0.37	**.728**	18.5	3.9	3.0	3	**2.36**	60	2.CFS.50037.IK	.1	.0	Δ
	.0150	0.38	**.748**	19.0	4.0	3.0	3	**2.36**	60	2.CFS.50038.IK	.1	.0	Δ
	.0154	0.39	**.768**	19.5	4.1	3.1	3	**2.36**	60	2.CFS.50039.IK	.1	.0	Δ
1/64	**.0156**	0.396	**.787**	20.0	4.2	3.2	3	**2.36**	60	2.CFS.50F164.IK	.1	-	◪
	.0157	0.40	**.787**	20.0	4.2	3.2	3	**2.36**	60	2.CFS.50040.IK	.1	.0	■
	.0161	0.41	**.807**	20.5	4.3	3.3	3	**2.36**	60	2.CFS.50041.IK	.1	.0	Δ
	.0165	0.42	**.827**	21.0	4.4	3.4	3	**2.36**	60	2.CFS.50042.IK	.1	.0	Δ
	.0169	0.43	**.846**	21.5	4.5	3.4	3	**2.36**	60	2.CFS.50043.IK	.1	.0	Δ
	.0173	0.44	**.866**	22.0	4.6	3.5	3	**2.36**	60	2.CFS.50044.IK	.1	.0	Δ
	.0177	0.45	**.886**	22.5	4.7	3.6	3	**2.36**	60	2.CFS.50045.IK	.1	.0	■
	.0181	0.46	**.906**	23.0	4.8	3.7	3	**2.36**	60	2.CFS.50046.IK	.1	.0	Δ
	.0185	0.47	**.925**	23.5	4.9	3.8	3	**2.36**	60	2.CFS.50047.IK	.1	.0	Δ
	.0189	0.48	**.945**	24.0	5.0	3.8	3	**2.36**	60	2.CFS.50048.IK	.1	.0	Δ
	.0193	0.49	**.965**	24.5	5.1	3.9	3	**2.36**	60	2.CFS.50049.IK	.1	.0	Δ
	.0197	0.50	**.984**	25.0	5.2	4.0	3	**2.52**	64	2.CFS.50050.IK	.1	.0	■
	.0201	0.51	**1.00**	25.5	5.3	4.1	3	**2.52**	64	2.CFS.50051.IK	.1	.0	Δ
	.0205	0.52	**1.02**	26.0	5.4	4.2	3	**2.52**	64	2.CFS.50052.IK	.1	.0	Δ
	.0209	0.53	**1.04**	26.5	5.5	4.2	3	**2.52**	64	2.CFS.50053.IK	.1	.0	Δ
	.0213	0.54	**1.06**	27.0	5.6	4.3	3	**2.52**	64	2.CFS.50054.IK	.1	.0	Δ
	.0217	0.55	**1.08**	27.5	5.8	4.4	3	**2.52**	64	2.CFS.50055.IK	.1	.0	■
	.0220	0.56	**1.10**	28.0	5.9	4.5	3	**2.52**	64	2.CFS.50056.IK	.1	.0	Δ
	.0224	0.57	**1.12**	28.5	6.0	4.6	3	**2.52**	64	2.CFS.50057.IK	.1	.0	Δ
	.0228	0.58	**1.14**	29.0	6.1	4.6	3	**2.52**	64	2.CFS.50058.IK	.1	.0	Δ
	.0232	0.59	**1.16**	29.5	6.2	4.7	3	**2.52**	64	2.CFS.50059.IK	.1	.0	Δ
	.0236	0.60	**1.18**	30.0	6.3	4.8	3	**2.76**	70	2.CFS.50060.IK	.1	.0	■
	.0240	0.61	**1.20**	30.5	6.4	4.9	3	**2.76**	70	2.CFS.50061.IK	.1	.0	Δ
	.0244	0.62	**1.22**	31.0	6.5	5.0	3	**2.76**	70	2.CFS.50062.IK	.1	.0	Δ
	.0248	0.63	**1.24**	31.5	6.6	5.0	3	**2.76**	70	2.CFS.50063.IK	.1	.0	Δ
	.0252	0.64	**1.26**	32.0	6.7	5.1	3	**2.76**	70	2.CFS.50064.IK	.1	.0	Δ

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products

CrazyDrill Flexpilot Steel p.129
CrazyDrill Crosspilot p.175

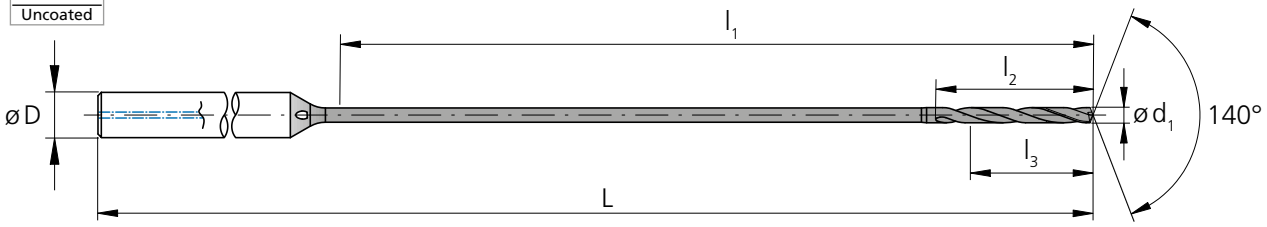
CRAZYDRILL by Mikron Tool Flex STEEL

Steel - 50 x d - coated / uncoated

DRILLING WITH INTEGRATED COOLING

.1 eXedur RIP

.0 Uncoated



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.0256	0.65	**1.28**	32.5	6.8	5.2	3	**2.76**	70	2.CFS.50065.IK	.1	.0	■
	.0260	0.66	**1.30**	33.0	6.9	5.3	3	**2.76**	70	2.CFS.50066.IK	.1	.0	Δ
	.0264	0.67	**1.32**	33.5	7.0	5.4	3	**2.76**	70	2.CFS.50067.IK	.1	.0	Δ
	.0268	0.68	**1.34**	34.0	7.1	5.4	3	**2.76**	70	2.CFS.50068.IK	.1	.0	Δ
	.0272	0.69	**1.36**	34.5	7.2	5.5	3	**2.76**	70	2.CFS.50069.IK	.1	.0	Δ
	.0276	0.70	**1.38**	35.0	7.4	5.6	3	**2.95**	75	2.CFS.50070.IK	.1	.0	■
	.0280	0.71	**1.40**	35.5	7.5	5.7	3	**2.95**	75	2.CFS.50071.IK	.1	.0	Δ
	.0283	0.72	**1.42**	36.0	7.6	5.8	3	**2.95**	75	2.CFS.50072.IK	.1	.0	Δ
	.0287	0.73	**1.44**	36.5	7.7	5.8	3	**2.95**	75	2.CFS.50073.IK	.1	.0	Δ
	.0291	0.74	**1.46**	37.0	7.8	5.9	3	**2.95**	75	2.CFS.50074.IK	.1	.0	Δ
	.0295	0.75	**1.48**	37.5	7.9	6.0	3	**2.95**	75	2.CFS.50075.IK	.1	.0	■
	.0299	0.76	**1.50**	38.0	8.0	6.1	3	**2.95**	75	2.CFS.50076.IK	.1	.0	Δ
	.0303	0.77	**1.52**	38.5	8.1	6.2	3	**2.95**	75	2.CFS.50077.IK	.1	.0	Δ
	.0307	0.78	**1.54**	39.0	8.2	6.2	3	**2.95**	75	2.CFS.50078.IK	.1	.0	Δ
	.0311	0.79	**1.56**	39.5	8.3	6.3	3	**2.95**	75	2.CFS.50079.IK	.1	.0	Δ
1/32	**.0312**	0.793	**1.57**	40.0	8.4	6.4	3	**3.15**	80	2.CFS.50F132.IK	.1	-	◪
	.0315	0.80	**1.57**	40.0	8.4	6.4	3	**3.15**	80	2.CFS.50080.IK	.1	.0	■
	.0319	0.81	**1.59**	40.5	8.5	6.5	3	**3.15**	80	2.CFS.50081.IK	.1	.0	Δ
	.0323	0.82	**1.61**	41.0	8.6	6.6	3	**3.15**	80	2.CFS.50082.IK	.1	.0	Δ
	.0327	0.83	**1.63**	41.5	8.7	6.6	3	**3.15**	80	2.CFS.50083.IK	.1	.0	Δ
	.0331	0.84	**1.65**	42.0	8.8	6.7	3	**3.15**	80	2.CFS.50084.IK	.1	.0	Δ
	.0335	0.85	**1.67**	42.5	8.9	6.8	3	**3.15**	80	2.CFS.50085.IK	.1	.0	■
	.0339	0.86	**1.69**	43.0	9.0	6.9	3	**3.15**	80	2.CFS.50086.IK	.1	.0	Δ
	.0343	0.87	**1.71**	43.5	9.1	7.0	3	**3.15**	80	2.CFS.50087.IK	.1	.0	Δ
	.0346	0.88	**1.73**	44.0	9.2	7.0	3	**3.15**	80	2.CFS.50088.IK	.1	.0	Δ
	.0350	0.89	**1.75**	44.5	9.3	7.1	3	**3.15**	80	2.CFS.50089.IK	.1	.0	Δ
	.0354	0.90	**1.77**	45.0	9.5	7.2	3	**3.35**	85	2.CFS.50090.IK	.1	.0	■
	.0358	0.91	**1.79**	45.5	9.6	7.3	3	**3.35**	80	2.CFS.50091.IK	.1	.0	Δ
	.0362	0.92	**1.81**	46.0	9.7	7.4	3	**3.35**	80	2.CFS.50092.IK	.1	.0	Δ
	.0366	0.93	**1.83**	46.5	9.8	7.4	3	**3.35**	85	2.CFS.50093.IK	.1	.0	Δ
	.0370	0.94	**1.85**	47.0	9.9	7.5	3	**3.35**	70	2.CFS.50094.IK	.1	.0	Δ
	.0374	0.95	**1.87**	47.5	10.0	7.6	3	**3.35**	70	2.CFS.50095.IK	.1	.0	■
	.0378	0.96	**1.89**	48.0	10.1	7.7	3	**3.35**	70	2.CFS.50096.IK	.1	.0	Δ
	.0382	0.97	**1.91**	48.5	10.2	7.8	3	**3.35**	85	2.CFS.50097.IK	.1	.0	Δ
	.0386	0.98	**1.93**	49.0	10.3	7.8	3	**3.35**	85	2.CFS.50098.IK	.1	.0	Δ
	.0390	0.99	**1.95**	49.5	10.4	7.9	3	**3.35**	85	2.CFS.50099.IK	.1	.0	Δ
	.0394	1.00	**1.97**	50.0	10.5	8.0	3	**3.54**	90	2.CFS.50100.IK	.1	.0	■

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Carbide	50xd1	140°	Z2	

Ø d_1	**.012" - .079"** (0.3 - 2.0 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Coated	Uncoated	Availability
	.0398	1.01	**1.99**	50.5	10.6	8.1	3	**3.54**	90	2.CFS.50101.IK	.1	.0	Δ
	.0402	1.02	**2.01**	51.0	10.7	8.2	3	**3.54**	90	2.CFS.50102.IK	.1	.0	Δ
	.0406	1.03	**2.03**	51.5	10.8	8.2	3	**3.54**	90	2.CFS.50103.IK	.1	.0	Δ
	.0409	1.04	**2.05**	52.0	10.9	8.3	3	**3.54**	90	2.CFS.50104.IK	.1	.0	Δ
	.0413	1.05	**2.07**	52.5	11.0	8.4	3	**3.54**	90	2.CFS.50105.IK	.1	.0	■
	.0417	1.06	**2.09**	53.0	11.1	8.5	3	**3.54**	90	2.CFS.50106.IK	.1	.0	Δ
	.0421	1.07	**2.11**	53.5	11.2	8.6	3	**3.54**	90	2.CFS.50107.IK	.1	.0	Δ
	.0425	1.08	**2.13**	54.0	11.3	8.6	3	**3.54**	90	2.CFS.50108.IK	.1	.0	Δ
	.0429	1.09	**2.15**	54.5	11.4	8.7	3	**3.54**	90	2.CFS.50109.IK	.1	.0	Δ
	.0433	1.10	**2.17**	55.0	11.6	8.8	3	**3.74**	95	2.CFS.50110.IK	.1	.0	■
	.0437	1.11	**2.19**	55.5	11.7	8.9	3	**3.74**	95	2.CFS.50111.IK	.1	.0	Δ
	.0441	1.12	**2.20**	56.0	11.8	9.0	3	**3.74**	95	2.CFS.50112.IK	.1	.0	Δ
	.0445	1.13	**2.22**	56.5	11.9	9.0	3	**3.74**	95	2.CFS.50113.IK	.1	.0	Δ
	.0449	1.14	**2.24**	57.0	12.0	9.1	3	**3.74**	95	2.CFS.50114.IK	.1	.0	Δ
	.0453	1.15	**2.26**	57.5	12.1	9.2	3	**3.74**	95	2.CFS.50115.IK	.1	.0	■
	.0457	1.16	**2.28**	58.0	12.2	9.3	3	**3.74**	95	2.CFS.50116.IK	.1	.0	Δ
	.0461	1.17	**2.30**	58.5	12.3	9.4	3	**3.74**	95	2.CFS.50117.IK	.1	.0	Δ
	.0465	1.18	**2.32**	59.0	12.4	9.4	3	**3.74**	95	2.CFS.50118.IK	.1	.0	Δ
	.0469	1.19	**2.34**	59.5	12.5	9.5	3	**3.74**	95	2.CFS.50119.IK	.1	.0	Δ
	.0472	1.20	**2.36**	60.0	12.6	9.6	3	**3.74**	95	2.CFS.50120.IK	.1	.0	■
	.0492	1.25	**2.46**	62.5	13.1	10.0	4	**4.13**	105	2.CFS.50125.IK	.1	-	◪
	.0512	1.30	**2.56**	65.0	13.7	10.4	4	**4.13**	105	2.CFS.50130.IK	.1	-	◪
	.0531	1.35	**2.66**	67.5	14.2	10.8	4	**4.13**	105	2.CFS.50135.IK	.1	-	◪
	.0551	1.40	**2.76**	70.0	14.7	11.2	4	**4.33**	110	2.CFS.50140.IK	.1	-	◪
	.0571	1.45	**2.85**	72.5	15.2	11.6	4	**4.53**	115	2.CFS.50145.IK	.1	-	◪
	.0591	1.50	**2.95**	75.0	15.8	12.0	4	**4.53**	115	2.CFS.50150.IK	.1	-	◪
	.0610	1.55	**3.05**	77.5	16.3	12.4	4	**4.53**	115	2.CFS.50155.IK	.1	-	◪
1/16	**.0625**	1.587	**3.15**	80.0	16.8	12.8	4	**4.72**	120	2.CFS.50F116.IK	.1	-	◪
	.0630	1.60	**3.15**	80.0	16.8	12.8	4	**4.72**	120	2.CFS.50160.IK	.1	-	◪
	.0650	1.65	**3.25**	82.5	17.3	13.2	4	**4.72**	120	2.CFS.50165.IK	.1	-	◪
	.0669	1.70	**3.35**	85.0	17.9	13.6	4	**4.92**	125	2.CFS.50170.IK	.1	-	◪
	.0689	1.75	**3.44**	87.5	18.4	14.0	4	**5.12**	130	2.CFS.50175.IK	.1	-	◪
	.0709	1.80	**3.54**	90.0	18.9	14.4	4	**5.12**	130	2.CFS.50180.IK	.1	-	◪
	.0728	1.85	**3.64**	92.5	19.4	14.8	4	**5.31**	135	2.CFS.50185.IK	.1	-	◪
	.0748	1.90	**3.74**	95.0	20.0	15.2	4	**5.31**	135	2.CFS.50190.IK	.1	-	◪
	.0768	1.95	**3.84**	97.5	20.5	15.6	4	**5.51**	140	2.CFS.50195.IK	.1	-	◪
	.0787	2.00	**3.94**	100.0	21.0	16.0	4	**5.51**	140	2.CFS.50200.IK	.1	-	◪

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

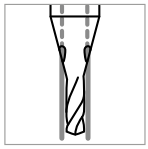
Complementary products

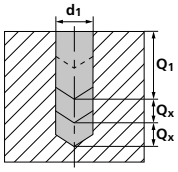
CrazyDrill Flexpilot Steel p.129
CrazyDrill Crosspilot p.175

CRAZYDRILL™ by Mikron Tool Flex STEEL

Steel - 50 x d - coated

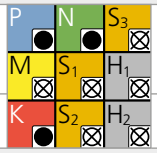
DRILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	5 – 40 | **16 – 131**	40 – 60 | **131 – 197**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	5 – 25 | **16 – 82**	25 – 50 | **82 – 164**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	5 – 20 | **16 – 66**	20 – 35 | **66 – 115**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	5 – 40 | **16 – 131**	50 – 100 | **164 – 328**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		40 – 80 | **131 – 262**
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	5 – 40 | **16 – 131**	60 – 120 | **197 – 394**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	5 – 40 | **16 – 131**	50 – 80 | **164 – 262**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100		
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	5 – 40 | **16 – 131**	60 – 100 | **197 – 328**
		2.102	CuSn6	UNS C51900		40 – 60 | **131 – 197**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

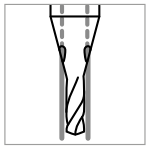


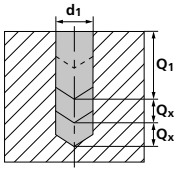
		f [mm/rev] | [IPR]					
		Ød1					
Q1	Qx	0.3 mm | .012"	1/64" 0.4 mm | .016"	0.6 mm | .024"	1/32" 0.8 mm | .032"	1.0 mm | .039"	1/16" 1.5–2.0 mm | .059"–.079"
		f	f	f	f	f	f
7xd1	0.5xd1	0.010 **.0004**	0.015 **.0006**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**
7xd1	0.5xd1	0.008 – 0.010 **.0003 – .0004**	0.012 – 0.015 **.0005 – .0006**	0.020 – 0.025 **.0008 – .0010**	0.035 **.0014**	0.050 **.0020**	0.070 **.0028**
7xd1	0.5xd1	0.008 **.0003**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**	0.060 **.0024**
		Recommended: CrazyDrill Flex SST-Inox 50 x d1					
7xd1	0.5xd1	0.010 **.0004**	0.015 **.0006**	0.020 **.0008**	0.035 **.0014**	0.050 **.0020**	0.070 **.0028**
7xd1	1xd1	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**	0.150 **.0059**
7xd1	1xd1	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**	0.150 **.0059**
		Recommended: CrazyDrill Flex Titanium 50 x d1					
		Recommended: CrazyDrill Flex SST-Inox 50 x d1					
7xd1	1xd1	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
2.5xd1	0.5xd1	0.006 **.00024**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**	0.060 **.0024**
		Recommended: CrazyDrill Flex SST-Inox 50 x d1					
		Recommended: CrazyDrill Flex Titanium 50 x d1					
		Recommended: CrazyDrill Flex Titanium 50 x d1					
		Recommended: CrazyDrill Flex SST-Inox 50 x d1					

CRAZYDRILL™ by Mikron Tool Flex STEEL

Steel - 50 x d - uncoated

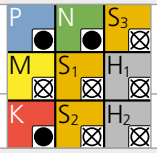
DRILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	5 – 40 | **16 – 131**	40 – 60 | **131 – 197**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	5 – 25 | **16 – 82**	25 – 50 | **82 – 164**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	5 – 20 | **16 – 66**	20 – 35 | **66 – 115**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	5 – 40 | **16 – 131**	50 – 100 | **164 – 328**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		40 – 80 | **131 – 262**
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	5 – 40 | **16 – 131**	60 – 120 | **197 – 394**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	5 – 40 | **16 – 131**	50 – 80 | **164 – 262**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100		
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	5 – 40 | **16 – 131**	60 – 100 | **197 – 328**
		2.102	CuSn6	UNS C51900		40 – 60 | **131 – 197**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



		f [mm/rev] | [IPR]				
Q_1	Q_x	Ød1				
		0.3 mm | **.012"**	0.4 mm | **.016"**	0.6 mm | **.024"**	0.8 mm | **.032"**	1.0 – 1.2 mm | **.039" – .047"**
		f	**f**	**f**	**f**	**f**
7xd1	0.5xd1	0.010 **.0004**	0.015 **.0006**	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**
7xd1	0.5xd1	0.008 – 0.010 **.0003 – .0004**	0.012 – 0.015 **.0005 – .0006**	0.020 – 0.025 **.0008 – .0010**	0.035 **.0014**	0.050 **.0020**
7xd1	0.5xd1	0.008 **.0003**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**
		Recommended: CrazyDrill Flex SST-Inox 50 x d1				
7xd1	0.5xd1	0.010 **.0004**	0.015 **.0006**	0.020 **.0008**	0.035 **.0014**	0.050 **.0020**
7xd1	1xd1	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
7xd1	1xd1	0.040 **.0016**	0.050 **.0020**	0.080 **.0031**	0.100 **.0039**	0.120 **.0047**
		Recommended: CrazyDrill Flex Titanium 50 x d1				
		Recommended: CrazyDrill Flex SST-Inox 50 x d1				
7xd1	1xd1	0.030 **.0012**	0.040 **.0016**	0.060 **.0024**	0.080 **.0031**	0.100 **.0039**
2.5xd1	0.5xd1	0.006 **.00024**	0.010 **.0004**	0.015 **.0006**	0.025 **.0010**	0.040 **.0016**
		Recommended: CrazyDrill Flex SST-Inox 50 x d1				
		Recommended: CrazyDrill Flex Titanium 50 x d1				
		Recommended: CrazyDrill Flex Titanium 50 x d1				
		Recommended: CrazyDrill Flex SST-Inox 50 x d1				

CRAZYDRILL by Mikron Tool Flex TITANIUM

Titanium - 30 x d

DRILLING WITH EXTERNAL COOLING



The solid carbide micro-drill CrazyDrill Flex Titanium is mainly designed for long-chip materials as titanium, titanium alloys and copper. It has a high flexibility thanks to a long and "flexible" section between the tip and the shaft. Therefore the tool is adapted for drilling with process reliability also under difficult conditions. It is able to flex effortlessly 40% of its diameter. This drill is also perfect for deep hole drilling from diameter .004" (0.1 mm) with a significantly shorter drilling time compared to the single-lip drill, electro-erosion or laser method.

CrazyDrill Flex Titanium 30 x d is used with external cooling and is uncoated.

We recommend pilot drilling with CrazyDrill Flexpilot Titanium or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.

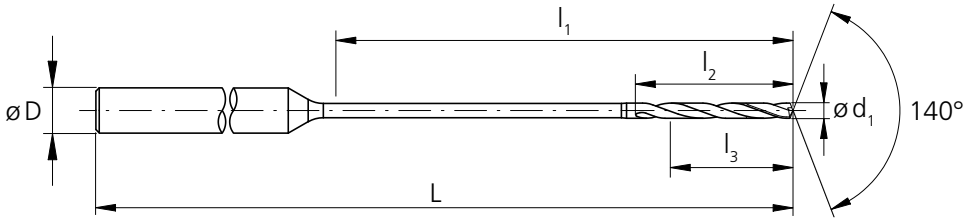
Coolant type, pressure and filtration
Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note
You couldn't find your suitable version of the CrazyDrill Flex Titanium (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide	30xd1	140°	Z2		Uncoated

Ø d_1	**.004" - .047"** (0.1 - 1.2 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm



d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.0039	0.10	**.118**	3.0	1.1	0.8	3	**1.77**	45	2.CFT.30010.0	■
.0043	0.11	**.130**	3.3	1.2	0.9	3	**1.77**	45	2.CFT.30011.0	Δ
.0047	0.12	**.142**	3.6	1.3	1.0	3	**1.77**	45	2.CFT.30012.0	Δ
.0051	0.13	**.154**	3.9	1.4	1.0	3	**1.77**	45	2.CFT.30013.0	Δ
.0055	0.14	**.165**	4.2	1.5	1.1	3	**1.77**	45	2.CFT.30014.0	Δ
.0059	0.15	**.177**	4.5	1.6	1.2	3	**1.77**	45	2.CFT.30015.0	■
.0063	0.16	**.189**	4.8	1.7	1.3	3	**1.77**	45	2.CFT.30016.0	Δ
.0067	0.17	**.201**	5.1	1.8	1.4	3	**1.77**	45	2.CFT.30017.0	Δ
.0071	0.18	**.213**	5.4	1.9	1.4	3	**1.77**	45	2.CFT.30018.0	Δ
.0075	0.19	**.224**	5.7	2.0	1.5	3	**1.77**	45	2.CFT.30019.0	Δ
.0079	0.20	**.236**	6.0	2.1	1.6	3	**1.77**	45	2.CFT.30020.0	■
.0083	0.21	**.248**	6.3	2.2	1.7	3	**1.77**	45	2.CFT.30021.0	Δ
.0087	0.22	**.260**	6.6	2.3	1.8	3	**1.77**	45	2.CFT.30022.0	Δ
.0091	0.23	**.272**	6.9	2.4	1.8	3	**1.77**	45	2.CFT.30023.0	Δ
.0094	0.24	**.283**	7.2	2.5	1.9	3	**1.77**	45	2.CFT.30024.0	Δ
.0098	0.25	**.295**	7.5	2.6	2.0	3	**1.77**	45	2.CFT.30025.0	■
.0102	0.26	**.307**	7.8	2.7	2.1	3	**1.77**	45	2.CFT.30026.0	Δ
.0106	0.27	**.319**	8.1	2.8	2.2	3	**1.77**	45	2.CFT.30027.0	Δ
.0110	0.28	**.331**	8.4	2.9	2.2	3	**1.77**	45	2.CFT.30028.0	Δ
.0114	0.29	**.343**	8.7	3.0	2.3	3	**1.77**	45	2.CFT.30029.0	Δ
.0118	0.30	**.354**	9.0	3.2	2.4	3	**1.97**	50	2.CFT.30030.0	■
.0122	0.31	**.366**	9.3	3.3	2.5	3	**1.97**	50	2.CFT.30031.0	Δ
.0126	0.32	**.378**	9.6	3.4	2.6	3	**1.97**	50	2.CFT.30032.0	Δ
.0130	0.33	**.390**	9.9	3.5	2.6	3	**1.97**	50	2.CFT.30033.0	Δ
.0134	0.34	**.402**	10.2	3.6	2.7	3	**1.97**	50	2.CFT.30034.0	Δ
.0138	0.35	**.413**	10.5	3.7	2.8	3	**1.97**	50	2.CFT.30035.0	■
.0142	0.36	**.425**	10.8	3.8	2.9	3	**1.97**	50	2.CFT.30036.0	Δ
.0146	0.37	**.437**	11.1	3.9	3.0	3	**1.97**	50	2.CFT.30037.0	Δ
.0150	0.38	**.449**	11.4	4.0	3.0	3	**1.97**	50	2.CFT.30038.0	Δ
.0154	0.39	**.461**	11.7	4.1	3.1	3	**1.97**	50	2.CFT.30039.0	Δ
.0157	0.40	**.472**	12.0	4.2	3.2	3	**1.97**	50	2.CFT.30040.0	■
.0161	0.41	**.484**	12.3	4.3	3.3	3	**1.97**	50	2.CFT.30041.0	Δ
.0165	0.42	**.496**	12.6	4.4	3.4	3	**1.97**	50	2.CFT.30042.0	Δ
.0169	0.43	**.508**	12.9	4.5	3.4	3	**1.97**	50	2.CFT.30043.0	Δ
.0173	0.44	**.520**	13.2	4.6	3.5	3	**1.97**	50	2.CFT.30044.0	Δ
.0177	0.45	**.531**	13.5	4.7	3.6	3	**1.97**	50	2.CFT.30045.0	■
.0181	0.46	**.543**	13.8	4.8	3.7	3	**1.97**	50	2.CFT.30046.0	Δ

■ Stock item

Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

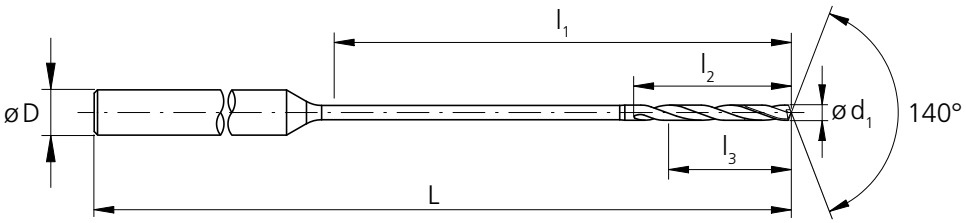
Complementary products

CrazyDrill Flexpilot Titanium	p.135
CrazyDrill Crosspilot	p.175

CRAZYDRILL™ by Mikron Tool Flex TITANIUM

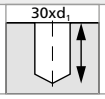
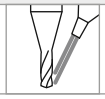
Titanium - 30 x d

DRILLING WITH EXTERNAL COOLING



d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.0185	0.47	**.555**	14.1	4.9	3.8	3	**1.97**	50	2.CFT.30047.0	Δ
.0189	0.48	**.567**	14.4	5.0	3.8	3	**1.97**	50	2.CFT.30048.0	Δ
.0193	0.49	**.579**	14.7	5.1	3.9	3	**1.97**	50	2.CFT.30049.0	Δ
.0197	0.50	**.591**	15.0	5.3	4.0	3	**2.09**	53	2.CFT.30050.0	■
.0201	0.51	**.602**	15.3	5.4	4.1	3	**2.09**	53	2.CFT.30051.0	Δ
.0205	0.52	**.614**	15.6	5.5	4.2	3	**2.09**	53	2.CFT.30052.0	Δ
.0209	0.53	**.626**	15.9	5.6	4.2	3	**2.09**	53	2.CFT.30053.0	Δ
.0213	0.54	**.638**	16.2	5.7	4.3	3	**2.09**	53	2.CFT.30054.0	Δ
.0217	0.55	**.650**	16.5	5.8	4.4	3	**2.09**	53	2.CFT.30055.0	■
.0220	0.56	**.661**	16.8	5.9	4.5	3	**2.09**	53	2.CFT.30056.0	Δ
.0224	0.57	**.673**	17.1	6.0	4.6	3	**2.09**	53	2.CFT.30057.0	Δ
.0228	0.58	**.685**	17.4	6.1	4.6	3	**2.09**	53	2.CFT.30058.0	Δ
.0232	0.59	**.697**	17.7	6.2	4.7	3	**2.09**	53	2.CFT.30059.0	Δ
.0236	0.60	**.709**	18.0	6.3	4.8	3	**2.09**	53	2.CFT.30060.0	■
.0240	0.61	**.720**	18.3	6.4	4.9	3	**2.09**	53	2.CFT.30061.0	Δ
.0244	0.62	**.732**	18.6	6.5	5.0	3	**2.09**	53	2.CFT.30062.0	Δ
.0248	0.63	**.744**	18.9	6.6	5.0	3	**2.09**	53	2.CFT.30063.0	Δ
.0252	0.64	**.756**	19.2	6.7	5.1	3	**2.09**	53	2.CFT.30064.0	Δ
.0256	0.65	**.768**	19.5	6.8	5.2	3	**2.09**	53	2.CFT.30065.0	■
.0260	0.66	**.780**	19.8	6.9	5.3	3	**2.09**	53	2.CFT.30066.0	Δ
.0264	0.67	**.791**	20.1	7.0	5.4	3	**2.09**	53	2.CFT.30067.0	Δ
.0268	0.68	**.803**	20.4	7.1	5.4	3	**2.09**	53	2.CFT.30068.0	Δ
.0272	0.69	**.815**	20.7	7.2	5.5	3	**2.09**	53	2.CFT.30069.0	Δ
.0276	0.70	**.827**	21.0	7.4	5.6	3	**2.36**	60	2.CFT.30070.0	■
.0280	0.71	**.839**	21.3	7.5	5.7	3	**2.36**	60	2.CFT.30071.0	Δ
.0283	0.72	**.850**	21.6	7.6	5.8	3	**2.36**	60	2.CFT.30072.0	Δ
.0287	0.73	**.862**	21.9	7.7	5.8	3	**2.36**	60	2.CFT.30073.0	Δ
.0291	0.74	**.874**	22.2	7.8	5.9	3	**2.36**	60	2.CFT.30074.0	Δ
.0295	0.75	**.886**	22.5	7.9	6.0	3	**2.36**	60	2.CFT.30075.0	■
.0299	0.76	**.898**	22.8	8.0	6.1	3	**2.36**	60	2.CFT.30076.0	Δ
.0303	0.77	**.909**	23.1	8.1	6.2	3	**2.36**	60	2.CFT.30077.0	Δ
.0307	0.78	**.921**	23.4	8.2	6.2	3	**2.36**	60	2.CFT.30078.0	Δ
.0311	0.79	**.933**	23.7	8.3	6.3	3	**2.36**	60	2.CFT.30079.0	Δ
.0315	0.80	**.945**	24.0	8.4	6.4	3	**2.36**	60	2.CFT.30080.0	■
.0319	0.81	**.957**	24.3	8.5	6.5	3	**2.36**	60	2.CFT.30081.0	Δ
.0323	0.82	**.969**	24.6	8.6	6.6	3	**2.36**	60	2.CFT.30082.0	Δ
.0327	0.83	**.980**	24.9	8.7	6.6	3	**2.36**	60	2.CFT.30083.0	Δ

■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Carbide			Z2		Uncoated

Ø d_1	**.004" - .047"** (0.1 - 1.2 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm

d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.0331	0.84	**.992**	25.2	8.8	6.7	3	**2.36**	60	2.CFT.30084.0	Δ
.0335	0.85	**1.00**	25.5	8.9	6.8	3	**2.52**	64	2.CFT.30085.0	■
.0339	0.86	**1.02**	25.8	9.0	6.9	3	**2.52**	64	2.CFT.30086.0	Δ
.0343	0.87	**1.03**	26.1	9.1	7.0	3	**2.52**	64	2.CFT.30087.0	Δ
.0346	0.88	**1.04**	26.4	9.2	7.0	3	**2.52**	64	2.CFT.30088.0	Δ
.0350	0.89	**1.05**	26.7	9.3	7.1	3	**2.52**	64	2.CFT.30089.0	Δ
.0354	0.90	**1.06**	27.0	9.5	7.2	3	**2.52**	64	2.CFT.30090.0	■
.0358	0.91	**1.07**	27.3	9.6	7.3	3	**2.52**	64	2.CFT.30091.0	Δ
.0362	0.92	**1.09**	27.6	9.7	7.4	3	**2.52**	64	2.CFT.30092.0	Δ
.0366	0.93	**1.10**	27.9	9.8	7.4	3	**2.52**	64	2.CFT.30093.0	Δ
.0370	0.94	**1.11**	28.2	9.9	7.5	3	**2.52**	64	2.CFT.30094.0	Δ
.0374	0.95	**1.12**	28.5	10.0	7.6	3	**2.52**	64	2.CFT.30095.0	■
.0378	0.96	**1.13**	28.8	10.1	7.7	3	**2.52**	64	2.CFT.30096.0	Δ
.0382	0.97	**1.15**	29.1	10.2	7.8	3	**2.52**	64	2.CFT.30097.0	Δ
.0386	0.98	**1.16**	29.4	10.3	7.8	3	**2.52**	64	2.CFT.30098.0	Δ
.0390	0.99	**1.17**	29.7	10.4	7.9	3	**2.52**	64	2.CFT.30099.0	Δ
.0394	1.00	**1.18**	30.0	10.5	8.0	3	**2.76**	70	2.CFT.30100.0	■
.0398	1.01	**1.19**	30.3	10.6	8.1	3	**2.76**	70	2.CFT.30101.0	Δ
.0402	1.02	**1.20**	30.6	10.7	8.2	3	**2.76**	70	2.CFT.30102.0	Δ
.0406	1.03	**1.22**	30.9	10.8	8.2	3	**2.76**	70	2.CFT.30103.0	Δ
.0409	1.04	**1.23**	31.2	10.9	8.3	3	**2.76**	70	2.CFT.30104.0	Δ
.0413	1.05	**1.24**	31.5	11.0	8.4	3	**2.76**	70	2.CFT.30105.0	■
.0417	1.06	**1.25**	31.8	11.1	8.5	3	**2.76**	70	2.CFT.30106.0	Δ
.0421	1.07	**1.26**	32.1	11.2	8.6	3	**2.76**	70	2.CFT.30107.0	Δ
.0425	1.08	**1.28**	32.4	11.3	8.6	3	**2.76**	70	2.CFT.30108.0	Δ
.0429	1.09	**1.29**	32.7	11.4	8.7	3	**2.76**	70	2.CFT.30109.0	Δ
.0433	1.10	**1.30**	33.0	11.6	8.8	3	**2.76**	70	2.CFT.30110.0	■
.0437	1.11	**1.31**	33.3	11.7	8.9	3	**2.76**	70	2.CFT.30111.0	Δ
.0441	1.12	**1.32**	33.6	11.8	9.0	3	**2.76**	70	2.CFT.30112.0	Δ
.0445	1.13	**1.33**	33.9	11.9	9.0	3	**2.76**	70	2.CFT.30113.0	Δ
.0449	1.14	**1.35**	34.2	12.0	9.1	3	**2.76**	70	2.CFT.30114.0	Δ
.0453	1.15	**1.36**	34.5	12.1	9.2	3	**2.76**	70	2.CFT.30115.0	■
.0457	1.16	**1.37**	34.8	12.2	9.3	3	**2.76**	70	2.CFT.30116.0	Δ
.0461	1.17	**1.38**	35.1	12.3	9.4	3	**2.76**	70	2.CFT.30117.0	Δ
.0465	1.18	**1.39**	35.4	12.4	9.4	3	**2.76**	70	2.CFT.30118.0	Δ
.0469	1.19	**1.41**	35.7	12.5	9.5	3	**2.76**	70	2.CFT.30119.0	Δ
.0472	1.20	**1.42**	36.0	12.6	9.6	3	**2.76**	70	2.CFT.30120.0	■

■ Stock item

Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

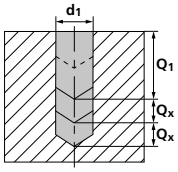
Complementary products

CrazyDrill Flexpilot Titanium	p.135
CrazyDrill Crosspilot	p.175

Titanium - 30 x d

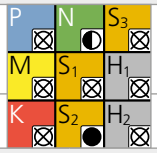
DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010		
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310		
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2		
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30		
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351		
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380		
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	5 – 40 | **16 – 131**	20 – 40 | **66 – 131**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500		
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000		
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	5 – 20 | **16 – 66**	20 – 30 | **66 – 98**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Q_1	Ød1 0.1 mm | .004" f	Q_x	0.2 mm | .008" f	Q_x	0.3 mm | .012" f	Q_x	0.4 mm | .016" f	Q_x	0.6 mm | .024" f	Q_x	0.8 mm | .032" f	Q_x	1.0–1.2 mm | .039"–.047" f	Q_x
	Recommended: CrazyDrill Flex Steel 30 x d1													
	Recommended: CrazyDrill Flex SST-Inox 30 x d1													
	Recommended: CrazyDrill Flex Steel 30 x d1													
	Recommended: CrazyDrill Flex Steel 30 x d1													
7xd1	0.005 **.00020**	0.5xd1	0.020 **.0008**	0.5xd1	0.040 **.0016**	0.5xd1	0.060 **.0024**	0.5xd1	0.120 **.0047**	0.5xd1	0.180 **.0071**	0.5xd1	0.200 **.0079**	0.5xd1
	Recommended: CrazyDrill Flex SST-Inox 30 x d1													
	Recommended: CrazyDrill Flex Steel 30 x d1													
	Recommended: CrazyDrill Flex SST-Inox 30 x d1													
3xd1	0.002 **.00008**	0.2xd1	0.004 **.00016**	0.25xd1	0.006 **.00024**	0.25xd1	0.008 **.00031**	0.25xd1	0.012 **.00047**	0.3xd1	0.016 **.00063**	0.5xd1	0.024 **.00094**	0.5xd1
3xd1	0.003 **.00012**	0.5xd1	0.006 **.00024**	0.25xd1	0.009 **.00035**	0.3xd1	0.016 **.00063**	0.5xd1	0.024 **.00094**	0.5xd1	0.032 **.00126**	0.5xd1	0.040 **.00157**	0.5xd1
	Recommended: CrazyDrill Flex SST-Inox 30 x d1													

CRAZYDRILL by Mikron Tool Flex TITANIUM

Titanium - 50 x d

DRILLING WITH INTEGRATED COOLING



The solid carbide micro-drill CrazyDrill Flex Titanium is mainly designed for long-chip materials as titanium, titanium alloys and copper. It has a high flexibility thanks to a long and "flexible" section between the tip and the shaft. Therefore the tool is adapted for drilling with process reliability also under difficult conditions. It is able to flex effortlessly 40% of its diameter. This drill is also perfect for deep hole drilling from diameter .012" (0.3 mm) with a significantly shorter drilling time compared to the single-lip drill, the electro-erosion or the laser method.

CrazyDrill Flex Titanium 50 x d has through coolant channels integrated in the shank which guarantee a constant, solid cooling on the drill tip. The temperature is constantly under control, chips are flushed away from the helical flute and hole and better tool life is achieved. The drill is uncoated.

We recommend pilot drilling with CrazyDrill Flexpilot Titanium or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.

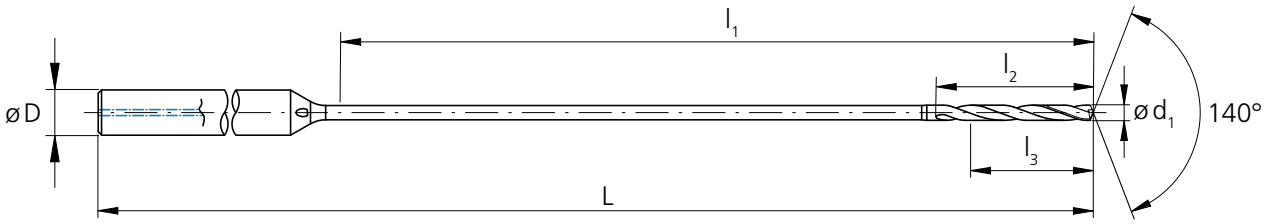
Coolant type, pressure and filtration
Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note
You couldn't find your suitable version of the CrazyDrill Flex Titanium (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide	50xd1	140°	Z2		Uncoated

Ø d_1	**.012" - .047"** (0.3 - 1.2 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm



d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.0118	0.30	**.591**	15.0	3.2	2.4	3	**2.09**	53	2.CFT.50030.IK.0	■
.0122	0.31	**.610**	15.5	3.3	2.5	3	**2.09**	53	2.CFT.50031.IK.0	Δ
.0126	0.32	**.630**	16.0	3.4	2.6	3	**2.09**	53	2.CFT.50032.IK.0	Δ
.0130	0.33	**.650**	16.5	3.5	2.6	3	**2.09**	53	2.CFT.50033.IK.0	Δ
.0134	0.34	**.669**	17.0	3.6	2.7	3	**2.09**	53	2.CFT.50034.IK.0	Δ
.0138	0.35	**.689**	17.5	3.7	2.8	3	**2.36**	60	2.CFT.50035.IK.0	■
.0142	0.36	**.709**	18.0	3.8	2.9	3	**2.36**	60	2.CFT.50036.IK.0	Δ
.0146	0.37	**.728**	18.5	3.9	3.0	3	**2.36**	60	2.CFT.50037.IK.0	Δ
.0150	0.38	**.748**	19.0	4.0	3.0	3	**2.36**	60	2.CFT.50038.IK.0	Δ
.0154	0.39	**.768**	19.5	4.1	3.1	3	**2.36**	60	2.CFT.50039.IK.0	Δ
.0157	0.40	**.787**	20.0	4.2	3.2	3	**2.36**	60	2.CFT.50040.IK.0	■
.0161	0.41	**.807**	20.5	4.3	3.3	3	**2.36**	60	2.CFT.50041.IK.0	Δ
.0165	0.42	**.827**	21.0	4.4	3.4	3	**2.36**	60	2.CFT.50042.IK.0	Δ
.0169	0.43	**.846**	21.5	4.5	3.4	3	**2.36**	60	2.CFT.50043.IK.0	Δ
.0173	0.44	**.866**	22.0	4.6	3.5	3	**2.36**	60	2.CFT.50044.IK.0	Δ
.0177	0.45	**.886**	22.5	4.7	3.6	3	**2.36**	60	2.CFT.50045.IK.0	■
.0181	0.46	**.906**	23.0	4.8	3.7	3	**2.36**	60	2.CFT.50046.IK.0	Δ
.0185	0.47	**.925**	23.5	4.9	3.8	3	**2.36**	60	2.CFT.50047.IK.0	Δ
.0189	0.48	**.945**	24.0	5.0	3.8	3	**2.36**	60	2.CFT.50048.IK.0	Δ
.0193	0.49	**.965**	24.5	5.1	3.9	3	**2.36**	60	2.CFT.50049.IK.0	Δ
.0197	0.50	**.984**	25.0	5.3	4.0	3	**2.52**	64	2.CFT.50050.IK.0	■
.0201	0.51	**1.00**	25.5	5.4	4.1	3	**2.52**	64	2.CFT.50051.IK.0	Δ
.0205	0.52	**1.02**	26.0	5.5	4.2	3	**2.52**	64	2.CFT.50052.IK.0	Δ
.0209	0.53	**1.04**	26.5	5.6	4.2	3	**2.52**	64	2.CFT.50053.IK.0	Δ
.0213	0.54	**1.06**	27.0	5.7	4.3	3	**2.52**	64	2.CFT.50054.IK.0	Δ
.0217	0.55	**1.08**	27.5	5.8	4.4	3	**2.52**	64	2.CFT.50055.IK.0	■
.0220	0.56	**1.10**	28.0	5.9	4.5	3	**2.52**	64	2.CFT.50056.IK.0	Δ
.0224	0.57	**1.12**	28.5	6.0	4.6	3	**2.52**	64	2.CFT.50057.IK.0	Δ
.0228	0.58	**1.14**	29.0	6.1	4.6	3	**2.52**	64	2.CFT.50058.IK.0	Δ
.0232	0.59	**1.16**	29.5	6.2	4.7	3	**2.52**	64	2.CFT.50059.IK.0	Δ
.0236	0.60	**1.18**	30.0	6.3	4.8	3	**2.76**	70	2.CFT.50060.IK.0	■

■ Stock item

Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

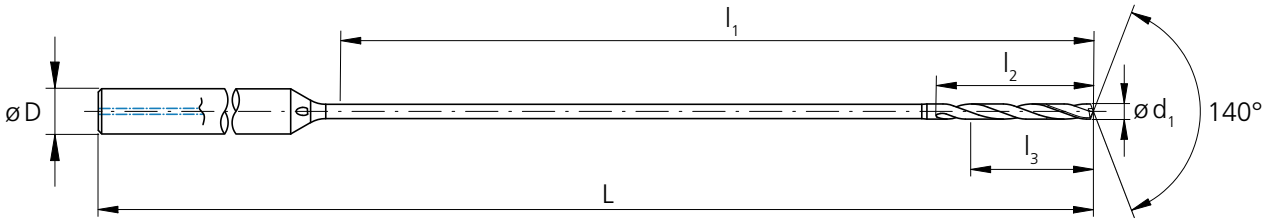
Complementary products

CrazyDrill Flexpilot Titanium	p.135
CrazyDrill Crosspilot	p.175

CRAZYDRILL™ by Mikron Tool Flex TITANIUM

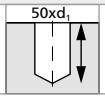
Titanium - 50 x d

DRILLING WITH INTEGRATED COOLING



d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.0240	0.61	**1.20**	30.5	6.4	4.9	3	**2.76**	70	2.CFT.50061.IK.0	Δ
.0244	0.62	**1.22**	31.0	6.5	5.0	3	**2.76**	70	2.CFT.50062.IK.0	Δ
.0248	0.63	**1.24**	31.5	6.6	5.0	3	**2.76**	70	2.CFT.50063.IK.0	Δ
.0252	0.64	**1.26**	32.0	6.7	5.1	3	**2.76**	70	2.CFT.50064.IK.0	Δ
.0256	0.65	**1.28**	32.5	6.8	5.2	3	**2.76**	70	2.CFT.50065.IK.0	■
.0260	0.66	**1.30**	33.0	6.9	5.3	3	**2.76**	70	2.CFT.50066.IK.0	Δ
.0264	0.67	**1.32**	33.5	7.0	5.4	3	**2.76**	70	2.CFT.50067.IK.0	Δ
.0268	0.68	**1.34**	34.0	7.1	5.4	3	**2.76**	70	2.CFT.50068.IK.0	Δ
.0272	0.69	**1.36**	34.5	7.2	5.5	3	**2.76**	70	2.CFT.50069.IK.0	Δ
.0276	0.70	**1.38**	35.0	7.4	5.6	3	**2.95**	75	2.CFT.50070.IK.0	■
.0280	0.71	**1.40**	35.5	7.5	5.7	3	**2.95**	75	2.CFT.50071.IK.0	Δ
.0283	0.72	**1.42**	36.0	7.6	5.8	3	**2.95**	75	2.CFT.50072.IK.0	Δ
.0287	0.73	**1.44**	36.5	7.7	5.8	3	**2.95**	75	2.CFT.50073.IK.0	Δ
.0291	0.74	**1.46**	37.0	7.8	5.9	3	**2.95**	75	2.CFT.50074.IK.0	Δ
.0295	0.75	**1.48**	37.5	7.9	6.0	3	**2.95**	75	2.CFT.50075.IK.0	■
.0299	0.76	**1.50**	38.0	8.0	6.1	3	**2.95**	75	2.CFT.50076.IK.0	Δ
.0303	0.77	**1.52**	38.5	8.1	6.2	3	**2.95**	75	2.CFT.50077.IK.0	Δ
.0307	0.78	**1.54**	39.0	8.2	6.2	3	**2.95**	75	2.CFT.50078.IK.0	Δ
.0311	0.79	**1.56**	39.5	8.3	6.3	3	**2.95**	75	2.CFT.50079.IK.0	Δ
.0315	0.80	**1.57**	40.0	8.4	6.4	3	**3.15**	80	2.CFT.50080.IK.0	■
.0319	0.81	**1.59**	40.5	8.5	6.5	3	**3.15**	80	2.CFT.50081.IK.0	Δ
.0323	0.82	**1.61**	41.0	8.6	6.6	3	**3.15**	80	2.CFT.50082.IK.0	Δ
.0327	0.83	**1.63**	41.5	8.7	6.6	3	**3.15**	80	2.CFT.50083.IK.0	Δ
.0331	0.84	**1.65**	42.0	8.8	6.7	3	**3.15**	80	2.CFT.50084.IK.0	Δ
.0335	0.85	**1.67**	42.5	8.9	6.8	3	**3.15**	80	2.CFT.50085.IK.0	■
.0339	0.86	**1.69**	43.0	9.0	6.9	3	**3.15**	80	2.CFT.50086.IK.0	Δ
.0343	0.87	**1.71**	43.5	9.1	7.0	3	**3.15**	80	2.CFT.50087.IK.0	Δ
.0346	0.88	**1.73**	44.0	9.2	7.0	3	**3.15**	80	2.CFT.50088.IK.0	Δ
.0350	0.89	**1.75**	44.5	9.3	7.1	3	**3.15**	80	2.CFT.50089.IK.0	Δ
.0354	0.90	**1.77**	45.0	9.5	7.2	3	**3.35**	85	2.CFT.50090.IK.0	■

■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Carbide			Z2		Uncoated

Ø d_1	**.012" - .047"** (0.3 - 1.2 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm

d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
.0358	0.91	**1.79**	45.5	9.6	7.3	3	**3.35**	85	2.CFT.50091.IK.0	Δ
.0362	0.92	**1.81**	46.0	9.7	7.4	3	**3.35**	85	2.CFT.50092.IK.0	Δ
.0366	0.93	**1.83**	46.5	9.8	7.4	3	**3.35**	85	2.CFT.50093.IK.0	Δ
.0370	0.94	**1.85**	47.0	9.9	7.5	3	**3.35**	85	2.CFT.50094.IK.0	Δ
.0374	0.95	**1.87**	47.5	10.0	7.6	3	**3.35**	85	2.CFT.50095.IK.0	■
.0378	0.96	**1.89**	48.0	10.1	7.7	3	**3.35**	85	2.CFT.50096.IK.0	Δ
.0382	0.97	**1.91**	48.5	10.2	7.8	3	**3.35**	85	2.CFT.50097.IK.0	Δ
.0386	0.98	**1.93**	49.0	10.3	7.8	3	**3.35**	85	2.CFT.50098.IK.0	Δ
.0390	0.99	**1.95**	49.5	10.4	7.9	3	**3.35**	85	2.CFT.50099.IK.0	Δ
.0394	1.00	**1.97**	50.0	10.5	8.0	3	**3.54**	90	2.CFT.50100.IK.0	■
.0398	1.01	**1.99**	50.5	10.6	8.1	3	**3.54**	90	2.CFT.50101.IK.0	Δ
.0402	1.02	**2.01**	51.0	10.7	8.2	3	**3.54**	90	2.CFT.50102.IK.0	Δ
.0406	1.03	**2.03**	51.5	10.8	8.2	3	**3.54**	90	2.CFT.50103.IK.0	Δ
.0409	1.04	**2.05**	52.0	10.9	8.3	3	**3.54**	90	2.CFT.50104.IK.0	Δ
.0413	1.05	**2.07**	52.5	11.0	8.4	3	**3.54**	90	2.CFT.50105.IK.0	■
.0417	1.06	**2.09**	53.0	11.1	8.5	3	**3.54**	90	2.CFT.50106.IK.0	Δ
.0421	1.07	**2.11**	53.5	11.2	8.6	3	**3.54**	90	2.CFT.50107.IK.0	Δ
.0425	1.08	**2.13**	54.0	11.3	8.6	3	**3.54**	90	2.CFT.50108.IK.0	Δ
.0429	1.09	**2.15**	54.5	11.4	8.7	3	**3.54**	90	2.CFT.50109.IK.0	Δ
.0433	1.10	**2.17**	55.0	11.6	8.8	3	**3.74**	95	2.CFT.50110.IK.0	■
.0437	1.11	**2.19**	55.5	11.7	8.9	3	**3.74**	95	2.CFT.50111.IK.0	Δ
.0441	1.12	**2.20**	56.0	11.8	9.0	3	**3.74**	95	2.CFT.50112.IK.0	Δ
.0445	1.13	**2.22**	56.5	11.9	9.0	3	**3.74**	95	2.CFT.50113.IK.0	Δ
.0449	1.14	**2.24**	57.0	12.0	9.1	3	**3.74**	95	2.CFT.50114.IK.0	Δ
.0453	1.15	**2.26**	57.5	12.1	9.2	3	**3.74**	95	2.CFT.50115.IK.0	■
.0457	1.16	**2.28**	58.0	12.2	9.3	3	**3.74**	95	2.CFT.50116.IK.0	Δ
.0461	1.17	**2.30**	58.5	12.3	9.4	3	**3.74**	95	2.CFT.50117.IK.0	Δ
.0465	1.18	**2.32**	59.0	12.4	9.4	3	**3.74**	95	2.CFT.50118.IK.0	Δ
.0469	1.19	**2.34**	59.5	12.5	9.5	3	**3.74**	95	2.CFT.50119.IK.0	Δ
.0472	1.20	**2.36**	60.0	12.6	9.6	3	**3.74**	95	2.CFT.50120.IK.0	■

■ Stock item

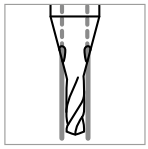
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

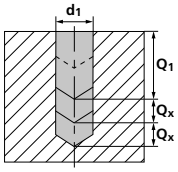
Complementary products

CrazyDrill Flexpilot Titanium p.135
CrazyDrill Crosspilot p.175

Titanium - 50 x d

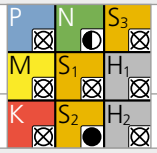
DRILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010		
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310		
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2		
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000		
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C		
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304		
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30		
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351		
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380		
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400		
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500		
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000		
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625		
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	5 – 20 | **16 – 66**	20 – 30 | **66 – 98**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	5 – 20 | **16 – 66**	20 – 40 | **66 – 131**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25		
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Q_1	Ød1 0.3 mm | .012"		0.4 mm | .016"		0.6 mm | .024"		0.8 mm | .032"		1.0–1.2 mm | .039"–.047"	
	f	Q_x	f	Q_x	f	Q_x	f	Q_x	f	Q_x
	Recommended: CrazyDrill Flex Steel 50 x d1									
	Recommended: CrazyDrill Flex SST-Inox 50 x d1									
	Recommended: CrazyDrill Flex Steel 50 x d1									
	Recommended: CrazyDrill Flex Steel 50 x d1									
7xd1	0.040 **.0016**	0.3xd1	0.060 **.0024**	0.375xd1	0.120 **.0047**	0.3xd1	0.180 **.00071**	0.3xd1	0.200 **.0079**	0.4xd1
	Recommended: CrazyDrill Flex SST-Inox 50 x d1									
	Recommended: CrazyDrill Flex Steel 50 x d1									
	Recommended: CrazyDrill Flex SST-Inox 50 x d1									
3xd1	0.006 **.00024**	0.25xd1	0.008 **.00031**	0.25xd1	0.012 **.00047**	0.25xd1	0.016 **.00063**	0.4xd1	0.024 **.00094**	0.3xd1
3xd1	0.009 **.00035**	0.3xd1	0.016 **.00063**	0.375xd1	0.024 **.00094**	0.3xd1	0.032 **.00126**	0.3xd1	0.040 **.00157**	0.4xd1
	Recommended: CrazyDrill Flex SST-Inox 50 x d1									

SST-Inox - 30 x d

DRILLING WITH INTEGRATED COOLING



The solid carbide micro-drill CrazyDrill SST-Inox with its degressive flute geometry is especially designed for deep hole drilling in stainless, acid and heat resistant steels. This drill is perfect for deep hole drilling from diameter .008" (0.2 mm) with a significantly shorter drilling time compared to the single-lip drill, electro-erosion or laser method.

CrazyDrill Flex SST-Inox 30 x d has through coolant channels integrated in the shank which guarantee a constant, solid cooling on the drill tip. The temperature is kept under control, chips are flushed away from the helical flute. Better tool life is achieved. Also the high-performance coating assures a long tool life.

We recommend pilot drilling with CrazyDrill Pilot SST-Inox or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.

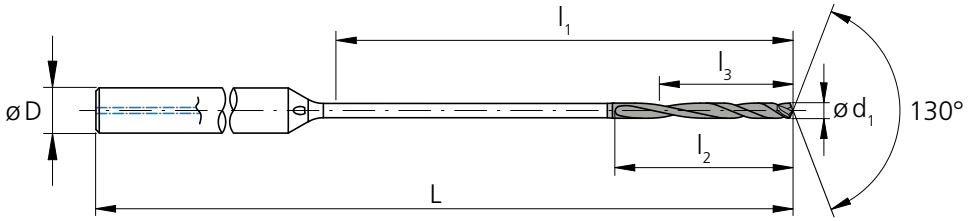
Coolant type, pressure and filtration
Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note
You couldn't find your suitable version of the CrazyDrill Flex SST-Inox (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide	30xd1	130°	Z2		eXedur RIP

Ø d_1	**.008" - .079"** (0.2 - 2.0 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0079	0.20	**.236**	6.0	2.0	1.6	3	**1.97**	50	2.CFI.30020.IK.1	■
	.0083	0.21	**.248**	6.3	2.1	1.7	3	**1.97**	50	2.CFI.30021.IK.1	Δ
	.0087	0.22	**.260**	6.6	2.2	1.8	3	**1.97**	50	2.CFI.30022.IK.1	Δ
	.0091	0.23	**.272**	6.9	2.3	1.8	3	**1.97**	50	2.CFI.30023.IK.1	Δ
	.0094	0.24	**.283**	7.2	2.4	1.9	3	**1.97**	50	2.CFI.30024.IK.1	Δ
	.0098	0.25	**.295**	7.5	2.5	2.0	3	**1.97**	50	2.CFI.30025.IK.1	■
	.0102	0.26	**.307**	7.8	2.5	2.1	3	**1.97**	50	2.CFI.30026.IK.1	Δ
	.0106	0.27	**.319**	8.1	2.6	2.2	3	**1.97**	50	2.CFI.30027.IK.1	Δ
	.0110	0.28	**.331**	8.4	2.7	2.2	3	**1.97**	50	2.CFI.30028.IK.1	Δ
	.0114	0.29	**.343**	8.7	2.8	2.3	3	**1.97**	50	2.CFI.30029.IK.1	Δ
	.0118	0.30	**.354**	9.0	2.9	2.4	3	**1.97**	50	2.CFI.30030.IK.1	■
	.0122	0.31	**.366**	9.3	3.0	2.5	3	**1.97**	50	2.CFI.30031.IK.1	Δ
	.0126	0.32	**.378**	9.6	3.1	2.6	3	**1.97**	50	2.CFI.30032.IK.1	Δ
	.0130	0.33	**.390**	9.9	3.2	2.6	3	**1.97**	50	2.CFI.30033.IK.1	Δ
	.0134	0.34	**.402**	10.2	3.3	2.7	3	**1.97**	50	2.CFI.30034.IK.1	Δ
	.0138	0.35	**.413**	10.5	3.4	2.8	3	**1.97**	50	2.CFI.30035.IK.1	■
	.0142	0.36	**.425**	10.8	3.5	2.9	3	**1.97**	50	2.CFI.30036.IK.1	Δ
	.0146	0.37	**.437**	11.1	3.6	3.0	3	**1.97**	50	2.CFI.30037.IK.1	Δ
	.0150	0.38	**.449**	11.4	3.7	3.0	3	**1.97**	50	2.CFI.30038.IK.1	Δ
	.0154	0.39	**.461**	11.7	3.8	3.1	3	**1.97**	50	2.CFI.30039.IK.1	Δ
1/64	**.0156**	0.396	**.472**	12.0	3.9	3.2	3	**1.97**	50	2.CFI.30F164.IK.1	■
	.0157	0.40	**.472**	12.0	3.9	3.2	3	**1.97**	50	2.CFI.30040.IK.1	■
	.0161	0.41	**.484**	12.3	4.0	3.3	3	**1.97**	50	2.CFI.30041.IK.1	Δ
	.0165	0.42	**.496**	12.6	4.1	3.4	3	**1.97**	50	2.CFI.30042.IK.1	Δ
	.0169	0.43	**.508**	12.9	4.2	3.4	3	**1.97**	50	2.CFI.30043.IK.1	Δ
	.0173	0.44	**.520**	13.2	4.3	3.5	3	**1.97**	50	2.CFI.30044.IK.1	Δ
	.0177	0.45	**.531**	13.5	4.4	3.6	3	**1.97**	50	2.CFI.30045.IK.1	■
	.0181	0.46	**.543**	13.8	4.5	3.7	3	**1.97**	50	2.CFI.30046.IK.1	Δ
	.0185	0.47	**.555**	14.1	4.6	3.8	3	**1.97**	50	2.CFI.30047.IK.1	Δ
	.0189	0.48	**.567**	14.4	4.7	3.8	3	**1.97**	50	2.CFI.30048.IK.1	Δ
	.0193	0.49	**.579**	14.7	4.8	3.9	3	**1.97**	50	2.CFI.30049.IK.1	Δ
	.0197	0.50	**.591**	15.0	4.9	4.0	3	**2.09**	53	2.CFI.30050.IK.1	■
	.0201	0.49	**.602**	15.3	5.0	4.1	3	**2.09**	53	2.CFI.30051.IK.1	Δ
	.0205	0.50	**.614**	15.6	5.1	4.2	3	**2.09**	53	2.CFI.30052.IK.1	Δ
	.0209	0.53	**.626**	15.9	5.2	4.2	3	**2.09**	53	2.CFI.30053.IK.1	Δ
	.0213	0.54	**.638**	16.2	5.3	4.3	3	**2.09**	53	2.CFI.30054.IK.1	Δ
	.0217	0.55	**.650**	16.5	5.4	4.4	3	**2.09**	53	2.CFI.30055.IK.1	■
	.0220	0.56	**.661**	16.8	5.5	4.5	3	**2.09**	53	2.CFI.30056.IK.1	Δ
	.0224	0.57	**.673**	17.1	5.6	4.6	3	**2.09**	53	2.CFI.30057.IK.1	Δ
	.0228	0.58	**.685**	17.4	5.7	4.6	3	**2.09**	53	2.CFI.30058.IK.1	Δ

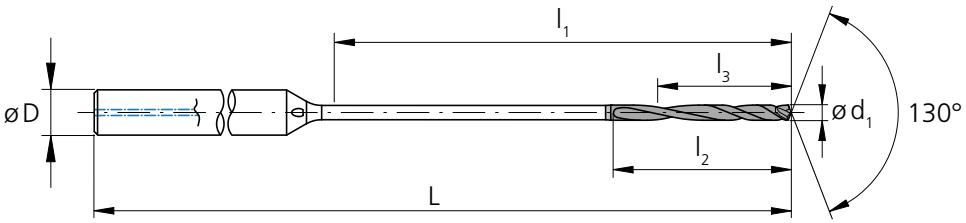
■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products	
CrazyDrill Pilot SST-Inox	p.149
CrazyDrill Crosspilot	p.175

CRAZYDRILL™ by Mikron Tool Flex SST-INOX

SST-Inox - 30 x d

DRILLING WITH INTEGRATED COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0232	0.59	**.697**	17.7	5.8	4.7	3	**2.09**	53	2.CFI.30059.IK.1	Δ
	.0236	0.60	**.709**	18.0	5.9	4.8	3	**2.09**	53	2.CFI.30060.IK.1	■
	.0240	0.61	**.720**	18.3	6.0	4.9	3	**2.09**	53	2.CFI.30061.IK.1	Δ
	.0244	0.62	**.732**	18.6	6.1	5.0	3	**2.09**	53	2.CFI.30062.IK.1	Δ
	.0248	0.63	**.744**	18.9	6.2	5.0	3	**2.09**	53	2.CFI.30063.IK.1	Δ
	.0252	0.64	**.756**	19.2	6.3	5.1	3	**2.09**	53	2.CFI.30064.IK.1	Δ
	.0256	0.65	**.768**	19.5	6.4	5.2	3	**2.09**	53	2.CFI.30065.IK.1	■
	.0260	0.66	**.780**	19.8	6.5	5.3	3	**2.09**	53	2.CFI.30066.IK.1	Δ
	.0264	0.67	**.791**	20.1	6.6	5.4	3	**2.09**	53	2.CFI.30067.IK.1	Δ
	.0268	0.68	**.803**	20.4	6.7	5.4	3	**2.09**	53	2.CFI.30068.IK.1	Δ
	.0272	0.69	**.815**	20.7	6.8	5.5	3	**2.09**	53	2.CFI.30069.IK.1	Δ
	.0276	0.70	**.827**	21.0	6.9	5.6	3	**2.36**	60	2.CFI.30070.IK.1	■
	.0280	0.71	**.839**	21.3	7.0	5.7	3	**2.36**	60	2.CFI.30071.IK.1	Δ
	.0283	0.72	**.850**	21.6	7.1	5.8	3	**2.36**	60	2.CFI.30072.IK.1	Δ
	.0287	0.73	**.862**	21.9	7.2	5.8	3	**2.36**	60	2.CFI.30073.IK.1	Δ
	.0291	0.74	**.874**	22.2	7.3	5.9	3	**2.36**	60	2.CFI.30074.IK.1	Δ
	.0295	0.75	**.886**	22.5	7.4	6.0	3	**2.36**	60	2.CFI.30075.IK.1	■
	.0299	0.76	**.898**	22.8	7.4	6.1	3	**2.36**	60	2.CFI.30076.IK.1	Δ
	.0303	0.77	**.909**	23.1	7.5	6.2	3	**2.36**	60	2.CFI.30077.IK.1	Δ
	.0307	0.78	**.921**	23.4	7.6	6.2	3	**2.36**	60	2.CFI.30078.IK.1	Δ
	.0311	0.79	**.933**	23.7	7.7	6.3	3	**2.36**	60	2.CFI.30079.IK.1	Δ
1/32	**.0312**	0.793	**.945**	24.0	7.8	6.4	3	**2.36**	60	2.CFI.30F132.IK.1	■
	.0315	0.80	**.945**	24.0	7.8	6.4	3	**2.36**	60	2.CFI.30080.IK.1	■
	.0319	0.81	**.957**	24.3	7.9	6.5	3	**2.36**	60	2.CFI.30081.IK.1	Δ
	.0323	0.82	**.969**	24.6	8.0	6.6	3	**2.36**	60	2.CFI.30082.IK.1	Δ
	.0327	0.83	**.980**	24.9	8.1	6.6	3	**2.36**	60	2.CFI.30083.IK.1	Δ
	.0331	0.84	**.992**	25.2	8.2	6.7	3	**2.36**	60	2.CFI.30084.IK.1	Δ
	.0335	0.85	**1.00**	25.5	8.3	6.8	3	**2.52**	64	2.CFI.30085.IK.1	■
	.0339	0.86	**1.02**	25.8	8.4	6.9	3	**2.52**	64	2.CFI.30086.IK.1	Δ
	.0343	0.87	**1.03**	26.1	8.5	7.0	3	**2.52**	64	2.CFI.30087.IK.1	Δ
	.0346	0.88	**1.04**	26.4	8.6	7.0	3	**2.52**	64	2.CFI.30088.IK.1	Δ
	.0350	0.89	**1.05**	26.7	8.7	7.1	3	**2.52**	64	2.CFI.30089.IK.1	Δ
	.0354	0.90	**1.06**	27.0	8.8	7.2	3	**2.52**	64	2.CFI.30090.IK.1	■
	.0358	0.91	**1.07**	27.3	8.9	7.3	3	**2.52**	64	2.CFI.30091.IK.1	Δ
	.0362	0.92	**1.09**	27.6	9.0	7.4	3	**2.52**	64	2.CFI.30092.IK.1	Δ
	.0366	0.93	**1.10**	27.9	9.1	7.4	3	**2.52**	64	2.CFI.30093.IK.1	Δ
	.0370	0.94	**1.11**	28.2	9.2	7.5	3	**2.52**	64	2.CFI.30094.IK.1	Δ
	.0374	0.95	**1.12**	28.5	9.3	7.6	3	**2.52**	64	2.CFI.30095.IK.1	■
	.0378	0.96	**1.13**	28.8	9.4	7.7	3	**2.52**	64	2.CFI.30096.IK.1	Δ
	.0382	0.97	**1.15**	29.1	9.5	7.8	3	**2.52**	64	2.CFI.30097.IK.1	Δ

■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Carbide | 30xd1 | 130° | Z2 | eXedur RIP

Ø d_1	**.008" - .079"** (0.2 - 2.0 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0386	0.98	**1.16**	29.4	9.6	7.8	3	**2.52**	64	2.CFI.30098.IK.1	Δ
	.0390	0.99	**1.17**	29.7	9.7	7.9	3	**2.52**	64	2.CFI.30099.IK.1	Δ
	.0394	1.00	**1.18**	30.0	9.8	8.0	3	**2.76**	70	2.CFI.30100.IK.1	■
	.0398	1.01	**1.19**	30.3	9.9	8.1	3	**2.76**	70	2.CFI.30101.IK.1	Δ
	.0402	1.02	**1.20**	30.6	10.0	8.2	3	**2.76**	70	2.CFI.30102.IK.1	Δ
	.0406	1.03	**1.22**	30.9	10.1	8.2	3	**2.76**	70	2.CFI.30103.IK.1	Δ
	.0409	1.04	**1.23**	31.2	10.2	8.3	3	**2.76**	70	2.CFI.30104.IK.1	Δ
	.0413	1.05	**1.24**	31.5	10.3	8.4	3	**2.76**	70	2.CFI.30105.IK.1	■
	.0417	1.06	**1.25**	31.8	10.4	8.5	3	**2.76**	70	2.CFI.30106.IK.1	Δ
	.0421	1.07	**1.26**	32.1	10.5	8.6	3	**2.76**	70	2.CFI.30107.IK.1	Δ
	.0425	1.08	**1.28**	32.4	10.6	8.6	3	**2.76**	70	2.CFI.30108.IK.1	Δ
	.0429	1.09	**1.29**	32.7	10.7	8.7	3	**2.76**	70	2.CFI.30109.IK.1	Δ
	.0433	1.10	**1.30**	33.0	10.8	8.8	3	**2.76**	70	2.CFI.30110.IK.1	■
	.0437	1.11	**1.31**	33.3	10.9	8.9	3	**2.76**	70	2.CFI.30111.IK.1	Δ
	.0441	1.12	**1.32**	33.6	11.0	9.0	3	**2.76**	70	2.CFI.30112.IK.1	Δ
	.0445	1.13	**1.33**	33.9	11.1	9.0	3	**2.76**	70	2.CFI.30113.IK.1	Δ
	.0449	1.14	**1.35**	34.2	11.2	9.1	3	**2.76**	70	2.CFI.30114.IK.1	Δ
	.0453	1.15	**1.36**	34.5	11.3	9.2	3	**2.76**	70	2.CFI.30115.IK.1	■
	.0457	1.16	**1.37**	34.8	11.4	9.3	3	**2.76**	70	2.CFI.30116.IK.1	Δ
	.0461	1.17	**1.38**	35.1	11.5	9.4	3	**2.76**	70	2.CFI.30117.IK.1	Δ
	.0465	1.18	**1.39**	35.4	11.6	9.4	3	**2.76**	70	2.CFI.30118.IK.1	Δ
	.0469	1.19	**1.41**	35.7	11.7	9.5	3	**2.76**	70	2.CFI.30119.IK.1	Δ
	.0472	1.20	**1.42**	36.0	11.8	9.6	3	**2.76**	70	2.CFI.30120.IK.1	■
	.0492	1.25	**1.48**	37.5	12.3	10.0	4	**2.95**	75	2.CFI.30125.IK.1	■
	.0512	1.30	**1.54**	39.0	12.7	10.4	4	**2.95**	75	2.CFI.30130.IK.1	■
	.0531	1.35	**1.59**	40.5	13.2	10.8	4	**2.95**	75	2.CFI.30135.IK.1	■
	.0551	1.40	**1.65**	42.0	13.7	11.2	4	**3.15**	80	2.CFI.30140.IK.1	■
	.0571	1.45	**1.71**	43.5	14.2	11.6	4	**3.35**	85	2.CFI.30145.IK.1	■
	.0591	1.50	**1.77**	45.0	14.7	12.0	4	**3.35**	85	2.CFI.30150.IK.1	■
	.0610	1.55	**1.83**	46.5	15.2	12.4	4	**3.35**	85	2.CFI.30155.IK.1	■
1/16	**.0625**	1.587	**1.89**	48.0	15.7	12.8	4	**3.35**	85	2.CFI.30F116.IK.1	■
	.0630	1.60	**1.89**	48.0	15.7	12.8	4	**3.35**	85	2.CFI.30160.IK.1	■
	.0650	1.65	**1.95**	49.5	16.2	13.2	4	**3.35**	85	2.CFI.30165.IK.1	■
	.0669	1.70	**2.01**	51.0	16.7	13.6	4	**3.54**	90	2.CFI.30170.IK.1	■
	.0689	1.75	**2.07**	52.5	17.2	14.0	4	**3.54**	90	2.CFI.30175.IK.1	■
	.0709	1.80	**2.13**	54.0	17.6	14.4	4	**3.54**	90	2.CFI.30180.IK.1	■
	.0728	1.85	**2.19**	55.5	18.1	14.8	4	**3.74**	95	2.CFI.30185.IK.1	■
	.0748	1.90	**2.24**	57.0	18.6	15.2	4	**3.74**	95	2.CFI.30190.IK.1	■
	.0768	1.95	**2.30**	58.5	19.1	15.6	4	**3.94**	100	2.CFI.30195.IK.1	■
	.0787	2.00	**2.36**	60.0	19.6	16.0	4	**3.94**	100	2.CFI.30200.IK.1	■

■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

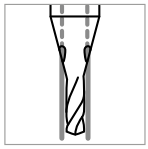
Complementary products

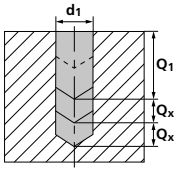
CrazyDrill Pilot SST-Inox	p.149
CrazyDrill Crosspilot	p.175

CRAZYDRILL™ by Mikron Tool Flex SST-INOX

SST-Inox - 30 x d

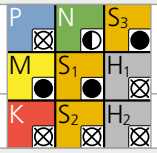
DRILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010		
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310		
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2		
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	30 – 40 | **98 – 131**	40 – 50 | **131 – 164**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	20 – 30 | **66 – 98**	30 – 40 | **98 – 131**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	20 – 30 | **66 – 98**	30 – 40 | **98 – 131**
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	20 – 30 | **66 – 98**	30 – 40 | **98 – 131**
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30		
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351		
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380		
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	20 – 30 | **66 – 98**	35 – 60 | **115 – 197**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	20 – 30 | **66 – 98**	35 – 60 | **115 – 197**
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500		
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000		
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	10 – 20 | **33 – 66**	20 – 30 | **66 – 98**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	20 – 30 | **66 – 98**	30 – 40 | **98 – 131**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] **| [IPR]**

Q_1	Q_x	0.2 mm **| .008"** **f**	1/64" 0.4 mm **| .016"** **f**	0.6 mm **| .024"** **f**	Ød1 1/32" 0.8 mm **| .032"** **f**	1.0 mm **| .039"** **f**	1/16" 1.5 mm **| .047"** **f**	2.0 mm **| .079"** **f**
		Recommended: CrazyDrill Flex Steel 30 x d1						
2xd1 – 3xd1	0.5xd1	0.015–0.020 **.0006–.0008**	0.015–0.020 **.0006–.0008**	0.020–0.030 **.0008–.0012**	0.020–0.030 **.0008–.0012**	0.030–0.040 **.0012–.0016**	0.040–0.050 **.0016–.0020**	0.050–0.060 **.0020–.0024**
2xd1 – 3xd1	0.5xd1	0.015–0.020 **.0006–.0008**	0.015–0.020 **.0006–.0008**	0.020–0.025 **.0008–.0010**	0.020–0.025 **.0008–.0010**	0.025–0.035 **.0010–.0014**	0.040–0.050 **.0016–.0020**	0.050–0.060 **.0020–.0024**
2xd1 – 3xd1	0.5xd1	0.015–0.020 **.0006–.0008**	0.015–0.020 **.0006–.0008**	0.020–0.025 **.0008–.0010**	0.020–0.025 **.0008–.0010**	0.025–0.035 **.0010–.0014**	0.040–0.050 **.0016–.0020**	0.050–0.060 **.0020–.0024**
2xd1 – 3xd1	0.5xd1	0.010–0.020 **.0004–.0008**	0.010–0.020 **.0004–.0008**	0.015–0.025 **.0006–.0010**	0.020–0.030 **.0008–.0012**	0.025–0.035 **.0010–.0014**	0.035–0.045 **.0014–.0018**	0.045–0.055 **.0018–.0022**
		Recommended: CrazyDrill Flex Steel 30 x d1						
		Recommended: CrazyDrill Flex Steel 30 x d1						
2xd1 – 3xd1	0.5xd1	0.040 **.0016**	0.045 **.0018**	0.050 **.0020**	0.060 **.0024**	0.070 **.0028**	0.080 **.0031**	0.100 **.0039**
2xd1 – 3xd1	0.5xd1	0.040 **.0016**	0.045 **.0018**	0.050 **.0020**	0.060 **.0024**	0.070 **.0028**	0.080 **.0031**	0.100 **.0039**
		Recommended: CrazyDrill Flex Steel 30 x d1						
2xd1 – 3xd1	0.2xd1	0.010–0.020 **.0004–.0008**	0.010–0.020 **.0004–.0008**	0.015–0.025 **.0006–.0010**	0.020–0.030 **.0008–.0012**	0.025–0.035 **.0010–.0014**	0.035–0.045 **.0014–.0018**	0.045–0.055 **.0018–.0022**
		Recommended: CrazyDrill Flex Titanium 30 x d1						
2xd1 – 3xd1	0.5xd1	0.010–0.020 **.0004–.0008**	0.010–0.020 **.0004–.0008**	0.015–0.025 **.0006–.0010**	0.020–0.030 **.0008–.0012**	0.025–0.035 **.0010–.0014**	0.035–0.045 **.0014–.0018**	0.045–0.055 **.0018–.0022**

CRAZYDRILL by Mikron Tool Flex SST-INOX

SST-Inox - 50 x d

DRILLING WITH INTEGRATED COOLING



The solid carbide micro-drill CrazyDrill SST-Inox with its degressive flute geometry is especially designed for deep hole drilling in stainless, acid and heat resistant steels. This drill is perfect for deep hole drilling from diameter .012" (0.3 mm) with a significantly shorter drilling time compared to the single-lip drill, electro-erosion or laser method.

CrazyDrill Flex SST-Inox 50 x d has through coolant channels integrated in the shank which guarantee a constant, solid cooling on the drill tip. The temperature is kept constantly under control, chips are flushed away from the helical flute. Better tool life is achieved. Also the high-performance coating assures a long tool life.

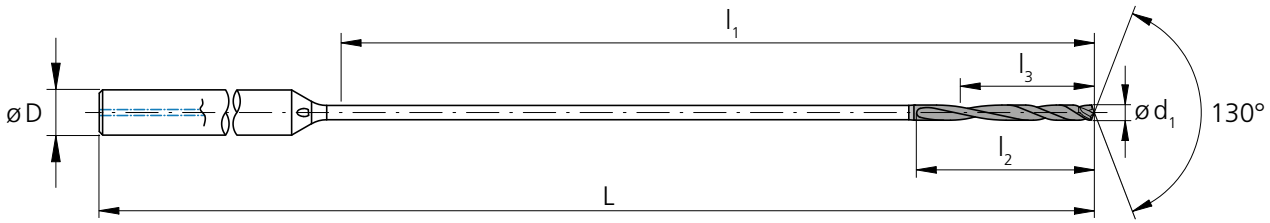
We recommend pilot drilling with CrazyDrill Pilot SST-Inox or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.

Coolant type, pressure and filtration
Recommendations for coolant type, pressure and filtration are on page "drilling process".

Please note
You couldn't find your suitable version of the CrazyDrill Flex SST-Inox (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide	50xd1	130°	Z2		eXedur RIP
Ø d1		.012" - .079" (0.3 - 2.0 mm)			
Tolerance		- .00012" - .00024"		- 0.003 mm - 0.006 mm	



d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	l3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0118	0.30	.591	15.0	2.9	2.4	3	2.09	53	2.CFI.50030.IK.1	■
	.0122	0.31	.610	15.5	3.0	2.5	3	2.09	53	2.CFI.50031.IK.1	Δ
	.0126	0.32	.630	16.0	3.1	2.6	3	2.09	53	2.CFI.50032.IK.1	Δ
	.0130	0.33	.650	16.5	3.2	2.6	3	2.09	53	2.CFI.50033.IK.1	Δ
	.0134	0.34	.669	17.0	3.3	2.7	3	2.09	53	2.CFI.50034.IK.1	Δ
	.0138	0.35	.689	17.5	3.4	2.8	3	2.09	53	2.CFI.50035.IK.1	■
	.0142	0.36	.709	18.0	3.5	2.9	3	2.09	53	2.CFI.50036.IK.1	Δ
	.0146	0.37	.728	18.5	3.6	3.0	3	2.09	53	2.CFI.50037.IK.1	Δ
	.0150	0.38	.748	19.0	3.7	3.0	3	2.09	53	2.CFI.50038.IK.1	Δ
	.0154	0.39	.768	19.5	3.8	3.1	3	2.09	53	2.CFI.50039.IK.1	Δ
1/64	.0156	0.396	.787	20.0	3.9	3.2	3	2.09	53	2.CFI.50F164.IK.1	■
	.0157	0.40	.787	20.0	3.9	3.2	3	2.09	53	2.CFI.50040.IK.1	■
	.0161	0.41	.807	20.5	4.0	3.3	3	2.36	60	2.CFI.50041.IK.1	Δ
	.0165	0.42	.827	21.0	4.1	3.4	3	2.36	60	2.CFI.50042.IK.1	Δ
	.0169	0.43	.846	21.5	4.2	3.4	3	2.36	60	2.CFI.50043.IK.1	Δ
	.0173	0.44	.866	22.0	4.3	3.5	3	2.36	60	2.CFI.50044.IK.1	Δ
	.0177	0.45	.886	22.5	4.4	3.6	3	2.36	60	2.CFI.50045.IK.1	■
	.0181	0.46	.906	23.0	4.5	3.7	3	2.36	60	2.CFI.50046.IK.1	Δ
	.0185	0.47	.925	23.5	4.6	3.8	3	2.36	60	2.CFI.50047.IK.1	Δ
	.0189	0.48	.945	24.0	4.7	3.8	3	2.36	60	2.CFI.50048.IK.1	Δ
	.0193	0.49	.965	24.5	4.8	3.9	3	2.36	60	2.CFI.50049.IK.1	Δ
	.0197	0.50	.984	25.0	4.9	4.0	3	2.36	60	2.CFI.50050.IK.1	■
	.0201	0.51	1.00	25.5	5.0	4.1	3	2.52	64	2.CFI.50051.IK.1	Δ
	.0205	0.52	1.02	26.0	5.1	4.2	3	2.52	64	2.CFI.50052.IK.1	Δ
	.0209	0.53	1.04	26.5	5.2	4.2	3	2.52	64	2.CFI.50053.IK.1	Δ
	.0213	0.54	1.06	27.0	5.3	4.3	3	2.52	64	2.CFI.50054.IK.1	Δ
	.0217	0.55	1.08	27.5	5.4	4.4	3	2.52	64	2.CFI.50055.IK.1	■
	.0220	0.56	1.10	28.0	5.5	4.5	3	2.52	64	2.CFI.50056.IK.1	Δ
	.0224	0.57	1.12	28.5	5.6	4.6	3	2.52	64	2.CFI.50057.IK.1	Δ
	.0228	0.58	1.14	29.0	5.7	4.6	3	2.52	64	2.CFI.50058.IK.1	Δ
	.0232	0.59	1.16	29.5	5.8	4.7	3	2.52	64	2.CFI.50059.IK.1	Δ
	.0236	0.60	1.18	30.0	5.9	4.8	3	2.52	64	2.CFI.50060.IK.1	■
	.0240	0.61	1.20	30.5	6.0	4.9	3	2.76	70	2.CFI.50061.IK.1	Δ
	.0244	0.62	1.22	31.0	6.1	5.0	3	2.76	70	2.CFI.50062.IK.1	Δ
	.0248	0.63	1.24	31.5	6.2	5.0	3	2.76	70	2.CFI.50063.IK.1	Δ
	.0252	0.64	1.26	32.0	6.3	5.1	3	2.76	70	2.CFI.50064.IK.1	Δ

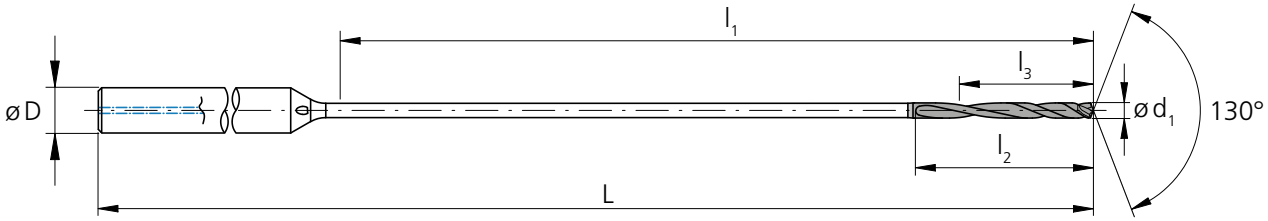
■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products	
CrazyDrill Pilot SST-Inox	p.149
CrazyDrill Crosspilot	p.175

CRAZYDRILL™ by Mikron Tool Flex SST-INOX

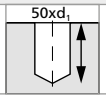
SST-Inox - 50 x d

DRILLING WITH INTEGRATED COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0256	0.65	**1.28**	32.5	6.4	5.2	3	**2.76**	70	2.CFI.50065.IK.1	■
	.0260	0.66	**1.30**	33.0	6.5	5.3	3	**2.76**	70	2.CFI.50066.IK.1	Δ
	.0264	0.67	**1.32**	33.5	6.6	5.4	3	**2.76**	70	2.CFI.50067.IK.1	Δ
	.0268	0.68	**1.34**	34.0	6.7	5.4	3	**2.76**	70	2.CFI.50068.IK.1	Δ
	.0272	0.69	**1.36**	34.5	6.8	5.5	3	**2.76**	70	2.CFI.50069.IK.1	Δ
	.0276	0.70	**1.38**	35.0	6.9	5.6	3	**2.76**	70	2.CFI.50070.IK.1	■
	.0280	0.71	**1.40**	35.5	7.0	5.7	3	**2.95**	75	2.CFI.50071.IK.1	Δ
	.0283	0.72	**1.42**	36.0	7.1	5.8	3	**2.95**	75	2.CFI.50072.IK.1	Δ
	.0287	0.73	**1.44**	36.5	7.2	5.8	3	**2.95**	75	2.CFI.50073.IK.1	Δ
	.0291	0.74	**1.46**	37.0	7.3	5.9	3	**2.95**	75	2.CFI.50074.IK.1	Δ
	.0295	0.75	**1.48**	37.5	7.4	6.0	3	**2.95**	75	2.CFI.50075.IK.1	■
	.0299	0.76	**1.50**	38.0	7.4	6.1	3	**2.95**	75	2.CFI.50076.IK.1	Δ
	.0303	0.77	**1.52**	38.5	7.5	6.2	3	**2.95**	75	2.CFI.50077.IK.1	Δ
	.0307	0.78	**1.54**	39.0	7.6	6.2	3	**2.95**	75	2.CFI.50078.IK.1	Δ
	.0311	0.79	**1.56**	39.5	7.7	6.3	3	**2.95**	75	2.CFI.50079.IK.1	Δ
1/32	**.0312**	0.793	**1.57**	40.0	7.8	6.4	3	**2.95**	75	2.CFI.50F132.IK.1	■
	.0315	0.80	**1.57**	40.0	7.8	6.4	3	**2.95**	75	2.CFI.50080.IK.1	■
	.0319	0.81	**1.59**	40.5	7.9	6.5	3	**3.15**	80	2.CFI.50081.IK.1	Δ
	.0323	0.82	**1.61**	41.0	8.0	6.6	3	**3.15**	80	2.CFI.50082.IK.1	Δ
	.0327	0.83	**1.63**	41.5	8.1	6.6	3	**3.15**	80	2.CFI.50083.IK.1	Δ
	.0331	0.84	**1.65**	42.0	8.2	6.7	3	**3.15**	80	2.CFI.50084.IK.1	Δ
	.0335	0.85	**1.67**	42.5	8.3	6.8	3	**3.15**	80	2.CFI.50085.IK.1	■
	.0339	0.86	**1.69**	43.0	8.4	6.9	3	**3.15**	80	2.CFI.50086.IK.1	Δ
	.0343	0.87	**1.71**	43.5	8.5	7.0	3	**3.15**	80	2.CFI.50087.IK.1	Δ
	.0346	0.88	**1.73**	44.0	8.6	7.0	3	**3.15**	80	2.CFI.50088.IK.1	Δ
	.0350	0.89	**1.75**	44.5	8.7	7.1	3	**3.15**	80	2.CFI.50089.IK.1	Δ
	.0354	0.90	**1.77**	45.0	8.8	7.2	3	**3.15**	80	2.CFI.50090.IK.1	■
	.0358	0.91	**1.79**	45.5	8.9	7.3	3	**3.35**	85	2.CFI.50091.IK.1	Δ
	.0362	0.92	**1.81**	46.0	9.0	7.4	3	**3.35**	85	2.CFI.50092.IK.1	Δ
	.0366	0.93	**1.83**	46.5	9.1	7.4	3	**3.35**	85	2.CFI.50093.IK.1	Δ
	.0370	0.94	**1.85**	47.0	9.2	7.5	3	**3.35**	85	2.CFI.50094.IK.1	Δ
	.0374	0.95	**1.87**	47.5	9.3	7.6	3	**3.35**	85	2.CFI.50095.IK.1	■
	.0378	0.96	**1.89**	48.0	9.4	7.7	3	**3.35**	85	2.CFI.50096.IK.1	Δ
	.0382	0.97	**1.91**	48.5	9.5	7.8	3	**3.35**	85	2.CFI.50097.IK.1	Δ
	.0386	0.98	**1.93**	49.0	9.6	7.8	3	**3.35**	85	2.CFI.50098.IK.1	Δ
	.0390	0.99	**1.95**	49.5	9.7	7.9	3	**3.35**	85	2.CFI.50099.IK.1	Δ
	.0394	1.00	**1.97**	50.0	9.8	8.0	3	**3.35**	85	2.CFI.50100.IK.1	■

■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Carbide			Z2		

Ø d_1	**.012" - .079"** (0.3 - 2.0 mm)	
Tolerance	**- .00012"** **- .00024"**	- 0.003 mm - 0.006 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	l_3 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.0398	1.01	**1.99**	50.5	9.9	8.1	3	**3.54**	90	2.CFI.50101.IK.1	Δ
	.0402	1.02	**2.01**	51.0	10.0	8.2	3	**3.54**	90	2.CFI.50102.IK.1	Δ
	.0406	1.03	**2.03**	51.5	10.1	8.2	3	**3.54**	90	2.CFI.50103.IK.1	Δ
	.0409	1.04	**2.05**	52.0	10.2	8.3	3	**3.54**	90	2.CFI.50104.IK.1	Δ
	.0413	1.05	**2.07**	52.5	10.3	8.4	3	**3.54**	90	2.CFI.50105.IK.1	■
	.0417	1.06	**2.09**	53.0	10.4	8.5	3	**3.54**	90	2.CFI.50106.IK.1	Δ
	.0421	1.07	**2.11**	53.5	10.5	8.6	3	**3.54**	90	2.CFI.50107.IK.1	Δ
	.0425	1.08	**2.13**	54.0	10.6	8.6	3	**3.54**	90	2.CFI.50108.IK.1	Δ
	.0429	1.09	**2.15**	54.5	10.7	8.7	3	**3.54**	90	2.CFI.50109.IK.1	Δ
	.0433	1.10	**2.17**	55.0	10.8	8.8	3	**3.54**	90	2.CFI.50110.IK.1	■
	.0437	1.11	**2.19**	55.5	10.9	8.9	3	**3.74**	95	2.CFI.50111.IK.1	Δ
	.0441	1.12	**2.20**	56.0	11.0	9.0	3	**3.74**	95	2.CFI.50112.IK.1	Δ
	.0445	1.13	**2.22**	56.5	11.1	9.0	3	**3.74**	95	2.CFI.50113.IK.1	Δ
	.0449	1.14	**2.24**	57.0	11.2	9.1	3	**3.74**	95	2.CFI.50114.IK.1	Δ
	.0453	1.15	**2.26**	57.5	11.3	9.2	3	**3.74**	95	2.CFI.50115.IK.1	■
	.0457	1.16	**2.28**	58.0	11.4	9.3	3	**3.74**	95	2.CFI.50116.IK.1	Δ
	.0461	1.17	**2.30**	58.5	11.5	9.4	3	**3.74**	95	2.CFI.50117.IK.1	Δ
	.0465	1.18	**2.32**	59.0	11.6	9.4	3	**3.74**	95	2.CFI.50118.IK.1	Δ
	.0469	1.19	**2.34**	59.5	11.7	9.5	3	**3.74**	95	2.CFI.50119.IK.1	Δ
	.0472	1.20	**2.36**	60.0	11.8	9.6	3	**3.74**	95	2.CFI.50120.IK.1	■
	.0492	1.25	**2.46**	62.5	12.3	10.0	4	**4.13**	105	2.CFI.50125.IK.1	■
	.0512	1.30	**2.56**	65.0	12.7	10.4	4	**4.13**	105	2.CFI.50130.IK.1	■
	.0531	1.35	**2.66**	67.5	13.2	10.8	4	**4.13**	105	2.CFI.50135.IK.1	■
	.0551	1.40	**2.76**	70.0	13.7	11.2	4	**4.33**	110	2.CFI.50140.IK.1	■
	.0571	1.45	**2.85**	72.5	14.2	11.6	4	**4.53**	115	2.CFI.50145.IK.1	■
	.0591	1.50	**2.95**	75.0	14.7	12.0	4	**4.53**	115	2.CFI.50150.IK.1	■
	.0610	1.55	**3.05**	77.5	15.2	12.4	4	**4.53**	115	2.CFI.50155.IK.1	■
1/16	**.0625**	1.587	**3.15**	80.0	15.7	12.8	4	**4.53**	115	2.CFI.50F116.IK.1	■
	.0630	1.60	**3.15**	80.0	15.7	12.8	4	**4.72**	120	2.CFI.50160.IK.1	■
	.0650	1.65	**3.25**	82.5	16.2	13.2	4	**4.72**	120	2.CFI.50165.IK.1	■
	.0669	1.70	**3.35**	85.0	16.7	13.6	4	**4.92**	125	2.CFI.50170.IK.1	■
	.0689	1.75	**3.44**	87.5	17.2	14.0	4	**5.12**	130	2.CFI.50175.IK.1	■
	.0709	1.80	**3.54**	90.0	17.6	14.4	4	**5.12**	130	2.CFI.50180.IK.1	■
	.0728	1.85	**3.64**	92.5	18.1	14.8	4	**5.31**	135	2.CFI.50185.IK.1	■
	.0748	1.90	**3.74**	95.0	18.6	15.2	4	**5.31**	135	2.CFI.50190.IK.1	■
	.0768	1.95	**3.84**	97.5	19.1	15.6	4	**5.51**	140	2.CFI.50195.IK.1	■
	.0787	2.00	**3.94**	100.0	19.6	16.0	4	**5.51**	140	2.CFI.50200.IK.1	■

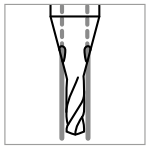
■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

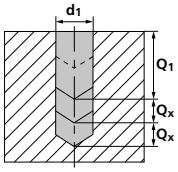
Complementary products

CrazyDrill Pilot SST-Inox	p.149
CrazyDrill Crosspilot	p.175

SST-Inox - 50 x d

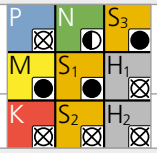
DRILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Ød1 ≤ 0.4 | .016"	v_c [m/min] | [SFM] Ød1 > 0.4 | .016"
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010		
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310		
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2		
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	25–35 | **82–115**	35–40 | **115–131**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	25–35 | **82–115**	35–40 | **115–131**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	25–35 | **82–115**	35–40 | **115–131**
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	25–35 | **82–115**	35–40 | **115–131**
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30		
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351		
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380		
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	20–30 | **66–98**	35–60 | **115–197**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	20–30 | **66–98**	35–60 | **115–197**
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500		
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000		
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	10–20 | **33–66**	20–30 | **66–98**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67		
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136		
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	20–30 | **66–98**	30–40 | **98–131**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f [mm/rev] | **[IPR]**

Q_1	Q_x	0.3 mm | **.012"** **f**	1/64" 0.4 mm | **.016"** **f**	0.6 mm | **.024"** **f**	Ød1 1/32" 0.8 mm | **.032"** **f**	1.0 mm | **.039"** **f**	1/16" 1.5 mm | **.059"** **f**	2.0 mm | **.079"** **f**
		Recommended: CrazyDrill Flex Steel 50 x d1						
2xd1 – 3xd1	0.2xd1 – 0.5xd1	0.010 – 0.015 **.0004 – .0006**	0.010 – 0.015 **.0004 – .0006**	0.015 – 0.020 **.0006 – .0008**	0.015 – 0.020 **.0006 – .0008**	0.030 – 0.040 **.0012 – .0016**	0.040 – 0.050 **.0016 – .0020**	0.050 – 0.060 **.0020 – .0024**
2xd1 – 3xd1	0.2xd1 – 0.5xd1	0.010 – 0.015 **.0004 – .0006**	0.010 – 0.015 **.0004 – .0006**	0.015 – 0.020 **.0006 – .0008**	0.015 – 0.020 **.0006 – .0008**	0.030 – 0.040 **.0012 – .0016**	0.040 – 0.050 **.0016 – .0020**	0.050 – 0.060 **.0020 – .0024**
2xd1 – 3xd1	0.2xd1 – 0.5xd1	0.010 – 0.015 **.0004 – .0006**	0.010 – 0.015 **.0004 – .0006**	0.015 – 0.020 **.0006 – .0008**	0.015 – 0.020 **.0006 – .0008**	0.030 – 0.040 **.0012 – .0016**	0.040 – 0.050 **.0016 – .0020**	0.050 – 0.060 **.0020 – .0024**
2xd1 – 3xd1	0.2xd1 – 0.5xd1	0.005 – 0.010 **.0002 – .0004**	0.005 – 0.010 **.0002 – .0004**	0.010 – 0.015 **.0004 – .0006**	0.010 – 0.015 **.0004 – .0006**	0.020 – 0.030 **.0008 – .0012**	0.030 – 0.040 **.0012 – .0016**	0.045 – 0.055 **.0018 – .0022**
		Recommended: CrazyDrill Flex Steel 50 x d1						
		Recommended: CrazyDrill Flex Steel 50 x d1						
2xd1 – 3xd1	0.5xd1	0.040 **.0016**	0.045 **.0018**	0.050 **.0020**	0.060 **.0024**	0.070 **.0028**	0.080 **.0031**	0.100 **.0039**
2xd1 – 3xd1	0.5xd1	0.040 **.0016**	0.045 **.0018**	0.050 **.0020**	0.060 **.0024**	0.070 **.0028**	0.080 **.0031**	0.100 **.0039**
		Recommended: CrazyDrill Flex Steel 50 x d1						
2xd1 – 3xd1	0.2xd1	0.010 – 0.020 **.0004 – .0008**	0.010 – 0.020 **.0004 – .0008**	0.015 – 0.025 **.0006 – .0010**	0.020 – 0.030 **.0008 – .0012**	0.025 – 0.035 **.0010 – .0014**	0.035 – 0.045 **.0014 – .0018**	0.045 – 0.055 **.0018 – .0022**
		Recommended: CrazyDrill Flex Titanium 50 x d1						
2xd1 – 3xd1	0.5xd1	0.010 – 0.020 **.0004 – .0008**	0.010 – 0.020 **.0004 – .0008**	0.015 – 0.025 **.0006 – .0010**	0.020 – 0.030 **.0008 – .0012**	0.025 – 0.035 **.0010 – .0014**	0.035 – 0.045 **.0014 – .0018**	0.045 – 0.055 **.0018 – .0022**



Drilling process CrazyDrill Flex

PRECISE AND EFFICIENT DRILLING FROM Ø .004" (0.1 MM)

Coolant type, pressure and filtration

Coolant type: For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

Filter: The large cooling channels allow a standard filter. Filter quality ≤ .002" (0.050 mm).

For tools with external cooling no specific parameters have to be considered concerning filter.



Coolant pressure: To ensure a reliable drilling process, the following minimal pressures are needed (see chart). Higher pressure is generally better for the cooling and flushing effect.

Revolution	[rpm]	≤ 10'000	> 10'000
Minimal pressure	[bar]	15	30
	[psi]	**218**	**435**

For tools with external cooling no specific parameters have to be considered concerning coolant pressure. But it must be ensured that the coolant is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical information".



Drilling process CrazyDrill Flex

PRECISE AND EFFICIENT DRILLING FROM Ø .004" (0.1 MM)

CrazyDrill Flex 20 x d, 30 x d, 50 x d

Mikron Tool recommends pilot drilling for all types of CrazyDrill Flex:

CrazyDrill Flex SST-Inox

- **CrazyDrill Pilot SST-Inox** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill on inclined surfaces

CrazyDrill Flex Steel

- **CrazyDrill Flexpilot Steel** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill on inclined surfaces

CrazyDrill Flex Titanium

- **CrazyDrill Flexpilot Titanium** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill on inclined surfaces

Pilot drilling and drilling

Pilot drilling with CrazyDrill Flexpilot / CrazyDrill Pilot SST-Inox is the perfect starting point for accurate drilling (position and alignment accuracy) and a stable machining process. This is also valid for the pilot drill CrazyDrill Crosspilot on inclined surfaces.

The quality of drilling (position and alignment accuracy, no measurable transition from pilot hole to follow-up hole) and a stable machining process are guaranteed by means of a predetermined tool.

DRILLING PROCESS

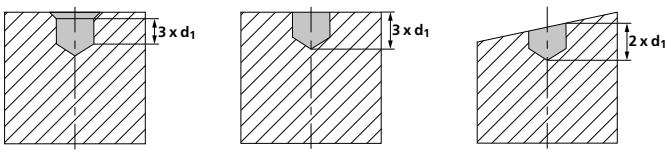
Drilling as per DIN 66025 / PAL

G83 deep-drilling cycle with chip break and chip removal (pecks)

Q = depth of the respective peck

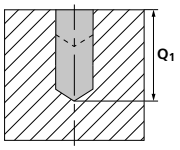
1 | PILOT DRILLING

- With CrazyDrill Pilot SST-Inox (straight surfaces) or CrazyDrill Crosspilot (inclined surfaces) for the version CrazyDrill Flex SST-Inox.
- With CrazyDrill Flexpilot Steel resp. Titanium (straight surfaces) or CrazyDrill Crosspilot (inclined surfaces) for the version CrazyDrill Flex Steel resp. Titanium.

