Cutting conditions setting chart

● Setting of cutting rate

Cutting rate means the sectional area (cm²) that is cut per minute, and is expressed with the unit of [cm²/min].
To obtain the target cutting rate, calculate the cutting time that is expressed by the following expression and adjust the cutting speed.

$$\text{Cutting time(minute)} = \frac{\text{Sectional area of material to be cut (cm}^2)}{\text{Cutting rate (cm}^2/\text{min})}$$

A simple method for calculation of sectional area is as follows:

Sectional area of rectangular material = Width (cm) x Height (cm)
Sectional area of round material = Diameter (cm) x Diameter (cm) x 0.8

* In case of cluster cutting, multiply the sectional area of one piece by the number of clustered pieces

●Fundamentals of cutting conditions setting

1. Select a blade that meets the cutting requirements from "Blade type selection guide".
2. Select a tooth pitch that meets the dimensions of the material to be cut from "Blade pitch selection guide".
3. Set the blade speed referring to the chart below.
4. Referring to the cutting rate given in the chart below, adjust the cutting speed so that the cutting time calculated as described in the page on the left can be obtained

Note: If the blade is a new one, perform break-in cutting. (See separate sheet for break-in cutting.)

Material size (mm)	H-Beam		Tube			Solid material							
	200×150	600×200	φ100×5t	φ50×3t 9-bundled	φ50 9-bundled	φ100	φ200	φ300	φ400	φ500	φ700	φ1000	
Sectional area (cm2)	39	134	15	40	177	79	314	707	1257	1963	3848	7854	

