



crazy about

drilling titanium

CRAZYDRILL COOL TITANIUM



FOR EACH TITANIUM ITS DRILL!

Drilling titanium is highly demanding. One of the reasons is the combination of its high elasticity and tensile strength. Because of its high toughness, chip breaking is difficult to realize and due to the low thermal conductivity of titanium, heat diffuses directly into the tool. In addition, titanium tends to form built-up edges. All of this leads to higher wear, poor surface quality and insufficient process reliability.

In addition, not all titanium is the same. Depending on titanium, pure or alloyed, the machinability is very different. Mikron Tool has therefore developed two new products:

■ **CrazyDrill Cool Titanium PTC for pure titanium**

■ **CrazyDrill Cool Titanium ATC for titanium alloys**

These drills, which are perfectly matched to the respective titanium grades, achieve maximum drilling performance combined with high process reliability. It is now even possible to drill titanium alloys up to 10xd in a single step without multiple pecking for chip removal.

INDEX

1	PRODUCT OVERVIEW	4
2	CHALLENGES AND SOLUTIONS	6
3	CRAZYDRILL COOLPILOT TITANIUM ATC Drilling depth 3 x d + 90° countersink, Ø.039" – 1/4" 1.0 - 6.35 mm, for titanium alloys	14
	CRAZYDRILL COOL TITANIUM ATC Drilling depth 6 x d, 10 x d, Ø.039" – 1/4" 1.0 - 6.35 mm, for titanium alloys	16
4	CRAZYDRILL COOL TITANIUM PTC Drilling depth 3 x d, 6 x d, Ø.039" – 1/4" 1.0 - 6.35 mm, for pure titanium	20

NEW

Product overview

Geometry ATC**Titanium alloys**

Ti Gr.5 / Ti Gr.5 ELI / Ti Gr.Nb

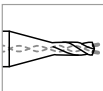
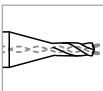
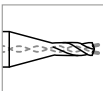
CRAZYDRILL™
by Mikron Tool
Coolpilot Titanium^{ATC}**CRAZYDRILL™**
by Mikron Tool
Cool Titanium^{ATC}**Geometry PTC****Pure titanium**

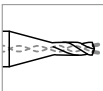
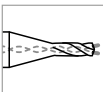
Ti Gr.2 - Ti Gr.4

CRAZYDRILL™
by Mikron Tool
Cool Titanium^{PTC}

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ☒ Not recommended

	Ø - range [inch] [mm]	Max. depth	Cooling	S ₂	S ₂	Item table page
				Pure titanium Ti Gr.2 - Ti Gr.4	Titanium alloys Ti Gr.5 / Ti Gr.5 ELI / Ti Gr.Nb	
	.039" – 1/4" 1.0 – 6.35 mm	3 x d + 90° countersink		☒	●	14
	.039" – 1/4" 1.0 – 6.35 mm	6 x d		☒	●	16
	.039" – 1/4" 1.0 – 6.35 mm	10 x d		☒	●	18

	.039" – 1/4" 1.0 – 6.35 mm	3 x d		●	☒	20
	.039" – 1/4" 1.0 – 6.35 mm	6 x d		●	☒	22

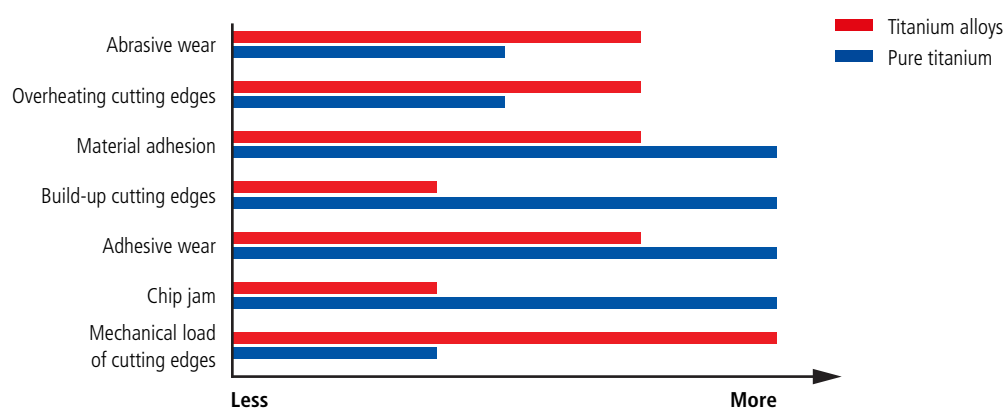
NEW

CrazyDrill Cool Titanium

THE NEW HIGH-PERFORMANCE DRILLS FOR TITANIUM

1. Challenge

Different properties of pure titanium and titanium alloys



The material properties of pure and alloyed titanium differ significantly, which is of utmost importance for their industrial machining. Especially for drilling, the demands on tools in terms of machinability are very high.

Solution

Material-specific cutting edge geometries

Mikron Tool's solution for drilling different types of titanium consists of two material-specific cutting edge geometries. This is the only way to achieve controlled chip evacuation, high drilling speeds and repeatable processes with excellent hole quality.



Geometry ATC
Titanium alloys
 Ti Gr.5 / Ti Gr.5 ELI / Ti Gr.Nb

S2

Geometry PTC
Pure Titan
 Ti Gr.2 - Ti Gr.4

S2

NEW

2. Challenge

High thermal load and chip jam

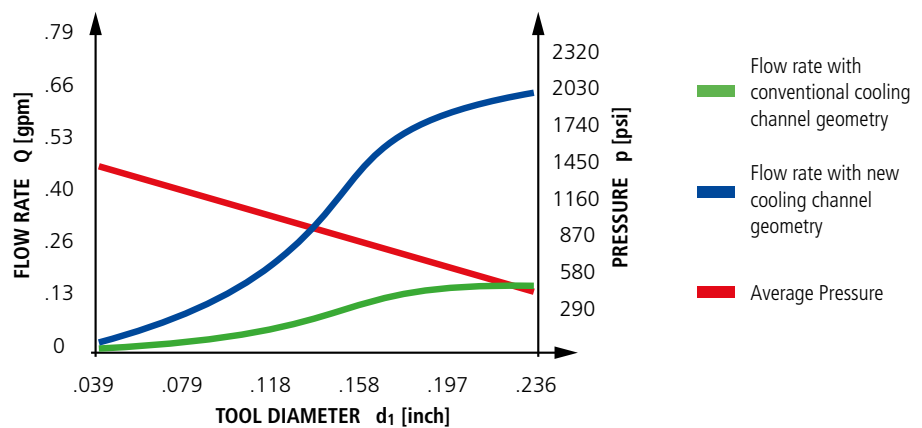
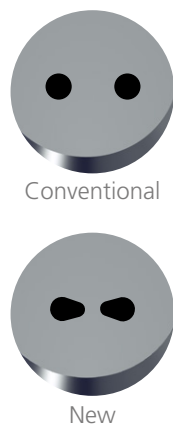
When drilling titanium, the high thermal load on the cutting edge is a challenge. This can lead to micro-chipping and eventually chipping on the cutting edge.

Furthermore, titanium chips tend to compact in the drill tip area, preventing further chips from flowing out. The result is uncontrolled drill breakage.

Material	Thermal conductivity
Aluminum	1158 BTU / (h·ft·°F) 167 W/mK
Stainless steel	146 BTU / (h·ft·°F) 21 W/mK
Titanium alloy	49 BTU / (h·ft·°F) 7 W/mK

Solution

Innovative cooling concept



Two specially designed cooling channels with a very large cross-section guide massive amounts of cooling lubricant to the drill tip to avoid excessive thermal loads on the cutting edges. The patented special shape of the cooling channels allows up to 4 times more coolant (compared to conventional cooling channels) at the same pressure. At the same time, the massive coolant jet flushes the chips through the flutes and prevents any form of chip jamming.

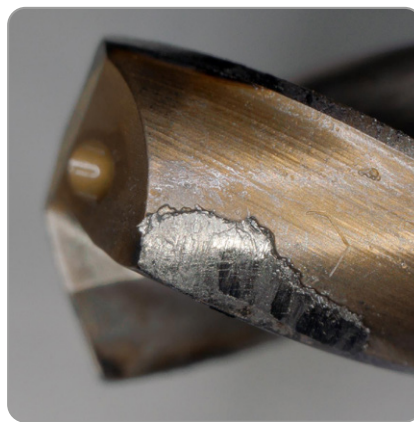
NEW

CrazyDrill Cool Titanium

THE NEW HIGH-PERFORMANCE DRILLS FOR TITANIUM

3. Challenge

Material adhesion



Material adhesions on guiding margin and the secondary margin have a negative effect on the hole quality.

Solution

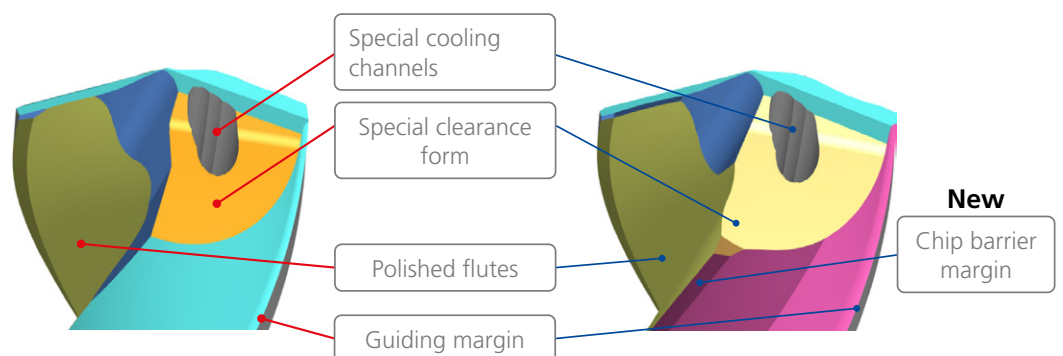
Guiding margin and the newly designed chip barrier margin

Drill for titanium alloys

Geometry ATC

Drill for pure titanium

Geometry PTC

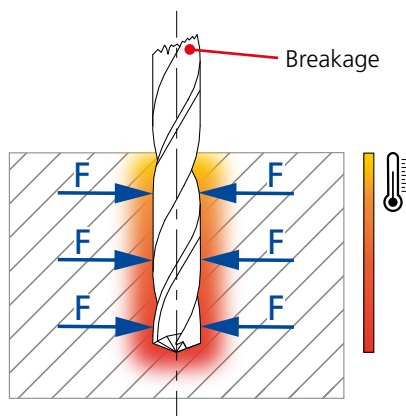


The particularly smooth surfaces of the guiding margin and the newly designed chip barrier margin on the PTC drill prevent material sticking and reduce the load on the tool.

