

CATALOG  
128

# MICRO 100<sup>®</sup>

super carbide tools

MICRO 100



MADE IN USA

CATALOG 128



INTERNATIONALLY ACCLAIMED



MICRO 100

# **MICRO 100<sup>®</sup>**

## **super carbide**

### **MICRO-GRAIN CARBIDE + PLUS!**

**MICRO 100** is more than just a micro-grain carbide of excellent quality. It is in a class of its own, resulting from the exclusive Micro 100 treating process.

**MICRO 100** is a space age carbide with superior rupture strength for exceptional machining versatility.

**MICRO 100** is highly shock resistant, it will not chip or break under normal machining conditions and is unexcelled in interrupted cutting.

**MICRO 100** considerably prolongs tool life in machining all hard stainless steels, efficiently performs in exotic metals.

**MICRO 100** cuts tool steels that are heat treated, eliminating costly annealing.

**MICRO 100** provides for vastly increased speed and feed rates in cutting aluminum, copper, stainless steels, high temperature alloys, thermoplastics and composites used in the aircraft industry.

**MICRO 100** lets you rely on just one grade of carbide for machining most metals better and faster.

**MICRO 100** is internationally acclaimed by the leaders in industry.

Specifications and prices subject to change without notice.

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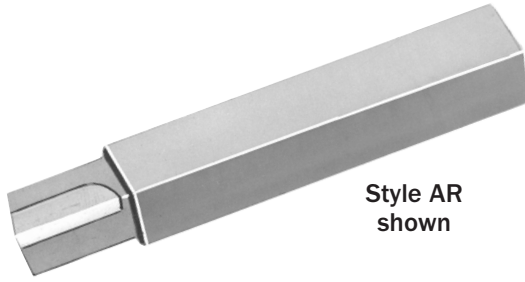
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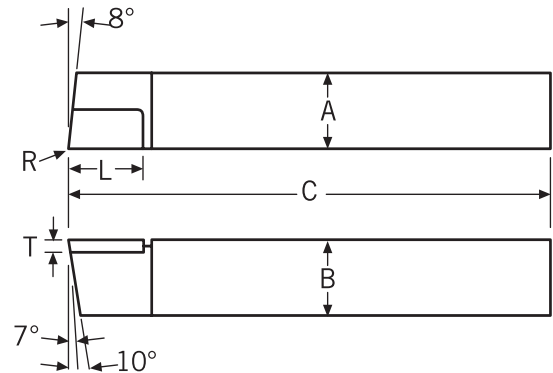
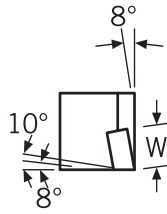
# STANDARD BRAZED TOOLS



## Style AR and AL

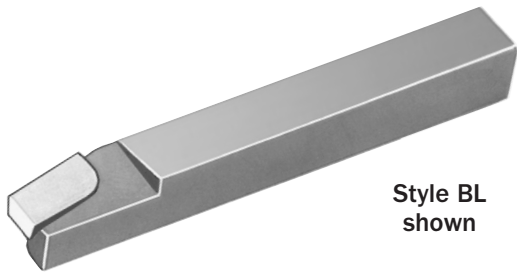


Style AR shown

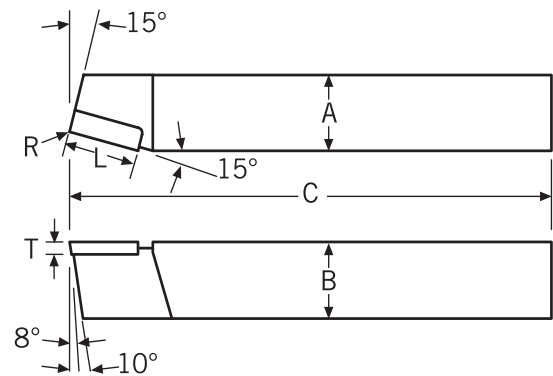
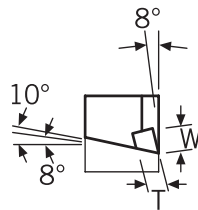


RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	DIMENSIONS							QUANTITY - PRICE EACH				
		SHANK			TIP				1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
		A	B	C	T	W	L	R					
AR-4	AL-4	1/4	1/4	2	1/16	3/16	1/4	1/64	10.50	9.50	8.50	8.00	7.50
AR-5	AL-5	5/16	5/16	2-1/4	1/16	1/4	5/16	1/64	10.70	9.70	8.70	8.20	7.70
AR-6	AL-6	3/8	3/8	2-1/2	1/8	1/4	3/8	1/64	11.15	10.15	9.15	8.65	8.15
AR-7	AL-7	7/16	7/16	3	1/8	1/4	7/16	1/32	11.55	10.55	9.55	9.05	8.55
AR-8	AL-8	1/2	1/2	3-1/2	1/8	1/4	1/2	1/32	11.80	10.80	9.80	9.30	8.80
AR-10	AL-10	5/8	5/8	4	5/32	3/8	5/8	1/32	19.25	18.25	17.25	16.75	16.25
AR-12	AL-12	3/4	3/4	4-1/2	3/16	7/16	3/4	1/32	25.70	24.70	23.70	23.20	22.70