Grade of the material to be cut

DIN		AISI/SAE/ASTM		JIS			H-Beam 200×150	H-Beam 600×200	Tube φ100×5t	Tube φ50×3t	Tube φ50	φ100	φ200	φ300	φ400	φ500	φ700	φ1000
St50-2 C22 C35 C45 St52-3 9SMn28 Ck22 Ck25 Ck40	1.0050 1.0402 1.0501 1.0503 1.0570 1.0715 1.1151 1.1158 1.1186	A570 Gr.50 A572 Gr.50 A588 A633 Gr.C M1020 M1023 1020 1023 1025	1035 1040 1045 1117 1137 1141 1144 1212 1213	S20C S22C S25C S28C S30C S33C S35C S40C S45C	SUM21 SUM22 SUM23 SUM31 SUM41 SUM42 SUM43 SM490A SS490	Blade speed (m/min)	48〜72	41〜61	52〜78	52〜78	48〜72	48〜72	48〜72	48〜72	43〜65	39〜58	34〜51	30〜44
						Cutting rate (cm²/min)	16〜24	32〜48	9〜13	16〜24	43〜65	36〜54	72〜108	72〜108	60〜91	49〜73	37〜56	26〜38
						Cutting time (m/min)	1.6〜2.4	2.8〜4.2	1.1〜1.7	1.7〜2.5	2.7〜4.1	1.5〜2.2	2.9〜4.4	6.5〜9.8	13.9〜20.8	26.8〜40	69〜103	205〜307
St37-2 St44-2 St60-2 C10 C15 Ck55 Ck50 16MnCr5 16CrMo4	1.0037 1.0044 1.0060 1.0301 1.0401 1.1203 1.1206 1.7131 1.7242	A570 Gr.36 A570 Gr.40 A572 Gr.65 A366 M1010 M1015 M1016 M1017 1008	1049 1050 1055 3310 3415 5115 8620 8740 9314	S10C S15C S55C SCM415 SCM418 SCr415 SCr420 SM400A SM570	SMn420 SMnC433 SNC236 SNCM220 SNCM240 SPCC SN400A SS400 STKM12A	Blade speed (m/min)	44〜66	37〜56	48〜71	48〜71	44〜66	44〜66	44〜66	44〜66	39〜59	35〜52	30〜45	26〜38
						Cutting rate (cm²/min)	13〜19	26〜38	7〜11	13〜19	34〜50	28〜42	56〜84	56〜84	47〜71	39〜58	30〜45	22〜32
						Cutting time (m/min)	2.0〜3.0	3.5〜5.3	1.4〜2.1	2.1〜3.1	3.5〜5.3	1.9〜2.8	3.7〜5.6	8.4〜12.6	17.7〜26.5	34〜51	85〜127	242〜364
C60 Ck60 14NiCr14 40NiCrMo6 34Cr4 37Cr4 20MnCr5 34CrMo4 42CrMo4	1.0601 1.1221 1.5752 1.6565 1.7033 1.7034 1.7147 1.7220 1.7225	1060 1064 3310 3415 4135 4137 4140 4142 4150	4337 4340 5120 5132 5135 5140 9314 9850 A355 Cl.A	S58C SCM421 SCM432 SCM440 SCM445 SCM822 SCr430 SCr435 SCr440	SCr445 SMnC420 SNC815 SNCM431 SNCM439 SNCM447 SACM645 SCCrM3 SNB7	Blade speed (m/min)	—	—	43〜65	43〜65	40〜60	40〜60	40〜60	40〜60	35〜53	31〜46	26〜39	22〜32
						Cutting rate (cm²/min)	—	—	6〜10	11〜17	24〜36	20〜30	40〜60	40〜60	34〜52	29〜43	23〜35	18〜26
						Cutting time (m/min)	—	—	1.5〜2.3	2.3〜3.5	4.9〜7.4	2.6〜3.9	5.2〜7.9	11.8〜17.7	24.4〜37	45〜68	111〜166	297〜446
C105W1 X155CrVMo12-1 55NiCrMoV6 S6-5-2-5 S6-5-2 S18-0-1 100Cr6 X10CrNi1812 55Cr3	1.1545 1.2379 1.2713 1.3243 1.3343 1.3355 1.3505 1.4305 1.7176	W1 W108 W110 A2 D2 L3 L6 303 303Se	M2 M33 T1 1075 5155 5160 6150 9260 52100	SK3 SKS93 SKS94 SKS95 SKT4 SKD11 SKH2 SKH51 SKH55	SUP9 SUP10 SUP13 SUJ1 SUJ2 SUS303 SUS303Se SNCM630 SNCM815	Blade speed (m/min)	—	—	30〜45	30〜45	28〜42	28〜42	28〜42	28〜42	25〜38	23〜34	20〜30	18〜26
						Cutting rate (cm²/min)	—	—	6〜9	10〜16	14〜27	11〜23	23〜46	23〜46	20〜40	17〜35	15〜25	12〜20
						Cutting time (m/min)	—	—	1.7〜2.6	2.6〜3.9	6.5〜12.9	3.5〜6.9	6.9〜13.8	15.5〜31	31〜63	57〜113	154〜263	385〜660
X210Cr12 40CrMnMo7 X40CrMoV5-1 105WCr6 X15Cr13 X20CrNi172 X5CrNi1810 X6CrNiTi18-10 X6CrNiMoTi17-12-2	1.2080 1.2311 1.2344 1.2419 1.4024 1.4057 1.4301 1.4541 1.4571	304 304L 304H 305 308 316 316L 316Ti 321	430Ti 431 439 440C 630 XM8 D3 H13 M42	SUS304 SUS304L SUS316 SUS316L SUS316Ti SUS321 SUS405 SUS410 SUS430	SUS431 SUS440C SUS630 SUS631 SCS24 SCS19 SKD1 SKD61 SKH59	Blade speed (m/min)	—	—	29〜43	29〜43	24〜36	24〜36	24〜36	22〜32	19〜29	17〜26	—	—
						Cutting rate (cm²/min)	—	—	5〜8	9〜14	10〜18	8〜15	16〜30	14〜27	13〜24	12〜22	—	—
						Cutting time (m/min)	—	—	1.9〜2.9	2.9〜4.3	9.8〜18.4	5.2〜9.8	10.5〜19.6	26〜49	52〜97	90〜168	—	—
X45CrNiW18-9 X5NiCrTi26-15 NiCr20TiAl NiCo20Cr15MoAlTi NiCo20Cr20MoTi NiCr19Co14Mo4Ti NiCr22Fe18Mo NiCr19NbMo LT31	1.4873 1.4980 2.4631 2.4634 2.4650 2.4654 2.4665 2.4668 3.7165	A-286 HASTELLOY INCOLOY INCONEL MONEL NIMONIC Udimet WASPALOY	Ti-13-11-3 Ti-6-2-4-2 Ti-6-2-4-6 Ti-6-4 Ti-6-6-2 309 446	A-286 HASTELLOY INCOLOY INCONEL MONEL NIMONIC Udimet WASPALOY Ti-6-4	SUH1 SUH3 SUH31 SUH36 SUH37 SUH38 SUH309 SUH446 SUH616	Blade speed (m/min)	—	—	—	—	—	8〜18	8〜18	7〜16	—	—	—	—
						Cutting rate (cm²/min)	—	—	—	—	—	2〜9	3〜15	3〜14	—	—	—	—
						Cutting time (m/min)	—	—	—	—	—	9.2〜52	20.9〜105	52〜262	—	—	—	—

Note 1: The above chart shows average data in the general market collected at random without consideration of blade type or band saw machine type.
Note 2: Cutting conditions vary greatly depending on the blade type, band saw machine type, shape and heat treatment of the material to be cut and required cutting specification (crooked cut, cut face roughness, blade life, etc.).
Note 3: Material grade codes included in the above chart are from standards of three countries. However, this chart does not constitute a standard cross-referancechart.

Accurate Cutting Services