



## 6-Flute, XHP Multi-Application Endmills - Square and Corner Radius, **Chip Control**, Variable Index & Helix



- RedLine XHP Variable 6-Flute tools offer optimum metal removal rates. By controlling the vibration and chatter through a unique dampening geometry, and through the application of our advanced heat resistant coating over a fine micro-grain carbide substrate, our tools can handle faster speeds and feeds with excellent tool life in even the most difficult to machine materials like Stainless and Titanium.
- These tools can be optimized by using High Efficiency Machining technology.
- Used to ramp, plunge, slot, rough and finish profiles.

### XHP Variable Index 6-Flute Endmills Speeds & Feeds

Material	Grades	Cut	Axial	Radial	SFM AITISN	Feed by Endmill Diameter (IPT)								
						1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
						(.1250)	(.1875)	(.2500)	(.3125)	(.3750)	(.4375)	(.5000)	(.6250)	(.7500)
<b>P - Steels</b>														
Tool & Die Steels	A2, D2, O1, S7, P20, H13	Peripheral - Rough	1.25 x D	.4 x D	315	.0006	.0009	.0012	.0015	.0018	.0021	.0024	.0030	.0036
		Peripheral - Finish	3 x D	.012 x D	315	.0007	.0010	.0013	.0016	.0020	.0023	.0026	.0033	.0039
		Peripheral - HEM	3 x D	.07 x D	347	.0011	.0016	.0022	.0027	.0032	.0038	.0043	.0054	.0065
		Slotting - Traditional	.625 x D	1 x D	248	.0004	.0006	.0009	.0011	.0013	.0015	.0017	.0021	.0026
		Rough Facing	.35 x D	.65 x D	347	.0006	.0008	.0011	.0014	.0016	.0019	.0022	.0027	.0033
		Finish Facing	.02 x D	.65 x D	331	.0006	.0009	.0012	.0015	.0018	.0021	.0024	.0030	.0036
		Helical Entry	2 x D	12 deg.	270	.0003	.0005	.0007	.0008	.0010	.0012	.0013	.0017	.0020
		Straight Line Ramp	.63 x D	16 deg.	285	.0003	.0005	.0006	.0007	.0009	.0010	.0012	.0015	.0018
Zig Zag Pocket	.625 x D	.55 x D	248	.0004	.0006	.0009	.0011	.0013	.0015	.0017	.0021	.0026		
Low Carbon	1018, 1020, 12L14, 5120, 8620	Peripheral - Rough	2 x D	.55 x D	361	.0008	.0012	.0016	.0020	.0024	.0028	.0032	.0040	.0048
		Peripheral - Finish	3 x D	.015 x D	380	.0009	.0013	.0018	.0022	.0026	.0031	.0035	.0044	.0053
		Peripheral - HEM	3 x D	.09 x D	418	.0015	.0023	.0031	.0039	.0046	.0054	.0062	.0077	.0093
		Slotting - Traditional	1 x D	1 x D	309	.0006	.0009	.0012	.0015	.0018	.0021	.0024	.0030	.0036
		Rough Facing	.375 x D	.7 x D	397	.0007	.0011	.0015	.0018	.0022	.0025	.0029	.0036	.0044
		Finish Facing	.02 x D	.7 x D	399	.0009	.0013	.0017	.0021	.0026	.0030	.0034	.0043	.0051
		Helical Entry	3 x D	25 deg.	371	.0005	.0007	.0009	.0012	.0014	.0016	.0018	.0023	.0028
		Straight Line Ramp	1 x D	20 deg.	380	.0004	.0006	.0008	.0009	.0011	.0013	.0015	.0019	.0023
Zig Zag Pocket	1 x D	.625 x D	309	.0006	.0009	.0012	.0015	.0018	.0021	.0024	.0030	.0036		
