



1051 Aviation Blvd.
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(916) 408-2442 FAX (916) 993-3949
www.abtoolsinc.com
E-Mail: mail@abtoolsinc.com

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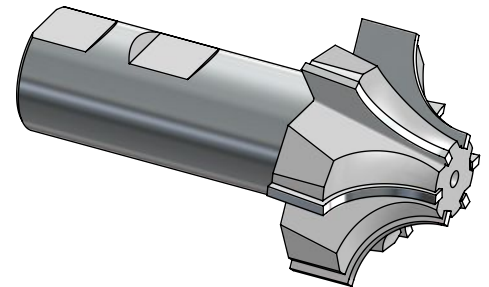
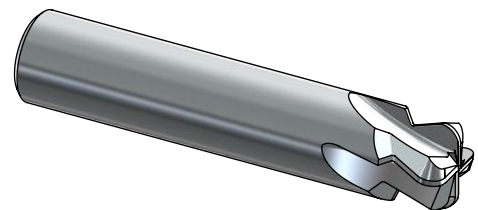
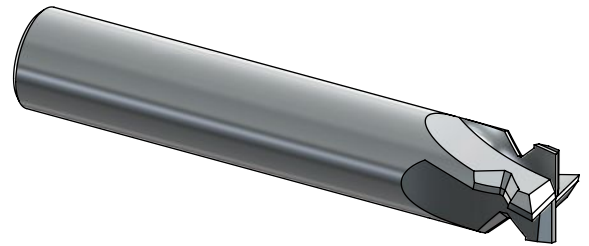
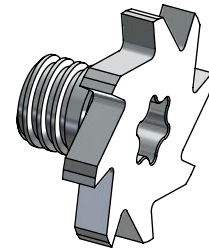
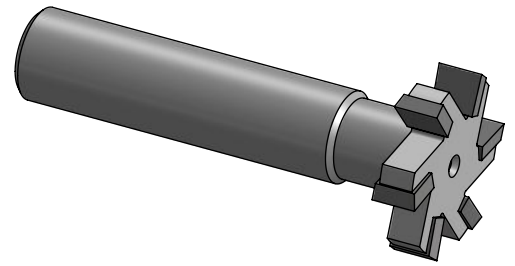
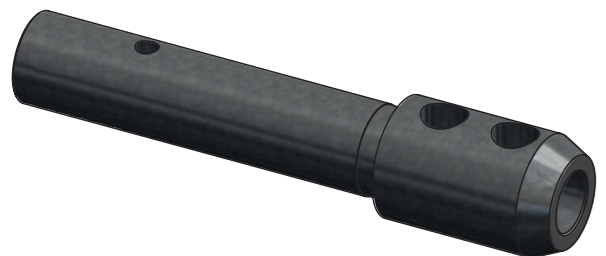
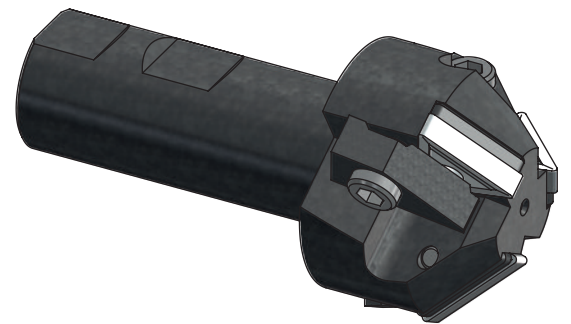
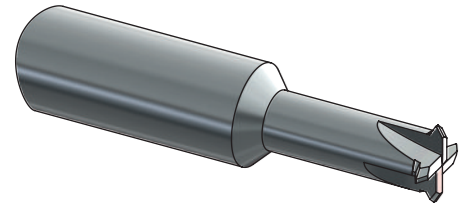


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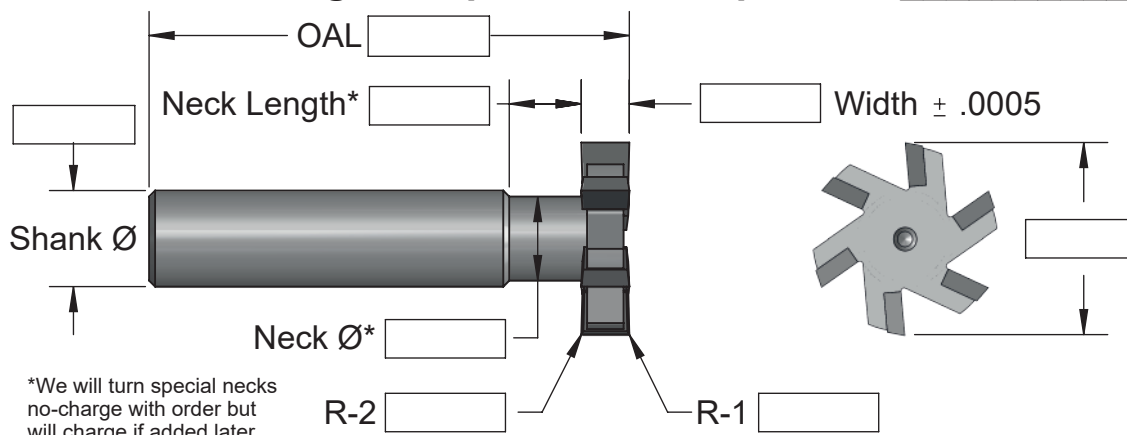


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Carbide Tipped Keyseat Cutters with your decimal width in 4-6 working days

Machining what part material, please? _____



Request For Quote

*We will turn special necks no-charge with order but will charge if added later.

Diameters to plus .015 unless you request otherwise

Diameter Plus .015 Minus Zero	Width Range	Basic Cutter Prices				Shank Ø & OAL
		For Aluminum Flutes	Price	For Ferrous Flutes	Price	
5/8	.065/.190	2	\$95.	5	\$120.	1/2" X 2.5
3/4	.065/.220	2	\$100.	5	\$120.	
7/8	.075/.255	2	\$110.	6	\$125.	
1	.085/.315	2	\$115.	6	\$130.	
1-1/8	.110/.315	2	\$120.	6	\$150.	
1-1/4	.110/.350	3	\$125.	8	\$170.	
1-3/8	.110/.380	3	\$135.	8	\$175.	

For Minor Modifications add to your basic price:

1 CHAMFER \$35.
2 CHAMFERS \$50.

1 RADIUS \$40.
2 RADII \$60.
FULL RADIUS \$60.

1-1/2	.110/.374	3	\$155.	8	\$195.	3/4" X 3.5
1-1/2	.375/.505	3	\$195.	8	\$235.	
1-3/4	.120/.374	4	\$180.	10	\$225.	
1-3/4	.375/.505	4	\$210.	10	\$255.	
2	.120/.374	4	\$215.	12	\$270.	
2	.375/.505	4	\$255.	12	\$310.	
2-1/4	.120/.374	4	\$235.	12	\$310.	
2-1/4	.375/.505	4	\$270.	12	\$340.	
2-1/2	.120/.374	6	\$260.	12	\$335.	
2-1/2	.375/.505	6	\$300.	12	\$380.	

Staggered tooth cutters add 30% to basic price
(2) piece minimum

Slot plus top Chamfers Upon Request

Suggested Starting Data:

Ferrous 150-250 SFM; .001/.003 IPT, Non-Ferrous 1K-3K SFM; .002/.006 IPT



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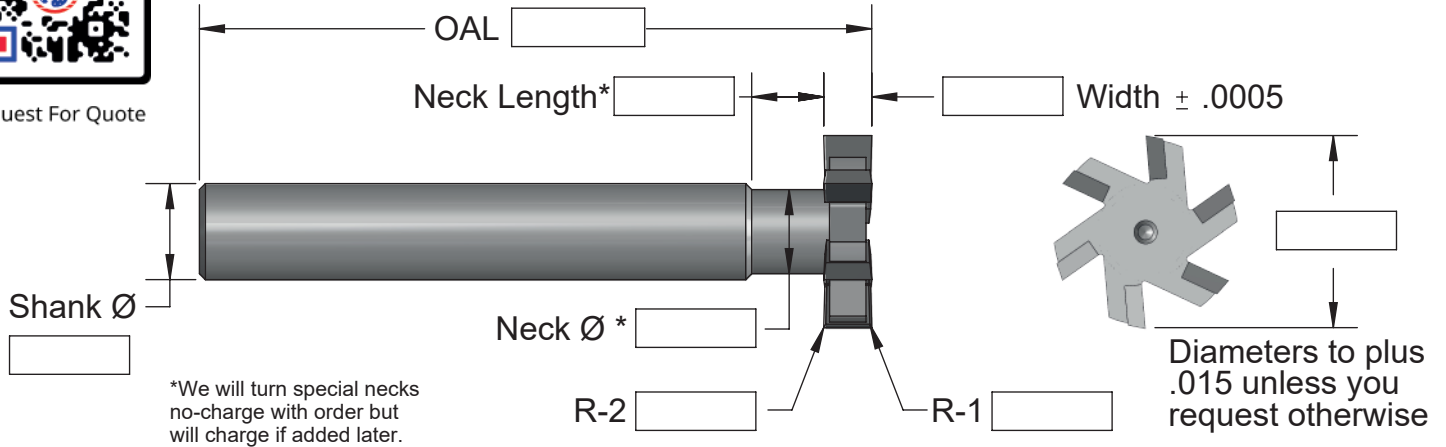
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Extra Long Carbide Tipped Keyseat Cutters with your decimal width in 4-6 working days



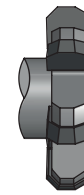
Request For Quote

Machining what part material, please? _____

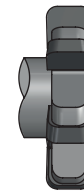


Diameter Plus .015 Minus Zero	Width Range	Basic Cutter Prices				Shank Ø & OAL
		For Aluminum Flutes	Price	For Ferrous Flutes	Price	
5/8	.065/.190	2	\$150.	5	\$165.	1/2" X 4.5
3/4	.065/.220	2	\$150.	5	\$165.	
7/8	.075/.255	2	\$160.	6	\$170.	
1	.085/.315	2	\$165.	6	\$180.	
1-1/8	.110/.315	2	\$170.	6	\$200.	
1-1/4	.110/.350	3	\$180.	8	\$220.	
1-3/8	.110/.380	3	\$190.	8	\$230.	

For Minor Modifications add to your basic price.

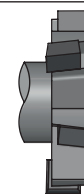


1 CHAMFER \$35.
2 CHAMFERS \$50.

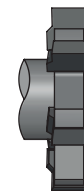


1 RADIUS \$40.
2 RADII \$60.
FULL RADIUS \$60.

1-1/2	.110/.374	3	\$215.	8	\$255.	3/4" X 6.0
1-1/2	.375/.505	3	\$255.	8	\$300.	
1-3/4	.120/.374	4	\$235.	10	\$290.	
1-3/4	.375/.505	4	\$275.	10	\$325.	
2	.120/.374	4	\$285.	12	\$335.	
2	.375/.505	4	\$320.	12	\$390.	
2-1/4	.120/.374	4	\$305.	12	\$390.	
2-1/4	.375/.505	4	\$345.	12	\$450.	
2-1/2	.120/.374	6	\$340.	12	\$430.	
2-1/2	.375/.505	6	\$355.	12	\$475.	



Staggered tooth Cutters add 30% to basic price
(2) piece minimum



Slot plus top Chamfers Upon Request

Suggested Starting Data:

Ferrous 150-250 SFM; .001/.003 IPT, Non-Ferrous 1K-3K SFM; .002/.006 IPT



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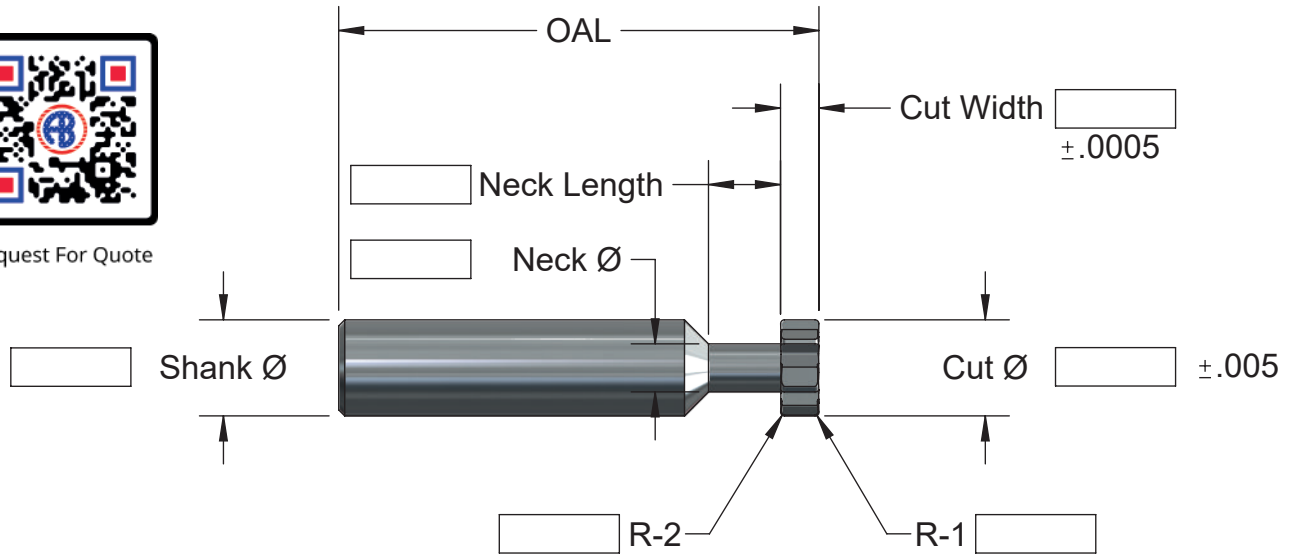
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Solid Carbide Slotting (Keyseat) Cutters .625 diameter and smaller your decimal width in 4-6 working days

Machining what part material, please? _____



Request For Quote



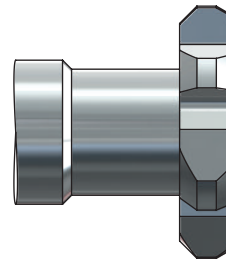
Suggested starting data:

Ferrous 150 to 300 SFM; .001/.003 IPT

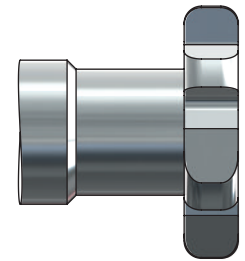
Non-Ferrous 1K-3K SFM; .002/.006 IPT

For thin or weak necked cutters, .0005 IPT

Number of flutes is your choice based on feasibility. We suggest coarse for non-ferrous, medium for titanium/stainless & maximum for cast iron and tough materials.

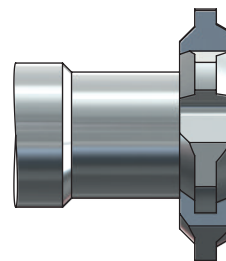


One Chamfer \$35.
Two Chamfers \$50.

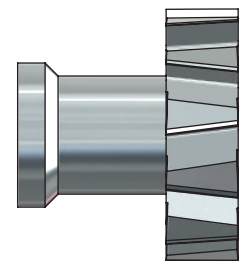


One Radius \$40.
Two Radii \$60.
Full Radius \$60.

Cut Ø	Shank Ø & OAL	Basic Price
.030/.060	3/16" X 2.0	\$105.
.062/.186	3/16" X 2.0	\$90.
.188/.248	1/4" X 2.0	\$95.
.250/.390	3/8" X 2.5	\$105.
.400/.515	1/2" X 2.5	\$115.
.515/.625	5/8" X 3.0	\$135.



Slot plus top Chamfers Upon Request



Staggered tooth cutters add 30% to basic price (2) piece minimum

Add above prices to the basic price for minor modifications.



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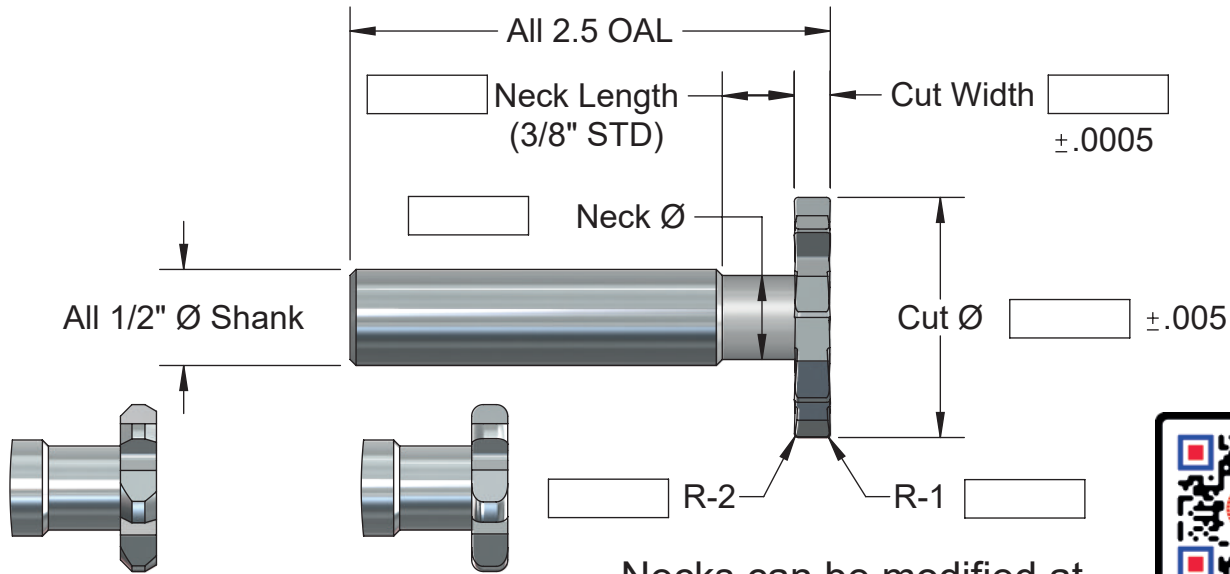
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E-Mail: mail@abtoolsinc.com

Solid Carbide Slotting (Keyseat) Cutters from .530 to 2.0 diameters

your decimal width in 4-6 working days

Machining what part material, please? _____



One Chamfer **\$35.**
Two Chamfers **\$50.**

One Radius **\$40.**
Two Radii **\$60.**
Full Radius **\$60.**

Necks can be modified at no extra charge if feasible.



Request For Quote

Suggested starting data:
Ferrous 150 to 300 SFM; .001/.003 IPT
Non-Ferrous 1K-3K SFM; .002/.006 IPT
For thin or weak necked cutters, .0005 IPT

Slot plus top Chamfers
Upon Request

Staggered tooth cutters add 30%
to basic price
(2) piece minimum

Number of flutes is your choice based on feasibility. We suggest coarse for non-ferrous, medium for titanium/stainless & maximum for cast iron and tough materials.

Cut Ø	Max. no. of Flutes	As-Cast Neck Ø	Basic Prices for .020 thru .135 Widths*	Basic Prices for .136 thru .260 Widths	Basic Prices for .261 thru .374 Widths	Basic Prices for .375 thru .440 Widths
.625	8	3/8	\$180.	\$190.	\$195.	
.750	10	7/16	\$185.	\$195.	\$200.	
1.00	12	7/16	\$195.	\$205.	\$210.	
1.25	14	7/16	\$210.	\$220.	\$250.	\$315.
1.50*	16	7/16	\$225.	\$250.	\$295.	\$335.
1.75*	18	15/32	\$260.	\$285.	\$330.	\$390.
2.00*	20	15/32	\$295.	\$310.	\$350.	\$415.

*1.50 Cut Dia. Minimum width .050, 1.75 - 2.00 Cut Dia. Minimum width .060



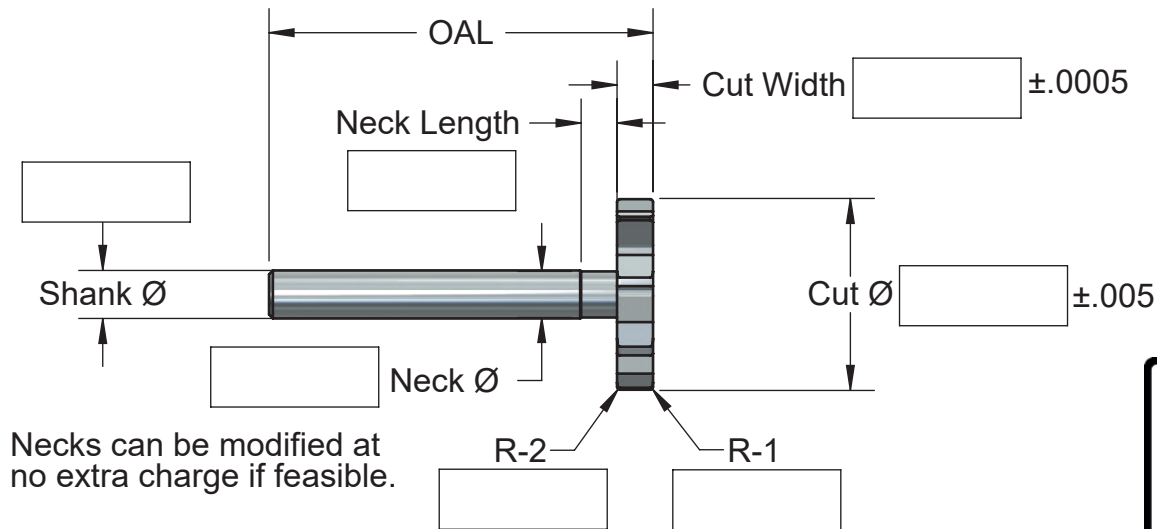
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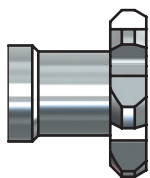
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Reduced Shank Solid Carbide Slotting Tools from .140 to 1.510 diameters with your decimal width in 4-6 working days

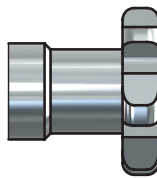
Machining what part material, please? _____



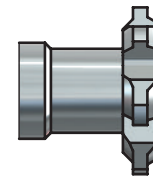
Request For Quote



One Chamfer \$35.
Two Chamfers \$50.

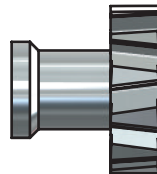


One Radius \$40.
Two Radii \$60.
Full Radius \$60.



Slot plus top Chamfers Upon Request

Number of flutes is your choice based on feasibility. We suggest coarse for non-ferrous, medium for titanium/stainless & maximum for cast iron and tough materials.



Staggered tooth cutters add 30% to basic price (2) piece minimum

Shank Ø & OAL	Cut Ø	Width Range	Basic Prices
1/8" x 1.5	.140 - .510	.020 - .188	\$135.
1/4" x 2.0	.375 - 1.010	.020 - .250	\$175.
1/4" x 2.0	.375 - 1.010	.251 - .440	\$190.
3/8" x 2.0	.500 - 1.510	.030 - .375	\$215.
3/8" x 2.5	.500 - 1.510	.376 - .440	\$245.

Suggested starting data:
Ferrous 150 to 300 SFM; .001/.003 IPT
Non-Ferrous 1K-3K SFM; .002/.006 IPT
For thin or weak necked cutters, .0005 IPT



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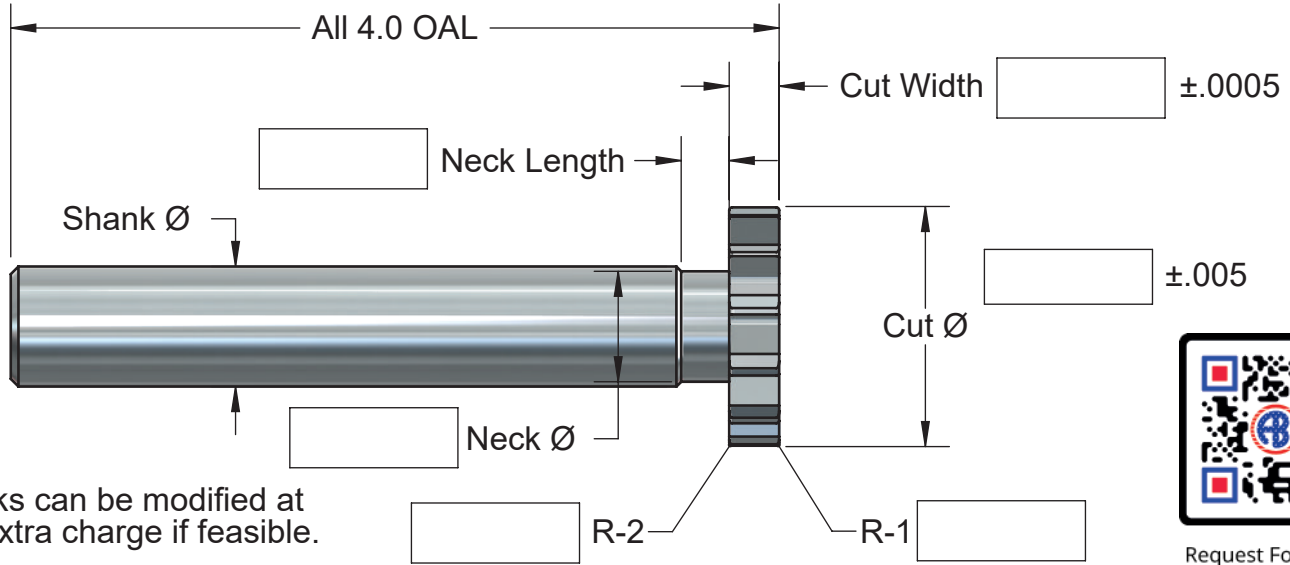
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E-Mail: mail@abtoolsinc.com

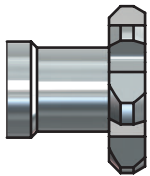
Extra Long Solid Carbide Keyseat Cutters from .530 to 2.0 diameters

with your decimal width in 4-6 working days

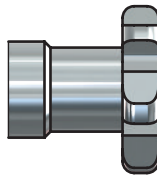
Machining what part material, please? _____



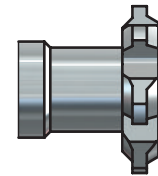
Necks can be modified at no extra charge if feasible.



One Chamfer \$35.
Two Chamfers \$50.

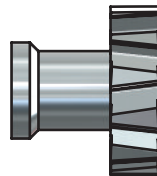


One Radius \$40.
Two Radii \$60.
Full Radius \$60.



Slot plus top Chamfers Upon Request

Number of flutes is your choice based on feasibility. We suggest coarse for non-ferrous, medium for titanium/stainless & maximum for cast iron and tough materials.



Staggered tooth cutters add 30% to basic price (2) piece minimum

Cut Ø	Max. # of Flutes	Shank Ø	Basic Prices for .020 thru .135 Widths	Basic Prices for .136 thru .260 Widths	Basic Prices for .261 thru .374 Widths
.625	8	1/2"	\$260.	\$275.	\$290.
.750	10	1/2"	\$275.	\$290.	\$315.
1.00	12	1/2"	\$290.	\$325.	\$350.
1.125	12	5/8"	\$325.	\$360.	\$385.
1.25	14	5/8"	\$345.	\$385.	\$405.
1.375	14	3/4"	\$410.	\$460.	\$480.
1.50*	16	3/4"	\$460.	\$490.	\$530.
1.75*	18	3/4"	\$520.	\$535.	\$580.
2.00*	20	3/4"	\$550.	\$585.	\$620.

*1.50 Cut Dia. Minimum width .050, 1.75 - 2.00 Cut Dia. Minimum width .060

Suggested starting data: Ferrous 150 to 300 SFM; .001/.003 IPT
Non-Ferrous 1K-3K SFM; .002/.006 IPT
For thin or weak necked cutters, .0005 IPT



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NEW !!! Modular Keyseat Cutters

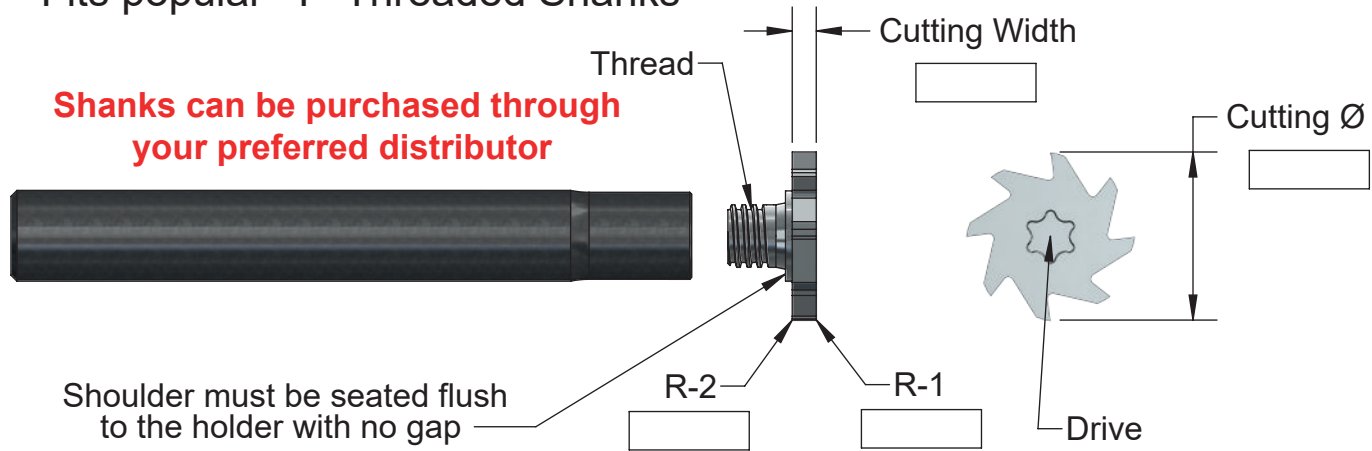
(Solid Carbide)

NEW !!!

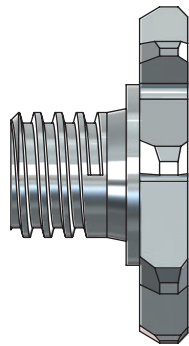
Machining what part material, please? _____

Fits popular "T" Threaded Shanks

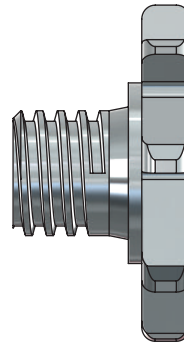
Shanks can be purchased through your preferred distributor



Use NO-Lube when assembling



One Chamfer \$35.
Two Chamfers \$50.



One Radius \$40.
Two Radii \$60.
Full Radius \$60.



Request For Quote

Add above prices to the basic price for minor modifications

Cutting Ø	Cutting Width	Thread	Drive	Torque Spec	Basic Price
.4375 - .500	.050 - .140	T05	T20	60 In Lb	\$165.
.500 - .630	.050 - .170	T06	T25	90 In Lb	\$175.
.625 - .875	.075 - .360	T08	T40	130 In Lb	\$245.
.875 - 1.094	.080 - .375	T10	T40	250 In Lb	\$250.
1.00 - 1.375	.205 - .360	T12	T50	250 In Lb	\$255.
1.00 - 1.375	.375 - .600	T12	T50	250 In Lb	\$305.



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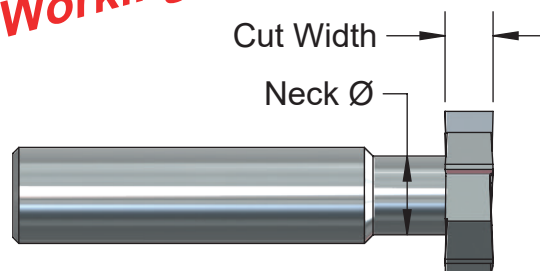
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E-Mail: mail@abtoolsinc.com

Specials in 4-6 Working Days

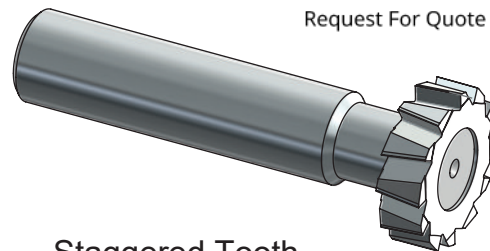
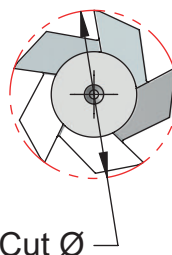
Standard Keyway Cutters Solid Carbide



Request For Quote



Straight Tooth
Shown Full Size
(#807 Keyway Cutter)



Staggered Tooth
Shown Full Size
(#807 Keyway Cutter)

All shanks are 1/2" Ø and 2.5 OAL

Ind. Std. #	Cut Ø	Cut Width	Neck Ø	Neck Length	No. of Flutes Aluminum	No. of Flutes Steel	No. of Flutes Staggered	Price	
								Straight Tooth	Staggered Tooth
202	1/4	1/16	.064	.090	3	6	6	\$90.	\$105.
202.5	5/16	1/16	.065	.090	3	6	6	\$90.	\$105.
302.5	5/16	3/32	.096	.150	3	6	6	\$90.	\$105.
203	3/8	1/16	.209	.125	3	6	6	\$100.	\$120.
303	3/8	3/32	.146	.180	3	6	6	\$100.	\$120.
403	3/8	1/8	.090	.180	3	6	6	\$100.	\$120.
204	1/2	1/16	.140	.090	3	8	8	\$115.	\$130.
304	1/2	3/32	.160	.180	3	8	8	\$115.	\$130.
404	1/2	1/8	.190	.250	3	8	8	\$115.	\$130.
305	5/8	3/32	.190	.150	4	8	8	\$170.	\$185.
405	5/8	1/8	.220	.250	4	8	8	\$170.	\$185.
505	5/8	5/32	.250	.250	4	8	8	\$170.	\$185.
605	5/8	3/16	.280	.280	4	8	8	\$170.	\$185.
406	3/4	1/8	.220	.250	4	10	10	\$175.	\$195.
506	3/4	5/32	.250	.250	4	10	10	\$175.	\$195.
606	3/4	3/16	.280	.280	4	10	10	\$175.	\$195.
806	3/4	1/4	.340	.250	4	10	10	\$175.	\$195.
607	7/8	3/16	.250	.280	5	12	12	\$180.	\$200.
707	7/8	7/32	.310	.250	5	12	12	\$180.	\$200.
807	7/8	1/4	.340	.250	5	12	12	\$180.	\$200.



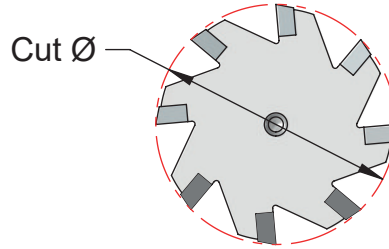
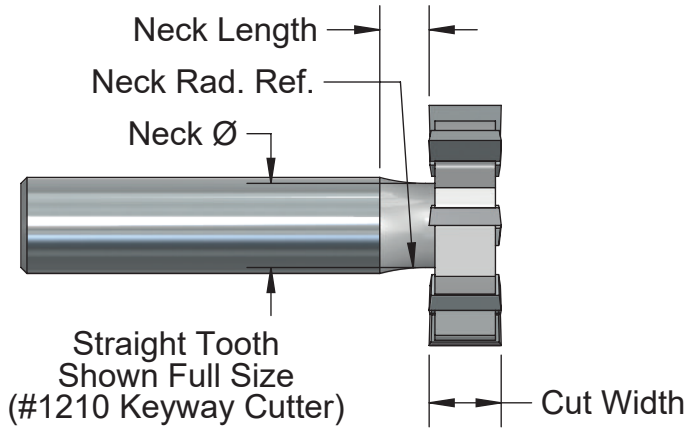
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Standard Keyway Cutters Carbide Tipped

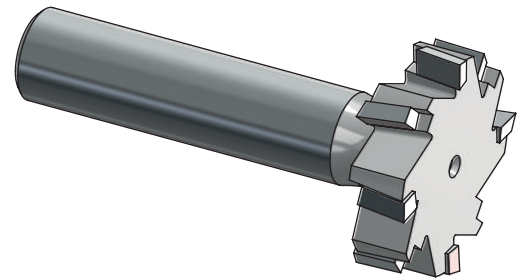
**Specials in 4-6
Working Days**



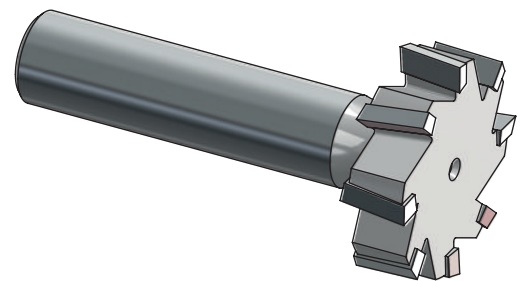
Request For Quote

All shanks are 1/2" Ø and 2.5 OAL

Ind. Std. #	Cut Ø	Cut Width	Neck Ø	Neck Length	Neck Rad. Ref.	No. of Flts.	Price	
							Straight Tooth	Staggered Tooth
608	1	3/16	.280	.440	.85	6	\$125.	\$160.
708	1	7/32	.310	.415	.865			
808	1	1/4	.340	.385	.880			
1008	1	5/16	.375	.219	N/A			
1208	1	3/8	.410	.219	N/A			
609	1-1/8	3/16	.310	.410	.855	6	\$140.	\$175.
709	1-1/8	7/32	.340	.380	.875			
809	1-1/8	1/4	.380	.346	.895			
1009	1-1/8	5/16	.435	.250	N/A			
610	1-1/4	3/16	.310	.410	.855	8	\$155.	\$195.
710	1-1/4	7/32	.340	.380	.875			
810	1-1/4	1/4	.375	.350	.895			
1010	1-1/4	5/16	.485	.250	N/A			
1210	1-1/4	3/8	.485	.250	N/A			
811	1-3/8	1/4	.400	.310	.930	8	\$165.	\$210.
1011	1-3/8	5/16	.485	.313	N/A			
1211	1-3/8	3/8	.485	.313	N/A			
812	1-1/2	1/4	.430	.310	N/A	8	\$190.	\$235.
1012	1-1/2	5/16	.490	.250	N/A			
1212	1-1/2	3/8	.490	.250	N/A			



Staggered Tooth
Shown Full Size
(#1210 Keyway Cutter)



Staggered Tooth
All Ends Cut
Shown Full Size
(#1210 Keyway Cutter)



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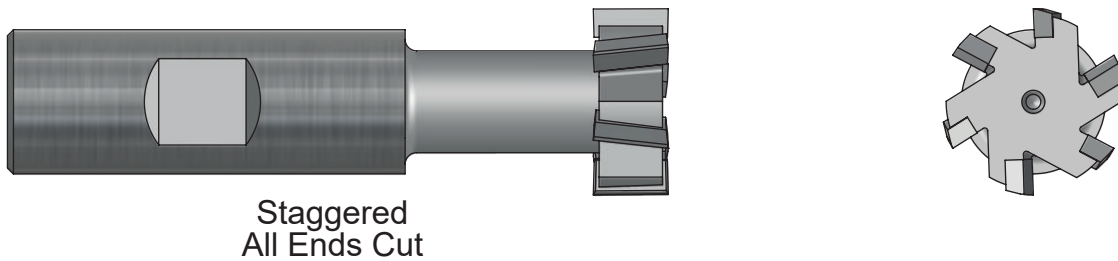
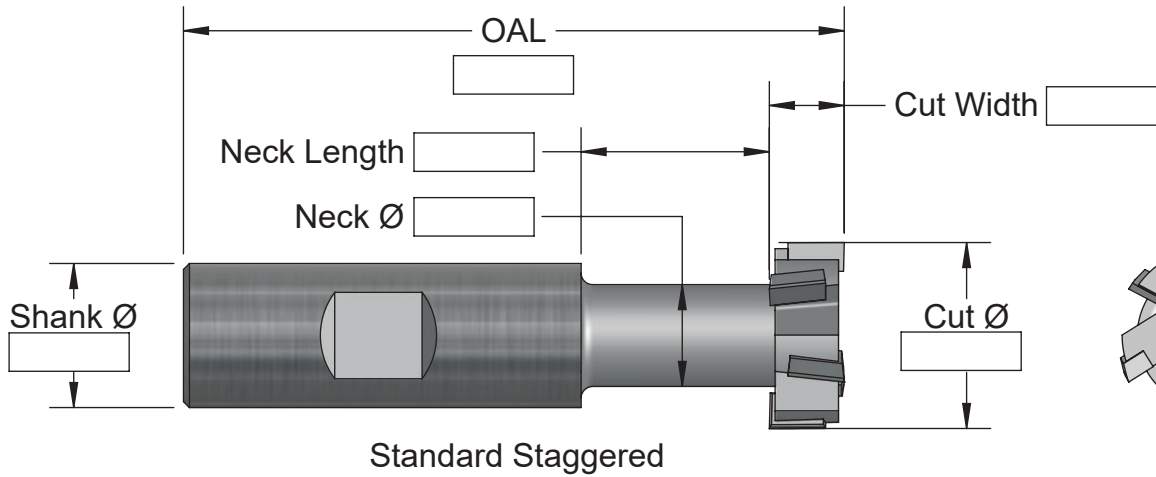
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Carbide Tipped T-Slot cutters Industry Standard Stagger Tooth



Request For Quote



Number	Bolt Size	Cut Ø	Cut Width	Neck Ø	Neck Length	Shank Ø	OAL	No. of Flutes	Price	
									Standard	All Ends Cut
TSKS-1/4*	1/4"	.531	.234	.256	.55	1/2"	2.5	6	\$160.	\$165.
TSKT-5/16	5/16"	.656	.265	.330	.61	1/2"	2.69	6	\$145.	\$150.
TSKT-3/8	3/8"	.781	.328	.410	.86	3/4"	3.25	6	\$175.	\$185.
TSKT-1/2	1/2"	.968	.390	.530	.98	3/4"	3.44	6	\$185.	\$195.
TSKT-5/8	5/8"	1.250	.484	.660	1.14	1"	3.94	6	\$230.	\$340.
TSKT-3/4	3/4"	1.468	.625	.780	1.50	1"	4.44	8	\$270.	\$285.
TSKT-1.0	1"	1.844	.828	1.030	1.67	1-1/4"	4.81	8	\$350.	\$365.
TSKT-1-1/4	1-1/4"	2.219	1.094	1.218	1.97	1-1/4"	5.38	8	\$435.	\$460.
TSKT-1-1/2	1-1/2"	2.656	1.344	-	-	1-1/4"	5.91	8	\$490.	\$515.