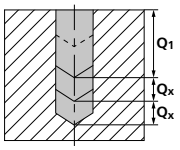


2 | DRILLING

- Drilling with CrazyDrill Flex SST-Inox / CrazyDrill Flex Steel / Titanium up to maximum drilling depth Q_1 in one step (see cutting data table),with subsequent chip removal.



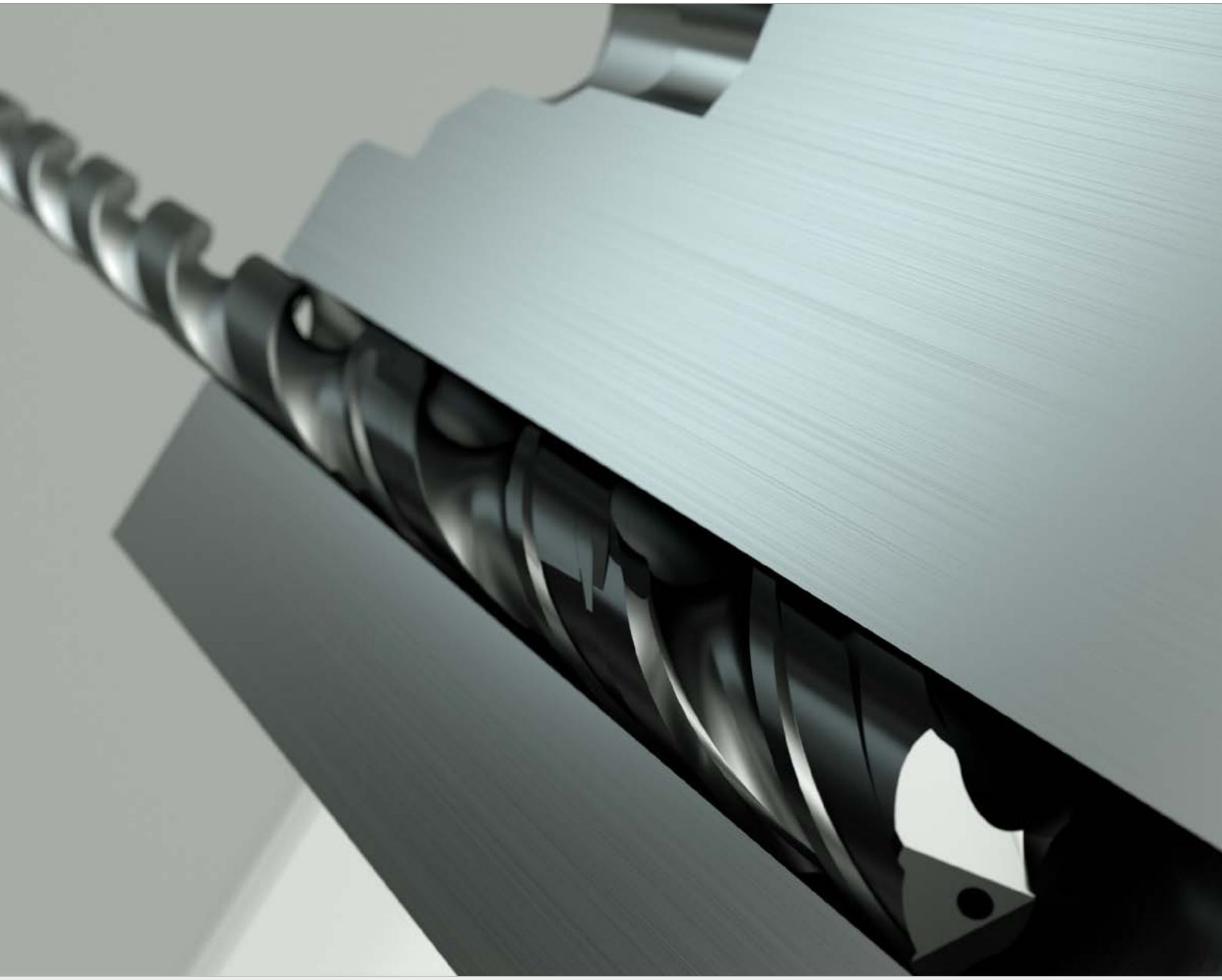
- Further drilling steps Q_X as per cutting data table, with subsequent chip removal.



Note:

Between the drilling steps, the drill may exit completely from the bore. Do not take the drill completely out from the bore in case of resonant vibration. After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

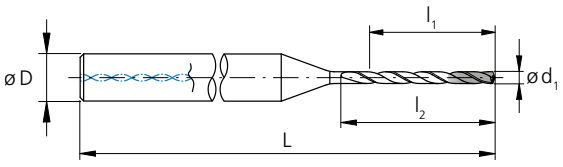
Customized drills



Mikron Tool produces solid carbide drills according to your needs and requirements and within the following range:

CHARACTERISTICS

- Diameter min.: .0039" (0.1 mm)
- Diameter max.: 1.26" (32.0 mm), please contact us for larger diameters
- Drilling depth max.: 50 x d
- Maximum tool length: 16.34" (415 mm)
- Tool diameter tolerance max.: ± 20 µin (0.5 µm)
- Chamfer and point angle as per customer need
- Step drill: see customer-specific step drill
- Concentricity between shank and diameters max.: ≤ 79 µin (2 µm)
- Number of cutting edges: 1, 2 or 3
- Cutting direction: right-hand drill or left-hand drill
- Conical and cylindrical drill
- Drill material: tungsten carbide, grade selection depending on application



COATINGS

Various choice according to application

COOLING

- Drill with internal cooling through holes following the helix up to the drill tip
- Drill with through coolant channels integrated in the shank
- Drill for external coolant supply

TYPE OF SHAFT

- Cylindrical as per DIN 6535 HA
- Cylindrical as per DIN 6535 HE (Whistle Notch)
- Cylindrical as per DIN 6535 HB (Weldon)
- More upon request

MATERIAL TO BE MACHINED

Drills for steel, corrosion-resistant steels, i.e. stainless steels, titanium / titanium alloys, super alloys or heat-resistant alloys such as Inconel or Hastelloy, CrCo alloys, drills for hardened steel up to 55HRC, aluminum / aluminum alloys, brass, copper, cast materials, etc.

TREATMENTS

Cutting edge preparation, polishing of flutes

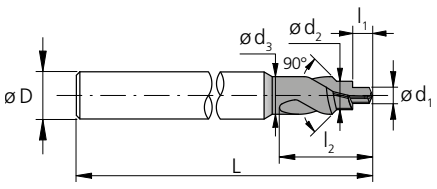
Customized step drills



Mikron Tool produces solid carbide step drills according to your needs and requirements and within the following range:

CHARACTERISTICS

- Diameter min.: .0039" (0.1 mm)
- Diameter max.: 1.26" (32.0 mm), please contact us for larger diameters
- Drilling depth max.: depending on application
- Maximum tool length: 13" (330 mm)
- Tool diameter tolerance max.: ± 20 µin (0.5 µm)
- Chamfer and point angle as per customer need
- Concentricity between shank and diameters max.: ≤ 79 µin (2 µm)
- Number of cutting edges: 2
- Cutting direction: right-hand drill or left-hand drill
- Shapes: conical drills, cylindrical drills, etc.
- Drill material: tungsten carbide, grade selection depending on application



COATINGS

Various choice according to application

COOLING

- Drill with internal cooling through holes following the helix up to the drill tip
- Drill with internal cooling through straight holes in the shaft
- Drill for external coolant supply

TYPE OF SHAFT

- Cylindrical as per DIN 6535 HA
- Cylindrical as per DIN 6535 HE (Whistle Notch)
- Cylindrical as per DIN 6535 HB (Weldon)
- More upon request

MATERIAL TO BE MACHINED

Drills for steel, corrosion-resistant steels, i.e. stainless steels, titanium / titanium alloys, super alloys or heat-resistant alloys such as Inconel or Hastelloy, CrCo alloys, drills for hardened steel up to 55HRC, aluminum / aluminum alloys, brass, copper, cast materials, etc.

TREATMENTS

Cutting edge preparation, polishing of flutes

crazy about milling



07

OVERVIEW **456**

CODIFICATION KEY 458

CRAZYMILL COOL SQUARE / CORNER RADIUS - Z2 460
Depth 1.5 x d, 3 x d, 5 x d
Ø 0.3 mm - 6.35 mm | **.012" – 1/4"**

CRAZYMILL COOL SQUARE / CORNER RADIUS - Z4 490
Depth 2 x d, 3 x d, 4 x d, 5 x d
Ø 1 mm - 8 mm | **.039" – .315"**

CRAZYMILL HEXALOBE 528
Micro milling, depth 3.5 x d or 5 x d
Ø 0.2 mm - 1 mm | **.008" – .039"**

CRAZYMILL COOL P&S 540
Plunge and slot milling, depth 2.5 x d or 5 x d
Ø 1 mm - 8 mm | **.012" – .315"**

CRAZYMILL COOL BALL - Z2 574
Depth 2 x d, 3 x d, 5 x d
Ø 0.3 mm - 8 mm | **.012" – .315"**

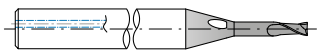
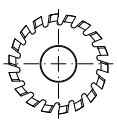
CRAZYMILL COOL BALL - Z4 604
Depth 2 x d, 3 x d, 3.5 x d, 4.5 x d, 5 x d
Ø 1 mm - 8 mm | **.039" – .315"**

CUSTOMIZED MILLING CUTTERS 642

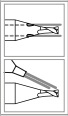
CUSTOMIZED PROFILE MILLING CUTTERS 644

Overview

CUTTING TOOL SOLUTIONS

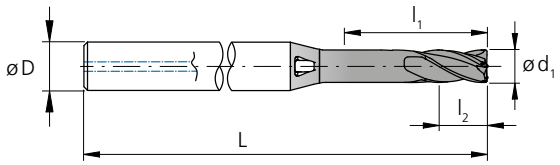
	CRAZYMILL Cool	Square - Z2	
	CRAZYMILL Cool	Corner radius - Z2	
NEW	CRAZYMILL Cool	Square - Z4	
NEW	CRAZYMILL Cool	Corner radius - Z4	
NEW	CRAZYMILL Hexalobe	Hexalobe	
NEW	CRAZYMILL Cool	Plunge&Slot	
	CRAZYMILL Cool	Ball - Z2	
NEW	CRAZYMILL Cool	Ball - Z4	
	Customized milling cutters		
	Customized profile milling cutters		

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

ø - range [mm] | [inch]	max. depth	Cooling	P Unalloyed and alloyed steel	M Stainless steel	K Cast iron	N Non ferrous metals	S_1 Super alloys	S_2 Titanium (pure and alloyed)	S_3 CrCo alloys	H_1 Hardened steel <55 HRC	H_2 Hardened steel ≥55 HRC	Page
0.3 – 6.35 **.012" – 1/4"**	1.5 x d 3 x d 5 x d		●	●	●	●	●	●	●	●	⊠	**460**
0.3 – 6.35 **.012" – 1/4"**	1.5 x d 3 x d 5 x d		●	●	●	●	●	●	●	●	⊠	**460**
1.0 – 8.0 **.039" – .315"**	2 x d 3 x d 4 x d 5 x d		●	●	●	●	●	●	●	⊠	⊠	**490**
1.0 – 8.0 **.039" – .315"**	2 x d 3 x d 4 x d 5 x d		●	●	●	●	●	●	●	⊠	⊠	**490**
0.2 – 1.0 **.008" – .039"**	3.5 x d 5 x d		⊠	●	⊠	⊠	⊠	●	⊠	⊠	⊠	**528**
1.0 – 8.0 **.039" – .315"**	2.5 x d 5 x d		●	●	●	●	●	●	●	⊠	⊠	**540**
0.3 – 8.0 **.012" – .315"**	2 x d 3 x d 5 x d		●	●	●	●	●	●	●	●	⊠	**574**
1.0 – 8.0 **.039" – .315"**	2 x d 3 x d 3.5 x d 4.5 x d 5 x d		●	●	●	●	●	●	●	●	⊠	**604**
0.2 – 32.0 **.008" – 1.26"**	as required		●	●	●	●	●	●	●	●	⊠	**642**
Bore 2.0 – 40.0 **.079" – 1.58"** Thickness 1.0 – 30.0 **.039" – 1.18"**	–		●	●	●	●	●	●	●	●	⊠	**644**

Codification key

ITEM NUMBER EASY TO UNDERSTAND



2.CMC42.C1Z4.400.1

Division number
- 2 = Mikron Tool SA Agno

CrazyMill family
- CMC = CrazyMill Cool
- CMT = CrazyMill Hexalobe Titanium
- CMI = CrazyMill Hexalobe Inox

Flute angle
- 42 = 42°

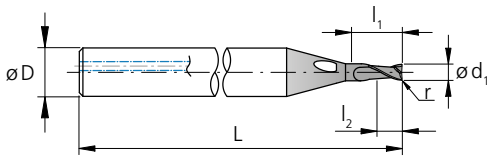
Tool type
- A = Type A - Short milling depth
- B = Type B - Medium milling depth
- C = Type C - Long milling depth
- M = Type M - Medium cutting length
- N = Type N - Long cutting length

Endmill geometry
- 1 / 8 = Square
- 2 = Corner radius with radius small
- 3 = Corner radius with radius medium
- 4 = Corner radius with radius big
- 5 = Ball

Flutes number
- Z4 = 4 flute

Cutting diameter d_1
- 400 = Ø 4 mm (.158")

Coating
- 1 = Coated



2.CMC.RB3Z2.F732

Division number
- 2 = Mikron Tool SA Agno

CrazyMill Cool family

Endmill geometry
- S = Square
- R = Corner radius
- PSS = Plunge&Slot Square
- B = Ball

Tool type
- A = Type A - Short milling depth
- B = Type B - Medium milling depth
- C = Type C - Long milling depth
- M = Type M - Medium cutting length
- N = Type N - Long cutting length

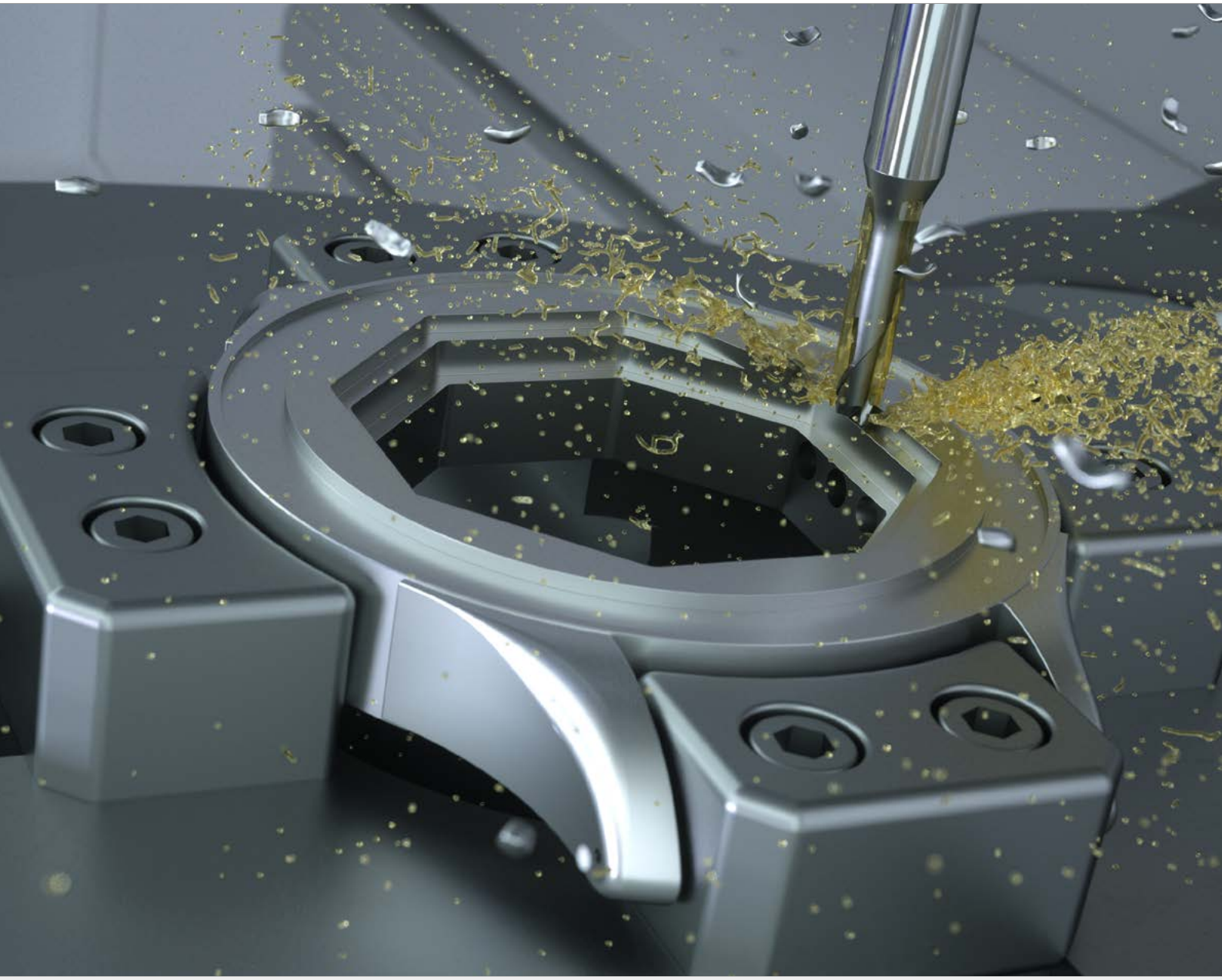
Radius r
- 2 = Radius small
- 3 = Radius medium
- 4 = Radius big

Flutes number
- Z2 = 2 flute

Cutting diameter in fractional inches d_1
- F732 = Ø 7/32"

PATENTED

CrazyMill Cool Square / Corner radius - Z2



CRAZYMILL Cool

HSPC-END MILL FOR DIFFICULT TO MACHINE MATERIALS



With CrazyMill Cool, Mikron Tool has achieved a quantum leap in the milling of stainless steel, titanium, chromium cobalt alloys, and superalloys. Three versions of cylindrical micro-cutters (sharp-edged with minimum protection phase of 45°) or with corner radius are available in diameters of .012" - 1/4" (0.3 - 6.35 mm) and with milling depths of up to 5 x d.

The strength of this solid carbide end mill with integrated cooling is the milling of grooves, pockets and walls with regard to cutting speeds, a_p, performance, service life, and surface quality. It combines HSC (high-speed cutting) and HPC (high-performance cutting), thus becoming an HSPC (high-speed performance cutting) milling tool. Due to its special cutting geometry and the continuous and extensive cooling of its cutting edges, this milling tool is a quantum leap for the machining of stainless steel, titanium, chromium-cobalt alloys, and superalloys.

CRAZYMILL by Mikron Tool Cool

A quantum leap in milling

ROUGHING AND FINISHING CUTTER WITH INTEGRATED COOLING

With CrazyMill Cool, Mikron Tool has achieved a quantum leap in the milling of stainless steel, titanium, chromium cobalt alloys, and superalloys. Three versions of cylindrical micro-cutters (sharp-edged with minimum protection phase of 45°) or with corner radius are available in diameters of .012" - 1/4" (0.3 - 6.35 mm) and with milling depths of up to 5 x d. The cutting length is always 1.5 x d.

- CrazyMill Cool Square, type A – milling depth 1.5 x d, through shank coolant, Z = 2
- CrazyMill Cool Square, type B – milling depth 3 x d, through shank coolant, Z = 2
- CrazyMill Cool Square, type C – milling depth 5 x d, through shank coolant, Z = 2

- CrazyMill Cool Corner radius, type A – milling depth 1.5 x d, through shank coolant, Z = 2
- CrazyMill Cool Corner radius, type B – milling depth 3 x d, through shank coolant, Z = 2
- CrazyMill Cool Corner radius, type C – milling depth 5 x d, through shank coolant, Z = 2

1.5 x d	3 x d	5 x d
Type A	Type B	Type C
■ Coated ■ Integrated cooling	■ Coated ■ Integrated cooling	■ Coated ■ Integrated cooling
		
		
page 468	page 474	page 480

PATENTED

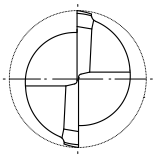
1 | SHANK
The robust carbide shank guarantees stable and vibration-free milling. A high degree of precision and excellent surface quality are achieved.

2 | INTEGRATED COOLING - PATENTED
The integrated cooling channels guarantee constant and maximal cooling of the cutting edges and optimal chip removal. The result is higher cutting speed and depth as well as improved surface quality.

3 | CARBIDE
The specially developed micro-grain carbide meets all requirements in terms of mechanical properties.

4 | COATING
The high-performance RIP coating is heat-resistant and wear-resistant, prevents build up edges and guarantees optimum chip flushing. The result is long tool life.

5 | CUTTING GEOMETRY
Developed for the machining of difficult-to-machine materials such as stainless steels, titanium, titanium alloys and heat-resistant alloys. Ensures roughing and finishing with high surface quality. Due to its highly smooth running, it will work with no vibration.

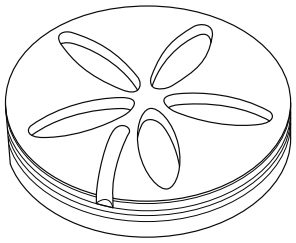
Mill tip 

CRAZYMILL by Mikron Tool Cool

Benefits and applications

ROUGHING AND FINISHING CUTTER WITH THROUGH-TOOL COOLING, FROM 0.3 MM (.012")

- **SHORT MACHINING TIME** | highest chip removal rate
- **LONG TOOL LIFE** | due to efficient patented cooling
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to internal cooling
- **HIGH SURFACE QUALITY** | due to special geometry



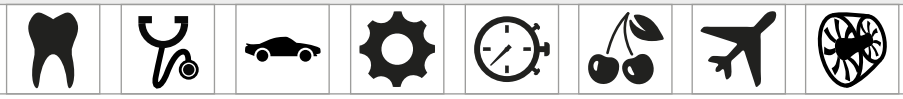
COMPONENT
Demo flower

MATERIAL
X2CrNiMo 18-14-3 / 1.4435 / AISI 316L

MACHINING
- Slot milling
- d = 1.5 mm | **.059"**

MILLING TOOL
Mikron Tool - CrazyMill Cool Corner radius Z2 - Type A

DATA	MIKRON TOOL
Tool type	CrazyMill Cool Corner radius - Z2 - Carbide - Coated - Internal cooling
Item number	2.CMC30.A3Z2.150.1
Cutting data	v_c = 180 m/min **| 591 SFM** f_z = 0.016 mm **| .0006 IPT** a_p = 1.5 mm **| .059"** r = 0.2 mm **| .008 IPT**



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Tooth crown
Medical technology	Component for endoscope
Automotive industry	Components for injection system
Mechanical engineering	Machine components
Watches	Watch housing
Food industry	Nozzle
Aerospace industry	Engine parts
Power industry	Blade

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4301	X5CrNi 18-10	304
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S2 Titanium (pure and alloyed)	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

CrazyMill Cool Square / Corner radius - Z2

MILLING WITH INTEGRATED COOLING

Square



1.5 x d
page 468



3 x d
page 474



5 x d
page 480

Corner radius



1.5 x d
page 469



3 x d
page 475



5 x d
page 481

CrazyMill Cool is setting new standards for the milling of grooves, pockets and walls with regard to cutting speeds, feed, performance, tool life, and surface quality. The new features of this roughing and finishing cutter include not only the solid carbide, coating, and geometry, but especially the unique cooling system with cooling channels integrated in the shaft, which achieve constant and extensive cooling of the cutting edges, thus enabling the highest cutting speeds and maximum feed.

The milling tools have three to five integrated cooling channels depending on the shaft diameter.

Mikron Tool developed two different variants:

- **Variant square** - sharp-edged with small, defined protection phase of 45°, for a maximum machining depth of 5 x d and with a cutting length of 1.5 x d.
- **Variant corner radius** - sharp-edged with a corner radius for a maximum machining depth of 5 x d and with a cutting length of 1.5 x d.

Coolant type, pressure and filtration

Detailed recommendations for coolant type, pressure and filtration are on page "milling process".

Please note

You couldn't find your suitable version of the CrazyMill Cool Square / Corner radius - Z2 (diameter, length, cutting direction…)? Ask us about our customized versions!

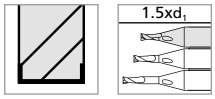
Regrinding: This product is not suitable for regrinding.

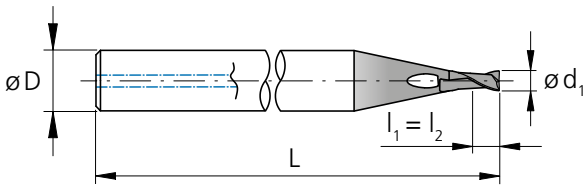
CRAZYMILL by Mikron Tool Cool

Type A - 1.5 x d - Square / Corner radius - Z2

MILLING WITH INTEGRATED COOLING

Square





l_1 = Effective length
l_2 = Cutting length

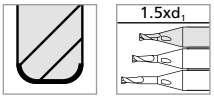
d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.012	0.3	**.018**	0.45	0.45	3	**1.50**	38	2.CMC30.A1Z2.030.1	■
1/64	**.0156**	0.396	**.023**	0.59	0.59	3	**1.50**	38	2.CMC.SAZ2.F164	■
	.016	0.4	**.024**	0.60	0.60	3	**1.50**	38	2.CMC30.A1Z2.040.1	■
	.020	0.5	**.030**	0.75	0.75	3	**1.50**	38	2.CMC30.A1Z2.050.1	■
	.024	0.6	**.035**	0.90	0.90	3	**1.50**	38	2.CMC30.A1Z2.060.1	■
1/32	**.0312**	0.793	**.047**	1.19	1.19	3	**1.50**	38	2.CMC.SAZ2.F132	■
	.031	0.8	**.047**	1.20	1.20	3	**1.50**	38	2.CMC30.A1Z2.080.1	■
	.039	1.0	**.059**	1.50	1.50	4	**1.57**	40	2.CMC30.A1Z2.100.1	■
	.047	1.2	**.071**	1.80	1.80	4	**1.57**	40	2.CMC30.A1Z2.120.1	■
	.059	1.5	**.089**	2.25	2.25	4	**1.57**	40	2.CMC30.A1Z2.150.1	■
1/16	**.0625**	1.587	**.094**	2.38	2.38	4	**1.57**	40	2.CMC.SAZ2.F116	■
	.071	1.8	**.106**	2.70	2.70	4	**1.57**	40	2.CMC30.A1Z2.180.1	■
	.079	2.0	**.118**	3.00	3.00	4	**1.57**	40	2.CMC30.A1Z2.200.1	■
3/32	**.0937**	2.381	**.141**	3.57	3.57	6	**1.77**	45	2.CMC.SAZ2.F332	■
	.098	2.5	**.148**	3.75	3.75	6	**1.77**	45	2.CMC30.A1Z2.250.1	■
	.118	3.0	**.177**	4.50	4.50	6	**1.97**	50	2.CMC30.A1Z2.300.1	■
1/8	**.1250**	3.175	**.187**	4.76	4.76	6	**1.97**	50	2.CMC.SAZ2.F18	■
5/32	**.1562**	3.968	**.234**	5.95	5.95	6	**1.97**	50	2.CMC.SAZ2.F532	■
	.157	4.0	**.236**	6.00	6.00	6	**1.97**	50	2.CMC30.A1Z2.400.1	■
3/16	**.1875**	4.762	**.281**	7.14	7.14	10	**2.36**	60	2.CMC.SAZ2.F316	■
7/32	**.2189**	5.560	**.328**	8.34	8.34	10	**2.36**	60	2.CMC.SAZ2.F732	■
	.236	6.0	**.354**	9.00	9.00	10	**2.36**	60	2.CMC30.A1Z2.600.1	■
1/4	**.2500**	6.350	**.375**	9.53	9.53	10	**2.36**	60	2.CMC.SAZ2.F14	■

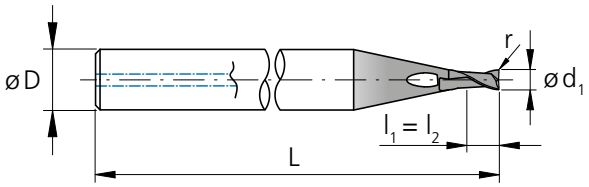
■ Stock item

Carbide | Z2 | 30° | eXedur RIP

Ød_1	**.012" - 1/4"** (0.3 - 6.35 mm)	
Tolerance	**+ .0004"** **- .0004"**	+ 0.01 mm - 0.01 mm

Corner radius





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	r [inch]	r [mm]	Item number	Availability
	.012	0.3	**.018**	0.45	0.45	3	**1.50**	38	**.0020**	0.05	2.CMC30.A2Z2.030.1	■
1/64	**.0156**	0.396	**.023**	0.59	0.59	3	**1.50**	38	**.0030**	0.076	2.CMC.RA2Z2.F164	■
	.016	0.4	**.024**	0.60	0.60	3	**1.50**	38	**.0020**	0.05	2.CMC30.A2Z2.040.1	■
	.020	0.5	**.030**	0.75	0.75	3	**1.50**	38	**.0020**	0.05	2.CMC30.A2Z2.050.1	■
	.020	0.5	**.030**	0.75	0.75	3	**1.50**	38	**.0039**	0.10	2.CMC30.A3Z2.050.1	■
	.024	0.6	**.035**	0.90	0.90	3	**1.50**	38	**.0020**	0.05	2.CMC30.A2Z2.060.1	■
	.024	0.6	**.035**	0.90	0.90	3	**1.50**	38	**.0039**	0.10	2.CMC30.A3Z2.060.1	■
1/32	**.0312**	0.793	**.047**	1.19	1.19	3	**1.50**	38	**.0030**	0.076	2.CMC.RA2Z2.F132	■
1/32	**.0312**	0.793	**.047**	1.19	1.19	3	**1.50**	38	**.0050**	0.127	2.CMC.RA3Z2.F132	■
	.031	0.8	**.047**	1.20	1.20	3	**1.50**	38	**.0020**	0.05	2.CMC30.A2Z2.080.1	■
	.031	0.8	**.047**	1.20	1.20	3	**1.50**	38	**.0039**	0.10	2.CMC30.A3Z2.080.1	■
	.039	1.0	**.059**	1.50	1.50	4	**1.57**	40	**.0039**	0.10	2.CMC30.A2Z2.100.1	■
	.039	1.0	**.059**	1.50	1.50	4	**1.57**	40	**.0079**	0.20	2.CMC30.A3Z2.100.1	■
	.047	1.2	**.071**	1.80	1.80	4	**1.57**	40	**.0039**	0.10	2.CMC30.A2Z2.120.1	■
	.047	1.2	**.071**	1.80	1.80	4	**1.57**	40	**.0079**	0.20	2.CMC30.A3Z2.120.1	■
	.059	1.5	**.089**	2.25	2.25	4	**1.57**	40	**.0039**	0.10	2.CMC30.A2Z2.150.1	■
	.059	1.5	**.089**	2.25	2.25	4	**1.57**	40	**.0118**	0.30	2.CMC30.A3Z2.150.1	■
1/16	**.0625**	1.587	**.094**	2.38	2.38	4	**1.57**	40	**.0050**	0.127	2.CMC.RA2Z2.F116	■
1/16	**.0625**	1.587	**.094**	2.38	2.38	4	**1.57**	40	**.0100**	0.254	2.CMC.RA3Z2.F116	■
	.071	1.8	**.106**	2.70	2.70	4	**1.57**	40	**.0039**	0.10	2.CMC30.A2Z2.180.1	■
	.071	1.8	**.106**	2.70	2.70	4	**1.57**	40	**.0118**	0.30	2.CMC30.A3Z2.180.1	■
	.079	2.0	**.118**	3.00	3.00	4	**1.57**	40	**.0039**	0.10	2.CMC30.A2Z2.200.1	■
	.079	2.0	**.118**	3.00	3.00	4	**1.57**	40	**.0079**	0.20	2.CMC30.A3Z2.200.1	■
	.079	2.0	**.118**	3.00	3.00	4	**1.57**	40	**.0197**	0.50	2.CMC30.A4Z2.200.1	■
3/32	**.0937**	2.381	**.141**	3.57	3.57	6	**1.77**	45	**.0050**	0.127	2.CMC.RA2Z2.F332	■
3/32	**.0937**	2.381	**.141**	3.57	3.57	6	**1.77**	45	**.0100**	0.254	2.CMC.RA3Z2.F332	■
3/32	**.0937**	2.381	**.141**	3.57	3.57	6	**1.77**	45	**.0150**	0.381	2.CMC.RA4Z2.F332	■
	.098	2.5	**.148**	3.75	3.75	6	**1.77**	45	**.0079**	0.20	2.CMC30.A2Z2.250.1	■
	.098	2.5	**.148**	3.75	3.75	6	**1.77**	45	**.0197**	0.50	2.CMC30.A3Z2.250.1	■
	.118	3.0	**.177**	4.50	4.50	6	**1.97**	50	**.0079**	0.20	2.CMC30.A2Z2.300.1	■
	.118	3.0	**.177**	4.50	4.50	6	**1.97**	50	**.0197**	0.50	2.CMC30.A3Z2.300.1	■
1/8	**.1250**	3.175	**.187**	4.76	4.76	6	**1.97**	50	**.0100**	0.254	2.CMC.RA2Z2.F18	■
1/8	**.1250**	3.175	**.187**	4.76	4.76	6	**1.97**	50	**.0150**	0.381	2.CMC.RA3Z2.F18	■
5/32	**.1562**	3.968	**.234**	5.95	5.95	6	**1.97**	50	**.0100**	0.254	2.CMC.RA2Z2.F532	■
5/32	**.1562**	3.968	**.234**	5.95	5.95	6	**1.97**	50	**.0150**	0.381	2.CMC.RA3Z2.F532	■
	.157	4.0	**.236**	6.00	6.00	6	**1.97**	50	**.0079**	0.20	2.CMC30.A2Z2.400.1	■
	.157	4.0	**.236**	6.00	6.00	6	**1.97**	50	**.0197**	0.50	2.CMC30.A3Z2.400.1	■
3/16	**.1875**	4.762	**.281**	7.14	7.14	10	**2.36**	60	**.0100**	0.254	2.CMC.RA2Z2.F316	■
3/16	**.1875**	4.762	**.281**	7.14	7.14	10	**2.36**	60	**.0150**	0.381	2.CMC.RA3Z2.F316	■
7/32	**.2189**	5.560	**.328**	8.34	8.34	10	**2.36**	60	**.0150**	0.381	2.CMC.RA2Z2.F732	■
7/32	**.2189**	5.560	**.328**	8.34	8.34	10	**2.36**	60	**.0300**	0.762	2.CMC.RA3Z2.F732	■
	.236	6.0	**.354**	9.00	9.00	10	**2.36**	60	**.0197**	0.50	2.CMC30.A2Z2.600.1	■
	.236	6.0	**.354**	9.00	9.00	10	**2.36**	60	**.0394**	1.00	2.CMC30.A3Z2.600.1	■
1/4	**.2500**	6.350	**.375**	9.53	9.53	10	**2.36**	60	**.0300**	0.762	2.CMC.RA2Z2.F14	■

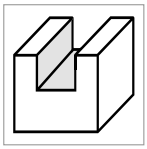
■ Stock item

CRAZYMILL by Mikron Tool Cool

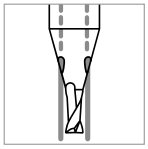
Type A - Conventional slot milling

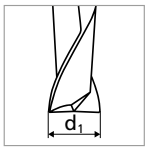
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

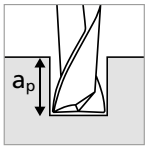
Conventional slot milling



■ $a_p = 1 \times d_1$



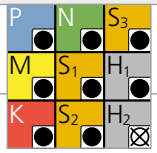




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3–0.4 mm | .012"–.016" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | 197	0.004 – 0.006 .00016 – .00024
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | 197	0.003–0.005 .00012–.00020
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | 197	0.003–0.005 .00012–.00020
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | 197	0.004–0.006 .00016–.00024
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | 197	0.003–0.005 .00012–.00020
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | 197	0.003–0.005 .00012–.00020
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | 197	0.003–0.005 .00012–.00020
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	60 | 197	0.002–0.004 .00008–.00016
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	60 | 197	0.005–0.007 .00020–.00028
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60 | 197	0.005–0.007 .00020–.00028
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	60 | 197	0.005–0.007 .00020–.00028
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	60 | 197	0.005–0.007 .00020–.00028
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	60 | 197	0.005–0.007 .00020–.00028
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	60 | 197	0.005–0.007 .00020–.00028
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	60 | 197	0.002–0.003 .00008–.00012
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	60 | 197	0.003–0.005 .00012–.00020
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	60 | 197	0.003–0.005 .00012–.00020
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 | 197	0.002–0.003 .00008–.00012
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | 197	0.003–0.005 .00012–.00020
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



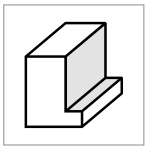
Ød1	1/32" 0.5–0.8 mm | .020"–.032"		1.0–1.2 mm | .039"–.047"		1/16" 1.5–1.8 mm | .059"–.071"		3/32" 2.0–2.5 mm | .079"–.098"		1/8" 3.0 mm | .118"		5/32–3/16–7/32–1/4" 4.0–6 mm | .158"–.236"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	100 | **328**	0.008 – 0.012 **.00031 – .00047**	140 | **459**	0.013 – 0.015 **.00051 – .00059**	180 | **591**	0.022 – 0.024 **.00087 – .00094**	200 | **656**	0.030 – 0.032 **.00118 – .00126**	220 | **722**	0.046 **.00181**	260 | **853**	0.048 **.00189**
	100 | **328**	0.007 – 0.010 **.00028 – .00039**	140 | **459**	0.012 – 0.014 **.00047 – .00055**	180 | **591**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.028 – 0.030 **.00110 – .00118**	220 | **722**	0.044 **.00173**	260 | **853**	0.046 **.00181**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	140 | **459**	0.009 – 0.011 **.00035 – .00043**	180 | **591**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.040 **.00157**	260 | **853**	0.042 **.00165**
	100 | **328**	0.008 – 0.012 **.00031 – .00047**	140 | **459**	0.014 – 0.016 **.00055 – .00063**	180 | **591**	0.022 – 0.024 **.00087 – .00094**	200 | **656**	0.030 – 0.032 **.00118 – .00126**	220 | **722**	0.044 **.00173**	260 | **853**	0.046 **.00181**
	100 | **328**	0.007 – 0.010 **.00028 – .00039**	140 | **459**	0.013 – 0.015 **.00051 – .00059**	180 | **591**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.028 – 0.030 **.00110 – .00118**	220 | **722**	0.042 **.00165**	260 | **853**	0.044 **.00173**
	100 | **328**	0.007 – 0.010 **.00028 – .00039**	140 | **459**	0.013 – 0.015 **.00051 – .00059**	180 | **591**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.028 – 0.030 **.00110 – .00118**	220 | **722**	0.042 **.00165**	260 | **853**	0.044 **.00173**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	140 | **459**	0.010 – 0.012 **.00039 – .00047**	180 | **591**	0.016 – 0.018 **.00063 – .00071**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.040 **.00157**	260 | **853**	0.042 **.00165**
	100 | **328**	0.005 – 0.008 **.00020 – .00031**	120 | **394**	0.010 – 0.020 **.00039 – .00079**	140 | **459**	0.022 – 0.025 **.00087 – .00098**	160 | **525**	0.026 – 0.035 **.00102 – .00138**	180 | **591**	0.040 – 0.046 **.00157 – .00181**	200 | **656**	0.050 – 0.054 **.00197 – .00213**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.052 **.00205**	260 | **853**	0.055 **.00217**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.050 **.00197**	260 | **853**	0.053 **.00209**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.052 **.00205**	260 | **853**	0.055 **.00217**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.052 **.00205**	260 | **853**	0.055 **.00217**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.052 **.00205**	260 | **853**	0.055 **.00217**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.016 – 0.018 **.00063 – .00071**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.052 **.00205**	260 | **853**	0.055 **.00217**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	120 | **394**	0.007 – 0.008 **.00028 – .00031**	130 | **427**	0.009 – 0.010 **.00035 – .00039**	140 | **459**	0.010 – 0.012 **.00039 – .00047**	150 | **492**	0.015 **.00059**	170 | **558**	0.020 **.00079**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	120 | **394**	0.014 – 0.016 **.00055 – .00063**	130 | **427**	0.018 – 0.020 **.00071 – .00079**	140 | **459**	0.026 – 0.028 **.00102 – .00110**	150 | **492**	0.040 **.00157**	170 | **558**	0.042 **.00165**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	120 | **394**	0.014 – 0.016 **.00055 – .00063**	130 | **427**	0.018 – 0.020 **.00071 – .00079**	140 | **459**	0.026 – 0.028 **.00102 – .00110**	150 | **492**	0.040 **.00157**	170 | **558**	0.042 **.00165**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	140 | **459**	0.007 – 0.008 **.00028 – .00031**	160 | **525**	0.009 – 0.010 **.00035 – .00039**	180 | **591**	0.010 – 0.012 **.00039 – .00047**	200 | **656**	0.015 **.00059**	220 | **722**	0.020 **.00079**
	80 | **262**	0.006 – 0.007 **.00024 – .00028**	100 | **328**	0.008 – 0.010 **.00031 – .00039**	140 | **459**	0.012 – 0.016 **.00047 – .00063**	180 | **591**	0.018 – 0.024 **.00071 – .00094**	200 | **656**	0.030 **.00118**	240 | **787**	0.035 **.00138**

CRAZYMILL by Mikron Tool Cool

Type A - Side and trochoidal slot milling

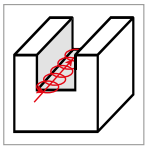
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Side milling

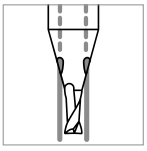


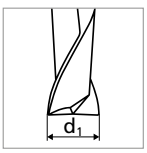
- $a_p = 1 \times d_1$
- $a_e = 0.3 \times d_1$

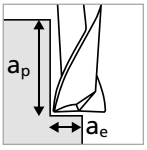
Trochoidal Slot Milling



- $a_p = 1 \times d_1$
- $a_e = 0.1 \times d_1$



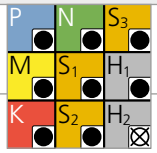




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3–0.4 mm | .012"–.016" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | 197	0.005–0.007 .00020–.00028
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | 197	0.004–0.006 .00016–.00024
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | 197	0.004–0.006 .00016–.00024
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | 197	0.005–0.007 .00020–.00028
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | 197	0.004–0.006 .00016–.00024
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | 197	0.004–0.006 .00016–.00024
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | 197	0.004–0.006 .00016–.00024
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	60 | 197	0.003–0.005 .00012–.00020
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	60 | 197	0.006–0.008 .00024–.00031
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60 | 197	0.006–0.008 .00024–.00031
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	60 | 197	0.006–0.008 .00024–.00031
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	60 | 197	0.006–0.008 .00024–.00031
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	60 | 197	0.006–0.008 .00024–.00031
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	60 | 197	0.006–0.008 .00024–.00031
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	60 | 197	0.003–0.004 .00012–.00016
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	60 | 197	0.004–0.006 .00016–.00024
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	60 | 197	0.004–0.006 .00016–.00024
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 | 197	0.003–0.004 .00012–.00016
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | 197	0.004–0.006 .00016–.00024
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



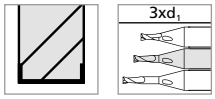
Ød1	1/32" 0.5–0.8 mm | .020"–.032"		1.0–1.2 mm | .039"–.047"		1/16" 1.5–1.8 mm | .059"–.071"		3/32" 2.0–2.5 mm | .079"–.098"		1/8" 3.0 mm | .118"		5/32–3/16–7/32–1/4" 4.0–6 mm | .158"–.236"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	200 | **656**	0.024 – 0.026 **.00094 – .00102**	220 | **722**	0.034 – 0.036 **.00134 – .00142**	240 | **787**	0.048 **.00189**	280 | **919**	0.050 **.00197**
	100 | **328**	0.009 – 0.012 **.00035 – .00047**	140 | **459**	0.014 – 0.016 **.00055 – .00063**	200 | **656**	0.022 – 0.024 **.00087 – .00094**	220 | **722**	0.032 – 0.034 **.00126 – .00134**	240 | **787**	0.046 **.00181**	280 | **919**	0.048 **.00189**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	140 | **459**	0.011 – 0.013 **.00043 – .00051**	200 | **656**	0.020 – 0.022 **.00079 – .00087**	220 | **722**	0.030 – 0.032 **.00118 – .00126**	240 | **787**	0.042 **.00165**	280 | **919**	0.044 **.00173**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.016 – 0.018 **.00063 – .00071**	200 | **656**	0.024 – 0.026 **.00094 – .00102**	220 | **722**	0.034 – 0.036 **.00134 – .00142**	240 | **787**	0.046 **.00181**	280 | **919**	0.048 **.00189**
	100 | **328**	0.009 – 0.012 **.00035 – .00047**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	200 | **656**	0.022 – 0.024 **.00087 – .00094**	220 | **722**	0.032 – 0.034 **.00126 – .00134**	240 | **787**	0.044 **.00173**	280 | **919**	0.046 **.00181**
	100 | **328**	0.009 – 0.012 **.00035 – .00047**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	200 | **656**	0.022 – 0.024 **.00087 – .00094**	220 | **722**	0.032 – 0.034 **.00126 – .00134**	240 | **787**	0.044 **.00173**	280 | **919**	0.046 **.00181**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	140 | **459**	0.012 – 0.014 **.00047 – .00055**	200 | **656**	0.016 – 0.018 **.00063 – .00071**	220 | **722**	0.030 – 0.032 **.00118 – .00126**	240 | **787**	0.042 **.00165**	280 | **919**	0.044 **.00173**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	120 | **394**	0.011 – 0.022 **.00043 – .00087**	140 | **459**	0.024 – 0.026 **.00094 – .00102**	160 | **525**	0.028 – 0.036 **.00110 – .00142**	180 | **591**	0.042 – 0.048 **.00165 – .00189**	200 | **656**	0.052 – 0.057 **.00205 – .00224**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014 – 0.018 **.00055 – .00071**	140 | **459**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014 – 0.018 **.00055 – .00071**	140 | **459**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014 – 0.018 **.00055 – .00071**	140 | **459**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	120 | **394**	0.007 – 0.008 **.00028 – .00031**	130 | **427**	0.009 – 0.010 **.00035 – .00039**	140 | **459**	0.010 – 0.012 **.00039 – .00047**	150 | **492**	0.015 **.00059**	170 | **558**	0.020 **.00079**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	120 | **394**	0.016 – 0.018 **.00063 – .00071**	130 | **427**	0.020 – 0.022 **.00079 – .00087**	140 | **459**	0.028 – 0.030 **.00110 – .00118**	150 | **492**	0.042 **.00165**	170 | **558**	0.044 **.00173**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	120 | **394**	0.016 – 0.018 **.00063 – .00071**	130 | **427**	0.020 – 0.022 **.00079 – .00087**	140 | **459**	0.028 – 0.030 **.00110 – .00118**	150 | **492**	0.042 **.00165**	170 | **558**	0.044 **.00173**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	140 | **459**	0.007 – 0.008 **.00028 – .00031**	180 | **591**	0.009 – 0.010 **.00035 – .00039**	200 | **656**	0.010 – 0.012 **.00039 – .00047**	220 | **722**	0.015 **.00059**	240 | **787**	0.020 **.00079**
	80 | **262**	0.007 – 0.009 **.00028 – .00035**	100 | **328**	0.010 – 0.012 **.00039 – .00047**	140 | **459**	0.014 – 0.018 **.00055 – .00071**	180 | **591**	0.020 – 0.026 **.00079 – .00102**	200 | **656**	0.035 **.00138**	240 | **787**	0.040 **.00157**

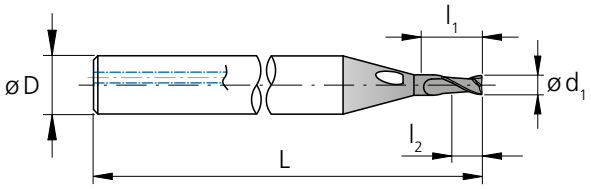
CRAZYMILL by Mikron Tool Cool

Type B - 3 x d - Square / Corner radius - Z2

MILLING WITH INTEGRATED COOLING

Square





l_1 = Effective length
l_2 = Cutting length

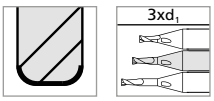
d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.012	0.3	**.035**	0.90	0.45	3	**1.50**	38	2.CMC30.B1Z2.030.1	■
1/64	**.0156**	0.396	**.047**	1.19	0.59	3	**1.50**	38	2.CMC.SBZ2.F164	■
	.016	0.4	**.047**	1.20	0.60	3	**1.50**	38	2.CMC30.B1Z2.040.1	■
	.020	0.5	**.059**	1.50	0.75	3	**1.50**	38	2.CMC30.B1Z2.050.1	■
	.024	0.6	**.071**	1.80	0.90	3	**1.50**	38	2.CMC30.B1Z2.060.1	■
1/32	**.0312**	0.793	**.094**	2.38	1.19	3	**1.50**	38	2.CMC.SBZ2.F132	■
	.031	0.8	**.094**	2.40	1.20	3	**1.50**	38	2.CMC30.B1Z2.080.1	■
	.039	1.0	**.118**	3.00	1.50	4	**1.57**	40	2.CMC30.B1Z2.100.1	■
	.047	1.2	**.142**	3.60	1.80	4	**1.57**	40	2.CMC30.B1Z2.120.1	■
	.059	1.5	**.177**	4.50	2.25	4	**1.57**	40	2.CMC30.B1Z2.150.1	■
1/16	**.0625**	1.587	**.187**	4.76	2.38	4	**1.57**	40	2.CMC.SBZ2.F116	■
	.071	1.8	**.213**	5.40	2.70	4	**1.57**	40	2.CMC30.B1Z2.180.1	■
	.079	2.0	**.236**	6.00	3.00	4	**1.57**	40	2.CMC30.B1Z2.200.1	■
3/32	**.0937**	2.381	**.281**	7.14	3.57	6	**1.77**	45	2.CMC.SBZ2.F332	■
	.098	2.5	**.295**	7.50	3.75	6	**1.77**	45	2.CMC30.B1Z2.250.1	■
	.118	3.0	**.354**	9.00	4.50	6	**1.97**	50	2.CMC30.B1Z2.300.1	■
1/8	**.1250**	3.175	**.375**	9.53	4.76	6	**2.56**	55	2.CMC.SBZ2.F18	■
5/32	**.1562**	3.968	**.469**	11.90	5.95	6	**2.17**	55	2.CMC.SBZ2.F532	■
	.157	4.0	**.472**	12.00	6.00	6	**2.17**	55	2.CMC30.B1Z2.400.1	■
3/16	**.1875**	4.762	**.563**	14.29	7.14	10	**2.56**	65	2.CMC.SBZ2.F316	■
7/32	**.2189**	5.560	**.657**	16.68	8.34	10	**2.56**	65	2.CMC.SBZ2.F732	■
	.236	6.0	**.709**	18.00	9.00	10	**2.56**	65	2.CMC30.B1Z2.600.1	■
1/4	**.2500**	6.350	**.750**	19.05	9.53	10	**2.56**	65	2.CMC.SBZ2.F14	■

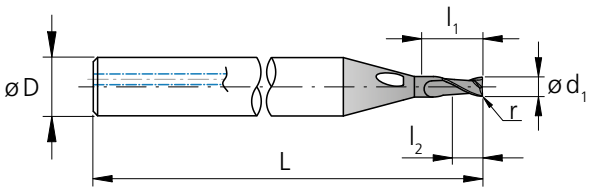
■ Stock item

Carbide | Z2 | 30° | eXedur RIP

Ø d_1	**.012" - 1/4"** (0.3 - 6.35 mm)	
Tolerance	**+ .0004"** **- .0004"**	+ 0.01 mm - 0.01 mm

Corner radius





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	r [inch]	r [mm]	Item number	Availability
	.012	0.3	**.035**	0.90	0.45	3	**1.50**	38	**.0020**	0.05	2.CMC30.B2Z2.030.1	■
1/64	**.0156**	0.396	**.047**	1.19	0.59	3	**1.50**	38	**.0030**	0.076	2.CMC.RB2Z2.F164	■
	.016	0.4	**.047**	1.20	0.60	3	**1.50**	38	**.0020**	0.05	2.CMC30.B2Z2.040.1	■
	.020	0.5	**.059**	1.50	0.75	3	**1.50**	38	**.0020**	0.05	2.CMC30.B2Z2.050.1	■
	.020	0.5	**.059**	1.50	0.75	3	**1.50**	38	**.0039**	0.10	2.CMC30.B3Z2.050.1	■
	.024	0.6	**.071**	1.80	0.90	3	**1.50**	38	**.0020**	0.05	2.CMC30.B2Z2.060.1	■
	.024	0.6	**.071**	1.80	0.90	3	**1.50**	38	**.0039**	0.10	2.CMC30.B3Z2.060.1	■
1/32	**.0312**	0.793	**.094**	2.38	1.19	3	**1.50**	38	**.0030**	0.076	2.CMC.RB2Z2.F132	■
1/32	**.0312**	0.793	**.094**	2.38	1.19	3	**1.50**	38	**.0050**	0.127	2.CMC.RB3Z2.F132	■
	.031	0.8	**.094**	2.40	1.20	3	**1.50**	38	**.0020**	0.05	2.CMC30.B2Z2.080.1	■
	.031	0.8	**.094**	2.40	1.20	3	**1.50**	38	**.0039**	0.10	2.CMC30.B3Z2.080.1	■
	.039	1.0	**.118**	3.00	1.50	4	**1.57**	40	**.0039**	0.10	2.CMC30.B2Z2.100.1	■
	.039	1.0	**.118**	3.00	1.50	4	**1.57**	40	**.0079**	0.20	2.CMC30.B3Z2.100.1	■
	.047	1.2	**.142**	3.60	1.80	4	**1.57**	40	**.0039**	0.10	2.CMC30.B2Z2.120.1	■
	.047	1.2	**.142**	3.60	1.80	4	**1.57**	40	**.0079**	0.20	2.CMC30.B3Z2.120.1	■
	.059	1.5	**.177**	4.50	2.25	4	**1.57**	40	**.0039**	0.10	2.CMC30.B2Z2.150.1	■
	.059	1.5	**.177**	4.50	2.25	4	**1.57**	40	**.0118**	0.30	2.CMC30.B3Z2.150.1	■
1/16	**.0625**	1.587	**.187**	4.76	2.38	4	**1.57**	40	**.0050**	0.127	2.CMC.RB2Z2.F116	■
1/16	**.0625**	1.587	**.187**	4.76	2.38	4	**1.57**	40	**.0100**	0.254	2.CMC.RB3Z2.F116	■
	.071	1.8	**.213**	5.40	2.70	4	**1.57**	40	**.0039**	0.10	2.CMC30.B2Z2.180.1	■
	.071	1.8	**.213**	5.40	2.70	4	**1.57**	40	**.0118**	0.30	2.CMC30.B3Z2.180.1	■
	.079	2.0	**.236**	6.00	3.00	4	**1.57**	40	**.0039**	0.10	2.CMC30.B2Z2.200.1	■
	.079	2.0	**.236**	6.00	3.00	4	**1.57**	40	**.0079**	0.20	2.CMC30.B3Z2.200.1	■
	.079	2.0	**.236**	6.00	3.00	4	**1.57**	40	**.0197**	0.50	2.CMC30.B4Z2.200.1	■
3/32	**.0937**	2.381	**.281**	7.14	3.57	6	**1.77**	45	**.0050**	0.127	2.CMC.RB2Z2.F332	■
3/32	**.0937**	2.381	**.281**	7.14	3.57	6	**1.77**	45	**.0100**	0.254	2.CMC.RB3Z2.F332	■
3/32	**.0937**	2.381	**.281**	7.14	3.57	6	**1.77**	45	**.0150**	0.381	2.CMC.RB4Z2.F332	■
	.098	2.5	**.295**	7.50	3.75	6	**1.77**	45	**.0079**	0.20	2.CMC30.B2Z2.250.1	■
	.098	2.5	**.295**	7.50	3.75	6	**1.77**	45	**.0197**	0.50	2.CMC30.B3Z2.250.1	■
	.118	3.0	**.354**	9.00	4.50	6	**1.97**	50	**.0079**	0.20	2.CMC30.B2Z2.300.1	■
	.118	3.0	**.354**	9.00	4.50	6	**1.97**	50	**.0197**	0.50	2.CMC30.B3Z2.300.1	■
1/8	**.1250**	3.175	**.375**	9.53	4.76	6	**2.17**	55	**.0100**	0.254	2.CMC.RB2Z2.F18	■
1/8	**.1250**	3.175	**.375**	9.53	4.76	6	**2.17**	55	**.0150**	0.381	2.CMC.RB3Z2.F18	■
5/32	**.1562**	3.968	**.469**	11.90	5.95	6	**2.17**	55	**.0100**	0.254	2.CMC.RB2Z2.F532	■
5/32	**.1562**	3.968	**.469**	11.90	5.95	6	**2.17**	55	**.0150**	0.381	2.CMC.RB3Z2.F532	■
	.157	4.0	**.472**	12.00	6.00	6	**2.17**	55	**.0079**	0.20	2.CMC30.B2Z2.400.1	■
	.157	4.0	**.472**	12.00	6.00	6	**2.17**	55	**.0197**	0.50	2.CMC30.B3Z2.400.1	■
3/16	**.1875**	4.762	**.563**	14.29	7.14	10	**2.56**	65	**.0100**	0.254	2.CMC.RB2Z2.F316	■
3/16	**.1875**	4.762	**.563**	14.29	7.14	10	**2.56**	65	**.0150**	0.381	2.CMC.RB3Z2.F316	■
7/32	**.2189**	5.560	**.657**	16.68	8.34	10	**2.56**	65	**.0150**	0.381	2.CMC.RB2Z2.F732	■
7/32	**.2189**	5.560	**.657**	16.68	8.34	10	**2.56**	65	**.0300**	0.762	2.CMC.RB3Z2.F732	■
	.236	6.0	**.709**	18.00	9.00	10	**2.56**	65	**.0197**	0.50	2.CMC30.B2Z2.600.1	■
	.236	6.0	**.709**	18.00	9.00	10	**2.56**	65	**.0394**	1.00	2.CMC30.B3Z2.600.1	■
1/4	**.2500**	6.350	**.750**	19.05	9.53	10	**2.56**	65	**.0300**	0.762	2.CMC.RB2Z2.F14	■

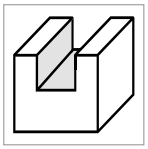
■ Stock item

CRAZYMILL by Mikron Tool Cool

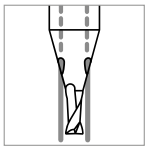
Type B - Conventional slot milling

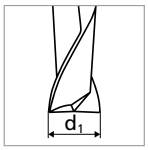
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

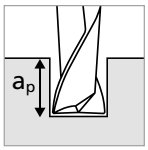
Conventional slot milling



- $a_p = 1 \times d_1$
- $a_p = 0.5 \times d_1$ for group S_1 and S_3



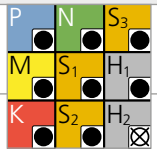




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3–0.4 mm | .012"–.016" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | 197	0.004 – 0.006 .00016 – .00024
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | 197	0.003–0.005 .00012–.00020
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | 197	0.003–0.005 .00012–.00020
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | 197	0.004–0.006 .00016–.00024
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | 197	0.003–0.005 .00012–.00020
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | 197	0.003–0.005 .00012–.00020
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | 197	0.003–0.005 .00012–.00020
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	60 | 197	0.002–0.004 .00008–.00016
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	60 | 197	0.005–0.007 .00020–.00028
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60 | 197	0.005–0.007 .00020–.00028
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	60 | 197	0.005–0.007 .00020–.00028
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	60 | 197	0.005–0.007 .00020–.00028
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	60 | 197	0.005–0.007 .00020–.00028
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	60 | 197	0.005–0.007 .00020–.00028
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	60 | 197	0.002–0.003 .00008–.00012
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	60 | 197	0.003–0.005 .00012–.00020
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	60 | 197	0.003–0.005 .00012–.00020
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 | 197	0.002–0.003 .00008–.00012
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | 197	0.003–0.005 .00012–.00020
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



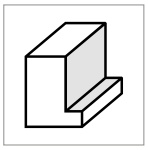
Ød1	1/32" 0.5–0.8 mm | .020"–.032"		1.0–1.2 mm | .039"–.047"		1/16" 1.5–1.8 mm | .059"–.071"		3/32" 2.0–2.5 mm | .079"–.098"		1/8" 3.0 mm | .118"		5/32–3/16–7/32–1/4" 4.0–6 mm | .158"–.236"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	100 | **328**	0.008 – 0.012 **.00031 – .00047**	140 | **459**	0.013 – 0.015 **.00051 – .00059**	180 | **591**	0.022 – 0.024 **.00087 – .00094**	200 | **656**	0.030 – 0.032 **.00118 – .00126**	220 | **722**	0.044 **.00173**	260 | **853**	0.048 **.00189**
	100 | **328**	0.007 – 0.010 **.00028 – .00039**	140 | **459**	0.012 – 0.014 **.00047 – .00055**	180 | **591**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.028 – 0.030 **.00110 – .00118**	220 | **722**	0.042 **.00165**	260 | **853**	0.046 **.00181**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	140 | **459**	0.009 – 0.011 **.00035 – .00043**	180 | **591**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.038 **.00150**	260 | **853**	0.040 **.00157**
	100 | **328**	0.008 – 0.012 **.00031 – .00047**	140 | **459**	0.014 – 0.016 **.00055 – .00063**	180 | **591**	0.022 – 0.024 **.00087 – .00094**	200 | **656**	0.030 – 0.032 **.00118 – .00126**	220 | **722**	0.042 **.00165**	260 | **853**	0.046 **.00181**
	100 | **328**	0.007 – 0.010 **.00028 – .00039**	140 | **459**	0.013 – 0.015 **.00051 – .00059**	180 | **591**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.028 – 0.030 **.00110 – .00118**	220 | **722**	0.040 **.00157**	260 | **853**	0.044 **.00173**
	100 | **328**	0.007 – 0.010 **.00028 – .00039**	140 | **459**	0.013 – 0.015 **.00051 – .00059**	180 | **591**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.028 – 0.030 **.00110 – .00118**	220 | **722**	0.040 **.00157**	260 | **853**	0.044 **.00173**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	140 | **459**	0.010 – 0.012 **.00039 – .00047**	180 | **591**	0.016 – 0.018 **.00063 – .00071**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.038 **.00150**	260 | **853**	0.042 **.00165**
	100 | **328**	0.005 – 0.008 **.00020 – .00031**	120 | **394**	0.010 – 0.020 **.00039 – .00079**	140 | **459**	0.022 – 0.025 **.00087 – .00098**	160 | **525**	0.026 – 0.035 **.00102 – .00138**	180 | **591**	0.038 – 0.045 **.00150 – .00177**	200 | **656**	0.048 – 0.052 **.00189 – .00205**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.050 **.00197**	260 | **853**	0.055 **.00217**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.048 **.00189**	260 | **853**	0.053 **.00209**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.050 **.00197**	260 | **853**	0.055 **.00217**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.050 **.00197**	260 | **853**	0.055 **.00217**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.050 **.00197**	260 | **853**	0.055 **.00217**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.016 – 0.018 **.00063 – .00071**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.050 **.00197**	260 | **853**	0.055 **.00217**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	120 | **394**	0.007 – 0.008 **.00028 – .00031**	130 | **427**	0.009 – 0.010 **.00035 – .00039**	140 | **459**	0.010 – 0.012 **.00039 – .00047**	150 | **492**	0.015 **.00059**	170 | **558**	0.020 **.00079**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	120 | **394**	0.014 – 0.016 **.00055 – .00063**	130 | **427**	0.018 – 0.020 **.00071 – .00079**	140 | **459**	0.026 – 0.028 **.00102 – .00110**	150 | **492**	0.040 **.00157**	170 | **558**	0.042 **.00165**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	120 | **394**	0.014 – 0.016 **.00055 – .00063**	130 | **427**	0.018 – 0.020 **.00071 – .00079**	140 | **459**	0.026 – 0.028 **.00102 – .00110**	150 | **492**	0.040 **.00157**	170 | **558**	0.042 **.00165**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	140 | **459**	0.007 – 0.008 **.00028 – .00031**	160 | **525**	0.009 – 0.010 **.00035 – .00039**	180 | **591**	0.010 – 0.012 **.00039 – .00047**	200 | **656**	0.015 **.00059**	220 | **722**	0.020 **.00079**
	80 | **262**	0.006 – 0.007 **.00024 – .00028**	100 | **328**	0.008 – 0.010 **.00031 – .00039**	140 | **459**	0.012 – 0.016 **.00047 – .00063**	180 | **591**	0.018 – 0.024 **.00071 – .00094**	200 | **656**	0.030 **.00118**	240 | **787**	0.035 **.00138**

CRAZYMILL by Mikron Tool Cool

Type B - Side and trochoidal slot milling

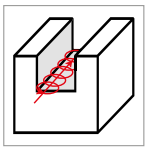
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Side milling

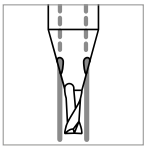


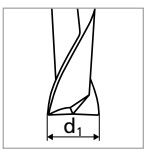
- $a_p = 1 \times d_1$
- $a_e = 0.3 \times d_1$

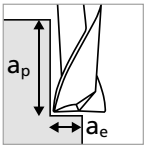
Trochoidal Slot Milling



- $a_p = 1 \times d_1$
- $a_e = 0.1 \times d_1$



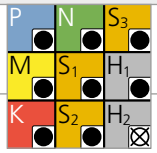




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3–0.4 mm | .012"–.016" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | 197	0.005–0.007 .00020–.00028
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | 197	0.004–0.006 .00016–.00024
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | 197	0.004–0.006 .00016–.00024
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | 197	0.005–0.007 .00020–.00028
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | 197	0.004–0.006 .00016–.00024
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | 197	0.004–0.006 .00016–.00024
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | 197	0.004–0.006 .00016–.00024
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	60 | 197	0.003–0.005 .00012–.00020
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	60 | 197	0.006–0.008 .00024–.00031
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60 | 197	0.006–0.008 .00024–.00031
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	60 | 197	0.006–0.008 .00024–.00031
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	60 | 197	0.006–0.008 .00024–.00031
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	60 | 197	0.006–0.008 .00024–.00031
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	60 | 197	0.006–0.008 .00024–.00031
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	60 | 197	0.003–0.004 .00012–.00016
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	60 | 197	0.004–0.006 .00016–.00024
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	60 | 197	0.004–0.006 .00016–.00024
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 | 197	0.003–0.004 .00012–.00016
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | 197	0.004–0.006 .00016–.00024
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



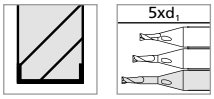
Ød1	1/32" 0.5–0.8 mm | .020"–.032"		1.0–1.2 mm | .039"–.047"		1/16" 1.5–1.8 mm | .059"–.071"		3/32" 2.0–2.5 mm | .079"–.098"		1/8" 3.0 mm | .118"		5/32–3/16–7/32–1/4" 4.0–6 mm | .158"–.236"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	200 | **656**	0.024 – 0.026 **.00094 – .00102**	220 | **722**	0.034 – 0.036 **.00134 – .00142**	240 | **787**	0.046 **.00181**	280 | **919**	0.050 **.00197**
	100 | **328**	0.009 – 0.012 **.00035 – .00047**	140 | **459**	0.014 – 0.016 **.00055 – .00063**	200 | **656**	0.022 – 0.024 **.00087 – .00094**	220 | **722**	0.032 – 0.034 **.00126 – .00134**	240 | **787**	0.044 **.00173**	280 | **919**	0.048 **.00189**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	140 | **459**	0.011 – 0.013 **.00043 – .00051**	200 | **656**	0.020 – 0.022 **.00079 – .00087**	220 | **722**	0.030 – 0.032 **.00118 – .00126**	240 | **787**	0.040 **.00157**	280 | **919**	0.042 **.00165**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.016 – 0.018 **.00063 – .00071**	200 | **656**	0.024 – 0.026 **.00094 – .00102**	220 | **722**	0.034 – 0.036 **.00134 – .00142**	240 | **787**	0.044 **.00173**	280 | **919**	0.048 **.00189**
	100 | **328**	0.009 – 0.012 **.00035 – .00047**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	200 | **656**	0.022 – 0.024 **.00087 – .00094**	220 | **722**	0.032 – 0.034 **.00126 – .00134**	240 | **787**	0.044 **.00173**	280 | **919**	0.046 **.00181**
	100 | **328**	0.009 – 0.012 **.00035 – .00047**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	200 | **656**	0.022 – 0.024 **.00087 – .00094**	220 | **722**	0.032 – 0.034 **.00126 – .00134**	240 | **787**	0.044 **.00173**	280 | **919**	0.046 **.00181**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	140 | **459**	0.012 – 0.014 **.00047 – .00055**	200 | **656**	0.016 – 0.018 **.00063 – .00071**	220 | **722**	0.030 – 0.032 **.00118 – .00126**	240 | **787**	0.040 **.00157**	280 | **919**	0.044 **.00173**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	120 | **394**	0.011 – 0.022 **.00043 – .00087**	140 | **459**	0.024 – 0.026 **.00094 – .00102**	160 | **525**	0.028 – 0.036 **.00110 – .00142**	180 | **591**	0.040 – 0.047 **.00157 – .00185**	200 | **656**	0.050 – 0.054 **.00197 – .00213**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014 – 0.018 **.00055 – .00071**	140 | **459**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014 – 0.018 **.00055 – .00071**	140 | **459**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014 – 0.018 **.00055 – .00071**	140 | **459**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	120 | **394**	0.007 – 0.008 **.00028 – .00031**	130 | **427**	0.009 – 0.010 **.00035 – .00039**	140 | **459**	0.010 – 0.012 **.00039 – .00047**	150 | **492**	0.015 **.00059**	170 | **558**	0.020 **.00079**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	120 | **394**	0.016 – 0.018 **.00063 – .00071**	130 | **427**	0.020 – 0.022 **.00079 – .00087**	140 | **459**	0.028 – 0.030 **.00110 – .00118**	150 | **492**	0.040 **.00157**	170 | **558**	0.044 **.00173**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	120 | **394**	0.016 – 0.018 **.00063 – .00071**	130 | **427**	0.020 – 0.022 **.00079 – .00087**	140 | **459**	0.028 – 0.030 **.00110 – .00118**	150 | **492**	0.040 **.00157**	170 | **558**	0.044 **.00173**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	140 | **459**	0.007 – 0.008 **.00028 – .00031**	180 | **591**	0.009 – 0.010 **.00035 – .00039**	200 | **656**	0.010 – 0.012 **.00039 – .00047**	220 | **722**	0.015 **.00059**	240 | **787**	0.020 **.00079**
	80 | **262**	0.007 – 0.009 **.00028 – .00035**	100 | **328**	0.010 – 0.012 **.00039 – .00047**	140 | **459**	0.014 – 0.018 **.00055 – .00071**	180 | **591**	0.020 – 0.026 **.00079 – .00102**	200 | **656**	0.033 **.00130**	240 | **787**	0.040 **.00157**

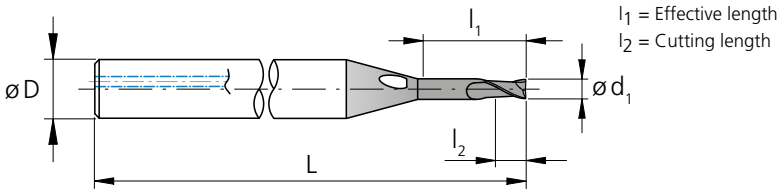
CRAZYMILL by Mikron Tool Cool

Type C - 5 x d - Square / Corner radius - Z2

MILLING WITH INTEGRATED COOLING

Square





l_1 = Effective length
l_2 = Cutting length

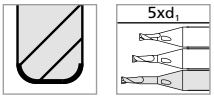
d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.012	0.3	**.059**	1.50	0.45	3	**1.50**	38	2.CMC30.C1Z2.030.1	■
1/64	**.0156**	0.396	**.078**	1.98	0.59	3	**1.50**	38	2.CMC.SCZ2.F164	■
	.016	0.4	**.079**	2.00	0.60	3	**1.50**	38	2.CMC30.C1Z2.040.1	■
	.020	0.5	**.098**	2.50	0.75	3	**1.50**	38	2.CMC30.C1Z2.050.1	■
	.024	0.6	**.118**	3.00	0.90	3	**1.50**	38	2.CMC30.C1Z2.060.1	■
1/32	**.0312**	0.793	**.156**	3.97	1.19	3	**1.50**	38	2.CMC.SCZ2.F132	■
	.031	0.8	**.157**	4.00	1.20	3	**1.50**	38	2.CMC30.C1Z2.080.1	■
	.039	1.0	**.197**	5.00	1.50	4	**1.57**	40	2.CMC30.C1Z2.100.1	■
	.047	1.2	**.236**	6.00	1.80	4	**1.57**	40	2.CMC30.C1Z2.120.1	■
	.059	1.5	**.295**	7.50	2.25	4	**1.57**	40	2.CMC30.C1Z2.150.1	■
1/16	**.0625**	1.587	**.313**	7.94	2.38	4	**1.57**	40	2.CMC.SCZ2.F116	■
	.071	1.8	**.354**	9.00	2.70	4	**1.57**	40	2.CMC30.C1Z2.180.1	■
	.079	2.0	**.394**	10.00	3.00	4	**1.73**	44	2.CMC30.C1Z2.200.1	■
3/32	**.0937**	2.381	**.469**	11.91	3.57	6	**1.97**	50	2.CMC.SCZ2.F332	■
	.098	2.5	**.492**	12.50	3.75	6	**1.97**	50	2.CMC30.C1Z2.250.1	■
	.118	3.0	**.591**	15.00	4.50	6	**2.17**	55	2.CMC30.C1Z2.300.1	■
1/8	**.1250**	3.175	**.625**	15.88	4.76	6	**2.36**	60	2.CMC.SCZ2.F18	■
5/32	**.1562**	3.968	**.781**	19.84	5.95	6	**2.36**	60	2.CMC.SCZ2.F532	■
	.157	4.0	**.787**	20.00	6.00	6	**2.36**	60	2.CMC30.C1Z2.400.1	■
3/16	**.1875**	4.762	**.937**	23.81	7.14	10	**2.76**	70	2.CMC.SCZ2.F316	■
7/32	**.2189**	5.560	**1.09**	27.80	8.34	10	**2.76**	70	2.CMC.SCZ2.F732	■
	.236	6.0	**1.18**	30.00	9.00	10	**2.76**	70	2.CMC30.C1Z2.600.1	■
1/4	**.2500**	6.350	**1.25**	31.75	9.53	10	**2.76**	70	2.CMC.SCZ2.F14	■

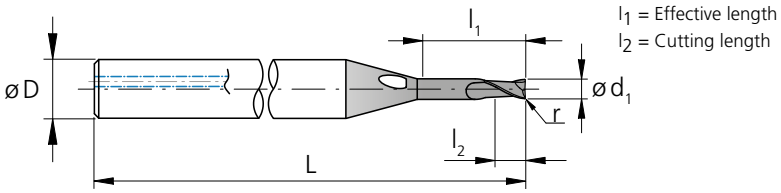
■ Stock item

Carbide | Z2 | 30° | eXedur RIP

Ø d_1	**.012" - 1/4"** (0.3 - 6.35 mm)	
Tolerance	**+ .0004"** **- .0004"**	+ 0.01 mm - 0.01 mm

Corner radius





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	r [inch]	r [mm]	Item number	Availability
	.012	0.3	**.059**	1.50	0.45	3	**1.50**	38	**.0020**	0.05	2.CMC30.C2Z2.030.1	■
1/64	**.0156**	0.396	**.078**	1.98	0.59	3	**1.50**	38	**.0030**	0.076	2.CMC.RC2Z2.F164	■
	.016	0.4	**.079**	2.00	0.60	3	**1.50**	38	**.0020**	0.05	2.CMC30.C2Z2.040.1	■
	.020	0.5	**.098**	2.50	0.75	3	**1.50**	38	**.0020**	0.05	2.CMC30.C2Z2.050.1	■
	.020	0.5	**.098**	2.50	0.75	3	**1.50**	38	**.0039**	0.10	2.CMC30.C3Z2.050.1	■
	.024	0.6	**.118**	3.00	0.90	3	**1.50**	38	**.0020**	0.05	2.CMC30.C2Z2.060.1	■
	.024	0.6	**.118**	3.00	0.90	3	**1.50**	38	**.0039**	0.10	2.CMC30.C3Z2.060.1	■
1/32	**.0312**	0.793	**.156**	3.97	1.19	3	**1.50**	38	**.0030**	0.076	2.CMC.RC2Z2.F132	■
1/32	**.0312**	0.793	**.156**	3.97	1.19	3	**1.50**	38	**.0050**	0.127	2.CMC.RC3Z2.F132	■
	.031	0.8	**.157**	4.00	1.20	3	**1.50**	38	**.0020**	0.05	2.CMC30.C2Z2.080.1	■
	.031	0.8	**.157**	4.00	1.20	3	**1.50**	38	**.0039**	0.10	2.CMC30.C3Z2.080.1	■
	.039	1.0	**.197**	5.00	1.50	4	**1.57**	40	**.0039**	0.10	2.CMC30.C2Z2.100.1	■
	.039	1.0	**.197**	5.00	1.50	4	**1.57**	40	**.0079**	0.20	2.CMC30.C3Z2.100.1	■
	.047	1.2	**.236**	6.00	1.80	4	**1.57**	40	**.0039**	0.10	2.CMC30.C2Z2.120.1	■
	.047	1.2	**.236**	6.00	1.80	4	**1.57**	40	**.0079**	0.20	2.CMC30.C3Z2.120.1	■
	.059	1.5	**.295**	7.50	2.25	4	**1.57**	40	**.0039**	0.10	2.CMC30.C2Z2.150.1	■
	.059	1.5	**.295**	7.50	2.25	4	**1.57**	40	**.0118**	0.30	2.CMC30.C3Z2.150.1	■
1/16	**.0625**	1.587	**.313**	7.94	2.38	4	**1.57**	40	**.0050**	0.127	2.CMC.RC2Z2.F116	■
1/16	**.0625**	1.587	**.313**	7.94	2.38	4	**1.57**	40	**.0100**	0.254	2.CMC.RC3Z2.F116	■
	.071	1.8	**.354**	9.00	2.70	4	**1.57**	40	**.0039**	0.10	2.CMC30.C2Z2.180.1	■
	.071	1.8	**.354**	9.00	2.70	4	**1.57**	40	**.0118**	0.30	2.CMC30.C3Z2.180.1	■
	.079	2.0	**.394**	10.00	3.00	4	**1.73**	44	**.0039**	0.10	2.CMC30.C2Z2.200.1	■
	.079	2.0	**.394**	10.00	3.00	4	**1.73**	44	**.0079**	0.20	2.CMC30.C3Z2.200.1	■
	.079	2.0	**.394**	10.00	3.00	4	**1.73**	44	**.0197**	0.50	2.CMC30.C4Z2.200.1	■
3/32	**.0937**	2.381	**.469**	11.91	3.57	6	**1.97**	50	**.0050**	0.127	2.CMC.RC2Z2.F332	■
3/32	**.0937**	2.381	**.469**	11.91	3.57	6	**1.97**	50	**.0100**	0.254	2.CMC.RC3Z2.F332	■
3/32	**.0937**	2.381	**.469**	11.91	3.57	6	**1.97**	50	**.0150**	0.381	2.CMC.RC4Z2.F332	■
	.098	2.5	**.492**	12.50	3.75	6	**1.97**	50	**.0079**	0.20	2.CMC30.C2Z2.250.1	■
	.098	2.5	**.492**	12.50	3.75	6	**1.97**	50	**.0197**	0.50	2.CMC30.C3Z2.250.1	■
	.118	3.0	**.591**	15.00	4.50	6	**2.17**	55	**.0079**	0.20	2.CMC30.C2Z2.300.1	■
	.118	3.0	**.591**	15.00	4.50	6	**2.17**	55	**.0197**	0.50	2.CMC30.C3Z2.300.1	■
1/8	**.1250**	3.175	**.625**	15.88	4.76	6	**2.36**	60	**.0100**	0.254	2.CMC.RC2Z2.F18	■
1/8	**.1250**	3.175	**.625**	15.88	4.76	6	**2.36**	60	**.0150**	0.381	2.CMC.RC3Z2.F18	■
5/32	**.1562**	3.968	**.781**	19.84	5.95	6	**2.36**	60	**.0100**	0.254	2.CMC.RC2Z2.F532	■
5/32	**.1562**	3.968	**.781**	19.84	5.95	6	**2.36**	60	**.0150**	0.381	2.CMC.RC3Z2.F532	■
	.157	4.0	**.787**	20.00	6.00	6	**2.36**	60	**.0079**	0.20	2.CMC30.C2Z2.400.1	■
	.157	4.0	**.787**	20.00	6.00	6	**2.36**	60	**.0197**	0.50	2.CMC30.C3Z2.400.1	■
3/16	**.1875**	4.762	**.937**	23.81	7.14	10	**2.76**	70	**.0100**	0.254	2.CMC.RC2Z2.F316	■
3/16	**.1875**	4.762	**.937**	23.81	7.14	10	**2.76**	70	**.0150**	0.381	2.CMC.RC3Z2.F316	■
7/32	**.2189**	5.560	**1.09**	27.80	8.34	10	**2.76**	70	**.0150**	0.381	2.CMC.RC2Z2.F732	■
7/32	**.2189**	5.560	**1.09**	27.80	8.34	10	**2.76**	70	**.0300**	0.762	2.CMC.RC3Z2.F732	■
	.236	6.0	**1.18**	30.00	9.00	10	**2.76**	70	**.0197**	0.50	2.CMC30.C2Z2.600.1	■
	.236	6.0	**1.18**	30.00	9.00	10	**2.76**	70	**.0394**	1.00	2.CMC30.C3Z2.600.1	■
1/4	**.2500**	6.350	**1.25**	31.75	9.53	10	**2.76**	70	**.0300**	0.762	2.CMC.RC2Z2.F14	■

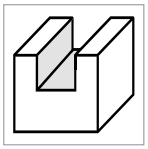
■ Stock item

CRAZYMILL by Mikron Tool Cool

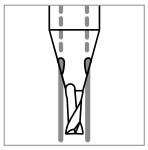
Type C - Conventional slot milling

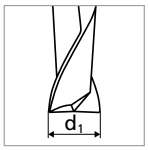
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

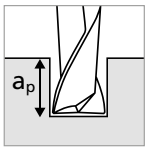
Conventional slot milling



- $a_p = 1 \times d_1$
- $a_p = 0.5 \times d_1$ for group S_1 and S_3



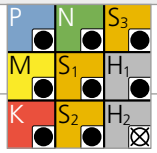




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3–0.4 mm | .012"–.016" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | 197	0.004 – 0.006 .00016 – .00024
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | 197	0.003–0.005 .00012–.00020
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | 197	0.003–0.005 .00012–.00020
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | 197	0.004–0.006 .00016–.00024
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | 197	0.003–0.005 .00012–.00020
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | 197	0.003–0.005 .00012–.00020
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | 197	0.003–0.005 .00012–.00020
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	60 | 197	0.002–0.004 .00008–.00016
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	60 | 197	0.005–0.007 .00020–.00028
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60 | 197	0.005–0.007 .00020–.00028
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	60 | 197	0.005–0.007 .00020–.00028
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	60 | 197	0.005–0.007 .00020–.00028
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	60 | 197	0.005–0.007 .00020–.00028
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	60 | 197	0.005–0.007 .00020–.00028
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	60 | 197	0.002–0.003 .00008–.00012
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	60 | 197	0.003–0.005 .00012–.00020
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	60 | 197	0.003–0.005 .00012–.00020
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 | 197	0.002–0.003 .00008–.00012
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | 197	0.003–0.005 .00012–.00020
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



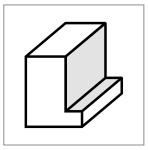
Ød1	1/32" 0.5–0.8 mm | .020"–.032"		1.0–1.2 mm | .039"–.047"		1/16" 1.5–1.8 mm | .059"–.071"		3/32" 2.0–2.5 mm | .079"–.098"		1/8" 3.0 mm | .118"		5/32–3/16–7/32–1/4" 4.0–6 mm | .158"–.236"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	100 | **328**	0.008 – 0.012 **.00031 – .00047**	140 | **459**	0.013 – 0.015 **.00051 – .00059**	180 | **591**	0.022 – 0.024 **.00087 – .00094**	200 | **656**	0.030 – 0.032 **.00118 – .00126**	220 | **722**	0.034 **.00134**	260 | **853**	0.048 **.00189**
	100 | **328**	0.007 – 0.010 **.00028 – .00039**	140 | **459**	0.012 – 0.014 **.00047 – .00055**	180 | **591**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.028 – 0.030 **.00110 – .00118**	220 | **722**	0.032 **.00126**	260 | **853**	0.046 **.00181**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	140 | **459**	0.009 – 0.011 **.00035 – .00043**	180 | **591**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.028 **.00110**	260 | **853**	0.042 **.00165**
	100 | **328**	0.008 – 0.012 **.00031 – .00047**	140 | **459**	0.014 – 0.016 **.00055 – .00063**	180 | **591**	0.022 – 0.024 **.00087 – .00094**	200 | **656**	0.030 – 0.032 **.00118 – .00126**	220 | **722**	0.034 **.00134**	260 | **853**	0.046 **.00181**
	100 | **328**	0.007 – 0.010 **.00028 – .00039**	140 | **459**	0.013 – 0.015 **.00051 – .00059**	180 | **591**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.028 – 0.030 **.00110 – .00118**	220 | **722**	0.032 **.00126**	260 | **853**	0.044 **.00173**
	100 | **328**	0.007 – 0.010 **.00028 – .00039**	140 | **459**	0.013 – 0.015 **.00051 – .00059**	180 | **591**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.028 – 0.030 **.00110 – .00118**	220 | **722**	0.032 **.00126**	260 | **853**	0.044 **.00173**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	140 | **459**	0.010 – 0.012 **.00039 – .00047**	180 | **591**	0.016 – 0.018 **.00063 – .00071**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.030 **.00118**	260 | **853**	0.042 **.00165**
	100 | **328**	0.005 – 0.008 **.00020 – .00031**	120 | **394**	0.010 – 0.020 **.00039 – .00079**	140 | **459**	0.022 – 0.025 **.00087 – .00098**	160 | **525**	0.026 – 0.035 **.00102 – .00138**	180 | **591**	0.040 **.00157**	200 | **656**	0.050 **.00197**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.052 **.00205**	260 | **853**	0.050 **.00197**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.050 **.00197**	260 | **853**	0.050 **.00197**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.052 **.00205**	260 | **853**	0.050 **.00197**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.052 **.00205**	260 | **853**	0.050 **.00197**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.052 **.00205**	260 | **853**	0.050 **.00197**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.016 – 0.018 **.00063 – .00071**	180 | **591**	0.024 – 0.026 **.00094 – .00102**	200 | **656**	0.032 – 0.034 **.00126 – .00134**	220 | **722**	0.052 **.00205**	260 | **853**	0.050 **.00197**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	120 | **394**	0.007 – 0.008 **.00028 – .00031**	130 | **427**	0.009 – 0.010 **.00035 – .00039**	140 | **459**	0.010 – 0.012 **.00039 – .00047**	150 | **492**	0.015 **.00059**	170 | **558**	0.020 **.00079**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	120 | **394**	0.014 – 0.016 **.00055 – .00063**	130 | **427**	0.018 – 0.020 **.00071 – .00079**	140 | **459**	0.026 – 0.028 **.00102 – .00110**	150 | **492**	0.030 **.00118**	170 | **558**	0.040 **.00157**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	120 | **394**	0.014 – 0.016 **.00055 – .00063**	130 | **427**	0.018 – 0.020 **.00071 – .00079**	140 | **459**	0.026 – 0.028 **.00102 – .00110**	150 | **492**	0.030 **.00118**	170 | **558**	0.040 **.00157**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	140 | **459**	0.007 – 0.008 **.00028 – .00031**	160 | **525**	0.009 – 0.010 **.00035 – .00039**	180 | **591**	0.010 – 0.012 **.00039 – .00047**	200 | **656**	0.015 **.00059**	220 | **722**	0.020 **.00079**
	80 | **262**	0.006 – 0.007 **.00024 – .00028**	100 | **328**	0.008 – 0.010 **.00031 – .00039**	140 | **459**	0.012 – 0.016 **.00047 – .00063**	180 | **591**	0.018 – 0.024 **.00071 – .00094**	200 | **656**	0.028 **.00110**	240 | **787**	0.030 **.00118**

CRAZYMILL by Mikron Tool Cool

Type C - Side and trochoidal slot milling

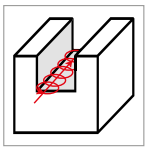
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Side milling

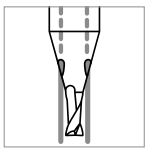


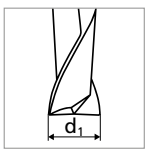
- $a_p = 1 \times d_1$
- $a_e = 0.3 \times d_1$

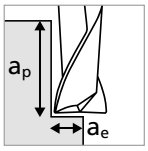
Trochoidal Slot Milling



- $a_p = 1 \times d_1$
- $a_e = 0.1 \times d_1$



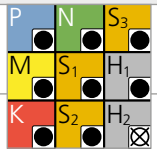




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3–0.4 mm | .012"–.016" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | 197	0.005–0.007 .00020–.00028
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | 197	0.004–0.006 .00016–.00024
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | 197	0.004–0.006 .00016–.00024
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | 197	0.005–0.007 .00020–.00028
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | 197	0.004–0.006 .00016–.00024
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | 197	0.004–0.006 .00016–.00024
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | 197	0.004–0.006 .00016–.00024
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	60 | 197	0.003–0.005 .00012–.00020
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	60 | 197	0.006–0.008 .00024–.00031
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60 | 197	0.006–0.008 .00024–.00031
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	60 | 197	0.006–0.008 .00024–.00031
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	60 | 197	0.006–0.008 .00024–.00031
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	60 | 197	0.006–0.008 .00024–.00031
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	60 | 197	0.006–0.008 .00024–.00031
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	60 | 197	0.003–0.004 .00012–.00016
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	60 | 197	0.004–0.006 .00016–.00024
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	60 | 197	0.004–0.006 .00016–.00024
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 | 197	0.003–0.004 .00012–.00016
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | 197	0.004–0.006 .00016–.00024
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1	1/32" 0.5–0.8 mm | .020"–.032"		1.0–1.2 mm | .039"–.047"		1/16" 1.5–1.8 mm | .059"–.071"		3/32" 2.0–2.5 mm | .079"–.098"		1/8" 3.0 mm | .118"		5/32–3/16–7/32–1/4" 4.0–6 mm | .158"–.236"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	200 | **656**	0.024 – 0.026 **.00094 – .00102**	220 | **722**	0.034 – 0.036 **.00134 – .00142**	240 | **787**	0.040 **.00157**	280 | **919**	0.050 **.00197**
	100 | **328**	0.009 – 0.012 **.00035 – .00047**	140 | **459**	0.014 – 0.016 **.00055 – .00063**	200 | **656**	0.022 – 0.024 **.00087 – .00094**	220 | **722**	0.032 – 0.034 **.00126 – .00134**	240 | **787**	0.038 **.00150**	280 | **919**	0.048 **.00189**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	140 | **459**	0.011 – 0.013 **.00043 – .00051**	200 | **656**	0.020 – 0.022 **.00079 – .00087**	220 | **722**	0.030 – 0.032 **.00118 – .00126**	240 | **787**	0.035 **.00138**	280 | **919**	0.044 **.00173**
	100 | **328**	0.010 – 0.014 **.00039 – .00055**	140 | **459**	0.016 – 0.018 **.00063 – .00071**	200 | **656**	0.024 – 0.026 **.00094 – .00102**	220 | **722**	0.034 – 0.036 **.00134 – .00142**	240 | **787**	0.040 **.00157**	280 | **919**	0.048 **.00189**
	100 | **328**	0.009 – 0.012 **.00035 – .00047**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	200 | **656**	0.022 – 0.024 **.00087 – .00094**	220 | **722**	0.032 – 0.034 **.00126 – .00134**	240 | **787**	0.036 **.00142**	280 | **919**	0.046 **.00181**
	100 | **328**	0.009 – 0.012 **.00035 – .00047**	140 | **459**	0.015 – 0.017 **.00059 – .00067**	200 | **656**	0.022 – 0.024 **.00087 – .00094**	220 | **722**	0.032 – 0.034 **.00126 – .00134**	240 | **787**	0.036 **.00142**	280 | **919**	0.046 **.00181**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	140 | **459**	0.012 – 0.014 **.00047 – .00055**	200 | **656**	0.016 – 0.018 **.00063 – .00071**	220 | **722**	0.030 – 0.032 **.00118 – .00126**	240 | **787**	0.034 **.00134**	280 | **919**	0.044 **.00173**
	100 | **328**	0.006 – 0.009 **.00024 – .00035**	120 | **394**	0.011 – 0.022 **.00043 – .00087**	140 | **459**	0.024 – 0.026 **.00094 – .00102**	160 | **525**	0.028 – 0.036 **.00110 – .00142**	180 | **591**	0.042 **.00165**	200 | **656**	0.052 **.00205**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**
	100 | **328**	0.014 – 0.018 **.00055 – .00071**	140 | **459**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**
	100 | **328**	0.014 – 0.018 **.00055 – .00071**	140 | **459**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**
	100 | **328**	0.014 – 0.018 **.00055 – .00071**	140 | **459**	0.020 – 0.022 **.00079 – .00087**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**
	100 | **328**	0.012 – 0.016 **.00047 – .00063**	140 | **459**	0.018 – 0.020 **.00071 – .00079**	200 | **656**	0.026 – 0.028 **.00102 – .00110**	220 | **722**	0.036 – 0.040 **.00142 – .00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	120 | **394**	0.007 – 0.008 **.00028 – .00031**	130 | **427**	0.009 – 0.010 **.00035 – .00039**	140 | **459**	0.010 – 0.012 **.00039 – .00047**	150 | **492**	0.015 **.00059**	170 | **558**	0.020 **.00079**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	120 | **394**	0.016 – 0.018 **.00063 – .00071**	130 | **427**	0.020 – 0.022 **.00079 – .00087**	140 | **459**	0.028 – 0.030 **.00110 – .00118**	150 | **492**	0.034 **.00134**	170 | **558**	0.042 **.00165**
	100 | **328**	0.008 – 0.011 **.00031 – .00043**	120 | **394**	0.016 – 0.018 **.00063 – .00071**	130 | **427**	0.020 – 0.022 **.00079 – .00087**	140 | **459**	0.028 – 0.030 **.00110 – .00118**	150 | **492**	0.034 **.00134**	170 | **558**	0.042 **.00165**
	100 | **328**	0.004 – 0.006 **.00016 – .00024**	140 | **459**	0.007 – 0.008 **.00028 – .00031**	180 | **591**	0.009 – 0.010 **.00035 – .00039**	200 | **656**	0.010 – 0.012 **.00039 – .00047**	220 | **722**	0.015 **.00059**	240 | **787**	0.020 **.00079**
	80 | **262**	0.007 – 0.009 **.00028 – .00035**	100 | **328**	0.010 – 0.012 **.00039 – .00047**	140 | **459**	0.014 – 0.018 **.00055 – .00071**	180 | **591**	0.020 – 0.026 **.00079 – .00102**	200 | **656**	0.030 **.00118**	240 | **787**	0.032 **.00126**



Process CrazyMill Cool Square / Corner radius - Z2

ACCURATE AND EFFICIENT MILLING

Coolant type, pressure and filtration

Coolant: for best results, Mikron Tool recommends the use of cutting oil as coolant. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used as well.

Filter: the large cooling channels permit the use of a standard filter with filter quality of ≤ .002" (0.05 mm).

Coolant pressure: at least 15 bar (218 psi) coolant pressure is required to achieve reliable milling. High pressure is generally better for the cooling and flushing effect.

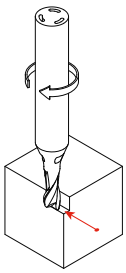
Revolution	[rpm]	≤ 10'000	> 10'000
Minimal pressure	[bar]	15	30
	[psi]	**218**	**435**

Tool holders

For detailed indications for tool holders see chapter "Technical information".

MLLING PROCESS

Climb milling and conventional milling

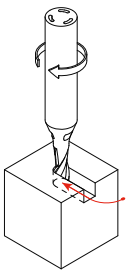


When milling pockets or walls, for example, Mikron Tool recommends climb milling since chip thickness in conventional milling is zero at the beginning and increases up to the exit. In this case, high cutting forces push the milling tool and the workpiece away from each other. Thus, surface quality decreases.

Entry for milling into the material

During milling with direct entry into the material, very thick chips are produced and the milling tool is subject to asymmetrical stress until it is working with its entire diameter in the material. These stresses can affect the service life of cutting edges, especially in hard and tough materials such as heat-resistant steel or titanium. We, therefore, recommend two other more gentle types of entry apart from direct entry with full feeding:

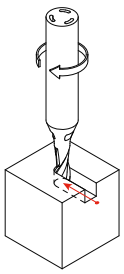
1. Indirect entry



f_z = 70%

Indirect milling (also referred to as rolling entry) into the material (clockwise entry into the material in one radius) and 30% less feed in hard and tough materials such as heat-resistant steels or titanium.

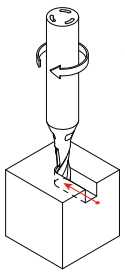
2. Reduced feed



f_z = 50%

Direct milling into the material with approx. 50% less feed in hard and tough materials, such as heat-resistant steels or titanium.

3. Direct milling



f_z = 100%

Without reducing the feed for general steels (material group P), aluminum, etc. (material group N).

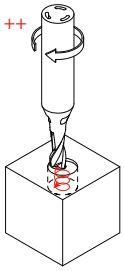
Process CrazyMill Cool Square / Corner radius - Z2

MILLING PROCESS

Immersion

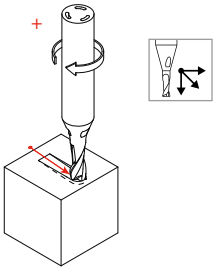
Spiral interpolation offers the best and most gentle method of immersion. The methods of immersion using a linear ramp can also be used with milling tools such as CrazyMill Cool (milling tool cuts over center).

1. Spiral interpolation



Note that the minimum diameter to be produced must be 1.3 x d_1. The minimum and maximum immersion angle α and the feed correction v_f must be maintained depending on the material (see tables).

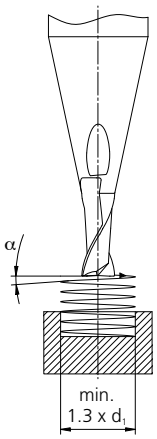
2. Linear ramp



A milling tool that can be immersed axially is needed for the immersion (milling tool must cut above center). The minimum and maximum immersion angle α and the feed correction v_f must be maintained depending on the material (see tables).

Suggested ramp angle

	Material	Ramp angle α min	Ramp angle α max
P	Unalloyed and alloyed Steel	5°	15°
M	Stainless steels	5°	10°
K	Cast iron	5°	15°
N	Aluminum and non-ferrous metals	10°	30°
S_1	Super alloys	2°	8°
S_2	Titanium and titanium alloys	2°	8°
S_3	CrCo alloys	2°	8°
H_1	Hardened steel < 55 HRC	5°	10°



Suggested feed correction v_f

Ramp angle α - Feed correction v_f				
α	5°	10°	20°	30°
V_f	80%	70%	60%	50%

MILLING PROCESS

Conventional slot milling

Cutting values: see cutting data chart "Conventional slot milling"!

Advantages

- Conventional 3-axis CNC machines can be used
- High metal removal rates if the conditions are stable (stable tool and workpiece clamping)
- Simple programming

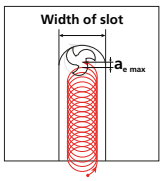
Drawbacks

- Sensitive to vibrations (several milling steps may be needed)
- Limited precision when flute milling (for example, perpendicularity or surface), sometimes must be machined in several milling steps a_p
- Produces high radial forces

Trochoidal slot milling

Cutting values: see cutting data chart "Side milling" / "Trochoidal slot milling"!

Additional parameter recommendation



- Milling tool diameter d_1 as compared to the groove: d_1 = max. 70% of the groove width
- Cutting width a_e = max. 10% of milling tool's diameter d_1
- Cutting depth a_p = depending on material and milling tool type, see cutting data chart
- Cutting speed = depending on material and milling tool type, see cutting data chart
- Feed per tooth f_z = depending on material and milling tool type, see cutting data chart

Advantages

- Generates smaller radial forces and fewer vibrations
- Higher precision due to smaller tool deflection (because of small radial forces)
- Better chip evacuation
- Less heat development
- Gentle on the tool, especially with stainless, acid-resistant and heat-resistant steel, and titanium alloys, resulting in longer service lives

Drawbacks

- A dynamic machining center and modern machine control are necessary
- More programming effort
- Longer processing time

PATENTED

CrazyMill Cool Square / Corner radius - Z4

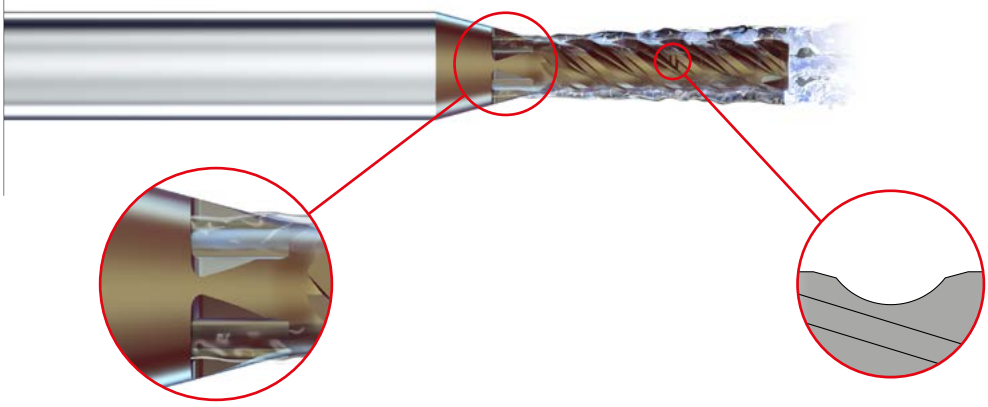


NEW

CRAZYMILL Cool

MILLING TOOL FOR PRE-MACHINING AND FINISHING DIFFICULT MATERIALS

CrazyMill Cool Square / Corner radius with four flutes is an innovative end mill, developed by Mikron Tool, for machining stainless steels, titanium alloys, CrCo and super alloys. It is available in the diameter range from .039" to .315" (1 mm to 8 mm) and a maximal milling depth of 5 x d.



Integrated cooling
Constant and massive cooling of the cutting edges

New chip-splitting concept
Optimized to guarantee short chips and a perfect evacuation

Performance features

- Highest speed and feed
- Integrated cooling
- Pre-machining and finishing with one tool
- New chip-splitting concept

Your advantages

- Time and cost saving
- Excellent surface quality
- Reliable process
- Perfect chip control

CRAZYMILL by Mikron Tool Cool

NEW

Maximum performance and surface quality

SQUARE / CORNER RADIUS ENDMILL WITH INTEGRATED COOLING

With CrazyMill Cool Square / Corner radius – Z4, Mikron Tool expands the range of milling cutters for difficult-to-machine materials. Four versions of square respectively corner radius endmills with four teeth and shank integrated cooling are available in the diameter range from .039" to .315" (1 mm to 8 mm) and a maximal milling depth of 5 x d.

