

## Recommended cutting speed and cooling lubricant

Material group	DIN	Mat.-No.	Cutting speed for Bimetal (m/min)		Cooling lubricant (oil content)
			Horizontal machine	Vertical machine	
<b>Copper</b>	Cu 99.0	2.0050	60 - 100	100 - 200	10 %
	Cu Be 2	2.1247	60 - 80	60 - 80	10 %
<b>Brass</b>	CuZn 40	2.0360	80 - 120	200 - 300	3 %
	CuZn 40 Pb 2	2.0402	80 - 120	200 - 300	3 %
	CuZn 15 Si 4	2.0492	80 - 120	200 - 300	3 %
<b>Bronzes</b>					
Tin bronze	CuSn 6	2.1020	80 - 120	100 - 160	3 %
	CuSn 8	2.1030	80 - 120	100 - 160	3 %
Red cast	CuSn 5 ZnPb	2.1096	60 - 100	80 - 150	3 %
	CuSn 10 Zn	2.1086	60 - 100	80 - 150	3 %
Aluminium bronze*	CuAl 8	2.0920	40 - 60	40 - 60	15 %
	CuAl 10 Fe	2.0940	30 - 40	30 - 40	15 %
	Ampco 18		40 - 65	40 - 60	15 %
	Ampco 25		30 - 50	30 - 40	15 %
Tin lead bronze	CuPb 20 Sn 5	2.1818	80 - 120	100 - 160	3 %
<b>Aluminium Forging alloy</b>	Al 99,8	3.0285	80 - 120	1000 - 2500	25 %
	AlMg 3	3.3535	80 - 120	1000 - 2500	25 %
	AlMg 4,5 Mn	3.3547	80 - 120	1000 - 2500	25 %
Cast alloy	G-AlSi 5 Mg	3.2341	80 - 120	1000 - 2000	25 %
	G-AlSi 9 Cu 3	3.2163	80 - 120	800 - 1500	25 %
	G-AlSi 12	3.2581	80 - 120	800 - 1500	25 %
Piston alloy*	AlSi 21 CuNiMg		80 - 120	400 - 800	25 %
<b>Plastics</b>					
- thermoplastic	PVC		80 - 120	200 - 400	dry
	polystyrene (PS)		80 - 120	200 - 400	dry
	polyethylene (PE)		80 - 120	200 - 400	dry
	polyamide (PA)		80 - 120	200 - 400	dry
- thermosetting	polyurethane (PUR)		80 - 120	800 - 1200	dry
	epoxide (EP)		80 - 120	800 - 1200	dry
	polyester resin (UP)		80 - 120	600 - 1000	dry
	fabric reinforced*/**		80 - 120	200 - 300	dry
	GRP */**		50 - 80	50 - 80	dry
<b>Gas-aerated concrete*</b>				300 - 500	dry
<b>Graphite carbon*</b>			80 - 120*	400 - 600	dry
<b>High-fired graphite**</b>			-	300 - 500	dry
<b>Fibre-cement*/**</b>			-	-	dry

