



Operating Guidelines - 5xD

		Materials		Condition	Tensile	HB	Vc	Vc IPR Cutting Diameter (in/rev) Cutting						
ISO	Mtl Group No.	Туре			Strength (N/mm2)	Hardness	Speed SFM	3.0-6.0 mm (.118- .235")	6.0-9.0 mm (.236- .353")	9.0- 12.0 mm (.354- .471")	12.0- 16.0 mm (.472- .629")	16.0- 19.05 mm (.630- .749")	19.05- 20.0 mm (.750- .787")	
	1		< 0.25 %C	Annealed	420	125								
	2	Non alloy	>= 0.25 %C	Annealed	650	190]							
	3	steel and cast steel free cutting	< 0.55 %C	Quenched and Tempered	850	250			.003000500075 - .0050 .0075 .0100		0100			
	4		>= 0.55 %C	Annealed	750	220]			0075			0450	
Р	5	steel	> 0.55 %C	Quenched and Tempered	1000	300	375				.0100 - .0130	.0130 - .0153	.0153 - .0160	
r	6			Annealed	600	200								
	7	Low alloy steel			930	275								
	8	steel (less than 5% of alloying elements)		Quenched and Tempered	1000	300]							
	9	anoying cicine	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Tempered	1200	350								
	10		High alloyed steel, cast		680	200		.0030 -	.0050 -	.0075 -	.0100 -	.0130 -	.0153 -	
	11	steel, and tool steel		Quenched and Tempered	1100	325	275	.0030-	.0050-	.0075-	.0100 -	.0130-	.0153 -	
	12	Stainless steel (410, 416, 420, 440)		Ferritic/ Martensitic	680	200		.00230047 -	0047	.0070 -	.0094 -	.0126 -	.0138 -	
	13	Stainless steel	(15-5, 17-4)	Martensitic	820	240	230	.0047 .0070		.0070-	.0126	.0138	.0140	
Μ	14	Stainless steel (302, 303, 304	4)	Austenitic	Austenitic 600	180								
		Stainless steel (310, 316, 321					180	.0020 - .0040	.0040 - .0060	- 0060 - .0080	.0080 - .0110	.0110 - .0121	.0121 - .0125	
	14	Stainless steel (323, 329, F55, 2205)		Austenitic/ Ferritic	820	240	150	.0020 - .0035	.0035 - .0045	.0045 - .0050	.0050 - .0055	.0055 - .0059	.0059 - .0060	
	21			<12% Si				.0120 -	.0140 -	.0200 -	.0250 -	.0260 -	.0268 -	
Ν	22	Aluminum Allo	oy Forging	1000 - 8000 series			820	.0120 -	.0140 -	.0200 -	.0250-	.0260 -	.0268 -	
IN	23			>12% Si				0440	0450	0100	0000	0040	0040	
	24	Aluminum Allo	oy Casting	4000 series &			820	.0110 - .0150	.0150 - .0190	.0190 - .0230	.0230 - .0240	.0240 - .0248	.0248 - .0250	
	25			Castings				.0130	.0190	.0230	.0240	.0240	.0200	
	36	Titonium Ti all	ove TI1100		Rm 400			.0020 -	.0030 -	.0040 -	0050	.0065 -	.0080 -	
S	37	TIGAL4V	Titanium Ti alloys TI1100, TI6AL4V		Rm1050		150	.0020-	.0030-	.0040 -	.0050 - .0065	.0085 -	.0080 -	