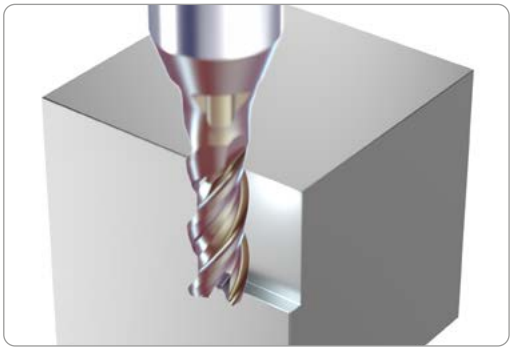
- CrazyMill Cool Square, Type A – milling depth 2 x d, cutting length 2 x d, through shank coolant, Z = 4
- CrazyMill Cool Square, Type C – milling depth 5 x d, cutting length 2 x d, through shank coolant, Z = 4
- CrazyMill Cool Square, Type M – milling depth 3 x d, cutting length 3 x d, through shank coolant, Z = 4
- CrazyMill Cool Square, Type N – milling depth 4 x d, cutting length 4 x d, through shank coolant, Z = 4

- CrazyMill Cool Corner radius, Type A – milling depth 2 x d, cutting length 2 x d, through shank coolant, Z = 4
- CrazyMill Cool Corner radius, Type C – milling depth 5 x d, cutting length 2 x d, through shank coolant, Z = 4
- CrazyMill Cool Corner radius, Type M – milling depth 3 x d, cutting length 3 x d, through shank coolant, Z = 4
- CrazyMill Cool Corner radius, Type N – milling depth 4 x d, cutting length 4 x d, through shank coolant, Z = 4

One tool for many applications

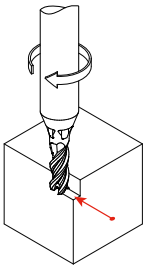
FOR DIFFICULT TO MACHINE MATERIALS

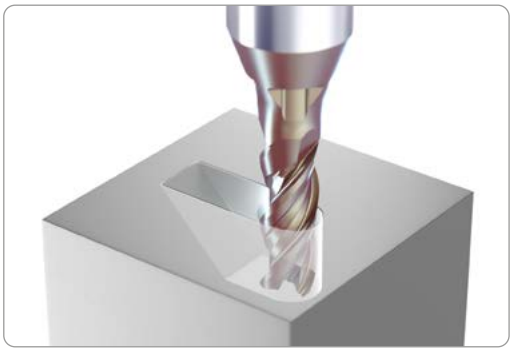
■ **CrazyMill Cool Square / Corner radius - Z4 for:**



1. Side milling: Pre-machining and Finishing

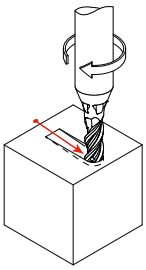
a_p = 2 x d / 3 x d / 4 x d

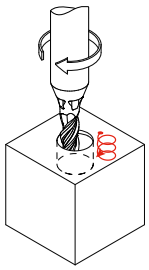


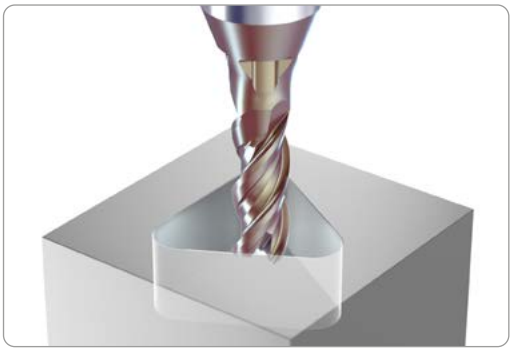


2. Linear ramp or helical interpolation milling

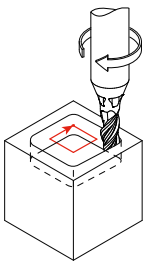
Angle depending on material







3. Pocket milling



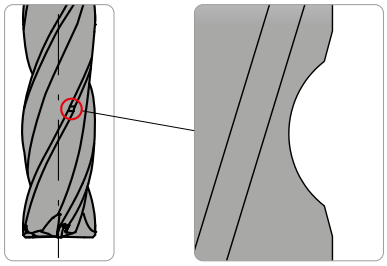
CRAZYMILL by Mikron Tool Cool

NEW Important features

FOR BEST PERFORMANCE ON SURFACE QUALITY

■ **Optimized chip-splitting for short chips and perfect surface quality**

Chip-splitting design



Optimized chip-splitting geometry for short chips and a perfect chip evacuation. The result is a perfect surface quality.

Short chips



Due the chip-splitting the chips are short and easily evacuated. The result is long tool life.

Surface quality

CrazyMill Cool

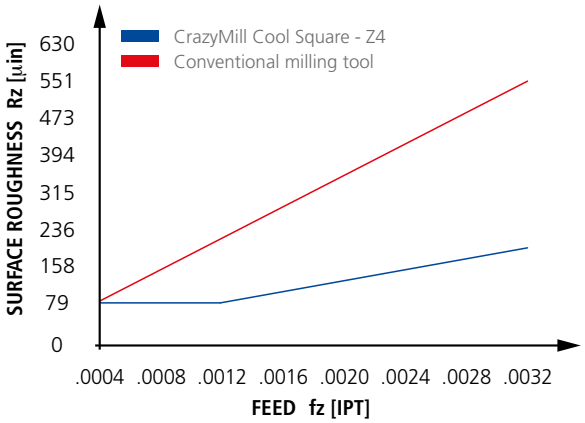


Conventional endmill



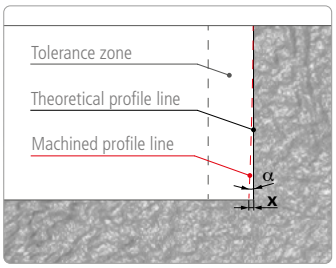
Due the new design of chip-splitting there is no visible mark as happens when using a conventional milling tool. The result is an excellent surface quality.

■ Surface roughness Rz



Material: X2CrNiMo17-12-2 / 1.4404 / AISI 316L
Diameter: .315" (8 mm); Milling depth: .630" (16 mm);
Coolant: cutting oil; Cutting data: v_c = 853 SFM (260 m/min);
a_p = .630" (16 mm); a_e = .006" (0.16 mm)

■ Perpendicularity



	Perpendicularity precision
x	.0008" (0.02 mm)
α	- 0.05°

Material: X2CrNiMo17-12-2 / 1.4404 / AISI 316L
Diameter: .236" (6 mm); Milling depth: .945" (24 mm);
Coolant: cutting oil; Cutting data: v_c = 723 SFM (220 m/min);
f_z = .0012 IPT (0.03 mm); a_p = .945" (24 mm);
a_e = .0047" (0.12 mm)

Thanks to the profile of the flute and the size of the core, greater stability is achieved. The result is high perpendicularity precision, in particularly for long tool versions.

CRAZYMILL by Mikron Tool Cool

PATENTED

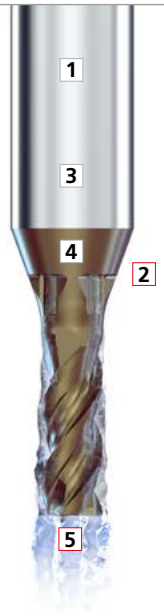
l_1 = Effective length
l_2 = Cutting length

2 x d

Type A

- Coated
- Integ. cooling
- l_1: 2xd, l_2: 2xd





page 502

5 x d

Type C

- Coated
- Integ. cooling
- l_1: 5xd, l_2: 2xd





page 508

3 x d

Type M

- Coated
- Integ. cooling
- l_1: 3xd, l_2: 3xd





page 514

4 x d

Type N

- Coated
- Integ. cooling
- l_1: 4xd, l_2: 4xd





page 520

NEW

1 | SHANK
The robust solid carbide shank guarantees stable and vibration-free milling. High precision and extraordinary surface quality are reached.

2 | INTEGRATED COOLING - PATENTED
The integrated cooling channels guarantee constant and maximal cooling of the cutting edges and optimal chip removal. The result is higher cutting speed and depth a_p as well as an excellent surface quality.

3 | CARBIDE
The specially developed micro-grain carbide meets all requirements in terms of mechanical properties.

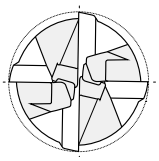
4 | COATING
The high-performance eXedur SNP coating is heat and wear resistant, prevents buildup edges and guarantees optimum chip flushing. The result is a long tool life.

5 | CUTTING GEOMETRY OF END FACE - LINEAR RAMP AND HELICAL INTERPOLATION MILLING
The frontal cutting geometry with the specially designed expanded chip collection has been optimized for linear ramp and helical interpolation milling by high ramp angles.

6 | LATERAL CUTTING GEOMETRY
The long and robust lateral cutting edge of versions M and N allows to obtain high tool rigidity. The result is higher machining force resistance that leads to high perpendicularity precision and high surface quality.

7 | CHIP-SPLITTING
An optimized chip-splitting guarantees short chips and highest surface quality. The chip-splitting is implemented in version M for Ø$d_1 \geq 4$ mm and N for Ø$d_1 \geq 3$ mm.

Mill tip



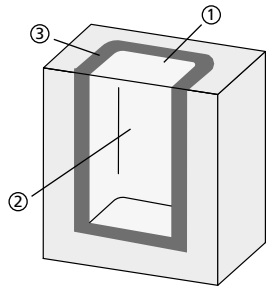


4 - Flute

NEW

Benefits and applications

PRE-MACHINING AND FINISHING CUTTER WITH INTEGRATED COOLING



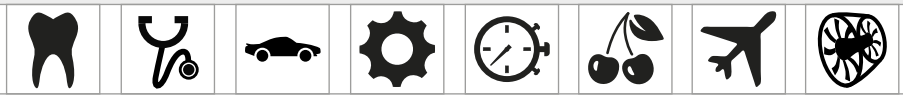
COMPONENT
Pocket milling

MATERIAL
X2CrNiMo17-12-2 / 1.4404 / AISI 316L

MACHINING
- ① Helical ramp
- ② Pre-machining
- ③ Finishing
- Diameter endmill = .315" (8 mm)
- Pocket depth = .630" (16 mm)

MILLING TOOL
Mikron Tool - CrazyMill Cool Square - Z4
Type A

DATA	MIKRON TOOL
Tool type	CrazyMill Cool Square - Z4 - Carbide - Coated - Integrated cooling
Item number	2.CMC42.A1Z4.800.1
Cutting data	① Helical ramp v_c = 160 m/min **| 525 SFM** f_z = 0.03 mm **| .00012 IPT** $a_{p,\,max}$ = 1 x d a_e = 7.5 mm **| .295"** α = 20° Q = 22.9 cm³/min **| .006 gpm** Δt = 4 s ② Pre-machining v_c = 180 m/min **| 591 SFM** f_z = 0.048 mm **| .0019 IPT** $a_{p,\,max}$ = 2 x d a_e = 1.6 mm **| .063"** Q = 35.2 cm³/min **| .009 gpm** Δt = 1 min 40 s ③ Finishing v_c = 260 m/min **| 853 SFM** f_z = 0.04 mm **| .0016 IPT** $a_{p,\,max}$ = 2 x d a_e = 0.16 mm **| .0063"** Q = 4.2 cm³/min **| .001 gpm** Δt = 9 s



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Tooth crown
Medical technology	Component for endoscope
Automotive industry	Components for injection system
Mechanical engineering	Machine components
Watches	Watch housing
Food industry	Nozzle
Aerospace industry	Engine parts
Power industry	Blade

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4301	X5CrNi 18-10	304
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S2 Titanium (pure and alloyed	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25

NEW CrazyMill Cool Square / Corner radius - Z4

MILLING WITH INTEGRATED COOLING

Square


2 x d
page 502


5 x d
page 508


3 x d
page 514


4 x d
page 520

Corner radius


2 x d
page 503


5 x d
page 509


3 x d
page 515


4 x d
page 521

CrazyMill Cool is setting new standards for the milling of pockets and walls with regard to cutting speeds, feed, performance, tool life, and surface quality. The new features of this pre-machining and finishing cutter include not only the solid carbide, coating, and geometry, but especially the unique cooling system with cooling channels integrated in the shaft, which achieve constant and extensive cooling of the cutting edges, thus enabling the highest cutting speeds and maximum feed.

The milling tools have three to five integrated cooling channels depending on the shaft diameter.

Mikron Tool developed two different variants:

- **Variant square** - sharp-edged with small, defined protection phase of 45°, for a maximum machining depth of 5 x d.
- **Variant corner radius** - sharp-edged with a corner radius for a maximum machining depth of 5 x d.

Coolant type, pressure and filtration

Detailed recommendations for coolant type, pressure and filtration are on page "milling process".

Please note

You couldn't find your suitable version of the CrazyMill Cool Square / Corner radius - Z4 (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

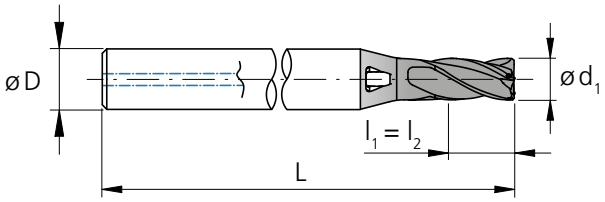
CRAZYMILL by Mikron Tool Cool

NEW Type A - 2 x d - Square / Corner radius - Z4

MILLING WITH INTEGRATED COOLING

Square





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.0	**.079**	2.0	2.0	4	**1.57**	40	2.CMC42.A1Z4.100.1	■
	.047	1.2	**.094**	2.4	2.4	4	**1.57**	40	2.CMC42.A1Z4.120.1	■
	.059	1.5	**.118**	3.0	3.0	4	**1.57**	40	2.CMC42.A1Z4.150.1	■
1/16	**.0625**	1.587	**.122**	3.1	3.1	4	**1.57**	40	2.CMC.SAZ4.F116	■
	.071	1.8	**.142**	3.6	3.6	4	**1.57**	40	2.CMC42.A1Z4.180.1	■
	.079	2.0	**.157**	4.0	4.0	4	**1.57**	40	2.CMC42.A1Z4.200.1	■
3/32	**.0937**	2.381	**.185**	4.7	4.7	4	**1.57**	40	2.CMC.SAZ4.F332	■
	.098	2.5	**.197**	5.0	5.0	6	**1.97**	50	2.CMC42.A1Z4.250.1	■
	.118	3.0	**.236**	6.0	6.0	6	**1.97**	50	2.CMC42.A1Z4.300.1	■
1/8	**.1250**	3.175	**.252**	6.4	6.4	6	**1.97**	50	2.CMC.SAZ4.F18	■
	.138	3.5	**.276**	7.0	7.0	6	**1.97**	50	2.CMC42.A1Z4.350.1	■
5/32	**.1562**	3.968	**.312**	7.9	7.9	6	**1.97**	50	2.CMC.SAZ4.F532	■
	.157	4.0	**.315**	8.0	8.0	6	**1.97**	50	2.CMC42.A1Z4.400.1	■
	.177	4.5	**.354**	9.0	9.0	8	**2.36**	60	2.CMC42.A1Z4.450.1	■
3/16	**.1875**	4.762	**.375**	9.5	9.5	8	**2.36**	60	2.CMC.SAZ4.F316	■
	.197	5.0	**.394**	10.0	10.0	8	**2.36**	60	2.CMC42.A1Z4.500.1	■
7/32	**.2189**	5.560	**.438**	11.1	11.1	10	**2.36**	60	2.CMC.SAZ4.F732	■
	.236	6.0	**.472**	12.0	12.0	10	**2.36**	60	2.CMC42.A1Z4.600.1	■
1/4	**.2500**	6.350	**.500**	12.7	12.7	10	**2.36**	60	2.CMC.SAZ4.F14	■
	.315	8.0	**.630**	16.0	16.0	12	**2.76**	70	2.CMC42.A1Z4.800.1	■

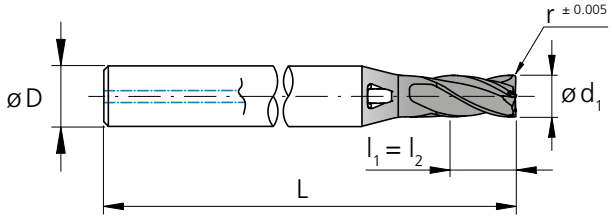
■ Stock item

Carbide | 2xd1 | Z4 | 42° | eXedur SNP | ap | ae

Ø d1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	- .00055" - .00110"	- 0.014 mm - 0.028 mm	- .00079" - .00150"	- 0.020 mm - 0.038 mm	- .00098" - .00185"	- 0.025 mm - 0.047 mm

Corner radius





l1 = Effective length
l2 = Cutting length

d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	r [inch]	r [mm]	Item number	Availability
	.039	1.0	.079	2.0	2.0	4	1.57	40	.0039	0.10	2.CMC42.A2Z4.100.1	■
	.039	1.0	.079	2.0	2.0	4	1.57	40	.0079	0.20	2.CMC42.A3Z4.100.1	■
	.047	1.2	.094	2.4	2.4	4	1.57	40	.0039	0.10	2.CMC42.A2Z4.120.1	■
	.047	1.2	.094	2.4	2.4	4	1.57	40	.0079	0.20	2.CMC42.A3Z4.120.1	■
	.059	1.5	.118	3.0	3.0	4	1.57	40	.0039	0.10	2.CMC42.A2Z4.150.1	■
	.059	1.5	.118	3.0	3.0	4	1.57	40	.0118	0.30	2.CMC42.A3Z4.150.1	■
1/16	.0625	1.587	.122	3.1	3.1	4	1.57	40	.0050	0.127	2.CMC.RA2Z4.F116	■
1/16	.0625	1.587	.122	3.1	3.1	4	1.57	40	.0100	0.254	2.CMC.RA3Z4.F116	■
	.071	1.8	.142	3.6	3.6	4	1.57	40	.0039	0.10	2.CMC42.A2Z4.180.1	■
	.071	1.8	.142	3.6	3.6	4	1.57	40	.0118	0.30	2.CMC42.A3Z4.180.1	■
	.079	2.0	.157	4.0	4.0	4	1.57	40	.0039	0.10	2.CMC42.A2Z4.200.1	■
	.079	2.0	.157	4.0	4.0	4	1.57	40	.0079	0.20	2.CMC42.A3Z4.200.1	■
	.079	2.0	.157	4.0	4.0	4	1.57	40	.0197	0.50	2.CMC42.A4Z4.200.1	■
3/32	.0937	2.381	.185	4.7	4.7	4	1.57	40	.0050	0.127	2.CMC.RA2Z4.F332	■
3/32	.0937	2.381	.185	4.7	4.7	4	1.57	40	.0100	0.254	2.CMC.RA3Z4.F332	■
3/32	.0937	2.381	.185	4.7	4.7	4	1.57	40	.0150	0.381	2.CMC.RA4Z4.F332	■
	.098	2.5	.197	5.0	5.0	6	1.97	50	.0079	0.20	2.CMC42.A2Z4.250.1	■
	.098	2.5	.197	5.0	5.0	6	1.97	50	.0197	0.50	2.CMC42.A3Z4.250.1	■
	.118	3.0	.236	6.0	6.0	6	1.97	50	.0079	0.20	2.CMC42.A2Z4.300.1	■
	.118	3.0	.236	6.0	6.0	6	1.97	50	.0197	0.50	2.CMC42.A3Z4.300.1	■
1/8	.1250	3.175	.250	6.4	6.4	6	1.97	50	.0100	0.254	2.CMC.RA2Z4.F18	■
1/8	.1250	3.175	.250	6.4	6.4	6	1.97	50	.0150	0.381	2.CMC.RA3Z4.F18	■
	.138	3.5	.276	7.0	7.0	6	1.97	50	.0079	0.20	2.CMC42.A2Z4.350.1	■
	.138	3.5	.276	7.0	7.0	6	1.97	50	.0197	0.50	2.CMC42.A3Z4.350.1	■
5/32	.1562	3.968	.312	7.9	7.9	6	1.97	50	.0100	0.254	2.CMC.RA2Z4.F532	■
5/32	.1562	3.968	.312	7.9	7.9	6	1.97	50	.0150	0.381	2.CMC.RA3Z4.F532	■
	.157	4.0	.315	8.0	8.0	6	1.97	50	.0079	0.20	2.CMC42.A2Z4.400.1	■
	.157	4.0	.315	8.0	8.0	6	1.97	50	.0197	0.50	2.CMC42.A3Z4.400.1	■
	.177	4.5	.354	9.0	9.0	8	2.36	60	.0079	0.20	2.CMC42.A2Z4.450.1	■
	.177	4.5	.354	9.0	9.0	8	2.36	60	.0197	0.50	2.CMC42.A3Z4.450.1	■
3/16	.1875	4.762	.375	9.5	9.5	8	2.36	60	.0100	0.254	2.CMC.RA2Z4.F316	■
3/16	.1875	4.762	.375	9.5	9.5	8	2.36	60	.0150	0.381	2.CMC.RA3Z4.F316	■
	.197	5.0	.394	10.0	10.0	8	2.36	60	.0079	0.20	2.CMC42.A2Z4.500.1	■
	.197	5.0	.394	10.0	10.0	8	2.36	60	.0197	0.50	2.CMC42.A3Z4.500.1	■
7/32	.2189	5.560	.438	11.1	11.1	10	2.36	60	.0150	0.381	2.CMC.RA2Z4.F732	■
7/32	.2189	5.560	.438	11.1	11.1	10	2.36	60	.0300	0.762	2.CMC.RA3Z4.F732	■
	.236	6.0	.472	12.0	12.0	10	2.36	60	.0079	0.20	2.CMC42.A2Z4.600.1	■
	.236	6.0	.472	12.0	12.0	10	2.36	60	.0197	0.50	2.CMC42.A3Z4.600.1	■
	.236	6.0	.472	12.0	12.0	10	2.36	60	.0394	1.00	2.CMC42.A4Z4.600.1	■
1/4	.2500	6.350	.500	12.7	12.7	10	2.36	60	.0150	0.381	2.CMC.RA2Z4.F14	■
1/4	.2500	6.350	.500	12.7	12.7	10	2.36	60	.0300	0.762	2.CMC.RA3Z4.F14	■
1/4	.2500	6.350	.500	12.7	12.7	10	2.36	60	.0600	1.524	2.CMC.RA4Z4.F14	■
	.315	8.0	.630	16.0	16.0	12	2.76	70	.0079	0.20	2.CMC42.A2Z4.800.1	■
	.315	8.0	.630	16.0	16.0	12	2.76	70	.0197	0.50	2.CMC42.A3Z4.800.1	■
	.315	8.0	.630	16.0	16.0	12	2.76	70	.0591	1.50	2.CMC42.A4Z4.800.1	■

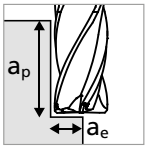
■ Stock item

CRAZYMILL by Mikron Tool Cool

NEW Type A - Pre-machining

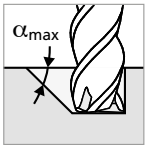
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Pre-machining



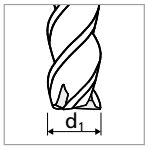
①
- $a_p = 1.5 \times d_1$
- $a_e = 0.3 \times d_1$

②
- $a_p = 2 \times d_1$
- $a_e = 0.2 \times d_1$



Note:
In case of linear ramp or helical interpolation milling reduce f_z by 35%

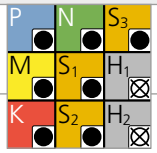




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" ① f_z	1.0 mm | .039" ② f_z	1.5 mm | 1/16" v_c	1.5 mm | 1/16" ① f_z	1.5 mm | 1/16" ② f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.011 **.00043**	0.013 **.00051**	200 **656**	0.024 **.00094**	0.017 **.00067**
		1.0401	C15	AISI 1015						
		1.1191	C45E/CK45	AISI 1045						
		1.0044	S275JR	AISI 1020						
		1.0715	11SMn30	AISI 1215						
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.010 **.00039**	0.012 **.00047**	200 **656**	0.022 **.00087**	0.015 **.00059**
		1.7131	16MnCr5	AISI 5115						
		1.3505	100Cr6	AISI 52100						
		1.7225	42CrMo4	AISI 4140						
		1.2842	90MnCrV8	AISI O2						
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.008 **.00032**	0.009 **.00035**	200 **656**	0.019 **.00075**	0.013 **.00051**
		1.2436	X210CrW12	AISI D4/D6						
		1.3343	HS6-5-2C	AISI M2 / UNS T11302						
		1.3355	HS18-0-1	AISI T1 / UNS T12001						
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.012 **.00047**	0.014 **.00055**	180 **591**	0.021 **.00083**	0.016 **.00063**
		1.4105	X6CrMoS17	AISI 430F						
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.011 **.00043**	0.013 **.00051**	180 **591**	0.021 **.00083**	0.016 **.00063**
		1.4112	X90CrMoV18	AISI 440B						
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.011 **.00043**	0.013 **.00051**	180 **591**	0.021 **.00083**	0.016 **.00063**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH						
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.009 **.00035**	0.011 **.00043**	180 **591**	0.018 **.00071**	0.014 **.00055**
		1.4435	X2CrNiMo18-14-3	AISI 316L						
		1.4441	X2CrNiMo18-15-3	AISI 316LM						
		1.4539	X1NiCrMoCu25-20-5	AISI 904L						
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.008 **.00032**	0.010 **.00039**	160 **525**	0.019 **.00075**	0.016 **.00063**
		0.6030	GG30	ASTM 40B						
		0.7040	GGG40	ASTM 60-40-18						
		0.7060	GGG60	ASTM 80-60-03						
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	160 **525**	0.013 **.00051**	0.015 **.00059**	200 **656**	0.026 **.00102**	0.018 **.00071**
		3.4365	AlZnMgCu1.5	ASTM 7075						
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	160 **525**	0.013 **.00051**	0.015 **.00059**	220 **722**	0.026 **.00102**	0.018 **.00071**
		3.2381	GD-AlSi10Mg	UNS A03590						
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	160 **525**	0.013 **.00051**	0.015 **.00059**	220 **722**	0.026 **.00102**	0.018 **.00071**
		2.0065	Cu-ETP / CW004A	UNS C11000						
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	160 **525**	0.013 **.00051**	0.015 **.00059**	220 **722**	0.026 **.00102**	0.018 **.00071**
		2.0360	CuZn40 CW509L	UNS C28000						
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	160 **525**	0.013 **.00051**	0.015 **.00059**	220 **722**	0.026 **.00102**	0.018 **.00071**
		2.1020	CuSn6	UNS C51900						
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	160 **525**	0.013 **.00051**	0.015 **.00059**	220 **722**	0.026 **.00102**	0.018 **.00071**
		2.0960	CuAl9Mn2	UNS C63200						
S_1	Super alloys	2.4856		Inconel 625	80 **262**	-	0.006 **.00024**	100 **328**	-	0.008 **.00030**
		2.4668		Inconel 718						
		2.4617	NiMo28	Hastelloy B-2						
		2.4665	NiCr22Fe18Mo	Hastelloy X						
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	100 **328**	0.010 **.00039**	0.012 **.00047**	100 **328**	0.017 **.00067**	0.014 **.00055**
		3.7065	Gr.4	ASTM B348 / F68						
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	100 **328**	0.010 **.00039**	0.012 **.00047**	100 **328**	0.017 **.00067**	0.014 **.00055**
		9.9367	TiAl6Nb7	ASTM F1295						
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	80 **262**	-	0.006 **.00024**	100 **328**	-	0.008 **.00030**
			CrCoMo28	ASTM F1537						
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1						
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2						

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1		①	②
3/32" 2.0 mm | .079"	v_c	f_z	
1/8" 3.0 mm | .118"	v_c	f_z	
5/32" 4.0 mm | .157"	v_c	f_z	
3/16" - 7/32" 5.0 mm | .197"	v_c	f_z	
1/4" 6.0 mm | .236"	v_c	f_z	
8.0 mm | .315"	v_c	f_z	

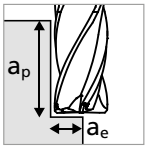
3/32" 2.0 mm | .079"			1/8" 3.0 mm | .118"			5/32" 4.0 mm | .157"			3/16" - 7/32" 5.0 mm | .197"			1/4" 6.0 mm | .236"			8.0 mm | .315"		
v_c	① f_z	② f_z	v_c	① f_z	② f_z	v_c	① f_z	② f_z	v_c	① f_z	② f_z	v_c	① f_z	② f_z	v_c	① f_z	② f_z
220 **722**	0.024 **.00094**	0.027 **.00106**	240 **787**	0.033 **.00130**	0.038 **.00150**	260 **853**	0.035 **.00138**	0.040 **.00157**	260 **853**	0.035 **.00138**	0.040 **.00157**	260 **853**	0.046 **.00181**	0.052 **.00205**	260 **853**	0.054 **.00213**	0.064 **.00252**
220 **722**	0.022 **.00087**	0.025 **.00098**	240 **787**	0.031 **.00122**	0.035 **.00139**	260 **853**	0.033 **.00130**	0.038 **.00151**	260 **853**	0.033 **.00130**	0.038 **.00151**	260 **853**	0.044 **.00173**	0.050 **.00197**	260 **853**	0.052 **.00205**	0.060 **.00236**
220 **722**	0.019 **.00075**	0.022 **.00087**	240 **787**	0.028 **.00110**	0.032 **.00126**	260 **853**	0.030 **.00118**	0.034 **.00134**	260 **853**	0.030 **.00118**	0.034 **.00134**	260 **853**	0.042 **.00165**	0.048 **.00189**	260 **853**	0.050 **.00197**	0.057 **.00224**
180 **591**	0.021 **.00083**	0.024 **.00094**	200 **656**	0.030 **.00118**	0.034 **.00134**	220 **722**	0.033 **.00130**	0.038 **.00151**	220 **722**	0.033 **.00130**	0.038 **.00151**	220 **722**	0.040 **.00157**	0.045 **.00177**	260 **853**	0.048 **.00189**	0.055 **.00217**
180 **591**	0.021 **.00083**	0.024 **.00094**	200 **656**	0.030 **.00118**	0.034 **.00134**	220 **722**	0.032 **.00126**	0.037 **.00145**	220 **722**	0.032 **.00126**	0.037 **.00145**	220 **722**	0.037 **.00145**	0.043 **.00169**	260 **853**	0.045 **.00177**	0.052 **.00205**
180 **591**	0.021 **.00083**	0.024 **.00094**	200 **656**	0.030 **.00118**	0.034 **.00134**	220 **722**	0.032 **.00126**	0.037 **.00145**	220 **722**	0.032 **.00126**	0.037 **.00145**	220 **722**	0.037 **.00145**	0.043 **.00169**	260 **853**	0.045 **.00177**	0.052 **.00205**
180 **591**	0.018 **.00071**	0.020 **.00079**	200 **656**	0.026 **.00102**	0.030 **.00118**	220 **722**	0.031 **.00122**	0.035 **.00138**	220 **722**	0.031 **.00122**	0.035 **.00139**	220 **722**	0.035 **.00139**	0.040 **.00157**	260 **853**	0.042 **.00165**	0.048 **.00189**
200 **656**	0.019 **.00075**	0.022 **.00087**	220 **722**	0.030 **.00118**	0.034 **.00135**	240 **787**	0.042 **.00165**	0.048 **.00189**	240 **787**	0.042 **.00165**	0.048 **.00189**	240 **787**	0.044 **.00173**	0.050 **.00197**	240 **787**	0.052 **.00205**	0.057 **.00224**
240 **787**	0.026 **.00102**	0.030 **.00118**	260 **853**	0.040 **.00157**	0.046 **.00183**	300 **984**	0.051 **.00201**	0.058 **.00228**	320 **1050**	0.051 **.00201**	0.058 **.00228**	320 **1050**	0.052 **.00205**	0.060 **.00236**	350 **1148**	0.060 **.00236**	0.069 **.00272**
240 **787**	0.026 **.00102**	0.030 **.00118**	260 **853**	0.040 **.00157**	0.046 **.00183**	300 **984**	0.051 **.00201**	0.058 **.00228**	320 **1050**	0.051 **.00201**	0.058 **.00228**	320 **1050**	0.052 **.00205**	0.060 **.00236**	350 **1148**	0.060 **.00236**	0.069 **.00272**
240 **787**	0.026 **.00102**	0.030 **.00118**	260 **853**	0.040 **.00157**	0.046 **.00183**	300 **984**	0.051 **.00201**	0.058 **.00228**	320 **1050**	0.051 **.00201**	0.058 **.00228**	320 **1050**	0.052 **.00205**	0.060 **.00236**	350 **1148**	0.060 **.00236**	0.069 **.00272**
240 **787**	0.026 **.00102**	0.030 **.00118**	260 **853**	0.040 **.00157**	0.046 **.00183**	300 **984**	0.051 **.00201**	0.058 **.00228**	320 **1050**	0.051 **.00201**	0.058 **.00228**	320 **1050**	0.052 **.00205**	0.060 **.00236**	350 **1148**	0.060 **.00236**	0.069 **.00272**
240 **787**	0.026 **.00102**	0.030 **.00118**	260 **853**	0.040 **.00157**	0.046 **.00183**	300 **984**	0.051 **.00201**	0.058 **.00228**	320 **1050**	0.051 **.00201**	0.058 **.00228**	320 **1050**	0.052 **.00205**	0.060 **.00236**	350 **1148**	0.060 **.00236**	0.069 **.00272**
100 **328**	-	0.010 **.00039**	100 **328**	-	0.014 **.00055**	120 **394**	-	0.016 **.00063**	120 **394**	-	0.018 **.00071**	120 **394**	-	0.020 **.00079**	120 **394**	-	0.020 **.00079**
110 **361**	0.017 **.00067**	0.020 **.00079**	110 **361**	0.028 **.00110**	0.032 **.00126**	130 **427**	0.028 **.00110**	0.035 **.00139**	130 **427**	0.031 **.00122**	0.035 **.00139**	130 **427**	0.032 **.00126**	0.037 **.00147**	140 **459**	0.035 **.00138**	0.040 **.00157**
110 **361**	0.017 **.00067**	0.020 **.00079**	110 **361**	0.028 **.00110**	0.032 **.00126**	130 **427**	0.028 **.00110**	0.035 **.00139**	130 **427**	0.031 **.00122**	0.035 **.00139**	130 **427**	0.032 **.00126**	0.037 **.00147**	140 **459**	0.035 **.00138**	0.040 **.00157**
100 **328**	-	0.010 **.00039**	100 **328**	-	0.014 **.00055**	120 **394**	-	0.016 **.00063**	120 **394**	-	0.018 **.00071**	120 **394**	-	0.020 **.00079**	120 **394**	-	0.025 **.00098**

CRAZYMILL by Mikron Tool Cool

NEW Type A - Finishing

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

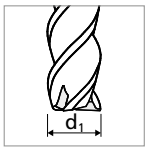
Finishing



①
- $a_p = 2 \times d_1$
- $a_e = 0.04 \times d_1$

②
- $a_p = 2 \times d_1$
- $a_e = 0.02 \times d_1$

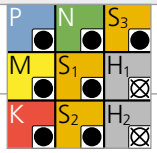




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" ① f_z	1.0 mm | .039" ② f_z	1.5 mm | .059" 1/16" v_c	1.5 mm | .059" 1/16" ① f_z	1.5 mm | .059" 1/16" ② f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	130 **427**	0.008 **.00032**	0.009 **.00035**	180 **591**	0.012 **.00047**	0.014 **.00055**
		1.0401	C15	AISI 1015						
		1.1191	C45E/CK45	AISI 1045						
		1.0044	S275JR	AISI 1020						
		1.0715	11SMn30	AISI 1215						
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	130 **427**	0.007 **.00028**	0.008 **.00032**	180 **591**	0.011 **.00043**	0.013 **.00051**
		1.7131	16MnCr5	AISI 5115						
		1.3505	100Cr6	AISI 52100						
		1.7225	42CrMo4	AISI 4140						
		1.2842	90MnCrV8	AISI O2						
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	130 **427**	0.006 **.00024**	0.007 **.00028**	180 **591**	0.010 **.00039**	0.012 **.00047**
		1.2436	X210CrW12	AISI D4/D6						
		1.3343	HS6-5-2C	AISI M2 / UNS T11302						
		1.3355	HS18-0-1	AISI T1 / UNS T12001						
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	130 **427**	0.008 **.00032**	0.009 **.00035**	180 **591**	0.012 **.00047**	0.014 **.00055**
		1.4105	X6CrMoS17	AISI 430F						
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	130 **427**	0.008 **.00032**	0.009 **.00035**	180 **591**	0.011 **.00043**	0.013 **.00051**
		1.4112	X90CrMoV18	AISI 440B						
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	130 **427**	0.008 **.00032**	0.009 **.00035**	180 **591**	0.011 **.00043**	0.013 **.00051**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH						
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	130 **427**	0.006 **.00024**	0.007 **.00028**	180 **591**	0.008 **.00032**	0.009 **.00035**
		1.4435	X2CrNiMo18-14-3	AISI 316L						
		1.4441	X2CrNiMo18-15-3	AISI 316LM						
		1.4539	X1NiCrMoCu25-20-5	AISI 904L						
K	Cast iron	0.6020	GG20	ASTM 30	110 **361**	0.006 **.00024**	0.007 **.00028**	130 **427**	0.012 **.00047**	0.014 **.00055**
		0.6030	GG30	ASTM 40B						
		0.7040	GGG40	ASTM 60-40-18						
		0.7060	GGG60	ASTM 80-60-03						
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	130 **427**	0.009 **.00035**	0.010 **.00039**	180 **591**	0.013 **.00051**	0.015 **.00060**
		3.4365	AlZnMgCu1.5	ASTM 7075						
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	130 **427**	0.009 **.00035**	0.010 **.00039**	180 **591**	0.013 **.00051**	0.015 **.00060**
		3.2381	GD-AlSi10Mg	UNS A03590						
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	130 **427**	0.010 **.00039**	0.012 **.00047**	180 **591**	0.013 **.00051**	0.015 **.00060**
		2.0065	Cu-ETP / CW004A	UNS C11000						
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	130 **427**	0.010 **.00039**	0.012 **.00047**	180 **591**	0.013 **.00051**	0.015 **.00060**
		2.0360	CuZn40 CW509L	UNS C28000						
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	130 **427**	0.010 **.00039**	0.012 **.00047**	180 **591**	0.013 **.00051**	0.015 **.00060**
		2.1020	CuSn6	UNS C51900						
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	130 **427**	0.009 **.00035**	0.010 **.00039**	180 **591**	0.013 **.00051**	0.015 **.00060**
		2.0960	CuAl9Mn2	UNS C63200						
S_1	Super alloys	2.4856		Inconel 625	110 **361**	0.004 **.00016**	0.005 **.00020**	120 **394**	0.005 **.00020**	0.006 **.00024**
		2.4668		Inconel 718						
		2.4617	NiMo28	Hastelloy B-2						
		2.4665	NiCr22Fe18Mo	Hastelloy X						
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	110 **361**	0.008 **.00032**	0.009 **.00035**	120 **394**	0.010 **.00039**	0.012 **.00047**
		3.7065	Gr.4	ASTM B348 / F68						
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	110 **361**	0.008 **.00032**	0.009 **.00035**	120 **394**	0.010 **.00039**	0.012 **.00047**
		9.9367	TiAl6Nb7	ASTM F1295						
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	110 **361**	0.004 **.00016**	0.005 **.00020**	120 **394**	0.005 **.00020**	0.006 **.00024**
			CrCoMo28	ASTM F1537						
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1						
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2						

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1	v_c	f_z ①	f_z ②
3/32" 2.0 mm | **.079"**	200 **656**	0.017 **.00067**	0.020 **.00079**
	200 **656**	0.016 **.00063**	0.018 **.00071**
	200 **656**	0.015 **.00059**	0.017 **.00067**
1/8" 3.0 mm | **.118"**	210 **689**	0.023 **.0091**	0.026 **.00103**
	210 **689**	0.022 **.00087**	0.025 **.00098**
	210 **689**	0.020 **.00079**	0.023 **.0091**
5/32" 4.0 mm | **.157"**	220 **722**	0.025 **.00098**	0.029 **.00114**
	220 **722**	0.024 **.00094**	0.028 **.00110**
	220 **722**	0.021 **.00083**	0.024 **.00094**
3/16" - 7/32" 5.0 mm | **.197"**	220 **722**	0.028 **.00110**	0.032 **.00126**
	220 **722**	0.026 **.00102**	0.030 **.00118**
	220 **722**	0.023 **.00091**	0.026 **.00102**
1/4" 6.0 mm | **.236"**	220 **722**	0.033 **.00130**	0.038 **.00150**
	220 **722**	0.029 **.00114**	0.033 **.00130**
	220 **722**	0.025 **.00098**	0.029 **.00114**
8.0 mm | **.315"**	220 **722**	0.038 **.00150**	0.044 **.00173**
	220 **722**	0.034 **.00134**	0.040 **.00157**
	220 **722**	0.030 **.00118**	0.035 **.00138**
	200 **656**	0.017 **.00067**	0.020 **.00079**
	200 **656**	0.016 **.00063**	0.018 **.00071**
	200 **656**	0.016 **.00063**	0.018 **.00071**
	200 **656**	0.015 **.00059**	0.017 **.00067**
	210 **689**	0.022 **.00087**	0.025 **.00098**
	210 **689**	0.022 **.00087**	0.025 **.00098**
	210 **689**	0.020 **.00079**	0.023 **.0091**
	220 **722**	0.024 **.00094**	0.028 **.00110**
	220 **722**	0.023 **.00091**	0.027 **.00106**
	220 **722**	0.023 **.00091**	0.027 **.00106**
	220 **722**	0.022 **.00087**	0.025 **.00098**
	220 **722**	0.026 **.00102**	0.030 **.00118**
	220 **722**	0.025 **.00098**	0.029 **.00114**
	220 **722**	0.025 **.00098**	0.029 **.00114**
	220 **722**	0.024 **.00094**	0.028 **.00110**
	220 **722**	0.029 **.00114**	0.033 **.00130**
	220 **722**	0.028 **.00110**	0.032 **.00126**
	220 **722**	0.028 **.00110**	0.032 **.00126**
	220 **722**	0.026 **.00102**	0.030 **.00118**
	260 **853**	0.034 **.00134**	0.040 **.00157**
	260 **853**	0.033 **.00130**	0.038 **.00150**
	260 **853**	0.033 **.00130**	0.038 **.00150**
	260 **853**	0.032 **.00126**	0.037 **.00146**
	150 **492**	0.014 **.00055**	0.016 **.00063**
	160 **525**	0.022 **.00087**	0.025 **.00098**
	170 **558**	0.025 **.00098**	0.029 **.00114**
	170 **558**	0.029 **.00114**	0.033 **.00130**
	170 **558**	0.031 **.00122**	0.036 **.00142**
	200 **656**	0.036 **.00142**	0.042 **.00165**
	200 **656**	0.018 **.00071**	0.021 **.00083**
	200 **656**	0.018 **.00071**	0.021 **.00083**
	200 **656**	0.018 **.00071**	0.021 **.00083**
	200 **656**	0.018 **.00071**	0.021 **.00083**
	200 **656**	0.018 **.00071**	0.021 **.00083**
	200 **656**	0.018 **.00071**	0.021 **.00083**
	210 **689**	0.029 **.00114**	0.033 **.00130**
	210 **689**	0.029 **.00114**	0.033 **.00130**
	210 **689**	0.029 **.00114**	0.033 **.00130**
	210 **689**	0.029 **.00114**	0.033 **.00130**
	210 **689**	0.029 **.00114**	0.033 **.00130**
	210 **689**	0.029 **.00114**	0.033 **.00130**
	220 **722**	0.030 **.00118**	0.035 **.00138**
	220 **722**	0.030 **.00118**	0.035 **.00138**
	220 **722**	0.030 **.00118**	0.035 **.00138**
	220 **722**	0.030 **.00118**	0.035 **.00138**
	220 **722**	0.030 **.00118**	0.035 **.00138**
	220 **722**	0.030 **.00118**	0.035 **.00138**
	220 **722**	0.033 **.00130**	0.038 **.00150**
	220 **722**	0.033 **.00130**	0.038 **.00150**
	220 **722**	0.033 **.00130**	0.038 **.00150**
	220 **722**	0.033 **.00130**	0.038 **.00150**
	220 **722**	0.033 **.00130**	0.038 **.00150**
	220 **722**	0.033 **.00130**	0.038 **.00150**
	220 **722**	0.036 **.00142**	0.041 **.00161**
	220 **722**	0.036 **.00142**	0.041 **.00161**
	220 **722**	0.036 **.00142**	0.041 **.00161**
	220 **722**	0.036 **.00142**	0.041 **.00161**
	220 **722**	0.036 **.00142**	0.041 **.00162**
	220 **722**	0.036 **.00142**	0.041 **.00161**
	270 **886**	0.041 **.00161**	0.047 **.00185**
	270 **886**	0.041 **.00161**	0.047 **.00185**
	270 **886**	0.041 **.00161**	0.047 **.00185**
	270 **886**	0.041 **.00161**	0.047 **.00185**
	270 **886**	0.041 **.00161**	0.047 **.00186**
	270 **886**	0.041 **.00161**	0.047 **.00185**
	130 **427**	0.005 **.00020**	0.006 **.00024**
	130 **427**	0.014 **.00055**	0.016 **.00063**
	130 **427**	0.014 **.00055**	0.016 **.00063**
	130 **427**	0.005 **.00020**	0.006 **.00024**
	130 **427**	0.008 **.00032**	0.009 **.00035**
	130 **427**	0.020 **.00079**	0.023 **.00091**
	130 **427**	0.020 **.00079**	0.023 **.00091**
	130 **427**	0.008 **.00032**	0.009 **.00035**
	140 **459**	0.010 **.00039**	0.012 **.00047**
	140 **459**	0.022 **.00087**	0.025 **.00098**
	140 **459**	0.022 **.00087**	0.025 **.00098**
	140 **459**	0.010 **.00039**	0.012 **.00047**
	140 **459**	0.011 **.00043**	0.013 **.00051**
	140 **459**	0.024 **.00094**	0.028 **.00110**
	140 **459**	0.024 **.00094**	0.028 **.00110**
	140 **459**	0.011 **.00043**	0.013 **.00051**
	150 **492**	0.012 **.00047**	0.014 **.00055**
	150 **492**	0.026 **.00102**	0.030 **.00118**
	150 **492**	0.026 **.00102**	0.030 **.00118**
	150 **492**	0.012 **.00047**	0.014 **.00055**
	160 **525**	0.017 **.00067**	0.020 **.00079**
	160 **525**	0.031 **.00122**	0.036 **.00142**
	160 **525**	0.031 **.00122**	0.036 **.00142**
	160 **525**	0.017 **.00067**	0.020 **.00079**

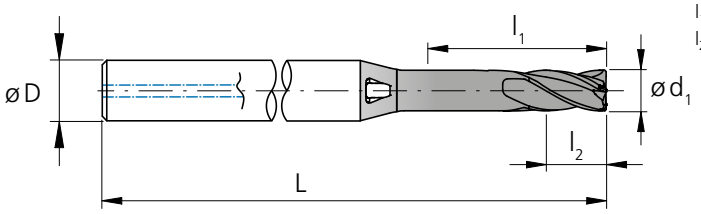
CRAZYMILL by Mikron Tool Cool

NEW Type C - 5 x d - Square / Corner radius - Z4

MILLING WITH INTEGRATED COOLING

Square





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.0	**.197**	5.00	2.00	4	**1.57**	40	2.CMC42.C1Z4.100.1	■
	.047	1.2	**.236**	6.00	2.40	4	**1.57**	40	2.CMC42.C1Z4.120.1	■
	.059	1.5	**.295**	7.50	3.00	4	**1.57**	40	2.CMC42.C1Z4.150.1	■
1/16	**.0625**	1.587	**.312**	7.94	3.10	4	**1.77**	45	2.CMC.SCZ4.F116	■
	.071	1.8	**.354**	9.00	3.60	4	**1.77**	45	2.CMC42.C1Z4.180.1	■
	.079	2.0	**.394**	10.00	4.00	4	**1.73**	44	2.CMC42.C1Z4.200.1	■
3/32	**.0937**	2.381	**.469**	11.91	4.70	4	**1.73**	44	2.CMC.SCZ4.F332	■
	.098	2.5	**.492**	12.50	5.00	6	**2.17**	55	2.CMC42.C1Z4.250.1	■
	.118	3.0	**.591**	15.00	6.00	6	**2.17**	55	2.CMC42.C1Z4.300.1	■
1/8	**.1250**	3.175	**.625**	15.88	6.40	6	**2.36**	60	2.CMC.SCZ4.F18	■
	.138	3.5	**.689**	17.50	7.00	6	**2.36**	60	2.CMC42.C1Z4.350.1	■
5/32	**.1562**	3.968	**.781**	19.84	7.94	6	**2.36**	60	2.CMC.SCZ4.F532	■
	.157	4.0	**.787**	20.00	8.00	6	**2.36**	60	2.CMC42.C1Z4.400.1	■
	.177	4.5	**.886**	22.50	9.00	8	**2.76**	70	2.CMC42.C1Z4.450.1	■
3/16	**.1875**	4.762	**.937**	23.81	9.52	8	**2.76**	70	2.CMC.SCZ4.F316	■
	.197	5.0	**.984**	25.00	10.00	8	**2.76**	70	2.CMC42.C1Z4.500.1	■
7/32	**.2189**	5.560	**1.09**	27.80	11.12	10	**2.76**	70	2.CMC.SCZ4.F732	■
	.236	6.0	**1.18**	30.00	12.00	10	**2.76**	70	2.CMC42.C1Z4.600.1	■
1/4	**.2500**	6.350	**1.25**	31.70	12.70	10	**2.76**	70	2.CMC.SCZ4.F14	■
	.315	8.0	**1.57**	40.00	16.00	12	**3.54**	90	2.CMC42.C1Z4.800.1	■

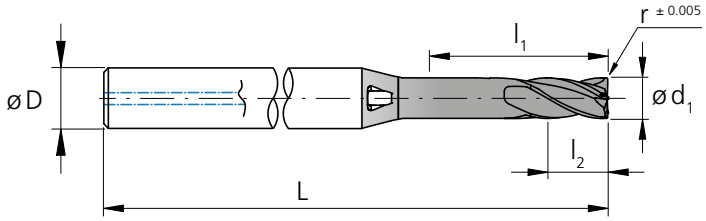
■ Stock item

Carbide | 5xd$_1$ | Z4 | 42° | eXedur SNP | a_p | a_e

Ø d$_1$	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	- .00055" - .00110"	- 0.014 mm - 0.028 mm	- .00079" - .00150"	- 0.020 mm - 0.038 mm	- .00098" - .00185"	- 0.025 mm - 0.047 mm

Corner radius





l$_1$ = Effective length
l$_2$ = Cutting length

d$_1$ [inch]	d$_1$ [inch]	d$_1$ [mm]	l$_1$ [inch]	l$_1$ [mm]	l$_2$ [mm]	D (h6) [mm]	L [inch]	L [mm]	r [inch]	r [mm]	Item number	Availability
	.039	1.0	.197	5.00	2.00	4	1.57	40	.0039	0.10	2.CMC42.C2Z4.100.1	■
	.039	1.0	.197	5.00	2.00	4	1.57	40	.0079	0.20	2.CMC42.C3Z4.100.1	■
	.047	1.2	.236	6.00	2.40	4	1.57	40	.0039	0.10	2.CMC42.C2Z4.120.1	■
	.047	1.2	.236	6.00	2.40	4	1.57	40	.0079	0.20	2.CMC42.C3Z4.120.1	■
	.059	1.5	.295	7.50	3.00	4	1.57	40	.0039	0.10	2.CMC42.C2Z4.150.1	■
	.059	1.5	.295	7.50	3.00	4	1.57	40	.0118	0.30	2.CMC42.C3Z4.150.1	■
1/16	.0625	1.587	.312	7.94	3.10	4	1.77	45	.0050	0.127	2.CMC.RC2Z4.F116	■
1/16	.0625	1.587	.312	7.94	3.10	4	1.77	45	.0100	0.254	2.CMC.RC3Z4.F116	■
	.071	1.8	.354	9.00	3.60	4	1.77	45	.0039	0.10	2.CMC42.C2Z4.180.1	■
	.071	1.8	.354	9.00	3.60	4	1.77	45	.0118	0.30	2.CMC42.C3Z4.180.1	■
	.079	2.0	.394	10.00	4.00	4	1.73	44	.0039	0.10	2.CMC42.C2Z4.200.1	■
	.079	2.0	.394	10.00	4.00	4	1.73	44	.0079	0.20	2.CMC42.C3Z4.200.1	■
	.079	2.0	.394	10.00	4.00	4	1.73	44	.0197	0.50	2.CMC42.C4Z4.200.1	■
3/32	.0937	2.381	.469	11.91	4.70	4	1.73	44	.0050	0.127	2.CMC.RC2Z4.F332	■
3/32	.0937	2.381	.469	11.91	4.70	4	1.73	44	.0100	0.254	2.CMC.RC3Z4.F332	■
3/32	.0937	2.381	.469	11.91	4.70	4	1.73	44	.0150	0.381	2.CMC.RC4Z4.F332	■
	.098	2.5	.492	12.50	5.00	6	2.17	55	.0079	0.20	2.CMC42.C2Z4.250.1	■
	.098	2.5	.492	12.50	5.00	6	2.17	55	.0197	0.50	2.CMC42.C3Z4.250.1	■
	.118	3.0	.591	15.00	6.00	6	2.17	55	.0079	0.20	2.CMC42.C2Z4.300.1	■
	.118	3.0	.591	15.00	6.00	6	2.17	55	.0197	0.50	2.CMC42.C3Z4.300.1	■
1/8	.1250	3.175	.625	15.88	6.35	6	2.36	60	.0100	0.254	2.CMC.RC2Z4.F18	■
1/8	.1250	3.175	.625	15.88	6.35	6	2.36	60	.0150	0.381	2.CMC.RC3Z4.F18	■
	.138	3.5	.689	17.50	7.00	6	2.36	60	.0079	0.20	2.CMC42.C2Z4.350.1	■
	.138	3.5	.689	17.50	7.00	6	2.36	60	.0197	0.50	2.CMC42.C3Z4.350.1	■
5/32	.1562	3.968	.781	19.84	7.94	6	2.36	60	.0100	0.254	2.CMC.RC2Z4.F532	■
5/32	.1562	3.968	.781	19.84	7.94	6	2.36	60	.0150	0.381	2.CMC.RC3Z4.F532	■
	.157	4.0	.787	20.00	8.00	6	2.36	60	.0079	0.20	2.CMC42.C2Z4.400.1	■
	.157	4.0	.787	20.00	8.00	6	2.36	60	.0197	0.50	2.CMC42.C3Z4.400.1	■
	.177	4.5	.886	22.50	9.00	8	2.76	70	.0079	0.20	2.CMC42.C2Z4.450.1	■
	.177	4.5	.886	22.50	9.00	8	2.76	70	.0197	0.50	2.CMC42.C3Z4.450.1	■
3/16	.1875	4.762	.937	23.81	9.52	8	2.76	70	.0100	0.254	2.CMC.RC2Z4.F316	■
3/16	.1875	4.762	.937	23.81	9.52	8	2.76	70	.0150	0.381	2.CMC.RC3Z4.F316	■
	.197	5.0	.984	25.00	10.00	8	2.76	70	.0079	0.20	2.CMC42.C2Z4.500.1	■
	.197	5.0	.984	25.00	10.00	8	2.76	70	.0197	0.50	2.CMC42.C3Z4.500.1	■
7/32	.2189	5.560	1.09	27.80	11.12	10	2.76	70	.0150	0.381	2.CMC.RC2Z4.F732	■
7/32	.2189	5.560	1.09	27.80	11.12	10	2.76	70	.0300	0.762	2.CMC.RC3Z4.F732	■
	.236	6.0	1.18	30.00	12.00	10	2.76	70	.0079	0.20	2.CMC42.C2Z4.600.1	■
	.236	6.0	1.18	30.00	12.00	10	2.76	70	.0197	0.50	2.CMC42.C3Z4.600.1	■
	.236	6.0	1.18	30.00	12.00	10	2.76	70	.0394	1.00	2.CMC42.C4Z4.600.1	■
1/4	.2500	6.350	1.25	31.70	12.70	10	2.76	70	.0150	0.381	2.CMC.RC2Z4.F14	■
1/4	.2500	6.350	1.25	31.70	12.70	10	2.76	70	.0300	0.762	2.CMC.RC3Z4.F14	■
1/4	.2500	6.350	1.25	31.70	12.70	10	2.76	70	.0600	1.524	2.CMC.RC4Z4.F14	■
	.315	8.0	1.57	40.00	16.00	12	3.54	90	.0079	0.20	2.CMC42.C2Z4.800.1	■
	.315	8.0	1.57	40.00	16.00	12	3.54	90	.0197	0.50	2.CMC42.C3Z4.800.1	■
	.315	8.0	1.57	40.00	16.00	12	3.54	90	.0591	1.50	2.CMC42.C4Z4.800.1	■

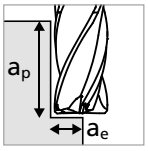
■ Stock item

CRAZYMILL by Mikron Tool Cool

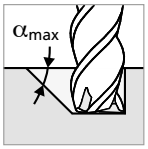
NEW Type C - Pre-machining

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Pre-machining

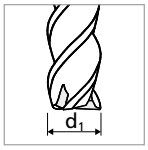


- $a_p = 2 \times d_1$
- $a_e = 0.1 \times d_1$



Note:
In case of linear ramp or helical interpolation milling reduce f_z by 35%

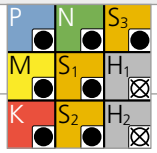




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 **394**	0.017 **.00067**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	120 **394**	0.016 **.00063**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	120 **394**	0.012 **.00047**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	120 **394**	0.018 **.00071**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	120 **394**	0.017 **.00067**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	120 **394**	0.017 **.00067**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	120 **394**	0.013 **.00051**
		1.4435	X2CrNiMo18-14-3	AISI 316L		
		1.4441	X2CrNiMo18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	100 **328**	0.012 **.00047**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	170 **558**	0.020 **.00079**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	170 **558**	0.020 **.00079**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	170 **558**	0.022 **.00087**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	170 **558**	0.022 **.00087**
		2.0360	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	170 **558**	0.022 **.00087**
		2.1020	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	170 **558**	0.020 **.00079**
		2.0960	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	100 **328**	0.008 **.00032**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	100 **328**	0.018 **.00071**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	100 **328**	0.018 **.00071**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	100 **328**	0.008 **.00032**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



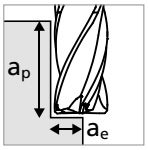
Ød1	1/16" 1.5 mm | .059"		3/32" 2.0 mm | .079"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .157"		3/16" - 7/32" 5.0 mm | .197"		1/4" 6.0 mm | .236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	140 **459**	0.026 **.00102**	160 **525**	0.038 **.00150**	180 **591**	0.048 **.00189**	200 **656**	0.050 **.00197**	220 **722**	0.052 **.00205**	220 **722**	0.056 **.00220**	220 **722**	0.068 **.00268**
	140 **459**	0.025 **.00098**	160 **525**	0.036 **.00142**	180 **591**	0.044 **.00173**	200 **656**	0.048 **.00189**	220 **722**	0.050 **.00197**	220 **722**	0.054 **.00213**	220 **722**	0.066 **.00260**
	140 **459**	0.022 **.00087**	160 **525**	0.035 **.00138**	180 **591**	0.042 **.00165**	200 **656**	0.043 **.00169**	220 **722**	0.045 **.00177**	220 **722**	0.048 **.00189**	220 **722**	0.058 **.00228**
	140 **459**	0.026 **.00102**	160 **525**	0.038 **.00150**	180 **591**	0.046 **.00181**	200 **656**	0.048 **.00189**	220 **722**	0.050 **.00197**	220 **722**	0.055 **.00217**	260 **853**	0.062 **.00244**
	140 **459**	0.025 **.00098**	160 **525**	0.036 **.00142**	180 **591**	0.044 **.00173**	200 **656**	0.046 **.00181**	220 **722**	0.048 **.00189**	220 **722**	0.052 **.00205**	260 **853**	0.060 **.00236**
	140 **459**	0.025 **.00098**	160 **525**	0.036 **.00142**	180 **591**	0.044 **.00173**	200 **656**	0.046 **.00181**	220 **722**	0.048 **.00189**	220 **722**	0.052 **.00205**	260 **853**	0.060 **.00236**
	140 **459**	0.016 **.00063**	160 **525**	0.034 **.00134**	180 **591**	0.042 **.00165**	200 **656**	0.044 **.00173**	220 **722**	0.046 **.00181**	220 **722**	0.049 **.00193**	260 **853**	0.058 **.00228**
	120 **394**	0.026 **.00102**	140 **459**	0.032 **.00126**	160 **525**	0.043 **.00169**	180 **591**	0.054 **.00213**	200 **656**	0.056 **.00220**	200 **656**	0.058 **.00228**	200 **656**	**0.070** **.00276**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00157**	230 **755**	0.060 **.00236**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00157**	230 **755**	0.060 **.00236**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00157**	230 **755**	0.060 **.00236**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00157**	230 **755**	0.060 **.00236**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00157**	230 **755**	0.060 **.00236**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00157**	230 **755**	0.060 **.00236**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	100 **328**	0.010 **.00039**	120 **394**	0.012 **.00047**	120 **394**	0.016 **.00063**	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**	160 **525**	0.022 **.00087**	160 **525**	0.024 **.00094**
	100 **328**	0.022 **.00087**	120 **394**	0.032 **.00126**	120 **394**	0.042 **.00165**	140 **459**	0.044 **.00173**	140 **459**	0.046 **.00181**	160 **525**	0.048 **.00189**	160 **525**	0.054 **.00213**
	100 **328**	0.022 **.00087**	120 **394**	0.032 **.00126**	120 **394**	0.042 **.00165**	140 **459**	0.044 **.00173**	140 **459**	0.046 **.00181**	160 **525**	0.048 **.00189**	160 **525**	0.054 **.00213**
	100 **328**	0.010 **.00039**	120 **394**	0.012 **.00047**	120 **394**	0.016 **.00063**	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**	160 **525**	0.022 **.00087**	160 **525**	0.024 **.00094**

CRAZYMILL by Mikron Tool Cool

NEW Type C - Finishing

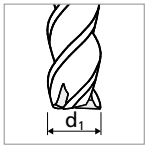
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Finishing



- $a_p = 2 \times d_1$
- $a_e = 0.02 \times d_1$

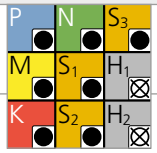




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	130 **425**	0.008 **.00032**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	130 **425**	0.007 **.00028**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	130 **425**	0.006 **.00024**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	130 **425**	0.008 **.00032**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	130 **425**	0.008 **.00032**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	130 **425**	0.008 **.00032**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	130 **425**	0.006 **.00024**
		1.4435	X2CrNiMo18-14-3	AISI 316L		
		1.4441	X2CrNiMo18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	110 **361**	0.006 **.00024**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	130 **425**	0.009 **.00035**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	130 **425**	0.009 **.00035**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	130 **425**	0.010 **.00039**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	130 **425**	0.010 **.00039**
		2.0360	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	130 **425**	0.010 **.00039**
		2.1020	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	130 **425**	0.009 **.00035**
		2.0960	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	110 **361**	0.004 **.00016**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	110 **361**	0.008 **.00032**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	110 **361**	0.008 **.00032**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	110 **361**	0.004 **.00016**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1	1/16" 1.5 mm | .059"		3/32" 2.0 mm | .079"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .157"		3/16" - 7/32" 5.0 mm | .197"		1/4" 6.0 mm | .236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	180 **591**	0.012 **.00047**	200 **656**	0.017 **.00067**	210 **688**	0.023 **.00091**	220 **722**	0.025 **.00098**	220 **722**	0.028 **.00110**	220 **722**	0.033 **.00130**	220 **722**	0.042 **.00165**
	180 **591**	0.011 **.00043**	200 **656**	0.016 **.00063**	210 **688**	0.022 **.00087**	220 **722**	0.024 **.00094**	220 **722**	0.026 **.00102**	220 **722**	0.029 **.00114**	220 **722**	0.038 **.00150**
	180 **591**	0.010 **.00039**	200 **656**	0.015 **.00059**	210 **688**	0.020 **.00079**	220 **722**	0.021 **.00083**	220 **722**	0.023 **.00091**	220 **722**	0.025 **.00098**	220 **722**	0.034 **.00134**
	180 **591**	0.012 **.00047**	200 **656**	0.017 **.00067**	210 **688**	0.022 **.00087**	220 **722**	0.024 **.00094**	220 **722**	0.026 **.00102**	220 **722**	0.029 **.00114**	260 **853**	0.036 **.00142**
	180 **591**	0.011 **.00043**	200 **656**	0.016 **.00063**	210 **688**	0.022 **.00087**	220 **722**	0.023 **.00091**	220 **722**	0.025 **.00098**	220 **722**	0.028 **.00110**	260 **853**	0.037 **.00146**
	180 **591**	0.011 **.00043**	200 **656**	0.016 **.00063**	210 **688**	0.022 **.00087**	220 **722**	0.023 **.00091**	220 **722**	0.025 **.00098**	220 **722**	0.028 **.00110**	260 **853**	0.037 **.00146**
	180 **591**	0.008 **.00032**	200 **656**	0.015 **.00059**	210 **688**	0.020 **.00079**	220 **722**	0.022 **.00087**	220 **722**	0.024 **.00094**	220 **722**	0.026 **.00102**	260 **853**	0.035 **.00138**
	130 **427**	0.012 **.00047**	150 **492**	0.014 **.00055**	160 **525**	0.022 **.00087**	170 **558**	0.025 **.00098**	170 **558**	0.029 **.00114**	170 **558**	0.031 **.00122**	200 **656**	0.040 **.00154**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**	270 **886**	0.045 **.00177**
	120 **394**	0.005 **.00020**	130 **427**	0.005 **.00020**	130 **427**	0.008 **.00032**	140 **459**	0.010 **.00039**	140 **459**	0.011 **.00043**	150 **492**	0.012 **.00047**	160 **525**	0.021 **.00083**
	120 **394**	0.010 **.00039**	130 **427**	0.014 **.00055**	130 **427**	0.020 **.00079**	140 **459**	0.022 **.00087**	140 **459**	0.024 **.00094**	150 **492**	0.026 **.00102**	160 **525**	0.035 **.00138**
	120 **394**	0.010 **.00039**	130 **427**	0.014 **.00055**	130 **427**	0.020 **.00079**	140 **459**	0.022 **.00087**	140 **459**	0.024 **.00094**	150 **492**	0.026 **.00102**	160 **525**	0.035 **.00138**
	120 **394**	0.005 **.00020**	130 **427**	0.005 **.00020**	130 **427**	0.008 **.00032**	140 **459**	0.010 **.00039**	140 **459**	0.011 **.00043**	150 **492**	0.012 **.00047**	160 **525**	0.021 **.00083**

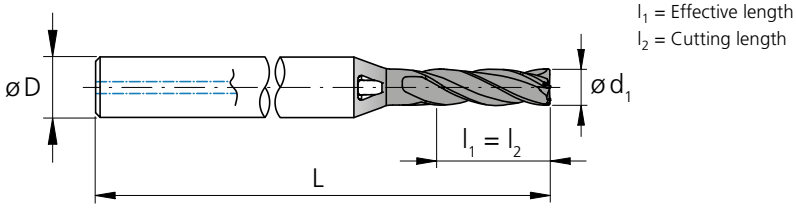
CRAZYMILL by Mikron Tool Cool

NEW Type M - 3 x d - Square / Corner radius - Z4

MILLING WITH INTEGRATED COOLING

Square





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.0	**.118**	3.0	3.0	4	**1.57**	40	2.CMC42.M1Z4.100.1	■
	.047	1.2	**.142**	3.6	3.6	4	**1.57**	40	2.CMC42.M1Z4.120.1	■
	.059	1.5	**.177**	4.5	4.5	4	**1.57**	40	2.CMC42.M1Z4.150.1	■
1/16	**.0625**	1.587	**.185**	4.7	4.7	4	**1.57**	40	2.CMC.SMZ4.F116	■
	.071	1.8	**.213**	5.4	5.4	4	**1.57**	40	2.CMC42.M1Z4.180.1	■
	.079	2.0	**.236**	6.0	6.0	4	**1.57**	40	2.CMC42.M1Z4.200.1	■
3/32	**.0937**	2.381	**.281**	7.1	7.1	4	**1.57**	40	2.CMC.SMZ4.F332	■
	.098	2.5	**.295**	7.5	7.5	6	**1.97**	50	2.CMC42.M1Z4.250.1	■
	.118	3.0	**.354**	9.0	9.0	6	**1.97**	50	2.CMC42.M1Z4.300.1	■
1/8	**.1250**	3.175	**.375**	9.5	9.5	6	**2.17**	55	2.CMC.SMZ4.F18	■
	.138	3.5	**.413**	10.5	10.5	6	**2.17**	55	2.CMC42.M1Z4.350.1	■
5/32	**.1562**	3.968	**.469**	11.9	11.9	6	**2.17**	55	2.CMC.SMZ4.F532	■
	.157	4.0	**.472**	12.0	12.0	6	**2.17**	55	2.CMC42.M1Z4.400.1	■
	.177	4.5	**.531**	13.5	13.5	8	**2.56**	65	2.CMC42.M1Z4.450.1	■
3/16	**.1875**	4.762	**.562**	14.3	14.3	8	**2.56**	65	2.CMC.SMZ4.F316	■
	.197	5.0	**.591**	15.0	15.0	8	**2.56**	65	2.CMC42.M1Z4.500.1	■
7/32	**.2189**	5.560	**.657**	16.7	16.7	10	**2.56**	65	2.CMC.SMZ4.F732	■
	.236	6.0	**.709**	18.0	18.0	10	**2.56**	65	2.CMC42.M1Z4.600.1	■
1/4	**.2500**	6.350	**.748**	19.0	19.0	10	**2.56**	65	2.CMC.SMZ4.F14	■
	.315	8.0	**.945**	24.0	24.0	12	**3.15**	80	2.CMC42.M1Z4.800.1	■

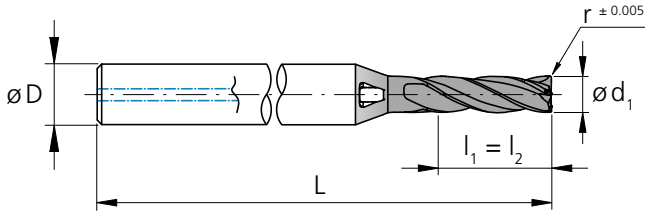
■ Stock item

Carbide | 3xd1 | Z4 | 42° | eXedur SNP | ap | ae

Ø d1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	- .00055" - .00110"	- 0.014 mm - 0.028 mm	- .00079" - .00150"	- 0.020 mm - 0.038 mm	- .00098" - .00185"	- 0.025 mm - 0.047 mm

Corner radius





l1 = Effective length
l2 = Cutting length

d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	r [inch]	r [mm]	Item number	Availability
	.039	1.0	.118	3.00	3.00	4	1.57	40	.0039	0.10	2.CMC42.M2Z4.100.1	■
	.039	1.0	.118	3.00	3.00	4	1.57	40	.0079	0.20	2.CMC42.M3Z4.100.1	■
	.047	1.2	.142	3.60	3.60	4	1.57	40	.0039	0.10	2.CMC42.M2Z4.120.1	■
	.047	1.2	.142	3.60	3.60	4	1.57	40	.0079	0.20	2.CMC42.M3Z4.120.1	■
	.059	1.5	.177	4.50	4.50	4	1.57	40	.0039	0.10	2.CMC42.M2Z4.150.1	■
	.059	1.5	.177	4.50	4.50	4	1.57	40	.0118	0.30	2.CMC42.M3Z4.150.1	■
1/16	.0625	1.587	.187	4.76	4.70	4	1.57	40	.0050	0.127	2.CMC.RM2Z4.F116	■
1/16	.0625	1.587	.187	4.76	4.70	4	1.57	40	.0100	0.254	2.CMC.RM3Z4.F116	■
	.071	1.8	.213	5.40	5.40	4	1.57	40	.0039	0.10	2.CMC42.M2Z4.180.1	■
	.071	1.8	.213	5.40	5.40	4	1.57	40	.0118	0.30	2.CMC42.M3Z4.180.1	■
	.079	2.0	.236	6.00	6.00	4	1.57	40	.0039	0.10	2.CMC42.M2Z4.200.1	■
	.079	2.0	.236	6.00	6.00	4	1.57	40	.0079	0.20	2.CMC42.M3Z4.200.1	■
	.079	2.0	.236	6.00	6.00	4	1.57	40	.0197	0.50	2.CMC42.M4Z4.200.1	■
3/32	.0937	2.381	.281	7.14	7.14	4	1.57	40	.0050	0.127	2.CMC.RM2Z4.F332	■
3/32	.0937	2.381	.281	7.14	7.14	4	1.57	40	.0100	0.254	2.CMC.RM3Z4.F332	■
3/32	.0937	2.381	.281	7.14	7.14	4	1.57	40	.0150	0.381	2.CMC.RM4Z4.F332	■
	.098	2.5	.295	7.50	7.50	6	1.97	50	.0079	0.20	2.CMC42.M2Z4.250.1	■
	.098	2.5	.295	7.50	7.50	6	1.97	50	.0197	0.50	2.CMC42.M3Z4.250.1	■
	.118	3.0	.354	9.00	9.00	6	1.97	50	.0079	0.20	2.CMC42.M2Z4.300.1	■
	.118	3.0	.354	9.00	9.00	6	1.97	50	.0197	0.50	2.CMC42.M3Z4.300.1	■
1/8	.1250	3.175	.375	9.53	9.53	6	2.17	55	.0100	0.254	2.CMC.RM2Z4.F18	■
1/8	.1250	3.175	.375	9.53	9.53	6	2.17	55	.0150	0.381	2.CMC.RM3Z4.F18	■
	.138	3.5	.413	10.50	10.50	6	2.17	55	.0079	0.20	2.CMC42.M2Z4.350.1	■
	.138	3.5	.413	10.50	10.50	6	2.17	55	.0197	0.50	2.CMC42.M3Z4.350.1	■
5/32	.1562	3.968	.469	11.90	11.90	6	2.17	55	.0100	0.254	2.CMC.RM2Z4.F532	■
5/32	.1562	3.968	.469	11.90	11.90	6	2.17	55	.0150	0.381	2.CMC.RM3Z4.F532	■
	.157	4.0	.472	12.00	12.00	6	2.17	55	.0079	0.20	2.CMC42.M2Z4.400.1	■
	.157	4.0	.472	12.00	12.00	6	2.17	55	.0197	0.50	2.CMC42.M3Z4.400.1	■
	.177	4.5	.531	13.50	13.50	8	2.56	65	.0079	0.20	2.CMC42.M2Z4.450.1	■
	.177	4.5	.531	13.50	13.50	8	2.56	65	.0197	0.50	2.CMC42.M3Z4.450.1	■
3/16	.1875	4.762	.563	14.29	14.29	8	2.56	65	.0100	0.254	2.CMC.RM2Z4.F316	■
3/16	.1875	4.762	.563	14.29	14.29	8	2.56	65	.0150	0.381	2.CMC.RM3Z4.F316	■
	.197	5.0	.591	15.00	15.00	8	2.56	65	.0079	0.20	2.CMC42.M2Z4.500.1	■
	.197	5.0	.591	15.00	15.00	8	2.56	65	.0197	0.50	2.CMC42.M3Z4.500.1	■
7/32	.2189	5.560	.657	16.68	16.68	10	2.56	65	.0150	0.381	2.CMC.RM2Z4.F732	■
7/32	.2189	5.560	.657	16.68	16.68	10	2.56	65	.0300	0.762	2.CMC.RM3Z4.F732	■
	.236	6.0	.709	18.00	18.00	10	2.56	65	.0079	0.20	2.CMC42.M2Z4.600.1	■
	.236	6.0	.709	18.00	18.00	10	2.56	65	.0197	0.50	2.CMC42.M3Z4.600.1	■
	.236	6.0	.709	18.00	18.00	10	2.56	65	.0394	1.00	2.CMC42.M4Z4.600.1	■
1/4	.2500	6.350	.750	19.05	19.00	10	2.56	65	.0150	0.381	2.CMC.RM2Z4.F14	■
1/4	.2500	6.350	.750	19.05	19.00	10	2.56	65	.0300	0.762	2.CMC.RM3Z4.F14	■
1/4	.2500	6.350	.750	19.05	19.00	10	2.56	65	.0600	1.524	2.CMC.RM4Z4.F14	■
	.315	8.0	.945	24.00	24.00	12	3.15	80	.0079	0.20	2.CMC42.M2Z4.800.1	■
	.315	8.0	.945	24.00	24.00	12	3.15	80	.0197	0.50	2.CMC42.M3Z4.800.1	■
	.315	8.0	.945	24.00	24.00	12	3.15	80	.0591	1.50	2.CMC42.M4Z4.800.1	■

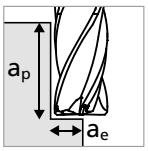
■ Stock item

CRAZYMILL by Mikron Tool Cool

NEW Type M - Pre-machining

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

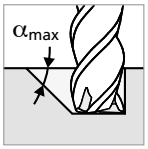
Pre-machining



①
- $a_p = 1.5 \times d_1$
- $a_e = 0.2 \times d_1$

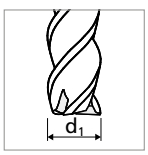
②
- $a_p = 3 \times d_1$
- $a_e = 0.1 \times d_1$

③
- $a_p = 3 \times d_1$
- $a_e = 0.05 \times d_1$



Note:
In case of linear ramp or helical interpolation milling reduce f_z by 35%

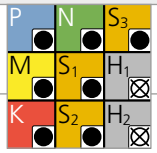




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z ①	1.0 mm | .039" f_z ②	1.0 mm | .039" f_z ③	1/16" 1.5 mm | .059" v_c	1/16" 1.5 mm | .059" f_z ①	1/16" 1.5 mm | .059" f_z ②	1/16" 1.5 mm | .059" f_z ③
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.011 **.00043**	0.015 **.00059**	0.020 **.00079**	200 **656**	0.015 **.00059**	0.020 **.00079**	0.028 **.00110**
		1.0401	C15	AISI 1015								
		1.1191	C45E/CK45	AISI 1045								
		1.0044	S275JR	AISI 1020								
		1.0715	11SMn30	AISI 1215								
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.010 **.00039**	0.013 **.00051**	0.018 **.00071**	200 **656**	0.013 **.00051**	0.017 **.00067**	0.024 **.00094**
		1.7131	16MnCr5	AISI 5115								
		1.3505	100Cr6	AISI 52100								
		1.7225	42CrMo4	AISI 4140								
		1.2842	90MnCrV8	AISI O2								
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.008 **.00032**	0.011 **.00043**	0.015 **.00059**	200 **656**	0.011 **.00043**	0.015 **.00059**	0.020 **.00079**
		1.2436	X210CrW12	AISI D4/D6								
		1.3343	HS6-5-2C	AISI M2 / UNS T11302								
		1.3355	HS18-0-1	AISI T1 / UNS T12001								
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.012 **.00047**	0.016 **.00063**	0.022 **.00087**	180 **591**	0.015 **.00059**	0.020 **.00079**	0.028 **.00110**
		1.4105	X6CrMoS17	AISI 430F								
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.011 **.00043**	0.015 **.00059**	0.020 **.00079**	180 **591**	0.014 **.00055**	0.019 **.00075**	0.026 **.00102**
		1.4112	X90CrMoV18	AISI 440B								
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.011 **.00043**	0.015 **.00059**	0.020 **.00079**	180 **591**	0.014 **.00055**	0.019 **.00075**	0.026 **.00102**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH								
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.009 **.00035**	0.012 **.00047**	0.017 **.00067**	180 **591**	0.012 **.00047**	0.016 **.00063**	0.022 **.00087**
		1.4435	X2CrNiMo18-14-3	AISI 316L								
		1.4441	X2CrNiMo18-15-3	AISI 316LM								
		1.4539	X1NiCrMoCu25-20-5	AISI 904L								
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.008 **.00032**	0.016 **.00063**	0.022 **.00087**	160 **525**	0.014 **.00055**	0.019 **.00075**	0.026 **.00102**
		0.6030	GG30	ASTM 40B								
		0.7040	GGG40	ASTM 60-40-18								
		0.7060	GGG60	ASTM 80-60-03								
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	160 **525**	0.013 **.00051**	0.017 **.00067**	0.024 **.00094**	200 **656**	0.016 **.00063**	0.021 **.00083**	0.029 **.00114**
		3.4365	AlZnMgCu1.5	ASTM 7075								
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	160 **525**	0.013 **.00051**	0.017 **.00067**	0.024 **.00094**	220 **722**	0.016 **.00063**	0.021 **.00083**	0.029 **.00114**
		3.2381	GD-AlSi10Mg	UNS A03590								
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	160 **525**	0.013 **.00051**	0.017 **.00067**	0.024 **.00094**	220 **722**	0.016 **.00063**	0.021 **.00083**	0.029 **.00114**
		2.0065	Cu-ETP / CW004A	UNS C11000								
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	160 **525**	0.013 **.00051**	0.017 **.00067**	0.024 **.00094**	220 **722**	0.016 **.00063**	0.021 **.00083**	0.029 **.00114**
		2.0360	CuZn40 CW509L	UNS C28000								
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3/CW614N	UNS C38500	160 **525**	0.013 **.00051**	0.017 **.00067**	0.024 **.00094**	220 **722**	0.016 **.00063**	0.021 **.00083**	0.029 **.00114**
		2.1020	CuSn6	UNS C51900								
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	160 **525**	0.013 **.00051**	0.017 **.00067**	0.024 **.00094**	220 **722**	0.016 **.00063**	0.021 **.00083**	0.029 **.00114**
		2.0960	CuAl9Mn2	UNS C63200								
S_1	Super alloys	2.4856		Inconel 625	80 **262**	0.006 **.00024**	0.008 **.00032**	0.011 **.00043**	100 **328**	0.008 **.00032**	0.011 **.00043**	0.015 **.00059**
		2.4668		Inconel 718								
		2.4617	NiMo28	Hastelloy B-2								
		2.4665	NiCr22Fe18Mo	Hastelloy X								
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.010 **.00039**	0.013 **.00051**	0.018 **.00071**	120 **394**	0.012 **.00047**	0.016 **.00063**	0.022 **.00087**
		3.7065	Gr.4	ASTM B348 / F68								
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.010 **.00039**	0.013 **.00051**	0.018 **.00071**	120 **394**	0.012 **.00047**	0.016 **.00063**	0.022 **.00087**
		9.9367	TiAl6Nb7	ASTM F1295								
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	80 **262**	0.006 **.00024**	0.008 **.00032**	0.011 **.00043**	100 **328**	0.008 **.00032**	0.011 **.00043**	0.015 **.00059**
			CrCoMo28	ASTM F1537								
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1								
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2								

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



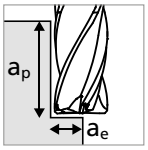
Ød1	3/32" 2.0 mm | .079"				1/8" 3.0 mm | .118"				5/32" 4.0 mm | .157"				3/16" - 7/32" 5.0 mm | .197"				1/4" 6.0 mm | .236"				8.0 mm | .315"			
	v_c	① f_z	② f_z	③ f_z	v_c	① f_z	② f_z	③ f_z	v_c	① f_z	② f_z	③ f_z	v_c	① f_z	② f_z	③ f_z	v_c	① f_z	② f_z	③ f_z	v_c	① f_z	② f_z	③ f_z
	220 **722**	0.024 **.00094**	0.032 **.00126**	0.044 **.00173**	240 **787**	0.033 **.00130**	0.044 **.00173**	0.061 **.00240**	260 **853**	0.034 **.00134**	0.045 **.00177**	0.062 **.00244**	260 **853**	0.035 **.00138**	0.047 **.00185**	0.064 **.00252**	260 **853**	0.046 **.00181**	**0.061** **.00240**	**0.084** **.00331**	260 **853**	0.054 **.00213**	0.072 **.00283**	0.100 **.00394**
	220 **722**	0.022 **.00087**	0.029 **.00114**	0.040 **.00157**	240 **787**	0.031 **.00122**	0.041 **.00161**	0.057 **.00224**	260 **853**	0.032 **.00126**	0.043 **.00169**	0.059 **.00232**	260 **853**	0.033 **.00130**	0.044 **.00173**	0.061 **.00240**	260 **853**	0.044 **.00173**	**0.059** **.00232**	**0.081** **.00319**	260 **853**	0.052 **.00205**	0.069 **.00272**	0.095 **.00374**
	220 **722**	0.019 **.00075**	0.025 **.00098**	0.035 **.00138**	240 **787**	0.028 **.00110**	0.037 **.00146**	0.051 **.00201**	260 **853**	0.029 **.00114**	0.039 **.00154**	0.053 **.00209**	260 **853**	0.030 **.00118**	0.040 **.00157**	0.055 **.00217**	260 **853**	0.042 **.00165**	0.056 **.00220**	0.077 **.00303**	260 **853**	0.050 **.00197**	0.067 **.00264**	0.092 **.00362**
	180 **591**	0.021 **.00083**	0.028 **.00110**	0.039 **.00154**	200 **656**	0.030 **.00118**	0.040 **.00157**	0.055 **.00217**	220 **722**	0.032 **.00126**	0.043 **.00169**	0.059 **.00232**	220 **722**	0.033 **.00130**	0.044 **.00173**	0.061 **.00240**	220 **722**	0.040 **.00157**	0.053 **.00209**	0.073 **.00287**	260 **853**	0.048 **.00189**	0.064 **.00252**	0.088 **.00346**
	180 **591**	0.020 **.00079**	0.027 **.00106**	0.037 **.00146**	200 **656**	0.028 **.00110**	0.037 **.00146**	0.051 **.00201**	220 **722**	0.031 **.00122**	0.041 **.00161**	0.057 **.00224**	220 **722**	0.032 **.00126**	0.043 **.00169**	0.059 **.00232**	220 **722**	0.037 **.00145**	0.049 **.00193**	0.068 **.00268**	260 **853**	0.045 **.00177**	0.060 **.00236**	0.083 **.00327**
	180 **591**	0.020 **.00079**	0.027 **.00106**	0.037 **.00146**	200 **656**	0.028 **.00110**	0.037 **.00146**	0.051 **.00201**	220 **722**	0.031 **.00122**	0.041 **.00161**	0.057 **.00224**	220 **722**	0.032 **.00126**	0.043 **.00169**	0.059 **.00232**	220 **722**	0.037 **.00145**	0.049 **.00193**	0.068 **.00268**	260 **853**	0.045 **.00177**	0.060 **.00236**	0.083 **.00327**
	180 **591**	0.018 **.00071**	0.024 **.00094**	0.034 **.00134**	200 **656**	0.026 **.00102**	0.035 **.00138**	0.048 **.00189**	220 **722**	0.030 **.00118**	0.040 **.00157**	0.055 **.00217**	220 **722**	0.031 **.00122**	0.041 **.00161**	0.057 **.00224**	220 **722**	0.035 **.00139**	0.047 **.00185**	0.064 **.00252**	260 **853**	0.042 **.00165**	0.056 **.00220**	0.077 **.00303**
	200 **656**	0.024 **.00094**	0.032 **.00126**	0.044 **.00173**	220 **722**	0.032 **.00126**	0.043 **.00169**	0.059 **.00232**	240 **787**	0.038 **.00150**	0.051 **.00201**	0.070 **.00276**	240 **787**	0.042 **.00165**	0.056 **.00220**	0.077 **.00303**	240 **787**	0.044 **.00173**	0.059 **.00232**	0.081 **.00319**	240 **787**	0.052 **.00205**	0.069 **.00272**	0.095 **.00374**
	240 **787**	0.026 **.00102**	0.035 **.00138**	0.048 **.00189**	260 **853**	0.040 **.00157**	0.053 **.00209**	0.073 **.00287**	300 **984**	0.048 **.00189**	0.064 **.00252**	0.088 **.00346**	300 **984**	0.051 **.00201**	0.068 **.00268**	0.094 **.00370**	320 **1050**	0.052 **.00205**	0.069 **.00272**	0.095 **.00374**	350 **1148**	0.060 **.00236**	0.080 **.00315**	0.110 **.00433**
	240 **787**	0.026 **.00102**	0.035 **.00138**	0.048 **.00189**	260 **853**	0.040 **.00157**	0.053 **.00209**	0.073 **.00287**	300 **984**	0.048 **.00189**	0.064 **.00252**	0.088 **.00346**	300 **984**	0.051 **.00201**	0.068 **.00268**	0.094 **.00370**	320 **1050**	0.052 **.00205**	0.069 **.00272**	0.095 **.00374**	350 **1148**	0.060 **.00236**	0.080 **.00315**	0.110 **.00433**
	240 **787**	0.026 **.00102**	0.035 **.00138**	0.048 **.00189**	260 **853**	0.040 **.00157**	0.053 **.00209**	0.073 **.00287**	300 **984**	0.048 **.00189**	0.064 **.00252**	0.088 **.00346**	300 **984**	0.051 **.00201**	0.068 **.00268**	0.094 **.00370**	320 **1050**	0.052 **.00205**	0.069 **.00272**	0.095 **.00374**	350 **1148**	0.060 **.00236**	0.080 **.00315**	0.110 **.00433**
	240 **787**	0.026 **.00102**	0.035 **.00138**	0.048 **.00189**	260 **853**	0.040 **.00157**	0.053 **.00209**	0.073 **.00287**	300 **984**	0.048 **.00189**	0.064 **.00252**	0.088 **.00346**	300 **984**	0.051 **.00201**	0.068 **.00268**	0.094 **.00370**	320 **1050**	0.052 **.00205**	0.069 **.00272**	0.095 **.00374**	350 **1148**	0.060 **.00236**	0.080 **.00315**	0.110 **.00433**
	240 **787**	0.026 **.00102**	0.035 **.00138**	0.048 **.00189**	260 **853**	0.040 **.00157**	0.053 **.00209**	0.073 **.00287**	300 **984**	0.048 **.00189**	0.064 **.00252**	0.088 **.00346**	300 **984**	0.051 **.00201**	0.068 **.00268**	0.094 **.00370**	320 **1050**	0.052 **.00205**	0.069 **.00272**	0.095 **.00374**	350 **1148**	0.060 **.00236**	0.080 **.00315**	0.110 **.00433**
	240 **787**	0.026 **.00102**	0.035 **.00138**	0.048 **.00189**	260 **853**	0.040 **.00157**	0.053 **.00209**	0.073 **.00287**	300 **984**	0.048 **.00189**	0.064 **.00252**	0.088 **.00346**	300 **984**	0.051 **.00201**	0.068 **.00268**	0.094 **.00370**	320 **1050**	0.052 **.00205**	0.069 **.00272**	0.095 **.00374**	350 **1148**	0.060 **.00236**	0.080 **.00315**	0.110 **.00433**
	100 **328**	0.010 **.00039**	0.013 **.00051**	0.018 **.00071**	100 **328**	0.014 **.00055**	0.019 **.00075**	0.026 **.00102**	120 **394**	0.016 **.00063**	0.021 **.00083**	0.029 **.00114**	120 **394**	0.018 **.00071**	0.024 **.00094**	0.033 **.00130**	120 **394**	0.020 **.00079**	0.027 **.00106**	0.037 **.00146**	120 **394**	0.025 **.00098**	0.033 **.00130**	0.046 **.00181**
	130 **427**	0.017 **.00067**	0.023 **.00091**	0.031 **.00122**	130 **427**	0.028 **.00110**	0.037 **.00146**	0.051 **.00201**	150 **492**	0.030 **.00118**	0.040 **.00157**	0.055 **.00217**	150 **492**	0.031 **.00122**	0.041 **.00161**	0.057 **.00224**	150 **492**	0.032 **.00126**	0.043 **.00169**	0.059 **.00232**	170 **558**	0.035 **.00138**	0.047 **.00185**	0.064 **.00252**
	130 **427**	0.017 **.00067**	0.023 **.00091**	0.031 **.00122**	130 **427**	0.028 **.00110**	0.037 **.00146**	0.051 **.00201**	150 **492**	0.030 **.00118**	0.040 **.00157**	0.055 **.00217**	150 **492**	0.031 **.00122**	0.041 **.00161**	0.057 **.00224**	150 **492**	0.032 **.00126**	0.043 **.00169**	0.059 **.00232**	170 **558**	0.035 **.00138**	0.047 **.00185**	0.064 **.00252**
	100 **328**	0.010 **.00039**	0.013 **.00051**	0.018 **.00071**	100 **328**	0.014 **.00055**	0.019 **.00075**	0.026 **.00102**	120 **394**	0.016 **.00063**	0.021 **.00083**	0.029 **.00114**	120 **394**	0.018 **.00071**	0.024 **.00094**	0.033 **.00130**	120 **394**	0.020 **.00079**	0.027 **.00106**	0.037 **.00146**	120 **394**	0.025 **.00098**	0.033 **.00130**	0.046 **.00181**

CRAZYMILL by Mikron Tool Cool

NEW Type M - Finishing

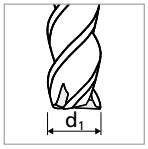
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Finishing



- $a_p = 3 \times d_1$
- $a_e = 0.02 \times d_1$

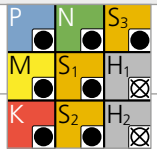




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	130 **425**	0.009 **.00035**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	130 **425**	0.008 **.00031**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	130 **425**	0.007 **.00028**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	130 **425**	0.009 **.00035**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	130 **425**	0.009 **.00035**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	130 **425**	0.009 **.00035**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	130 **425**	0.007 **.00028**
		1.4435	X2CrNiMo18-14-3	AISI 316L		
		1.4441	X2CrNiMo18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	110 **361**	0.007 **.00028**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	130 **425**	0.010 **.00039**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	130 **425**	0.010 **.00039**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	130 **425**	0.012 **.00047**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	130 **425**	0.012 **.00047**
		2.0360	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	130 **425**	0.012 **.00047**
		2.1020	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	130 **425**	0.010 **.00039**
		2.0960	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	110 **361**	0.005 **.00020**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	110 **361**	0.009 **.00035**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	110 **361**	0.009 **.00035**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	110 **361**	0.005 **.00020**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1	1/16" 1.5 mm | .059"		3/32" 2.0 mm | .079"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .157"		3/16" - 7/32" 5.0 mm | .197"		1/4" 6.0 mm | .236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	180 **591**	0.014 **.00055**	200 **656**	0.020 **.00079**	210 **688**	0.026 **.00102**	220 **722**	0.029 **.00114**	220 **722**	0.032 **.00126**	220 **722**	0.038 **.00150**	220 **722**	0.044 **.00173**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.025 **.00098**	220 **722**	0.028 **.00110**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.040 **.00157**
	180 **591**	0.012 **.00047**	200 **656**	0.017 **.00067**	210 **688**	0.023 **.00091**	220 **722**	0.024 **.00094**	220 **722**	0.026 **.00102**	220 **722**	0.029 **.00114**	220 **722**	0.035 **.00138**
	180 **591**	0.014 **.00055**	200 **656**	0.020 **.00079**	210 **688**	0.025 **.00098**	220 **722**	0.028 **.00110**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	260 **853**	0.040 **.00157**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.025 **.00098**	220 **722**	0.027 **.00106**	220 **722**	0.029 **.00114**	220 **722**	0.032 **.00126**	260 **853**	0.038 **.00150**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.025 **.00098**	220 **722**	0.027 **.00106**	220 **722**	0.029 **.00114**	220 **722**	0.032 **.00126**	260 **853**	0.038 **.00150**
	180 **591**	0.009 **.00035**	200 **656**	0.017 **.00067**	210 **688**	0.023 **.00091**	220 **722**	0.025 **.00098**	220 **722**	0.028 **.00110**	220 **722**	0.030 **.00118**	260 **853**	0.037 **.00146**
	130 **427**	0.014 **.00055**	150 **492**	0.016 **.00063**	160 **525**	0.025 **.00098**	170 **558**	0.029 **.00114**	170 **558**	0.033 **.00130**	170 **558**	0.036 **.00142**	200 **656**	0.042 **.00165**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	120 **394**	0.006 **.00024**	130 **427**	0.006 **.00024**	130 **427**	0.009 **.00035**	140 **459**	0.012 **.00047**	140 **459**	0.013 **.00051**	150 **492**	0.014 **.00055**	160 **525**	0.020 **.00079**
	120 **394**	0.012 **.00047**	130 **427**	0.016 **.00063**	130 **427**	0.023 **.00091**	140 **459**	0.025 **.00098**	140 **459**	0.028 **.00110**	150 **492**	0.030 **.00118**	160 **525**	0.036 **.00142**
	120 **394**	0.012 **.00047**	130 **427**	0.016 **.00063**	130 **427**	0.023 **.00091**	140 **459**	0.025 **.00098**	140 **459**	0.028 **.00110**	150 **492**	0.030 **.00118**	160 **525**	0.036 **.00142**
	120 **394**	0.006 **.00024**	130 **427**	0.006 **.00024**	130 **427**	0.009 **.00035**	140 **459**	0.012 **.00047**	140 **459**	0.013 **.00051**	150 **492**	0.014 **.00055**	160 **525**	0.020 **.00079**

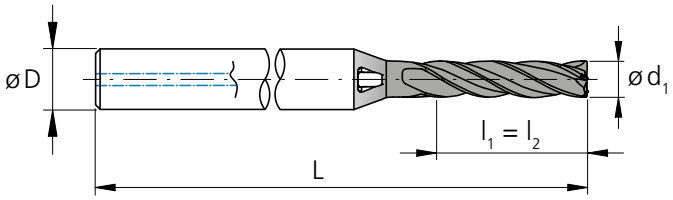
CRAZYMILL by Mikron Tool Cool

NEW Type N - 4 x d - Square / Corner radius - Z4

MILLING WITH INTEGRATED COOLING

Square





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.0	**.157**	4.0	4.0	4	**1.57**	40	2.CMC42.N1Z4.100.1	■
	.047	1.2	**.189**	4.8	4.8	4	**1.57**	40	2.CMC42.N1Z4.120.1	■
	.059	1.5	**.236**	6.0	6.0	4	**1.57**	40	2.CMC42.N1Z4.150.1	■
1/16	**.0625**	1.587	**.250**	6.3	6.3	4	**1.77**	45	2.CMC.SNZ4.F116	■
	.071	1.8	**.283**	7.2	7.2	4	**1.77**	45	2.CMC42.N1Z4.180.1	■
	.079	2.0	**.315**	8.0	8.0	4	**1.73**	44	2.CMC42.N1Z4.200.1	■
3/32	**.0937**	2.381	**.375**	9.5	9.5	4	**1.73**	44	2.CMC.SNZ4.F332	■
	.098	2.5	**.394**	10.0	10.0	6	**2.17**	55	2.CMC42.N1Z4.250.1	■
	.118	3.0	**.472**	12.0	12.0	6	**2.17**	55	2.CMC42.N1Z4.300.1	■
1/8	**.1250**	3.175	**.500**	12.7	12.7	6	**2.36**	60	2.CMC.SNZ4.F18	■
	.138	3.5	**.551**	14.0	14.0	6	**2.36**	60	2.CMC42.N1Z4.350.1	■
5/32	**.1562**	3.968	**.625**	15.9	15.9	6	**2.36**	60	2.CMC.SNZ4.F532	■
	.157	4.0	**.630**	16.0	16.0	6	**2.36**	60	2.CMC42.N1Z4.400.1	■
	.177	4.5	**.709**	18.0	18.0	8	**2.76**	70	2.CMC42.N1Z4.450.1	■
3/16	**.1875**	4.762	**.750**	19.0	19.0	8	**2.76**	70	2.CMC.SNZ4.F316	■
	.197	5.0	**.787**	20.0	20.0	8	**2.76**	70	2.CMC42.N1Z4.500.1	■
7/32	**.2189**	5.560	**.876**	22.2	22.2	10	**2.76**	70	2.CMC.SNZ4.F732	■
	.236	6.0	**.945**	24.0	24.0	10	**2.76**	70	2.CMC42.N1Z4.600.1	■
1/4	**.2500**	6.350	**1.00**	25.4	25.4	10	**2.76**	70	2.CMC.SNZ4.F14	■
	.315	8.0	**1.26**	32.0	32.0	12	**3.54**	90	2.CMC42.N1Z4.800.1	■

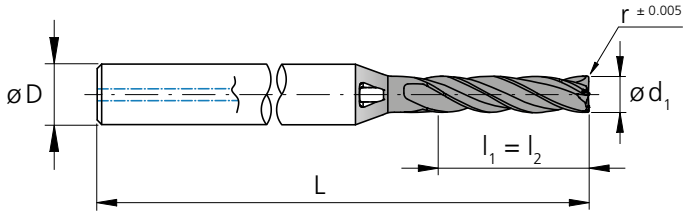
■ Stock item

Carbide | 4xd1 | Z4 | 42° | eXedur SNP | ap | ae

Ø d1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	- .00055" - .00110"	- 0.014 mm - 0.028 mm	- .00079" - .00150"	- 0.020 mm - 0.038 mm	- .00098" - .00185"	- 0.025 mm - 0.047 mm

Corner radius





l1 = Effective length
l2 = Cutting length

d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	r [inch]	r [mm]	Item number	Availability
	.039	1.0	.157	4.0	4.0	4	1.57	40	.0039	0.10	2.CMC42.N2Z4.100.1	■
	.039	1.0	.157	4.0	4.0	4	1.57	40	.0079	0.20	2.CMC42.N3Z4.100.1	■
	.047	1.2	.189	4.8	4.8	4	1.57	40	.0039	0.10	2.CMC42.N2Z4.120.1	■
	.047	1.2	.189	4.8	4.8	4	1.57	40	.0079	0.20	2.CMC42.N3Z4.120.1	■
	.059	1.5	.236	6.0	6.0	4	1.57	40	.0039	0.10	2.CMC42.N2Z4.150.1	■
	.059	1.5	.236	6.0	6.0	4	1.57	40	.0118	0.30	2.CMC42.N3Z4.150.1	■
1/16	.0625	1.587	.250	6.3	6.3	4	1.77	45	.0050	0.127	2.CMC.RN2Z4.F116	■
1/16	.0625	1.587	.250	6.3	6.3	4	1.77	45	.0100	0.254	2.CMC.RN3Z4.F116	■
	.071	1.8	.283	7.2	7.2	4	1.77	45	.0039	0.10	2.CMC42.N2Z4.180.1	■
	.071	1.8	.283	7.2	7.2	4	1.77	45	.0118	0.30	2.CMC42.N3Z4.180.1	■
	.079	2.0	.315	8.0	8.0	4	1.73	44	.0039	0.10	2.CMC42.N2Z4.200.1	■
	.079	2.0	.315	8.0	8.0	4	1.73	44	.0079	0.20	2.CMC42.N3Z4.200.1	■
	.079	2.0	.315	8.0	8.0	4	1.73	44	.0197	0.50	2.CMC42.N4Z4.200.1	■
3/32	.0937	2.381	.375	9.5	9.5	4	1.73	44	.0050	0.127	2.CMC.RN2Z4.F332	■
3/32	.0937	2.381	.375	9.5	9.5	4	1.73	44	.0100	0.254	2.CMC.RN3Z4.F332	■
3/32	.0937	2.381	.375	9.5	9.5	4	1.73	44	.0150	0.381	2.CMC.RN4Z4.F332	■
	.098	2.5	.394	10.0	10.0	6	2.17	55	.0079	0.20	2.CMC42.N2Z4.250.1	■
	.098	2.5	.394	10.0	10.0	6	2.17	55	.0197	0.50	2.CMC42.N3Z4.250.1	■
	.118	3.0	.472	12.0	12.0	6	2.17	55	.0079	0.20	2.CMC42.N2Z4.300.1	■
	.118	3.0	.472	12.0	12.0	6	2.17	55	.0197	0.50	2.CMC42.N3Z4.300.1	■
1/8	.1250	3.175	.500	12.7	12.7	6	2.36	60	.0100	0.254	2.CMC.RN2Z4.F18	■
1/8	.1250	3.175	.500	12.7	12.7	6	2.36	60	.0150	0.381	2.CMC.RN3Z4.F18	■
	.138	3.5	.551	14.0	14.0	6	2.36	60	.0079	0.20	2.CMC42.N2Z4.350.1	■
	.138	3.5	.551	14.0	14.0	6	2.36	60	.0197	0.50	2.CMC42.N3Z4.350.1	■
5/32	.1562	3.968	.625	15.9	15.9	6	2.36	60	.0100	0.254	2.CMC.RN2Z4.F532	■
5/32	.1562	3.968	.625	15.9	15.9	6	2.36	60	.0150	0.381	2.CMC.RN3Z4.F532	■
	.157	4.0	.630	16.0	16.0	6	2.36	60	.0079	0.20	2.CMC42.N2Z4.400.1	■
	.157	4.0	.630	16.0	16.0	6	2.36	60	.0197	0.50	2.CMC42.N3Z4.400.1	■
	.177	4.5	.709	18.0	18.0	8	2.76	70	.0079	0.20	2.CMC42.N2Z4.450.1	■
	.177	4.5	.709	18.0	18.0	8	2.76	70	.0197	0.50	2.CMC42.N3Z4.450.1	■
3/16	.1875	4.762	.750	19.0	19.0	8	2.76	70	.0100	0.254	2.CMC.RN2Z4.F316	■
3/16	.1875	4.762	.750	19.0	19.0	8	2.76	70	.0150	0.381	2.CMC.RN3Z4.F316	■
	.197	5.0	.787	20.0	20.0	8	2.76	70	.0079	0.20	2.CMC42.N2Z4.500.1	■
	.197	5.0	.787	20.0	20.0	8	2.76	70	.0197	0.50	2.CMC42.N3Z4.500.1	■
7/32	.2189	5.560	.876	22.2	22.2	10	2.76	70	.0150	0.381	2.CMC.RN2Z4.F732	■
7/32	.2189	5.560	.876	22.2	22.2	10	2.76	70	.0300	0.762	2.CMC.RN3Z4.F732	■
	.236	6.0	.945	24.0	24.0	10	2.76	70	.0079	0.20	2.CMC42.N2Z4.600.1	■
	.236	6.0	.945	24.0	24.0	10	2.76	70	.0197	0.50	2.CMC42.N3Z4.600.1	■
	.236	6.0	.945	24.0	24.0	10	2.76	70	.0394	1.00	2.CMC42.N4Z4.600.1	■
1/4	.2500	6.350	1.00	25.4	25.4	10	2.76	70	.0150	0.381	2.CMC.RN2Z4.F14	■
1/4	.2500	6.350	1.00	25.4	25.4	10	2.76	70	.0300	0.762	2.CMC.RN3Z4.F14	■
1/4	.2500	6.350	1.00	25.4	25.4	10	2.76	70	.0600	1.524	2.CMC.RN4Z4.F14	■
	.315	8.0	1.26	32.0	32.0	12	3.54	90	.0079	0.20	2.CMC42.N2Z4.800.1	■
	.315	8.0	1.26	32.0	32.0	12	3.54	90	.0197	0.50	2.CMC42.N3Z4.800.1	■
	.315	8.0	1.26	32.0	32.0	12	3.54	90	.0591	1.50	2.CMC42.N4Z4.800.1	■