NEW

4. Challenge

Tool jamming with increasing drilling depth



As the drilling depth increases, the extreme viscoplasticity of the titanium leads to jamming of the tool. The consequence is tool breakage.

Solution

Special cutting edge geometry with optimum cutting performance and stability

Cutting edge geometry	Cutting performance	Cutting edge stability
Sharp	●	●
Rounded	●	●
CrazyDrill Cool Titanium	●	●

The solution is sharply ground cutting edges that must be stable at the same time - a contradiction in terms. A unique specific cutting edge geometry has been developed for titanium drills that masters this balance. As a result, cutting pressures and temperature are significantly reduced.

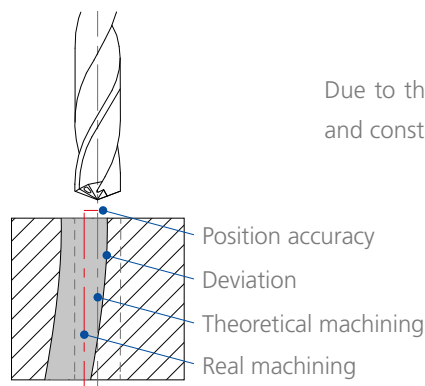
NEW

CrazyDrill Cool Titanium

THE NEW HIGH-PERFORMANCE DRILLS FOR TITANIUM

5. Challenge

Position accuracy



Due to the viscoplastic properties of titanium, an accurate entry point and constant tool guidance during drilling cannot be guaranteed.

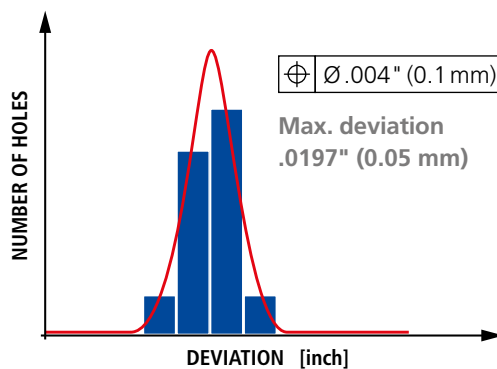
Solution

Specific pilot drill

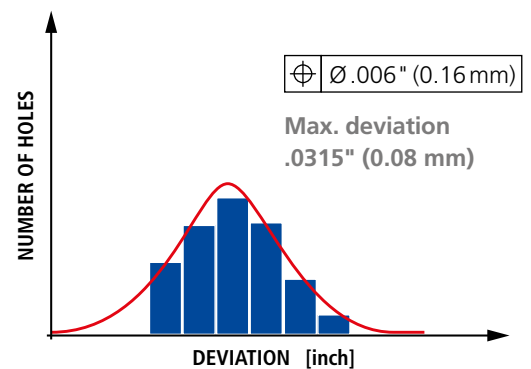
To achieve high position accuracy, the new pilot drill (with 90° chamfer) CrazyDrill Coolpilot Titanium ATC can be used.

Position accuracy

With pilot drill



Without pilot drill



Material: Ti Gr.5 / 3.7165 / ASTM F136; **Diameter:** 4 mm; **Drilling depth:** 10 x d; **Drill step:** 1;
Coolant: Emulsion 8%; **Cutting data:** vc = 197 SFM (60 m/min); f = .0031 IPR (0.08 mm/rev)

Maximum performance guaranteed

NEW

EXAMPLE IN TITANIUM MACHINING IN COMPARISON

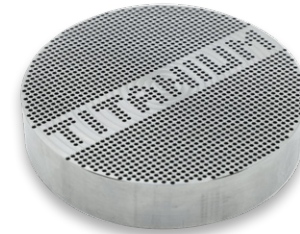
■ Example

Longer tool life

Machining: Drilling in one shot
Drilling depth: .394" (10 mm);
Coolant: Emulsion 8%

Titanium alloy: Ti Gr.5 / 3.7165 / TiAl6V4 / ASTM B348 **S2**

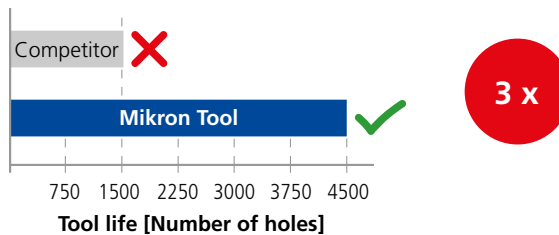
Tool: CrazyDrill Cool Titanium ATC
Diameter: .039" (1.0 mm)



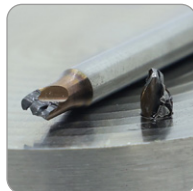
Cutting data:

Conventional titanium drill		CrazyDrill Cool Titanium	
$v_c = 197 \text{ SFM}$ 60 m/min	$f = .0008 \text{ IPR}$ 0.020 mm/rev	$v_c = 197 \text{ SFM}$ 60 m/min	$f = .0008 \text{ IPR}$ 0.020 mm/rev

Results:



Competitor



Breakage

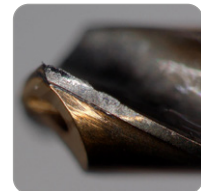
Mikron Tool



Front view



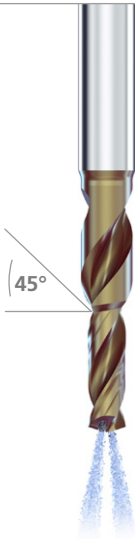
Flute view



Guiding margin view

Movie:



NEW	Geometry ATC			Geometry PTC	
	CRAZYDRILL [™] by Mikron Tool Coolpilot Titanium ^{ATC}	CRAZYDRILL [™] by Mikron Tool Cool Titanium ^{ATC}		CRAZYDRILL [™] by Mikron Tool Cool Titanium ^{PTC}	
	3 x d	6 x d	10 x d	3 x d	6 x d
					
					
	page 14	page 16	page 18	page 20	page 22

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

Your benefits

The most important features

- Two specific geometries: PTC for pure titanium and ATC for titanium alloys
- Innovative flute and tip geometry
- New: Chip barrier margin for PTC drill
- Specially designed cooling concept

Your advantages

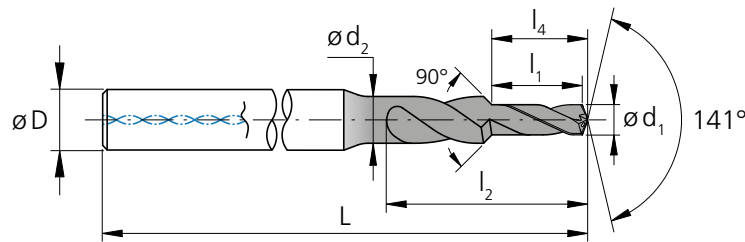
- Perfect performance for any titanium grade
- Low cutting pressure
- Prevention of chip jamming
- Excellent heat dissipation

Your benefits

- Maximum drilling speed (e.g. 10 x d in one shot drilling with ATC)
- Excellent drilling quality
- Process reliability
- Up to 3 times longer tool life

CrazyDrill Coolpilot Titanium ATC - 3 x d

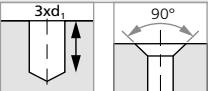
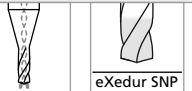
DRILLING WITH INTERNAL COOLING



d ₁	d ₁	d ₁	l ₁	l ₁	d ₂	l ₂	l ₄	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	[mm]		
	.039	1.00	.118	3.00	1.60	6.5	3.20	4	1.97	50	2.PD.01000.ATC	■
	.041	1.05	.124	3.15	1.60	6.8	3.30	4	1.97	50	2.PD.01050.ATC	■
	.043	1.10	.130	3.30	1.60	7.1	3.50	4	1.97	50	2.PD.01100.ATC	■
	.045	1.15	.136	3.45	1.60	7.5	3.60	4	1.97	50	2.PD.01150.ATC	■
	.047	1.20	.142	3.60	1.90	7.8	3.80	4	1.97	50	2.PD.01200.ATC	■
	.049	1.25	.148	3.75	1.90	8.1	4.00	4	1.97	50	2.PD.01250.ATC	■
	.051	1.30	.154	3.90	1.90	8.4	4.10	4	1.97	50	2.PD.01300.ATC	■
	.053	1.35	.159	4.05	1.90	8.7	4.30	4	1.97	50	2.PD.01350.ATC	■
	.055	1.40	.165	4.20	1.90	9.1	4.40	4	1.97	50	2.PD.01400.ATC	■
	.057	1.45	.171	4.35	2.25	10.4	4.60	4	1.97	50	2.PD.01450.ATC	■
	.059	1.50	.177	4.50	2.25	10.7	4.70	4	1.97	50	2.PD.01500.ATC	■
	.061	1.55	.183	4.65	2.25	10.9	4.90	4	1.97	50	2.PD.01550.ATC	■
1/16	.0625	1.587	.187	4.76	2.25	11.2	5.00	4	1.97	50	2.PD.F116.ATC	■
	.063	1.60	.189	4.80	2.25	11.2	5.10	4	1.97	50	2.PD.01600.ATC	■
	.065	1.65	.195	4.95	2.25	11.5	5.20	4	1.97	50	2.PD.01650.ATC	■
	.067	1.70	.201	5.10	2.60	11.8	5.40	4	2.09	53	2.PD.01700.ATC	■
	.069	1.75	.207	5.25	2.60	12.1	5.50	4	2.09	53	2.PD.01750.ATC	■
	.071	1.80	.213	5.40	2.60	12.3	5.70	4	2.09	53	2.PD.01800.ATC	■
	.073	1.85	.219	5.55	2.60	12.6	5.80	4	2.09	53	2.PD.01850.ATC	■
	.075	1.90	.224	5.70	2.60	12.8	6.00	4	2.09	53	2.PD.01900.ATC	■
	.077	1.95	.230	5.85	2.60	13.1	6.20	4	2.09	53	2.PD.01950.ATC	■
	.079	2.00	.236	6.00	3.10	13.3	6.30	4	2.17	55	2.PD.02000.ATC	■