\* Carbide tipped band saw blades are strongly recommended

\*\* We recommend diamond coated band saw blades

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Material group	DIN	Material number	USA	JIS
<b>Structural steels</b>	St 37/42	1.0037/1.0042	A 570	STKM 12 A/SM 400 A
	St 52/60	1.0050/1.0060	A 572	SS 490/SM 570
<b>Case hardened steels</b>	C10/C15	1.0301/1.0401	1010/1016	S 10 C/S 15 C
	16 MnCr 5	1.7131	5115	-
	20 CrMo 5	1.7264	-	SCM 420 H
	21 NiCrMo 2	1.6523	8620	SNCM 22
<b>Nitriding steels</b>	34 CrAlNi 7	1.8550	-	-
	34 CrAlMo 5	1.8507	A 355 Cl.D	-
<b>Machining steels</b>	9 S 20	1.0711	1212	SUM 21
<b>Quenched and tempered steels</b>	C 35/45	1.0501/1.0503	1035/1045	S35C/S45 C
	42 CrMo 4	1.7225	4140	SCM 440
	34 CrNiMo 6	1.6582	4340	SNCM 447
<b>Ball bearing steels</b>	100 Cr 6	1.3505	52100	SUJ 2
<b>Spring steels</b>	65 Si 7	1.5028	9260 H	SUP 6
	50 CrV 4	1.8159	6150	SUP 10
Unalloyed	C 125 W	1.1663	W 112	SK 2
<b>Tool steels</b>	C 80 W 1	1.1525	W 108	-
<b>Tool steels for cold work</b>	125 Cr 1	1.2002	-	-
	X 210 Cr 12	1.2080	D 3	SKD 1
	X 155 CrVMo 12 1	1.2379	D 2	SKD 11
	100 MnCrW 4	1.2510	O 1	-
	90 MnCrV 8	1.2842	O 2	-
	40 CrMnMo 7	1.2311	-	-
<b>Tool steels for hot work</b>	X 40 CrMoV 5 1	1.2344	H 13	SKD 61
	56 NiCrMoV 7	1.2714	L 6	SKT 4
	40 CrMnNiMo 8 6 4	1.2738	-	-
<b>High-speed steels</b>	S 6-5-2	1.3343	M 2	SKH 51
	S 3-3-2	1.3333	-	-
	S 2-10-1-8	1.3247	M 42	SKH 59
	S 10-4-3-10	1.3207	-	SKH 57
	S 18-0-1	1.3355	T 1	SKH 2
<b>Stainless steels</b>	X 5 CrNi 18 10	1.4301	304	SUS 304
	X 6 CrNiMoTi 17 12 2	1.4571	316 Ti	SUS 316
	X 20 Cr 13	1.4021	420	SUS 420 J1
<b>Valve steels</b>	X 45 CrSi 9 3	1.4718	HNV 3	SUH 1
	X 45 CrNiW 18 9	1.4873	-	SUH 31
<b>High-temperature resisting steels</b>	X 12 CrCoNi 21 20	1.4971	HEV 1	SUH 661
	X 20 CrMoWV 12 1	1.4935	HNV 8	SUH 616
<b>Heat-resistant steels</b>	X 15 CrNiSi 25 20	1.4841	314	SUH 310
	X 12 NiCrSi 36 16	1.4864	330	SUH 330
<b>Special alloys</b>	NiCr 19 NbMo	2.4668	Inconel 718	-
	NiMo 30	2.4810	Hastelloy B	-
	NiCr 13 Mo 6 Ti 3	2.4662	Nimonic 901	-
	NiCo 20 Cr 20 MoTi	2.4650	Nimonic 263	-
	X 8 CrNiAlTi 20 20	1.4847	Incoloy 840	-
<b>Tempered steels</b>				
1000-1200 N/mm <sup>2</sup>	-	-	-	-
1200-1400 N/mm <sup>2</sup>	-	-	-	-
1400-1600 N/mm <sup>2</sup>	-	-	-	-
<b>Hardened steels</b>				
50 HRC	-	-	-	-
55 HRC	-	-	-	-
60 HRC	-	-	-	-
<b>Cast steel</b>	GS-38	1.0420	-	-
	GS-60	1.0558	-	-
<b>Cast iron</b>	GG-30	0.6030	A48-45B	-
	GGG-50	0.7050	65-45-12	-
- alloyed	(NiCrMo)	-	-	-
<b>Titanium</b>	Ti 1	3.7025	CP Titanium	-
- alloyed	G-TiAl 6 V 4	3.7164	Ti-6Al-4V	-
<b>Zirconium</b>	-	-	-	-

