-SK, -NG, -HP CHIPBREAKERS - 2xD, 3xD, 4xD RECOMMENDED CUTTING CONDITIONS

ISO	Material	Condition	Tensile Strength Rm (N/mm²)	Hardness (HB)	Matl No.	Cutting Speed Vc (SFM)	Feed v.s. Drill Diameter In/Rev Drill Length 2, 3, 4xD								
							SOMT 04 Ø.472-.531 (inch)	SOMT 05 Ø.551-.645 (inch)	SOMT 06 Ø.649-.763 (inch)	SOMT 07 Ø.767-.882 (inch)	SOMT 08 Ø.886-1.039 (inch)	SOMT 09 Ø 1.063-1.220 (inch)	SOMT 11 Ø 1.250-1.460 (inch)	SOMT 13 Ø 1.437-1.687 (inch)	SOMT 15 Ø 1.719-2.000 (inch)
P	Non-alloy steel <0.25% C & cast steel, >=0.25% C free cutting <0.55% C steel >=0.55% C	Annealed	420	125	1	700-1200	.002-.003	.002-.003	.002-.003	.002-.004	.002-.004	.003-.004	.003-.005	.003-.005	.003-.005
		Annealed	650	190	2	600-950	.003-.004	.003-.004	.003-.004	.003-.005	.003-.005	.003-.006	.003-.006	.003-.0065	.003-.0065
		Quenched & Tempered	850	250	3	450-800	.003-.005	.003-.005	.003-.005	.003-.006	.003-.006	.004-.006	.004-.006	.004-.007	.004-.007
		Annealed	750	220	4	450-800	.003-.005	.003-.005	.003-.005	.003-.006	.003-.006	.004-.007	.004-.007	.004-.007	.004-.007
		Quenched & Tempered	1000	300	5	450-800	.003-.005	.003-.005	.003-.005	.003-.006	.003-.006	.004-.007	.004-.007	.004-.007	.004-.007
	Low alloy steel & cast steek (less than 5% alloying elements)	Annealed	600	200	6	450-800	.003-.006	.003-.006	.003-.006	.003-.007	.003-.007	.004-.007	.004-.009	.004-.009	.004-.0095
		Quenched & Tempered	930	275	7	325-600	.003-.006	.003-.006	.003-.006	.003-.008	.003-.008	.004-.008	.004-.0085	.004-.0085	.004-.0085
			1000	300	8	325-600	.003-.006	.003-.006	.003-.006	.003-.008	.003-.008	.004-.008	.004-.0085	.004-.0085	.004-.0085
			1200	350	9	325-600	.003-.006	.003-.006	.003-.006	.003-.008	.003-.008	.004-.008	.004-.0085	.004-.0085	.004-.0085
	High alloy steel, cast steel, & tool steel	Annealed	680	200	10	450-675	.002-.005	.002-.005	.0025-.005	.0025-.005	.003-.006	.004-.007	.004-.007	.004-.008	.004-.008
		Quenched & Tempered	1100	325	11	325-525	.0025-.005	.0025-.005	.0025-.005	.003-.006	.003-.006	.0035-.007	.0035-.008	.004-.008	.004-.008
M	Stainless steel & cast stainless steel	Ferritic/ martensitic	680	200	12	500-800	.0025-.005	.0025-.005	.0025-.005	.003-.006	.003-.006	.003-.007	.0035-.008	.004-.008	.004-.008
		Martensitic	820	240	13	500-800	.0025-.005	.0025-.005	.0025-.005	.003-.006	.003-.006	.003-.007	.0035-.008	.004-.008	.004-.008
		Austenitic	600	180	14	500-800	.0025-.005	.0025-.005	.0025-.005	.003-.006	.003-.006	.003-.007	.0035-.008	.004-.008	.004-.008
K	GreyCast Iron (GG)	Ferritic		160	15	525-850	.003-.007	.003-.007	.003-.007	.004-.008	.004-.008	.004-.008	.004-.008	.004-.0085	.004-.0085
		Pearlitic		250	16	525-850	.003-.007	.003-.007	.003-.007	.004-.008	.004-.008	.004-.008	.004-.008	.004-.0085	.004-.0085
	Cast Iron Nodular (GGG)	Ferritic		180	17	525-850	.003-.007	.003-.007	.003-.007	.004-.008	.004-.008	.004-.008	.004-.008	.004-.0085	.004-.0085
		Pearlitic		260	18	525-850	.003-.007	.003-.007	.003-.007	.004-.008	.004-.008	.004-.008	.004-.008	.004-.0085	.004-.0085