* Noted cutter is solid carbide



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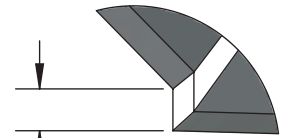
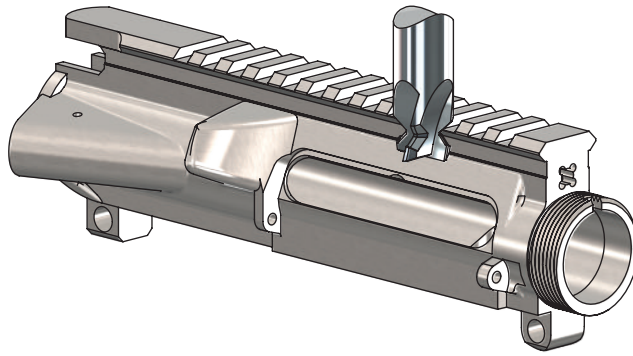
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Picatinny/NATO Rail Cutters

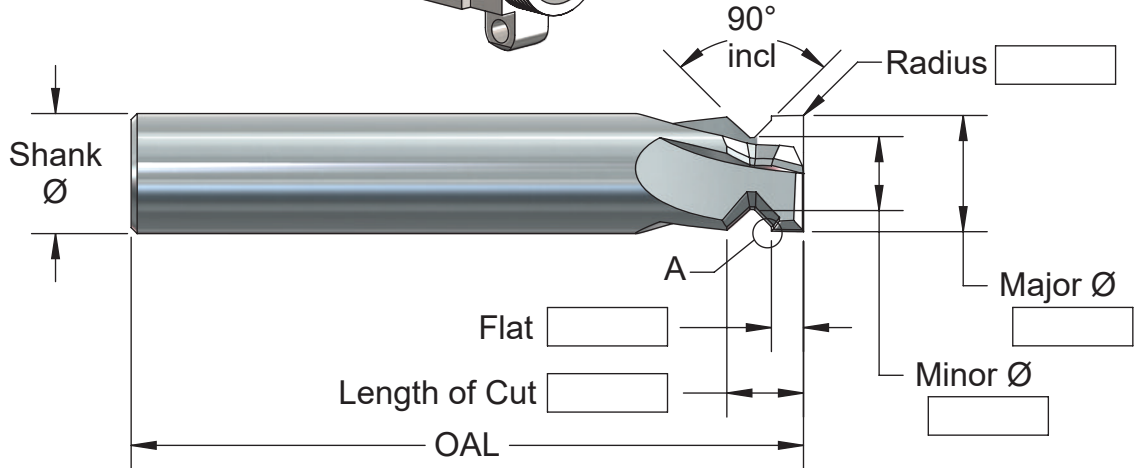
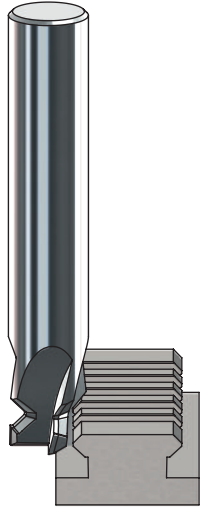


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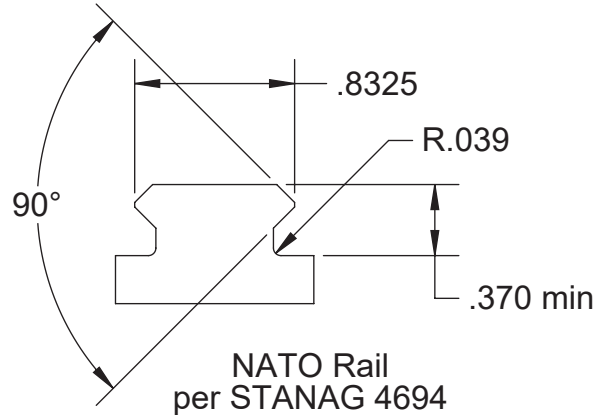
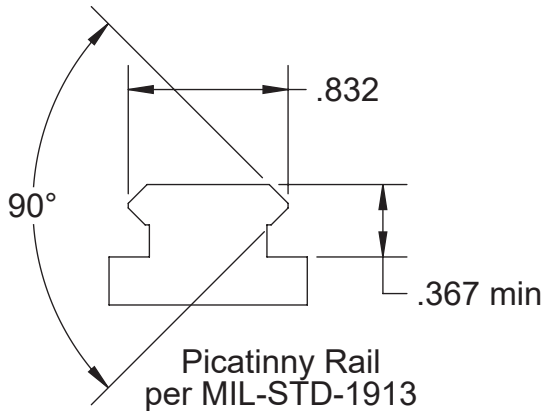
Step

DETAIL A
SCALE 10 : 1



Number	Major Ø	Minor Ø	Length of Cut	Flat	Radius	Shank Ø	OAL	No. of Flutes	Price
PT605-90H-3	.605	.385	.399	.167	None	5/8"	3.5	3	\$150.
PT605-90H-4	.605	.385	.399	.167	None	5/8"	3.5	4	\$160.
PT480-90H-2	.480	.260	.399	.167	None	1/2"	2.5	2	\$135.
PT480-90H-3	.480	.260	.399	.167	None	1/2"	2.5	3	\$143.
PTN625-90H-3*	.625	.405	.387	.143	.039	5/8"	3.5	3	\$163.
PTN625-90H-4*	.625	.405	.387	.143	.039	5/8"	3.5	4	\$170.
PTN500-90H-2*	.500	.280	.387	.143	.039	1/2"	2.5	2	\$140.
PTN500-90H-3*	.500	.280	.387	.143	.039	1/2"	2.5	3	\$148.

* Cutter produces NATO rail

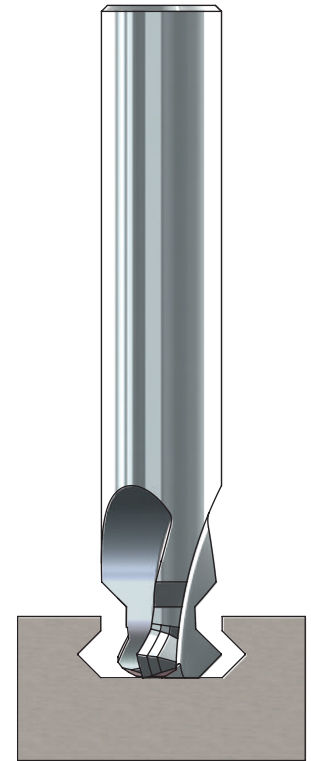
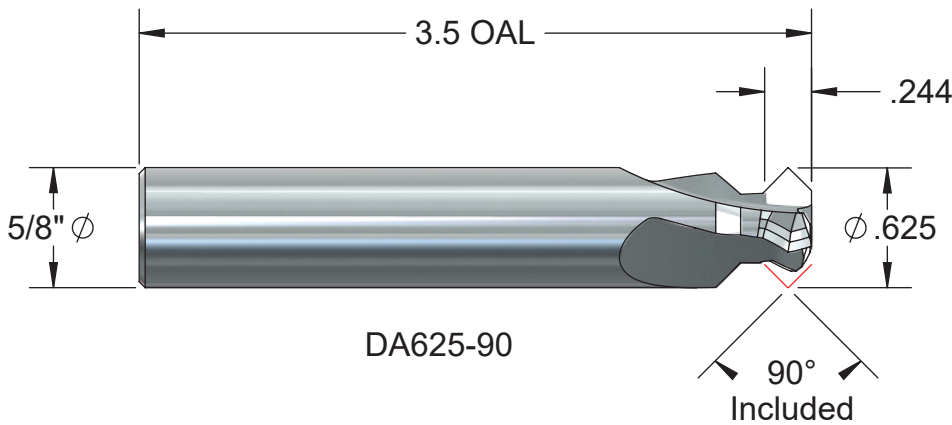


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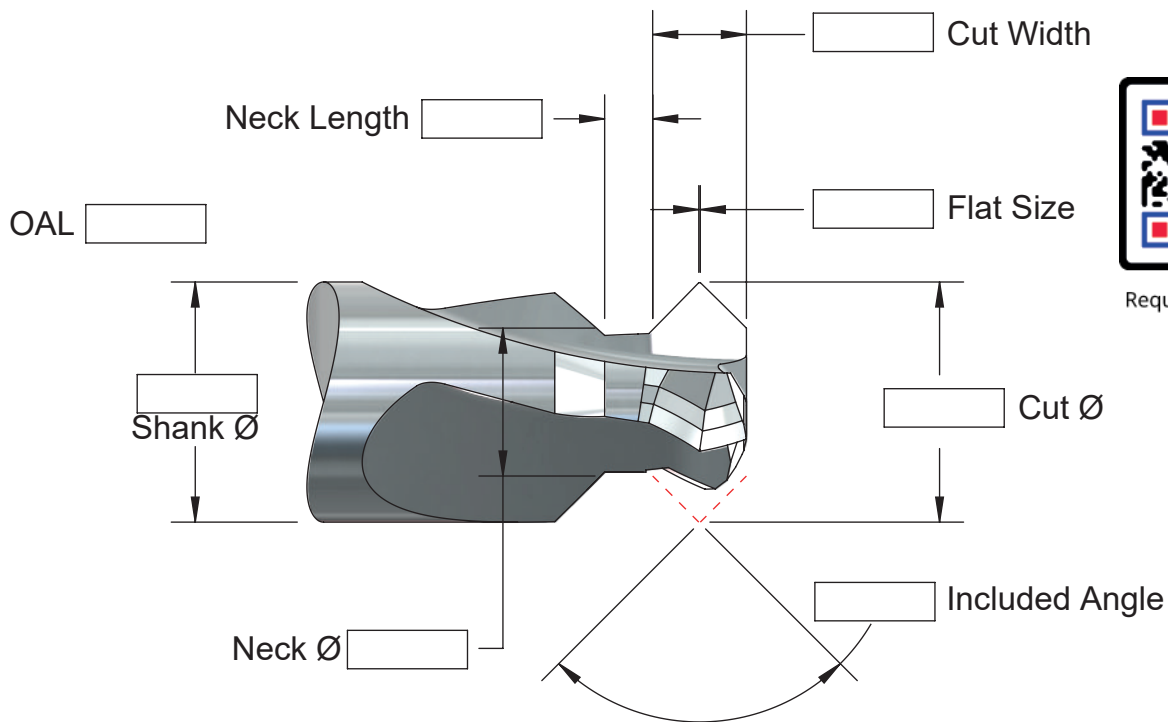
Solid Carbide Male Picatinny (Fixture) Cutter



Number	Flutes	Price	
		No-Coat	AlTiN
DA625-90-3	3	\$175.	\$187.
DA625-90-4	4	\$183.	\$195.

Special Male Picatinny (Fixture) Cutters in 4-6 Working Days

Machining what part material, please? _____



Request For Quote

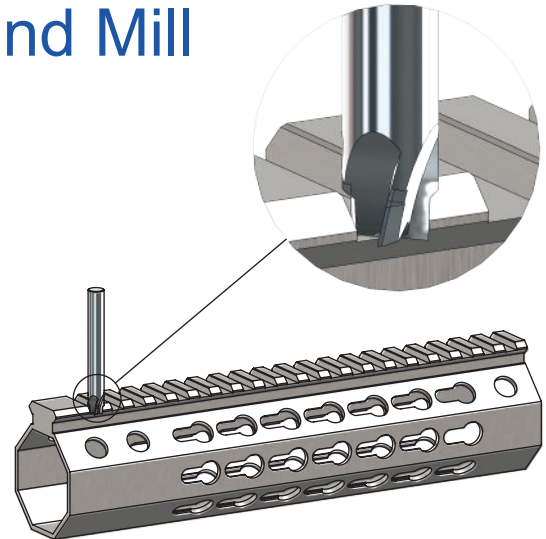
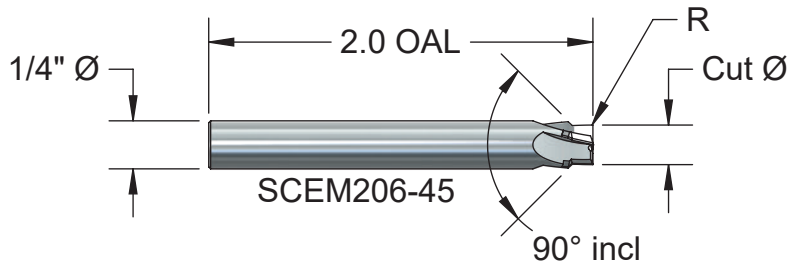


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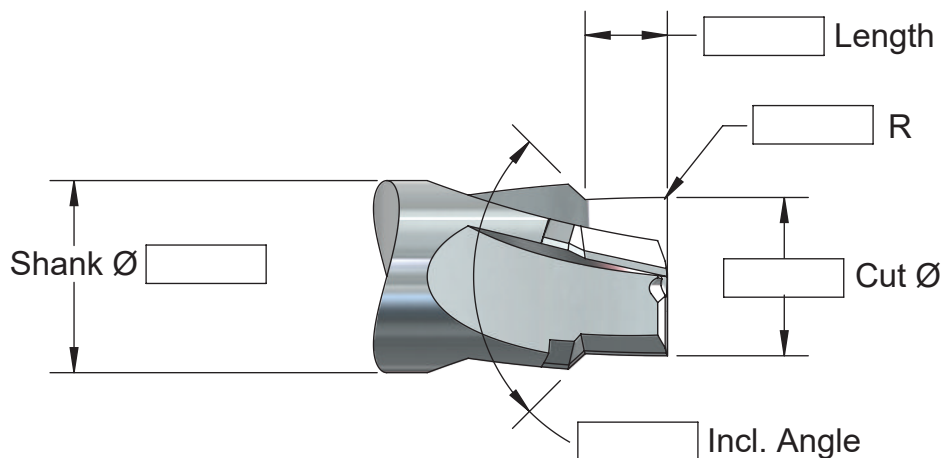
Solid Carbide Slot & Chamfer Picatinny Rail End Mill



Number	Cut Ø	Radius	Price			AITIN add
			3 flutes	4 flutes	5 flutes	
SCEM206-45	.206	None	\$60.	\$70.	\$81.	\$4.
SCEM206-45-10R	.206	.010	\$70.	\$81.	\$91.	\$4.
SCEM206-45-20R	.206	.020	\$70.	\$81.	\$91.	\$4.
SCEM210-45	.210	None	\$60.	\$70.	\$81.	\$4.
SCEM210-45-10R	.210	.010	\$70.	\$81.	\$91.	\$4.
SCEM210-45-20R	.210	.020	\$70.	\$81.	\$91.	\$4.

Special Slot & Chamfer End Mills in 4-6 Working Days

Machining what part material, please? _____



Request For Quote



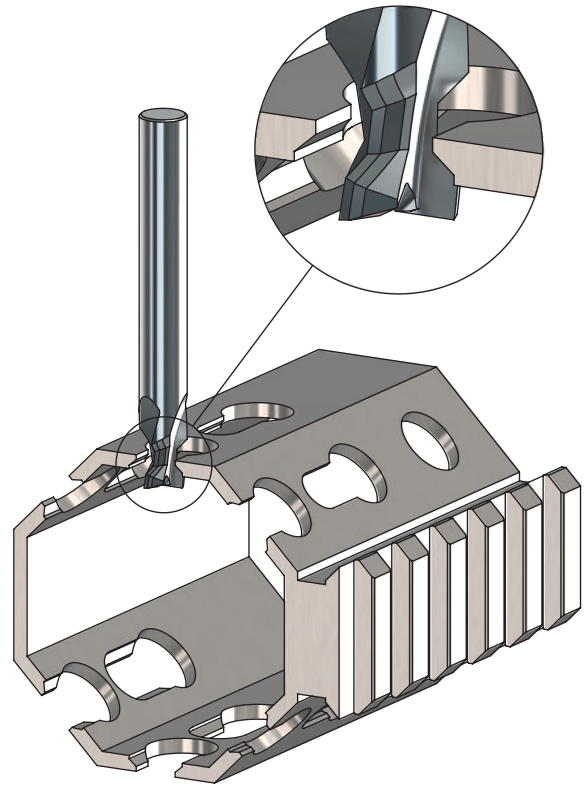
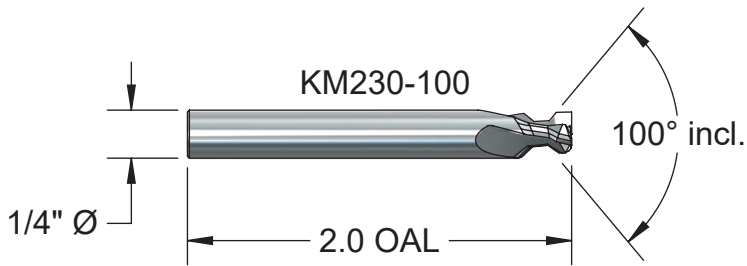
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Solid Carbide Keymod Cutter

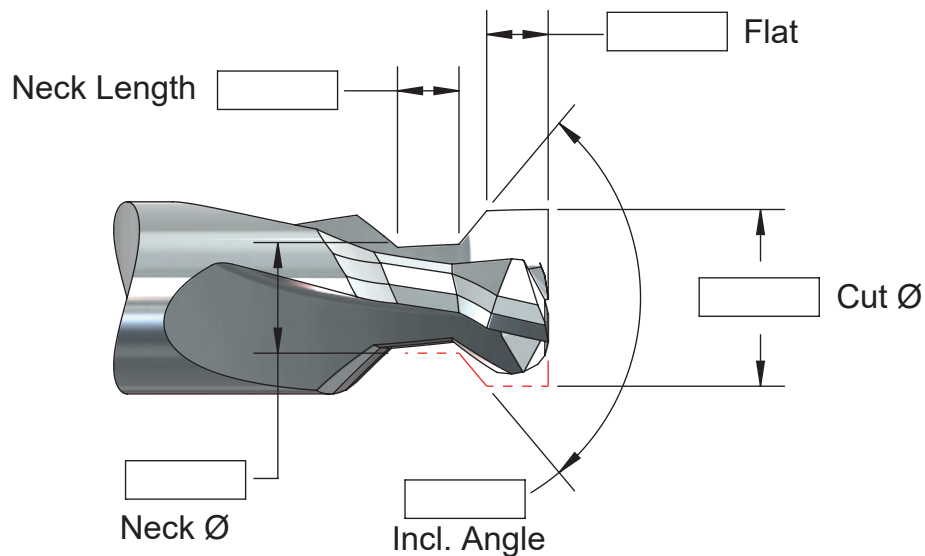
(3) flutes



Number	Price	
	No-Coat	AlTiN
KM230-100	\$95.	\$98.

Special Keymod Cutters in 4-6 Working Days

Machining what part material, please? _____



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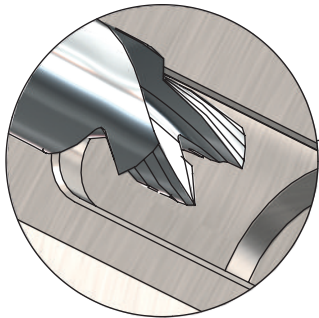
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NEW !!!

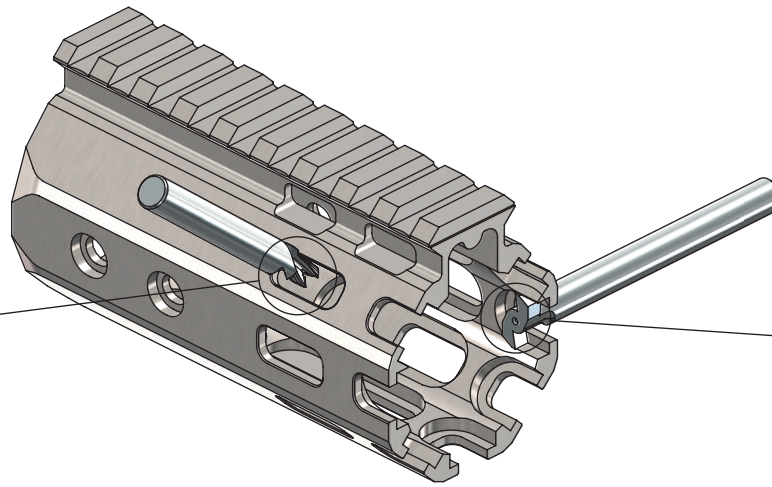
M-LOK Cutters

NEW !!!

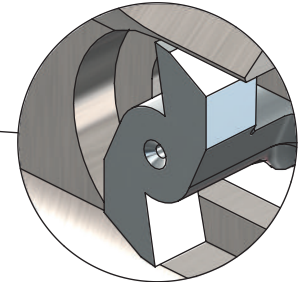
M-LOK Slot & Chamfer Cutter



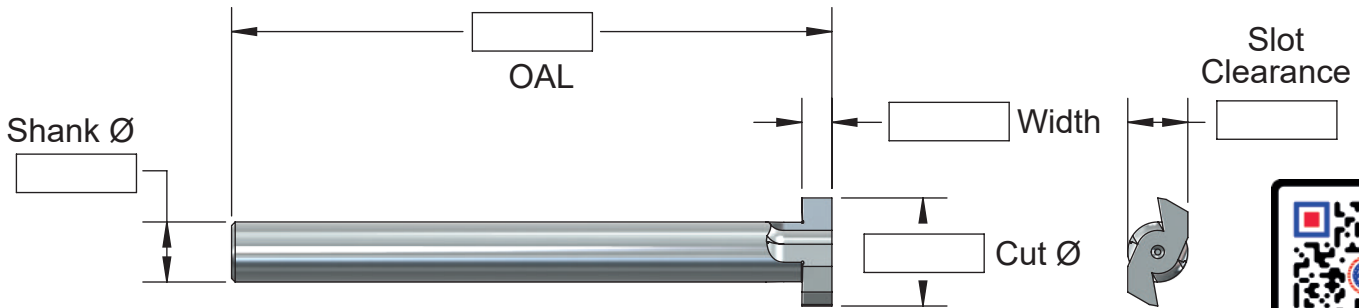
MLSC



M-LOK Back Face Cutter



MLBC

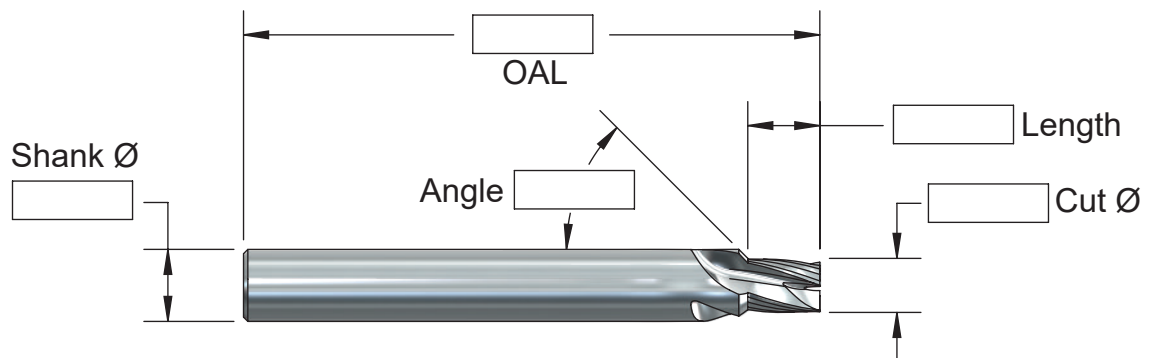


Request For Quote

Number	Cut Ø	Width	Shank Ø	OAL	No. of Flutes	Price
MLBC450	.450	.125	1/4"	2.5	2	\$125.
MLBC475	.475	.125	1/4"	2.5	2	\$125.



Request For Quote



Number	Cut Ø	Length	Angle	Shank Ø	OAL	No. of Flutes	Price
MLSC1875	.1875	.250	45°	1/4"	2.0	3	\$75.



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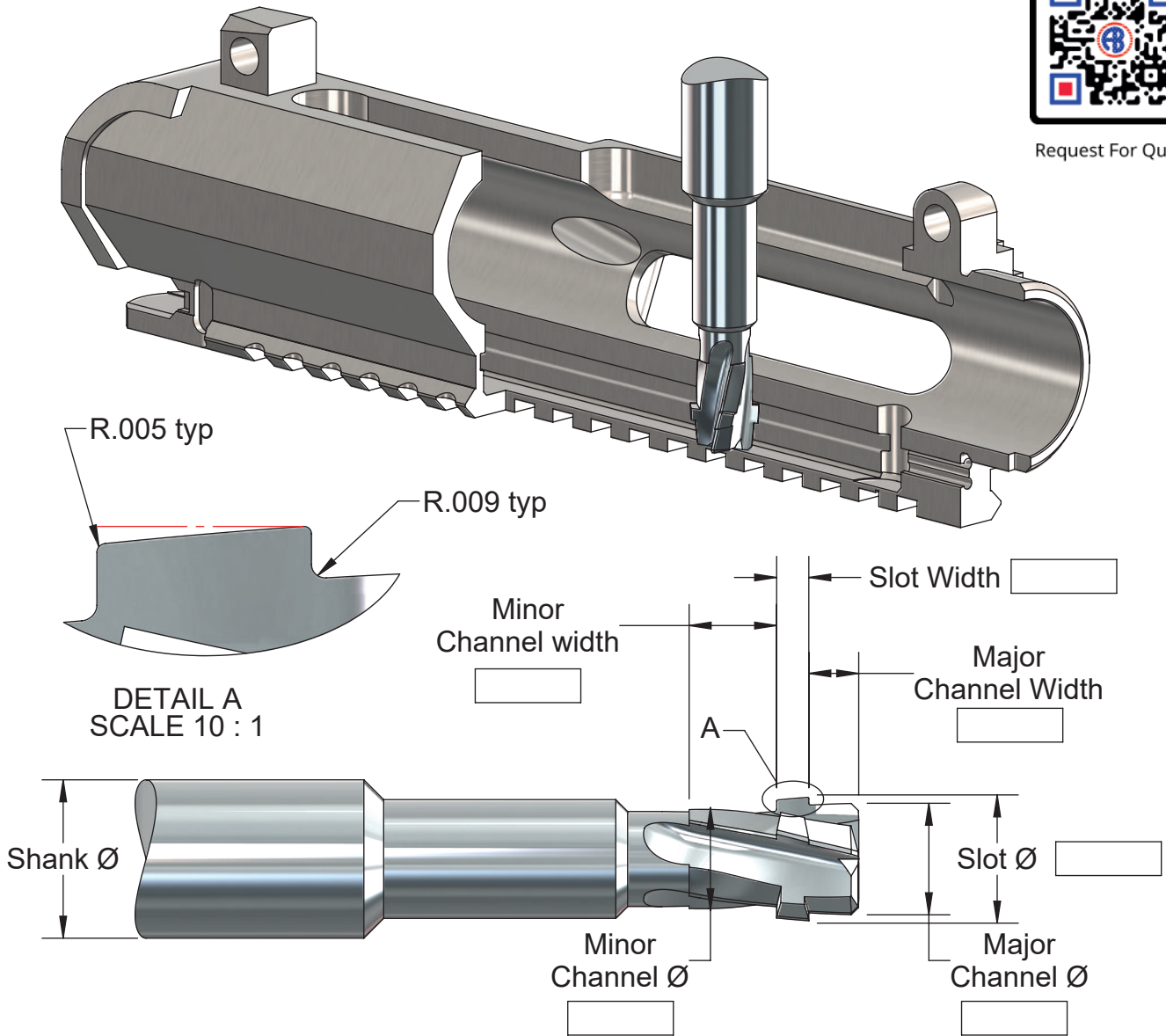
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Charging Handle Slot Cutter



Request For Quote



Special Charging Handle Slot Cutters in 4 - 6 working days

Machining what part material, please? _____

Number	Slot Ø	Slot Width	Helix	Shank Ø & OAL	No. of Flutes	Price	
						No-Coat	AlTiN
CHSC-R15	.486	.127	15°	5/8" X 5.0	3	\$250.	\$265.
CHSC-R30	.486	.127	30°	5/8" X 5.0	3	\$250.	\$265.
CHSC-F15	.506	.127	15°	5/8" X 5.0	4	\$250.	\$265.
CHSC-F30	.506	.127	30°	5/8" X 5.0	4	\$250.	\$265.

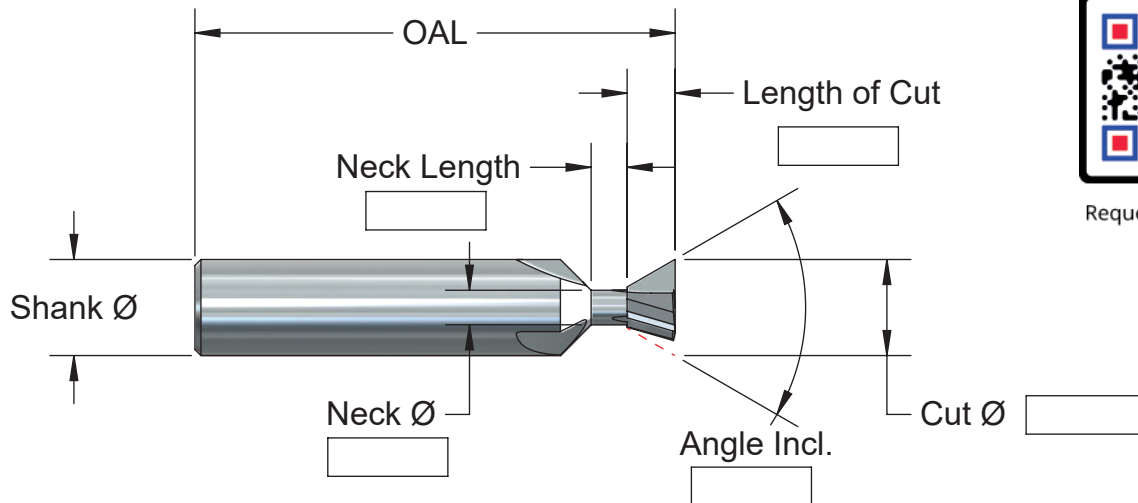
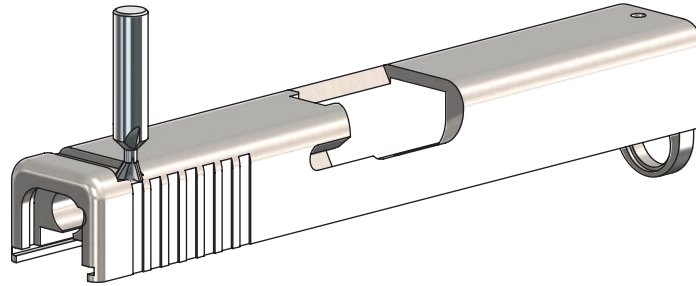


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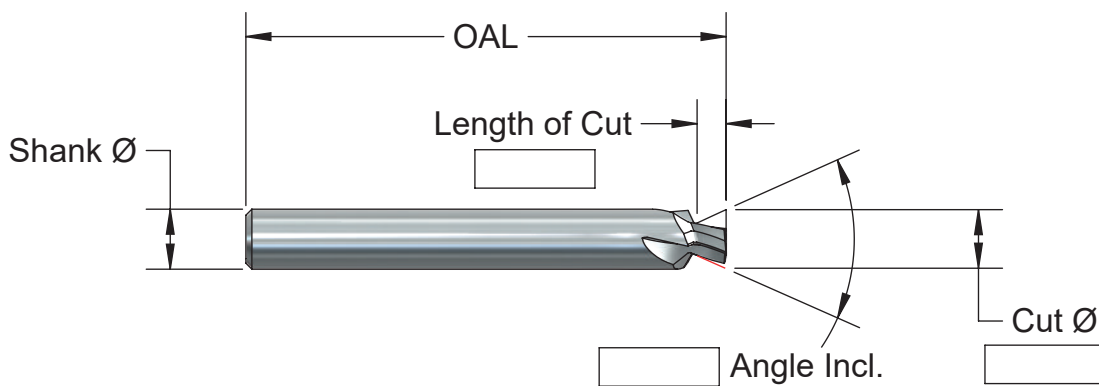
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NEW!!! Pistol Sight Dovetail Slot Cutters NEW!!!



Request For Quote

Number	Angle Incl.	Cut Ø	Length of Cut	Neck Ø	Neck Length	Shank Ø	OAL	Flutes	Price
DS200-38	38°	.200	.125	.114	.063	1/4"	2.0	3	\$70.
DS1/4-32	32°	.250	.125	.155	.125	1/4"	2.0	3	\$70.



Number	Angle Incl.	Cut Ø	Length of Cut	Shank Ø	OAL	Flutes	Price
SCD50-330	50°	.330	.093	3/8"	2.5	3	\$88.
SCD50-344	50°	.344	.125	3/8"	2.5	3	\$88.
SCD50-495	50°	.495	.250	1/2"	2.5	3	\$105.
SCD60-300	60°	.300	.093	5/16"	2.5	3	\$75.
SCD60-359	60°	.359	.125	3/8"	2.5	3	\$88.



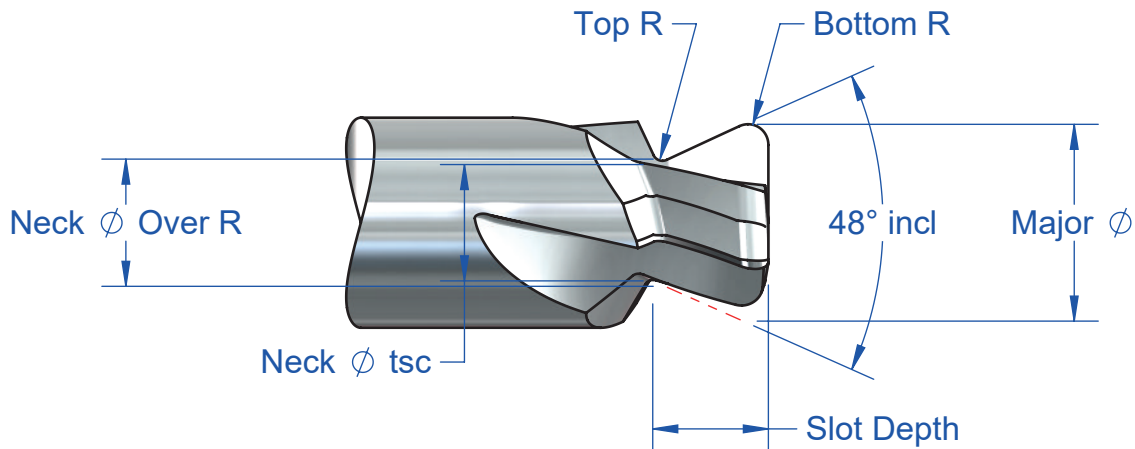
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Solid Carbide Dovetail Cutters for O-Ring Grooves

NUMBER	O-RING SIZE	NECK Ø TSC	NECK Ø OVER R	SLOT DEPTH	TOP RAD.	BOTTOM RAD.	MAJOR Ø	PRICE	AITIN
DT1/16 DT1/16-5	.070	.057 .052	.0624 .0574	.051	.005	.015	.0862 .0812	\$70.	\$74.
DT1/16-054	.070	.059	.064	.054	.005	.016	.090	\$70.	\$74.
DT3/32 DT3/32-8	.103	.085 .077	.0958 .0878	.082	.010	.015	.1418 .1338	\$70.	\$74.
DT1/8 DT1/8-10	.139	.115 .105	.1258 .1158	.112	.010	.031	.1812 .1712	\$80.	\$84.
DT3/16 DT3/16-12	.210	.173 .161	.1892 .1772	.172	.015	.031	.2927 .2807	\$90.	\$97.
DT1/4 DT1/4-15	.275	.233 .218	.2492 .2342	.232	.015	.062	.3726 .3576	\$110.	\$117.
DT3/8 DT3/8-15	.375	.317 .302	.3386 .3236	.317	.020	.094	.4978 .4828	\$140.	\$149.