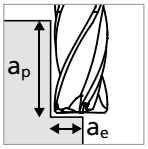
■ Stock item

CRAZYMILL by Mikron Tool Cool

NEW Type N - Pre-machining

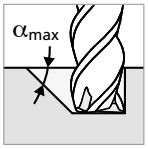
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Pre-machining



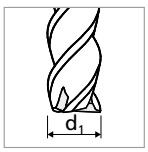
①
- $a_p = 2 \times d_1$
- $a_e = 0.1 \times d_1$

②
- $a_p = 4 \times d_1$
- $a_e = 0.05 \times d_1$



Note:
In case of linear ramp or helical interpolation milling reduce f_z by 35%

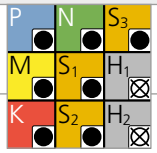




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z ①	1.0 mm | .039" f_z ②	1.5 mm | 1/16" v_c	1.5 mm | 1/16" f_z ①	1.5 mm | 1/16" f_z ②
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.011 **.00043**	0.008 **.00032**	200 **656**	0.015 **.00059**	0.012 **.00047**
		1.0401	C15	AISI 1015						
		1.1191	C45E/CK45	AISI 1045						
		1.0044	S275JR	AISI 1020						
		1.0715	11SMn30	AISI 1215						
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.010 **.00039**	0.007 **.00028**	200 **656**	0.013 **.00051**	0.011 **.00043**
		1.7131	16MnCr5	AISI 5115						
		1.3505	100Cr6	AISI 52100						
		1.7225	42CrMo4	AISI 4140						
		1.2842	90MnCrV8	AISI O2						
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.008 **.00032**	0.006 **.00024**	200 **656**	0.011 **.00043**	0.010 **.00039**
		1.2436	X210CrW12	AISI D4/D6						
		1.3343	HS6-5-2C	AISI M2 / UNS T11302						
		1.3355	HS18-0-1	AISI T1 / UNS T12001						
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.012 **.00047**	0.008 **.00032**	180 **591**	0.015 **.00059**	0.012 **.00047**
		1.4105	X6CrMoS17	AISI 430F						
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.011 **.00043**	0.008 **.00032**	180 **591**	0.014 **.00055**	0.011 **.00043**
		1.4112	X90CrMoV18	AISI 440B						
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.011 **.00043**	0.008 **.00032**	180 **591**	0.014 **.00055**	0.011 **.00043**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH						
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.009 **.00035**	0.006 **.00024**	180 **591**	0.012 **.00047**	0.008 **.00031**
		1.4435	X2CrNiMo18-14-3	AISI 316L						
		1.4441	X2CrNiMo18-15-3	AISI 316LM						
		1.4539	X1NiCrMoCu25-20-5	AISI 904L						
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.010 **.00039**	0.006 **.00024**	160 **525**	0.014 **.00055**	0.012 **.00047**
		0.6030	GG30	ASTM 40B						
		0.7040	GGG40	ASTM 60-40-18						
		0.7060	GGG60	ASTM 80-60-03						
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	160 **525**	0.013 **.00051**	0.009 **.00035**	200 **656**	0.016 **.00063**	0.013 **.00051**
		3.4365	AlZnMgCu1.5	ASTM 7075						
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	160 **525**	0.013 **.00051**	0.009 **.00035**	220 **722**	0.016 **.00063**	0.013 **.00051**
		3.2381	GD-AlSi10Mg	UNS A03590						
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	160 **525**	0.013 **.00051**	0.010 **.00039**	220 **722**	0.016 **.00063**	0.013 **.00051**
		2.0065	Cu-ETP / CW004A	UNS C11000						
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	160 **525**	0.013 **.00051**	0.010 **.00039**	220 **722**	0.016 **.00063**	0.013 **.00051**
		2.0360	CuZn40 CW509L	UNS C28000						
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	160 **525**	0.013 **.00051**	0.010 **.00039**	220 **722**	0.016 **.00063**	0.013 **.00051**
		2.1020	CuSn6	UNS C51900						
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	160 **525**	0.013 **.00051**	0.009 **.00035**	220 **722**	0.016 **.00063**	0.013 **.00051**
		2.0960	CuAl9Mn2	UNS C63200						
S_1	Super alloys	2.4856		Inconel 625	100 **328**	0.006 **.00024**	0.004 **.00016**	100 **328**	0.008 **.00031**	0.005 **.00020**
		2.4668		Inconel 718						
		2.4617	NiMo28	Hastelloy B-2						
		2.4665	NiCr22Fe18Mo	Hastelloy X						
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.010 **.00039**	0.008 **.00032**	120 **394**	0.012 **.00047**	0.010 **.00039**
		3.7065	Gr.4	ASTM B348 / F68						
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.010 **.00039**	0.008 **.00032**	120 **394**	0.012 **.00047**	0.010 **.00039**
		9.9367	TiAl6Nb7	ASTM F1295						
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	100 **328**	0.006 **.00024**	0.004 **.00016**	140 **459**	0.008 **.00031**	0.005 **.00018**
			CrCoMo28	ASTM F1537						
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1						
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2						

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



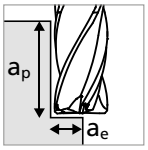
Ød1	v_c	f_z ①	f_z ②
3/32" 2.0 mm | **.079"**	220 **722**	0.024 **.00094**	0.017 **.00067**
	220 **722**	0.022 **.00087**	0.016 **.00063**
	220 **722**	0.019 **.00075**	0.015 **.00059**
	180 **591**	0.021 **.00083**	0.017 **.00067**
	180 **591**	0.020 **.00079**	0.016 **.00063**
	180 **591**	0.020 **.00079**	0.016 **.00063**
	180 **591**	0.018 **.00071**	0.015 **.00059**
	200 **656**	0.024 **.00094**	0.014 **.00055**
	240 **787**	0.026 **.00102**	0.018 **.00071**
	240 **787**	0.026 **.00102**	0.018 **.00071**
	240 **787**	0.026 **.00102**	0.018 **.00071**
	240 **787**	0.026 **.00102**	0.018 **.00071**
	240 **787**	0.026 **.00102**	0.018 **.00071**
	240 **787**	0.026 **.00102**	0.018 **.00071**
	100 **328**	0.010 **.00039**	0.005 **.00020**
	130 **427**	0.017 **.00067**	0.014 **.00055**
	130 **427**	0.017 **.00067**	0.014 **.00055**
	100 **328**	0.010 **.00039**	0.005 **.00020**
1/8" 3.0 mm | **.118"**	240 **787**	0.033 **.00130**	0.020 **.00079**
	240 **787**	0.031 **.00122**	0.019 **.00075**
	240 **787**	0.028 **.00110**	0.018 **.00071**
	200 **656**	0.030 **.00118**	0.034 **.00134**
	200 **656**	0.028 **.00110**	0.018 **.00071**
	200 **656**	0.028 **.00110**	0.018 **.00071**
	200 **656**	0.026 **.00102**	0.017 **.00067**
	220 **722**	0.032 **.00126**	0.021 **.00083**
	260 **853**	0.040 **.00157**	0.029 **.00114**
	260 **853**	0.040 **.00157**	0.029 **.00114**
	260 **853**	0.040 **.00157**	0.029 **.00114**
	260 **853**	0.040 **.00157**	0.029 **.00114**
	260 **853**	0.040 **.00157**	0.029 **.00114**
	260 **853**	0.040 **.00157**	0.029 **.00114**
	100 **328**	0.014 **.00055**	0.008 **.00032**
	130 **427**	0.028 **.00110**	0.017 **.00067**
	130 **427**	0.028 **.00110**	0.017 **.00067**
	100 **328**	0.014 **.00055**	0.008 **.00032**
5/32" 4.0 mm | **.157"**	260 **853**	0.034 **.00134**	0.025 **.00098**
	260 **853**	0.032 **.00126**	0.024 **.00094**
	260 **853**	0.029 **.00114**	0.022 **.00087**
	220 **722**	0.032 **.00126**	0.024 **.00094**
	220 **722**	0.031 **.00122**	0.023 **.00091**
	220 **722**	0.031 **.00122**	0.023 **.00091**
	220 **722**	0.030 **.00118**	0.022 **.00087**
	240 **787**	0.038 **.00150**	0.026 **.00102**
	300 **984**	0.048 **.00189**	0.028 **.00110**
	300 **984**	0.048 **.00189**	0.028 **.00110**
	300 **984**	0.048 **.00189**	0.028 **.00110**
	300 **984**	0.048 **.00189**	0.028 **.00110**
	300 **984**	0.048 **.00189**	0.028 **.00110**
	300 **984**	0.048 **.00189**	0.028 **.00110**
	120 **394**	0.016 **.00063**	0.010 **.00039**
	150 **492**	0.030 **.00118**	0.021 **.00083**
	150 **492**	0.030 **.00118**	0.021 **.00083**
	120 **394**	0.016 **.00063**	0.010 **.00039**
3/16" - 7/32" 5.0 mm | **.197"**	260 **853**	0.035 **.00138**	0.028 **.00110**
	260 **853**	0.033 **.00130**	0.026 **.00102**
	260 **853**	0.030 **.00118**	0.024 **.00094**
	220 **722**	0.033 **.00130**	0.026 **.00102**
	220 **722**	0.032 **.00126**	0.025 **.00098**
	220 **722**	0.032 **.00126**	0.025 **.00098**
	220 **722**	0.031 **.00122**	0.024 **.00094**
	240 **787**	0.042 **.00165**	**0.029** **.00114**
	320 **1050**	0.051 **.00201**	0.030 **.00118**
	320 **1050**	0.051 **.00201**	0.030 **.00118**
	320 **1050**	0.051 **.00201**	0.030 **.00118**
	320 **1050**	0.051 **.00201**	0.030 **.00118**
	320 **1050**	0.051 **.00201**	0.030 **.00118**
	320 **1050**	0.051 **.00201**	0.030 **.00118**
	120 **394**	0.018 **.00071**	0.011 **.00043**
	150 **492**	0.031 **.00122**	0.023 **.00091**
	150 **492**	0.031 **.00122**	0.023 **.00091**
	120 **394**	0.018 **.00071**	0.011 **.00043**
1/4" 6.0 mm | **.236"**	260 **853**	0.046 **.00181**	0.030 **.00117**
	260 **853**	0.044 **.00173**	0.028 **.00110**
	260 **853**	0.042 **.00165**	0.026 **.00103**
	220 **722**	0.040 **.00157**	0.028 **.00110**
	220 **722**	0.037 **.00145**	0.027 **.00106**
	220 **722**	0.037 **.00145**	0.027 **.00106**
	220 **722**	0.035 **.00139**	0.026 **.00103**
	240 **787**	0.044 **.00173**	**0.031** **.00120**
	320 **1050**	0.052 **.00205**	0.032 **.00128**
	320 **1050**	0.052 **.00205**	0.032 **.00128**
	320 **1050**	0.052 **.00205**	0.032 **.00128**
	320 **1050**	0.052 **.00205**	0.032 **.00128**
	320 **1050**	0.052 **.00205**	0.032 **.00128**
	320 **1050**	0.052 **.00205**	0.032 **.00128**
	120 **394**	0.020 **.00079**	0.012 **.00046**
	150 **492**	0.032 **.00126**	0.024 **.00096**
	150 **492**	0.032 **.00126**	0.024 **.00096**
	120 **394**	0.020 **.00079**	0.012 **.00046**
8.0 mm | **.315"**	260 **853**	0.054 **.00213**	0.033 **.00130**
	260 **853**	0.052 **.00205**	0.031 **.00122**
	260 **853**	0.050 **.00197**	0.029 **.00114**
	260 **853**	0.048 **.00189**	0.031 **.00122**
	260 **853**	0.045 **.00177**	0.030 **.00118**
	260 **853**	0.045 **.00177**	0.030 **.00118**
	260 **853**	0.042 **.00165**	0.029 **.00114**
	350 **1148**	0.052 **.00205**	**0.034** **.00134**
	350 **1148**	0.060 **.00236**	0.036 **.00142**
	350 **1148**	0.060 **.00236**	0.036 **.00142**
	350 **1148**	0.060 **.00236**	0.036 **.00142**
	350 **1148**	0.060 **.00236**	0.036 **.00142**
	350 **1148**	0.060 **.00236**	0.036 **.00142**
	350 **1148**	0.060 **.00236**	0.036 **.00142**
	120 **394**	0.025 **.00098**	0.013 **.00051**
	170 **558**	0.035 **.00138**	0.027 **.00106**
	170 **558**	0.035 **.00138**	**0.027** **.00106**
	120 **394**	0.025 **.00098**	0.013 **.00051**

CRAZYMILL by Mikron Tool Cool

NEW Type N - Finishing

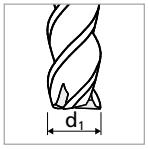
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Finishing



- $a_p = 4 \times d_1$
- $a_e = 0.02 \times d_1$

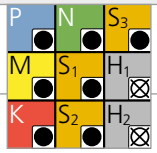




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	130 **425**	0.009 **.00035**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	130 **425**	0.008 **.00032**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	130 **425**	0.007 **.00028**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	130 **425**	0.009 **.00035**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	130 **425**	0.009 **.00035**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	130 **425**	0.009 **.00035**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	130 **425**	0.007 **.00028**
		1.4435	X2CrNiMo18-14-3	AISI 316L		
		1.4441	X2CrNiMo18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	110 **361**	0.007 **.00028**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	130 **425**	0.010 **.00039**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	130 **425**	0.010 **.00039**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	130 **425**	0.012 **.00047**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	130 **425**	0.012 **.00047**
		2.0360	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	130 **425**	0.012 **.00047**
		2.1020	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	130 **425**	0.010 **.00039**
		2.0960	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	110 **361**	0.005 **.00020**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	110 **361**	0.009 **.00035**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	110 **361**	0.009 **.00035**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	110 **361**	0.005 **.00020**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1	1/16" 1.5 mm | .059"		3/32" 2.0 mm | .079"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .157"		3/16" - 7/32" 5.0 mm | .197"		1/4" 6.0 mm | .236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	180 **591**	0.014 **.00055**	200 **656**	0.020 **.00079**	210 **688**	0.026 **.00102**	220 **722**	0.029 **.00114**	220 **722**	0.032 **.00126**	220 **722**	0.038 **.00150**	220 **722**	0.044 **.00173**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.025 **.00098**	220 **722**	0.028 **.00110**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.040 **.00157**
	180 **591**	0.012 **.00047**	200 **656**	0.017 **.00067**	210 **688**	0.023 **.00091**	220 **722**	0.024 **.00094**	220 **722**	0.026 **.00102**	220 **722**	0.029 **.00114**	220 **722**	0.035 **.00138**
	180 **591**	0.014 **.00055**	200 **656**	0.020 **.00079**	210 **688**	0.025 **.00098**	220 **722**	0.028 **.00110**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	260 **853**	0.040 **.00157**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.025 **.00098**	220 **722**	0.027 **.00106**	220 **722**	0.029 **.00114**	220 **722**	0.032 **.00126**	260 **853**	0.038 **.00150**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.025 **.00098**	220 **722**	0.027 **.00106**	220 **722**	0.029 **.00114**	220 **722**	0.032 **.00126**	260 **853**	0.038 **.00150**
	180 **591**	0.009 **.00035**	200 **656**	0.017 **.00067**	210 **688**	0.023 **.00091**	220 **722**	0.025 **.00098**	220 **722**	0.028 **.00110**	220 **722**	0.030 **.00118**	260 **853**	0.037 **.00146**
	130 **427**	0.014 **.00055**	150 **492**	0.016 **.00063**	160 **525**	0.025 **.00098**	170 **558**	0.029 **.00114**	170 **558**	0.033 **.00130**	170 **558**	0.036 **.00142**	200 **656**	0.042 **.00165**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	180 **591**	0.015 **.00059**	200 **656**	0.021 **.00083**	210 **688**	0.033 **.00130**	220 **722**	0.035 **.00138**	220 **722**	0.038 **.00150**	220 **722**	0.041 **.00161**	270 **886**	0.047 **.00185**
	120 **394**	0.006 **.00024**	130 **427**	0.006 **.00024**	130 **427**	0.009 **.00035**	140 **459**	0.012 **.00047**	140 **459**	0.013 **.00051**	150 **492**	0.014 **.00055**	160 **525**	0.020 **.00079**
	120 **394**	0.012 **.00047**	130 **427**	0.016 **.00063**	130 **427**	0.023 **.00091**	140 **459**	0.025 **.00098**	140 **459**	0.028 **.00110**	150 **492**	0.030 **.00118**	160 **525**	0.036 **.00142**
	120 **394**	0.012 **.00047**	130 **427**	0.016 **.00063**	130 **427**	0.023 **.00091**	140 **459**	0.025 **.00098**	140 **459**	0.028 **.00110**	150 **492**	0.030 **.00118**	160 **525**	0.036 **.00142**
	120 **394**	0.006 **.00024**	130 **427**	0.006 **.00024**	130 **427**	0.009 **.00035**	140 **459**	0.012 **.00047**	140 **459**	0.013 **.00051**	150 **492**	0.014 **.00055**	160 **525**	0.020 **.00079**

07



NEW

Process CrazyMill Cool Square / Corner radius - Z4

ACCURATE AND EFFICIENT MILLING

Coolant type, pressure and filtration

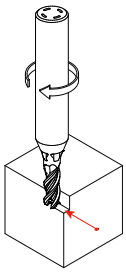
Coolant: for best results, Mikron Tool recommends the use of cutting oil as coolant. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used as well.

Filter: the large cooling channels permit the use of a standard filter with filter quality of ≤ .002" (0.05 mm).

Coolant pressure: at least 15 bar (218 psi) coolant pressure is required to achieve reliable milling. High pressure is generally better for the cooling and flushing effect.

Revolution	[rpm]	≤ 10'000	> 10'000
Minimal pressure	[bar]	15	30
	[psi]	**218**	**435**

Climb milling and conventional milling

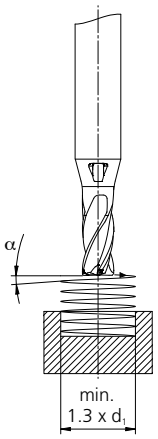


Mikron tool recommends climb milling for the machining of side and pocket milling. The chip thickness here is greater at the beginning and decreases continuously; the cutting forces remain low. With conventional milling, however, high cutting forces would push the milling tool away from the part.Thus surface quality decreases.

MILLING PROCESS

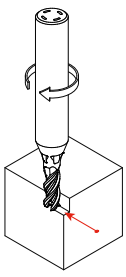
Maximum ramp angles in linear ramping or helical interpolation

	Material	α - Linear ramp	α - Helical interpolation
P	Unalloyed carbon steel	45°	47°
P	Low alloyed steel	45°	47°
P	High alloyed tool steel	27°	28°
M	Stainless steel ferritic	45°	47°
M	Stainless steel martensitic	27°	28°
M	Stainless steel martensitic - PH	27°	28°
M	Stainless steel austenitic	45°	47°
K	Cast iron	45°	47°
N	Aluminium alloy wrought	45°	47°
N	Aluminium alloy cast	45°	47°
N	Copper	45°	47°
N	Brass lead free	45°	47°
N	Brass, Bronze Rm < 400 N/mm²	45°	47°
N	Bronze Rm < 600 N/mm²	45°	47°
S_1	Super alloys	14°	15°
S_2	Titanium pure and titanium alloys	14°	15°
S_3	CrCo alloys	27°	28°



Note: In case of linear ramping or helical interpolation refer to cutting data for pre-machining with a reduction by 35% of f_z

Pre-machining

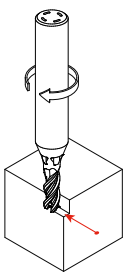


Recommended cutting parameters

v_c and f_z = as specified in the cutting data table

Strategy	Type A	Type M	Type N	Type C
①	a_p = 1.5 x d a_e = 0.3 x d	a_p = 1.5 x d a_e = 0.2 x d	a_p = 2 x d a_e = 0.1 x d	a_p = 2 x d a_e = 0.1 x d
②	a_p = 2 x d a_e = 0.2 x d	a_p = 3 x d a_e = 0.1 x d	a_p = 4 x d a_e = 0.05 x d	-
③	-	a_p = 3 x d a_e = 0.05 x d	-	-

Finishing



Recommended cutting parameters

v_c and f_z = as specified in the cutting data table

Strategy	Type A	Type M	Type N	Type C
①	a_p = 2 x d a_e = 0.04 x d	a_p = 3 x d a_e = 0.02 x d	a_p = 4 x d a_e = 0.02 x d	a_p = 2 x d a_e = 0.02 x d
②	a_p = 2 x d a_e = 0.02 x d	-	-	-

NEW CrazyMill Hexalobe



NEW

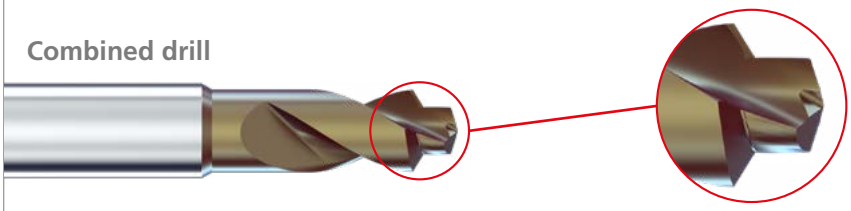
THE NEW CONCEPT FOR MACHINING YOUR "TORX®" SOCKET

New concept

- Drilling - Chamfering - Milling - Deburring: Four operations in three steps with two tools.
- High efficient machining in shorter time for titanium and stainless steel.

CRAZYDRILL Hexalobe

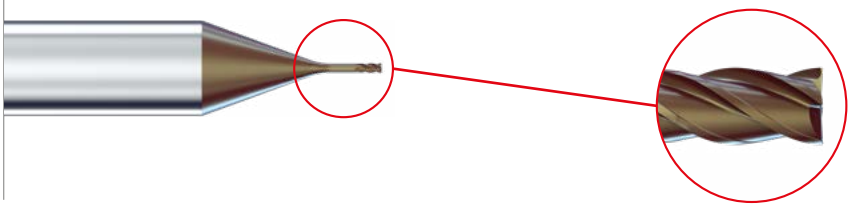
Combined drill



Drilling and chamfering in one step

CRAZYMILL Hexalobe

Micro endmill



Micro endmill with special micro-grain carbide for high stiffness and edge chipping resistence

Performance features

- Highest stiffness
- New cutting geometry

Your advantages

- Shorter milling process
- Highest profile precision
- Excellent surface quality
- Minimal burr

07

NEW Best performance on hexalobular sockets

TURNKEY SOLUTION FOR TITANIUM AND STAINLESS STEEL



Material

■ **Titanium**

S2

Ti Gr.5 ELI
TiAl6V4 ELI
3.7165

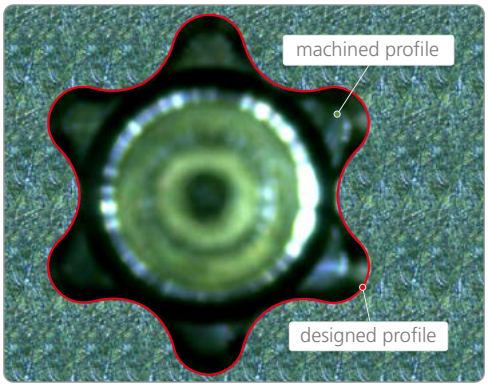
■ **Stainless Steel**

M

316 LM
X2CrNiMo18-15-3
1.4441

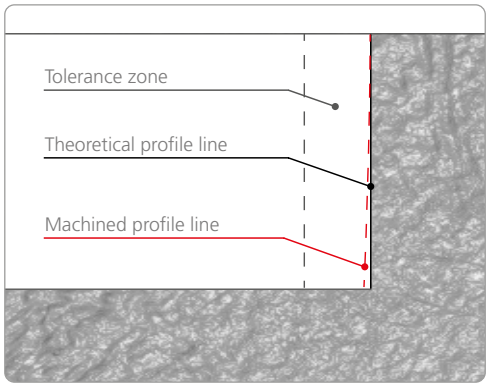
Shape precision

■ **Nearly perfect profile**



Perfect profile matching.

■ **Perpendicularity**

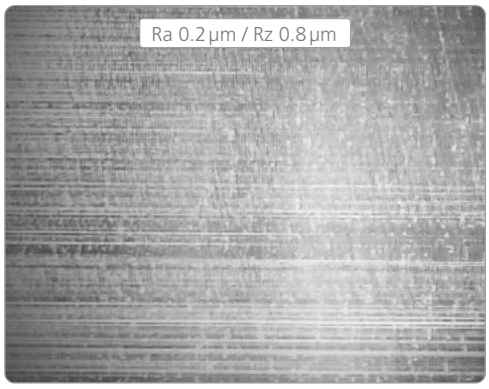


Guaranteed profile geometry.

NEW

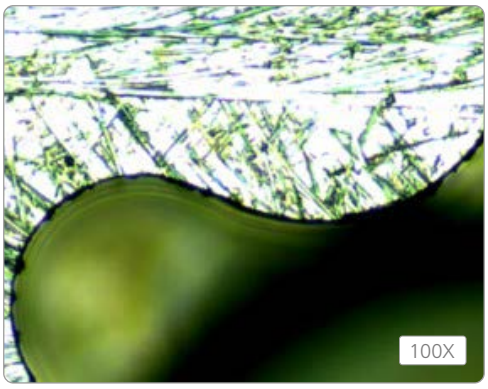
Quality and performance

■ Surface quality



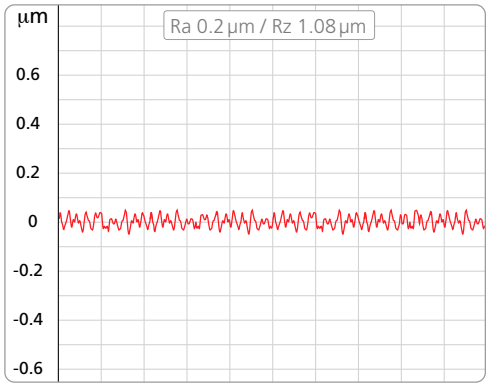
Excellent surface quality.*1

■ Nearly burr free



Machining profile with minimal burrs.

■ Chamfer roughness



Lowest roughness on chamfer surface.*1

■ Milling cycle time

Torx type	Time [s]
T6	27
T8	24
T10	22
T15	22
T20	21
T25	20

Machined on titanium with version 3.5 x d and p = 0.4 x d.*1

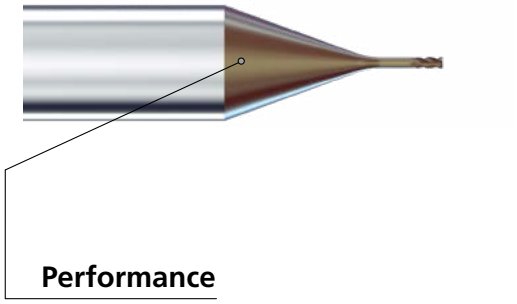
Note *1: The quality and cycle time depends on cutting parameters and machine conditions.

NEW High efficient milling hexalobular socket

THE MICRO ENDMILL

CrazyMill Hexalobe

The new endmill for "Torx®" socket machining

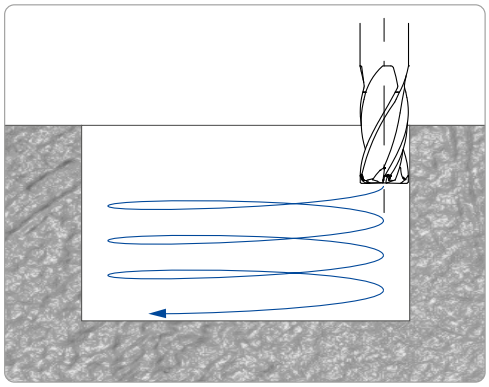


Performance

■ Real cutting conditions

Tested and approved cutting conditions for best process execution and tool life.

■ Helical interpolation



Higher pitch up to 0.8 x d.

■ New carbide

A special micro-grain carbide with high stiffness and edge chipping resistence has been developed to guarantee high profile precision.

■ Two cutting geometries

Two types of endmills have been developed for vibration free machining in titanium and stainless steel.

■ Coating

Cr

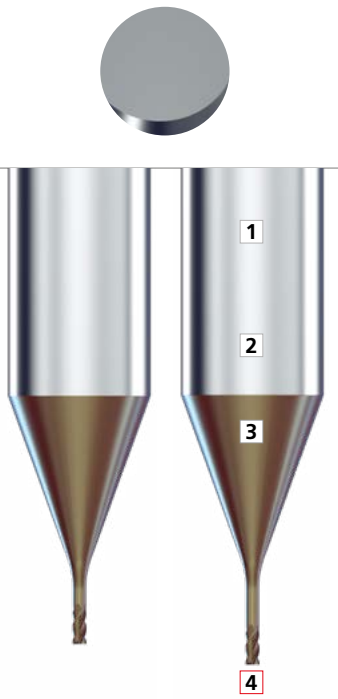
Chrome free coating to avoid cross contamination on medical parts.

Regrinding: This product is not suitable for regrinding.

CrazyMill Hexalobe

Titanium

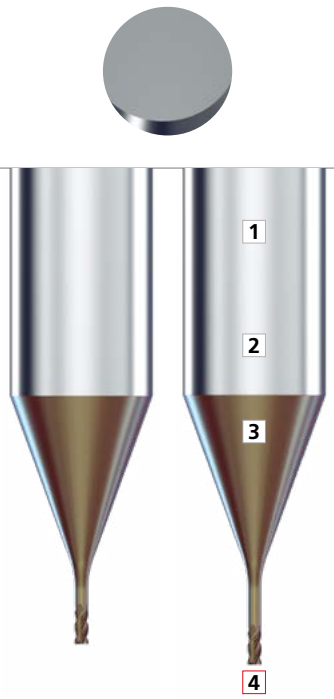
- Coated
- External cooling



page 536

SST-Inox

- Coated
- External cooling



page 536

NEW

1 | SHANK
The robust carbide shank guarantees stable and vibration free milling. A high degree of precision and excellent surface quality are achieved.

2 | NEW CARBIDE
Due to the high degree of toughness and low thermal conductivity of titanium and stainless steel, a specially micro-grain carbide with high stiffnessand edge chipping resistence has been developed to perfectly meet all requirements in terms of mechanical properties.

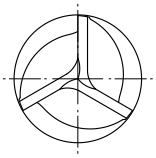
3 | NEW COATING
The high-performance coating eXedur SNP is heat and wear resistant, prevents buildup edges and guarantees optimum chip flushing. The result is a long tool life.

4 | CUTTING GEOMETRY
Two specific geometries have been developed for the machining of:
- **Titanium**
- **Stainless steel**

Vibration free cutting for machining with helical interpolation.

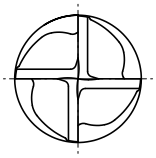
Mill tip form

3 Flute



Diameter range
Ø .008" - .012"
Ø 0.2 - 0.3 mm

4 Flute



Diameter range
Ø .016" - .039"
Ø 0.4 - 1.0 mm

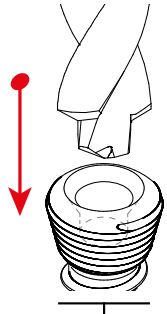
NEW Machining process

HELICAL INTERPOLATION FOR TITANIUM

Step 1

Pre-hole drilling with 120° chamfer

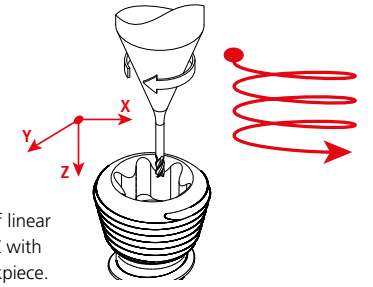
Ti
S2



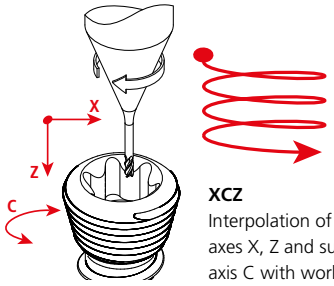
Helical interpolation XYZ

Helical interpolation XCZ

Step 2



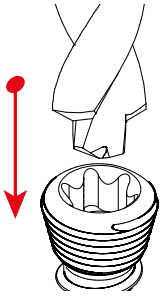
XYZ
Interpolation of linear axes X, Y and Z with stationary workpiece.



XCZ
Interpolation of linear axes X, Z and subspindle axis C with workpiece on rotation.

Deburring

Step 3



Repeat chamfering to clean the burrs

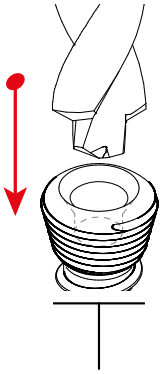
Note: Helical interpolation process is optimal for titanium, saving up to 20% of cycle time in comparison to side milling process.

NEW

SIDE MILLING FOR TITANIUM AND STAINLESS STEEL

Step 1

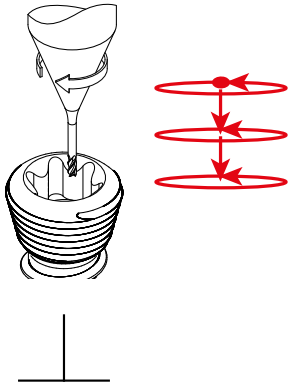
Pre-hole drilling with 120° chamfer



Ti S2 | SST M

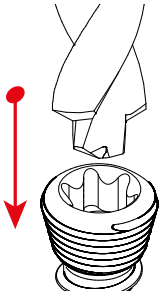
Step 2

Side milling



Step 3

Deburring



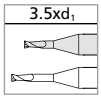
Repeat chamfering
to clean the burrs

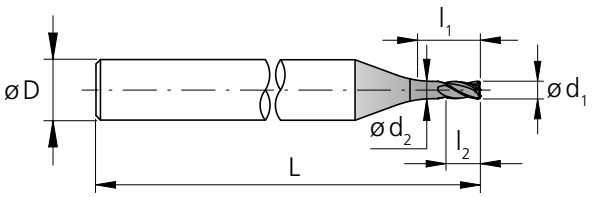
07

NEW CrazyMill Hexalobe

DRILLING WITH EXTERNAL COOLING

Short version





l_1 = Effective length
l_2 = Cutting length

Torx type	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	d_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [Teeth]	Item number **Titanium**	Item number **SST-Inox**	Availability
T4	**.008**	0.20	**.028**	0.70	0.30	0.19	4	**1.57**	40	3	2.CMT35.B1Z3.020.1	2.CMI35.B1Z3.020.1	■
T5	**.010**	0.25	**.034**	0.875	0.40	0.23	4	**1.57**	40	3	2.CMT35.B1Z3.025.1	2.CMI35.B1Z3.025.1	■
T6 / T7	**.012**	0.30	**.041**	1.05	0.45	0.28	4	**1.57**	40	3	2.CMT35.B1Z3.030.1	2.CMI35.B1Z3.030.1	■
T8 / T10	**.016**	0.40	**.055**	1.40	0.60	0.38	4	**1.57**	40	4	2.CMT35.B1Z4.040.1	2.CMI35.B1Z4.040.1	■
T10 / T15	**.020**	0.50	**.069**	1.75	0.75	0.47	4	**1.57**	40	4	2.CMT35.B1Z4.050.1	2.CMI35.B1Z4.050.1	■
T20	**.024**	0.60	**.083**	2.10	0.90	0.56	4	**1.57**	40	4	2.CMT35.B1Z4.060.1	2.CMI35.B1Z4.060.1	■
T25	**.031**	0.80	**.110**	2.80	1.20	0.75	4	**1.57**	40	4	2.CMT35.B1Z4.080.1	2.CMI35.B1Z4.080.1	■
T30	**.039**	1.00	**.138**	3.50	1.50	0.94	4	**1.57**	40	4	2.CMT35.B1Z4.100.1	2.CMI35.B1Z4.100.1	■

■ Stock item

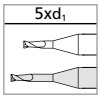
Complementary products

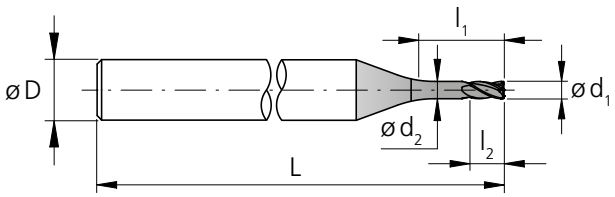
CrazyDrill Hexalobe p.204

Carbide | Z 3-4 | 35° | eXedur SNP

Ød_1	**.008" - .039"** (0.2 - 1.0 mm)	
Tolerance	**0 - .0004"**	0 - 0.01 mm

Long version





l_1 = Effective length
l_2 = Cutting length

Torx type	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	d_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [Teeth]	Item number **Titanium**	Item number **SST-Inox**	Availability
T4	**.008**	0.20	**.039**	1.00	0.30	0.19	4	**1.57**	40	3	2.CMT35.C1Z3.020.1	2.CMI35.C1Z3.020.1	■
T5	**.010**	0.25	**.049**	1.25	0.40	0.23	4	**1.57**	40	3	2.CMT35.C1Z3.025.1	2.CMI35.C1Z3.025.1	■
T6 / T7	**.012**	0.30	**.059**	1.50	0.45	0.28	4	**1.57**	40	3	2.CMT35.C1Z3.030.1	2.CMI35.C1Z3.030.1	■
T8 / T10	**.016**	0.40	**.079**	2.00	0.60	0.38	4	**1.57**	40	4	2.CMT35.C1Z4.040.1	2.CMI35.C1Z4.040.1	■
T10 / T15	**.020**	0.50	**.098**	2.50	0.75	0.47	4	**1.57**	40	4	2.CMT35.C1Z4.050.1	2.CMI35.C1Z4.050.1	■
T20	**.024**	0.60	**.118**	3.00	0.90	0.56	4	**1.57**	40	4	2.CMT35.C1Z4.060.1	2.CMI35.C1Z4.060.1	■
T25	**.031**	0.80	**.157**	4.00	1.20	0.75	4	**1.57**	40	4	2.CMT35.C1Z4.080.1	2.CMI35.C1Z4.080.1	■
T30	**.039**	1.00	**.197**	5.00	1.50	0.94	4	**1.57**	40	4	2.CMT35.C1Z4.100.1	2.CMI35.C1Z4.100.1	■

■ Stock item

Complementary products

CrazyDrill Hexalobe p.204

NEW Helical interpolation (XYZ / XCZ) - 3.5 x d / 5 x d

MILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW

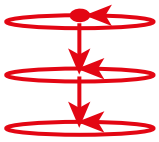


Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	p (pitch) 3.5 x d1	p (pitch) 5 x d1
S_2	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	0.2 - 0.8 x d1	0.1 - 0.4 x d1
		9.9367	TiAl6Nb7	ASTM F1295		

Note: In case of p = 0.8 x d1 decrease the feed f_z by 30% to increase tool life and profile precision.

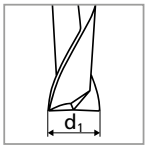
Side milling - 3.5 x d / 5 x d

MILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	$a_{p, max}$	a_e
M	Stainless steel austenitic	1.4435	X2CrNiMo 18-14-3	AISI 316L	0.5 x d1	0.1 x d1
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
S_2	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	0.5 x d1	variable
		9.9367	TiAl6Nb7	ASTM F1295		

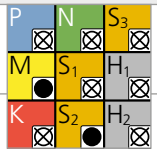




General advise: Cutting conditions have been tested and approved with n = 30'000 - 40'000 rpm, different cutting speeds may affect tool life.

v_c **[SFM]** | [m/min]
f_z **[IPT]** | [mm]
p **[inch]** | [mm]

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



T4 Ød1 .0079" | 0.20 mm		T5 Ød1 .0098" | 0.25 mm		T6 - T7 Ød1 .0118" | 0.30 mm		T8 - T10 Ød1 .0157" | 0.40 mm		T10 - T15 Ød1 .0197" | 0.50 mm		T20 Ød1 .0236" | 0.60 mm		T25 Ød1 .0315" | 0.80 mm		T30 Ød1 .0394" | 1.00 mm	
v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
66 – 131 20 - 40	**.00004** 0.0010	**82 – 164** 25 - 50	**.00004** 0.0010	**98 – 197** 30 - 60	**.00004** 0.0010	**131 – 246** 40 - 75	**.00006** 0.0015	**164 – 295** 50 - 90	**.00008** 0.0020	**197 – 328** 60 - 100	**.00010** 0.0025	**230 – 427** 70 - 130	**.00012** 0.0030	**263 – 459** 80 - 140	**.00016** 0.0040

v_c **[SFM]** | [m/min]
f_z **[IPT]** | [mm]
a_p **[inch]** | [mm]
a_e **[inch]** | [mm]

T4 Ød1 .0079" | 0.20 mm		T5 Ød1 .0098" | 0.25 mm		T6 - T7 Ød1 .0118" | 0.30 mm		T8 - T10 Ød1 .0157" | 0.40 mm		T10 - T15 Ød1 .0197" | 0.50 mm		T20 Ød1 .0236" | 0.60 mm		T25 Ød1 .0315" | 0.80 mm		T30 Ød1 .0394" | 1.00 mm	
v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
66 – 131 20 - 40	**.00006** 0.0015	**82 – 164** 25 - 50	**.00010** 0.0025	**98 – 197** 30 - 60	**.00012** 0.0030	**131 – 246** 40 - 75	**.00018** 0.0045	**164 – 295** 50 - 90	**.00024** 0.0060	**197 – 328** 60 - 100	**.00026** 0.0065	**230 – 427** 70 - 130	**.00032** 0.0080	**263 – 459** 80 - 140	**.00039** 0.0100
66 – 131 20 - 40	**.00006** 0.0015	**82 – 164** 25 - 50	**.00010** 0.0025	**98 – 197** 30 - 60	**.00012** 0.0030	**131 – 246** 40 - 75	**.00018** 0.0045	**164 – 295** 50 - 90	**.00024** 0.0060	**197 – 328** 60 - 100	**.00026** 0.0065	**230 – 427** 70 - 130	**.00032** 0.0080	**263 – 459** 80 - 140	**.00039** 0.0100

Coolant type, pressure, filtration and flowrate

For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the cooling medium is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical information".

PATENTED

CrazyMill Cool P&S



NEW

CRAZYMILL Cool

PLUNGE MILL FOR SLOTS AND POCKETS IN MINIMAL SPACES



With CrazyMill Cool P&S, Mikron Tool introduces a new 3-flutes milling cutter for the rough and finish milling of many materials, with emphasis on stainless steels, titanium, super alloys and CrCo alloys. This square micro-cutter is available in diameters from .039" to .315" (1 mm to 8 mm) and with milling depth up to 5 x d.

Due to its special features such as cutting geometry and integrated cooling, CrazyMill Cool P&S is capable of plunging perpendicularly into the material and impresses with its speed, output, performance as well as the high tool life and surface quality. This tool is well adapted for the milling of slots, pockets and sides in minimal spaces. An example of these applications is the keyway that can be found in transmission shafts.

CRAZYMILL by Mikron Tool Cool

NEW Highest performance in smallest dimensions

PLUNGE AND SLOT END MILL WITH INTEGRATED COOLING

With the CrazyMill Cool P&S Mikron Tool expands its range of milling cutters for difficult to machine materials. The three flute milling cutter allows perpendicular plunging with subsequent milling into solid material. Available with integrated cooling, in the diameter range from .039" to .315" (1 mm to 8 mm) and for maximal milling depth of 5 x d.

- CrazyMill Cool P&S, type A – milling depth 2.5 x d, cutting length 2.5 x d, through shaft cooling, Z = 3
- CrazyMill Cool P&S, type C – milling depth 5 x d, cutting length 2 x d, through shaft cooling, Z = 3

2.5 x d

Type A

- Coated
- Through-tool cooling





page 549

5 x d

Type C

- Coated
- Through-tool cooling





page 558

PATENTED

1 | SHANK
The robust carbide shank guarantees stable and vibration-free milling. A high degree of precision and excellent surface quality is achieved.

2 | INTEGRATED COOLING – PATENTED
The integrated cooling channels guarantee constant and maximal cooling of the cutting edges and optimal chip removal. The result is higher cutting speed and depth as well as improved surface quality.

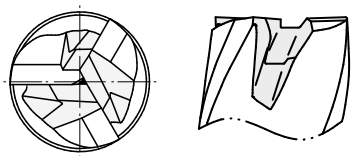
3 | CARBIDE
The specially developed micro-grain carbide meets all requirements in terms of mechanical properties.

4 | COATING
The high-performance eXedur SNP coating is heat and wear resistant, prevents material build-up on cutting edges and guarantees optimum chip flushing. The result is long tool life.

5 | FLUTE GEOMETRY
The specially designed flutes provide high stability and sufficient space for perfect chip evacuation.

6 | GEOMETRY OF THE END FACE
The specially designed expanded chip collection section in the end face guarantees good chip evacuation when plunging. A correction in the web prevents edge breakout, reduces the penetration force and increases tool life.

End face geometry - 3 Flute



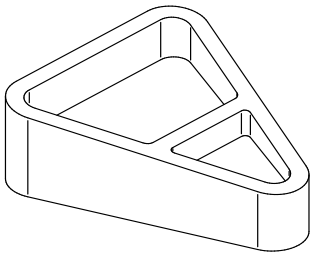
CRAZYMILL by Mikron Tool Cool

NEW

Benefits and applications

ROUGHING AND FINISHING CUTTER WITH INTEGRATED COOLING, FROM .039" (1 MM)

- **SHORT MACHINING TIME** | up to 5 times faster
- **LONG TOOL LIFE** | due to efficient cooling
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to through shank coolant
- **HIGH SURFACE QUALITY** | due to anti-vibration geometry

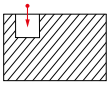
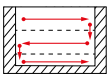
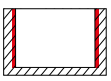


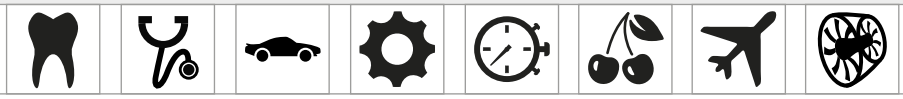
COMPONENT
Steering component

MATERIAL
X2CrNiMo18-14-3 / 1.4435 / AISI 316L

MACHINING
- ① Plunging
- ② Slotting
- ③ Finishing
- d = 6 mm | **.236"**
- Milling depth 14.4 mm | **.567"**

MILLING TOOL
Mikron Tool - CrazyMill Cool P&S

DATA	MIKRON TOOL
Tool type	CrazyMill Cool P&S - Carbide - Coated - Integrated cooling
Item number	2.CMC42.A8Z3.600.1
Cutting data	① Plunging v_c = 160 m/min | **525 SFM** $f_{z,p}$ = 0.005 mm | **.00020 IPT** a_p = 1 x d  ② Slotting v_c = 160 m/min | **525 SFM** $f_{z,s}$ = 0.025 mm | **.00098 IPT** a_p = 1 x d  ③ Finishing v_c = 220 m/min | **722 SFM** f_z = 0.026 mm | **.00102 IPT** a_p = 2.5 x d a_e = 0.3 mm | **.0118"** 



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Tooth crown
Medical technology	Component for endoscope
Automotive industry	Components for injection system
Mechanical engineering	Machine components
Watches	Watch housing
Food industry	Nozzle
Aerospace industry	Engine parts
Power industry	Blade

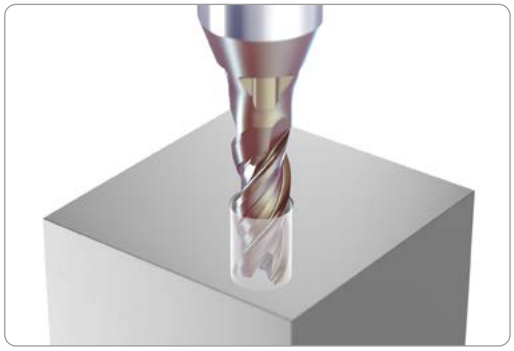
MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4301	X5CrNi 18-10	304
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S2 Titanium (pure and alloyed	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25

CRAZYMILL by Mikron Tool Cool

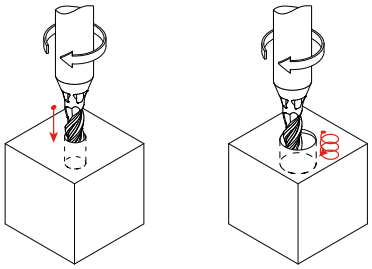
NEW One tool for many applications

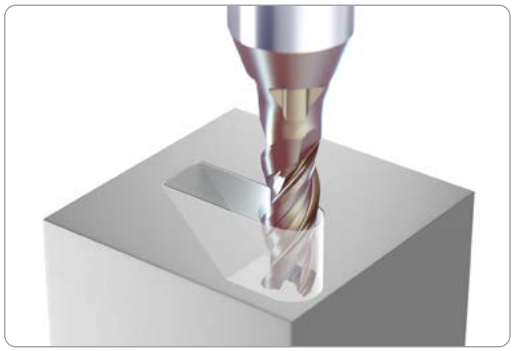
FOR DIFFICULT TO MACHINE MATERIALS

CrazyMill Cool P&S for:

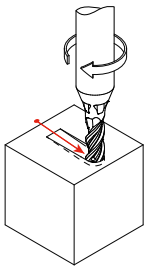


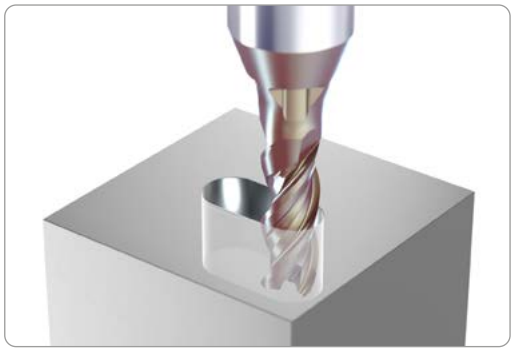
1. Plunge milling
Direct or with helical interpolation



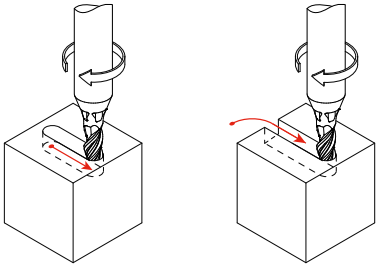


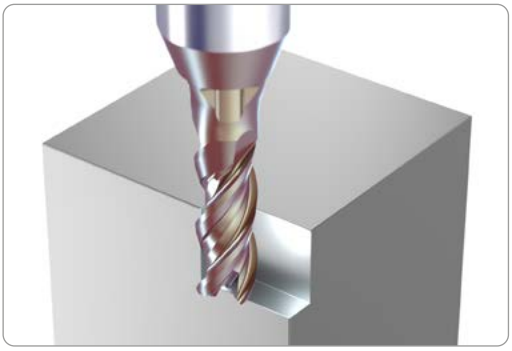
2. Linear ramp milling
Angle depending on material





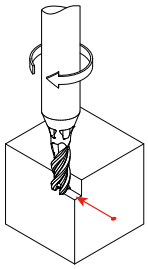
3. Slot milling
Pockets or through slots

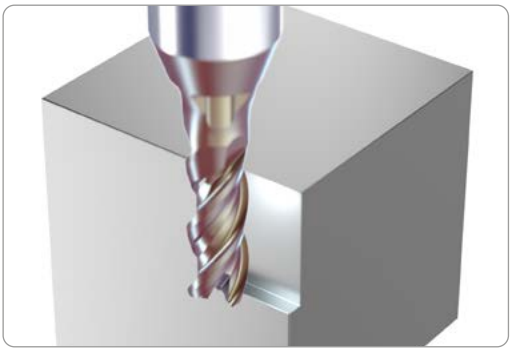




4. Side milling - Semi-finishing

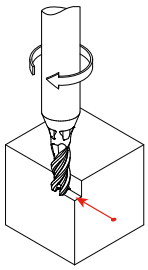
a_p = max. 1 x d





5. Side milling - Finishing

a_p = 2.5 x d



CRAZYMILL by Mikron Tool Cool

NEW CrazyMill Cool P&S

MILLING WITH INTEGRATED COOLING



CrazyMill Cool P&S end-mill is especially developed with 3 flutes for the rough and finish milling of stainless steels, titanium, super alloys and CrCo alloys. Its strengths include high cutting speeds, high removal rate, a long tool life and excellent surface quality.

The special edge geometry provides a stable and vibration-free "Drilling" (perpendicular plunging) up to 1 x d. A correction in the center stabilizes the web (no breakout), reduces penetration force and helps increase tool life. Due to the specially designed chip space in the head of the tool, chips are evacuated into the flutes when plunging. The design of the flutes creates enough space for perfect chip evacuation and simultaneously guarantees robust stability for the lateral milling process up to 5 x d.

In the shank, integrated ducts provide a constant and massive coolant flow instrumental for an efficient chip evacuation from the milling area. This concept is ideally suited to machine groves, slots and pockets since chips are flushed out even from tight and angled spaces. The surface quality improves significantly and reaches finishing quality when milling into solid material. Moreover, the cooling prevents an over-heating of the cutting edges and thus guarantees long tool life and significantly higher chip removal compared to conventional milling.

Coolant type, pressure and filtration

Detailed recommendations for coolant type, pressure and filtration are on page "milling process".

Please note

You couldn't find your suitable version of the CrazyMill Cool P&S (diameter, length, cutting direction…)? Ask us about our customized versions!

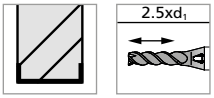
Regrinding: This product is not suitable for regrinding.

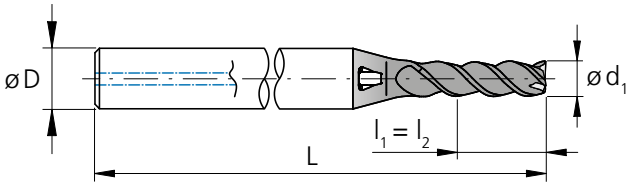
Type A - 2.5 x d - Square - Z3

Carbide | Z3 | 42° | eXedur SNP

Ød_1	**.039" - .315"** (1.0 - 8.0 mm)	
Tolerance	**0 - .0008"**	0 - 0.02 mm

P&S - Square





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.0	**.098**	2.50	2.50	4	**1.57**	40	2.CMC42.A8Z3.100.1	■
	.043	1.1	**.108**	2.75	2.75	4	**1.57**	40	2.CMC42.A8Z3.110.1	■
	.047	1.2	**.118**	3.00	3.00	4	**1.57**	40	2.CMC42.A8Z3.120.1	■
	.051	1.3	**.128**	3.25	3.25	4	**1.57**	40	2.CMC42.A8Z3.130.1	■
	.055	1.4	**.138**	3.50	3.50	4	**1.57**	40	2.CMC42.A8Z3.140.1	■
	.059	1.5	**.148**	3.75	3.75	4	**1.57**	40	2.CMC42.A8Z3.150.1	■
1/16	**.0625**	1.587	**.157**	3.97	3.97	4	**1.57**	40	2.CMC.PSSAZ3.F116	■
	.063	1.6	**.157**	4.00	4.00	4	**1.57**	40	2.CMC42.A8Z3.160.1	■
	.067	1.7	**.167**	4.25	4.25	4	**1.57**	40	2.CMC42.A8Z3.170.1	■
	.071	1.8	**.177**	4.50	4.50	4	**1.57**	40	2.CMC42.A8Z3.180.1	■
	.075	1.9	**.187**	4.75	4.75	4	**1.57**	40	2.CMC42.A8Z3.190.1	■
	.079	2.0	**.197**	5.00	5.00	4	**1.57**	40	2.CMC42.A8Z3.200.1	■
	.083	2.1	**.207**	5.25	5.25	4	**1.57**	40	2.CMC42.A8Z3.210.1	■
	.087	2.2	**.217**	5.50	5.50	4	**1.57**	40	2.CMC42.A8Z3.220.1	■
	.091	2.3	**.226**	5.75	5.75	4	**1.57**	40	2.CMC42.A8Z3.230.1	■
3/32	**.0937**	2.381	**.236**	5.95	5.95	4	**1.57**	40	2.CMC.PSSAZ3.F332	■
	.094	2.4	**.236**	6.00	6.00	4	**1.57**	40	2.CMC42.A8Z3.240.1	■
	.098	2.5	**.246**	6.25	6.25	6	**1.97**	50	2.CMC42.A8Z3.250.1	■
	.102	2.6	**.256**	6.50	6.50	6	**1.97**	50	2.CMC42.A8Z3.260.1	■
	.106	2.7	**.266**	6.75	6.75	6	**1.97**	50	2.CMC42.A8Z3.270.1	■
	.110	2.8	**.276**	7.00	7.00	6	**1.97**	50	2.CMC42.A8Z3.280.1	■
	.114	2.9	**.285**	7.25	7.25	6	**1.97**	50	2.CMC42.A8Z3.290.1	■
	.118	3.0	**.295**	7.50	7.50	6	**1.97**	50	2.CMC42.A8Z3.300.1	■
	.122	3.1	**.305**	7.75	7.75	6	**1.97**	50	2.CMC42.A8Z3.310.1	■
1/8	**.1250**	3.175	**.325**	7.94	7.94	6	**1.97**	50	2.CMC.PSSAZ3.F18	■
	.130	3.3	**.325**	8.25	8.25	6	**1.97**	50	2.CMC42.A8Z3.330.1	■
	.146	3.7	**.364**	9.25	9.25	6	**1.97**	50	2.CMC42.A8Z3.370.1	■
5/32	**.1562**	3.968	**.394**	9.92	9.92	6	**1.97**	50	2.CMC.PSSAZ3.F532	■
	.157	4.0	**.394**	10.00	10.00	6	**1.97**	50	2.CMC42.A8Z3.400.1	■
	.169	4.3	**.423**	10.75	10.75	8	**2.36**	60	2.CMC42.A8Z3.430.1	■
	.185	4.7	**.463**	11.75	11.75	8	**2.36**	60	2.CMC42.A8Z3.470.1	■
3/16	**.1875**	4.762	**.472**	11.91	11.91	8	**2.36**	60	2.CMC.PSSAZ3.F316	■
	.189	4.8	**.472**	12.00	12.00	8	**2.36**	60	2.CMC42.A8Z3.480.1	■
	.197	5.0	**.492**	12.50	12.50	8	**2.36**	60	2.CMC42.A8Z3.500.1	■
	.209	5.3	**.522**	13.25	13.25	10	**2.56**	65	2.CMC42.A8Z3.530.1	■
7/32	**.2189**	5.560	**.561**	13.90	13.90	10	**2.56**	65	2.CMC.PSSAZ3.F732	■
	.224	5.7	**.561**	14.25	14.25	10	**2.56**	65	2.CMC42.A8Z3.570.1	■
	.236	6.0	**.591**	15.00	15.00	10	**2.56**	65	2.CMC42.A8Z3.600.1	■
1/4	**.2500**	6.350	**.625**	15.88	15.88	10	**2.56**	65	2.CMC.PSSAZ3.F14	■
	.315	8.0	**.787**	20.00	20.00	12	**3.15**	80	2.CMC42.A8Z3.800.1	■

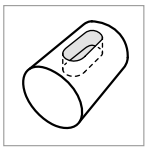
■ Stock item

CRAZYMILL by Mikron Tool Cool

NEW Type A - Keyways - Plunge - Slot milling

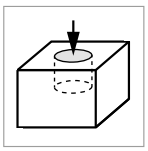
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Keyway slot milling



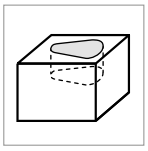
- $f_{z,p}$: for plunge milling
- $f_{z,s}$: for slot milling

Plunge milling

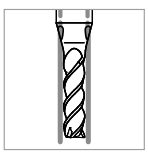


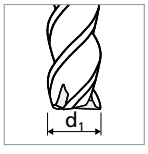
- $f_{z,p}$: for plunge milling

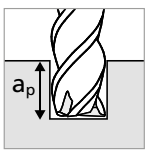
Slot milling



- $f_{z,p}$: for plunge milling
- $f_{z,s}$: for slot milling



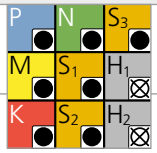




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	$f_{z,p}$	$f_{z,s}$	a_p
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	100 **328**	0.0013 **.00005**	0.0046 **.00018**	1xd1
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	100 **328**	0.0014 **.00006**	0.0049 **.00019**	1xd1
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	100 **328**	0.0012 **.00005**	0.0042 **.00017**	0.5xd1
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	100 **328**	0.0010 **.00004**	0.0035 **.00014**	1xd1
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	100 **328**	0.0010 **.00004**	0.0035 **.00014**	0.5xd1
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	100 **328**	0.0010 **.00004**	0.0035 **.00014**	0.5xd1
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	100 **328**	0.0010 **.00004**	0.0035 **.00014**	1xd1
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	100 **328**	0.0013 **.00005**	0.0042 **.00017**	1xd1
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	100 **328**	0.0012 **.00005**	0.0100 **.00039**	1xd1
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	100 **328**	0.0012 **.00005**	0.0100 **.00039**	1xd1
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	100 **328**	0.0012 **.00005**	0.0100 **.00039**	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	100 **328**	0.0012 **.00005**	0.0100 **.00039**	1xd1
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	100 **328**	0.0012 **.00005**	0.0100 **.00039**	1xd1
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	100 **328**	0.0012 **.00005**	0.0100 **.00039**	1xd1
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	40 **131**	0.0010 **.00004**	0.0035 **.00014**	0.25xd1
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	80 **262**	0.0010 **.00004**	0.0032 **.00012**	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	80 **262**	0.0010 **.00004**	0.0032 **.00012**	0.25xd1
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 **197**	0.0010 **.00004**	0.0035 **.00014**	0.5xd1
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1				
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]** a_p [mm] | **[inch]**
$f_{z,p}$ [mm] | **[IPT]** $f_{z,s}$ [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



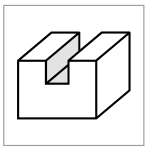
Ød1	1/16" 1.5 mm | .059"				3/32" 2.0 mm | .079"				1/8" 3.0 mm | .118"				5/32" 4.0 mm | .157"				3/16" - 7/32" 5.0 mm | .197"				1/4" 6.0 mm - 8.0 mm | .236" - .315"			
	v_c	$f_{z,p}$	$f_{z,s}$	a_p	v_c	$f_{z,p}$	$f_{z,s}$	a_p	v_c	$f_{z,p}$	$f_{z,s}$	a_p	v_c	$f_{z,p}$	$f_{z,s}$	a_p	v_c	$f_{z,p}$	$f_{z,s}$	a_p	v_c	$f_{z,p}$	$f_{z,s}$	a_p
	120 **394**	0.0020 **.00008**	0.0065 **.00026**	1xd1	120 **394**	0.0026 **.00010**	0.0091 **.00036**	1xd1	140 **459**	0.004 **.00014**	0.013 **.00051**	1xd1	140 **459**	0.005 **.00020**	0.020 **.00077**	1xd1	150 **492**	0.005 **.00020**	0.026 **.00102**	1xd1	160 **525**	0.006 **.00024**	0.033 **.00128**	1xd1
	120 **394**	0.0021 **.00008**	0.0070 **.00028**	1xd1	120 **394**	0.0028 **.00011**	0.0098 **.00039**	1xd1	140 **459**	0.004 **.00014**	0.014 **.00055**	1xd1	140 **459**	0.005 **.00020**	0.021 **.00083**	1xd1	150 **492**	0.006 **.00022**	0.027 **.00106**	1xd1	160 **525**	0.006 **.00024**	0.034 **.00133**	1xd1
	120 **394**	0.0018 **.00007**	0.0060 **.00024**	0.5xd1	120 **394**	0.0024 **.00009**	0.0084 **.00033**	0.5xd1	140 **459**	0.003 **.00012**	0.012 **.00047**	0.5xd1	140 **459**	0.004 **.00016**	0.017 **.00068**	0.5xd1	150 **492**	0.004 **.00016**	0.022 **.00087**	0.5xd1	160 **525**	0.005 **.00020**	0.028 **.00108**	0.5xd1
	120 **394**	0.0015 **.00006**	0.0050 **.00020**	1xd1	120 **394**	0.0020 **.00008**	0.0070 **.00028**	1xd1	140 **459**	0.003 **.00012**	0.010 **.00039**	1xd1	140 **459**	0.004 **.00016**	0.015 **.00059**	1xd1	150 **492**	0.004 **.00016**	0.020 **.00079**	1xd1	160 **525**	0.005 **.00020**	0.025 **.00098**	1xd1
	120 **394**	0.0015 **.00006**	0.0050 **.00020**	0.5xd1	120 **394**	0.0020 **.00008**	0.0070 **.00028**	0.5xd1	140 **459**	0.003 **.00012**	0.010 **.00039**	0.5xd1	140 **459**	0.004 **.00016**	0.015 **.00059**	0.5xd1	150 **492**	0.004 **.00016**	0.020 **.00079**	0.5xd1	160 **525**	0.005 **.00020**	0.025 **.00098**	0.5xd1
	120 **394**	0.0015 **.00006**	0.0050 **.00020**	0.5xd1	120 **394**	0.0020 **.00008**	0.0070 **.00028**	0.5xd1	140 **459**	0.003 **.00012**	0.010 **.00039**	0.5xd1	140 **459**	0.004 **.00016**	0.015 **.00059**	0.5xd1	150 **492**	0.004 **.00016**	0.020 **.00079**	0.5xd1	160 **525**	0.005 **.00020**	0.025 **.00098**	0.5xd1
	120 **394**	0.0015 **.00006**	0.0050 **.00020**	1xd1	120 **394**	0.0020 **.00008**	0.0070 **.00028**	1xd1	140 **459**	0.003 **.00012**	0.010 **.00039**	1xd1	140 **459**	0.004 **.00016**	0.015 **.00059**	1xd1	150 **492**	0.004 **.00016**	0.020 **.00079**	1xd1	160 **525**	0.005 **.00020**	0.025 **.00098**	1xd1
	120 **394**	0.0019 **.00007**	0.0060 **.00024**	1xd1	120 **394**	0.0024 **.00009**	0.0084 **.00033**	1xd1	140 **459**	0.004 **.00014**	0.012 **.00047**	1xd1	140 **459**	0.004 **.00016**	0.017 **.00068**	1xd1	150 **492**	0.005 **.00019**	0.022 **.00087**	1xd1	160 **525**	0.005 **.00020**	0.028 **.00108**	1xd1
	120 **394**	0.0018 **.00007**	0.0160 **.00063**	1xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	1xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	1xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	1xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	1xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	1xd1
	120 **394**	0.0018 **.00007**	0.0160 **.00063**	1xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	1xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	1xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	1xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	1xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	1xd1
	120 **394**	0.0018 **.00007**	0.0160 **.00063**	1xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	1xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	1xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	1xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	1xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	1xd1
	120 **394**	0.0018 **.00007**	0.0160 **.00063**	1xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	1xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	1xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	1xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	1xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	1xd1
	120 **394**	0.0018 **.00007**	0.0160 **.00063**	1xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	1xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	1xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	1xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	1xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	1xd1
	120 **394**	0.0018 **.00007**	0.0160 **.00063**	1xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	1xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	1xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	1xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	1xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	1xd1
	40 **131**	0.0015 **.00006**	0.0050 **.00020**	0.25xd1	50 **164**	0.0020 **.00008**	0.0070 **.00028**	0.25xd1	50 **164**	0.003 **.00012**	0.010 **.00039**	0.25xd1	60 **197**	0.004 **.00016**	0.014 **.00053**	0.25xd1	80 **262**	0.004 **.00016**	0.018 **.00071**	0.25xd1	80 **262**	0.005 **.00020**	0.021 **.00084**	0.25xd1
	90 **295**	0.0014 **.00005**	0.0045 **.00018**	0.25xd1	100 **328**	0.0018 **.00007**	0.0063 **.00025**	0.25xd1	110 **361**	0.003 **.00012**	0.010 **.00039**	0.25xd1	120 **394**	0.004 **.00016**	0.013 **.00050**	0.25xd1	120 **394**	0.004 **.00016**	0.016 **.00064**	0.25xd1	120 **394**	0.005 **.00020**	0.019 **.00075**	0.25xd1
	90 **295**	0.0014 **.00005**	0.0045 **.00018**	0.25xd1	100 **328**	0.0018 **.00007**	0.0063 **.00025**	0.25xd1	110 **361**	0.003 **.00012**	0.010 **.00039**	0.25xd1	120 **394**	0.004 **.00016**	0.013 **.00050**	0.25xd1	120 **394**	0.004 **.00016**	0.016 **.00064**	0.25xd1	120 **394**	0.005 **.00020**	0.019 **.00075**	0.25xd1
	60 **197**	0.0015 **.00006**	0.0050 **.00020**	0.5xd1	80 **262**	0.0020 **.00008**	0.0070 **.00028**	0.5xd1	80 **262**	0.003 **.00012**	0.010 **.00039**	0.5xd1	100 **328**	0.004 **.00016**	0.014 **.00053**	0.5xd1	100 **328**	0.004 **.00016**	0.018 **.00071**	0.5xd1	120 **394**	0.005 **.00020**	0.021 **.00084**	0.5xd1

CRAZYMILL by Mikron Tool Cool

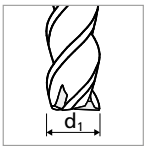
NEW Type A - Milling of through slots

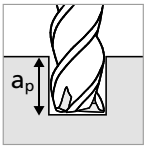
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Through slot milling





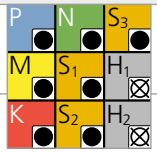




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	f_z	a_p
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.009 **.00035**	1xd1
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.008 **.00032**	1xd1
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.006 **.00024**	0.5xd1
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.009 **.00035**	1xd1
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.009 **.00035**	1xd1
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.009 **.00035**	1xd1
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.007 **.00028**	1xd1
		1.4435	X2CrNiMo18-14-3	AISI 316L			
		1.4441	X2CrNiMo18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.007 **.00028**	1xd1
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.010 **.00039**	1xd1
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.010 **.00039**	1xd1
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.012 **.00047**	1xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.012 **.00047**	1xd1
		2.0360	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.012 **.00047**	1xd1
		2.1020	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.011 **.00043**	1xd1
		2.0960	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625	80 **262**	0.005 **.00020**	0.5xd1
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	100 **328**	0.009 **.00035**	0.5xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	100 **328**	0.009 **.00035**	0.5xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	80 **262**	0.005 **.00020**	0.5xd1
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1			
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**
a_p [mm] | **[inch]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



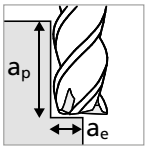
	Ød1 1/16" 1.5 mm | .059"			3/32" 2.0 mm | .079"			1/8" 3.0 mm | .118"			5/32" 4.0 mm | .157"			3/16" - 7/32" 5.0 mm | .197"			1/4" 6.0 mm - 8.0 mm | .236" - .315"		
	v_c	f_z	a_p	v_c	f_z	a_p	v_c	f_z	a_p	v_c	f_z	a_p	v_c	f_z	a_p	v_c	f_z	a_p
	180 **591**	0.015 **.00059**	1xd1	200 **656**	0.020 **.00079**	1xd1	220 **722**	0.029 **.00114**	1xd1	230 **755**	0.031 **.00122**	1xd1	240 **787**	0.031 **.00122**	1xd1	260 **853**	0.032 **.00126**	1xd1
	180 **591**	0.013 **.00051**	1xd1	200 **656**	0.019 **.00075**	1xd1	220 **722**	0.028 **.00110**	1xd1	230 **755**	0.029 **.00114**	1xd1	240 **787**	0.030 **.00118**	1xd1	260 **853**	0.031 **.00122**	1xd1
	180 **591**	0.012 **.00047**	0.5xd1	200 **656**	0.017 **.00067**	0.5xd1	220 **722**	0.025 **.00098**	0.5xd1	230 **755**	0.026 **.00102**	0.5xd1	240 **787**	0.026 **.00102**	0.5xd1	260 **853**	0.027 **.00106**	0.5xd1
	180 **591**	0.015 **.00059**	1xd1	200 **656**	0.020 **.00079**	1xd1	220 **722**	0.028 **.00110**	1xd1	230 **755**	0.029 **.00114**	1xd1	240 **787**	0.030 **.00118**	1xd1	260 **853**	0.031 **.00122**	1xd1
	180 **591**	0.013 **.00051**	1xd1	200 **656**	0.019 **.00075**	1xd1	220 **722**	0.027 **.00106**	1xd1	230 **755**	0.028 **.00110**	1xd1	240 **787**	0.029 **.00114**	1xd1	260 **853**	0.029 **.00114**	1xd1
	180 **591**	0.013 **.00051**	1xd1	200 **656**	0.019 **.00075**	1xd1	220 **722**	0.027 **.00106**	1xd1	230 **755**	0.028 **.00110**	1xd1	240 **787**	0.029 **.00114**	1xd1	260 **853**	0.029 **.00114**	1xd1
	180 **591**	0.011 **.00043**	1xd1	200 **656**	0.017 **.00067**	1xd1	220 **722**	0.025 **.00098**	1xd1	230 **755**	0.027 **.00106**	1xd1	240 **787**	0.027 **.00106**	1xd1	260 **853**	0.028 **.00110**	1xd1
	140 **459**	0.015 **.00059**	1xd1	160 **525**	0.017 **.00067**	1xd1	180 **591**	0.025 **.00098**	1xd1	200 **656**	0.031 **.00122**	1xd1	200 **656**	0.031 **.00122**	1xd1	200 **656**	0.032 **.00126**	1xd1
	180 **591**	0.016 **.00063**	1xd1	200 **656**	0.021 **.00083**	1xd1	220 **722**	0.034 **.00134**	1xd1	260 **853**	0.035 **.00139**	1xd1	300 **984**	0.036 **.00142**	1xd1	340 **1115**	0.037 **.00146**	1xd1
	180 **591**	0.016 **.00063**	1xd1	200 **656**	0.021 **.00083**	1xd1	220 **722**	0.032 **.00126**	1xd1	260 **853**	0.034 **.00134**	1xd1	300 **984**	0.034 **.00134**	1xd1	340 **1115**	0.036 **.00142**	1xd1
	180 **591**	0.016 **.00063**	1xd1	200 **656**	0.021 **.00083**	1xd1	220 **722**	0.034 **.00134**	1xd1	260 **853**	0.035 **.00139**	1xd1	300 **984**	0.036 **.00142**	1xd1	340 **1115**	0.037 **.00146**	1xd1
	180 **591**	0.016 **.00063**	1xd1	200 **656**	0.021 **.00083**	1xd1	220 **722**	0.034 **.00134**	1xd1	260 **853**	0.035 **.00139**	1xd1	300 **984**	0.036 **.00142**	1xd1	340 **1115**	0.037 **.00146**	1xd1
	180 **591**	0.016 **.00063**	1xd1	200 **656**	0.021 **.00083**	1xd1	220 **722**	0.034 **.00134**	1xd1	260 **853**	0.035 **.00139**	1xd1	300 **984**	0.036 **.00142**	1xd1	340 **1115**	0.037 **.00146**	1xd1
	180 **591**	0.016 **.00063**	1xd1	200 **656**	0.021 **.00083**	1xd1	220 **722**	0.034 **.00134**	1xd1	260 **853**	0.035 **.00139**	1xd1	300 **984**	0.036 **.00142**	1xd1	340 **1115**	0.037 **.00146**	1xd1
	80 **262**	0.006 **.00024**	0.5xd1	100 **328**	0.007 **.00028**	0.5xd1	100 **328**	0.010 **.00039**	0.5xd1	120 **394**	0.013 **.00051**	0.5xd1	120 **394**	0.013 **.00051**	0.5xd1	120 **394**	0.013 **.00051**	0.5xd1
	100 **328**	0.012 **.00047**	0.5xd1	120 **394**	0.017 **.00067**	0.5xd1	120 **394**	0.027 **.00106**	0.5xd1	140 **459**	0.027 **.00106**	0.5xd1	140 **459**	0.027 **.00106**	0.5xd1	140 **459**	0.028 **.00110**	0.5xd1
	100 **328**	0.012 **.00047**	0.5xd1	120 **394**	0.017 **.00067**	0.5xd1	120 **394**	0.027 **.00106**	0.5xd1	140 **459**	0.027 **.00106**	0.5xd1	140 **459**	0.027 **.00106**	0.5xd1	140 **459**	0.028 **.00110**	0.5xd1
	80 **262**	0.006 **.00024**	0.5xd1	100 **328**	0.007 **.00028**	0.5xd1	100 **328**	0.010 **.00039**	0.5xd1	120 **394**	0.013 **.00051**	0.5xd1	120 **394**	0.013 **.00051**	0.5xd1	120 **394**	0.013 **.00051**	0.5xd1

CRAZYMILL by Mikron Tool Cool

NEW Type A - Side milling - Semi-finishing

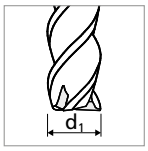
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Semi-finishing



- $a_p = 1 \times d_1 - 2 \times d_1$
- $a_e = 0.2 \times d_1$

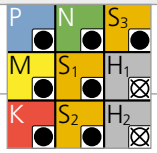




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.013 **.00051**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.012 **.00047**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.009 **.00035**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.014 **.00055**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.013 **.00051**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.013 **.00051**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.010 **.00039**
		1.4435	X2CrNiMo18-14-3	AISI 316L		
		1.4441	X2CrNiMo18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.009 **.00035**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.015 **.00059**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.015 **.00059**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.017 **.00067**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.017 **.00067**
		2.0360	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.017 **.00067**
		2.1020	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.015 **.00059**
		2.0960	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	80 **262**	0.006 **.00024**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.014 **.00054**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.014 **.00054**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	80 **262**	0.006 **.00024**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



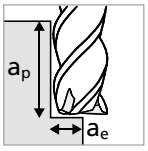
Ød1	1/16" 1.5 mm | .059"		3/32" 2.0 mm | .079"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .157"		3/16" - 7/32" 5.0 mm | .197"		1/4" 6.0 mm | .236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.020 **.00079**	220 **722**	0.029 **.00114**	240 **787**	0.037 **.00146**	260 **853**	0.040 **.00158**	260 **853**	0.040 **.00158**	260 **853**	0.043 **.00169**	260 **853**	0.051 **.00169**
	200 **656**	0.019 **.00075**	220 **722**	0.027 **.00106**	240 **787**	0.035 **.00138**	260 **853**	0.038 **.00150**	260 **853**	0.038 **.00150**	260 **853**	0.041 **.00161**	260 **853**	0.049 **.00193**
	200 **656**	0.017 **.00067**	220 **722**	0.026 **.00102**	240 **787**	0.032 **.00126**	260 **853**	0.034 **.00134**	260 **853**	0.034 **.00134**	260 **853**	0.036 **.00141**	260 **853**	0.043 **.00169**
	200 **656**	0.020 **.00079**	220 **722**	0.029 **.00114**	240 **787**	0.035 **.00138**	260 **853**	0.038 **.00150**	260 **853**	0.038 **.00150**	260 **853**	0.041 **.00161**	260 **853**	0.046 **.00161**
	200 **656**	0.019 **.00075**	220 **722**	0.027 **.00106**	240 **787**	0.035 **.00138**	260 **853**	0.037 **.00146**	260 **853**	0.037 **.00146**	260 **853**	0.039 **.00154**	260 **853**	0.045 **.00177**
	200 **656**	0.019 **.00075**	220 **722**	0.027 **.00106**	240 **787**	0.035 **.00138**	260 **853**	0.037 **.00146**	260 **853**	0.037 **.00146**	260 **853**	0.039 **.00154**	260 **853**	0.045 **.00177**
	200 **656**	0.014 **.00055**	220 **722**	0.026 **.00102**	240 **787**	0.032 **.00126**	260 **853**	0.035 **.00138**	260 **853**	0.035 **.00138**	260 **853**	0.037 **.00146**	260 **853**	0.043 **.00146**
	140 **459**	0.020 **.00079**	160 **525**	0.024 **.00095**	180 **591**	0.034 **.00134**	200 **656**	0.040 **.00158**	200 **656**	0.042 **.00165**	200 **656**	0.044 **.00173**	200 **656**	0.052 **.00173**
	200 **656**	0.022 **.00087**	220 **722**	0.031 **.00122**	240 **787**	0.046 **.00181**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**	260 **853**	0.063 **.00248**
	200 **656**	0.022 **.00087**	220 **722**	0.031 **.00122**	240 **787**	0.046 **.00181**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**	260 **853**	0.063 **.00248**
	200 **656**	0.022 **.00087**	220 **722**	0.031 **.00122**	240 **787**	0.046 **.00181**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**	260 **853**	0.063 **.00248**
	200 **656**	0.022 **.00087**	220 **722**	0.031 **.00122**	240 **787**	0.046 **.00181**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**	260 **853**	0.063 **.00248**
	200 **656**	0.022 **.00087**	220 **722**	0.031 **.00122**	240 **787**	0.046 **.00181**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**	260 **853**	0.063 **.00248**
	200 **656**	0.022 **.00087**	220 **722**	0.031 **.00122**	240 **787**	0.046 **.00181**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**	260 **853**	0.063 **.00248**
	100 **328**	0.008 **.00032**	100 **328**	0.009 **.00035**	100 **328**	0.012 **.00047**	120 **394**	0.016 **.00063**	120 **394**	0.016 **.00063**	120 **394**	0.017 **.00067**	120 **394**	0.018 **.00071**
	120 **394**	0.017 **.00067**	130 **427**	0.024 **.00095**	130 **427**	0.032 **.00126**	150 **492**	0.035 **.00138**	150 **492**	0.035 **.00138**	150 **492**	0.037 **.00146**	150 **492**	0.040 **.00146**
	120 **394**	0.017 **.00067**	130 **427**	0.024 **.00095**	130 **427**	0.032 **.00126**	150 **492**	0.035 **.00138**	150 **492**	0.035 **.00138**	150 **492**	0.037 **.00146**	150 **492**	0.040 **.00146**
	100 **328**	0.008 **.00032**	100 **328**	0.009 **.00035**	100 **328**	0.012 **.00047**	120 **394**	0.016 **.00063**	120 **394**	0.016 **.00063**	120 **394**	0.017 **.00067**	120 **394**	0.018 **.00071**

CRAZYMILL by Mikron Tool Cool

NEW Type A - Side milling - Finishing

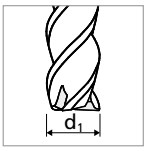
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Finishing



- $a_p = 2.5 \times d_1$
- $a_e = 0.05 \times d_1$

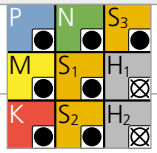




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	130 **425**	0.008 **.00032**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	130 **425**	0.007 **.00028**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	130 **425**	0.006 **.00024**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	130 **425**	0.008 **.00032**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	130 **425**	0.008 **.00032**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	130 **425**	0.008 **.00032**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	130 **425**	0.006 **.00024**
		1.4435	X2CrNiMo18-14-3	AISI 316L		
		1.4441	X2CrNiMo18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	110 **361**	0.006 **.00024**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	130 **425**	0.009 **.00035**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	130 **425**	0.009 **.00035**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	130 **425**	0.010 **.00039**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	130 **425**	0.010 **.00039**
		2.0360	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	130 **425**	0.010 **.00039**
		2.1020	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	130 **425**	0.009 **.00035**
		2.0960	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	110 **361**	0.004 **.00016**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	110 **361**	0.008 **.00032**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	110 **361**	0.008 **.00032**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	110 **361**	0.004 **.00016**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

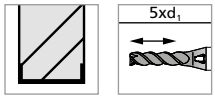


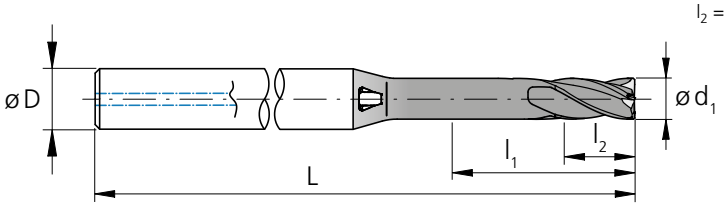
Ød1	1/16" 1.5 mm | .059"		3/32" 2.0 mm | .079"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .157"		3/16" - 7/32" 5.0 mm | .197"		1/4" 6.0 mm | .236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	180 **591**	0.012 **.00047**	200 **656**	0.017 **.00067**	210 **688**	0.023 **.000091**	220 **772**	0.025 **.00098**	220 **772**	0.028 **.00110**	220 **772**	0.033 **.00130**	220 **772**	0.042 **.00165**
	180 **591**	0.011 **.00043**	200 **656**	0.016 **.00063**	210 **688**	0.022 **.00087**	220 **772**	0.024 **.00095**	220 **772**	0.026 **.00102**	220 **772**	0.029 **.00114**	220 **772**	0.038 **.00150**
	180 **591**	0.010 **.00039**	200 **656**	0.015 **.00059**	210 **688**	0.020 **.00079**	220 **772**	0.021 **.00083**	220 **772**	0.023 **.00091**	220 **772**	0.025 **.00098**	220 **772**	0.034 **.00134**
	180 **591**	0.012 **.00047**	200 **656**	0.017 **.00067**	210 **688**	0.022 **.00087**	220 **772**	0.024 **.00095**	220 **772**	0.026 **.00102**	220 **772**	0.029 **.00114**	220 **772**	0.036 **.00142**
	180 **591**	0.011 **.00043**	200 **656**	0.016 **.00063**	210 **688**	0.022 **.00087**	220 **772**	0.023 **.00091**	220 **772**	0.025 **.00098**	220 **772**	0.028 **.00110**	220 **772**	0.037 **.00146**
	180 **591**	0.011 **.00043**	200 **656**	0.016 **.00063**	210 **688**	0.022 **.00087**	220 **772**	0.023 **.00091**	220 **772**	0.025 **.00098**	220 **772**	0.028 **.00110**	220 **772**	0.037 **.00146**
	180 **591**	0.008 **.00032**	200 **656**	0.015 **.00059**	210 **688**	0.020 **.00079**	220 **772**	0.022 **.00087**	220 **772**	0.024 **.00095**	220 **772**	0.026 **.00102**	220 **772**	0.035 **.00138**
	130 **427**	0.012 **.00047**	150 **492**	0.014 **.00055**	160 **525**	0.022 **.00087**	170 **558**	0.025 **.00098**	170 **558**	0.029 **.00114**	170 **558**	0.031 **.00122**	200 **656**	0.040 **.00157**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	120 **394**	0.005 **.00020**	130 **427**	0.005 **.00020**	130 **427**	0.008 **.00032**	140 **459**	0.010 **.00039**	140 **459**	0.011 **.00043**	150 **492**	0.012 **.00047**	160 **525**	0.021 **.00083**
	120 **394**	0.010 **.00039**	130 **427**	0.014 **.00055**	130 **427**	0.020 **.00079**	140 **459**	0.022 **.00087**	150 **492**	0.024 **.00095**	150 **492**	0.026 **.00102**	160 **525**	0.035 **.00138**
	120 **394**	0.010 **.00039**	130 **427**	0.014 **.00055**	130 **427**	0.020 **.00079**	140 **459**	0.022 **.00087**	150 **492**	0.024 **.00095**	150 **492**	0.026 **.00102**	160 **525**	0.035 **.00138**
	120 **394**	0.005 **.00020**	130 **427**	0.005 **.00020**	130 **427**	0.008 **.00032**	140 **459**	0.010 **.00039**	140 **459**	0.011 **.00043**	150 **492**	0.012 **.00047**	160 **525**	0.021 **.00083**

CRAZYMILL by Mikron Tool Cool

NEW Type C - 5 x d - Square - Z3

P&S - Square





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.0	**.197**	5.00	2.00	4	**1.57**	40	2.CMC42.C1Z3.100.1	■
	.043	1.1	**.217**	5.50	2.20	4	**1.57**	40	2.CMC42.C1Z3.110.1	■
	.047	1.2	**.236**	6.00	2.40	4	**1.57**	40	2.CMC42.C1Z3.120.1	■
	.051	1.3	**.256**	6.50	2.60	4	**1.57**	40	2.CMC42.C1Z3.130.1	■
	.055	1.4	**.276**	7.00	2.80	4	**1.57**	40	2.CMC42.C1Z3.140.1	■
	.059	1.5	**.295**	7.50	3.00	4	**1.57**	40	2.CMC42.C1Z3.150.1	■
1/16	**.0625**	1.587	**.312**	7.94	3.17	4	**1.77**	45	2.CMC.PSSCZ3.F116	■
	.063	1.6	**.315**	8.00	3.20	4	**1.77**	45	2.CMC42.C1Z3.160.1	■
	.067	1.7	**.335**	8.50	3.40	4	**1.77**	45	2.CMC42.C1Z3.170.1	■
	.071	1.8	**.354**	9.00	3.60	4	**1.77**	45	2.CMC42.C1Z3.180.1	■
	.075	1.9	**.374**	9.50	3.80	4	**1.73**	44	2.CMC42.C1Z3.190.1	■
	.079	2.0	**.394**	10.00	4.00	4	**1.73**	44	2.CMC42.C1Z3.200.1	■
	.083	2.1	**.413**	10.50	4.20	4	**1.73**	44	2.CMC42.C1Z3.210.1	■
	.087	2.2	**.433**	11.00	4.40	4	**1.73**	44	2.CMC42.C1Z3.220.1	■
	.091	2.3	**.453**	11.50	4.60	4	**1.73**	44	2.CMC42.C1Z3.230.1	■
3/32	**.0937**	2.381	**.469**	11.91	4.76	4	**1.73**	44	2.CMC.PSSCZ3.F332	■
	.094	2.4	**.472**	12.00	4.80	4	**1.73**	44	2.CMC42.C1Z3.240.1	■
	.098	2.5	**.492**	12.50	5.00	6	**2.17**	55	2.CMC42.C1Z3.250.1	■
	.102	2.6	**.512**	13.00	5.20	6	**2.17**	55	2.CMC42.C1Z3.260.1	■
	.106	2.7	**.531**	13.50	5.40	6	**2.17**	55	2.CMC42.C1Z3.270.1	■

■ Stock item

Carbide | Z3 | 42° | eXedur SNP

Ø d_1	**.039" - .315"** (1.0 - 8.0 mm)	
Tolerance	**0 - .0008"**	0 - 0.02 mm

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.110	2.8	**.551**	14.00	5.60	6	**2.17**	55	2.CMC42.C1Z3.280.1	■
	.114	2.9	**.571**	14.50	5.80	6	**2.17**	55	2.CMC42.C1Z3.290.1	■
	.118	3.0	**.591**	15.00	6.00	6	**2.17**	55	2.CMC42.C1Z3.300.1	■
	.122	3.1	**.610**	15.50	6.20	6	**2.36**	60	2.CMC42.C1Z3.310.1	■
1/8	**.1250**	3.175	**.625**	15.88	6.35	6	**2.36**	60	2.CMC.PSSCZ3.F18	■
	.130	3.3	**.650**	16.50	6.60	6	**2.36**	60	2.CMC42.C1Z3.330.1	■
	.146	3.7	**.728**	18.50	7.40	6	**2.36**	60	2.CMC42.C1Z3.370.1	■
5/32	**.1562**	3.968	**.781**	19.84	7.94	6	**2.36**	60	2.CMC.PSSCZ3.F532	■
	.157	4.0	**.787**	20.00	8.00	6	**2.36**	60	2.CMC42.C1Z3.400.1	■
	.169	4.3	**.846**	21.50	8.60	8	**2.36**	60	2.CMC42.C1Z3.430.1	■
	.185	4.7	**.925**	23.50	9.40	8	**2.76**	70	2.CMC42.C1Z3.470.1	■
3/16	**.1875**	4.762	**.937**	23.81	9.52	8	**2.76**	70	2.CMC.PSSCZ3.F316	■
	.189	4.8	**.945**	24.00	9.60	8	**2.76**	70	2.CMC42.C1Z3.480.1	■
	.197	5.0	**.984**	25.00	10.00	8	**2.76**	70	2.CMC42.C1Z3.500.1	■
	.209	5.3	**1.04**	26.50	10.60	10	**2.76**	70	2.CMC42.C1Z3.530.1	■
7/32	**.2189**	5.560	**1.09**	27.80	11.12	10	**2.76**	70	2.CMC.PSSCZ3.F732	■
	.224	5.7	**1.12**	28.50	11.40	10	**2.76**	70	2.CMC42.C1Z3.570.1	■
	.236	6.0	**1.18**	30.00	12.00	10	**2.76**	70	2.CMC42.C1Z3.600.1	■
1/4	**.2500**	6.350	**1.25**	31.75	12.70	10	**2.76**	70	2.CMC.PSSCZ3.F14	■
	.315	8.0	**1.57**	40.00	16.00	12	**3.54**	90	2.CMC42.C1Z3.800.1	■

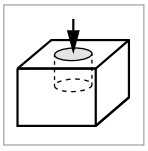
■ Stock item

CRAZYMILL by Mikron Tool Cool

NEW Type C - Plunge - Slot milling

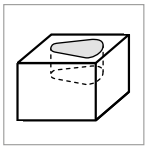
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Plunge milling



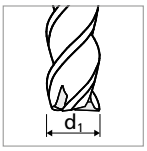
■ $f_{z,p}$: for plunge milling

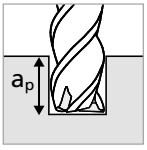
Slot milling



■ $f_{z,p}$: for plunge milling
■ $f_{z,s}$: for slot milling



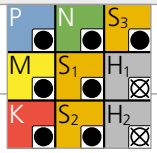




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	$f_{z,p}$	$f_{z,s}$	a_p
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	100 **328**	0.0013 **.00005**	0.0046 **.00018**	0.5xd1
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	100 **328**	0.0014 **.00006**	0.0049 **.00019**	0.5xd1
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	100 **328**	0.0012 **.00005**	0.0042 **.00017**	0.25xd1
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	100 **328**	0.0010 **.00004**	0.0035 **.00014**	0.5xd1
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	100 **328**	0.0010 **.00004**	0.0035 **.00014**	0.25xd1
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	100 **328**	0.0010 **.00004**	0.0035 **.00014**	0.25xd1
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	100 **328**	0.0010 **.00004**	0.0035 **.00014**	0.5xd1
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	100 **328**	0.0013 **.00005**	0.0042 **.00017**	0.5xd1
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	100 **328**	0.0012 **.00005**	0.0100 **.00039**	0.5xd1
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	100 **328**	0.0012 **.00005**	0.0100 **.00039**	0.5xd1
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	100 **328**	0.0012 **.00005**	0.0100 **.00039**	0.5xd1
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	100 **328**	0.0012 **.00005**	0.0100 **.00039**	0.5xd1
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	100 **328**	0.0012 **.00005**	0.0100 **.00039**	0.5xd1
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	100 **328**	0.0012 **.00005**	0.0100 **.00039**	0.5xd1
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	40 **131**	0.0010 **.00004**	0.0035 **.00014**	0.25xd1
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	80 **262**	0.0010 **.00004**	0.0032 **.00012**	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	80 **262**	0.0010 **.00004**	0.0032 **.00012**	0.25xd1
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 **197**	0.0010 **.00004**	0.0035 **.00014**	0.25xd1
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1				
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]** a_p [mm] | **[inch]**
$f_{z,p}$ [mm] | **[IPT]** $f_{z,s}$ [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



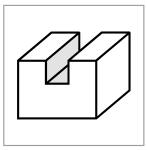
	Ød1	1/16" 1.5 mm | .059"				3/32" 2.0 mm | .079"				1/8" 3.0 mm | .118"				5/32" 4.0 mm | .157"				3/16" - 7/32" 5.0 mm | .197"				1/4" 6.0 mm - 8.0 mm | .236" - .315"			
		v_c	$f_{z,p}$	$f_{z,s}$	a_p	v_c	$f_{z,p}$	$f_{z,s}$	a_p	v_c	$f_{z,p}$	$f_{z,s}$	a_p	v_c	$f_{z,p}$	$f_{z,s}$	a_p	v_c	$f_{z,p}$	$f_{z,s}$	a_p	v_c	$f_{z,p}$	$f_{z,s}$	a_p
		120 **394**	0.0020 **.00008**	0.0065 **.00026**	0.5xd1	120 **394**	0.0026 **.00010**	0.0091 **.00036**	0.5xd1	140 **459**	0.004 **.00014**	0.013 **.00051**	0.5xd1	140 **459**	0.005 **.00020**	0.020 **.00077**	0.5xd1	150 **492**	0.005 **.00020**	0.026 **.00102**	0.5xd1	160 **525**	0.006 **.00024**	0.033 **.00128**	0.5xd1
		120 **394**	0.0021 **.00008**	0.0070 **.00028**	0.5xd1	120 **394**	0.0028 **.00011**	0.0098 **.00039**	0.5xd1	140 **459**	0.004 **.00014**	0.014 **.00055**	0.5xd1	140 **459**	0.005 **.00020**	0.021 **.00083**	0.5xd1	150 **492**	0.006 **.00022**	0.027 **.00106**	0.5xd1	160 **525**	0.006 **.00024**	0.034 **.00133**	0.5xd1
		120 **394**	0.0018 **.00007**	0.0060 **.00024**	0.25xd1	120 **394**	0.0024 **.00009**	0.0084 **.00033**	0.25xd1	140 **459**	0.003 **.00012**	0.012 **.00047**	0.25xd1	140 **459**	0.004 **.00016**	0.017 **.00068**	0.25xd1	150 **492**	0.004 **.00016**	0.022 **.00087**	0.25xd1	160 **525**	0.005 **.00020**	0.028 **.00108**	0.25xd1
		120 **394**	0.0015 **.00006**	0.0050 **.00020**	0.5xd1	120 **394**	0.0020 **.00008**	0.0070 **.00028**	0.5xd1	140 **459**	0.003 **.00012**	0.010 **.00039**	0.5xd1	140 **459**	0.004 **.00016**	0.015 **.00059**	0.5xd1	150 **492**	0.004 **.00016**	0.020 **.00079**	0.5xd1	160 **525**	0.005 **.00020**	0.025 **.00098**	0.5xd1
		120 **394**	0.0015 **.00006**	0.0050 **.00020**	0.25xd1	120 **394**	0.0020 **.00008**	0.0070 **.00028**	0.25xd1	140 **459**	0.003 **.00012**	0.010 **.00039**	0.25xd1	140 **459**	0.004 **.00016**	0.015 **.00059**	0.25xd1	150 **492**	0.004 **.00016**	0.020 **.00079**	0.25xd1	160 **525**	0.005 **.00020**	0.025 **.00098**	0.25xd1
		120 **394**	0.0015 **.00006**	0.0050 **.00020**	0.25xd1	120 **394**	0.0020 **.00008**	0.0070 **.00028**	0.25xd1	140 **459**	0.003 **.00012**	0.010 **.00039**	0.25xd1	140 **459**	0.004 **.00016**	0.015 **.00059**	0.25xd1	150 **492**	0.004 **.00016**	0.020 **.00079**	0.25xd1	160 **525**	0.005 **.00020**	0.025 **.00098**	0.25xd1
		120 **394**	0.0015 **.00006**	0.0050 **.00020**	0.5xd1	120 **394**	0.0020 **.00008**	0.0070 **.00028**	0.5xd1	140 **459**	0.003 **.00012**	0.010 **.00039**	0.5xd1	140 **459**	0.004 **.00016**	0.015 **.00059**	0.5xd1	150 **492**	0.004 **.00016**	0.020 **.00079**	0.5xd1	160 **525**	0.005 **.00020**	0.025 **.00098**	0.5xd1
		120 **394**	0.0019 **.00007**	0.0060 **.00024**	0.5xd1	120 **394**	0.0024 **.00009**	0.0084 **.00033**	0.5xd1	140 **459**	0.004 **.00014**	0.012 **.00047**	0.5xd1	140 **459**	0.004 **.00016**	0.017 **.00068**	0.5xd1	150 **492**	0.005 **.00019**	0.022 **.00087**	0.5xd1	160 **525**	0.005 **.00020**	0.028 **.00108**	0.5xd1
		120 **394**	0.0018 **.00007**	0.0160 **.00063**	0.5xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	0.5xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	0.5xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	0.5xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	0.5xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	0.5xd1
		120 **394**	0.0018 **.00007**	0.0160 **.00063**	0.5xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	0.5xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	0.5xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	0.5xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	0.5xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	0.5xd1
		120 **394**	0.0018 **.00007**	0.0160 **.00063**	0.5xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	0.5xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	0.5xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	0.5xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	0.5xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	0.5xd1
		120 **394**	0.0018 **.00007**	0.0160 **.00063**	0.5xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	0.5xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	0.5xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	0.5xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	0.5xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	0.5xd1
		120 **394**	0.0018 **.00007**	0.0160 **.00063**	0.5xd1	120 **394**	0.0024 **.00009**	0.0210 **.00083**	0.5xd1	150 **492**	0.004 **.00014**	0.034 **.00134**	0.5xd1	160 **525**	0.004 **.00016**	0.035 **.00138**	0.5xd1	170 **558**	0.005 **.00019**	0.036 **.00142**	0.5xd1	180 **591**	0.005 **.00020**	0.037 **.00146**	0.5xd1
		40 **131**	0.0015 **.00006**	0.0050 **.00020**	0.25xd1	50 **164**	0.0020 **.00008**	0.0070 **.00028**	0.25xd1	50 **164**	0.003 **.00012**	0.010 **.00039**	0.25xd1	60 **197**	0.004 **.00016**	0.014 **.00053**	0.25xd1	80 **262**	0.004 **.00016**	0.018 **.00071**	0.25xd1	80 **262**	0.005 **.00020**	0.021 **.00084**	0.25xd1
		90 **295**	0.0014 **.00005**	0.0045 **.00018**	0.25xd1	100 **328**	0.0018 **.00007**	0.0063 **.00025**	0.25xd1	110 **361**	0.003 **.00012**	0.010 **.00039**	0.25xd1	120 **394**	0.004 **.00016**	0.013 **.00050**	0.25xd1	120 **394**	0.004 **.00016**	0.016 **.00064**	0.25xd1	120 **394**	0.005 **.00020**	0.019 **.00075**	0.25xd1
		90 **295**	0.0014 **.00005**	0.0045 **.00018**	0.25xd1	100 **328**	0.0018 **.00007**	0.0063 **.00025**	0.25xd1	110 **361**	0.003 **.00012**	0.010 **.00039**	0.25xd1	120 **394**	0.004 **.00016**	0.013 **.00050**	0.25xd1	120 **394**	0.004 **.00016**	0.016 **.00064**	0.25xd1	120 **394**	0.005 **.00020**	0.019 **.00075**	0.25xd1
		60 **197**	0.0015 **.00006**	0.0050 **.00020**	0.25xd1	80 **262**	0.0020 **.00008**	0.0070 **.00028**	0.25xd1	80 **262**	0.003 **.00012**	0.010 **.00039**	0.25xd1	100 **328**	0.004 **.00016**	0.014 **.00053**	0.25xd1	100 **328**	0.004 **.00016**	0.018 **.00071**	0.25xd1	120 **394**	0.005 **.00020**	0.021 **.00084**	0.25xd1

CRAZYMILL by Mikron Tool Cool

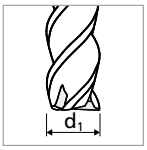
NEW Type C - Milling of through slots

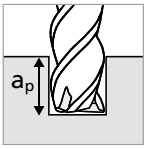
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Through slot milling