■ Stock item

d ₁	d ₁	d ₁	l ₁	l ₁	d ₂	l ₂	l ₄	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	[mm]		
	.081	2.05	.242	6.15	3.10	13.6	6.50	4	2.17	55	2.PD.02050.ATC	■
	.083	2.10	.248	6.30	3.10	13.8	6.60	4	2.17	55	2.PD.02100.ATC	■
	.085	2.15	.254	6.45	3.10	14.1	6.80	4	2.17	55	2.PD.02150.ATC	■
	.087	2.20	.260	6.60	3.10	14.4	7.00	4	2.17	55	2.PD.02200.ATC	■
	.089	2.25	.266	6.75	3.10	14.7	7.10	4	2.17	55	2.PD.02250.ATC	■
	.091	2.30	.272	6.90	3.50	14.9	7.30	4	2.24	57	2.PD.02300.ATC	■
	.093	2.35	.278	7.05	3.50	15.2	7.40	4	2.24	57	2.PD.02350.ATC	■
3/32	.0937	2.381	.281	7.14	3.50	15.5	7.49	4	2.24	57	2.PD.F332.ATC	■
	.094	2.40	.283	7.20	3.50	15.6	7.60	4	2.24	57	2.PD.02400.ATC	■
	.096	2.45	.289	7.35	3.50	15.9	7.70	4	2.24	57	2.PD.02450.ATC	■
	.098	2.50	.295	7.50	3.50	16.2	7.90	4	2.24	57	2.PD.02500.ATC	■
	.100	2.55	.301	7.65	3.50	16.5	8.10	4	2.24	57	2.PD.02550.ATC	■
	.102	2.60	.307	7.80	4.00	16.9	8.20	4	2.24	57	2.PD.02600.ATC	■
	.104	2.65	.313	7.95	4.00	17.2	8.40	4	2.24	57	2.PD.02650.ATC	■
	.106	2.70	.319	8.10	4.00	17.5	8.50	4	2.24	57	2.PD.02700.ATC	■
	.108	2.75	.325	8.25	4.00	17.8	8.70	4	2.24	57	2.PD.02750.ATC	■
	.110	2.80	.331	8.40	4.00	18.2	8.80	4	2.24	57	2.PD.02800.ATC	■
	.112	2.85	.337	8.55	4.00	18.5	9.00	4	2.24	57	2.PD.02850.ATC	■
	.114	2.90	.343	8.70	4.00	18.8	9.20	4	2.24	57	2.PD.02900.ATC	■
	.116	2.95	.348	8.85	4.00	19.1	9.30	4	2.24	57	2.PD.02950.ATC	■
	.118	3.00	.354	9.00	4.70	19.5	9.50	6	2.56	65	2.PD.03000.ATC	■
	.120	3.05	.360	9.15	4.70	19.8	9.60	6	2.56	65	2.PD.03050.ATC	■

	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	+ .00031" + .00008"	+ 0.008 mm + 0.002 mm	+ .00047" + .00016"	+ 0.012 mm + 0.004 mm	+ .00059" + .00024"	+ 0.015 mm + 0.006 mm

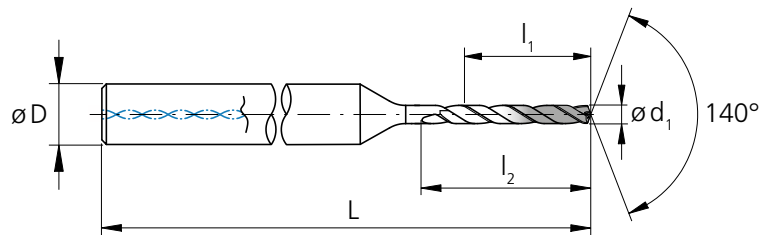
d ₁	d ₁	d ₁	l ₁	l ₁	d ₂	l ₂	l ₄	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	[mm]		
	.122	3.10	.366	9.30	4.70	20.1	9.80	6	2.56	65	2.PD.03100.ATC	■
	.124	3.15	.372	9.45	4.70	20.4	10.00	6	2.56	65	2.PD.03150.ATC	■
1/8	.1250	3.175	.375	9.53	4.70	20.6	10.00	6	2.56	65	2.PD.F18.ATC	■
	.126	3.20	.378	9.60	4.70	20.8	10.10	6	2.56	65	2.PD.03200.ATC	■
	.128	3.25	.384	9.75	4.70	21.1	10.30	6	2.56	65	2.PD.03250.ATC	■
	.130	3.30	.390	9.90	4.70	21.4	10.40	6	2.56	65	2.PD.03300.ATC	■
	.132	3.35	.396	10.05	4.70	21.7	10.60	6	2.56	65	2.PD.03350.ATC	■
	.134	3.40	.402	10.20	4.70	22.1	10.70	6	2.56	65	2.PD.03400.ATC	■
	.136	3.45	.407	10.35	4.70	22.4	10.90	6	2.56	65	2.PD.03450.ATC	■
	.138	3.50	.413	10.50	5.40	22.7	11.10	6	2.68	68	2.PD.03500.ATC	■
	.140	3.55	.419	10.65	5.40	23.0	11.20	6	2.68	68	2.PD.03550.ATC	■
	.142	3.60	.425	10.80	5.40	23.4	11.40	6	2.68	68	2.PD.03600.ATC	■
	.144	3.65	.431	10.95	5.40	23.7	11.50	6	2.68	68	2.PD.03650.ATC	■
	.146	3.70	.437	11.10	5.40	24.0	11.70	6	2.68	68	2.PD.03700.ATC	■
	.148	3.75	.443	11.25	5.40	24.3	11.80	6	2.68	68	2.PD.03750.ATC	■
	.150	3.80	.449	11.40	5.40	24.7	12.00	6	2.68	68	2.PD.03800.ATC	■
	.152	3.85	.455	11.55	5.40	25.0	12.20	6	2.68	68	2.PD.03850.ATC	■
	.154	3.90	.461	11.70	5.40	25.3	12.30	6	2.68	68	2.PD.03900.ATC	■
	.156	3.95	.467	11.85	5.40	25.6	12.50	6	2.68	68	2.PD.03950.ATC	■
5/32	.1562	3.968	.469	11.90	5.40	25.7	12.50	6	2.68	68	2.PD.F532.ATC	■
	.157	4.00	.472	12.00	5.40	26.0	12.60	6	2.68	68	2.PD.04000.ATC	■
	.161	4.10	.484	12.30	6.00	26.6	12.90	6	2.83	72	2.PD.04100.ATC	■

■ Stock item

d ₁	d ₁	d ₁	l ₁	l ₁	d ₂	l ₂	l ₄	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[inch]	[mm]		
	.165	4.20	.496	12.60	6.00	27.2	13.30	6	2.83	72	2.PD.04200.ATC	■
	.169	4.30	.508	12.90	6.00	27.9	13.60	6	2.83	72	2.PD.04300.ATC	■
	.173	4.40	.520	13.20	6.00	28.5	13.90	6	2.83	72	2.PD.04400.ATC	■
	.177	4.50	.531	13.50	6.00	29.2	14.20	6	2.83	72	2.PD.04500.ATC	■
	.181	4.60	.543	13.80	6.00	29.8	14.50	6	2.83	72	2.PD.04600.ATC	■
	.185	4.70	.555	14.10	7.00	30.5	14.80	8	3.54	75	2.PD.04700.ATC	■
3/16	.1875	4.762	.562	14.29	7.00	30.8	15.00	8	3.54	75	2.PD.F316.ATC	■
	.189	4.80	.567	14.40	7.00	31.1	15.20	8	3.54	75	2.PD.04800.ATC	■
	.193	4.90	.579	14.70	7.00	31.8	15.50	8	3.54	75	2.PD.04900.ATC	■
	.197	5.00	.591	15.00	7.00	32.4	15.80	8	3.54	75	2.PD.05000.ATC	■
	.201	5.10	.602	15.30	7.50	33.1	16.10	8	3.54	75	2.PD.05100.ATC	■
	.205	5.20	.614	15.60	7.50	33.7	16.40	8	3.54	75	2.PD.05200.ATC	■
	.209	5.30	.626	15.90	7.50	34.4	16.70	8	3.54	75	2.PD.05300.ATC	■
	.213	5.40	.638	16.20	8.00	35.0	17.10	8	3.54	80	2.PD.05400.ATC	■
	.217	5.50	.650	16.50	8.00	35.7	17.40	8	3.54	80	2.PD.05500.ATC	■
7/32	.2189	5.560	.657	16.68	8.00	36.0	17.52	8	3.54	80	2.PD.F732.ATC	■
	.220	5.60	.661	16.80	8.00	36.3	17.70	8	3.54	80	2.PD.05600.ATC	■
	.224	5.70	.673	17.10	8.00	37.0	18.00	8	3.54	80	2.PD.05700.ATC	■
	.228	5.80	.685	17.40	8.00	37.6	18.30	8	3.54	80	2.PD.05800.ATC	■
	.232	5.90	.697	17.70	8.00	38.3	18.60	8	3.54	80	2.PD.05900.ATC	■
	.236	6.00	.709	18.00	8.00	38.9	18.90	8	3.54	80	2.PD.06000.ATC	■
1/4	.2500	6.350	.750	19.05	8.00	41.2	20.02	8	3.54	90	2.PD.F14.ATC	■

