

GARR TOOL General Purpose Drilling Guide (Uncoated)

	ISO Material	HRC	M/Min. (by Series)			
			1100	1200, 1205, 1520	1500, 1510	1600
S	COBALT BASE ALLOYS					
	Haynes 25/188, Stellite 21, Cobalt Chrome	< 40 > 40	- -	14 - 21 10 - 18	14 - 21 10 - 18	10 - 17 6 - 14
	NICKEL BASE ALLOYS					
	Inconel-625/718, Waspaloy, Invar, Rene, Hastelloy, Monel	< 40 > 40	- -	14 - 21 10 - 18	14 - 21 10 - 18	10 - 17 6 - 14
	IRON BASE ALLOYS					
	A286, Discaloy, Haynes 556, Carpenter 22, Greek Ascology	< 40 > 40	- -	14 - 21 10 - 18	14 - 21 10 - 18	10 - 17 6 - 14
	TITANIUM ALLOYS					
	Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		-	18 - 27	18 - 27	14 - 23
	5553 / Beta Titanium		-	14 - 20	14 - 20	10 - 15
	M	STAINLESS STEELS				
13/8, 15/5, 17-4, pH Types		< 40 > 40	- -	15 - 25 10 - 18	15 - 25 10 - 18	10 - 20 6 - 14
300 Series, 304L, Nitronic 50, Duplex, Super-Austenitic		< 40 > 40	- -	14 - 23 10 - 17	14 - 23 10 - 17	10 - 18 6 - 12
400 Series - 403, 405, 420, 455		< 40 > 40	- -	18 - 27 12 - 20	18 - 27 12 - 20	14 - 23 8 - 15
HIGH STRENGTH TOOL STEELS						
A2, D2, P20, H13, S7, O1	< 40 > 40	- -	25 - 40 18 - 34	25 - 40 18 - 34	20 - 34 14 - 27	
Thompson Shaft, Armor Plate (Class 1)	> 50	-	-	14 - 25	10 - 20	
P	MEDIUM ALLOY TOOL STEELS					
	4140, 4340, 52100, 6150, 8620	< 40 > 40	-	30 - 43 21 - 37	30 - 43 21 - 37	20 - 37 17 - 30
	CARBON STEELS					
	1000's - 1018, 1020, 12L14	< 40	-	37 - 52	37 - 52	32 - 45
K	CAST MATERIAL					
	Ductile Iron		21 - 43	37 - 52	37 - 52	32 - 45
	Gray Iron		21 - 50	37 - 58	37 - 58	32 - 52
N	NON-FERROUS					
	Aluminum (6061, 7075)		-	60 - 90	-	50 - 75
	Magnesium		-	37 - 65	-	25 - 50
	Copper		-	30 - 50	-	18 - 38
	Brass, Bronze		-	37 - 65	-	25 - 50
O	COMPOSITE (non-ISO)					
	Glass Epoxy, Fiberglass, Plastics, Graphite, G10		43	30 - 70	32 - 70	-

