

Calculation of HSS-E milling cutter

Note:

- Please use the tables on pages 20-14 to 20-17 to assign the materials to be machined.
- All milling specifications apply to a rigid setup, including clamping, sufficient machine output and applications of coolant.
- Please adjust these guideline values according to clamping operation and machine set-up!
- The feed (Vf) should be halved for milling in long version.

1. Table

Please see Table 1 for the cutting speed of the respective material.

ISO	Material	Hardness HB	Tensile strength N/mm ²	Cutting speed Vc m/min.
P	magnetic, soft steel	< 120	< 400	40
	Structural steel, steel for case hardening	< 200	< 700	32
	Carbon steel, unalloyed	< 250	< 850	25
	Alloyed steel	< 250	< 850	25
	Alloyed steel, hardened and tempered	250-350	850-1.200	20
	Alloyed steel, hardened and tempered	> 350	> 1200	12
M	Good machinability	< 250	< 850	20
	austenitic	< 250	< 850	16
	ferritic, austenitic	< 300	< 1000	12
K	with lamellar graphite	< 150	< 500	32
	with lamellar graphite	150-300	500-1.000	25
	with spheroidal graphite, malleable cast iron	< 200	< 700	32
	with spheroidal graphite, malleable cast iron	200-300	700-1.000	20
S	Titanium, unalloyed	< 200	< 700	16
	Titanium, alloyed	< 270	< 900	12
	Titanium, alloyed	270-350	900-1.250	10
	Nickel, unalloyed	< 150	< 500	8
	Nickel, alloyed	> 270	< 900	8
	Nickel, alloyed	270-350	900-1.200	6
N	Copper	< 100	< 350	80
	Brass, bronze	< 200	< 700	40
	Brass	< 200	< 700	50
	High-strength bronze	< 470	< 1500	16
	Aluminium, magnesium, non-alloyed	< 100	< 350	100
	Aluminium alloyed, Si < 5%	< 150	< 500	80
	Aluminium alloyed, Si 5-10%	< 120	< 400	60
	Aluminium alloyed, Si > 10%	< 120	< 400	50
	Whisker-reinforced			
	Aluminium and aluminium alloy			
	Thermoplastics	-	-	80
	Thermoset plastics	-	-	60
	Fibre-reinforced plastics	-	-	60

2. Table

Using the cutting speed (Vc) from Table 1, you obtain the rotational speed depending on the diameter of the tool use.

Ø mm	Cutting speed Vc m/min.															
	6	8	10	12	16	20	25	32	40	50	60	80	100	125	160	200
	Rotational speed rev/min.															
2	955	1.273	1.592	1.910	2.546	3.183	3.979	5.093	6.366	7.958	9.549	12.732	15.915	19.894	25.465	31.831
2.5	764	1.019	1.273	1.528	2.037	2.546	3.183	4.074	5.093	6.366	7.639	10.186	12.732	15.915	20.372	25.465
3	637	849	1.061	1.273	1.698	2.122	2.653	3.395	4.244	5.305	6.366	8.488	10.610	13.263	16.977	21.221
4	477	637	796	955	1.273	1.592	1.989	2.546	3.183	3.979	4.775	6.366	7.958	9.947	12.732	15.915
5	382	509	637	764	1.019	1.273	1.592	2.037	2.546	3.183	3.820	5.093	6.366	7.958	10.186	12.732
6	318	424	531	637	849	1.061	1.326	1.698	2.122	2.653	3.183	4.244	5.305	6.631	8.488	10.610
8	239	318	398	477	637	796	995	1.273	1.592	1.989	2.387	3.183	3.979	4.974	6.366	7.958
10	191	255	318	382	509	637	796	1.019	1.273	1.592	1.910	2.546	3.183	3.979	5.093	6.366
12	159	212	265	318	424	531	663	849	1.061	1.326	1.592	2.122	2.653	3.316	4.244	5.305
16	119	159	199	239	318	398	497	637	796	995	1.194	1.592	1.989	2.487	3.183	3.979
20	95	127	159	191	255	318	398	509	637	796	955	1.273	1.592	1.989	2.546	3.183
25	76	102	127	153	204	255	318	407	509	637	764	1.019	1.273	1.592	2.037	2.546
32	60	80	99	119	159	199	249	318	398	497	597	796	995	1.243	1.592	1.989
40	48	64	80	95	127	159	199	255	318	398	477	637	796	995	1.273	1.592
50	38	51	64	76	102	127	159	204	255	318	382	509	637	796	1.019	1.273
63	30	40	51	61	81	101	126	162	202	253	303	404	505	632	808	1.011
80	24	32	40	48	64	80	99	127	159	199	239	318	398	497	637	796
100	19	25	32	38	51	64	80	102	127	159	191	255	318	398	509	637
125	15	20	25	31	41	51	64	81	102	127	153	204	255	318	407	509
160	12	16	20	24	32	40	50	64	80	99	119	159	199	249	318	398