STANDARD CUTTING CONDITIONS (for rougher endmills)

ISO	Material		Condition	Tensile Strength (N/mm2)	Hardness HB	Cutting speed: *Vc* (m/min) min	max
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	260	280
		≥ 0.25 %C	Annealed	650	190	200	230
		< 0.55 %C	Quenched and tempered	850	250	160	190
		≥ 0.55 %C	Annealed	750	220	160	180
		≥ 0.55 %C	Quenched and tempered	1000	300	140	160
	Low alloy steel and cast steel (less than 5% all elements)		Annealed	600	200	160	190
			Quenched and tempered	930	275	120	140
			Quenched and tempered	1000	300	130	150
			Quenched and tempered	1200	350	140	160
	High alloy steel, cast steel, and tool steel		Annealed	680	200	130	160
			Quenched and tempered	1100	325	70	90
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	110	200
			Martensitic	820	240	60	180
			Austenitic	600	180	80	120
K	Cast iron nodular (GGG)		Ferritic / pearlitic	-	180	80	260
			Pearlitic	-	260	130	240
	Grey cast iron (GG)		Ferritic	-	160	150	280
			Pearlitic	-	250	90	280
	Malleable cast iron		Ferritic	-	130	150	280
			Pearlitic	-	230	140	240
N	Aluminium-wrought alloy		Not cureable	-	60	810	840
			Cured	-	100	730	830
	Aluminium-cast, alloyed	≤ 12% Si	Not cureable	-	75	800	840
			Cured	-	90	730	830
		> 12% Si	High temperature	-	130	320	340
	Copper alloys	> 1% Pb	Free cutting	-	110	400	430
			Brass	-	90	400	430
			Electrolitic copper	-	100	270	300
	Non-metallic		Duroplastics, fiber plastics	-	-	-	-
			Hard rubber	-	-	-	-
S	High temp. alloys	Fe based	Annealed	-	200	20	40
		Fe based	Cured	-	280	20	30
		Ni or Co based	Annealed	-	250	20	30
		Ni or Co based	Cured	-	350	20	30
		Ni or Co based	Cast	-	320	30	70
	Titanium and Ti alloys			RM 400	-	30	70
			Alpha + beta alloys cured	RM 1050	-	30	70
H	Hardened steel		Hardened	-	55 HRC	30	50
			Hardened	-	60 HRC	30	40
	Chilled cast iron		Cast	-	400	60	80
	Cast iron		Hardened	-	55 HRC	30	50

STANDARD CUTTING CONDITIONS (for endmills)

ISO	Material		Condition	Tensile Strength (N/mm2)	Hardness HB	Cutting speed: *Vc* (m/min) min	max
P	Non-alloy steel and cast steel, free cutting stee	< 0.25 %C	Annealed	420	125	220	230
		≥ 0.25 %C	Annealed	650	190	170	190
		< 0.55 %C	Quenched and tempered	850	250	140	150
		≥ 0.55 %C	Annealed	750	220	140	150
		≥ 0.55 %C	Quenched and tempered	1000	300	120	130
	Low alloy steel and cast steel (less than 5% all elements)		Annealed	600	200	140	150
			Quenched and tempered	930	275	100	110
			Quenched and tempered	1000	300	110	120
			Quenched and tempered	1200	350	120	130
	High alloy steel, cast steel, and tool steel		Annealed	680	200	110	130
			Quenched and tempered	1100	325	60	70
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	100	170
			Martensitic	820	240	60	150
			Austenitic	600	180	70	100
K	Cast iron nodular (GGG)		Ferritic / pearlitic	-	180	70	220
			Pearlitic	-	260	110	200
	Grey cast iron (GG)		Ferritic	-	160	130	230
			Pearlitic	-	250	70	230
	Malleable cast iron		Ferritic	-	130	130	230
			Pearlitic	-	230	110	200
N	Aluminium-wrought alloy		Not cureable	-	60	670	700
			Cured	-	100	610	690
	Aluminium-cast, alloyed	≤ 12% Si	Not cureable	-	75	670	700
			Cured	-	90	610	690
		> 12% Si	High temperature	-	130	270	280
	Copper alloys	> 1% Pb	Free cutting	-	110	330	350
			Brass	-	90	330	350
			Electrolitic copper	-	100	230	250
	Non-metallic		Duroplastics, fiber plastics	-	-	-	-
			Hard rubber	-	-	-	-
S	High temp. alloys	Fe based	Annealed	-	200	20	30
		Fe based	Cured	-	280	20	20
		Ni or Co based	Annealed	-	250	20	20
		Ni or Co based	Cured	-	350	20	20
		Ni or Co based	Cast	-	320	30	60
	Titanium and Ti alloys	Ni or Co based		RM 400	-	30	60
		Ni or Co based	Alpha + beta alloys cured	RM 1050	-	30	60
H	Hardened steel		Hardened	-	55 HRC	30	40
			Hardened	-	60 HRC	30	30
	Chilled cast iron		Cast	-	400	50	60
	Cast iron		Hardened	-	55 HRC	30	40

FEEDMEISTER (Ceramic Endmil)

STANDARD CUTTING CONDITIONS (for endmills)

ISO	Material	Hardness	Max D.O.C (mm)	Cutting speed *Vc* (m/min)	Feed per tooth (mm / tooth)					
					ø6	ø8	ø10	ø12	ø16	ø20
K	Cast iron	180- 260HB	0.25-1.0	250-1000	0.10	0.15	0.17	0.19	0.23	0.25
	Nodular iron	160- 250HB	0.25-1.0	250-1000	0.10	0.15	0.17	0.19	0.23	0.25
	Malleable iron	130- 230HB	0.25-1.0	250-1000	0.10	0.15	0.17	0.19	0.23	0.25
N	Non ferrous/ graphite products	-	0.25-1.0	500-1500	0.10	0.15	0.17	0.19	0.23	0.25
S	Ni-based superalloys	-	0.25-1.0	250-1000	0.10	0.13	0.15	0.18	0.20	0.22

For machining nickel-based alloys, use a cutting speed of 250 m/min or more in dry cutting.

GRADE PRIORITIES FOR SOLID CARBIDE ENDMILLS

In most cases the best performance can be attained without using coolant for specific grades. However, it should be noted that if for any reason coolant must be used, it could possibly affect tool life and sometimes cause insert failure, due to thermal shock.

Material Groups	ISO P	ISO H	ISO M	ISO S	ISO K	ISO N
	Steel	Hard Materials	Stainless	Superalloys	Cast Iron	Non-ferrous
	Harder AH750 **AH725** Tougher	Harder **AH750** AH725 Tougher	Harder **AH725** Tougher	Harder AH750 **AH725** KS15F Tougher	Harder AH750 **AH725** Tougher	Harder AH725 **KS15F** Tougher