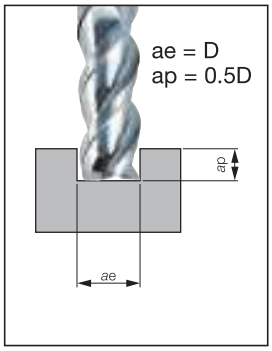
MACHINING DATA FOR SOLID CARBIDE ENDMILLS

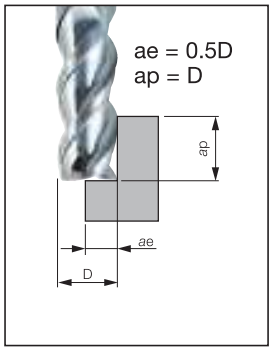
ISO	Material		Condition	Tensile Strength (N/mm2)	Hardness HB	Cutting speed: *Vc* (m/min) min	max
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	220	230
		≥ 0.25 %C	Annealed	650	190	170	190
		< 0.55 %C	Quenched and tempered	850	250	140	150
		≥ 0.55 %C	Annealed	750	220	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			RM 400	-	30	60
			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

Recommended Feeds

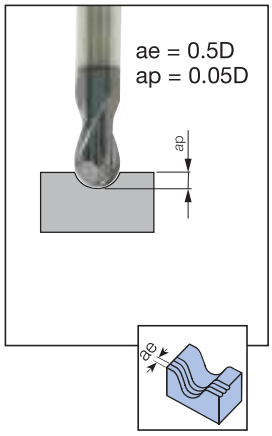
Slotting



Shoulder milling



Profiling



	Slotting		Shoulder milling / Profiling	
D (mm)	Min. *fz*	Max. *fz*	Min. *fz*	Max. *fz*
1	0.003	0.005	0.003	0.007
1.3	0.003	0.01	0.003	0.012
1.5	0.003	0.02	0.003	0.022
1.8	0.005	0.025	0.005	0.028
2	0.005	0.03	0.005	0.033
2.3	0.005	0.03	0.005	0.033
2.5	0.005	0.03	0.005	0.03
2.8	0.01	0.035	0.01	0.038
3	0.01	0.04	0.01	0.044
3.3	0.015	0.04	0.01	0.044
4	0.015	0.045	0.015	0.049
4.3	0.020	0.045	0.015	0.049
5	0.025	0.05	0.02	0.055
6	0.03	0.06	0.025	0.066
7	0.03	0.07	0.03	0.077
8	0.03	0.08	0.03	0.088
9	0.03	0.08	0.03	0.088
10	0.035	0.09	0.03	0.098
12	0.04	0.1	0.035	0.108
14	0.05	0.11	0.04	0.119
16	0.05	0.12	0.05	0.13
18	0.05	0.13	0.05	0.14
20	0.05	0.15	0.05	0.17
25	0.06	0.15	0.06	0.18

1. For Slotting	M type materials	—	*ap* max = 0.5D
	S type materials	—	*ap* max = 0.25D
2. For Finishing	P type materials	—	*ap* max = 1.5D
3. For Roughing			*ap* max = 1.5D V = 1.25 x *Vc*

High speed cutting on Hard materials (up to 60 HRC):
Apply small depth of cut: *ap* (0.1 - 0.3 mm) at *Vc* 80 - 160 m/min

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

■ First choice