Medium Carbon	1045, 4140, 4340, 5140	Peripheral - Rough	2 x D	.55 x D	356	.0008	.0011	.0015	.0019	.0023	.0027	.0030	.0038	.0046
		Peripheral - Finish	3 x D	.015 x D	356	.0008	.0012	.0016	.0020	.0024	.0028	.0032	.0040	.0048
		Peripheral - HEM	3 x D	.09 x D	380	.0014	.0021	.0028	.0034	.0041	.0048	.0055	.0069	.0083
		Slotting - Traditional	1 x D	1 x D	285	.0006	.0008	.0011	.0014	.0016	.0019	.0022	.0027	.0033
		Rough Facing	.375 x D	.7 x D	392	.0007	.0010	.0014	.0017	.0021	.0024	.0027	.0034	.0041
		Finish Facing	.02 x D	.7 x D	374	.0008	.0012	.0016	.0020	.0023	.0027	.0031	.0039	.0047
		Helical Entry	3 x D	25 deg.	356	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0025
		Straight Line Ramp	1 x D	20 deg.	380	.0004	.0005	.0007	.0009	.0010	.0012	.0014	.0017	.0021
Zig Zag Pocket	1 x D	.625 x D	285	.0006	.0008	.0011	.0014	.0016	.0019	.0022	.0027	.0033		
<b>M - Stainless Steels</b>														
Austenitic	303, 304, 316, Invar, Kovar	Peripheral - Rough	2 x D	.25 x D	356	.0007	.0011	.0015	.0019	.0022	.0026	.0030	.0037	.0045
		Peripheral - Finish	3 x D	.012 x D	315	.0007	.0011	.0014	.0017	.0021	.0024	.0028	.0035	.0042
		Peripheral - HEM	3 x D	.2 x D	356	.0010	.0014	.0019	.0024	.0028	.0033	.0038	.0047	.0057
		Slotting - Traditional	.75 x D	1 x D	248	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
		Rough Facing	.35 x D	.65 x D	361	.0007	.0011	.0014	.0018	.0021	.0025	.0028	.0035	.0043
		Finish Facing	.02 x D	.65 x D	331	.0006	.0009	.0012	.0014	.0017	.0020	.0023	.0029	.0035
		Helical Entry	3 x D	7 deg.	292	.0002	.0004	.0005	.0006	.0007	.0008	.0010	.0012	.0014
		Straight Line Ramp	.63 x D	4 deg.	248	.0004	.0006	.0008	.0010	.0011	.0013	.0015	.0019	.0023
Zig Zag Pocket	.75 x D	.55 x D	248	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024		
Martensitic & Ferritic	410, 416, 440	Peripheral - Rough	2.25 x D	.25 x D	329	.0007	.0011	.0014	.0018	.0022	.0025	.0029	.0036	.0043
		Peripheral - Finish	3 x D	.012 x D	338	.0008	.0012	.0015	.0019	.0023	.0027	.0031	.0038	.0046
		Peripheral - HEM	3 x D	.2 x D	360	.0010	.0015	.0019	.0024	.0029	.0034	.0039	.0048	.0058
		Slotting - Traditional	.75 x D	1 x D	248	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
		Rough Facing	.35 x D	.65 x D	361	.0007	.0010	.0013	.0016	.0019	.0023	.0026	.0032	.0039
		Finish Facing	.02 x D	.65 x D	345	.0006	.0010	.0013	.0016	.0019	.0022	.0025	.0032	.0038
		Helical Entry	3 x D	7 deg.	297	.0002	.0004	.0005	.0006	.0007	.0008	.0009	.0012	.0014
		Straight Line Ramp	.63 x D	4 deg.	248	.0004	.0006	.0008	.0010	.0011	.0013	.0015	.0019	.0023
Zig Zag Pocket	.75 x D	.55 x D	248	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024		

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.