Reference Chart

NUMBER	NO. OF FLUTES	SHANK Ø	OAL
DT1/16 DT1/16-5	1	3/16"	2.0
DT1/16-054	2	3/16"	2.0
DT3/32 DT3/32-8	2	3/16"	2.0
DT1/8 DT1/8-10	2	1/4"	2.0
DT3/16 DT3/16-12	3	5/16"	2.5
DT1/4 DT1/4-15	3	3/8"	2.5
DT3/8 DT3/8-15	4	1/2"	2.5

**Specials in 4-6
Working Days
(See Page 24)**



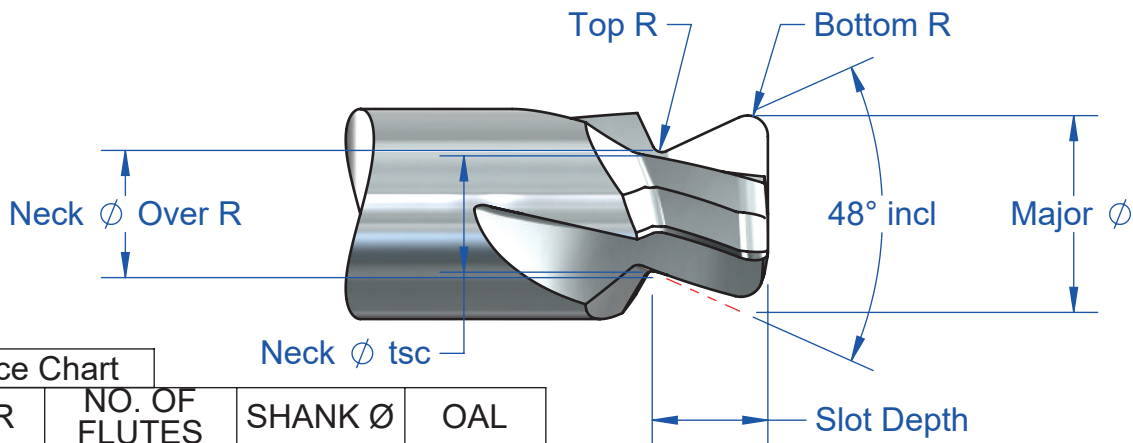
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Solid Carbide Dovetail for O-Ring Grooves (Metric)

NUMBER	O-RING SIZE	NECK Ø TSC	NECK Ø OVER R	SLOT DEPTH	TOP RAD.	BOTTOM RAD.	MAJOR Ø	PRICE	AITiN
DT3MM	3MM	.096	.102	.094	.010	.016	.162	\$70.	\$74.
DT3.5MM	3.5MM	.110	.121	.110	.010	.031	.1745	\$70.	\$74.
DT4MM	4MM	.122	.133	.126	.010	.031	.201	\$75.	\$79.
DT4.5MM	4.5MM	.138	.149	.144	.010	.031	.232	\$75.	\$79.
DT5MM	5MM	.152	.162	.163	.010	.031	.264	\$90.	\$97.
DT5.5MM	5.5MM	.165	.183	.181	.016	.031	.293	\$90.	\$97.
DT6MM	6MM	.179	.196	.199	.016	.031	.323	\$110.	\$117.
DT6.5MM	6.5MM	.193	.210	.2165	.016	.031	.352	\$110.	\$117.
DT7MM	7MM	.207	.224	.234	.016	.059	.352	\$110.	\$117.
DT7.5MM	7.5MM	.2205	.238	.252	.016	.059	.381	\$140.	\$149.
DT8MM	8MM	.236	.258	.270	.020	.059	.413	\$140.	\$149.
DT8.5MM	8.5MM	.250	.272	.289	.020	.059	.444	\$140.	\$149.
DT9MM	9MM	.264	.285	.307	.020	.059	.473	\$140.	\$149.
DT9.5MM	9.5MM	.278	.299	.323	.020	.059	.501	\$140.	\$149.
DT10MM	10MM	.291	.313	.3425	.020	.059	.533	\$175.	\$188.



NUMBER	NO. OF FLUTES	SHANK Ø	OAL
DT3MM	2	3/16"	2.0
DT3.5MM	2	3/16"	2.0
DT4MM	2	1/4"	2.0
DT4.5MM	2	1/4"	2.0
DT5MM	3	5/16"	2.5
DT5.5MM	3	5/16"	2.5
DT6MM	3	3/8"	2.5
DT6.5MM	3	3/8"	2.5
DT7MM	3	3/8"	2.5
DT7.5MM	3	1/2"	2.5
DT8MM	3	1/2"	2.5
DT8.5MM	3	1/2"	2.5
DT9MM	3	1/2"	2.5
DT9.5MM	3	1/2"	2.5
DT10MM	3	5/8"	3.5

**Specials in 4-6
Working Days
(See Page 24)**



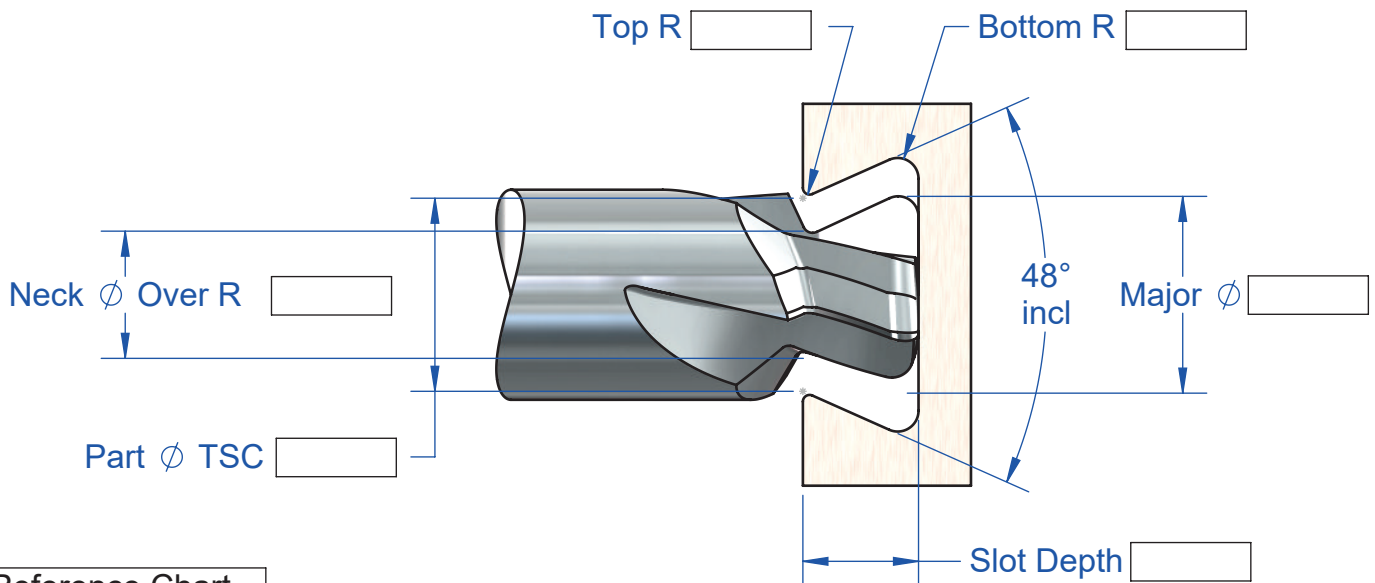
A. B. TOOLS, INC.
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Lincoln, CA 95648-9312

Phone 916 408-2442
FAX 916 993-3949

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E-Mail: mail@abtoolsinc.com

Solid Carbide Dovetail Cutters for O-Ring Grooves WITHOUT Drop Hole Provision

NUMBER	O-RING SIZE	PART Ø TSC	NECK Ø OVER R	SLOT DEPTH	TOP RAD.	BOTTOM RAD.	NO. OF FLUTES	PRICE	AITiN
DTNDH1/16	.070	.057	.036	.051	.005	.015	2	\$70.	\$74.
DTNDH1/16-054	.070	.059	.034	.054	.005	.015	2	\$70.	\$74.
DTNDH3/32	.103	.085	.048	.082	.010	.015	2	\$70.	\$74.
DTNDH1/8	.139	.115	.0685	.112	.010	.031	2	\$80.	\$84.
DTNDH3/16	.210	.173	.0835	.172	.015	.031	2	\$90.	\$95.
DTNDH1/4	.275	.233	.1235	.232	.015	.062	2	\$110.	\$117.
DTNDH3/8	.375	.156	.178	.317	.020	.094	3	\$140.	\$149.



Reference Chart

NUMBER	MAJOR Ø	SHANK Ø	OAL
DTNDH1/16	.060	3/16"	2.0
DTNDH1/16-054	.060	3/16"	2.0
DTNDH3/32	.094	3/16"	2.0
DTNDH1/8	.124	3/16"	2.0
DTNDH3/16	.187	1/4"	2.0
DTNDH1/4	.247	5/16"	2.5
DTNDH3/8	.337	3/8"	2.5

Specials in 4-6 Working Days



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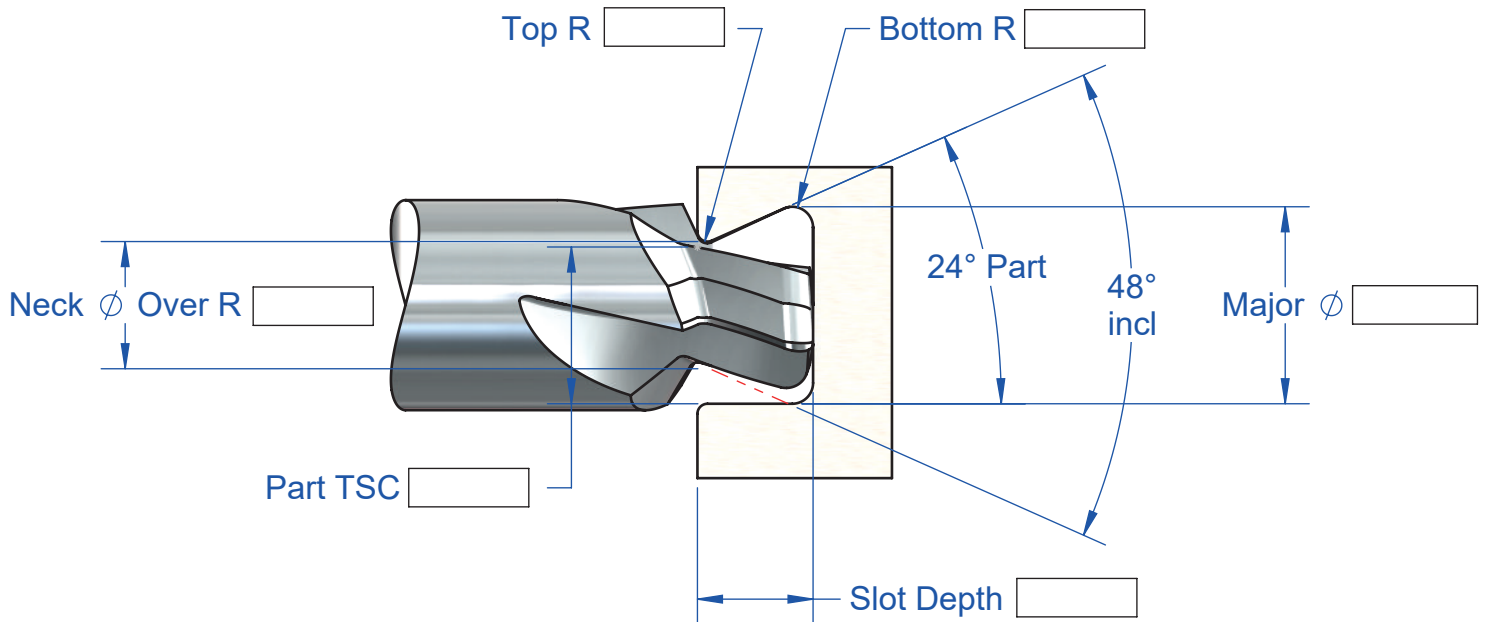
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Solid Carbide Dovetail Cutters for Half Dovetail O-Ring Grooves

NUMBER	O-RING SIZE	PART Ø TSC	NECK Ø OVER R	SLOT DEPTH	TOP RAD.	BOTTOM RAD.	NO. OF FLUTES	PRICE	AITiN
HDG1/16	.070	.065	.0545	.054	.005	.015	2	\$70.	\$74.
HDG3/32	.103	.096	.0775	.084	.010	.015	2	\$70.	\$74.
HDG1/8	.139	.126	.103	.114	.010	.031	2	\$80.	\$84.
HDG3/16	.210	.1915	.146	.1745	.015	.031	2	\$90.	\$97.
HDG1/4	.275	.256	.2005	.236	.015	.062	3	\$110.	\$117.
HDG3/8	.375	.354	.283	.321	.020	.093	4	\$140.	\$149.



Reference Chart

NUMBER	MAJOR Ø	SHANK Ø	OAL
HDG1/16	.081	3/16"	2.0
HDG3/32	.125	3/16"	2.0
HDG1/8	.160	3/16"	2.0
HDG3/16	.253	5/16"	2.5
HDG1/4	.328	3/8"	2.5
HDG3/8	.447	1/2"	2.5

Specials in 4-6 Working Days



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Solid Carbide Dovetail Cutters for O-Ring Grooves

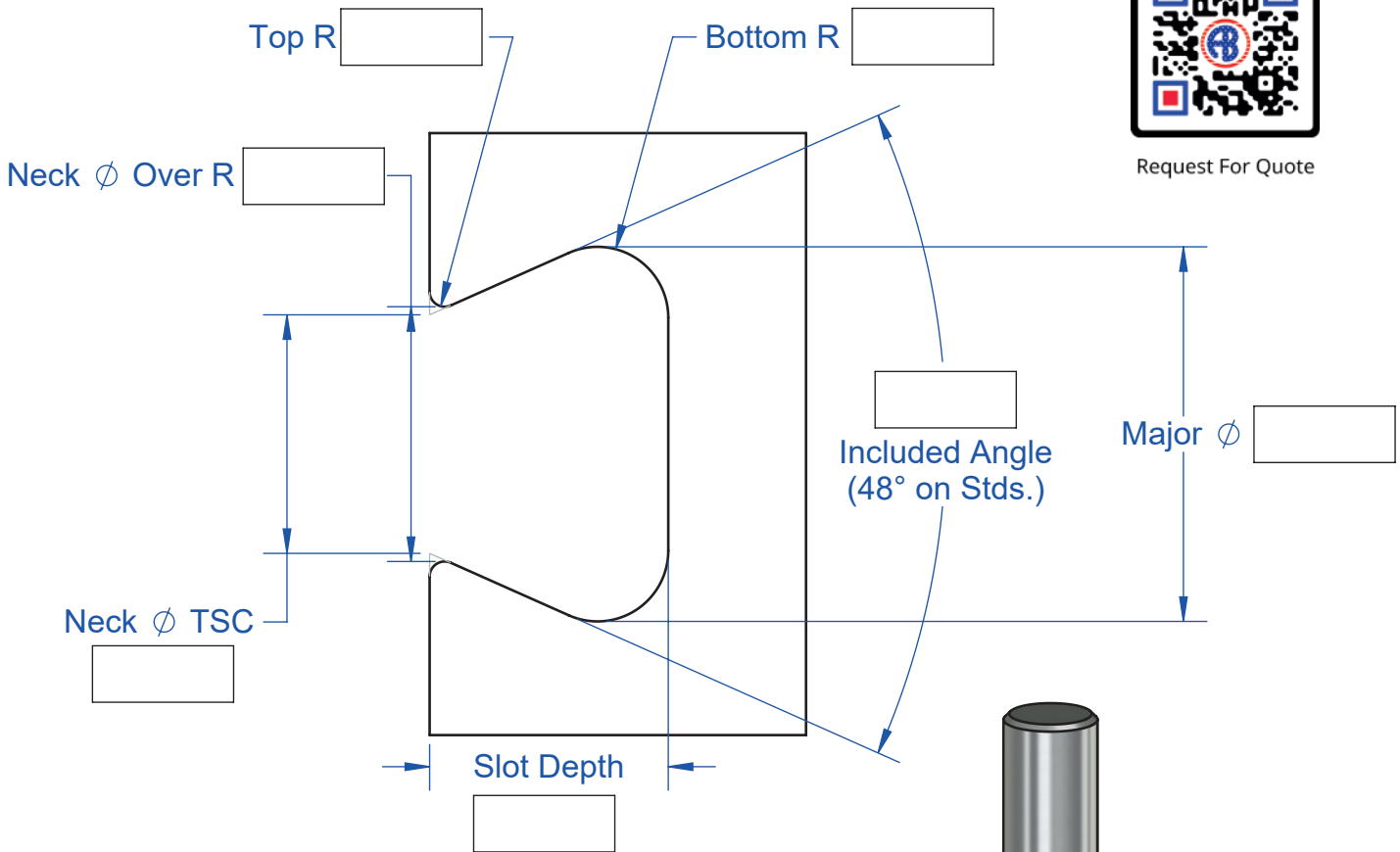
Specials in 4-6 working days

Machining what part material, please? _____

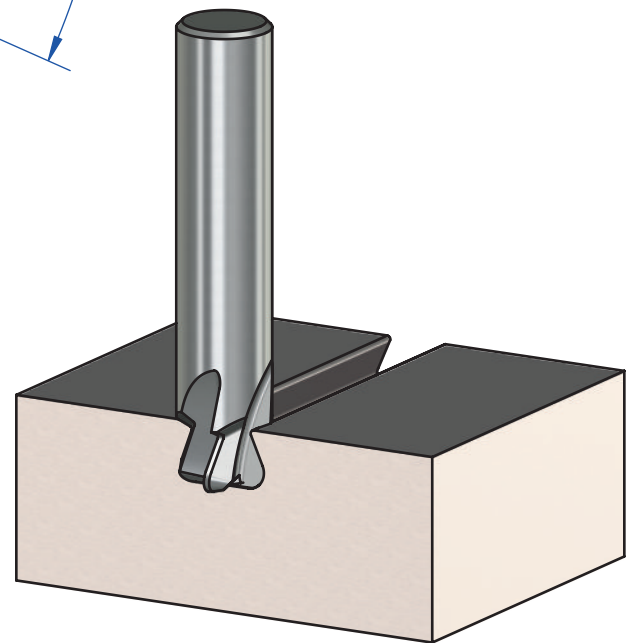
Number of flutes is based on part material and Neck ϕ .



Request For Quote



Shank ϕ and overall length are based on cutter Major ϕ . Or per request if feasible.



Basic Prices		
Major ϕ	1 tool	2 tools
Up to .250	\$160.	\$135. ea
.251 thru .375	\$195.	\$150. ea
.376 thru .500	\$235.	\$165. ea
.501 thru .625	\$325.	\$240. ea
.626 thru .750	\$360.	\$265. ea



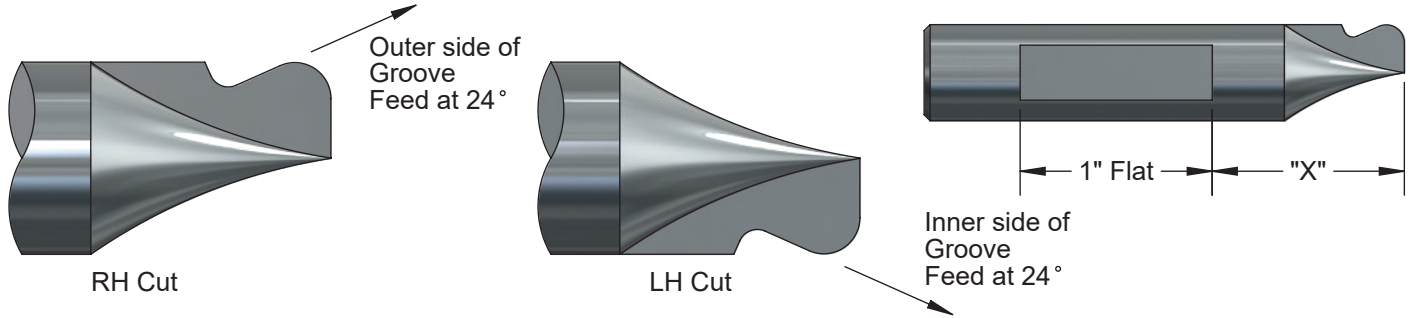
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E-Mail: mail@abtoolsinc.com

Solid Carbide O-Ring Dovetails for Lathes

Single flute carbide O-Ring form tools for lathe applications that match Parker-Hannifin standards



NUMBER		O'RING Ø	*NECK Ø	SLOT DEPTH	TOP RAD.	BOTT. RAD.	X	SHANK Ø & OAL	PRICES	
RH Cut	LH Cut								No Coat	AlTiN
DTL1/16-R	DTL1/16-L	.070	.057	.051	.005	.015	1/2"	3/16" X 2.0	\$85.	\$89.
DTL1/16-054-R	DTL1/16-054-L	.070	.059	.054	.005	.016	1/2"	3/16" X 2.0	\$85.	\$89.
DTL3/32-R	DTL3/32-L	.103	.085	.082	.010	.015	1/2"	3/16" X 2.0	\$85.	\$89.
DTL1/8-R	DTL1/8-L	.139	.115	.112	.010	.031	5/8"	1/4" X 2.0	\$95.	\$99.
DTL3/16-R	DTL3/16-L	.210	.173	.172	.015	.031	3/4"	5/16" X 2.5	\$105.	\$112.
DTL1/4-R	DTL1/4-L	.275	.233	.232	.015	.062	7/8"	3/8" X 2.5	\$120.	\$127.
DTL3/8-R	DTL3/8-L	.375	.317	.317	.020	.094	1"	1/2" X 2.5	\$170.	\$179.

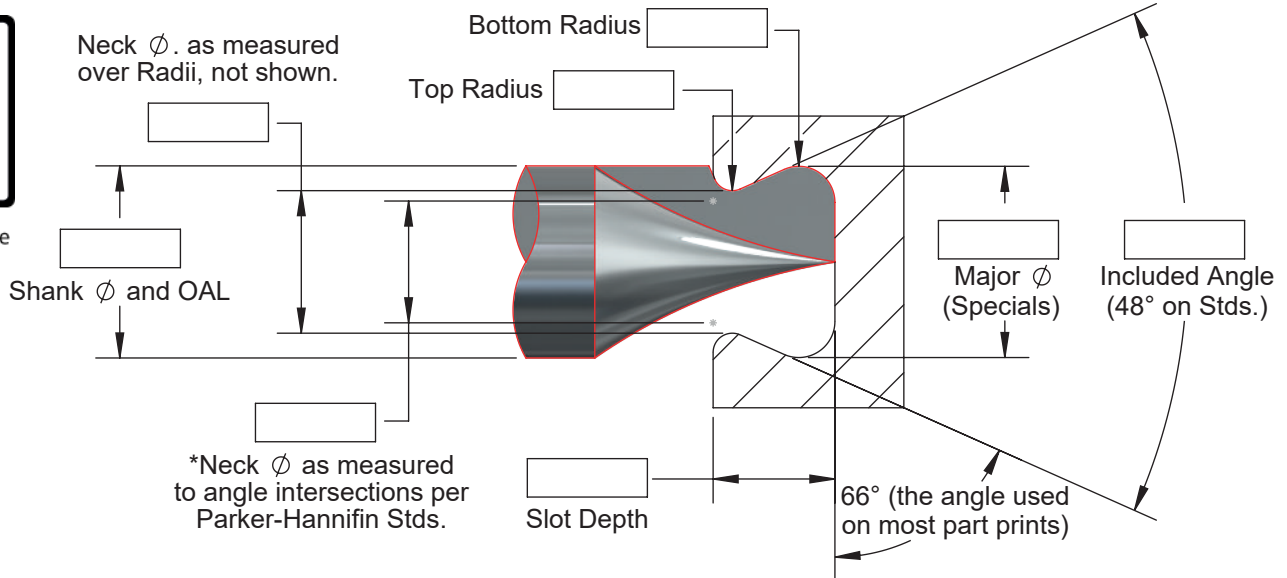
Specials in 4-6 working days

Machining what part material, please? _____

Low Carbon Steel: 500 SFM, .0005-.0010 IPR
 Aluminum: 6000 SFM, .0005-.0010 IPR
 304 SS: 225 SFM, .0005-.0010 IPR



Request For Quote



Special Carbide Cutters for O-Ring Grooves	To 1/4 Major Ø	1 at \$185. and 2 at \$160. each
	.251 thru .375 Major Ø	1 at \$220. and 2 at \$175. each
	.376 thru .500 Major Ø	1 at \$260. and 2 at \$190. each



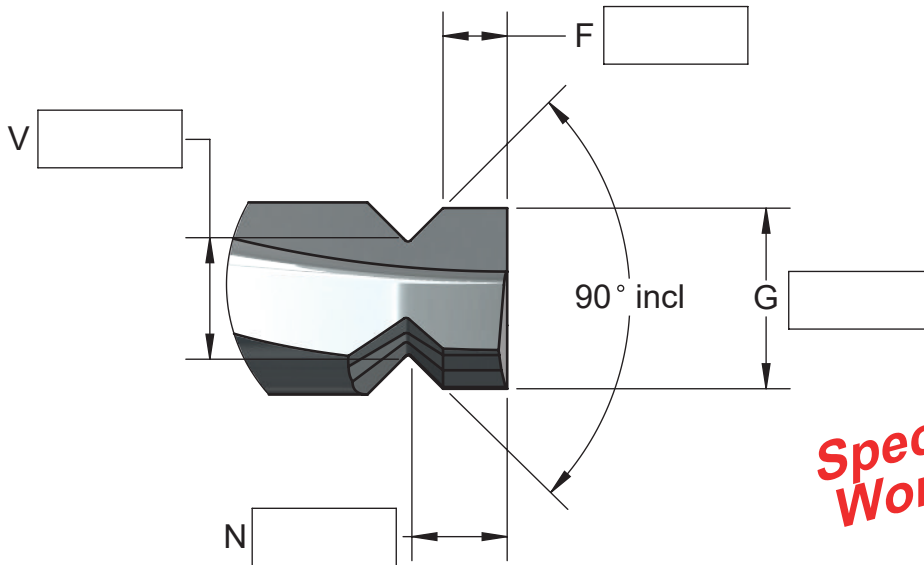
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 E-Mail: mail@abtoolsinc.com

Solid Carbide DSP Cutters for protective cable grooves

Number	"G"	"N"	"F"	"V"	Shank Ø	OAL	Flutes	Price
DSP-02	.047	.023	.0125	.026	3/16"	2.0	2	\$75.
DSP-03	.064	.036	.021	.034	3/16"	2.0	2	\$75.
DSP-04B	.095	.045	.022	.049	3/16"	2.0	2	\$80.
DSP-070	.095	.053	.0325	.054	3/16"	2.0	2	\$80.
DSP-05B	.110	.059	.035	.062	3/16"	2.0	2	\$80.
DSP-06	.126	.071	.0455	.075	3/16"	2.0	2	\$85.
DSP-103	.142	.077	.048	.084	3/16"	2.0	2	\$85.
DSP-07B	.157	.079	.0485	.094	3/16"	2.0	2	\$85.
DSP-08	.172	.096	.060	.100	3/16"	2.0	2	\$85.
DSP-139	.188	.113	.0715	.105	1/4"	2.0	2	\$95.
DSP-09	.188	.105	.0705	.119	1/4"	2.0	2	\$95.
DSP-11	.235	.129	.0835	.144	1/4"	2.0	2	\$95.
DSP-12	.251	.147	.093	.144	3/8"	2.5	2	\$110.
DSP-16	.344	.185	.128	.229	3/8"	2.5	2	\$115.
DSP-20	.407	.233	.164	.269	1/2"	2.5	3	\$130.
DSP-24	.501	.280	.196	.333	1/2"	2.5	3	\$185.
DSP-32	.657	.377	.267	.437	3/4"	3.0	4	\$260.



**Specials in 4-6
Working Days**



Request For Quote

Multi Seal Solid Carbide DMSP Cutter

Number	"G"	"N"	"F"	"V"	Shank Ø	OAL	Flutes	Price
DMSP-04	.187	.051	.016	.117	3/16"	2.0	2	\$85.
DMSP-06	.250	.074	.028	.159	3/8"	2.5	2	\$100.
DMSP-08	.313	.086	.044	.229	3/8"	2.5	3	\$110.
DMSP-12	.500	.145	.063	.336	1/2"	2.5	3	\$185.
DMSP-16	.625	.192	.106	.454	5/8"	3.5	4	\$220.



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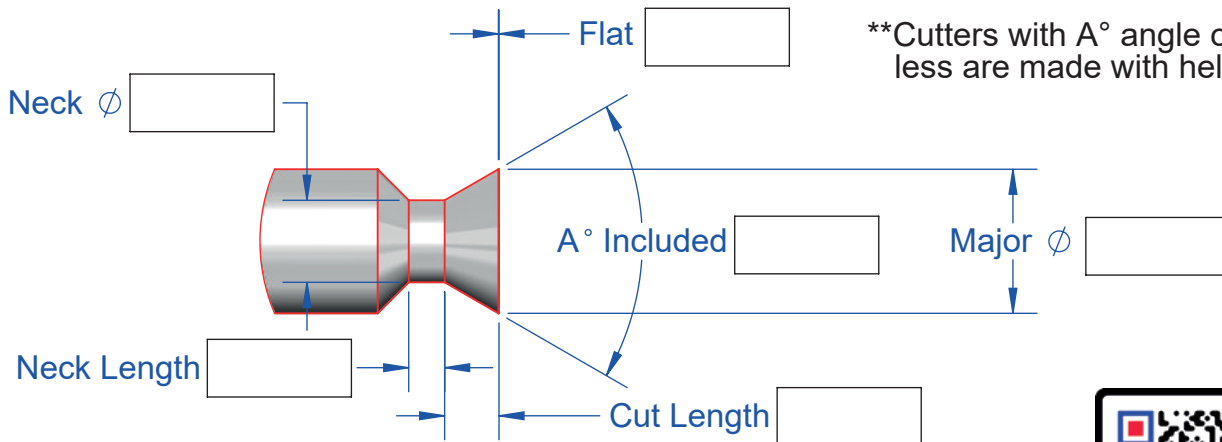
Phone 916 408-2442
FAX 916 993-3949

www.abtoolsinc.com
E-Mail: mail@abtoolsinc.com

Solid Carbide Dovetail Cutters

1/8 Major Ø x 1.5 OAL. With 1/8 Neck Length. 3 Flutes.						
Number	A°	Cut Lngth	Neck Ø	Flat	Price	AlTiN
DS1/8-10	10°	.188	.090	.001	\$63.	\$67.
DS1/8-20	20°	.125	.080	.001	\$63.	\$67.
DS1/8-30	30°	.090	.075	.001	\$63.	\$67.
DS1/8-40	40°	.080	.065	.001	\$63.	\$67.
DS1/8-45	45°	.070	.065	.001	\$63.	\$67.
DS1/8-50	50°	.065	.065	.002	\$63.	\$67.
DS1/8-60	60°	.050	.065	.002	\$63.	\$67.
DS1/8-70	70°	.040	.065	.002	\$63.	\$67.
DS1/8-80	80°	.035	.065	.002	\$63.	\$67.
DS1/8-90	90°	.030	.065	.002	\$63.	\$67.
DS1/8-100	100°	.025	.065	.003	\$63.	\$67.
DS1/8-120	120°	.020	.065	.003	\$63.	\$67.

3/16 Major Ø x 2.0 OAL. With 1/8 Neck Length. 3 Flutes.						
Number	A°	Cut Lngth	Neck Ø	Flat	Price	AlTiN
DS3/16-10	10°	.270	.140	.001	\$65.	\$69.
DS3/16-20	20°	.210	.110	.001	\$65.	\$69.
DS3/16-30	30°	.160	.100	.001	\$65.	\$69.
DS3/16-40	40°	.130	.090	.001	\$65.	\$69.
DS3/16-45	45°	.115	.090	.001	\$65.	\$69.
DS3/16-50	50°	.100	.090	.002	\$65.	\$69.
DS3/16-60	60°	.080	.090	.002	\$65.	\$69.
DS3/16-70	70°	.070	.090	.002	\$65.	\$69.
DS3/16-80	80°	.055	.090	.002	\$65.	\$69.
DS3/16-90	90°	.050	.090	.002	\$65.	\$69.
DS3/16-100	100°	.040	.090	.003	\$65.	\$69.
DS3/16-120	120°	.030	.090	.003	\$65.	\$69.

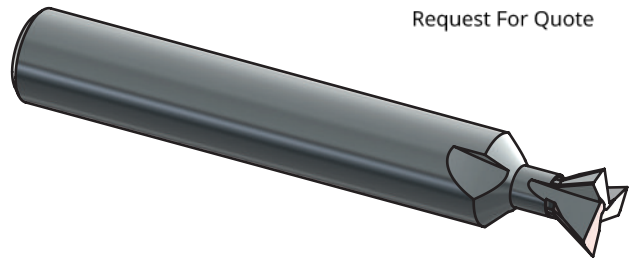


Cutters with A° angle of 45° and less are made with helical flutes.

1/4 Major Ø x 2.0 OAL. With 1/8 Neck Length. 3 Flutes.						
Number	A°	Cut Lngth	Neck Ø	Flat	Price	AlTiN
DS1/4-10	10°	.320	.160	.001	\$70.	\$75.
DS1/4-20	20°	.300	.130	.001	\$70.	\$75.
DS1/4-30	30°	.250	.115	.001	\$70.	\$75.
DS1/4-32	32°	.125	.155	N/A	\$70.	\$75.
DS1/4-40	40°	.190	.110	.001	\$70.	\$75.
DS1/4-45	45°	.165	.110	.001	\$70.	\$75.
DS1/4-50	50°	.150	.110	.002	\$70.	\$75.
DS1/4-60	60°	.120	.110	.002	\$70.	\$75.
DS1/4-70	70°	.100	.110	.002	\$70.	\$75.
DS1/4-80	80°	.085	.110	.002	\$70.	\$75.
DS1/4-90	90°	.070	.110	.002	\$70.	\$75.
DS1/4-100	100°	.060	.110	.003	\$70.	\$75.
DS1/4-120	120°	.045	.110	.003	\$70.	\$75.



Request For Quote



Specials in 4-6 Working Days



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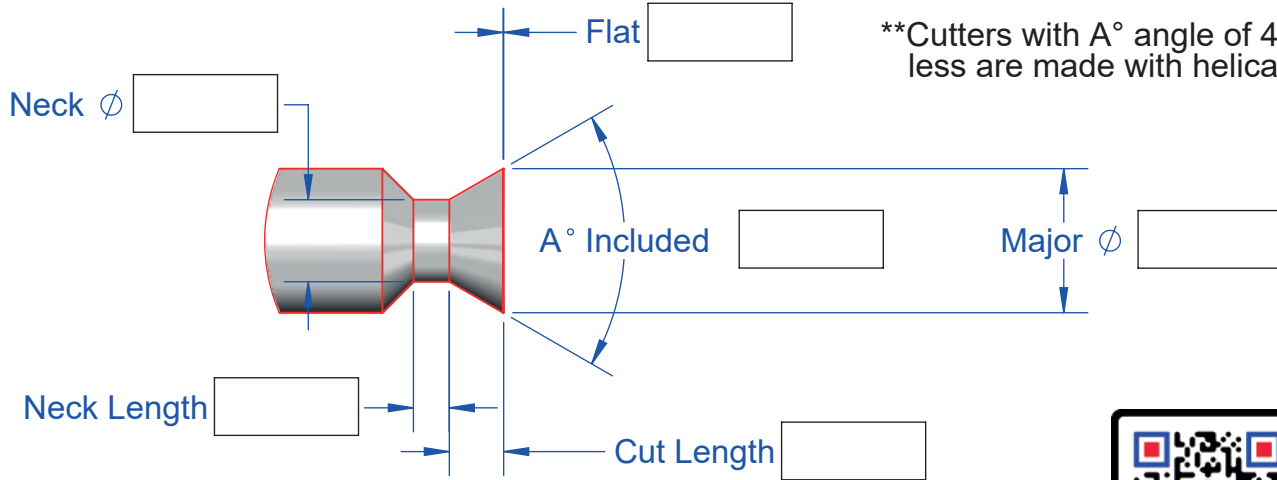
Solid Carbide Dovetail Cutters

3/8 Major Ø x 2.5 OAL. With 3/16 Neck Length. 3 Flutes.

Number	A°	Cut Lngth	Neck Ø	Flat	Price	AlTiN
DS3/8-10	10°	.370	.260	.001	\$88.	\$94.
DS3/8-20	20°	.370	.230	.001	\$88.	\$94.
DS3/8-30	30°	.370	.170	.001	\$88.	\$94.
DS3/8-40	40°	.260	.170	.001	\$88.	\$94.
DS3/8-45	45°	.235	.170	.001	\$88.	\$94.
DS3/8-50	50°	.210	.170	.002	\$88.	\$94.
DS3/8-60	60°	.180	.170	.002	\$88.	\$94.
DS3/8-70	70°	.145	.170	.002	\$88.	\$94.
DS3/8-80	80°	.130	.160	.002	\$88.	\$94.
DS3/8-90	90°	.110	.160	.002	\$88.	\$94.
DS3/8-100	100°	.090	.160	.003	\$88.	\$94.
DS3/8-120	120°	.060	.160	.003	\$88.	\$94.