Operating Guidelines - 16xD

		Materials		Condition	Tensile	HB	Vc		IPR Cutt	ing Diamete	er (in/rev)	
ISO	Mti Group No.	Group		•	Strength (N/mm2)	Hardness	Cutting Speed SFM	3.0-5.9 mm (.118- .235")	6.0-8.9 mm (.236- .353")	9.0-11.9 mm (.354- .471")	12.0- 15.9 mm (.472- .629")	16.0+ mm (.630+")
	1		< 0.25 %C	Annealed	420	125						
	2	Nonallov	>= 0.25 %C	Annealed	650	190]				.0130 - .0140	
	3	Non alloy steel and cast steel free cutting steel	< 0.55 %C	Quenched and Tempered	850	250	375		.0094 - .0120	.0120 - .0130		.0140
	4		>= 0.55 %C	Annealed	750	220	1	.0094	.0120	.0130	.0140	
Р	5		> 0.55 %C	Quenched and Tempered	1000	300						
F	6			Annealed	600	200						
	7	Low alloy steel and cast steel (less than 5% of alloying elements)			930	275	260	.0058 -	.0094 -	0.012 -	.0130 -	.0140
	8			Quenched and Tempered	1000	300	200	.0094	.0120	.0130	.0140	
	9			Tempereu	1200	350						
	10	High alloyed steel, cast		Annealed	680	200		.0043 -	.0069 -	.0088 -	.0095 -	
	11	steel, and tool		Quenched and Tempered	1100	325	230	.0043 -	.0089 -	.0088-	.0095 -	.0102
	12	Stainless steel (410, 416, 420		Ferritic/ Martensitic	680	200	230	.0043 - .0069	.0069 - .0088	.0088 - .0095	.0095 - .0102	.0102
	13	Stainless steel	(15-5, 17-4)	Martensitic	820	240		.0007	.0000	.0075	.0102	
Μ	14	Stainless steel (302, 303, 304		Austenitic	600	180	220	.0023 - .0047	.0047 - .0070	.0070 - .0094	.0094 - .0122	.0122
	14	Stainless steel (310, 316, 321		Austennic	000	100	180	.0018 - .0035	.0035 - .0053	.0053 - .0070	.0070 - .0093	.0093
	14	Stainless steel (323, 329, F55, 2205)		Austenitic/ Ferritic	820	240	125	0.001 - .0024	.0024 - .0029	.0029 - .0033	.0033 - .0036	.0036
	36	The stress T' all			Rm 400			0014	0005	0000		
S			bys 111100,	Alpha + Beta alloys cured	Rm1050		125	.0014 - .0025	.0025 - .0030	.0030 - .0035	.0035 - .0040	.0040





Operating Guidelines - 20xD

		Materials		Condition	Tensile Strength	HB	Vc		IPR Cutting I	Diameter (in/re	v)
ISO	Mtl Group No.	Туре		•	(N/mm2)		Cutting Speed SFM	3.0-5.9 mm (.118- .235")	6.0-8.9 mm (.236- .353")	9.0-11.9 mm (.354- .471")	12.0-16.0 mm (.472+")
	1		< 0.25 %C	Annealed	420	125					
	2	Non alloy steel and cast steel free cutting steel	>= 0.25 %C	Annealed	650	190		.0058 - .0094		.0120 - .0130	
	3		< 0.55 %C	Quenched and Tempered	850	250	360		.0094 - .0120		.0130
	4		>= 0.55 %C	Annealed	750	220			.0120	.0130	
Р	5		> 0.55 %C	Quenched and Tempered	1000	300					
r	6			Annealed	600	200					
	7	Low alloy steel and cast steel (less than 5% of alloying elements)		Quenched and	930	275	245	.0058 -	.0094 -	0.012 -	.0130
	8			Quenched and Tempered	1000	300	245	.0094	.0120	.0130	.0130
	9			Tempereu	1200	350					
	10	High alloyed steel, cast		Annealed	680	200		.0043 -	.0069 -	.0088 -	.0094 -
	11	steel, and tool		Quenched and Tempered	1100	325	220	.0043 -	.0069 -	.0088 - .0094	.0102
	12	Stainless steel (410, 416, 420		Ferritic/ Martensitic	680	200	220	.0043 - .0069	.0069 - .088	.0088 - .0094	.0094 - .0102
	13	Stainless steel		Martensitic	820	240		.0009	.000	.0074	.0102
Μ	14	Stainless steel (302, 303, 304	1)	Austenitic	600	180	220	.0023 - .0047	.0047 - .0070	.0070 - .0094	.0094 - .0122
	14	Stainless steel (310, 316, 321		Austennik	000	100	165	.0018 - .0035	.0035 - .0053	.0053 - .0070	.0070 - .0093
	14	Stainless steel (323, 329, F55, 2205)		Austenitic/ Ferritic	820	240	120	.0010 - .0024	.0024 - .0029	.0029 - .0033	.0033 - .0036
	36	Titenium Ti II	aug TI1100		Rm 400			0010			0022
S	37	Titanium Ti alloys TI1100, TI6AL4V		Alpha + Beta alloys cured	Rm1050		120	.0010 - .0023	.0023 - .0028	.0028 - .0032	.0032 - .0037