## XHP Variable Index 6-Flute Endmills Speeds & Feeds (Cont'd)

Material	Grades	Cut	Axial	Radial	SFM AITSN	Feed by Endmill Diameter (IPT)								
						1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
						(.1250)	(.1875)	(.2500)	(.3125)	(.3750)	(.4375)	(.5000)	(.6250)	(.7500)
<b>P - Stainless Steels</b>														
Precipitation Hardening Stainless Steel	17-4, 15-5, 13-8	Peripheral - Rough	2 x D	.28 x D	351	.0007	.0010	.0013	.0017	.0020	.0023	.0027	.0034	.0040
		Peripheral - Finish	3 x D	.015 x D	309	.0006	.0009	.0012	.0015	.0019	.0022	.0025	.0031	.0037
		Peripheral - HEM	3 x D	.2 x D	347	.0008	.0013	.0017	.0021	.0025	.0029	.0033	.0042	.0050
		Slotting - Traditional	.75 x D	1 x D	238	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
		Rough Facing	.375 x D	.7 x D	376	.0006	.0009	.0012	.0015	.0019	.0022	.0025	.0031	.0037
		Finish Facing	.02 x D	.7 x D	324	.0005	.0008	.0011	.0014	.0016	.0019	.0022	.0027	.0032
		Helical Entry	3 x D	7 deg.	285	.0003	.0004	.0005	.0006	.0007	.0009	.0010	.0012	.0015
		Straight Line Ramp	.63 x D	5 deg.	243	.0004	.0005	.0007	.0009	.0011	.0012	.0014	.0018	.0021
Zig Zag Pocket	.75 x D	.625 x D	238	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024		
<b>K - Cast Irons</b>														
Ductile	A536, J434, 60-40-18	Peripheral - Rough	1.5 x D	.3 x D	315	.0006	.0010	.0013	.0016	.0019	.0022	.0025	.0032	.0038
		Peripheral - Finish	3 x D	.01 x D	315	.0006	.0009	.0012	.0015	.0018	.0021	.0024	.0030	.0036
		Peripheral - HEM	3 x D	.07 x D	351	.0017	.0025	.0034	.0042	.0051	.0059	.0068	.0084	.0101
		Slotting - Traditional	.5 x D	1 x D	234	.0004	.0006	.0009	.0011	.0013	.0015	.0017	.0021	.0026
		Rough Facing	.35 x D	.65 x D	347	.0006	.0009	.0011	.0014	.0017	.0020	.0023	.0028	.0034
		Finish Facing	.02 x D	.65 x D	331	.0005	.0008	.0010	.0013	.0015	.0018	.0020	.0026	.0031
		Helical Entry	3 x D	18 deg.	260	.0004	.0006	.0008	.0010	.0012	.0015	.0017	.0021	.0025
		Straight Line Ramp	.5 x D	13 deg.	234	.0004	.0006	.0009	.0011	.0013	.0015	.0017	.0021	.0026
Zig Zag Pocket	.5 x D	.55 x D	234	.0004	.0006	.0009	.0011	.0013	.0015	.0017	.0021	.0026		
Gray	ATSM-A48 Class 20, 25, 30, 35 & 40	Peripheral - Rough	1.5 x D	.3 x D	352	.0007	.0011	.0014	.0018	.0021	.0025	.0029	.0036	.0043
		Peripheral - Finish	3 x D	.015 x D	356	.0007	.0010	.0014	.0017	.0021	.0024	.0028	.0034	.0041
		Peripheral - HEM	3 x D	.08 x D	361	.0017	.0025	.0033	.0042	.0050	.0058	.0067	.0083	.0100
		Slotting - Traditional	.625 x D	1 x D	285	.0005	.0008	.0010	.0012	.0015	.0017	.0020	.0025	.0030
		Rough Facing	.375 x D	.7 x D	387	.0006	.0010	.0013	.0016	.0019	.0022	.0026	.0032	.0038
		Finish Facing	.020 x D	.7 x D	374	.0006	.0010	.0013	.0016	.0019	.0022	.0025	.0032	.0038
		Helical Entry	3 x D	18 deg.	309	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
