


WJX14

CUTTING SPEED (DRY CUTTING)

Material	Properties	Grade	Vc	
P	Mild steels	MP6120	150 (100—200)	
		MP6130	140 (90—180)	
		VP15TF	150 (100—200)	
		VP30RT	120 (80—160)	
	Carbon steels Alloy steels	180—280HB	MP6120	140 (80—200)
			MP6130	120 (70—180)
			VP15TF	140 (80—200)
	Carbon steels Alloy steels	280—350HB	VP30RT	100 (60—150)
			MP6120	140 (80—200)
			MP6130	120 (70—180)
	Alloy tool steels	≤350HB (Annealing)	VP15TF	140 (80—200)
			VP30RT	100 (60—150)
MP6120			140 (80—200)	
Pre-hardened steels	35—45HRC	MP6130	120 (70—180)	
		VP15TF	140 (80—200)	
		VP30RT	100 (60—150)	
		MP6120	110 (70—150)	
M	Austenitic stainless steels	MP6130	90 (50—130)	
		MP7140	110 (70—150)	
		VP30RT	80 (40—120)	
		MC7020	220 (170—270)	
		MP7130	160 (130—200)	
		MP7140	150 (120—180)	
	Ferritic and martensitic stainless steels	≤200HB	VP30RT	150 (120—180)
			MC7020	190 (140—240)
			MP7130	140 (100—200)
			MP7140	130 (80—180)
			VP30RT	130 (80—180)
			MC7020	220 (170—270)
Duplex stainless steels	≤280HB	MP7130	150 (100—200)	
		MP7140	130 (80—180)	
		VP30RT	130 (80—180)	
		MC7020	180 (130—230)	
Precipitation hardening stainless steels	<450HB	MP7130	130 (80—180)	
		MP7140	110 (60—160)	
		VP30RT	110 (60—160)	
K	Gray cast irons	≤350MPa	VP30RT	170 (120—220)
	Ductile cast irons	≤450MPa	MP7130	110 (60—160)
	Ductile cast irons	≤800MPa	MP7140	90 (50—130)
S	Heat resistant alloys	—	VP30RT	90 (50—130)
		—	MP9120	40 (20— 50)
		—	MP9130	30 (20— 40)
H	Hardened steels	40—55HRC	VP15TF	40 (20— 50)
		40—55HRC	VP15TF	70 (40—100)


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DEPTH OF CUT / FEED PER TOOTH

Material	Properties	ap		DCX=50,52	DCX>63	
				fz	fz	
P	Mild steels	≤180HB	≤1	M, R	1.5 [0.6–2.5]	1.7 [0.6–2.8]
			≤1	L	1.2 [0.4–2.0]	1.2 [0.4–2.0]
			≤1.5	M, R	1.3 [0.6–2.0]	1.5 [0.6–2.5]
			≤1.5	L	1.0 [0.4–1.8]	1.0 [0.4–1.8]
			≤2	M, R	1.2 [0.6–2.0]	1.3 [0.6–2.5]
			≤2	L	0.8 [0.4–1.7]	0.8 [0.4–1.7]
	Carbon steels Alloy steels	180–280HB	≤2.5	M, R	0.8 [0.3–1.5]	1.0 [0.3–1.6]
			≤3	M, R	0.4 [0.2–1.0]	0.5 [0.2–1.2]
			≤1	M, R	1.5 [0.5–2.0]	1.7 [0.5–2.5]
			≤1	L	1.0 [0.3–1.7]	1.0 [0.3–1.7]
			≤1.5	M, R	1.2 [0.5–1.7]	1.3 [0.5–2.5]
			≤1.5	L	0.8 [0.3–1.5]	0.8 [0.3–1.5]
	Carbon steels Alloy steels Alloy tool steels	280–350HB ≤350HB (Annealing)	≤2	M, R	1.0 [0.5–1.5]	1.2 [0.5–2.0]
			≤2	L	0.7 [0.3–1.2]	0.7 [0.3–1.2]
			≤2.5	M, R	0.7 [0.3–1.2]	0.9 [0.3–1.5]
			≤3	M, R	0.3 [0.2–0.8]	0.4 [0.2–1.0]
			≤1	M, R	1.5 [0.5–2.0]	1.7 [0.5–2.5]
			≤1	L	1.0 [0.3–1.7]	1.0 [0.3–1.7]
Pre-hardened steels	35–45HRC	≤1.5	M, R	1.0 [0.4–1.5]	1.2 [0.4–1.5]	
		≤1.5	L	0.6 [0.3–1.0]	0.6 [0.3–1.0]	
		≤2	M, R	0.8 [0.4–1.2]	1.0 [0.4–1.3]	
		≤2	L	0.5 [0.3–0.8]	0.5 [0.3–0.8]	
		≤1	M, R	1.3 [0.4–1.7]	1.5 [0.4–2.0]	
		≤1	L	0.7 [0.3–1.2]	0.7 [0.3–1.2]	
M	Austenitic stainless steels	≤200HB	≤1.5	M	1.0 [0.5–1.2]	1.0 [0.5–1.2]
			≤1.5	L	0.8 [0.3–1.0]	0.8 [0.3–1.0]
			≤1.5	M	1.0 [0.5–1.0]	1.0 [0.5–1.0]
	Ferritic and martensitic stainless steels	≤200HB	≤1	L	0.8 [0.3–1.2]	0.8 [0.3–1.2]
			≤1	M	1.0 [0.5–1.2]	1.0 [0.5–1.2]
			≤1.5	L	0.8 [0.3–1.0]	0.8 [0.3–1.0]
	Duplex stainless steels	≤280HB	≤1.5	M	1.0 [0.5–1.0]	1.0 [0.5–1.0]
			≤1	L	0.6 [0.3–1.0]	0.6 [0.3–1.0]
			≤1	M	0.8 [0.4–1.0]	0.8 [0.4–1.0]
	Precipitation hardening stainless steels	<450HB	≤1.5	L	0.6 [0.3–0.8]	0.6 [0.3–0.8]
			≤1.5	M	0.8 [0.4–0.8]	0.8 [0.4–0.8]
			≤1.5	M	0.8 [0.4–1.0]	0.8 [0.4–1.0]