CrazyDrill Cool Titanium ATC - 6 x d

DRILLING WITH INTERNAL COOLING



d ₁	d ₁	d ₁	L ₁	L ₁	L ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
.039	1.00	.236	6.0	9.0	4	2.17	55	2.CD.060100.ATC	■	
.041	1.05	.248	6.3	9.5	4	2.17	55	2.CD.060105.ATC	■	
.043	1.10	.260	6.6	9.9	4	2.17	55	2.CD.060110.ATC	■	
.045	1.15	.272	6.9	10.4	4	2.17	55	2.CD.060115.ATC	■	
.047	1.20	.283	7.2	10.8	4	2.24	57	2.CD.060120.ATC	■	
.049	1.25	.295	7.5	11.3	4	2.24	57	2.CD.060125.ATC	■	
.051	1.30	.307	7.8	11.7	4	2.24	57	2.CD.060130.ATC	■	
.053	1.35	.319	8.1	12.2	4	2.24	57	2.CD.060135.ATC	■	
.055	1.40	.331	8.4	12.6	4	2.24	57	2.CD.060140.ATC	■	
.057	1.45	.343	8.7	13.1	4	2.28	58	2.CD.060145.ATC	■	
.059	1.50	.354	9.0	13.5	4	2.28	58	2.CD.060150.ATC	■	
.061	1.55	.366	9.3	14.0	4	2.28	58	2.CD.060155.ATC	■	
1/16	.0625	1.587	.375	9.5	14.3	4	2.28	58	2.CD.060F116.ATC	■
.063	1.60	.378	9.6	14.4	4	2.28	58	2.CD.060160.ATC	■	
.065	1.65	.390	9.9	14.9	4	2.28	58	2.CD.060165.ATC	■	
.067	1.70	.402	10.2	15.3	4	2.36	60	2.CD.060170.ATC	■	
.069	1.75	.413	10.5	15.8	4	2.36	60	2.CD.060175.ATC	■	
.071	1.80	.425	10.8	16.2	4	2.36	60	2.CD.060180.ATC	■	
.073	1.85	.437	11.1	16.7	4	2.36	60	2.CD.060185.ATC	■	
.075	1.90	.449	11.4	17.1	4	2.36	60	2.CD.060190.ATC	■	
.077	1.95	.461	11.7	17.6	4	2.36	60	2.CD.060195.ATC	■	
.079	2.00	.472	12.0	18.0	4	2.48	63	2.CD.060200.ATC	■	

d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
.081	2.05	.484	12.3	18.5	4	2.48	63	2.CD.060205.ATC	■	
.083	2.10	.496	12.6	18.9	4	2.48	63	2.CD.060210.ATC	■	
.085	2.15	.508	12.9	19.4	4	2.48	63	2.CD.060215.ATC	■	
.087	2.20	.520	13.2	19.8	4	2.48	63	2.CD.060220.ATC	■	
.089	2.25	.531	13.5	20.3	4	2.48	63	2.CD.060225.ATC	■	
.091	2.30	.543	13.8	20.7	4	2.56	65	2.CD.060230.ATC	■	
.093	2.35	.555	14.1	21.2	4	2.56	65	2.CD.060235.ATC	■	
3/32	.0937	2.381	.563	14.3	21.4	4	2.56	65	2.CD.060F332.ATC	■
.094	2.40	.567	14.4	21.6	4	2.56	65	2.CD.060240.ATC	■	
.096	2.45	.579	14.7	22.1	4	2.56	65	2.CD.060245.ATC	■	
.098	2.50	.591	15.0	22.5	4	2.56	65	2.CD.060250.ATC	■	
.100	2.55	.602	15.3	23.0	4	2.56	65	2.CD.060255.ATC	■	
.102	2.60	.614	15.6	23.4	4	2.68	68	2.CD.060260.ATC	■	
.104	2.65	.626	15.9	23.9	4	2.68	68	2.CD.060265.ATC	■	
.106	2.70	.638	16.2	24.3	4	2.68	68	2.CD.060270.ATC	■	
.108	2.75	.650	16.5	24.8	4	2.68	68	2.CD.060275.ATC	■	
.110	2.80	.661	16.8	25.2	4	2.68	68	2.CD.060280.ATC	■	
.112	2.85	.673	17.1	25.7	4	2.68	68	2.CD.060285.ATC	■	
.114	2.90	.685	17.4	26.1	4	2.68	68	2.CD.060290.ATC	■	
.116	2.95	.697	17.7	26.6	4	2.68	68	2.CD.060295.ATC	■	
.118	3.00	.709	18.0	27.0	6	2.91	74	2.CD.060300.ATC	■	
.120	3.05	.720	18.3	27.5	6	2.91	74	2.CD.060305.ATC	■	

■ 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	+ .00031" 0	+ 0.006 mm 0	+ .00035" + .00004"	+ 0.009 mm + 0.001 mm	+ .00039" + .00004"	+ 0.010 mm + 0.001 mm	

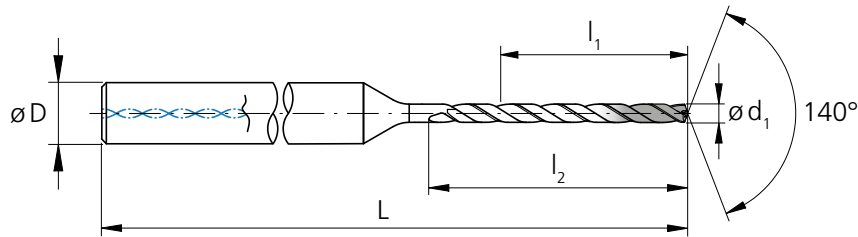
d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
1/8	.122	3.10	.732	18.6	27.9	6	2.91	74	2.CD.060310.ATC	■
	.124	3.15	.744	18.9	28.4	6	2.91	74	2.CD.060315.ATC	■
	.1250	3.175	.750	19.1	28.6	6	2.91	74	2.CD.060F18.ATC	■
	.126	3.20	.756	19.2	28.8	6	2.91	74	2.CD.060320.ATC	■
	.128	3.25	.768	19.5	29.3	6	2.91	74	2.CD.060325.ATC	■
	.130	3.30	.780	19.8	29.7	6	2.91	74	2.CD.060330.ATC	■
	.132	3.35	.791	20.1	30.2	6	2.91	74	2.CD.060335.ATC	■
	.134	3.40	.803	20.4	30.6	6	2.91	74	2.CD.060340.ATC	■
	.136	3.45	.815	20.7	31.1	6	2.91	74	2.CD.060345.ATC	■
	.138	3.50	.827	21.0	31.5	6	3.07	78	2.CD.060350.ATC	■
	.140	3.55	.839	21.3	32.0	6	3.07	78	2.CD.060355.ATC	■
	.142	3.60	.850	21.6	32.4	6	3.07	78	2.CD.060360.ATC	■
	.144	3.65	.862	21.9	32.9	6	3.07	78	2.CD.060365.ATC	■
	.146	3.70	.874	22.2	33.3	6	3.07	78	2.CD.060370.ATC	■
	.148	3.75	.886	22.5	33.8	6	3.07	78	2.CD.060375.ATC	■
	.150	3.80	.898	22.8	34.2	6	3.07	78	2.CD.060380.ATC	■
.152	3.85	.909	23.1	34.7	6	3.07	78	2.CD.060385.ATC	■	
5/32	.154	3.90	.921	23.4	35.1	6	3.07	78	2.CD.060390.ATC	■
	.156	3.95	.933	23.7	35.6	6	3.07	78	2.CD.060395.ATC	■
	.1562	3.968	.937	23.8	35.7	6	3.07	78	2.CD.060F532.ATC	■
	.157	4.00	.945	24.0	36.0	6	3.07	78	2.CD.060400.ATC	■
	.161	4.10	.969	24.6	36.9	6	3.15	80	2.CD.060410.ATC	■

■ Stock item

d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
	.165	4.20	.992	25.2	37.8	6	3.15	80	2.CD.060420.ATC	■
	.169	4.30	1.02	25.8	38.7	6	3.15	80	2.CD.060430.ATC	■
	.173	4.40	1.04	26.4	39.6	6	3.15	80	2.CD.060440.ATC	■
	.177	4.50	1.06	27.0	40.5	6	3.15	80	2.CD.060450.ATC	■
	.181	4.60	1.09	27.6	41.4	6	3.15	80	2.CD.060460.ATC	■
	.185	4.70	1.11	28.2	42.3	6	3.31	84	2.CD.060470.ATC	■
3/16	.1875	4.762	1.13	28.6	42.9	6	3.31	84	2.CD.060F316.ATC	■
	.189	4.80	1.13	28.8	43.2	6	3.31	84	2.CD.060480.ATC	■
	.193	4.90	1.16	29.4	44.1	6	3.31	84	2.CD.060490.ATC	■
	.197	5.00	1.18	30.0	45.0	6	3.31	84	2.CD.060500.ATC	■
	.201	5.10	1.20	30.6	45.9	6	3.31	84	2.CD.060510.ATC	■
	.205	5.20	1.23	31.2	46.8	6	3.31	84	2.CD.060520.ATC	■
	.209	5.30	1.25	31.8	47.7	6	3.31	84	2.CD.060530.ATC	■
	.213	5.40	1.28	32.4	48.6	6	3.46	88	2.CD.060540.ATC	■
	.217	5.50	1.30	33.0	49.5	6	3.46	88	2.CD.060550.ATC	■
7/32	.2189	5.560	1.31	33.4	50.0	6	3.46	88	2.CD.060F732.ATC	■
	.220	5.60	1.32	33.6	50.4	6	3.46	88	2.CD.060560.ATC	■
	.224	5.70	1.35	34.2	51.3	6	3.46	88	2.CD.060570.ATC	■
	.228	5.80	1.37	34.8	52.2	6	3.46	88	2.CD.060580.ATC	■
	.232	5.90	1.39	35.4	53.1	6	3.46	88	2.CD.060590.ATC	■
	.236	6.00	1.42	36.0	54.0	6	3.46	88	2.CD.060600.ATC	■
1/4	.2500	6.350	1.50	38.1	57.2	8	3.86	98	2.CD.060F14.ATC	■

CrazyDrill Cool Titanium ATC - 10 x d

DRILLING WITH INTERNAL COOLING



d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
	.039	1.00	.394	10.0	13.0	4	2.32	59	2.CD.100100.ATC	■
	.041	1.05	.413	10.5	13.7	4	2.32	59	2.CD.100105.ATC	■
	.043	1.10	.433	11.0	14.3	4	2.32	59	2.CD.100110.ATC	■
	.045	1.15	.453	11.5	15.0	4	2.32	59	2.CD.100115.ATC	■
	.047	1.20	.472	12.0	15.6	4	2.44	62	2.CD.100120.ATC	■
	.049	1.25	.492	12.5	16.3	4	2.44	62	2.CD.100125.ATC	■
	.051	1.30	.512	13.0	16.9	4	2.44	62	2.CD.100130.ATC	■
	.053	1.35	.531	13.5	17.6	4	2.44	62	2.CD.100135.ATC	■
	.055	1.40	.551	14.0	18.2	4	2.44	62	2.CD.100140.ATC	■
	.057	1.45	.571	14.5	18.9	4	2.56	65	2.CD.100145.ATC	■
	.059	1.50	.591	15.0	19.5	4	2.56	65	2.CD.100150.ATC	■
	.061	1.55	.610	15.5	20.2	4	2.56	65	2.CD.100155.ATC	■
1/16	.0625	1.587	.625	15.9	20.6	4	2.56	65	2.CD.100F116.ATC	■
	.063	1.60	.630	16.0	20.8	4	2.56	65	2.CD.100160.ATC	■
	.065	1.65	.650	16.5	21.5	4	2.56	65	2.CD.100165.ATC	■
	.067	1.70	.669	17.0	22.1	4	2.64	67	2.CD.100170.ATC	■
	.069	1.75	.689	17.5	22.8	4	2.64	67	2.CD.100175.ATC	■
	.071	1.80	.709	18.0	23.4	4	2.64	67	2.CD.100180.ATC	■
	.073	1.85	.728	18.5	24.1	4	2.64	67	2.CD.100185.ATC	■
	.075	1.90	.748	19.0	24.7	4	2.64	67	2.CD.100190.ATC	■
	.077	1.95	.768	19.5	25.4	4	2.64	67	2.CD.100195.ATC	■
	.079	2.00	.787	20.0	26.0	4	2.76	70	2.CD.100200.ATC	■