1/2 Major Ø x 2.5 OAL. With 3/16 Neck Length. 3 Flutes.

Number	A°	Cut Lngth	Neck Ø	Flat	Price	AlTiN
DS1/2-10	10°	.500	.360	.001	\$105.	\$114.
DS1/2-20	20°	.400	.300	.001	\$105.	\$114.
DS1/2-30	30°	.320	.200	.001	\$105.	\$114.
DS1/2-40	40°	.320	.180	.001	\$105.	\$114.
DS1/2-45	45°	.320	.180	.001	\$105.	\$114.
DS1/2-50	50°	.320	.180	.002	\$105.	\$114.
DS1/2-60	60°	.250	.180	.002	\$105.	\$114.
DS1/2-70	70°	.210	.180	.002	\$105.	\$114.
DS1/2-80	80°	.180	.180	.002	\$105.	\$114.
DS1/2-90	90°	.140	.180	.002	\$105.	\$114.
DS1/2-100	100°	.120	.180	.003	\$105.	\$114.
DS1/2-120	120°	.090	.180	.003	\$105.	\$114.



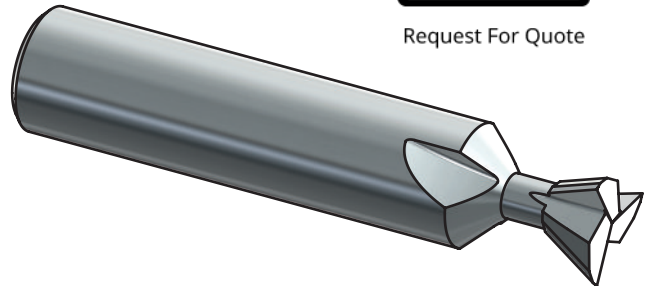
Cutters with A° angle of 45° and less are made with helical flutes.

5/8 Major Ø x 3.0 OAL. With 3/16 Neck Length. 4 Flutes.

Number	A°	Cut Lngth	Neck Ø	Flat	Price	AlTiN
DS5/8-10	10°	.600	.500	.001	\$150.	\$159.
DS5/8-20	20°	.500	.440	.001	\$150.	\$159.
DS5/8-30	30°	.450	.360	.001	\$150.	\$159.
DS5/8-40	40°	.400	.330	.001	\$150.	\$159.
DS5/8-45	45°	.350	.330	.001	\$150.	\$159.
DS5/8-50	50°	.310	.330	.002	\$150.	\$159.
DS5/8-60	60°	.250	.330	.002	\$150.	\$159.
DS5/8-70	70°	.210	.330	.002	\$150.	\$159.
DS5/8-80	80°	.185	.310	.002	\$150.	\$159.
DS5/8-90	90°	.150	.310	.002	\$150.	\$159.
DS5/8-100	100°	.130	.310	.003	\$150.	\$159.
DS5/8-120	120°	.090	.310	.003	\$150.	\$159.



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Specials in 4-6 Working Days



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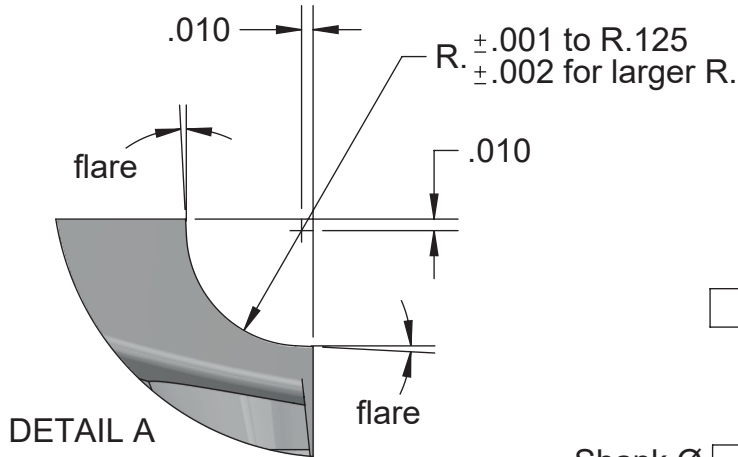
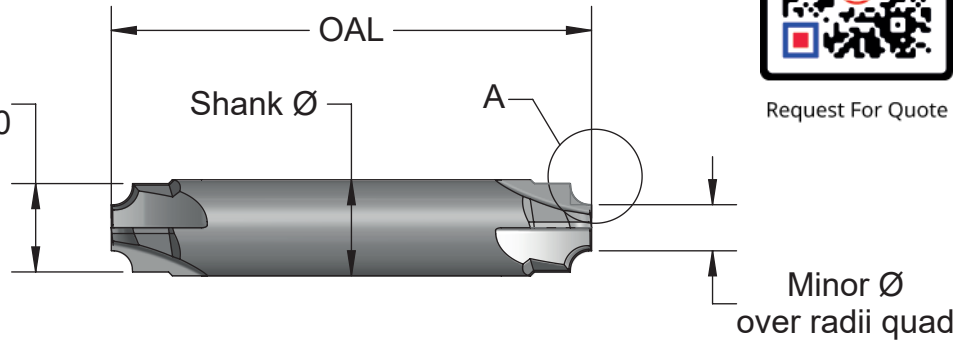
Solid Carbide Corner Rounders

CNC Profile Ground, Double End



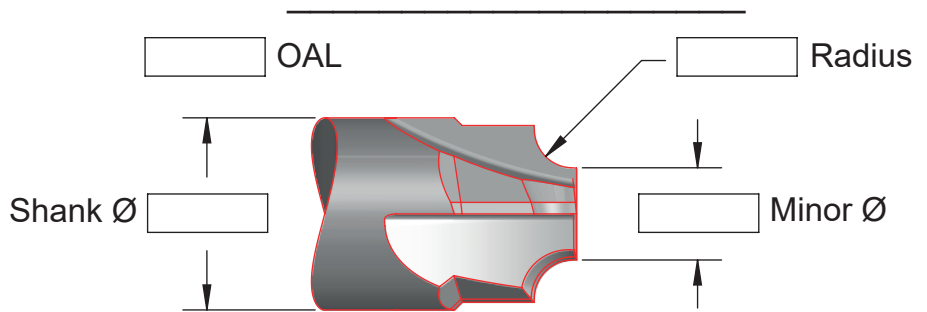
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The Major Cut \varnothing equals
the Minor $\varnothing + (R. \times 2) + .020$



**Special Corner Rounders
in 4-6 working days**

**Machining what part
material, please?**



All AB Tools corner rounders
are made with these features
to avoid gouging.

Tool No.	(add R. to prefix, example CR12-031) Radius Sizes Available	Minor \varnothing	No. Flutes	Shank \varnothing & OAL	Prices	
					No-Coat	AlTiN
CR1-____	.010 .013 .015 .018 .020 .022 .025 .028 .031 .035 .038 .040 .046 .048 .050 .055	.240	4	3/8" x 2.5	\$100.	\$114.
CR2-____	.062 .070 .078 .080 .085 .093 .100 .109 .118 .120 .125			1/2" x 2.5	\$125.	\$143.
	.140 .156 .170 .187			5/8" x 3.5	\$195.	\$221.
	.197 .203 .218 .234 .250			3/4" x 4.0	\$230.	\$260.
CR03-____	.010 .015 .020 .025 .031 .040 .046 .050 .055 .062 .070 .078	.030	2	3/16" x 2.0	\$65.	\$72.
CR06-____	.010 .013 .015 .018 .020 .022 .025 .028 .031 .035 .040 .046 .048 .050 .055 .060	.060	2	3/16" x 2.0	\$65.	\$72.
CR12-____	.010 .013 .015 .018 .020 .022 .025 .028 .031 .035 .038 .040 .046 .048 .050 .055 .060	.120	2	1/4" x 2.0	\$75.	\$83.
CR18-____	.015 .020 .031 .035 .046 .055 .062 .070 .078 .080 .085 .093 .098 .109 .118 .120 .125 .130 .135 .140 .150 .156	.180	3	3/8" x 2.5	\$100.	\$114.
	.170 .180 .1875 .197 .203 .218			1/2" x 2.5	\$125.	\$143.
	.234 .250			5/8" x 3.5	\$195.	\$221.
				3/4" x 4.0	\$230.	\$260.

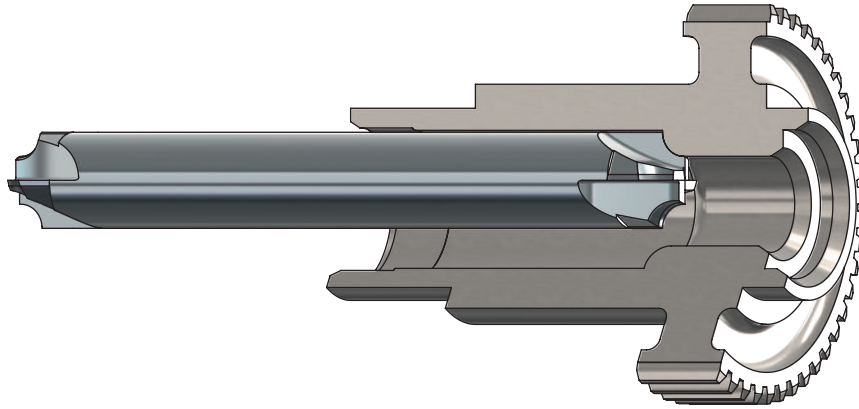


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FAX 916 993-3949

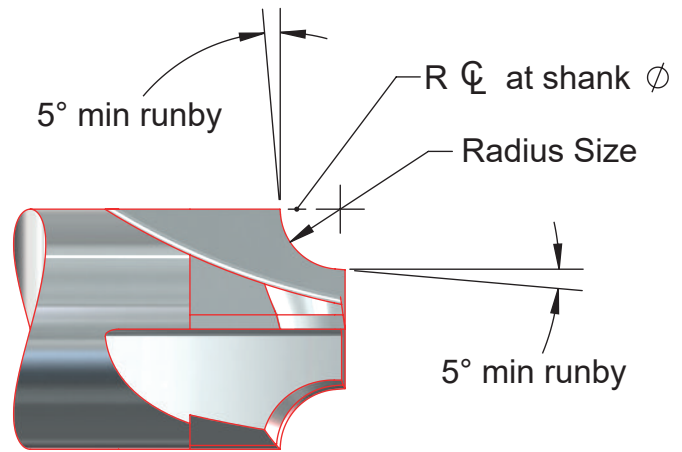
www.abtoolsinc.com
E-Mail: mail@abtoolsinc.com

Extended Reach, Double End, Solid Carbide, Corner Rounders



Specials in 4-6 Working Days

Radius center at shank ϕ allows machining close to other features.



Number	Radius sizes, add to prefix, example CRL1/2-062	Shank ϕ & OAL	Flutes	Price
CRL1/4-	.010 .015 .020 .031 .046 .062	1/4" X 3.0	2 or 4	\$100.
CRL3/8-	.010 .015 .020 .031 .046 .062	3/8" X 4.0	2 or 4	\$120.
	.093 .125	3/8" X 4.0	2 or 4	
CRL1/2-	.010 .015 .020 .031 .046 .062 .093 .125	1/2" X 4.0	2 or 4	\$145.
	.156 .187	1/2" X 4.0	2 or 4	

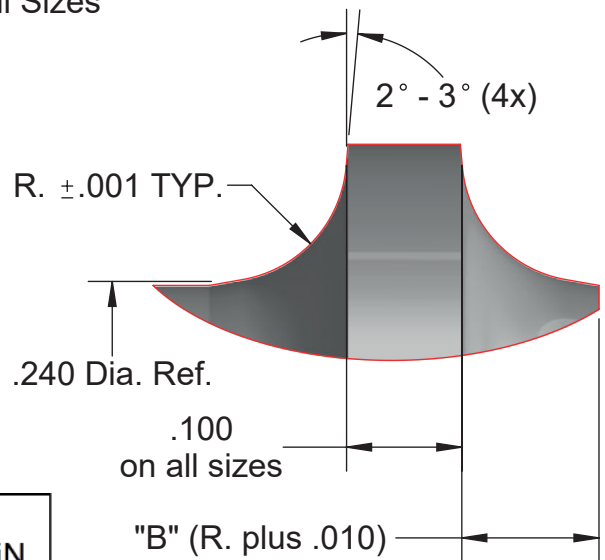
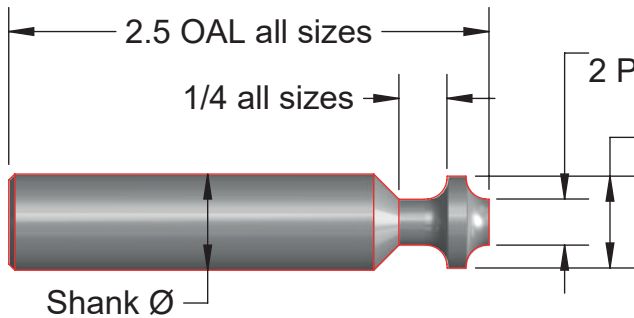
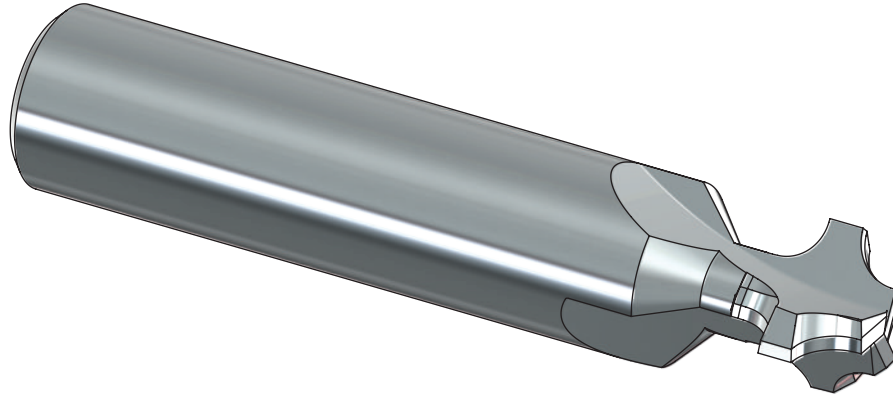


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Solid Carbide TOP & BOTTOM Corner Rounders



Single End, 3 Flutes,
Micro-grain Carbide

Tool No.	R. Size	Ø "A"	Lgth. "B"	Shank Ø	Price	
					No Coat	AlTiN
CRD-015	.015	.290	.025	3/8"	\$145.	\$152.
CRD-020	.020	.300	.030	3/8"	\$145.	\$152.
CRD-031	.031	.322	.041	3/8"	\$145.	\$152.
CRD-040	.040	.340	.050	3/8"	\$145.	\$152.
CRD-046	.046	.352	.056	3/8"	\$145.	\$152.
CRD-062	.062	.384	.072	1/2"	\$160.	\$169.
CRD-078	.078	.416	.088	1/2"	\$160.	\$169.
CRD-093	.093	.446	.103	1/2"	\$160.	\$169.
CRD-109	.109	.478	.119	1/2"	\$160.	\$169.
CRD-125	.125	.510	.135	1/2"	\$160.	\$169.

**Specials in 4-6
Working Days**

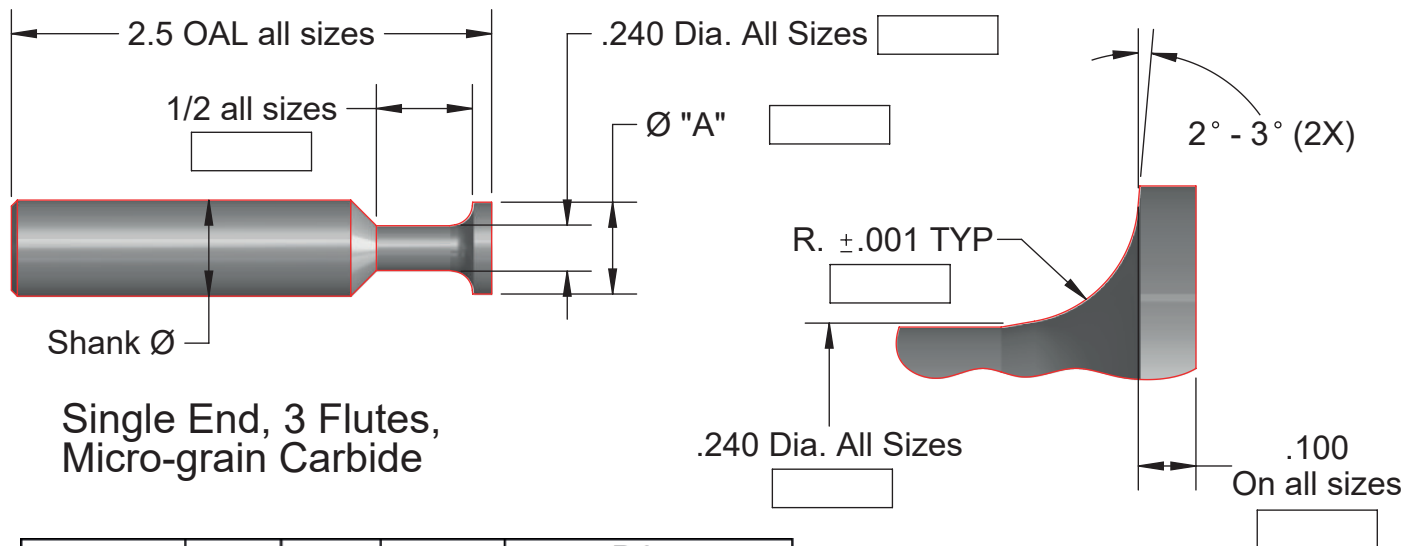
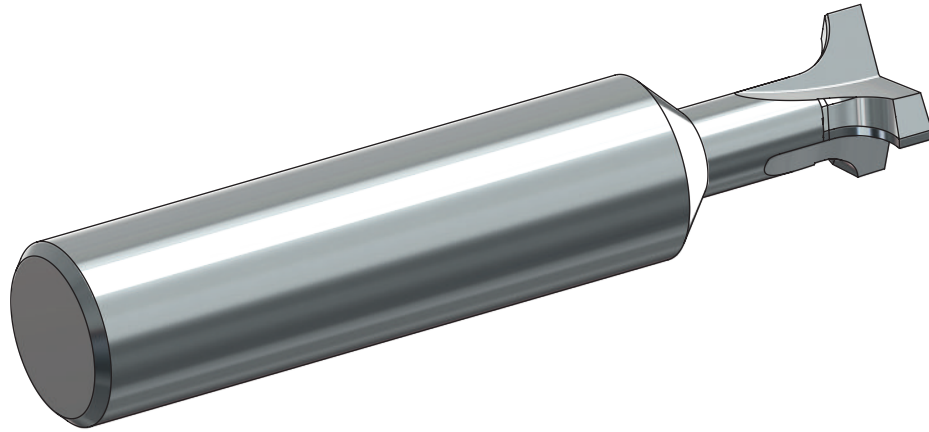


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Solid Carbide BACK Corner Rounders



Single End, 3 Flutes,
Micro-grain Carbide

Tool No.	R. Size	Ø "A"	Shank Ø	Price	
				No Coat	AlTiN
BCR-015	.015	.290	3/8"	\$115.	\$122.
BCR-020	.020	.300	3/8"	\$115.	\$122.
BCR-031	.031	.322	3/8"	\$115.	\$122.
BCR-040	.040	.340	3/8"	\$115.	\$122.
BCR-046	.046	.352	3/8"	\$115.	\$122.
BCR-062	.062	.384	1/2"	\$125.	\$134.
BCR-078	.078	.416	1/2"	\$125.	\$134.
BCR-093	.093	.446	1/2"	\$125.	\$134.
BCR-109	.109	.478	1/2"	\$125.	\$134.
BCR-125	.125	.510	1/2"	\$125.	\$134.



Request For Quote

**Specials in 4-6
Working Days**

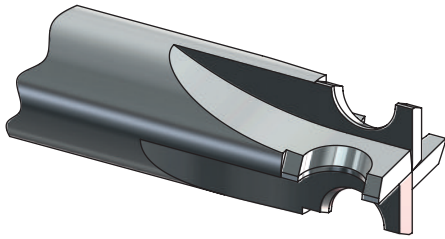


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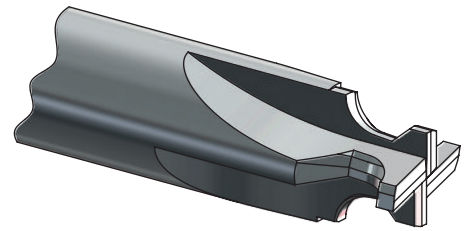
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Solid Carbide Full Concave Cutters

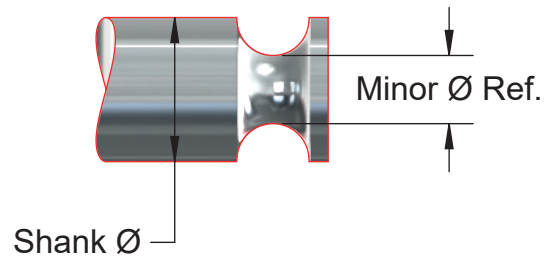
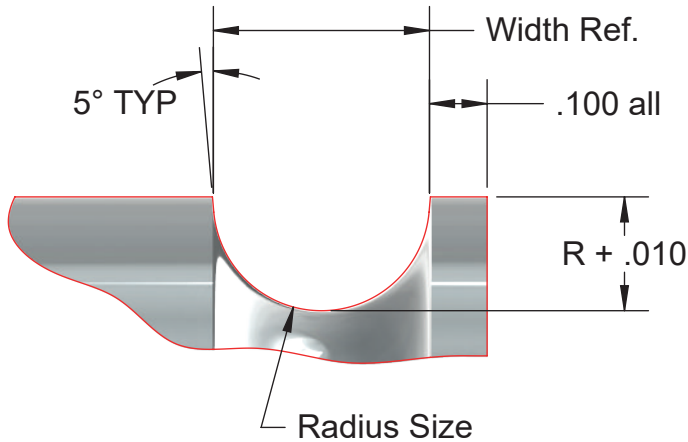


Full Form Design

Specials in 4-6 Working Days



Alternating Tooth Design



Profile ground (not formed) for rounder, more free cutting concave cutters.

Tool Number	Radius Size	Width Ref.	Shank Ø X OAL	Number of Flutes	Minor Ø Ref.	Price	
						No-Coat	AlTiN
FCR-031 *	.031	.062	1/2" X 2.5	6	.418	\$170.	\$179.
FCR-040 *	.040	.080	1/2" X 2.5	4	.400	\$170.	\$179.
FCR-046 *	.046	.092	1/2" X 2.5	4	.388	\$170.	\$179.
FCR-0625	.0625	.125	1/2" X 2.5	4	.355	\$180.	\$189.
FCR-079	.079	.158	1/2" X 2.5	4	.322	\$185.	\$194.
FCR-094	.094	.188	5/8" X 3.5	6	.417	\$220.	\$233.
FCR-100	.100	.200	5/8" X 3.5	4	.405	\$220.	\$233.
FCR-120	.120	.240	5/8" X 3.5	4	.365	\$225.	\$238.
FCR-125	.125	.250	5/8" X 3.5	4	.355	\$225.	\$238.
FCR-157	.157	.314	3/4" X 4.0	6	.416	\$255.	\$270.
FCR-1875	.1875	.375	3/4" X 4.0	4	.355	\$270.	\$285.
FCR-197	.197	.394	3/4" X 4.0	4	.336	\$270.	\$285.

*Cutters with smaller radii are ground with alternating tooth design

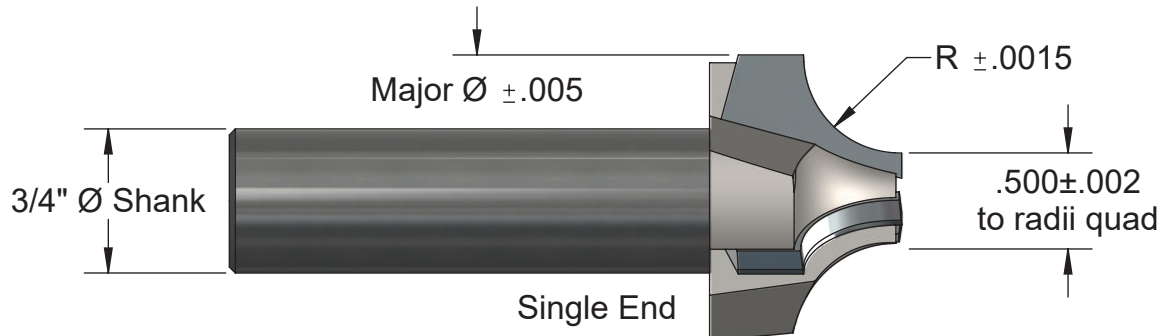


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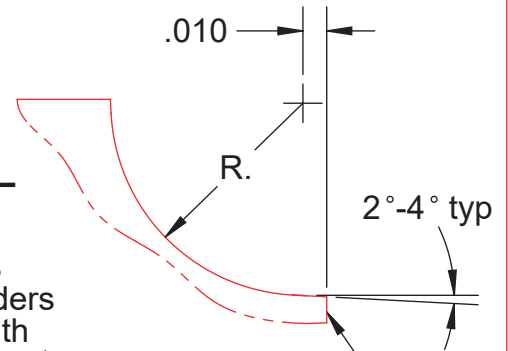
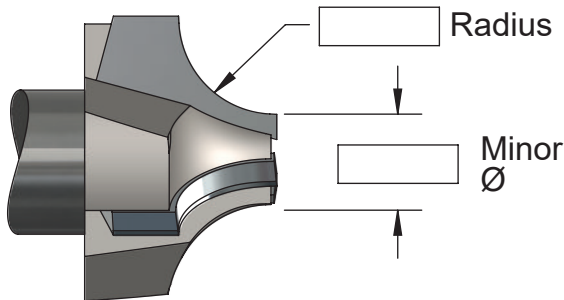
NEW!!! Carbide Tipped Corner Rounders NEW!!!



Request For Quote

Special Carbide Tipped Corner Rounders in 4-6 working days

Machining what part material, please? _____



All AB Tools corner rounders are made with these features to avoid gouging.

End Cutting, also the major Ø is cutting for 1/8 min.

Tool No.	Rad.	Major Ø	OAL	Price	
				No-Coat	AlTiN
3 Flutes, Positive Rake					
CR3-187	.187	.895	3.25	\$215.	\$236.
CR3-203	.203	.926		\$225.	\$246.
CR3-218	.218	.956		\$240.	\$261.
CR3-250	.250	1.020		\$245.	\$269.
CR3-281	.281	1.082		\$265.	\$289.
CR3-312	.312	1.144		\$275.	\$299.
CR3-343	.343	1.206		\$300.	\$324.
CR3-375	.375	1.270		\$325.	\$351.
CR3-406	.406	1.332		\$345.	\$371.
CR3-437	.437	1.394		\$355.	\$381.
CR3-468	.468	1.456		\$370.	\$396.
CR3-500	.500	1.520		\$390.	\$422.
CR3-562	.562	1.644		3.50	\$430.
CR3-625	.625	1.770	\$475.		\$576.

Tool No.	Rad.	Rad. Inch	Major Ø	OAL	Price	
					No-Coat	AlTiN
3 Flutes, Positive Rake						
CR3-5	5 mm	.197	.914	3.25	\$225.	\$246.
CR3-6	6 mm	.236	.992		\$245.	\$269.
CR3-8	8 mm	.315	1.150		\$300.	\$324.
CR3-10	10 mm	.394	1.307		\$345.	\$371.
CR3-12	12 mm	.472	1.465		\$390.	\$422.
CR3-16	16 mm	.630	1.780		3.50	\$475.

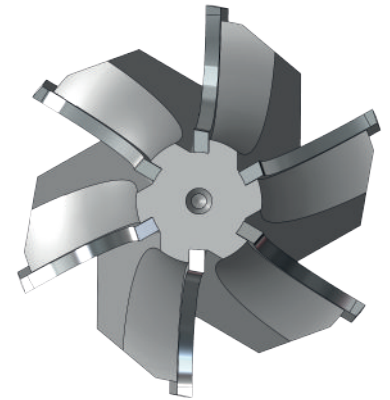
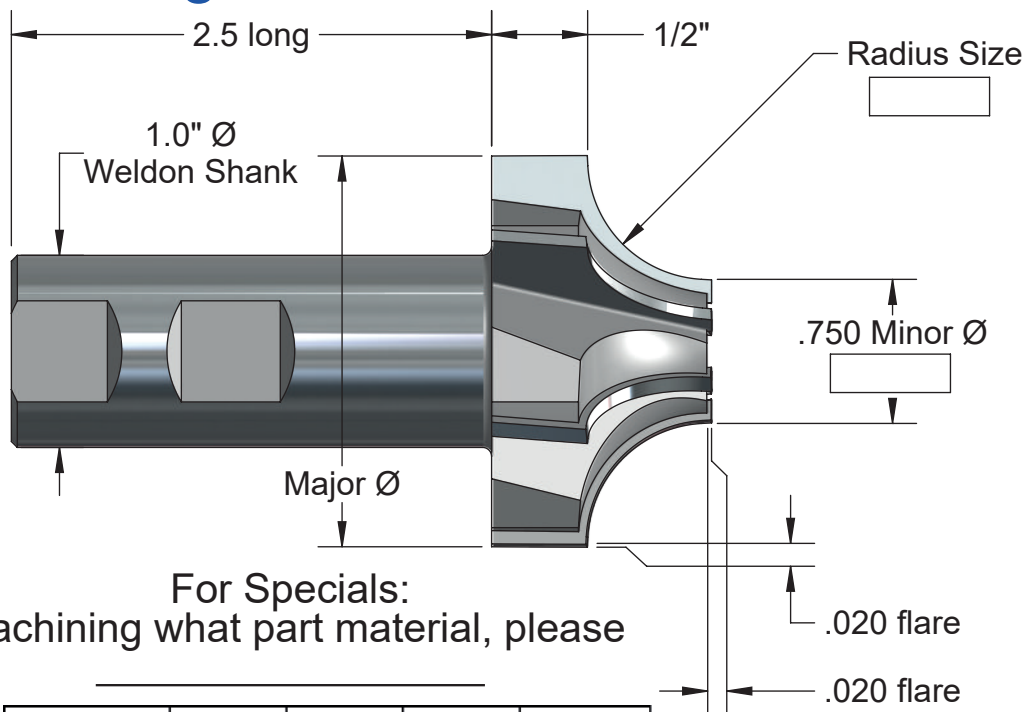


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Large Radii M42 Cobalt Corner Rounders



For Specials:
Machining what part material, please



Request For Quote

Number	Radius	Major Ø	No. of Flutes	Price
CCR-625	.625	2.04	6	\$600.
CCR-687	.687	2.16	6	\$610.
CCR-719	.719	2.23	6	\$615.
CCR-750	.750	2.29	6	\$620.
CCR-787	.787	2.36	6	\$625.
CCR-812	.812	2.41	6	\$630.
CCR-875	.875	2.54	6	\$650.
CCR-937	.937	2.66	6	\$665.
CCR-984	.984	2.76	6	\$675.
CCR-1000	1.000	2.79	6	\$685.
CCR-1063	1.063	2.91	6	\$700.
CCR-1125	1.125	3.04	6	\$715.
CCR-1181	1.181	3.15	6	\$735.
CCR-1250	1.250	3.29	6	\$760.
CCR-1312	1.312	3.41	6	\$800.
CCR-1375	1.375	3.54	6	\$865.
CCR-1437	1.437	3.66	6	\$940.
CCR-1500	1.500	3.79	6	\$1010.

We've milled full radius cuts with these Corner Rounders in M2 HSS at 90 SFM and .0015 Inch Per Tooth Chip Load with GREAT results

***Coatings available upon request.

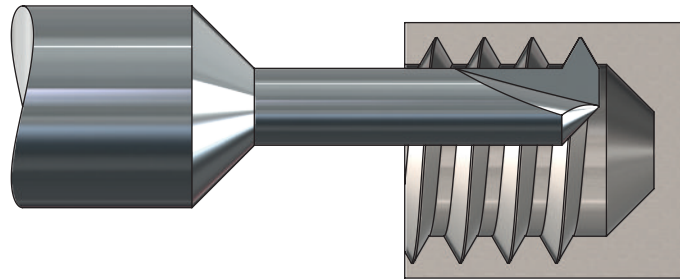


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Solid Carbide Thread Mills



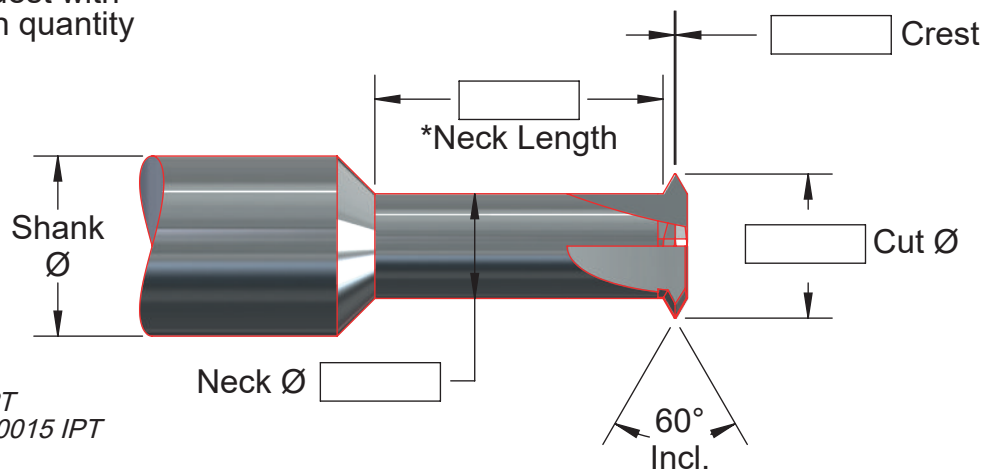
Request For Quote

With these 12 cutters you can mill Coarse or Fine threads from No. 3 thru 3/4 and from 2MM thru 24MM

Number	For Sizes (NC & NF)		Cut Ø	Crest	Neck Ø	Neck* Length	Shank Ø & OAL	No. of Flutes	Price	
									No-Coat	AlTiN
TM3	#3	2MM	.072	.001	.040	.160	3/16" X 2.0	1	\$70.	\$74.
TM4	#4	3MM	.083	.001	.045	.190	3/16" X 2.0	1	\$70.	\$74.
	#5	3.5MM								
TM6	#6	4MM	.099	.0015	.055	.260	3/16" X 2.0	2	\$70.	\$74.
TM8	#8	4.5MM	.128	.002	.083	.320	3/16" X 2.0	3	\$75.	\$79.
TM10	#10	5MM	.139	.0025	.081	.380	3/16" X 2.0	3	\$75.	\$79.
TM1/4	1/4	6MM	.188	.003	.124	.400	1/4" X 2.0	4	\$80.	\$84.
TM5/16	5/16	8MM	.247	.003	.175	.500	3/8" X 2.5	4	\$95.	\$102.
TM3/8	3/8	10MM	.300	.003	.218	.600	3/8" X 2.5	4	\$100.	\$107.
TM7/16	7/16	12MM	.330	.0035	.184	.660	3/8" X 2.5	5	\$105.	\$112.
TM1/2	1/2	16MM	.420	.0035	.300	.800	1/2" X 2.5	6	\$125.	\$134.
TM5/8	5/8	20MM	.500	.0026	.307	1.00	5/8" X 3.5	6	\$170.	\$183.
TM3/4	3/4	24MM	.625	.0026	.416	1.25	3/4" X 4.0	6	\$230.	\$245.

*Necks ground longer on request with minimal charges based upon quantity

Special Thread Mills in 4-6 Working Days
Machining what part material, please?



Suggested Starting Data:
Ferrous 150/300 SFM; .0002/.001 IPT
Non-Ferrous 500/1000 SFM; .0005/.0015 IPT
Interpolate helix from bottom up.

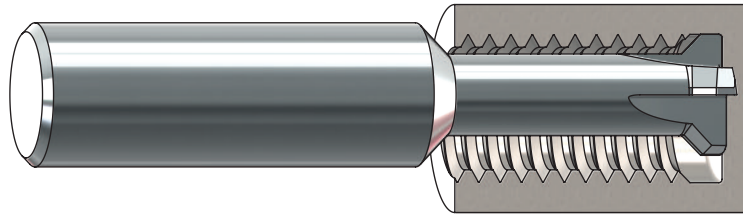


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Solid Carbide Thread Relief Mills



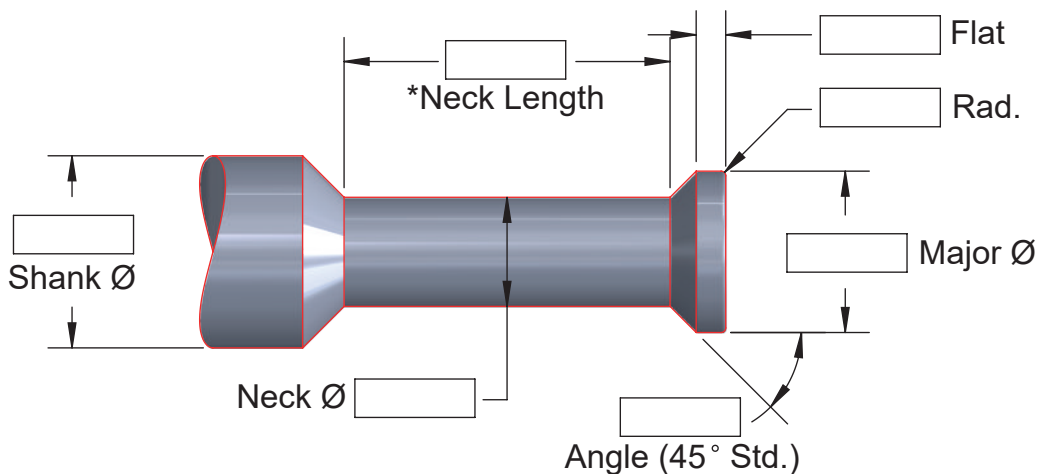
Number	Major Ø	Flat	Rad.	Neck Ø	Neck Length	Shank Ø	OAL	No. of Flutes	Price	
									No-Coat	AlTiN
TR3-48	.072	.021	.005	.032	.180	3/16"	2.0	2	\$70.	\$74.
TR4-40	.080	.025	.005	.032	.210	3/16"	2.0	2	\$70.	\$74.
TR6-32	.099	.031	.010	.047	.290	3/16"	2.0	2	\$70.	\$74.
TR8-32	.128	.031	.010	.076	.330	3/16"	2.0	3	\$70.	\$74.
TR10-24	.139	.042	.012	.073	.410	3/16"	2.0	3	\$70.	\$74.
TR1/4-20	.188	.050	.012	.108	.435	1/4"	2.0	4	\$75.	\$79.
TR5/16-18	.247	.056	.012	.159	.538	3/8"	2.5	4	\$90.	\$97.
TR3/8-16	.300	.063	.012	.202	.641	3/8"	2.5	4	\$100.	\$107.
TR1/2-13	.420	.077	.012	.284	.848	1/2"	2.5	6	\$115.	\$124.