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DEPTH OF CUT / FEED PER TOOTH

Material	Properties	ap 	DCX=50,52		DCX>63
			fz		fz
K Gray cast irons	≤350MPa	≤1	M, R	1.7 [0.6—2.5]	1.8 [0.6—2.8]
		≤1	L	1.3 [0.4—2.0]	1.3 [0.4—2.0]
		≤1.5	M, R	1.5 [0.6—2.0]	1.7 [0.6—2.5]
		≤1.5	L	1.2 [0.4—1.8]	1.2 [0.4—1.8]
		≤2	M, R	1.3 [0.6—2.0]	1.5 [0.6—2.5]
		≤2	L	1.0 [0.4—1.5]	1.0 [0.4—1.5]
		≤2.5	M, R	0.8 [0.3—1.5]	1.0 [0.3—1.6]
		≤3	M, R	0.4 [0.2—1.0]	0.5 [0.2—1.2]
K Ductile cast irons	≤450MPa	≤1	M, R	1.5 [0.5—2.0]	1.7 [0.5—2.5]
		≤1	L	1.2 [0.3—2.0]	1.2 [0.3—2.0]
		≤1.5	M, R	1.3 [0.5—1.8]	1.5 [0.5—2.0]
		≤1.5	L	1.0 [0.3—1.7]	1.0 [0.3—1.7]
		≤2	M, R	1.2 [0.5—1.8]	1.3 [0.5—2.0]
		≤2	L	0.8 [0.3—1.5]	0.8 [0.3—1.5]
	≤800MPa	≤2.5	M, R	0.7 [0.3—1.2]	0.9 [0.3—1.5]
		≤3	M, R	0.3 [0.2—0.8]	0.4 [0.2—1.0]
		≤1	M, R	1.3 [0.4—1.8]	1.5 [0.4—2.0]
		≤1	L	1.0 [0.3—1.7]	1.0 [0.3—1.7]
		≤1.5	M, R	1.2 [0.4—1.5]	1.3 [0.4—1.8]
		≤1.5	L	0.8 [0.3—1.5]	0.8 [0.3—1.5]
S Titanium alloy	—	≤2	L	0.7 [0.3—1.2]	0.7 [0.3—1.2]
		≤1	L	0.3 [0.2—0.6]	0.3 [0.2—0.6]
		≤1.5	L	0.3 [0.2—0.5]	0.3 [0.2—0.5]
S Heat resistant alloys	—	≤2	L	0.3 [0.2—0.4]	0.3 [0.2—0.4]
		≤1	L, M, R	1.0 [0.3—1.3]	1.0 [0.3—1.3]
		≤1.5	L, M, R	0.8 [0.3—1.2]	0.8 [0.3—1.2]
H Hardened steels	40—55HRC	≤2	L, M, R	0.7 [0.3—1.2]	0.7 [0.3—1.2]
		≤1	R, M	0.8 [0.3—1.2]	0.8 [0.3—1.2]
		≤1.5	R, M	0.6 [0.3—1.0]	0.6 [0.3—1.0]
		≤2	R, M	0.5 [0.3—0.8]	0.5 [0.3—0.8]

1. Internal coolant is recommended for titanium alloy and heat resistant alloy machining.
2. To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, wet cutting is recommended.
3. When large vibration occurs, reduce the cutting conditions.
4. For interrupted cutting, reduce the cutting speed and feed rate by 20 %.
5. If ap is set at 2 mm or more, avoid wall machining or ramping.