Operating Guidelines - 25xD

		Materials		Condition	Tensile Strength	HB Hardness	Vc		IPR Cutting Di	ameter (in/re v	1)
ISO	Mti Group No.	Туре	уре		(N/mm2)		Cutting Speed SFM	3.0-5.9 mm (.118- .235")	6.0-8.9 mm (.236- .353")	9.0-11.9 mm (.354- .471")	12.0-16.0 mm (.472+")
	1	< 0.25 %C		Annealed	420	125					
	2	Non alloy steel and cast steel free cutting steel	>= 0.25 %C	Annealed	650	190	1				
	3		< 0.55 %C	Quenched and Tempered	850	250	360	.0058 - .0094 .0094	.0094011	.0110 -	.0130
	4		>= 0.55 %C	Annealed	750	220]			.0130	
Р	5		> 0.55 %C	Quenched and Tempered	1000	300					
Γ	6			Annealed	600	200					
	7	Low alloy steel and cast steel (less than 5% of alloying elements)		0	930	275	230	.0058 -	.0094 -	.0110 -	.0130
	8			Quenched and Tempered	1000	300	230	.0094	.0110	.0130	.0130
	9			Tomporou	1200	350					
	10	High alloyed steel, cast steel, and tool steel		Annealed	680	200	210	.0043 -	.0069 -	.0081 - .0095	.0095
	11			Quenched and Tempered	1100	325		.0043 -	.0081		
	12	Stainless steel (410, 416, 420		Ferritic/ Martensitic	680	200	210	.0043 - .0069	.0069 - .0081	.0081 - .0095	.0095
	13	Stainless steel	(15-5, 17-4)	Martensitic	820	240		.0009	.0001	.0075	
Μ	14	Stainless steel (302, 303, 304		Austenitic	600	180	210	.0023 - .0047	.0047 - .0070	.0070 - .0094	.0094
	14	Stainless steel (310, 316, 321		Austennik	000	100	165	.0016 - .0032	.0032 - .0050	.0050 - .0065	.0065
	14	Stainless steel (323, 329, F55, 2205)		Austenitic/ Ferritic	820	240	120	.0011 - .0019	.0019 0023	.0023 - .0027	.0027
	36	Titonium Ti all	aug TI1100		Rm 400			0010	0020	0007	
S	37	Titanium Ti alloys TI1100, TI6AL4V		Alpha + Beta alloys cured	Rm1050			.0010 - .0020	.0020 - .0027	.0027 - .0032	.0032





Operating Guidelines - 30xD

		Materials		Condition	Tensile	HB	Vc	IPR	Cutting Diameter (i	n/rev)
ISO	Mtl Group No.	Туре		•	Strength (N/mm2)	Hardness	Cutting Speed SFM	3.0-5.9 mm (.118235")	6.0-8.9 mm (.236353")	9.0-11.9 mm (.354+")
	1		< 0.25 %C	Annealed	420	125				
	2	Non alloy	>= 0.25 %C	Annealed	650	190		.00580094		
	3	steel and cast steel	< 0.55 %C	Quenched and Tempered	850	250	345		.00940120	.0120
	4	free cutting	>= 0.55 %C	Annealed	750	220				
Р	5	steel	> 0.55 %C	Quenched and Tempered	1000	300				
Γ	6			Annealed	600	200				
	7	Low alloy steel and cast steel (less than 5% of alloying elements)			930	275	215	.00580094	.00940120	.0120
	8			Quenched and Tempered	1000	300	215	.00580094	.00940120	.0120
	9			Tempereu	1200	350				
	10	High alloyed steel, cast		Annealed	680	200				
	11	steel, and tool		Quenched and Tempered	1100	325	200	.00430069	.00690088	.0088
	12	Stainless steel (410, 416, 420		Ferritic/ Martensitic	680	200	200	.00430069	.00690088	.0088
	13	Stainless steel		Martensitic	820	240				
Μ	14	Stainless steel (302, 303, 304	1)	Austenitic	600	180	195	.00230047	.0047007	.0070
	14		Stainless steel (310, 316, 321)		000		150	.00160032	.00320050	.0050
	14	Stainless steel (323, 329, F55, 2205)		Austenitic/ Ferritic	820	240	120	.00110019	.00190023	.0023
	36	Tite			Rm 400					
S	37	Titanium Ti alloys TI1100, TI6AL4V		Alpha + Beta alloys cured	Rm1050		110	.00100020	.00200026	.0026