		Straight Line Ramp	.630 x D	11 deg.	285	.0005	.0007	.0009	.0011	.0014	.0016	.0018	.0023	.0028
Zig Zag Pocket	.625 x D	.625 x D	285	.0005	.0008	.0010	.0012	.0015	.0017	.0020	.0025	.0030		
Malleable	A220, A602, J158	Peripheral - Rough	1.5 x D	.3 x D	315	.0006	.0009	.0012	.0015	.0018	.0021	.0024	.0030	.0036
		Peripheral - Finish	3 x D	.01 x D	315	.0006	.0009	.0012	.0015	.0018	.0020	.0023	.0029	.0035
		Peripheral - HEM	3 x D	.07 x D	351	.0017	.0025	.0033	.0042	.0050	.0058	.0067	.0083	.0100
		Slotting - Traditional	.5 x D	1 x D	239	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
		Rough Facing	.35 x D	.65 x D	347	.0006	.0008	.0011	.0014	.0016	.0019	.0022	.0027	.0033
		Finish Facing	.02 x D	.65 x D	331	.0005	.0007	.0010	.0012	.0015	.0017	.0020	.0025	.0030
		Helical Entry	3 x D	18 deg.	256	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
		Straight Line Ramp	.5 x D	13 deg.	239	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
Zig Zag Pocket	.5 x D	.55 x D	239	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024		
<b>N- Non Ferrous</b>														
Bronze, High Tin	Bronze, Manganese Bronze, Work Hardened Bronze, 201-277 Bhn	Peripheral - Rough	1.5 x D	.3 x D	338	.0005	.0008	.0011	.0014	.0016	.0019	.0022	.0027	.0032
		Peripheral - Finish	3 x D	.012 x D	342	.0005	.0008	.0010	.0013	.0016	.0018	.0021	.0026	.0031
		Peripheral - HEM	2.25 x D	.1 x D	351	.0010	.0014	.0019	.0024	.0028	.0033	.0038	.0047	.0057
		Slotting - Traditional	.7 x D	1 x D	252	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
		Rough Facing	.35 x D	.65 x D	371	.0004	.0006	.0008	.0011	.0013	.0015	.0017	.0021	.0025
		Finish Facing	.02 x D	.7 x D	376	.0004	.0006	.0009	.0011	.0013	.0015	.0017	.0021	.0026
		Helical Entry	2.5 x D	10 deg.	270	.0004	.0006	.0008	.0010	.0012	.0013	.0015	.0019	.0023
		Straight Line Ramp	.75 x D	18 deg.	269	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
Zig Zag Pocket	.7 x D	.55 x D	252	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024		
Aluminum Alloys	0-T6 2024, 6061, 7075	Peripheral - Rough	2.25 x D	.6 x D	500	.0018	.0026	.0035	.0044	.0053	.0061	.0070	.0088	.0105
		Peripheral - Finish	3 x D	.02 x D	750	.0006	.0009	.0013	.0016	.0019	.0022	.0025	.0031	.0038
		Peripheral - HEM	3 x D	.25 x D	700	.0018	.0026	.0035	.0044	.0053	.0061	.0070	.0088	.0105
		Slotting - Traditional	1 x D	1 x D	375	.0008	.0012	.0016	.0020	.0024	.0028	.0032	.0040	.0048
		Rough Facing	.375 x D	.7 x D	550	.0014	.0022	.0029	.0036	.0043	.0051	.0058	.0072	.0087
		Finish Facing	.02 x D	.7 x D	784	.0005	.0008	.0010	.0013	.0015	.0018	.0020	.0025	.0030
		Helical Entry	3 x D	10 deg.	500	.0006	.0010	.0013	.0016	.0019	.0022	.0025	.0032	.0038
		Straight Line Ramp	.5 x D	10 deg.	463	.0006	.0009	.0012	.0016	.0019	.0022	.0025	.0031	.0037
Zig Zag Pocket	1 x D	.45 x D	375	.0008	.0012	.0016	.0020	.0024	.0028	.0032	.0040	.0048		

