Cutting data recommendation for replaceable head drills

Feed and cutting speed

TTD - Type 01 - Uni

MMG*			Material	Tensile strength/Hardness [N/mm²] [HRC]		Cutting speed v_c [m/min]				Feed f [mm] with drill diameter					
						Internal cooling	External cooling	MQL	Air	12,0	15,5	19,5	25,0	32,0	40,0
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steel, non-alloyed	< 700 N/mm²		100	90	90		0,23	0,26	0,30	0,33	0,33	0,30
		P1.2	Structural, free-cutting, case hardened and heat-treated steel, non-alloyed	< 1200 N/mm²		90	75	75		0,28	0,33	0,37	0,41	0,42	0,38
	P2	P2.1	Nitrated, case hardened and heat-treated steel, alloyed	< 900 N/mm²		100	85	85		0,27	0,31	0,35	0,39	0,40	0,37
		P2.2	Nitrated, case hardened and heat-treated steel, alloyed	< 1400 N/mm²		70	60	60		0,21	0,25	0,28	0,30	0,31	0,28
	P3	P3.1	Tool, roller bearing, spring and high speed steel	< 900 N/mm²		75	65	65		0,24	0,28	0,32	0,35	0,36	0,33
		P3.2	Tool, roller bearing, spring and high speed steel	< 1500 N/mm²		60	55	55		0,20	0,23	0,26	0,28	0,29	0,26
	P4	P4.1	Stainless steel, ferritic and martensitic			60	45	50		0,16	0,18	0,21	0,23	0,23	0,21
	P5	P5.1	Cast steel			100	85	85		0,27	0,31	0,35	0,39	0,40	0,37
	P6	P6.1	Stainless cast steel, ferritic and martensitic			60	45	50		0,16	0,18	0,21	0,23	0,23	0,21
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), EN-GJL	< 300 N/mm²		95	70	70	70	0,33	0,39	0,44	0,49	0,50	0,46
	K2	K2.1	Cast iron with spheroidal graphite, EN-GJS	< 500 N/mm²		130	80	95	95	0,31	0,36	0,41	0,45	0,46	0,42
		K2.2	Cast iron with spheroidal graphite , EN-GJS	500-800 N/mm²		80	60	60		0,26	0,31	0,35	0,39	0,40	0,36
		K2.3	Cast iron with spheroidal graphite , EN-GJS	> 800 N/mm²											
	K3	K3.1	Cast iron with vermicular graphite, EN-GJV; Malleable cast iron, GJM	< 500 N/mm²											
		K3.2	Cast iron with vermicular graphite, EN-GJV; Malleable cast iron, GJM	> 500 N/mm²											

TTD - Type 02 - Inox

MMG*			Material	Tensile strength/Hardness [N/mm²] [HRC]		Cutting speed v_c [m/min]				Feed f [mm] with drill diameter					
						Internal cooling	External cooling	MQL	Air	12,0	15,5	19,5	25,0	32,0	40,0
P	P1	P1.1	Structural, free-cutting, case hardened and heat-treated steel, non-alloyed	< 700 N/mm²		100	90	90		0,20	0,24	0,27	0,29	0,30	0,27
		P1.2	Structural, free-cutting, case hardened and heat-treated steel, non-alloyed	< 1200 N/mm²		90	75	75		0,25	0,30	0,33	0,37	0,38	0,34
	P2	P2.1	Nitrated, case hardened and heat-treated steel, alloyed	< 900 N/mm²		100	85	85		0,24	0,28	0,32	0,35	0,36	0,33
		P2.2	Nitrated, case hardened and heat-treated steel, alloyed	< 1400 N/mm²		70	60	60		0,19	0,22	0,25	0,27	0,28	0,26
	P3	P3.1	Tool, roller bearing, spring and high speed steel	< 900 N/mm²		75	65	65		0,22	0,25	0,28	0,31	0,32	0,30
		P3.2	Tool, roller bearing, spring and high speed steel	< 1500 N/mm²		60	55	55		0,18	0,21	0,23	0,25	0,26	0,24
	P4	P4.1	Stainless steel, ferritic and martensitic			60	45	50		0,14	0,17	0,19	0,21	0,21	0,19
	P5	P5.1	Cast steel			100	85	85		0,24	0,28	0,32	0,35	0,36	0,33
	P6	P6.1	Stainless cast steel, ferritic and martensitic			60	45	50		0,14	0,17	0,19	0,21	0,21	0,19
M	M1	M1.1	Stainless steel, austenitic	< 700 N/mm²		55	35	35		0,18	0,21	0,24	0,26	0,27	0,24
		M1.2	Stainless steel, ferritic/austenitic (Duplex)	< 1000 N/mm²		50	30	30		0,16	0,18	0,20	0,22	0,23	0,21
	M2	M2.1	Stainless cast steel, austenitic	< 700 N/mm²		55	35	35		0,18	0,21	0,24	0,26	0,27	0,24
	M3	M3.1	Stainless cast steel, ferritic/austenitic (Duplex)	< 1000 N/mm²		50	30	30		0,16	0,18	0,20	0,22	0,23	0,21
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), EN-GJL	< 300 N/mm²		95	70	70	70	0,33	0,39	0,44	0,49	0,50	0,46
	K2	K2.1	Cast iron with spheroidal graphite, EN-GJS	< 500 N/mm²		130	80	95	95	0,31	0,36	0,41	0,45	0,46	0,42
		K2.2	Cast iron with spheroidal graphite , EN-GJS	500-800 N/mm²		80	60	60		0,26	0,31	0,35	0,39	0,40	0,36
		K2.3	Cast iron with spheroidal graphite , EN-GJS	> 800 N/mm²		50	30	40		0,18	0,21	0,23	0,25	0,26	0,24
	K3	K3.1	Cast iron with vermicular graphite, EN-GJV; Malleable cast iron, GJM	< 500 N/mm²		70	65	65		0,28	0,33	0,38	0,42	0,43	0,39
		K3.2	Cast iron with vermicular graphite, EN-GJV; Malleable cast iron, GJM	> 500 N/mm²		65	55	55		0,23	0,27	0,30	0,33	0,34	0,31
S	S1	S1.1	Titanium, titanium alloy	< 400 N/mm²		40	25			0,16	0,18	0,21	0,23	0,23	0,21
	S2	S2.1	Titanium, titanium alloy	< 1200 N/mm²		30	20			0,14	0,16	0,18	0,20	0,20	0,18
		S2.2	Titanium, titanium alloy	> 1200 N/mm²		25	15			0,11	0,13	0,15	0,16	0,17	0,15
	S3	S3.1	Nickel, non-alloyed and alloyed	< 900 N/mm²		20	15			0,09	0,11	0,12	0,13	0,13	0,12
		S3.2	Nickel, non-alloyed and alloyed	> 900 N/mm²		15	10			0,11	0,13	0,15	0,16	0,17	0,15
	S4	S4.1	Heat resistant super alloys, Ni, Co, and Fe based			15	10			0,09	0,11	0,12	0,13	0,13	0,12
	S5	S5.1	Tungsten and molybdenum alloys			15	10			0,09	0,11	0,12	0,13	0,13	0,12

* MILLER machining groups

The cutting data recommendations shown, are guidelines.
The best data for the machining task in question should be calculated during trials or during the machining operation.