

# GARR TOOL General Purpose Milling Guide

TECHNICAL

	ISO Material	HRC	M/Min. (Vc)	CHIPLOAD PER TOOTH (Fz)									
				1.5mm	3.0mm	5.0mm	6.0mm	8.0mm	10.0mm	12.0mm	16.0mm	20.0mm	25.0mm
S	<b>COBALT BASE ALLOYS</b>												
	Powdered Metal, Stellite, Hs-21, Haynes 25/188, X-40, L-605	< 40 > 40	24 - 35 20 - 31	.010 - .020 .008 - .015	.010 - .020 .008 - .015	.010 - .020 .008 - .015	.013 - .025 .008 - .020	.020 - .038 .013 - .025	.025 - .046 .020 - .038	.038 - .076 .025 - .038	.051 - .076 .038 - .064	.064 - .089 .038 - .051	.064 - .089 .038 - .051
	<b>NICKEL BASE ALLOYS</b>												
	Invar, Kovar, Inconel-625/718, Waspaloy, Rene, Hastelloy, A286	< 40 > 40	22 - 35 18 - 31	.010 - .020 .008 - .015	.010 - .020 .008 - .015	.010 - .020 .008 - .015	.013 - .025 .008 - .020	.020 - .038 .013 - .025	.025 - .046 .020 - .038	.038 - .076 .025 - .038	.051 - .076 .038 - .064	.064 - .089 .038 - .051	.064 - .089 .038 - .051
	<b>IRON BASE ALLOYS</b>												
	Incoloy 800-802, Multimet N-155, Timkin 16-25-6, Carpenter 22-b3	< 40 > 40	22 - 35 20 - 31	.010 - .020 .008 - .015	.010 - .020 .008 - .015	.010 - .020 .008 - .015	.013 - .025 .008 - .020	.020 - .038 .013 - .025	.025 - .046 .020 - .038	.038 - .076 .025 - .038	.051 - .076 .038 - .064	.064 - .089 .038 - .051	.064 - .089 .038 - .051
	<b>MONEL</b>												
	Monel - 65% Nickel		20 - 31	.008 - .020	.008 - .020	.013 - .030	.013 - .030	.020 - .038	.025 - .038	.033 - .051	.046 - .064	.051 - .076	.064 - .089
	<b>TITANIUM ALLOYS</b>												
Commercially Pure, 6Al-4V, Astm 1/2/3, 6Al-25N-4Zr-2Mo-Si		39 - 59	.008 - .020	.008 - .020	.013 - .030	.013 - .030	.020 - .038	.025 - .038	.033 - .051	.046 - .064	.051 - .076	.064 - .089	
5553 / Beta Titanium		35 - 47	.008 - .020	.008 - .020	.010 - .025	.010 - .025	.013 - .030	.020 - .036	.025 - .041	.025 - .051	.038 - .064	.038 - .064	
M	<b>STAINLESS STEELS</b>												
	13/8, 15/5, 17-4, pH Types	< 40 > 40	39 - 59 31 - 39	.005 - .013 .005 - .010	.008 - .015 .005 - .010	.008 - .018 .005 - .015	.015 - .023 .008 - .018	.020 - .030 .010 - .020	.033 - .046 .018 - .030	.025 - .051 .020 - .038	.030 - .064 .025 - .041	.030 - .051 .033 - .043	.051 - .071 .038 - .051
	200 Series, 300 Series	< 40 > 40	59 - 89 49 - 87	.005 - .013 .005 - .010	.005 - .015 .008 - .013	.013 - .020 .008 - .018	.020 - .038 .013 - .025	.038 - .046 .020 - .030	.025 - .046 .023 - .038	.038 - .064 .033 - .046	.046 - .071 .038 - .058	.056 - .081 .043 - .064	.064 - .102 .056 - .081
	304L, 316L, Nitronic 50	< 40 > 40	39 - 59 31 - 39	.008 - .015 .005 - .010	.008 - .018 .005 - .013	.013 - .025 .010 - .018	.020 - .038 .013 - .025	.023 - .033 .018 - .025	.025 - .046 .018 - .025	.038 - .051 .023 - .038	.046 - .056 .030 - .046	.046 - .089 .038 - .064	.058 - .091 .051 - .076
