

# GARR TOOL High Performance Drilling Guide for Mini Drills

## Fractional

TECHNICAL

Type	Rc Hardness	Recommended SFM	CHIPLOAD PER FLUTE (Fz)		
		Series 1250H 1550H 1850H	1/32" - 0.99mm (.0312" - .0390")	1.00mm - 2.00mm (.0394" - .0787")	2.01mm - 1/8" (.0791" - .1250")
<b>COBALT BASE ALLOYS</b>					
Powdered Metal, Stellite, Hs-21, Haynes 25/188, X-40, L-605	< 35	100 - 150	.0002" - .0004"	.0004" - .0008"	.0006" - .0012"
	> 35	80 - 110	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
<b>NICKEL BASE ALLOYS</b>					
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	125 - 150	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
	> 35	100 - 125	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
<b>IRON BASE ALLOYS</b>					
Incoloy 800-802, Multimet N-155, Timkin 16-25-6, Carpenter 22-b3	< 35	125 - 175	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
	> 35	80 - 100	.0003" - .0006"	.0004" - .0008"	.0006" - .0012"
<b>MONEL</b>					
Monel - 65% Nickel		75 - 125	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
<b>TITANIUM ALLOYS</b>					
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		150 - 200	.0003" - .0006"	.0004" - .0008"	.0006" - .0012"
<b>STAINLESS STEELS</b>					
(Precipitation) 13/8, 15/5, 17-4, pH Types	< 35	125 - 175	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
	> 35	80 - 125	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
(Austenitic) Inox, 200 Series, 300 Series	< 35	100 - 175	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
	> 35	80 - 125	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
(Austenitic) 304L, 316L, Nitronic 50, Inox	< 35	80 - 100	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
	> 35	60 - 90	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
(Martensitic) 400 Series	< 35	100 - 150	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
	> 35	80 - 125	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
<b>HIGH STRENGTH TOOL STEELS</b>					
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35	100 - 175	.0003" - .0006"	.0004" - .0008"	.0006" - .0012"
	35-48	80 - 130	.0002" - .0005"	.0003" - .0008"	.0006" - .0012"
	> 48	60 - 80	.0002" - .0004"	.0003" - .0006"	.0005" - .0010"
<b>MEDIUM ALLOY TOOL STEELS</b>					
200, 250, 300, 8620	< 35	125 - 175	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
	> 35	80 - 125	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
<b>CARBON STEELS</b>					
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	125 - 175	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
	> 35	80 - 125	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
<b>CAST MATERIAL</b>					
Steel		100 - 175	.0003" - .0006"	.0004" - .0008"	.0006" - .0012"
Ductile Iron		100 - 200	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
Gray Iron		80 - 175	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
Aluminum		100 - 250	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
<b>ALUMINUM</b>					
2014, 2024, 6061-(T1-T6), 7075, Extruded		125 - 300	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
<b>MAGNESIUM</b>					
		125 - 250	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
<b>COPPER</b>					
Copper Alloys		125 - 250	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
<b>BRASS</b>					
Short Chips Long Chips		125 - 250	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
		100 - 200	.0003" - .0005"	.0004" - .0008"	.0006" - .0012"
<b>BRONZE</b>					
Short Chips Long Chips		100 - 250	.0004" - .0008"	.0006" - .0012"	.0008" - .0015"
		80 - 175	.0003" - .0006"	.0004" - .0008"	.0006" - .0012"

