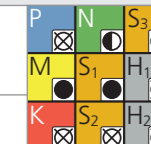


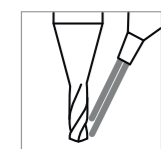
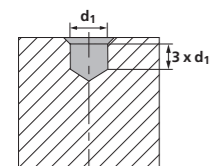
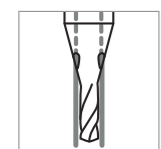
3 x d - 90° countersink

RECOMMENDATION FOR USE

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



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] | f [mm/rev] [IPR] | | | | | | | | | |
|--|--|--------------------------|-------------------------|-----------------------|--------------------------|----------------------|------------------------------|------------------------------|---------------------|---------------------|---------------------|------------------------------|---------------------|---------------------|---------------|
| | | | | | | $\varnothing d_1$ | | | | | | | | | |
| | | | | | | 0.2 mm .008" f | 1/64" 0.5 mm .020" f | 1/32" 0.8 mm .032" f | 1.0 mm .039" f | 1.2 mm .047" f | 1.4 mm .055" f | 1/16" 1.6 mm .063" f | 1.8 mm .071" f | 2.0 mm .079" f | |
| P | Unalloyed carbon steel Rm < 800 N/mm ² | 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 | | | | | | | | | | | |
| | | 1.5752 | 15NiCr13 | ASTM 3415 / AISI 3310 | | | | | | | | | | | |
| | Low alloyed steel Rm > 900 N/mm ² | 1.7131 | 16MnCr5 | AISI 5115 | | | | | | | | | | | |
| | | 1.3505 | 100Cr6 | AISI 52100 | | | | | | | | | | | |
| | | 1.7225 | 42CrMo4 | AISI 4140 | | | | | | | | | | | |
| | | 1.2842 | 90MnCrV8 | AISI O2 | | | | | | | | | | | |
| | | 1.2379 | X153CrMoV12 | AISI D2 | | | | | | | | | | | |
| | | 1.2436 | X210CrW12 | AISI D4/D6 | | | | | | | | | | | |
| High alloyed tool steel Rm < 1200 N/mm ² | 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 | 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 |
| | | | 1.4105 | X6CrMoS17 | AISI 430F | | | | | | | | | | |
| | | | 1.4034 | X46Cr13 | AISI 420C | 35 – 50 115 – 164 | 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 |
| | Stainless steel martensitic | 1.4112 | X90CrMoV18 | AISI 440B | | | | | | | | | | | |
| 1.4542 | | X5CrNiCuNb 16-4 | AISI 630 / ASTM 17-4 PH | 35 – 50 115 – 164 | 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 | | |
| Stainless steel martensitic – PH | 1.4545 | X5CrNiCuNb 15-5 | ASTM 15-5 PH | | | | | | | | | | | | |
| | 1.4301 | X5CrNi 18-10 | AISI 304 | | | | | | | | | | | | |
| Stainless steel austenitic | 1.4435 | X2CrNiMo 18-14-3 | AISI 316L | 30 – 45 98 – 148 | 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 | | |
| | 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 | 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 | |
| | | 2.0065 | Cu-ETP / CW004A | UNS C11000 | | | | | | | | | | | |
| | Brass lead free | 2.0321 | CuZn37 CW508L | UNS C27400 | 40 – 100 131 – 328 | 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 | |
| | | 2.036 | CuZn40 CW509L | UNS C28000 | | | | | | | | | | | |
| | Brass, Bronze Rm < 400 N/mm ² | 2.0401 | CuZn39Pb3 / CW614N | UNS C38500 | | | | | | | | | | | |
| | | 2.102 | CuSn6 | UNS C51900 | | | | | | | | | | | |
| Bronze Rm < 600 N/mm ² | 2.0966 | CuAl10Ni5Fe4 | UNS C63000 | | | | | | | | | | | | |
| | 2.096 | CuAl9Mn2 | UNS C63200 | | | | | | | | | | | | |
| S ₁ | Super alloys | 2.4856 | | Inconel 625 | 15 – 30 49 – 98 | 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 | |
| | | 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 | | | | | | | | | | | |
| S ₃ | Titanium alloys | 3.7165 | TiAl6V4 | ASTM B348 / F136 | | | | | | | | | | | |
| | | 9.9367 | TiAl6Nb7 | ASTM F1295 | | | | | | | | | | | |
| H ₁ | Hardened steel < 55 HRC | 2.4964 | CoCr20W15Ni | Haynes 25 | 40 – 50 131 – 164 | 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 | |
| | | | CrCoMo28 | ASTM F1537 | | | | | | | | | | | |
| H ₂ | Hardened steel ≥ 55 HRC | 1.2510 | 100MnCrMoW4 | AISI O1 | | | | | | | | | | | |
| | | 1.2379 | X153CrMoV12 | AISI D2 | | | | | | | | | | | |