



# HY-PRO® CARB VGM5-LN

High Performance Variable Geometry End Mills

## List VGM5-LN: 5 Flute, Long Neck

### Side Milling

Hardness	-		Up to 30 HRC		-		-		-		-		-		35 HRC	
Work Material	Mild Steels Carbon Steels Cast Iron		Tool Steel Alloy Steel		Stainless Steel 304		Titanium Alloy Ti-6AL-4V		Inconel 718		Inconel 625		Cast Iron		Hardened Steel	
Cutting	350-650 SFM		350-650 SFM		200-350 SFM		200-350 SFM		100-200 SFM		150-250 SFM		350-750 SFM		200-350 SFM	
Depth of Cut	Aa = up to Max LOC, Ar= 0.3xD						Aa = up to Max LOC, Ar= 0.2xD		Aa = up to Max LOC, Ar= 0.1xD				Aa = up to Max LOC, Ar= 0.3xD		Aa = up to Max LOC, Ar= 0.15xD	
Mill Dia. Inch	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM
1/8	16,794	84.0	16,794	84.0	7,634	38.2	7,634	38.2	4,580	22.9	6,107	30.5	16,794	84.0	7,634	38.2
3/16	11,196	88.2	11,196	88.2	5,089	40.1	5,089	40.1	3,053	22.9	4,071	30.5	11,196	88.2	5,089	40.1
1/4	8,397	92.4	8,397	92.4	3,817	42.0	3,817	42.0	2,290	22.9	3,053	30.5	8,397	92.4	3,817	42.0
3/8	5,598	98.0	5,598	98.0	2,545	44.5	2,545	44.5	1,527	19.1	2,036	25.4	5,598	98.0	2,545	44.5
1/2	4,198	88.2	4,198	88.2	1,908	40.1	1,908	40.1	1,145	14.3	1,527	19.1	4,198	88.2	1,908	40.1
5/8	3,359	70.5	3,359	70.5	1,527	32.1	1,527	32.1	906	11.5	1,221	15.3	3,359	70.5	1,527	32.1
3/4	2,799	61.6	2,799	61.6	1,272	28.0	1,272	28.0	763	9.5	1,018	12.7	2,799	61.6	1,272	28.0
1	2,099	46.2	2,099	46.2	954	21.0	954	21.0	573	8.6	763	11.5	2,099	46.2	954	21.0

- The above milling condition is a guideline for L/D ratio 3.
- Use a rigid and precise machine and holder.
- The rotational speed is calculated by the median of the recommended cutting speed.  
Adjustments may be necessary depending on the rigidity or the workpiece, fixture, and machine.
- Please use a suitable fluid with high smoke retardant properties.
- During dry (no fluid) milling, please use air blow to remove chips from the milling area and to eliminate chip packing.
- Please use water-soluble coolant when machining stainless steel and titanium alloy.
- Reduce speed and feed as well as depth of cut when high precision is required.

### Speed & Feed Reduction Chart by L/D Ratio

Hardness	-		Up to 30 HRC		-		-		-		-		-		35 HRC	
Work Material	Mild Steels Carbon Steels Cast Iron		Tool Steel Alloy Steel		Stainless Steel 304		Titanium Alloy Ti-6AL-4V		Inconel 718		Inconel 625		Cast Iron		Hardened Steel	
L/D Ratio	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM	Speed RPM	Feed IPM
4	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
5	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
6	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
7	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%
8	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
9	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
10	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%

### Aa & Ar Adjustment Chart by L/D Ratio

Hardness	-		Up to 30 HRC		-		-		-		-		-		35 HRC	
Work Material	Mild Steels Carbon Steels Cast Iron		Tool Steel Alloy Steel		Stainless Steel 304		Titanium Alloy Ti-6AL-4V		Inconel 718		Inconel 625		Cast Iron		Hardened Steel	
L/D Ratio	Aa	Ar	Aa	Ar	Aa	Ar	Aa	Ar	Aa	Ar	Aa	Ar	Aa	Ar	Aa	Ar
4	1 x D		1 x D		1 x D		1 x D		1 x D		1 x D		1 x D		1 x D	
5	0.75 x D		0.75 x D		0.75 x D		0.75 x D		0.75 x D		0.75 x D		0.75 x D		0.75 x D	
6	0.6 x D		0.6 x D		0.6 x D		0.6 x D		0.6 x D		0.6 x D		0.6 x D		0.6 x D	
7	0.5 x D	0.3 x D	0.5 x D	0.3 x D	0.5 x D	0.3 x D	0.5 x D	0.2 x D	0.5 x D	0.1 x D	0.5 x D	0.1 x D	0.5 x D	0.3 x D	0.5 x D	0.15 x D
8	0.4 x D		0.4 x D		0.4 x D		0.4 x D		0.4 x D		0.4 x D		0.4 x D		0.4 x D	
9	0.2 x D		0.2 x D		0.2 x D		0.2 x D		0.2 x D		0.2 x D		0.2 x D		0.2 x D	
10	0.2 x D		0.2 x D		0.2 x D		0.2 x D		0.2 x D		0.2 x D		0.2 x D		0.2 x D	

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