

GARR TOOL General Purpose Drilling Guide (Uncoated)

	ISO Material	HRC	SFM (by Series)			
			1100	1200, 1205, 1520	1500, 1510	1600
S	COBALT BASE ALLOYS					
	Haynes 25/188, Stellite 21, Cobalt Chrome	< 40 > 40	- -	45 - 70 35 - 60	45 - 70 35 - 60	30 - 55 20 - 45
	NICKEL BASE ALLOYS					
	Inconel-625/718, Waspaloy, Invar, Rene, Hastelloy, Monel	< 40 > 40	- -	45 - 70 35 - 60	45 - 70 35 - 60	30 - 55 20 - 45
	IRON BASE ALLOYS					
	A286, Discaloy, Haynes 556, Carpenter 22, Greek Ascology	< 40 > 40	- -	45 - 70 35 - 60	45 - 70 35 - 60	30 - 55 20 - 45
	TITANIUM ALLOYS					
	Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		-	60 - 90	60 - 90	45 - 75
	5553 / Beta Titanium		-	45 - 65	45 - 65	30 - 50
	M	STAINLESS STEELS				
13/8, 15/5, 17-4, pH Types		< 40 > 40	- -	50 - 80 35 - 60	50 - 80 35 - 60	35 - 65 20 - 45
300 Series, 304L, Nitronic 50, Duplex, Super-Austenitic		< 40 > 40	- -	45 - 75 35 - 55	45 - 75 35 - 55	30 - 60 20 - 40
400 Series - 403, 405, 420, 455		< 40 > 40	- -	60 - 90 40 - 65	60 - 90 40 - 65	45 - 75 25 - 50
HIGH STRENGTH TOOL STEELS						
A2, D2, P20, H13, S7, O1	< 40 > 40	- -	80 - 130 60 - 110	80 - 130 60 - 110	65 - 110 45 - 90	
Thompson Shaft, Armor Plate (Class 1)	> 50	-	-	45 - 80	30 - 60	
P	MEDIUM ALLOY TOOL STEELS					
	4140, 4340, 52100, 6150, 8620	< 40 > 40	- -	100 - 140 70 - 120	100 - 140 70 - 120	65 - 120 55 - 100
	CARBON STEELS					
	1000's - 1018, 1020, 12L14	< 40	-	120 - 170	120 - 170	105 - 150
K	CAST MATERIAL					
	Ductile Iron		70 - 140	120 - 170	120 - 170	105 - 150
	Gray Iron		70 - 165	120 - 190	120 - 190	105 - 170
N	NON-FERROUS					
	Aluminum (6061, 7075)		-	200 - 300	-	160 - 250
	Magnesium		-	120 - 215	-	80 - 165
	Copper		-	100 - 165	-	60 - 125
	Brass, Bronze		-	120 - 215	-	80 - 165
O	COMPOSITE (non-ISO)					
	Glass Epoxy, Fiberglass, Plastics, Graphite, G10		140	100 - 230	105 - 230	-

NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

GARR TOOL General Purpose Drilling Guide

ISO Material	HRC	CHIPLOAD PER TOOTH (Fz)				
		1/16" - 1/8"	1/8" - 1/4"	1/4" - 3/8"	3/8" - 1/2"	1/2" - 5/8"
COBALT BASE ALLOYS						
Haynes 25/188, Stellite 21, Cobalt Chrome	< 40	.0003" - .0008"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0032"
	> 40	.0002" - .0006"	.0004" - .0009"	.0008" - .0015"	.0012" - .0022"	.0017" - .0030"
NICKEL BASE ALLOYS						
Inconel-625/718, Waspaloy, Invar, Rene, Hastelloy, Monel	< 40	.0003" - .0008"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0032"
	> 40	.0002" - .0006"	.0004" - .0009"	.0008" - .0015"	.0012" - .0022"	.0017" - .0030"
IRON BASE ALLOYS						
A286, Discaloy, Haynes 556, Carpenter 22, Greek Ascology	< 40	.0003" - .0008"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0032"
	> 40	.0002" - .0006"	.0004" - .0009"	.0008" - .0015"	.0012" - .0022"	.0017" - .0030"
TITANIUM ALLOYS						
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si 5553 / Beta Titanium	< 40	.0004" - .0009"	.0008" - .0014"	.0012" - .0020"	.0016" - .0027"	.0021" - .0033"
	> 40	.0003" - .0007"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0030"
STAINLESS STEELS						
13/8, 15/5, 17-4, pH Types	< 40	.0004" - .0009"	.0007" - .0013"	.0011" - .0019"	.0015" - .0026"	.0020" - .0032"
	> 40	.0003" - .0007"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0030"
300 Series, 304L, Nitronic 50, Duplex, Super-Austenitic	< 40	.0004" - .0009"	.0007" - .0013"	.0011" - .0019"	.0015" - .0026"	.0020" - .0032"
	> 40	.0003" - .0007"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0030"
400 Series - 403, 405, 420, 455	< 40	.0004" - .0009"	.0007" - .0013"	.0011" - .0019"	.0015" - .0026"	.0020" - .0032"
	> 40	.0003" - .0007"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0030"
HIGH STRENGTH TOOL STEELS						
A2, D2, P20, H13, S7, O1	< 40	.0004" - .0009"	.0007" - .0013"	.0011" - .0019"	.0015" - .0026"	.0020" - .0032"
	> 40	.0003" - .0007"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0030"
Thompson Shaft, Armor Plate (Class 1)	> 50	.0002" - .0006"	.0005" - .0009"	.0009" - .0015"	.0013" - .0022"	.0018" - .0028"
MEDIUM ALLOY TOOL STEELS						
4140, 4340, 52100, 6150, 8620	< 40	.0004" - .0009"	.0007" - .0013"	.0011" - .0019"	.0015" - .0026"	.0020" - .0032"
	> 40	.0003" - .0007"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0030"
CARBON STEELS						
1000's - 1018, 1020, 12L14	< 40	.0005" - .0010"	.0008" - .0014"	.0012" - .0020"	.0016" - .0027"	.0021" - .0033"
CAST MATERIAL						
Ductile Iron		.0005" - .0010"	.0008" - .0014"	.0012" - .0020"	.0016" - .0027"	.0021" - .0033"
Gray Iron		.0005" - .0010"	.0008" - .0014"	.0012" - .0020"	.0016" - .0027"	.0021" - .0033"
NON-FERROUS						
Aluminum (6061, 7075)		.0006" - .0011"	.0009" - .0015"	.0013" - .0021"	.0017" - .0028"	.0022" - .0034"
Magnesium		.0005" - .0010"	.0009" - .0014"	.0013" - .0020"	.0017" - .0027"	.0022" - .0033"
Copper		.0004" - .0008"	.0008" - .0012"	.0012" - .0018"	.0016" - .0025"	.0021" - .0031"
Brass, Bronze		.0005" - .0009"	.0009" - .0013"	.0013" - .0019"	.0017" - .0026"	.0022" - .0032"
COMPOSITE (non-ISO)						
Glass Epoxy, Fiberglass, Plastics, Graphite, G10		.0003" - .0008"	.0007" - .0012"	.0011" - .0018"	.0015" - .0025"	.0020" - .0031"

NOTE - ABOVE ARE STARTING PARAMETERS ONLY. HIGHER RESULTS MAY BE ACHIEVED WITH OPTIMUM CONDITIONS.

GARR TOOL General Purpose Drilling Guide (Hardlube Coated)

	ISO Material	HRC	SFM (by Series)			
			1100H, 1120H	1200H, 1205H, 1520H	1500H, 1510H	1800H
S	COBALT BASE ALLOYS					
	Haynes 25/188, Stellite 21, Cobalt Chrome	< 40	-	55 - 75	55 - 75	-
		> 40	-	45 - 65	45 - 65	-
	NICKEL BASE ALLOYS					
	Inconel-625/718, Waspaloy, Invar, Rene, Hastelloy, Monel	< 40	-	55 - 80	55 - 80	-
		> 40	-	45 - 70	45 - 70	-
	IRON BASE ALLOYS					
A286, Discaloy, Haynes 556, Carpenter 22, Greek Ascology	< 40	-	55 - 80	55 - 80	-	
	> 40	-	45 - 70	45 - 70	-	
TITANIUM ALLOYS						
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si			-	70 - 100	70 - 100	-
5553 / Beta Titanium			-	55 - 75	55 - 75	-
M	STAINLESS STEELS					
	13/8, 15/5, 17-4, pH Types	< 40	-	60 - 90	60 - 90	-
		> 40	-	45 - 70	45 - 70	-
	300 Series, 304L, Nitronic 50, Duplex, Super-Austenitic	< 40	-	55 - 85	55 - 85	-
		> 40	-	45 - 65	45 - 65	-
400 Series - 403, 405, 420, 455	< 40	-	70 - 100	70 - 100	-	
	> 40	-	50 - 75	50 - 75	-	
P	HIGH STRENGTH TOOL STEELS					
	A2, D2, P20, H13, S7, O1	< 40	-	90 - 140	90 - 140	-
		> 40	-	70 - 120	70 - 120	-
	Thompson Shaft, Armor Plate (Class 1)	> 50	-	-	55 - 90	-
	MEDIUM ALLOY TOOL STEELS					
	4140, 4340, 52100, 6150, 8620	< 40	-	110 - 150	110 - 150	-
	> 40	-	80 - 130	80 - 130	-	
CARBON STEELS						
1000's - 1018, 1020, 12L14	< 40	-	130 - 180	130 - 180	-	
K	CAST MATERIAL					
	Ductile Iron		80 - 150	130 - 180	130 - 180	-
	Gray Iron		80 - 175	130 - 200	130 - 200	-
N	NON-FERROUS					
	Aluminum (6061, 7075)		-	200 - 300	-	200 - 300
	Magnesium		-	130 - 225	-	130 - 225
	Copper		-	110 - 175	-	110 - 175
	Brass, Bronze		-	130 - 225	-	130 - 225
O	COMPOSITE (non-ISO)					
	Glass Epoxy, Fiberglass, Plastics, Graphite, G10		160	125 - 250	125 - 250	-