## Style BR and BL



Style BL shown

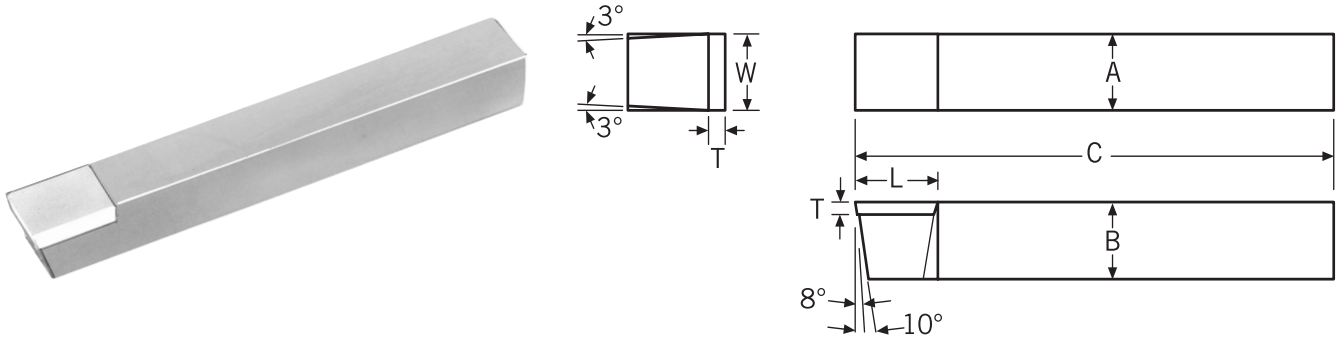


RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	DIMENSIONS							QUANTITY - PRICE EACH				
		SHANK			TIP				1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
		A	B	C	T	W	L	R					
BR-6	BL-6	3/8	3/8	2-1/2	1/8	1/4	1/2	1/64	11.30	10.30	9.30	8.80	8.30
BR-7	BL-7	7/16	7/16	3	1/8	1/4	1/2	1/32	11.80	10.80	9.80	9.30	8.80
BR-8	BL-8	1/2	1/2	3-1/2	1/8	1/4	5/8	1/32	12.30	11.30	10.30	9.80	9.30
BR-10	BL-10	5/8	5/8	4	5/32	3/8	3/4	1/32	19.75	18.75	17.75	17.25	16.75
BR-12	BL-12	3/4	3/4	4-1/2	3/16	7/16	13/16	1/32	25.95	24.95	23.95	23.45	22.95

# STANDARD BRAZED TOOLS

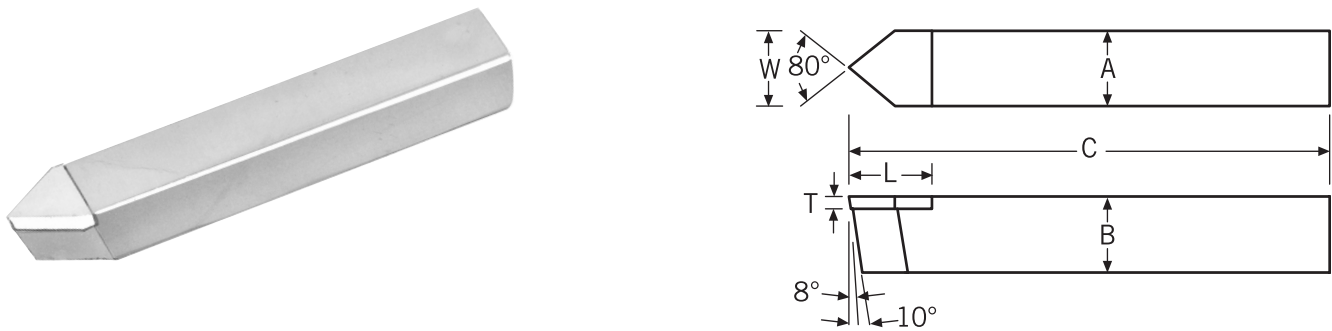


## Style C



TOOL NO.	DIMENSIONS						QUANTITY – PRICE EACH				
	SHANK			TIP			1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
	A	B	C	T	W	L					
C-4	1/4	1/4	2	1/16	1/4	1/4	10.70	9.70	8.70	8.20	7.70
C-5	5/16	5/16	2-1/4	1/16	5/16	5/16	11.30	10.30	9.30	8.80	8.30
C-6	3/8	3/8	2-1/2	1/8	3/8	3/8	11.65	10.65	9.65	9.15	8.65
C-7	7/16	7/16	3	1/8	7/16	7/16	11.80	10.80	9.80	9.30	8.80
C-8	1/2	1/2	3-1/2	1/8	1/2	1/2	12.20	11.20	10.20	9.70	9.20
C-10	5/8	5/8	4	5/32	5/8	5/8	21.50	20.50	19.50	19.00	18.50
C-12	3/4	3/4	4-1/2	3/16	3/4	3/4	26.60	25.60	24.60	24.10	23.60