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.

**XHP Variable Index 6-Flute Endmills Speeds & Feeds (Cont'd)**

Material	Grades	Cut	Axial	Radial	SFM AITSN	Feed by Endmill Diameter (IPT)								
						1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
						(.1250)	(.1875)	(.2500)	(.3125)	(.3750)	(.4375)	(.5000)	(.6250)	(.7500)
<b>N- Non Ferrous</b>														
Composites, Plastics, Fiberglass	Fiberglass, Graphite, Epoxy	Peripheral - Rough	1.5 x D	.5 x D	428	.0007	.0011	.0014	.0018	.0021	.0025	.0029	.0036	.0043
		Peripheral - Finish	3 x D	.015 x D	447	.0007	.0010	.0014	.0017	.0021	.0024	.0028	.0034	.0041
		Peripheral - HEM	2.25 x D	.12 x D	475	.0012	.0018	.0024	.0030	.0036	.0042	.0048	.0059	.0071
		Slotting - Traditional	1 x D	1 x D	380	.0007	.0010	.0013	.0017	.0020	.0023	.0027	.0033	.0040
		Rough Facing	.375 x D	.7 x D	495	.0006	.0009	.0012	.0015	.0017	.0020	.0023	.0029	.0035
		Finish Facing	.02 x D	.7 x D	491	.0006	.0009	.0012	.0015	.0018	.0020	.0023	.0029	.0035
		Helical Entry	3 x D	20 deg.	400	.0007	.0010	.0013	.0017	.0020	.0023	.0027	.0033	.0040
		Straight Line Ramp	1 x D	25 deg.	400	.0006	.0010	.0013	.0016	.0019	.0022	.0025	.0032	.0038
		Zig Zag Pocket	1 x D	.625 x D	400	.0007	.0011	.0014	.0018	.0021	.0025	.0028	.0035	.0042
Copper, Brass 111-170 Bhn		Peripheral - Rough	2 x D	.3 x D	361	.0006	.0009	.0012	.0015	.0018	.0021	.0024	.0030	.0036
		Peripheral - Finish	3 x D	.015 x D	366	.0006	.0008	.0011	.0014	.0016	.0019	.0022	.0027	.0033
		Peripheral - HEM	2.25 x D	.1 x D	380	.0011	.0016	.0021	.0027	.0032	.0037	.0043	.0053	.0064
		Slotting - Traditional	.75 x D	1 x D	276	.0004	.0006	.0009	.0011	.0013	.0015	.0017	.0021	.0026
		Rough Facing	.375 x D	.7 x D	418	.0005	.0007	.0010	.0012	.0015	.0017	.0019	.0024	.0029
		Finish Facing	.02 x D	.7 x D	402	.0005	.0007	.0009	.0012	.0014	.0016	.0019	.0023	.0028
		Helical Entry	3 x D	12 deg.	304	.0004	.0006	.0009	.0011	.0013	.0015	.0017	.0021	.0026
		Straight Line Ramp	1 x D	20 deg.	300	.0004	.0007	.0009	.0011	.0013	.0015	.0018	.0022	.0026
		Zig Zag Pocket	.75 x D	.625 x D	290	.0005	.0007	.0009	.0011	.0014	.0016	.0018	.0023	.0027
Magnesium Alloys 47-140 Bhn		Peripheral - Rough	1.5 x D	.3 x D	342	.0006	.0008	.0011	.0014	.0017	.0020	.0023	.0028	.0034
		Peripheral - Finish	2.25 x D	.6 x D	500	.0018	.0026	.0035	.0044	.0053	.0061	.0070	.0088	.0105
		Peripheral - HEM	3 x D	.02 x D	750	.0006	.0009	.0013	.0016	.0019	.0022	.0025	.0031	.0038
		Peripheral - HEM	3 x D	.25 x D	665	.0017	.0025	.0033	.0042	.0050	.0058	.0067	.0083	.0100