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

# GARR TOOL High Performance Drilling Guide for Mini Drills

## Metric

TECHNICAL

Type	Rc Hardness	Recommended M/Min.	CHIPLOAD PER FLUTE (Fz)		
		Series 1250H 1550H 1850H	1/32" - 0.99mm (.0312" - .0390")	1.00mm - 2.00mm (.0394" - .0787")	2.01mm - 1/8" (.0791" - .1250")
<b>COBALT BASE ALLOYS</b>					
Powdered Metal, Stellite, Hs-21, Haynes 25/188, X-40, L-605	< 35	30 - 45	.005 - .010	.010 - .020	.015 - .030
	> 35	25 - 35	.005 - .010	.008 - .015	.013 - .025
<b>NICKEL BASE ALLOYS</b>					
Invar, Kovar, Inconel-625/718, Waspalloy, Rene, Hastalloy, A286	< 35	40 - 45	.008 - .013	.010 - .020	.015 - .030
	> 35	30 - 40	.005 - .010	.008 - .015	.013 - .025
<b>IRON BASE ALLOYS</b>					
Incoloy 800-802, Multimet N-155, Timkin 16-25-6, Carpenter 22-b3	< 35	40 - 50	.010 - .020	.015 - .030	.020 - .038
	> 35	25 - 30	.008 - .015	.010 - .020	.015 - .030
<b>MONEL</b>					
Monel - 65% Nickel		20 - 40	.005 - .010	.008 - .015	.013 - .025
<b>TITANIUM ALLOYS</b>					
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		45 - 60	.008 - .015	.010 - .020	.015 - .030
<b>STAINLESS STEELS</b>					
(Precipitation) 13/8, 15/5, 17-4, pH Types	< 35	40 - 50	.008 - .013	.010 - .020	.015 - .030
	> 35	25 - 40	.005 - .010	.008 - .015	.013 - .025
(Austenitic) Inox, 200 Series, 300 Series	< 35	30 - 50	.008 - .013	.010 - .020	.015 - .030
	> 35	25 - 40	.005 - .010	.008 - .015	.013 - .025
(Austenitic) 304L, 316L, Nitronic 50, Inox	< 35	25 - 30	.008 - .013	.010 - .020	.015 - .030
	> 35	20 - 25	.005 - .010	.008 - .015	.013 - .025
(Martensitic) 400 Series	< 35	30 - 45	.008 - .013	.010 - .020	.015 - .030
	> 35	25 - 40	.005 - .010	.008 - .015	.013 - .025
<b>HIGH STRENGTH TOOL STEELS</b>					
4140, 4340, 6150, 5210, A2, D2, P20, H11, H13, S2, O1	< 35	30 - 50	.008 - .015	.010 - .020	.015 - .030
	35-48	25 - 40	.005 - .013	.008 - .020	.015 - .030
	> 48	20 - 25	.005 - .010	.008 - .015	.013 - .025
<b>MEDIUM ALLOY TOOL STEELS</b>					
200, 250, 300, 8620	< 35	40 - 50	.010 - .020	.015 - .030	.020 - .038
	> 35	25 - 40	.008 - .013	.010 - .020	.015 - .030
<b>CARBON STEELS</b>					
Platinum, A36, 12L14, 1000's, 1100's, 1300's	< 35	40 - 50	.010 - .020	.015 - .030	.020 - .038
	> 35	25 - 40	.008 - .013	.010 - .020	.015 - .030
<b>CAST MATERIAL</b>					
Steel		30 - 50	.008 - .015	.010 - .020	.015 - .030
Ductile Iron		30 - 60	.010 - .020	.015 - .030	.020 - .038
Gray Iron		25 - 50	.010 - .020	.015 - .030	.020 - .038
Aluminum		30 - 75	.010 - .020	.015 - .030	.020 - .038
<b>ALUMINUM</b>					
2014, 2024, 6061-(T1-T6), 7075, Extruded		40 - 90	.010 - .020	.015 - .030	.020 - .038
<b>MAGNESIUM</b>					
		40 - 75	.010 - .020	.015 - .030	.020 - .038
<b>COPPER</b>					
Copper Alloys		40 - 75	.010 - .020	.015 - .030	.020 - .038
<b>BRASS</b>					
Short Chips Long Chips		40 - 75	.010 - .020	.015 - .030	.020 - .038
		30 - 60	.008 - .013	.010 - .020	.015 - .030
<b>BRONZE</b>					
Short Chips Long Chips		30 - 75	.010 - .020	.015 - .030	.020 - .038
		25 - 50	.008 - .015	.010 - .020	.015 - .030

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