

HSV-4

SPEEDS & FEEDS

4 Flute - Variable Pitch

HSV-4 / HSV-RN-4 / HSM-4																														
			Inches per Tooth (IPT)																											
Mat	terial Guide	Hardness	SFM		1/16			3/32			1/8			3/16			1/4		<u> </u>	3/8			1/2			3/4			1	
				Slot	Rgh	Fin	Slot	Rgh	Fin	Slot	Rgh	Fin	Slot	Rgh	Fin	Slot	Rgh	Fin	Slot	Rgh	Fin	Slot	Rgh	Fin	Slot	Rgh	Fin	Slot	Rgh	Fin
CARBON STEEL	10XX, 11XX, 12XX, 12LXX, ASTM A27,	< 75 HRB 75 - 98 HRB	455 445	.0004	.0006	.0008	.0005	.0009	.0012	.0007	.0012	.0016 .0014	.0010	.0018	.0019	.0014	.0024	.0021	.0020 .0015	.0036	.0024	.0027	.0047	.0028 .0024	.0038	.0067 .0049	.0034 .0029	.0049 .0036	.0086	.0041 .0035
STEEL	ASTM A36	21 - 36 HRC	400	.0002	.0003	.0006	.0002	.0005	.0008	.0003	.0006	.0011	.0005	.0009	.0013	.0007	.0011	.0014	.0010	.0017	.0017	.0013	.0022	.0019	.0018	.0032	.0023	.0023	.0041	.0028
LOW ALLOY STEEL	13XX, 41XX, 43XX, 51XX, 86XX, 93XX	75 - 98 HRB 21 - 36 HRC	390 340	.0003	.0004	.0007	.0004	.0006	.0010	.0005	.0008	.0013	.0007	.0011	.0015	.0009	.0015	.0017	.0013	.0023	.0019	.0017	.0030	.0023	.0024	.0043	.0027	.0031	.0054	.0033
		36 - 50 HRC	260	.0002	.0003	.0006	.0002	.0003	.0008	.0003	.0005	.0011	.0004	.0007	.0012	.0006	.0010	.0013	.0008	.0017	.0016	.0013	.0019	.0018	.0016	.0032	.0023	.0020	.0035	.0026
		> 50 HRC	155	.0001	.0002	.0005	.0002	.0003	.0007	.0002	.0004	.0009	.0003	.0006	.0010	.0005	.0008	.0012	.0007	.0012	.0014	.0009	.0015	.0016	.0012	.0022	.0019	.0016	.0028	.0023
TOOL STEEL	A2, H13, L6, P20, S7	75 - 98 HRB	340	.0003	.0004	.0007	.0004	.0006	.0010	.0005	.0008	.0013	.0007	.0011	.0015	.0009	.0015	.0017	.0013	.0023	.0019	.0017	.0030	.0023	.0024	.0043	.0027	.0031	.0054	.0033
		21 - 36 HRC 36 - 50 HRC	250 145	.0002	.0003	.0006	.0003	.0005	.0009	.0004	.0006	.0012	.0005	.0009	.0013	.0007	.0012	.0015	.0010	.0018	.0017	.0013	.0024	.0020	.0019	.0034	.0024	.0025	.0043	.0029
		> 50 HRC	85	.0001	.0002	.0005	.0002	.0003	.0007	.0002	.0004	.0009	.0003	.0006	.0010	.0005	.0008	.0012	.0007	.0012	.0014	.0009	.0015	.0016	.0012	.0022	.0019	.0016		.0023
SPECIALTY STEEL	300M, Invar 36, Kovar, Maraging 200, Marag- ing 250, Maraging 300,	< 75 HRB	290	.0003	.0005	.0008	.0005	.0008	.0011	.0006	.0010	.0015	.0009	.0015	.0017	.0011	.0020	.0019	.0017	.0030	.0022	.0022	.0039	.0026	.0032	.0056	.0031	.0040	.0071	.0037
		75 - 98 HRB	255	.0002	.0004	.0006	.0003	.0005	.0009	.0004	.0007	.0012	.0006	.0010	.0014	.0008	.0014	.0016	.0012	.0021	.0018	.0015	.0027	.0021	.0022	.0038	.0025	.0028	.0049	.0031
		21 - 36 HRC 36 - 50 HRC	175 150	.0002	.0003	.0006	.0003	.0005	.0009	.0004	.0006	.0012	.0005	.0009	.0013	.0007	.0012	.0015	.0010	.0018	.0017	.0014	.0024	.0020	.0020	.0034	.0024	.0025	.0044	.0029
	Maraging 350	> 50 HRC	55	.0001	.0002	.0005	.0002	.0003	.0007	.0002	.0004	.0009	.0003	.0005	.0010	.0004	.0007	.0011	.0006	.0010	.0013	.0008	.0013	.0015	.0011	.0019	.0018	.0014		.0022
