TD4N | Recommended Cutting Conditions

Please use the correct ramping angles, shown in the table on Page 5.

Work piece material		Recommend grade & Target hardness (HRC)			Emulsion	Mist	Air	Parameter		D16–2NT			D20–3NT			D25–4NT			D32 & D35–5NT			D40 & D42–6NT		
		30	40	50						3D–5D	5D–7D	> 7D	3D–5D	5D–7D	> 7D	3D–5D	5D–7D	> 7D	3D–5D	5D–7D	> 7D	3D–5D	5D–7D	> 7D
I	Carbon-Steel Alloy-Steel <30HRC							V_c	(m/min)	180	160	140	180	160	140	180	160	140	180	160	140	180	160	140
		GX2140					•	n	(min^{-1})	3581	3183	2785	2865	2546	2228	2292	2037	1783	1790	1592	1393	1432	1273	1114
		JM4160			•	•	•	f_z	feed/tooth	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8
		JS4045					•	V_f	(mm/min)	8594	6366	4456	10313	7639	5348	11001	8149	5704	10743	7958	5570	10313	7639	5348
								a_p	(mm)	0.8	0.6	0.4	0.8	0.6	0.5	0.8	0.6	0.5	0.8	0.6	0.5	0.8	0.6	0.5
								a_e	(mm)	10	10	10	14	14	14	19	19	19	22	22	22	28	28	28
								Q	(cm^3/min)	68.8	38.2	17.8	115.5	64.2	37.4	167.2	92.9	54.2	189.1	105.0	61.3	231.0	128.3	74.9
II	Pre-Hard-ened Steel 30–40 HRC							V_c	(m/min)	150	130	110	150	130	110	150	130	110	150	130	110	150	130	110
		GX2140					•	n	(min^{-1})	2984	2586	2188	2387	2069	1751	1910	1655	1401	1492	1293	1094	1194	1035	875
		JM4160			•	•	•	f_z	feed/tooth	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6
		JS4045					•	V_f	(mm/min)	5968	4138	2626	7162	4966	3151	7639	5297	3361	7460	5173	3283	7162	4966	3151
								a_p	(mm)	0.8	0.6	0.4	0.8	0.6	0.5	0.8	0.6	0.5	0.8	0.6	0.5	0.8	0.6	0.5
								a_e	(mm)	10	10	10	14	14	14	19	19	19	22	22	22	28	28	28
								Q	(cm^3/min)	47.7	24.8	10.5	80.2	41.7	22.1	116.1	60.4	31.9	131.3	68.3	36.1	160.4	83.4	44.1
III	Hardened Steel 40–55 HRC							V_c	(m/min)	100	85	70	100	85	70	100	85	70	100	85	70	100	85	70
								n	(min^{-1})	1989	1691	1393	1592	1353	1114	1273	1082	891	995	846	696	796	676	557
								f_z	feed/tooth	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6
		JS4045					•	V_f	(mm/min)	3979	2706	1671	4775	3247	2005	5093	3463	2139	4974	3382	2089	4775	3247	2005
			JP4120		•	•	•	a_p	(mm)	0.6	0.5	0.4	0.6	0.5	0.4	0.6	0.5	0.4	0.6	0.5	0.4	0.6	0.5	0.4
								a_e	(mm)	10	10	10	14	14	14	19	19	19	22	22	22	28	28	28
								Q	(cm^3/min)	23.9	13.5	6.7	40.1	22.7	11.2	58.1	32.9	16.3	65.7	37.2	18.4	80.2	45.5	22.5
IV	Stainless Steels SUS							V_c	(m/min)	120	100	80	120	100	80	120	100	80	120	100	80	120	100	80
								n	(min^{-1})	2387	1989	1592	1910	1592	1273	1528	1273	1019	1194	995	796	955	796	637
		JM4160			•	•	•	f_z	feed/tooth	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6
								V_f	(mm/min)	4775	3183	1910	5730	3820	2292	6112	4074	2445	5968	3979	2387	5730	3820	2292
			JP4120		•	•	•	a_p	(mm)	0.6	0.5	0.4	0.6	0.5	0.4	0.6	0.5	0.4	0.6	0.5	0.4	0.6	0.5	0.4
								a_e	(mm)	10	10	10	14	14	14	19	19	19	22	22	22	28	28	28
								Q	(cm^3/min)	28.6	15.9	7.6	48.1	26.7	12.8	69.7	38.7	18.6	78.8	43.8	21.0	96.3	53.5	25.7
V	Cast-Iron GG EN-JL10** EN-GJL-***							V_c	(m/min)	200	180	160	200	180	160	200	180	160	200	180	160	200	180	160
		GX2140					•	n	(min^{-1})	3979	3581	3183	3183	2865	2546	2546	2292	2037	1989	1790	1592	1592	1432	1273
		JM4160			•	•	•	f_z	feed/tooth	1.5	1.3	1.1	1.5	1.3	1.1	1.5	1.3	1.1	1.5	1.3	1.1	1.5	1.3	1.1
		JS4045					•	V_f	(mm/min)	11937	9311	7003	14324	11173	8403	15279	11918	8964	14921	11638	8754	14324	11173	8403
			JP4120		•	•	•	a_p	(mm)	0.8	0.6	0.5	0.8	0.6	0.5	0.8	0.6	0.5	0.8	0.6	0.5	0.8	0.6	0.5
								a_e	(mm)	10	10	10	14	14	14	19	19	19	22	22	22	28	28	28
								Q	(cm^3/min)	95.5	55.9	35.0	160.4	93.9	58.8	232.2	135.9	85.2	262.6	153.6	96.3	320.9	187.7	117.6
	Cast-Iron GGG EN-JS10** EN-GJS-***							V_c	(m/min)	160	140	120	160	140	120	160	140	120	160	140	120	160	140	120
								n	(min^{-1})	3183	2785	2387	2546	2228	1910	2037	1783	1528	1592	1393	1194	1273	1114	955
								f_z	feed/tooth	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6	1	0.8	0.6
		JS4045					•	V_f	(mm/min)	6366	4456	2865	7639	5348	3438	8149	5704	3667	7958	5570	3581	7639	5348	3438
			JP4120		•	•	•	a_p	(mm)	0.8	0.6	0.4	0.8	0.6	0.4	0.8	0.6	0.4	0.8	0.6	0.4	0.8	0.6	0.4
								a_e	(mm)	10	10	10	14	14	14	19	19	19	22	22	22	28	28	28
								Q	(cm^3/min)	50.9	26.7	11.5	85.6	44.9	19.3	123.9	65.0	27.9	140.1	73.5	31.5	171.1	89.8	38.5

