

## SPEEDS & FEEDS HXVR-5

5 Flute - Knuckle Rougher - Variable Pitch

			H	(VF	R / I	HX۱	∕R-	RN	(5	Flu	ıte)						
				Inches per Tooth (IPT)													
Material Guide		Hardness	SFM	1/8		3/16		1/4		3/8		1/2		3/4		1	
				Slot	Rgh	Slot	Rgh	Slot	Rgh	Slot	Rgh	Slot	Rgh	Slot	Rgh	Slot	Rgh
CARBON STEEL	10XX, 11XX, 12XX, 12LXX, ASTM A27, ASTM A36	< 75 HRB	455	.0007	.0010	.0010	.0015	.0015	.0023	.0022	.0034	.0029	.0045	.0041	.0064	.0052	.0082
		75 - 98 HRB 21 - 36 HRC	445 400	.0006 .0004	.0009	.0008	.0013	.0012 .0008	.0019 .0012	.0018 .0012	.0028 .0018	.0024 .0015	.0037 .0024	.0034 .0022	.0053 .0035	.0043 .0028	.0068
LOW ALLOY STEEL	13XX, 41XX, 43XX, 51XX, 86XX, 93XX	75 - 98 HRB	390	.0005	.0008	.0007	.0011	.0011	.0017	.0016	.0025	.0021	.0032	.0029	.0046	.0038	.0059
		21 - 36 HRC	340	.0004	.0006	.0005	.0008	.0008	.0012	.0012	.0018	.0015	.0024	.0022	.0034	.0028	.0044
		36 - 50 HRC > 50 HRC	260 155	.0003	.0005	.0005	.0007	.0007 .0005	.0011	.0010	.0016 .0013	.0013 .0011	.0021 .0017	.0019 .0015	.0030 .0024	.0024 .0019	.0038
TOOL STEEL	A2, H13, L6, P20, S7	75 - 98 HRB	340	.0005	.0008	.0007	.0011	.0011	.0017	.0016	.0025	.0021	.0032	.0029	.0024	.0038	.0059
		21 - 36 HRC	250	.0004	.0006	.0006	.0009	.0008	.0013	.0013	.0020	.0016	.0026	.0023	.0037	.0030	.0047
		36 - 50 HRC	145	.0003	.0005	.0004	.0007	.0007	.0010	.0010	.0015	.0013	.0020	.0018	.0029	.0023	.0036
		> 50 HRC < 75 HRB	85 290	.0002	.0004	.0004	.0006	.0005	.0008	.0008	.0013	.0010 .0015	.0016	.0015	.0023	.0019	.0030
SPECIALTY STEEL	300M, Invar 36, Kovar, Maraging 200, Maraging 250, Maraging 300, Maraging 350	75 - 98 HRB	255	.0004	.0008	.0005	.0006	.0006	.0012	.0012	.0016	.0015	.0024	.0022	.0050	.0026	.0043
		21 - 36 HRC	175	.0003	.0004	.0004	.0006	.0006	.0009	.0009	.0014	.0012	.0018	.0017	.0026	.0021	.0033
		36 - 50 HRC	150	.0004	.0005	.0005	.0008	.0008	.0012	.0011	.0018	.0015	.0023	.0021	.0033	.0027	.0042
		> 50 HRC	55	.0002	.0003	.0003	.0005	.0005	.0007	.0007	.0011	.0009	.0014	.0013	.0020	.0017	.0026
AUSTENITIC STAINLESS STEEL	Nitronic 50, Nitronic 60, 301, 303, 304, 304L, Incoloy 27-7MO, 316,	75 - 98 HRB	265	.0005	.0008	.0008	.0012	.0012	.0019	.0018	.0028	.0023	.0036	.0033	.0052	.0042	.0066
		21 - 36 HRC	225	.0004	.0006	.0006	.0009	.0009	.0014	.0013	.0021	.0017	.0027	.0025	.0038	.0031	.0049
	316L, 321, 347	36 - 50 HRC	180	.0003	.0005	.0005	.0007	.0007	.0011	.0010	.0016	.0013	.0021	.0019	.0030	.0024	.0038
MARTENSITIC & FERRITIC	403, 410, 416, 420, 440, 430, 446	75 - 98 HRB	300	.0005	.0008	.0007	.0011	.0011	.0017	.0016	.0025	.0021	.0032	.0030	.0046	.0038	.0059
STAINLESS		21 - 36 HRC	280	.0004	.0007	.0006	.0010	.0009	.0014	.0014	.0021	.0018	.0028	.0026	.0040	.0033	.0051
STEEL	15-5, 17-4, Carpenter 450, Carpenter 465	21 - 36 HRC	200	.0004	.0006	.0005	.0008	.0008	.0012	.0012	.0018	.0015	.0024	.0022	.0034	.0028	.0043
