



PXRE End Mills

PM Machining Guide



Roughing & Finishing (LDR 4xD)

For LDR Greater See LDR Notes

RPM/Spindle Speed

Material		Carbon/Alloy Steel (30-40 HRC)		Tool Steel (40-50 HRC)		Tool Steel (50-60 HRC)	
Diameter		Rough	Finish	Rough	Finish	Rough	Finish
Inch	mm						
0.375	-	4590 - 6625	6120 - 9175	2550 - 4075	3570 - 5600	2295 - 3570	3315 - 5100
-	10	4375 - 6315	5835 - 8750	2430 - 3885	3400 - 5340	2190 - 3400	3160 - 4860
-	12	3640 - 5255	4850 - 7280	2020 - 3235	2830 - 4450	1820 - 2830	2630 - 4045
0.500	-	3440 - 4965	4585 - 6875	1910 - 3055	2675 - 4200	1720 - 2675	2485 - 3820
0.625	-	2750 - 3975	3670 - 5500	1530 - 2450	2140 - 3360	1375 - 2140	1985 - 3055
-	16	2730 - 3940	3640 - 5460	1520 - 2425	2125 - 3335	1365 - 2125	1970 - 3035
0.750	-	2290 - 3310	3055 - 4585	1275 - 2040	1785 - 2800	1150 - 1785	1655 - 2550
-	20	2180 - 3150	2910 - 4365	1215 - 1940	1700 - 2670	1090 - 1700	1575 - 2425
-	25	1750 - 2520	2340 - 3500	970 - 1550	1360 - 2135	875 - 1365	1260 - 1940
1.000	-	1720 - 2480	2300 - 3440	955 - 1530	1340 - 2100	860 - 1340	1240 - 1910

Chip Load/Inch Per Tooth

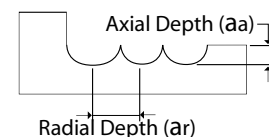
Material		Carbon/Alloy Steel (30-40 HRC)		Tool Steel (40-50 HRC)		Tool Steel (50-60 HRC)	
Diameter		Rough	Finish	Rough	Finish	Rough	Finish
Inch	mm						
0.375	-	0.0112 - 0.0119	0.0101 - 0.0107	0.0090 - 0.0108	0.0080 - 0.0097	0.0070 - 0.0084	0.0063 - 0.0075
-	10	0.0112 - 0.0119	0.0101 - 0.0107	0.0090 - 0.0108	0.0080 - 0.0097	0.0070 - 0.0084	0.0063 - 0.0075
-	12	0.0150 - 0.0159	0.0135 - 0.0143	0.0120 - 0.0144	0.0108 - 0.0129	0.0094 - 0.0112	0.0084 - 0.0100
0.500	-	0.0150 - 0.0159	0.0135 - 0.0143	0.0120 - 0.0144	0.0108 - 0.0129	0.0094 - 0.0112	0.0084 - 0.0100
0.625	-	0.0161 - 0.0168	0.0144 - 0.0151	0.0128 - 0.0153	0.0115 - 0.0137	0.0104 - 0.0124	0.0093 - 0.0111
-	16	0.0161 - 0.0168	0.0144 - 0.0151	0.0128 - 0.0153	0.0115 - 0.0137	0.0104 - 0.0124	0.0093 - 0.0111
0.750	-	0.0169 - 0.0178	0.0152 - 0.0160	0.0135 - 0.0162	0.0121 - 0.0145	0.0103 - 0.0123	0.0092 - 0.0110
-	20	0.0169 - 0.0178	0.0152 - 0.0160	0.0135 - 0.0162	0.0121 - 0.0145	0.0103 - 0.0123	0.0092 - 0.0110
-	25	0.0225 - 0.0237	0.0203 - 0.0213	0.0180 - 0.0216	0.0161 - 0.0193	0.0137 - 0.0164	0.0127 - 0.0147
1.000	-	0.0225 - 0.0237	0.0203 - 0.0213	0.0180 - 0.0216	0.0161 - 0.0193	0.0137 - 0.0164	0.0127 - 0.0147

Axial and Radial Depths

Material Hardness	Carbon/Alloy Steel (30-40 HRC)	Tool Steel (40-50 HRC)	Tool Steel (50-60 HRC)	Tool Steel (Over 60 HRC)
Axial Depth (Aa)	10% of Corner Rad. Max.	10% of Corner Rad. Max.	10% of Corner Rad. Max.	10% of Corner Rad. Max.
Radial Depth (Ar)	40% of tool Dia. Max.	35% of tool Dia. Max.	30% of tool Dia. Max.	25% of tool Dia. Max.