NOTE:	
	Use a highly rigid and accurate machine as possible. If the rpm available is lower than recommended, please reduce the feed rate by the same ratio.
	Please use CAM-R for your programming corner radius. For precise tool definition in CAM systems, please download DXF data (QuickFinder) or contact your local MMC Hitachi Tool Process Optimizer for more details.
	Please set up ramping angle ≤ 0.5°.
	Use the appropriate coolant for the work material and machining shape. We recommend air blow as first choice for cooling system.
	These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and workpiece conditions.

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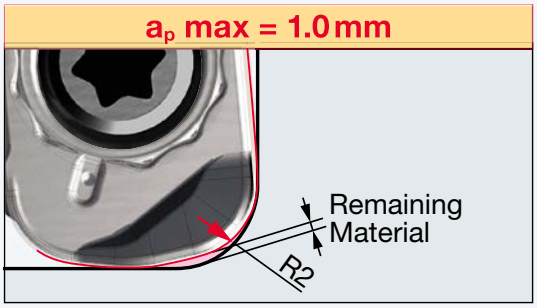
TD4N | Recommended Cutting Conditions

CAM Radius

In CAM, define the tool shape as an R 2.0 radius shape.
Use with axial-direction cutting depths a_p of 1.0 mm or less.

Tool definition shape on CAM	Remains (mm)	Over Cut (mm)
R 3.0	0	0.4
R 2.0	0.2	0
R 1.5	0.3	0



Please note:

1. Please note that the GX2140 does not cause a reaction in conductive touch sensors.
2. To prevent tool damage due to chip clogging, always use a chip removal method such as an air blower, etc.
3. Exchange inserts at the correct time to ensure safety of the tool holder.
4. The following equation can be used to determine the metal removal rate per unit time Q:

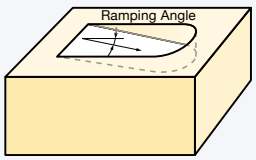
$$Q\ (cm^3/min) = \frac{a_p\ (mm) \cdot a_e\ (mm) \cdot V_f\ (mm/min)}{1000}$$

5. Do not set values higher than the maximum value.

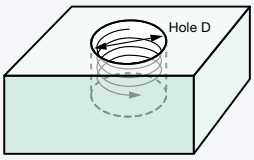
Ramping / Helical Milling

Ramping

Ramping is possible. Please use the following data for direct milling without pre-drilling any starter holes.



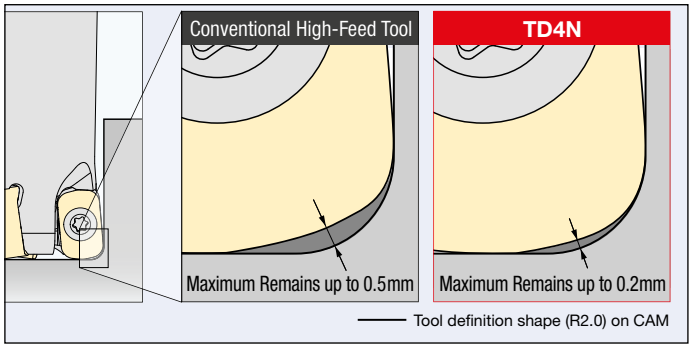
Ramping



Helical Milling

Tool Diameter D mm	D 16	D 20	D 25	D 32	D 35	D 40	D 42
Max. Ramping Angle°	0.8	0.8	0.8	0.5	0.5	0.3	0.3
Recommended Ramping Angle°	0.5	0.5	0.5	0.4	0.4	0.2	0.2
Hole D (mm)	24–30	32–38	42–48	56–62	62–68	72–78	76–82

Reduces uncut Remnants on Workpieces



Economical 4-Corner-Use Inserts