■ Stock item

d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
.081	2.05	.807	20.5	26.7	4	2.76	70	2.CD.100205.ATC	■	
.083	2.10	.827	21.0	27.3	4	2.76	70	2.CD.100210.ATC	■	
.085	2.15	.846	21.5	28.0	4	2.76	70	2.CD.100215.ATC	■	
.087	2.20	.866	22.0	28.6	4	2.76	70	2.CD.100220.ATC	■	
.089	2.25	.886	22.5	29.3	4	2.76	70	2.CD.100225.ATC	■	
.091	2.30	.906	23.0	29.9	4	2.95	75	2.CD.100230.ATC	■	
.093	2.35	.925	23.5	30.6	4	2.95	75	2.CD.100235.ATC	■	
3/32	.0937	2.381	.937	23.8	31.0	4	2.95	75	2.CD.100F332.ATC	■
.094	2.40	.945	24.0	31.2	4	2.95	75	2.CD.100240.ATC	■	
.096	2.45	.965	24.5	31.9	4	2.95	75	2.CD.100245.ATC	■	
.098	2.50	.984	25.0	32.5	4	2.95	75	2.CD.100250.ATC	■	
.100	2.55	1.00	25.5	33.2	4	2.95	75	2.CD.100255.ATC	■	
.102	2.60	1.02	26.0	33.8	4	3.15	80	2.CD.100260.ATC	■	
.104	2.65	1.04	26.5	34.5	4	3.15	80	2.CD.100265.ATC	■	
.106	2.70	1.06	27.0	35.1	4	3.15	80	2.CD.100270.ATC	■	
.108	2.75	1.08	27.5	35.8	4	3.15	80	2.CD.100275.ATC	■	
.110	2.80	1.10	28.0	36.4	4	3.15	80	2.CD.100280.ATC	■	
.112	2.85	1.12	28.5	37.1	4	3.15	80	2.CD.100285.ATC	■	
.114	2.90	1.14	29.0	37.7	4	3.15	80	2.CD.100290.ATC	■	
.116	2.95	1.16	29.5	38.4	4	3.15	80	2.CD.100295.ATC	■	
.118	3.00	1.18	30.0	39.0	6	3.43	87	2.CD.100300.ATC	■	
.120	3.05	1.20	30.5	39.7	6	3.43	87	2.CD.100305.ATC	■	

	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	+ .00031" 0	+ 0.006 mm 0	+ .00035" + .00004"	+ 0.009 mm + 0.001 mm	+ .00039" + .00004"	+ 0.010 mm + 0.001 mm	

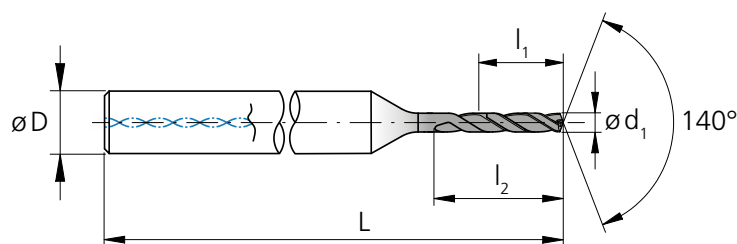
d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
.122	3.10	1.22	31.0	40.3	6	3.43	87		2.CD.100310.ATC	■
.124	3.15	1.24	31.5	41.0	6	3.43	87		2.CD.100315.ATC	■
1/8	.1250	3.175	1.25	31.8	41.3	6	3.43	87	2.CD.100F18.ATC	■
.126	3.20	1.26	32.0	41.6	6	3.43	87		2.CD.100320.ATC	■
.128	3.25	1.28	32.5	42.3	6	3.43	87		2.CD.100325.ATC	■
.130	3.30	1.30	33.0	42.9	6	3.43	87		2.CD.100330.ATC	■
.132	3.35	1.32	33.5	43.6	6	3.43	87		2.CD.100335.ATC	■
.134	3.40	1.34	34.0	44.2	6	3.43	87		2.CD.100340.ATC	■
.136	3.45	1.36	34.5	44.9	6	3.43	87		2.CD.100345.ATC	■
.138	3.50	1.38	35.0	45.5	6	3.74	95		2.CD.100350.ATC	■
.140	3.55	1.40	35.5	46.2	6	3.74	95		2.CD.100355.ATC	■
.142	3.60	1.42	36.0	46.8	6	3.74	95		2.CD.100360.ATC	■
.144	3.65	1.44	36.5	47.5	6	3.74	95		2.CD.100365.ATC	■
.146	3.70	1.46	37.0	48.1	6	3.74	95		2.CD.100370.ATC	■
.148	3.75	1.48	37.5	48.8	6	3.74	95		2.CD.100375.ATC	■
.150	3.80	1.50	38.0	49.4	6	3.74	95		2.CD.100380.ATC	■
.152	3.85	1.52	38.5	50.1	6	3.74	95		2.CD.100385.ATC	■
.154	3.90	1.54	39.0	50.7	6	3.74	95		2.CD.100390.ATC	■
.156	3.95	1.56	39.5	51.4	6	3.74	95		2.CD.100395.ATC	■
5/32	.1562	3.968	1.56	39.7	51.6	6	3.74	95	2.CD.100F532.ATC	■
.157	4.00	1.57	40.0	52.0	6	3.74	95		2.CD.100400.ATC	■
.161	4.10	1.61	41.0	53.3	6	3.94	100		2.CD.100410.ATC	■

d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
.165	4.20	1.65	42.0	54.6	6	3.94	100		2.CD.100420.ATC	■
.169	4.30	1.69	43.0	55.9	6	3.94	100		2.CD.100430.ATC	■
.173	4.40	1.73	44.0	57.2	6	3.94	100		2.CD.100440.ATC	■
.177	4.50	1.77	45.0	58.5	6	3.94	100		2.CD.100450.ATC	■
.181	4.60	1.81	46.0	59.8	6	3.94	100		2.CD.100460.ATC	■
.185	4.70	1.85	47.0	61.1	6	4.13	105		2.CD.100470.ATC	■
3/16	.1875	4.762	1.87	47.6	61.9	6	4.13	105	2.CD.100F316.ATC	■
.189	4.80	1.89	48.0	62.4	6	4.13	105		2.CD.100480.ATC	■
.193	4.90	1.93	49.0	63.7	6	4.13	105		2.CD.100490.ATC	■
.197	5.00	1.97	50.0	65.0	6	4.13	105		2.CD.100500.ATC	■
.201	5.10	2.01	51.0	66.3	6	4.13	105		2.CD.100510.ATC	■
.205	5.20	2.05	52.0	67.6	6	4.13	105		2.CD.100520.ATC	■
.209	5.30	2.09	53.0	68.9	6	4.13	105		2.CD.100530.ATC	■
.213	5.40	2.13	54.0	70.2	6	4.41	112		2.CD.100540.ATC	■
.217	5.50	2.17	55.0	71.5	6	4.41	112		2.CD.100550.ATC	■
7/32	.2189	5.560	2.19	55.6	72.3	6	4.41	112	2.CD.100F732.ATC	■
.220	5.60	2.20	56.0	72.8	6	4.41	112		2.CD.100560.ATC	■
.224	5.70	2.24	57.0	74.1	6	4.41	112		2.CD.100570.ATC	■
.228	5.80	2.28	58.0	75.4	6	4.41	112		2.CD.100580.ATC	■
.232	5.90	2.32	59.0	76.7	6	4.41	112		2.CD.100590.ATC	■
.236	6.00	2.36	60.0	78.0	6	4.41	112		2.CD.100600.ATC	■
1/4	.2500	6.350	2.50	63.5	82.6	8	4.92	125	2.CD.100F14.ATC	■

■ Stock item

CrazyDrill Cool Titanium PTC - 3 x d

DRILLING WITH INTERNAL COOLING



d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D	L	L	Item	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	(h6)	[inch]	[mm]	number	
	.039	1.00	.118	3.00	6.0	4	1.97	50	2.CD.030100.PTC	■
	.041	1.05	.124	3.15	6.3	4	1.97	50	2.CD.030105.PTC	■
	.043	1.10	.130	3.30	6.6	4	1.97	50	2.CD.030110.PTC	■
	.045	1.15	.136	3.45	6.9	4	1.97	50	2.CD.030115.PTC	■
	.047	1.20	.142	3.60	7.2	4	1.97	50	2.CD.030120.PTC	■
	.049	1.25	.148	3.75	7.5	4	1.97	50	2.CD.030125.PTC	■
	.051	1.30	.154	3.90	7.8	4	1.97	50	2.CD.030130.PTC	■
	.053	1.35	.159	4.05	8.1	4	1.97	50	2.CD.030135.PTC	■
	.055	1.40	.165	4.20	8.4	4	1.97	50	2.CD.030140.PTC	■
	.057	1.45	.171	4.35	8.7	4	1.97	50	2.CD.030145.PTC	■
	.059	1.50	.177	4.50	9.0	4	1.97	50	2.CD.030150.PTC	■
	.061	1.55	.183	4.65	9.3	4	1.97	50	2.CD.030155.PTC	■
1/16	.0625	1.587	.187	4.76	9.5	4	1.97	50	2.CD.030F116.PTC	■
	.063	1.60	.189	4.80	9.6	4	1.97	50	2.CD.030160.PTC	■
	.065	1.65	.195	4.95	9.9	4	1.97	50	2.CD.030165.PTC	■
	.067	1.70	.201	5.10	10.2	4	2.09	53	2.CD.030170.PTC	■
	.069	1.75	.207	5.25	10.5	4	2.09	53	2.CD.030175.PTC	■
	.071	1.80	.213	5.40	10.8	4	2.09	53	2.CD.030180.PTC	■
	.073	1.85	.219	5.55	11.1	4	2.09	53	2.CD.030185.PTC	■
	.075	1.90	.224	5.70	11.4	4	2.09	53	2.CD.030190.PTC	■
	.077	1.95	.230	5.85	11.7	4	2.09	53	2.CD.030195.PTC	■
	.079	2.00	.236	6.00	12.0	4	2.17	55	2.CD.030200.PTC	■