	Malleable Cast Iron	Ferritic		130	19	400-725	.003-.0055	.003-.0055	.003-.0055	.004-.006	.004-.006	.004-.0065	.004-.007	.004-.007	.004-.007
		Pearlitic		230	20	400-725	.003-.0055	.003-.0055	.003-.0055	.004-.006	.004-.006	.004-.0065	.004-.007	.004-.007	.004-.007
N	Aluminum - wrought alloy	Not cureable		60	21	650-1150	.0025-.006	.0025-.006	.0025-.006	.003-.0065	.003-.0065	.0035-.007	.0035-.007	.004-.0075	.004-.0075
		Cured		100	22	650-1150	.0025-.006	.0025-.006	.0025-.006	.003-.0065	.003-.0065	.0035-.007	.0035-.007	.004-.0075	.004-.0075
	Aluminum - cast, alloyed <=12% Si / >12% Si	Not cureable		75	23	650-1150	.0025-.006	.0025-.006	.0025-.006	.003-.0065	.003-.0065	.0035-.007	.0035-.007	.004-.0075	.004-.0075
		Cured		90	24	650-1150	.0025-.006	.0025-.006	.0025-.006	.003-.0065	.003-.0065	.0035-.007	.0035-.007	.004-.0075	.004-.0075
		High temperature		130	25	650-1150	.0025-.006	.0025-.006	.0025-.006	.003-.0065	.003-.0065	.0035-.007	.0035-.007	.004-.0075	.004-.0075
	Copper alloys > 1% Pb	Free cutting		110	26	490-825	.0025-.006	.0025-.006	.0025-.006	.003-.0065	.003-.0065	.004-.007	.004-.007	.004-.008	.004-.008
		Brass		90	27	490-825	.0025-.006	.0025-.006	.0025-.006	.003-.0065	.003-.0065	.004-.007	.004-.007	.004-.008	.004-.008
		Electrolitic copper		100	28	490-825	.0025-.006	.0025-.006	.0025-.006	.003-.0065	.003-.0065	.004-.007	.004-.007	.004-.008	.004-.008
	Non-metallic	Duro & fiber plastics			29	490-825	.0025-.006	.0025-.006	.0025-.006	.003-.0065	.003-.0065	.004-.007	.004-.007	.004-.008	.004-.008
		Hard rubber			30	490-825	.0025-.006	.0025-.006	.0025-.006	.003-.0065	.003-.0065	.004-.007	.004-.007	.004-.008	.004-.008
S	High temp alloys Fe based / Ni or Co based	Annealed		200	31	100-200	.002-.003	.002-.003	.002-.003	.002-.0035	.002-.0035	.003-.004	.003-.004	.003-.005	.003-.005
		Cured		280	32	100-200	.002-.003	.002-.003	.002-.003	.002-.0035	.002-.0035	.003-.004	.003-.004	.003-.005	.003-.005
		Annealed		250	33	100-200	.002-.003	.002-.003	.002-.003	.002-.0035	.002-.0035	.003-.004	.003-.004	.003-.005	.003-.005
		Cured		350	34	100-200	.002-.003	.002-.003	.002-.003	.002-.0035	.002-.0035	.003-.004	.003-.004	.003-.005	.003-.005
		Cast		320	35	100-200	.002-.003	.002-.003	.002-.003	.002-.0035	.002-.0035	.003-.004	.003-.004	.003-.005	.003-.005
	Titanium, Ti alloys		Rm 400		36	165-265	.0025-.0035	.0025-.0035	.0025-.0035	.003-.004	.003-.004	.003-.004	.003-.004	.003-.004	.003-.004
		Alpha+beta alloys cured	Rm 1050		37	165-265	.0025-.0035	.0025-.0035	.0025-.0035	.003-.004	.003-.004	.003-.004	.003-.004	.003-.004	.003-.004
H	Hardened steel	Hardened		55 HRC	38	100-200	.002-.0035	.002-.0035	.002-.0035	.002-.004	.002-.004	.002-.0045	.002-.0045	.002-.0045	.002-.0045
		Hardened		60 HRC	39	100-200	.002-.0035	.002-.0035	.002-.0035	.002-.004	.002-.004	.002-.0045	.002-.0045	.002-.0045	.002-.0045
	Chilled cast iron	Cast		400	40	100-200	.002-.0035	.002-.0035	.002-.0035	.002-.004	.002-.004	.002-.0045	.002-.0045	.002-.0045	.002-.0045
	Cast iron nodular	Hardened		55 HRC	41	100-200	.002-.0035	.002-.0035	.002-.0035	.002-.004	.002-.004	.002-.0045	.002-.0045	.002-.0045	.002-.0045