*Necks ground longer on request with minimal charges based upon quantity

Undercut diameter:
 Pitches finer than 20 TPI = thread basic major dia + .0075
 Pitches of 20 TPI and courser = thread basic major dia + .0150

Special Thread Relief Mills Made in 4-6 Working Days

Machining what part material, please? _____



Request For Quote

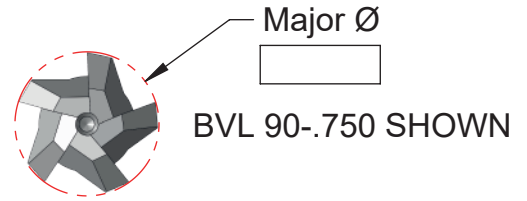
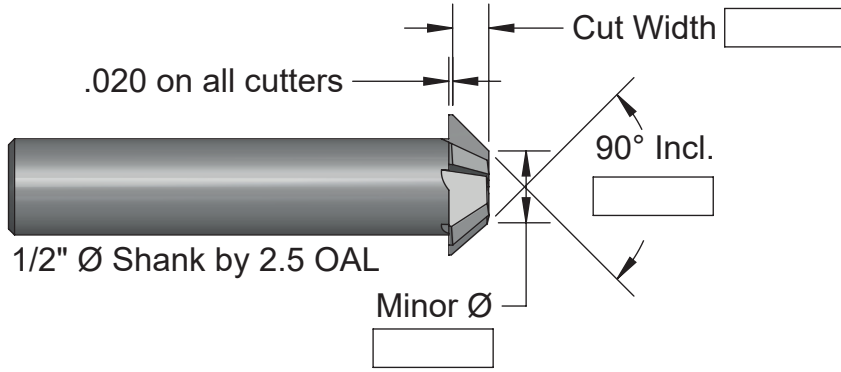


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Solid Carbide Bevel Cutters



Request For Quote

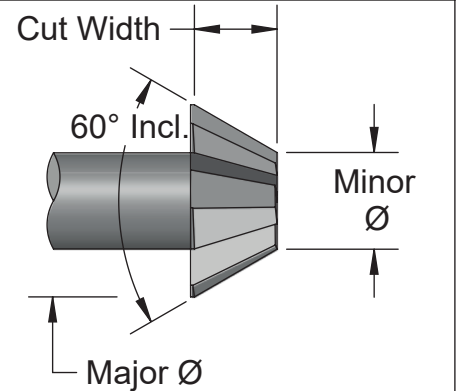
Specials in 4-6 Working Days

90° Included Angles

Number	Major Ø	Minor Ø	Cut Width	Number of Flutes	Price
BVL 90-.500	.500	.250	.125	4	\$125.
BVL 90-.750	.750	.375	.188	5	\$150.
BVL 90-1.00	1.000	.375	.312	6	\$185.
BVL 90-1.25	1.250	.500	.375	8	\$220.
BVL 90-1.50*	1.500	.500	.500	10	\$265.

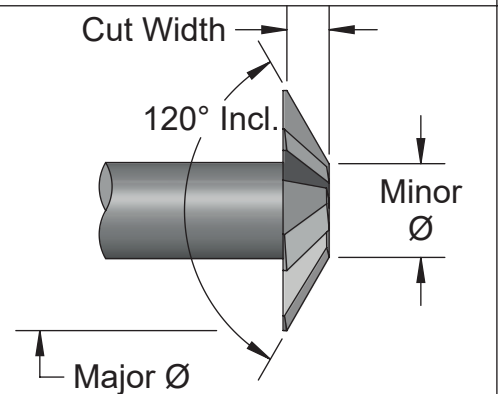
60° Included Angles

Number	Major Ø	Minor Ø	Cut Width	Number of Flutes	Price
BVL 60-.500	.500	.246	.220	4	\$125.
BVL 60-.750	.750	.390	.312	5	\$150.
BVL 60-1.00	1.000	.503	.430	6	\$185.
BVL 60-1.25*	1.250	.673	.500	8	\$225.
BVL 60-1.50*	1.500	.778	.625	10	\$275.



120° Included Angles

Number	Major Ø	Minor Ø	Cut Width	Number of Flutes	Price
BVL 120-.500	.500	.188	.090	4	\$125.
BVL 120-.750	.750	.317	.125	5	\$150.
BVL 120-1.00	1.000	.350	.188	6	\$185.
BVL 120-1.25	1.250	.488	.220	8	\$220.
BVL 120-1.50	1.500	.634	.250	10	\$265.



* These cutters are on 3/4" Ø shank and 2.75 OAL



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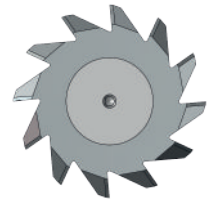
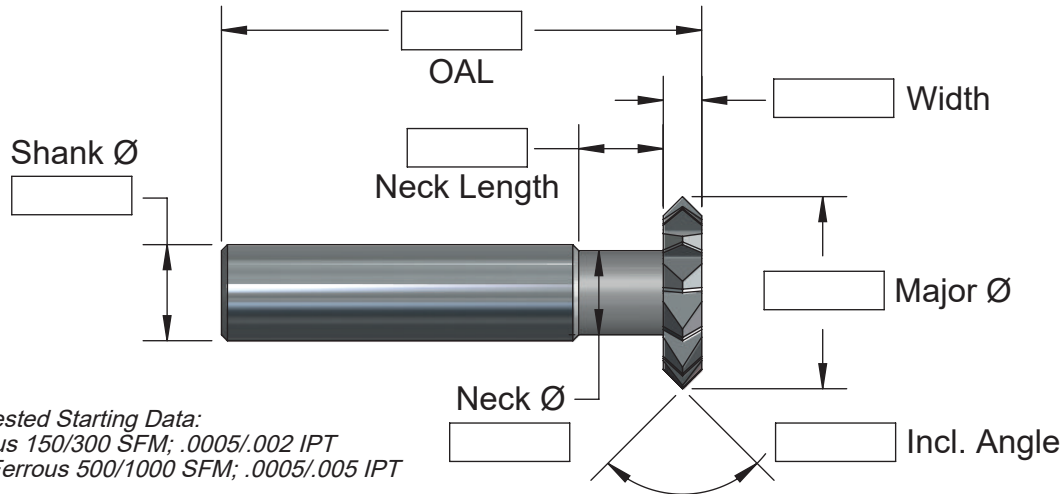
Solid Carbide TOP & BOTTOM Chamfer Cutters

Specials in 4-6 Working Days

Machining what part material, please? _____



Request For Quote



Suggested Starting Data:
 Ferrous 150/300 SFM; .0005/.002 IPT
 Non-Ferrous 500/1000 SFM; .0005/.005 IPT

Number	Major Ø	Width	Neck Ø	Neck Length	Incl. Angle	Shank Ø & OAL	No. of Flutes	Price	
								No-Coat	AlTiN
CCD-187-90	.187	.060	.115	.38	90°	3/16" X 2.0	4	\$73.	\$77.
CCD-250-90	.250	.090	.150	.44	90°	1/4" X 2.0	4	\$85.	\$89.
CCD-375-90	.375	.110	.250	.50	90°	3/8" X 2.5	6	\$110.	\$117.
CCD-500-90	.500	.125	.350	.68	90°	1/2" X 2.5	6	\$130.	\$139.
CCD-625-90	.625	.140	As Cast		90°	1/2" X 2.5	8	\$165.	\$175.
CCD-750-90	.750	.170	As Cast		90°	1/2" X 2.5	10	\$180.	\$192.
CCD-100-90	1.00	.200	As Cast		90°	1/2" X 2.5	12	\$210.	\$224.
CCD-187-60	.187	.030	.115	.38	60°	3/16" X 2.0	4	\$73.	\$77.
CCD-250-60	.250	.045	.150	.44	60°	1/4" X 2.0	4	\$85.	\$89.
CCD-375-60	.375	.060	.250	.50	60°	3/8" X 2.5	6	\$110.	\$117.
CCD-500-60	.500	.075	.350	.68	60°	1/2" X 2.5	6	\$130.	\$139.
CCD-625-60	.625	.090	As Cast		60°	1/2" X 2.5	8	\$165.	\$175.
CCD-750-60	.750	.150	As Cast		60°	1/2" X 2.5	10	\$180.	\$192.
CCD-100-60	1.00	.200	As Cast		60°	1/2" X 2.5	12	\$210.	\$224.
CCD-187-120	.187	.060	.115	.38	120°	3/16" X 2.0	4	\$73.	\$77.
CCD-250-120	.250	.090	.150	.44	120°	1/4" X 2.0	4	\$85.	\$89.
CCD-375-120	.375	.110	.250	.50	120°	3/8" X 2.5	6	\$110.	\$117.
CCD-500-120	.500	.125	.350	.68	120°	1/2" X 2.5	6	\$130.	\$139.
CCD-625-120	.625	.140	As Cast		120°	1/2" X 2.5	8	\$165.	\$175.
CCD-750-120	.750	.170	As Cast		120°	1/2" X 2.5	10	\$180.	\$192.
CCD-100-120	1.00	.200	As Cast		120°	1/2" X 2.5	12	\$210.	\$224.

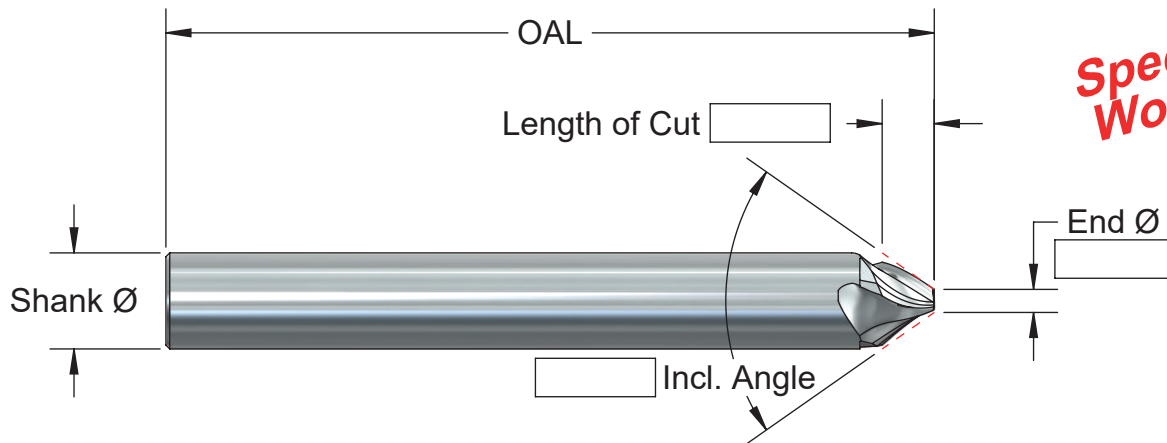


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 Lincoln, CA 95648-9312

Phone 916 408-2442
 FAX 916 993-3949

www.abtoolsinc.com
 E-Mail: mail@abtoolsinc.com

Solid Carbide Chamfer End Mills



Specials in 4-6 Working Days



Request For Quote

Number	End Ø	Incl. Angle	Length of Cut	Shank Ø X OAL	No. of Flutes	Price	
						No-Coat	AlTiN
CEM060-70	.060	70°	.136	1/4" X 2.0	3	\$80.	\$84.
CEM060-74	.060	74°	.126	1/4" X 2.0	3	\$80.	\$84.
CEM060-80	.060	80°	.113	1/4" X 2.0	3	\$80.	\$84.
CEM060-82	.060	82°	.109	1/4" X 2.0	3	\$80.	\$84.
CEM060-90	.060	90°	.095	1/4" X 2.0	3	\$80.	\$84.
CEM060-100	.060	100°	.080	1/4" X 2.0	3	\$80.	\$84.
CEM060-120	.060	120°	.091	3/8" X 2.5	3	\$95.	\$102.
CEM120-70	.120	70°	.182	3/8" X 2.5	3	\$95.	\$102.
CEM120-74	.120	74°	.169	3/8" X 2.5	3	\$95.	\$102.
CEM120-80	.120	80°	.152	3/8" X 2.5	3	\$95.	\$102.
CEM120-82	.120	82°	.147	3/8" X 2.5	3	\$95.	\$102.
CEM120-90	.120	90°	.128	3/8" X 2.5	3	\$95.	\$102.
CEM120-100	.120	100°	.107	3/8" X 2.5	3	\$95.	\$102.
CEM120-120	.120	120°	.110	1/2" X 2.5	3	\$110.	\$119.
CEM180-70	.180	70°	.229	1/2" X 2.5	3	\$110.	\$119.
CEM180-74	.180	74°	.212	1/2" X 2.5	3	\$110.	\$119.
CEM180-80	.180	80°	.191	1/2" X 2.5	3	\$110.	\$119.
CEM180-82	.180	82°	.184	1/2" X 2.5	3	\$110.	\$119.
CEM180-90	.180	90°	.160	1/2" X 2.5	3	\$110.	\$119.
CEM180-100	.180	100°	.134	1/2" X 2.5	3	\$110.	\$119.
CEM180-120	.180	120°	.128	5/8" X 3.0	3	\$130.	\$142.

These are stocked with helical flutes. Positive axial rake is an option, same price. Ask for the same tool with -AX at the end of the tool number. eg: CEM120-90-AX



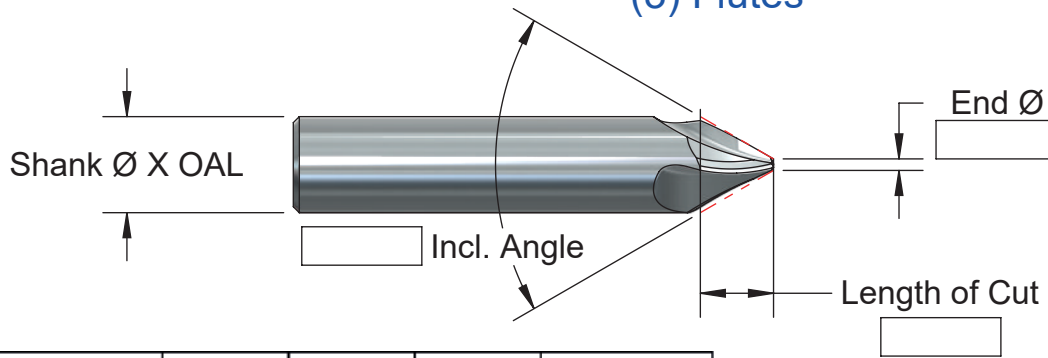
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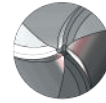
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Solid Carbide Taper End Mills

(3) Flutes



Specials in 4-6 Working Days



Request For Quote

Number	End Ø	Incl. Angle	Length of Cut	Shank Ø X OAL
TEM060-10	.060	10°	.729	3/16" X 2.5
TEM060-12	.060	12°	.607	3/16" X 2.5
TEM060-15	.060	15°	.484	3/16" X 2.5
TEM060-20	.060	20°	.893	3/8" X 2.5
TEM060-25	.060	25°	.710	3/8" X 2.5
TEM060-30	.060	30°	.588	3/8" X 2.5
TEM060-35	.060	35°	.500	3/8" X 2.5
TEM060-40	.060	40°	.604	1/2" X 2.5
TEM060-45	.060	45°	.531	1/2" X 2.5
TEM060-50	.060	50°	.472	1/2" X 2.5
TEM060-60	.060	60°	.381	1/2" X 2.5

Shank Ø X OAL	Price	
	No-Coat	AlTiN
3/16" X 2.5	\$80.	\$84.
1/4" X 2.5	\$80.	\$86.
3/8" X 2.5	\$100.	\$107.
1/2" X 2.5	\$110.	\$119.
1/2" X 3.0	\$115.	\$124.
1/2" X 4.0	\$130.	\$141.

Number	End Ø	Incl. Angle	Length of Cut	Shank Ø X OAL
TEM120-10	.120	10°	.743	1/4" X 2.5
TEM120-12	.120	12°	.618	1/4" X 2.5
TEM120-15	.120	15°	.494	1/4" X 2.5
TEM120-20	.120	20°	.723	3/8" X 2.5
TEM120-25	.120	25°	.575	3/8" X 2.5
TEM120-30	.120	30°	.476	3/8" X 2.5
TEM120-35	.120	35°	.404	3/8" X 2.5
TEM120-40	.120	40°	.522	1/2" X 2.5
TEM120-45	.120	45°	.459	1/2" X 2.5
TEM120-50	.120	50°	.407	1/2" X 2.5
TEM120-60	.120	60°	.329	1/2" X 2.5

Number	End Ø	Incl. Angle	Length of Cut	Shank Ø X OAL
TEM180-10	.180	10°	1.829	1/2" X 4.0
TEM180-12	.180	12°	1.522	1/2" X 4.0
TEM180-15	.180	15°	1.215	1/2" X 3.0
TEM180-20	.180	20°	.907	1/2" X 3.0
TEM180-25	.180	25°	.722	1/2" X 3.0
TEM180-30	.180	30°	.597	1/2" X 3.0
TEM180-35	.180	35°	.507	1/2" X 2.5
TEM180-40	.180	40°	.440	1/2" X 2.5
TEM180-45	.180	45°	.386	1/2" X 2.5
TEM180-50	.180	50°	.343	1/2" X 2.5
TEM180-60	.180	60°	.277	1/2" X 2.5



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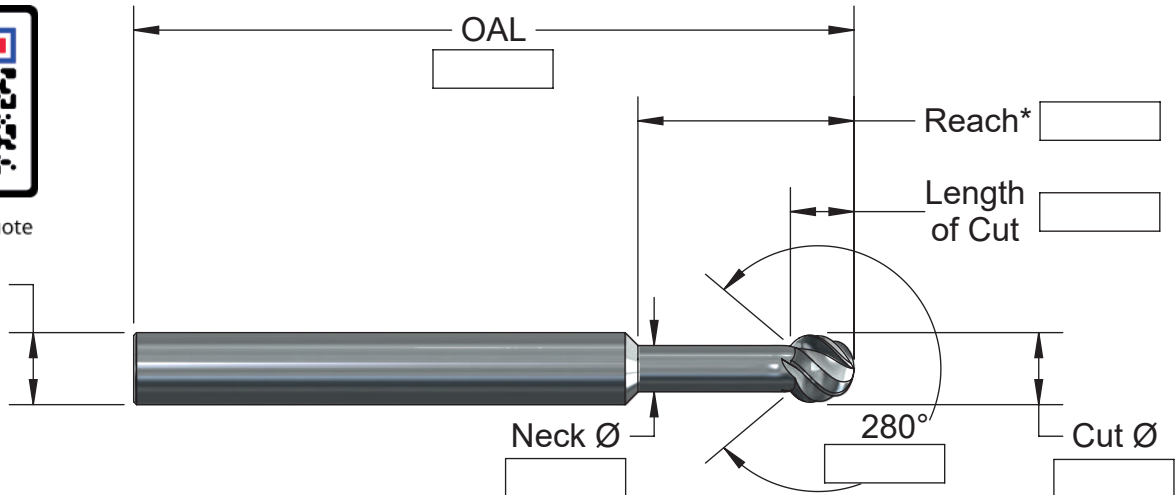
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Lollipop Undercut End Mills



Request For Quote

Shank Ø



* Longer necks can be ground in 1 work day

Tool No.	Cut Ø	Length of Cut	Neck Ø	Reach	Shank Ø	OAL	No. of Flutes	Price
BE040-280	.040	.035	.026	.120	1/8"	2.0	4	\$80.
BE050-280	.050	.044	.032	.150	1/8"	2.0	4	\$80.
BE062-280	.062	.055	.040	.190	1/8"	2.0	4	\$75.
BE078-280	.078	.069	.050	.235	1/8"	2.0	4	\$75.
BE093-280	.093	.082	.060	.280	1/8"	2.0	4	\$75.
BE110-280	.110	.097	.071	.330	1/8"	2.0	4	\$75.
BE118-280	.118	.104	.076	.355	1/8"	2.0	4	\$75.
BE125-280	.125	.110	.080	.375	1/8"	2.0	4	\$75.
BE140-280	.140	.124	.090	.420	3/16"	2.0	4	\$90.
BE156-280	.156	.138	.100	.470	3/16"	2.0	4	\$90.
BE187-280	.187	.165	.120	.565	3/16"	2.0	4	\$90.
BE197-280	.197	.174	.127	.595	1/4"	2.5	4	\$100.
BE218-280	.218	.192	.140	.655	1/4"	2.5	4	\$100.
BE236-280	.236	.208	.152	.710	1/4"	2.5	4	\$100.
BE250-280	.250	.221	.161	.750	1/4"	2.5	4	\$100.
BE281-280	.281	.248	.181	.845	5/16"	2.5	4	\$125.
BE312-280	.312	.276	.201	.940	5/16"	2.5	6	\$125.
BE340-280	.340	.300	.219	1.020	3/8"	2.5	6	\$135.
BE375-280	.375	.331	.241	1.125	3/8"	2.5	6	\$135.
BE393-280	.393	.347	.253	1.180	1/2"	2.5	6	\$195.
BE437-280	.437	.386	.281	1.315	1/2"	2.5	6	\$195.
BE500-280	.500	.442	.321	1.500	1/2"	2.5	8	\$195.
BE530-280	.530	.468	.341	1.590	5/8"	3.5	8	\$250.
BE562-280	.562	.496	.361	1.690	5/8"	3.5	8	\$250.
BE625-280	.625	.552	.402	1.875	5/8"	3.5	8	\$250.
BE750-280	.750	.662	.482	2.250	3/4"	5.0	8	\$320.



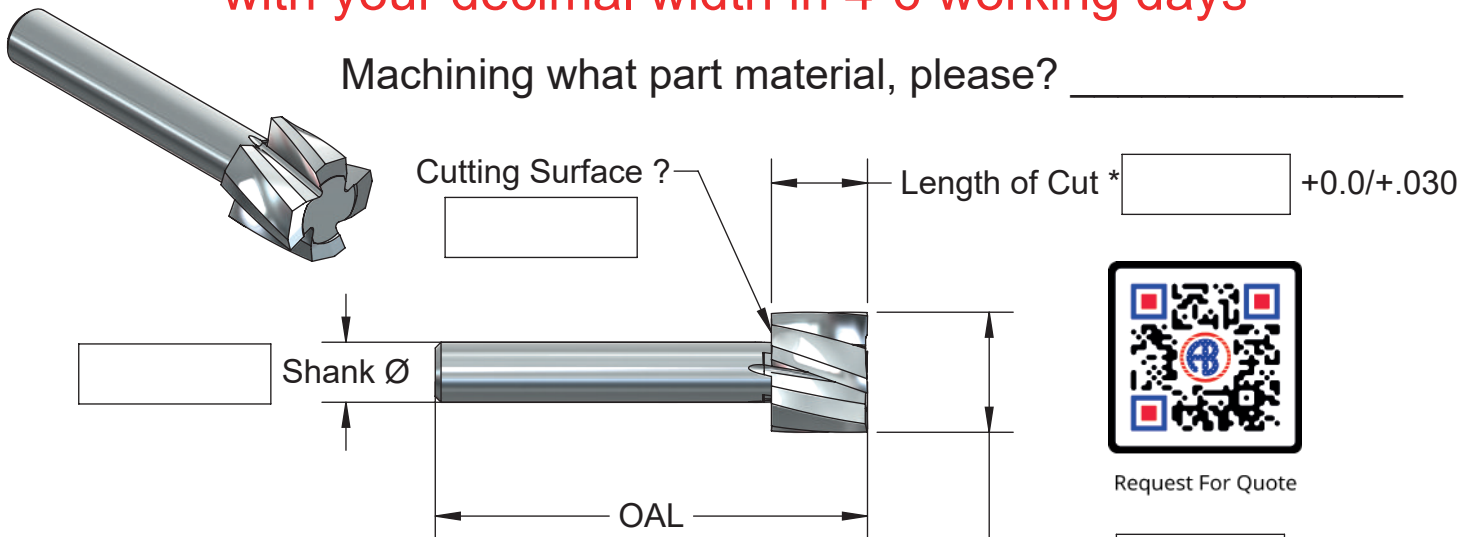
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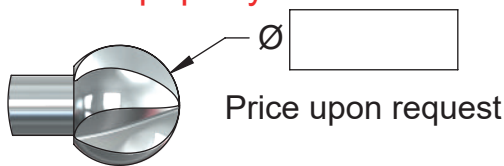
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Reduced Shank Solid Carbide End Mills from .140 to 1.0 diameters with your decimal width in 4-6 working days

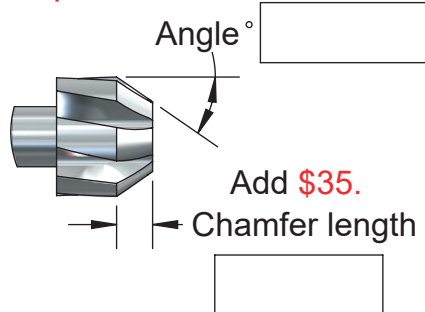
Machining what part material, please? _____



Lollipop Style



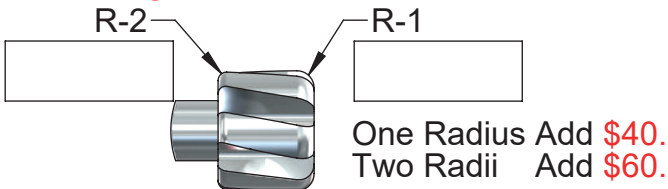
Taper/Chamfer



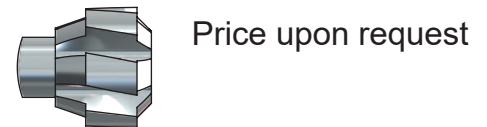
Ballnose Style



Corner Radius



Slot plus Top Chamfers



Shank Ø	OAL	Cut Ø	Length of Cut Max	Basic Prices
1/8"	1.5	.140 - .250	.250	\$125.
3/16"	1.5	.195 - .375	.375	\$135.
1/4"	2.0	.260 - .500	.500	\$150.
5/16"	2.25	.320 - .625	.625	\$165.
3/8"	2.5	.390 - .750	.750	\$200.
1/2"	3.0	.515 - 1.0	1.0	\$215.

* If the back surface is cutting the Length of Cut will be held to ±.0005".

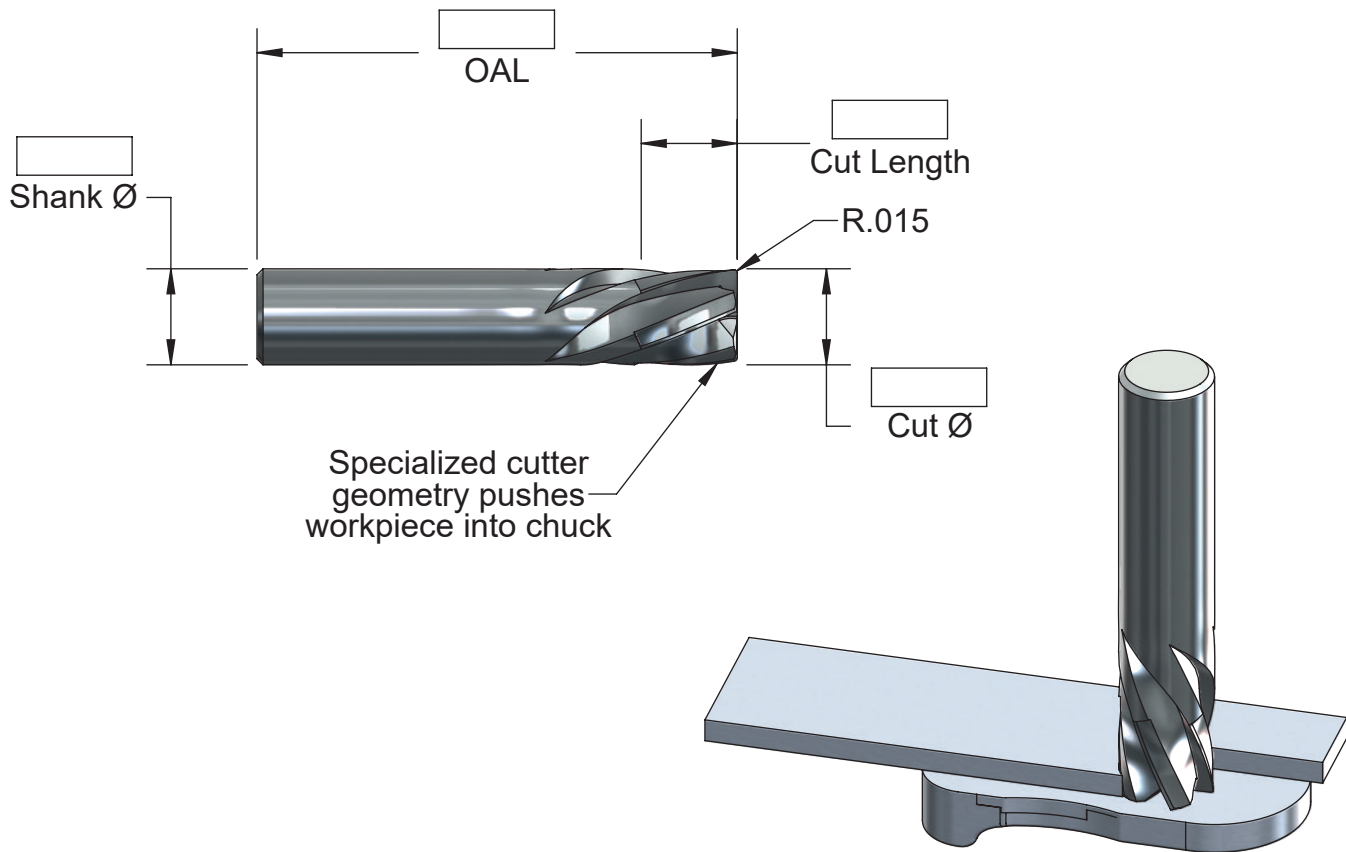


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TOP HAT REMOVAL TOOL



Number	Cut Ø	Cut Length	Shank Ø	OAL	No. of Flutes	Price	AlTiN
SEM25-30LH	.250	.250	1/4"	2.0	3	\$65.	\$69.
SEM375-30LH	.375	.375	3/8"	2.5	5	\$80.	\$87.
SEM5-30LH	.500	.500	1/2"	2.5	5	\$90.	\$99.
SEM625-30LH	.625	.625	5/8"	3.0	6	\$115.	\$125.
SEM75-30LH	.750	.750	3/4"	4.0	8	\$170.	\$183.
SEM1-30LH	1.0	1.0	1"	4.0	9	\$250.	\$270.
SEM125-30LH	1.250	1.250	1-1/4"	4.5	9	\$365.	\$390.

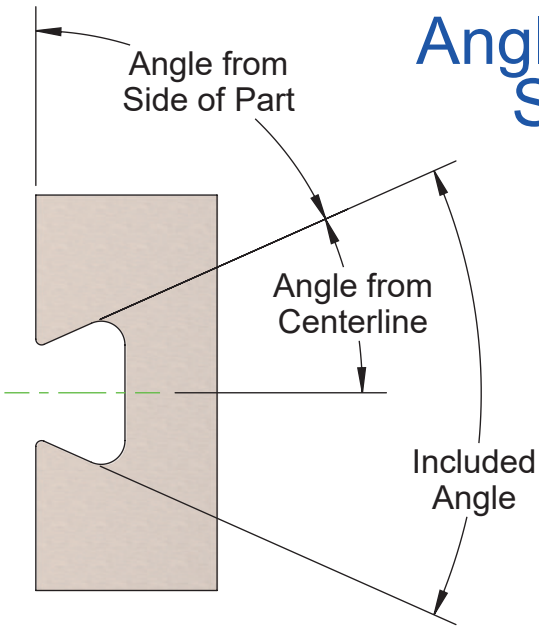


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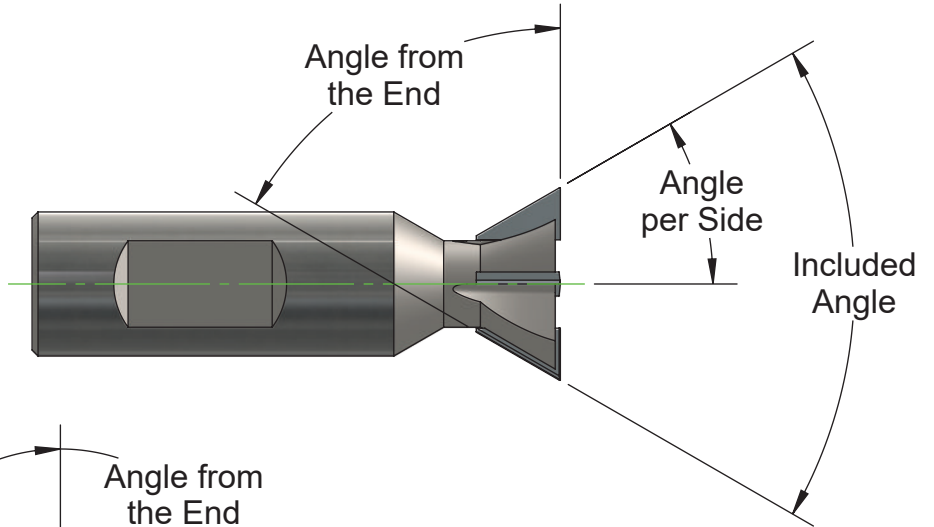
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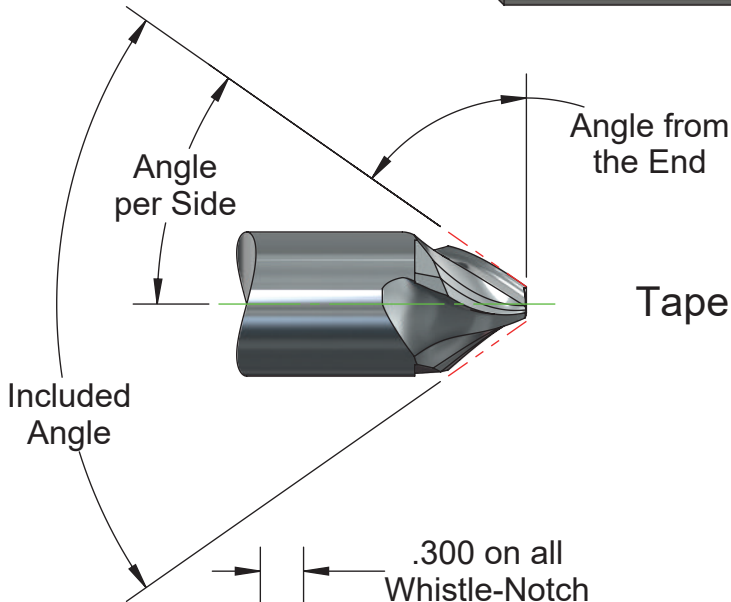
Angle Reference and Standard Flats



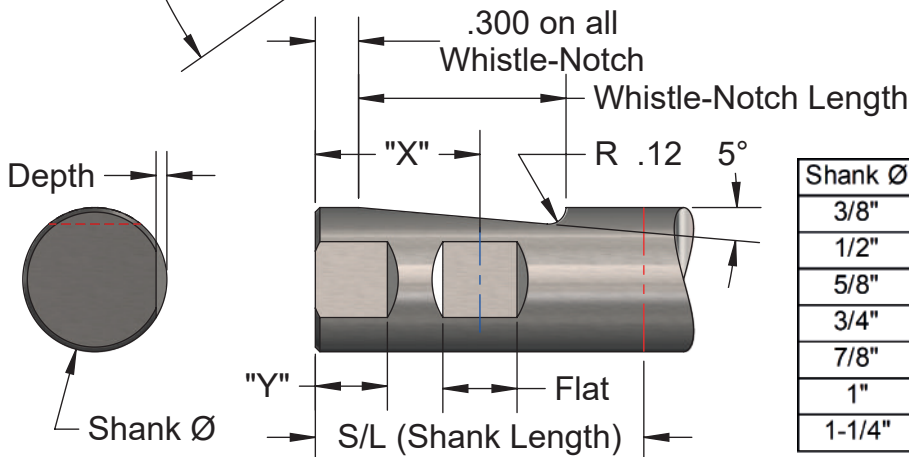
Part Angles



Angles on a Dovetail Style Cutter



Angles on a Taper End Mill or Chamfer Mill Style Cutter



Shank Ø	Flat	"Y"	"X"	Depth	S/L	W/N
3/8"	.280		.781	.050	1.56	1.0
1/2"	.330		.890	.065	1.78	1.06
5/8"	.400		.953	.070	1.90	1.19
3/4"	.455		1.015	.075	2.03	1.25
7/8"	.455	.50	1.015	.075	2.03	1.25
1"	.515	.50	1.140	.075	2.28	1.44
1-1/4"	.515	.50	1.140	.095	2.28	1.44



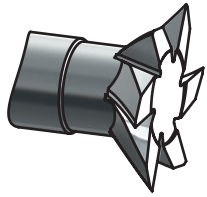
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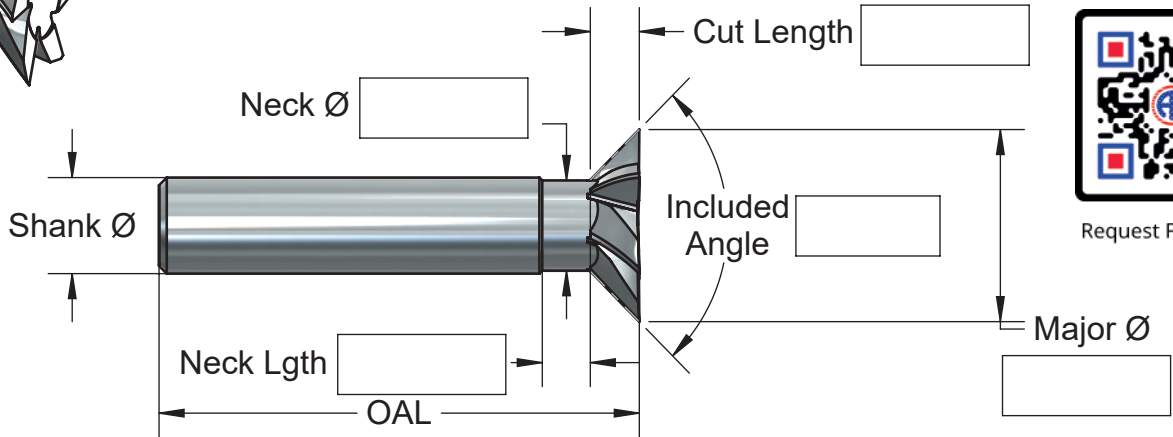
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Solid Carbide Dovetail Cutters from .750 to 1.5 diameters

Custom Specials upon request.