■ Stock item

d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D	L	L	Item	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	(h6)	[inch]	[mm]	number	
	.081	2.05	.242	6.15	12.3	4	2.17	55	2.CD.030205.PTC	■
	.083	2.10	.248	6.30	12.6	4	2.17	55	2.CD.030210.PTC	■
	.085	2.15	.254	6.45	12.9	4	2.17	55	2.CD.030215.PTC	■
	.087	2.20	.260	6.60	13.2	4	2.17	55	2.CD.030220.PTC	■
	.089	2.25	.266	6.75	13.5	4	2.17	55	2.CD.030225.PTC	■
	.091	2.30	.272	6.90	13.8	4	2.24	57	2.CD.030230.PTC	■
	.093	2.35	.278	7.05	14.1	4	2.24	57	2.CD.030235.PTC	■
3/32	.0937	2.381	.281	7.14	14.3	4	2.24	57	2.CD.030F332.PTC	■
	.094	2.40	.283	7.20	14.4	4	2.24	57	2.CD.030240.PTC	■
	.096	2.45	.289	7.35	14.7	4	2.24	57	2.CD.030245.PTC	■
	.098	2.50	.295	7.50	15.0	4	2.24	57	2.CD.030250.PTC	■
	.100	2.55	.301	7.65	15.3	4	2.24	57	2.CD.030255.PTC	■
	.102	2.60	.307	7.80	15.6	4	2.24	57	2.CD.030260.PTC	■
	.104	2.65	.313	7.95	15.9	4	2.24	57	2.CD.030265.PTC	■
	.106	2.70	.319	8.10	16.2	4	2.24	57	2.CD.030270.PTC	■
	.108	2.75	.325	8.25	16.5	4	2.24	57	2.CD.030275.PTC	■
	.110	2.80	.331	8.40	16.8	4	2.24	57	2.CD.030280.PTC	■
	.112	2.85	.337	8.55	17.1	4	2.24	57	2.CD.030285.PTC	■
	.114	2.90	.343	8.70	17.4	4	2.24	57	2.CD.030290.PTC	■
	.116	2.95	.348	8.85	17.7	4	2.24	57	2.CD.030295.PTC	■
	.118	3.00	.354	9.00	18.0	6	2.56	65	2.CD.030300.PTC	■
	.120	3.05	.360	9.15	18.3	6	2.56	65	2.CD.030305.PTC	■

	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	+ .00031" 0	+ 0.006 mm 0	+ .00035" + .00004"	+ 0.009 mm + 0.001 mm	+ .00039" + .00004"	+ 0.010 mm + 0.001 mm	

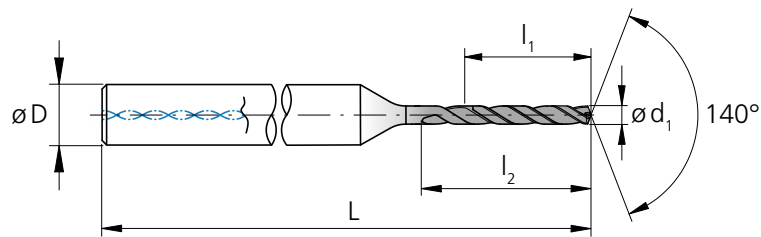
d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
1/8	.122	3.10	.366	9.30	18.6	6	2.56	65	2.CD.030310.PTC	■
	.124	3.15	.372	9.45	18.9	6	2.56	65	2.CD.030315.PTC	■
	.1250	3.175	.375	9.53	19.1	6	2.56	65	2.CD.030F18.PTC	■
	.126	3.20	.378	9.60	19.2	6	2.56	65	2.CD.030320.PTC	■
	.128	3.25	.384	9.75	19.5	6	2.56	65	2.CD.030325.PTC	■
	.130	3.30	.390	9.90	19.8	6	2.56	65	2.CD.030330.PTC	■
	.132	3.35	.396	10.05	20.1	6	2.56	65	2.CD.030335.PTC	■
	.134	3.40	.402	10.20	20.4	6	2.56	65	2.CD.030340.PTC	■
	.136	3.45	.407	10.35	20.7	6	2.56	65	2.CD.030345.PTC	■
	.138	3.50	.413	10.50	21.0	6	2.68	68	2.CD.030350.PTC	■
	.140	3.55	.419	10.65	21.3	6	2.68	68	2.CD.030355.PTC	■
	.142	3.60	.425	10.80	21.6	6	2.68	68	2.CD.030360.PTC	■
	.144	3.65	.431	10.95	21.9	6	2.68	68	2.CD.030365.PTC	■
	.146	3.70	.437	11.10	22.2	6	2.68	68	2.CD.030370.PTC	■
	.148	3.75	.443	11.25	22.5	6	2.68	68	2.CD.030375.PTC	■
	.150	3.80	.449	11.40	22.8	6	2.68	68	2.CD.030380.PTC	■
5/32	.152	3.85	.455	11.55	23.1	6	2.68	68	2.CD.030385.PTC	■
	.154	3.90	.461	11.70	23.4	6	2.68	68	2.CD.030390.PTC	■
	.156	3.95	.467	11.85	23.7	6	2.68	68	2.CD.030395.PTC	■
	.1562	3.968	.469	11.90	23.8	6	2.68	68	2.CD.030F532.PTC	■
	.157	4.00	.472	12.00	24.0	6	2.68	68	2.CD.030400.PTC	■
	.161	4.10	.484	12.30	24.6	6	2.83	72	2.CD.030410.PTC	■

■ Stock item

d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
	.165	4.20	.496	12.60	25.2	6	2.83	72	2.CD.030420.PTC	■
	.169	4.30	.508	12.90	25.8	6	2.83	72	2.CD.030430.PTC	■
	.173	4.40	.520	13.20	26.4	6	2.83	72	2.CD.030440.PTC	■
	.177	4.50	.531	13.50	27.0	6	2.83	72	2.CD.030450.PTC	■
	.181	4.60	.543	13.80	27.6	6	2.83	72	2.CD.030460.PTC	■
	.185	4.70	.555	14.10	28.2	6	2.95	75	2.CD.030470.PTC	■
3/16	.1875	4.762	.562	14.29	28.6	6	2.95	75	2.CD.030F316.PTC	■
	.189	4.80	.567	14.40	28.8	6	2.95	75	2.CD.030480.PTC	■
	.193	4.90	.579	14.70	29.4	6	2.95	75	2.CD.030490.PTC	■
	.197	5.00	.591	15.00	30.0	6	2.95	75	2.CD.030500.PTC	■
	.201	5.10	.602	15.30	30.6	6	2.95	75	2.CD.030510.PTC	■
	.205	5.20	.614	15.60	31.2	6	2.95	75	2.CD.030520.PTC	■
	.209	5.30	.626	15.90	31.8	6	2.95	75	2.CD.030530.PTC	■
	.213	5.40	.638	16.20	32.4	6	3.15	80	2.CD.030540.PTC	■
	.217	5.50	.650	16.50	33.0	6	3.15	80	2.CD.030550.PTC	■
7/32	.2189	5.560	.657	16.68	33.4	6	3.15	80	2.CD.030F732.PTC	■
	.220	5.60	.661	16.80	33.6	6	3.15	80	2.CD.030560.PTC	■
	.224	5.70	.673	17.10	34.2	6	3.15	80	2.CD.030570.PTC	■
	.228	5.80	.685	17.40	34.8	6	3.15	80	2.CD.030580.PTC	■
	.232	5.90	.697	17.70	35.4	6	3.15	80	2.CD.030590.PTC	■
	.236	6.00	.709	18.00	36.0	6	3.15	80	2.CD.030600.PTC	■
1/4	.2500	6.350	.750	19.05	38.1	8	3.15	80	2.CD.030F14.PTC	■

CrazyDrill Cool Titanium PTC - 6 x d

DRILLING WITH INTERNAL COOLING



d ₁	d ₁	d ₁	L ₁	L ₁	L ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
	.039	1.00	.236	6.0	9.0	4	2.17	55	2.CD.060100.PTC	■
	.041	1.05	.248	6.3	9.5	4	2.17	55	2.CD.060105.PTC	■
	.043	1.10	.260	6.6	9.9	4	2.17	55	2.CD.060110.PTC	■
	.045	1.15	.272	6.9	10.4	4	2.17	55	2.CD.060115.PTC	■
	.047	1.20	.283	7.2	10.8	4	2.24	57	2.CD.060120.PTC	■
	.049	1.25	.295	7.5	11.3	4	2.24	57	2.CD.060125.PTC	■
	.051	1.30	.307	7.8	11.7	4	2.24	57	2.CD.060130.PTC	■
	.053	1.35	.319	8.1	12.2	4	2.24	57	2.CD.060135.PTC	■
	.055	1.40	.331	8.4	12.6	4	2.24	57	2.CD.060140.PTC	■
	.057	1.45	.343	8.7	13.1	4	2.28	58	2.CD.060145.PTC	■
	.059	1.50	.354	9.0	13.5	4	2.28	58	2.CD.060150.PTC	■
	.061	1.55	.366	9.3	14.0	4	2.28	58	2.CD.060155.PTC	■
1/16	.0625	1.587	.375	9.5	14.3	4	2.28	58	2.CD.060F116.PTC	■
	.063	1.60	.378	9.6	14.4	4	2.28	58	2.CD.060160.PTC	■
	.065	1.65	.390	9.9	14.9	4	2.28	58	2.CD.060165.PTC	■
	.067	1.70	.402	10.2	15.3	4	2.36	60	2.CD.060170.PTC	■
	.069	1.75	.413	10.5	15.8	4	2.36	60	2.CD.060175.PTC	■
	.071	1.80	.425	10.8	16.2	4	2.36	60	2.CD.060180.PTC	■
	.073	1.85	.437	11.1	16.7	4	2.36	60	2.CD.060185.PTC	■
	.075	1.90	.449	11.4	17.1	4	2.36	60	2.CD.060190.PTC	■
	.077	1.95	.461	11.7	17.6	4	2.36	60	2.CD.060195.PTC	■
	.079	2.00	.472	12.0	18.0	4	2.48	63	2.CD.060200.PTC	■

