



## 4-Flute, Extra High Performance Endmills, Variable Index, Square, Corner Radius & Ball End, 38 Degree Helix

- RedLine XHP Variable 4-Flute tools are designed for faster metal removal. We control vibration and chatter through a unique dampening geometry and can handle faster speeds and feeds generated by the application of our AlCrNX coating.
- Our XHP Variable 4-flute tools can be run wet or dry and can be used in a wide variety of applications, from roughing and finishing to slotting and pocketing.
- Designed to run in a wide range of materials from cast irons and steels to titanium and high temperature alloys.
- These tools are the ultimate for versatility, performance and lowest overall cost.
- These Extra High Performance tools can be found on pages 47-53, 57.

### XHP Variable Index 4-Flute Tools Speeds & Feeds (Cont'd)

Material	Grades	Cut Type	Axial DOC	Radial DOC	Stub/Reg	Long/X-Long	Feed by Endmill Diameter (IPT)								
							SFM	SFM	1/8	1/4	3/8	1/2	5/8	3/4	1
							AlCrNX	AlCrNX	(.1250)	(.2500)	(.3750)	(.5000)	(.6250)	(.7500)	(1.000)
<b>P - Steels</b>															
High Strength Tool Steel	A2, D2, P20, H11, H13, S2, 01	Slotting	.75 x D	1 x D	300	240	.0004-.0006	.0010-.0012	.0014-.0018	.0020-.0024	.0024-.0030	.0029-.0036	.0038-.0048		
		Peripheral - Rough	1.25 x D	.3 x D	375	300	.0006-.0007	.0012-.0015	.0018-.0022	.0023-.0029	.0030-.0037	.0035-.0044	.0047-.0059		
		Peripheral - HEM	2 x D	.15 x D	475	380	.0010-.0012	.0019-.0024	.0028-.0035	.0038-.0047	.0047-.0059	.0057-.0071	.0076-.0095		
		Finish	1.5 x D	.015 x D	450	360	.0006-.0007	.0012-.0015	.0018-.0022	.0023-.0029	.0030-.0037	.0035-.0044	.0047-.0059		
Low Carbon	A36, 12L14, 12L15, 1005, 1018, 1020, 1108-1119, 1213-1215, 1513-1518, 4012, 5015, 9310	Slotting	1 x D	1 x D	350	280	.0004-.0006	.0010-.0013	.0015-.0019	.0020-.0026	.0025-.0032	.0030-.0038	.0040-.0050		
		Peripheral - Rough	1.25 x D	.5 x D	425	340	.0006-.0008	.0013-.0016	.0020-.0024	.0026-.0032	.0032-.0040	.0038-.0048	.0050-.0064		
		Peripheral - HEM	2 x D	.15 x D	525	420	.0012-.0015	.0025-.0031	.0038-.0046	.0049-.0061	.0060-.0077	.0074-.0092	.0098-.0123		
		Finish	1.5 x D	.015 x D	500	400	.0007-.0009	.0014-.0018	.0022-.0027	.0029-.0036	.0035-.0044	.0042-.0053	.0057-.0071		
Medium Carbon	1040-1095, 1140-1151, 1330-1345, 1520-1572, 4023-4063, 4120-4161, 4330-4340, 4620-4640, 8620-8660, 8740-8750, 6150, 51000, 52100	Slotting	1 x D	1 x D	300	240	.0004-.0006	.0010-.0012	.0014-.0018	.0020-.0024	.0024-.0030	.0029-.0036	.0038-.0048		