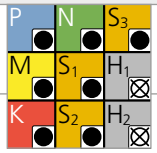




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	f_z	a_p
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 **394**	0.009 **.00035**	0.5xd1
		1.0401	C15	AISI 1015			
		1.1191	C45E/CK45	AISI 1045			
		1.0044	S275JR	AISI 1020			
		1.0715	11SMn30	AISI 1215			
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	120 **394**	0.008 **.00032**	0.5xd1
		1.7131	16MnCr5	AISI 5115			
		1.3505	100Cr6	AISI 52100			
		1.7225	42CrMo4	AISI 4140			
		1.2842	90MnCrV8	AISI O2			
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	120 **394**	0.006 **.00024**	0.25xd1
		1.2436	X210CrW12	AISI D4/D6			
		1.3343	HS6-5-2C	AISI M2 / UNS T11302			
		1.3355	HS18-0-1	AISI T1 / UNS T12001			
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	120 **394**	0.009 **.00035**	0.5xd1
		1.4105	X6CrMoS17	AISI 430F			
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	120 **394**	0.009 **.00035**	0.5xd1
		1.4112	X90CrMoV18	AISI 440B			
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	120 **394**	0.009 **.00035**	0.5xd1
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH			
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	120 **394**	0.007 **.00028**	0.5xd1
		1.4435	X2CrNiMo18-14-3	AISI 316L			
		1.4441	X2CrNiMo18-15-3	AISI 316LM			
		1.4539	X1NiCrMoCu25-20-5	AISI 904L			
K	Cast iron	0.6020	GG20	ASTM 30	100 **328**	0.007 **.00028**	0.5xd1
		0.6030	GG30	ASTM 40B			
		0.7040	GGG40	ASTM 60-40-18			
		0.7060	GGG60	ASTM 80-60-03			
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	170 **558**	0.010 **.00039**	0.5xd1
		3.4365	AlZnMgCu1.5	ASTM 7075			
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	170 **558**	0.010 **.00039**	0.5xd1
		3.2381	GD-AlSi10Mg	UNS A03590			
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	170 **558**	0.012 **.00047**	0.5xd1
		2.0065	Cu-ETP / CW004A	UNS C11000			
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	170 **558**	0.012 **.00047**	0.5xd1
		2.0360	CuZn40 CW509L	UNS C28000			
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	170 **558**	0.012 **.00047**	0.5xd1
		2.1020	CuSn6	UNS C51900			
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	170 **558**	0.011 **.00043**	0.5xd1
		2.0960	CuAl9Mn2	UNS C63200			
S_1	Super alloys	2.4856		Inconel 625	80 **262**	0.005 **.00020**	0.25xd1
		2.4668		Inconel 718			
		2.4617	NiMo28	Hastelloy B-2			
		2.4665	NiCr22Fe18Mo	Hastelloy X			
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	80 **262**	0.009 **.00035**	0.25xd1
		3.7065	Gr.4	ASTM B348 / F68			
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	80 **262**	0.009 **.00035**	0.25xd1
		9.9367	TiAl6Nb7	ASTM F1295			
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	80 **262**	0.005 **.00020**	0.25xd1
			CrCoMo28	ASTM F1537			
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1			
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2			

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**
a_p [mm] | **[inch]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



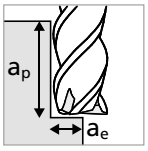
Ød$_1$	1/16" 1.5 mm | .059"			3/32" 2.0 mm | .079"			1/8" 3.0 mm | .118"			5/32" 4.0 mm | .157"			3/16" - 7/32" 5.0 mm | .197"			1/4" 6.0 mm - 8.0 mm | .236" - .315"		
	v_c	f_z	a_p	v_c	f_z	a_p	v_c	f_z	a_p	v_c	f_z	a_p	v_c	f_z	a_p	v_c	f_z	a_p
	140 **459**	0.015 **.00059**	0.5xd1	160 **525**	0.020 **.00079**	0.5xd1	180 **591**	0.029 **.00114**	0.5xd1	200 **656**	0.031 **.00122**	0.5xd1	200 **656**	0.031 **.00122**	0.5xd1	220 **722**	0.032 **.00126**	0.5xd1
	140 **459**	0.013 **.00051**	0.5xd1	160 **525**	0.019 **.00075**	0.5xd1	180 **591**	0.028 **.00110**	0.5xd1	200 **656**	0.029 **.00114**	0.5xd1	200 **656**	0.030 **.00118**	0.5xd1	220 **722**	0.031 **.00122**	0.5xd1
	140 **459**	0.012 **.00047**	0.25xd1	160 **525**	0.017 **.00067**	0.25xd1	180 **591**	0.025 **.00098**	0.25xd1	200 **656**	0.026 **.00102**	0.25xd1	200 **656**	0.026 **.00102**	0.25xd1	220 **722**	0.027 **.00106**	0.25xd1
	140 **459**	0.015 **.00059**	0.5xd1	160 **525**	0.020 **.00079**	0.5xd1	180 **591**	0.028 **.00110**	0.5xd1	200 **656**	0.029 **.00114**	0.5xd1	200 **656**	0.030 **.00118**	0.5xd1	220 **722**	0.031 **.00122**	0.5xd1
	140 **459**	0.013 **.00051**	0.5xd1	160 **525**	0.019 **.00075**	0.5xd1	180 **591**	0.027 **.00106**	0.5xd1	200 **656**	0.028 **.00110**	0.5xd1	200 **656**	0.029 **.00114**	0.5xd1	220 **722**	0.029 **.00114**	0.5xd1
	140 **459**	0.013 **.00051**	0.5xd1	160 **525**	0.019 **.00075**	0.5xd1	180 **591**	0.027 **.00106**	0.5xd1	200 **656**	0.028 **.00110**	0.5xd1	200 **656**	0.029 **.00114**	0.5xd1	220 **722**	0.029 **.00114**	0.5xd1
	140 **459**	0.011 **.00043**	0.5xd1	160 **525**	0.017 **.00067**	0.5xd1	180 **591**	0.025 **.00098**	0.5xd1	200 **656**	0.027 **.00106**	0.5xd1	200 **656**	0.027 **.00106**	0.5xd1	220 **722**	0.028 **.00110**	0.5xd1
	120 **394**	0.015 **.00059**	0.5xd1	140 **459**	0.017 **.00067**	0.5xd1	160 **525**	0.025 **.00098**	0.5xd1	180 **591**	0.031 **.00122**	0.5xd1	200 **656**	0.031 **.00122**	0.5xd1	200 **656**	0.032 **.00126**	0.5xd1
	190 **623**	0.016 **.00063**	0.5xd1	210 **689**	0.021 **.00083**	0.5xd1	230 **755**	0.034 **.00134**	0.5xd1	250 **820**	0.035 **.00139**	0.5xd1	250 **820**	0.036 **.00142**	0.5xd1	270 **886**	0.037 **.00146**	0.5xd1
	190 **623**	0.016 **.00063**	0.5xd1	210 **689**	0.021 **.00083**	0.5xd1	230 **755**	0.032 **.00126**	0.5xd1	250 **820**	0.034 **.00134**	0.5xd1	250 **820**	0.034 **.00134**	0.5xd1	270 **886**	0.036 **.00142**	0.5xd1
	190 **623**	0.016 **.00063**	0.5xd1	210 **689**	0.021 **.00083**	0.5xd1	230 **755**	0.034 **.00134**	0.5xd1	250 **820**	0.035 **.00139**	0.5xd1	250 **820**	0.036 **.00142**	0.5xd1	270 **886**	0.037 **.00146**	0.5xd1
	190 **623**	0.016 **.00063**	0.5xd1	210 **689**	0.021 **.00083**	0.5xd1	230 **755**	0.034 **.00134**	0.5xd1	250 **820**	0.035 **.00139**	0.5xd1	250 **820**	0.036 **.00142**	0.5xd1	270 **886**	0.037 **.00146**	0.5xd1
	190 **623**	0.016 **.00063**	0.5xd1	210 **689**	0.021 **.00083**	0.5xd1	230 **755**	0.034 **.00134**	0.5xd1	250 **820**	0.035 **.00139**	0.5xd1	250 **820**	0.036 **.00142**	0.5xd1	270 **886**	0.037 **.00146**	0.5xd1
	190 **623**	0.016 **.00063**	0.5xd1	210 **689**	0.021 **.00083**	0.5xd1	230 **755**	0.034 **.00134**	0.5xd1	250 **820**	0.035 **.00139**	0.5xd1	250 **820**	0.036 **.00142**	0.5xd1	270 **886**	0.037 **.00146**	0.5xd1
	80 **262**	0.006 **.00024**	0.25xd1	100 **328**	0.007 **.00028**	0.25xd1	100 **328**	0.010 **.00039**	0.25xd1	120 **394**	0.013 **.00051**	0.25xd1	120 **394**	0.013 **.00051**	0.25xd1	120 **394**	0.013 **.00051**	0.25xd1
	80 **262**	0.012 **.00047**	0.25xd1	100 **328**	0.017 **.00067**	0.25xd1	100 **328**	0.027 **.00106**	0.25xd1	120 **394**	0.027 **.00106**	0.25xd1	120 **394**	0.027 **.00106**	0.25xd1	140 **459**	0.028 **.00110**	0.25xd1
	80 **262**	0.012 **.00047**	0.25xd1	100 **328**	0.017 **.00067**	0.25xd1	100 **328**	0.027 **.00106**	0.25xd1	120 **394**	0.027 **.00106**	0.25xd1	120 **394**	0.027 **.00106**	0.25xd1	140 **459**	0.028 **.00110**	0.25xd1
	80 **262**	0.006 **.00024**	0.25xd1	100 **328**	0.007 **.00028**	0.25xd1	100 **328**	0.010 **.00039**	0.25xd1	120 **394**	0.013 **.00051**	0.25xd1	120 **394**	0.013 **.00051**	0.25xd1	120 **394**	0.013 **.00051**	0.25xd1

CRAZYMILL by Mikron Tool Cool

NEW Type C - Side milling - Semi-finishing

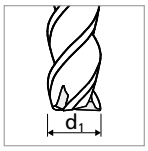
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Semi-finishing



- $a_p = 1 \times d_1 - 2 \times d_1$
- $a_e = 0.1 \times d_1$

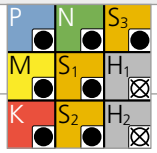




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 **394**	0.017 **.00067**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	120 **394**	0.016 **.00063**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	120 **394**	0.012 **.00035**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	120 **394**	0.018 **.00055**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	120 **394**	0.017 **.00067**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	120 **394**	0.017 **.00067**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	120 **394**	0.013 **.00039**
		1.4435	X2CrNiMo18-14-3	AISI 316L		
		1.4441	X2CrNiMo18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	100 **328**	0.012 **.00035**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	170 **558**	0.020 **.00059**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	170 **558**	0.020 **.00059**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	170 **558**	0.022 **.00087**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	170 **558**	0.022 **.00087**
		2.0360	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	170 **558**	0.022 **.00087**
		2.1020	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	170 **558**	0.020 **.00059**
		2.0960	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	100 **328**	0.008 **.00032**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	100 **328**	0.018 **.00071**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	100 **328**	0.018 **.00071**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	100 **328**	0.008 **.00032**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



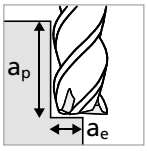
Ød1	1/16" 1.5 mm | .059"		3/32" 2.0 mm | .079"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .157"		3/16" - 7/32" 5.0 mm | .197"		1/4" 6.0 mm | .236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	140 **459**	0.026 **.00079**	160 **525**	0.038 **.00150**	180 **591**	0.048 **.00146**	200 **656**	0.050 **.00197**	220 **722**	0.052 **.00205**	220 **722**	0.056 **.00169**	220 **722**	0.068 **.00268**
	140 **459**	0.025 **.00075**	160 **525**	0.036 **.00106**	180 **591**	0.044 **.00138**	200 **656**	0.048 **.00150**	220 **722**	0.050 **.00150**	220 **722**	0.054 **.00213**	220 **722**	0.066 **.00260**
	140 **459**	0.022 **.00087**	160 **525**	0.035 **.00102**	180 **591**	0.042 **.00165**	200 **656**	0.043 **.00134**	220 **722**	0.045 **.00134**	220 **722**	0.048 **.00189**	220 **722**	0.058 **.00228**
	140 **459**	0.026 **.00079**	160 **525**	0.038 **.00150**	180 **591**	0.046 **.00138**	200 **656**	0.048 **.00150**	220 **722**	0.050 **.00150**	220 **722**	0.055 **.00161**	220 **722**	0.062 **.00244**
	140 **459**	0.025 **.00075**	160 **525**	0.036 **.00106**	180 **591**	0.044 **.00138**	200 **656**	0.046 **.00146**	220 **722**	0.048 **.00146**	220 **722**	0.052 **.00205**	220 **722**	0.060 **.00236**
	140 **459**	0.025 **.00075**	160 **525**	0.036 **.00106**	180 **591**	0.044 **.00138**	200 **656**	0.046 **.00146**	220 **722**	0.048 **.00146**	220 **722**	0.052 **.00205**	220 **722**	0.060 **.00236**
	140 **459**	0.016 **.00055**	160 **525**	0.034 **.00102**	180 **591**	0.042 **.00165**	200 **656**	0.044 **.00138**	220 **722**	0.046 **.00138**	220 **722**	0.049 **.00146**	220 **722**	0.058 **.00228**
	120 **394**	0.026 **.00079**	140 **459**	0.032 **.00095**	160 **525**	0.043 **.00134**	180 **591**	0.054 **.00213**	200 **656**	0.056 **.00165**	200 **656**	0.058 **.00173**	200 **656**	0.070 **.00276**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00122**	230 **755**	0.060 **.00181**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00122**	230 **755**	0.060 **.00181**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00122**	230 **755**	0.060 **.00181**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00122**	230 **755**	0.060 **.00181**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00122**	230 **755**	0.060 **.00181**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	190 **623**	0.029 **.00114**	210 **689**	0.040 **.00122**	230 **755**	0.060 **.00181**	250 **820**	0.062 **.00244**	270 **886**	0.064 **.00252**	270 **886**	0.068 **.00268**	270 **886**	0.084 **.00331**
	100 **328**	0.010 **.00032**	120 **394**	0.012 **.00035**	120 **394**	0.016 **.00063**	140 **459**	0.018 **.00071**	160 **525**	0.020 **.00079**	160 **525**	0.022 **.00087**	160 **525**	0.024 **.00094**
	100 **328**	0.022 **.00087**	120 **394**	0.032 **.00095**	120 **394**	0.042 **.00165**	140 **459**	0.044 **.00138**	160 **525**	0.046 **.00138**	160 **525**	0.048 **.00146**	160 **525**	0.054 **.00213**
	100 **328**	0.022 **.00087**	120 **394**	0.032 **.00095**	120 **394**	0.042 **.00165**	140 **459**	0.044 **.00138**	160 **525**	0.046 **.00138**	160 **525**	0.048 **.00146**	160 **525**	0.054 **.00213**
	100 **328**	0.010 **.00032**	120 **394**	0.012 **.00035**	120 **394**	0.016 **.00063**	140 **459**	0.018 **.00071**	160 **525**	0.020 **.00079**	160 **525**	0.022 **.00087**	160 **525**	0.024 **.00094**

CRAZYMILL by Mikron Tool Cool

NEW Type C - Side milling - Finishing

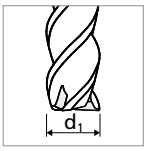
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Finishing



- $a_p = 2 \times d_1$
- $a_e = 0.02 \times d_1$

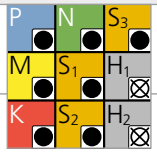




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	130 **425**	0.008 **.00032**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	130 **425**	0.007 **.00028**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	130 **425**	0.006 **.00024**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	130 **425**	0.008 **.00032**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	130 **425**	0.008 **.00032**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	130 **425**	0.008 **.00032**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	130 **425**	0.006 **.00024**
		1.4435	X2CrNiMo18-14-3	AISI 316L		
		1.4441	X2CrNiMo18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	110 **361**	0.006 **.00024**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	130 **425**	0.009 **.00035**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	130 **425**	0.009 **.00035**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	130 **425**	0.010 **.00039**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	130 **425**	0.010 **.00039**
		2.0360	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	130 **425**	0.010 **.00039**
		2.1020	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	130 **425**	0.009 **.00035**
		2.0960	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	110 **361**	0.004 **.00016**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	110 **361**	0.008 **.00032**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	110 **361**	0.008 **.00032**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	110 **361**	0.004 **.00016**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1		
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1	1/16" 1.5 mm | .059"		3/32" 2.0 mm | .079"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .157"		3/16" - 7/32" 5.0 mm | .197"		1/4" 6.0 mm | .236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	180 **591**	0.012 **.00047**	200 **656**	0.017 **.00067**	210 **688**	0.023 **.000091**	220 **772**	0.025 **.00098**	220 **772**	0.028 **.00110**	220 **772**	0.033 **.00130**	220 **772**	0.042 **.00165**
	180 **591**	0.011 **.00043**	200 **656**	0.016 **.00063**	210 **688**	0.022 **.00087**	220 **772**	0.024 **.00095**	220 **772**	0.026 **.00102**	220 **772**	0.029 **.00114**	220 **772**	0.038 **.00150**
	180 **591**	0.010 **.00039**	200 **656**	0.015 **.00059**	210 **688**	0.020 **.00079**	220 **772**	0.021 **.00083**	220 **772**	0.023 **.00091**	220 **772**	0.025 **.00098**	220 **772**	0.034 **.00134**
	180 **591**	0.012 **.00047**	200 **656**	0.017 **.00067**	210 **688**	0.022 **.00087**	220 **772**	0.024 **.00095**	220 **772**	0.026 **.00102**	220 **772**	0.029 **.00114**	220 **772**	0.036 **.00142**
	180 **591**	0.011 **.00043**	200 **656**	0.016 **.00063**	210 **688**	0.022 **.00087**	220 **772**	0.023 **.00091**	220 **772**	0.025 **.00098**	220 **772**	0.028 **.00110**	220 **772**	0.037 **.00146**
	180 **591**	0.011 **.00043**	200 **656**	0.016 **.00063**	210 **688**	0.022 **.00087**	220 **772**	0.023 **.00091**	220 **772**	0.025 **.00098**	220 **772**	0.028 **.00110**	220 **772**	0.037 **.00146**
	180 **591**	0.008 **.00032**	200 **656**	0.015 **.00059**	210 **688**	0.020 **.00079**	220 **772**	0.022 **.00087**	220 **772**	0.024 **.00095**	220 **772**	0.026 **.00102**	220 **772**	0.035 **.00138**
	130 **425**	0.012 **.00047**	150 **492**	0.014 **.00055**	160 **525**	0.022 **.00087**	170 **558**	0.025 **.00098**	170 **558**	0.029 **.00114**	170 **558**	0.031 **.00122**	200 **656**	0.040 **.00157**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	180 **591**	0.013 **.00051**	200 **656**	0.018 **.00071**	210 **688**	0.029 **.00114**	220 **772**	0.030 **.00118**	220 **772**	0.033 **.00130**	220 **772**	0.036 **.00142**	270 **886**	0.045 **.00177**
	120 **394**	0.005 **.00020**	130 **427**	0.005 **.00020**	130 **427**	0.008 **.00032**	140 **459**	0.010 **.00039**	140 **459**	0.011 **.00043**	150 **492**	0.012 **.00047**	160 **525**	0.021 **.00083**
	120 **394**	0.010 **.00039**	130 **427**	0.014 **.00055**	130 **427**	0.020 **.00079**	140 **459**	0.022 **.00087**	150 **492**	0.024 **.00095**	150 **492**	0.026 **.00102**	160 **525**	0.035 **.00138**
	120 **394**	0.010 **.00039**	130 **427**	0.014 **.00055**	150 **492**	0.020 **.00079**	140 **459**	0.022 **.00087**	150 **492**	0.024 **.00095**	150 **492**	0.026 **.00102**	160 **525**	0.035 **.00138**
	120 **394**	0.005 **.00020**	130 **427**	0.005 **.00020**	130 **427**	0.008 **.00032**	140 **459**	0.010 **.00039**	140 **459**	0.011 **.00043**	150 **492**	0.012 **.00047**	160 **525**	0.021 **.00083**



NEW

Process CrazyMill Cool P&S

ACCURATE AND EFFICIENT MILLING

Coolant type, pressure and filtration

Coolant: for best results, Mikron Tool recommends the use of cutting oil as coolant. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used as well.

Filter: the large cooling channels permit the use of a standard filter with filter quality of ≤ .002" (0.05 mm).

Coolant pressure: at least 218 psi (15 bar) coolant pressure is required to achieve reliable milling. High pressure is generally better for the cooling and flushing effect.

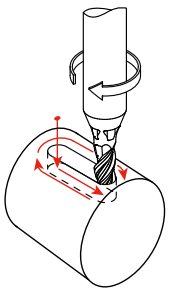
Revolution	[rpm]	≤ 10'000	> 10'000
Minimal pressure	[bar]	15	30
	[psi]	**218**	**435**

Tool holders

For optimal use of the tool, Mikron Tool recommends a shrink fit collet as per DIN 69871 or as an alternative a hydraulic tool holder. For additional information regarding tool holding refer to "Technical Information" in our main catalogue.

Milling process

A. Milling of keyways - only for Type A



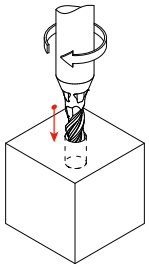
Mikron Tool recommends a maching process in 3 steps to guarantee the tolerance of the slot:

- **1. Plunge milling or plunging with a linear ramp**
- **2. Slot milling**
- **3. Side milling (finishing milling)**

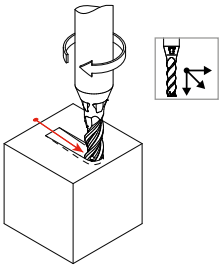
Mikron Tool generally recommends the time and space saving plunge milling (vertical). As an alternative, plunging with a linear ramp is also possible.

MLLING PROCESS

1. Plunge milling or Linear ramp

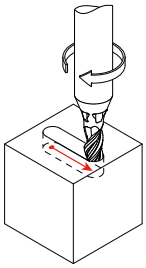


When plunge milling, an increase of the drilling diameter of approx. .002" (0.05 mm) respect to the tool diameter needs to be applied. The maximum milling depth is 2.5 x d_1 ($a_{p,max}$ = 1 x d_1). For data regarding feed $f_{z,p}$ refer to cutting data for plunge milling (page 550).



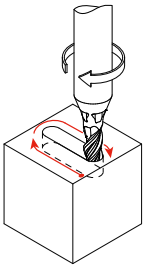
The maximum plunge angle α depends on the material and cannot be overcut (see table below). For data regarding feed $f_{z,s}$ refer to cutting data for keyway milling (page 550).

2. Slot milling



Attention: a finishing operation is provided after slot milling. For data regarding feed $f_{z,s}$ refer to cutting data for slot milling (page 550). For the corresponding selection of tool (diameter) refer to the table "Tool selection" (page 572).

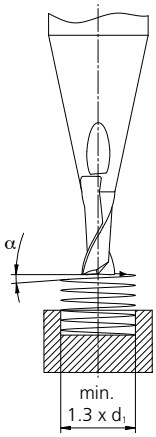
3. Side milling



A finishing operation is necessary to reach the required tolerance and highest squareness.

Maximum plunge angles in linear ramp or helical interpolation

	Material	α - Linear ramp	α - Helical interpolation
P	Unalloyed carbon steel	45°	47°
P	Low alloyed steel	45°	47°
P	High alloyed tool steel	27°	28°
M	Stainless steel ferritic	45°	47°
M	Stainless steel martensitic	27°	28°
M	Stainless steel martensitic - PH	27°	28°
M	Stainless steel austenitic	45°	47°
K	Cast iron	45°	47°
N	Aluminium alloy wrought	45°	47°
N	Aluminium alloy cast	45°	47°
N	Copper	45°	47°
N	Brass lead free	45°	47°
N	Brass, Bronze Rm < 400 N/mm²	45°	47°
N	Bronze Rm < 600 N/mm²	45°	47°
S_1	Super alloys	14°	15°
S_2	Titanium pure and titanium alloys	14°	15°
S_3	CrCo alloys	27°	28°

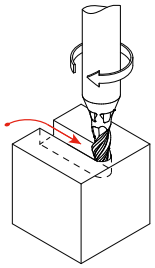


NEW

Process CrazyMill Cool P&S

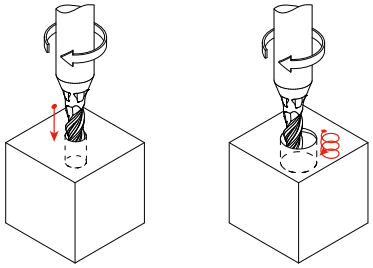
MLLING PROCESS

B. Milling of through slots



When milling through slots, the maximum cutting parameters can be applied. Refer to the cutting data page 552 / page 562.

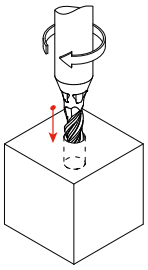
C. Plunge milling



With CrazyMill Cool P&S, plunge milling (drilling) can be executed in two versions:

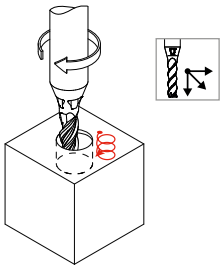
- **1. Direct plunge milling**
- **2. Plunging with helical interpolation**

1. Direct plunge milling



When plunge milling, an increase of the drilling diameter of approx. .002" (0.05 mm) respect to the tool diameter needs to be applied. The maximum milling depth is 2.5 x d_1 - Type A / 2 x d_1 - Type C ($a_{p,max}$ = 1 x d_1). For data regarding feed $f_{z,p}$ refer to cutting data for plunge milling (page 550 / page 560).

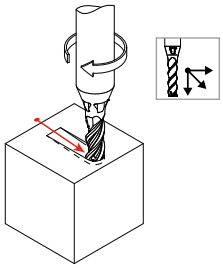
2. Plunging with helical interpolation



The maximum plunge angle α depends on the material and cannot be overcut (see table page 569). For data regarding feed $f_{z,s}$ refer to cutting data for keyway milling (page 550 / page 560). Attention: the minimum diameter of the hole is $d_{hole} = 1.3 \times d_{tool}$

MLLING PROCESS

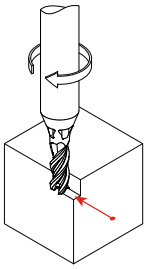
D. Linear ramp



The maximum plunge angle α depends on the material and cannot be overcut (see table page 569). For data regarding feed $f_{z,s}$ refer to cutting data for keyway milling (page 550 / page 560).

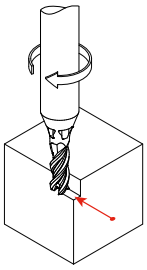
E. Side milling

Semi-finishing



Recommended cutting parameters:
v_c and f_z = as specified in the cutting data table
a_p = max. 1 x d
a_e = 0.2 x d

Finishing



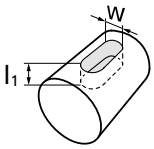
Recommended cutting parameters:
v_c and f_z = as specified in the cutting data table
a_p = 2.5 x d - Type A
a_p = 2 x d - Type C
a_e = 0.05 – 0.1 x d depending on required surface quality

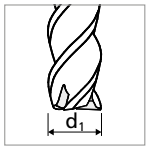
CRAZYMILL by Mikron Tool Cool

NEW Process CrazyMill Cool P&S

THE RIGHT TOOL FOR KEYWAY SLOTTING - ONLY FOR TYPE A

Tool selection





w slot [inch]	w slot [mm]	d_1 Tool [inch]	d_1 Tool [mm]	$l_{1,max}$ [inch]	$l_{1,max}$ [mm]	Item number
.043	1.1	.039	1.0	.098	2.50	2.CMC42.A8Z3.100.1
.047	1.2	.039	1.0	.098	2.50	2.CMC42.A8Z3.100.1
		.043	1.1	.108	2.75	2.CMC42.A8Z3.110.1
.051	1.3	.043	1.1	.108	2.75	2.CMC42.A8Z3.110.1
		.047	1.2	.118	3.00	2.CMC42.A8Z3.120.1
.055	1.4	.047	1.2	.118	3.00	2.CMC42.A8Z3.120.1
		.051	1.3	.128	3.25	2.CMC42.A8Z3.130.1
.059	1.5	.051	1.3	.128	3.25	2.CMC42.A8Z3.130.1
		.055	1.4	.138	3.50	2.CMC42.A8Z3.140.1
1/16	1.587	.051	1.3	.128	3.25	2.CMC42.A8Z3.130.1
		.055	1.4	.138	3.50	2.CMC42.A8Z3.140.1
.063	1.6	.055	1.4	.138	3.50	2.CMC42.A8Z3.140.1
		.059	1.5	.148	3.75	2.CMC42.A8Z3.150.1
.067	1.7	.059	1.5	.148	3.75	2.CMC42.A8Z3.150.1
		1/16	1.587	.156	3.97	2.CMC.PSSAZ3.F116
		.063	1.6	.157	4.00	2.CMC42.A8Z3.160.1
.071	1.8	.059	1.5	.148	3.75	2.CMC42.A8Z3.150.1
		1/16	1.587	.156	3.97	2.CMC.PSSAZ3.F116
		.063	1.6	.157	4.00	2.CMC42.A8Z3.160.1
.075	1.9	.063	1.6	.157	4.00	2.CMC42.A8Z3.160.1
		.067	1.7	.167	4.25	2.CMC42.A8Z3.170.1
.079	2.0	.067	1.7	.167	4.25	2.CMC42.A8Z3.170.1
		.071	1.8	.177	4.50	2.CMC42.A8Z3.180.1
.083	2.1	.071	1.8	.177	4.50	2.CMC42.A8Z3.180.1
		.075	1.9	.187	4.75	2.CMC42.A8Z3.190.1
.087	2.2	.075	1.9	.187	4.75	2.CMC42.A8Z3.190.1
		.079	2.0	.197	5.00	2.CMC42.A8Z3.200.1
.091	2.3	.079	2.0	.197	5.00	2.CMC42.A8Z3.200.1
		.083	2.1	.207	5.25	2.CMC42.A8Z3.210.1
3/32	2.381	.079	2.0	.197	5.00	2.CMC42.A8Z3.200.1
		.083	2.1	.207	5.25	2.CMC42.A8Z3.210.1
		.087	2.2	.217	5.50	2.CMC42.A8Z3.220.1
.094	2.4	.079	2.0	.197	5.00	2.CMC42.A8Z3.200.1
		.083	2.1	.207	5.25	2.CMC42.A8Z3.210.1
		.087	2.2	.217	5.50	2.CMC42.A8Z3.220.1
.098	2.5	.083	2.1	.207	5.25	2.CMC42.A8Z3.210.1
		.087	2.2	.217	5.50	2.CMC42.A8Z3.220.1
		.091	2.3	.226	5.75	2.CMC42.A8Z3.230.1
.102	2.6	.087	2.2	.217	5.50	2.CMC42.A8Z3.220.1
		.091	2.3	.226	5.75	2.CMC42.A8Z3.230.1
		3/32	2.381	.234	5.95	2.CMC.PSSAZ3.F332
		.094	2.4	.236	6.00	2.CMC42.A8Z3.240.1
.106	2.7	.091	2.3	.226	5.75	2.CMC42.A8Z3.230.1
		3/32	2.381	.234	5.95	2.CMC.PSSAZ3.F332
		.094	2.4	.236	6.00	2.CMC42.A8Z3.240.1
		.098	2.5	.246	6.25	2.CMC42.A8Z3.250.1
.110	2.8	.094	2.4	.236	6.00	2.CMC42.A8Z3.240.1
		.098	2.5	.246	6.25	2.CMC42.A8Z3.250.1
		.102	2.6	.256	6.50	2.CMC42.A8Z3.260.1
.114	2.9	.098	2.5	.246	6.25	2.CMC42.A8Z3.250.1
		.102	2.6	.256	6.50	2.CMC42.A8Z3.260.1
		.106	2.7	.266	6.75	2.CMC42.A8Z3.270.1
.118	3.0	.102	2.6	.256	6.50	2.CMC42.A8Z3.260.1
		.106	2.7	.266	6.75	2.CMC42.A8Z3.270.1
		.110	2.8	.276	7.00	2.CMC42.A8Z3.280.1

w slot [inch]	w slot [mm]	d_1 Tool [inch]	d_1 Tool [mm]	$l_{1,max}$ [inch]	$l_{1,max}$ [mm]	Item number
.122	3.1	.102	2.6	.256	6.50	2.CMC42.A8Z3.260.1
		.106	2.7	.266	6.75	2.CMC42.A8Z3.270.1
		.110	2.8	.276	7.00	2.CMC42.A8Z3.280.1
		.114	2.9	.285	7.25	2.CMC42.A8Z3.290.1
1/8	3.175	.106	2.7	.266	6.75	2.CMC42.A8Z3.270.1
		.110	2.8	.276	7.00	2.CMC42.A8Z3.280.1
		.114	2.9	.285	7.25	2.CMC42.A8Z3.290.1
.126	3.2	.106	2.7	.266	6.75	2.CMC42.A8Z3.270.1
		.110	2.8	.276	7.00	2.CMC42.A8Z3.280.1
		.114	2.9	.285	7.25	2.CMC42.A8Z3.290.1
		.118	3.0	.295	7.50	2.CMC42.A8Z3.300.1
.130	3.3	.110	2.8	.276	7.00	2.CMC42.A8Z3.280.1
		.114	2.9	.285	7.25	2.CMC42.A8Z3.290.1
		.118	3.0	.295	7.50	2.CMC42.A8Z3.300.1
		.122	3.1	.305	7.75	2.CMC42.A8Z3.310.1
.134	3.4	.114	2.9	.285	7.25	2.CMC42.A8Z3.290.1
		.118	3.0	.295	7.50	2.CMC42.A8Z3.300.1
		.122	3.1	.305	7.75	2.CMC42.A8Z3.310.1
.138	3.5	.118	3.0	.295	7.50	2.CMC42.A8Z3.300.1
		.122	3.1	.305	7.75	2.CMC42.A8Z3.310.1
		1/8	3.175	.313	7.94	2.CMC.PSSAZ3.F18
		.130	3.3	.325	8.25	2.CMC42.A8Z3.330.1
.142	3.6	.118	3.0	.295	7.50	2.CMC42.A8Z3.300.1
		.122	3.1	.305	7.75	2.CMC42.A8Z3.310.1
		1/8	3.175	.313	7.94	2.CMC.PSSAZ3.F18
		.130	3.3	.325	8.25	2.CMC42.A8Z3.330.1
.146	3.7	.122	3.1	.305	7.75	2.CMC42.A8Z3.310.1
		1/8	3.175	.313	7.94	2.CMC.PSSAZ3.F18
		.130	3.3	.325	8.25	2.CMC42.A8Z3.330.1
.150	3.8	.130	3.3	.325	8.25	2.CMC42.A8Z3.330.1
.154	3.9	.130	3.3	.325	8.25	2.CMC42.A8Z3.330.1
		.146	3.7	.364	9.25	2.CMC42.A8Z3.370.1
5/32	3.968	.130	3.3	.325	8.25	2.CMC42.A8Z3.330.1
		.146	3.7	.364	9.25	2.CMC42.A8Z3.370.1
.157	4.0	.146	3.7	.364	9.25	2.CMC42.A8Z3.370.1
.161	4.1	.146	3.7	.364	9.25	2.CMC42.A8Z3.370.1
.165	4.2	.146	3.7	.364	9.25	2.CMC42.A8Z3.370.1
		5/32	3.968	.391	9.92	2.CMC.PSSAZ3.F532
		.157	4.0	.394	10.00	2.CMC42.A8Z3.400.1
.169	4.3	.146	3.7	.364	9.25	2.CMC42.A8Z3.370.1
		5/32	3.968	.391	9.92	2.CMC.PSSAZ3.F532
		.157	4.0	.394	10.00	2.CMC42.A8Z3.400.1
.173	4.4	.146	3.7	.364	9.25	2.CMC42.A8Z3.370.1
		5/32	3.968	.391	9.92	2.CMC.PSSAZ3.F532
		.157	4.0	.394	10.00	2.CMC42.A8Z3.400.1
.177	4.5	.157	4.0	.394	10.00	2.CMC42.A8Z3.400.1
		.169	4.3	.423	10.75	2.CMC42.A8Z3.430.1
.181	4.6	.157	4.0	.394	10.00	2.CMC42.A8Z3.400.1
		.169	4.3	.423	10.75	2.CMC42.A8Z3.430.1
.185	4.7	.157	4.0	.394	10.00	2.CMC42.A8Z3.400.1
		.169	4.3	.423	10.75	2.CMC42.A8Z3.430.1
3/16	4.762	.157	4.0	.394	10.00	2.CMC42.A8Z3.400.1
		.169	4.3	.423	10.75	2.CMC42.A8Z3.430.1
.189	4.8	.157	4.0	.394	10.00	2.CMC42.A8Z3.400.1
		.169	4.3	.423	10.75	2.CMC42.A8Z3.430.1

w slot [inch]	w slot [mm]	d_1 Tool [inch]	d_1 Tool [mm]	$l_{1,max}$ [inch]	$l_{1,max}$ [mm]	Item number
.193	4.9	.169	4.3	.423	10.75	2.CMC42.A8Z3.430.1
		.185	4.7	.463	11.75	2.CMC42.A8Z3.470.1
.197	5.0	.169	4.3	.423	10.75	2.CMC42.A8Z3.430.1
		.185	4.7	.463	11.75	2.CMC42.A8Z3.470.1
		3/16	4.762	.469	11.91	2.CMC.PSSAZ3.F316
		.189	4.8	.472	12.00	2.CMC42.A8Z3.480.1
.201	5.1	.169	4.3	.423	10.75	2.CMC42.A8Z3.430.1
		.185	4.7	.463	11.75	2.CMC42.A8Z3.470.1
		3/16	4.762	.469	11.91	2.CMC.PSSAZ3.F316
		.189	4.8	.472	12.00	2.CMC42.A8Z3.480.1
.205	5.2	.185	4.7	.463	11.75	2.CMC42.A8Z3.470.1
		3/16	4.762	.469	11.91	2.CMC.PSSAZ3.F316
		.189	4.8	.472	12.00	2.CMC42.A8Z3.480.1
		.197	5.0	.492	12.50	2.CMC42.A8Z3.500.1
.209	5.3	.185	4.7	.463	11.75	2.CMC42.A8Z3.470.1
		3/16	4.762	.469	11.91	2.CMC.PSSAZ3.F316
		.189	4.8	.472	12.00	2.CMC42.A8Z3.480.1
		.197	5.0	.492	12.50	2.CMC42.A8Z3.500.1
.213	5.4	.185	4.7	.463	11.75	2.CMC42.A8Z3.470.1
		3/16	4.762	.469	11.91	2.CMC.PSSAZ3.F316
		.189	4.8	.472	12.00	2.CMC42.A8Z3.480.1
		.197	5.0	.492	12.50	2.CMC42.A8Z3.500.1
.217	5.5	.185	4.7	.463	11.75	2.CMC42.A8Z3.470.1
		3/16	4.762	.469	11.91	2.CMC.PSSAZ3.F316
		.189	4.8	.472	12.00	2.CMC42.A8Z3.480.1
		.197	5.0	.492	12.50	2.CMC42.A8Z3.500.1
		.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
7/32	5.560	.185	4.7	.463	11.75	2.CMC42.A8Z3.470.1
		3/16	4.762	.469	11.91	2.CMC.PSSAZ3.F316
		.189	4.8	.472	12.00	2.CMC42.A8Z3.480.1
		.197	5.0	.492	12.50	2.CMC42.A8Z3.500.1
		.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
.220	5.6	.185	4.7	.463	11.75	2.CMC42.A8Z3.470.1
		3/16	4.762	.469	11.91	2.CMC.PSSAZ3.F316
		.189	4.8	.472	12.00	2.CMC42.A8Z3.480.1
		.197	5.0	.492	12.50	2.CMC42.A8Z3.500.1
		.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
.224	5.7	.189	4.8	.472	12.00	2.CMC42.A8Z3.480.1
		.197	5.0	.492	12.50	2.CMC42.A8Z3.500.1
		.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
.228	5.8	.197	5.0	.492	12.50	2.CMC42.A8Z3.500.1
		.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
.232	5.9	.197	5.0	.492	12.50	2.CMC42.A8Z3.500.1
		.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
		7/32	5.560	.547	13.90	2.CMC.PSSAZ3.F732
		.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
.236	6.0	.197	5.0	.492	12.50	2.CMC42.A8Z3.500.1
		.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
		7/32	5.560	.547	13.90	2.CMC.PSSAZ3.F732
		.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
.240	6.1	.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
		7/32	5.560	.547	13.90	2.CMC.PSSAZ3.F732
		.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
.244	6.2	.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
		7/32	5.560	.547	13.90	2.CMC.PSSAZ3.F732
		.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
		.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
.248	6.3	.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
		7/32	5.560	.547	13.90	2.CMC.PSSAZ3.F732
		.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
		.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
1/4	6.350	.209	5.3	.522	13.25	2.CMC42.A8Z3.530.1
		7/32	5.560	.547	13.90	2.CMC.PSSAZ3.F732
		.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
		.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
.252	6.4	.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
		.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
.256	6.5	.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
		.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
.260	6.6	.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
		.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
		1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.264	6.7	.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
		.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
		1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.268	6.8	.224	5.7	.561	14.25	2.CMC42.A8Z3.570.1
		.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
		1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.272	6.9	.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
		1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.276	7.0	.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
		1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.280	7.1	.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
		1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.283	7.2	.236	6.0	.591	15.00	2.CMC42.A8Z3.600.1
		1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.287	7.3	1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.291	7.4	1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.295	7.5	1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.299	7.6	1/4	6.350	.625	15.88	2.CMC.PSSAZ3.F14
.323 - .378	8.2 - 9.6	.315	8.0	.787	20.00	2.CMC42.A8Z3.800.1

Example:

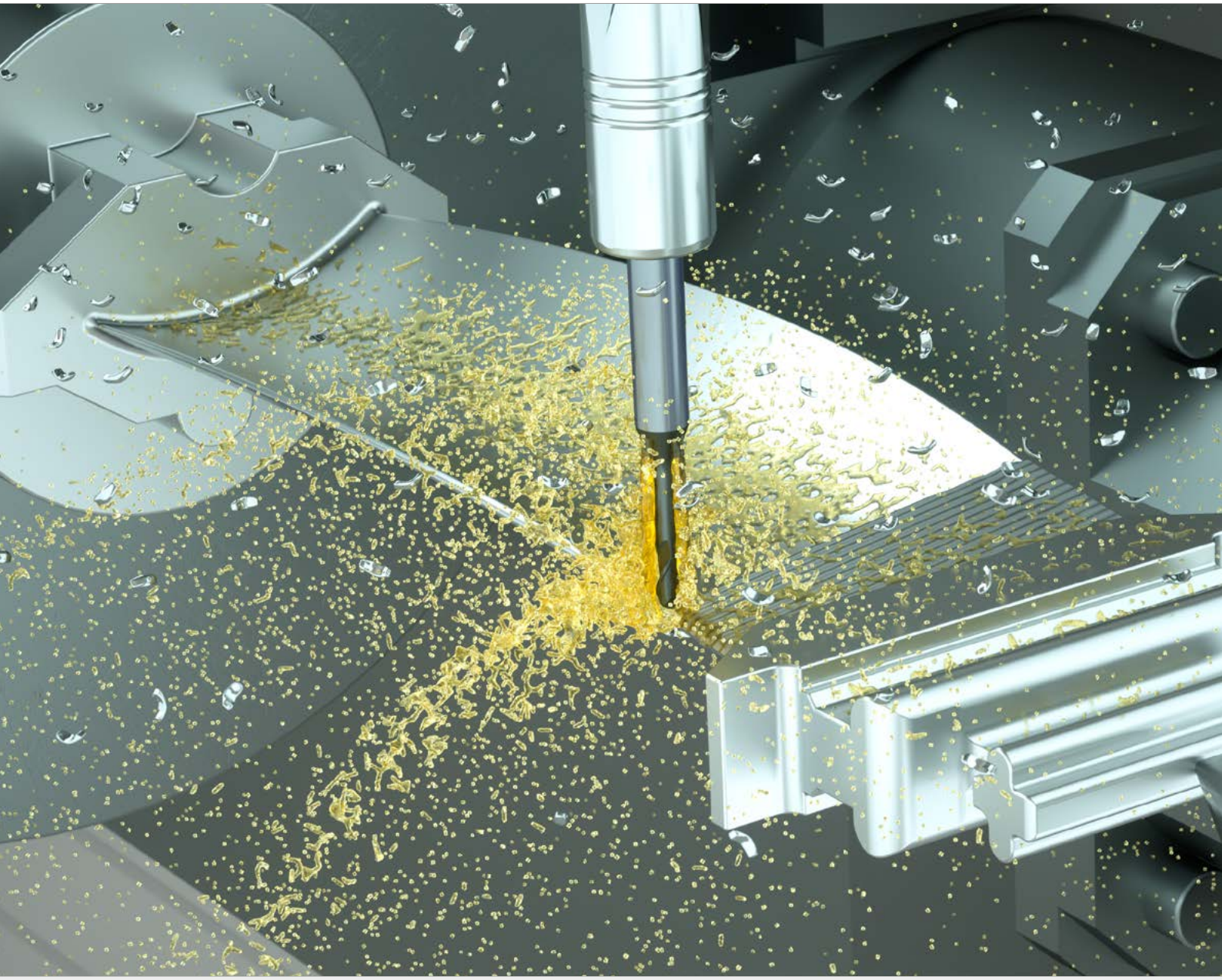
Milling of keyway slot 3x1.8 mm DIN 6885

Width of keyway: **w** = 3 mm**|.118"**; Depth of keyway: l_1 = 1.8 mm**|.071"**;

Mikron Tool recommends the following diameters: d_1 = 2.6 mm**|.102"** or d_1 = 2.7 mm**|.106"** or d_1 = 2.8 mm**|.110"**

PATENTED

CrazyMill Cool Ball - Z2



CRAZYMILL Cool

HSPC MILLING TOOL FOR DIFFICULT TO MACHINE MATERIALS



CrazyMill Cool Ball is an innovative ball endmill from Mikron Tool developed for the roughing and finishing of stainless steels, titanium alloys, CrCo alloys and super alloys. With a very efficient integrated coolant supply it reaches the highest cutting speeds and guarantees a high chip removal rate.

The cutting geometry is especially designed to improve speed and surface quality in a manner to limit oscillation and vibration. The extended cutting depths facilitate machining on the radius and on the cylindrical part, and make the milling cutter into a versatile tool.

CrazyMill Cool Ball combines HSC (high-speed cutting) and HPC (high-performance cutting), thus becoming an HSPC (high-speed performance cutting) ball endmill.

CRAZYMILL by Mikron Tool Cool

Maximum performance and surface quality

BALL ENDMILL WITH COOLANT THROUGH THE SHANK FOR ROUGHING AND FINISHING

With CrazyMill Cool Ball, Mikron Tool expands its range of milling tools for difficult to machine materials. Three versions of two fluted ball endmill with coolant through the shank are available in the diameter range of .012" to .315" (0.3 mm to 8.0 mm) and a maximum milling depth up to 5 x d. The cutting length is always 2 x d.

- CrazyMill Cool Ball, type A – milling depth 2 x d, through shank coolant, Z = 2
- CrazyMill Cool Ball, type B – milling depth 3 x d, through shank coolant, Z = 2
- CrazyMill Cool Ball, type C – milling depth 5 x d, through shank coolant, Z = 2

2 x d	3 x d	5 x d
Type A	Type B	Type C
■ Coated ■ Integrated cooling	■ Coated ■ Integrated cooling	■ Coated ■ Integrated cooling
		
		
page 581	page 582	page 583

PATENTED

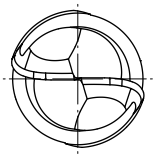
1 | SHANK
The robust carbide shank guarantees stable and vibration-free milling. A high degree of precision and excellent surface quality are achieved.

2 | INTEGRATED COOLING - PATENTED
The integrated cooling channels guarantee constant and maximal cooling of the cutting edges and optimal chip removal. The result is higher cutting speed and depth as well as improved surface quality.

3 | CARBIDE
The specially developed micro-grain carbide meets all requirements in terms of mechanical properties.

4 | COATING
The high-performance RIP coating is heat-resistant and wear-resistant, prevents build up edges and guarantees optimum chip flushing. The result is long tool life.

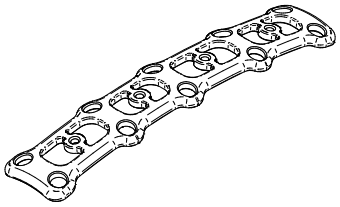
5 | CUTTING GEOMETRY
Developed for the machining of difficult-to-machine materials such as stainless steels, titanium, titanium alloys and heat-resistant alloys. Ensures roughing and finishing with high surface quality. Due to its highly smooth running, it will work with no vibration.

Mill tip 

Benefits and applications

ROUGHING AND FINISHING CUTTER WITH INTEGRATED COOLING, FROM .012" (0.3 MM)

- **SHORT MACHINING TIME** | up to 2 times faster
- **LONG TOOL LIFE** | due to efficient cooling
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to through shank coolant
- **HIGH SURFACE QUALITY** | due to anti-vibration geometry
- **LOW PRODUCTION COSTS** | roughing and finishing with one tool



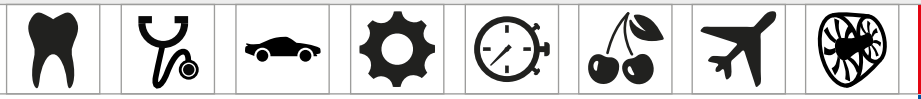
COMPONENT
Bone plate

MATERIAL
TiAl6V4 / 3.7165 / B348 (Grade 5)

MACHINING
- Roughing
- d = 6 mm | **.236"**

MILLING TOOL
Mikron Tool - CrazyMill Cool Ball - Z2 - Type C

DATA	MIKRON TOOL
Tool type	CrazyMill Cool Ball - Z2 - Carbide - Coated - Integrated cooling
Item number	2.CMC30.C5Z2.600.1
Cutting data	Roughing v_c = 170 m/min	**558 SFM** f_z = 0.042 mm	**.00165 IPT** $a_{p,\,max}$ = 1 x d a_e = 1 mm	**.039"** Z = 2



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Tooth crown
Medical technology	Component for endoscope
Automotive industry	Components for injection system
Mechanical engineering	Machine components
Watches	Watch housing
Food industry	Nozzle
Aerospace industry	Engine parts
Power industry	Blade

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4301	X5CrNi 18-10	304
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S2 Titanium (pure and alloyed	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

CrazyMill Cool Ball - Z2

MILLING WITH INTEGRATED COOLING



CrazyMill Cool Ball is setting new standards for copy and side milling. Its strengths include high cutting speeds and depths, high removal rates, a long tool life and excellent surface quality.

The new features of this roughing and finishing cutter include not only the solid carbide, coating, and geometry, but especially the unique cooling system with cooling channels integrated in the shaft, which achieve constant and extensive cooling of the cutting edges, thus enabling the highest cutting speeds and maximum feed.

The milling tools have three to five integrated cooling channels depending on the shaft diameter.

Coolant type, pressure and filtration

Detailed recommendations for coolant type, pressure and filtration are on page "milling process".

Please note

You couldn't find your suitable version of the CrazyMill Cool Ball (diameter, length, cutting direction…)? Ask us about our customized versions!

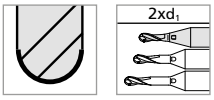
Regrinding: This product is not suitable for regrinding.

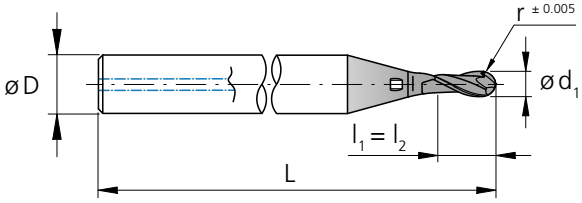
Type A - 2 x d - Ball - Z2

Carbide | Z2 | 30° | eXedur RIP

Ød_1	**.039" - .315"** (1.0 - 8.0 mm)	
Tolerance	**+ .0004"** **- .0004"**	+ 0.01 mm - 0.01 mm

Ball





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	r [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [teeth]	Item number	Availability
	.012	0.3	0.15	**.024**	0.60	0.60	3	**1.50**	38	2	2.CMC30.A5Z2.030.1	■
1/64	**.0156**	0.396	0.198	**.031**	0.79	0.79	3	**1.50**	38	2	2.CMC.BAZ2.F164	■
	.016	0.4	0.20	**.031**	0.80	0.80	3	**1.50**	38	2	2.CMC30.A5Z2.040.1	■
	.020	0.5	0.25	**.039**	1.00	1.00	3	**1.50**	38	2	2.CMC30.A5Z2.050.1	■
	.024	0.6	0.30	**.047**	1.20	1.20	3	**1.50**	38	2	2.CMC30.A5Z2.060.1	■
1/32	**.0312**	0.793	0.397	**.063**	1.59	1.59	3	**1.50**	38	2	2.CMC.BAZ2.F132	■
	.031	0.8	0.40	**.063**	1.60	1.60	3	**1.50**	38	2	2.CMC30.A5Z2.080.1	■
	.039	1.0	0.50	**.079**	2.00	2.00	4	**1.57**	40	2	2.CMC30.A5Z2.100.1	■
	.047	1.2	0.60	**.094**	2.40	2.40	4	**1.57**	40	2	2.CMC30.A5Z2.120.1	■
	.059	1.5	0.75	**.118**	3.00	3.00	4	**1.57**	40	2	2.CMC30.A5Z2.150.1	■
1/16	**.0625**	1.587	0.794	**.125**	3.17	3.17	4	**1.57**	40	2	2.CMC.BAZ2.F116	■
	.071	1.8	0.90	**.142**	3.60	3.60	4	**1.57**	40	2	2.CMC30.A5Z2.180.1	■
	.079	2.0	1.00	**.157**	4.00	4.00	4	**1.57**	40	2	2.CMC30.A5Z2.200.1	■
3/32	**.0937**	2.381	1.191	**.187**	4.76	4.76	4	**1.77**	40	2	2.CMC.BAZ2.F332	■
	.098	2.5	1.25	**.197**	5.00	5.00	6	**1.77**	45	2	2.CMC30.A5Z2.250.1	■
	.118	3.0	1.50	**.236**	6.00	6.00	6	**1.97**	50	2	2.CMC30.A5Z2.300.1	■
1/8	**.1250**	3.175	1.588	**.250**	6.35	6.35	6	**1.97**	50	2	2.CMC.BAZ2.F18	■
5/32	**.1562**	3.968	1.984	**.313**	7.94	7.94	6	**1.97**	50	2	2.CMC.BAZ2.F532	■
	.157	4.0	2.00	**.315**	8.00	8.00	6	**1.97**	50	2	2.CMC30.A5Z2.400.1	■
3/16	**.1875**	4.762	2.381	**.375**	9.52	9.52	8	**2.36**	60	2	2.CMC.BAZ2.F316	■
7/32	**.2189**	5.560	2.780	**.438**	11.12	11.12	10	**2.36**	60	2	2.CMC.BAZ2.F732	■
	.236	6.0	3.00	**.472**	12.00	12.00	10	**2.36**	60	2	2.CMC30.A5Z2.600.1	■
1/4	**.2500**	6.350	3.175	**.500**	12.70	12.70	10	**2.36**	60	2	2.CMC.BAZ2.F14	■
	.315	8.0	4.00	**.630**	16.00	16.00	12	**2.76**	70	2	2.CMC30.A5Z2.800.1	■

■ Stock item

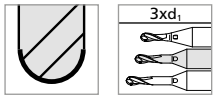
CRAZYMILL by Mikron Tool Cool

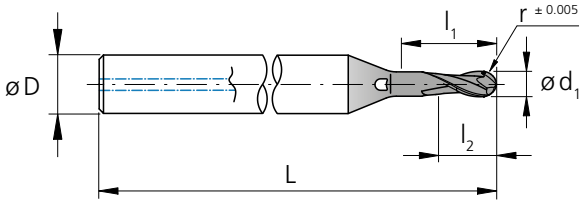
Type B - 3 x d - Ball - Z2

Carbide | Z2 | 30° | eXedur RIP

Ød_1	**.039" - .315"** (1.0 - 8.0 mm)	
Tolerance	**+ .0004"** **- .0004"**	+ 0.01 mm - 0.01 mm

Ball





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	r [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [teeth]	Item number	Availability
	.012	0.3	0.15	**.035**	0.90	0.60	3	**1.50**	38	2	2.CMC30.B5Z2.030.1	■
1/64	**.0156**	0.396	0.198	**.047**	1.19	0.79	3	**1.50**	38	2	2.CMC.BBZ2.F164	■
	.016	0.4	0.20	**.047**	1.20	0.80	3	**1.50**	38	2	2.CMC30.B5Z2.040.1	■
	.020	0.5	0.25	**.059**	1.50	1.00	3	**1.50**	38	2	2.CMC30.B5Z2.050.1	■
	.024	0.6	0.30	**.071**	1.80	1.20	3	**1.50**	38	2	2.CMC30.B5Z2.060.1	■
1/32	**.0312**	0.793	0.397	**.094**	2.38	1.59	3	**1.50**	38	2	2.CMC.BBZ2.F132	■
	.031	0.8	0.40	**.094**	2.40	1.60	3	**1.50**	38	2	2.CMC30.B5Z2.080.1	■
	.039	1.0	0.50	**.118**	3.00	2.00	4	**1.57**	40	2	2.CMC30.B5Z2.100.1	■
	.047	1.2	0.60	**.142**	3.60	2.40	4	**1.57**	40	2	2.CMC30.B5Z2.120.1	■
	.059	1.5	0.75	**.177**	4.50	3.00	4	**1.57**	40	2	2.CMC30.B5Z2.150.1	■
1/16	**.0625**	1.587	0.794	**.187**	4.76	3.17	4	**1.57**	40	2	2.CMC.BBZ2.F116	■
	.071	1.8	0.90	**.213**	5.40	3.60	4	**1.57**	40	2	2.CMC30.B5Z2.180.1	■
	.079	2.0	1.00	**.236**	6.00	4.00	4	**1.57**	40	2	2.CMC30.B5Z2.200.1	■
3/32	**.0937**	2.381	1.191	**.281**	7.14	4.76	4	**1.77**	40	2	2.CMC.BBZ2.F332	■
	.098	2.5	1.25	**.295**	7.50	5.00	6	**1.77**	45	2	2.CMC30.B5Z2.250.1	■
	.118	3.0	1.50	**.354**	9.00	6.00	6	**1.97**	50	2	2.CMC30.B5Z2.300.1	■
1/8	**.1250**	3.175	1.588	**.375**	9.53	6.35	6	**2.17**	55	2	2.CMC.BBZ2.F18	■
5/32	**.1562**	3.968	1.984	**.469**	11.90	7.94	6	**2.17**	55	2	2.CMC.BBZ2.F532	■
	.157	4.0	2.00	**.472**	12.00	8.00	6	**2.17**	55	2	2.CMC30.B5Z2.400.1	■
3/16	**.1875**	4.762	2.381	**.563**	14.29	9.52	8	**2.56**	65	2	2.CMC.BBZ2.F316	■
7/32	**.2189**	5.560	2.780	**.657**	16.68	11.12	10	**2.56**	65	2	2.CMC.BBZ2.F732	■
	.236	6.0	3.00	**.709**	18.00	12.00	10	**2.56**	65	2	2.CMC30.B5Z2.600.1	■
1/4	**.2500**	6.350	3.175	**.750**	19.05	12.70	10	**2.56**	65	2	2.CMC.BBZ2.F14	■
	.315	8.0	4.00	**.945**	24.00	16.00	12	**3.15**	80	2	2.CMC30.B5Z2.800.1	■

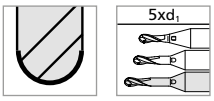
■ Stock item

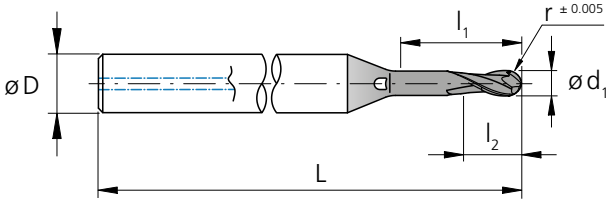
Type C - 5 x d - Ball - Z2

Carbide | Z2 | 30° | eXedur RIP

Ød_1	**.039" - .315"** (1.0 - 8.0 mm)	
Tolerance	**+ .0004"** **- .0004"**	+ 0.01 mm - 0.01 mm

Ball





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	r [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [teeth]	Item number	Availability
	.012	0.3	0.15	**.059**	1.50	0.60	3	**1.50**	38	2	2.CMC30.C5Z2.030.1	■
1/64	**.0156**	0.396	0.198	**.078**	1.98	0.79	3	**1.50**	38	2	2.CMC.BCZ2.F164	■
	.016	0.4	0.20	**.079**	2.00	0.80	3	**1.50**	38	2	2.CMC30.C5Z2.040.1	■
	.020	0.5	0.25	**.098**	2.50	1.00	3	**1.50**	38	2	2.CMC30.C5Z2.050.1	■
	.024	0.6	0.30	**.118**	3.00	1.20	3	**1.50**	38	2	2.CMC30.C5Z2.060.1	■
1/32	**.0312**	0.793	0.397	**.156**	3.97	1.59	3	**1.50**	38	2	2.CMC.BCZ2.F132	■
	.031	0.8	0.40	**.157**	4.00	1.60	3	**1.50**	38	2	2.CMC30.C5Z2.080.1	■
	.039	1.0	0.50	**.197**	5.00	2.00	4	**1.57**	40	2	2.CMC30.C5Z2.100.1	■
	.047	1.2	0.60	**.236**	6.00	2.40	4	**1.57**	40	2	2.CMC30.C5Z2.120.1	■
	.059	1.5	0.75	**.295**	7.50	3.00	4	**1.57**	40	2	2.CMC30.C5Z2.150.1	■
1/16	**.0625**	1.587	0.794	**.313**	7.94	3.17	4	**1.73**	40	2	2.CMC.BCZ2.F116	■
	.071	1.8	0.90	**.354**	9.00	3.60	4	**1.73**	44	2	2.CMC30.C5Z2.180.1	■
	.079	2.0	1.00	**.394**	10.00	4.00	4	**1.73**	44	2	2.CMC30.C5Z2.200.1	■
3/32	**.0937**	2.381	1.191	**.469**	11.91	4.76	4	**1.97**	44	2	2.CMC.BCZ2.F332	■
	.098	2.5	1.25	**.492**	12.50	5.00	6	**1.97**	50	2	2.CMC30.C5Z2.250.1	■
	.118	3.0	1.50	**.591**	15.00	6.00	6	**2.17**	55	2	2.CMC30.C5Z2.300.1	■
1/8	**.1250**	3.175	1.588	**.625**	15.88	6.35	6	**2.36**	60	2	2.CMC.BCZ2.F18	■
5/32	**.1562**	3.968	1.984	**.781**	19.84	7.94	6	**2.36**	60	2	2.CMC.BCZ2.F532	■
	.157	4.0	2.00	**.787**	20.00	8.00	6	**2.36**	60	2	2.CMC30.C5Z2.400.1	■
3/16	**.1875**	4.762	2.381	**.937**	23.81	9.52	8	**2.76**	70	2	2.CMC.BCZ2.F316	■
7/32	**.2189**	5.560	2.780	**1.09**	27.80	11.12	10	**2.76**	70	2	2.CMC.BCZ2.F732	■
	.236	6.0	3.00	**1.18**	30.00	12.00	10	**2.76**	70	2	2.CMC30.C5Z2.600.1	■
1/4	**.2500**	6.350	3.175	**1.25**	31.75	12.70	10	**2.76**	70	2	2.CMC.BCZ2.F14	■
	.315	8.0	4.00	**1.57**	40.00	16.00	12	**3.54**	90	2	2.CMC30.C5Z2.800.1	■

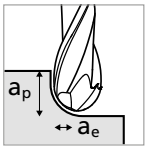
■ Stock item

CRAZYMILL by Mikron Tool Cool

Type A - Roughing

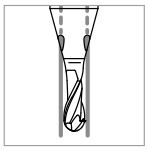
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

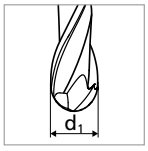
Roughing



- $a_p = 0.5 \times d_1$ ($Ød_1 \leq 0.5$ mm | **.020"**)
- $a_p = 1 \times d_1$ ($Ød_1 > 0.5$ mm | **.020"**)
- $a_e = 0.3 \times d_1$

Machining angle = 0°

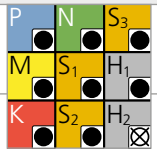




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3–0.4 mm | .012"–.016" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | **197**	0.005–0.007 **.00020–.00028**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | **197**	0.004–0.006 **.00016–.00024**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | **197**	0.004–0.006 **.00016–.00024**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | **197**	0.005–0.007 **.00020–.00028**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | **197**	0.004–0.006 **.00016–.00024**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | **197**	0.004–0.006 **.00016–.00024**
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | **197**	0.004–0.006 **.00016–.00024**
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	60 | **197**	0.003–0.005 **.00012–.00020**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	60 | **197**	0.006–0.008 **.00024–.00031**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60 | **197**	0.006–0.008 **.00024–.00031**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	60 | **197**	0.006–0.008 **.00024–.00031**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	60 | **197**	0.006–0.008 **.00024–.00031**
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	60 | **197**	0.006–0.008 **.00024–.00031**
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	60 | **197**	0.006–0.008 **.00024–.00031**
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	60 | **197**	0.003–0.004 **.00012–.00016**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	60 | **197**	0.004–0.006 **.00016–.00024**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	60 | **197**	0.004–0.006 **.00016–.00024**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 | **197**	0.003–0.004 **.00012–.00016**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | **197**	0.004–0.006 **.00016–.00024**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



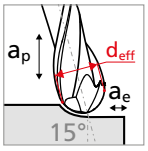
Ød1	1/32" 0.5–0.8 mm | .020"–.032"		1.0–1.2 mm | .039"–.047"		1/16" 1.5–1.8 mm | .059"–.071"		3/32" 2.0–2.5 mm | .079"–.098"		1/8" 3.0 mm | .118"		5/32–3/16–7/32–1/4" 4.0–6 mm | .158"–.236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	100 | **328**	0.010–0.014 **.00039–.00055**	140 | **459**	0.015–0.017 **.00059–.00067**	200 | **656**	0.024–0.026 **.00094–.00102**	220 | **722**	0.034–0.036 **.00134–.00142**	240 | **787**	0.048 **.00189**	280 | **919**	0.050 **.00197**	280 | **919**	0.050 **.00197**
	100 | **328**	0.009–0.012 **.00035–.00047**	140 | **459**	0.014–0.016 **.00055–.00063**	200 | **656**	0.022–0.024 **.00087–.00094**	220 | **722**	0.032–0.034 **.00126–.00134**	240 | **787**	0.046 **.00181**	280 | **919**	0.048 **.00189**	280 | **919**	0.048 **.00189**
	100 | **328**	0.008–0.011 **.00031–.00043**	140 | **459**	0.011–0.013 **.00043–.00051**	200 | **656**	0.020–0.022 **.00079–.00087**	220 | **722**	0.030–0.032 **.00118–.00126**	240 | **787**	0.042 **.00165**	280 | **919**	0.044 **.00173**	280 | **919**	0.044 **.00173**
	100 | **328**	0.010–0.014 **.00039–.00055**	140 | **459**	0.016–0.018 **.00063–.00071**	200 | **656**	0.024–0.026 **.00094–.00102**	220 | **722**	0.034–0.036 **.00134–.00142**	240 | **787**	0.046 **.00181**	280 | **919**	0.048 **.00189**	280 | **919**	0.048 **.00189**
	100 | **328**	0.009–0.012 **.00035–.00047**	140 | **459**	0.015–0.017 **.00059–.00067**	200 | **656**	0.022–0.024 **.00087–.00094**	220 | **722**	0.032–0.034 **.00126–.00134**	240 | **787**	0.044 **.00173**	280 | **919**	0.046 **.00181**	280 | **919**	0.046 **.00181**
	100 | **328**	0.009–0.012 **.00035–.00047**	140 | **459**	0.015–0.017 **.00059–.00067**	200 | **656**	0.022–0.024 **.00087–.00094**	220 | **722**	0.032–0.034 **.00126–.00134**	240 | **787**	0.044 **.00173**	280 | **919**	0.046 **.00181**	280 | **919**	0.046 **.00181**
	100 | **328**	0.008–0.011 **.00031–.00043**	140 | **459**	0.012–0.014 **.00047–.00055**	200 | **656**	0.016–0.018 **.00063–.00071**	220 | **722**	0.030–0.032 **.00118–.00126**	240 | **787**	0.042 **.00165**	280 | **919**	0.044 **.00173**	280 | **919**	0.044 **.00173**
	100 | **328**	0.006–0.009 **.00024–.00035**	120 | **394**	0.011–0.022 **.00043–.00087**	140 | **459**	0.024–0.026 **.00094–.00102**	160 | **525**	0.028–0.036 **.00110–.00142**	180 | **591**	0.042–0.048 **.00165–.00189**	200 | **656**	0.052–0.057 **.00205–.00224**	200 | **656**	0.052–0.057 **.00205–.00224**
	100 | **328**	0.012–0.016 **.00047–.00063**	140 | **459**	0.018–0.020 **.00071–.00079**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.012–0.016 **.00047–.00063**	140 | **459**	0.018–0.020 **.00071–.00079**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014–0.018 **.00055–.00071**	140 | **459**	0.020–0.022 **.00079–.00087**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014–0.018 **.00055–.00071**	140 | **459**	0.020–0.022 **.00079–.00087**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014–0.018 **.00055–.00071**	140 | **459**	0.020–0.022 **.00079–.00087**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.012–0.016 **.00047–.00063**	140 | **459**	0.018–0.020 **.00071–.00079**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.004–0.006 **.00016–.00024**	120 | **394**	0.007–0.008 **.00028–.00031**	130 | **427**	0.009–0.010 **.00035–.00039**	140 | **459**	0.010–0.012 **.00039–.00047**	150 | **492**	0.015 **.00059**	170 | **558**	0.020 **.00079**	170 | **558**	0.020 **.00079**
	100 | **328**	0.008–0.011 **.00031–.00043**	120 | **394**	0.016–0.018 **.00063–.00071**	130 | **427**	0.020–0.022 **.00079–.00087**	140 | **459**	0.028–0.030 **.00110–.00118**	150 | **492**	0.042 **.00165**	170 | **558**	0.044 **.00173**	170 | **558**	0.044 **.00173**
	100 | **328**	0.008–0.011 **.00031–.00043**	120 | **394**	0.016–0.018 **.00063–.00071**	130 | **427**	0.020–0.022 **.00079–.00087**	140 | **459**	0.028–0.030 **.00110–.00118**	150 | **492**	0.042 **.00165**	170 | **558**	0.044 **.00173**	170 | **558**	0.044 **.00173**
	100 | **328**	0.004–0.006 **.00016–.00024**	140 | **459**	0.007–0.008 **.00028–.00031**	180 | **591**	0.009–0.010 **.00035–.00039**	200 | **656**	0.010–0.012 **.00039–.00047**	220 | **722**	0.015 **.00059**	240 | **787**	0.020 **.00079**	240 | **787**	0.020 **.00079**
	80 | **262**	0.007–0.009 **.00028–.00035**	100 | **328**	0.010–0.012 **.000639–.00047**	140 | **459**	0.014–0.018 **.00055–.00071**	180 | **591**	0.020–0.026 **.00079–.00102**	200 | **656**	0.035 **.00138**	240 | **787**	0.040 **.00157**	240 | **787**	0.040 **.00157**

CRAZYMILL by Mikron Tool Cool

Type A - Semi-finishing

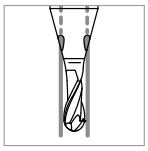
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

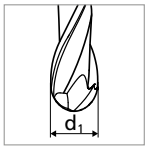
Semi-finishing



- $a_p = 0.25 \times d_1$ ($Ød_1 \leq 0.5$ mm **| .020"**)
- $a_p = 0.5 \times d_1$ ($Ød_1 > 0.5$ mm **| .020"**)
- $a_e = 0.1 \times d_1$

Machining angle = 15°

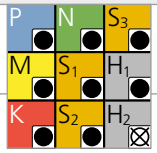




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3 mm | .012" v_c	d_{eff}	f_z	0.4 mm | .016" v_c	d_{eff}	f_z	0.5 mm | .020" v_c	d_{eff}	f_z	0.6 mm | .024" v_c	d_{eff}	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	55	0.29	0.005	73	0.39	0.007	92	0.48	0.010	100	0.60	0.012
		1.0401	C15	AISI 1015	**180**	**.011**	**.00020**	**240**	**.015**	**.00028**	**302**	**.019**	**.00039**	**328**	**.024**	**.00047**
		1.1191	C45E/CK45	AISI 1045												
		1.0044	S275JR	AISI 1020												
		1.0715	11SMn30	AISI 1215												
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415	55	0.29	0.004	73	0.39	0.006	92	0.48	0.009	100	0.60	0.011
		1.7131	16MnCr5	AISI 5115	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00035**	**328**	**.024**	**.00043**
		1.3505	100Cr6	AISI 52100												
		1.7225	42CrMo4	AISI 4140												
		1.2842	90MnCrV8	AISI O2												
	High alloyed tool steel Rm<1200N/mm²	1.2379	X153CrMoV12	AISI D2	55	0.29	**0.004**	73	0.39	0.006	92	0.48	0.008	100	0.60	0.009
		1.2436	X210CrW12	AISI D4/D6	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00031**	**328**	**.024**	**.00035**
		1.3343	HS6-5-2C	AISI M2												
		1.3355	HS18-0-1	AISI T1												
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430	55	0.29	0.005	73	0.39	0.007	92	0.48	0.010	100	0.60	0.012
		1.4105	X6CrMoS17	AISI 430F	**180**	**.011**	**.00020**	**240**	**.015**	**.00028**	**302**	**.019**	**.00039**	**328**	**.024**	**.00047**
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	55	0.29	0.004	73	0.39	0.006	92	0.48	0.009	100	0.60	0.010
		1.4112	X90CrMoV18	AISI 440B	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00035**	**328**	**.024**	**.00039**
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630	55	0.29	0.004	73	0.39	0.006	92	0.48	0.009	100	0.60	0.010
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00035**	**328**	**.024**	**.00039**
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	55	0.29	0.004	73	0.39	0.006	92	0.48	0.008	100	0.60	0.010
		1.4435	X2CrNiMo 18-14-3	AISI 316L	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00031**	**328**	**.024**	**.00039**
		1.4441	X2CrNiMo 18-15-3	AISI 316LM												
		1.4539	X1NiCrMoCu25-20-5	AISI 904L												
K	Cast iron	0.6020	GG20	ASTM 30	55	0.29	0.003	73	0.39	0.005	92	0.48	0.006	100	0.60	0.008
		0.6030	GG30	ASTM 40B	**180**	**.011**	**.00012**	**240**	**.015**	**.00020**	**302**	**.019**	**.00024**	**328**	**.024**	**.00030**
		0.7040	GGG40	ASTM60-40-18												
		0.7060	GGG60	ASTM80-60-03												
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	55	0.29	0.006	73	0.39	0.008	92	0.48	0.012	100	0.60	0.014
		3.4365	AlZnMgCu1.5	ASTM 7075	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00047**	**328**	**.024**	**.00055**
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	55	0.29	0.006	73	0.39	0.008	92	0.48	0.012	100	0.60	0.014
		3.2381	GD-AlSi10Mg	UNS A03590	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00047**	**328**	**.024**	**.00055**
	Copper	2.004	Cu-OF / CW008A	UNS C10100	55	0.29	0.006	73	0.39	0.008	92	0.48	0.014	100	0.60	0.016
		2.0065	Cu-ETP / CW004A	UNS C11000	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00055**	**328**	**.024**	**.00063**
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	55	0.29	0.006	73	0.39	0.008	92	0.48	0.014	100	0.60	0.016
		2.036	CuZn40 CW509L	UNS C28000	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00055**	**328**	**.024**	**.00063**
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3	UNS C38500	55	0.29	0.006	73	0.39	0.008	92	0.48	0.014	100	0.60	0.016
		2.102	CuSn6	UNS C51900	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00055**	**328**	**.024**	**.00063**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	55	0.29	0.006	73	0.39	0.008	92	0.48	0.012	100	0.60	0.014
		2.096	CuAl9Mn2	UNS C63200	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00047**	**328**	**.024**	**.00055**
S_1	Super alloys	2.4856		Inconel 625	55	0.29	0.003	73	0.39	0.004	92	0.48	0.004	100	0.60	0.005
		2.4668		Inconel 718	**180**	**.011**	**.00012**	**240**	**.015**	**.00016**	**302**	**.019**	**.00016**	**328**	**.024**	**.00020**
		2.4617	NiMo28	Hastelloy B-2												
		2.4665	NiCr22Fe18Mo	Hastelloy X												
S_2	Titanium pure	3.7035	Gr.2	ASTM B348	55	0.29	0.004	73	0.39	0.004	92	0.48	0.008	100	0.60	0.009
		3.7065	Gr.4	ASTM B348	**180**	**.011**	**.00016**	**240**	**.015**	**.00016**	**302**	**.019**	**.00031**	**328**	**.024**	**.00035**
	Titanium alloys	3.7165	TiAl6V4	ASTM B348	55	0.29	0.004	73	0.39	0.004	92	0.48	0.008	100	0.60	0.009
		9.9367	TiAl6Nb7	ASTM F1295	**180**	**.011**	**.00016**	**240**	**.015**	**.00016**	**302**	**.019**	**.00031**	**328**	**.024**	**.00035**
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	55	0.29	0.003	73	0.39	0.003	92	0.48	0.005	100	0.60	0.005
			CrCoMo28	ASTM F1537	**180**	**.011**	**.00012**	**240**	**.015**	**.00012**	**302**	**.019**	**.00020**	**328**	**.024**	**.00020**
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	55	0.29	0.004	73	0.39	0.006	92	0.48	0.007	80	0.60	0.008
					180	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00028**	**262**	**.024**	**.00031**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2												

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**
d_{eff} [mm] | **[inch]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1

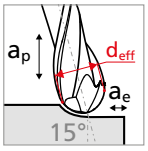
1/32" 0.8mm | .032"			1.0mm | .039"			1.2mm | .047"			1/16" 1.5 | .059"			1.8mm | .071"			2.0mm | .079"			3/32" 2.5mm | .098"			1/8" 3.0mm | .118"			5/32" 4.0mm | .158"			3/16–7/32–1/4" 6.0mm | .236"			8.0mm | .315"		
v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z
100	0.80	0.014	140	1.00	0.015	140	1.20	0.017	200	1.50	0.024	200	1.80	0.026	220	2.00	0.034	220	2.50	0.036	240	3.00	0.048	260	4.00	0.050	260	6.00	0.050	260	8.00	0.050
328	**.032**	**.00055**	**459**	**.039**	**.00059**	**459**	**.047**	**.00067**	**656**	**.059**	**.00094**	**656**	**.071**	**.00102**	**722**	**.079**	**.00134**	**722**	**.098**	**.00142**	**787**	**.118**	**.00189**	**853**	**.158**	**.00197**	**853**	**.236**	**.00197**	**853**	**.315**	**.00197**
100	0.80	0.012	140	1.00	0.014	140	1.20	0.016	200	1.50	0.022	200	1.80	0.024	220	2.00	0.032	220	2.50	0.034	240	3.00	0.046	260	4.00	0.048	260	6.00	0.048	260	8.00	0.048
328	**.032**	**.00047**	**459**	**.039**	**.00055**	**459**	**.047**	**.00063**	**656**	**.059**	**.00087**	**656**	**.071**	**.00094**	**722**	**.079**	**.00126**	**722**	**.098**	**.00134**	**787**	**.118**	**.00181**	**853**	**.158**	**.00189**	**853**	**.236**	**.00189**	**853**	**.315**	**.00189**
100	0.80	0.011	140	1.00	0.011	140	1.20	0.013	200	1.50	0.020	200	1.80	0.022	220	2.00	0.030	220	2.50	0.032	240	3.00	0.042	260	4.00	0.044	260	6.00	0.044	260	8.00	0.044
328	**.032**	**.00043**	**459**	**.039**	**.00043**	**459**	**.047**	**.00051**	**656**	**.059**	**.00079**	**656**	**.071**	**.00087**	**722**	**.079**	**.00118**	**722**	**.098**	**.00126**	**787**	**.118**	**.00165**	**853**	**.158**	**.00173**	**853**	**.236**	**.00173**	**853**	**.315**	**.00173**
100	0.80	0.014	140	1.00	0.016	140	1.20	0.018	200	1.50	0.024	200	1.80	0.026	220	2.00	0.034	220	2.50	0.036	240	3.00	0.046	260	4.00	0.048	260	6.00	0.048	260	8.00	0.048
328	**.032**	**.00055**	**459**	**.039**	**.00063**	**459**	**.047**	**.00071**	**656**	**.059**	**.00094**	**656**	**.071**	**.00102**	**722**	**.079**	**.00134**	**722**	**.098**	**.00142**	**787**	**.118**	**.00181**	**853**	**.158**	**.00189**	**853**	**.236**	**.00189**	**853**	**.315**	**.00189**
100	0.80	0.012	140	1.00	0.015	140	1.20	0.017	200	1.50	0.022	200	1.80	0.024	220	2.00	0.032	220	2.50	0.034	240	3.00	0.044	260	4.00	0.046	260	6.00	0.046	260	8.00	0.046
328	**.032**	**.00047**	**459**	**.039**	**.00059**	**459**	**.047**	**.00067**	**656**	**.059**	**.00087**	**656**	**.071**	**.00094**	**722**	**.079**	**.00126**	**722**	**.098**	**.00134**	**787**	**.118**	**.00173**	**853**	**.158**	**.00181**	**853**	**.236**	**.00181**	**853**	**.315**	**.00181**
100	0.80	0.012	140	1.00	0.015	140	1.20	0.017	200	1.50	0.022	200	1.80	0.024	220	2.00	0.032	220	2.50	0.034	240	3.00	0.044	260	4.00	0.046	260	6.00	0.046	260	8.00	0.046
328	**.032**	**.00047**	**459**	**.039**	**.00059**	**459**	**.047**	**.00067**	**656**	**.059**	**.00087**	**656**	**.071**	**.00094**	**722**	**.079**	**.00126**	**722**	**.098**	**.00134**	**787**	**.118**	**.00173**	**853**	**.158**	**.00181**	**853**	**.236**	**.00181**	**853**	**.315**	**.00181**
100	0.80	0.011	140	1.00	0.012	140	1.20	0.014	200	1.50	0.016	200	1.80	0.018	220	2.00	0.030	220	2.50	0.032	240	3.00	0.042	260	4.00	0.044	260	6.00	0.044	260	8.00	0.044
328	**.032**	**.00043**	**459**	**.039**	**.00047**	**459**	**.047**	**.00055**	**656**	**.059**	**.00063**	**656**	**.071**	**.00071**	**722**	**.079**	**.00118**	**722**	**.098**	**.00126**	**787**	**.118**	**.00165**	**853**	**.158**	**.00173**	**853**	**.236**	**.00173**	**853**	**.315**	**.00173**
100	0.80	0.009	120	1.00	0.011	120	1.20	0.022	140	1.50	0.024	140	1.80	0.026	160	2.00	0.028	160	2.50	0.036	180	3.00	0.044	200	4.00	0.055	200	6.00	0.055	200	8.00	0.055
328	**.032**	**.00035**	**394**	**.039**	**.00043**	**394**	**.047**	**.00087**	**459**	**.059**	**.00094**	**459**	**.071**	**.00102**	**525**	**.079**	**.00110**	**525**	**.098**	**.00142**	**591**	**.118**	**.00173**	**656**	**.158**	**.00217**	**656**	**.236**	**.00217**	**656**	**.315**	**.00217**
100	0.80	0.016	140	1.00	0.018	140	1.20	0.020	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.060	260	6.00	0.060	260	8.00	0.060
328	**.032**	**.00063**	**459**	**.039**	**.00071**	**459**	**.047**	**.00079**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00236**	**853**	**.236**	**.00236**	**853**	**.315**	**.00236**
100	0.80	0.016	140	1.00	0.018	140	1.20	0.020	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.060	260	6.00	0.060	260	8.00	0.060
328	**.032**	**.00063**	**459**	**.039**	**.00071**	**459**	**.047**	**.00079**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00236**	**853**	**.236**	**.00236**	**853**	**.315**	**.00236**
100	0.80	0.018	140	1.00	0.020	140	1.20	0.022	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.060	260	6.00	0.060	260	8.00	0.060
328	**.032**	**.00071**	**459**	**.039**	**.00079**	**459**	**.047**	**.00087**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00236**	**853**	**.236**	**.00236**	**853**	**.315**	**.00236**
100	0.80	0.018	140	1.00	0.020	140	1.20	0.022	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.060	260	6.00	0.060	260	8.00	0.060
328	**.032**	**.00071**	**459**	**.039**	**.00079**	**459**	**.047**	**.00087**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00236**	**853**	**.236**	**.00236**	**853**	**.315**	**.00236**
100	0.80	0.018	140	1.00	0.020	140	1.20	0.022	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.060	260	6.00	0.060	260	8.00	0.060
328	**.032**	**.00071**	**459**	**.039**	**.00079**	**459**	**.047**	**.00087**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00236**	**853**	**.236**	**.00236**	**853**	**.315**	**.00236**
100	0.80	0.016	140	1.00	0.018	140	1.20	0.020	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.060	260	6.00	0.060	260	8.00	0.060
328	**.032**	**.00063**	**459**	**.039**	**.00071**	**459**	**.047**	**.00079**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00236**	**853**	**.236**	**.00236**	**853**	**.315**	**.00236**
100	0.80	0.006	120	1.00	0.007	120	1.20	0.008	130	1.50	0.009	130	1.80	0.010	140	2.00	0.010	140	2.50	0.012	150	3.00	0.015	170	4.00	0.020	170	6.00	0.020	170	8.00	0.020
328	**.032**	**.00024**	**394**	**.039**	**.00028**	**394**	**.047**	**.00031**	**427**	**.059**	**.00035**	**427**	**.071**	**.00039**	**459**	**.079**	**.00039**	**459**	**.098**	**.00047**	**492**	**.118**	**.00059**	**558**	**.158**	**.00079**	**558**	**.236**	**.00079**	**558**	**.315**	**.00079**
100	0.80	0.011	120	1.00	0.016	120	1.20	0.018	130	1.50	0.020	130	1.80	0.022	140	2.00	0.028	140	2.50	0.030	150	3.00	0.042	170	4.00	0.044	170	6.00	0.044	170	8.00	0.044
328	**.032**	**.00043**	**394**	**.039**	**.00063**	**394**	**.047**	**.00071**	**427**	**.059**	**.00079**	**427**	**.071**	**.00087**	**459**	**.079**	**.00110**	**459**	**.098**	**.00118**	**492**	**.118**	**.00165**	**558**	**.158**	**.00173**	**558**	**.236**	**.00173**	**558**	**.315**	**.00173**
100	0.80	0.011	120	1.00	0.016	120	1.20	0.018	130	1.50	0.020	130	1.80	0.022	140	2.00	0.028	140	2.50	0.030	150	3.00	0.042	170	4.00	0.044	170	6.00	0.044	170	8.00	0.044
328	**.032**	**.00043**	**394**	**.039**	**.00063**	**394**	**.047**	**.00071**	**427**	**.059**	**.00079**	**427**	**.071**	**.00087**	**459**	**.079**	**.00110**	**459**	**.098**	**.00118**	**492**	**.118**	**.00165**	**558**	**.158**	**.00173**	**558**	**.236**	**.00173**	**558**	**.315**	**.00173**
100	0.80	0.006	140	1.00	0.007	140	1.20	0.008	180	1.50	0.009	180	1.80	0.010	200	2.00	0.010	200	2.50	0.012	220	3.00	0.015	240	4.00	0.020	240	6.00	0.020	240	8.00	0.020
328	**.032**	**.00024**	**459**	**.039**	**.00028**	**459**	**.047**	**.00031**	**591**	**.059**	**.00035**	**591**	**.071**	**.00039**	**656**	**.079**	**.00039**	**656**	**.098**	**.00047**	**722**	**.118**	**.00059**	**787**	**.158**	**.00079**	**787**	**.236**	**.00079**	**787**	**.315**	**.00079**
80	0.80	0.009	100	1.00	0.010	100	1.20	0.012	140	1.50	0.014	140	1.80	0.018	180	2.00	0.020	180	2.50	0.026	200	3.00	0.035	240	4.00	0.040	240	6.00	0.040	240	8.00	0.040
262	**.032**	**.00035**	**328**	**.039**	**.00039**	**328**	**.047**	**.00047**	**459**	**.059**	**.00055**	**459**	**.071**	**.00071**	**591**	**.079**	**.00079**	**591**	**.098**	**.00102**	**656**	**.118**	**.00138**	**787**	**.158**	**.00157**	**787**	**.236**	**.00157**	**787**	**.315**	**.00157**

CRAZYMILL by Mikron Tool Cool

Type A - Finishing

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

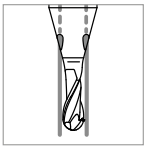
Finishing

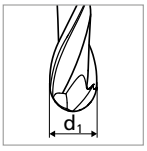


- $a_p = 0.1 \times d_1$
- $a_e = 0.05 \times d_1$

Machining angle = 15°

n_{max} = 60'000 rpm

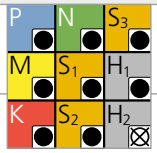




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3 mm | .012" v_c	d_{eff}	f_z	0.4 mm | .016" v_c	d_{eff}	f_z	0.5 mm | .020" v_c	d_{eff}	f_z	0.6 mm | .024" v_c	d_{eff}	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	45	0.24	0.006	59	0.31	0.008	74	0.39	0.012	89	0.47	0.014
		1.0401	C15	AISI 1015	**148**	**.009**	**.00024**	**194**	**.012**	**.00031**	**243**	**.015**	**.00047**	**292**	**.019**	**.00055**
		1.1191	C45E/CK45	AISI 1045												
		1.0044	S275JR	AISI 1020												
		1.0715	11SMn30	AISI 1215												
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415	45	0.24	0.005	59	0.31	0.007	74	0.39	0.011	89	0.47	0.013
		1.7131	16MnCr5	AISI 5115	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00043**	**292**	**.019**	**.00051**
		1.3505	100Cr6	AISI 52100												
		1.7225	42CrMo4	AISI 4140												
		1.2842	90MnCrV8	AISI O2												
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	45	0.24	0.005	59	0.31	0.007	74	0.39	0.010	89	0.47	0.011
		1.2436	X210CrW12	AISI D4/D6	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00039**	**292**	**.019**	**.00043**
		1.3343	HS6-5-2C	AISI M2												
		1.3355	HS18-0-1	AISI T1												
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430	45	0.24	0.006	59	0.31	0.008	74	0.39	0.012	89	0.47	0.014
		1.4105	X6CrMoS17	AISI 430F	**148**	**.009**	**.00024**	**194**	**.012**	**.00031**	**243**	**.015**	**.00047**	**292**	**.019**	**.00055**
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	45	0.24	0.005	59	0.31	0.007	74	0.39	0.011	89	0.47	0.012
		1.4112	X90CrMoV18	AISI 440B	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00043**	**292**	**.019**	**.00047**
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630	45	0.24	0.005	59	0.31	0.007	74	0.39	0.011	89	0.47	0.012
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00043**	**292**	**.019**	**.00047**
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	45	0.24	0.005	59	0.31	0.007	74	0.39	0.010	89	0.47	0.012
		1.4435	X2CrNiMo 18-14-3	AISI 316L	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00039**	**292**	**.019**	**.00047**
		1.4441	X2CrNiMo 18-15-3	AISI 316LM												
		1.4539	X1NiCrMoCu25-20-5	AISI 904L												
K	Cast iron	0.6020	GG20	ASTM 30	45	0.24	0.004	59	0.31	0.006	74	0.39	0.007	89	0.47	0.009
		0.6030	GG30	ASTM 40B	**148**	**.009**	**.00016**	**194**	**.012**	**.00024**	**243**	**.015**	**.00028**	**292**	**.019**	**.00035**
		0.7040	GGG40	ASTM60-40-18												
		0.7060	GGG60	ASTM80-60-03												
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	45	0.24	0.007	59	0.31	0.010	74	0.39	0.014	89	0.47	0.017
		3.4365	AlZnMgCu1.5	ASTM 7075	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00055**	**292**	**.019**	**.00067**
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	45	0.24	0.007	59	0.31	0.010	74	0.39	0.014	89	0.47	0.017
		3.2381	GD-AlSi10Mg	UNS A03590	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00055**	**292**	**.019**	**.00067**
	Copper	2.004	Cu-OF / CW008A	UNS C10100	45	0.24	0.007	59	0.31	0.010	74	0.39	0.017	89	0.47	0.019
		2.0065	Cu-ETP / CW004A	UNS C11000	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00067**	**292**	**.019**	**.00075**
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	45	0.24	0.007	59	0.31	0.010	74	0.39	0.017	89	0.47	0.019
		2.036	CuZn40 CW509L	UNS C28000	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00067**	**292**	**.019**	**.00075**
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3	UNS C38500	45	0.24	0.007	59	0.31	0.010	74	0.39	0.017	89	0.47	0.019
		2.102	CuSn6	UNS C51900	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00067**	**292**	**.019**	**.00075**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	45	0.24	0.007	59	0.31	0.010	74	0.39	0.014	89	0.47	0.017
		2.096	CuAl9Mn2	UNS C63200	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00055**	**292**	**.019**	**.00067**
S_1	Super alloys	2.4856		Inconel 625	45	0.24	0.004	59	0.31	0.005	74	0.39	0.005	89	0.47	0.006
		2.4668		Inconel 718	**148**	**.009**	**.00016**	**194**	**.012**	**.00020**	**243**	**.015**	**.00020**	**292**	**.019**	**.00024**
		2.4617	NiMo28	Hastelloy B-2												
		2.4665	NiCr22Fe18Mo	Hastelloy X												
S_2	Titanium pure	3.7035	Gr.2	ASTM B348	45	0.24	0.005	59	0.31	0.005	74	0.39	0.010	100	0.47	0.011
		3.7065	Gr.4	ASTM B348	**148**	**.009**	**.00020**	**194**	**.012**	**.00020**	**243**	**.015**	**.00039**	**328**	**.019**	**.00043**
	Titanium alloys	3.7165	TiAl6V4	ASTM B348	45	0.24	0.005	59	0.31	0.005	74	0.39	0.010	89	0.47	0.011
		9.9367	TiAl6Nb7	ASTM F1295	**148**	**.009**	**.00020**	**194**	**.012**	**.00020**	**243**	**.015**	**.00039**	**292**	**.019**	**.00043**
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	45	0.24	0.004	59	0.31	0.004	74	0.39	0.006	89	0.47	0.006
			CrCoMo28	ASTM F1537	**148**	**.009**	**.00016**	**194**	**.012**	**.00016**	**243**	**.015**	**.00024**	**292**	**.019**	**.00024**
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	45	0.24	0.005	59	0.31	0.007	74	0.39	0.008	80	0.47	0.010
					148	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00031**	**262**	**.019**	**.00039**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2												

v_c [SFM] | [m/min]
f_z [IPT] | [mm]
d_{eff} [inch] | [mm]

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1

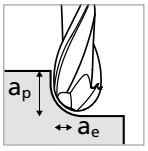
1/32"			1/16"									3/32"			1/8"			5/32"			3/16–7/32–1/4"					
0.8mm|.032"			1.0mm|.039"			1.2mm|.047"			1.5|.059"			1.8mm|.071"			2.0mm|.079"			2.5mm|.098"			3.0mm|.118"			4.0mm|.158"			6.0mm|.236"			8.0mm|.315"		
v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z
100	0.63	0.017	140	0.79	0.018	140	0.94	0.020	200	1.18	0.029	200	1.42	0.031	220	1.57	0.041	220	1.97	0.043	240	2.36	0.058	260	3.15	0.060	260	4.72	0.060	260	6.29	0.060
328	**.025**	**.00067**	**459**	**.031**	**.00071**	**459**	**.037**	**.00079**	**656**	**.046**	**.00114**	**656**	**.056**	**.00122**	**722**	**.062**	**.00161**	**722**	**.077**	**.00169**	**787**	**.093**	**.00228**	**853**	**.124**	**.00236**	**853**	**.186**	**.00236**	**853**	**.248**	**.00236**
100	0.63	0.014	140	0.79	0.017	140	0.94	0.019	200	1.18	0.026	200	1.42	0.029	220	1.57	0.038	220	1.97	0.041	240	2.36	0.055	260	3.15	0.058	260	4.72	0.058	260	6.29	0.058
328	**.025**	**.00055**	**459**	**.031**	**.00067**	**459**	**.037**	**.00075**	**656**	**.046**	**.00102**	**656**	**.056**	**.00114**	**722**	**.062**	**.00150**	**722**	**.077**	**.00161**	**787**	**.093**	**.00217**	**853**	**.124**	**.00228**	**853**	**.186**	**.00228**	**853**	**.248**	**.00228**
100	0.63	0.013	140	0.79	0.013	140	0.94	0.016	200	1.18	0.024	200	1.42	0.026	220	1.57	0.036	220	1.97	0.038	240	2.36	0.050	260	3.15	0.053	260	4.72	0.053	260	6.29	0.053
328	**.025**	**.00051**	**459**	**.031**	**.00051**	**459**	**.037**	**.00063**	**656**	**.046**	**.00094**	**656**	**.056**	**.00102**	**722**	**.062**	**.00142**	**722**	**.077**	**.00150**	**787**	**.093**	**.00197**	**853**	**.124**	**.00209**	**853**	**.186**	**.00209**	**853**	**.248**	**.00209**
100	0.63	0.017	140	0.79	0.019	140	0.94	0.022	200	1.18	0.029	200	1.42	0.031	220	1.57	0.041	220	1.97	0.043	240	2.36	0.055	260	3.15	0.058	260	4.72	0.058	260	6.29	0.058
328	**.025**	**.00067**	**459**	**.031**	**.00075**	**459**	**.037**	**.00087**	**656**	**.046**	**.00114**	**656**	**.056**	**.00122**	**722**	**.062**	**.00161**	**722**	**.077**	**.00169**	**787**	**.093**	**.00217**	**853**	**.124**	**.00228**	**853**	**.186**	**.00228**	**853**	**.248**	**.00228**
100	0.63	0.014	140	0.79	0.018	140	0.94	0.020	200	1.18	0.026	200	1.42	0.029	220	1.57	0.038	220	1.97	0.041	240	2.36	0.053	260	3.15	0.055	260	4.72	0.055	260	6.29	0.055
328	**.025**	**.00055**	**459**	**.031**	**.00071**	**459**	**.037**	**.00079**	**656**	**.046**	**.00102**	**656**	**.056**	**.00114**	**722**	**.062**	**.00150**	**722**	**.077**	**.00161**	**787**	**.093**	**.00209**	**853**	**.124**	**.00217**	**853**	**.186**	**.00217**	**853**	**.248**	**.00217**
100	0.63	0.014	140	0.79	0.018	140	0.94	0.020	200	1.18	0.026	200	1.42	0.029	220	1.57	0.038	220	1.97	0.041	240	2.36	0.053	260	3.15	0.055	260	4.72	0.055	260	6.29	0.055
328	**.025**	**.00055**	**459**	**.031**	**.00071**	**459**	**.037**	**.00079**	**656**	**.046**	**.00102**	**656**	**.056**	**.00114**	**722**	**.062**	**.00150**	**722**	**.077**	**.00161**	**787**	**.093**	**.00209**	**853**	**.124**	**.00217**	**853**	**.186**	**.00217**	**853**	**.248**	**.00217**
100	0.63	0.013	140	0.79	0.014	140	0.94	0.017	200	1.18	0.019	200	1.42	0.022	220	1.57	0.036	220	1.97	0.038	240	2.36	0.050	260	3.15	0.053	260	4.72	0.053	260	6.29	0.053
328	**.025**	**.00051**	**459**	**.031**	**.00055**	**459**	**.037**	**.00067**	**656**	**.046**	**.00075**	**656**	**.056**	**.00087**	**722**	**.062**	**.00142**	**722**	**.077**	**.00150**	**787**	**.093**	**.00197**	**853**	**.124**	**.00209**	**853**	**.186**	**.00209**	**853**	**.248**	**.00209**
100	0.63	0.011	120	0.79	0.013	120	0.94	0.026	140	1.18	0.029	140	1.42	0.031	160	1.57	0.034	160	1.97	0.043	180	2.36	0.053	200	3.15	0.066	200	4.72	0.066	200	6.29	0.066
328	**.025**	**.00043**	**394**	**.031**	**.00051**	**394**	**.037**	**.00102**	**459**	**.046**	**.00114**	**459**	**.056**	**.00122**	**525**	**.062**	**.00134**	**525**	**.077**	**.00169**	**591**	**.093**	**.00209**	**656**	**.124**	**.00260**	**656**	**.186**	**.00260**	**656**	**.248**	**.00260**
100	0.63	0.019	140	0.79	0.022	140	0.94	0.024	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00075**	**459**	**.031**	**.00087**	**459**	**.037**	**.00094**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.019	140	0.79	0.022	140	0.94	0.024	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00075**	**459**	**.031**	**.00087**	**459**	**.037**	**.00094**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.022	140	0.79	0.024	140	0.94	0.026	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00087**	**459**	**.031**	**.00094**	**459**	**.037**	**.00102**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.022	140	0.79	0.024	140	0.94	0.026	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00087**	**459**	**.031**	**.00094**	**459**	**.037**	**.00102**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.022	140	0.79	0.024	140	0.94	0.026	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00087**	**459**	**.031**	**.00094**	**459**	**.037**	**.00102**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.019	140	0.79	0.022	140	0.94	0.024	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00075**	**459**	**.031**	**.00087**	**459**	**.037**	**.00094**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.007	120	0.79	0.008	120	0.94	0.010	130	1.18	0.011	130	1.42	0.012	140	1.57	0.012	140	1.97	0.014	150	2.36	0.018	170	3.15	0.024	170	4.72	0.024	170	6.29	0.024
328	**.025**	**.00028**	**394**	**.031**	**.00031**	**394**	**.037**	**.00039**	**427**	**.046**	**.00043**	**427**	**.056**	**.00047**	**459**	**.062**	**.00047**	**459**	**.077**	**.00055**	**492**	**.093**	**.00071**	**558**	**.124**	**.00094**	**558**	**.186**	**.00094**	**558**	**.248**	**.00094**
100	0.63	0.013	120	0.79	0.019	120	0.94	0.022	130	1.18	0.024	130	1.42	0.026	140	1.57	0.034	140	1.97	0.036	150	2.36	0.050	170	3.15	0.053	170	4.72	0.053	170	6.29	0.053
328	**.025**	**.00051**	**394**	**.031**	**.00075**	**394**	**.037**	**.00087**	**427**	**.046**	**.00094**	**427**	**.056**	**.00102**	**459**	**.062**	**.00134**	**459**	**.077**	**.00142**	**492**	**.093**	**.00197**	**558**	**.124**	**.00209**	**558**	**.186**	**.00209**	**558**	**.248**	**.00209**
100	0.63	0.013	120	0.79	0.019	120	0.94	0.022	130	1.18	0.024	130	1.42	0.026	140	1.57	0.034	140	1.97	0.036	150	2.36	0.050	170	3.15	0.053	170	4.72	0.053	170	6.29	0.053
328	**.025**	**.00051**	**394**	**.031**	**.00075**	**394**	**.037**	**.00087**	**427**	**.046**	**.00094**	**427**	**.056**	**.00102**	**459**	**.062**	**.00134**	**459**	**.077**	**.00142**	**492**	**.093**	**.00197**	**558**	**.124**	**.00209**	**558**	**.186**	**.00209**	**558**	**.248**	**.00209**
100	0.63	0.007	140	0.79	0.008	140	0.94	0.010	180	1.18	0.011	180	1.42	0.012	200	1.57	0.012	200	1.97	0.014	220	2.36	0.018	240	3.15	0.024	240	4.72	0.024	240	6.29	0.024
328	**.025**	**.00028**	**459**	**.031**	**.00031**	**459**	**.037**	**.00039**	**591**	**.046**	**.00043**	**591**	**.056**	**.00047**	**656**	**.062**	**.00047**	**656**	**.077**	**.00055**	**722**	**.093**	**.00071**	**787**	**.124**	**.00094**	**787**	**.186**	**.00094**	**787**	**.248**	**.00094**
80	0.63	0.011	100	0.79	0.012	100	0.94	0.014	140	1.18	0.017	140	1.42	0.022	180	1.57	0.024	180	1.97	0.031	200	2.36	0.042	240	3.15	0.048	240	4.72	0.048	240	6.29	0.048
262	**.025**	**.00043**	**328**	**.031**	**.00047**	**328**	**.037**	**.00055**	**459**	**.046**	**.00067**	**459**	**.056**	**.00087**	**591**	**.062**	**.00094**	**591**	**.077**	**.00122**	**656**	**.093**	**.00165**	**787**	**.124**	**.00189**	**787**	**.186**	**.00189**	**787**	**.248**	**.00189**

CRAZYMILL by Mikron Tool Cool

Type B - Roughing

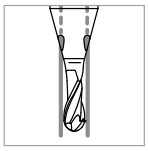
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

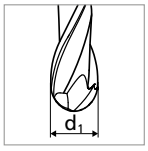
Roughing



- $a_p = 0.5 \times d_1$ ($Ød_1 \leq 0.5$ mm | **.020"**)
- $a_p = 1 \times d_1$ ($Ød_1 > 0.5$ mm | **.020"**)
- $a_e = 0.3 \times d_1$

Machining angle = 0°

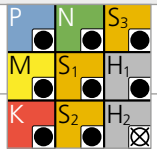




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3–0.4 mm | .012"–.016" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | **197**	0.005–0.007 **.00020–.00028**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | **197**	0.004–0.006 **.00016–.00024**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | **197**	0.004–0.006 **.00016–.00024**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | **197**	0.005–0.007 **.00020–.00028**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | **197**	0.004–0.006 **.00016–.00024**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | **197**	0.004–0.006 **.00016–.00024**
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | **197**	0.004–0.006 **.00016–.00024**
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	60 | **197**	0.003–0.005 **.00012–.00020**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	60 | **197**	0.006–0.008 **.00024–.00031**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60 | **197**	0.006–0.008 **.00024–.00031**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	60 | **197**	0.006–0.008 **.00024–.00031**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	60 | **197**	0.006–0.008 **.00024–.00031**
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	60 | **197**	0.006–0.008 **.00024–.00031**
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	60 | **197**	0.006–0.008 **.00024–.00031**
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	60 | **197**	0.003–0.004 **.00012–.00016**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	60 | **197**	0.004–0.006 **.00016–.00024**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	60 | **197**	0.004–0.006 **.00016–.00024**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 | **197**	0.003–0.004 **.00012–.00016**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | **197**	0.004–0.006 **.00016–.00024**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



