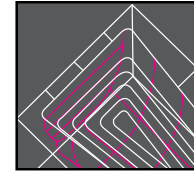
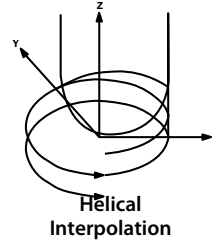


High Speed Machining Guide

Machining Tips

- Use Z-Level climb cutting for roughing operations.
- Use Helical for material engagement whenever possible for material entry (See Helical chart for ramp angles and arc limits depending on tool dia.).
- 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.
- LDR of 6xD to 10xD reduce spindle speed by 35% and feed rate by 25% to get started.
- LDR of 10xD and over reduce RPM by 50% and depth of cut by 65% to get started. **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.



Corner Rounding on Tool Path

Formulas

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

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

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

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

Depth of Cut

Adjusting depths of cuts based on LDR (Length Diameter Ratio)

Axial Depths of Cuts

- Depth of cut should be reduced by 5% per increment of LDR.

Radial Depths of Cuts

- This cutter performs best with step over amounts up to 20% of cutter diameter. Larger amounts will result in less stability and reduce performance overall.

Diagnosing Problems

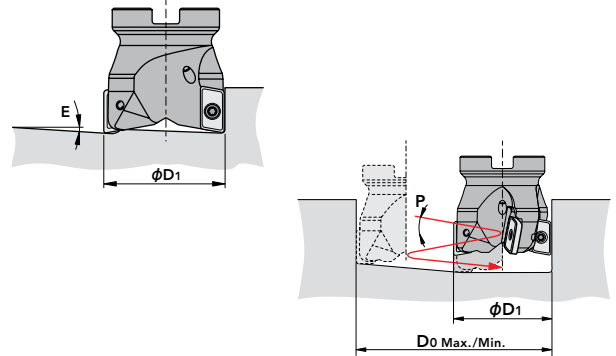
Insert Chipping - early during use means chip load too high, please reduce feed rate in increments of 20% until problem is resolved or shorten the length of the tool.

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.

Maximum Helical Ramping Angle

Insert Size	ZDKT11				ZDKT15			
	Diameter (Inch)	Ramping Angle	Helical Milling (Inch)	Helical Angle	Ramping Angle	Helical Milling (Inch)	Helical Angle	
0.625	10.8	0.709	1.142	9.5	-	-	-	-
0.750	9.8	1.181	1.457	7.0	-	-	-	-
1.000	7.5	1.575	1.850	4.5	9.5	1.457	1.889	7.5
1.250	4.8	2.087	2.402	3.2	6.8	1.850	2.441	5.0
1.500	2.9	2.835	3.031	2.2	5.1	2.480	3.071	3.2
2.000	2.2	3.661	3.858	1.7	2.5	3.386	3.858	2.5
2.500	1.8	4.646	4.843	1.5	2.5	4.370	4.882	1.5
3.000	1.4	5.984	6.181	1.0	2.0	5.787	6.220	1.3
4.000	-	-	-	-	1.5	7.480	7.795	1.1
5.000	-	-	-	-	0.9	9.449	9.764	0.9
6.000	-	-	-	-	0.7°	11.488	11.921	0.6°



Recommended Materials by Application

Insert Grade	Chip Breaker	Coolant	Carbon Steels	Stainless Steels	Cast Irons	Non-Ferrous	Hi-Temp Alloys	Hardened Steels
			P	M	K	N	S	H
CK010	NM	Yes				⊙		
XP3035	GL	-	⊙	○	○			
	GM							
XP2040	GR	Yes		⊙			○	⊙
	GL							
XC1015	GM	-			⊙			
	GR							
XC5035	SM	-		⊙				○
		Yes						
XC5040	SM	Yes		○		○		○
XP6015	HR	-	○		○			⊙

GL: Light Cutting GM: Medium Cutting GR: Heavy Cutting NM: Aluminum SM: Heat Resistant Alloy HR: Hardened Steel

○ good ⊙ best

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