		Peripheral - Rough	1.25 x D	.5 x D	375	300	.0006-.0008	.0012-.0015	.0018-.0023	.0024-.0030	.0030-.0038	.0036-.0045	.0048-.0060		
		Peripheral - HEM	2 x D	.15 x D	475	380	.0011-.0014	.0022-.0028	.0034-.0042	.0045-.0056	.0056-.0070	.0067-.0084	.0090-.0110		
		Finish	1.5 x D	.015 x D	450	360	.0006-.0008	.0014-.0017	.0020-.0025	.0026-.0033	.0034-.0042	.0040-.0050	.0054-.0067		
<b>M - Stainless Steels</b>															
Austenitic	301-304L, 310, 316L, 321, 347	Slotting	.75 x D	1 x D	275	220	.0006-.0007	.0010-.0013	.0016-.0020	.0020-.0026	.0026-.0033	.0031-.0039	.0040-.0050		
		Peripheral - Rough	1.25 x D	.3 x D	325	260	.0006-.0008	.0013-.0016	.0020-.0025	.0026-.0033	.0033-.0041	.0039-.0049	.0050-.0065		
		Peripheral - HEM	2 x D	.10 x D	425	340	.0013-.0016	.0025-.0031	.0040-.0047	.0050-.0063	.0062-.0078	.0075-.0094	.0100-.0125		
		Finish	1.5 x D	.015 x D	400	320	.0006-.0008	.0014-.0017	.0020-.0025	.0026-.0033	.0034-.0042	.0040-.0050	.0054-.0067		
Martensitic	403, 410, 416, 420, 430, 431, 440	Slotting	.75 x D	1 x D	300	240	.0004-.0006	.0010-.0012	.0014-.0018	.0020-.0024	.0024-.0030	.0029-.0036	.0038-.0048		
		Peripheral - Rough	1.25 x D	.3 x D	375	300	.0006-.0007	.0012-.0015	.0018-.0022	.0023-.0029	.0030-.0037	.0035-.0044	.0047-.0059		
		Peripheral - HEM	2 x D	.15 x D	475	380	.0011-.0014	.0022-.0028	.0034-.0042	.0045-.0056	.0056-.0070	.0067-.0087	.0090-.0112		
		Finish	1.5 x D	.015 x D	450	360	.0006-.0007	.0012-.0015	.0018-.0022	.0023-.0029	.0030-.0037	.0035-.0044	.0047-.0059		
Precipitation Hardening	12/8, 15/5, 17/4, AM-350/355/363 PH13-8MO, PH14-8/MO	Slotting	.5 x D	1 x D	250	200	.0004-.0005	.0008-.0010	.0012-.0015	.0016-.0020	.0020-.0025	.0024-.0030	.0032-.0040		
		Peripheral - Rough	1.25 x D	.3 x D	300	240	.0005-.0006	.0010-.0013	.0015-.0019	.0020-.0025	.0025-.0031	.0030-.0038	.0040-.0050		
		Peripheral - HEM	1.5 x D	.10 x D	400	320	.0010-.0013	.0020-.0026	.0031-.0039	.0042-.0052	.0050-.0065	.0060-.0078	.0080-.0100		
		Finish	1.5 x D	.015 x D	375	300	.0005-.0006	.0010-.0013	.0015-.0019	.0020-.0026	.0026-.0032	.0030-.0038	.0040-.0050		
<b>K - Cast Irons</b>															
Ductile	A536, J434 60-40-18	Slotting	1 x D	1 x D	300	240	.0004-.0005	.0009-.0011	.0013-.0016	.0018-.0022	.0022-.0027	.0026-.0032	.0034-.0043		
		Peripheral - Rough	1.25 x D	.5 x D	375	300	.0056-.0007	.0011-.0014	.0016-.0020	.0022-.0027	.0027-.0034	.0033-.0041	.0043-.0054		
		Peripheral - HEM	2 x D	.15 x D	475	380	.0009-.0011	.0018-.0022	.0026-.0033	.0035-.0044	.0044-.0055	.0053-.0066	.0070-.0090		
		Finish	1.5 x D	.015 x D	450	360	.0056-.0007	.0012-.0015	.0018-.0022	.0024-.0030	.0030-.0037	.0036-.0045	.0048-.0060		