d ₁	d ₁	d ₁	L ₁	L ₁	L ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
.081	2.05	.484	12.3	18.5	4	2.48	63	2.CD.060205.PTC	■	
.083	2.10	.496	12.6	18.9	4	2.48	63	2.CD.060210.PTC	■	
.085	2.15	.508	12.9	19.4	4	2.48	63	2.CD.060215.PTC	■	
.087	2.20	.520	13.2	19.8	4	2.48	63	2.CD.060220.PTC	■	
.089	2.25	.531	13.5	20.3	4	2.48	63	2.CD.060225.PTC	■	
.091	2.30	.543	13.8	20.7	4	2.56	65	2.CD.060230.PTC	■	
.093	2.35	.555	14.1	21.2	4	2.56	65	2.CD.060235.PTC	■	
3/32	.0937	2.381	.562	14.3	21.4	4	2.56	65	2.CD.060F332.PTC	■
.094	2.40	.567	14.4	21.6	4	2.56	65	2.CD.060240.PTC	■	
.096	2.45	.579	14.7	22.1	4	2.56	65	2.CD.060245.PTC	■	
.098	2.50	.591	15.0	22.5	4	2.56	65	2.CD.060250.PTC	■	
.100	2.55	.602	15.3	23.0	4	2.56	65	2.CD.060255.PTC	■	
.102	2.60	.614	15.6	23.4	4	2.68	68	2.CD.060260.PTC	■	
.104	2.65	.626	15.9	23.9	4	2.68	68	2.CD.060265.PTC	■	
.106	2.70	.638	16.2	24.3	4	2.68	68	2.CD.060270.PTC	■	
.108	2.75	.650	16.5	24.8	4	2.68	68	2.CD.060275.PTC	■	
.110	2.80	.661	16.8	25.2	4	2.68	68	2.CD.060280.PTC	■	
.112	2.85	.673	17.1	25.7	4	2.68	68	2.CD.060285.PTC	■	
.114	2.90	.685	17.4	26.1	4	2.68	68	2.CD.060290.PTC	■	
.116	2.95	.697	17.7	26.6	4	2.68	68	2.CD.060295.PTC	■	
.118	3.00	.709	18.0	27.0	6	2.91	74	2.CD.060300.PTC	■	
.120	3.05	.720	18.3	27.5	6	2.91	74	2.CD.060305.PTC	■	

■ 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	+ .00031" 0	+ 0.006 mm 0	+ .00035" + .00004"	+ 0.009 mm + 0.001 mm	+ .00039" + .00004"	+ 0.010 mm + 0.001 mm		

d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
.122	3.10	.732	18.6	27.9	6	2.91	74		2.CD.060310.PTC	■
.124	3.15	.744	18.9	28.4	6	2.91	74		2.CD.060315.PTC	■
1/8 .1250	3.175	.756	19.1	28.6	6	2.91	74		2.CD.060F18.PTC	■
.126	3.20	.750	19.2	28.8	6	2.91	74		2.CD.060320.PTC	■
.128	3.25	.768	19.5	29.3	6	2.91	74		2.CD.060325.PTC	■
.130	3.30	.780	19.8	29.7	6	2.91	74		2.CD.060330.PTC	■
.132	3.35	.791	20.1	30.2	6	2.91	74		2.CD.060335.PTC	■
.134	3.40	.803	20.4	30.6	6	2.91	74		2.CD.060340.PTC	■
.136	3.45	.815	20.7	31.1	6	2.91	74		2.CD.060345.PTC	■
.138	3.50	.827	21.0	31.5	6	3.07	78		2.CD.060350.PTC	■
.140	3.55	.839	21.3	32.0	6	3.07	78		2.CD.060355.PTC	■
.142	3.60	.850	21.6	32.4	6	3.07	78		2.CD.060360.PTC	■
.144	3.65	.862	21.9	32.9	6	3.07	78		2.CD.060365.PTC	■
.146	3.70	.874	22.2	33.3	6	3.07	78		2.CD.060370.PTC	■
.148	3.75	.886	22.5	33.8	6	3.07	78		2.CD.060375.PTC	■
.150	3.80	.898	22.8	34.2	6	3.07	78		2.CD.060380.PTC	■
.152	3.85	.909	23.1	34.7	6	3.07	78		2.CD.060385.PTC	■
.154	3.90	.921	23.4	35.1	6	3.07	78		2.CD.060390.PTC	■
.156	3.95	.933	23.7	35.6	6	3.07	78		2.CD.060395.PTC	■
5/32 .1562	3.968	.945	23.8	35.7	6	3.07	78		2.CD.060F532.PTC	■
.157	4.00	.945	24.0	36.0	6	3.07	78		2.CD.060400.PTC	■
.161	4.10	.969	24.6	36.9	6	3.15	80		2.CD.060410.PTC	■

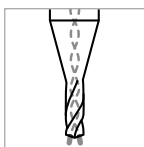
■ Stock item

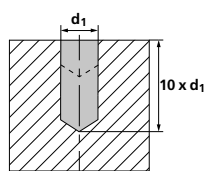
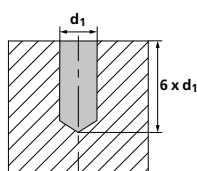
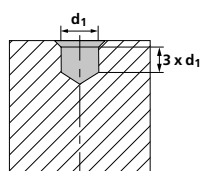
d ₁	d ₁	d ₁	l ₁	l ₁	l ₂	D (h6)	L	L	Item number	Availability
[inch]	[inch]	[mm]	[inch]	[mm]	[mm]	[mm]	[inch]	[mm]		
.165	4.20	.992	25.2	37.8	6	3.15	80		2.CD.060420.PTC	■
.169	4.30	1.02	25.8	38.7	6	3.15	80		2.CD.060430.PTC	■
.173	4.40	1.04	26.4	39.6	6	3.15	80		2.CD.060440.PTC	■
.177	4.50	1.06	27.0	40.5	6	3.15	80		2.CD.060450.PTC	■
.181	4.60	1.09	27.6	41.4	6	3.15	80		2.CD.060460.PTC	■
.185	4.70	1.11	28.2	42.3	6	3.31	84		2.CD.060470.PTC	■
3/16 .1875	4.762	1.12	28.6	42.9	6	3.31	84		2.CD.060F316.PTC	■
.189	4.80	1.13	28.8	43.2	6	3.31	84		2.CD.060480.PTC	■
.193	4.90	1.16	29.4	44.1	6	3.31	84		2.CD.060490.PTC	■
.197	5.00	1.18	30.0	45.0	6	3.31	84		2.CD.060500.PTC	■
.201	5.10	1.20	30.6	45.9	6	3.31	84		2.CD.060510.PTC	■
.205	5.20	1.23	31.2	46.8	6	3.31	84		2.CD.060520.PTC	■
.209	5.30	1.25	31.8	47.7	6	3.31	84		2.CD.060530.PTC	■
.213	5.40	1.28	32.4	48.6	6	3.46	88		2.CD.060540.PTC	■
.217	5.50	1.30	33.0	49.5	6	3.46	88		2.CD.060550.PTC	■
7/32 .2189	5.560	1.31	33.4	50.0	6	3.46	88		2.CD.060F732.PTC	■
.220	5.60	1.32	33.6	50.4	6	3.46	88		2.CD.060560.PTC	■
.224	5.70	1.35	34.2	51.3	6	3.46	88		2.CD.060570.PTC	■
.228	5.80	1.37	34.8	52.2	6	3.46	88		2.CD.060580.PTC	■
.232	5.90	1.39	35.4	53.1	6	3.46	88		2.CD.060590.PTC	■
.236	6.00	1.42	36.0	54.0	6	3.46	88		2.CD.060600.PTC	■
1/4 .2500	6.350	1.50	38.1	57.2	8	3.86	98		2.CD.060F14.PTC	■

NEW

ATC - 3 x d - 6 x d - 10 x d

DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW

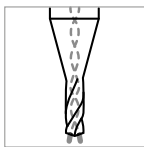
	Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v _c [m/min] [SFM]	
						Mid	High
	S₂	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	40 131	60 197
			9.9367	TiAl6Nb7	ASTM F1295		



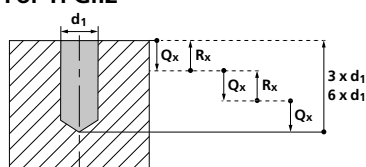
NEW

PTC - 3 x d - 6 x d

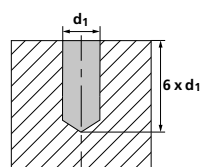
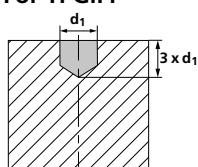
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW

	Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v _c [m/min] [SFM]		Q _s [mm] [inch]		R _s [mm] [inch]	
						Mid	High				
	S₂	Pure titanium	3.7035	Ti Gr.2	ASTM B348 / F67	40 131	60 197	0.5 x d1		0.5 x d1	
			3.7065	Ti Gr.4	ASTM B348 / F68			-		-	

For Ti Gr.2



For Ti Gr.4



Chip breaking cycle

RECOMMENDATION FOR USE

● Excellent | ● Good | ○ Acceptable | ☒ Not recommended

P	N	S ₃
M	S ₁	H ₁
K	S ₂	H ₂

f [mm/rev] | [IPR]

1.0 mm .039"		1.25 mm .049"		1/16"		3/32"		Ød1		1/8"		5/32"		3/16" - 7/32"		1/4"	
Mid	High	Mid	High	Mid	High	Mid	High	Mid	High	Mid	High	Mid	High	Mid	High	Mid	High
0.020 .0008	0.025 .0010	0.025 .0010	0.030 .0012	0.030 .0012	0.035 .0014	0.035 .0014	0.045 .0018	0.045 .0018	0.055 .0022	0.050 .0020	0.065 .0026	0.060 .0024	0.075 .0030	0.070 .0028	0.085 .0033	0.075 .0030	0.090 .0035

f [mm/rev] | [IPR]

1.0 mm .039"		1.25 mm .049"		1/16"		3/32"		Ød1		1/8"		5/32"		3/16" - 7/32"		1/4"	
Mid	High	Mid	High	Mid	High	Mid	High	Mid	High	Mid	High	Mid	High	Mid	High	Mid	High
0.010 .0004	0.020 .0008	0.013 .0005	0.025 .0010	0.015 .0006	0.030 .0012	0.020 .0008	0.040 .0016	0.025 .0010	0.050 .0020	0.030 .0012	0.060 .0024	0.040 .0016	0.080 .0031	0.050 .0020	0.100 .0039	0.060 .0024	0.120 .0047
0.010 .0004	0.020 .0008	0.013 .0005	0.025 .0010	0.015 .0006	0.030 .0012	0.020 .0008	0.040 .0016	0.025 .0010	0.050 .0020	0.030 .0012	0.060 .0024	0.040 .0016	0.080 .0031	0.050 .0020	0.100 .0039	0.060 .0024	0.120 .0047

NEW

Drilling process CrazyDrill Cool Titanium

PRECISE AND FAST DRILLING UP TO 10 X D IN TITANIUM ALLOYS

Coolant type, pressure and filtration

Coolant type

For best results, Mikron Tool recommends the use of 8% emulsion with EP-Additives (Extreme-Pressure-Additives) as coolant fluid. Alternatively, cutting oil 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 dramatically reduce the flowrate.