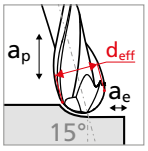
Ød1	1/32" 0.5–0.8 mm | .020"–.032"		1.0–1.2 mm | .039"–.047"		1/16" 1.5–1.8 mm | .059"–.071"		3/32" 2.0–2.5 mm | .079"–.098"		1/8" 3.0 mm | .118"		5/32–3/16–7/32–1/4" 4.0–6 mm | .158"–.236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	100 | **328**	0.010–0.014 **.00039–.00055**	140 | **459**	0.015–0.017 **.00059–.00067**	200 | **656**	0.024–0.026 **.00094–.00102**	220 | **722**	0.034–0.036 **.00134–.00142**	240 | **787**	0.046 **.00181**	280 | **919**	0.050 **.00197**	280 | **919**	0.050 **.00197**
	100 | **328**	0.009–0.012 **.00035–.00047**	140 | **459**	0.014–0.016 **.00055–.00063**	200 | **656**	0.022–0.024 **.00087–.00094**	220 | **722**	0.032–0.034 **.00126–.00134**	240 | **787**	0.044 **.00173**	280 | **919**	0.048 **.00189**	280 | **919**	0.048 **.00189**
	100 | **328**	0.008–0.011 **.00031–.00043**	140 | **459**	0.011–0.013 **.00043–.00051**	200 | **656**	0.020–0.022 **.00079–.00087**	220 | **722**	0.030–0.032 **.00118–.00126**	240 | **787**	0.040 **.00157**	280 | **919**	0.042 **.00165**	280 | **919**	0.042 **.00165**
	100 | **328**	0.010–0.014 **.00039–.00055**	140 | **459**	0.016–0.018 **.00063–.00071**	200 | **656**	0.024–0.026 **.00094–.00102**	220 | **722**	0.034–0.036 **.00134–.00142**	240 | **787**	0.044 **.00173**	280 | **919**	0.048 **.00189**	280 | **919**	0.048 **.00189**
	100 | **328**	0.009–0.012 **.00035–.00047**	140 | **459**	0.015–0.017 **.00059–.00067**	200 | **656**	0.022–0.024 **.00087–.00094**	220 | **722**	0.032–0.034 **.00126–.00134**	240 | **787**	0.044 **.00173**	280 | **919**	0.046 **.00181**	280 | **919**	0.046 **.00181**
	100 | **328**	0.009–0.012 **.00035–.00047**	140 | **459**	0.015–0.017 **.00059–.00067**	200 | **656**	0.022–0.024 **.00087–.00094**	220 | **722**	0.032–0.034 **.00126–.00134**	240 | **787**	0.044 **.00173**	280 | **919**	0.046 **.00181**	280 | **919**	0.046 **.00181**
	100 | **328**	0.008–0.011 **.00031–.00043**	140 | **459**	0.012–0.014 **.00047–.00055**	200 | **656**	0.016–0.018 **.00063–.00071**	220 | **722**	0.030–0.032 **.00118–.00126**	240 | **787**	0.040 **.00157**	280 | **919**	0.044 **.00173**	280 | **919**	0.044 **.00173**
	100 | **328**	0.006–0.009 **.00024–.00035**	120 | **394**	0.011–0.022 **.00043–.00087**	140 | **459**	0.024–0.026 **.00094–.00102**	160 | **525**	0.028–0.036 **.00110–.00142**	180 | **591**	0.040–0.047 **.00157–.00185**	200 | **656**	0.050–0.054 **.00197–.00213**	200 | **656**	0.050–0.054 **.00197–.00213**
	100 | **328**	0.012–0.016 **.00047–.00063**	140 | **459**	0.018–0.020 **.00071–.00079**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.012–0.016 **.00047–.00063**	140 | **459**	0.018–0.020 **.00071–.00079**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014–0.018 **.00055–.00071**	140 | **459**	0.020–0.022 **.00079–.00087**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014–0.018 **.00055–.00071**	140 | **459**	0.020–0.022 **.00079–.00087**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.014–0.018 **.00055–.00071**	140 | **459**	0.020–0.022 **.00079–.00087**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.012–0.016 **.00047–.00063**	140 | **459**	0.018–0.020 **.00071–.00079**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.060 **.00236**	280 | **919**	0.060 **.00236**
	100 | **328**	0.004–0.006 **.00016–.00024**	120 | **394**	0.007–0.008 **.00028–.00031**	130 | **427**	0.009–0.010 **.00035–.00039**	140 | **459**	0.010–0.012 **.00039–.00047**	150 | **492**	0.015 **.00059**	170 | **558**	0.020 **.00079**	170 | **558**	0.020 **.00079**
	100 | **328**	0.008–0.011 **.00031–.00043**	120 | **394**	0.016–0.018 **.00063–.00071**	130 | **427**	0.020–0.022 **.00079–.00087**	140 | **459**	0.028–0.030 **.00110–.00118**	150 | **492**	0.040 **.00157**	170 | **558**	0.044 **.00173**	170 | **558**	0.044 **.00173**
	100 | **328**	0.008–0.011 **.00031–.00043**	120 | **394**	0.016–0.018 **.00063–.00071**	130 | **427**	0.020–0.022 **.00079–.00087**	140 | **459**	0.028–0.030 **.00110–.00118**	150 | **492**	0.040 **.00157**	170 | **558**	0.044 **.00173**	170 | **558**	0.044 **.00173**
	100 | **328**	0.004–0.006 **.00016–.00024**	140 | **459**	0.007–0.008 **.00028–.00031**	180 | **591**	0.009–0.010 **.00035–.00039**	200 | **656**	0.010–0.012 **.00039–.00047**	220 | **722**	0.015 **.00059**	240 | **787**	0.020 **.00079**	240 | **787**	0.020 **.00079**
	80 | **262**	0.007–0.009 **.00028–.00035**	100 | **328**	0.010–0.012 **.00039–.00047**	140 | **459**	0.014–0.018 **.00055–.00071**	180 | **591**	0.020–0.026 **.00079–.00102**	200 | **656**	0.033 **.00130**	240 | **787**	0.040 **.00157**	240 | **787**	0.040 **.00157**

CRAZYMILL by Mikron Tool Cool

Type B - Semi-finishing

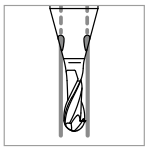
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

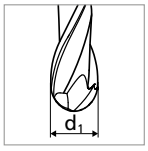
Semi-finishing



- $a_p = 0.25 \times d_1$ ($Ød_1 \leq 0.5$ mm **| .020"**)
- $a_p = 0.5 \times d_1$ ($Ød_1 > 0.5$ mm **| .020"**)
- $a_e = 0.1 \times d_1$

Machining angle = 15°





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3 mm | .012" v_c	d_{eff}	f_z	0.4 mm | .016" v_c	d_{eff}	f_z	0.5 mm | .020" v_c	d_{eff}	f_z	0.6 mm | .024" v_c	d_{eff}	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	55	0.29	0.005	73	0.39	0.007	92	0.48	0.010	100	0.60	0.012
		1.0401	C15	AISI 1015	**180**	**.011**	**.00020**	**240**	**.015**	**.00028**	**302**	**.019**	**.00039**	**328**	**.024**	**.00047**
		1.1191	C45E/CK45	AISI 1045												
		1.0044	S275JR	AISI 1020												
		1.0715	11SMn30	AISI 1215												
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415	55	0.29	0.004	73	0.39	0.006	92	0.48	0.009	100	0.60	0.011
		1.7131	16MnCr5	AISI 5115	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00035**	**328**	**.024**	**.00043**
		1.3505	100Cr6	AISI 52100												
		1.7225	42CrMo4	AISI 4140												
		1.2842	90MnCrV8	AISI O2												
	High alloyed tool steel Rm<1200N/mm²	1.2379	X153CrMoV12	AISI D2	55	0.29	**0.004**	73	0.39	0.006	92	0.48	0.008	100	0.60	0.009
		1.2436	X210CrW12	AISI D4/D6	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00031**	**328**	**.024**	**.00035**
		1.3343	HS6-5-2C	AISI M2												
		1.3355	HS18-0-1	AISI T1												
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430	55	0.29	0.005	73	0.39	0.007	92	0.48	0.010	100	0.60	0.012
		1.4105	X6CrMoS17	AISI 430F	**180**	**.011**	**.00020**	**240**	**.015**	**.00028**	**302**	**.019**	**.00039**	**328**	**.024**	**.00047**
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	55	0.29	0.004	73	0.39	0.006	92	0.48	0.009	100	0.60	0.010
		1.4112	X90CrMoV18	AISI 440B	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00035**	**328**	**.024**	**.00039**
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630	55	0.29	0.004	73	0.39	0.006	92	0.48	0.009	100	0.60	0.010
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00035**	**328**	**.024**	**.00039**
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	55	0.29	0.004	73	0.39	0.006	92	0.48	0.008	100	0.60	0.010
		1.4435	X2CrNiMo 18-14-3	AISI 316L	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00031**	**328**	**.024**	**.00039**
		1.4441	X2CrNiMo 18-15-3	AISI 316LM												
		1.4539	X1NiCrMoCu25-20-5	AISI 904L												
K	Cast iron	0.6020	GG20	ASTM 30	55	0.29	0.003	73	0.39	0.005	92	0.48	0.006	100	0.60	0.008
		0.6030	GG30	ASTM 40B	**180**	**.011**	**.00012**	**240**	**.015**	**.00020**	**302**	**.019**	**.00024**	**328**	**.024**	**.00030**
		0.7040	GGG40	ASTM60-40-18												
		0.7060	GGG60	ASTM80-60-03												
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	55	0.29	0.006	73	0.39	0.008	92	0.48	0.012	100	0.60	0.014
		3.4365	AlZnMgCu1.5	ASTM 7075	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00047**	**328**	**.024**	**.00055**
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	55	0.29	0.006	73	0.39	0.008	92	0.48	0.012	100	0.60	0.014
		3.2381	GD-AlSi10Mg	UNS A03590	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00047**	**328**	**.024**	**.00055**
	Copper	2.004	Cu-OF / CW008A	UNS C10100	55	0.29	0.006	73	0.39	0.008	92	0.48	0.014	100	0.60	0.016
		2.0065	Cu-ETP / CW004A	UNS C11000	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00055**	**328**	**.024**	**.00063**
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	55	0.29	0.006	73	0.39	0.008	92	0.48	0.014	100	0.60	0.016
		2.036	CuZn40 CW509L	UNS C28000	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00055**	**328**	**.024**	**.00063**
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3	UNS C38500	55	0.29	0.006	73	0.39	0.008	92	0.48	0.014	100	0.60	0.016
		2.102	CuSn6	UNS C51900	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00055**	**328**	**.024**	**.00063**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	55	0.29	0.006	73	0.39	0.008	92	0.48	0.012	100	0.60	0.014
		2.096	CuAl9Mn2	UNS C63200	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00047**	**328**	**.024**	**.00055**
S_1	Super alloys	2.4856		Inconel 625	55	0.29	0.003	73	0.39	0.004	92	0.48	0.004	100	0.60	0.005
		2.4668		Inconel 718	**180**	**.011**	**.00012**	**240**	**.015**	**.00016**	**302**	**.019**	**.00016**	**328**	**.024**	**.00020**
		2.4617	NiMo28	Hastelloy B-2												
		2.4665	NiCr22Fe18Mo	Hastelloy X												
S_2	Titanium pure	3.7035	Gr.2	ASTM B348	55	0.29	0.004	73	0.39	0.004	92	0.48	0.008	100	0.60	0.009
		3.7065	Gr.4	ASTM B348	**180**	**.011**	**.00016**	**240**	**.015**	**.00016**	**302**	**.019**	**.00031**	**328**	**.024**	**.00035**
	Titanium alloys	3.7165	TiAl6V4	ASTM B348	55	0.29	0.004	73	0.39	0.004	92	0.48	0.008	100	0.60	0.009
		9.9367	TiAl6Nb7	ASTM F1295	**180**	**.011**	**.00016**	**240**	**.015**	**.00016**	**302**	**.019**	**.00031**	**328**	**.024**	**.00035**
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	55	0.29	0.003	73	0.39	0.003	92	0.48	0.005	100	0.60	0.005
			CrCoMo28	ASTM F1537	**180**	**.011**	**.00012**	**240**	**.015**	**.00012**	**302**	**.019**	**.00020**	**328**	**.024**	**.00020**
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	55	0.29	0.004	73	0.39	0.006	92	0.48	0.007	80	0.60	0.008
					180	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00028**	**262**	**.024**	**.00031**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2												

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**
d_{eff} [mm] | **[inch]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

P	N	S3
●	●	●
M	**S1**	**H1**
●	●	●
K	**S2**	**H2**
●	●	⊠

07

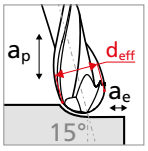
Ød1																																
1/32" 0.8 mm | **.032"**			1.0 mm | **.039"**			1.2 mm | **.047"**			**1/16"** 1.5 | **.059"**			1.8 mm | **.071"**			2.0 mm | **.079"**			**3/32"** 2.5 mm | **.098"**			**1/8"** 3.0 mm | **.118"**			**5/32"** 4.0 mm | **.158"**			**3/16–7/32–1/4"** 6.0 mm | **.236"**			8.0 mm | **.315"**		
v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z
100 **328**	0.80 **.032**	0.014 **.00055**	140 **459**	1.00 **.039**	0.015 **.00059**	140 **459**	1.20 **.047**	0.017 **.00067**	200 **656**	1.50 **.059**	0.024 **.00094**	200 **656**	1.80 **.071**	0.026 **.00102**	220 **722**	2.00 **.079**	0.034 **.00134**	220 **722**	2.50 **.098**	0.036 **.00142**	240 **787**	3.00 **.118**	0.046 **.00181**	260 **853**	4.00 **.158**	0.050 **.00197**	260 **853**	6.00 **.236**	0.050 **.00197**	260 **853**	8.00 **.315**	0.050 **.00197**
100 **328**	0.80 **.032**	0.012 **.00047**	140 **459**	1.00 **.039**	0.014 **.00055**	140 **459**	1.20 **.047**	0.016 **.00063**	200 **656**	1.50 **.059**	0.022 **.00087**	200 **656**	1.80 **.071**	0.024 **.00094**	220 **722**	2.00 **.079**	0.032 **.00126**	220 **722**	2.50 **.098**	0.034 **.00134**	240 **787**	3.00 **.118**	0.044 **.00173**	260 **853**	4.00 **.158**	0.048 **.00189**	260 **853**	6.00 **.236**	0.048 **.00189**	260 **853**	8.00 **.315**	0.048 **.00189**
100 **328**	0.80 **.032**	0.011 **.00043**	140 **459**	1.00 **.039**	0.011 **.00043**	140 **459**	1.20 **.047**	0.013 **.00051**	200 **656**	1.50 **.059**	0.020 **.00079**	200 **656**	1.80 **.071**	0.022 **.00087**	220 **722**	2.00 **.079**	0.030 **.00118**	220 **722**	2.50 **.098**	0.032 **.00126**	240 **787**	3.00 **.118**	0.040 **.00157**	260 **853**	4.00 **.158**	0.042 **.00165**	260 **853**	6.00 **.236**	0.042 **.00165**	260 **853**	8.00 **.315**	0.042 **.00165**
100 **328**	0.80 **.032**	0.014 **.00055**	140 **459**	1.00 **.039**	0.016 **.00063**	140 **459**	1.20 **.047**	0.018 **.00071**	200 **656**	1.50 **.059**	0.024 **.00094**	200 **656**	1.80 **.071**	0.026 **.00102**	220 **722**	2.00 **.079**	0.034 **.00134**	220 **722**	2.50 **.098**	0.036 **.00142**	240 **787**	3.00 **.118**	0.044 **.00173**	260 **853**	4.00 **.158**	0.048 **.00189**	260 **853**	6.00 **.236**	0.048 **.00189**	260 **853**	8.00 **.315**	0.048 **.00189**
100 **328**	0.80 **.032**	0.012 **.00047**	140 **459**	1.00 **.039**	0.015 **.00059**	140 **459**	1.20 **.047**	0.017 **.00067**	200 **656**	1.50 **.059**	0.022 **.00087**	200 **656**	1.80 **.071**	0.024 **.00094**	220 **722**	2.00 **.079**	0.032 **.00126**	220 **722**	2.50 **.098**	0.034 **.00134**	240 **787**	3.00 **.118**	0.044 **.00173**	260 **853**	4.00 **.158**	0.046 **.00181**	260 **853**	6.00 **.236**	0.046 **.00181**	260 **853**	8.00 **.315**	0.046 **.00181**
100 **328**	0.80 **.032**	0.012 **.00047**	140 **459**	1.00 **.039**	0.015 **.00059**	140 **459**	1.20 **.047**	0.017 **.00067**	200 **656**	1.50 **.059**	0.022 **.00087**	200 **656**	1.80 **.071**	0.024 **.00094**	220 **722**	2.00 **.079**	0.032 **.00126**	220 **722**	2.50 **.098**	0.034 **.00134**	240 **787**	3.00 **.118**	0.044 **.00173**	260 **853**	4.00 **.158**	0.046 **.00181**	260 **853**	6.00 **.236**	0.046 **.00181**	260 **853**	8.00 **.315**	0.046 **.00181**
100 **328**	0.80 **.032**	0.011 **.00043**	140 **459**	1.00 **.039**	0.012 **.00047**	140 **459**	1.20 **.047**	0.014 **.00055**	200 **656**	1.50 **.059**	0.016 **.00063**	200 **656**	1.80 **.071**	0.018 **.00071**	220 **722**	2.00 **.079**	0.030 **.00118**	220 **722**	2.50 **.098**	0.032 **.00126**	240 **787**	3.00 **.118**	0.040 **.00157**	260 **853**	4.00 **.158**	0.044 **.00173**	260 **853**	6.00 **.236**	0.044 **.00173**	260 **853**	8.00 **.315**	0.044 **.00173**
100 **328**	0.80 **.032**	0.009 **.00035**	120 **394**	1.00 **.039**	0.011 **.00043**	120 **394**	1.20 **.047**	0.022 **.00087**	140 **459**	1.50 **.059**	0.024 **.00094**	140 **459**	1.80 **.071**	0.026 **.00102**	160 **525**	2.00 **.079**	0.028 **.00110**	160 **525**	2.50 **.098**	0.036 **.00142**	180 **591**	3.00 **.118**	0.043 **.00169**	200 **656**	4.00 **.158**	0.050 **.00197**	200 **656**	6.00 **.236**	0.052 **.00205**	200 **656**	8.00 **.315**	0.052 **.00205**
100 **328**	0.80 **.032**	0.016 **.00063**	140 **459**	1.00 **.039**	0.018 **.00071**	140 **459**	1.20 **.047**	0.020 **.00079**	200 **656**	1.50 **.059**	0.026 **.00102**	200 **656**	1.80 **.071**	0.028 **.00110**	220 **722**	2.00 **.079**	0.036 **.00142**	220 **722**	2.50 **.098**	0.040 **.00157**	240 **787**	3.00 **.118**	0.058 **.00228**	260 **853**	4.00 **.158**	0.060 **.00236**	260 **853**	6.00 **.236**	0.060 **.00236**	260 **853**	8.00 **.315**	0.060 **.00236**
100 **328**	0.80 **.032**	0.016 **.00063**	140 **459**	1.00 **.039**	0.018 **.00071**	140 **459**	1.20 **.047**	0.020 **.00079**	200 **656**	1.50 **.059**	0.026 **.00102**	200 **656**	1.80 **.071**	0.028 **.00110**	220 **722**	2.00 **.079**	0.036 **.00142**	220 **722**	2.50 **.098**	0.040 **.00157**	240 **787**	3.00 **.118**	0.058 **.00228**	260 **853**	4.00 **.158**	0.060 **.00236**	260 **853**	6.00 **.236**	0.060 **.00236**	260 **853**	8.00 **.315**	0.060 **.00236**
100 **328**	0.80 **.032**	0.018 **.00071**	140 **459**	1.00 **.039**	0.020 **.00079**	140 **459**	1.20 **.047**	0.022 **.00087**	200 **656**	1.50 **.059**	0.026 **.00102**	200 **656**	1.80 **.071**	0.028 **.00110**	220 **722**	2.00 **.079**	0.036 **.00142**	220 **722**	2.50 **.098**	0.040 **.00157**	240 **787**	3.00 **.118**	0.058 **.00228**	260 **853**	4.00 **.158**	0.060 **.00236**	260 **853**	6.00 **.236**	0.060 **.00236**	260 **853**	8.00 **.315**	0.060 **.00236**
100 **328**	0.80 **.032**	0.018 **.00071**	140 **459**	1.00 **.039**	0.020 **.00079**	140 **459**	1.20 **.047**	0.022 **.00087**	200 **656**	1.50 **.059**	0.026 **.00102**	200 **656**	1.80 **.071**	0.028 **.00110**	220 **722**	2.00 **.079**	0.036 **.00142**	220 **722**	2.50 **.098**	0.040 **.00157**	240 **787**	3.00 **.118**	0.058 **.00228**	260 **853**	4.00 **.158**	0.060 **.00236**	260 **853**	6.00 **.236**	0.060 **.00236**	260 **853**	8.00 **.315**	0.060 **.00236**
100 **328**	0.80 **.032**	0.018 **.00071**	140 **459**	1.00 **.039**	0.020 **.00079**	140 **459**	1.20 **.047**	0.022 **.00087**	200 **656**	1.50 **.059**	0.026 **.00102**	200 **656**	1.80 **.071**	0.028 **.00110**	220 **722**	2.00 **.079**	0.036 **.00142**	220 **722**	2.50 **.098**	0.040 **.00157**	240 **787**	3.00 **.118**	0.058 **.00228**	260 **853**	4.00 **.158**	0.060 **.00236**	260 **853**	6.00 **.236**	0.060 **.00236**	260 **853**	8.00 **.315**	0.060 **.00236**
100 **328**	0.80 **.032**	0.016 **.00063**	140 **459**	1.00 **.039**	0.018 **.00071**	140 **459**	1.20 **.047**	0.020 **.00079**	200 **656**	1.50 **.059**	0.026 **.00102**	200 **656**	1.80 **.071**	0.028 **.00110**	220 **722**	2.00 **.079**	0.036 **.00142**	220 **722**	2.50 **.098**	0.040 **.00157**	240 **787**	3.00 **.118**	0.058 **.00228**	260 **853**	4.00 **.158**	0.060 **.00236**	260 **853**	6.00 **.236**	0.060 **.00236**	260 **853**	8.00 **.315**	0.060 **.00236**
100 **328**	0.80 **.032**	0.006 **.00024**	120 **394**	1.00 **.039**	0.007 **.00028**	120 **394**	1.20 **.047**	0.008 **.00031**	130 **427**	1.50 **.059**	0.009 **.00035**	130 **427**	1.80 **.071**	0.010 **.00039**	140 **459**	2.00 **.079**	0.010 **.00039**	140 **459**	2.50 **.098**	0.012 **.00047**	150 **492**	3.00 **.118**	0.015 **.00059**	170 **558**	4.00 **.158**	0.020 **.00079**	170 **558**	6.00 **.236**	0.020 **.00079**	170 **558**	8.00 **.315**	0.020 **.00079**
100 **328**	0.80 **.032**	0.011 **.00043**	120 **394**	1.00 **.039**	0.016 **.00063**	120 **394**	1.20 **.047**	0.018 **.00071**	130 **427**	1.50 **.059**	0.020 **.00079**	130 **427**	1.80 **.071**	0.022 **.00087**	140 **459**	2.00 **.079**	0.028 **.00110**	140 **459**	2.50 **.098**	0.030 **.00118**	150 **492**	3.00 **.118**	0.040 **.00157**	170 **558**	4.00 **.158**	0.044 **.00173**	170 **558**	6.00 **.236**	0.044 **.00173**	170 **558**	8.00 **.315**	0.044 **.00173**
100 **328**	0.80 **.032**	0.011 **.00043**	120 **394**	1.00 **.039**	0.016 **.00063**	120 **394**	1.20 **.047**	0.018 **.00071**	130 **427**	1.50 **.059**	0.020 **.00079**	130 **427**	1.80 **.071**	0.022 **.00087**	140 **459**	2.00 **.079**	0.028 **.00110**	140 **459**	2.50 **.098**	0.030 **.00118**	150 **492**	3.00 **.118**	0.040 **.00157**	170 **558**	4.00 **.158**	0.044 **.00173**	170 **558**	6.00 **.236**	0.044 **.00173**	170 **558**	8.00 **.315**	0.044 **.00173**
100 **328**	0.80 **.032**	0.006 **.00024**	140 **459**	1.00 **.039**	0.007 **.00028**	140 **459**	1.20 **.047**	0.008 **.00031**	180 **591**	1.50 **.059**	0.009 **.00035**	180 **591**	1.80 **.071**	0.010 **.00039**	200 **656**	2.00 **.079**	0.010 **.00039**	200 **656**	2.50 **.098**	0.012 **.00047**	220 **722**	3.00 **.118**	0.015 **.00059**	240 **787**	4.00 **.158**	0.020 **.00079**	240 **787**	6.00 **.236**	0.020 **.00079**	240 **787**	8.00 **.315**	0.020 **.00079**
80 **262**	0.80 **.032**	0.009 **.00035**	100 **328**	1.00 **.039**	0.010 **.00039**	100 **328**	1.20 **.047**	0.012 **.00047**	140 **459**	1.50 **.059**	0.014 **.00055**	140 **459**	1.80 **.071**	0.018 **.00071**	180 **591**	2.00 **.079**	0.020 **.00079**	180 **591**	2.50 **.098**	0.026 **.00102**	200 **656**	3.00 **.118**	0.033 **.00130**	240 **787**	4.00 **.158**	0.040 **.00157**	240 **787**	6.00 **.236**	0.040 **.00157**	240 **787**	8.00 **.315**	0.040 **.00157**

CRAZYMILL by Mikron Tool Cool

Type B - Finishing

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

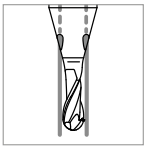
Finishing

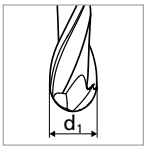


- $a_p = 0.1 \times d_1$
- $a_e = 0.05 \times d_1$

Machining angle = 15°

n_{max} = 60'000 rpm

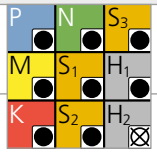




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3 mm | .012" v_c	d_{eff}	f_z	0.4 mm | .016" v_c	d_{eff}	f_z	0.5 mm | .020" v_c	d_{eff}	f_z	0.6 mm | .024" v_c	d_{eff}	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	45	0.24	0.006	59	0.31	0.008	74	0.39	0.012	89	0.47	0.014
		1.0401	C15	AISI 1015	**148**	**.009**	**.00024**	**194**	**.012**	**.00031**	**243**	**.015**	**.00047**	**292**	**.019**	**.00055**
		1.1191	C45E/CK45	AISI 1045												
		1.0044	S275JR	AISI 1020												
		1.0715	11SMn30	AISI 1215												
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415	45	0.24	0.005	59	0.31	0.007	74	0.39	0.011	89	0.47	0.013
		1.7131	16MnCr5	AISI 5115	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00043**	**292**	**.019**	**.00051**
		1.3505	100Cr6	AISI 52100												
		1.7225	42CrMo4	AISI 4140												
		1.2842	90MnCrV8	AISI O2												
	High alloyed tool steel Rm<1200N/mm²	1.2379	X153CrMoV12	AISI D2	45	0.24	0.005	59	0.31	0.007	74	0.39	0.010	89	0.47	0.011
		1.2436	X210CrW12	AISI D4/D6	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00039**	**292**	**.019**	**.00043**
		1.3343	HS6-5-2C	AISI M2												
		1.3355	HS18-0-1	AISI T1												
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430	45	0.24	0.006	59	0.31	0.008	74	0.39	0.012	89	0.47	0.014
		1.4105	X6CrMoS17	AISI 430F	**148**	**.009**	**.00024**	**194**	**.012**	**.00031**	**243**	**.015**	**.00047**	**292**	**.019**	**.00055**
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	45	0.24	0.005	59	0.31	0.007	74	0.39	0.011	89	0.47	0.012
		1.4112	X90CrMoV18	AISI 440B	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00043**	**292**	**.019**	**.00047**
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630	45	0.24	0.005	59	0.31	0.007	74	0.39	0.011	89	0.47	0.012
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00043**	**292**	**.019**	**.00047**
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	45	0.24	0.005	59	0.31	0.007	74	0.39	0.010	89	0.47	0.012
		1.4435	X2CrNiMo 18-14-3	AISI 316L	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00039**	**292**	**.019**	**.00047**
		1.4441	X2CrNiMo 18-15-3	AISI 316LM												
		1.4539	X1NiCrMoCu25-20-5	AISI 904L												
K	Cast iron	0.6020	GG20	ASTM 30	45	0.24	0.004	59	0.31	0.006	74	0.39	0.007	89	0.47	0.009
		0.6030	GG30	ASTM 40B	**148**	**.009**	**.00016**	**194**	**.012**	**.00024**	**243**	**.015**	**.00028**	**292**	**.019**	**.00035**
		0.7040	GGG40	ASTM60-40-18												
		0.7060	GGG60	ASTM80-60-03												
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	45	0.24	0.007	59	0.31	0.010	74	0.39	0.014	89	0.47	0.017
		3.4365	AlZnMgCu1.5	ASTM 7075	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00055**	**292**	**.019**	**.00067**
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	45	0.24	0.007	59	0.31	0.010	74	0.39	0.014	89	0.47	0.017
		3.2381	GD-AlSi10Mg	UNS A03590	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00055**	**292**	**.019**	**.00067**
	Copper	2.004	Cu-OF / CW008A	UNS C10100	45	0.24	0.007	59	0.31	0.010	74	0.39	0.017	89	0.47	0.019
		2.0065	Cu-ETP / CW004A	UNS C11000	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00067**	**292**	**.019**	**.00075**
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	45	0.24	0.007	59	0.31	0.010	74	0.39	0.017	89	0.47	0.019
		2.036	CuZn40 CW509L	UNS C28000	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00067**	**292**	**.019**	**.00075**
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3	UNS C38500	45	0.24	0.007	59	0.31	0.010	74	0.39	0.017	89	0.47	0.019
		2.102	CuSn6	UNS C51900	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00067**	**292**	**.019**	**.00075**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	45	0.24	0.007	59	0.31	0.010	74	0.39	0.014	89	0.47	0.017
		2.096	CuAl9Mn2	UNS C63200	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00055**	**292**	**.019**	**.00067**
S_1	Super alloys	2.4856		Inconel 625	45	0.24	0.004	59	0.31	0.005	74	0.39	0.005	89	0.47	0.006
		2.4668		Inconel 718	**148**	**.009**	**.00016**	**194**	**.012**	**.00020**	**243**	**.015**	**.00020**	**292**	**.019**	**.00024**
		2.4617	NiMo28	Hastelloy B-2												
		2.4665	NiCr22Fe18Mo	Hastelloy X												
S_2	Titanium pure	3.7035	Gr.2	ASTM B348	45	0.24	0.005	59	0.31	0.005	74	0.39	0.010	100	0.47	0.011
		3.7065	Gr.4	ASTM B348	**148**	**.009**	**.00020**	**194**	**.012**	**.00020**	**243**	**.015**	**.00039**	**328**	**.019**	**.00043**
	Titanium alloys	3.7165	TiAl6V4	ASTM B348	45	0.24	0.005	59	0.31	0.005	74	0.39	0.010	89	0.47	0.011
		9.9367	TiAl6Nb7	ASTM F1295	**148**	**.009**	**.00020**	**194**	**.012**	**.00020**	**243**	**.015**	**.00039**	**292**	**.019**	**.00043**
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	45	0.24	0.004	59	0.31	0.004	74	0.39	0.006	89	0.47	0.006
			CrCoMo28	ASTM F1537	**148**	**.009**	**.00016**	**194**	**.012**	**.00016**	**243**	**.015**	**.00024**	**292**	**.019**	**.00024**
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	45	0.24	0.005	59	0.31	0.007	74	0.39	0.008	80	0.47	0.010
					148	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00031**	**262**	**.019**	**.00039**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2												

v_c **[SFM] |** [m/min]
f_z **[IPT] |** [mm]
d_{eff} **[inch] |** [mm]

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1

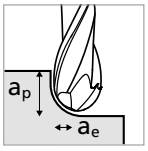
1/32"						1/16"												3/32"			1/8"			5/32"			3/16–7/32–1/4"					
0.8mm|.032"			1.0mm|.039"			1.2mm|.047"			1.5|.059"			1.8mm|.071"			2.0mm|.079"			2.5mm|.098"			3.0mm|.118"			4.0mm|.158"			6.0mm|.236"			8.0mm|.315"		
v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z
100	0.63	0.017	140	0.79	0.018	140	0.94	0.020	200	1.18	0.029	200	1.42	0.031	220	1.57	0.041	220	1.97	0.043	240	2.36	0.055	260	3.15	0.060	260	4.72	0.060	260	6.29	0.060
328	**.025**	**.00067**	**459**	**.031**	**.00071**	**459**	**.037**	**.00079**	**656**	**.046**	**.00114**	**656**	**.056**	**.00122**	**722**	**.062**	**.00161**	**722**	**.077**	**.00169**	**787**	**.093**	**.00217**	**853**	**.124**	**.00236**	**853**	**.186**	**.00236**	**853**	**.248**	**.00236**
100	0.63	0.014	140	0.79	0.017	140	0.94	0.019	200	1.18	0.026	200	1.42	0.029	220	1.57	0.038	220	1.97	0.041	240	2.36	0.053	260	3.15	0.058	260	4.72	0.058	260	6.29	0.058
328	**.025**	**.00055**	**459**	**.031**	**.00067**	**459**	**.037**	**.00075**	**656**	**.046**	**.00102**	**656**	**.056**	**.00114**	**722**	**.062**	**.00150**	**722**	**.077**	**.00161**	**787**	**.093**	**.00209**	**853**	**.124**	**.00228**	**853**	**.186**	**.00228**	**853**	**.248**	**.00228**
100	0.63	0.013	140	0.79	0.013	140	0.94	0.016	200	1.18	0.024	200	1.42	0.026	220	1.57	0.036	220	1.97	0.038	240	2.36	0.048	260	3.15	0.050	260	4.72	0.050	260	6.29	0.050
328	**.025**	**.00051**	**459**	**.031**	**.00051**	**459**	**.037**	**.00063**	**656**	**.046**	**.00094**	**656**	**.056**	**.00102**	**722**	**.062**	**.00142**	**722**	**.077**	**.00150**	**787**	**.093**	**.00189**	**853**	**.124**	**.00197**	**853**	**.186**	**.00197**	**853**	**.248**	**.00197**
100	0.63	0.017	140	0.79	0.019	140	0.94	0.022	200	1.18	0.029	200	1.42	0.031	220	1.57	0.041	220	1.97	0.043	240	2.36	0.053	260	3.15	0.058	260	4.72	0.058	260	6.29	0.058
328	**.025**	**.00067**	**459**	**.031**	**.00075**	**459**	**.037**	**.00087**	**656**	**.046**	**.00114**	**656**	**.056**	**.00122**	**722**	**.062**	**.00161**	**722**	**.077**	**.00169**	**787**	**.093**	**.00209**	**853**	**.124**	**.00228**	**853**	**.186**	**.00228**	**853**	**.248**	**.00228**
100	0.63	0.014	140	0.79	0.018	140	0.94	0.020	200	1.18	0.026	200	1.42	0.029	220	1.57	0.038	220	1.97	0.041	240	2.36	0.053	260	3.15	0.055	260	4.72	0.055	260	6.29	0.055
328	**.025**	**.00055**	**459**	**.031**	**.00071**	**459**	**.037**	**.00079**	**656**	**.046**	**.00102**	**656**	**.056**	**.00114**	**722**	**.062**	**.00150**	**722**	**.077**	**.00161**	**787**	**.093**	**.00209**	**853**	**.124**	**.00217**	**853**	**.186**	**.00217**	**853**	**.248**	**.00217**
100	0.63	0.014	140	0.79	0.018	140	0.94	0.020	200	1.18	0.026	200	1.42	0.029	220	1.57	0.038	220	1.97	0.041	240	2.36	0.053	260	3.15	0.055	260	4.72	0.055	260	6.29	0.055
328	**.025**	**.00055**	**459**	**.031**	**.00071**	**459**	**.037**	**.00079**	**656**	**.046**	**.00102**	**656**	**.056**	**.00114**	**722**	**.062**	**.00150**	**722**	**.077**	**.00161**	**787**	**.093**	**.00209**	**853**	**.124**	**.00217**	**853**	**.186**	**.00217**	**853**	**.248**	**.00217**
100	0.63	0.013	140	0.79	0.014	140	0.94	0.017	200	1.18	0.019	200	1.42	0.022	220	1.57	0.036	220	1.97	0.038	240	2.36	0.048	260	3.15	0.053	260	4.72	0.053	260	6.29	0.053
328	**.025**	**.00051**	**459**	**.031**	**.00055**	**459**	**.037**	**.00067**	**656**	**.046**	**.00075**	**656**	**.056**	**.00087**	**722**	**.062**	**.00142**	**722**	**.077**	**.00150**	**787**	**.093**	**.00189**	**853**	**.124**	**.00209**	**853**	**.186**	**.00209**	**853**	**.248**	**.00209**
100	0.63	0.011	120	0.79	0.013	120	0.94	0.026	140	1.18	0.029	140	1.42	0.031	160	1.57	0.034	160	1.97	0.043	180	2.36	0.052	200	3.15	0.060	200	4.72	0.060	200	6.29	0.060
328	**.025**	**.00043**	**394**	**.031**	**.00051**	**394**	**.037**	**.00102**	**459**	**.046**	**.00114**	**459**	**.056**	**.00122**	**525**	**.062**	**.00134**	**525**	**.077**	**.00169**	**591**	**.093**	**.00205**	**656**	**.124**	**.00236**	**656**	**.186**	**.00236**	**656**	**.248**	**.00236**
100	0.63	0.019	140	0.79	0.022	140	0.94	0.024	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00075**	**459**	**.031**	**.00087**	**459**	**.037**	**.00094**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.019	140	0.79	0.022	140	0.94	0.024	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00075**	**459**	**.031**	**.00087**	**459**	**.037**	**.00094**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.022	140	0.79	0.024	140	0.94	0.026	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00087**	**459**	**.031**	**.00094**	**459**	**.037**	**.00102**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.022	140	0.79	0.024	140	0.94	0.026	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00087**	**459**	**.031**	**.00094**	**459**	**.037**	**.00102**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.022	140	0.79	0.024	140	0.94	0.026	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00087**	**459**	**.031**	**.00094**	**459**	**.037**	**.00102**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.019	140	0.79	0.022	140	0.94	0.024	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.072	260	4.72	0.072	260	6.29	0.072
328	**.025**	**.00075**	**459**	**.031**	**.00087**	**459**	**.037**	**.00094**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00283**	**853**	**.186**	**.00283**	**853**	**.248**	**.00283**
100	0.63	0.007	120	0.79	0.008	120	0.94	0.010	130	1.18	0.011	130	1.42	0.012	140	1.57	0.012	140	1.97	0.014	150	2.36	0.018	170	3.15	0.024	170	4.72	0.024	170	6.29	0.024
328	**.025**	**.00028**	**394**	**.031**	**.00031**	**394**	**.037**	**.00039**	**427**	**.046**	**.00043**	**427**	**.056**	**.00047**	**459**	**.062**	**.00047**	**459**	**.077**	**.00055**	**492**	**.093**	**.00071**	**558**	**.124**	**.00094**	**558**	**.186**	**.00094**	**558**	**.248**	**.00094**
100	0.63	0.013	120	0.79	0.019	120	0.94	0.022	130	1.18	0.024	130	1.42	0.026	140	1.57	0.034	140	1.97	0.036	150	2.36	0.048	170	3.15	0.053	170	4.72	0.053	170	6.29	0.053
328	**.025**	**.00051**	**394**	**.031**	**.00075**	**394**	**.037**	**.00087**	**427**	**.046**	**.00094**	**427**	**.056**	**.00102**	**459**	**.062**	**.00134**	**459**	**.077**	**.00142**	**492**	**.093**	**.00189**	**558**	**.124**	**.00209**	**558**	**.186**	**.00209**	**558**	**.248**	**.00209**
100	0.63	0.013	120	0.79	0.019	120	0.94	0.022	130	1.18	0.024	130	1.42	0.026	140	1.57	0.034	140	1.97	0.036	150	2.36	0.048	170	3.15	0.053	170	4.72	0.053	170	6.29	0.053
328	**.025**	**.00051**	**394**	**.031**	**.00075**	**394**	**.037**	**.00087**	**427**	**.046**	**.00094**	**427**	**.056**	**.00102**	**459**	**.062**	**.00134**	**459**	**.077**	**.00142**	**492**	**.093**	**.00189**	**558**	**.124**	**.00209**	**558**	**.186**	**.00209**	**558**	**.248**	**.00209**
100	0.63	0.007	140	0.79	0.008	140	0.94	0.010	180	1.18	0.011	180	1.42	0.012	200	1.57	0.012	200	1.97	0.014	220	2.36	0.018	240	3.15	0.024	240	4.72	0.024	240	6.29	0.024
328	**.025**	**.00028**	**459**	**.031**	**.00031**	**459**	**.037**	**.00039**	**591**	**.046**	**.00043**	**591**	**.056**	**.00047**	**656**	**.062**	**.00047**	**656**	**.077**	**.00055**	**722**	**.093**	**.00071**	**787**	**.124**	**.00094**	**787**	**.186**	**.00094**	**787**	**.248**	**.00094**
80	0.63	0.011	100	0.79	0.012	100	0.94	0.014	140	1.18	0.017	140	1.42	0.022	180	1.57	0.024	180	1.97	0.031	200	2.36	0.040	240	3.15	0.048	240	4.72	0.048	240	6.29	0.048
262	**.025**	**.00043**	**328**	**.031**	**.00047**	**328**	**.037**	**.00055**	**459**	**.046**	**.00067**	**459**	**.056**	**.00087**	**591**	**.062**	**.00094**	**591**	**.077**	**.00122**	**656**	**.093**	**.00157**	**787**	**.124**	**.00189**	**787**	**.186**	**.00189**	**787**	**.248**	**.00189**

CRAZYMILL by Mikron Tool Cool

Type C - Roughing

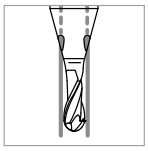
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

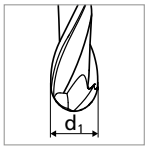
Roughing



- $a_p = 0.5 \times d_1$ ($Ød_1 \leq 0.5$ mm | **.020"**)
- $a_p = 1 \times d_1$ ($Ød_1 > 0.5$ mm | **.020"**)
- $a_e = 0.3 \times d_1$

Machining angle = 0°

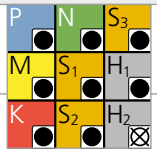




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3–0.4 mm | .012"–.016" v_c	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	60 | **197**	0.005–0.007 **.00020–.00028**
		1.0401	C15	AISI 1015		
		1.1191	C45E/CK45	AISI 1045		
		1.0044	S275JR	AISI 1020		
		1.0715	11SMn30	AISI 1215		
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	60 | **197**	0.004–0.006 **.00016–.00024**
		1.7131	16MnCr5	AISI 5115		
		1.3505	100Cr6	AISI 52100		
		1.7225	42CrMo4	AISI 4140		
		1.2842	90MnCrV8	AISI O2		
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	60 | **197**	0.004–0.006 **.00016–.00024**
		1.2436	X210CrW12	AISI D4/D6		
		1.3343	HS6-5-2C	AISI M2 / UNS T11302		
		1.3355	HS18-0-1	AISI T1 / UNS T12001		
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	60 | **197**	0.005–0.007 **.00020–.00028**
		1.4105	X6CrMoS17	AISI 430F		
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	60 | **197**	0.004–0.006 **.00016–.00024**
		1.4112	X90CrMoV18	AISI 440B		
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	60 | **197**	0.004–0.006 **.00016–.00024**
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH		
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	60 | **197**	0.004–0.006 **.00016–.00024**
		1.4435	X2CrNiMo 18-14-3	AISI 316L		
		1.4441	X2CrNiMo 18-15-3	AISI 316LM		
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L		
K	Cast iron	0.6020	GG20	ASTM 30	60 | **197**	0.003–0.005 **.00012–.00020**
		0.6030	GG30	ASTM 40B		
		0.7040	GGG40	ASTM 60-40-18		
		0.7060	GGG60	ASTM 80-60-03		
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	60 | **197**	0.006–0.008 **.00024–.00031**
		3.4365	AlZnMgCu1.5	ASTM 7075		
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	60 | **197**	0.006–0.008 **.00024–.00031**
		3.2381	GD-AlSi10Mg	UNS A03590		
	Copper	2.004	Cu-OF / CW008A	UNS C10100	60 | **197**	0.006–0.008 **.00024–.00031**
		2.0065	Cu-ETP / CW004A	UNS C11000		
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	60 | **197**	0.006–0.008 **.00024–.00031**
		2.036	CuZn40 CW509L	UNS C28000		
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	60 | **197**	0.006–0.008 **.00024–.00031**
		2.102	CuSn6	UNS C51900		
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	60 | **197**	0.006–0.008 **.00024–.00031**
		2.096	CuAl9Mn2	UNS C63200		
S_1	Super alloys	2.4856		Inconel 625	60 | **197**	0.003–0.004 **.00012–.00016**
		2.4668		Inconel 718		
		2.4617	NiMo28	Hastelloy B-2		
		2.4665	NiCr22Fe18Mo	Hastelloy X		
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	60 | **197**	0.004–0.006 **.00016–.00024**
		3.7065	Gr.4	ASTM B348 / F68		
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	60 | **197**	0.004–0.006 **.00016–.00024**
		9.9367	TiAl6Nb7	ASTM F1295		
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	60 | **197**	0.003–0.004 **.00012–.00016**
			CrCoMo28	ASTM F1537		
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | **197**	0.004–0.006 **.00016–.00024**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2		

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



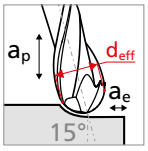
Ød1	1/32" 0.5–0.8 mm | .020"–.032"		1.0–1.2 mm | .039"–.047"		1/16" 1.5–1.8 mm | .059"–.071"		3/32" 2.0–2.5 mm | .079"–.098"		1/8" 3.0 mm | .118"		5/32–3/16–7/32–1/4" 4.0–6 mm | .158"–.236"		8.0 mm | .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	100 | **328**	0.010–0.014 **.00039–.00055**	140 | **459**	0.015–0.017 **.00059–.00067**	200 | **656**	0.024–0.026 **.00094–.00102**	220 | **722**	0.034–0.036 **.00134–.00142**	240 | **787**	0.040 **.00157**	280 | **919**	0.050 **.00197**	280 | **919**	0.050 **.00197**
	100 | **328**	0.009–0.012 **.00035–.00047**	140 | **459**	0.014–0.016 **.00055–.00063**	200 | **656**	0.022–0.024 **.00087–.00094**	220 | **722**	0.032–0.034 **.00126–.00134**	240 | **787**	0.038 **.00150**	280 | **919**	0.048 **.00189**	280 | **919**	0.048 **.00189**
	100 | **328**	0.008–0.011 **.00031–.00043**	140 | **459**	0.011–0.013 **.00043–.00051**	200 | **656**	0.020–0.022 **.00079–.00087**	220 | **722**	0.030–0.032 **.00118–.00126**	240 | **787**	0.035 **.00138**	280 | **919**	0.044 **.00173**	280 | **919**	0.044 **.00173**
	100 | **328**	0.010–0.014 **.00039–.00055**	140 | **459**	0.016–0.018 **.00063–.00071**	200 | **656**	0.024–0.026 **.00094–.00102**	220 | **722**	0.034–0.036 **.00134–.00142**	240 | **787**	0.040 **.00157**	280 | **919**	0.048 **.00189**	280 | **919**	0.048 **.00189**
	100 | **328**	0.009–0.012 **.00035–.00047**	140 | **459**	0.015–0.017 **.00059–.00067**	200 | **656**	0.022–0.024 **.00087–.00094**	220 | **722**	0.032–0.034 **.00126–.00134**	240 | **787**	0.036 **.00142**	280 | **919**	0.046 **.00181**	280 | **919**	0.046 **.00181**
	100 | **328**	0.009–0.012 **.00035–.00047**	140 | **459**	0.015–0.017 **.00059–.00067**	200 | **656**	0.022–0.024 **.00087–.00094**	220 | **722**	0.032–0.034 **.00126–.00134**	240 | **787**	0.046 **.00142**	280 | **919**	0.046 **.00181**	280 | **919**	0.046 **.00181**
	100 | **328**	0.008–0.011 **.00031–.00043**	140 | **459**	0.012–0.014 **.00047–.00055**	200 | **656**	0.016–0.018 **.00063–.00071**	220 | **722**	0.030–0.032 **.00118–.00126**	240 | **787**	0.034 **.00134**	280 | **919**	0.044 **.00173**	280 | **919**	0.044 **.00173**
	100 | **328**	0.006–0.009 **.00024–.00035**	120 | **394**	0.011–0.022 **.00043–.00087**	140 | **459**	0.024–0.026 **.00094–.00102**	160 | **525**	0.028–0.036 **.00110–.00142**	180 | **591**	0.042 **.00165**	200 | **656**	0.052 **.00205**	200 | **656**	0.052 **.00205**
	100 | **328**	0.012–0.016 **.00047–.00063**	140 | **459**	0.018–0.020 **.00071–.00079**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**	280 | **919**	0.055 **.00217**
	100 | **328**	0.012–0.016 **.00047–.00063**	140 | **459**	0.018–0.020 **.00071–.00079**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**	280 | **919**	0.055 **.00217**
	100 | **328**	0.014–0.018 **.00055–.00071**	140 | **459**	0.020–0.022 **.00079–.00087**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**	280 | **919**	0.055 **.00217**
	100 | **328**	0.014–0.018 **.00055–.00071**	140 | **459**	0.020–0.022 **.00079–.00087**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**	280 | **919**	0.055 **.00217**
	100 | **328**	0.014–0.018 **.00055–.00071**	140 | **459**	0.020–0.022 **.00079–.00087**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**	280 | **919**	0.055 **.00217**
	100 | **328**	0.012–0.016 **.00047–.00063**	140 | **459**	0.018–0.020 **.00071–.00079**	200 | **656**	0.026–0.028 **.00102–.00110**	220 | **722**	0.036–0.040 **.00142–.00157**	240 | **787**	0.058 **.00228**	280 | **919**	0.055 **.00217**	280 | **919**	0.055 **.00217**
	100 | **328**	0.004–0.006 **.00016–.00024**	120 | **394**	0.007–0.008 **.00028–.00031**	130 | **427**	0.009–0.010 **.00035–.00039**	140 | **459**	0.010–0.012 **.00039–.00047**	150 | **492**	0.015 **.00059**	170 | **558**	0.020 **.00079**	170 | **558**	0.020 **.00079**
	100 | **328**	0.008–0.011 **.00031–.00043**	120 | **394**	0.016–0.018 **.00063–.00071**	130 | **427**	0.020–0.022 **.00079–.00087**	140 | **459**	0.028–0.030 **.00110–.00118**	150 | **492**	0.034 **.00134**	170 | **558**	0.042 **.00165**	170 | **558**	0.042 **.00165**
	100 | **328**	0.008–0.011 **.00031–.00043**	120 | **394**	0.016–0.018 **.00063–.00071**	130 | **427**	0.020–0.022 **.00079–.00087**	140 | **459**	0.028–0.030 **.00110–.00118**	150 | **492**	0.034 **.00134**	170 | **558**	0.042 **.00165**	170 | **558**	0.042 **.00165**
	100 | **328**	0.004–0.006 **.00016–.00024**	140 | **459**	0.007–0.008 **.00028–.00031**	180 | **591**	0.009–0.010 **.00035–.00039**	200 | **656**	0.010–0.012 **.00039–.00047**	220 | **722**	0.015 **.00059**	240 | **787**	0.020 **.00079**	240 | **787**	0.020 **.00079**
	80 | **262**	0.007–0.009 **.00028–.00035**	100 | **328**	0.010–0.012 **.00039–.00047**	140 | **459**	0.014–0.018 **.00055–.00071**	180 | **591**	0.020–0.026 **.00079–.00102**	200 | **656**	0.030 **.00118**	240 | **787**	0.032 **.00126**	240 | **787**	0.032 **.00126**

CRAZYMILL by Mikron Tool Cool

Type C - Semi-finishing

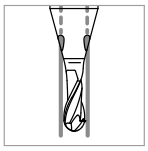
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

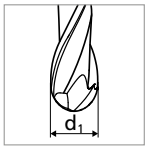
Semi-finishing



- $a_p = 0.25 \times d_1$ ($Ød_1 \leq 0.5$ mm **| .020"**)
- $a_p = 0.5 \times d_1$ ($Ød_1 > 0.5$ mm **| .020"**)
- $a_e = 0.1 \times d_1$

Machining angle = 15°

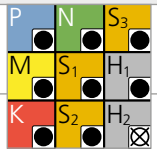




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3 mm | .012" v_c	d_{eff}	f_z	0.4 mm | .016" v_c	d_{eff}	f_z	0.5 mm | .020" v_c	d_{eff}	f_z	0.6 mm | .024" v_c	d_{eff}	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	55	0.29	0.005	73	0.39	0.007	92	0.48	0.010	100	0.60	0.012
		1.0401	C15	AISI 1015	**180**	**.011**	**.00020**	**240**	**.015**	**.00028**	**302**	**.019**	**.00039**	**328**	**.024**	**.00047**
		1.1191	C45E/CK45	AISI 1045												
		1.0044	S275JR	AISI 1020												
		1.0715	11SMn30	AISI 1215												
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415	55	0.29	0.004	73	0.39	0.006	92	0.48	0.009	100	0.60	0.011
		1.7131	16MnCr5	AISI 5115	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00035**	**328**	**.024**	**.00043**
		1.3505	100Cr6	AISI 52100												
		1.7225	42CrMo4	AISI 4140												
		1.2842	90MnCrV8	AISI O2												
	High alloyed tool steel Rm<1200N/mm²	1.2379	X153CrMoV12	AISI D2	55	0.29	**0.004**	73	0.39	0.006	92	0.48	0.008	100	0.60	0.009
		1.2436	X210CrW12	AISI D4/D6	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00031**	**328**	**.024**	**.00035**
		1.3343	HS6-5-2C	AISI M2												
		1.3355	HS18-0-1	AISI T1												
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430	55	0.29	0.005	73	0.39	0.007	92	0.48	0.010	100	0.60	0.012
		1.4105	X6CrMoS17	AISI 430F	**180**	**.011**	**.00020**	**240**	**.015**	**.00028**	**302**	**.019**	**.00039**	**328**	**.024**	**.00047**
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	55	0.29	0.004	73	0.39	0.006	92	0.48	0.009	100	0.60	0.010
		1.4112	X90CrMoV18	AISI 440B	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00035**	**328**	**.024**	**.00039**
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630	55	0.29	0.004	73	0.39	0.006	92	0.48	0.009	100	0.60	0.010
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00035**	**328**	**.024**	**.00039**
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	55	0.29	0.004	73	0.39	0.006	92	0.48	0.008	100	0.60	0.010
		1.4435	X2CrNiMo 18-14-3	AISI 316L	**180**	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00031**	**328**	**.024**	**.00039**
		1.4441	X2CrNiMo 18-15-3	AISI 316LM												
		1.4539	X1NiCrMoCu25-20-5	AISI 904L												
K	Cast iron	0.6020	GG20	ASTM 30	55	0.29	0.003	73	0.39	0.005	92	0.48	0.006	100	0.60	0.008
		0.6030	GG30	ASTM 40B	**180**	**.011**	**.00012**	**240**	**.015**	**.00020**	**302**	**.019**	**.00024**	**328**	**.024**	**.00030**
		0.7040	GGG40	ASTM60-40-18												
		0.7060	GGG60	ASTM80-60-03												
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	55	0.29	0.006	73	0.39	0.008	92	0.48	0.012	100	0.60	0.014
		3.4365	AlZnMgCu1.5	ASTM 7075	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00047**	**328**	**.024**	**.00055**
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	55	0.29	0.006	73	0.39	0.008	92	0.48	0.012	100	0.60	0.014
		3.2381	GD-AlSi10Mg	UNS A03590	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00047**	**328**	**.024**	**.00055**
	Copper	2.004	Cu-OF / CW008A	UNS C10100	55	0.29	0.006	73	0.39	0.008	92	0.48	0.014	100	0.60	0.016
		2.0065	Cu-ETP / CW004A	UNS C11000	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00055**	**328**	**.024**	**.00063**
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	55	0.29	0.006	73	0.39	0.008	92	0.48	0.014	100	0.60	0.016
		2.036	CuZn40 CW509L	UNS C28000	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00055**	**328**	**.024**	**.00063**
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3	UNS C38500	55	0.29	0.006	73	0.39	0.008	92	0.48	0.014	100	0.60	0.016
		2.102	CuSn6	UNS C51900	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00055**	**328**	**.024**	**.00063**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	55	0.29	0.006	73	0.39	0.008	92	0.48	0.012	100	0.60	0.014
		2.096	CuAl9Mn2	UNS C63200	**180**	**.011**	**.00024**	**240**	**.015**	**.00031**	**302**	**.019**	**.00047**	**328**	**.024**	**.00055**
S_1	Super alloys	2.4856		Inconel 625	55	0.29	0.003	73	0.39	0.004	92	0.48	0.004	100	0.60	0.005
		2.4668		Inconel 718	**180**	**.011**	**.00012**	**240**	**.015**	**.00016**	**302**	**.019**	**.00016**	**328**	**.024**	**.00020**
		2.4617	NiMo28	Hastelloy B-2												
		2.4665	NiCr22Fe18Mo	Hastelloy X												
S_2	Titanium pure	3.7035	Gr.2	ASTM B348	55	0.29	0.004	73	0.39	0.004	92	0.48	0.008	100	0.60	0.009
		3.7065	Gr.4	ASTM B348	**180**	**.011**	**.00016**	**240**	**.015**	**.00016**	**302**	**.019**	**.00031**	**328**	**.024**	**.00035**
	Titanium alloys	3.7165	TiAl6V4	ASTM B348	55	0.29	0.004	73	0.39	0.004	92	0.48	0.008	100	0.60	0.009
		9.9367	TiAl6Nb7	ASTM F1295	**180**	**.011**	**.00016**	**240**	**.015**	**.00016**	**302**	**.019**	**.00031**	**328**	**.024**	**.00035**
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	55	0.29	0.003	73	0.39	0.003	92	0.48	0.005	100	0.60	0.005
			CrCoMo28	ASTM F1537	**180**	**.011**	**.00012**	**240**	**.015**	**.00012**	**302**	**.019**	**.00020**	**328**	**.024**	**.00020**
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	55	0.29	0.004	73	0.39	0.006	92	0.48	0.007	80	0.60	0.008
					180	**.011**	**.00016**	**240**	**.015**	**.00024**	**302**	**.019**	**.00028**	**262**	**.024**	**.00031**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2												

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**
d_{eff} [mm] | **[inch]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1

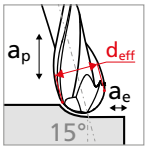
1/32"			1/16"									3/32"			1/8"			5/32"			3/16–7/32–1/4"					
0.8mm|.032"			1.0mm|.039"			1.2mm|.047"			1.5|.059"			1.8mm|.071"			2.0mm|.079"			2.5mm|.098"			3.0mm|.118"			4.0mm|.158"			6.0mm|.236"			8.0mm|.315"		
v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z
100	0.80	0.014	140	1.00	0.015	140	1.20	0.017	200	1.50	0.024	200	1.80	0.026	220	2.00	0.034	220	2.50	0.036	240	3.00	0.040	260	4.00	0.050	260	6.00	0.050	260	8.00	0.050
328	**.032**	**.00055**	**459**	**.039**	**.00059**	**459**	**.047**	**.00067**	**656**	**.059**	**.00094**	**656**	**.071**	**.00102**	**722**	**.079**	**.00134**	**722**	**.098**	**.00142**	**787**	**.118**	**.00157**	**853**	**.158**	**.00197**	**853**	**.236**	**.00197**	**853**	**.315**	**.00197**
100	0.80	0.012	140	1.00	0.014	140	1.20	0.016	200	1.50	0.022	200	1.80	0.024	220	2.00	0.032	220	2.50	0.034	240	3.00	0.038	260	4.00	0.044	260	6.00	0.048	260	8.00	0.048
328	**.032**	**.00047**	**459**	**.039**	**.00055**	**459**	**.047**	**.00063**	**656**	**.059**	**.00087**	**656**	**.071**	**.00094**	**722**	**.079**	**.00126**	**722**	**.098**	**.00134**	**787**	**.118**	**.00150**	**853**	**.158**	**.00173**	**853**	**.236**	**.00189**	**853**	**.315**	**.00189**
100	0.80	0.011	140	1.00	0.011	140	1.20	0.013	200	1.50	0.020	200	1.80	0.022	220	2.00	0.030	220	2.50	0.032	240	3.00	0.035	260	4.00	0.044	260	6.00	0.044	260	8.00	0.044
328	**.032**	**.00043**	**459**	**.039**	**.00043**	**459**	**.047**	**.00051**	**656**	**.059**	**.00079**	**656**	**.071**	**.00087**	**722**	**.079**	**.00118**	**722**	**.098**	**.00126**	**787**	**.118**	**.00138**	**853**	**.158**	**.00173**	**853**	**.236**	**.00173**	**853**	**.315**	**.00173**
100	0.80	0.014	140	1.00	0.016	140	1.20	0.018	200	1.50	0.024	200	1.80	0.026	220	2.00	0.034	220	2.50	0.036	240	3.00	0.040	260	4.00	0.048	260	6.00	0.048	260	8.00	0.048
328	**.032**	**.00055**	**459**	**.039**	**.00063**	**459**	**.047**	**.00071**	**656**	**.059**	**.00094**	**656**	**.071**	**.00102**	**722**	**.079**	**.00134**	**722**	**.098**	**.00142**	**787**	**.118**	**.00157**	**853**	**.158**	**.00189**	**853**	**.236**	**.00189**	**853**	**.315**	**.00189**
100	0.80	0.012	140	1.00	0.015	140	1.20	0.017	200	1.50	0.022	200	1.80	0.024	220	2.00	0.032	220	2.50	0.034	240	3.00	0.036	260	4.00	0.046	260	6.00	0.046	260	8.00	0.046
328	**.032**	**.00047**	**459**	**.039**	**.00059**	**459**	**.047**	**.00067**	**656**	**.059**	**.00087**	**656**	**.071**	**.00094**	**722**	**.079**	**.00126**	**722**	**.098**	**.00134**	**787**	**.118**	**.00142**	**853**	**.158**	**.00181**	**853**	**.236**	**.00181**	**853**	**.315**	**.00181**
100	0.80	0.012	140	1.00	0.015	140	1.20	0.017	200	1.50	0.022	200	1.80	0.024	220	2.00	0.032	220	2.50	0.034	240	3.00	0.036	260	4.00	0.046	260	6.00	0.046	260	8.00	0.046
328	**.032**	**.00047**	**459**	**.039**	**.00059**	**459**	**.047**	**.00067**	**656**	**.059**	**.00087**	**656**	**.071**	**.00094**	**722**	**.079**	**.00126**	**722**	**.098**	**.00134**	**787**	**.118**	**.00142**	**853**	**.158**	**.00181**	**853**	**.236**	**.00181**	**853**	**.315**	**.00181**
100	0.80	0.011	140	1.00	0.012	140	1.20	0.014	200	1.50	0.016	200	1.80	0.018	220	2.00	0.030	220	2.50	0.032	240	3.00	0.034	260	4.00	0.044	260	6.00	0.044	260	8.00	0.044
328	**.032**	**.00043**	**459**	**.039**	**.00047**	**459**	**.047**	**.00055**	**656**	**.059**	**.00063**	**656**	**.071**	**.00071**	**722**	**.079**	**.00118**	**722**	**.098**	**.00126**	**787**	**.118**	**.00134**	**853**	**.158**	**.00173**	**853**	**.236**	**.00173**	**853**	**.315**	**.00173**
100	0.80	0.009	120	1.00	0.011	120	1.20	0.022	140	1.50	0.024	140	1.80	0.026	160	2.00	0.028	160	2.50	0.036	180	3.00	0.042	200	4.00	0.052	200	6.00	0.052	200	8.00	0.052
328	**.032**	**.00035**	**394**	**.039**	**.00043**	**394**	**.047**	**.00087**	**459**	**.059**	**.00094**	**459**	**.071**	**.00102**	**525**	**.079**	**.00110**	**525**	**.098**	**.00142**	**591**	**.118**	**.00165**	**656**	**.158**	**.00205**	**656**	**.236**	**.00205**	**656**	**.315**	**.00205**
100	0.80	0.016	140	1.00	0.018	140	1.20	0.020	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.055	260	6.00	0.055	260	8.00	0.055
328	**.032**	**.00063**	**459**	**.039**	**.00071**	**459**	**.047**	**.00079**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00217**	**853**	**.236**	**.00217**	**853**	**.315**	**.00217**
100	0.80	0.016	140	1.00	0.018	140	1.20	0.020	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.055	260	6.00	0.055	260	8.00	0.055
328	**.032**	**.00063**	**459**	**.039**	**.00071**	**459**	**.047**	**.00079**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00217**	**853**	**.236**	**.00217**	**853**	**.315**	**.00217**
100	0.80	0.018	140	1.00	0.020	140	1.20	0.022	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.055	260	6.00	0.055	260	8.00	0.055
328	**.032**	**.00071**	**459**	**.039**	**.00079**	**459**	**.047**	**.00087**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00217**	**853**	**.236**	**.00217**	**853**	**.315**	**.00217**
100	0.80	0.018	140	1.00	0.020	140	1.20	0.022	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.055	260	6.00	0.055	260	8.00	0.055
328	**.032**	**.00071**	**459**	**.039**	**.00079**	**459**	**.047**	**.00087**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00217**	**853**	**.236**	**.00217**	**853**	**.315**	**.00217**
100	0.80	0.018	140	1.00	0.020	140	1.20	0.022	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.055	260	6.00	0.055	260	8.00	0.055
328	**.032**	**.00071**	**459**	**.039**	**.00079**	**459**	**.047**	**.00087**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00217**	**853**	**.236**	**.00217**	**853**	**.315**	**.00217**
100	0.80	0.016	140	1.00	0.018	140	1.20	0.020	200	1.50	0.026	200	1.80	0.028	220	2.00	0.036	220	2.50	0.040	240	3.00	0.058	260	4.00	0.055	260	6.00	0.055	260	8.00	0.055
328	**.032**	**.00063**	**459**	**.039**	**.00071**	**459**	**.047**	**.00079**	**656**	**.059**	**.00102**	**656**	**.071**	**.00110**	**722**	**.079**	**.00142**	**722**	**.098**	**.00157**	**787**	**.118**	**.00228**	**853**	**.158**	**.00217**	**853**	**.236**	**.00217**	**853**	**.315**	**.00217**
100	0.80	0.006	120	1.00	0.007	120	1.20	0.008	130	1.50	0.009	130	1.80	0.010	140	2.00	0.010	140	2.50	0.012	150	3.00	0.015	170	4.00	0.020	170	6.00	0.020	170	8.00	0.020
328	**.032**	**.00024**	**394**	**.039**	**.00028**	**394**	**.047**	**.00031**	**427**	**.059**	**.00035**	**427**	**.071**	**.00039**	**459**	**.079**	**.00039**	**459**	**.098**	**.00047**	**492**	**.118**	**.00059**	**558**	**.158**	**.00079**	**558**	**.236**	**.00079**	**558**	**.315**	**.00079**
100	0.80	0.011	120	1.00	0.016	120	1.20	0.018	130	1.50	0.020	130	1.80	0.022	140	2.00	0.028	140	2.50	0.030	150	3.00	0.034	170	4.00	0.042	170	6.00	0.042	170	8.00	0.042
328	**.032**	**.00043**	**394**	**.039**	**.00063**	**394**	**.047**	**.00071**	**427**	**.059**	**.00079**	**427**	**.071**	**.00087**	**459**	**.079**	**.00110**	**459**	**.098**	**.00118**	**492**	**.118**	**.00134**	**558**	**.158**	**.00165**	**558**	**.236**	**.00165**	**558**	**.315**	**.00165**
100	0.80	0.011	120	1.00	0.016	120	1.20	0.018	130	1.50	0.020	130	1.80	0.022	140	2.00	0.028	140	2.50	0.030	150	3.00	0.034	170	4.00	0.042	170	6.00	0.042	170	8.00	0.042
328	**.032**	**.00043**	**394**	**.039**	**.00063**	**394**	**.047**	**.00071**	**427**	**.059**	**.00079**	**427**	**.071**	**.00087**	**459**	**.079**	**.00110**	**459**	**.098**	**.00118**	**492**	**.118**	**.00134**	**558**	**.158**	**.00165**	**558**	**.236**	**.00165**	**558**	**.315**	**.00165**
100	0.80	0.006	140	1.00	0.007	140	1.20	0.008	180	1.50	0.009	180	1.80	0.010	200	2.00	0.010	200	2.50	0.012	220	3.00	0.015	240	4.00	0.020	240	6.00	0.020	240	8.00	0.020
328	**.032**	**.00024**	**459**	**.039**	**.00028**	**459**	**.047**	**.00031**	**591**	**.059**	**.00035**	**591**	**.071**	**.00039**	**656**	**.079**	**.00039**	**656**	**.098**	**.00047**	**722**	**.118**	**.00059**	**787**	**.158**	**.00079**	**787**	**.236**	**.00079**	**787**	**.315**	**.00079**
80	0.80	0.009	100	1.00	0.010	100	1.20	0.012	140	1.50	0.014	140	1.80	0.018	180	2.00	0.020	180	2.50	0.026	200	3.00	0.030	240	4.00	0.032	240	6.00	0.032	240	8.00	0.032
262	**.032**	**.00035**	**328**	**.039**	**.00039**	**328**	**.047**	**.00047**	**459**	**.059**	**.00055**	**459**	**.071**	**.00071**	**591**	**.079**	**.00079**	**591**	**.098**	**.00102**	**656**	**.118**	**.00118**	**787**	**.158**	**.00126**	**787**	**.236**	**.00126**	**787**	**.315**	**.00126**

CRAZYMILL by Mikron Tool Cool

Type C - Finishing

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

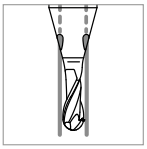
Finishing

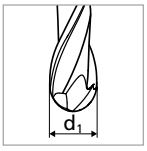


- $a_p = 0.1 \times d_1$
- $a_e = 0.05 \times d_1$

Machining angle = 15°

n_{max} = 60'000 rpm

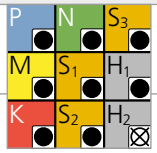




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1/64" 0.3 mm | .012" v_c	d_{eff}	f_z	0.4 mm | .016" v_c	d_{eff}	f_z	0.5 mm | .020" v_c	d_{eff}	f_z	0.6 mm | .024" v_c	d_{eff}	f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	45	0.24	0.006	59	0.31	0.008	74	0.39	0.012	89	0.47	0.014
		1.0401	C15	AISI 1015	**148**	**.009**	**.00024**	**194**	**.012**	**.00031**	**243**	**.015**	**.00047**	**292**	**.019**	**.00055**
		1.1191	C45E/CK45	AISI 1045												
		1.0044	S275JR	AISI 1020												
		1.0715	11SMn30	AISI 1215												
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415	45	0.24	0.005	59	0.31	0.007	74	0.39	0.011	89	0.47	0.013
		1.7131	16MnCr5	AISI 5115	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00043**	**292**	**.019**	**.00051**
		1.3505	100Cr6	AISI 52100												
		1.7225	42CrMo4	AISI 4140												
		1.2842	90MnCrV8	AISI O2												
	High alloyed tool steel Rm<1200N/mm²	1.2379	X153CrMoV12	AISI D2	45	0.24	0.005	59	0.31	0.007	74	0.39	0.010	89	0.47	0.011
		1.2436	X210CrW12	AISI D4/D6	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00039**	**292**	**.019**	**.00043**
		1.3343	HS6-5-2C	AISI M2												
		1.3355	HS18-0-1	AISI T1												
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430	45	0.24	0.006	59	0.31	0.008	74	0.39	0.012	89	0.47	0.014
		1.4105	X6CrMoS17	AISI 430F	**148**	**.009**	**.00024**	**194**	**.012**	**.00031**	**243**	**.015**	**.00047**	**292**	**.019**	**.00055**
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	45	0.24	0.005	59	0.31	0.007	74	0.39	0.011	89	0.47	0.012
		1.4112	X90CrMoV18	AISI 440B	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00043**	**292**	**.019**	**.00047**
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630	45	0.24	0.005	59	0.31	0.007	74	0.39	0.011	89	0.47	0.012
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00043**	**292**	**.019**	**.00047**
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	45	0.24	0.005	59	0.31	0.007	74	0.39	0.010	89	0.47	0.012
		1.4435	X2CrNiMo 18-14-3	AISI 316L	**148**	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00039**	**292**	**.019**	**.00047**
		1.4441	X2CrNiMo 18-15-3	AISI 316LM												
		1.4539	X1NiCrMoCu25-20-5	AISI 904L												
K	Cast iron	0.6020	GG20	ASTM 30	45	0.24	0.004	59	0.31	0.006	74	0.39	0.007	89	0.47	0.009
		0.6030	GG30	ASTM 40B	**148**	**.009**	**.00016**	**194**	**.012**	**.00024**	**243**	**.015**	**.00028**	**292**	**.019**	**.00035**
		0.7040	GGG40	ASTM60-40-18												
		0.7060	GGG60	ASTM80-60-03												
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	45	0.24	0.007	59	0.31	0.010	74	0.39	0.014	89	0.47	0.017
		3.4365	AlZnMgCu1.5	ASTM 7075	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00055**	**292**	**.019**	**.00067**
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	45	0.24	0.007	59	0.31	0.010	74	0.39	0.014	89	0.47	0.017
		3.2381	GD-AlSi10Mg	UNS A03590	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00055**	**292**	**.019**	**.00067**
	Copper	2.004	Cu-OF / CW008A	UNS C10100	45	0.24	0.007	59	0.31	0.010	74	0.39	0.017	89	0.47	0.019
		2.0065	Cu-ETP / CW004A	UNS C11000	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00067**	**292**	**.019**	**.00075**
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	45	0.24	0.007	59	0.31	0.010	74	0.39	0.017	89	0.47	0.019
		2.036	CuZn40 CW509L	UNS C28000	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00067**	**292**	**.019**	**.00075**
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3	UNS C38500	45	0.24	0.007	59	0.31	0.010	74	0.39	0.017	89	0.47	0.019
		2.102	CuSn6	UNS C51900	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00067**	**292**	**.019**	**.00075**
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	45	0.24	0.007	59	0.31	0.010	74	0.39	0.014	89	0.47	0.017
		2.096	CuAl9Mn2	UNS C63200	**148**	**.009**	**.00028**	**194**	**.012**	**.00039**	**243**	**.015**	**.00055**	**292**	**.019**	**.00067**
S_1	Super alloys	2.4856		Inconel 625	45	0.24	0.004	59	0.31	0.005	74	0.39	0.005	89	0.47	0.006
		2.4668		Inconel 718	**148**	**.009**	**.00016**	**194**	**.012**	**.00020**	**243**	**.015**	**.00020**	**292**	**.019**	**.00024**
		2.4617	NiMo28	Hastelloy B-2												
		2.4665	NiCr22Fe18Mo	Hastelloy X												
S_2	Titanium pure	3.7035	Gr.2	ASTM B348	45	0.24	0.005	59	0.31	0.005	74	0.39	0.010	100	0.47	0.011
		3.7065	Gr.4	ASTM B348	**148**	**.009**	**.00020**	**194**	**.012**	**.00020**	**243**	**.015**	**.00039**	**328**	**.019**	**.00043**
	Titanium alloys	3.7165	TiAl6V4	ASTM B348	45	0.24	0.005	59	0.31	0.005	74	0.39	0.010	89	0.47	0.011
		9.9367	TiAl6Nb7	ASTM F1295	**148**	**.009**	**.00020**	**194**	**.012**	**.00020**	**243**	**.015**	**.00039**	**292**	**.019**	**.00043**
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	45	0.24	0.004	59	0.31	0.004	74	0.39	0.006	89	0.47	0.006
			CrCoMo28	ASTM F1537	**148**	**.009**	**.00016**	**194**	**.012**	**.00016**	**243**	**.015**	**.00024**	**292**	**.019**	**.00024**
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	45	0.24	0.005	59	0.31	0.007	74	0.39	0.008	80	0.47	0.010
					148	**.009**	**.00020**	**194**	**.012**	**.00028**	**243**	**.015**	**.00031**	**262**	**.019**	**.00039**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2												

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**
d_{eff} [mm] | **[inch]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1

1/32"			1/16"									3/32"			1/8"			5/32"			3/16–7/32–1/4"					
0.8mm|.032"			1.0mm|.039"			1.2mm|.047"			1.5|.059"			1.8mm|.071"			2.0mm|.079"			2.5mm|.098"			3.0mm|.118"			4.0mm|.158"			6.0mm|.236"			8.0mm|.315"		
v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z	v_c	d_{eff}	f_z
100	0.63	0.017	140	0.79	0.018	140	0.94	0.020	200	1.18	0.029	200	1.42	0.031	220	1.57	0.041	220	1.97	0.043	240	2.36	0.048	260	3.15	0.060	260	4.72	0.060	260	6.29	0.060
328	**.025**	**.00067**	**459**	**.031**	**.00071**	**459**	**.037**	**.00079**	**656**	**.046**	**.00114**	**656**	**.056**	**.00122**	**722**	**.062**	**.00161**	**722**	**.077**	**.00169**	**787**	**.093**	**.00189**	**853**	**.124**	**.00236**	**853**	**.186**	**.00236**	**853**	**.248**	**.00236**
100	0.63	0.014	140	0.79	0.017	140	0.94	0.019	200	1.18	0.026	200	1.42	0.029	220	1.57	0.038	220	1.97	0.041	240	2.36	0.046	260	3.15	0.058	260	4.72	0.058	260	6.29	0.058
328	**.025**	**.00055**	**459**	**.031**	**.00067**	**459**	**.037**	**.00075**	**656**	**.046**	**.00102**	**656**	**.056**	**.00114**	**722**	**.062**	**.00150**	**722**	**.077**	**.00161**	**787**	**.093**	**.00181**	**853**	**.124**	**.00228**	**853**	**.186**	**.00228**	**853**	**.248**	**.00228**
100	0.63	0.013	140	0.79	0.013	140	0.94	0.016	200	1.18	0.024	200	1.42	0.026	220	1.57	0.036	220	1.97	0.038	240	2.36	0.042	260	3.15	0.053	260	4.72	0.053	260	6.29	0.053
328	**.025**	**.00051**	**459**	**.031**	**.00051**	**459**	**.037**	**.00063**	**656**	**.046**	**.00094**	**656**	**.056**	**.00102**	**722**	**.062**	**.00142**	**722**	**.077**	**.00150**	**787**	**.093**	**.00165**	**853**	**.124**	**.00209**	**853**	**.186**	**.00209**	**853**	**.248**	**.00209**
100	0.63	0.017	140	0.79	0.019	140	0.94	0.022	200	1.18	0.029	200	1.42	0.031	220	1.57	0.041	220	1.97	0.043	240	2.36	0.048	260	3.15	0.058	260	4.72	0.058	260	6.29	0.058
328	**.025**	**.00067**	**459**	**.031**	**.00075**	**459**	**.037**	**.00087**	**656**	**.046**	**.00114**	**656**	**.056**	**.00122**	**722**	**.062**	**.00161**	**722**	**.077**	**.00169**	**787**	**.093**	**.00189**	**853**	**.124**	**.00228**	**853**	**.186**	**.00228**	**853**	**.248**	**.00228**
100	0.63	0.014	140	0.79	0.018	140	0.94	0.020	200	1.18	0.026	200	1.42	0.029	220	1.57	0.038	220	1.97	0.041	240	2.36	0.043	260	3.15	0.055	260	4.72	0.055	260	6.29	0.055
328	**.025**	**.00055**	**459**	**.031**	**.00071**	**459**	**.037**	**.00079**	**656**	**.046**	**.00102**	**656**	**.056**	**.00114**	**722**	**.062**	**.00150**	**722**	**.077**	**.00161**	**787**	**.093**	**.00169**	**853**	**.124**	**.00217**	**853**	**.186**	**.00217**	**853**	**.248**	**.00217**
100	0.63	0.014	140	0.79	0.018	140	0.94	0.020	200	1.18	0.026	200	1.42	0.029	220	1.57	0.038	220	1.97	0.041	240	2.36	0.043	260	3.15	0.055	260	4.72	0.055	260	6.29	0.055
328	**.025**	**.00055**	**459**	**.031**	**.00071**	**459**	**.037**	**.00079**	**656**	**.046**	**.00102**	**656**	**.056**	**.00114**	**722**	**.062**	**.00150**	**722**	**.077**	**.00161**	**787**	**.093**	**.00169**	**853**	**.124**	**.00217**	**853**	**.186**	**.00217**	**853**	**.248**	**.00217**
100	0.63	0.013	140	0.79	0.014	140	0.94	0.017	200	1.18	0.019	200	1.42	0.022	220	1.57	0.036	220	1.97	0.038	240	2.36	0.041	260	3.15	0.053	260	4.72	0.053	260	6.29	0.053
328	**.025**	**.00051**	**459**	**.031**	**.00055**	**459**	**.037**	**.00067**	**656**	**.046**	**.00075**	**656**	**.056**	**.00087**	**722**	**.062**	**.00142**	**722**	**.077**	**.00150**	**787**	**.093**	**.00161**	**853**	**.124**	**.00209**	**853**	**.186**	**.00209**	**853**	**.248**	**.00209**
100	0.63	0.011	120	0.79	0.013	120	0.94	0.026	140	1.18	0.029	140	1.42	0.031	160	1.57	0.034	160	1.97	0.043	180	2.36	0.050	200	3.15	0.062	200	4.72	0.062	200	6.29	0.062
328	**.025**	**.00043**	**394**	**.031**	**.00051**	**394**	**.037**	**.00102**	**459**	**.046**	**.00114**	**459**	**.056**	**.00122**	**525**	**.062**	**.00134**	**525**	**.077**	**.00169**	**591**	**.093**	**.00197**	**656**	**.124**	**.00244**	**656**	**.186**	**.00244**	**656**	**.248**	**.00244**
100	0.63	0.019	140	0.79	0.022	140	0.94	0.024	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.066	260	4.72	0.066	260	6.29	0.066
328	**.025**	**.00075**	**459**	**.031**	**.00087**	**459**	**.037**	**.00094**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00260**	**853**	**.186**	**.00260**	**853**	**.248**	**.00260**
100	0.63	0.019	140	0.79	0.022	140	0.94	0.024	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.066	260	4.72	0.066	260	6.29	0.066
328	**.025**	**.00075**	**459**	**.031**	**.00087**	**459**	**.037**	**.00094**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00260**	**853**	**.186**	**.00260**	**853**	**.248**	**.00260**
100	0.63	0.022	140	0.79	0.024	140	0.94	0.026	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.066	260	4.72	0.066	260	6.29	0.066
328	**.025**	**.00087**	**459**	**.031**	**.00094**	**459**	**.037**	**.00102**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00260**	**853**	**.186**	**.00260**	**853**	**.248**	**.00260**
100	0.63	0.022	140	0.79	0.024	140	0.94	0.026	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.066	260	4.72	0.066	260	6.29	0.066
328	**.025**	**.00087**	**459**	**.031**	**.00094**	**459**	**.037**	**.00102**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00260**	**853**	**.186**	**.00260**	**853**	**.248**	**.00260**
100	0.63	0.022	140	0.79	0.024	140	0.94	0.026	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.066	260	4.72	0.066	260	6.29	0.066
328	**.025**	**.00087**	**459**	**.031**	**.00094**	**459**	**.037**	**.00102**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00260**	**853**	**.186**	**.00260**	**853**	**.248**	**.00260**
100	0.63	0.022	140	0.79	0.024	140	0.94	0.026	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.066	260	4.72	0.066	260	6.29	0.066
328	**.025**	**.00087**	**459**	**.031**	**.00094**	**459**	**.037**	**.00102**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00260**	**853**	**.186**	**.00260**	**853**	**.248**	**.00260**
100	0.63	0.019	140	0.79	0.022	140	0.94	0.024	200	1.18	0.031	200	1.42	0.034	220	1.57	0.043	220	1.97	0.048	240	2.36	0.070	260	3.15	0.066	260	4.72	0.066	260	6.29	0.066
328	**.025**	**.00075**	**459**	**.031**	**.00087**	**459**	**.037**	**.00094**	**656**	**.046**	**.00122**	**656**	**.056**	**.00134**	**722**	**.062**	**.00169**	**722**	**.077**	**.00189**	**787**	**.093**	**.00276**	**853**	**.124**	**.00260**	**853**	**.186**	**.00260**	**853**	**.248**	**.00260**
100	0.63	0.007	120	0.79	0.008	120	0.94	0.010	130	1.18	0.011	130	1.42	0.012	140	1.57	0.012	140	1.97	0.014	150	2.36	0.018	170	3.15	0.024	170	4.72	0.024	170	6.29	0.024
328	**.025**	**.00028**	**394**	**.031**	**.00031**	**394**	**.037**	**.00039**	**427**	**.046**	**.00043**	**427**	**.056**	**.00047**	**459**	**.062**	**.00047**	**459**	**.077**	**.00055**	**492**	**.093**	**.00071**	**558**	**.124**	**.00094**	**558**	**.186**	**.00094**	**558**	**.248**	**.00094**
100	0.63	0.013	120	0.79	0.019	120	0.94	0.022	130	1.18	0.024	130	1.42	0.026	140	1.57	0.034	140	1.97	0.036	150	2.36	0.041	170	3.15	0.050	170	4.72	0.050	170	6.29	0.050
328	**.025**	**.00051**	**394**	**.031**	**.00075**	**394**	**.037**	**.00087**	**427**	**.046**	**.00094**	**427**	**.056**	**.00102**	**459**	**.062**	**.00134**	**459**	**.077**	**.00142**	**492**	**.093**	**.00161**	**558**	**.124**	**.00197**	**558**	**.186**	**.00197**	**558**	**.248**	**.00197**
100	0.63	0.013	120	0.79	0.019	120	0.94	0.022	130	1.18	0.024	130	1.42	0.026	140	1.57	0.034	140	1.97	0.036	150	2.36	0.041	170	3.15	0.050	170	4.72	0.050	170	6.29	0.050
328	**.025**	**.00051**	**394**	**.031**	**.00075**	**394**	**.037**	**.00087**	**427**	**.046**	**.00094**	**427**	**.056**	**.00102**	**459**	**.062**	**.00134**	**459**	**.077**	**.00142**	**492**	**.093**	**.00161**	**558**	**.124**	**.00197**	**558**	**.186**	**.00197**	**558**	**.248**	**.00197**
100	0.63	0.007	140	0.79	0.008	140	0.94	0.010	180	1.18	0.011	180	1.42	0.012	200	1.57	0.012	200	1.97	0.014	220	2.36	0.018	240	3.15	0.024	240	4.72	0.024	240	6.29	0.024
328	**.025**	**.00028**	**459**	**.031**	**.00031**	**459**	**.037**	**.00039**	**591**	**.046**	**.00043**	**591**	**.056**	**.00047**	**656**	**.062**	**.00047**	**656**	**.077**	**.00055**	**722**	**.093**	**.00071**	**787**	**.124**	**.00094**	**787**	**.186**	**.00094**	**787**	**.248**	**.00094**
80	0.63	0.011	100	0.79	0.012	100	0.94	0.014	140	1.18	0.017	140	1.42	0.022	180	1.57	0.024	180	1.97	0.031	200	2.36	0.036	240	3.15	0.038	240	4.72	0.038	240	6.29	0.038
262	**.025**	**.00043**	**328**	**.031**	**.00047**	**328**	**.037**	**.00055**	**459**	**.046**	**.00067**	**459**	**.056**	**.00087**	**591**	**.062**	**.00094**	**591**	**.077**	**.00122**	**656**	**.093**	**.00142**	**787**	**.124**	**.00150**	**787**	**.186**	**.00150**	**787**	**.248**	**.00150**



Process CrazyMill Cool Ball - Z2

ACCURATE AND EFFICIENT MILLING

Coolant type, pressure and filtration

Coolant: for best results, Mikron Tool recommends the use of cutting oil as coolant. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used as well.

Filter: the large cooling channels permit the use of a standard filter with filter quality of ≤ .002" (0.05 mm).

Coolant pressure: at least 218 psi (15 bar) coolant pressure is required to achieve reliable milling. High pressure is generally better for the cooling and flushing effect.

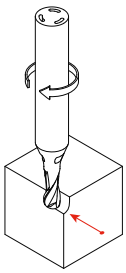
Revolution	[rpm]	≤ 10'000	> 10'000
Minimal pressure	[bar]	15	30
	[psi]	**218**	**435**

Tool holders

For detailed indications for tool holders see chapter "Technical information".

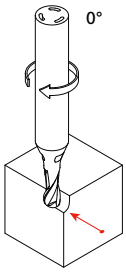
MLLING PROCESS

Climb milling and conventional milling



Mikron tool recommends climb milling for the machining of surfaces or edges. The chip thickness here is greater at the beginning and decreases continuously; the cutting forces remain low. With conventional milling, however, high cutting forces would push the milling tool away from the part.Thus surface quality decreases.

Roughing

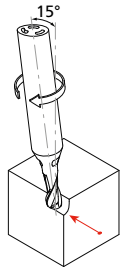


Mikron Tool recommends vertical machining with respect to the workpiece for roughing with CrazyMill Cool Ball (machining angle 0°). This allows the maximum recommended cutting depth a_p to be fully utilized. The result is an extremely high removal rate (Q [cm^3/min]).

Recommended cutting parameters

v_c and f_z = as specified in the cutting data table
a_p = max. 1 x d
a_e = 0.3 x d

Finishing



Mikron Tool recommends machining at a machining angle of 15° or 75° with respect to the workpiece surface for finishing with CrazyMill Cool Ball. This shifts the milling contact away from the tool's axis center towards its external diameter, where the ideal cutting geometry takes effect and also the cutting speed increases (the cutting speed is zero at the tool's center).

An angle of 15° of the milling body with respect to the workpiece brings certain advantages:

- The cutting speed is higher
- Better surface quality
- Longer service life

Recommended cutting parameters

v_c and f_z = as specified in the cutting data table
a_p = 0.05 – 0.5 x d
a_e = 0.05 – 0.15 x d depending on the required surface quality
a_e = f_z for maximum surface quality

PATENTED

CrazyMill Cool Ball - Z4



NEW

CRAZYMILL Cool

HSPC MILLING TOOL FOR DIFFICULT TO MACHINE MATERIALS

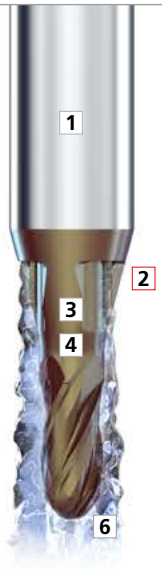
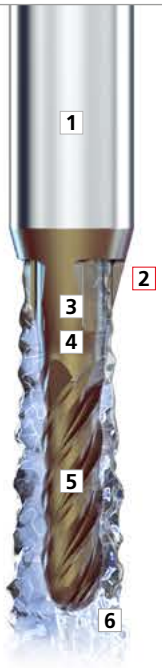


With CrazyMill Cool Ball - Z4, Mikron Tool introduces a new four flutes milling cutter for the finishing of many materials such as stainless steels, titanium alloys, CrCo and super alloys. This ball end-mill is available in diameters from .039" to .315" (1 mm to 8 mm) and for a maximum milling depth of 5 x d.

Due to its new cutting edge geometry, the integrated cooling and the high performance coating, CrazyMill Cool Ball - Z4 sets new benchmarks compared to conventional milling tools regarding copy and side milling with its high cutting speed and cutting depth ap, increased tool life and improved surface quality.

- CrazyMill Cool Ball, Type A – milling depth 2 x d, cutting length 2 x d, through shank coolant, Z = 4
- CrazyMill Cool Ball, Type B – milling depth 3 x d, cutting length 2 x d, through shank coolant, Z = 4
- CrazyMill Cool Ball, Type C – milling depth 5 x d, cutting length 2 x d, through shank coolant, Z = 4
- CrazyMill Cool Ball, Type M – milling depth 3.5 x d, cutting length 3.5 x d, through shank coolant, Z = 4
- CrazyMill Cool Ball, Type N – milling depth 4.5 x d, cutting length 4.5 x d, through shank coolant, Z = 4

CRAZYMILL™ by Mikron Tool Cool

PATENTED	2 x d	3 x d	5 x d	3.5 x d	4.5 x d
	Type A	Type B	Type C	Type M	Type N
l_1 = Effective length l_2 = Cutting length	■ Coated ■ Integ. cooling ■ l_1: 2xd, l_2: 2xd	■ Coated ■ Integ. cooling ■ l_1: 3xd, l_2: 2xd	■ Coated ■ Integ. cooling ■ l_1: 5xd, l_2: 2xd	■ Coated ■ Integ. cooling ■ l_1: 3.5xd, l_2: 3.5xd	■ Coated ■ Integ. cooling ■ l_1: 4.5xd, l_2: 4.5xd
					
					
	page 611	page 612	page 613	page 614	page 615

NEW

1 | SHANK
The robust solid carbide shank guarantees stable and vibration less milling. High precision and extraordinary surface quality are reached.

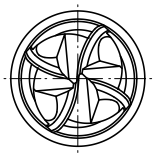
2 | INTEGRATED COOLING - PATENTED
The integrated cooling channels guarantee constant and maximal cooling of the cutting edges and optimal chip removal. The results are higher cutting speed and depth a_p as well as an excellent surface quality.

3 | CARBIDE
The specially developed micro-grain carbide meets all requirements in terms of mechanical properties.

4 | COATING
The high-performance SNP coating is heat-resistant and wear-resistant, prevents build up edges and guarantees optimum chip flushing. The result is long tool life.

5 | PROGRESSIVE FLUTE
The new technology with progressive flute allows to machining with a soft cutting and without vibrations. The result is a maximal surface quality.

6 | CUTTING GEOMETRY ON RADIUS
Developed for difficult-to-machine materials such as stainless steels, titanium and super alloys. Allows finishing with high surface quality due to vibration less machining.

Mill tip  4 - Teeth

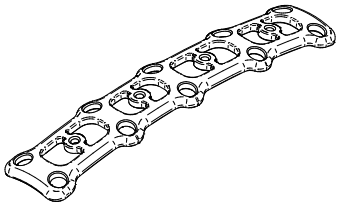
CRAZYMILL by Mikron Tool Cool

NEW

Benefits and applications

SEMI-FINISHING AND FINISHING CUTTER WITH INTEGRATED COOLING, FROM .039" (1 MM)

- **SHORT MACHINING TIME** | up to 5 times faster
- **LONG TOOL LIFE** | due to efficient cooling
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to through shank coolant
- **HIGH SURFACE QUALITY** | due to anti-vibration geometry
- **LOW PRODUCTION COSTS** | roughing and finishing with one tool



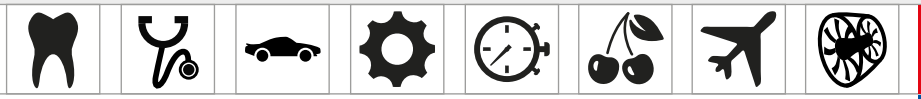
COMPONENT
Bone plate

MATERIAL
TiAl6V4 / 3.7165 / B348 (Grade 5)

MACHINING
- Semi-finishing and finishing
- d = 6 mm | **.236"**

MILLING TOOL
Mikron Tool - CrazyMill Cool Ball - Z4 - Type C

DATA	MIKRON TOOL
Tool type	CrazyMill Cool Ball - Z4 - Carbide - Coated - Integrated cooling
Item number	2.CMC30.C5Z4.600.1
Cutting data	Semi-finishing v_c = 170 m/min | **558 SFM** f_z = 0.036 mm | **.00142 IPT** $a_{p,\,max}$ = 0.5 x d a_e = 1 mm | **.039"** Z = 4 Finishing v_c = 170 m/min | **558 SFM** f_z = 0.039 mm | **.00154 IPT** $a_{p,\,max}$ = 0.1 x d a_e = 0.3 mm | **.012"** Z = 4



APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Tooth crown
Medical technology	Component for endoscope
Automotive industry	Components for injection system
Mechanical engineering	Machine components
Watches	Watch housing
Food industry	Nozzle
Aerospace industry	Engine parts
Power industry	Blade

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group P Unalloyed and alloyed steel	1.0401	C15	1015
	1.3505	100Cr6	52100
	1.2436	X210CrW12	D4 / D6
Group M Stainless steel	1.4105	X6CrMoS17	430F
	1.4112	X90CrMoV18	440B
	1.4301	X5CrNi 18-10	304
Group K Cast iron	0.7040	GGG40	60-40-18
Group N Non ferrous metals	3.2315	AlMgSi1	6351
	3.2163	GD-AlSi9Cu3	A380
	2.004	Cu-OF / CW008A	C10100
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S1 Super alloys	2.4856		INCONEL 625
	2.4665	NiCr22Fe18Mo	HASTELLOY X
Group S2 Titanium (pure and alloyed	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136
Group S3 CrCo alloys	2.4964	CoCr20W15Ni	HAYNES 25
Group H1 Hardened steel <55 HRC	1.2510	100MnCrMoW4	O1

CRAZYMILL by Mikron Tool Cool

NEW CrazyMill Cool Ball - Z4

MILLING WITH INTEGRATED COOLING



CrazyMill Cool Ball end-mill is especially developed with four flutes for finishing operations in stainless steels, titanium, super alloys and CrCo alloys. Its strengths include high cutting speeds, high removal rate, long tool life and excellent surface quality.

With progressive flutes in the versions M (3.5 x d) and N (4.5 x d) these characteristics are once more significantly increased. The cutting length of these two versions is extended in order to allow machining on the radius as well as the cylindrical section of the tool. The outcome is a very versatile milling cutter.

High performance is possible due to the new cutting edge geometry specially designed to reduce vibrations and improve process time and due to the integrated cooling channels that guarantee substantial cooling of the cutting edges.

The new high performance coating, which is specially suitable for finishing operations, improves tool life and milling performance.

Coolant type, pressure and filtration

Detailed recommendations for coolant type, pressure and filtration are on page "milling process".

Please note

You couldn't find your suitable version of the CrazyMill Cool Ball (diameter, length, cutting direction…)? Ask us about our customized versions!

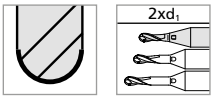
Regrinding: This product is not suitable for regrinding.