Machining what part material, please? _____



Request For Quote

.002-.005 flat on all ODs

Add \$40. each for corner radius (R.060 Max)

1/2" shank Ø x 2.5 OAL								
Number	Major Ø	Incl. Angle	Cut Length	Neck Ø	Neck Lgth	Flutes	Price	Altin
SCD75-60	.750	60°	.313	.370	.250	6	\$240.	\$251.
SCD75-90	.750	90°	.188	.360	.250	6	\$240.	\$251.
SCD75-120	.750	120°	.120	.320	.370	6	\$240.	\$251.
SCD1-60	1.0	60°	.435	.480	.250	6	\$255.	\$271.
SCD1-90	1.0	90°	.255	.470	.250	6	\$255.	\$271.
SCD1-120	1.0	120°	.160	.430	.370	6	\$255.	\$271.

5/8" shank Ø x 3.0 OAL								
Number	Major Ø	Incl. Angle	Cut Length	Neck Ø	Neck Lgth	Flutes	Price	Altin
SCD125-60	1.25	60°	.500	.600	.250	7	\$320.	\$340.
SCD125-90	1.25	90°	.360	.515	.250	7	\$320.	\$340.
SCD125-120	1.25	120°	.225	.450	.370	7	\$320.	\$340.

3/4" shank Ø x 3.5 OAL								
Number	Major Ø	Incl. Angle	Cut Length	Neck Ø	Neck Lgth	Flutes	Price	Altin
SCD15-60	1.5	60°	.625	.725	.250	7	\$385.	\$410.
SCD15-90	1.5	90°	.440	.600	.250	7	\$385.	\$410.
SCD15-120	1.5	120°	.285	.500	.370	7	\$385.	\$410.



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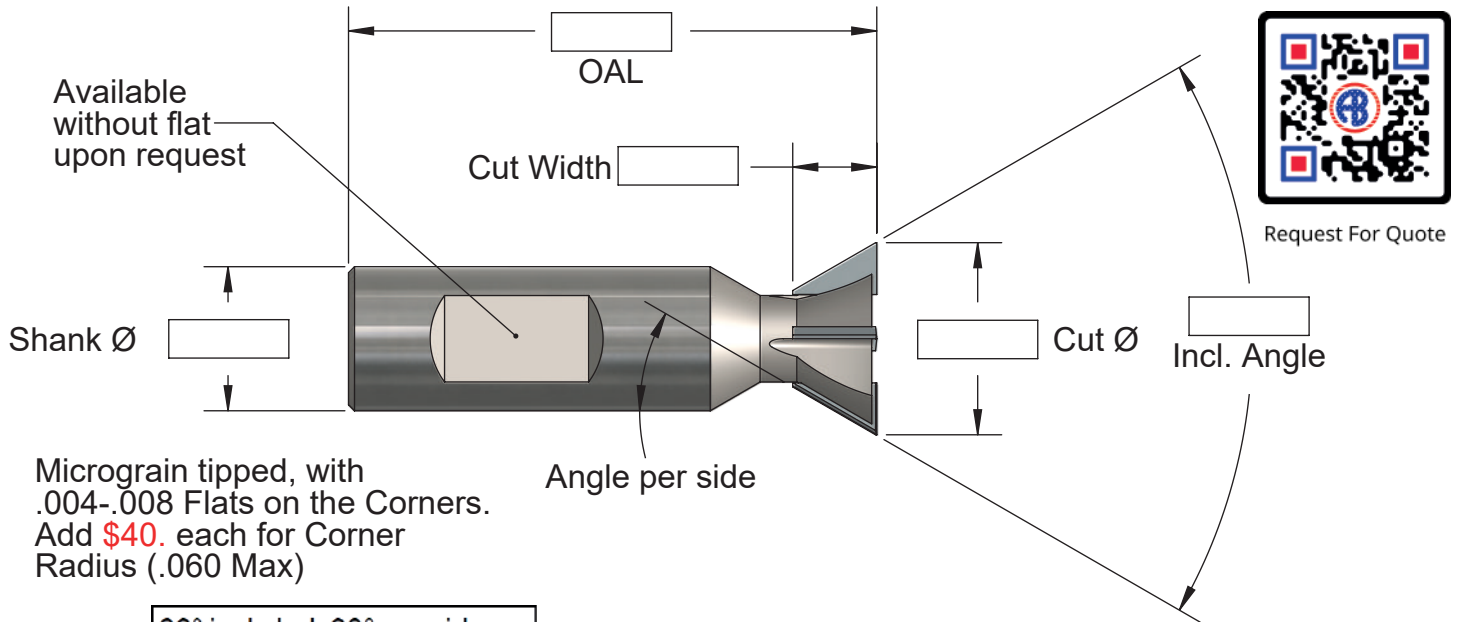
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Carbide Tipped Dovetail Cutters

Specials in 4-6 Working Days

Machining what part material, please? _____



Micrograin tipped, with
.004-.008 Flats on the Corners.
Add \$40. each for Corner
Radius (.060 Max)

60° included; 30° per side								
Number	Incl. Angle	Cut Ø	Cut Width	Shank Ø	OAL	Flutes	Price	
							No-Coat	AlTiN
D60-.75	60°	.750	.313	3/4"	2.75	3	\$190.	\$202.
D60-1.0	60°	1.00	.438	3/4"	2.75	4	\$200.	\$217.
D60-1.25	60°	1.25	.500	3/4"	3.0	5	\$210.	\$231.
D60-1.38	60°	1.38	.500	3/4"	3.0	6	\$220.	\$244.
D60-1.5	60°	1.50	.625	3/4"	3.5	6	\$280.	\$304.
D60-2.0	60°	2.00	.875	1"	3.75	8	\$325.	\$426.
D60-2.5	60°	2.50	.875	1"	3.75	8	\$420.	\$537.

90° included; 45° per side								
Number	Incl. Angle	Cut Ø	Cut Width	Shank Ø	OAL	Flutes	Price	
							No-Coat	AlTiN
D90-.75	90°	.750	.188	1/2"	2.25	3	\$195.	\$207.
D90-1.0	90°	1.00	.250	1/2"	2.5	5	\$205.	\$222.
D90-1.25	90°	1.25	.313	5/8"	2.75	5	\$265.	\$286.
D90-1.5	90°	1.50	.438	3/4"	3.25	6	\$345.	\$371.
D90-1.75	90°	1.75	.500	3/4"	3.75	6	\$395.	\$427.
D90-2.0	90°	2.00	.563	1"	4.0	6	\$440.	\$541.
D90-2.5	90°	2.50	.750	1"	4.5	6	\$510.	\$627.

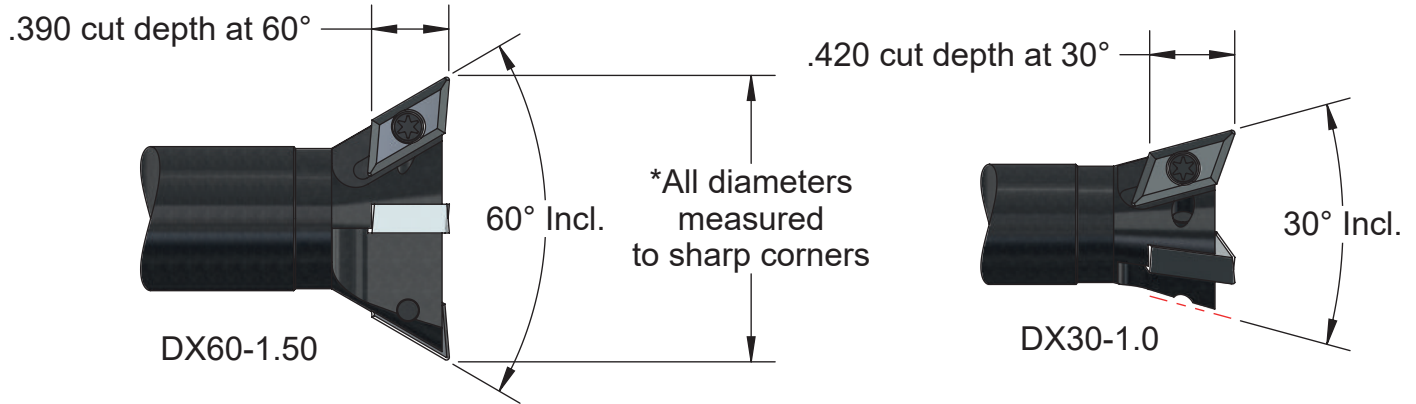


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The Dexi-Dovetail Short Inserts



Cutter Number	*Cut Ø	Cut Depth	Incl. Angle	Shank Ø & Overall	Flutes	Price
DX10-1.25	1.25	.440	10°	3/4" X 3.5	4	\$260.
DX20-1.0	1.0	.430	20°	5/8" X 3.5	3	\$230.
DX20-1.25	1.25	.430	20°	3/4" X 3.5	3	\$250.
DX20-1.50	1.5	.430	20°	3/4" X 3.5	4	\$275.
DX30-1.0	1.0	.420	30°	5/8" X 3.5	3	\$250.
DX30-1.25	1.25	.420	30°	3/4" X 3.5	3	\$250.
DX40-1.25	1.25	.410	40°	3/4" X 3.5	3	\$250.
DX45-1.25	1.25	.405	45°	3/4" X 3.5	3	\$250.
DX50-1.25	1.25	.400	50°	3/4" X 3.5	3	\$250.
DX60-1.25	1.25	.390	60°	1/2" X 3.0	3	\$250.
DX60-1.38	1.375	.390	60°	5/8" X 3.5	3	\$260.
DX60-1.50	1.5	.390	60°	3/4" X 3.5	4	\$290.
DX60-8	1.25	.390	60°	1-1/4" X 8.0	3	\$345.

Short Insert	Insert Number	Radius	Price	
			No-Coat	AlTiN
	Di60-0078	.0078		
	Di60-1	.015	\$17.	\$20.
	Di60-2	.030		

Screw & Key	Number	Price
	DX-3MM	\$2.50
	T9	\$7.50

Insert screw torque to 18-20 in lbs.

We use all these cutters in production, milling (38Rc) 4340 at 1100 to 1800 RPM and .001 to .002 IPT.

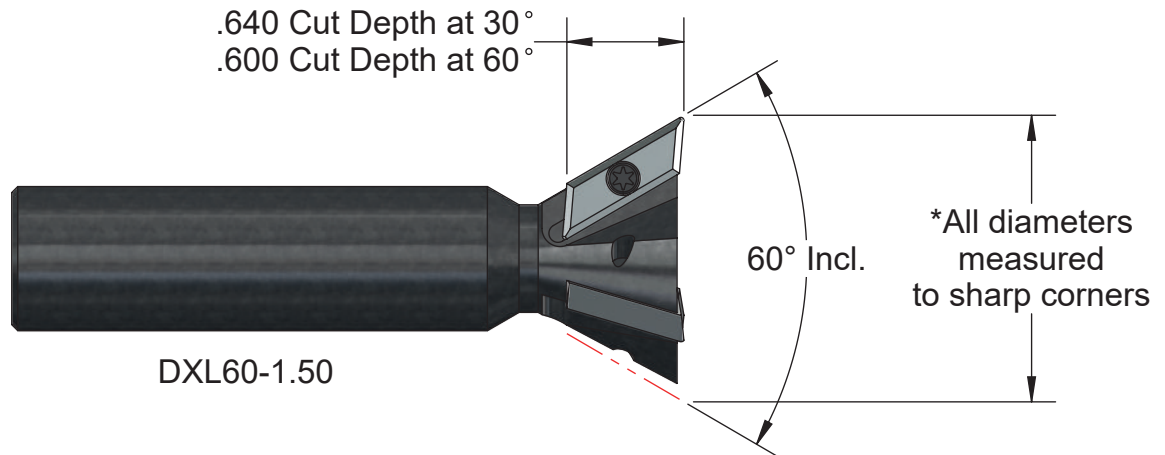


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The Dexi-Dovetail Long Inserts



Number	*Cut Ø	Cut Depth	Incl. Angle	Shank Ø & Overall	Flutes	Price
DXL20-1.25	1.25	.650	20°	3/4" X 3.5	3	\$295.
DXL30-1.25	1.25	.640	30°	3/4" X 3.5	3	\$295.
DXL30-1.312	1.313	.640	30°	3/4" X 3.5	3	\$300.
DXL30-1.37	1.375	.640	30°	3/4" X 3.5	3	\$305.
DXL30-2.0	2.0	.640	30°	1" X 3.88	5	\$455.
DXL40-1.50	1.5	.630	40°	3/4" X 3.5	3	\$315.
DXL50-1.50	1.5	.620	50°	3/4" X 3.5	3	\$315.
DXL50-2.0	2.0	.620	50°	1" X 4.0	4	\$435.
DXL60-1.50	1.5	.600	60°	3/4" X 3.5	3	\$315.
DXL60-1.62	1.625	.600	60°	3/4" X 3.5	3	\$330.
DXL60-2.0	2.0	.600	60°	1" X 3.88	4	\$455.
DXL60-3.0	3.0	.600	60°	1-1/4" X 4.5	6	\$665.

Long Insert 	Insert Number	Radius	Price	
			No-Coat	AlTiN
	Di60L-1	.015		
	Di60L-2	.030	\$19.	\$24.
	Di60L-3	.046		

Screw & Key	Number	Price
	DX-3MM	\$2.50
	T9	\$7.50

Insert screw torque to 18-20 in lbs.

We use all these cutters in production, milling (38Rc) 4340 at 1100 to 1800 RPM and .001 to .002 IPT.



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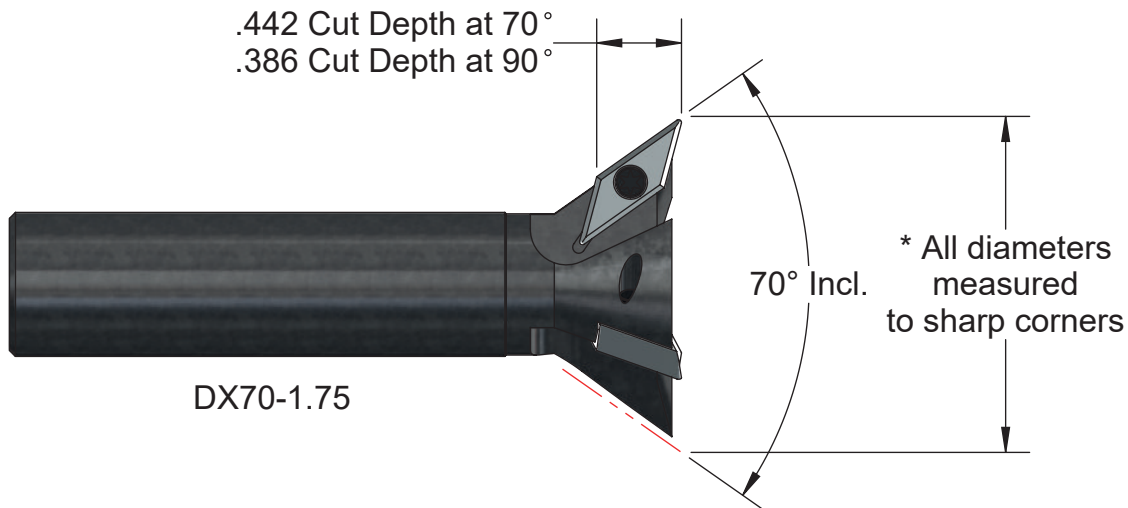
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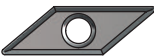
NEW !!!



70° to 90° Dexi-Dovetail Short Inserts

NEW !!!



Number	*Cut Ø	Cut Depth	Incl. Angle	Shank Ø & Overall	Flutes	Price
DX70-1.75	1.75	.442	70°	3/4" X 3.5	3	\$375.
DX80-1.75	1.75	.415	80°	3/4" X 3.5	3	\$375.
DX90-1.75	1.75	.386	90°	3/4" X 3.5	3	\$375.

Short Insert 	Insert Number	Radius	Price	
			No-Coat	AlTiN
	Di90-1	.015	\$17.	\$20.

Screw & Key 	Number	Price
	DX-3MM	\$2.50
	T9	\$7.50

Insert screw torque to 18-20 in lbs.

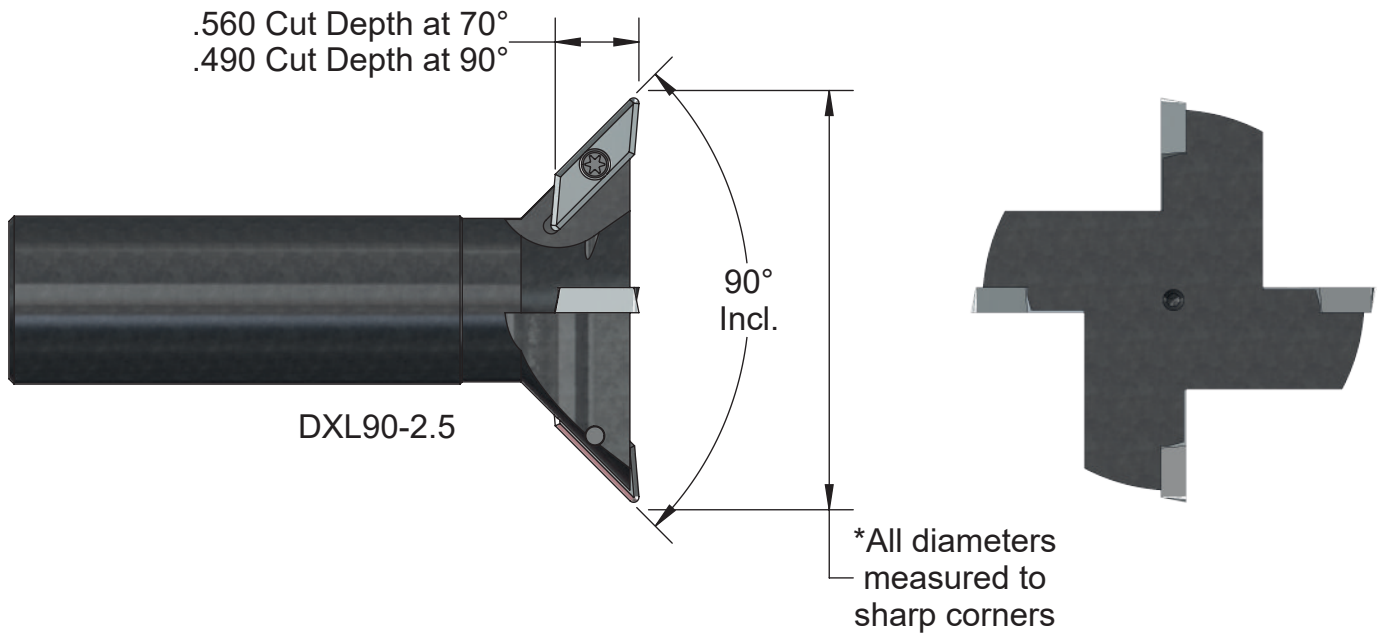


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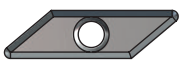
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70° to 90° Dexi-Dovetail Original Width Inserts



Number	*Cut Ø	Cut Depth	Incl. Angle	Shank Ø & OAL	Flutes	Price
DXL70-1.75	1.75	.560	70°	3/4" X 3.75	3	\$405.
DXL70-2.0	2.0	.560	70°	1" X 3.75	3	\$415.
DXL75-2.0	2.0	.550	75°	1" X 3.75	3	\$415.
DXL80-2.0	2.0	.530	80°	1" X 3.75	3	\$415.
DXL90-2.0	2.0	.490	90°	3/4" X 3.75	3	\$415.
DXL90-2.5	2.5	.490	90°	1" X 3.75	4	\$550.
DXL90-3.0	3.0	.490	90°	1" X 3.75	5	\$625.

Original Long Insert 	Insert Number	Radius	Price	
			No-Coat	AITiN
	Di90L-1	.015		
	Di90L-2	.030	\$19.	\$24.
	Di90L-3	.046		

Screw & Key	Number	Price
	DX-3MM	\$2.50
	T9	\$7.50

Insert screw torque to 18-20 in lbs.

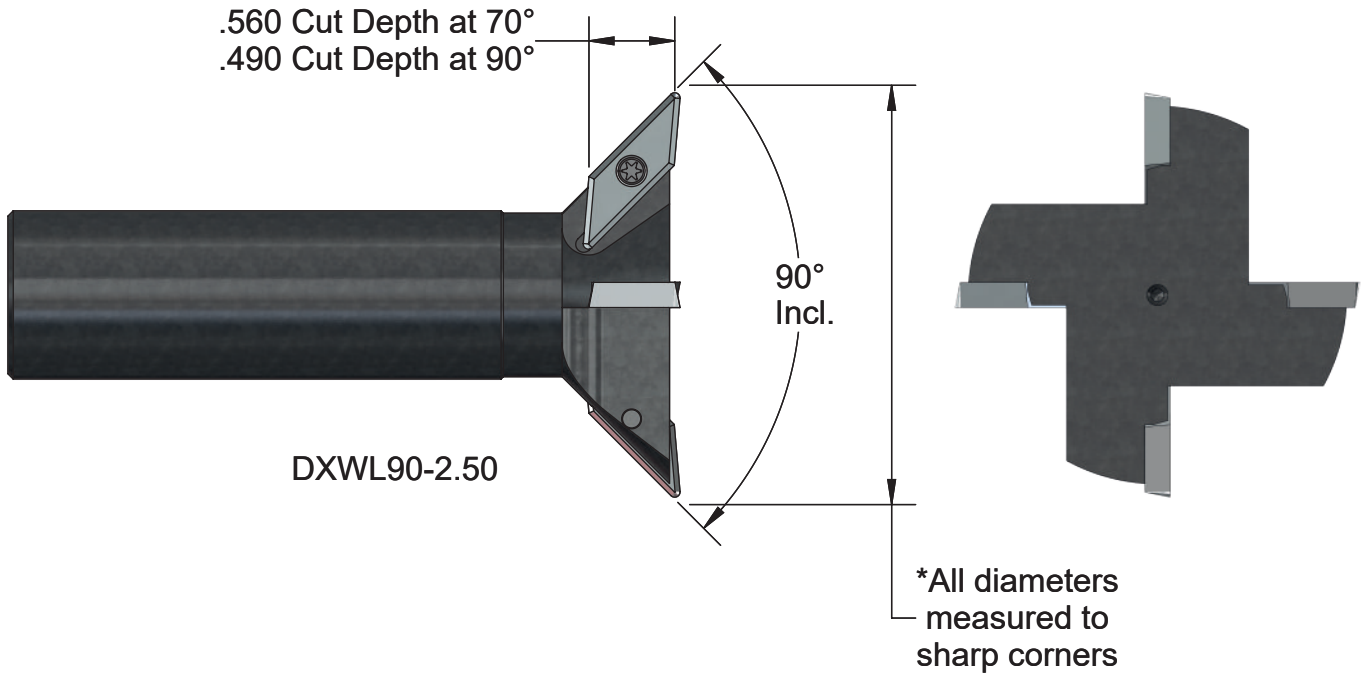


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70° to 90° Dexi-Dovetails wider, stronger inserts



Number	*Cut Ø	Cut Depth	Incl. Angle	Shank Ø & OAL	Flutes	Price
DXWL70-2.0	2.000	.560	70°	1" X 4.0	3	\$425.
DXWL80-2.25	2.250	.530	80°	1" X 4.0	3	\$470.
DXWL90-2.25	2.250	.490	90°	1" X 4.0	3	\$470.
DXWL90-2.50	2.500	.490	90°	1" X 4.0	4	\$575.
DXWL90-3.0	3.000	.490	90°	1" X 4.0	4	\$635.

Wide Insert				
	Insert Number	Radius	Price	
			No-Coat	AlTiN
	Di90WL-1	.015	\$20.	\$25.
Di90WL-2	.030			

Screw & Key	Number	Price
	DX-3MM	\$2.50
	T9	\$7.50

Insert screw torque to 18-20 in lbs.

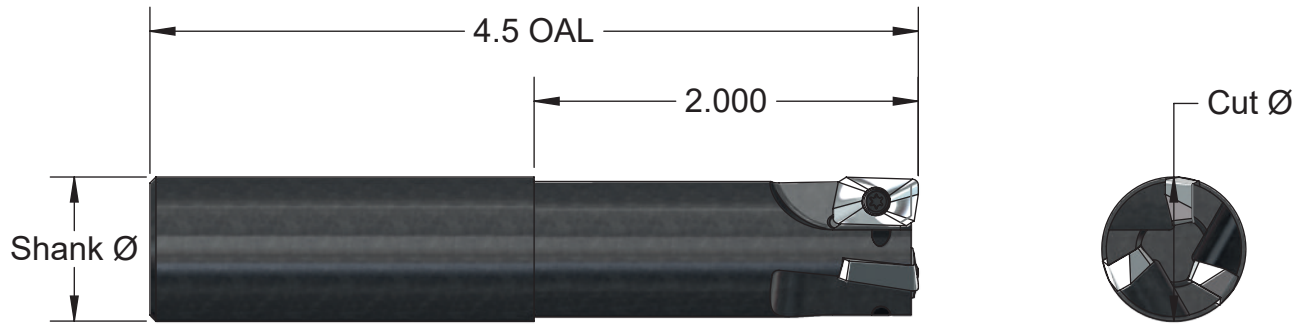


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All Purpose Indexable End Mills

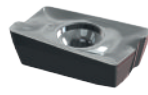




APM750-75 Shown Full Size

Number	Cut Ø	Shank Ø	No. of Flutes	Insert size	Price
APM625-5	.625	1/2"	2	APi11	\$235.
APM625-75	.625	3/4"	2	APi11	\$235.
APM750-5	.750	1/2"	3	APi11	\$275.
APM750-75	.750	3/4"	3	APi11	\$275.
APM100-75-11	.750	3/4"	3	APi11	\$290.
APM100-75	1.000	3/4"	2	APi16	\$290.
APM100-1	1.000	1"	2	APi16	\$290.
APM125-75	1.250	3/4"	3	APi16	\$360.
APM125-1	1.250	1"	3	APi16	\$360.

APi11 Inserts			
	Number	Radius	Price
	APi11-031G	0.031	\$9.
	APi11-031N	0.031	\$9.

G = General Purpose/Steels N = Non-Ferrous/Aluminum

APi16 Inserts			
	Number	Radius	Price
	APi16-031G	0.031	\$13.75
	APi16-063G	0.063	\$13.75
	APi16-094G	0.094	\$13.75
	APi16-125G	0.125	\$13.75
	APi16-037N	0.037	\$13.75

Hardware	
	
Insert Screw	Wrench
APi11 Insert Size	
2.5MM-AP	T8
\$4.25	\$7.50
APi16 Insert Size	
4MM-AP	T15
\$5.	\$10.00

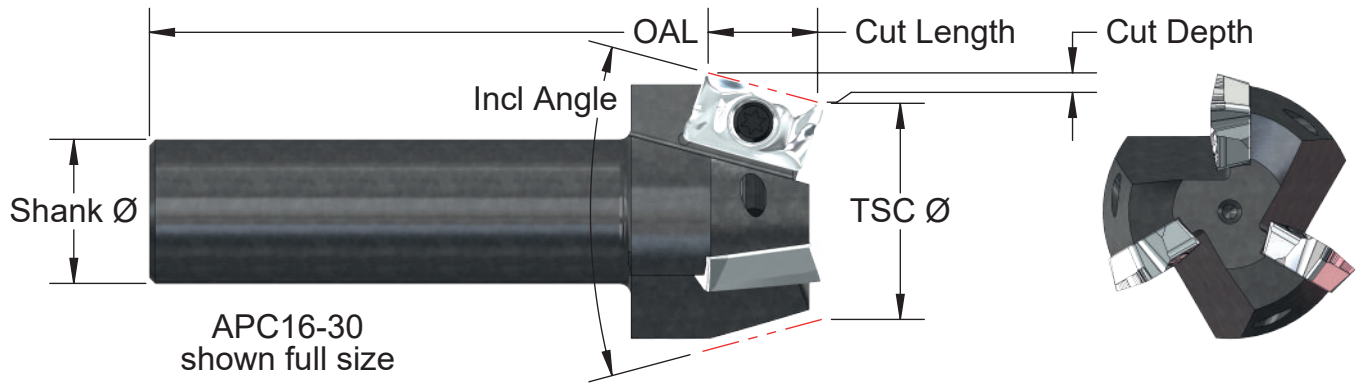


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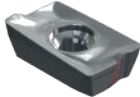
All Purpose Indexable Chamfer Cutters





Number	TSC Ø	Incl Angle	Cut Length	Cut Depth	Shank Ø	OAL	No. of Flutes	Insert Size	Price
APC11-30	.750	30°	.325	.080	1/2"	2.5	3	APi11	\$275.
APC11-60	.750	60°	.290	.165	1/2"	2.5	3	APi11	\$275.
APC11-82	.750	82°	.250	.220	1/2"	2.5	3	APi11	\$275.
APC11-90	.750	90°	.235	.235	3/4"	3.5	3	APi11	\$325.
APC11-100	.750	100°	.210	.260	3/4"	3.5	3	APi11	\$325.
APC11-120	.750	120°	.160	.290	3/4"	3.5	3	APi11	\$325.
APC11-150	.750	150°	.080	.325	3/4"	3.5	3	APi11	\$325.
APC16-30	1.0	30°	.540	.140	3/4"	3.5	3	APi16	\$460.
APC16-60	1.0	60°	.480	.285	3/4"	3.5	3	APi16	\$460.
APC16-82	1.0	82°	.415	.370	3/4"	3.5	3	APi16	\$460.
APC16-90	1.0	90°	.390	.400	3/4"	3.5	3	APi16	\$460.
APC16-100	1.0	100°	.350	.430	3/4"	3.5	3	APi16	\$460.
APC16-120	1.0	120°	.270	.490	3/4"	3.5	3	APi16	\$495.
APC16-150	1.0	150°	.125	.545	3/4"	3.5	3	APi16	\$495.

APi11 Inserts			
	Number	Radius	Price
	APi11-031G	0.031	\$9.
	APi11-031N	0.031	\$9.

G = General Purpose/Steels N = Non-Ferrous/Aluminum

APi16 Inserts			
	Number	Radius	Price
	APi16-031G	0.031	\$13.75
	APi16-063G	0.063	\$13.75
	APi16-094G	0.094	\$13.75
	APi16-125G	0.125	\$13.75
	APi16-037N	0.037	\$13.75

Hardware	
	
Insert Screw	Wrench
APi11 Insert Size	
2.5MM-AP	T8
\$4.25	\$7.50
APi16 Insert Size	
4MM-AP	T15
\$5.	\$10.00

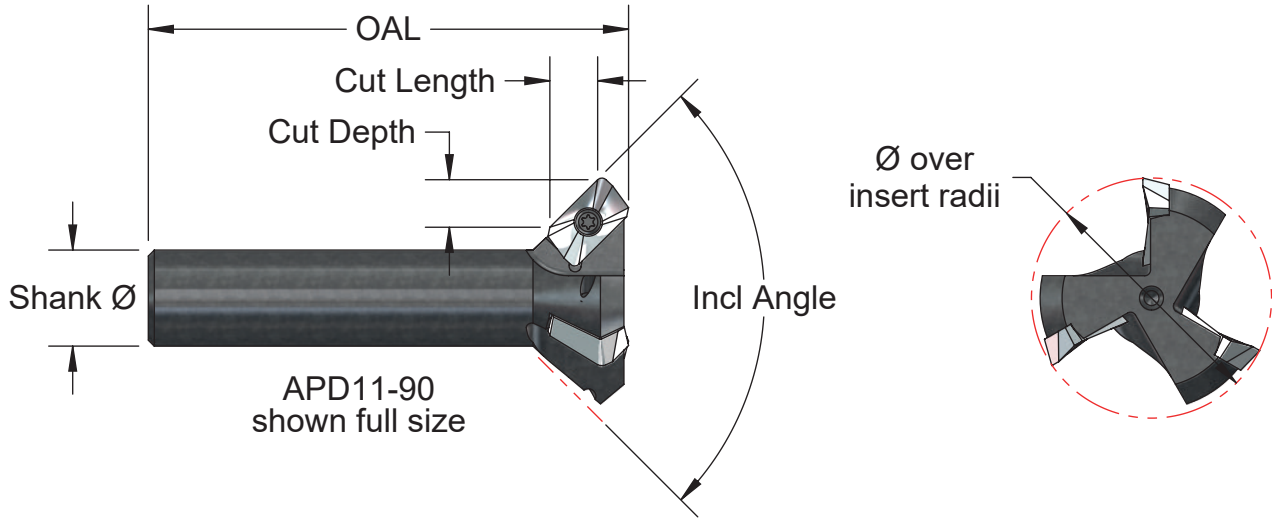


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All Purpose Indexable Back Chamfer Cutters





Number	Ø over R	Incl Angle	Cut Depth	Cut Length	Shank Ø	OAL	No. of Flutes	Insert Size	Price
APD11-90	1.250	90	.235	.235	1/2"	2.5	3	APi11	\$265.
APD11-100	1.375	100	.255	.210	1/2"	2.5	3	APi11	\$275.
APD11-120	1.375	120	.290	.160	1/2"	2.5	3	APi11	\$275.
APD11-140	1.375	140	.315	.110	1/2"	2.5	3	APi11	\$275.
APD11-150	1.375	150	.325	.080	1/2"	2.5	3	APi11	\$275.
APD16-90	2.0	90	.390	.400	3/4"	3.5	3	APi16	\$460.
APD16-100	2.0	100	.420	.350	3/4"	3.5	3	APi16	\$460.
APD16-120	2.0	120	.480	.280	3/4"	3.5	3	APi16	\$460.
APD16-140	2.0	140	.530	.190	3/4"	3.5	3	APi16	\$460.
APD16-150	2.0	150	.540	.140	3/4"	3.5	3	APi16	\$460.

APi11 Inserts			
	Number	Radius	Price
	APi11-031G	0.031	\$9.
	APi11-031N	0.031	\$9.

G = General Purpose/Steels N = Non-Ferrous/Aluminum

APi16 Inserts			
	Number	Radius	Price
	APi16-031G	0.031	\$13.75
	APi16-063G	0.063	\$13.75
	APi16-094G	0.094	\$13.75
	APi16-125G	0.125	\$13.75
	APi16-037N	0.037	\$13.75

Hardware	
	
Insert Screw	Wrench
APi11 Insert Size	
2.5MM-AP	T8
\$4.25	\$7.50
APi16 Insert Size	
4MM-AP	T15
\$5.	\$10.00



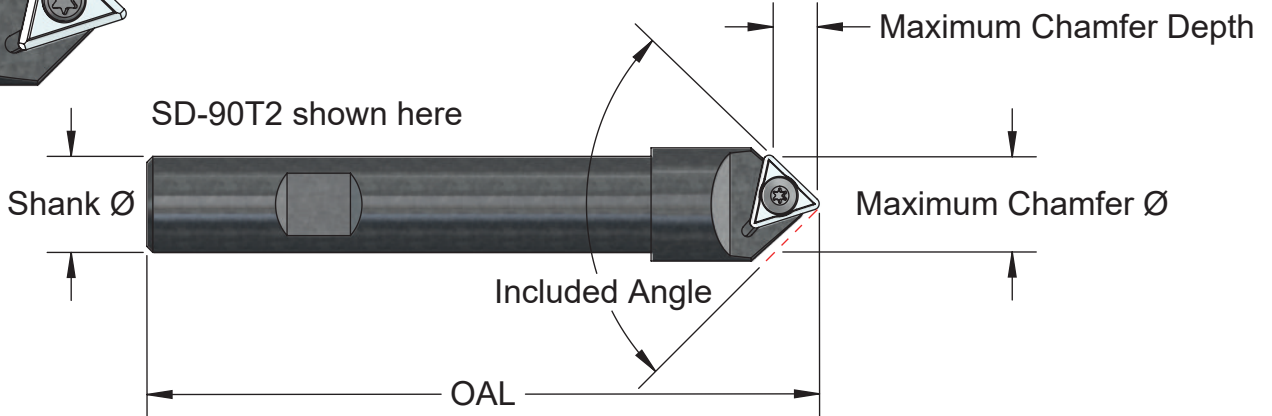
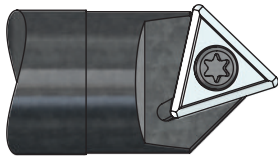
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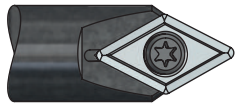
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Spot-Dex Tools (for all part materials)

SD-90T3 shown here



SD-60D3 shown here



SD-60D2 shown here



These all use Industry Standard inserts with secondary clearance facets ground to avoid dragging on the small cut diameters.

We've spot drilled to .190 depth with the SD-60D2 in mild steel at 4000 RPM and 1 IPM, and milled grooves in X-Y at 10 IPM.

Number	Included Angle	Max Chamfer Ø	Max Chamfer Depth	*Insert No. (modified)	Screw Size	Shank Ø & OAL	Price including Wrench & Screw
SD-60D2	60°	.310	.240	DPMT-21.51	2.5MM	1/2" X 3.5	\$200.
SD-60D3	60°	.480	.380	DPMT-32.52	4MM		\$220.
SD-70D2	70°	.350	.230	DPMT-21.51	2.5MM		\$200.
SD-70D3	70°	.530	.340	DPMT-32.52	4MM		\$220.
SD-82T2	82°	.530	.290	TPMT2-2	4-40	1/2" X 3.5	\$200.
SD-82T3	82°	.770	.410	TPMT322	4MM	3/4" X 5.0	\$220.
SD-90T2	90°	.570	.270	TPMT2-2	4-40	1/2" X 3.5	\$200.
SD-90T3	90°	.820	.390	TPMT322	4MM	3/4" X 5.0	\$220.
SD-100T2	100°	.610	.240	TPMT2-2	4-40	1/2" X 3.5	\$200.
SD-100T3	100°	.890	.350	TPMT322	4MM	3/4" X 5.0	\$220.
SD-120T2	120°	.680	.190	TPMT2-2	4-40	1/2" X 3.5	\$200.
SD-120T3	120°	.990	.270	TPMT322	4MM	3/4" X 5.0	\$220.

