

## HSV-4

## **SPEEDS & FEEDS**

4 Flute - Variable Pitch

HSV-4 / HSV-RN-4																								
Material Guide					Inches per Tooth (IPT)																			
		Hardness	SFM	Slot	1/8 Rgh	Fin	Slot	3/16 Rgh	Fin	Slot	1/4 Rgh	Fin	Slot	3/8 Rgh	Fin	Slot	1/2 Rgh	Fin	Slot	3/4 Rgh	Fin	Slot	1 Rgh	Fin
0.155.011 40.07 40.07 40.07 40.07	< 75 HRB	455	.0007	.0012	.0016	.0010	.0018	.0019	.0014	.0024	.0021	.0020	.0036	.0024	.0027	.0047	.0028	.0038	.0067	.0034	.0049	.0086	.0041	
CARBON STEEL	10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36	75 - 98 HRB 21 - 36 HRC	445 400	.0005 .0003	.0009 .0006	.0014 .0011	.0008 .0005	.0013	.0016 .0013	.0010 .0007	.0018 .0011	.0018 .0014	.0015 .0010	.0026 .0017	.0021 .0017	.0020 .0013	.0034 .0022	.0024	.0028 .0018	.0049 .0032	.0029 .0023	.0036 .0023	.0063 .0041	.0035 .0028
LOW ALLOY STEEL	13XX, 41XX, 43XX, 51XX,	75 - 98 HRB 21 - 36 HRC	390 340	.0005	.0008	.0013	.0007	.0011	.0015	.0009	.0015	.0017	.0013	.0023	.0019	.0017	.0030	.0023	.0024	.0043	.0027	.0031	.0054	.0033
SIEEL	86XX, 93XX	36 - 50 HRC > 50 HRC 75 - 98 HRB	260 155 340	.0003	.0005 .0004	.0011	.0004 .0003	.0007	.0012	.0006	.0010	.0013 .0012	.0008	.0015 .0012	.0016 .0014	.0011 .0009	.0019 .0015	.0018	.0016 .0012	.0028 .0022 .0043	.0022 .0019	.0020 .0016	.0035 .0028	.0026 .0023
TOOL STEEL A2, H13, L6	A2, H13, L6, P20, S7	21 - 36 HRC 36 - 50 HRC	250 145	.0004	.0006 .0005	.0012 .0010	.0005 .0004	.0009	.0013 .0012	.0007 .0005	.0012 .0010	.0015 .0013	.0010 .0008	.0018 .0014	.0017 .0015	.0013 .0010	.0024 .0019	.0020 .0018	.0019 .0015	.0034 .0027	.0024 .0021	.0025 .0019	.0043 .0034	.0029 .0026
SPECIALTY N STEEL 2	300M, Invar 36, Kovar, Maraging 200, Maraging 250, Maraging 300, Maraging 350	> 50 HRC < 75 HRB 75 - 98 HRB	290 255	.0002 .0006 .0004	.0004 .0010 .0007	.0009 .0015 .0012	.0003 .0009 .0006	.0006 .0015 .0010	.0010 .0017 .0014	.0005	.0008 .0020 .0014	.0012 .0019 .0016	.0007 .0017 .0012	.0012 .0030 .0021	.0014 .0022 .0018	.0009 .0022 .0015	.0015 .0039 .0027	.0016 .0026 .0021	.0012 .0032 .0022	.0022 .0056 .0038	.0019 .0031 .0025	.0016 .0040 .0028	.0028 .0071 .0049	.0023 .0037 .0031
		21 - 36 HRC 36 - 50 HRC > 50 HRC	175 150 55	.0004 .0003 .0002	.0006 .0006 .0004	.0012 .0011 .0009	.0005 .0005 .0003	.0009 .0008 .0005	.0013 .0012 .0010	.0007 .0006 .0004	.0012 .0011 .0007	.0015 .0014 .0011	.0010 .0009 .0006	.0018 .0016 .0010	.0017 .0016 .0013	.0014 .0012 .0008	.0024 .0021 .0013	.0020 .0019 .0015	.0020 .0017 .0011	.0034 .0031 .0019	.0024 .0023 .0018	.0025 .0022 .0014	.0044 .0039 .0024	.0029 .0028 .0022