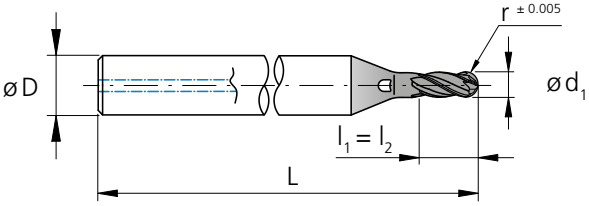
Type A - 2 x d - Ball - Z4

Carbide | Z4 | 30° | eXedur SNP

Ød_1	**.039" - .315"** (1.0 - 8.0 mm)	
Tolerance	**+ .0004"** **- .0004"**	+ 0.01 mm - 0.01 mm

Ball





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	r [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [teeth]	Item number	Availability
	.039	1.0	0.50	**.079**	2.00	2.00	4	**1.57**	40	4	2.CMC30.A5Z4.100.1	■
	.047	1.2	0.60	**.094**	2.40	2.40	4	**1.57**	40	4	2.CMC30.A5Z4.120.1	■
	.059	1.5	0.75	**.118**	3.00	3.00	4	**1.57**	40	4	2.CMC30.A5Z4.150.1	■
1/16	**.0625**	1.587	0.794	**.125**	3.17	3.17	4	**1.57**	40	4	2.CMC.BAZ4.F116	■
	.071	1.8	0.90	**.142**	3.60	3.60	4	**1.57**	40	4	2.CMC30.A5Z4.180.1	■
	.079	2.0	1.00	**.157**	4.00	4.00	4	**1.57**	40	4	2.CMC30.A5Z4.200.1	■
3/32	**.0937**	2.381	1.191	**.187**	4.76	4.76	4	**1.97**	40	4	2.CMC.BAZ4.F332	■
	.098	2.5	1.25	**.197**	5.00	5.00	6	**1.97**	50	4	2.CMC30.A5Z4.250.1	■
	.118	3.0	1.50	**.236**	6.00	6.00	6	**1.97**	50	4	2.CMC30.A5Z4.300.1	■
1/8	**.1250**	3.175	1.588	**.250**	6.35	6.35	6	**1.97**	50	4	2.CMC.BAZ4.F18	■
5/32	**.1562**	3.968	1.984	**.313**	7.94	7.94	6	**1.97**	50	4	2.CMC.BAZ4.F532	■
	.157	4.0	2.00	**.315**	8.00	8.00	6	**1.97**	50	4	2.CMC30.A5Z4.400.1	■
3/16	**.1875**	4.762	2.381	**.375**	9.52	9.52	8	**2.36**	60	4	2.CMC.BAZ4.F316	■
	.197	5.0	2.50	**.394**	10.00	10.00	8	**2.36**	60	4	2.CMC30.A5Z4.500.1	■
7/32	**.2189**	5.560	2.780	**.438**	11.12	11.12	10	**2.36**	60	4	2.CMC.BAZ4.F732	■
	.236	6.0	3.00	**.472**	12.00	12.00	10	**2.36**	60	4	2.CMC30.A5Z4.600.1	■
1/4	**.2500**	6.350	3.175	**.500**	12.70	12.70	10	**2.36**	60	4	2.CMC.BAZ4.F14	■
	.315	8.0	4.00	**.630**	16.00	16.00	12	**2.76**	70	4	2.CMC30.A5Z4.800.1	■

■ Stock item

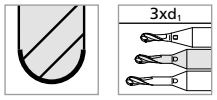
CRAZYMILL by Mikron Tool Cool

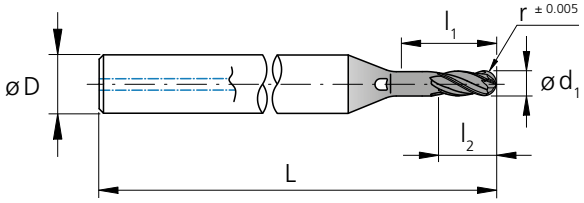
NEW Type B - 3 x d - Ball - Z4

Carbide | Z4 | 30° | eXedur SNP

Ød_1	**.039" - .315"** (1.0 - 8.0 mm)	
Tolerance	**+ .0004"** **- .0004"**	+ 0.01 mm - 0.01 mm

Ball





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	r [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [teeth]	Item number	Availability
	.039	1.0	0.50	**.118**	3.00	2.00	4	**1.57**	40	4	2.CMC30.B5Z4.100.1	■
	.047	1.2	0.60	**.142**	3.60	2.40	4	**1.57**	40	4	2.CMC30.B5Z4.120.1	■
	.059	1.5	0.75	**.177**	4.50	3.00	4	**1.57**	40	4	2.CMC30.B5Z4.150.1	■
1/16	**.0625**	1.587	0.794	**.187**	4.76	3.17	4	**1.57**	40	4	2.CMC.BBZ4.F116	■
	.071	1.8	0.90	**.213**	5.40	3.60	4	**1.57**	40	4	2.CMC30.B5Z4.180.1	■
	.079	2.0	1.00	**.236**	6.00	4.00	4	**1.57**	40	4	2.CMC30.B5Z4.200.1	■
3/32	**.0937**	2.381	1.191	**.281**	7.14	4.76	4	**1.97**	40	4	2.CMC.BBZ4.F332	■
	.098	2.5	1.25	**.295**	7.50	5.00	6	**1.97**	50	4	2.CMC30.B5Z4.250.1	■
	.118	3.0	1.50	**.354**	9.00	6.00	6	**1.97**	50	4	2.CMC30.B5Z4.300.1	■
1/8	**.1250**	3.175	1.588	**.375**	9.53	6.35	6	**2.17**	55	4	2.CMC.BBZ4.F18	■
5/32	**.1562**	3.968	1.984	**.469**	11.90	7.94	6	**2.17**	55	4	2.CMC.BBZ4.F532	■
	.157	4.0	2.00	**.472**	12.00	8.00	6	**2.17**	55	4	2.CMC30.B5Z4.400.1	■
3/16	**.1875**	4.762	2.381	**.563**	14.29	9.52	8	**2.56**	65	4	2.CMC.BBZ4.F316	■
	.197	5.0	2.50	**.591**	15.00	10.00	8	**2.56**	65	4	2.CMC30.B5Z4.500.1	■
7/32	**.2189**	5.560	2.780	**.657**	16.68	11.12	8	**2.56**	65	4	2.CMC.BBZ4.F732	■
	.236	6.0	3.00	**.709**	18.00	12.00	10	**2.56**	65	4	2.CMC30.B5Z4.600.1	■
1/4	**.2500**	6.350	3.175	**.750**	19.05	12.70	10	**2.56**	65	4	2.CMC.BBZ4.F14	■
	.315	8.0	4.00	**.945**	24.00	16.00	12	**3.15**	80	4	2.CMC30.B5Z4.800.1	■

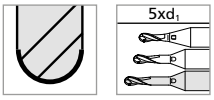
■ Stock item

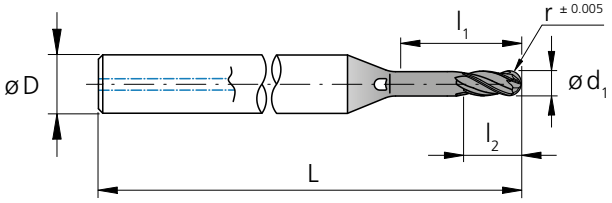
Type C - 5 x d - Ball - Z4

Carbide | Z4 | 30° | eXedur SNP

Ød$_1$	.039" - .315" (1.0 - 8.0 mm)	
Tolerance	+ .0004" - .0004"	+ 0.01 mm - 0.01 mm

Ball





l_1 = Effective length
l_2 = Cutting length

d$_1$ [inch]	d$_1$ [inch]	d$_1$ [mm]	r [mm]	l$_1$ [inch]	l$_1$ [mm]	l$_2$ [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [teeth]	Item number	Availability
	.039	1.0	0.50	.197	5.00	2.00	4	1.57	40	4	2.CMC30.C5Z4.100.1	■
	.047	1.2	0.60	.236	6.00	2.40	4	1.57	40	4	2.CMC30.C5Z4.120.1	■
	.059	1.5	0.75	.295	7.50	3.00	4	1.57	40	4	2.CMC30.C5Z4.150.1	■
1/16	.0625	1.587	0.794	.313	7.94	3.17	4	1.77	45	4	2.CMC.BCZ4.F116	■
	.071	1.8	0.90	.354	9.00	3.60	4	1.77	45	4	2.CMC30.C5Z4.180.1	■
	.079	2.0	1.00	.394	10.00	4.00	4	1.73	44	4	2.CMC30.C5Z4.200.1	■
3/32	.0937	2.381	1.191	.469	11.91	4.76	4	2.17	44	4	2.CMC.BCZ4.F332	■
	.098	2.5	1.25	.492	12.50	5.00	6	2.17	55	4	2.CMC30.C5Z4.250.1	■
	.118	3.0	1.50	.591	15.00	6.00	6	2.17	55	4	2.CMC30.C5Z4.300.1	■
1/8	.1250	3.175	1.588	.625	15.88	6.35	6	2.36	60	4	2.CMC.BCZ4.F18	■
5/32	.1562	3.968	1.984	.781	19.84	7.94	6	2.36	60	4	2.CMC.BCZ4.F532	■
	.157	4.0	2.00	.787	20.00	8.00	6	2.36	60	4	2.CMC30.C5Z4.400.1	■
3/16	.1875	4.762	2.381	.937	23.81	9.52	8	2.76	70	4	2.CMC.BCZ4.F316	■
	.197	5.0	2.50	.984	25.00	10.00	8	2.76	70	4	2.CMC30.C5Z4.500.1	■
7/32	.2189	5.560	2.780	1.09	27.80	11.12	10	2.76	70	4	2.CMC.BCZ4.F732	■
	.236	6.0	3.00	1.18	30.00	12.00	10	2.76	70	4	2.CMC30.C5Z4.600.1	■
1/4	.2500	6.350	3.175	1.25	31.75	12.70	10	2.76	70	4	2.CMC.BCZ4.F14	■
	.315	8.0	4.00	1.57	40.00	16.00	12	3.54	90	4	2.CMC30.C5Z4.800.1	■

■ Stock item

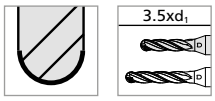
CRAZYMILL by Mikron Tool Cool

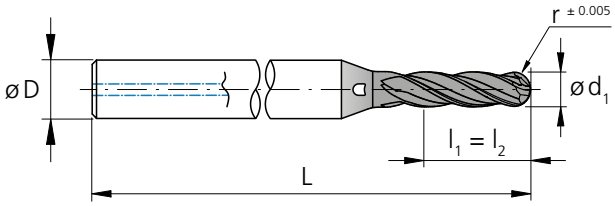
NEW Type M - 3.5 x d - Ball - Z4

Carbide | Z4 | 30° | eXedur SNP

Ø d_1	**.039" - .315"** (1.0 - 8.0 mm)	
Tolerance	**+ .0004"** **- .0004"**	+ 0.01 mm - 0.01 mm

Ball





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	r [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [teeth]	Item number	Availability
	.039	1.0	0.50	**.138**	3.50	3.50	4	**1.57**	40	4	2.CMC30.M5Z4.100.1	■
	.047	1.2	0.60	**.165**	4.20	4.20	4	**1.57**	40	4	2.CMC30.M5Z4.120.1	■
	.059	1.5	0.75	**.207**	5.25	5.25	4	**1.57**	40	4	2.CMC30.M5Z4.150.1	■
1/16	**.0625**	1.587	0.794	**.219**	5.55	5.55	4	**1.57**	40	4	2.CMC.BMZ4.F116	■
	.071	1.8	0.90	**.248**	6.30	6.30	4	**1.57**	40	4	2.CMC30.M5Z4.180.1	■
	.079	2.0	1.00	**.276**	7.00	7.00	4	**1.57**	40	4	2.CMC30.M5Z4.200.1	■
3/32	**.0937**	2.381	1.191	**.328**	8.33	8.33	4	**1.97**	40	4	2.CMC.BMZ4.F332	■
	.098	2.5	1.25	**.344**	8.75	8.75	6	**1.97**	50	4	2.CMC30.M5Z4.250.1	■
	.118	3.0	1.50	**.413**	10.50	10.50	6	**1.97**	50	4	2.CMC30.M5Z4.300.1	■
1/8	**.1250**	3.175	1.588	**.437**	11.11	11.11	6	**2.17**	55	4	2.CMC.BMZ4.F18	■
5/32	**.1562**	3.968	1.984	**.547**	13.89	13.89	6	**2.17**	55	4	2.CMC.BMZ4.F532	■
	.157	4.0	2.00	**.551**	14.00	14.00	6	**2.17**	55	4	2.CMC30.M5Z4.400.1	■
3/16	**.1875**	4.762	2.381	**.656**	16.67	16.67	8	**2.56**	65	4	2.CMC.BMZ4.F316	■
	.197	5.0	2.50	**.689**	17.50	17.50	8	**2.56**	65	4	2.CMC30.M5Z4.500.1	■
7/32	**.2189**	5.560	2.780	**.766**	19.46	19.46	10	**2.56**	65	4	2.CMC.BMZ4.F732	■
	.236	6.0	3.00	**.827**	21.00	21.00	10	**2.56**	65	4	2.CMC30.M5Z4.600.1	■
1/4	**.2500**	6.350	3.175	**.875**	22.23	22.23	10	**2.56**	65	4	2.CMC.BMZ4.F14	■
	.315	8.0	4.00	**1.10**	28.00	28.00	12	**3.15**	80	4	2.CMC30.M5Z4.800.1	■

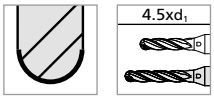
■ Stock item

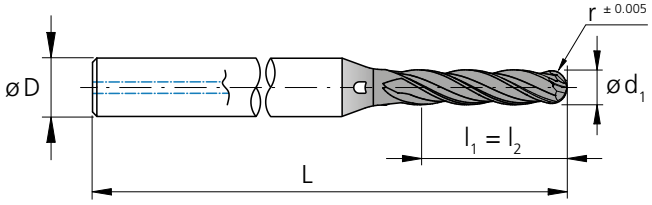
Type N - 4.5 x d - Ball - Z4

Carbide | Z4 | 30° | eXedur SNP

Ød_1	**.039" - .315"** (1.0 - 8.0 mm)	
Tolerance	**+ .0004"** **- .0004"**	+ 0.01 mm - 0.01 mm

Ball





l_1 = Effective length
l_2 = Cutting length

d_1 [inch]	d_1 [inch]	d_1 [mm]	r [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Z [teeth]	Item number	Availability
	.039	1.0	0.50	**.177**	4.50	4.50	4	**1.57**	40	4	2.CMC30.N5Z4.100.1	■
	.047	1.2	0.60	**.213**	5.40	5.40	4	**1.57**	40	4	2.CMC30.N5Z4.120.1	■
	.059	1.5	0.75	**.266**	6.75	6.75	4	**1.57**	40	4	2.CMC30.N5Z4.150.1	■
1/16	**.0625**	1.587	0.794	**.281**	7.14	7.14	4	**1.77**	45	4	2.CMC.BNZ4.F116	■
	.071	1.8	0.90	**.319**	8.10	8.10	4	**1.77**	45	4	2.CMC30.N5Z4.180.1	■
	.079	2.0	1.00	**.354**	9.00	9.00	4	**1.73**	44	4	2.CMC30.N5Z4.200.1	■
3/32	**.0937**	2.381	1.191	**.422**	10.71	10.71	4	**2.17**	44	4	2.CMC.BNZ4.F332	■
	.098	2.5	1.25	**.443**	11.25	11.25	6	**2.17**	55	4	2.CMC30.N5Z4.250.1	■
	.118	3.0	1.50	**.531**	13.50	13.50	6	**2.17**	55	4	2.CMC30.N5Z4.300.1	■
1/8	**.1250**	3.175	1.588	**.563**	14.29	14.29	6	**2.36**	60	4	2.CMC.BNZ4.F18	■
5/32	**.1562**	3.968	1.984	**.703**	17.86	17.86	6	**2.36**	60	4	2.CMC.BNZ4.F532	■
	.157	4.0	2.00	**.709**	18.00	18.00	6	**2.36**	60	4	2.CMC30.N5Z4.400.1	■
3/16	**.1875**	4.762	2.381	**.844**	21.43	21.43	8	**2.76**	70	4	2.CMC.BNZ4.F316	■
	.197	5.0	2.50	**.886**	22.50	22.50	8	**2.76**	70	4	2.CMC30.N5Z4.500.1	■
7/32	**.2189**	5.560	2.780	**.985**	25.02	25.02	10	**2.76**	70	4	2.CMC.BNZ4.F732	■
	.236	6.0	3.00	**1.06**	27.00	27.00	10	**2.76**	70	4	2.CMC30.N5Z4.600.1	■
1/4	**.2500**	6.350	3.175	**1.13**	28.58	28.58	10	**2.76**	70	4	2.CMC.BNZ4.F14	■
	.315	8.0	4.00	**1.42**	36.00	36.00	12	**3.54**	90	4	2.CMC30.N5Z4.800.1	■

■ Stock item

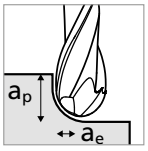
CRAZYMILL by Mikron Tool Cool

NEW Type A - Semi-finishing

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Possibility 1

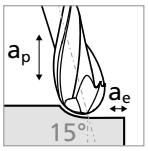
Inclination 0°



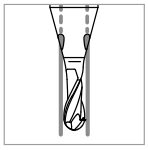
- $a_p = 1 \times d_1$
- $a_e = 0.2 \times d_1$

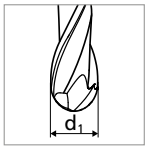
Possibility 2

Inclination 15°



- $a_p = 0.5 \times d_1$
- $a_e = 0.2 \times d_1$

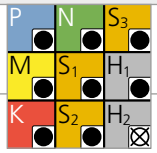




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.012 **.00047**	140 **459**	0.014 **.00054**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.009 **.00037**	140 **459**	0.011 **.00044**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.014 **.00054**	140 **459**	0.015 **.00060**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.010 **.00040**	140 **459**	0.012 **.00047**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.009 **.00037**	120 **394**	0.019 **.00074**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	120 **394**	0.006 **.00023**	120 **394**	0.007 **.00027**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.014 **.00054**	120 **394**	0.015 **.00060**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.014 **.00054**	120 **394**	0.015 **.00060**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	140 **459**	0.006 **.00023**	140 **459**	0.007 **.00027**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	100 **328**	0.009 **.00033**	100 **328**	0.010 **.00040**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



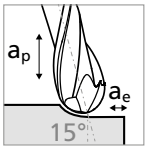
Ød1	1/16" 1.5 mm | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.020 **.00080**	200 **656**	0.022 **.00087**	220 **722**	0.029 **.00114**	220 **722**	0.031 **.00120**	240 **787**	0.038 **.00151**	260 **853**	0.040 **.00157**	260 **853**	0.040 **.00157**	260 **853**	0.043 **.00167**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.037 **.00145**	260 **853**	0.038 **.00151**	260 **853**	0.038 **.00151**	260 **853**	0.041 **.00161**
	200 **656**	0.017 **.00067**	200 **656**	0.019 **.00074**	220 **722**	0.026 **.00100**	220 **722**	0.027 **.00107**	240 **787**	0.034 **.00132**	260 **853**	0.035 **.00139**	260 **853**	0.035 **.00139**	260 **853**	0.037 **.00147**
	200 **656**	0.020 **.00080**	200 **656**	0.022 **.00087**	220 **722**	0.029 **.00114**	220 **722**	0.031 **.00120**	240 **787**	0.037 **.00145**	260 **853**	0.038 **.00151**	260 **853**	0.038 **.00151**	260 **853**	0.041 **.00161**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.035 **.00139**	260 **853**	0.037 **.00145**	260 **853**	0.037 **.00145**	260 **853**	0.039 **.00154**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.035 **.00139**	260 **853**	0.037 **.00145**	260 **853**	0.037 **.00145**	260 **853**	0.039 **.00154**
	200 **656**	0.014 **.00054**	200 **656**	0.015 **.00060**	220 **722**	0.026 **.00100**	220 **722**	0.027 **.00107**	240 **787**	0.034 **.00132**	260 **853**	0.035 **.00139**	260 **853**	0.035 **.00139**	260 **853**	0.037 **.00147**
	140 **459**	0.020 **.00080**	140 **459**	0.022 **.00087**	160 **525**	0.024 **.00094**	160 **525**	0.031 **.00120**	180 **591**	0.035 **.00139**	200 **656**	0.044 **.00173**	200 **656**	0.044 **.00173**	200 **656**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	130 **427**	0.008 **.00030**	130 **427**	0.009 **.00033**	140 **459**	0.009 **.00033**	140 **459**	0.010 **.00040**	150 **492**	0.012 **.00047**	170 **558**	0.016 **.00063**	170 **558**	0.016 **.00063**	170 **558**	0.017 **.00067**
	130 **427**	0.017 **.00067**	130 **427**	0.019 **.00074**	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00100**	150 **492**	0.034 **.00132**	170 **558**	0.035 **.00139**	170 **558**	0.035 **.00139**	170 **558**	0.037 **.00147**
	130 **427**	0.017 **.00067**	130 **427**	0.019 **.00074**	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00100**	150 **492**	0.034 **.00132**	170 **558**	0.035 **.00139**	170 **558**	0.035 **.00139**	170 **558**	0.037 **.00147**
	180 **591**	0.008 **.00030**	180 **591**	0.009 **.00033**	200 **656**	0.009 **.00033**	200 **656**	0.010 **.00040**	220 **722**	0.012 **.00047**	240 **787**	0.016 **.00063**	240 **787**	0.016 **.00063**	240 **787**	0.017 **.00067**
	140 **459**	0.012 **.00047**	140 **459**	0.015 **.00060**	180 **591**	0.017 **.00067**	180 **591**	0.022 **.00087**	200 **656**	0.028 **.00110**	240 **787**	0.032 **.00126**	240 **787**	0.032 **.00126**	240 **787**	0.034 **.00134**

CRAZYMILL by Mikron Tool Cool

NEW Type A - Finishing

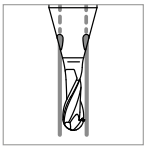
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

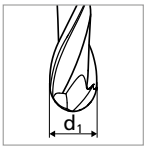
Inclination 15°



- $a_p = 0.1 \times d_1$
- $a_e = 0.05 - 0.1 \times d_1$

$n_{max} = 60'000$ rpm

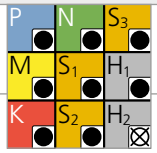




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.014 **.00055**	140 **459**	0.016 **.00063**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.011 **.00043**	140 **459**	0.013 **.00051**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.016 **.00063**	140 **459**	0.018 **.00071**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.012 **.00047**	140 **459**	0.014 **.00055**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.011 **.00043**	120 **394**	0.022 **.00087**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	120 **394**	0.007 **.00028**	120 **394**	0.008 **.00031**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.016 **.00063**	120 **394**	0.018 **.00071**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.016 **.00063**	120 **394**	0.018 **.00071**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	140 **459**	0.007 **.00028**	140 **459**	0.008 **.00031**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	100 **328**	0.010 **.00039**	100 **328**	0.012 **.00047**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.024 **.00094**	200 **656**	0.026 **.00102**	220 **722**	0.034 **.00134**	220 **722**	0.036 **.00142**	240 **787**	0.042 **.00166**	260 **853**	0.044 **.00173**	260 **853**	0.044 **.00173**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.040 **.00159**	260 **853**	0.042 **.00166**	260 **853**	0.042 **.00166**	260 **853**	0.045 **.00177**
	200 **656**	0.020 **.00079**	200 **656**	0.022 **.00087**	220 **722**	0.030 **.00118**	220 **722**	0.032 **.00126**	240 **787**	0.037 **.00146**	260 **853**	0.039 **.00152**	260 **853**	0.039 **.00152**	260 **853**	0.041 **.00162**
	200 **656**	0.024 **.00094**	200 **656**	0.026 **.00102**	220 **722**	0.034 **.00134**	220 **722**	0.036 **.00142**	240 **787**	0.040 **.00159**	260 **853**	0.042 **.00166**	260 **853**	0.042 **.00166**	260 **853**	0.045 **.00177**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.039 **.00152**	260 **853**	0.040 **.00159**	260 **853**	0.040 **.00159**	260 **853**	0.043 **.00169**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.039 **.00152**	260 **853**	0.040 **.00159**	260 **853**	0.040 **.00159**	260 **853**	0.043 **.00169**
	200 **656**	0.016 **.00063**	200 **656**	0.018 **.00071**	220 **722**	0.030 **.00118**	220 **722**	0.032 **.00126**	240 **787**	0.037 **.00146**	260 **853**	0.039 **.00152**	260 **853**	0.039 **.00152**	260 **853**	0.041 **.00162**
	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00102**	160 **525**	0.028 **.00110**	160 **525**	0.036 **.00142**	180 **591**	0.039 **.00152**	200 **656**	0.048 **.00191**	200 **656**	0.048 **.00191**	200 **656**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	130 **427**	0.009 **.00035**	130 **427**	0.010 **.00039**	140 **459**	0.010 **.00039**	140 **459**	0.012 **.00047**	150 **492**	0.013 **.00052**	170 **558**	0.018 **.00069**	170 **558**	0.018 **.00069**	170 **558**	0.019 **.00074**
	130 **427**	0.020 **.00079**	130 **427**	0.022 **.00087**	140 **459**	0.028 **.00110**	140 **459**	0.030 **.00118**	150 **492**	0.037 **.00146**	170 **558**	0.039 **.00152**	170 **558**	0.039 **.00152**	170 **558**	0.041 **.00162**
	130 **427**	0.020 **.00079**	130 **427**	0.022 **.00087**	140 **459**	0.028 **.00110**	140 **459**	0.030 **.00118**	150 **492**	0.037 **.00146**	170 **558**	0.039 **.00152**	170 **558**	0.039 **.00152**	170 **558**	0.041 **.00162**
	180 **591**	0.009 **.00035**	180 **591**	0.010 **.00039**	200 **656**	0.010 **.00039**	200 **656**	0.012 **.00047**	220 **722**	0.013 **.00052**	240 **787**	0.018 **.00069**	240 **787**	0.018 **.00069**	240 **787**	0.019 **.00074**
	140 **459**	0.014 **.00055**	140 **459**	0.018 **.00071**	180 **591**	0.020 **.00079**	180 **591**	0.026 **.00102**	200 **656**	0.031 **.00121**	240 **787**	0.035 **.00139**	240 **787**	0.035 **.00139**	240 **787**	0.037 **.00147**

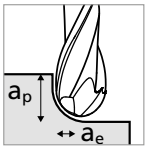
CRAZYMILL by Mikron Tool Cool

NEW Type B - Semi-finishing

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Possibility 1

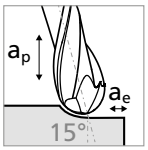
Inclination 0°



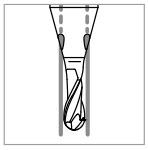
- $a_p = 1 \times d_1$
- $a_e = 0.2 \times d_1$

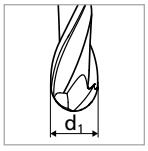
Possibility 2

Inclination 15°



- $a_p = 0.5 \times d_1$
- $a_e = 0.2 \times d_1$

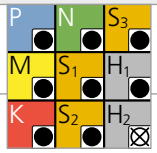




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.012 **.00047**	140 **459**	0.014 **.00054**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.009 **.00037**	140 **459**	0.011 **.00044**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.014 **.00054**	140 **459**	0.015 **.00060**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.010 **.00040**	140 **459**	0.012 **.00047**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.009 **.00037**	120 **394**	0.019 **.00074**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	120 **394**	0.006 **.00023**	120 **394**	0.007 **.00027**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.014 **.00054**	120 **394**	0.015 **.00060**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.014 **.00054**	120 **394**	0.015 **.00060**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	140 **459**	0.006 **.00023**	140 **459**	0.007 **.00027**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	100 **328**	0.009 **.00033**	100 **328**	0.010 **.00040**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



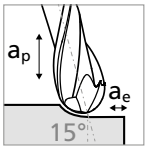
Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.020 **.00080**	200 **656**	0.022 **.00087**	220 **722**	0.029 **.00114**	220 **722**	0.031 **.00120**	240 **787**	0.037 **.00145**	260 **853**	0.040 **.00157**	260 **853**	0.040 **.00157**	260 **853**	0.043 **.00167**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.035 **.00139**	260 **853**	0.038 **.00151**	260 **853**	0.038 **.00151**	260 **853**	0.041 **.00161**
	200 **656**	0.017 **.00067**	200 **656**	0.019 **.00074**	220 **722**	0.026 **.00100**	220 **722**	0.027 **.00107**	240 **787**	0.032 **.00126**	260 **853**	0.034 **.00132**	260 **853**	0.034 **.00132**	260 **853**	0.036 **.00141**
	200 **656**	0.020 **.00080**	200 **656**	0.022 **.00087**	220 **722**	0.029 **.00114**	220 **722**	0.031 **.00120**	240 **787**	0.035 **.00139**	260 **853**	0.038 **.00151**	260 **853**	0.038 **.00151**	260 **853**	0.041 **.00161**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.035 **.00139**	260 **853**	0.037 **.00145**	260 **853**	0.037 **.00145**	260 **853**	0.039 **.00154**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.035 **.00139**	260 **853**	0.037 **.00145**	260 **853**	0.037 **.00145**	260 **853**	0.039 **.00154**
	200 **656**	0.014 **.00054**	200 **656**	0.015 **.00060**	220 **722**	0.026 **.00100**	220 **722**	0.027 **.00107**	240 **787**	0.032 **.00126**	260 **853**	0.035 **.00139**	260 **853**	0.035 **.00139**	260 **853**	0.037 **.00147**
	140 **459**	0.020 **.00080**	140 **459**	0.022 **.00087**	160 **525**	0.024 **.00094**	160 **525**	0.031 **.00120**	180 **591**	0.034 **.00135**	200 **656**	0.040 **.00157**	200 **656**	0.042 **.00164**	200 **656**	0.044 **.00174**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	130 **427**	0.008 **.00030**	130 **427**	0.009 **.00033**	140 **459**	0.009 **.00033**	140 **459**	0.010 **.00040**	150 **492**	0.012 **.00047**	170 **558**	0.016 **.00063**	170 **558**	0.016 **.00063**	170 **558**	0.017 **.00067**
	130 **427**	0.017 **.00067**	130 **427**	0.019 **.00074**	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00100**	150 **492**	0.032 **.00126**	170 **558**	0.035 **.00139**	170 **558**	0.035 **.00139**	170 **558**	0.037 **.00147**
	130 **427**	0.017 **.00067**	130 **427**	0.019 **.00074**	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00100**	150 **492**	0.032 **.00126**	170 **558**	0.035 **.00139**	170 **558**	0.035 **.00139**	170 **558**	0.037 **.00147**
	180 **591**	0.008 **.00030**	180 **591**	0.009 **.00033**	200 **656**	0.009 **.00033**	200 **656**	0.010 **.00040**	220 **722**	0.012 **.00047**	240 **787**	0.016 **.00063**	240 **787**	0.016 **.00063**	240 **787**	0.017 **.00067**
	140 **459**	0.012 **.00047**	140 **459**	0.015 **.00060**	180 **591**	0.017 **.00067**	180 **591**	0.022 **.00087**	200 **656**	0.026 **.00104**	240 **787**	0.032 **.00126**	240 **787**	0.032 **.00126**	240 **787**	0.034 **.00134**

CRAZYMILL by Mikron Tool Cool

NEW Type B - Finishing

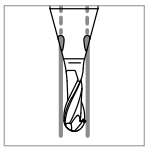
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

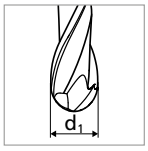
Inclination 15°



- $a_p = 0.1 \times d_1$
- $a_e = 0.05 - 0.1 \times d_1$

$n_{max} = 60'000$ rpm

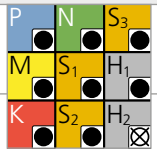




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.014 **.00055**	140 **459**	0.016 **.00063**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.011 **.00043**	140 **459**	0.013 **.00051**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.016 **.00063**	140 **459**	0.018 **.00071**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.012 **.00047**	140 **459**	0.014 **.00055**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.011 **.00043**	120 **394**	0.022 **.00087**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	120 **394**	0.007 **.00028**	120 **394**	0.008 **.00031**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.016 **.00063**	120 **394**	0.018 **.00071**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.016 **.00063**	120 **394**	0.018 **.00071**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	140 **459**	0.007 **.00028**	140 **459**	0.008 **.00031**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	100 **328**	0.010 **.00039**	100 **328**	0.012 **.00047**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.024 **.00094**	200 **656**	0.026 **.00102**	220 **722**	0.034 **.00134**	220 **722**	0.036 **.00142**	240 **787**	0.040 **.00159**	260 **853**	0.044 **.00173**	260 **853**	0.044 **.00173**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.039 **.00152**	260 **853**	0.042 **.00166**	260 **853**	0.042 **.00166**	260 **853**	0.045 **.00177**
	200 **656**	0.020 **.00079**	200 **656**	0.022 **.00087**	220 **722**	0.030 **.00118**	220 **722**	0.032 **.00126**	240 **787**	0.035 **.00139**	260 **853**	0.037 **.00146**	260 **853**	0.037 **.00146**	260 **853**	0.039 **.00155**
	200 **656**	0.024 **.00094**	200 **656**	0.026 **.00102**	220 **722**	0.034 **.00134**	220 **722**	0.036 **.00142**	240 **787**	0.039 **.00152**	260 **853**	0.042 **.00166**	260 **853**	0.042 **.00166**	260 **853**	0.045 **.00177**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.039 **.00152**	260 **853**	0.040 **.00159**	260 **853**	0.040 **.00159**	260 **853**	0.043 **.00169**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.039 **.00152**	260 **853**	0.040 **.00159**	260 **853**	0.040 **.00159**	260 **853**	0.043 **.00169**
	200 **656**	0.016 **.00063**	200 **656**	0.018 **.00071**	220 **722**	0.030 **.00118**	220 **722**	0.032 **.00126**	240 **787**	0.035 **.00139**	260 **853**	0.039 **.00152**	260 **853**	0.039 **.00152**	260 **853**	0.041 **.00162**
	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00102**	160 **525**	0.028 **.00110**	160 **525**	0.036 **.00142**	180 **591**	0.038 **.00149**	200 **656**	0.044 **.00173**	200 **656**	0.046 **.00180**	200 **656**	0.049 **.00191**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	130 **427**	0.009 **.00035**	130 **427**	0.010 **.00039**	140 **459**	0.010 **.00039**	140 **459**	0.012 **.00047**	150 **492**	0.013 **.00052**	170 **558**	0.018 **.00069**	170 **558**	0.018 **.00069**	170 **558**	0.019 **.00074**
	130 **427**	0.020 **.00079**	130 **427**	0.022 **.00087**	140 **459**	0.028 **.00110**	140 **459**	0.030 **.00118**	150 **492**	0.035 **.00139**	170 **558**	0.039 **.00152**	170 **558**	0.039 **.00152**	170 **558**	0.041 **.00162**
	130 **427**	0.020 **.00079**	130 **427**	0.022 **.00087**	140 **459**	0.028 **.00110**	140 **459**	0.030 **.00118**	150 **492**	0.035 **.00139**	170 **558**	0.039 **.00152**	170 **558**	0.039 **.00152**	170 **558**	0.041 **.00162**
	180 **591**	0.009 **.00035**	180 **591**	0.010 **.00039**	200 **656**	0.010 **.00039**	200 **656**	0.012 **.00047**	220 **722**	0.013 **.00052**	240 **787**	0.018 **.00069**	240 **787**	0.018 **.00069**	240 **787**	0.019 **.00074**
	140 **459**	0.014 **.00055**	140 **459**	0.018 **.00071**	180 **591**	0.020 **.00079**	180 **591**	0.026 **.00102**	200 **656**	0.029 **.00114**	240 **787**	0.035 **.00139**	240 **787**	0.035 **.00139**	240 **787**	0.037 **.00147**

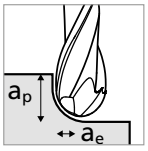
CRAZYMILL by Mikron Tool Cool

NEW Type C - Semi-finishing

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Possibility 1

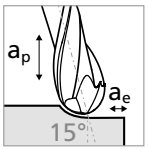
Inclination 0°



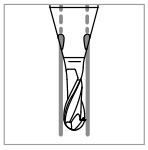
- $a_p = 0.5 \times d_1$
- $a_e = 0.2 \times d_1$

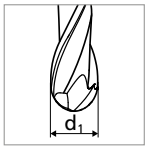
Possibility 2

Inclination 15°



- $a_p = 0.5 \times d_1$
- $a_e = 0.2 \times d_1$

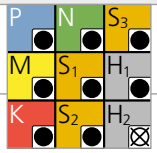




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.012 **.00047**	140 **459**	0.014 **.00054**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.009 **.00037**	140 **459**	0.011 **.00044**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.014 **.00054**	140 **459**	0.015 **.00060**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.010 **.00040**	140 **459**	0.012 **.00047**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.009 **.00037**	120 **394**	0.019 **.00074**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	120 **394**	0.006 **.00023**	120 **394**	0.007 **.00027**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.014 **.00054**	120 **394**	0.015 **.00060**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.014 **.00054**	120 **394**	0.015 **.00060**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	140 **459**	0.006 **.00023**	140 **459**	0.007 **.00027**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	100 **328**	0.009 **.00033**	100 **328**	0.010 **.00040**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



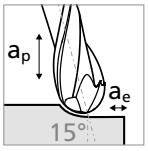
Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.020 **.00080**	200 **656**	0.022 **.00087**	220 **722**	0.029 **.00114**	220 **722**	0.031 **.00120**	240 **787**	0.032 **.00126**	260 **853**	0.040 **.00157**	260 **853**	0.040 **.00157**	260 **853**	0.043 **.00167**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.030 **.00120**	260 **853**	0.038 **.00151**	260 **853**	0.038 **.00151**	260 **853**	0.041 **.00161**
	200 **656**	0.017 **.00067**	200 **656**	0.019 **.00074**	220 **722**	0.026 **.00100**	220 **722**	0.027 **.00107**	240 **787**	0.028 **.00110**	260 **853**	0.035 **.00139**	260 **853**	0.034 **.00132**	260 **853**	0.037 **.00147**
	200 **656**	0.020 **.00080**	200 **656**	0.022 **.00087**	220 **722**	0.029 **.00114**	220 **722**	0.031 **.00120**	240 **787**	0.032 **.00126**	260 **853**	0.038 **.00151**	260 **853**	0.038 **.00151**	260 **853**	0.041 **.00161**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.029 **.00113**	260 **853**	0.037 **.00145**	260 **853**	0.037 **.00145**	260 **853**	0.039 **.00154**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.029 **.00113**	260 **853**	0.037 **.00145**	260 **853**	0.037 **.00145**	260 **853**	0.039 **.00154**
	200 **656**	0.014 **.00054**	200 **656**	0.015 **.00060**	220 **722**	0.026 **.00100**	220 **722**	0.027 **.00107**	240 **787**	0.027 **.00107**	260 **853**	0.035 **.00139**	260 **853**	0.035 **.00139**	260 **853**	0.037 **.00147**
	140 **459**	0.020 **.00080**	140 **459**	0.022 **.00087**	160 **525**	0.024 **.00094**	160 **525**	0.031 **.00120**	180 **591**	0.034 **.00132**	200 **656**	0.042 **.00164**	200 **656**	0.042 **.00164**	200 **656**	0.044 **.00174**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	130 **427**	0.008 **.00030**	130 **427**	0.009 **.00033**	140 **459**	0.009 **.00033**	140 **459**	0.010 **.00040**	150 **492**	0.012 **.00047**	170 **558**	0.016 **.00063**	170 **558**	0.016 **.00063**	170 **558**	0.017 **.00067**
	130 **427**	0.017 **.00067**	130 **427**	0.019 **.00074**	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00100**	150 **492**	0.027 **.00107**	170 **558**	0.034 **.00132**	170 **558**	0.035 **.00139**	170 **558**	0.036 **.00141**
	130 **427**	0.017 **.00067**	130 **427**	0.019 **.00074**	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00100**	150 **492**	0.027 **.00107**	170 **558**	0.034 **.00132**	170 **558**	0.035 **.00139**	170 **558**	0.036 **.00141**
	180 **591**	0.008 **.00030**	180 **591**	0.009 **.00033**	200 **656**	0.009 **.00033**	200 **656**	0.010 **.00040**	220 **722**	0.012 **.00047**	240 **787**	0.016 **.00063**	240 **787**	0.016 **.00063**	240 **787**	0.017 **.00067**
	140 **459**	0.012 **.00047**	140 **459**	0.015 **.00060**	180 **591**	0.017 **.00067**	180 **591**	0.022 **.00087**	200 **656**	0.024 **.00094**	240 **787**	0.026 **.00101**	240 **787**	0.032 **.00126**	240 **787**	0.027 **.00107**

CRAZYMILL by Mikron Tool Cool

NEW Type C - Finishing

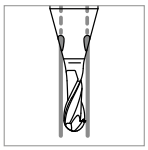
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

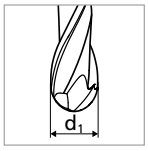
Inclination 15°



- $a_p = 0.1 \times d_1$
- $a_e = 0.05 - 0.1 \times d_1$

$n_{max} = 60'000$ rpm

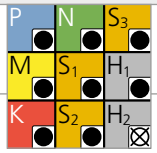




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.014 **.00055**	140 **459**	0.016 **.00063**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.011 **.00043**	140 **459**	0.013 **.00051**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.016 **.00063**	140 **459**	0.018 **.00071**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.012 **.00047**	140 **459**	0.014 **.00055**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.011 **.00043**	120 **394**	0.022 **.00087**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	120 **394**	0.007 **.00028**	120 **394**	0.008 **.00031**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.016 **.00063**	120 **394**	0.018 **.00071**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.016 **.00063**	120 **394**	0.018 **.00071**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	140 **459**	0.007 **.00028**	140 **459**	0.008 **.00031**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	100 **328**	0.010 **.00039**	100 **328**	0.012 **.00047**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.024 **.00094**	200 **656**	0.026 **.00102**	220 **722**	0.034 **.00134**	220 **722**	0.036 **.00142**	240 **787**	0.035 **.00139**	260 **853**	0.044 **.00173**	260 **853**	0.044 **.00173**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.033 **.00132**	260 **853**	0.042 **.00166**	260 **853**	0.042 **.00166**	260 **853**	0.045 **.00177**
	200 **656**	0.020 **.00079**	200 **656**	0.022 **.00087**	220 **722**	0.030 **.00118**	220 **722**	0.032 **.00126**	240 **787**	0.031 **.00121**	260 **853**	0.039 **.00152**	260 **853**	0.037 **.00146**	260 **853**	0.041 **.00162**
	200 **656**	0.024 **.00094**	200 **656**	0.026 **.00102**	220 **722**	0.034 **.00134**	220 **722**	0.036 **.00142**	240 **787**	0.035 **.00139**	260 **853**	0.042 **.00166**	260 **853**	0.042 **.00166**	260 **853**	0.045 **.00177**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.032 **.00125**	260 **853**	0.040 **.00159**	260 **853**	0.040 **.00159**	260 **853**	0.043 **.00169**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.032 **.00125**	260 **853**	0.040 **.00159**	260 **853**	0.040 **.00159**	260 **853**	0.043 **.00169**
	200 **656**	0.016 **.00063**	200 **656**	0.018 **.00071**	220 **722**	0.030 **.00118**	220 **722**	0.032 **.00126**	240 **787**	0.030 **.00118**	260 **853**	0.039 **.00152**	260 **853**	0.039 **.00152**	260 **853**	0.041 **.00162**
	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00102**	160 **525**	0.028 **.00110**	160 **525**	0.036 **.00142**	180 **591**	0.037 **.00146**	200 **656**	0.046 **.00180**	200 **656**	0.046 **.00180**	200 **656**	0.049 **.00191**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	130 **427**	0.009 **.00035**	130 **427**	0.010 **.00039**	140 **459**	0.010 **.00039**	140 **459**	0.012 **.00047**	150 **492**	0.013 **.00052**	170 **558**	0.018 **.00069**	170 **558**	0.018 **.00069**	170 **558**	0.019 **.00074**
	130 **427**	0.020 **.00079**	130 **427**	0.022 **.00087**	140 **459**	0.028 **.00110**	140 **459**	0.030 **.00118**	150 **492**	0.030 **.00118**	170 **558**	0.037 **.00146**	170 **558**	0.039 **.00152**	170 **558**	0.039 **.00155**
	130 **427**	0.020 **.00079**	130 **427**	0.022 **.00087**	140 **459**	0.028 **.00110**	140 **459**	0.030 **.00118**	150 **492**	0.030 **.00118**	170 **558**	0.037 **.00146**	170 **558**	0.039 **.00152**	170 **558**	0.039 **.00155**
	180 **591**	0.009 **.00035**	180 **591**	0.010 **.00039**	200 **656**	0.010 **.00039**	200 **656**	0.012 **.00047**	220 **722**	0.013 **.00052**	240 **787**	0.018 **.00069**	240 **787**	0.018 **.00069**	240 **787**	0.019 **.00074**
	140 **459**	0.014 **.00055**	140 **459**	0.018 **.00071**	180 **591**	0.020 **.00079**	180 **591**	0.026 **.00102**	200 **656**	0.026 **.00104**	240 **787**	0.028 **.00111**	240 **787**	0.035 **.00139**	240 **787**	0.030 **.00118**

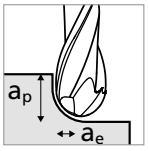
CRAZYMILL by Mikron Tool Cool

NEW Type M - Semi-finishing

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Possibility 1

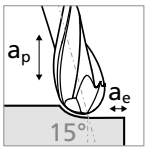
Inclination 0°



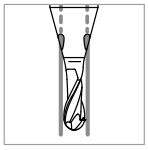
- $a_p = 1 \times d_1$
- $a_e = 0.2 \times d_1$

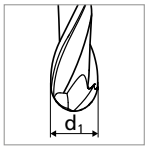
Possibility 2

Inclination 15°



- $a_p = 0.5 \times d_1$
- $a_e = 0.2 \times d_1$

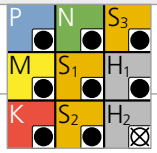




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.012 **.00047**	140 **459**	0.014 **.00054**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.009 **.00037**	140 **459**	0.011 **.00044**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.014 **.00054**	140 **459**	0.015 **.00060**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.010 **.00040**	140 **459**	0.012 **.00047**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.009 **.00037**	120 **394**	0.019 **.00074**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	120 **394**	0.006 **.00023**	120 **394**	0.007 **.00027**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.014 **.00054**	120 **394**	0.015 **.00060**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.014 **.00054**	120 **394**	0.015 **.00060**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	140 **459**	0.006 **.00023**	140 **459**	0.007 **.00027**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	100 **328**	0.009 **.00033**	100 **328**	0.010 **.00040**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



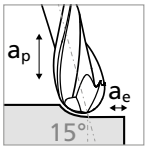
Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.020 **.00080**	200 **656**	0.022 **.00087**	220 **722**	0.029 **.00114**	220 **722**	0.031 **.00120**	240 **787**	0.037 **.00145**	260 **853**	0.040 **.00157**	260 **853**	0.040 **.00157**	260 **853**	0.043 **.00167**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.035 **.00139**	260 **853**	0.038 **.00151**	260 **853**	0.038 **.00151**	260 **853**	0.041 **.00161**
	200 **656**	0.017 **.00067**	200 **656**	0.019 **.00074**	220 **722**	0.026 **.00100**	220 **722**	0.027 **.00107**	240 **787**	0.032 **.00126**	260 **853**	0.034 **.00132**	260 **853**	0.034 **.00132**	260 **853**	0.036 **.00141**
	200 **656**	0.020 **.00080**	200 **656**	0.022 **.00087**	220 **722**	0.029 **.00114**	220 **722**	0.031 **.00120**	240 **787**	0.035 **.00139**	260 **853**	0.038 **.00151**	260 **853**	0.038 **.00151**	260 **853**	0.041 **.00161**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.035 **.00139**	260 **853**	0.037 **.00145**	260 **853**	0.037 **.00145**	260 **853**	0.039 **.00154**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.035 **.00139**	260 **853**	0.037 **.00145**	260 **853**	0.037 **.00145**	260 **853**	0.039 **.00154**
	200 **656**	0.014 **.00054**	200 **656**	0.015 **.00060**	220 **722**	0.026 **.00100**	220 **722**	0.027 **.00107**	240 **787**	0.032 **.00126**	260 **853**	0.035 **.00139**	260 **853**	0.035 **.00139**	260 **853**	0.037 **.00147**
	140 **459**	0.020 **.00080**	140 **459**	0.022 **.00087**	160 **525**	0.024 **.00094**	160 **525**	0.031 **.00120**	180 **591**	0.034 **.00135**	200 **656**	0.040 **.00157**	200 **656**	0.042 **.00164**	200 **656**	0.044 **.00174**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.048 **.00189**	260 **853**	0.048 **.00189**	260 **853**	0.051 **.00201**
	130 **427**	0.008 **.00030**	130 **427**	0.009 **.00033**	140 **459**	0.009 **.00033**	140 **459**	0.010 **.00040**	150 **492**	0.012 **.00047**	170 **558**	0.016 **.00063**	170 **558**	0.016 **.00063**	170 **558**	0.017 **.00067**
	130 **427**	0.017 **.00067**	130 **427**	0.019 **.00074**	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00100**	150 **492**	0.032 **.00126**	170 **558**	0.035 **.00139**	170 **558**	0.035 **.00139**	170 **558**	0.037 **.00147**
	130 **427**	0.017 **.00067**	130 **427**	0.019 **.00074**	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00100**	150 **492**	0.032 **.00126**	170 **558**	0.035 **.00139**	170 **558**	0.035 **.00139**	170 **558**	0.037 **.00147**
	180 **591**	0.008 **.00030**	180 **591**	0.009 **.00033**	200 **656**	0.009 **.00033**	200 **656**	0.010 **.00040**	220 **722**	0.012 **.00047**	240 **787**	0.016 **.00063**	240 **787**	0.016 **.00063**	240 **787**	0.017 **.00067**
	140 **459**	0.012 **.00047**	140 **459**	0.015 **.00060**	180 **591**	0.017 **.00067**	180 **591**	0.022 **.00087**	200 **656**	0.026 **.00104**	240 **787**	0.032 **.00126**	240 **787**	0.032 **.00126**	240 **787**	0.034 **.00134**

CRAZYMILL by Mikron Tool Cool

NEW Type M - Finishing

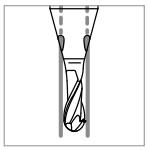
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

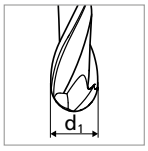
Inclination 15°



- $a_p = 0.1 \times d_1$
- $a_e = 0.05 - 0.1 \times d_1$

$n_{max} = 60'000$ rpm

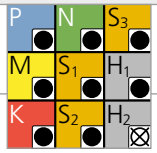




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.014 **.00055**	140 **459**	0.016 **.00063**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.011 **.00043**	140 **459**	0.013 **.00051**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.016 **.00063**	140 **459**	0.018 **.00071**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.012 **.00047**	140 **459**	0.014 **.00055**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.011 **.00043**	120 **394**	0.022 **.00087**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	120 **394**	0.007 **.00028**	120 **394**	0.008 **.00031**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.016 **.00063**	120 **394**	0.018 **.00071**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.016 **.00063**	120 **394**	0.018 **.00071**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	140 **459**	0.007 **.00028**	140 **459**	0.008 **.00031**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	100 **328**	0.010 **.00039**	100 **328**	0.012 **.00047**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



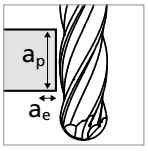
Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.024 **.00094**	200 **656**	0.026 **.00102**	220 **722**	0.034 **.00134**	220 **722**	0.036 **.00142**	240 **787**	0.040 **.00159**	260 **853**	0.044 **.00173**	260 **853**	0.044 **.00173**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.039 **.00152**	260 **853**	0.042 **.00166**	260 **853**	0.042 **.00166**	260 **853**	0.045 **.00177**
	200 **656**	0.020 **.00079**	200 **656**	0.022 **.00087**	220 **722**	0.030 **.00118**	220 **722**	0.032 **.00126**	240 **787**	0.035 **.00139**	260 **853**	0.037 **.00146**	260 **853**	0.037 **.00146**	260 **853**	0.039 **.00155**
	200 **656**	0.024 **.00094**	200 **656**	0.026 **.00102**	220 **722**	0.034 **.00134**	220 **722**	0.036 **.00142**	240 **787**	0.039 **.00152**	260 **853**	0.042 **.00166**	260 **853**	0.042 **.00166**	260 **853**	0.045 **.00177**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.039 **.00152**	260 **853**	0.040 **.00159**	260 **853**	0.040 **.00159**	260 **853**	0.043 **.00169**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.039 **.00152**	260 **853**	0.040 **.00159**	260 **853**	0.040 **.00159**	260 **853**	0.043 **.00169**
	200 **656**	0.016 **.00063**	200 **656**	0.018 **.00071**	220 **722**	0.030 **.00118**	220 **722**	0.032 **.00126**	240 **787**	0.035 **.00139**	260 **853**	0.039 **.00152**	260 **853**	0.039 **.00152**	260 **853**	0.041 **.00162**
	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00102**	160 **525**	0.028 **.00110**	160 **525**	0.036 **.00142**	180 **591**	0.038 **.00149**	200 **656**	0.044 **.00173**	200 **656**	0.046 **.00180**	200 **656**	0.049 **.00191**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.053 **.00208**	260 **853**	0.053 **.00208**	260 **853**	0.056 **.00221**
	130 **427**	0.009 **.00035**	130 **427**	0.010 **.00039**	140 **459**	0.010 **.00039**	140 **459**	0.012 **.00047**	150 **492**	0.013 **.00052**	170 **558**	0.018 **.00069**	170 **558**	0.018 **.00069**	170 **558**	0.019 **.00074**
	130 **427**	0.020 **.00079**	130 **427**	0.022 **.00087**	140 **459**	0.028 **.00110**	140 **459**	0.030 **.00118**	150 **492**	0.035 **.00139**	170 **558**	0.039 **.00152**	170 **558**	0.039 **.00152**	170 **558**	0.041 **.00162**
	130 **427**	0.020 **.00079**	130 **427**	0.022 **.00087**	140 **459**	0.028 **.00110**	140 **459**	0.030 **.00118**	150 **492**	0.035 **.00139**	170 **558**	0.039 **.00152**	170 **558**	0.039 **.00152**	170 **558**	0.041 **.00162**
	180 **591**	0.009 **.00035**	180 **591**	0.010 **.00039**	200 **656**	0.010 **.00039**	200 **656**	0.012 **.00047**	220 **722**	0.013 **.00052**	240 **787**	0.018 **.00069**	240 **787**	0.018 **.00069**	240 **787**	0.019 **.00074**
	140 **459**	0.014 **.00055**	140 **459**	0.018 **.00071**	180 **591**	0.020 **.00079**	180 **591**	0.026 **.00102**	200 **656**	0.029 **.00114**	240 **787**	0.035 **.00139**	240 **787**	0.035 **.00139**	240 **787**	0.037 **.00147**

CRAZYMILL by Mikron Tool Cool

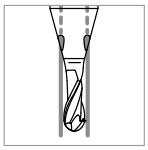
NEW Type M - Side-finishing

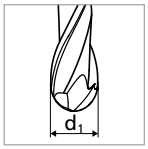
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Inclination 0°



- $a_p = 3 \times d_1$
- $a_e = 0.02 - 0.1 \times d_1$

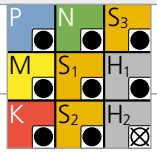




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	130 **425**	0.008 **.00031**	130 **425**	0.009 **.00035**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	130 **425**	0.007 **.00028**	130 **425**	0.008 **.00031**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	130 **425**	0.006 **.00024**	130 **425**	0.007 **.00028**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	130 **425**	0.008 **.00031**	130 **425**	0.009 **.00035**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	130 **425**	0.008 **.00031**	130 **425**	0.009 **.00035**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	130 **425**	0.008 **.00031**	130 **425**	0.009 **.00035**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	130 **425**	0.006 **.00024**	130 **425**	0.007 **.00028**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	111 **365**	0.006 **.00024**	111 **365**	0.011 **.00043**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	130 **425**	0.009 **.00035**	130 **425**	0.010 **.00039**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	130 **425**	0.009 **.00035**	130 **425**	0.010 **.00039**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	130 **425**	0.010 **.00039**	130 **425**	0.011 **.00043**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	130 **425**	0.010 **.00039**	130 **425**	0.011 **.00043**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	130 **425**	0.010 **.00039**	130 **425**	0.011 **.00043**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	130 **425**	0.009 **.00035**	130 **425**	0.010 **.00039**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	111 **365**	0.004 **.00016**	111 **365**	0.004 **.00016**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	111 **365**	0.008 **.00031**	111 **365**	0.009 **.00035**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	111 **365**	0.008 **.00031**	111 **365**	0.009 **.00035**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	130 **425**	0.004 **.00016**	130 **425**	0.004 **.00016**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	93 **304**	0.005 **.00020**	93 **304**	0.006 **.00024**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	180 **591**	0.012 **.00047**	180 **591**	0.013 **.00051**	200 **656**	0.017 **.00067**	200 **656**	0.018 **.00071**	210 **688**	0.023 **.00091**	220 **722**	0.025 **.00098**	220 **722**	0.028 **.00110**	220 **722**	0.033 **.00130**
	180 **591**	0.011 **.00043**	180 **591**	0.012 **.00047**	200 **656**	0.016 **.00063**	200 **656**	0.017 **.00067**	210 **688**	0.022 **.00087**	220 **722**	0.024 **.00094**	220 **722**	0.026 **.00102**	220 **722**	0.029 **.00114**
	180 **591**	0.010 **.00039**	180 **591**	0.011 **.00043**	200 **656**	0.015 **.00059**	200 **656**	0.016 **.00063**	210 **688**	0.020 **.00079**	220 **722**	0.021 **.00083**	220 **722**	0.023 **.00091**	220 **722**	0.025 **.00098**
	180 **591**	0.012 **.00047**	180 **591**	0.013 **.00051**	200 **656**	0.017 **.00067**	200 **656**	0.018 **.00071**	210 **688**	0.022 **.00087**	220 **722**	0.024 **.00094**	220 **722**	0.026 **.00102**	220 **722**	0.029 **.00114**
	180 **591**	0.011 **.00043**	180 **591**	0.012 **.00047**	200 **656**	0.016 **.00063**	200 **656**	0.017 **.00067**	210 **688**	0.022 **.00087**	220 **722**	0.023 **.00091**	220 **722**	0.025 **.00098**	220 **722**	0.028 **.00110**
	180 **591**	0.011 **.00043**	180 **591**	0.012 **.00047**	200 **656**	0.016 **.00063**	200 **656**	0.017 **.00067**	210 **688**	0.022 **.00087**	220 **722**	0.023 **.00091**	220 **722**	0.025 **.00098**	220 **722**	0.028 **.00110**
	180 **591**	0.008 **.00031**	180 **591**	0.009 **.00035**	200 **656**	0.015 **.00059**	200 **656**	0.016 **.00063**	210 **688**	0.020 **.00079**	220 **722**	0.022 **.00087**	220 **722**	0.024 **.00094**	220 **722**	0.026 **.00102**
	126 **414**	0.012 **.00047**	126 **414**	0.013 **.00051**	145 **477**	0.014 **.00055**	145 **477**	0.018 **.00071**	157 **516**	0.022 **.00087**	169 **556**	0.025 **.00098**	169 **556**	0.029 **.00114**	169 **556**	0.031 **.00122**
	180 **591**	0.013 **.00051**	180 **591**	0.014 **.00055**	200 **656**	0.018 **.00071**	200 **656**	0.020 **.00079**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**
	180 **591**	0.013 **.00051**	180 **591**	0.014 **.00055**	200 **656**	0.018 **.00071**	200 **656**	0.020 **.00079**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**
	180 **591**	0.013 **.00051**	180 **591**	0.014 **.00055**	200 **656**	0.018 **.00071**	200 **656**	0.020 **.00079**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**
	180 **591**	0.013 **.00051**	180 **591**	0.014 **.00055**	200 **656**	0.018 **.00071**	200 **656**	0.020 **.00079**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**
	180 **591**	0.013 **.00051**	180 **591**	0.014 **.00055**	200 **656**	0.018 **.00071**	200 **656**	0.020 **.00079**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**
	180 **591**	0.013 **.00051**	180 **591**	0.014 **.00055**	200 **656**	0.018 **.00071**	200 **656**	0.020 **.00079**	210 **688**	0.029 **.00114**	220 **722**	0.030 **.00118**	220 **722**	0.033 **.00130**	220 **722**	0.036 **.00142**
	117 **384**	0.005 **.00020**	117 **384**	0.005 **.00020**	127 **418**	0.005 **.00020**	127 **418**	0.006 **.00024**	131 **430**	0.008 **.00031**	144 **473**	0.010 **.00039**	144 **473**	0.011 **.00043**	144 **473**	0.012 **.00047**
	117 **384**	0.010 **.00039**	117 **384**	0.011 **.00043**	127 **418**	0.014 **.00055**	127 **418**	0.015 **.00059**	131 **430**	0.020 **.00079**	144 **473**	0.022 **.00087**	144 **473**	0.024 **.00094**	144 **473**	0.026 **.00102**
	117 **384**	0.010 **.00039**	117 **384**	0.011 **.00043**	127 **418**	0.014 **.00055**	127 **418**	0.015 **.00059**	131 **430**	0.020 **.00079**	144 **473**	0.022 **.00087**	144 **473**	0.024 **.00094**	144 **473**	0.026 **.00102**
	162 **532**	0.005 **.00020**	162 **532**	0.005 **.00020**	182 **597**	0.005 **.00020**	182 **597**	0.006 **.00024**	192 **630**	0.008 **.00031**	203 **667**	0.010 **.00039**	203 **667**	0.011 **.00043**	203 **667**	0.012 **.00047**
	126 **414**	0.007 **.00028**	126 **414**	0.009 **.00035**	164 **537**	0.010 **.00039**	164 **537**	0.013 **.00051**	175 **573**	0.017 **.00067**	203 **667**	0.020 **.00079**	203 **667**	0.022 **.00087**	203 **667**	0.024 **.00094**

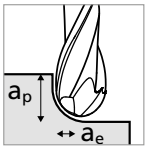
CRAZYMILL by Mikron Tool Cool

NEW Type N - Semi-finishing

MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Possibility 1

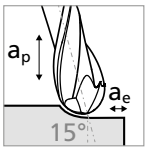
Inclination 0°



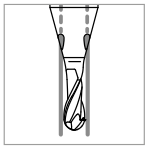
- $a_p = 0.5 \times d_1$
- $a_e = 0.2 \times d_1$

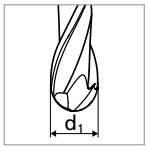
Possibility 2

Inclination 15°



- $a_p = 0.5 \times d_1$
- $a_e = 0.2 \times d_1$

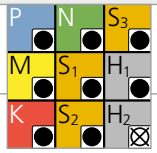




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.012 **.00047**	140 **459**	0.014 **.00054**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.009 **.00037**	140 **459**	0.011 **.00044**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.014 **.00054**	140 **459**	0.015 **.00060**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.013 **.00050**	140 **459**	0.014 **.00057**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.010 **.00040**	140 **459**	0.012 **.00047**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.009 **.00037**	120 **394**	0.019 **.00074**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.017 **.00067**	140 **459**	0.019 **.00074**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.015 **.00060**	140 **459**	0.017 **.00067**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	120 **394**	0.006 **.00023**	120 **394**	0.007 **.00027**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.014 **.00054**	120 **394**	0.015 **.00060**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.014 **.00054**	120 **394**	0.015 **.00060**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	140 **459**	0.006 **.00023**	140 **459**	0.007 **.00027**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	100 **328**	0.009 **.00033**	100 **328**	0.010 **.00040**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



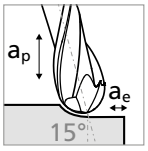
Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.020 **.00080**	200 **656**	0.022 **.00087**	220 **722**	0.029 **.00114**	220 **722**	0.031 **.00120**	240 **787**	0.032 **.00126**	260 **853**	0.040 **.00157**	260 **853**	0.040 **.00157**	260 **853**	0.043 **.00167**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.030 **.00120**	260 **853**	0.038 **.00151**	260 **853**	0.038 **.00151**	260 **853**	0.041 **.00161**
	200 **656**	0.017 **.00067**	200 **656**	0.019 **.00074**	220 **722**	0.026 **.00100**	220 **722**	0.027 **.00107**	240 **787**	0.028 **.00110**	260 **853**	0.035 **.00139**	260 **853**	0.034 **.00132**	260 **853**	0.037 **.00147**
	200 **656**	0.020 **.00080**	200 **656**	0.022 **.00087**	220 **722**	0.029 **.00114**	220 **722**	0.031 **.00120**	240 **787**	0.032 **.00126**	260 **853**	0.038 **.00151**	260 **853**	0.038 **.00151**	260 **853**	0.041 **.00161**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.029 **.00113**	260 **853**	0.037 **.00145**	260 **853**	0.037 **.00145**	260 **853**	0.039 **.00154**
	200 **656**	0.019 **.00074**	200 **656**	0.020 **.00080**	220 **722**	0.027 **.00107**	220 **722**	0.029 **.00114**	240 **787**	0.029 **.00113**	260 **853**	0.037 **.00145**	260 **853**	0.037 **.00145**	260 **853**	0.039 **.00154**
	200 **656**	0.014 **.00054**	200 **656**	0.015 **.00060**	220 **722**	0.026 **.00100**	220 **722**	0.027 **.00107**	240 **787**	0.027 **.00107**	260 **853**	0.035 **.00139**	260 **853**	0.035 **.00139**	260 **853**	0.037 **.00147**
	140 **459**	0.020 **.00080**	140 **459**	0.022 **.00087**	160 **525**	0.024 **.00094**	160 **525**	0.031 **.00120**	180 **591**	0.034 **.00132**	200 **656**	0.042 **.00164**	200 **656**	0.042 **.00164**	200 **656**	0.044 **.00174**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.031 **.00120**	220 **722**	0.034 **.00134**	240 **787**	0.046 **.00183**	260 **853**	0.044 **.00173**	260 **853**	0.048 **.00189**	260 **853**	0.047 **.00184**
	130 **427**	0.008 **.00030**	130 **427**	0.009 **.00033**	140 **459**	0.009 **.00033**	140 **459**	0.010 **.00040**	150 **492**	0.012 **.00047**	170 **558**	0.016 **.00063**	170 **558**	0.016 **.00063**	170 **558**	0.017 **.00067**
	130 **427**	0.017 **.00067**	130 **427**	0.019 **.00074**	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00100**	150 **492**	0.027 **.00107**	170 **558**	0.034 **.00132**	170 **558**	0.035 **.00139**	170 **558**	0.036 **.00141**
	130 **427**	0.017 **.00067**	130 **427**	0.019 **.00074**	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00100**	150 **492**	0.027 **.00107**	170 **558**	0.034 **.00132**	170 **558**	0.035 **.00139**	170 **558**	0.036 **.00141**
	180 **591**	0.008 **.00030**	180 **591**	0.009 **.00033**	200 **656**	0.009 **.00033**	200 **656**	0.010 **.00040**	220 **722**	0.012 **.00047**	240 **787**	0.016 **.00063**	240 **787**	0.016 **.00063**	240 **787**	0.017 **.00067**
	140 **459**	0.012 **.00047**	140 **459**	0.015 **.00060**	180 **591**	0.017 **.00067**	180 **591**	0.022 **.00087**	200 **656**	0.024 **.00094**	240 **787**	0.026 **.00101**	240 **787**	0.032 **.00126**	240 **787**	0.027 **.00107**

CRAZYMILL by Mikron Tool Cool

NEW Type N - Finishing

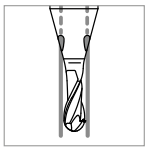
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

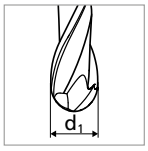
Inclination 15°



- $a_p = 0.1 \times d_1$
- $a_e = 0.05 - 0.1 \times d_1$

$n_{max} = 60'000$ rpm

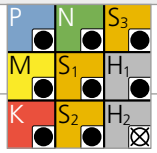




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	140 **459**	0.014 **.00055**	140 **459**	0.016 **.00063**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	140 **459**	0.011 **.00043**	140 **459**	0.013 **.00051**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	140 **459**	0.016 **.00063**	140 **459**	0.018 **.00071**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	140 **459**	0.015 **.00059**	140 **459**	0.017 **.00067**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	140 **459**	0.012 **.00047**	140 **459**	0.014 **.00055**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	120 **394**	0.011 **.00043**	120 **394**	0.022 **.00087**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	140 **459**	0.020 **.00079**	140 **459**	0.022 **.00087**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	140 **459**	0.018 **.00071**	140 **459**	0.020 **.00079**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	120 **394**	0.007 **.00028**	120 **394**	0.008 **.00031**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	120 **394**	0.016 **.00063**	120 **394**	0.018 **.00071**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	120 **394**	0.016 **.00063**	120 **394**	0.018 **.00071**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	140 **459**	0.007 **.00028**	140 **459**	0.008 **.00031**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	100 **328**	0.010 **.00039**	100 **328**	0.012 **.00047**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



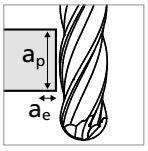
Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	200 **656**	0.024 **.00094**	200 **656**	0.026 **.00102**	220 **722**	0.034 **.00134**	220 **722**	0.036 **.00142**	240 **787**	0.035 **.00139**	260 **853**	0.044 **.00173**	260 **853**	0.044 **.00173**	260 **853**	0.047 **.00184**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.033 **.00132**	260 **853**	0.042 **.00166**	260 **853**	0.042 **.00166**	260 **853**	0.045 **.00177**
	200 **656**	0.020 **.00079**	200 **656**	0.022 **.00087**	220 **722**	0.030 **.00118**	220 **722**	0.032 **.00126**	240 **787**	0.031 **.00121**	260 **853**	0.039 **.00152**	260 **853**	0.037 **.00146**	260 **853**	0.041 **.00162**
	200 **656**	0.024 **.00094**	200 **656**	0.026 **.00102**	220 **722**	0.034 **.00134**	220 **722**	0.036 **.00142**	240 **787**	0.035 **.00139**	260 **853**	0.042 **.00166**	260 **853**	0.042 **.00166**	260 **853**	0.045 **.00177**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.032 **.00125**	260 **853**	0.040 **.00159**	260 **853**	0.040 **.00159**	260 **853**	0.043 **.00169**
	200 **656**	0.022 **.00087**	200 **656**	0.024 **.00094**	220 **722**	0.032 **.00126**	220 **722**	0.034 **.00134**	240 **787**	0.032 **.00125**	260 **853**	0.040 **.00159**	260 **853**	0.040 **.00159**	260 **853**	0.043 **.00169**
	200 **656**	0.016 **.00063**	200 **656**	0.018 **.00071**	220 **722**	0.030 **.00118**	220 **722**	0.032 **.00126**	240 **787**	0.030 **.00118**	260 **853**	0.039 **.00152**	260 **853**	0.039 **.00152**	260 **853**	0.041 **.00162**
	140 **459**	0.024 **.00094**	140 **459**	0.026 **.00102**	160 **525**	0.028 **.00110**	160 **525**	0.036 **.00142**	180 **591**	0.037 **.00146**	200 **656**	0.046 **.00180**	200 **656**	0.046 **.00180**	200 **656**	0.049 **.00191**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	200 **656**	0.026 **.00102**	200 **656**	0.028 **.00110**	220 **722**	0.036 **.00142**	220 **722**	0.040 **.00157**	240 **787**	0.051 **.00201**	260 **853**	0.048 **.00191**	260 **853**	0.053 **.00208**	260 **853**	0.051 **.00202**
	130 **427**	0.009 **.00035**	130 **427**	0.010 **.00039**	140 **459**	0.010 **.00039**	140 **459**	0.012 **.00047**	150 **492**	0.013 **.00052**	170 **558**	0.018 **.00069**	170 **558**	0.018 **.00069**	170 **558**	0.019 **.00074**
	130 **427**	0.020 **.00079**	130 **427**	0.022 **.00087**	140 **459**	0.028 **.00110**	140 **459**	0.030 **.00118**	150 **492**	0.030 **.00118**	170 **558**	0.037 **.00146**	170 **558**	0.039 **.00152**	170 **558**	0.039 **.00155**
	130 **427**	0.020 **.00079**	130 **427**	0.022 **.00087**	140 **459**	0.028 **.00110**	140 **459**	0.030 **.00118**	150 **492**	0.030 **.00118**	170 **558**	0.037 **.00146**	170 **558**	0.039 **.00152**	170 **558**	0.039 **.00155**
	180 **591**	0.009 **.00035**	180 **591**	0.010 **.00039**	200 **656**	0.010 **.00039**	200 **656**	0.012 **.00047**	220 **722**	0.013 **.00052**	240 **787**	0.018 **.00069**	240 **787**	0.018 **.00069**	240 **787**	0.019 **.00074**
	140 **459**	0.014 **.00055**	140 **459**	0.018 **.00071**	180 **591**	0.020 **.00079**	180 **591**	0.026 **.00102**	200 **656**	0.026 **.00104**	240 **787**	0.028 **.00111**	240 **787**	0.035 **.00139**	240 **787**	0.030 **.00118**

CRAZYMILL by Mikron Tool Cool

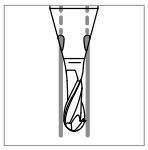
NEW Type N - Side-finishing

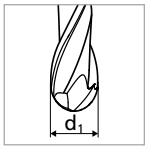
MILLING WITH INTEGRATED COOLING | CUTTING DATA OVERVIEW

Inclination 0°



- $a_p = 4 \times d_1$
- $a_e = 0.02 - 0.1 \times d_1$

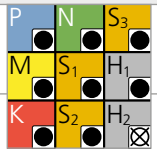




Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	1.0 mm | .039" v_c	1.0 mm | .039" f_z	1.2 mm | .047" v_c	1.2 mm | .047" f_z
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	130 **425**	0.008 **.00031**	130 **425**	0.009 **.00035**
		1.0401	C15	AISI 1015				
		1.1191	C45E/CK45	AISI 1045				
		1.0044	S275JR	AISI 1020				
		1.0715	11SMn30	AISI 1215				
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	130 **425**	0.007 **.00028**	130 **425**	0.008 **.00031**
		1.7131	16MnCr5	AISI 5115				
		1.3505	100Cr6	AISI 52100				
		1.7225	42CrMo4	AISI 4140				
		1.2842	90MnCrV8	AISI O2				
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	130 **425**	0.006 **.00024**	130 **425**	0.007 **.00028**
		1.2436	X210CrW12	AISI D4/D6				
		1.3343	HS6-5-2C	AISI M2 / UNS T11302				
		1.3355	HS18-0-1	AISI T1 / UNS T12001				
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	130 **425**	0.008 **.00031**	130 **425**	0.009 **.00035**
		1.4105	X6CrMoS17	AISI 430F				
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	130 **425**	0.008 **.00031**	130 **425**	0.009 **.00035**
		1.4112	X90CrMoV18	AISI 440B				
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb16-4	AISI 630 / ASTM 17-4 PH	130 **425**	0.008 **.00031**	130 **425**	0.009 **.00035**
		1.4545	X5CrNiCuNb15-5	ASTM 15-5 PH				
	Stainless steel austenitic	1.4301	X5CrNi18-10	AISI 304	130 **425**	0.006 **.00024**	130 **425**	0.007 **.00028**
		1.4435	X2CrNiMo18-14-3	AISI 316L				
		1.4441	X2CrNiMo18-15-3	AISI 316LM				
		1.4539	X1NiCrMoCu25-20-5	AISI 904L				
K	Cast iron	0.6020	GG20	ASTM 30	111 **365**	0.006 **.00024**	111 **365**	0.011 **.00043**
		0.6030	GG30	ASTM 40B				
		0.7040	GGG40	ASTM 60-40-18				
		0.7060	GGG60	ASTM 80-60-03				
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	130 **425**	0.009 **.00035**	130 **425**	0.010 **.00039**
		3.4365	AlZnMgCu1.5	ASTM 7075				
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	130 **425**	0.009 **.00035**	130 **425**	0.010 **.00039**
		3.2381	GD-AlSi10Mg	UNS A03590				
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	130 **425**	0.010 **.00039**	130 **425**	0.011 **.00043**
		2.0065	Cu-ETP / CW004A	UNS C11000				
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	130 **425**	0.010 **.00039**	130 **425**	0.011 **.00043**
		2.0360	CuZn40 CW509L	UNS C28000				
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	130 **425**	0.010 **.00039**	130 **425**	0.011 **.00043**
		2.1020	CuSn6	UNS C51900				
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	130 **425**	0.009 **.00035**	130 **425**	0.010 **.00039**
		2.0960	CuAl9Mn2	UNS C63200				
S_1	Super alloys	2.4856		Inconel 625	111 **365**	0.004 **.00016**	111 **365**	0.004 **.00016**
		2.4668		Inconel 718				
		2.4617	NiMo28	Hastelloy B-2				
		2.4665	NiCr22Fe18Mo	Hastelloy X				
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	111 **365**	0.008 **.00031**	111 **365**	0.009 **.00035**
		3.7065	Gr.4	ASTM B348 / F68				
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	111 **365**	0.008 **.00031**	111 **365**	0.009 **.00035**
		9.9367	TiAl6Nb7	ASTM F1295				
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	130 **425**	0.004 **.00016**	130 **425**	0.004 **.00016**
			CrCoMo28	ASTM F1537				
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	93 **304**	0.005 **.00020**	93 **304**	0.006 **.00024**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2				

v_c [m/min] | **[SFM]**
f_z [mm] | **[IPT]**

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



07

Ød1	1/16" 1.5 | .059"		1.8 mm | .071"		2.0 mm | .079"		3/32" 2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" 5.0 mm | .197"		7/32 – 1/4" 6.0 – 8.0 mm | .236" – .315"	
	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z	v_c	f_z
	185 **608**	0.012 **.00047**	185 **608**	0.013 **.00051**	204 **668**	0.017 **.00067**	204 **668**	0.018 **.00071**	222 **729**	0.020 **.00079**	241 **790**	0.025 **.00098**	241 **790**	0.028 **.00110**	241 **790**	0.033 **.00130**
	185 **608**	0.011 **.00043**	185 **608**	0.012 **.00047**	204 **668**	0.016 **.00063**	204 **668**	0.017 **.00067**	222 **729**	0.019 **.00075**	241 **790**	0.024 **.00094**	241 **790**	0.026 **.00102**	241 **790**	0.031 **.00122**
	185 **608**	0.010 **.00039**	185 **608**	0.011 **.00043**	204 **668**	0.015 **.00059**	204 **668**	0.016 **.00063**	222 **729**	0.018 **.00071**	241 **790**	0.022 **.00087**	241 **790**	0.024 **.00094**	241 **790**	0.029 **.00114**
	185 **608**	0.012 **.00047**	185 **608**	0.013 **.00051**	204 **668**	0.017 **.00067**	204 **668**	0.018 **.00071**	222 **729**	0.020 **.00079**	241 **790**	0.024 **.00094**	241 **790**	0.026 **.00102**	241 **790**	0.031 **.00122**
	185 **608**	0.011 **.00043**	185 **608**	0.012 **.00047**	204 **668**	0.016 **.00063**	204 **668**	0.017 **.00067**	222 **729**	0.018 **.00071**	241 **790**	0.023 **.00091**	241 **790**	0.025 **.00098**	241 **790**	0.030 **.00118**
	185 **608**	0.011 **.00043**	185 **608**	0.012 **.00047**	204 **668**	0.016 **.00063**	204 **668**	0.017 **.00067**	222 **729**	0.018 **.00071**	241 **790**	0.023 **.00091**	241 **790**	0.025 **.00098**	241 **790**	0.030 **.00118**
	185 **608**	0.008 **.00031**	185 **608**	0.009 **.00035**	204 **668**	0.015 **.00059**	204 **668**	0.016 **.00063**	222 **729**	0.017 **.00067**	241 **790**	0.022 **.00087**	241 **790**	0.024 **.00094**	241 **790**	0.029 **.00114**
	130 **425**	0.012 **.00047**	130 **425**	0.013 **.00051**	148 **486**	0.014 **.00055**	148 **486**	0.018 **.00071**	167 **547**	0.021 **.00083**	185 **608**	0.026 **.00102**	185 **608**	0.029 **.00114**	185 **608**	0.034 **.00134**
	185 **608**	0.013 **.00051**	185 **608**	0.014 **.00055**	204 **668**	0.018 **.00071**	204 **668**	0.020 **.00079**	222 **729**	0.029 **.00114**	241 **790**	0.028 **.00110**	241 **790**	0.030 **.00118**	241 **790**	0.036 **.00142**
	185 **608**	0.013 **.00051**	185 **608**	0.014 **.00055**	204 **668**	0.018 **.00071**	204 **668**	0.020 **.00079**	222 **729**	0.029 **.00114**	241 **790**	0.028 **.00110**	241 **790**	0.030 **.00118**	241 **790**	0.036 **.00142**
	185 **608**	0.013 **.00051**	185 **608**	0.014 **.00055**	204 **668**	0.018 **.00071**	204 **668**	0.020 **.00079**	222 **729**	0.029 **.00114**	241 **790**	0.028 **.00110**	241 **790**	0.030 **.00118**	241 **790**	0.036 **.00142**
	185 **608**	0.013 **.00051**	185 **608**	0.014 **.00055**	204 **668**	0.018 **.00071**	204 **668**	0.020 **.00079**	222 **729**	0.029 **.00114**	241 **790**	0.028 **.00110**	241 **790**	0.030 **.00118**	241 **790**	0.036 **.00142**
	185 **608**	0.013 **.00051**	185 **608**	0.014 **.00055**	204 **668**	0.018 **.00071**	204 **668**	0.020 **.00079**	222 **729**	0.029 **.00114**	241 **790**	0.028 **.00110**	241 **790**	0.030 **.00118**	241 **790**	0.036 **.00142**
	185 **608**	0.013 **.00051**	185 **608**	0.014 **.00055**	204 **668**	0.018 **.00071**	204 **668**	0.020 **.00079**	222 **729**	0.029 **.00114**	241 **790**	0.028 **.00110**	241 **790**	0.030 **.00118**	241 **790**	0.036 **.00142**
	120 **395**	0.005 **.00020**	120 **395**	0.005 **.00020**	130 **425**	0.005 **.00020**	130 **425**	0.006 **.00024**	139 **456**	0.008 **.00031**	157 **516**	0.010 **.00039**	157 **516**	0.011 **.00043**	157 **516**	0.013 **.00051**
	120 **395**	0.010 **.00039**	120 **395**	0.011 **.00043**	130 **425**	0.014 **.00055**	130 **425**	0.015 **.00059**	139 **456**	0.017 **.00067**	157 **516**	0.021 **.00083**	157 **516**	0.023 **.00091**	157 **516**	0.027 **.00106**
	120 **395**	0.010 **.00039**	120 **395**	0.011 **.00043**	130 **425**	0.014 **.00055**	130 **425**	0.015 **.00059**	139 **456**	0.017 **.00067**	157 **516**	0.021 **.00083**	157 **516**	0.023 **.00091**	157 **516**	0.027 **.00106**
	167 **547**	0.005 **.00020**	167 **547**	0.005 **.00020**	185 **608**	0.005 **.00020**	185 **608**	0.006 **.00024**	204 **668**	0.008 **.00031**	222 **729**	0.010 **.00039**	222 **729**	0.011 **.00043**	222 **729**	0.013 **.00051**
	130 **425**	0.007 **.00028**	130 **425**	0.009 **.00035**	167 **547**	0.010 **.00039**	167 **547**	0.013 **.00051**	185 **608**	0.015 **.00059**	222 **729**	0.016 **.00063**	222 **729**	0.018 **.00071**	222 **729**	0.021 **.00083**



NEW Process CrazyMill Cool Ball - Z4

ACCURATE AND EFFICIENT MILLING

Coolant type, pressure and filtration

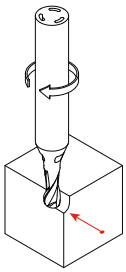
Coolant: for best results, Mikron Tool recommends the use of cutting oil as coolant. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used as well.

Filter: the large cooling channels permit the use of a standard filter with filter quality of ≤ .002" (0.05 mm).

Coolant pressure: at least 218 psi (15 bar) coolant pressure is required to achieve reliable milling. High pressure is generally better for the cooling and flushing effect.

Revolution	[rpm]	≤ 10'000	> 10'000
Minimal pressure	[bar]	15	30
	[psi]	**218**	**435**

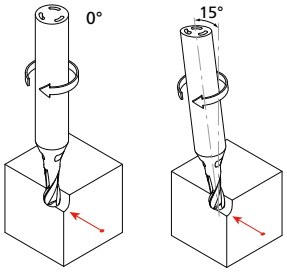
Climb milling and conventional milling



Mikron tool recommends climb milling for the machining of surfaces or edges. The chip thickness here is greater at the beginning and decreases continuously; the cutting forces remain low. With conventional milling, however, high cutting forces would push the milling tool away from the part.Thus surface quality decreases.

MILLING PROCESS

Semi-finishing

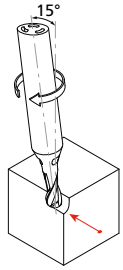


Mikron Tool recommends vertical machining with respect to the workpiece for semi-finishing with CrazyMill Cool Ball (machining angle 0°) or a machining angle of 15° or 75° with respect to the workpiece surface.

Recommended cutting parameters

v_c and f_z = as specified in the cutting data table
End mill Type A, B and M: a_p = max. 1 x d, a_e = 0.2 x d
End mill Type C and N: a_p = max. 0.5 x d, a_e = 0.2 x d

Finishing



Mikron Tool recommends machining at a machining angle of 15° or 75° with respect to the workpiece surface for finishing with CrazyMill Cool Ball. This shifts the milling contact away from the tool's axis center towards its external diameter, where the ideal cutting geometry takes effect and also the cutting speed increases (the cutting speed is zero at the tool's center).

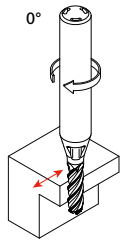
An angle of 15° of the milling body with respect to the workpiece brings certain advantages:

- The cutting speed is higher
- Better surface quality
- Longer service life

Recommended cutting parameters

v_c and f_z = as specified in the cutting data table
a_p = 0.1 x d
a_e = 0.05 – 0.1 x d depending on the required surface quality
a_e = f_z for maximum surface quality

Side-finishing



For side-finishing with CrazyMill Cool Ball, the machining must be executed vertically with respect to the workpiece (machining angle 0°).

Recommended cutting parameters

v_c and f_z = as specified in the cutting data table
End mill Type M: a_p = 3 x d, a_e = 0.02 – 0.1 x d
End mill Type N: a_p = 4 x d, a_e = 0.02 – 0.1 x d

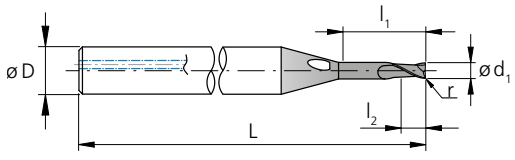
Customized milling cutters



Mikron Tool produces solid carbide milling cutters according to your needs and requirements and within the following range:

CHARACTERISTICS

- Diameter min.: .008" (0.2 mm)
- Diameter max.: 1.26" (32.0 mm), please contact us for larger diameters
- Maximum tool length: 13" (330 mm)
- Tool diameter tolerance max.: ± 197µin (5 µm)
- Concentricity between shank and tool diameters max.: ≤ 79 µin (2 µm)
- Types of milling cutters: conical milling cutters, cylindrical milling tools, spherical milling tools, solid carbide circular saws (see chapter on circular saws), milling tools with chamfer, milling tools with corner radius, form milling tools, angle milling tools, solid carbide recess milling tools, rough and finish milling tools, etc.
- Number of teeth: 1 up to 16
- Cutting direction: right-hand cutting or left-hand cutting
- Material for milling cutters: tungsten carbide, grade selection according to application



COATINGS

Various choices according to application

COOLING

- Milling cutters with straight internal cooling ducts in the shaft
- Milling cutters with internal cooling channels and special exit, for example in the flutes
- Milling cutters to be used with external coolant supply

TYPE OF SHAFT

- Cylindrical as per DIN 6535 HA
- Cylindrical as per DIN 6535 HB (Weldon)
- Others upon request

MATERIAL TO BE MACHINED

Drills for steel, corrosion-resistant steels, i.e. stainless steels, titanium / titanium alloys, super alloys or heat-resistant alloys such as Inconel or Hastelloy, CrCo alloys, drills for hardened steel up to 55HRC, aluminum / aluminum alloys, brass, copper, cast materials, etc.

TREATMENTS

Cutting edge preparation, polishing of flutes

Customized profile milling cutters



Mikron Tool produces solid carbide profile milling cutters according to your needs and requirements and within the following range:

CHARACTERISTICS

- External diameter min.: .197" - 7.87" (5 mm – 200 mm)
- Thickness: .004" – 1.18" (0.1 mm – 30.0 mm)
- Bore diameter (diameter of profile milling cutter holder): .079" – 1.58" (2.0 mm – 40.0 mm)
- Tolerance tool diameter max.: ± .0004" (0.01 mm)
- Concentricity internal to external diameter: .0004" (0.01 mm)
- Number of teeth: 10 up to 160
- Cutting edge geometry: with or without logarithmic relief
- Direction of cut: right- or left-hand cutting
- Material of profile milling cutter: tungsten carbide, grade selection according to application left-hand cutting

COATINGS

Various possibilities, selection according to application

COOLING

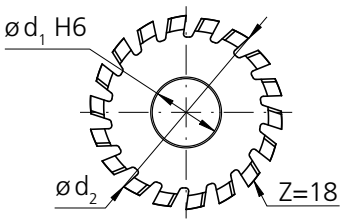
- Tools to be used with external coolant supply

MATERIAL TO BE MACHINED

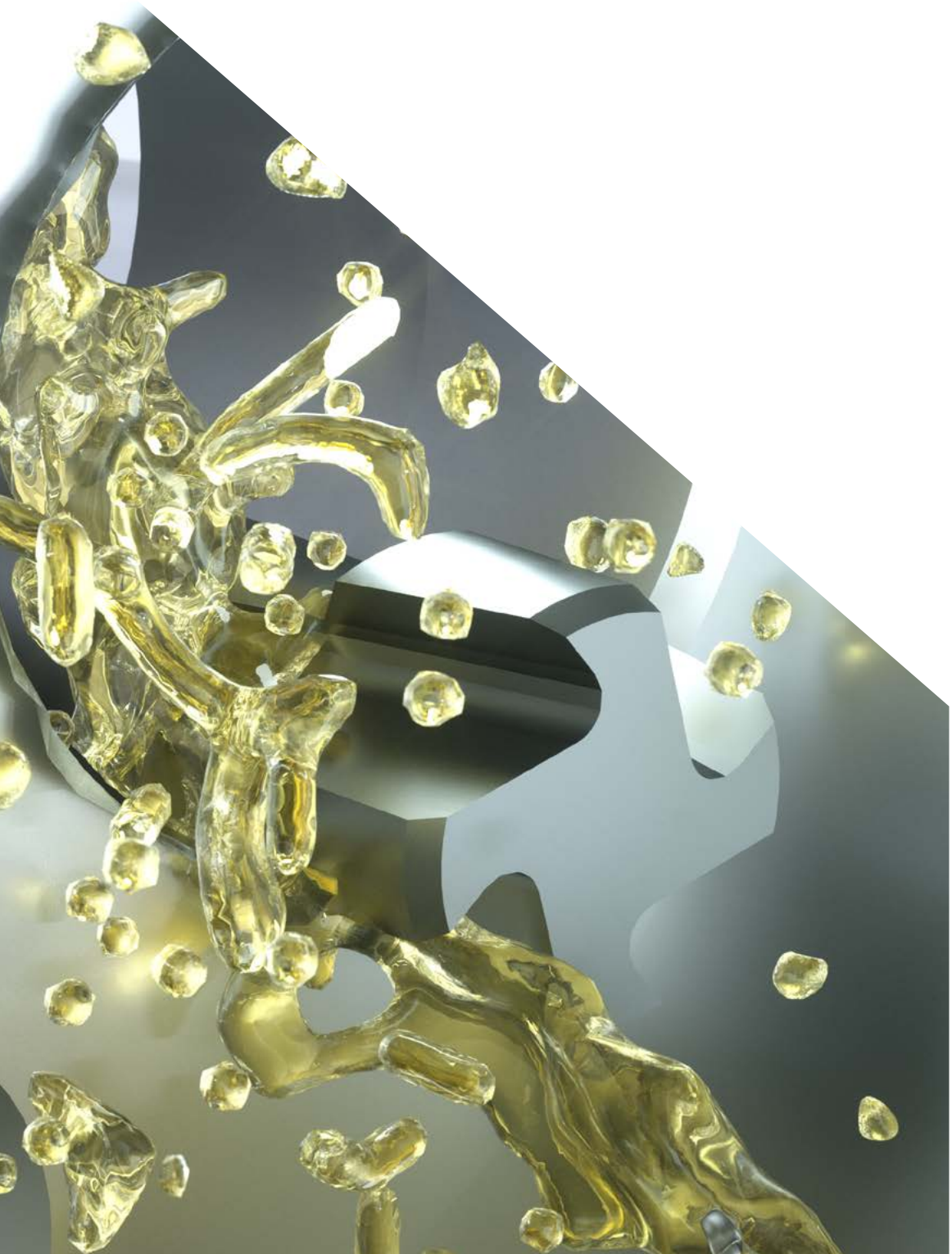
For steel, corrosion-resistant steel i.e. stainless steel, titanium / titanium alloys, super alloys i.e. heat-resistant steel such as Inconel or Hastelloy, CrCo alloys, hardened steel up to 55 HRC, aluminum / aluminum alloys, brass, copper, cast metals, etc.

TREATMENTS

Cutting edge preparation



crazy about deburring



DEBURRING TOOLS

08

OVERVIEW **648**

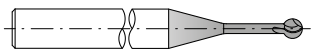
CODIFICATION KEY 650

CRAZYMILL CHAMFER 652
Chamfering and deburring, Ø 0.36 mm - 6 mm | **.014" – .236"**

CUSTOMIZED CHAMFER AND DEBURRING TOOLS 676

Overview

CUTTING TOOL SOLUTIONS

CRAZYMILL Chamfer	 Frontchamfer	
CRAZYMILL Chamfer	 Backchamfer	
CRAZYMILL Chamfer	 Doublechamfer	
CRAZYMILL Chamfer	 Radiuschamfer	
Customized Chamfer and Deburring Tools		

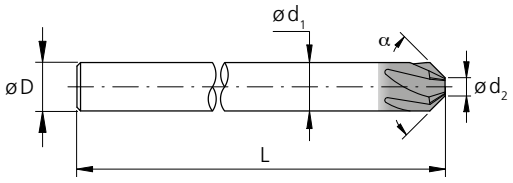
RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended

ø - range [mm] | [inch]	max. depth	Cooling	P Unalloyed and alloyed steel	M Stainless steel	K Cast iron	N Non ferrous metals	S_1 Super alloys	S_2 Titanium (pure and alloyed)	S_3 CrCo alloys	H_1 Hardened steel <55 HRC	H_2 Hardened steel ≥55 HRC	Page
1.0 – 6.0 **.039" – .236"**	–		●	●	●	●	●	●	●	●	⊠	**658**
0.36 – 5.70 **.014" – .224"**	3 x d 5 x d		●	●	●	●	●	●	●	●	⊠	**662**
0.9 – 5.7 **.035" – .224"**	3 x d 6 x d		●	●	●	●	●	●	●	●	⊠	**666**
1.0 – 6.0 **.039" – .236"**	4 x d		●	●	●	●	●	●	●	●	⊠	**670**
0.1 – 32.0 **.004" – 1.26"**	as required		●	●	●	●	●	●	●	●	⊠	**676**

08

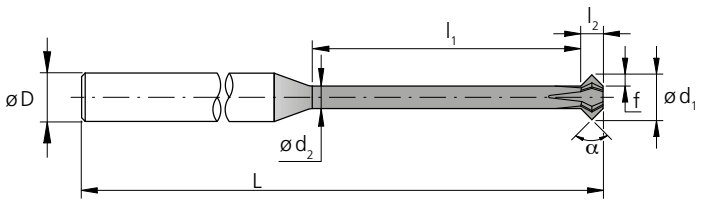
Codification key

ITEM NUMBER EASY TO UNDERSTAND



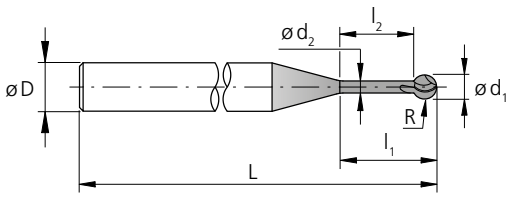
2.FC.100 300 90.1

- **Division number**
  - 2 = Mikron Tool SA Agno
- **CrazyMill Chamfer family**
  - FC = CrazyMill Frontchamfer
- **Second diameter d_2**
  - 100 = Ø 1 mm (.039")
- **Cutting diameter d_1**
  - 300 = Ø 3 mm (.118")
- **Chamfer angle**
  - 90 = 90°
- **Coating**
  - 1 = Coated



2.DC.06 140 090.1

- **Division number**
  - 2 = Mikron Tool SA Agno
- **CrazyMill Chamfer family**
  - BC = CrazyMill Backchamfer
  - DC = CrazyMill Doublechamfer
- **Effective length l_1**
  - 06 = 6 x d_1
- **Cutting diameter d_1**
  - 140 = Ø 1.4 mm (.055")
- **Chamfer angle**
  - 090 = 90°
- **Coating**
  - 1 = Coated



2.RC.040 100.1

Division number
- 2 = Mikron Tool SA Agno

CrazyMill Chamfer family
- RC = CrazyMill Radiuschamfer

Effective length l_1
- 040 = 4 x d_1

Cutting diameter d_1
- 100 = Ø 1 mm (.039")

Coating
- 1 = Coated

CrazyMill Chamfer



CRAZYMILL Chamfer

CHAMFER TOOLS FOR EACH APPLICATION



Mikron Tool's CrazyMill Chamfer provides a full program of solid carbide deburring and milling cutters. Every single model specializes in chamfering and deburring in the diameter range of .014" to .236" (0.36 to 6.0 mm).

The deburring tools complement each other and offer users the ideal tool for every deburring situation. Whether steel, stainless steel, cast iron, non-ferrous metal, or titanium – the milling tools can be universally used in many different materials.

All four models have the same quality features: They are suitable for small-scale machining with a wide variety of materials, can be utilized at high feed rates, cut sharply, and offer first-class surface quality. The long service life can be attributed to the special solid carbide with high fracture toughness on the one hand, and to the high-performance coating used for all models on the other hand.

CRAZYMILL by Mikron Tool Chamfer

Perfect finished parts

CHAMFERING AND DEBURRING IN SMALL DIMENSIONS

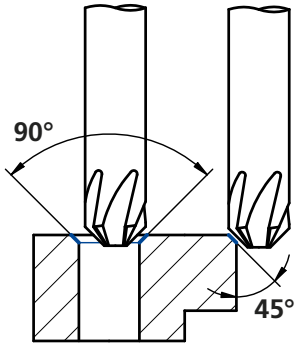
Mikron Tool's CrazyMill Chamfer provides a full set of solid carbide deburring and milling cutters. Every single model specializes in chamfering and deburring in the diameter range of .014" to .236" (0.36 to 6.0 mm).

- CrazyMill Frontchamfer for front deburring and chamfering
- CrazyMill Backchamfer for rear deburring, usable length 3 x d and 5 x d
- CrazyMill Doublechamfer for front and rear deburring, usable length 3 x d and 6 x d
- CrazyMill Radiuschamfer for universal usage, usable length 4 x d

All options with 4 versions

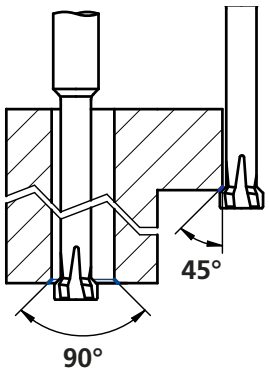
CrazyMill Frontchamfer

For front deburring and chamfering



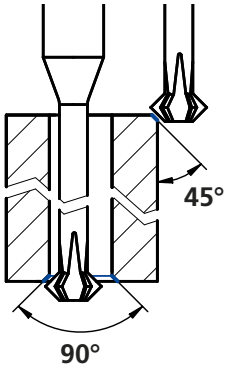
CrazyMill Backchamfer

For rear deburring



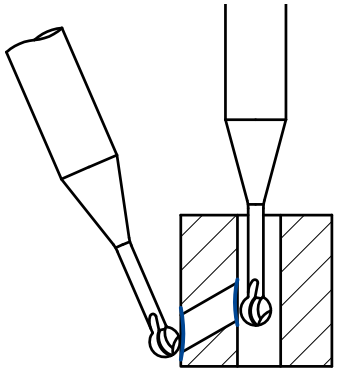
CrazyMill Doublechamfer

For front and rear deburring



CrazyMill Radiuschamfer

For universal usage



Front	Back	Double	Radius
	3 x d / 5 x d	3 x d / 6 x d	4 x d
■ External cooling ■ Coated ■ Ø .039" - .236" (1.0 - 6.0 mm)	■ External cooling ■ Coated ■ Ø .014" - .224" (0.36 - 5.70 mm)	■ External cooling ■ Coated ■ Ø .035" - .224" (0.9 - 5.7 mm)	■ External cooling ■ Coated ■ Ø .039" - .236" (1.0 - 6.0 mm)
			
page 659	page 663	page 667	page 671

1 | SHAFT / USABLE LENGTH
The sturdy solid carbide shaft combined with a short usable length supports stable vibration-free machining.

2 | SOLID CARBIDE
A long tool service life, even with materials which are difficult to machine, thanks to solid carbide with high fracture toughness and resistance to heat shock.

3 | COATING
High-performance coating for a long service life and perfect surface quality.

4 | TOOL SHAPE
Different types of geometries result in a complete range of deburring tools for all possible deburring situations.

5A | TIP GEOMETRY
The tip geometry is designed to prevent secondary burrs.
■ Positively cut, sharply ground.

5B | HIGH NUMBER OF TEETH
Three to six teeth depending on the diameter enable a high feed speed and result in outstanding surface quality.

6 | CHAMFER 90°
A 90° chamfer can be applied simultaneously during front and rear deburring.

7 | CRAZYMILL FRONTCHAMFER
Recommended for front deburring and chamfering.

8 | CRAZYMILL BACKCHAMFER
Recommended for backside deburring of edges, holes, and threads.

9 | CRAZYMILL DOUBLECHAMFER
Can deburr front and rear in a single clamping.

10 | CRAZYMILL RADIUSCHAMFER: 300° CUTTING ZONE
Suited for hard-to-reach spots, for inner and outer contours, drilling / milling intersections and inclined hole exits.

CrazyMill Frontchamfer

FRONTSIDE DEBURRING WITH EXTERNAL COOLING



The CrazyMill Frontchamfer deburring tool in carbide is recommended for front chamfering and deburring. Edges, holes, and even threads are accurately deburred with the sharp deburring and milling cutter without formation of a secondary burr, even in hard-to-reach spots. With diameters of .039" to .236" (1.0 mm to 6.0 mm) it is ideally used in the smallest machining applications with the most diverse materials (even those that are poorly machinable). The four to six teeth ensure a high surface quality and permit high feed rates.

Coolant type, pressure and filtration

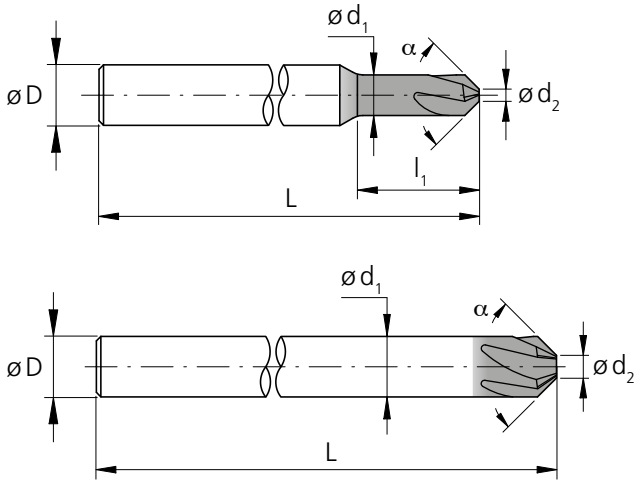
Recommendations for coolant type, pressure and filtration are on page "deburring process".

Please note

You couldn't find your suitable version of the CrazyMill Frontchamfer (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide | 45° | Z 4-6 | eXedur RIP



d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer α	Z [Teeth]	Item number	Availability
.039	1.0	**.118**	3	0.3	3	**1.57**	40	90°	4	2.FC.03010090.1	■
.079	2.0	**.236**	6	0.6	3	**1.57**	40	90°	4	2.FC.06020090.1	■
.118	3.0	**-**	-	1.0	3	**1.97**	50	90°	5	2.FC.10030090.1	■
.157	4.0	**-**	-	1.5	4	**1.97**	50	90°	6	2.FC.15040090.1	■
.236	6.0	**-**	-	2.0	6	**1.97**	50	90°	6	2.FC.20060090.1	■

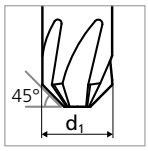
■ Stock item

CRAZYMILL by Mikron Tool Frontchamfer

CrazyMill Frontchamfer

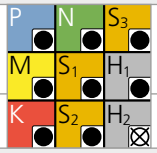
DEBURRING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 | **394**
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	100 | **328**
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	80 | **262**
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	50 | **164**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	80 | **262**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	50 | **164**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	60 | **197**
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	200 | **656**
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | **656**
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40 | **131**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40 | **131**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	200 | **656**
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	200 | **656**
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	40 | **131**
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	40 | **131**
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	40 | **131**
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	50 | **164**
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | **197**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



	f_z [mm] | [IPT]	
	Ød1	
	1.0 – 2.0 mm | .039" – .079"	3.0 – 6.0 mm | .118" – .236"
	f	f
	0.01 – 0.04 | .0004 – .0016	0.03 – 0.05 | .0012 – .0020
	0.01 – 0.03 | .0004 – .0012	0.02 – 0.04 | .0008 – .0016
	0.01 – 0.02 | .0004 – .0008	0.01 – 0.03 | .0004 – .0012
	0.01 – 0.02 | .0004 – .0008	0.02 – 0.03 | .0008 – .0012
	0.01 – 0.02 | .0004 – .0008	0.01 – 0.03 | .0004 – .0012
	0.01 – 0.02 | .0004 – .0008	0.02 – 0.03 | .0008 – .0012
	0.01 – 0.02 | .0004 – .0008	0.01 – 0.03 | .0004 – .0012
	0.02 – 0.05 | .0008 – .0020	0.03 – 0.07 | .0012 – .0028
	0.02 – 0.05 | .0008 – .0020	0.03 – 0.07 | .0012 – .0028
	0.01 – 0.02 | .0004 – .0008	0.02 – 0.03 | .0008 – .0012
	0.01 – 0.02 | .0004 – .0008	0.02 – 0.03 | .0008 – .0012
	0.02 – 0.05 | .0008 – .0020	0.03 – 0.07 | .0012 – .0028
	0.02 – 0.05 | .0008 – .0020	0.03 – 0.07 | .0012 – .0028
	0.01 – 0.02 | .0004 – .0008	0.02 – 0.03 | .0008 – .0012
	0.01 – 0.02 | .0004 – .0008	0.02 – 0.03 | .0008 – .0012
	0.01 – 0.02 | .0004 – .0008	0.02 – 0.03 | .0008 – .0012
	0.01 – 0.02 | .0004 – .0008	0.02 – 0.03 | .0008 – .0012
	0.01 – 0.02 | .0004 – .0008	0.01 – 0.03 | .0004 – .0012

CrazyMill Backchamfer 3 x d / 5 x d

BACKSIDE DEBURRING WITH EXTERNAL COOLING



The CrazyMill Backchamfer is recommended for backside deburring of edges, holes, and threads. This means the part no longer needs to be re-clamped on the machine, and it ensures greater precision and faster machining cycles. The short version with a usable length of 3 x d gives the tool even greater stability and is especially suitable when it comes to smaller edge lengths or drilling depths. The long version with a usable length of 5 x d is suited for high edges and greater drilling depths.

With its diameter range of .014" to .224" (0.36 mm - 5.70 mm) CrazyMill Backchamfer is suitable for backside deburring of holes with a diameter of .016" (0.4 mm) or greater. Its high tooth number (3 - 6 depending on diameter) and special cutting geometry (positively sharply ground) yield excellent surface quality without the formation of a secondary burr.

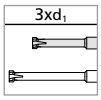
Coolant type, pressure and filtration

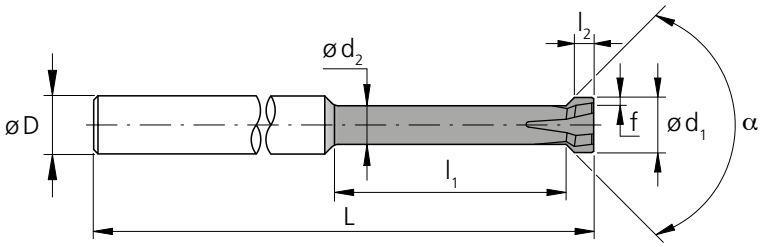
Recommendations for coolant type, pressure and filtration are on page "deburring process".

Please note

You couldn't find your suitable version of the CrazyMill Backchamfer (diameter, length, cutting direction…)? Ask us about our customized versions!

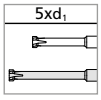
Regrinding: This product is not suitable for regrinding.

