Cutting data recommendation for replaceable head drills

Feed and cutting speed

TTD - Type 03 - Alu

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
N	N1	N1.1	Aluminium, non-alloyed and alloyed <3% Si			300	200	250		0,23	0,26	0,30	0,33	0,33	0,30
		N1.2	Aluminium, alloyed ≤7% Si			250	180	200		0,29	0,35	0,39	0,43	0,44	0,40
		N1.3	Aluminium, alloyed > 7-12% Si			220	150	180		0,29	0,35	0,39	0,43	0,44	0,40
		N1.4	Aluminium, alloyed > 12% Si			180	120	150		0,29	0,35	0,39	0,43	0,44	0,40
	N2	N2.1	Copper, non-alloyed and low alloyed	< 300 N/mm²		140	100			0,23	0,26	0,30	0,33	0,33	0,30
		N2.2	Copper, alloyed	> 300 N/mm²		120	90			0,29	0,35	0,39	0,43	0,44	0,40
		N2.3	Brass, bronze, gun metal	< 1200 N/mm²		200	160	160	120	0,37	0,43	0,49	0,55	0,56	0,51
	N3	N3.1	Graphite												
	N4	N4.1	Plastic, thermoplastic												
		N4.2	Plastic, thermosetting plastic (duroplast)												
		N4.3	Plastic, foam												

TTD - Type 04 - Steel

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		110	100	100		0,26	0,30	0,34	0,37	0,38	0,35
		P1.2	Structural, free-cutting, case hardened and heat-treated steel, non-alloyed	< 1200 N/mm²		100	85	85		0,32	0,38	0,43	0,47	0,48	0,44
	P2	P2.1	Nitrated, case hardened and heat-treated steel, alloyed	< 900 N/mm²		110	95	95		0,31	0,36	0,40	0,44	0,46	0,42
		P2.2	Nitrated, case hardened and heat-treated steel, alloyed	< 1400 N/mm²		75	65	65		0,24	0,28	0,32	0,35	0,36	0,33
	P3	P3.1	Tool, roller bearing, spring and high speed steel	< 900 N/mm²		85	70	70		0,27	0,32	0,36	0,40	0,41	0,38
		P3.2	Tool, roller bearing, spring and high speed steel	< 1500 N/mm²		65	60	60		0,23	0,26	0,30	0,32	0,33	0,30
	P4	P4.1	Stainless steel, ferritic and martensitic			65	50	55		0,18	0,21	0,24	0,26	0,27	0,24
	P5	P5.1	Cast steel			110	95	95		0,31	0,36	0,40	0,44	0,46	0,42
	P6	P6.1	Stainless cast steel, ferritic and martensitic			65	50	55		0,18	0,21	0,24	0,26	0,27	0,24
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), EN-GJL	< 300 N/mm²		110	75	75	75	0,37	0,43	0,49	0,55	0,56	0,51
	K2	K2.1	Cast iron with spheroidal graphite, EN-GJS	< 500 N/mm²		145	90	110	110	0,34	0,40	0,45	0,50	0,51	0,47
		K2.2	Cast iron with spheroidal graphite , EN-GJS	500-800 N/mm²		90	70	70		0,29	0,35	0,39	0,43	0,44	0,40
		K2.3	Cast iron with spheroidal graphite , EN-GJS	> 800 N/mm²		55	35	45		0,20	0,23	0,26	0,28	0,29	0,26
	K3	K3.1	Cast iron with vermicular graphite, EN-GJV; Malleable cast iron, GJM	< 500 N/mm²		80	70	70		0,32	0,37	0,42	0,46	0,47	0,43
		K3.2	Cast iron with vermicular graphite, EN-GJV; Malleable cast iron, GJM	> 500 N/mm²		70	65	65		0,25	0,29	0,33	0,37	0,38	0,35

TTD - Type 05 - Iron

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
K	K1	K1.1	Cast iron with lamellar graphite (grey cast iron), EN-GJL	< 300 N/mm²		120	85	85	85	0,35	0,44	0,53	0,62	0,67	0,61
	K2	K2.1	Cast iron with spheroidal graphite, EN-GJS	< 500 N/mm²		160	100	120	120	0,33	0,41	0,49	0,57	0,62	0,56
		K2.2	Cast iron with spheroidal graphite , EN-GJS	500-800 N/mm²		100	75	75		0,29	0,35	0,42	0,49	0,53	0,48
		K2.3	Cast iron with spheroidal graphite , EN-GJS	> 800 N/mm²		60	40	50		0,20	0,24	0,28	0,32	0,35	0,32
	K3	K3.1	Cast iron with vermicular graphite, EN-GJV; Malleable cast iron, GJM	< 500 N/mm²		90	80	80		0,31	0,38	0,45	0,53	0,57	0,52
		K3.2	Cast iron with vermicular graphite, EN-GJV; Malleable cast iron, GJM	> 500 N/mm²		80	70	70		0,25	0,30	0,36	0,42	0,45	0,42

* 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.