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)				
			2.0 - 3.0mm	3.0 - 6.0mm	6.0 - 10.0mm	10.0 - 13.0mm	13.0 - 16.0mm
S	COBALT BASE ALLOYS						
	Haynes 25/188, Stellite 21, Cobalt Chrome	< 40	.008 - .020	.015 - .028	.025 - .043	.036 - .061	.048 - .081
		> 40	.005 - .015	.010 - .023	.020 - .038	.030 - .056	.043 - .076
	NICKEL BASE ALLOYS						
	Inconel-625/718, Waspaloy, Invar, Rene, Hastelloy, Monel	< 40	.008 - .020	.015 - .028	.025 - .043	.036 - .061	.048 - .081
		> 40	.005 - .015	.010 - .023	.020 - .038	.030 - .056	.043 - .076
	IRON BASE ALLOYS						
	A286, Discaloy, Haynes 556, Carpenter 22, Greek Ascology	< 40	.008 - .020	.015 - .028	.025 - .043	.036 - .061	.048 - .081
		> 40	.005 - .015	.010 - .023	.020 - .038	.030 - .056	.043 - .076
	TITANIUM ALLOYS						
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		.010 - .023	.020 - .036	.030 - .051	.041 - .069	.053 - .084	
5553 / Beta Titanium		.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076	
M	STAINLESS STEELS						
	13/8, 15/5, 17-4, pH Types	< 40	.010 - .023	.018 - .033	.028 - .048	.038 - .066	.051 - .081
		> 40	.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076
	300 Series, 304L, Nitronic 50, Duplex, Super-Austenitic	< 40	.010 - .023	.018 - .033	.028 - .048	.038 - .066	.051 - .081
		> 40	.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076
	400 Series - 403, 405, 420, 455	< 40	.010 - .023	.018 - .033	.028 - .048	.038 - .066	.051 - .081
	> 40	.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076	
P	HIGH STRENGTH TOOL STEELS						
	A2, D2, P20, H13, S7, O1	< 40	.010 - .023	.018 - .033	.028 - .048	.038 - .066	.051 - .081
		> 40	.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076
	Thompson Shaft, Armor Plate (Class 1)	> 50	.005 - .015	.013 - .023	.023 - .038	.033 - .056	.046 - .071
	MEDIUM ALLOY TOOL STEELS						
	4140, 4340, 52100, 6150, 8620	< 40	.010 - .023	.018 - .033	.028 - .048	.038 - .066	.051 - .081
	> 40	.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076	
CARBON STEELS							
1000's - 1018, 1020, 12L14	< 40	.013 - .025	.020 - .036	.030 - .051	.041 - .069	.053 - .084	
K	CAST MATERIAL						
	Ductile Iron		.013 - .025	.020 - .036	.030 - .051	.041 - .069	.053 - .084
	Gray Iron		.013 - .025	.020 - .036	.030 - .051	.041 - .069	.053 - .084
N	NON-FERROUS						
	Aluminum (6061, 7075)		.015 - .028	.023 - .038	.033 - .053	.043 - .071	.056 - .086
	Magnesium		.013 - .025	.023 - .036	.033 - .051	.043 - .069	.056 - .084
	Copper		.010 - .020	.020 - .030	.030 - .046	.041 - .064	.053 - .079
	Brass, Bronze		.013 - .023	.023 - .033	.033 - .048	.043 - .066	.056 - .081
O	COMPOSITE (non-ISO)						
	Glass Epoxy, Fiberglass, Plastics, Graphite, G10		.008 - .020	.018 - .030	.028 - .046	.038 - .064	.051 - .079

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	M/Min. (by Series)			
			1100H, 1120H	1200H, 1205H, 1520H	1500H, 1510H	1800H
S	COBALT BASE ALLOYS					
	Haynes 25/188, Stellite 21, Cobalt Chrome	< 40	-	17 - 23	17 - 23	-
		> 40	-	13 - 20	13 - 20	-
	NICKEL BASE ALLOYS					
	Inconel-625/718, Waspaloy, Invar, Rene, Hastelloy, Monel	< 40	-	17 - 25	17 - 25	-
		> 40	-	13 - 21	13 - 21	-
	IRON BASE ALLOYS					
	A286, Discaloy, Haynes 556, Carpenter 22, Greek Ascology	< 40	-	17 - 25	17 - 25	-
		> 40	-	13 - 21	13 - 21	-
	TITANIUM ALLOYS					
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		-	21 - 30	21 - 30	-	
5553 / Beta Titanium		-	17 - 23	17 - 23	-	
M	STAINLESS STEELS					
	13/8, 15/5, 17-4, pH Types	< 40	-	18 - 27	18 - 27	-
		> 40	-	13 - 21	13 - 21	-
	300 Series, 304L, Nitronic 50, Duplex, Super-Austenitic	< 40	-	17 - 26	17 - 26	-
		> 40	-	13 - 20	13 - 20	-
	400 Series - 403, 405, 420, 455	< 40	-	21 - 30	21 - 30	-
	> 40	-	15 - 23	15 - 23	-	
P	HIGH STRENGTH TOOL STEELS					
	A2, D2, P20, H13, S7, O1	< 40	-	27 - 43	27 - 43	-
		> 40	-	21 - 37	21 - 37	-
	Thompson Shaft, Armor Plate (Class 1)	> 50	-	-	17 - 27	-
	MEDIUM ALLOY TOOL STEELS					
	4140, 4340, 52100, 6150, 8620	< 40	-	34 - 45	34 - 45	-
		> 40	-	25 - 40	25 - 40	-
CARBON STEELS						
1000's - 1018, 1020, 12L14	< 40	-	40 - 55	40 - 55	-	
K	CAST MATERIAL					
	Ductile Iron		25 - 45	40 - 55	40 - 55	-
	Gray Iron		25 - 53	40 - 60	40 - 60	-
N	NON-FERROUS					
	Aluminum (6061, 7075)		-	60 - 90	-	60 - 90
	Magnesium		-	40 - 68	-	40 - 68
	Copper		-	34 - 53	-	34 - 53
	Brass, Bronze		-	40 - 68	-	40 - 68
O	COMPOSITE (non-ISO)					
	Glass Epoxy, Fiberglass, Plastics, Graphite, G10		50	38 - 75	-	-