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		1/16" - 1/8"	1/8" - 1/4"	1/4" - 3/8"	3/8" - 1/2"	1/2" - 5/8"
COBALT BASE ALLOYS						
Haynes 25/188, Stellite 21, Cobalt Chrome	< 40	.0003" - .0008"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0032"
	> 40	.0002" - .0006"	.0004" - .0009"	.0008" - .0015"	.0012" - .0022"	.0017" - .0030"
NICKEL BASE ALLOYS						
Inconel-625/718, Waspaloy, Invar, Rene, Hastelloy, Monel	< 40	.0003" - .0008"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0032"
	> 40	.0002" - .0006"	.0004" - .0009"	.0008" - .0015"	.0012" - .0022"	.0017" - .0030"
IRON BASE ALLOYS						
A286, Discaloy, Haynes 556, Carpenter 22, Greek Ascology	< 40	.0003" - .0008"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0032"
	> 40	.0002" - .0006"	.0004" - .0009"	.0008" - .0015"	.0012" - .0022"	.0017" - .0030"
TITANIUM ALLOYS						
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si 5553 / Beta Titanium	< 40	.0004" - .0009"	.0008" - .0014"	.0012" - .0020"	.0016" - .0027"	.0021" - .0033"
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STAINLESS STEELS						
13/8, 15/5, 17-4, pH Types	< 40	.0004" - .0009"	.0007" - .0013"	.0011" - .0019"	.0015" - .0026"	.0020" - .0032"
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300 Series, 304L, Nitronic 50, Duplex, Super-Austenitic	< 40	.0004" - .0009"	.0007" - .0013"	.0011" - .0019"	.0015" - .0026"	.0020" - .0032"
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400 Series - 403, 405, 420, 455	< 40	.0004" - .0009"	.0007" - .0013"	.0011" - .0019"	.0015" - .0026"	.0020" - .0032"
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HIGH STRENGTH TOOL STEELS						
A2, D2, P20, H13, S7, O1	< 40	.0004" - .0009"	.0007" - .0013"	.0011" - .0019"	.0015" - .0026"	.0020" - .0032"
	> 40	.0003" - .0007"	.0006" - .0011"	.0010" - .0017"	.0014" - .0024"	.0019" - .0030"
Thompson Shaft, Armor Plate (Class 1)	> 50	.0002" - .0006"	.0005" - .0009"	.0009" - .0015"	.0013" - .0022"	.0018" - .0028"
MEDIUM ALLOY TOOL STEELS						
4140, 4340, 52100, 6150, 8620	< 40	.0004" - .0009"	.0007" - .0013"	.0011" - .0019"	.0015" - .0026"	.0020" - .0032"
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CARBON STEELS						
1000's - 1018, 1020, 12L14	< 40	.0005" - .0010"	.0008" - .0014"	.0012" - .0020"	.0016" - .0027"	.0021" - .0033"
CAST MATERIAL						
Ductile Iron		.0005" - .0010"	.0008" - .0014"	.0012" - .0020"	.0016" - .0027"	.0021" - .0033"
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Magnesium		.0005" - .0010"	.0009" - .0014"	.0013" - .0020"	.0017" - .0027"	.0022" - .0033"
Copper		.0004" - .0008"	.0008" - .0012"	.0012" - .0018"	.0016" - .0025"	.0021" - .0031"
Brass, Bronze		.0005" - .0009"	.0009" - .0013"	.0013" - .0019"	.0017" - .0026"	.0022" - .0032"
COMPOSITE (non-ISO)						
Glass Epoxy, Fiberglass, Plastics, Graphite, G10		.0003" - .0008"	.0007" - .0012"	.0011" - .0018"	.0015" - .0025"	.0020" - .0031"

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