Operating Guidelines - 40xD

	Materials			Condition	Tensile	HB	Vc	IPR	Cutting Diameter (i	n/rev)
ISO	Mtl Group No.	Туре		•	Strength (N/mm2)	Hardness	Cutting Speed SFM	3.0-5.99 mm (.118235")	6.0-7.99 mm (.236314")	8.0 mm (.312+")
	1		< 0.25 %C	Annealed	420	125				
	2		>= 0.25 %C	Annealed	650	190]	.00500094		
	3	Non alloy steel and cast steel	< 0.55 %C	Quenched and Tempered	850	250	330		.00940105	.0105
	4	free cutting	>= 0.55 %C	Annealed	750	220]			
Р	5	steel	> 0.55 %C	Quenched and Tempered	1000	300				
Γ	6	Low alloy steel and cast steel (less than 5% of alloying elements)		Annealed	600	200				
	7				930	275	215	.00500094	.00940105	.0105
	8			Quenched and Tempered	1000	300	215	.00500094	.00940105	.0105
	9			Tempereu	1200	350				
	10	High alloyed steel, cast		Annealed	680	200				
	11	steel, and tool		Quenched and Tempered	1100	325	200	.00370069	.00690077	.0077
	12	Stainless steel (410, 416, 420)		Ferritic/ Martensitic	680	200	200	.00370069	.00690077	.0077
	13	Stainless steel	(15-5, 17-4)	Martensitic	820	240				
Μ	14	Stainless steel (302, 303, 304		Austenitic	600	180	195	.00200040	.00400055	.0055
	14	Stainless steel (310, 316, 321		Austeintic	000	100	145	.00160032	.00320045	.0045
	14	Stainless steel (323, 329, F55, 2205)		Austenitic/ Ferritic	820	240	115	.00100019	.00190021	.0021
	36	The stress T' all			Rm 400					
S	37	Titanium Ti alloys TI1100, TI6AL4V		Alpha + Beta alloys cured	Rm1050		100	.00100020	.00200030	.0030





Operating Guidelines - 50xD

		Materials		Condition	Tensile	HB	Vc	IPR	Cutting Diameter (i	n/rev)
ISO	Mtl Group No.	Туре	Туре		(N/mm2)		Cutting Speed SFM	4.0-4.99 mm (.157196")	5.0-5.99 mm (.197235")	6.0 mm (.250+")
	1		< 0.25 %C	Annealed	420	125				
	2	Nenelley	>= 0.25 %C	Annealed	650	190	1	.00600075		
	3	Non alloy steel and cast steel	< 0.55 %C	Quenched and Tempered	850	250	330		.00750094	.0094
	4	free cutting	>= 0.55 %C	Annealed	750	220				
Р	5	steel	> 0.55 %C	Quenched and Tempered	1000	300				
r	6			Annealed	600	200				
	7	Low alloy steel and cast steel (less than 5% of alloying elements)			930	275	215	.00600075	.00750094	.0094
	8			Quenched and Tempered	1000	300	215	.00000075	.00750094	.0094
	9			Tempereu	1200	350				
	10	High alloyed steel, cast		Annealed	680	200				
	11	steel, and tool		Quenched and Tempered	1100	325	190	.00400052	.00520065	.0065
	12	Stainless steel (410, 416, 420		Ferritic/ Martensitic	680	200	190	.00400052	.00520065	.0065
	13	Stainless steel		Martensitic	820	240				
Μ	14	Stainless steel (302, 303, 304	1)	Austenitic	600	180	195	.00250032	.00320040	.0040
	14	Stainless steel (310, 316, 321			000		145	.00180026	.00260032	.0032
	14	Stainless steel (323, 329, F55, 2205)		Austenitic/ Ferritic	820	240	115	.00100015	.00150019	.0019
	36	The street T			Rm 400					
S	37	Titanium Ti alloys TI1100, TI6AL4V		Alpha + Beta alloys cured	Rm1050		100	.00100015	.00150020	.0020