	400 Series	< 40 > 40	59 - 79 39 - 59	.013 - .020 .008 - .018	.018 - .025 .010 - .020	.023 - .038 .015 - .025	.023 - .036 .018 - .028	.028 - .038 .020 - .030	.033 - .046 .023 - .038	.038 - .064 .030 - .051	.051 - .089 .046 - .076	.056 - .102 .051 - .089	.076 - .117 .061 - .107
	<b>HIGH STRENGTH TOOL STEELS</b>												
A2, D2, P20, H13, S7, O1	< 40 > 40	59 - 79 39 - 59	.008 - .020 .008 - .013	.008 - .020 .008 - .013	.013 - .025 .008 - .020	.025 - .038 .013 - .025	.030 - .051 .013 - .025	.030 - .051 .013 - .025	.036 - .061 .025 - .038	.046 - .066 .030 - .046	.051 - .071 .036 - .051	.056 - .076 .038 - .056	
<b>MEDIUM ALLOY TOOL STEELS</b>													
4140, 4340, 52100, 6150, 8620	< 40 > 40	59 - 79 39 - 59	.008 - .020 .008 - .013	.008 - .020 .008 - .013	.013 - .025 .008 - .020	.025 - .038 .013 - .025	.030 - .051 .013 - .025	.030 - .051 .013 - .025	.036 - .061 .025 - .038	.046 - .066 .030 - .046	.051 - .071 .036 - .051	.056 - .076 .038 - .056	
<b>CARBON STEELS</b>													
1000's - 1018, 1020, 12L14	< 40 > 40	59 - 79 39 - 59	.008 - .020 .008 - .013	.008 - .020 .008 - .013	.013 - .025 .008 - .020	.025 - .038 .013 - .025	.030 - .051 .013 - .025	.030 - .051 .013 - .025	.036 - .061 .025 - .038	.046 - .066 .030 - .046	.051 - .071 .036 - .051	.056 - .076 .038 - .056	
<b>CAST STEELS</b>													
Steel		49 - 69	.008 - .020	.008 - .020	.013 - .025	.025 - .046	.025 - .046	.031 - .051	.038 - .064	.061 - .081	.066 - .086	.076 - .102	
K	<b>CAST MATERIAL</b>												
	Ductile Iron		69 - 89	.013 - .020	.020 - .031	.025 - .038	.038 - .064	.038 - .064	.051 - .076	.064 - .089	.089 - .114	.089 - .114	.114 - .140
Gray Iron		69 - 89	.013 - .020	.020 - .031	.025 - .038	.038 - .064	.038 - .064	.051 - .076	.064 - .089	.089 - .114	.089 - .114	.114 - .140	
N	<b>NON-FERROUS</b>												
	Aluminum		118 - 197	.008 - .013	.015 - .025	.020 - .036	.030 - .051	.036 - .071	.051 - .076	.089 - .122	.127 - .152	.147 - .178	.173 - .229
	Magnesium		118 - 197	.008 - .013	.015 - .025	.020 - .036	.030 - .051	.036 - .071	.051 - .076	.089 - .122	.127 - .152	.147 - .178	.173 - .229
	Copper		98 - 177	.008 - .013	.015 - .025	.020 - .036	.030 - .051	.036 - .071	.051 - .076	.089 - .122	.127 - .152	.147 - .178	.173 - .229
Brass, Bronze		79 - 157	.008 - .013	.015 - .025	.020 - .036	.030 - .051	.036 - .071	.051 - .076	.089 - .122	.127 - .152	.147 - .178	.173 - .229	
O	<b>COMPOSITE (non-ISO)</b>												
	Fiberglass, Plastics		79 - 157	.008 - .013	.015 - .025	.020 - .036	.030 - .051	.036 - .071	.051 - .076	.089 - .122	.127 - .152	.147 - .178	.173 - .229
	Graphite, G10	(See Graphite Chart - page 311)											

When plunging into a solid, drop feed by approximately 50%. 20% of diameter for basic engagement parameters.

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