**XHP Variable Index 4-Flute Tools Speeds & Feeds**

Material	Grades	Cut Type	Axial DOC	Radial DOC	Stub/Reg		Feed by Endmill Diameter (IPT)						
					SFM	Long/X-Long SFM	1/8	1/4	3/8	1/2	5/8	3/4	1
					AlCrNX	AlCrNX	(.1250)	(.2500)	(.3750)	(.5000)	(.6250)	(.7500)	(1.000)
<b>K - Cast Irons</b>													
Gray	A48, A436, A319 Class 20, G4000	Slotting	1 x D	1 x D	325	260	.0004-.0006	.0010-.0012	.0014-.0018	.0020-.0024	.0024-.0030	.0029-.0036	.0038-.0048
		Peripheral - Rough	1.25 x D	.5 x D	400	320	.0006-.0008	.0012-.0015	.0018-.0023	.0024-.0030	.0030-.0038	.0036-.0045	.0048-.0060
		Peripheral - HEM	2 x D	.15 x D	500	400	.0010-.0013	.0020-.0028	.0031-.0039	.0040-.0053	.0050-.0066	.0060-.0079	.0084-.0105
		Finish	1.5 x D	.015 x D	475	380	.0006-.0008	.0014-.0017	.0020-.0025	.0026-.0033	.0034-.0042	.0040-.0050	.0054-.0067
Malleable	A220, A602, J158	Slotting	.75 x D	1 x D	250	200	.0004-.0005	.0009-.0011	.0013-.0016	.0018-.0022	.0022-.0027	.0026-.0032	.0034-.0043
		Peripheral - Rough	1.25 x D	.3 x D	325	260	.0006-.0007	.0011-.0014	.0016-.0020	.0022-.0027	.0027-.0034	.0033-.0041	.0043-.0054
		Peripheral - HEM	2 x D	.15 x D	425	340	.0009-.0011	.0018-.0022	.0026-.0033	.0035-.0044	.0044-.0055	.0053-.0066	.0070-.0090
		Finish	1.5 x D	.015 x D	400	320	.0005-.0007	.0012-.0015	.0018-.0022	.0024-.0030	.0030-.0037	.0036-.0045	.0048-.0060
<b>N - Non-Ferrous</b>													
Brass/Bronze	Aluminum Bronze Low Silicon Bronze	Slotting	.5 x D	1 x D	350	280	.0005-.0006	.0010-.0012	.0015-.0018	.0020-.0025	.0025-.0030	.0034-.0039	.0045-.0050
		Peripheral - Rough	1 x D	.5 x D	400	320	.0006-.0008	.0012-.0015	.0018-.0022	.0025-.0030	.0032-.0037	.0042-.0047	.0055-.0060
		Peripheral - HEM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Finish	1.5 x D	.01 x D	425	340	.0007-.0009	.0015-.0017	.0022-.0026	.0030-.0035	.0040-.0045	.0050-.0055	.0065-.0070
Composites	G-10, Fiberglass, Graphite, Graphite Epoxy, Plastics	N/A	NA	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Copper		Slotting	.5 x D	1 x D	350	280	.0005-.0006	.0010-.0012	.0015-.0018	.0020-.0025	.0025-.0030	.0034-.0039	.0045-.0050
		Peripheral - Rough	1 x D	.5 x D	400	320	.0006-.0008	.0012-.0015	.0018-.0022	.0025-.0030	.0032-.0037	.0042-.0047	.0055-.0060
		Peripheral - HEM			N/A	N/A	—	—	—	—	—	—	—
		Finish	1.5 x D	.01 x D	425	340	.0007-.0009	.0015-.0017	.0022-.0026	.0030-.0035	.0040-.0045	.0050-.0055	.0065-.0070
Magnesium		N/A	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
<b>S - High Temp Alloys</b>													
Cobalt Base	Stellite, HS-21, Haynes 25/188, X40, L605	Slotting	.25 x D	1 x D	60	48	.0004-.0005	.0009-.0011	.0013-.0016	.0017-.0021	.0022-.0027	.0026-.0032	.0034-.0042
		Peripheral - Rough	1.25 x D	.25 x D	90	72	.0006-.0007	.0010-.0013	.0016-.0020	.0022-.0027	.0026-.0033	.0032-.0040	.0040-.0053
		Peripheral - HEM	1.5 x D	.10 x D	225	180	.0007-.0009	.0014-.0018	.0022-.0027	.0029-.0036	.0035-.0044	.0042-.0053	.0057-.0071
		Finish	1.5 x D	.010 x D	125	100	.0006-.0008	.0013-.0016	.0018-.0023	.0025-.0031	.0031-.0039	.0038-.0047	.0050-.0060
Iron Base	Incoloy 800-802, Multimet N-155 Timkin 16-25-6, Carpenter 22-b3	Slotting	.25 x D	1 x D	60	48	.0004-.0005	.0009-.0011	.0013-.0016	.0017-.0021	.0022-.0027	.0026-.0032	.0034-.0042
		Peripheral - Rough	1.25 x D	.25 x D	90	72	.0006-.0007	.0010-.0013	.0016-.0020	.0022-.0027	.0026-.0033	.0032-.0040	.0040-.0053
		Peripheral - HEM	1.5 x D	.10 x D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		Finish	1.5 x D	.010 x D	125	100	.0006-.0008	.0013-.0016	.0018-.0023	.0025-.0031	.0031-.0039	.0038-.0047	.0050-.0060
Nickel Base	Inconel 625/718, Inco 700, 713C, 718 Monel 400-401, 404, K401, Rene, Rene 41 & 95 Hastelloy, Waspoly Udimet 500 & 700	Slotting	.25 x D	1 x D	60	48	.0004-.0005	.0009-.0011	.0013-.0016	.0017-.0021	.0022-.0027	.0026-.0032	.0034-.0042
		Peripheral - Rough	1.25 x D	.25 x D	90	72	.0006-.0007	.0010-.0013	.0016-.0020	.0022-.0027	.0026-.0033	.0032-.0040	.0040-.0053
		Peripheral - HEM	1.5 x D	.10 x D	225	180	.0007-.0009	.0014-.0018	.0022-.0027	.0029-.0036	.0035-.0044	.0042-.0053	.0057-.0071
		Finish	1.5 x D	.010 x D	125	100	.0006-.0008	.0013-.0016	.0018-.0023	.0025-.0031	.0031-.0039	.0038-.0047	.0050-.0060
Titanium	Commercially Pure, 6Al-4V ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si Ti-8Al-1Mo, Ti-8Al-4Mo	Slotting	.5 x D	1 x D	250	200	.0004-.0005	.0008-.0010	.0012-.0015	.0016-.0020	.0020-.0025	.0024-.0030	.0032-.0040
		Peripheral - Rough	1.25 x D	.3 x D	300	240	.0005-.0006	.0010-.0013	.0015-.0019	.0020-.0025	.0025-.0031	.0030-.0038	.0040-.0050
		Peripheral - HEM	1.5 x D	.10 x D	400	320	.0010-.0012	.0019-.0024	.0029-.0036	.0038-.0048	.0048-.0060	.0058-.0072	.0077-.0096
		Finish	1.5 x D	.015 x D	375	300	.0005-.0006	.0010-.0013	.0015-.0019	.0020-.0026	.0026-.0032	.0030-.0038	.0040-.0050

D = tool diameter. Reduce feed rates by 20% when using long length tools. Starting parameters shown.  
 NOTE: Speeds and Feeds listed are estimated and will vary by application.