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			2.0 - 3.0mm	3.0 - 6.0mm	6.0 - 10.0mm	10.0 - 13.0mm	13.0 - 16.0mm
S	COBALT BASE ALLOYS						
	Haynes 25/188, Stellite 21, Cobalt Chrome	< 40	.008 - .020	.015 - .028	.025 - .043	.036 - .061	.048 - .081
		> 40	.005 - .015	.010 - .023	.020 - .038	.030 - .056	.043 - .076
	NICKEL BASE ALLOYS						
	Inconel-625/718, Waspaloy, Invar, Rene, Hastelloy, Monel	< 40	.008 - .020	.015 - .028	.025 - .043	.036 - .061	.048 - .081
		> 40	.005 - .015	.010 - .023	.020 - .038	.030 - .056	.043 - .076
	IRON BASE ALLOYS						
	A286, Discaloy, Haynes 556, Carpenter 22, Greek Ascology	< 40	.008 - .020	.015 - .028	.025 - .043	.036 - .061	.048 - .081
		> 40	.005 - .015	.010 - .023	.020 - .038	.030 - .056	.043 - .076
	TITANIUM ALLOYS						
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		.010 - .023	.020 - .036	.030 - .051	.041 - .069	.053 - .084	
5553 / Beta Titanium		.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076	
M	STAINLESS STEELS						
	13/8, 15/5, 17-4, pH Types	< 40	.010 - .023	.018 - .033	.028 - .048	.038 - .066	.051 - .081
		> 40	.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076
	300 Series, 304L, Nitronic 50, Duplex, Super-Austenitic	< 40	.010 - .023	.018 - .033	.028 - .048	.038 - .066	.051 - .081
		> 40	.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076
	400 Series - 403, 405, 420, 455	< 40	.010 - .023	.018 - .033	.028 - .048	.038 - .066	.051 - .081
	> 40	.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076	
P	HIGH STRENGTH TOOL STEELS						
	A2, D2, P20, H13, S7, O1	< 40	.010 - .023	.018 - .033	.028 - .048	.038 - .066	.051 - .081
		> 40	.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076
	Thompson Shaft, Armor Plate (Class 1)	> 50	.005 - .015	.013 - .023	.023 - .038	.033 - .056	.046 - .071
	MEDIUM ALLOY TOOL STEELS						
	4140, 4340, 52100, 6150, 8620	< 40	.010 - .023	.018 - .033	.028 - .048	.038 - .066	.051 - .081
	> 40	.008 - .018	.015 - .028	.025 - .043	.036 - .061	.048 - .076	
CARBON STEELS							
1000's - 1018, 1020, 12L14	< 40	.013 - .025	.020 - .036	.030 - .051	.041 - .069	.053 - .084	
K	CAST MATERIAL						
	Ductile Iron		.013 - .025	.020 - .036	.030 - .051	.041 - .069	.053 - .084
	Gray Iron		.013 - .025	.020 - .036	.030 - .051	.041 - .069	.053 - .084
N	NON-FERROUS						
	Aluminum (6061, 7075)		.015 - .028	.023 - .038	.033 - .053	.043 - .071	.056 - .086
	Magnesium		.013 - .025	.023 - .036	.033 - .051	.043 - .069	.056 - .084
	Copper		.010 - .020	.020 - .030	.030 - .046	.041 - .064	.053 - .079
	Brass, Bronze		.013 - .023	.023 - .033	.033 - .048	.043 - .066	.056 - .081
O	COMPOSITE (non-ISO)						
	Glass Epoxy, Fiberglass, Plastics, Graphite, G10		.008 - .020	.018 - .030	.028 - .046	.038 - .064	.051 - .079

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