	Extra/Diamant	Cutting speed (m/min)			Carbide	Cooling lubricant (oil content)
		Bimetal Ø < 100 mm	Bimetal Ø 100-500 mm	Bimetal Ø > 500 mm		
	40 - 60	90 - 100	70 - 90	50 - 70	100 - 130	10 %
	35 - 50	70 - 90	50 - 70	40 - 50	90 - 120	10 %
	50 - 70	95 - 110	80 - 95	60 - 80	110 - 140	15 %
	35 - 45	65 - 75	55 - 65	40 - 55	80 - 100	10 %
	35 - 45	65 - 75	55 - 65	40 - 55	80 - 100	10 %
	35 - 45	55 - 65	45 - 55	35 - 45	70 - 90	10 %
	-	40 - 45	30 - 40	20 - 30	45 - 60	5 %
	-	40 - 45	30 - 40	20 - 30	45 - 60	5 %
	50 - 70	100 - 130	80 - 120	60 - 80	100 - 160	15 %
	40 - 60	75 - 90	60 - 75	40 - 60	90 - 120	5 %
	35 - 45	60 - 70	50 - 60	40 - 50	70 - 90	5 %
	35 - 45	60 - 70	50 - 60	40 - 50	70 - 90	5 %
	25 - 35	65 - 75	55 - 65	30 - 50	70 - 90	3 %
	30 - 40	60 - 70	40 - 60	30 - 40	65 - 85	3 %
	30 - 40	60 - 70	40 - 60	30 - 40	65 - 85	3 %
	30 - 40	50 - 65	40 - 50	30 - 40	65 - 80	3 %
	30 - 40	55 - 70	45 - 55	35 - 45	70 - 85	3 %
	30 - 40	50 - 65	40 - 50	30 - 40	65 - 80	3 %
	20 - 30	30 - 40	20 - 30	15 - 20	40 - 50	dry/2 %
	20 - 30	30 - 40	20 - 30	15 - 20	40 - 50	dry/2 %
	20 - 30	50 - 60	40 - 50	30 - 40	60 - 80	3 %
	20 - 30	35 - 45	30 - 35	20 - 30	45 - 55	3 %
	-	25 - 35	20 - 25	15 - 20	70 - 90	5 %
	-	22 - 30	18 - 22	12 - 18	60 - 80	5 %
	-	30 - 40	25 - 30	20 - 25	50 - 70	5 %
	-	25 - 35	20 - 25	15 - 20	35 - 50	5 %
	20 - 30	45 - 50	35 - 45	25 - 35	50 - 60	3 %
	20 - 30	50 - 55	40 - 50	30 - 40	55 - 65	3 %
	20 - 30	40 - 45	30 - 40	20 - 30	45 - 60	3 %
	20 - 30	40 - 45	30 - 40	20 - 30	45 - 60	3 %
	20 - 30	40 - 45	30 - 40	20 - 30	45 - 60	3 %
	-	40 - 50	30 - 40	20 - 30	70 - 80	10 %
	-	40 - 50	30 - 40	20 - 30	65 - 75	10 %
	-	40 - 50	30 - 40	25 - 35	80 - 100	10 %
	-	45 - 55	35 - 45	25 - 35	50 - 60	5 %
	-	40 - 50	30 - 40	20 - 30	40 - 50	5 %
	-	25 - 30	20 - 25	15 - 20	30 - 40	10 %
	-	35 - 40	30 - 35	25 - 30	80 - 100	10 %
	-	20 - 25	15 - 20	10 - 15	30 - 40	15 %
	-	20 - 25	15 - 20	10 - 15	30 - 40	15 %
	-	15 - 20	10 - 15	8 - 12	20 - 30	20 %
	-	20 - 25	15 - 20	10 - 15	22 - 35	12 %
	-	15 - 20	10 - 15	8 - 12	20 - 30	20 %
	-	17 - 22	12 - 17	10 - 14	22 - 35	15 %
	-	18 - 23	13 - 18	11 - 15	22 - 35	15 %
	-	30 - 35	25 - 30	20 - 25	35 - 50	~ 5 %
	-	25 - 30	20 - 25	15 - 20	30 - 45	~ 5 %
	-	20 - 25	15 - 20	10 - 15	25 - 35	~ 5 %
	-	-	-	-	15 - 20	~ 5 %
	-	-	-	-	10 - 15	~ 5 %
	-	-	-	-	8 - 12	~ 5 %
	30 - 40	60 - 70	50 - 60	40 - 50	70 - 100	~ 3 %
	25 - 35	50 - 60	40 - 50	35 - 40	60 - 85	~ 3 %
	30 - 40	50 - 60	40 - 50	30 - 40	60 - 80	dry/2 %
	25 - 35	45 - 55	35 - 45	25 - 35	55 - 75	dry/2 %
	-	30 - 40	20 - 30	15 - 25	40 - 50	dry/2 %
	-	35 - 45	20 - 35	15 - 20	80 - 100	10 %
	-	-	-	-	65 - 90	10 %
	-	-	-	-	50 - 70	12 %