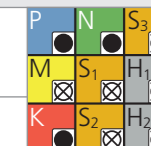
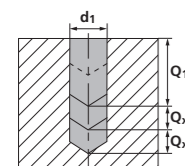
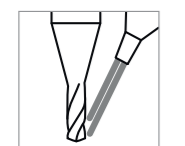


Steel - 20 x d - uncoated

RECOMMENDATION FOR USE
● Excellent | ● Good | ○ Acceptable | ☒ Not recommended



DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v _c		Q ₁	Q ₂	f [mm/rev] [IPR]													
					[m/min] [SFM]				Ød1													
					Ød1 ≤ 0.4 .016"	Ød1 > 0.4 .016"			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"							
P	Unalloyed carbon steel Rm < 800 N/mm ²	1.0301	C10	AISI 1010	5 - 40 16 - 131	40 - 60 131 - 197	7xd1	0.5xd1	0.002	0.005	0.010	0.015	0.030	0.040	0.060							
		1.0401	C15	AISI 1015					.00008	.0002	.0004	.0006	.0012	.0016	.0024							
		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	5 - 25 16 - 82	25 - 50 82 - 164	7xd1	0.5xd1	0.002	0.003 - 0.005	0.008 - 0.010	0.012 - 0.015	0.020 - 0.025	0.035	0.050							
		1.3505	100Cr6	AISI 52100					.00008	.00012 - .00020	.0003 - .0004	.0005 - .0006	.0008 - .0010	.0014	.0020							
		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	5 - 20 16 - 66	20 - 35 66 - 115	7xd1	1xd1	0.0005	0.004	0.008	0.010	0.015	0.025	0.040								
	1.3355	HS18-0-1	AISI T1 / UNS T12001					.0002	.00016	.0003	.0004	.0006	.0010	.0016								
	1.4016	X6Cr17	AISI 430 / UNS S43000																			
	1.4105	X6CrMoS17	AISI 430F																			
	1.4034	X46Cr13	AISI 420C																			
	1.4112	X90CrMoV18	AISI 440B																			
M	Stainless steel ferritic	1.4542	X5CrNiCuNb 16-4	AISI 630 / ASTM 17-4 PH																		
		1.4545	X5CrNiCuNb 15-5	ASTM 15-5 PH																		
		1.4301	X5CrNi 18-10	AISI 304																		
	Stainless steel martensitic	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	7xd1	1xd1	0.002	0.005	0.010	0.015	0.020	0.035	0.050							
		0.6030	GG30	ASTM 40B					.00008	.0002	.0004	.0006	.0008	.0014	.0020							
		0.7040	GGG40	ASTM 60-40-18																		
		0.7060	GGG60	ASTM 80-60-03																		
	N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	5 - 40 16 - 131	60 - 120 197 - 394	7xd1	1xd1	0.003	0.015	0.040	0.050	0.080	0.100	0.120						
			3.4365	AlZnMgCu1.5	ASTM 7075					.00012	.0006	.0016	.0020	.0031	.0039	.0047						
Aluminium alloy cast		3.2163	GD-AlSi9Cu3	ASTM A380	5 - 40 16 - 131					50 - 80 164 - 262	7xd1	1xd1	0.003	0.015	0.040	0.050	0.080	0.100	0.120			
		3.2381	GD-AlSi10Mg	UNS A03590									.00012	.0006	.0016	.0020	.0031	.0039	.0047			
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/mm ²	2.0401	CuZn39Pb3 / CW614N	UNS C38500	5 - 40 16 - 131	60 - 100 197 - 328	7xd1	1xd1	0.004	0.010	0.030	0.040	0.060	0.080	0.100								
	2.102	CuSn6	UNS C51900					.00016	.0004	.0012	.0016	.0024	.0031	.0039								
Bronze Rm < 600 N/mm ²	2.0966	CuAl10Ni5Fe4	UNS C63000	5 - 20 16 - 66	20 - 40 66 - 131	2.5xd1	0.5xd1	0.002	0.004	0.006	0.010	0.015	0.025	0.040								
	2.096	CuAl9Mn2	UNS C63200					.00008	.00016	.00024	.0004	.0006	.0010	.0016								
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																		
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																		
			CrCoMo28	ASTM F1537																		
H ₂	Hardened steel ≥ 55 HRC	1.2510	100MnCrMoW4	AISI O1																		
		1.2379	X153CrMoV12	AISI D2																		