AUSTENITIC STAINLESS STEEL	Nitronic 50, Nitronic 60, 301, 303, 304, 304L, Incoloy 27-7MO, 316, 316L, 321, 347	75 - 98 HRB	265	.0002	.0004	.0007	.0003	.0006	.0010	.0004	.0008	.0013	.0006	.0011	.0015	.0009	.0015	.0017	.0013	.0022	.0019	.0017	.0029	.0022	.0024	.0042	.0026	.0030	.0053	.0032
		21 - 36 HRC	225	.0002	.0004	.0006	.0003	.0005	.0009	.0004	.0007	.0012	.0006	.0010	.0014	.0008	.0014	.0016	.0011	.0020	.0018	.0015	.0026	.0021	.0021	.0038	.0025	.0027	.0048	.0030
		36 - 50 HRC	180	.0002	.0003	.0006	.0002	.0005	.0008	.0003	.0006	.0011	.0005	.0008	.0012	.0006	.0011	.0014	.0009	.0016	.0016	.0012	.0021	.0019	.0017	.0030	.0023	.0022	.0038	.0027
MARTENSITIC & FERRITIC STAINLESS STEEL	403, 410, 416, 420, 440, 430, 446	75 - 98 HRB 21 - 36 HRC	300 280	.0003 .0002	.0004 .0004	.0007 .0006	.0004	.0006 .0005	.0010 .0009	.0005 .0004	.0008 .0007	.0013 .0012	.0007 .0006	.0011 .0010	.0015 .0014	.0009 .0008	.0016 .0013	.0017 .0016	.0013 .0011	.0023 .0020	.0019 .0018	.0017 .0015	.0030 .0026	.0023 .0021	.0024 .0021	.0043 .0037	.0027 .0025	.0031 .0027	.0055 .0047	.0033
PH STAINLESS	15-5, 17-4, Carpenter	21 - 36 HRC	200	.0002	.0003	.0006	.0002	.0005	.0008	.0003	.0006	.0011	.0005	.0008	.0012	.0006	.0011	.0014	.0010	.0017	.0016	.0012	.0022	.0019	.0018	.0031	.0023	.0023	.0040	.0028
STEEL	450, Carpenter 465	36 - 50 HRC	145	.0002	.0003	.0006	.0002	.0004	.0008	.0003	.0005	.0011	.0004	.0007	.0012	.0006	.0010	.0014	.0008	.0014	.0015	.0011	.0019	.0018	.0016	.0027	.0021	.0020	.0035	.0026
GRAY CAST	SAE J431, ASTM A48	75 - 98 HRB	410	.0004	.0007	.0009	.0005	.0010	.0013	.0007	.0013	.0017	.0011	.0019	.0019	.0014	.0025	.0021	.0021	.0037	.0025	.0027	.0048	.0029	.0039	.0069	.0034	.0050		.0042
IRON MALLEABLE CAST IRON	ASTM A47, ASTM A220, ASTM A602	21 - 36 HRC	370	.0002	.0004	.0006	.0003	.0005	.0009	.0004	.0007	.0012	.0006	.0010	.0014	.0008	.0013	.0016	.0011	.0020	.0018	.0015	.0026	.0021	.0021	.0038	.0025	.0027	.0048	.0031
		75 - 98 HRB 21 - 36 HRC	345 335	.0003	.0004	.0007	.0004	.0006	.0010	.0005	.0008	.0013	.0007	.0012	.0015	.0009	.0016	.0017	.0013	.0023	.0019	.0017	.0031	.0023	.0025	.0044	.0027	.0032	.0056	.0033
NODULAR	.,	75 - 98 HRB	310	.0003	.0004	.0007	.0004	.0006	.0011	.0005	.0008	.0014	.0007	.0012	.0015	.0009	.0016	.0017	.0014	.0024	.0020	.0018	.0032	.0023	.0026	.0046	.0028	.0033	.0058	.0034
(DUCTILE)	ASTM A536, ASTM 897	21 - 36 HRC	260	.0002	.0003	.0006	.0002	.0005	.0008	.0003	.0006	.0011	.0005	.0008	.0012	.0006	.0011	.0014	.0009	.0016	.0016	.0012	.0021	.0019	.0017	.0030	.0023	.0022	.0039	.0027
CAST IRON		36 - 50 HRC	135	.0001	.0002	.0005	.0002	.0003	.0007	.0002	.0004	.0009	.0003	.0005	.0010	.0004	.0007	.0011	.0006	.0010	.0013	.0008	.0013	.0015	.0011	.0019	.0018	.0014		.0022
PURE NICKEL	Nickel 200, Nickel 201	< 75 HRB 75 - 98 HRB	285 250	.0003	.0006	.0008	.0005	.0008	.0011	.0006 .0005	.0011	.0015 .0014	.0009	.0016	.0017 .0016	.0012	.0021	.0020	.0018 .0015	.0031	.0023	.0023	.0041	.0026 .0024	.0033	.0059	.0031	.0042 .0035	.0075	.0038
