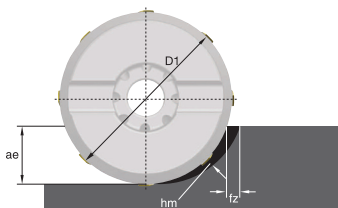


Cutting Data

for TS90 Milling Cutters

ANSI ISO 513	Cutting Data for TS90 Milling Cutters				COATED															
	Cutter		Carbide Insert		TN2510			TN5515			TN6520			TN6525		TN6540				
					feed per tooth *(inch)															
	TS90		SDMT- ... -ML		.003	.004	.006	.003	.006	.008	-	-	-	.003	.004	.006	.004	.006	.009	
			SDMT- ... -MH		-	-	-	.004	.007	.010	-	-	-	.003	.006	.0008	.004	.007	.011	
			SDMX- ... -MM		.004	.008	.011	.006	.009	.013	.006	.011	.016	.005	.008	.011	.006	.010	.015	
P	Work Material	Condition	Hardness HB	Mat. Gr.	vc *(sfm)															
	Carbon steel, Unalloyed steel, cast steel and free cutting steel	< 0.25% C	annealed	125	1	1180	920	750	-	-	-	-	-	-	980	750	620	820	660	560
		≥ 0.25% C	annealed	190	2	920	720	620	-	-	-	-	-	-	750	590	490	560	460	390
		< 0.55% C	heat-treated	250	3	750	590	520	-	-	-	-	-	-	620	460	430	460	360	330
		≥ 0.55% C	annealed	220	4	790	620	560	-	-	-	-	-	-	660	490	460	490	390	330
			heat-treated	300	5	690	460	430	-	-	-	-	-	-	560	390	360	430	300	260
	Low alloy steel and cast steel	annealed	200	6	850	690	560	-	-	-	-	-	-	720	560	460	560	430	330	
		heat-treated	275	7	690	560	430	-	-	-	-	-	-	560	460	360	430	330	260	
		heat-treated	300	8	590	430	390	-	-	-	-	-	-	460	360	330	360	260	230	
		heat-treated	350	9	560	390	330	-	-	-	-	-	-	460	330	260	330	230	200	
	High alloy steel, cast steel & tool steel	annealed	200	10	690	560	460	-	-	-	-	-	-	560	460	390	430	330	300	
		heat-treated	325	11	430	360	260	-	-	-	-	-	-	360	300	200	260	200	160	
	400 series stainless	FE / MA	200	12	850	660	560	-	-	-	-	-	-	720	520	460	520	390	330	
		MA	240	13.1	750	560	430	-	-	-	-	-	-	620	460	360	460	330	260	
MA / PH		330	13.2	390	260	230	-	-	-	-	-	-	330	230	160	230	160	130		
M	300 Series	AU	180	14.1	-	-	-	-	-	-	-	-	-	620	390	260	460	300	200	
	Stainless	DU	230	14.2	-	-	-	-	-	-	-	-	-	490	330	200	390	230	160	
	Duplex	S-AU	200	14.3	-	-	-	-	-	-	-	-	-	390	260	160	300	160	150	
	Stainless	AU-PH	330	14.4	-	-	-	-	-	-	-	-	-	330	200	150	260	150	110	
K	Grey cast iron	ferrit./pearl.	180	15	1210	890	720	1080	790	660	950	690	560	-	-	-	-	-	-	
		pearlitic	260	16	980	690	590	840	620	540	720	520	460	-	-	-	-	-	-	
	Nodular cast iron	ferritic	160	17	950	720	560	900	690	540	790	590	490	750	590	490	560	460	390	
		pearlitic	250	18	850	490	360	690	390	300	590	360	260	620	460	430	460	360	330	
	Malleable cast iron	ferritic	130	19	1020	620	330	900	540	480	790	460	390	-	-	-	-	-	-	
pearlitic		230	20	790	520	360	720	460	330	620	390	300	-	-	-	-	-	-		
S	High Temp	G	200	31	-	-	-	-	-	-	-	-	-	-	-	-	160	130	110	
	Alloy FE	AG	280	32	-	-	-	-	-	-	-	-	-	-	-	-	130	100	80	
	High Temp	G	250	33	-	-	-	-	-	-	-	-	-	-	-	-	80	50	30	
	Alloy	AG	350	34	-	-	-	-	-	-	-	-	-	-	-	-	70	50	20	
	Ni / Co	GO	320	35	-	-	-	-	-	-	-	-	-	-	-	-	110	80	50	
	Titanium alloys			36	-	-	-	-	-	-	-	-	-	-	-	-	230	130	100	
	TiAL6V4	AG		37	-	-	-	-	-	-	-	-	-	-	-	-	200	100	80	
H	Hardened steel	H	45	38.1	330	260	200	-	-	-	-	-	-	-	-	-	-	-	-	
		H	55	38.2	330	260	200	-	-	-	-	-	-	-	-	-	-	-	-	
		H	60	39.1	300	230	160	-	-	-	-	-	-	-	-	-	-	-	-	
		H	> 62	39.2	300	230	160	-	-	-	-	-	-	-	-	-	-	-	-	



$$hm = fz \cdot \sqrt{\frac{ae}{D1}}$$

$$fz = hm \cdot \sqrt{\frac{D1}{ae}}$$

First choice starting speed (vc) are in bold type.
Use corresponding feed (fz).

fz and vc are valid for $ae \geq 0.4 D1$.