-SK, -NG, -HP CHIPBREAKERS - 5xD RECOMMENDED CUTTING CONDITIONS

ISO	Material	Condition	Tensile Strength Rm (N/mm²)	Hardness (HB)	Matl No.	Cutting Speed Vc (SFM)	Feed v.s. Drill Diameter In/Rev Drill Length 5xD							
							SOMT 04 Ø.472-.531 (inch)	SOMT 05 Ø.551-.645 (inch)	SOMT 06 Ø.649-.763 (inch)	SOMT 07 Ø.767-.882 (inch)	SOMT 08 Ø.886-1.039 (inch)	SOMT 09 Ø 1.063-1.220 (inch)	SOMT 11 Ø 1.250-1.460 (inch)	SOMT 13 Ø 1.437-1.687 (inch)	SOMT 15 Ø 1.719-2.000 (inch)
P	Non-alloy steel <0.25% C & cast steel, > = 0.25% C free cutting <0.55% C steel > = 0.55% C	Annealed	420	125	1	700 -1200	.002-.003	.0015-.002	.0015-.002	.0015-.002	.0015-.002	.0025-.0035	.0025-.0035	.0025-.004	.0025-.004
		Annealed	650	190	2	600 - 950	.003-.004	.002-.003	.002-.003	.002-.004	.002-.004	.003-.005	.003-.005	.003-.0055	.003-.0055
		Quenched & Tempered	850	250	3	450 - 800	.003-.005	.002-.004	.002-.004	.003-.005	.003-.005	.003-.007	.003-.006	.004-.007	.004-.007
		Annealed	750	220	4	450 - 800	.003-.005	.002-.004	.002-.004	.003-.005	.003-.005	.003-.007	.003-.006	.004-.007	.004-.007
		Quenched & Tempered	1000	300	5	450 - 800	.003-.005	.002-.004	.002-.004	.003-.005	.003-.005	.003-.007	.003-.006	.004-.007	.004-.007
	Low alloy steel & cast steek (less than 5% alloying elements)	Annealed	600	200	6	450 - 800	.003-.006	.002-.005	.002-.005	.003-.006	.003-.006	.003-.007	.003-.008	.003-.008	.004-.0085
		Quenched & Tempered	930	275	7	325 - 600	.003-.006	.002-.005	.002-.005	.003-.006	.003-.006	.003-.007	.003-.008	.003-.008	.004-.0085
			1000	300	8	325 - 600	.003-.006	.002-.005	.002-.005	.003-.006	.003-.006	.003-.007	.003-.008	.003-.008	.004-.0085
			1200	350	9	325 - 600	.003-.006	.002-.005	.002-.005	.003-.006	.003-.006	.003-.007	.003-.008	.003-.008	.004-.0085
	High alloy steel, cast steel, & tool steel	Annealed	680	200	10	450 - 675	.002-.005	.002-.004	.002-.004	.003-.005	.003-.005	.003-.006	.003-.007	.003-.007	.004-.008
		Quenched & Tempered	1100	325	11	325 - 525	.0025-.005	.002-.004	.002-.004	.003-.005	.003-.005	.003-.006	.003-.007	.004-.007	.004-.008
M	Stainless steel & cast stainless steel	Ferritic/ martensitic	680	200	12	500 - 800	.0025-.005	.002-.004	.002-.004	.003-.005	.003-.005	.003-.006	.003-.007	.004-.007	.004-.008
		Martensitic	820	240	13	500 - 800	.0025-.005	.002-.004	.002-.004	.003-.005	.003-.005	.003-.006	.003-.007	.004-.007	.004-.008
		Austenitic	600	180	14	500 - 800	.0025-.005	.002-.004	.002-.004	.003-.005	.003-.005	.003-.006	.003-.007	.004-.007	.004-.008
K	GreyCast Iron (GG)	Ferritic		160	15	525 - 850	.003-.007	.003-.0055	.003-.0055	.003-.006	.003-.006	.004-.007	.004-.007	.004-.008	.004-.008
		Pearlitic		250	16	525 - 850	.003-.007	.003-.0055	.003-.0055	.003-.006	.003-.006	.004-.007	.004-.007	.004-.008	.004-.008
	Cast Iron Nodular (GGG)	Ferritic		180	17	525 - 850	.003-.007	.003-.0055	.003-.0055	.003-.006	.003-.006	.004-.007	.004-.007	.004-.008	.004-.008
		Pearlitic		260	18	525 - 850	.003-.007	.003-.0055	.003-.0055	.003-.006	.003-.006	.004-.007	.004-.007	.004-.008	.004-.008
	Malleable Cast Iron	Ferritic		130	19	400 - 725	.003-.0055	.0025-.0045	.0025-.0045	.003-.0055	.003-.0055	.004-.006	.004-.006	.004-.0065	.004-.0065