		Slotting - Traditional	1 x D	1 x D	375	.0008	.0012	.0016	.0020	.0024	.0028	.0032	.0040	.0048
		Rough Facing	.375 x D	.7 x D	550	.0014	.0022	.0029	.0036	.0043	.0051	.0058	.0072	.0087
		Finish Facing	.02 x D	.7 x D	784	.0005	.0008	.0010	.0013	.0015	.0018	.0020	.0025	.0030
		Helical Entry	3 x D	10 deg.	500	.0006	.0010	.0013	.0016	.0019	.0022	.0025	.0032	.0038
		Straight Line Ramp	.5 x D	10 deg.	488	.0006	.0009	.0012	.0016	.0019	.0022	.0025	.0031	.0037
Zig Zag Pocket	1 x D	.45 x D	375	.0008	.0012	.0016	.0020	.0024	.0028	.0032	.0040	.0048		
<b>S - High Temp Alloys</b>														
Nickel Based Super Alloys	400-401, 404, K401, Rene, Rene 41 & 95 Hastelloy, Waspoloy, Udimet 500 & 700	Peripheral - Rough	1 x D	.2 x D	81	.0004	.0005	.0007	.0009	.0011	.0013	.0014	.0018	.0022
		Peripheral - Finish	3 x D	.01 x D	180	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
		Peripheral - HEM	2 x D	.075 x D	99	.0014	.0020	.0027	.0034	.0041	.0047	.0054	.0068	.0081
		Slotting - Traditional	.25 x D	1 x D	54	.0003	.0005	.0006	.0008	.0009	.0011	.0012	.0015	.0018
		Rough Facing	.28 x D	.65 x D	89	.0003	.0005	.0006	.0008	.0010	.0011	.0013	.0016	.0019
		Finish Facing	.02 x D	.7 x D	188	.0003	.0005	.0007	.0009	.0010	.0012	.0014	.0017	.0021
		Helical Entry	2.5 x D	10 deg.	108	.0005	.0007	.0009	.0011	.0013	.0016	.0018	.0022	.0027
		Straight Line Ramp	.5 x D	3 deg.	52	.0003	.0005	.0006	.0008	.0009	.0011	.0012	.0015	.0018
		Zig Zag Pocket	.25 x D	.55 x D	54	.0003	.0005	.0006	.0008	.0009	.0011	.0012	.0015	.0018
Titanium Alloys	Commercially Pure, 6Al-4V, ASTM 1/2/3, 6Al-25N-4Zr-2Mo-Si, Ti-8Al-1Mo, Ti-8Al-4Mo, 32-36 HRC	Peripheral - Rough	1.5 x D	.25 x D	248	.0006	.0008	.0011	.0014	.0017	.0020	.0023	.0028	.0034
		Peripheral - Finish	3 x D	.012 x D	270	.0006	.0008	.0011	.0014	.0017	.0020	.0023	.0028	.0034
		Peripheral - HEM	3 x D	.2 x D	365	.0009	.0014	.0018	.0023	.0027	.0032	.0036	.0045	.0054
		Slotting - Traditional	.75 x D	1 x D	225	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024
		Rough Facing	.35 x D	.65 x D	272	.0005	.0008	.0010	.0013	.0015	.0018	.0020	.0025	.0030
		Finish Facing	.02 x D	.65 x D	290	.0005	.0007	.0010	.0012	.0015	.0017	.0020	.0025	.0029
		Helical Entry	3 x D	18 deg.	360	.0003	.0005	.0007	.0008	.0010	.0012	.0013	.0017	.0020
		Straight Line Ramp	.75 x D	22 deg.	338	.0004	.0006	.0007	.0009	.0011	.0013	.0015	.0019	.0022
		Zig Zag Pocket	.75 x D	.55 x D	225	.0004	.0006	.0008	.0010	.0012	.0014	.0016	.0020	.0024

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.