The following filter qualities must be adhered especially in small diameters:

- Drill with $\varnothing < .079"$ (2 mm) filter quality $\leq .0004"$ (0.010 mm).
- Drill with $\varnothing < .118"$ (3 mm) filter quality $\leq .0008"$ (0.020 mm).
- Drill with $\varnothing < .236"$ (6 mm) filter quality $\leq .0020"$ (0.050 mm).

Coolant pressure: The minimum coolant pressure mentioned in the chart is required for the CrazyDrill Cool Titanium to achieve reliable drilling. Higher pressure is generally better for the cooling and flushing effect.

$\varnothing$ d, 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		3 - 6 - 10 x d	3 - 6 - 10 x d	3 - 6 - 10 x d
Minimal pressure	[bar]	40	30	30
	[psi]	580	435	435

CrazyDrill Cool Titanium ATC 6 x d

Because of the high degree of self-centering capability, CrazyDrill Cool Titanium ATC 6 x d 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 Titanium ATC** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces

CrazyDrill Cool Titanium ATC 10 x d

We recommend pilot drilling with CrazyDrill Coolpilot Titanium ATC or CrazyDrill Crosspilot on inclined surfaces.

CrazyDrill Cool Titanium PTC 3 x d

Because of the high degree of self-centering capability, CrazyDrill Cool Titanium PTC can be used on regular and straight surfaces without a centering or pilot hole.

CrazyDrill Cool Titanium PTC 6 x d

Because of the high degree of self-centering capability, CrazyDrill Cool Titanium PTC 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 Cool Titanium PTC 3 x d** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces

Pilot drilling and drilling

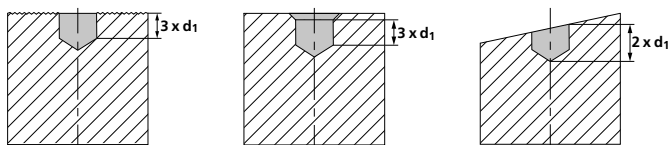
Pilot drilling with CrazyDrill Coolpilot Titanium ATC or CrazyDrill Crosspilot (on inclined surfaces) is the perfect starting point for accurate drilling (position and alignment accuracy). The drilling quality (no measurable transition from pilot drilling to follow-up drilling) is guaranteed due to predetermined tool tolerances.

NEW

Drilling process of titanium alloy Gr.5 / Gr.Nb

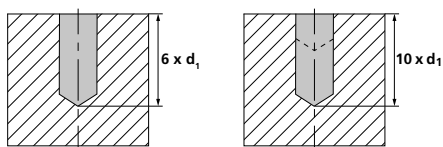
1 | PILOT DRILLING

- Turn on internal coolant.
- Drill with CrazyDrill Coolpilot Titanium ATC up to $3 \times d$, on irregular or rough surfaces.
With simultaneous chamfer of 90° .
Drill with CrazyDrill Crosspilot on inclined surfaces.



2 | DRILLING

- Turn on internal coolant.
- Drill with CrazyDrill Cool Titanium ATC in one step with recommended drilling speed and feed (see cutting data chart).



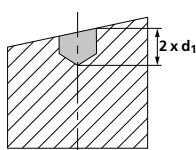
Note:

After the drill has reached the desired cutting depth, return at increased feed rate to safety position. With CrazyDrill Cool Titanium ATC it is possible enter the material and drill up to $10 \times d$ using the recommended cutting speed and feed.

Drilling process of pure titanium Gr.2

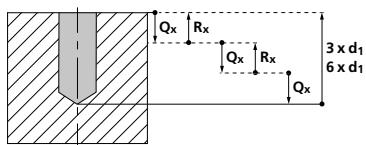
1 | PILOT DRILLING (ONLY ON INCLINED SURFACES)

- Drill with CrazyDrill Crosspilot on inclined surfaces.



2 | DRILLING

- Turn on internal coolant.
- Drill with CrazyDrill Cool Titanium PTC in a chip breaking drilling cycle with recommended drilling speed and feed (see cutting data chart).



Note:

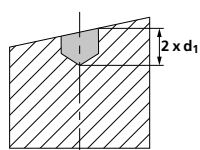
After the drill has reached the desired cutting depth, return at increased feed rate to safety position. With CrazyDrill Cool Titanium PTC it is possible enter the material and drill up to $6 \times d$ using the recommended cutting speed and feed.

NEW

Drilling process of pure titanium Gr.4

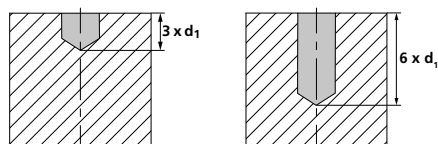
1 | PILOT DRILLING (ONLY ON INCLINED SURFACES)

- Drill with CrazyDrill Crosspilot on inclined surfaces.



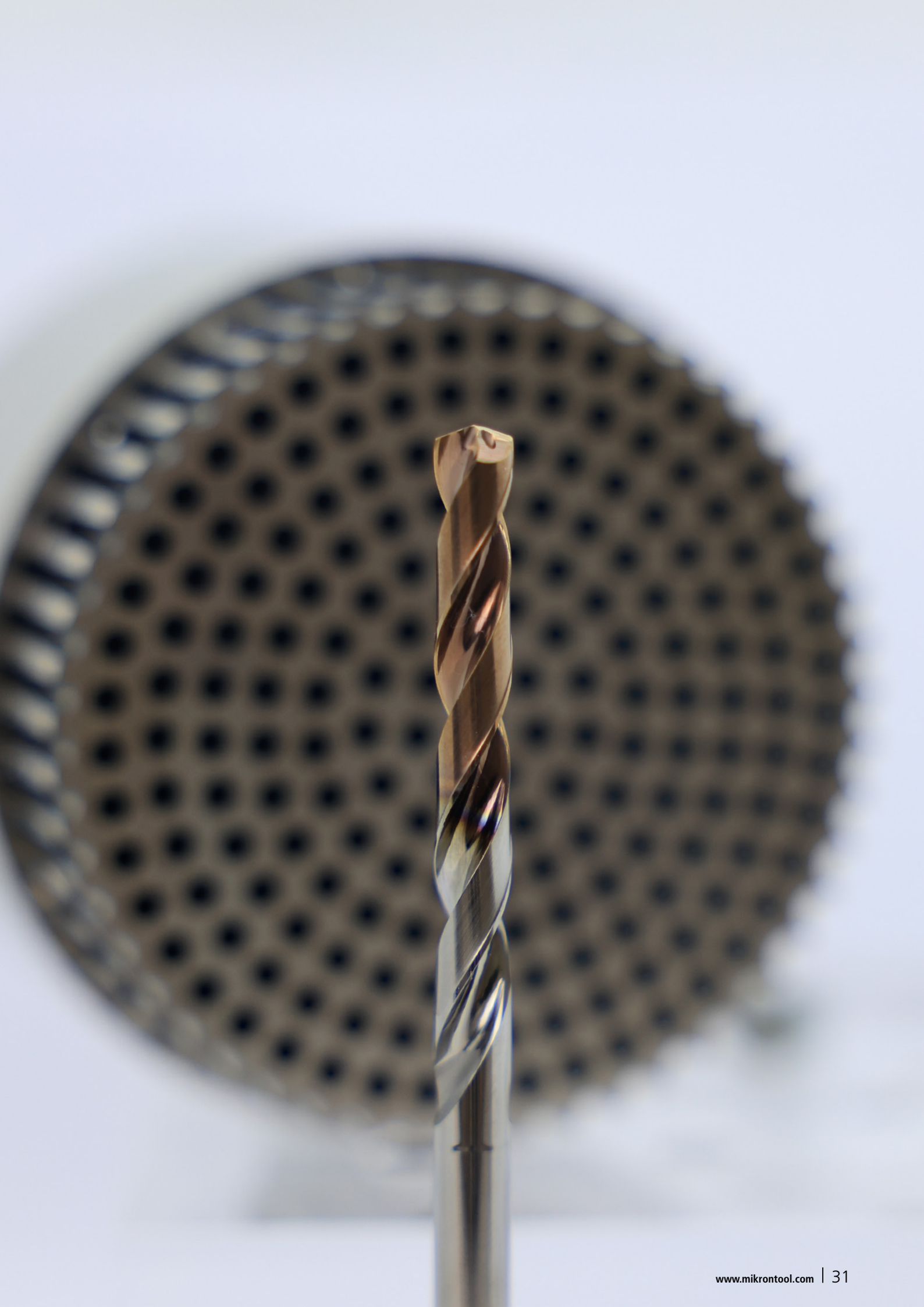
2 | DRILLING

- Turn on internal coolant.
- Drill with CrazyDrill Cool Titanium PTC in one step with recommended drilling speed and feed (see cutting data chart).



Note:

After the drill has reached the desired cutting depth, return at increased feed rate to safety position. With CrazyDrill Cool Titanium PTC it is possible enter the material and drill up to 6 x d using the recommended cutting speed and feed.



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