Length-to-Diameter Compensations

Overhang Length	Cutting Speed	Chip Load	Aa	Ar
LDR Under 4xD	100%	100%	100%	100%
LDR 4xD to 6xD	60% - 80%	60% - 80%	60% - 80%	100%
LDR 6xD to 10xD	40% - 60%	40% - 60%	40% - 60%	100%

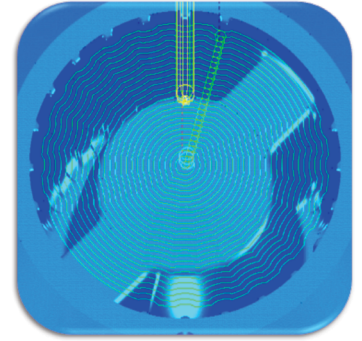
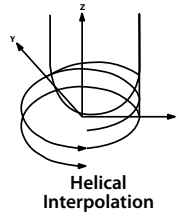


Carbide shank recommended for LDR 6xD and above.

High Speed Machining Guide

Machining Tips

- Use Z-Level climb cutting for roughing operations.
- Use Helical for material engagement whenever possible. Use 3° ramp angle and 0.8xDiameter of cutter for the tool path arc.
- Add radiuses larger than cutter to corner of tool path for smooth operation.
- LDR should always be as short as possible.
- LDR of 4xD or less use chart on reverse side with high speed steel body.
- LDR of 6xD to 10xD use chart on reverse side with carbide body.
- **Machining is very difficult over 10xD.**
- Leave extra stock for semi-finishing to prevent gouging of surface when using long reach tools.
- Use air or oil mist for all applications except those involving gummy or sticky materials such as stainless, which machines well with water based coolant.



Z-Level Machining with Climb Cutting is Highly Recommended

Diagnosing Problems

Insert Chipping - early during use means chip load too high, please reduce feed rate in increments of 20% until problem is resolved or shorten the length of the tool.

Insert Burning - of coating or glowing at the tip means RPM is too high. Reduce RPM by 20% increments until problem is resolved along with feed rate until excessive heat is subdued.

Chatter - excessive tool length is a primary cause. After reducing tool length if possible, lower RPM and feed rate until chatter is minimized.

Formulas

$$\text{RPM} = (3.82 \times \text{SFM}) / \text{Tool Diameter}$$

$$\text{SFM} = 0.262 \times \text{RPM} \times \text{Tool Diameter}$$

$$\text{IPM} = \text{RPM} \times \# \text{ Flutes} \times \text{Chip Load}$$

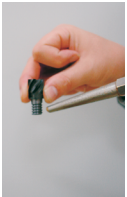
$$\text{Chip Load} = \text{IPM} / (\text{RPM} \times \# \text{ Flutes})$$

Stock Left for Semi-Finishing

Medium parts 6" square to 24"

- No heat treat: leave 0.010" to 0.015" stock.
- Heat treat: leave 0.015" to 0.030" stock, depending on geometry.

Exchangeable Head Tightening Procedure



Step 1: Cleaning
Remove dirt and chips from the connecting thread & shank.



Step 2: Attach Head
Attach PXM head to shank and tighten by hand.

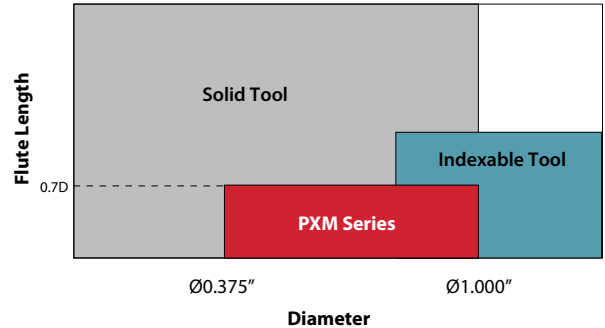


Step 3: Tighten Head
Tighten PXM head using supplied spanner wrench.



Step 4: Check
Confirm there is no gap between PXM head and shank.

The Complete Milling Tool Offering



Compared to solid tools	PXM offers similar productivity & precision, increased flexibility, and greater cost savings than solid tools at larger diameters.
Compared to indexable tools	PXM offers increased productivity and higher precision than indexable tools at smaller diameters.

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