Insert Number	R. Size	Price
DPMT-21.51	.015	\$17.50
TPMT2-2	.031	\$16.00
DPMT-32.52	.031	\$19.00
TPMT322	.031	\$19.00

Screw	Price
2.5 MM	\$4.25
4-40	\$5.00
4 MM	\$5.00
4 MM	\$5.00

Wrench	Price
T-7	\$7.50
T-7	\$7.50
T-15	\$10.00
T-15	\$10.00



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The Single Flute Chamfer Hogs



CHA90-1 SHOWN FULL SIZE

This cutter was developed in 1982 for spot drilling and chamfer milling small slots in non-ferrous part materials. If used prior to drilling in non-ferrous materials it performs well. If used as a countersink after the hole is drilled it is chatter prone.

It is not for use as a rotating cutter in ferrous materials since the (25°) relief angle is too weak. However, in the more rigid lathe environment it can be used successfully to spot drill holes in ferrous materials. We spot drill our Accu-Holds (4340) in CNC lathes at 900 RPM and .0005 IPR, with tool life of 200 holes per insert corner.

It should never be used in a drill press.

All five cutters are on 3/4" Ø shanks and have a 5.0 overall length

All Single Flute Chamfer-Hogs, including inserts, are **\$215.** ea.

Number	Included Angle	Maximum Chamfer Ø	Insert	Clamp	Insert Prices	
CHA90-1	90°	.800	TFG32-90	CL-4	TFG32-90	\$15.00
CHA82-1	82°	.730	TFG32-90	CL-4	TFG32-90T (TiN Coated)	\$17.25
CHA100-1	100°	.940	TFG32-90	CL-4	TD6P-120	\$22.50
CHA120-1	120°	1.00	TD6P-120	5-40		
CHA60-1*	60°	1.00	TFG32-90	CL-4M		

* Note: CHA60-1 is **not** center cut; it has .200 end cut Ø.

The CL-4 & CL-4M Clamps are **\$17.50** each, includes screw.

The 10-32 Socket Head Cap Screw is Industry Standard.

TFG32-90 and TD-6P are Industry Standard Inserts modified with a secondary facet near the point to prevent "heeling".

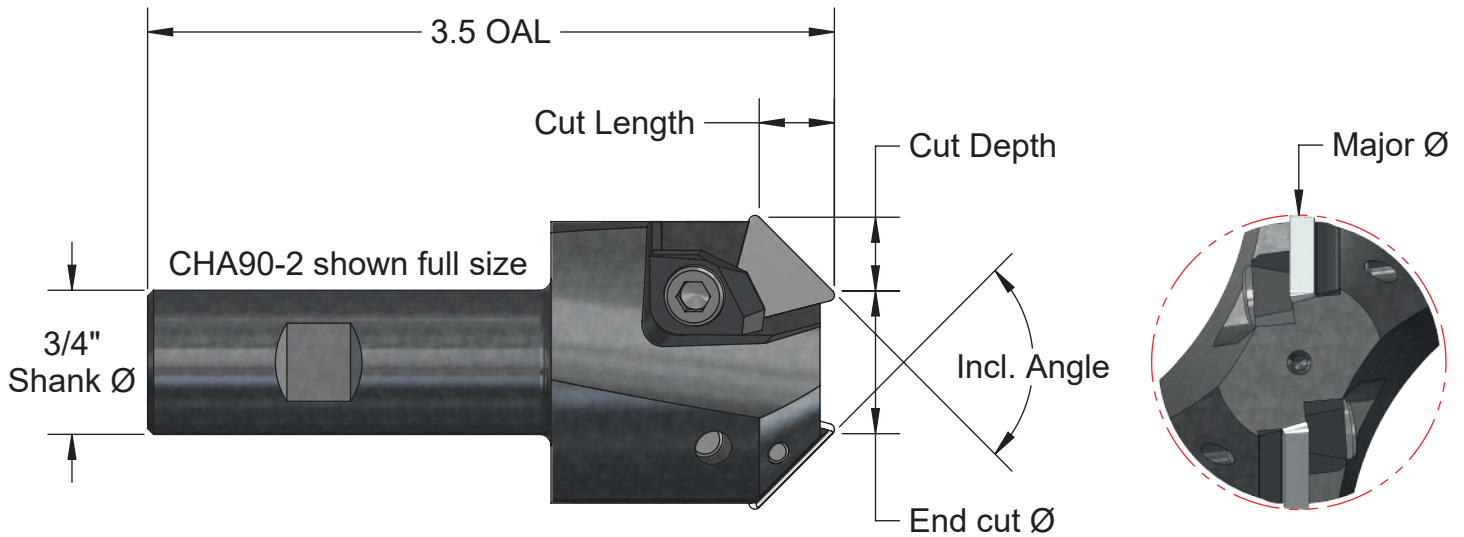


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Positive Rake Chamfer-Hogs



All Positive Chamfer-Hogs use
Insert TPU322 and Shim SM41
For Ferrous or Non-Ferrous

Number	Included Angle	No. of Flutes	End Cut Ø	Major Ø	Cut Length	Cut Depth	Clamp No.	Price Incl. Inserts
CHA90-2	90°	2	.750	1.5	.37	.37	CL2	\$325.
CHA120-2	120°	2	.625	1.6	.19	.42	CL2	\$325.
CHA60-3P	60°	3	1.10	1.6	.42	.19	CL5*	\$435.
CHA150-2	150°	2	.470	1.56	.14	.52	CL5*	\$325.

Insert	Price	Clamps	Price	Shims	Price	Screws at no charge with each purchase of Clamps & Shims. Ind. Standard 10-32 or 1/4-20 Socket Head, and 4-40 Flat Head.
TPU322 C5	\$14.	CL2	\$19.	SM41 Modified	\$19.	
		CL5*	\$25.			

*Uses 1/4-20

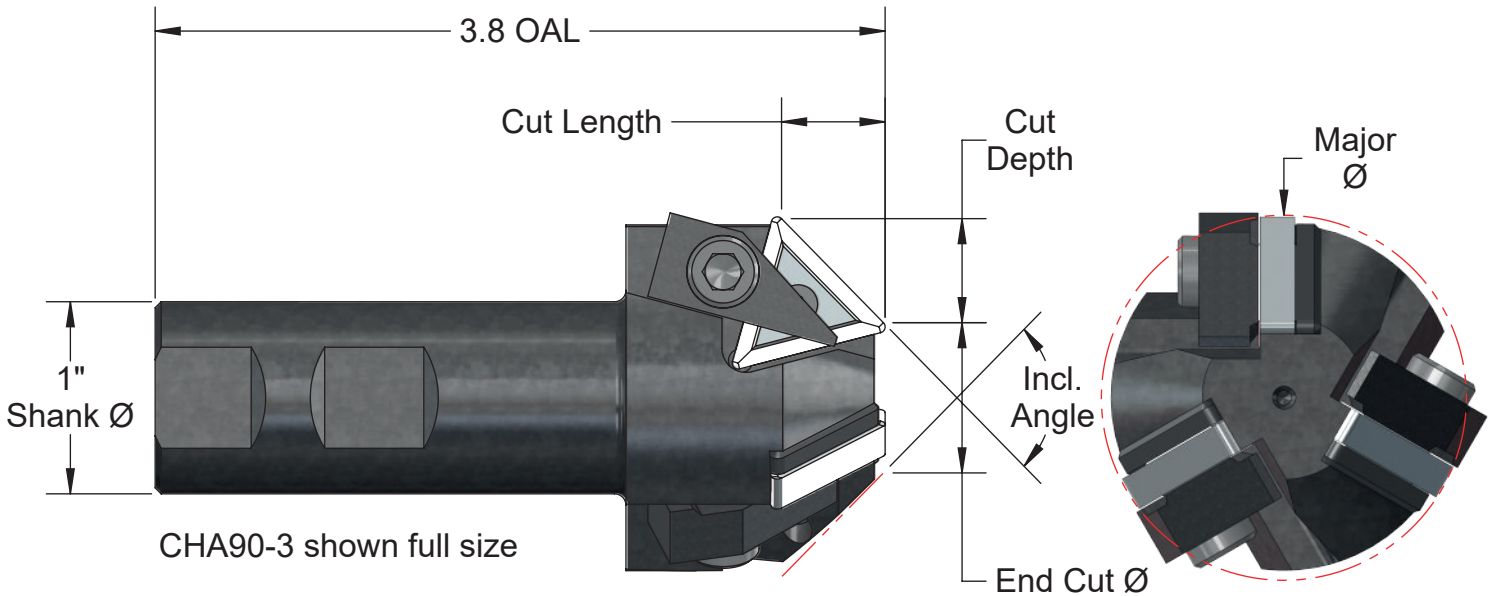


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Negative Rake Chamfer-Hogs (Ferrous Only)



Number	Included Angle	No. of Flutes	End Cut Ø	Major Ø	Cut Length	Cut Depth	Clamp No.	Price Incl. Inserts
CHA30-3	30°	3	1.75	2.16	.73	.25	CL5	\$475.
CHA60-3N	60°	3	1.40	2.16	.65	.45	CL5	\$475.
CHA70-3	70°	3	1.25	2.14	.62	.44	CL5	\$475.
CHA82-3	82°	3	1.0	2.02	.57	.50	CL5	\$475.
CHA90-3	90°	3	.750	1.90	.52	.52	CL5	\$475.
CHA90-4	90°	4	1.76	2.85	.52	.52	CL5	\$530.
CHA100-3	100°	3	.820	1.99	.49	.58	CL5	\$475.
CHA110-3	110°	3	.750	2.02	.43	.62	CL5	\$475.
CHA120-3	120°	3	.750	2.10	.29	.62	CL5	\$475.
CHA130-3	130°	3	.770	2.16	.32	.67	CL5	\$475.
CHA140-3	140°	3	.750	2.20	.25	.70	CL5	\$475.

All Negative Rake Chamfer-Hogs use the below insert, clamp, and shim

Insert	Price	Clamp	Price	Shim	Price	Screws at no charge with each purchase of Clamps & Shims. Ind. Standard 1/4-20 Socket Head and 8-32 Flat Head.
TNMG432 C5	\$18.	CL5	\$25.	SM26 Ind. Std.	\$14.	



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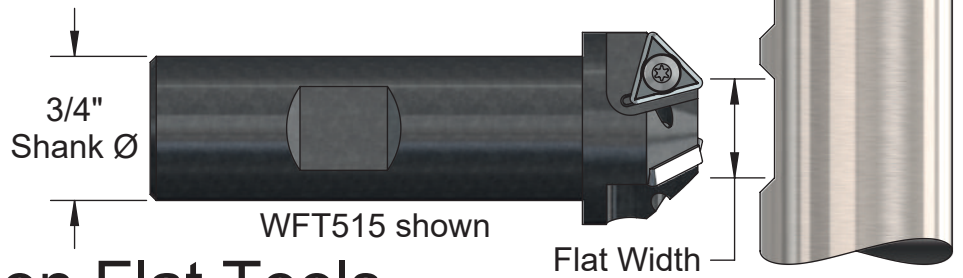
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Are you tired of hand ground screw flats on your tool and cutter shanks?

Mill precise flats with our Weldon Flat Tools.

See page 45 for the USCTI Weldon Flat specifications

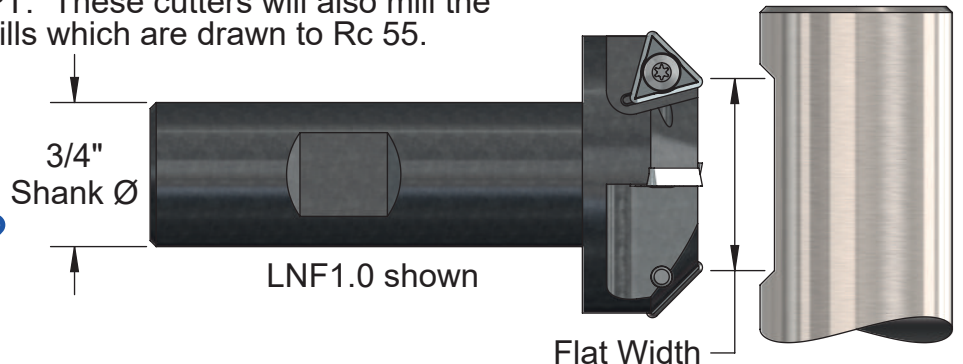


Weldon Flat Tools

Number	Flat Width	For these Shank sizes	Number of Flutes	Price
WFT280	.280	3/8"	1	\$215.
WFT330	.330	1/2"	2	\$235.
WFT400	.400	5/8"	2	\$250.
WFT455	.455	3/4" & 7/8"	3	\$285.
WFT515	.515	1", 1-1/4", 1-1/2"	3	\$310.
WFT700	.700	2"	3	\$375.

We mill Weldon Flats with the WFT515 in 4340 alloy steel hardened to Rc 46 @ 1500 RPM and .002 IPT. These cutters will also mill the shanks on standard HSS end mills which are drawn to Rc 55.

Would you prefer linear flats for easy "Z" Axis adjustment?



Linear Flat Tools for any Shank size

Number	Flat Width	Number of Flutes	Price
LNF750	.750	4	\$385.
LNF1.0	1.000	4	\$410.
LNF1125	1.125	4	\$440.
LNF1250	1.250	5	\$495.

Insert	Price
TPMT2-2	\$17.50

Screw	Price
SR 14-505	\$5.00

Wrench	Price
T-7	\$7.50

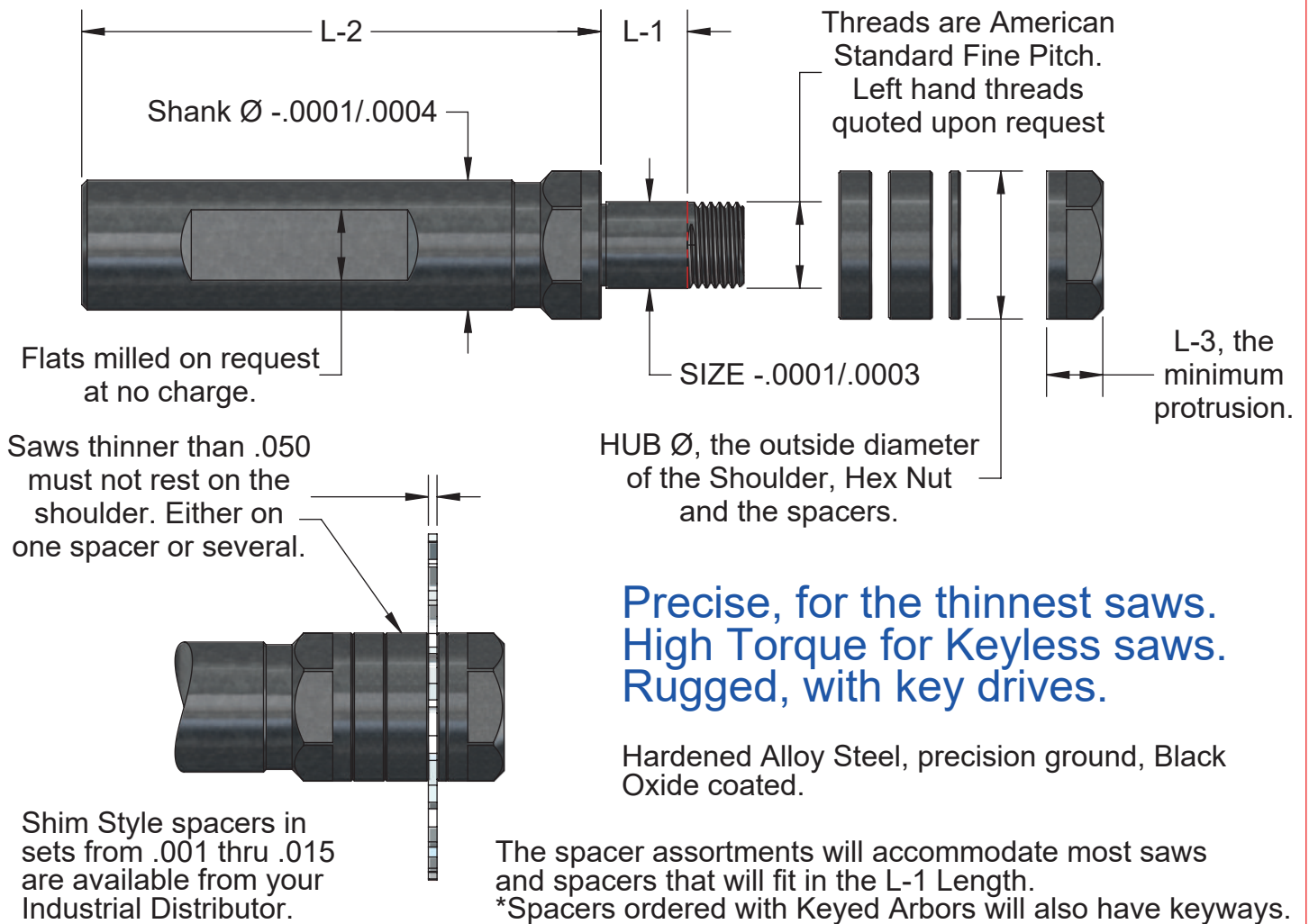


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SAW ARBORS for Carbide or HSS Saws with key drives for 5/8 and larger arbors



Number	Size	Shank Ø	L-1	L-2	L-3	Hub Ø	Spacers with each Arbor	Price
SA250	.250	1/2"	.350	2.13	.250	.570	.0625 .125 .1875	\$235.
SA375	.375	5/8"	.375	2.40	.280	.710		\$255.
SA500	.500	3/4"	.500	3.00	.325	.855		\$275.
SA625	.625	7/8"	.500	3.15	.390	1.000	.0625 .1875 .250	\$350.
SA750	.750	1"	.500	3.40	.440	1.215		\$365.
SA875	.875	1"	.500	3.40	.440	1.434		\$380.
SA100	1.00	1"	.500	3.50	.440	1.480		\$420.
SA125	1.25	1-1/4"	.500	3.50	.440	2.000		\$510.

*Sorry, unable to manufacture precise spacers thinner than .0625 in steel; suggest Robb-Jack's Solid Carbide spacers for thinner sizes.



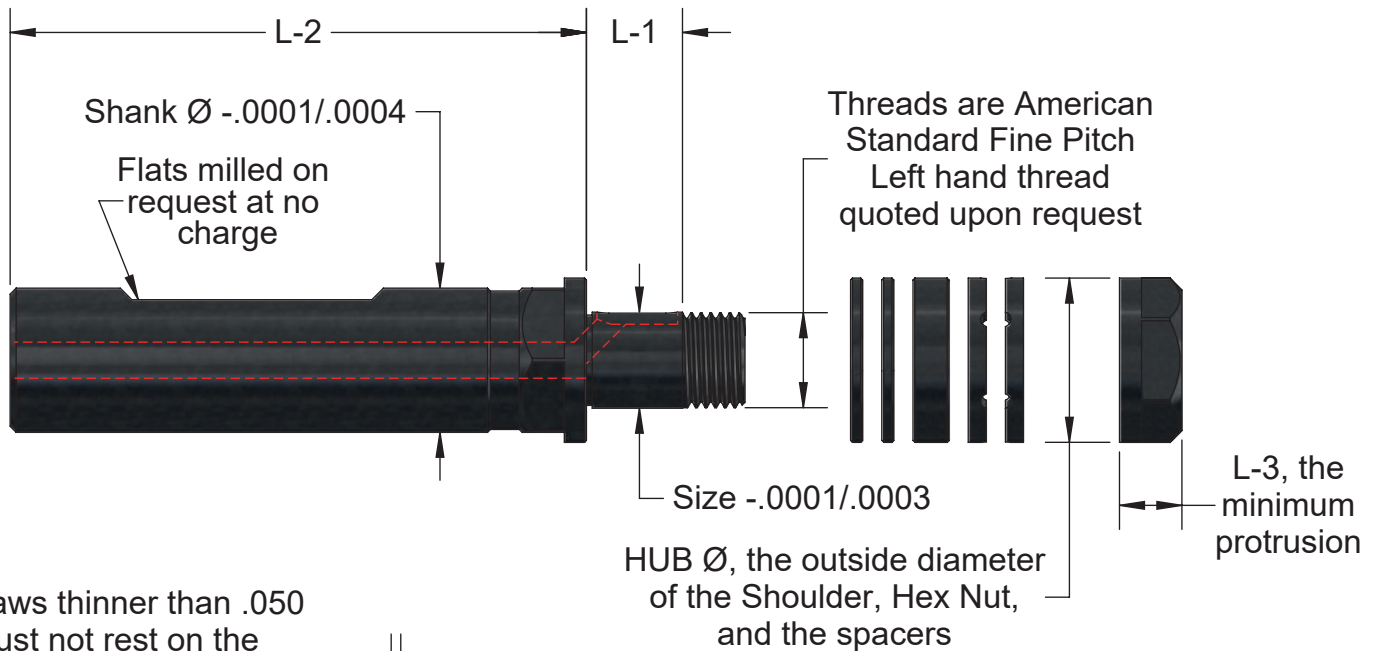
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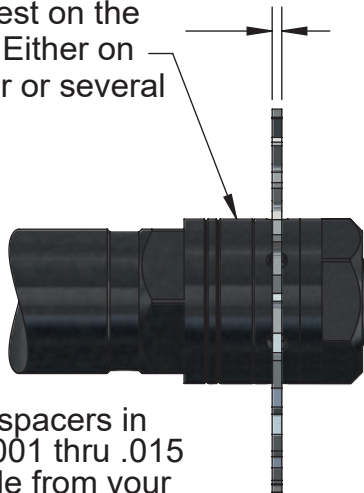
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NEW !!! Thru-Coolant Saw Arbors

NEW !!!



Saws thinner than .050 must not rest on the shoulder. Either on one spacer or several



Shim style spacers in sets from .001 thru .015 are available from your Industrial Distributor

Precise, for the thinnest saws.
 High Torque for Keyless saws.
 Rugged, with key drives.



Hardened Alloy Steel, precision ground, Black Oxide coated.

The spacer assortment will accommodate most saws and spacers that will fit in the L-1 length. Spacers ordered with Keyed Arbors will also have keyways.

Replacement Outer Flange Sets	
Number	Price
TCOF375	\$100.00
TCOF500	\$100.00
TCOF625	\$100.00
TCOF750	\$100.00
TCOF875	\$100.00
TCOF100	\$125.00
TCOF125	\$125.00

For spacers thinner than .0625 or thru-Coolant for Gang saw applications we suggest RobbJack's Solid Carbide spacers.

Number	Size	Shank Ø	L-1	L-2	L-3	Hub Ø	Spacers with each Arbor	Thru-Coolant Outer Flange	Price
SATC375*	.375	5/8"	.375	2.40	.280	.710	3pcs - .0625	2pcs - .0937	\$469.00
SATC500*	.500	3/4"	.500	3.00	.325	.855	2pcs - .0625, 1 pc - .1875		\$550.00
SATC625	.625	7/8"	.500	3.15	.390	1.000			\$700.00
SATC750	.750	1"	.500	3.40	.440	1.215			\$730.00
SATC875	.875	1"	.500	3.40	.440	1.434			\$760.00
SATC100	1.00	1"	.500	3.40	.440	1.480			\$840.00
SATC125	1.25	1-1/4"	.500	3.50	.440	2.000			\$999.00

* No keyway



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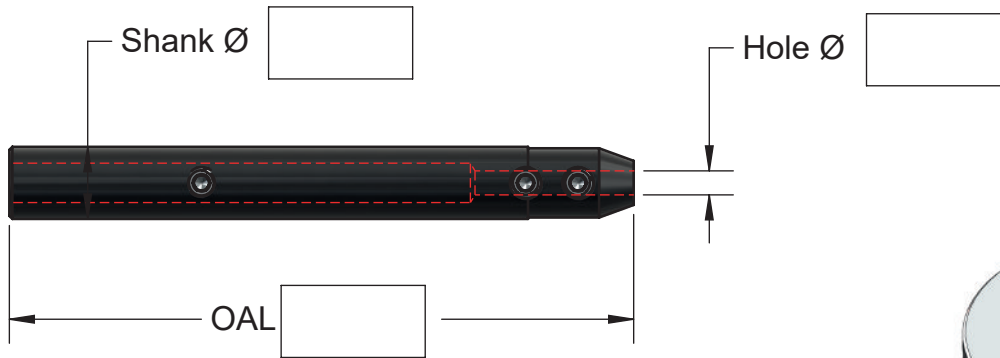
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The Accu-Hold

The MOST precise extension holder you have ever used.

Concentric within .0003; Hole size is plus .00015 and minus Zero.

Improves rigidity, concentricity, and coolant effectiveness.



Request For Quote



Number	Hole Ø	Decimal Equiv.	Shank size Ø	OAL	Screw Size	Price
ACH3/32	3/32"	.0937	3/8"	2.25	5-40	\$195.
ACH1/8	1/8"	.125	3/8"	3.25	8-32	\$205.
ACH1/8-6	1/8"	.125	3/8"	6.0	8-32	\$305.
ACH5/32	5/32"	.1562	1/2"	3.5	8-32	\$180.
ACH3/16	3/16"	.1875	1/2"	3.5	8-32	\$180.
ACH3/16-5	3/16"	.1875	1/2"	5.0	8-32	\$215.
ACH1/4	1/4"	.250	5/8"	4.25	10-32	\$190.
ACH1/4-6	1/4"	.250	5/8"	6.0	10-32	\$220.
ACH5/16	5/16"	.3125	3/4"	4.5	1/4-28	\$205.
ACH3/8	3/8"	.375	3/4"	4.5	5/16-24	\$215.
ACH3/8-6	3/8"	.375	3/4"	6.0	5/16-24	\$250.
ACH7/16	7/16"	.4375	3/4"	4.5	5/16-24	\$235.
ACH1/2*	1/2"	.500	3/4"	4.75	3/8-24	\$275.
ACH1/2-1	1/2"	.500	1"	4.75	3/8-24	\$305.
ACH1/2-6	1/2"	.500	1"	6.0	3/8-24	\$325.
ACH9/16	9/16"	.5625	1"	5.25	3/8-24	\$325.
ACH5/8	5/8"	.625	1"	5.5	3/8-24	\$325.
ACH3/4**	3/4"	.750	1"	5.25	7/16-20	\$375.
ACH3/4-1.25	3/4"	.750	1-1/4"	6.0	7/16-20	\$385.
ACH1.0***	1"	1.000	1"	5.5	7/16-20	\$525.

*The ACH1/2 has a 1" Dia. x 1.5" long head

**The ACH3/4 has a 1-1/4" Dia. x 2-1/4" long head with a 2" deep hole

***The ACH1.0 has a 1-1/2" Dia. x 2-1/4" long head with a 2" deep hole



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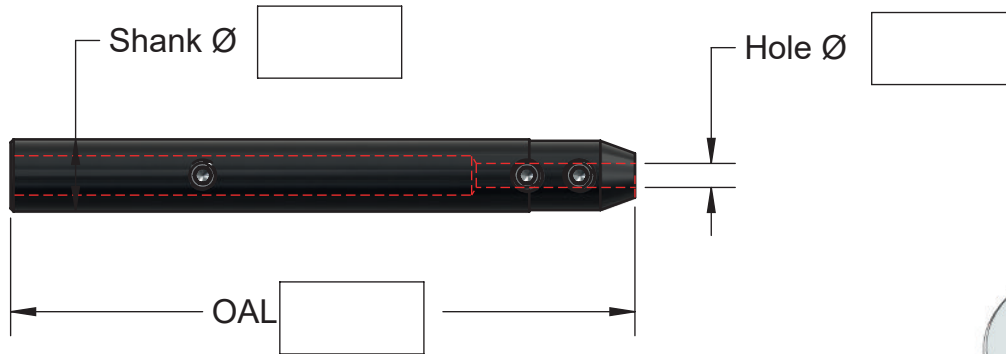
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The Metric Accu-Hold

The MOST precise extension holder you have ever used.

Concentric within .0003; Hole size is plus .00015 and minus Zero.

Improves rigidity, concentricity, and coolant effectiveness.



Number	Hole Ø	Decimal Equiv.	Shank size Ø	OAL	Screw Size	Price
ACH3MM	3MM	.1181	3/8"	3.25	8-32	\$205.
ACH4MM	4MM	.1575	1/2"	3.5	8-32	\$190.
ACH5MM	5MM	.1968	1/2"	3.5	8-32	\$190.
ACH6MM	6MM	.2362	5/8"	4.25	10-32	\$195.
ACH7MM	7MM	.2756	5/8"	4.25	10-32	\$250.
ACH8MM	8MM	.3149	3/4"	4.5	1/4-28	\$205.
ACH9MM	9MM	.3543	3/4"	4.5	5/16-24	\$265.
ACH10MM	10MM	.3937	3/4"	4.5	5/16-24	\$240.
ACH11MM	11MM	.4331	3/4"	4.5	5/16-24	\$290.
ACH12MM*	12MM	.4724	3/4"	4.75	3/8-24	\$270.
ACH12MM-1	12MM	.4724	1"	4.75	3/8-24	\$285.
ACH13MM	13MM	.5118	1"	4.75	3/8-24	\$315.
ACH14MM	14MM	.5512	1"	5.5	3/8-24	\$315.
ACH15MM	15MM	.5905	1"	5.5	3/8-24	\$340.
ACH16MM	16MM	.6299	1"	5.5	3/8-24	\$330.
ACH18MM**	18MM	.7086	1"	5.25	7/16-20	\$250.
ACH20MM-1	20MM	.7874	1"	6.0	7/16-20	\$375.
ACH20MM	20MM	.7874	1-1/4"	6.0	7/16-20	\$385.
ACH25MM***	25MM	.9842	1"	6.5	7/16-20	\$525.

*The ACH12MM has a 1" Dia. x 1.5" long head.

**The ACH18MM has a 1-1/4" Dia. x 2-1/4" long head with a 2" deep hole

***The ACH25MM has a 1-1/2" Dia. x 2-1/4" long head with a 2" deep hole



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Accu-Hold MMH - All Metric

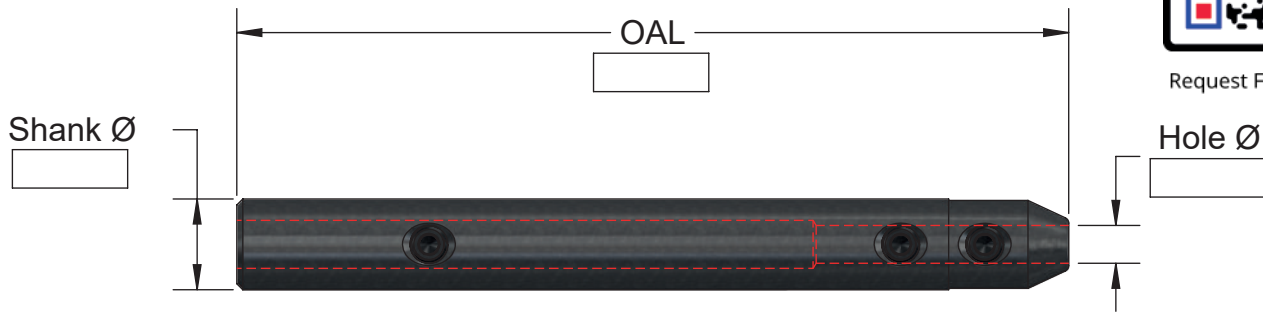
The MOST precise extension holder you have ever used.

Concentric within .0003; Hole size is plus .00015 and minus Zero.

Improves rigidity, concentricity, and coolant effectiveness.



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Number	Hole Ø	Decimal Equiv.	Shank size Ø	OAL	Screw size	Price
MMH-03	3 mm	0.1181	10 mm	82 mm	M3x.5x3	\$245.
MMH-04	4 mm	0.1575	12 mm	110 mm	M4x.7x4	\$220.
MMH-05	5 mm	0.1968	12 mm	110 mm	M5x.8x4	\$220.
MMH-06	6 mm	0.2362	16 mm	125 mm	M5x.8x5	\$230.
MMH-08	8 mm	0.3149	20 mm	135 mm	M6x1.0x6	\$250.
MMH-10	10 mm	0.3937	20 mm	135 mm	M8x1.25x6	\$305.
MMH-12	12 mm	0.4724	25 mm	150 mm	M10x1.50x8	\$315.
MMH-16	16 mm	0.6299	32 mm	150 mm	M10x1.50x8	\$350.
MMH-20	20 mm	0.7874	32 mm	150 mm	M8x1.25x6	\$405.

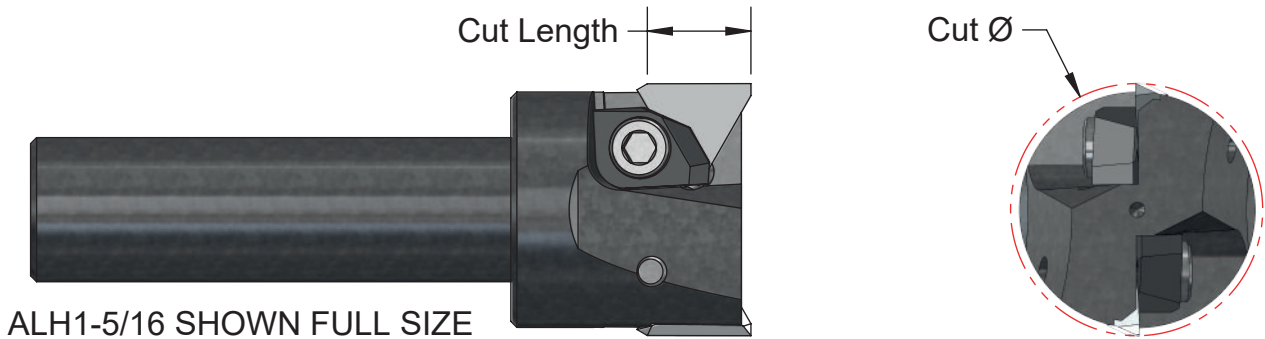


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The Aluma-Hogs



We started making ALUMA-HOGS in 1982. In 1997 we introduced the SHEAR-HOG; see back cover. With its high shear inserts, and no top clamps, the SHEAR-HOG outperforms the ALUMA-HOGS by 50% in Metal Removal rates. We will stock Aluma-Hogs, inserts, and parts as long as needed.



NUMBER	Cut Ø	Shank Ø	OAL	Cut Length	Insert & Qty.	Clamp	Shim	Price Incl. Inserts
ALH1A	1.0	3/4"	3.75	.25	TEG2.522 (2)	CL1		\$240.
ALH1B	1.0	1"	3.75	.25	TEG2.522 (2)	CL1		\$240.
ALH1-5/16	1.312	3/4"	3.75	.50	TFG32MF (2)	CL2		\$295.
ALH1-7/8A	1.875	3/4"	3.87	.75	TEG42MF (2)	CL3		\$315.
ALH1-7/8B	1.875	1"	4.12	.75	TEG42MF (2)	CL3		\$315.
ALH2	2.0	1"	4.12	.75	TEG42MF (2)	CL3		\$360.
ALH3S	3.0	1"	4.12	.75	TEG42MF (3)	CL3	SM37	\$455.
ALH4S	4.0	1"	4.25	.75	TEG42MF (4)	CL3	SM37	\$590.

Inserts/Hardware	Relief Angle	Price
TEG2.522 (.031 R)	20°	\$14.00
TEG2.52MF (Mill Flat)	20°	\$16.00
TFG322 (.031 R)	25°	\$14.00
TFG32MF (Mill Flat)	25°	\$16.00
TEG422 (.031 R)	20°	\$17.00
TEG42MF (Mill Flat)	20°	\$19.00
CL1 or CL2 Clamp		\$18.50
CL3 Clamp		\$24.00
SM37 Shim, Modified		\$18.00

*Suggested Starting Data:
Non-Ferrous ONLY
500/2,000 SFM; .002/.010 IPT
10,000 max RPM*

See pages 67 & 71 for information on the SHEAR-HOG, which will rough mill Aluminum at 6 CIM per HP.

Screws included with any Clamp/Shim orders.



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Aluminum Milling Tests

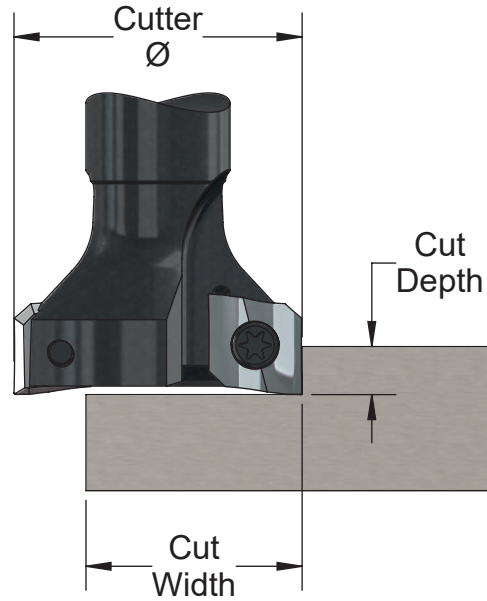
Faster CIM metal removal rates in aluminum depend more on IPM feed rates, horsepower and the cutter geometry than RPM.

You'll get higher CIM with smaller cutters, (assuming you're rough milling with cutters about 1-1/4" diameter and larger). On tests with full diameter cuts, the 1-1/4" diameter cutter gets 42 CIM and the 2" diameter cutter gets 37 CIM.

You'll get higher CIM with a cut width that is about 3/4 of the cutter diameter than with a full diameter cut width, (a long accepted machinist's rule).

Compare tests below

You can get greater CIM with fewer flutes, plus reduced insert costs; see Test 3.



See Page 71 for all shank style Shear-Hogs.

Test No.	Cutter	Cutter Ø	RPM	Cut Width	Cut Depth	IPM Feed	No. Flutes	IPT Chip	CIM
1.	SH125	1.25	6500	1.25	.125	275	2	.027	42
2.	SH125	1.25	6500	1.0	.250	375	2	.037	47
3.	SH200	2.0	6500	2.0	.250	75	3	.004	37

All tests were run on a recent model Haas VF1 based on the highest Inches Per Minute possible with the load meter showing 100%. Haas estimates 7.5 actual spindle HP at 6500 RPM.