For smaller ae, fz and vc should be multiplied
by the following factors:

ae / D1	0.02	0.05	0.1	0.2	0.4
fz - Factor	3.5	3	2	1.5	1
fc - Factor	1.6	1.5	1.4	1.3	1.1

Cutting Data

for TS90 Milling Cutters

ANSI ISO 513	Cutting Data for TS90 Milling Cutters				COATED						UNCOATED									
	Cutter		Carbide Insert		TN7525		TN7535		TTI25		THM		TTM							
					feed per tooth *(inch)															
TS90					.003	.005	.006	.003	.006	.008	.003	.006	.008	.003	.006	.008	.003	.006	.008	
					.003	.005	.008	.004	.007	.010	-	-	-	-	-	-	-	-	-	
					.004	.008	.011	.006	.009	.013	.004	.007	.010	.006	.009	.013	.006	.009	.013	
P	Work Material	Condition	Hardness HB	Mat. Gr.	vc *(sfm)															
	Carbon steel, Unalloyed steel, cast steel and free cutting steel	< 0.25% C	annealed	125	1	1080	820	690	920	720	620	1180	980	820	-	-	-	560	490	460
		≥ 0.25% C	annealed	190	2	820	660	560	620	490	430	920	790	690	-	-	-	390	330	300
		< 0.55% C	heat-treated	250	3	690	520	490	520	390	360	820	620	560	-	-	-	330	260	230
		≥ 0.55% C	annealed	220	4	720	560	490	540	430	360	850	690	590	-	-	-	360	280	260
			heat-treated	300	5	620	430	390	460	330	280	-	-	-	-	-	-	280	230	200
	Low alloy steel and cast steel		annealed	200	6	790	620	490	610	460	380	950	720	590	-	-	-	390	330	300
			heat-treated	275	7	620	490	390	460	360	300	720	590	490	-	-	-	300	260	230
			heat-treated	300	8	520	390	360	390	300	260	-	-	-	-	-	-	260	200	180
			heat-treated	350	9	490	360	300	360	260	230	-	-	-	-	-	-	230	160	130
	High alloy steel, cast steel & tool steel		annealed	200	10	620	490	430	460	360	330	720	590	490	-	-	-	360	280	260
			heat-treated	325	11	390	310	230	300	230	200	-	-	-	-	-	-	230	160	130
	400 series stainless		FE / MA	200	12	790	590	490	590	440	380	920	690	590	-	-	-	380	300	280
			MA	240	13.1	690	490	390	510	360	300	820	590	490	-	-	-	330	260	230
			MA / PH	330	13.2	360	250	200	260	180	150	390	300	250	-	-	-	160	130	110
M	300 Series	AU	180	14.1	690	430	300	520	330	230	1310	850	590	-	-	-	330	200	130	
	Stainless	DU	230	14.2	560	360	230	430	260	200	1080	720	490	-	-	-	260	160	110	
	Duplex	S-AU	200	14.3	430	280	200	330	200	160	890	560	390	-	-	-	200	110	80	
	Stainless	AU-PH	330	14.4	360	210	160	300	160	130	700	430	300	-	-	-	160	100	70	
K	Grey cast iron	ferrit./pearl.	180	15	-	-	-	-	-	-	-	-	-	460	330	260	-	-	-	
		pearlitic	260	16	-	-	-	-	-	-	-	-	-	330	260	230	-	-	-	
	Nodular cast iron	ferritic	160	17	-	-	-	620	490	430	-	-	-	390	300	250	390	330	300	
		pearlitic	250	18	-	-	-	520	390	360	-	-	-	360	280	200	330	260	230	
	Malleable cast iron	ferritic	130	19	-	-	-	-	-	-	-	-	-	490	390	260	-	-	-	
pearlitic		230	20	-	-	-	-	-	-	-	-	-	430	310	200	-	-	-		
N	Wrought	Non AG	60	21	-	-	-	-	-	-	-	-	-	2950	1970	1640	-	-	-	
		AG	100	22	-	-	-	-	-	-	-	-	-	1480	980	820	-	-	-	
	Cast aluminum alloys	Non Ag	75	23	-	-	-	-	-	-	-	-	-	2950	1970	1640	-	-	-	
		Si ≤ 12%	AG	90	24	-	-	-	-	-	-	-	-	-	2300	1640	1310	-	-	-
		Si ≥ 12%		130	25	-	-	-	-	-	-	-	-	-	1480	920	660	-	-	-
	Copper & Copper alloys	Pb > 1%		110	26	-	-	-	-	-	-	-	-	-	1310	820	660	-	-	-
				90	27	-	-	-	-	-	-	-	-	-	1120	690	520	-	-	-
			100	28	-	-	-	-	-	-	-	-	-	820	520	390	-	-	-	
Non Metals			29	-	-	-	-	-	-	-	-	-	-	1640	1150	660	-	-	-	
			30	-	-	-	-	-	-	-	-	-	-	1640	1150	660	-	-	-	
S	High Temp	G	200	31	-	-	-	-	-	-	-	-	-	120	80	-	-	-	-	
	Alloy FE	AG	280	32	-	-	-	-	-	-	-	-	-	100	70	-	-	-	-	
	High Temp	G	250	33	-	-	-	-	-	-	-	-	-	80	50	-	-	-	-	
	Alloy	AG	350	34	-	-	-	-	-	-	-	-	-	70	40	-	-	-	-	
	Ni / Co	GO	320	35	-	-	-	-	-	-	-	-	-	100	70	-	-	-	-	
	Titanium alloys			36	-	-	-	-	-	-	-	-	-	160	100	-	-	-	-	
	TiAL6V4	AG		37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	