		Pearlitic		230	20	400 - 725	.003-.0055	.0025-.0045	.0025-.0045	.003-.0055	.003-.0055	.004-.006	.004-.006	.004-.0065	.004-.0065
N	Aluminum - wrought alloy	Not cureable		60	21	650 - 1150	.0025-.006	.002-.0055	.002-.0055	.0025-.006	.0025-.006	.003-.006	.003-.006	.0035-.007	.0035-.007
		Cured		100	22	650 - 1150	.0025-.006	.002-.0055	.002-.0055	.0025-.006	.0025-.006	.003-.006	.003-.006	.0035-.007	.0035-.007
	Aluminum - cast, alloyed <=12% Si / >12% Si	Not cureable		75	23	650 - 1150	.0025-.006	.002-.0055	.002-.0055	.0025-.006	.0025-.006	.003-.006	.003-.006	.0035-.007	.0035-.007
		Cured		90	24	650 - 1150	.0025-.006	.002-.0055	.002-.0055	.0025-.006	.0025-.006	.003-.006	.003-.006	.0035-.007	.0035-.007
		High temperature		130	25	650 - 1150	.0025-.006	.002-.0055	.002-.0055	.0025-.006	.0025-.006	.003-.006	.003-.006	.0035-.007	.0035-.007
	Copper alloys > 1% Pb	Free cutting		110	26	490 - 825	.0025-.006	.002-.0055	.002-.0055	.003-.006	.003-.006	.003-.0065	.003-.0065	.0035-.0075	.0035-.0075
		Brass		90	27	490 - 825	.0025-.006	.002-.0055	.002-.0055	.003-.006	.003-.006	.003-.0065	.003-.0065	.0035-.0075	.0035-.0075
		Electrolitic copper		100	28	490 - 825	.0025-.006	.002-.0055	.002-.0055	.003-.006	.003-.006	.003-.0065	.003-.0065	.0035-.0075	.0035-.0075
	Non-metallic	Duro & fiber plastics			29	490 - 825	.0025-.006	.002-.0055	.002-.0055	.0025-.006	.0025-.006	.003-.006	.0035-.006	.0035-.0075	.0035-.0075
		Hard rubber			30	490 - 825	.0025-.006	.002-.0055	.002-.0055	.0025-.006	.0025-.006	.003-.006	.0035-.006	.0035-.0075	.0035-.0075
S	High temp alloys Fe based / Ni or Co based	Annealed		200	31	100 - 200	.002-.003	.0015-.0025	.0015-.0025	.0015-.0025	.0015-.0025	.0025-.0035	.0025-.0035	.0025-.004	.0025-.004
		Cured		280	32	100 - 200	.002-.003	.0015-.0025	.0015-.0025	.0015-.0025	.0015-.0025	.0025-.0035	.0025-.0035	.0025-.004	.0025-.004
		Annealed		250	33	100 - 200	.002-.003	.0015-.0025	.0015-.0025	.0015-.0025	.0015-.0025	.0025-.0035	.0025-.0035	.0025-.004	.0025-.004
		Cured		350	34	100 - 200	.002-.003	.0015-.0025	.0015-.0025	.0015-.0025	.0015-.0025	.0025-.0035	.0025-.0035	.0025-.004	.0025-.004
		Cast		320	35	100 - 200	.002-.003	.0015-.0025	.0015-.0025	.0015-.0025	.0015-.0025	.0025-.0035	.0025-.0035	.0025-.004	.0025-.004
	Titanium, Ti alloys		Rm 400		36	165 - 265	.0025-.0035	.002-.003	.002-.003	.0025-.0035	.0025-.0035	.0025-.0035	.0025-.0035	.0025-.0035	.0025-.0035
		Alpha+beta alloys cured	Rm 1050		37	165 - 265	.0025-.0035	.002-.003	.002-.003	.0025-.0035	.0025-.0035	.0025-.0035	.0025-.0035	.0025-.0035	.0025-.0035
H	Hardened steel	Hardened		55 HRC	38	100 - 200	.002-.0035	.0015-.003	.0015-.003	.0015-.0035	.0015-.0035	.0015-.004	.0015-.004	.0015-.004	.0015-.004
		Hardened		60 HRC	39	100 - 200	.002-.0035	.0015-.003	.0015-.003	.0015-.0035	.0015-.0035	.0015-.004	.0015-.004	.0015-.004	.0015-.004
	Chilled cast iron	Cast		400	40	100 - 200	.002-.0035	.0015-.003	.0015-.003	.0015-.0035	.0015-.0035	.0015-.004	.0015-.004	.0015-.004	.0015-.004
	Cast iron nodular	Hardened		55 HRC	41	100 - 200	.002-.0035	.0015-.003	.0015-.003	.0015-.0035	.0015-.0035	.0015-.004	.0015-.004	.0015-.004	.0015-.004