When calculating speeds and feeds for Shear-Hogs we aim for 6 CIM per horse power at the spindle. Please see the sample calculation below.

Given: 10 HP at the spindle, 6,500 RPM, Cut width 3.5", (4) flutes, and Cut depth of .100"

Stock Removal (CIM)... HP X 6.....10 X 6..... 60 CIM
 SFM..... RPM X .262 X Tool Dia.....6,500 X .262 X 3.5..... 5,960 SFM
 IPM..... CIM / (Cut Width X Cut Depth).....60 / (3.5 X .100)..... 171 IPM
 IPT..... IPM / (RPM X No. of Teeth).....171 / (6,500 X 4)..... .0066 IPT



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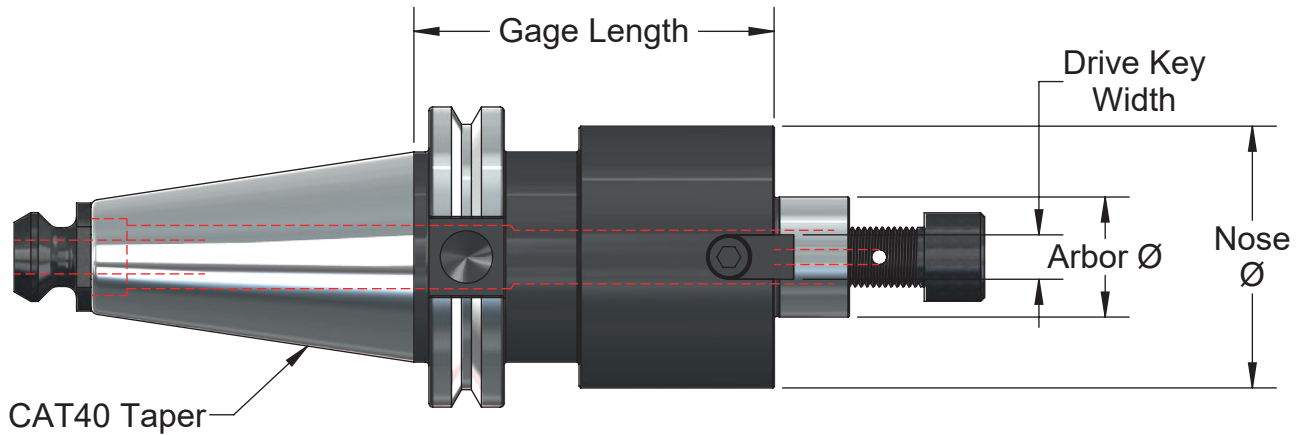
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NEW !!!

Shell Mill Arbors

NEW !!!



Concentricity better than .0002 at face and arbor

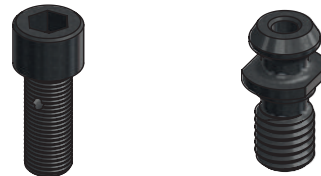
Made from Alloy Steel Rc 54 - 56

Removable drive keys

No.	Arbor Ø	Nose Ø	Gage Length	Drive Key Width	Shell Shear-Hog	Price
CAT40 x FMA 1/2"-1.37"	.500	1.45	1.37	.25	Shell-200	\$145.
CAT40 x FMA 3/4"-1.37"	.750	1.69	1.37	.31	Shell-250	\$145.
CAT40 x FMA 3/4"-1.37"	.750	1.69	1.37	.31	Shell-275	\$145.
CAT40 x FMA 1"-2.06"	1.00	2.20	2.06	.38	Shell-300	\$155.
CAT40 x FMA 1-1/4"-2.21"	1.25	2.75	2.21	.50	Shell-400	\$165.
CAT40 x FMA 1-1/2"-2.21"	1.50	3.80	2.21	.63	Shell-500	\$175.
CAT40 x FMA 1-1/2"-2.21"	1.50	3.80	2.21	.63	Shell-600	\$175.
CAT40 x FMA 1-1/2"-2.21"	1.50	3.80	2.21	.63	Shell-700	\$175.

Thru Coolant Arbor Screws		
Size	Shell Shear-Hog	Price
1/4-28	SHELL-200	\$8.
3/8-24	SHELL-250	\$8.
3/8-24	SHELL-275	\$8.
1/2-20	SHELL-300	\$9.
5/8-18	SHELL-400	\$11.
3/4-16	SHELL-500	\$13.
3/4-16	SHELL-600	\$13.
3/4-16	SHELL-700	\$13.

Thru Coolant Retention Knob	
No.	Price
21003-45C	\$18.

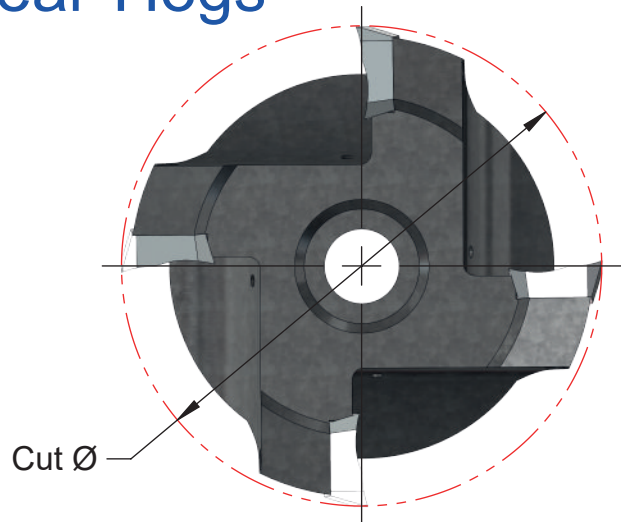
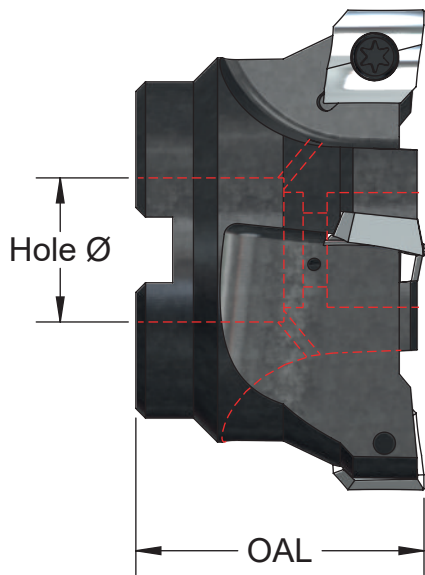


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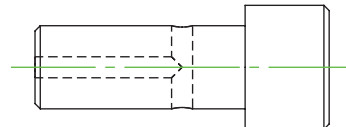
Shell Shear-Hogs®



All cutter prices include inserts, insert screws, coolant screw and wrench

Number	Cut Ø	Hole Ø	OAL	No. of Flutes	Price Incl. Inserts	Coolant Screws	
						Size	Price
SHELL-200	2.0	.500	1.25	2 or 3	\$470.	1/4-28	\$8.
SHELL-250	2.5	.750	1.50	4	\$520.	3/8-24	\$8.
SHELL-275	2.75	.750	1.50	4	\$550.	3/8-24	\$8.
SHELL-300	3.0	1.00	1.75	4	\$595.	1/2-20	\$9.
SHELL-400	4.0	1.25	1.87	4 or 5	\$690.	5/8-18	\$11.
SHELL-500	5.0	1.50	2.25	5	\$810.	3/4-16	\$13.
SHELL-600	6.0	1.50	2.25	6	\$1100.	3/4-16	\$13.
SHELL-700	7.0	1.50	2.25	8	\$1625.	3/4-16	\$13.

You may use Std. Socket Head screws without thru-tool coolant. Or, use our modified screws with coolant holes



Shear-Hog Inserts	Corner	Price
ADEH-430	Sharp	\$21. ea.
ADEH-431	.010 R	\$21. ea.
ADEH-432	.030 R	\$21. ea.
ADEH-434	.060 R	\$21. ea.
ADEH-436	.090 R	\$23. ea.
ADEH-438	.120 R	\$23. ea.
ADEH-45	.015 x 45°	\$23. ea.

Extra Insert Features	Add to Price
.002 Honed Edge	\$3.
AlTiN Coat	\$5.
DLC Coat	\$6.
Honed Edge & AlTiN Coat	\$8.
Insert Screws and Wrenches	
3.5mm-SH (2012 and newer)	\$2. ea.
8-32-SH (Older than 2012)*	\$2. ea.
T15 Wrench	\$10. ea.

Insert screw torque to 28-30 in lbs.

*Uses Industry Standard T10 Wrench

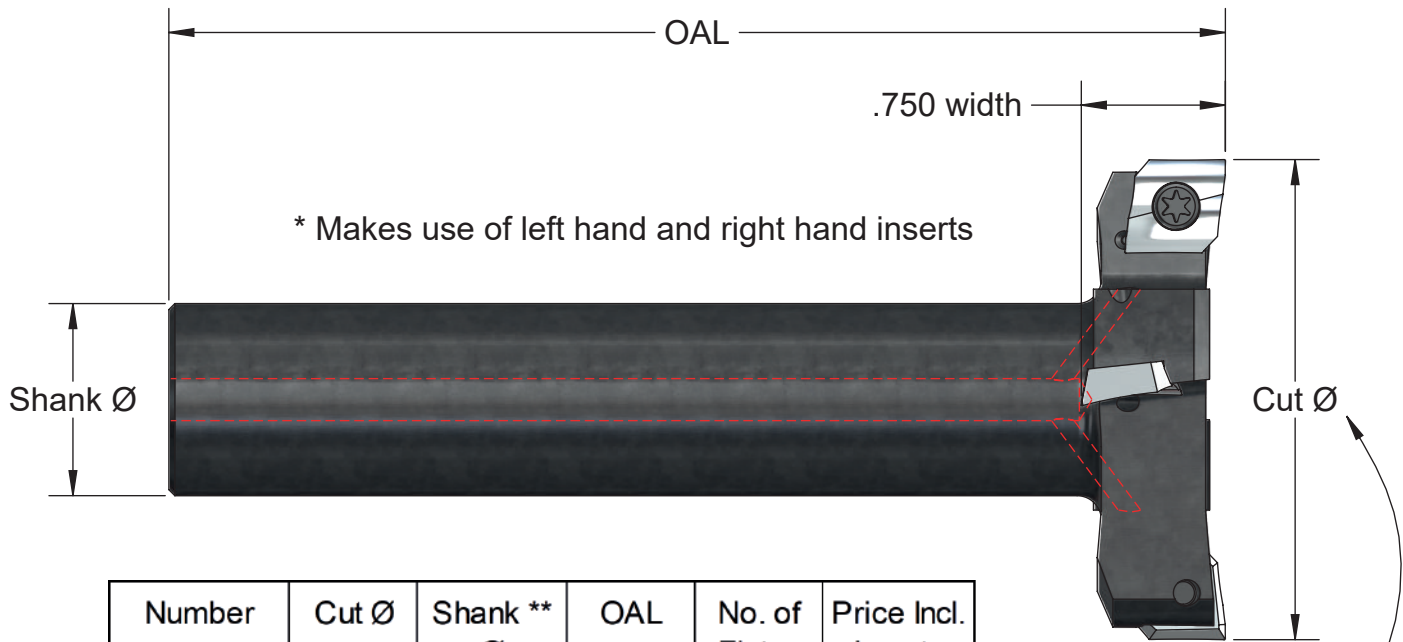


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T-Slot Shear-Hogs®



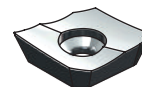
Number	Cut Ø	Shank ** Ø	OAL	No. of Flutes	Price Incl. Inserts
TS-150	1.50	3/4"	4.5	2	\$475.
TS-175	1.75	3/4"	5.5	2	\$520.
TS-200	2.00	1"	6.0	2	\$570.
TS-250	2.50	1"	5.5	4	\$600.
TS-325	3.25	1-1/4"	6.0	4	\$735.
TS-400	4.00	1-1/4"	7.0	4	\$850.
TS-450	4.50	1-1/4"	7.0	6	\$910.

Cutting diameters are not for finish profiling with T-Slot Shear-Hogs.

Inserts can be spun ground in T-Slot Shear-Hogs to cut straight in that tool only at an additional charge.

** We can modify shanks to smaller sizes.
Price & lead time based on specific request.

LH/RH Inserts same price



Shear-Hog Inserts	Corner	Price
ADEH-430	Sharp	\$21. ea.
ADEH-431	.010 R	\$21. ea.
ADEH-432	.030 R	\$21. ea.
ADEH-434	.060 R	\$21. ea.
ADEH-436	.090 R	\$23. ea.
ADEH-438	.120 R	\$23. ea.
ADEH-45	.015 x 45°	\$23. ea.

Insert screw torque to 28-30 in lbs.

Extra Insert Features	Add to Price
.002 Honed Edge	\$3.
AlTiN Coat	\$5.
DLC Coat	\$6.
Honed Edge & AlTiN Coat	\$8.
Insert Screws and Wrenches	
3.5mm-SH (2012 and newer)	\$2. ea.
8-32-SH (Older than 2012)*	\$2. ea.
T15 Wrench	\$10. ea.

* Uses Industry Standard T10 Wrench



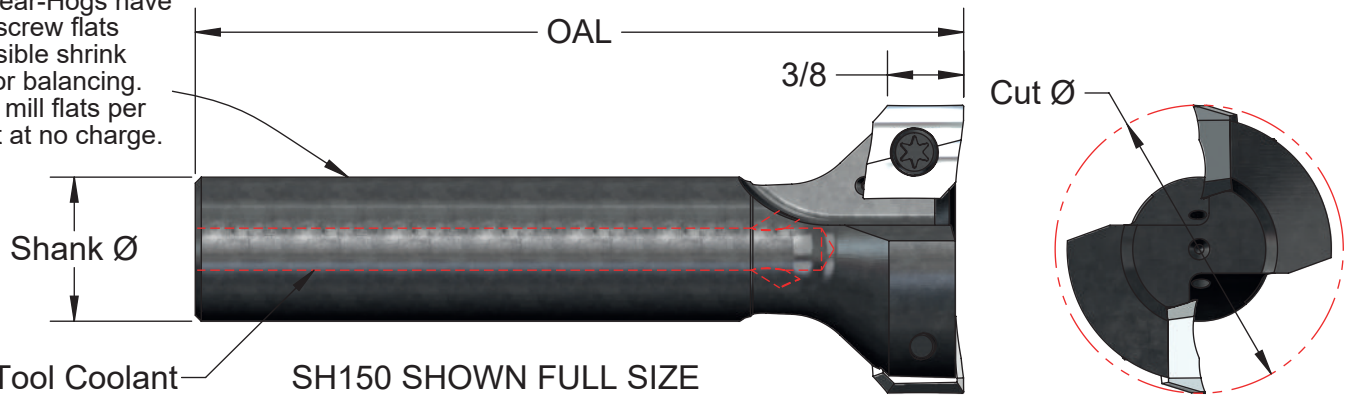
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Shank Style Shear-Hogs®

The Shear-Hogs have no set-screw flats for possible shrink fit use or balancing. We will mill flats per request at no charge.



Are you rough milling aluminum at 6 CIM per HP?

Number	Cut Ø	Shank Ø	OAL	No. of Flutes	Ramp Angle	Price	Shear-Hog Inserts	Corner	Price
SH100	1.0	3/4"	4.0	1	Drills in Z!	\$240.	ADEH-430	Sharp	\$21. ea.
SH100-6	1.0	3/4"	6.0	1	Drills in Z!	\$295.	ADEH-431	.010 R	\$21. ea.
SH125	1.25	3/4"	4.0	2	8°	\$270.	ADEH-432	.030 R	\$21. ea.
SH125-1	1.25	1"	4.0	2	8°	\$285.	ADEH-434	.060 R	\$21. ea.
SH125-6	1.25	1"	6.0	2	8°	\$365.	ADEH-436	.090 R	\$23. ea.
SH125-9	1.25	1"	9.0	2	8°	\$480.	ADEH-438	.120 R	\$23. ea.
SH150	1.5	3/4"	4.0	2	5°	\$315.	ADEH-45	.015 x 45°	\$23. ea.
SH150-1	1.5	1"	4.5	2	5°	\$325.	Extra Insert Features		Add to Price
SH150-7	1.5	1-1/4"	7.0	2	5°	\$405.	.002 Honed Edge		\$3.
SH150-8	1.5	1"	8.0	2	5°	\$435.	ATiN Coat		\$5.
SH200-3/4	2.0	3/4"	4.5	3	4°	\$375.	DLC Coat		\$6.
SH200-1	2.0	1"	5.0	3	4°	\$375.	Honed Edge & ATiN Coat		\$8.
SH200-7	2.0	1-1/4"	7.0	3	4°	\$455.	Insert Screws and Wrenches		
SH200-9	2.0	1-1/4"	9.0	3	4°	\$515.	3.5mm-SH (2012 and newer)		\$2. ea.
SH300-3/4	3.0	3/4"	5.0	4	None	\$505.	8-32-SH (Older than 2012)*		\$2. ea.
SH300-1	3.0	1"	5.0	4	None	\$505.	T15 Wrench		\$10. ea.
SH300-1.25	3.0	1-1/4"	5.0	4	None	\$505.	*Uses Industry Standard T10 Wrench		
SH400-1.25	4.0	1-1/4"	5.5	4	None	\$660.			
SH450	4.5	1-1/4"	5.5	5	None	\$745.			

Insert screw torque to 28-30 in lbs.

All cutter prices include Inserts, Screws, and Wrench, assembled and ready to cut.

See page 67 for recent test results on a HAAS VF1



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HOW AB TOOLS HAPPENED

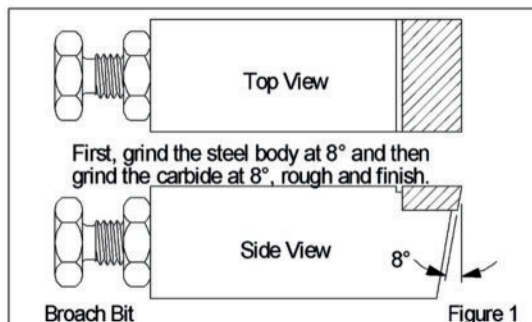
BY ALAN BAKER



In September of 1953, Myrna and I were 25 years old, and neither of us had a job. I didn't have a degree or any learned skill with which to earn a decent living. We had about \$300 in cash and normal debts. Myrna and I had been married for four years, Jon's older brother David (who is next door at Robb-Jack) was two years old, we had some furniture and a car on which we owed more than the car's value, and we were...totally defeated.

Myrna took David on a Greyhound bus from Warren, Pennsylvania, to spend a few weeks with her parents in Missouri while I tried to find a job and a place to live. I wondered at times if she would want to come back to me. I drove two hours north from Warren to Buffalo, New York because I'd seen newspaper ads for unskilled assembly workers at the Chevrolet-Tonawanda Engine plant. I told Myrna, "I can work on an engine assembly line as well as anyone." I would've taken any job I could get. I drove early from Warren to be first in line at 8 AM on Monday, filled out their application, took a five-minute timed test, and ten minutes later, the personnel man said, "We have an opening for a cutter grinder trainee on the swing shift." It sounded like a question, so I said, "Yes, Sir." I found and paid a deposit on a tiny apartment, called Myrna to discuss how soon she could join me, and went to work that Monday at 3:30 PM.

MY FIRST JOB



My first job was hand-grinding broach bits. First, I ground the steel away under the carbide, then I rough ground the carbide edge on the vitrified green wheel (which is now obsolete), and then I finished ground the carbide edge on a diamond face wheel, sliding the broach bit back and forth on a table tilted to 8 degrees. After a few hours, my fingers were sore from gripping the tools so hard, and I had blisters for a few weeks.

I didn't make many friends with the other cutter grinders, and on the way to my car one night, the union steward told me that trying to outperform everyone else was causing some ill will. Then he said, "You better take it easy, Baker. You could find your



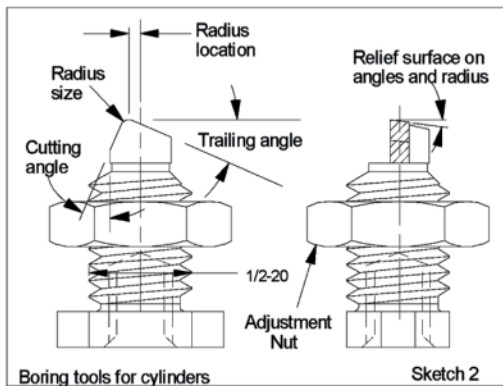
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tires punctured some night." Fortunately, that never happened, but I started trying to be friendlier.

A \$50 AWARD



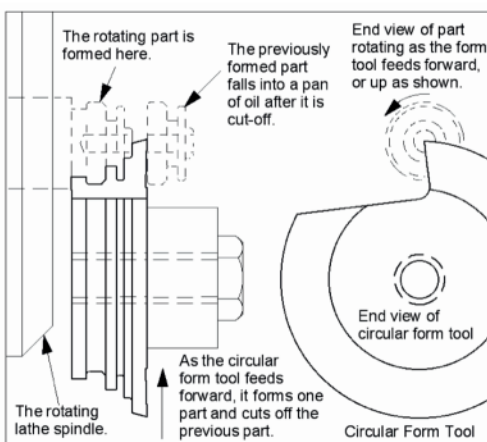
After six or eight months of sore hands (my hands were much stronger than when I started) I started grinding the boring tools for the V-8 cylinders on a device that gripped each tool precisely as it was swung back and forth to grind the two cutting angles and the corner radius, shown on the sketch below. They finished the cylinders to size with a carbide-tipped reamer.

After I had been grinding the carbide-tipped boring tools for about four months, I turned in a suggestion by filling out a form from the bulletin board to improve the swinging device with an additional adjustment screw and stop. I got a \$50 award, which was over two days' pay, and in about a week, the toolmakers had installed the new screw and stop that I had pencil-sketched. I was proud of it, but there were no comments from my fellow grinders or the supervisor.

WE CAN'T AFFORD A NEW SKIRT

Then Myrna worked days in an office at Bell Aircraft, and I left David with a neighbor when I went to work at 3 PM. Myrna got home at about 5 PM every weeknight. In those days, secretaries all wore skirts and heels. We went shopping and found some nice wool skirts, but they were \$20 each. As we were leaving the store, knowing we couldn't afford \$20 skirts, there were some beautiful one-yard square wool remnants on a counter for only \$1 each. I told Myrna, "I think I could cut up an old skirt that fits you for a sample and make a skirt for \$1 plus the zipper." We had an old electric sewing machine that I found mechanically fascinating and still do; I had already made simple drapes by copying old ones. I made a skirt, and she loved it, and during several months, I made seven more. A lot of my inside seams were sloppy, but no one saw them except the dry cleaners and us.

MY SECOND JOB AT NIAGRA CUTTER



A skilled cutter grinder at Chevrolet told me that he had been working four hours a morning at Niagara Cutter, learning a lot, and that they were looking for another part-time trainee. After two years at Chevrolet-Tonawanda on the swing shift, I started my second job from 8 to 12 each morning at Niagara Cutter, where I learned to grind circular form tools. Myrna was happy to be a full-time housewife and mother again.

The HSS Circular Form tools were cylindrically ground, requiring lots of wheel changing and wheel dressing for every tool. You can see above how it is held in an automatic screw machine, forming one part as it cuts off the previous part. I also learned to grind flat form tools and

swing corner radii on a Pratt & Whitney Radius Grinder. After working two months part-time, Niagara offered me full-time work at a slightly higher rate plus an hour of overtime a day, so I left my swing shift job at the Chevy plant. Our younger son, Jon, was born in 1957, a year after I started work at Niagara.

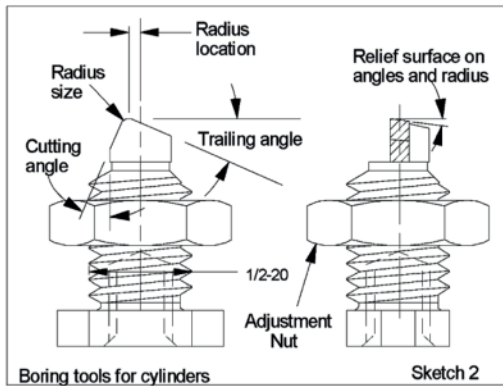


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ALAN'S EXPENSIVE RAIL DRILLS



But this extra hardness caused them to be brittle and have less torsional strength so the web shape is extremely thick, with shallow, short flutes. The Rail Drills solved the problem immediately...the hard armor drilling bottleneck was gone! (Rail Drills were developed for railroad tracks in the early 1900s.) The Rail Drills were run at a low RPM with a heavy feed rate, which I had observed at National, and the cutter grinders had no problem in regrinding the unusual split points. (My critics made sure that those boxes full of broken carbide drills disappeared overnight.)

About two months after the armor plate drilling had been in successful production with the Rail Drills, Tony, the lead cutter grinder, called me and said, "Alan, come quickly to the big radial, the lathe shop manager had me grind a Rail Drill split point on a regular HSS drill and he's going to prove that an ordinary HSS drill with that split point will work just as well, that we don't need Alan's expensive Rail Drills."

I rushed to the machine, and about ten people, including Bill Griffiths, the Chief Tool Engineer, were watching as the lathe shop manager replaced the 13/16 diameter taper shank Rail Drill with his modified regular HSS drill and started drilling the hard armor plate. The drill entered and sounded OK, but then it broke in the 1/4-inch thick hard plate, snapping with a frightening noise and sending drill pieces flying in several directions, but no one was cut. He disliked me more than ever.

After three to six months of testing them on various lathes I'd changed the steel cutting inserts in the lathe shop to a new carbide grade, with a new coating, which ran faster and lasted longer than their existing grades. Within a few years competitors had introduced their own new grades that competed with it but for about a year, it was "THE" industry grade for turning steel parts. (These inserts had upset the lathe shop manager.)

INTRODUCTION OF FORM TAPS

My third cost savings was the introduction of form taps, saving thousands of dollars in oversized threaded holes and broken taps. They had transmission housings stacked near the machines where they were drilled and tapped, with rejection tags because of oversized threads or broken taps. When I asked Bill Griffiths, the Chief Tool Engineer, if I could order some form taps in small sizes, he quickly replied... "No! Form taps are not approved in the H28 Handbook," which I'd never heard of. I found the H28 handbook, dog-eared and yellow, where Form Taps weren't mentioned. The H28 handbook on taps and threads was written by the Defense Department for World War II contractors before the introduction of form taps in the early 1950. With my supervisor's approval, I had FMC's Met-Labs run comparative tests, and they easily outperformed cut taps in aluminum. The Met-Labs engineers tapped 1/4-20 holes with both cut and form taps, then put a ground, heat-treated steel thread gauge in each hole and pulled on it until the threads in the aluminum part were stripped. It took 4100 pounds of tensile strength to strip the cut taps but it took 4350 pounds to strip the form tap threads, a 5% improvement. Yes, a bolt screwed into 1/4-20 threads in aluminum will lift a 4,000 pound car without stripping the threads! I still find that hard to believe.

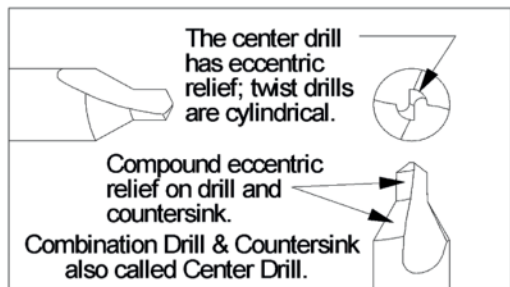
Shortly after the form taps were in production, and about 18 months before I left FMC, my boss frightened me by saying, "Bill Griffiths wants you in his office." Bill was a grouchy guy but he chatted pleasantly for a few minutes and then he asked, "Alan, if you scribed dimension lines on a steel part, and center punched holes at the intersections so small holes could be drilled, would



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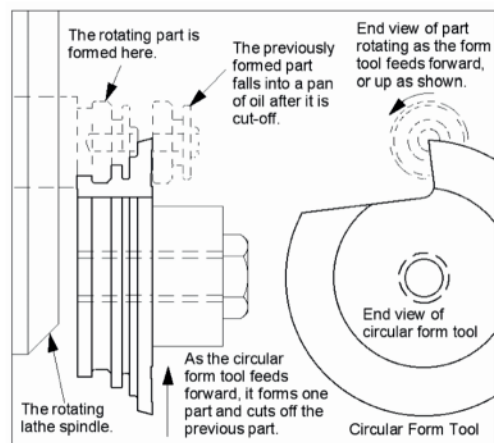


you use a regular drill or would you use a center drill first?" I responded quickly, saying, "A center drill will drill the holes on the spindle centerline, so a twist drill, with cylindrical margins, should be used to follow the punched dimples." Bill smiled and then he asked, "Why?" I told him "The center drill has eccentric radial relief on the diameter and it will bore a hole on the spindle centerline; it won't follow the punched holes." I got another big smile and he became quiet. As I walked back to my desk I was smiling

too because I'd asked several machinists the same questions to learn if they knew that center drills have eccentric relief on their diameters, causing them to bore new hole locations. Two weeks later I was shocked with a big promotion. I became Bill Griffith's Staff Engineer, with complete cutting tool responsibility in the 9,000-employee plant making the Bradley vehicles. My desk was next to Wes Hammond's desk, a smart, important person with 20 years experience who supported me in every way.

24 YEARS AND 9 DIFFERENT CUTTING TOOL JOBS

After 24 years and nine different cutting tool jobs I finally had a job I was sure I'd keep until retirement. FMC was busy with long term Bradley vehicle contracts, I was proud of my assignment, I loved my work and I was finally starting to qualify for some retirement income. I learned later why Bill had put me in charge of cutting tools, which he'd always managed himself. He had cancer and knew he'd be retiring soon, and he died two years later. I'm proud to have worked for Bill. He knew more about metal cutting, welding and forming than anyone I've known and Bill was second in political power only to "Snoopy" Taylor, the late President of FMC Ordnance, who will always be one of my heroes.



Tony, the lead cutter grinder at FMC, had shown me a problem he had with the HSS angle cutters they purchased to cut weld chamfers on the aluminum hull plates. See the next page. He told me he had contacted the manufacturer's representative and showed him how the high radial rake angle, at small diameters, was breakage-prone and resulted in limited regrind life. He showed me some more of those cutters in 1977, telling me again about the breakage problems he was having and telling me that he could not get any response from the cutter manufacturer, and Tony was angry. My mind was spinning...my only thought was, "I could make those cutters correctly if I had only a lathe, a mill, and a cutter grinder."

Those of you who have learned to turn, mill, and grind the HSS F-Dash cutters know how important some of the end grinds were. Some high-seniority employees may remember when making F-Dash cutters was about 30% of our business.

THE START OF AB TOOLS

In April of 1977, at age 49, Myrna and I signed a 10-year, \$30,000 second mortgage on our \$65,000 house and started AB Tools. (Based on inflation data our \$30K loan would be like \$124,000 today.) This was more traumatic for her than it was for me, but we both knew we'd be paying on a huge mortgage for ten years if I failed. I bought 4 small machines and a cheap comparator. I rented a 14' by 24' shop in Santa Clara for \$600 a month. I worked eight hours at FMC plus nights and weekends at my shop, getting small orders for specials through distributor friends.



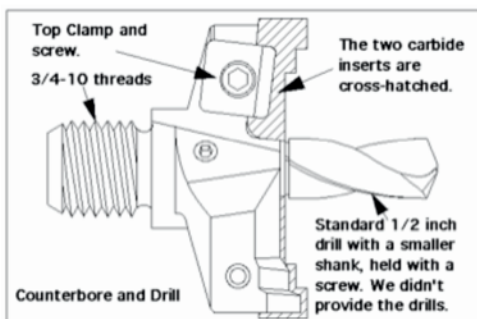
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During my one-year moonlighting period Myrna and I couldn't have made it without our two salaries, making it possible to start AB Tools in a good cash position. I worked both jobs for about a year and then resigned from FMC and worked full-time alone at AB Tools for about 10 months. When Myrna quit her school secretary job in 1981 she took her retirement money as a lump sum of \$3000, which we invested in AB Tools.

MY FIRST EMPLOYEE



In early 1979, I got a huge order for 200 special carbide insert-style counterbores for wood, shown below. David was happy at Robb-Jack, and Bob Eitrem, the majority owner, was happy with David's work. Jon was 21, operating a turret lathe in a small machine shop. After getting that big order, I asked Jon if he wanted to be my first employee, which he thought about for a week...a long, anxious week for me. Then Jon worked patiently with me from early 1979 until I retired in 2003. During the first few years there were many days when we didn't have enough

work, so I made sales calls on distributors and machine shops, with single page flyers.

Jon had three complaints at AB Tools, the first one being the lack of details on customers' drawings. Senior employees know that the flute shape and number of flutes are usually our decisions, not the customers'. It took Jon a while to accept this because in making machined parts, he knew every dimension with tolerances. His second frustration was with collets. We ground the shanks from center holes. Then we ground the corner radii by holding the shanks in a collet, but they were never concentric, so Jon asked if I could make a center device for the radius grinder. It evolved into the center devices we still use for grinding manually.

OUR NEW CENTER DEVICES

Jon's third frustration was the smeared floor finish he got when milling pockets with standard carbide-tipped keyseat cutters, which we bought. So, I ground side relief on some of those standard carbide keyseat cutters. Then he told me that a lot of the friends he'd worked with would be happy to buy carbide-tipped keyseat cutters with side relief from us, and he suggested that we print a flyer. I took pencil sketches to a print shop that was already using the early CAD software. Then I took those one-page flyers to distributors in the Bay area, after which we started getting orders for slotting cutters, mostly tipped at first, then solids, with side relief. About 25% of our business is still related to basic slotting and form cutters.

In addition to promoting our new center devices and suggesting ads for cutters with the side relief grind, Jon was more skilled at delegating than I was, so our management methods became more effective as the company has grown. David and Jon are both strong but caring managers.

PERSUADED TO MAKE ACCU-HOLD

In the early 90's Mike Stewart of Coast Tools persuaded us to make our first Accu-Hold because Hewlett Packard had a new 60,000 RPM machine they were unable to use because of eccentric extension holders. It was a long struggle and we finally found the right way to make them, the opposite of our methods. After inconsistent quality when another shop was honing the Accu-Holds we bought our first Sunnen hone. Since then several key employees have developed the skills and gaging methods to make sure our Accu-Holds are always concentric. We even sell some to competitors because CNC machine manufacturers often ship them as accessories. The Accu-Holds are now 10% of our sales.



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INTRODUCTION OF THE SHEAR-HOG

In about 1998, we developed our most successful product, the Shear-Hog. Based on our testing no other cutter has outperformed it in the cubic inches per minute of metal removal per HP, in aluminum. The Shear-Hog has two important features. The first is extreme sharpness and the other is ample chip-exit space. Jon still gets occasional phone calls from an excited machinist who wants to tell us how fast he is rough-milling aluminum. Reducing a customer's rough milling time from eight minutes to six minutes is a real savings, with no off-setting costs. Our inserts are expensive but with .030 to .040 thick chips, the insert life is exceptional.

THE MOST IMPORTANT THING THAT HAPPENS

My job jumping was personally embarrassing. Having nine employers in 24 years is hardly something to brag about, but having so many jobs gave me a broad knowledge of the manufacture and application of cutting tools, plus...business, marketing and getting along well with others.

This is enough about how AB Tools happened. What is the most important thing that happens here every day, now? The dollar amount of new orders? The dollar amount of cutters shipped that day? Getting a raise? Getting a new customer? Having a record sales month? The most important thing that happens here every day is when you are grinding or inspecting the relief and rake surfaces on a cutter. IF those two surfaces aren't perfect, and concentric, some customer will be unhappy.

Our final inspections might miss something that only the finish grinder or the inspector knows. What if one flute is .002 higher, or lower than the others...the person inspecting the tool could easily miss it.

We won't be angry if you discuss an error, but we'll be angry if we learn about the error from a customer.

Most of you have learned that if there is a bad dimension on a cutter, such as a .250 cut width being only .2493, this needs to be discussed and if the scrap versus ship-as-is decision reaches Jon's desk he will try to get customer approval before deciding whether to ship it or start over. With each of you inspecting another person's work, instead of one inspector measuring every tool, this makes all of us more tolerant, since we all make mistakes. If there is a question or a problem...talk about it, now.

We'll continue to be strict about attendance, punctuality and stretching our break times. My only proverb is, "**Boredom is more tiring than hard work.**" You've learned that the clock goes faster when you're working hard.

We've needed and tried to keep our skilled, loyal employees with bonuses, health care, dental care, and our profit-sharing plan, which now totals \$3.3 million. As owners, Myrna and I never took any of the company profit, which has been used only for new machines, bonuses and profit sharing.

If you're expecting some personal advice from the old man...

Eat less, exercise more, work hard, make friends and save 10% of every paycheck.



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GENERAL MILLING SPEEDS & FEEDS*

Part Material	SFM	IPT^
Aluminum	1000	.00025-.006
Aluminum (gummy)	750	.00025-.003
Cast Aluminum	750	.00025-.006
Plastics	1400	.00025-.006
Brass	750	.00025-.006
Copper	600	.00025-.006
Fiberglass	1000	.00025-.006
Composite	800	.00025-.003
Tool Steel	180	.0001-.0015
Mild Steel 1018	350	.00025-.003
Stainless Steel 304	225	.00025-.003
Stainless Steel 303	500	.00025-.003
Hardened Steel	60	.00025-.003
Titanium 6AL4V	125	.00025-.003
High Temp Alloy	60	.00025-.003

* For Specific materials, series of cutters,
or more cutting information:
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^ For Thin or Weak necked cutters use
lower IPT to start.

SPEED & FEED CALCULATIONS

$$\text{RPM} = (\text{SFM} \times 3.82) \div \text{Dia}$$

$$\text{SFM} = \text{RPM} \times .262 \times \text{Dia}$$

$$\text{Chip load/tooth} = \text{in/Min} \div \# \text{ of Teeth} \div \text{RPM}$$

$$\text{Feedrate} = \text{Chip Load/Tooth} \times \# \text{ of Teeth} \times \text{RPM}$$

$$\text{Cubic inches/min} = \text{R-Woc} \times \text{A-Doc} \times \text{in/Min}$$

Regrinds/Resharpens made by A.B. Tools Inc. must be returned for inspection and quoting. Please include necessary paperwork or PO & return to the address below.

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