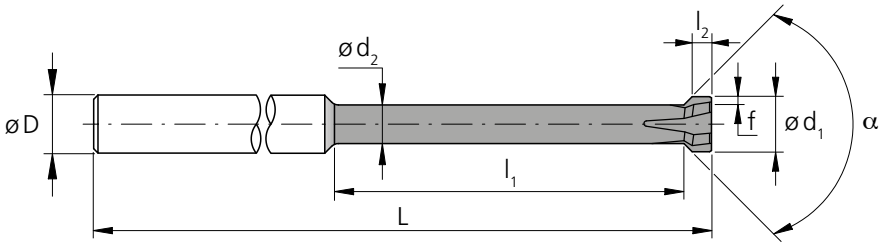




d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer α	Z [Teeth]	f [mm]	Item number	Availability
.014	0.36	**.063**	1.6	0.22	0.20	3	**1.97**	50	90°	3	0.03	2.BC.03036090.1	■
.018	0.46	**.079**	2.0	0.30	0.25	3	**1.97**	50	90°	3	0.04	2.BC.03046090.1	■
.026	0.65	**.110**	2.8	0.40	0.35	3	**1.97**	50	90°	3	0.04	2.BC.03065090.1	■
.035	0.90	**.158**	4.0	0.60	0.50	4	**1.97**	50	90°	4	0.075	2.BC.03090090.1	■
.055	1.40	**.236**	6.0	0.95	0.90	4	**1.97**	50	90°	4	0.10	2.BC.03140090.1	■
.075	1.90	**.315**	8.0	1.40	1.00	4	**1.97**	50	90°	5	0.10	2.BC.03190090.1	■
.114	2.90	**.472**	12.0	2.10	1.50	4	**2.36**	60	90°	5	0.20	2.BC.03290090.1	■
.146	3.70	**.630**	16.0	2.70	2.00	4	**2.36**	60	90°	5	0.30	2.BC.03370090.1	■
.185	4.70	**.787**	20.0	3.30	2.00	6	**2.76**	70	90°	6	0.40	2.BC.03470090.1	■
.224	5.70	**.945**	24.0	4.00	2.00	6	**2.76**	70	90°	6	0.50	2.BC.03570090.1	■

■ Stock item





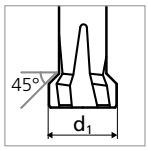
d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer α	Z [Teeth]	f [mm]	Item number	Availability
.014	0.36	**.094**	2.4	0.22	0.20	3	**1.97**	50	90°	3	0.03	2.BC.05036090.1	■
.018	0.46	**.118**	3.0	0.30	0.25	3	**1.97**	50	90°	3	0.04	2.BC.05046090.1	■
.026	0.65	**.165**	4.2	0.40	0.35	3	**1.97**	50	90°	3	0.04	2.BC.05065090.1	■
.035	0.90	**.236**	6.0	0.60	0.50	4	**2.36**	60	90°	4	0.075	2.BC.05090090.1	■
.055	1.40	**.354**	9.0	0.95	0.90	4	**2.36**	60	90°	4	0.10	2.BC.05140090.1	■
.075	1.90	**.472**	12.0	1.40	1.00	4	**2.36**	60	90°	5	0.10	2.BC.05190090.1	■
.114	2.90	**.709**	18.0	2.10	1.50	4	**2.76**	70	90°	5	0.20	2.BC.05290090.1	■
.146	3.70	**.945**	24.0	2.70	2.00	4	**2.76**	70	90°	5	0.30	2.BC.05370090.1	■
.185	4.70	**1.18**	30.0	3.30	2.00	6	**3.15**	80	90°	6	0.40	2.BC.05470090.1	■
.224	5.70	**1.42**	36.0	4.00	2.00	6	**3.15**	80	90°	6	0.50	2.BC.05570090.1	■

■ Stock item

CrazyMill Backchamfer 3 x d / 5 x d

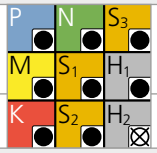
DEBURRING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 | **394**
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	100 | **328**
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	80 | **262**
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	50 | **164**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	80 | **262**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	50 | **164**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	60 | **197**
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	200 | **656**
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | **656**
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40 | **131**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40 | **131**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	200 | **656**
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	200 | **656**
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	40 | **131**
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	40 | **131**
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	40 | **131**
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	50 | **164**
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | **197**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f_z [mm] | **[IPT]**

	Ød1 0.36 - 1.90 mm	**.014" - .075"** **f**	2.90 - 5.70 mm	**.114" - .224"** **f**
		0.030	**.0012**	0.040	**.0016**
		0.020	**.0008**	0.030	**.0012**
		0.015	**.0006**	0.030	**.0012**
		0.010	**.0004**	0.030	**.0012**
		0.015	**.0006**	0.030	**.0012**
		0.015	**.0006**	0.030	**.0012**
		0.015	**.0006**	0.030	**.0012**
		0.030	**.0012**	0.040	**.0016**
		0.030	**.0012**	0.040	**.0016**
		0.020	**.0008**	0.030	**.0012**
		0.020	**.0008**	0.030	**.0012**
		0.030	**.0012**	0.040	**.0016**
		0.030	**.0012**	0.040	**.0016**
		0.020	**.0008**	0.030	**.0012**
		0.020	**.0008**	0.030	**.0012**
		0.020	**.0008**	0.030	**.0012**
		0.020	**.0008**	0.030	**.0012**
		0.015	**.0006**	0.020	**.0008**

CrazyMill Doublechamfer 3 x d / 6 x d

FRONT AND REAR DEBURRING WITH EXTERNAL COOLING



CrazyMill Doublechamfer can deburr front and rear in a single clamping. The short version with a usable length of 3 x d gives the tool greater stability and is especially suitable when it comes to smaller edge lengths or drilling depths. The long version with a usable length of 6 x d is suited for high edges and greater drilling depths.

Its small diameter (available in diameters of .035" (0.9 mm) and greater) permits backside deburring of holes from a diameter of .039" (1.0 mm). The high quantity of cutting edges (4 - 6 depending on diameter) provides for excellent surface quality.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "deburring process".

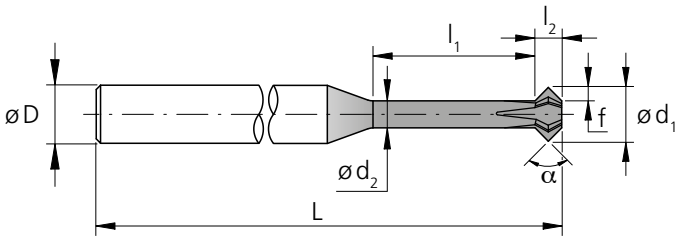
Please note

You couldn't find your suitable version of the CrazyMill Doublechamfer (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide | 45° 45° | Z 4-6 | eXedur RIP

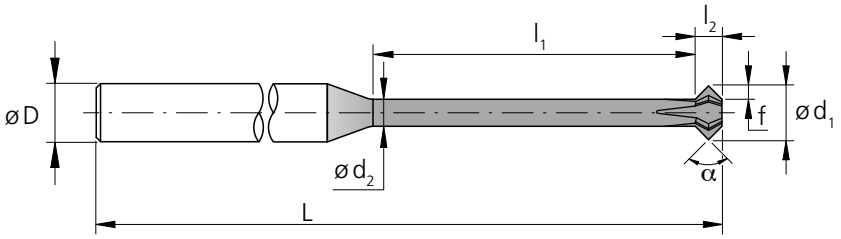
3xd$_1$



d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer α	Z [Teeth]	f [mm]	Item number	Availability
.035	0.9	**.106**	2.7	0.45	0.45	3	**2.11**	53.5	90°	4	0.23	2.DC.03090090.1	■
.055	1.4	**.165**	4.2	0.70	0.70	3	**2.11**	53.5	90°	5	0.35	2.DC.03140090.1	■
.071	1.8	**.213**	5.4	0.90	0.90	4	**2.17**	55.0	90°	5	0.45	2.DC.03180090.1	■
.110	2.8	**.331**	8.4	1.40	1.40	4	**2.36**	60.0	90°	5	0.70	2.DC.03280090.1	■
.146	3.7	**.437**	11.1	1.85	1.85	4	**2.36**	60.0	90°	5	0.93	2.DC.03370090.1	■
.185	4.7	**.555**	14.1	2.35	2.35	6	**2.76**	70.0	90°	5	1.18	2.DC.03470090.1	■
.224	5.7	**.673**	17.1	2.85	2.85	6	**2.76**	70.0	90°	6	1.43	2.DC.03570090.1	■

■ Stock item

6xd$_1$



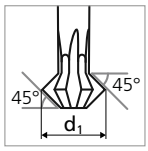
d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	d_2 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Chamfer α	Z [Teeth]	f [mm]	Item number	Availability
.035	0.9	**.213**	5.4	0.54	0.36	3	**2.36**	60.0	90°	4	0.18	2.DC.06090090.1	■
.055	1.4	**.331**	8.4	0.84	0.56	3	**2.36**	60.0	90°	5	0.28	2.DC.06140090.1	■
.071	1.8	**.425**	10.8	1.08	0.72	4	**2.36**	60.0	90°	5	0.36	2.DC.06180090.1	■
.110	2.8	**.661**	16.8	1.68	1.12	4	**2.36**	60.0	90°	5	0.56	2.DC.06280090.1	■
.146	3.7	**.874**	22.2	2.22	1.48	4	**2.36**	60.0	90°	5	0.74	2.DC.06370090.1	■
.185	4.7	**1.11**	28.2	2.82	1.88	6	**3.15**	80.0	90°	5	0.94	2.DC.06470090.1	■
.224	5.7	**1.35**	34.2	3.42	2.28	6	**3.15**	80.0	90°	6	1.14	2.DC.06570090.1	■

■ Stock item

CrazyMill Doublechamfer 3 x d / 6 x d

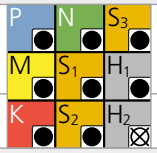
DEBURRING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 | **394**
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	100 | **328**
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	80 | **262**
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	50 | **164**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	80 | **262**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	50 | **164**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	60 | **197**
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	200 | **656**
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | **656**
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40 | **131**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40 | **131**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	200 | **656**
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	200 | **656**
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	40 | **131**
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	40 | **131**
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	40 | **131**
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	50 | **164**
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | **197**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



	f_z [mm] | [IPT]	
	Ød1	
	0.90 - 1.80 mm | .035" - .071"	2.80 - 5.70 mm | .110" - .224"
	f	f
	0.030 | .0012	0.040 | .0016
	0.020 | .0008	0.030 | .0012
	0.015 | .0006	0.030 | .0012
	0.010 | .0004	0.030 | .0012
	0.015 | .0006	0.030 | .0012
	0.015 | .0006	0.030 | .0012
	0.015 | .0006	0.030 | .0012
	0.030 | .0012	0.040 | .0016
	0.030 | .0012	0.040 | .0016
	0.020 | .0008	0.030 | .0012
	0.020 | .0008	0.030 | .0012
	0.030 | .0012	0.040 | .0016
	0.030 | .0012	0.040 | .0016
	0.020 | .0008	0.030 | .0012
	0.020 | .0008	0.030 | .0012
	0.020 | .0008	0.030 | .0012
	0.015 | .0006	0.030 | .0012
	0.015 | .0006	0.020 | .0008

CrazyMill Radiuschamfer

UNIVERSALLY DEBURRING WITH EXTERNAL COOLING



Due to its special shape, the CrazyMill Radiuschamfer is often referred to as the "Lollipop". It can be used universally thanks to its extra-large 300° cutting zone. It is suitable for front and rear chamfering, for all possible internal and external contours as well as for intersections of holes and milling procedures or oblique hole exits.

Available from a ball diameter of .039" (1.0 mm) and a version of up to 4 x d, the tool reaches even difficult-to-access angles and positions.

Coolant type, pressure and filtration

Recommendations for coolant type, pressure and filtration are on page "deburring process".

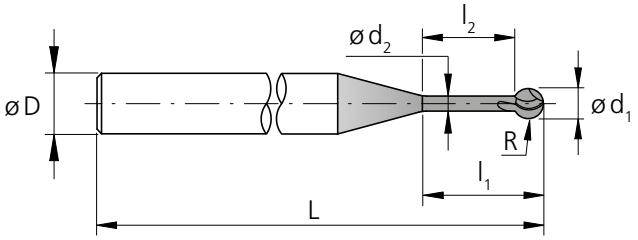
Please note

You couldn't find your suitable version of the CrazyMill Radiuschamfer (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.

Carbide	300°	Z3		eXedur RIP

Ø d_1	**.039" - .236"** (1 - 6 mm)	
Tolerance	**0 - .0016"**	0 - 0.04 mm



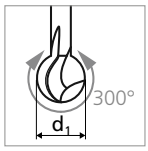
d_1 **[inch]**	**d_1** [mm]	**l_1** **[inch]**	**l_1** [mm]	**d_2** [mm]	**l_2** [mm]	**D** **(h6)** [mm]	**L** **[inch]**	**L** [mm]	**Z** [Teeth]	**R** **(0/- 0.02)** [mm]	**Item number**	Availability
.039	1.0	**.157**	4	0.50	3.0	4	**1.97**	50	3	0.50	2.RC.040100.1	■
.059	1.5	**.236**	6	0.75	4.5	4	**1.97**	50	3	0.75	2.RC.040150.1	■
.079	2.0	**.315**	8	1.00	6.0	4	**2.36**	60	3	1.00	2.RC.040200.1	■
.098	2.5	**.394**	10	1.25	7.5	4	**2.36**	60	3	1.25	2.RC.040250.1	■
.118	3.0	**.472**	12	1.50	9.0	4	**2.36**	60	3	1.50	2.RC.040300.1	■
.157	4.0	**.630**	16	2.00	12.0	6	**2.76**	70	3	2.00	2.RC.040400.1	■
.236	6.0	**.945**	24	3.00	18.0	6	**2.76**	70	3	3.00	2.RC.040600.1	■

■ Stock item

CrazyMill Radiuschamfer

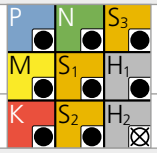
DEBURRING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW





Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM]
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010	120 | **394**
		1.0401	C15	AISI 1015	
		1.1191	C45E/CK45	AISI 1045	
		1.0044	S275JR	AISI 1020	
		1.0715	11SMn30	AISI 1215	
	Low alloyed steel Rm > 900 N/mm²	1.5752	15NiCr13	ASTM 3415 / AISI 3310	100 | **328**
		1.7131	16MnCr5	AISI 5115	
		1.3505	100Cr6	AISI 52100	
		1.7225	42CrMo4	AISI 4140	
		1.2842	90MnCrV8	AISI O2	
	High alloyed tool steel Rm < 1200 N/mm²	1.2379	X153CrMoV12	AISI D2	80 | **262**
		1.2436	X210CrW12	AISI D4/D6	
		1.3343	HS6-5-2C	AISI M2 / UNS T11302	
		1.3355	HS18-0-1	AISI T1 / UNS T12001	
M	Stainless steel ferritic	1.4016	X6Cr17	AISI 430 / UNS S43000	50 | **164**
		1.4105	X6CrMoS17	AISI 430F	
	Stainless steel martensitic	1.4034	X46Cr13	AISI 420C	80 | **262**
		1.4112	X90CrMoV18	AISI 440B	
	Stainless steel martensitic – PH	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH	
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH	
	Stainless steel austenitic	1.4301	X5CrNi 18-10	AISI 304	50 | **164**
		1.4435	X2CrNiMo 18-14-3	AISI 316L	
		1.4441	X2CrNiMo 18-15-3	AISI 316LM	
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L	
K	Cast iron	0.6020	GG20	ASTM 30	60 | **197**
		0.6030	GG30	ASTM 40B	
		0.7040	GGG40	ASTM 60-40-18	
		0.7060	GGG60	ASTM 80-60-03	
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	200 | **656**
		3.4365	AlZnMgCu1.5	ASTM 7075	
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200 | **656**
		3.2381	GD-AlSi10Mg	UNS A03590	
	Copper	2.004	Cu-OF / CW008A	UNS C10100	40 | **131**
		2.0065	Cu-ETP / CW004A	UNS C11000	
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400	40 | **131**
		2.036	CuZn40 CW509L	UNS C28000	
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	200 | **656**
		2.102	CuSn6	UNS C51900	
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000	200 | **656**
		2.096	CuAl9Mn2	UNS C63200	
S_1	Super alloys	2.4856		Inconel 625	40 | **131**
		2.4668		Inconel 718	
		2.4617	NiMo28	Hastelloy B-2	
		2.4665	NiCr22Fe18Mo	Hastelloy X	
S_2	Titanium pure	3.7035	Gr.2	ASTM B348 / F67	40 | **131**
		3.7065	Gr.4	ASTM B348 / F68	
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	40 | **131**
		9.9367	TiAl6Nb7	ASTM F1295	
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25	50 | **164**
			CrCoMo28	ASTM F1537	
H_1	Hardened steel < 55 HRC	1.2510	100MnCrMoW4	AISI O1	60 | **197**
H_2	Hardened steel ≥ 55 HRC	1.2379	X153CrMoV12	AISI D2	

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended



f_z [mm] | **[IPT]**

	Ød1 1.0 - 2.0 mm	**.039" - .079"** **f**	**Ød1** 3.0 - 6.0 mm	**.118" - .236"** **f**
	0.030	**.0012**	0.040	**.0016**
	0.020	**.0008**	0.030	**.0012**
	0.015	**.0006**	0.030	**.0012**
	0.010	**.0004**	0.030	**.0012**
	0.015	**.0006**	0.030	**.0012**
	0.015	**.0006**	0.030	**.0012**
	0.015	**.0006**	0.030	**.0012**
	0.030	**.0012**	0.040	**.0016**
	0.030	**.0012**	0.040	**.0016**
	0.020	**.0008**	0.030	**.0012**
	0.020	**.0008**	0.030	**.0012**
	0.030	**.0012**	0.040	**.0016**
	0.030	**.0012**	0.040	**.0016**
	0.020	**.0008**	0.030	**.0012**
	0.020	**.0008**	0.030	**.0012**
	0.020	**.0008**	0.030	**.0012**
	0.015	**.0006**	0.030	**.0012**
	0.015	**.0006**	0.020	**.0008**



Deburring process CrazyMill Chamfer

PRECISE AND EFFICIENT CHAMFERING AND DEBURRING

Coolant type, pressure and filtration

For best results, Mikron Tool recommends the use of cutting oil as coolant. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used as well.

For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the cooling fluid is aimed directly to the deburring cutter tip, thus cooling and lubricating the tool perfectly and flushing away the chips.

Tool holders

For detailed indications for tool holders see chapter "Technical information".

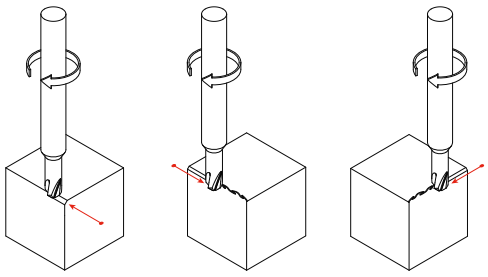
CrazyMill Chamfer

The chamfering and deburring tool of the CrazyMill Chamfer product line supplements the CrazyDrill / MiquDrill drill line and the CrazyMill Cool line. Holes, edges, grooves, and corners can be quickly and easily deburred front or rear. The result is a burr-free part with a defined chamfer.

- **CrazyMill Frontchamfer** for front deburring and chamfering
- **CrazyMill Backchamfer** for rear deburring and chamfering without reclamping the workpiece
- **CrazyMill Doublechamfer** for front and rear deburring and chamfering
- **CrazyMill Radiuschamfer** for front and rear deburring, for inner and outer contours and for complex profiles such as intersections of holes and milling processes

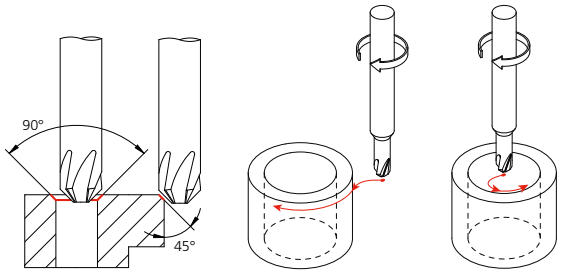
CHAMFERING AND DEBURRING PROCESS

1. Upcut milling and downcut milling



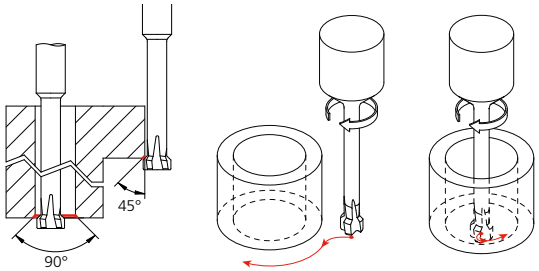
- Upcut milling is recommended for chamfering
- The machining direction for deburring depends on the direction of burr formation. Mikron Tool recommends using the milling tool in the opposite direction of the burr

2. Front deburring / chamfering of holes, pockets, and edges



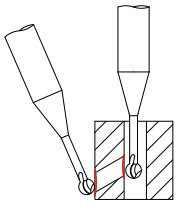
- Approach via spiral interpolation, rolling entry, or tangential entry

3. Back deburring / chamfering of holes, pockets, and edges



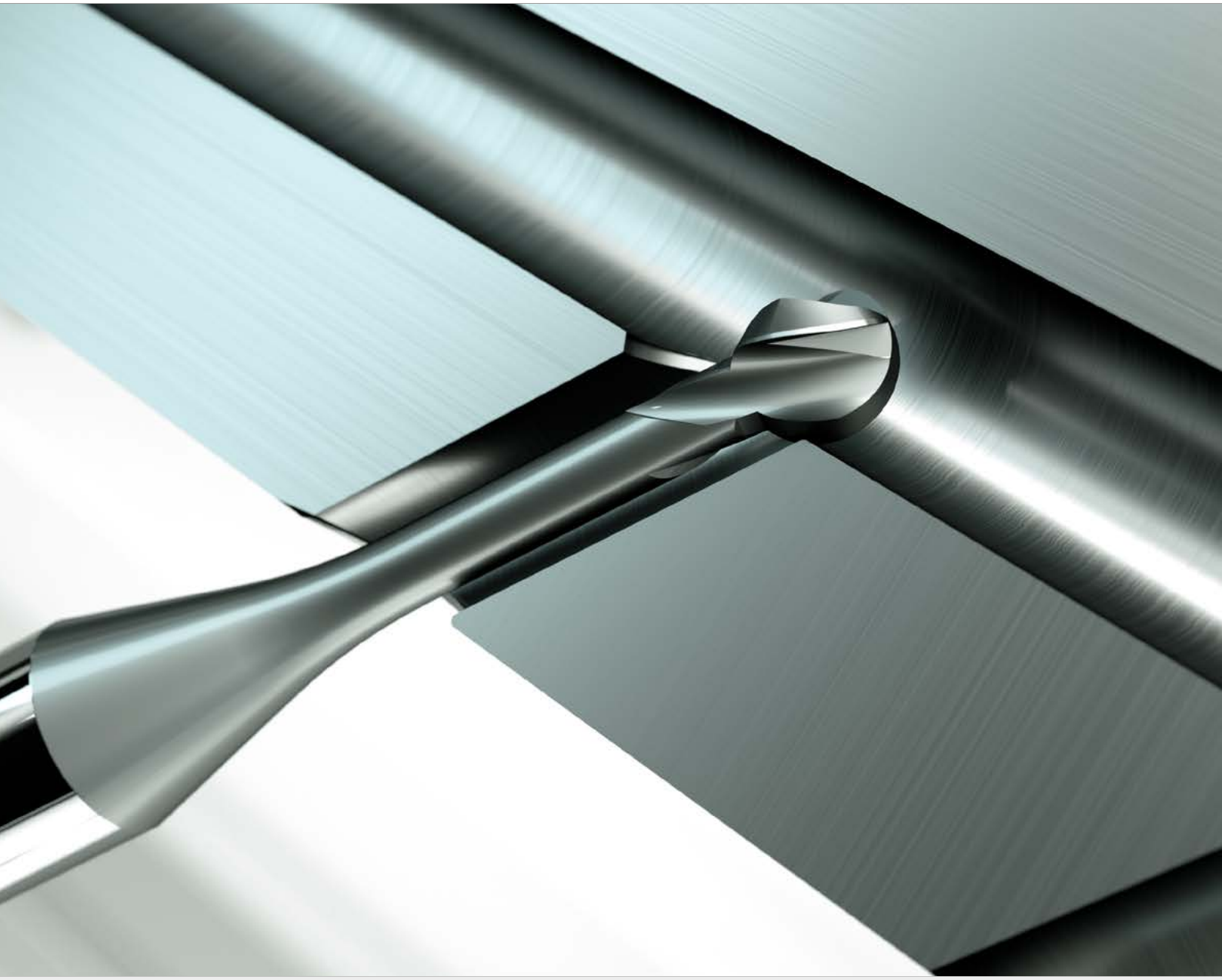
- Approach via spiral interpolation, rolling entry, or tangential entry

4. Deburring of complex edges such as hole intersections



- Depending on the workpiece geometry, approach using spiral interpolation, rolling entry, tangential entry, side delivery, or CNC special functions for tubular openings

Customized Chamfer and Deburring Tools



Mikron Tool produces solid carbide chamfer and deburring tools according to your needs and requirements and within the following range:

MILLING TOOLS FOR DEBURRING FRONT AND BACKSIDE AS WELL AS MULTI CHAMFER MILLING

- Diameter standard milling sizes min: .014" (0.36 mm)
- Number of cutting edges: 1 up to 16

DRILLS FOR DEBURRING

- Diameter min: .004" (0.1 mm)
- Number of cutting edges 1 up to 4

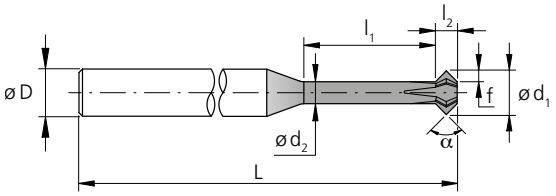
REAMERS FOR DEBURRING

- Diameter min: .016" (0.4 mm)
- Number of cutting edges 2 up to 8

DEBURRING TOOLS

GENERAL CHARACTERISTICS

- Maximum tool diameter: 1.26" (32.0 mm), bigger as per specific request
- Maximum tool length: 13" (330 mm)
- Tool diameter tolerance max.: ± 20 µin (0.5 µm)
- Concentricity between shaft and tool diameters max.: ≤ 79 µin (2 µm)



- Direction of cut: right- hand cutting or left-hand cutting
- Material for deburring and chamfering tools: tungsten carbide, grade selection depending on application

COATINGS

Various, choice according to application

COOLING

- Cooling via straight internal coolant channels in the shaft
- Cooling via cooling channels in the shaft, but with special exits, (for ex. in the flutes)
- Deburring tools to be used with external coolant supply

TYPE OF SHAFT

- Cylindrical as per DIN 6535 HA
- Cylindrical as per DIN 6535 HB (Weldon)
- Clamping face for turning tools
- Others upon request

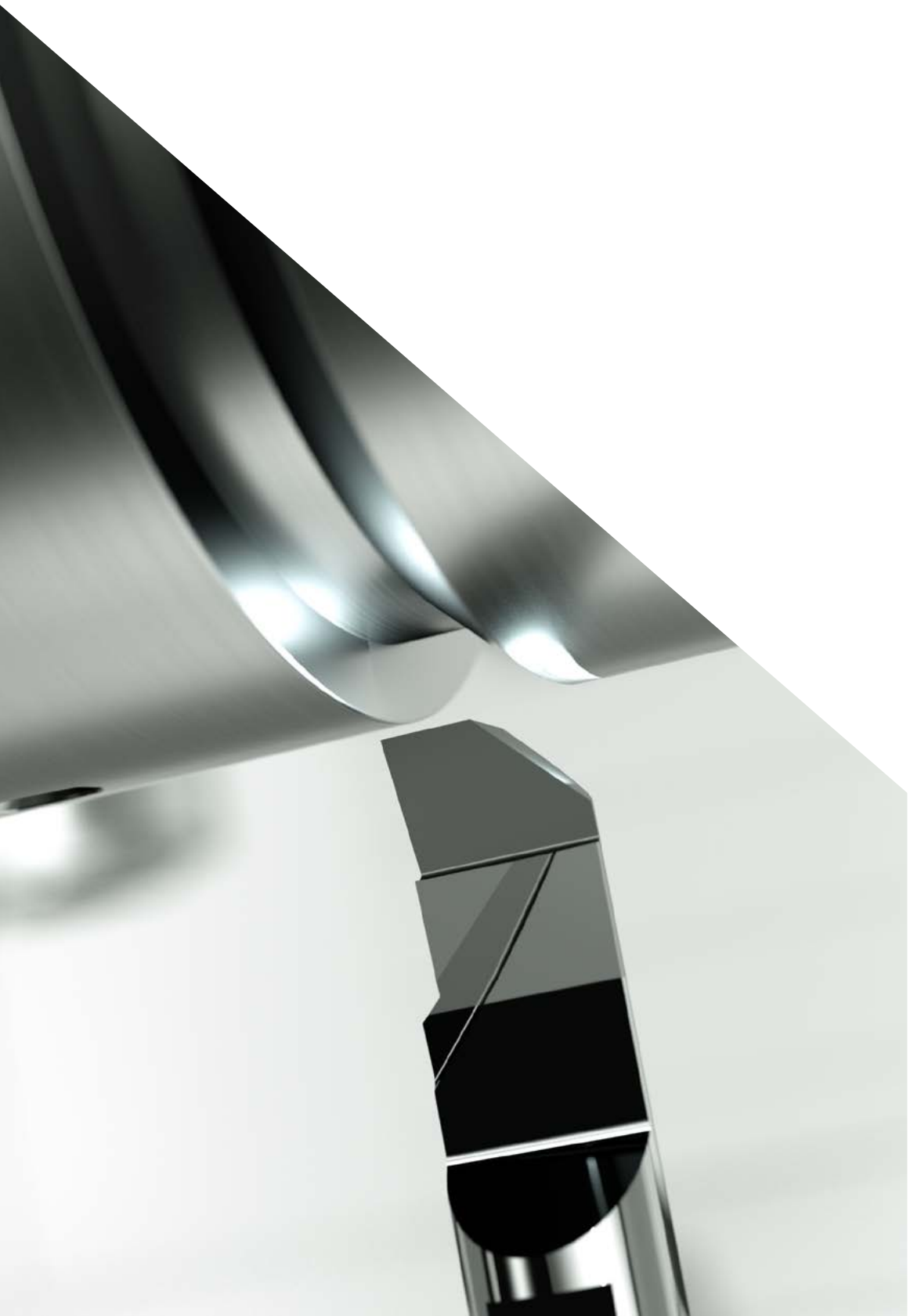
MATERIAL TO BE MACHINED

For steel, corrosion-resistant steels, i.e. stainless steels, titanium pure / titanium alloys, super alloys, i.e. heat-resistant alloys such as Inconel or Hastelloy, CrCo alloys, hardened steel up to 55HRC, aluminum / aluminum alloys, brass, copper, cast materials, etc.

CONDITIONING

Cutting edge preparation, polishing of flutes

crazy about turning



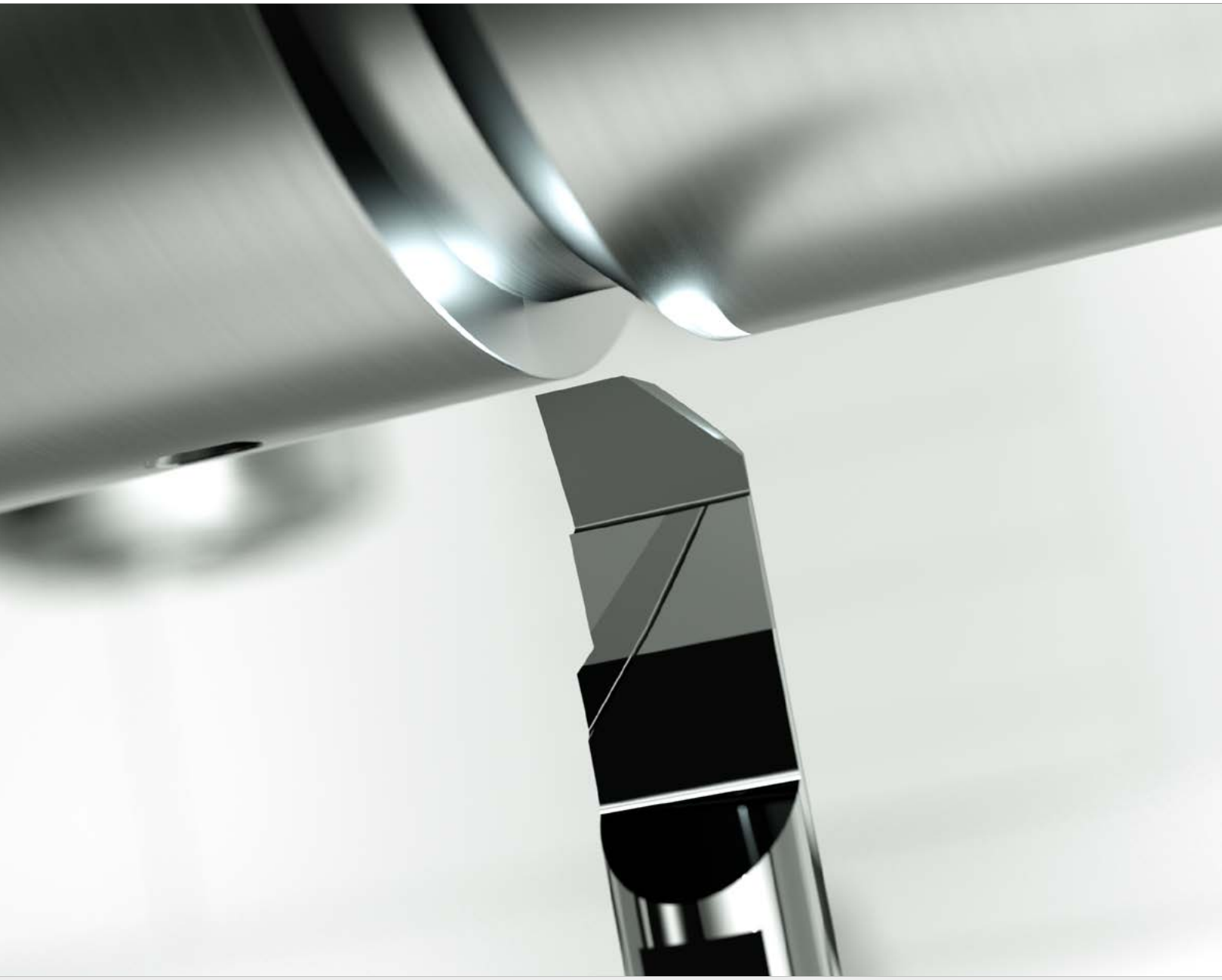
TURNING TOOLS

09

CUSTOMIZED FORM TURNING TOOLS 680

CUSTOMIZED GROOVING TOOLS 682

Customized form turning tools



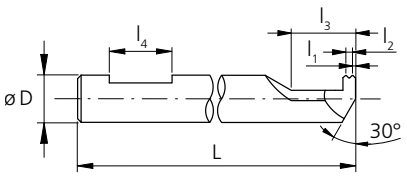
Mikron Tool produces solid carbide form turning tools according to your needs and requirements:

CHARACTERISTICS

- For internal or external machining
- Form tolerance max.: ± 39 µin (1 µm)
- Number of cutting edges: 1 or more
- Cutting direction: right-hand cutting or left-hand cutting
- Material for form turning tool: tungsten carbide, grade selection depending on application

COATINGS

Various choice according to application



COOLING

- Form turning tools for external or integrated coolant supply

TOOL HOLDING

- Clamping face for turning tools
- Others upon request

MATERIAL TO BE MACHINED

Steel, corrosion-resistant steels, i.e. stainless steels, pure titanium / titanium alloys, super alloys or heat-resistant alloys such as Inconel or Hastelloy, CrCo alloys, drills for hardened steel up to 55HRC, aluminum / aluminum alloys, brass, copper, cast materials, etc.

TREATMENTS

Cutting edge preparation

Customized grooving tools



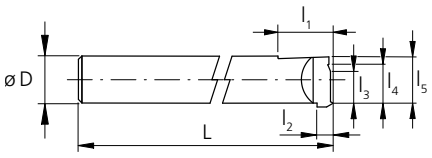
Mikron Tool produces solid carbide grooving tools according to your needs and requirements:

CHARACTERISTICS

- For internal or external machining
- Form tolerance max.: ± 39 µin (1 µm)
- Number of cutting edges: 1 or more
- Cutting direction: right-hand cutting or left-hand cutting
- Material for grooving tool: tungsten carbide, grade selection depending on application

COATINGS

Various choice according to application



COOLING

- Grooving tools for external or integrated coolant supply

TOOL HOLDING

- By means of clamping face for turning tools
- Others upon request

MATERIAL TO BE MACHINED

Steel, corrosion-resistant steels, i.e. stainless steels, pure titanium / titanium alloys, super alloys or heat-resistant alloys such as Inconel or Hastelloy, CrCo alloys, drills for hardened steel up to 55HRC, aluminum / aluminum alloys, brass, copper, cast materials, etc.

TREATMENTS

Cutting edge preparation

crazy about reaming



10

CUSTOMIZED REAMING TOOLS 686

Customized reaming tools

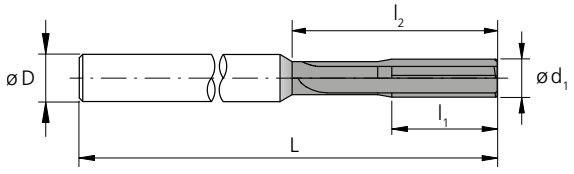


Mikron Tool produces solid carbide reamers according to your needs and requirements and within the following range:

- Reamer with 1-diameter
- Step reamer with different diameters
- Surface quality n5 can be obtained depending on cutting / coolant medium, machine tool equipment, spindle, tool holder (concentricity), material to be removed

CHARACTERISTICS

- Diameter min: .016" (0.4 mm)
- Diameter max: 1.26" (32.0 mm), bigger following specific request
- Maximum tool length: 13" (330 mm)
- Tool diameter tolerance max.: ± 20 µin (0.5 µm)
- Concentricity with shaft max.: 79 µin (2 µm)
- Number of cutting edges: 1 up to 16
- Cutting direction: right-hand cutting or left-hand cutting
- Form of flutes: straight flutes left-hand helix, right-hand helix
- Division of teeth: regular or irregular
- Shape of cutting edges: various
- Reamer material: tungsten carbide, grade selection depending on application



COATINGS

Various, choice according to application

COOLING

- Reaming tools with straight internal cooling channels in the shaft
- Reaming tools with internal cooling channels, special exits, for example in the flutes
- Reaming tool for external coolant supply

TYPE OF SHAFT

- Cylindrical as per DIN 6535 HA
- Cylindrical as per DIN 6535 HB (Weldon)
- Others upon request

MATERIAL TO BE MACHINED

Reamer for steel, corrosion-resistant steels, i.e. stainless steels, pure titanium / titanium alloys, super alloys, i.e. heat-resistant alloys such as Inconel or Hastelloy, CrCo alloys, hardened steel up to 55HRC, aluminum / aluminum alloys, brass, copper, cast materials, etc.

TREATMENTS

Cutting edge preparation, polishing of flutes

crazy about multifuncional



MULTIFUNCIONAL TOOLS

11

CUSTOMIZED MULTIFUNCIONAL TOOLS 690

Customized multifuncinal tools

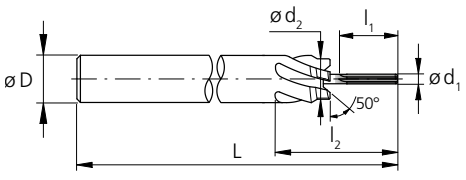


Mikron Tool produces solid carbide multifunctional tools according to your needs and requirements and within the following range:

- Various operations can be combined in one tool for example:
  1. Tool for centering + drilling
  2. Tool for centering + drilling + reaming
  3. Tool for drilling + reaming
  4. Drill + form drill
  5. Tool for milling + deburring

CHARACTERISTICS

- Diameter min: .039" (1.0 mm)
- Diameter max: 1.26" (32.0 mm), bigger following specific requests
- Maximum tool length: 13" (330 mm)
- Tolerance of tool diameters max.: ± 20 µin (0.5 µm)
- Concentricity between shaft and cutting diameters.: 79 µin (2 µm)
- Number of cutting edges: 2 - 8
- Cutting direction: right-hand cutting or left-hand cutting
- Tool material: tungsten carbide, grade selection depending on application



COATINGS

Various, choice according to application

COOLING

- Tools with internal helix shaped cooling channels up to the tip of the tool
- Tools with straight internal cooling channels in the shaft
- Tools to be used with external coolant supply

TYPE OF SHAFT

- Cylindrical as per DIN 6535 HA
- Cylindrical as per DIN 6535 HE (Whistle Notch)
- Cylindrical as per DIN 6535 HB (Weldon)
- Others upon request

MATERIAL TO BE MACHINED

Tool for steel, corrosion-resistant steels, i.e. stainless steels, pure titanium / titanium alloys, super alloys, i.e. heat-resistant alloys such as Inconel or Hastelloy, CrCo alloys, hardened steel up to 55HRC, aluminum / aluminum alloys, brass, copper, cast materials, etc.

TREATMENTS

Cutting edge preparation, polishing of flutes

crazy about regrinding



REGRINDING

12

SAVE RESOURCES – REDUCE COSTS 694
Regrinding of tools increases savings significantly

TOP QUALITY ALSO WITH THE SECOND REGRIND 696
Tools reground by Mikron Tool have the same performance as new tools

Save resources – reduce costs



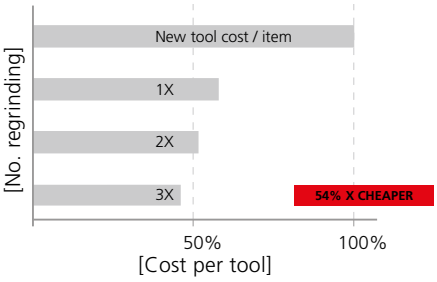
REGRINDING INCREASES SAVINGS

Worldwide reserves of raw materials for carbide tools (cobalt and tungsten) are limited and expensive. This is also a reason to treat these resources with respect and to obtain a maximum of efficiency. If only for environmental reasons.

Regrinding pays off

Economics is the most used argument justifying reprocessing of worn tools. Where a regrinding is possible, the price is reduced clearly for the second and third use. No new raw material is necessary, the tool geometry is already there, only the cutting edges are reground.

The example of a CrazyDrill Cool XL shows: With multiple regrinding the tool costs can be lowered by more than half.



54% = cost reduction per tool with regrinding for 25 pcs.
CrazyDrill Cool XL Ø .079" (2 mm), length 30 x d.

Multiple regrinding is worthwhile!

Standard Tools

You find information regarding the feasibility to regrind a tool in this catalogue in form of a note for each tool under product description. The quantity graduations for the price of regrinding are in the pricelist.

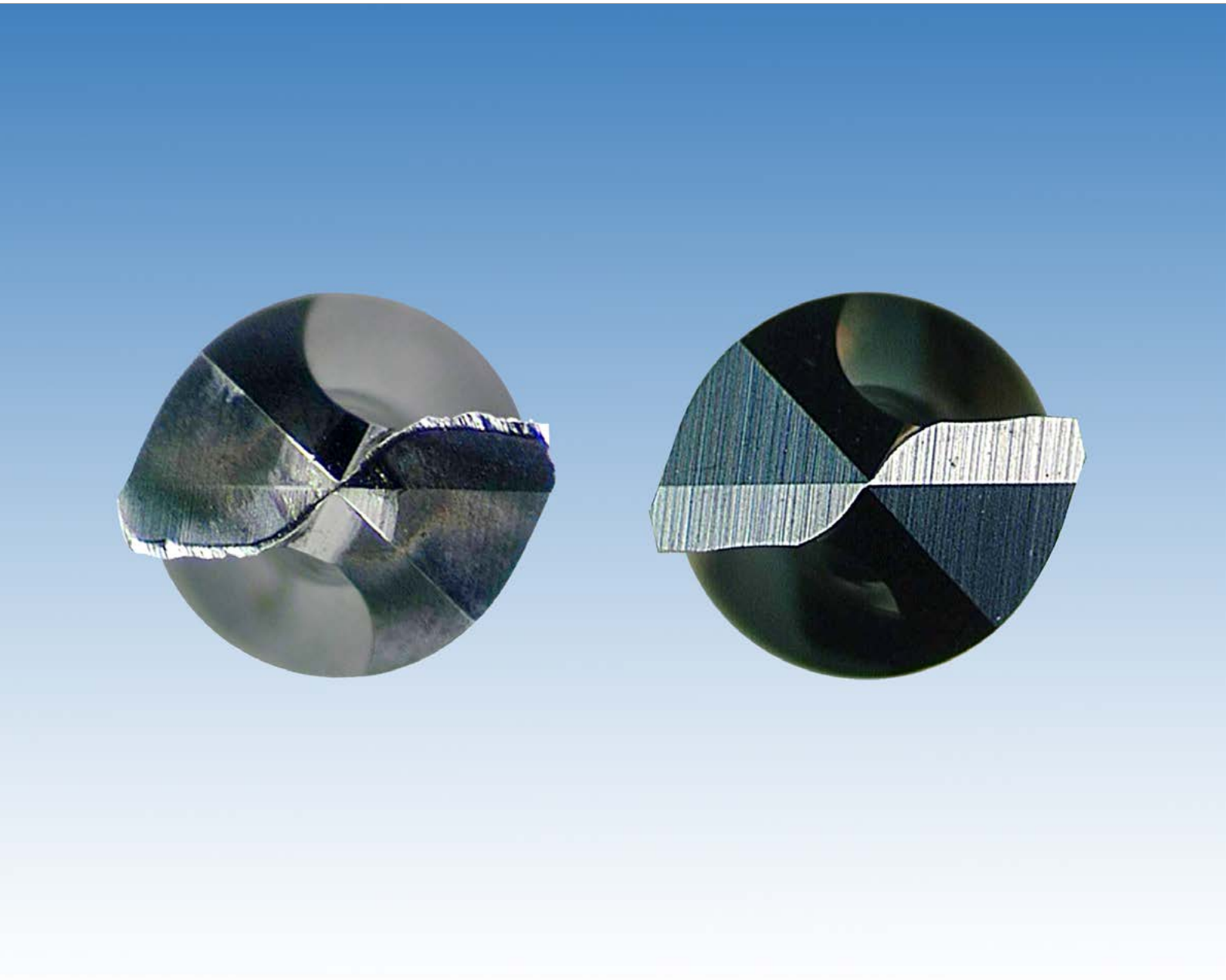
Customer specific tools

Check already in the planning of the purchase whether regrinding of a tool is possible. If yes, this allows the calculation of the tool price, which is significantly more economical than using always new tools.

Conclusion

It's worthwhile to obtain information regarding the possibility of reprocessing tools already when buying new tools.

Top quality also with the second regrind



TOP PERFORMANCE ALSO WITH REGROUND TOOLS

Highest quality also with the second regrind

At Mikron Tool, when it comes to the quality of the final product, there is no difference between new and reground tools. This is valid for standard as well as customer specific tools.

Selection for regrinding

Regrinding starts with a detailed control and selection of the incoming, used tools. Whether a tool can be reground depends mainly on its condition. Significant breakout of the cutting edge angles, severely worn edges or tools which have already been reground several times are eliminated. With this we guarantee that the reground tools have the same quality and performance of a new tool.

Regrinding by the original manufacturer

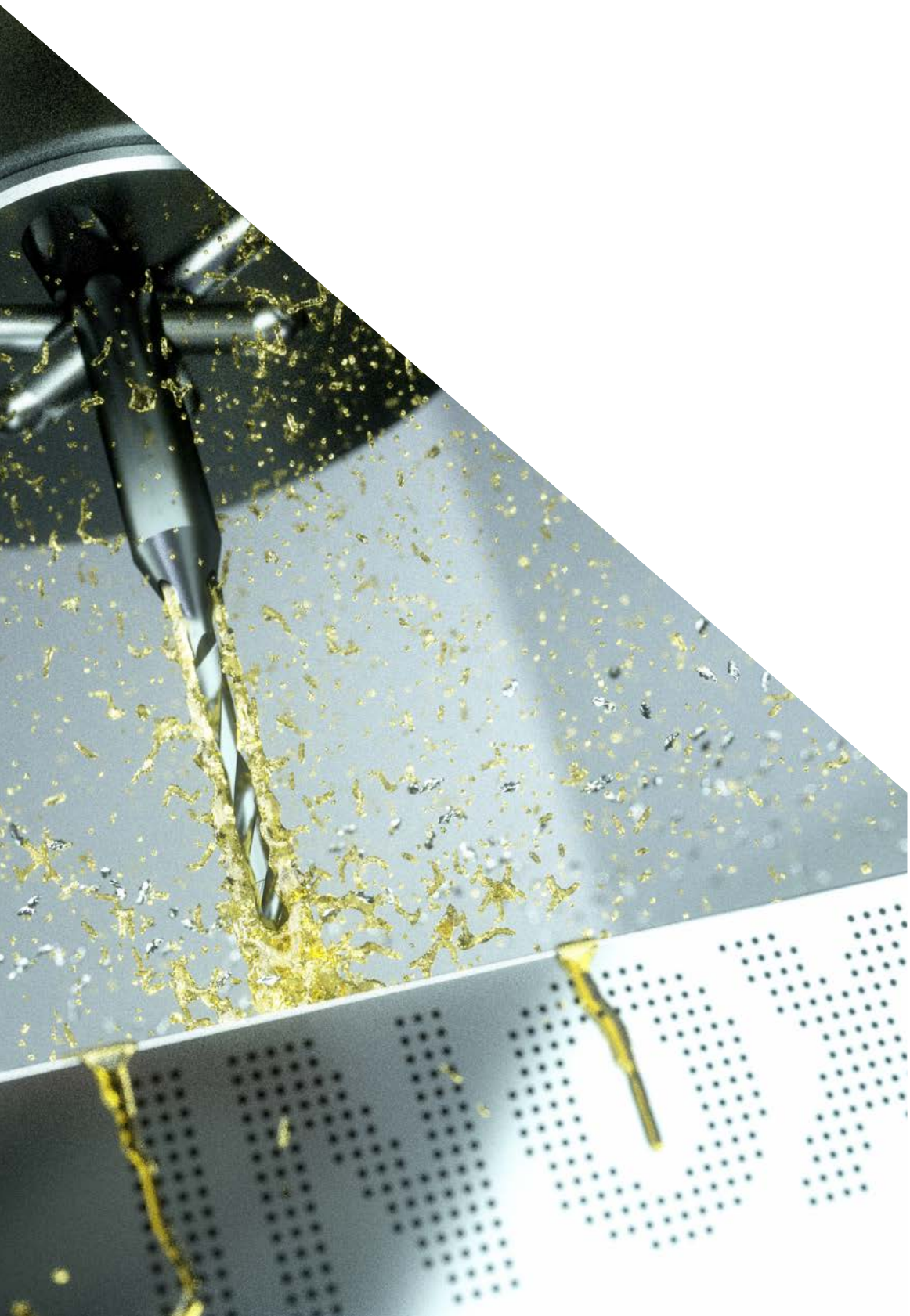
Why should the customer have regrinding be done by the original manufacturer?
Only the manufacturer knows his tools in detail. He guarantees that nothing is left up to chance when regrinding or even coating. All parameters are taken from the manufacturing process of new tools:

- same grinding machine
- same grinding wheels
- same grinding programs
- same edge preparation

After grinding, the tools receive an original coating and honing. A rigorous quality control completes the process.

The end-user has the guarantee that the quality of reground tools is identical to the one of new tools and that they can be used with the same cutting parameters.

crazy about challenging materials



13

INTRODUCTION	**700**
STAINLESS STEEL	702
TITANIUM AND TITANIUM ALLOYS	708
SUPERALLOYS	714
CR-CO ALLOYS	720

Introduction



STAINLESS STEEL, TITANIUM, SUPERALLOYS, CR-CO ALLOYS

The challenge

Difficult-to-machine metals are a broad field and depending on the material comprise a wide variety of machining difficulties. These go from long chips and tough/elastic behavior to poor heat conduction and extreme hardness. This is a special challenge for cutting tool users in general and tool suppliers and machine operators in particular. In spite (or simply because) of such properties, these metals are readily used in demanding industries, that is, everywhere where the material is exposed to extreme conditions. This is therefore about properties such as heat resistance, corrosion and acid resistance, biocompatibility, low weight but high degree of strength, good formability or even high degree of hardness.

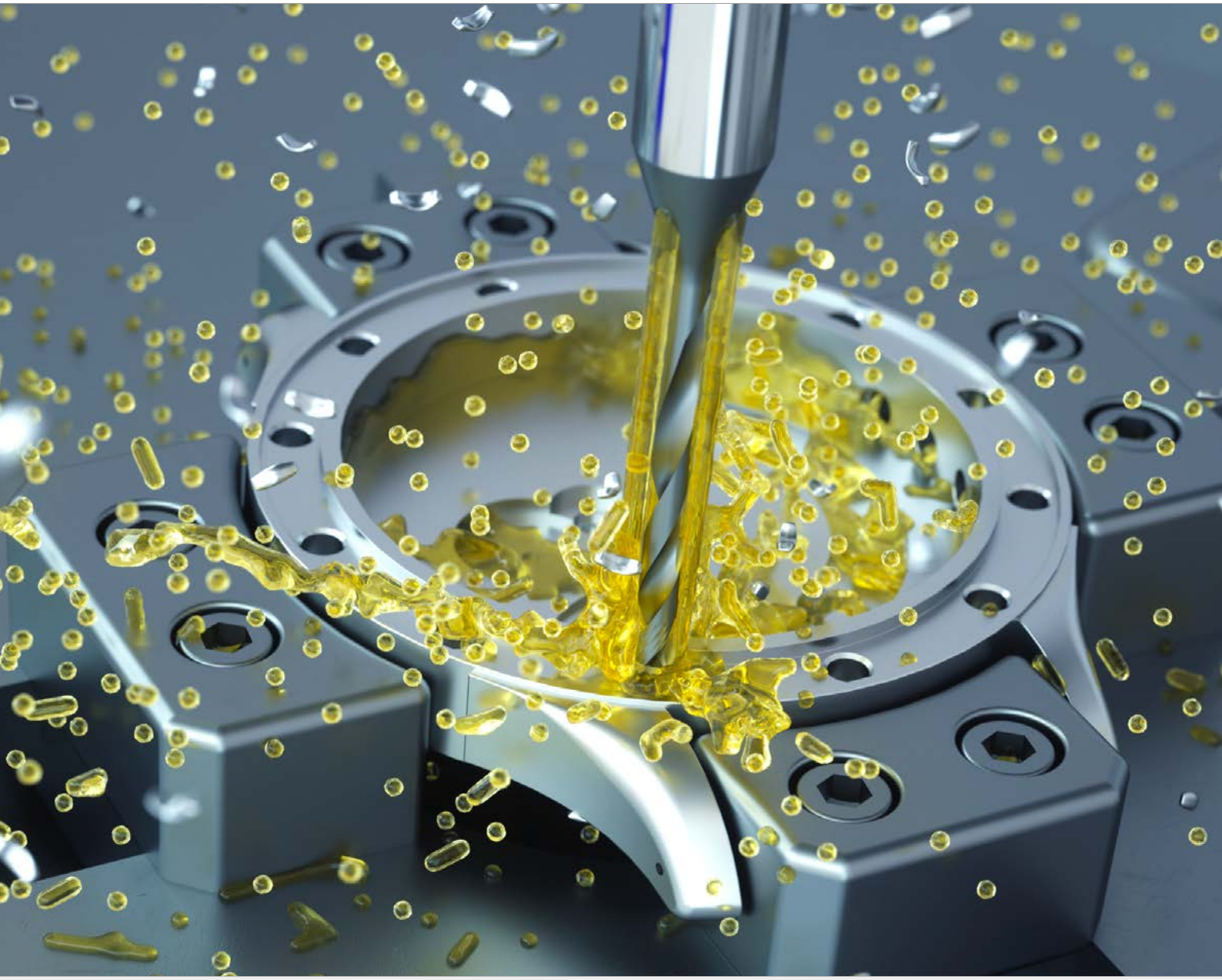
The characteristics

- **Stainless steel (rustproof and acid-resistant steels):** corrosion and acid-resistant, high degree of toughness, low thermal conductivity (depending on composition), good formability.
- **Titanium:** high degree of stability at low density (hard like steel at approximately half the weight), corrosion and temperature-resistant, biocompatible, good tensile strength, high degree of toughness, low thermal conductivity.
- **Superalloys (HRSA = Heat Resistant Super Alloys):** high degree of strength and hardness even at high temperatures; corrosion, acid and heat-resistant. Low thermal conductivity.
- **CrCo alloys:** biocompatible, minor heat expansion (like ceramic), corrosion, acid and heat-resistant, high degree of hardness.

The solution

To be able to offer an efficient solution for machining even in small diameters, a solution that actually earns the addendum "best suited for difficult-to-machine materials", Mikron Tool has incorporated different factors in tool development as geometry, cooling system, solid carbide, coating and a clearly defined machining process.

Stainless steel



EFFICIENT MACHINING OF STAINLESS STEEL

Stainless and acid-resistant steels (R&S) are generally characterized by high resistance to corrosion and acids where the higher the nickel content, the better the resistance. They have a high degree of toughness, and low electrical and thermal conductivity. They are also used more and more in mechanical engineering and in the household due to their good formability. The corrosion resistance makes them appealing to the food, medical and chemical industries or even for the watchmaking and jewelry industries.

Stainless steel

EFFICIENT MACHINING OF STAINLESS STEEL

THE CHARACTERISTICS

Generally, we make a distinction between ferritic, martensitic and austenitic steels. The level of difficulty for machining is increasing with the complexity of the alloys and the higher nickel content

- Corrosion protection: medium – high
- Not heat-treatable through thermal treatment (exception: austenitic steel)
- Magnetic (exception: austenitic steel)
- Thermal conductivity: low – medium
- Hot and cold formability: good – very good
- Coefficient of thermal expansion: from low (ferritic steel) to high (austenitic steel)
- Machinability: from easy (ferritic) to difficult (austenitic)
- Mechanical properties: good (high tensile strength)
- Toughness: high even at low temperatures
- Cost of materials: medium – high

THE CHALLENGE

As appreciated these afore mentioned qualities are in the application, they become very demanding when it comes to machining. Efficient machining often fails because of poor thermal conductivity (austenitic steels), the tendency towards strain hardening of the surface and the tough/elastic behavior of these materials. The consequences for tools, for example, are overheating and material buildup on the cutting edges, high wear and, particularly when drilling, the jamming of long chips in the flutes.

Considering the challenges, Mikron Tool developed special tool solutions for efficient machining of stainless and acid-resistant steels with process reliability.



THE APPLICATION DOMAINS

Stainless steel is easily deformable, corrosion and acid-resistant and therefore applied more and more in the industry and daily use.

Ferritic steels:

- Axles
- Shafts

Martensitic steels:

- Turbine components
- Pump components
- Energy equipment
- Food industry
- Household appliances
- Medical technology

Austenitic steels:

- Turbine construction
- Aviation technology
- Energy equipment
- Chemical industry
- Precision instruments
- Medical technology
- Watch and jewelry industry

Stainless steel

EFFICIENT MACHINING OF STAINLESS STEEL

Mikron Tool offers a range of standardized tools, specially designed for the machining of ferritic, martensitic and austenitic stainless steel.

- **CrazyDrill Twicenter:** Centering tool from Ø .012" to .236" (0.3 to 6.0 mm), center drill with internal cooling



- **CrazyDrill Pilot SST-Inox:** Pilot drilling from Ø .008" to .079" (0.2 to 2.0 mm), drilling depth up to 3 x d + 90° chamfer angle, pilot drill with integrated cooling



- **CrazyDrill Coolpilot:** Pilot drilling from Ø .039" to 1/4"(1.0 to 6.35 mm), driling depth up to 3 x d + 90° chamfer angle, pilot drill with internal cooling



- **CrazyDrill SST-Inox:** Drilling from Ø .008" to .079" (0.2 to 2.0 mm), drilling depth up to 12 x d, drill with or without integrated cooling



- **CrazyDrill Cool SST-Inox:** Drilling from Ø .039" to 1/4"(1.0 to 6.35 mm), drilling depth up to 40 x d, drill with internal cooling



- **CrazyDrill Flex SST-Inox:** Micro deep-hole drilling from Ø .008" to .079" (0.2 to 2.0 mm), drilling depth up to 50 x d, micro drill with integrated cooling



- **CrazyDrill Hexalobe / CrazyMill Hexalobe:** Combined drill from Ø.035" to .150" (0.9 to 3.8 mm), drilling and chamfering 120°; micro endmill from Ø.008" to .039"(0.2 to 1.0 mm) with maximal milling depth up to 5 x d; external cooling





- **CrazyMill Cool:** Milling from Ø.012" to 315" (0.3 to 8.0 mm) (square, corner radius and ball end mills), Ø.039" to .315"(1.0 to 8.0 mm) P&S mills; maximal milling depth up to 5 x d, integrated cooling



More appropriate tools for machining of stainless and acid-resistant steels

- **CrazyDrill Pilot:** Pilot drilling from Ø .016" to 1/4" (0.4 to 6.35 mm), drilling depth up to 2 x d + 90° chamfer angle, pilot drill with external cooling



- **CrazyDrill Crosspilot:** Pilot drilling on irregular, inclined and curved surfaces from Ø .016" to 1/4" (0.4 to 6.35 mm), pilot drill with external cooling



- **CrazyDrill Cool:** Deep-hole drilling from Ø .030" to .236"(0.75 to 6.0 mm), drilling depth up to 15 x d, drill with internal cooling



- **CrazyDrill Cool XL:** Deep-hole drilling from Ø .039" to .236" (1.0 to 6.0 mm), drilling depth up to 40 x d, drill with internal cooling

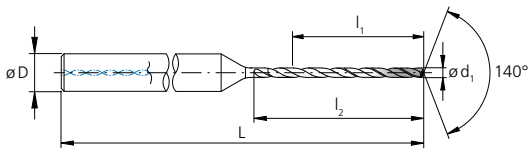


- **CrazyMill Chamfer:** Chamfering and deburring front and rear from Ø .014" to .236" (0.36 to 6.0 mm), tool with external cooling



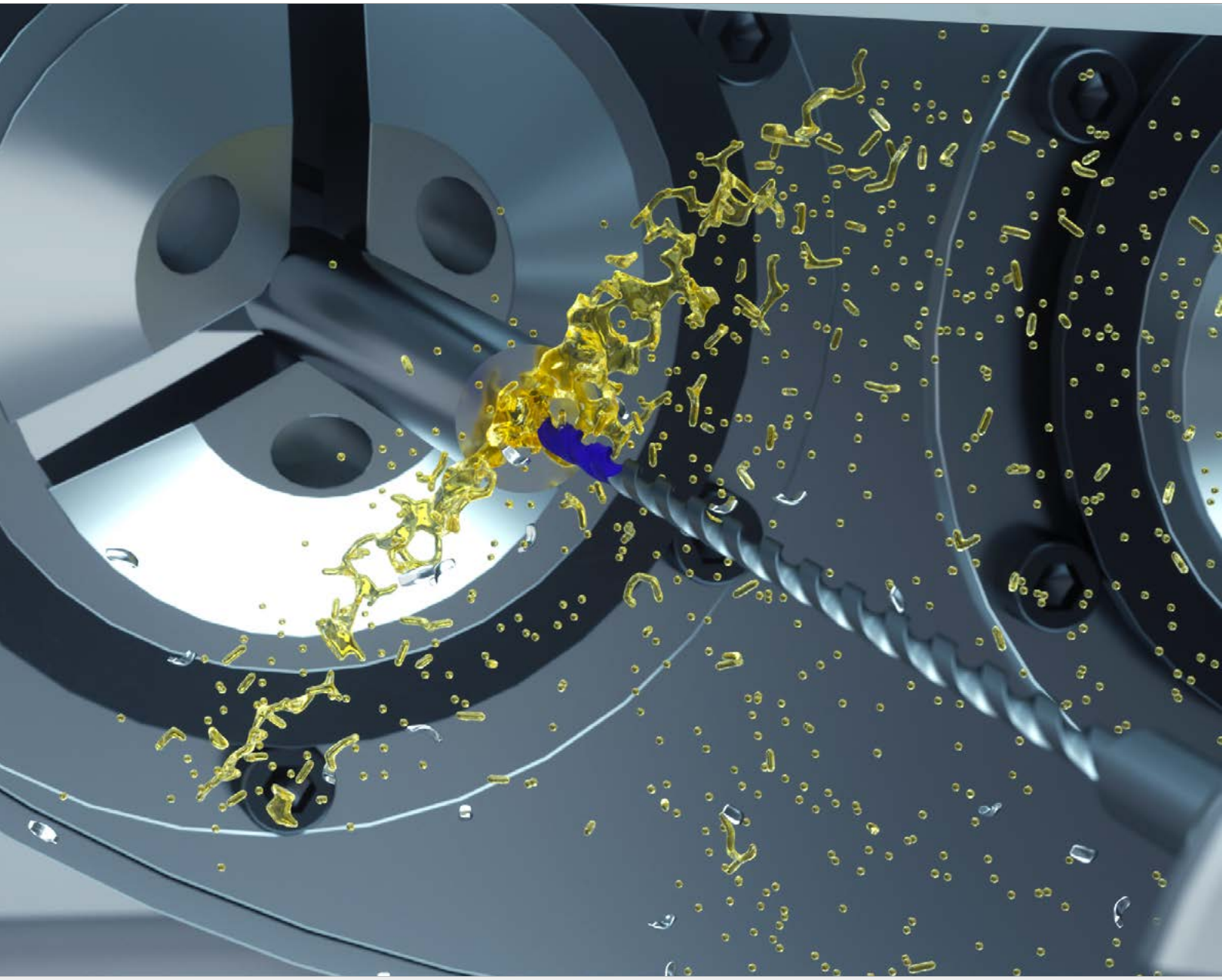
Customer-specific tools for machining of stainless and acid-resistant steels

- **Customer-specific tools:** We offer many possibilities of customer-specific tools such as drills, step drills, milling tools, reamers, deburring tools, turning tools, form tools and combined tools. Diameters from .004" to 1.26" (0.1 to 32.0 mm)



Please find more details in each chapter

Titanium and titanium alloys



EFFICIENT MACHINING OF TITANIUM AND TITANIUM ALLOYS

Occurring relatively frequently in nature but seldom in pure form, titanium is obtained by using a complicated production process. This makes titanium a costly and exclusive product. It is its properties that nonetheless make this element a coveted commodity in today's industry. Very malleable in pure form with a high durability in a low density (60% in comparison to steel), titanium is simultaneously corrosion and temperature-resistant. Its compatibility when in contact with the human body is also excellent.

Titanium and titanium alloys

EFFICIENT MACHINING OF TITANIUM AND TITANIUM ALLOYS

THE CHARACTERISTICS

Two main categories are differentiated: Titanium alloys where the titanium is alloyed with other metals and pure titanium which contains only minor impurities.

- Corrosion protection: high
- Acid resistance: good
- Good mechanical properties (tensile strength)
- Thoughness: high even at low temperatures
- Specific density: low
- Thermal conductivity: low
- Not magnetic
- Biocompatibility: very good – excellent
- Machinability: medium – difficult (pure titanium)
- Cost of materials: high

THE CHALLENGE

The poor heat conductivity is one of the key challenges in all materials made of titanium (pure or alloyed). The heat resulting during the machining process remains on the tool, the cutting edges heat up and the risk of cutting edge breakage is high. Tool life and process reliability suffer because of this.

Nonetheless, those who wish to achieve good machining rates, cannot avoid the topic of cooling. Cooling is also important since titanium at elevated pressures or at temperatures above 300° begins to burn. The high elasticity is an issue especially in pure titanium (degree 1 - 4). It requires a high shearing force and leads to high cutting wear. Chips splinter up and flow in a viscous and gummy manner.

Considering the challenges, Mikron Tool developed special tool solutions for efficient machining of titanium and titanium alloys with good process reliability.



THE APPLICATION DOMAINS

Titanium is a popular material in most various segments due to its lightweight, corrosion and temperature resistance and its excellent compatibility when in contact with the human body.

Titanium grade 5 and higher:

- Watches and jewelry industry
- Medical technology
- Aerospace industry
- Turbine construction
- Motorsports
- Chemical industry

Pure titanium grade 1 - 4:

- Medical technology (implants)
- Dental equipment
- Aerospace industry
- Watches and jewelry industry

Titanium and titanium alloys

EFFICIENT MACHINING OF TITANIUM AND TITANIUM ALLOYS

Mikron Tool offers a range of standardized tools, specially designed for the machining of pure titanium and titanium alloys.

- **CrazyDrill Twicenter:** Centering tool from Ø .012" to .236" (0.3 to 6.0 mm), center drill with internal cooling



- **CrazyDrill Flexpilot Titanium:** Pilot drilling from Ø .012" to .079" (0.3 to 2.0 mm), drilling depth up to 3 x d, pilot drill with external cooling



- **CrazyDrill Flex Titanium:** Micro deep-hole drilling from Ø .004" to .047" (0.1 to 1.2 mm), drilling depth up to 50 x d, drill with or without integrated cooling



- **CrazyDrill Hexalobe / CrazyMill Hexalobe:** Combined drill from Ø.035" to .150" (0.9 to 3.8 mm), drilling and chamfering 120°; micro endmill from Ø.008" to .039"(0.2 to 1.0 mm) with maximal milling depth up to 5 x d; external cooling




- **CrazyMill Cool:** Milling from Ø.012" to 315" (0.3 to 8.0 mm) (square, corner radius and ball end mills), Ø.039" to .315"(1.0 to 8.0 mm) P&S mills; maximal milling depth up to 5 x d, integrated cooling



More appropriate tools for machining of titanium and titanium alloys

- **CrazyDrill Pilot:** Pilot drilling from Ø .016" to 1/4" (0.4 to 6.35 mm), drilling depth up to 2 x d + 90° chamfer angle, pilot drill with external cooling



- **CrazyDrill Crosspilot:** Pilot drilling on irregular, inclined and curved surfaces from Ø.016" to 1/4" (0.4 to 6.35 mm), pilot drill with external cooling



- **CrazyDrill Steel:** Drilling from Ø .016" to 1/4" (0.4 to 6.35 mm), drilling depth up to 7 x d, drill with external cooling



- **CrazyDrill Cool XL:** Deep-hole drilling from Ø .039" to .236" (1.0 to 6.0 mm), drilling depth up to 40 x d, drill with internal cooling

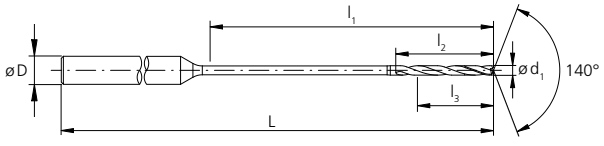


- **CrazyMill Chamfer:** Chamfering and deburring front and rear from Ø .014" to .236" (0.36 to 6.0 mm), tool with external cooling



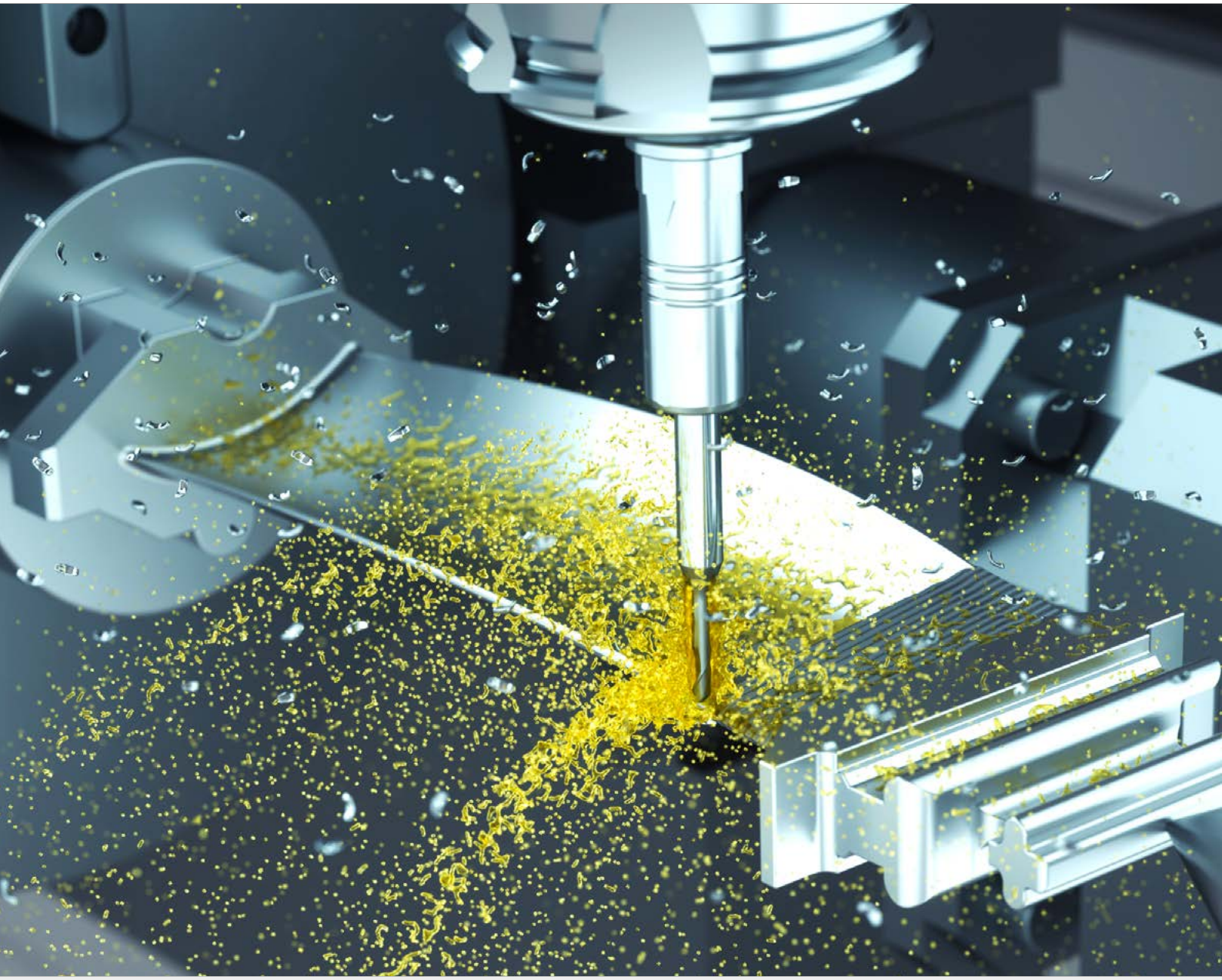
Customer-specific tools for machining of titanium and titanium alloys

- **Customer-specific tools:** We offer many possibilities of customer-specific tools such as drills, step drills, milling tools, reamers, deburring tools, turning tools, form tools and combined tools. Diameters from .004" to 1.26" (0.1 to 32.0 mm)



Please find more details in each chapter

Superalloys



EFFICIENT MACHINING OF SUPERALLOYS

Wherever the requirements for materials increase and where high operating temperatures prevail, the so-called superalloys or HRSA (heat-resistant superalloys) come into play. These are alloys with a complex composition. They are appealing because of their property to retain their stability and hardness even at high temperatures and to be corrosion-resistant.

Superalloys

EFFICIENT MACHINING OF SUPERALLOYS

THE CHARACTERISTICS

- Corrosion protection: very high
- Acid resistance: very high
- Heat resistance: high – very high
- High degree of hardness, even at high temperatures
- Not heat-treatable (low C content < 0.07 %)
- Not magnetic
- Thermal conductivity: low
- Hot and cold formability: very good
- Coefficient of thermal expansion: high
- Retention of stability and hardness, even at high temperatures
- Mechanical properties: very good (high tensile strength, elongation at break)
- Toughness: high, even at low temperatures
- Machinability: very challenging
- Cost of materials: very high

THE CHALLENGE

The extremely high degree of hardness and the low thermal conductivity generate high temperatures during machining. The tendency towards strain hardening and surface hardening increase wear on the tool 's cutting edges. These properties of the material make these heavy-duty alloys a challenge for the operator. Add to this a pronounced toughness which constitutes an additional hurdle when it comes to chip formation and removal.

For this reason, alternative wear-free methods are often preferred especially when drilling (electric discharge machining or laser). However, these reach their limits where there are strict regulations with respect to peripheral area quality (for example in the aerospace industry). Machining with cutting tools has a clear advantage in this respect.

Considering the challenges, Mikron Tool developed special tool solutions for efficient machining of superalloys with process reliability.



THE APPLICATION DOMAINS

Corrosion-resistant, unmodified stability and hardness also with high temperatures, these are the reasons why superalloys are appealing for challenging industries.

Major application domains:

- Chemical industry
- Petrochemical industry
- Aviation technology
- Power generation
- Medical technology
- Automotive industry
- Electronics

Superalloys

EFFICIENT MACHINING OF SUPERALLOYS

Mikron Tool offers a range of standardized tools, designed for the machining of superalloys, especially nickel-based superalloys.

- **CrazyDrill Twicenter:** Centering tool from Ø .012" to .236" (0.3 to 6.0 mm), center drill with internal cooling



- **CrazyDrill Pilot SST-Inox:** Pilot drilling from Ø .008" to .079" (0.2 to 2.0 mm), drilling depth up to 3 x d + 90° chamfer angle, pilot drill with integrated cooling



- **CrazyDrill Coolpilot:** Pilot drilling from Ø .039" to 1/4"(1.0 to 6.35 mm), driling depth up to 3 x d + 90° chamfer angle, pilot drill with internal cooling



- **CrazyDrill SST-Inox:** Drilling from Ø .008" to .079" (0.2 to 2.0 mm), drilling depth up to 12 x d, drill with or without integrated cooling



- **CrazyDrill Cool SST-Inox:** Drilling from Ø .039" to 1/4"(1.0 to 6.35 mm), drilling depth up to 40 x d, drill with internal cooling



■ **CrazyDrill Flex SST-Inox:** Micro deep-hole drilling from Ø .008" to .079" (0.2 to 2.0 mm), drilling depth up to 50 x d, micro drill with integrated cooling



■ **CrazyMill Chamfer:** Chamfering and deburring front and rear from Ø .014" to .236" (0.36 to 6.0 mm), tool with external cooling

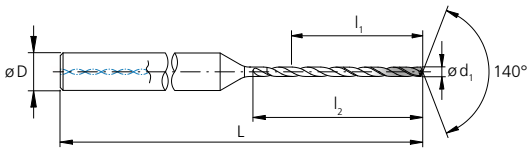


■ **CrazyMill Cool:** Milling from Ø.012" to 315" (0.3 to 8.0 mm) (square, corner radius and ball end mills), Ø.039" to .315"(1.0 to 8.0 mm) P&S mills; maximal milling depth up to 5 x d, integrated cooling



Customer-specific tools for machining of superalloys

■ **Customer-specific tools:** We offer many possibilities of customer-specific tools such as drills, step drills, milling tools, reamers, deburring tools, turning tools, form tools and combined tools. Diameters from .004" to 1.26" (0.1 to 32.0 mm)



Please find more details in each chapter

CrCo alloys



EFFICIENT MACHINING OF CR-CO ALLOYS

Chromium-cobalt alloys represent a special group among the superalloys. Due to their high price and poor machinability, they are only used when there are no other more cost-effective alternatives. Today these alloys are found predominantly in the medical technology because of their corrosion resistance and bio-compatibility. They are also especially suitable for dental equipment where in the mouth's humid environment a property such as "completely corrosion-resistant" is indispensable. Furthermore, since the coefficient of thermal expansion is conform to the ceramic coat of the tooth, no fissures are generated between both materials.

CrCo alloys

EFFICIENT MACHINING OF CR-CO ALLOYS

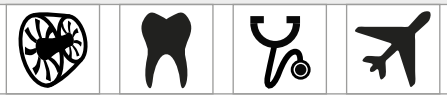
THE CHARACTERISTICS

- Corrosion protection: very high
- Acid resistance: very high
- Heat resistance: very high
- High degree of hardness, even at high temperatures
- Heat-treatable
- Not magnetic
- Biocompatible
- Thermal conductivity: low
- Hot and cold formability: very good
- Coefficient of thermal expansion: high
- Mechanical properties: good (high tensile strength, elongation at break)
- Toughness: high, even at low temperatures
- Machinability: very challenging
- Cost of materials: very high

THE CHALLENGE

The extremely high degree of hardness combined with high elasticity and poor thermal conductivity poses the highest demands on the machining process and tools are exposed to high wear. The surface tends towards strain hardening. With the price for the raw material being high, the process reliability is an important factor in the decision, how and with which tools a part is being machined. By all means, it's possible to machine these heat-resistant superalloys with cutting tools and process reliability.

Considering the challenges, Mikron Tool developed special tool solutions for efficient machining of CrCo alloys with process reliability.



THE APPLICATION DOMAINS

In spite of bad machinability, CrCo alloys are interesting for demanding segments due to highest corrosion resistance and biocompatibility.

Major application domains:

- Dental equipment
- Aviation technology
- Aerospace industry
- Medical technology

CrCo alloys

EFFICIENT MACHINING OF CR-CO ALLOYS

Mikron Tool offers several standardized tools, specially designed for the machining of CrCo alloys

- **CrazyDrill Twicenter:** Centering tool from Ø .012" to .236" (0.3 to 6.0 mm), center drill with internal cooling



- **CrazyDrill Pilot SST-Inox:** Pilot drilling from Ø .008" to .079" (0.2 to 2.0 mm), drilling depth up to 3 x d + 90° chamfer angle, pilot drill with integrated cooling



- **CrazyDrill Coolpilot:** Pilot drilling from Ø .039" to 1/4"(1.0 to 6.35 mm), driling depth up to 3 x d + 90° chamfer angle, pilot drill with internal cooling



- **CrazyDrill SST-Inox:** Drilling from Ø .008" to .079" (0.2 to 2.0 mm), drilling depth up to 12 x d, drill with or without integrated cooling



- **CrazyDrill Cool SST-Inox:** Drilling from Ø .039" to 1/4"(1.0 to 6.35 mm), drilling depth up to 40 x d, drill with internal cooling



■ **CrazyDrill Flex SST-Inox:** Micro deep-hole drilling from Ø .008" to .079" (0.2 to 2.0 mm), drilling depth up to 50 x d, micro drill with integrated cooling



■ **CrazyMill Chamfer:** Chamfering and deburring front and rear from Ø .014" to .236" (0.36 to 6.0 mm), tool with external cooling

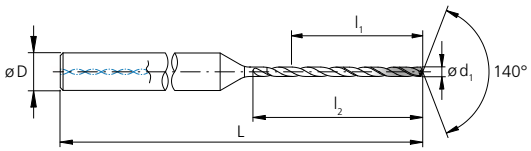


■ **CrazyMill Cool:** Milling from Ø.012" to 315" (0.3 to 8.0 mm) (square, corner radius and ball end mills), Ø.039" to .315"(1.0 to 8.0 mm) P&S mills; maximal milling depth up to 5 x d, integrated cooling



Customer-specific tools for machining of CrCo alloys

■ **Customer-specific tools:** We offer many possibilities of customer-specific tools such as drills, step drills, milling tools, reamers, deburring tools, turning tools, form tools and combined tools. Diameters from .004" to 1.26" (0.1 to 32.0 mm)



Please find more details in each chapter

crazy about technical perfection



14

INTRODUCTION	**728**
MACHINES	730
TOOL HOLDERS	732
COOLANT TYPE, PRESSURE AND FILTRATION	736
FORMULAS AND CONVERSIONS	738

Introduction



TECHNICAL INFORMATION ON THE PROPER USE OF MIKRON TOOL CUTTING TOOLS

To fulfill current requirements for manufacturing precision and process reliability, the "machine tool – spindle – tool – tool holder" system must be perfectly matched.

- **The machine tool:** High level of stiffness, vibration isolation of the foundations, lightweight design of the moving parts, high concentricity of the spindle, pull-in forces of the machine spindle, intelligent and fast machine controls
- **The tool holder:** High concentricity and balance quality, friction-locked tightening of the tool
- **The tool:** High concentricity, excellent balance quality (geometry, shaft design), long tool life (tool material, geometry, coating)

Machines



FROM THE MACHINE TO THE TOOL: THE PERFORMANCE MUST CONVINCE

Mikron Tool cutting tools can be used on CNC machining centers, lathes or transfer machines.

Minimum speeds and minimum concentricity of the spindle must be considered as well as whether or not the tools are used with through-tool coolant.

Details on the requirements for the various tool groups can be found in the individual product descriptions.

Tool holders

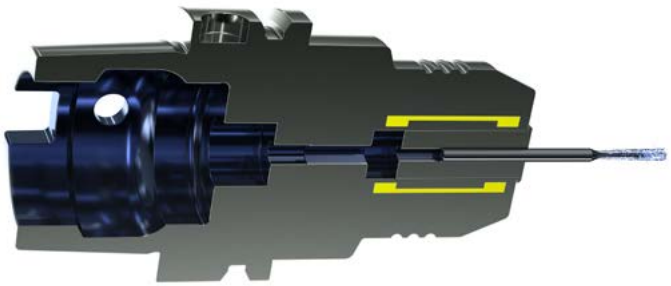


THE RIGHT CLAMPING FOR EACH TOOL (APPLICATION)

The clamping equipment

Mikron Tool recommends using a high-precision tool holder which, depending on the tool, is equipped with through-tool coolant supply.

Hydraulic expansion tool holder



These ensure the high concentricity during drilling.

Features

- Concentricity: .00012" (0.003 mm)
- Max. speed: 50'000 rpm, balance rate (G 2.5 / 25000 min^{-1})
- Precise concentric clamping
- High torque transmission
- Maintenance-free (closed system)
- No wear in the clamping diameter
- Longer (up to 4 times) tool life
- Adjustable clamping force
- Short tool change time (without additional devices such as shrink fit device)

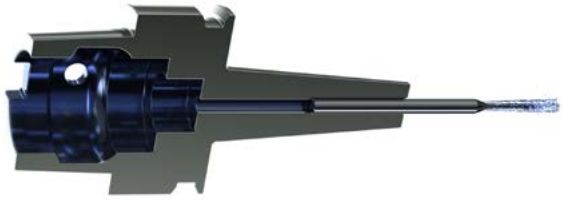
Application

- High-precision clamping of tools with cylindrical shaft
- Universal tool holder for milling (roughing and finishing) and drilling
- Advantageous in the case of HSC processing (milling, e.g. on a small CNC milling machine) due to its shock-absorbing

Tool holders

THE RIGHT CLAMPING FOR EACH TOOL (APPLICATION)

Shrink fit tool holder – shrink fit tool holder according to DIN 69871



These guarantee highest concentricity with secure friction-fit connection and form an optimal connection between the tool and the holder.

Features

- Concentricity: ≤ .00012" (0.003 mm)
- Max. speed: 40'000 rpm
- Absolutely secure friction-fit force transmission
- Adequate for shaft diameter of .158" (4 mm) (.118"(3 mm) are conditionally possible)
- Transmittable torque 2 to 4 times higher compared to the hydraulic-tool holder and the high precision collet tool holder
- Average tool change time (shrink fit device is necessary)
- Suitable for machining in narrow spaces and interfacing edges due to the small overall construction size and longer versions

Application

- Optimal for HSC machining, in particular also for smallest drills
- For milling and drilling tools with cylindrical shaft

Collet tool holder systems (ER collet chucks) according to DIN 6499-A / optimized precision collets



These guarantee highest concentricity.

Features

- Concentricity: .00012" (0.003 mm) possible
- Max. speed: 40'000 rpm
- Average tool change time (a torque wrench is necessary)

Application

- Clamping of tools with a cylindrical shaft in high precision collet according to DIN 6499
- Universal tool holder for milling (roughing and finishing) and drilling

Balance quality

The balance quality of the collet tool holder is specially critical in high speed machining processes. The best possible balance quality guarantees not only reduced vibrations of the tool but increases tool life, improves surface quality and above all, protects the spindle bearings.

Coolant type, pressure and filtration

BEST CONDITIONS RESULT IN HIGHEST PERFORMANCE

Coolant

For best results, Mikron Tool recommends using cutting oil as a cooling lubricant. Emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can also be used as an alternative.

Coolant pressure and filters

The minimum required pressure and the filter quality depend on the coolant system.

External coolant supply



No particular requirements exist for coolant pressure and filters. It must be ensured, however, that the coolant is routed directly to the drill tip for effective cooling, lubrication, and chip removal.

Integrated coolant delivery through the shaft



The large cooling channels generally permit a standard filter with a filter quality of ≤ .0020" (0.050 mm). Tools with integrated cooling channels in the shaft require a minimum coolant pressure of at least 218 psi (15 bar) to ensure a reliable drilling or milling process. High pressure is generally better for the cooling and flushing effect.

Linear through tool coolant channels



The large cooling channels generally permit a standard filter with a filter quality of ≤ 0020" (0.050 mm). Tools with linear cooling channels require a minimum coolant pressure of at least 218 psi (15 bar) to ensure a reliable drilling process. High pressure is generally better for the cooling and flushing effect.

Twisted coolant delivery up to the tip (round cross-section)





Good filter quality is important in drilling tools with through-tool cooling, so that no dirt particles or chips reach the tool through the coolant supply and jeopardize coolant flow in the tool. The following filter qualities must be complied for small diameters:

- Spiral drill types with diameter < .079" (2 mm) Filter quality ≤ .0004" (0.010 mm)
- Spiral drill types with diameter < .118" (3 mm) Filter quality ≤ .0008" (0.020 mm)
- Spiral drill types with diameter < .236" (6 mm) Filter quality ≤ .0020" (0.050 mm)

At least 435 psi (30 bar) coolant pressure is requested for drilling diameter .158" – .236"(4.0 – 6.0 mm) for a reliable drilling process. Higher pressures are needed for smaller drill diameters. High pressure is generally better for the cooling and flushing effect.

Twisted coolant delivery up to the tip (drop shape)





Good filter quality is important in drilling tools with through-tool cooling, so that no dirt particles or chips reach the tool through the coolant supply and jeopardize coolant flow in the tool. The following filter qualities must be complied for small diameters:

- Spiral drill types with diameter < 079" (2 mm) Filter quality ≤ .0004" (0.010 mm)
- Spiral drill types with diameter < .118" (3 mm) Filter quality ≤ .0008" (0.020 mm)
- Spiral drill types with diameter < 1/4" (6.35 mm) Filter quality ≤ .0020" (0.050 mm)

Tools with linear cooling channels require, at least, 435 psi (30 bar) coolant pressure for drilling diameter .158" – 1/4" (4.0 – 6.35 mm) for a reliable drilling process. Higher pressures are needed for smaller drill diameters. High pressure is generally better for the cooling and flushing effect.

Note:
Detailed data on the specific requirements can be found directly in the individual product descriptions.

Formulas and conversions

FORMULAS AND DIMENSIONS AT A GLANCE

Formulas for drilling and milling

Designation of parameters

n :	Revolution number	[rpm]	**z** :	Number of teeth	[teeth]
v_c :	Cutting speed	[SFM] ⋮ $\left[\frac{m}{min}\right]$	**f_z** :	Feed per tooth and revolution	[inch] ⋮ [mm]
d_1 :	Diameter of the cutting edge	[inch] ⋮ [mm]	**a_p** :	Axial infeed depth	[inch] ⋮ [mm]
v_f :	Feed rate	$\left[\frac{inch}{min}\right]$ ⋮ $\left[\frac{mm}{min}\right]$	**a_e** :	Radial infeed depth	[inch] ⋮ [mm]
f :	Feed per revolution	$\left[\frac{inch}{rev}\right]$ ⋮ $\left[\frac{mm}{rev}\right]$	**Q** :	Material removal rate	$\left[\frac{inch^3}{min}\right]$ ⋮ $\left[\frac{mm}{min}\right]$
Q_1 :	Depth of first peck	[inch] ⋮ [mm]	**d_{eff}** :	Effective engagement diameter	[inch] ⋮ [mm]
Q_x :	Depth of further pecks	[inch] ⋮ [mm]	**β** :	Setting angle	[°]

Cutting speed

$$v_c = \frac{\pi \cdot d_1 \cdot n}{1000} \cdot 3.28 \quad [SFM]$$

Spindle speed

$$n = \frac{1000 \cdot v_c}{\pi \cdot d_1} \quad [rpm]$$

Feed per rotation

$$f = f_z \cdot z \quad \left[\frac{inch}{rev}\right]$$

Feed rate

$$v_f = f \cdot n = f_z \cdot z \cdot n \quad \left[\frac{inch}{min}\right]$$

Feed per tooth

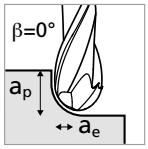
$$f_z = \frac{v_f}{z \cdot n} \quad [inch]$$

Material removal rate

$$Q = \frac{a_p \cdot a_e \cdot v_f}{1000} \quad \left[\frac{\text{inch}^3}{\text{min}}\right]$$

Effective engagement diameter

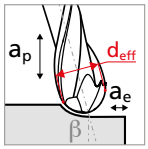
For ball end mills at a set angle β = 0°



$$d_{eff} = 2 \cdot \sqrt{d_1 \cdot a_p - a_p^2} \quad \text{[inch]}$$

Effective engagement diameter

For ball end mills at a set angle 0°< β > 15°



$$d_{eff} = d_1 \cdot \sin\left[\beta + \cos^{-1}\left(\frac{(d_1 - 2 \cdot a_p)}{d_1}\right)\right] \quad \text{[inch]}$$

Conversions between systems

1 [mm] = .0394 [inch]

$1\left[\frac{\text{m}}{\text{min}}\right]$ = 3.28 [SFM]

1 [bar] = 14.5 [psi]

crazy about first quality worldwide



GENERAL INFORMATION & ITEM INDEX

15

GLOBAL PRESENCE 742

ICONS 744

SALES CONDITIONS AND CERTIFICATES 746

ITEM INDEX 747

Global presence

CLOSE TO THE CUSTOMER

Worldwide we are present in four different locations with our own subsidiaries:

Agno – Switzerland



Our main office with 130 employees ist the center of our activities: production, research & development, administration, sales and technical support, stock.

Rottweil – Germany



The second most important pillar is located in South Germany: production, re-sharpening, sales and technical support, project management, stock. In addition, the European customers are supplied from this location quickly and efficiently with standardized Mikron Tool products by means of the "Euro-Stock".

Monroe – USA



For the American continents (North and South America), a sales team is available: sales and technical support, stock. In addition, Mikron Tool represents two additional product lines in USA: threading tools from DC Swiss (Switzerland) and milling cutters from NS Tool (Japan).

Shanghai – China



In Shanghai, a sales team is available to the customers in Asia: sales and technical support.

Representatives network

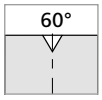
Mikron Tool is working worldwide with various partner companies. This way, we guarantee, along with the company-own locations, an efficient and competent technical support to our customers in the entire world.

Icons

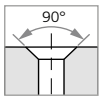
ICONS AT A GLANCE



Tool material



Chamfer 60°



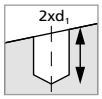
Pilot drilling with chamfer 90°



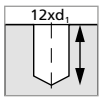
Tool without coating



Coating eXedur RIP



Max. drilling depth 2 x d
inclined surface

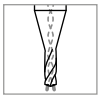


Max. drilling depth 12 x d


Flood coolant


Linear through tool coolant


Integrated shaft coolant

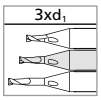

Twisted through tool coolant



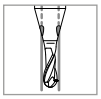
Tip angle 140°

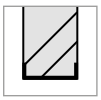


Teeth number



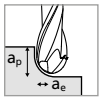
Max. machining depth 3 x d


Mill with integrated
shaft coolant

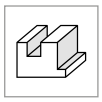

Square mill


Corner radius mill

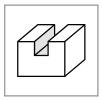

Ball mill



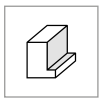
a_p = depth feed,
a_e = lateral feed



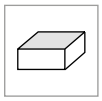
Slot and side milling



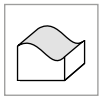
Slot milling



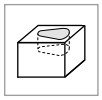
Side milling



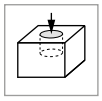
Face milling



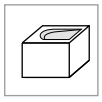
Copy milling



Pocket milling



Plunge milling



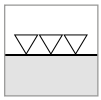
Linear ramp milling



Helix angle 30°



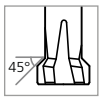
Machining direction



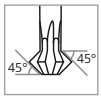
Perfect surface quality
similar to grinding quality



CrazyMill Frontchamfer



CrazyMill Backchamfer



CrazyMill Doublechamfer



CrazyMill Radiuschamfer

Sales conditions and certificates

SALES AND QUALITY

Sales conditions

You find the detailed sales terms for Mikron Tool products under:

www.mikrontool.com/en/Download/Sales conditions

Certificates


Certificate

MIKRON TOOL Mikron Tool SA Agno
6982 Agno
Switzerland

Certified area
Mikron Tool SA Agno
Via Campagna 3, 6982 Agno
Switzerland

Field of activity
Engineering and production of cutting tools

Standards
ISO 9001:2008 Quality Management System
ISO 14001:2004 Environmental Management System
OHSAS 18001:2007 Occupational Health and Safety Management System

The certification according to the ISO standards is self-evident for Mikron Tool. We have been working continuously on the quality of our processes, their reliability and environmental compatibility. We are now in possession of all important certificates in our industry: ISO 9001, ISO 14001 und OHS 18001.

Would you like to download a copy of our certificate?
You find it under: www.mikrontool.com/en/Download/Certificates

Item index

EASY TO FIND

Item number	Family	Page
2.BC.03XXXXXX.1	CrazyMill Backchamfer	663
2.BC.05XXXXXX.1	CrazyMill Backchamfer	663
2.CC.XXXXX.60	CrazyDrill Twicenter	85
2.CC.XXXXX.90	CrazyDrill Twicenter	85
2.CC.XXXXX.120	CrazyDrill Twicenter	89
2.CD.XXXXX.120.T	CrazyDrill Hexalobe	204
2.CD.XXXXX.120.I	CrazyDrill Hexalobe	204
2.CD.040XXX.S	CrazyDrill Steel	239
2.CD.050XXX.A	CrazyDrill Alu	261
2.CD.060XXX.CA	CrazyDrill Cool	297
2.CD.060XXX.CS	CrazyDrill Cool	297
2.CD.060XXX.IC	CrazyDrill Cool SST-Inox	370
2.CD.070XXX.S	CrazyDrill Steel	245
2.CD.080XXX.IK	CrazyDrill SST-Inox	279
2.CD.080XXX.IN	CrazyDrill SST-Inox	283
2.CD.100XXX.A	CrazyDrill Alu	265
2.CD.100XXX.CA	CrazyDrill Cool	305
2.CD.100XXX.CS	CrazyDrill Cool	305
2.CD.100XXX.IC	CrazyDrill Cool SST-Inox	372
2.CD.120XXX.IK	CrazyDrill SST-Inox	279
2.CD.120XXX.IN	CrazyDrill SST-Inox	283
2.CD.150XXX.CA	CrazyDrill Cool	313
2.CD.150XXX.CS	CrazyDrill Cool	313
2.CD.150XXX.IC	CrazyDrill Cool SST-Inox	374
2.CD.150XXX.XL	CrazyDrill Cool XL	331
2.CD.200XXX.IC	CrazyDrill Cool SST-Inox	376
2.CD.200XXX.XL	CrazyDrill Cool XL	337
2.CD.300XXX.IC	CrazyDrill Cool SST-Inox	380
2.CD.300XXX.XL	CrazyDrill Cool XL	343
2.CD.400XXX.IC	CrazyDrill Cool SST-Inox	382
2.CD.400XXX.XL	CrazyDrill Cool XL	349
2.CFI.300XXX.IK.1	CrazyDrill Flex SST-Inox	435
2.CFI.500XXX.IK.1	CrazyDrill Flex SST-Inox	441
2.CFS.200XXX.0	CrazyDrill Flex Steel	399
2.CFS.200XXX.1	CrazyDrill Flex Steel	399
2.CFS.300XXX.0	CrazyDrill Flex Steel	407
2.CFS.300XXX.1	CrazyDrill Flex Steel	407
2.CFS.500XXX.IK.0	CrazyDrill Flex Steel	415
2.CFS.500XXX.IK.1	CrazyDrill Flex Steel	415
2.CFT.300XXX.0	CrazyDrill Flex Titanium	423
2.CFT.500XXX.IK.0	CrazyDrill Flex Titanium	429
2.CMC.BXZ2.FXXX	CrazyMill Cool Ball - Z2	581
2.CMC.BXZ4.FXXX	CrazyMill Cool Ball - Z4	611
2.CMC.PSSXZ3.FXXX	CrazyMill Cool P&S	549
2.CMC.RXXZ2.FXXX	CrazyMill Cool Corner radius - Z2	469
2.CMC.RXXZ4.FXXX	CrazyMill Cool Corner radius - Z4	503
2.CMC.SXZ2.FXXX	CrazyMill Cool Square - Z2	468
2.CMC.SXZ4.FXXX	CrazyMill Cool Square - Z4	502
2.CMC30.A1Z2.XXX.1	CrazyMill Cool Square - Z2	468
2.CMC30.A1Z4.XXX.1	CrazyMill Cool Square - Z4	502
2.CMC30.A2Z2.XXX.1	CrazyMill Cool Corner radius - Z2	469
2.CMC30.A2Z4.XXX.1	CrazyMill Cool Corner radius - Z4	503
2.CMC30.A3Z2.XXX.1	CrazyMill Cool Corner radius - Z2	469
2.CMC30.A3Z4.XXX.1	CrazyMill Cool Corner radius - Z4	503
2.CMC30.A4Z2.XXX.1	CrazyMill Cool Corner radius - Z2	469
2.CMC30.A4Z4.XXX.1	CrazyMill Cool Corner radius - Z4	503
2.CMC30.A5Z2.XXX.1	CrazyMill Cool Ball - Z2	581
2.CMC30.A5Z4.XXX.1	CrazyMill Cool Ball - Z4	611
2.CMC30.A8Z3.XXX.1	CrazyMill Cool P&S	549
2.CMC30.B1Z2.XXX.1	CrazyMill Cool Square - Z2	474
2.CMC30.B2Z2.XXX.1	CrazyMill Cool Corner radius - Z2	475
2.CMC30.B3Z2.XXX.1	CrazyMill Cool Corner radius - Z2	475
2.CMC30.B4Z2.XXX.1	CrazyMill Cool Corner radius - Z2	475
2.CMC30.B5Z2.XXX.1	CrazyMill Cool Ball - Z2	582
2.CMC30.B5Z4.XXX.1	CrazyMill Cool Ball - Z4	612
2.CMC30.C1Z2.XXX.1	CrazyMill Cool Square - Z2	480
2.CMC30.C1Z3.XXX.1	CrazyMill Cool P&S	558
2.CMC30.C1Z4.XXX.1	CrazyMill Cool Square - Z4	508
2.CMC30.C2Z2.XXX.1	CrazyMill Cool Corner radius - Z2	481
2.CMC30.C2Z4.XXX.1	CrazyMill Cool Corner radius - Z4	509
2.CMC30.C3Z2.XXX.1	CrazyMill Cool Corner radius - Z2	481
2.CMC30.C3Z4.XXX.1	CrazyMill Cool Corner radius - Z4	509
2.CMC30.C4Z2.XXX.1	CrazyMill Cool Corner radius - Z2	481
2.CMC30.C4Z4.XXX.1	CrazyMill Cool Corner radius - Z4	509
2.CMC30.C5Z2.XXX.1	CrazyMill Cool Ball - Z2	583
2.CMC30.C5Z4.XXX.1	CrazyMill Cool Ball - Z4	613
2.CMC30.M1Z4.XXX.1	CrazyMill Cool Square - Z4	514
2.CMC30.M2Z4.XXX.1	CrazyMill Cool Corner radius - Z4	515
2.CMC30.M3Z4.XXX.1	CrazyMill Cool Corner radius - Z4	515
2.CMC30.M4Z4.XXX.1	CrazyMill Cool Corner radius - Z4	515
2.CMC30.M5Z4.XXX.1	CrazyMill Cool Ball - Z4	614
2.CMC30.N1Z4.XXX.1	CrazyMill Cool Square - Z4	520
2.CMC30.N2Z4.XXX.1	CrazyMill Cool Corner radius - Z4	521
2.CMC30.N3Z4.XXX.1	CrazyMill Cool Corner radius - Z4	521
2.CMC30.N4Z4.XXX.1	CrazyMill Cool Corner radius - Z4	521
2.CMC30.N5Z4.XXX.1	CrazyMill Cool Ball - Z4	615
2.CMI35.XXXX.1	CrazyMill Hexalobe	536
2.CMT35.XXXX.1	CrazyMill Hexalobe	536
2.DC.03XXXXXX.1	CrazyMill Doublechamfer	667
2.DC.06XXXXXX.1	CrazyMill Doublechamfer	667
2.FC.XXXXXXXX.1	CrazyMill Frontchamfer	659
2.MC.090XXX.0	MiquDrill Centro	73
2.MC.090XXX.1	MiquDrill Centro	69
2.MC.120XXX.0	MiquDrill Centro	73
2.MC.120XXX.1	MiquDrill Centro	69
2.MD.200XXX.0	MiquDrill 200	111
2.MD.200XXX.1	MiquDrill 200	111
2.MD.210XXX.0	MiquDrill 210	223
2.MD.210XXX.1	MiquDrill 210	223
2.PD.XXXXX.090	CrazyDrill Pilot	161
2.PD.XXXXX.170	CrazyDrill Crosspilot	175
2.PD.XXXXX.IC	CrazyDrill Coolpilot	189
2.PD.XXXXX.IK	CrazyDrill Pilot SST-Inox	149
2.PFS.XXX.0	CrazyDrill Flexpilot Steel	129
2.PFS.XXX.1	CrazyDrill Flexpilot Steel	129
2.PFT.XXX.0	CrazyDrill Flexpilot Titanium	135
2.RC.040XXX.1	CrazyMill Radiuschamfer	671

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