AUSTENITIC STAINLESS STEEL	Nitronic 50, Nitronic 60, 301, 303, 304, 304L, Incoloy 27-7MO, 316, 316L, 321, 347	75 - 98 HRB 21 - 36 HRC 36 - 50 HRC	265 225 180	.0004 .0004 .0003	.0008 .0007 .0006	.0013 .0012 .0011	.0006 .0006 .0005	.0011 .0010 .0008	.0015 .0014 .0012	.0009 .0008 .0006	.0015 .0014 .0011	.0017 .0016 .0014	.0013 .0011 .0009	.0022 .0020 .0016	.0019 .0018 .0016	.0017 .0015 .0012	.0029 .0026 .0021	.0022 .0021 .0019	.0024 .0021 .0017	.0042 .0038 .0030	.0026 .0025 .0023	.0030 .0027 .0022	.0053 .0048 .0038	.0032 .0030 .0027
MARTENSITIC & FERRITIC STAINLESS STEEL	403, 410, 416, 420, 440, 430, 446	75 - 98 HRB 21 - 36 HRC	300 280	.0005 .0004	.0008	.0013 .0012	.0007 .0006	.0011 .0010	.0015 .0014	.0009	.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 STEEL	15-5, 17-4, Carpenter 450, Carpenter 465	21 - 36 HRC 36 - 50 HRC	200 145	.0003	.0006	.0011	.0005 .0004	.0008	.0012	.0006	.0011	.0014	.0010	.0017 .0014	.0016 .0015	.0012	.0022 .0019	.0019 .0018	.0018 .0016	.0031	.0023	.0023	.0040 .0035	.0028 .0026
GRAY CAST IRON	SAE J431, ASTM A48	75 - 98 HRB 21 - 36 HRC	410 370	.0007 .0004	.0013 .0007	.0017 .0012	.0011 .0006	.0019 .0010	.0019 .0014	.0014 .0008	.0025 .0013	.0021 .0016	.0021 .0011	.0037 .0020	.0025 .0018	.0027 .0015	.0048 .0026	.0029 .0021	.0039 .0021	.0069 .0038	.0034 .0025	.0050 .0027	.0088 .0048	.0042 .0031
MALLEABLE CAST IRON	ASTM A47, ASTM A220, ASTM A602	75 - 98 HRB 21 - 36 HRC	345 335	.0005 .0004	.0008 .0007	.0013 .0012	.0007 .0006	.0012 .0010	.0015 .0014	.0009 .0008	.0016 .0014	.0017 .0016	.0013 .0011	.0023 .0020	.0019 .0018	.0017 .0015	.0031 .0026	.0023 .0021	.0025 .0021	.0044 .0038	.0027 .0025	.0032 .0027	.0056 .0048	.0033 .0031
NODULAR (DUCTILE) CAST IRON	ASTM A536, ASTM 897	75 - 98 HRB 21 - 36 HRC 36 - 50 HRC	310 260 135	.0005 .0003 .0002	.0008 .0006 .0004	.0014 .0011 .0009	.0007 .0005 .0003	.0012 .0008 .0005	.0015 .0012 .0010	.0009 .0006 .0004	.0016 .0011 .0007	.0017 .0014 .0011	.0014 .0009 .0006	.0024 .0016 .0010	.0020 .0016 .0013	.0018 .0012 .0008	.0032 .0021 .0013	.0023 .0019 .0015	.0026 .0017 .0011	.0046 .0030 .0019	.0028 .0023 .0018	.0033 .0022 .0014	.0058 .0039 .0024	.0034 .0027 .0022