PH STAINLESS STEEL		36 - 50 HRC	145	.0004	.0005	.0003	.0007	.0007	.0012	.0012	.0015	.0013	.0024	.0022	.0034	.0028	.0043
GRAY CAST IRON	SAE J431, ASTM A48	75 - 98 HRB	410	.0008	.0012	.0012	.0018	.0017	.0027	.0025	.0040	.0033	.0052	.0048	.0075	.0061	.0095
		21 - 36 HRC	370	.0004	.0007	.0006	.0010	.0009	.0015	.0014	.0022	.0018	.0028	.0026	.0041	.0033	.0052
MALLEABLE CAST IRON	ASTM A47, ASTM A220, ASTM A602	75 - 98 HRB 21 - 36 HRC	345 335	.0005 .0004	.0008	.0007	.0011 .0010	.0011	.0017 .0015	.0016 .0014	.0025	.0021 .0018	.0033	.0030 .0026	.0047 .0041	.0039	.0061 .0052
	ASTM A002	75 - 98 HRB	310	.0004	.0007	.0008	.0010	.0009	.0015	.0014	.0022	.0018	.0029	.0026	.0041	.0033	.0052
NODULAR (DUCTILE) CAST IRON	ASTM A536, ASTM 897	21 - 36 HRC	260	.0003	.0005	.0005	.0008	.0008	.0010	.0017	.0020	.0022	.0023	.0032	.0033	.0040	.0042
		36 - 50 HRC	135	.0002	.0003	.0003	.0005	.0005	.0007	.0007	.0011	.0009	.0015	.0013	.0021	.0017	.0026
PURE NICKEL NICKEL ALLOY	Nickel 200, Nickel 201  Hastelloy C-22, Inconel 625, Waspaloy, René 41, Inconel 718, Incoloy 20	< 75 HRB	285	.0007	.0010	.0010	.0015	.0015	.0023	.0022	.0034	.0028	.0044	.0041	.0063	.0052	.0081
		75 - 98 HRB	250	.0005	.0009	.0008	.0013	.0012	.0019	.0018	.0028	.0024	.0037	.0034	.0053	.0043	.0068
		75 - 98 HRB	80	.0004	.0006	.0006	.0009	.0008	.0013	.0012	.0019	.0016 .0016	.0025	.0023	.0036	.0029	.0045
		21 - 36 HRC 36 - 50 HRC	75 70	.0004	.0005	.0005	.0009	.0008	.0013	.0012	.0019	.0016	.0025 .0020	.0023	.0036	.0030	.0046 .0037
PURE TITANIUM	Ti Grade 1, Ti Grade 2, Ti Grade 3, Ti Grade 4, Ti Grade 7, Ti Grade 12	< 75 HRB	300	.0003	.0003	.0014	.0021	.0007	.0032	.0030	.0047	.0013	.0020	.0056	.0029	.0024	.0112
		75 - 98 HRB	275	.0008	.0014	.0014	.0021	.0020	.0032	.0030	.0039	.0033	.0051	.0030	.0073	.0060	.0094
		21 - 36 HRC	250	.0006	.0009	.0009	.0013	.0013	.0020	.0019	.0029	.0025	.0038	.0035	.0055	.0045	.0070
TITANIUM	Ti 3Al-2.5V, Ti 6Al-4V, Ti	21 - 36 HRC	180	.0005	.0007	.0007	.0010	.0010	.0016	.0015	.0023	.0019	.0030	.0028	.0043	.0035	.0055
ALLOY	10V-2Fe-3Al	36 - 50 HRC	160 210	.0004	.0007	.0006	.0009	.0009	.0014	.0013	.0021	.0018	.0028	.0025	.0039	.0032	.0050
COBALT	ASTM F562, ASTM F90, ASTM F75, ASTM F799	75 - 98 HRB 21 - 36 HRC	210 170	.0004 .0004	.0006	.0006	.0009	.0008 .0008	.0013	.0012	.0020 .0019	.0016 .0016	.0026 .0025	.0023	.0037 .0035	.0030	.0047 .0045
ALLOY		36 - 50 HRC	65	.0003	.0004	.0004	.0006	.0006	.0009	.0008	.0013	.0010	.0023	.0015	.0024	.0020	.0031

Milling Process	Hardness	ADOC	RDOC			
Slot (Full Slotting)	< 35 HRC	30%-60% Diameter	100% Diameter			
Slot (Full Slotting)	≥ 35 HRC	30%-60% Diameter	100% Diameter			
Dale (Traditional Develope)	< 35 HRC	Up to Max LOC	10%-30% Diameter			
Rgh (Traditional Roughing)	≥ 35 HRC	Up to Max LOC	10%-30% 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.