Note: For 5xD, reduce feed rate by 40% for first .150" to stabilize and then up to 100% programmed feed.

-PS CHIPBREAKER - 2xD, 3xD, 4xD, 5xD RECOMMENDED CUTTING CONDITIONS

ISO	Material	Condition	Tensile Strength Rm (N/mm²)	Hardness (HB)	Matl No.	Cutting Speed Vc (SFM)	Feed vs. Drill Diameter In/Rev Drill Length 2, 3, 4, 5xD							
							SOMT 05 Ø.551-.645 (inch)	SOMT 06 Ø.649-.763 (inch)	SOMT 07 Ø.767-.882 (inch)	SOMT 08 Ø.886-1.039 (inch)	SOMT 09 Ø 1.063-1.220 (inch)	SOMT 11 Ø 1.250-1.460 (inch)	SOMT 13 Ø 1.437-1.687 (inch)	SOMT 15 Ø 1.719-2.000 (inch)
P	Non-alloy steel <0.25% C & cast steel, > = 0.25% C free cutting <0.55% C steel > = 0.55% C	Annealed	420	125	1	700 -1200	.0015-.003	.0015-.003	.0025-.004	.0025-.004	.0025-.005	.0025-.005	.0025-.005	.0025-.005
		Annealed	650	190	2	600 - 950	.0025-.004	.0025-.004	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005
		Quenched & Tempered	850	250	3	450 - 800	.0025-.005	.0025-.005	.0025-.006	.0025-.006	.0025-.006	.0025-.006	.0025-.006	.0025-.006
		Annealed	750	220	4	450 - 800	.0025-.005	.0025-.005	.0025-.006	.0025-.006	.0025-.006	.0025-.006	.0025-.006	.0025-.006
		Quenched & Tempered	1000	300	5	450 - 800	.0025-.005	.0025-.005	.0025-.006	.0025-.006	.0025-.006	.0025-.006	.0025-.006	.0025-.006
	Low alloy steel & cast steek (less than 5% alloying elements)	Annealed	600	200	6	450 - 800	.0025-.005	.0025-.005	.0025-.006	.0025-.006	.0025-.006	.0025-.006	.0025-.006	.0025-.006
		Quenched & Tempered	930	275	7	325 - 600	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005
			1000	300	8	325 - 600	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005
			1200	350	9	325 - 600	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005
	High alloy steel, cast steel, & tool steel	Annealed	680	200	10	450 - 675	.0025-.004	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005
		Quenched & Tempered	1100	325	11	325 - 525	.0025-.004	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005	.0025-.005

-PS CHIPBREAKER - CASE STUDY

Machine		Vertical machining center (Spindle-CAT50)		
Coolant		Internal (145 psi)		
Workpiece Material		Low carbon steel (1115)		
Drill Body		QR0222089N5R02		
Inserts		**SOMT 070306 PS IN2505** **SOMT 070306 SK IN2505**		
Depth of Cut	ap (inch)	2.00"		
Cutting Speed	V (sfm)	590	656	721
Feed Rate	f (ipr)	.004"		

PS			
SK