PURE NICKEL	Nickel 200, Nickel 201	< 75 HRB 75 - 98 HRB	285 250	.0006 .0005	.0011 .0009	.0015 .0014	.0009 .0008	.0016 .0013	.0017 .0016	.0012 .0010	.0021 .0018	.0020 .0018	.0018 .0015	.0031 .0026	.0023 .0021	.0023 .0019	.0041 .0034	.0026 .0024	.0033 .0028	.0059 .0049	.0031 .0029	.0042 .0035	.0075 .0063	.0038 .0035
NICKEL ALLOY	Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718, Incoloy 20	75 - 98 HRB 21 - 36 HRC 36 - 50 HRC	80 75 70	.0003 .0003 .0003	.0005 .0005 .0005	.0011 .0011 .0010	.0005 .0004 .0004	.0008 .0008 .0007	.0012 .0012 .0011	.0006 .0006 .0005	.0011 .0010 .0009	.0014 .0014 .0013	.0009 .0009 .0007	.0016 .0015 .0013	.0016 .0016 .0015	.0012 .0011 .0010	.0021 .0020 .0017	.0019 .0018 .0017	.0017 .0016 .0014	.0030 .0029 .0025	.0023 .0022 .0020	.0022 .0021 .0018	.0038 .0036 .0031	.0027 .0027 .0025
PURE TITANIUM	Ti Grade 1, Ti Grade 2, Ti Grade 3, Ti Grade 4, Ti Grade 7, Ti Grade 12	< 75 HRB 75 - 98 HRB 21 - 36 HRC	300 275 250	.0008 .0007 .0005	.0015 .0012 .0009	.0018 .0017 .0014	.0013 .0010 .0008	.0022 .0018 .0014	.0020 .0019 .0016	.0017 .0014 .0010	.0029 .0024 .0018	.0023 .0021 .0018	.0025 .0021 .0015	.0043 .0036 .0027	.0027 .0024 .0021	.0032 .0027 .0020	.0057 .0047 .0036	.0031 .0028 .0025	.0046 .0039 .0029	.0081 .0068 .0051	.0037 .0034 .0029	.0059 .0049 .0037	.0103 .0087 .0065	.0045 .0041 .0036
TITANIUM ALLOY	Ti 3Al-2.5V, Ti 6Al-4V, Ti 10V-2Fe-3Al	21 - 36 HRC 36 - 50 HRC	180 160	.0004 .0004	.0007 .0007	.0013 .0012	.0006 .0006	.0011 .0010	.0014 .0014	.0008 .0007	.0014 .0013	.0016 .0016	.0012 .0011	.0021 .0020	.0019 .0018	.0016 .0015	.0028 .0026	.0022 .0021	.0023 .0021	.0040 .0037	.0026 .0025	.0029 .0026	.0051 .0047	.0031 .0030
COBALT ALLOY	ASTM F562, ASTM F90, ASTM F75, ASTM F799	75 - 98 HRB 21 - 36 HRC 36 - 50 HRC	210 170 65	.0004 .0003 .0002	.0006 .0006 .0004	.0012 .0011 .0009	.0005 .0005 .0003	.0009 .0009 .0006	.0013 .0013 .0011	.0007 .0007 .0005	.0012 .0012 .0008	.0015 .0015 .0012	.0010 .0010 .0007	.0018 .0017 .0012	.0017 .0017 .0014	.0013 .0013 .0009	.0024 .0023 .0016	.0020 .0020 .0016	.0019 .0019 .0013	.0034 .0033 .0022	.0024 .0023 .0019	.0025 .0024 .0016	.0043 .0042 .0028	.0029 .0028 .0023

Milling Process	Hardness	ADOC	RDOC				
Slot (Full Slotting)	< 35 HRC	75%-125% Diameter	100% Diameter				
Siot (Full Siotting)	≥ 35 HRC	60%-100% Diameter	100% Diameter				
Rgh (Traditional Roughing)	< 35 HRC	Up to Max LOC	30%-40% Diameter				
Rgii (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.