

# Recommended RPM and Table Feed Rates for TiAlN Coated Carbide End Mills

Work Piece Material	Cutting Speed		1/4		5/16		3/8		1/2		5/8		3/4		1	
	SFM	RPM	IPM	RPM	IPM	RPM	IPM	RPM	IPM	RPM	IPM	RPM	IPM	RPM	IPM	
Gray Cast Iron	450	Low	6870	28.0	5500	27.0	4580	30.0	3430	34.0	2750	33.0	2300	32.0	1720	31.0
	550	High	8400	34.0	6720	32.0	5600	36.0	3200	32.0	3360	40.0	2800	39.0	2100	38.0
Soft Steels (1018-1060)	500	Low	7640	30.0	6100	29.0	5100	32.0	3800	38.0	3050	36.0	2500	35.0	1900	34.0
	600	High	9200	37.0	7300	35.0	6100	39.0	4580	46.0	3650	44.0	3050	43.0	2300	41.0
Alloy Steels >36Rc (4140-4340)	350	Low	5348	34.23	4285	34.28	3565	35.65	2674	33.16	2139	29.95	1783	26.38	1337	21.39
	450	High	6876	44.01	5510	44.08	4584	45.84	3438	42.63	2750	38.51	2292	33.92	1719	27.50
Alloy Steels <37Rc (4140-4340)	250	Low	3820	24.45	3061	24.49	2547	25.47	1910	23.68	1528	21.39	1273	18.85	955	15.28
	300	High	4584	29.34	3673	29.38	3056	30.56	2292	28.42	1834	25.67	1528	22.61	1146	18.34
Alloy Steels >35Rc (4140-4340)	250	Low	3820	21.39	3061	23.26	2547	20.37	1910	19.10	1528	18.95	1273	16.30	955	13.37
	300	High	4584	25.67	3673	27.92	3056	24.45	2292	29.92	1834	22.74	1528	19.56	1146	16.04
Tool Steels <36Rc (A2, D2, S7)	159	Low	2430	13.61	1947	14.80	1620	12.96	1215	12.15	972	12.05	810	10.37	607	8.50
	200	High	3056	17.11	2449	18.61	2037	16.30	1528	15.28	1222	15.16	1019	13.04	764	10.70
Tool Steels >36Rc	350	Low	5348	34.23	4285	34.28	3565	35.65	2674	33.16	2139	29.95	1783	26.38	1337	21.39
	450	High	6876	44.01	5510	44.08	4584	45.84	3438	42.63	2750	38.51	2292	33.92	1719	27.50
Die Steels <37Rc (P20, H13)	250	Low	3820	24.45	3061	24.49	2547	25.47	1910	23.68	1528	21.39	1273	18.85	955	15.28
	300	High	4584	29.34	3673	29.38	3056	30.56	2292	28.42	1834	25.67	1528	22.61	1146	18.34
Easy to cut Stainless Steels (303)	300	Low	4540	15.0	3670	13.0	3050	17.0	2300	20.0	1830	19.0	1530	19.0	1150	18.0
	380	High	5800	19.0	4650	17.0	3870	22.0	2900	25.0	2320	24.0	1940	24.0	1450	23.0
Moderately difficult to cut Stainless Steels (304, Invar, Kovar)	260	Low	3970	9.0	3180	9.0	2650	14.0	1990	16.0	1590	15.0	1320	15.0	990	13.0
	290	High	4430	11.0	3550	10.0	2950	15.0	2220	18.0	1780	17.0	1480	17.0	1110	15.0
Difficult to cut Stainless Steels (316L, 304L, 13-8 PH, etc.)	250	Low	3820	9.0	3060	9.0	2550	13.0	1910	15.0	1530	14.0	1270	14.0	960	12.0
	280	High	4280	10.0	3420	10.0	2850	15.0	2140	17.0	1700	16.0	1430	16.0	1070	13.0
High Temperature Alloys (718 inconel, A286, Haynes)	75	Low	1150	2.5	920	2.5	780	3.1	570	3.6	460	3.1	380	3.0	290	2.8
	90	High	1380	3.0	1100	3.0	920	3.7	690	4.4	550	3.7	460	3.7	350	3.4
Titanium Alloys (6Al-4V, 6-2222)	160	Low	2450	7.0	1950	6.2	1630	9.0	1220	10.0	980	9.4	820	9.2	610	9.0
	190	High	2900	8.0	2300	7.5	1940	11.0	1450	11.6	1160	11.0	970	11.0	720	10.5

- Recommendations are for slotting conditions with depth of cut equal to the diameter of the end mill.
- For profiling operations, increase the table feed by 20%

The feeds and speeds shown on this table are based on providing a combination of high metal removal rates with a long tool life and avoiding tool breakage. The low rates are more appropriate for 40 taper machines and weak fixturing. The high rates are more suitable for 50 taper machines and rigid set ups.

## Recommended Chip Loads

Workpiece Material	Cutting Speed (SFM)	Chip Load Per Tooth										a	b	c
		1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1				
Gray Cast Iron	490-590	0.0008	0.0008	0.0008	0.0012	0.0012	0.0018	0.0020	0.0024	0.0028		D	.5D	D
Soft steels (>35HRC)	295-390	0.0006	0.0008	0.0008	0.0012	0.0012	0.0018	0.0020	0.0024	0.0028		D	.5D	D
Alloy Steels (4140-4340 ect.)	250-450	0.0006	0.0010	0.0016	0.0020	0.0025	0.0031	0.0035	0.0037	0.0040		D	.5D	D
Tool Steels (A2, D2, S7)	150-300	0.0005	0.0007	0.0014	0.0019	0.0020	0.0025	0.0031	0.0032	0.0035		D	.5D	D
Die Steels (P20, H13)	250-450	0.0006	0.0010	0.0016	0.0020	0.0025	0.0031	0.0035	0.0037	0.0040		D	.5D	D
Easy to cut stainless steels (303)	290-375	0.0006	0.0006	0.0008	0.0012	0.0012	0.0018	0.0020	0.0024	0.0024		D	.5D	D
Mod. difficult to cut stainless steels	230-280	0.0005	0.0005	0.0007	0.0011	0.0011	0.0017	0.0019	0.0023	0.0023		D	.5D	D
Difficult to cut stainless steels (316L)	295-360	0.0004	0.0004	0.0006	0.0010	0.0010	0.0016	0.0018	0.0022	0.0022		D	.5D	D
High temperature alloys	80-120	0.0004	0.0004	0.0007	0.0011	0.0011	0.0017	0.0019	0.0024	0.0024		D	.2D	.3D
**Titanium	160-230	0.0005	0.0005	0.0006	0.0009	0.0011	0.0014	0.0015	0.0022	0.0026		D	.2D	.5D

\*SFM is for TiAlN coated Varimill cutters

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