NICKEL ALLOY	Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718,	75 - 98 HRB	80	.0002	.0003	.0006	.0002	.0004	.0008	.0003	.0005	.0011	.0005	.0008	.0012	.0006	.0011	.0014	.0009	.0016	.0016	.0012	.0021	.0019	.0017	.0030	.0023	.0022	.0038	.0027
		21 - 36 HRC	75	.0002	.0003	.0006	.0002	.0004	.0008	.0003	.0005	.0011	.0004	.0008	.0012	.0006	.0010	.0014	.0009	.0015	.0016	.0011	.0020	.0018	.0016	.0029	.0022	.0021	.0036	.0027
	Incoloy 20	36 - 50 HRC	70	.0002	.0003	.0005	.0002	.0004	.0008	.0003	.0005	.0010	.0004	.0007	.0011	.0005	.0009	.0013	.0007	.0013	.0015	.0010	.0017	.0017	.0014	.0025	.0020	.0018	.0031	.0025
PURE	Ti Grade 1, Ti Grade 2,	< 75 HRB	300	.0004	.0008	.0009	.0006	.0011	.0014	.0008	.0015	.0018	.0013	.0022	.0020	.0017	.0029	.0023	.0025	.0043	.0027	.0032	.0057	.0031	.0046	.0081	.0037	.0059	- 1	.0045
TITANIUM	Ti Grade 3, Ti Grade 4, Ti Grade 7, Ti Grade 12	75 - 98 HRB 21 - 36 HRC	275 250	.0004	.0006	.0009	.0005	.0009	.0013	.0007	.0012	.0017	.0010	.0018	.0019	.0014	.0024	.0021	.0021	.0036	.0024	.0027	.0047	.0028	.0039	.0068	.0034	.0049	.0087	.0041
TITANIUM	Ti 3Al-2.5V. Ti 6Al-4V. Ti	21 - 36 HRC	180	.0003	.0005	.0007	.0004	.0007	.0010	.0005	.0009	.0014	.0008	.0014	.0016	.0008	.0018	.0018	.0015	.0027	.0021	.0020	.0036	.0025	.0029	.0051	.0029	.0037	.0051	.0036
ALLOY	10V-2Fe-3Al	36 - 50 HRC	160	.0002	.0004	.0006	.0003	.0005	.0009	.0004	.0007	.0012	.0006	.0010	.0014	.0007	.0013	.0016	.0011	.0020	.0018	.0015	.0026	.0021	.0021	.0037	.0025	.0026	.0047	.0030
COBALT	ASTM F562, ASTM	75 - 98 HRB	210	.0002	.0003	.0006	.0003	.0005	.0009	.0004	.0006	.0012	.0005	.0009	.0013	.0007	.0012	.0015	.0010	.0018	.0017	.0013	.0024	.0020	.0019	.0034	.0024	.0025	.0043	.0029
ALLOY	F90, ASTM F75, ASTM F799	21 - 36 HRC 36 - 50 HRC	170 65	.0002 .0001	.0003	.0006	.0002	.0005	.0008 .0007	.0003 .0002	.0006 .0004	.0011 .0009	.0005	.0009 .0006	.0013 .0011	.0007 .0005	.0012 .0008	.0015 .0012	.0010 .0007	.0017 .0012	.0017 .0014	.0013	.0023 .0016	.0020 .0016	.0019 .0013	.0033 .0022	.0023 .0019	.0024 .0016	.0042 .0028	.0028 .0023

Milling Process	Hardness	ADOC	RDOC				
Clot (Full Clotting)	< 35 HRC	75%-125% Diameter	100% Diameter				
Slot (Full Slotting)	≥ 35 HRC	60%-100% Diameter	100% Diameter				
Dala (Traditional Develope)	< 35 HRC	Up to Max LOC	30%-40% Diameter				
Rgh (Traditional Roughing)	≥ 35 HRC	Up to Max LOC	25%-35% Diameter				
Fin (Finishing)	N/A	Up to Max LOC	4%-6% Diameter				

NOTES:

Hardness Scales: HRB = Rockwell B

HRC = Rockwell C

IPT values shown are for 2.5xD length of cut tools, and should be adjusted for longer or shorter lengths of cut. Values shown are for non-reached tools. For tools with reaches greater than 3xD, IPT should be reduced. For more accurate running parameters, please refer to Machining Advisor Pro.