

# GARR TOOL High Performance Drilling Guide

ISO Material	HRC	M/Min. (Vc)		CHIPLOAD PER TOOTH (Fz)				
		NON-COOLANT	COOLANT FED	3.0 - 6.0mm	6.0 - 10.0mm	10.0 - 13.0mm	13.0 - 16.0mm	16.0 - 20.0mm
<b>S</b>								
<b>COBALT BASE ALLOYS</b>								
Haynes 25/188, Stellite 21, Cobalt Chrome	< 40 > 40	25 20	30 25	.020 - .038 .013 - .030	.030 - .051 .023 - .043	.043 - .066 .036 - .058	.056 - .081 .048 - .074	.069 - .097 .061 - .089
<b>NICKEL BASE ALLOYS</b>								
Inconel-625/718, Waspaloy, Invar, Rene, Hastelloy, Monel	< 40 > 40	25 20	35 25	.020 - .038 .013 - .030	.030 - .051 .023 - .043	.043 - .066 .036 - .058	.056 - .081 .048 - .074	.069 - .097 .061 - .089
<b>IRON BASE ALLOYS</b>								
A286, Discaloy, Haynes 556, Carpenter 22, Greek Ascology	< 40 > 40	25 20	35 25	.020 - .038 .013 - .030	.030 - .051 .023 - .043	.043 - .066 .036 - .058	.056 - .081 .048 - .074	.069 - .097 .061 - .089
<b>TITANIUM ALLOYS</b>								
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		35	40	.025 - .046	.038 - .058	.051 - .074	.064 - .089	.076 - .104
5553 / Beta Titanium		20	30	.020 - .038	.030 - .051	.043 - .066	.056 - .081	.069 - .097
<b>M</b>								
<b>STAINLESS STEELS</b>								
13/8, 15/5, 17-4, pH Types	< 40 > 40	30 25	35 25	.025 - .043 .018 - .038	.036 - .056 .028 - .051	.048 - .071 .041 - .066	.061 - .086 .053 - .081	.074 - .102 .066 - .097
300 Series, 304L, Nitronic 50, Duplex, Super-Austenitic	< 40 > 40	25 20	35 25	.025 - .043 .018 - .038	.036 - .056 .028 - .051	.048 - .071 .041 - .066	.061 - .086 .053 - .081	.074 - .102 .066 - .097
400 Series - 403, 405, 420, 455	< 40 > 40	35 25	40 30	.025 - .043 .018 - .038	.036 - .056 .028 - .051	.048 - .071 .041 - .066	.061 - .086 .053 - .081	.074 - .102 .066 - .097
<b>P</b>								
<b>HIGH STRENGTH TOOL STEELS</b>								
A2, D2, P20, H13, S7, O1	< 40 > 40	50 40	60 45	.028 - .051 .018 - .036	.038 - .064 .028 - .048	.051 - .079 .041 - .064	.064 - .094 .053 - .079	.076 - .109 .066 - .094
<b>MEDIUM ALLOY TOOL STEELS</b>								
4140, 4340, 52100, 6150, 8620	< 40 > 40	55 45	65 50	.028 - .051 .018 - .036	.038 - .064 .028 - .048	.051 - .079 .041 - .064	.064 - .094 .053 - .079	.076 - .109 .066 - .094
<b>CARBON STEELS</b>								
1000's - 1018, 1020, 12L14	< 40	70	85	.036 - .058	.048 - .069	.058 - .064	.071 - .099	.084 - .114
<b>K</b>								
<b>CAST MATERIAL</b>								
Ductile Iron		75	105	.038 - .058	.048 - .071	.061 - .086	.074 - .102	.086 - .117
Gray Iron		85	115	.041 - .061	.051 - .074	.064 - .089	.076 - .104	.089 - .119
<b>N</b>								
<b>NON-FERROUS</b>								
Aluminum 2014, 2024, 6061-(T1-T6), 7075		105	130	.058 - .084	.069 - .097	.084 - .112	.097 - .127	.109 - .142
Aluminum Die Cast		90	115	.046 - .071	.056 - .084	.069 - .099	.081 - .114	.094 - .130
Magnesium		85	105	.051 - .076	.061 - .089	.074 - .104	.086 - .119	.099 - .135
Copper		60	90	.043 - .064	.053 - .076	.066 - .091	.079 - .107	.091 - .122
Brass		75	105	.051 - .081	.061 - .094	.074 - .109	.086 - .124	.099 - .140
Bronze		60	85	.048 - .064	.056 - .076	.069 - .091	.081 - .107	.094 - .122

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