## Style D



TOOL NO.	DIMENSIONS						QUANTITY – PRICE EACH				
	SHANK			TIP			1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
	A	B	C	T	W	L					
D-4	3/8	3/8	2-1/2	1/8	3/8	1/2	10.50	9.50	8.50	8.00	7.50
D-5	7/16	7/16	3	1/8	7/16	1/2	10.95	9.95	8.95	8.45	7.95
D-6	1/2	1/2	3-1/2	1/8	1/2	5/8	11.40	10.40	9.40	8.90	8.40
D-7	5/8	5/8	4	5/32	5/8	3/4	11.60	10.60	9.60	9.10	8.60
D-8	3/4	3/4	4-1/2	3/16	3/4	13/16	11.80	10.80	9.80	9.30	8.80
D-10	5/8	5/8	4	5/32	5/8	5/8	19.20	18.20	17.20	16.70	16.20
D-12	3/4	3/4	4-1/2	3/16	3/4	13/16	24.90	23.90	22.90	22.40	21.90



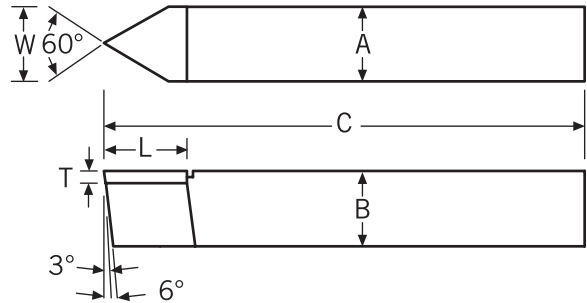
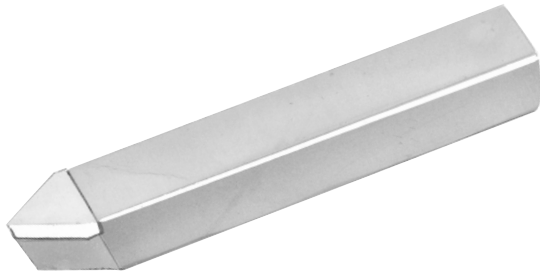
super carbide tools



# STANDARD BRAZED TOOLS

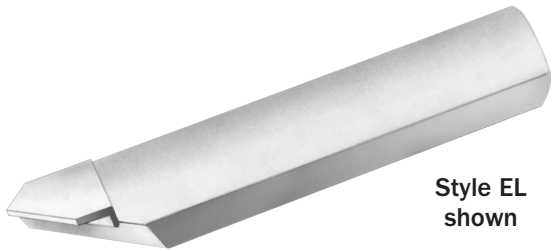


## Style E

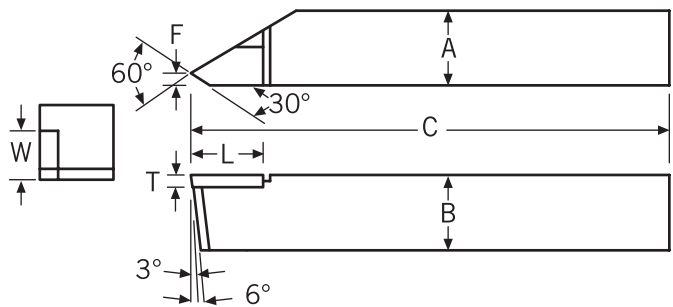


TOOL NO.	DIMENSIONS						QUANTITY - PRICE EACH				
	SHANK			TIP			1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
	A	B	C	T	W	L					
E-5	5/16	5/16	2-1/4	3/32	5/16	3/8	10.95	9.95	8.95	8.45	7.95
E-6	3/8	3/8	2-1/2	3/32	3/8	1/2	11.40	10.40	9.40	8.90	8.40
E-8	1/2	1/2	3-1/2	1/8	1/2	1/2	11.85	10.85	9.85	9.35	8.85
E-10	5/8	5/8	4	5/32	5/8	5/8	19.20	18.20	17.20	16.70	16.20
E-12	3/4	3/4	4-1/2	3/16	3/4	3/4	23.80	22.80	21.80	21.30	20.80

## Style ER and EL



Style EL shown

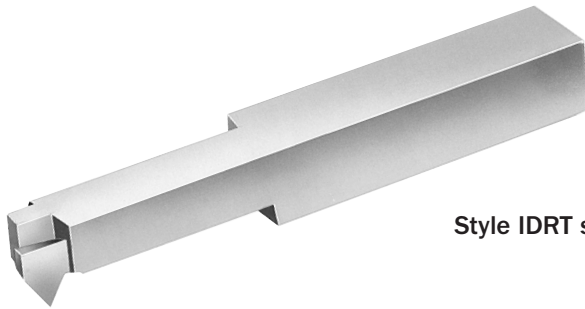


RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	DIMENSIONS								QUANTITY - PRICE EACH				
		SHANK			TIP					1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
		A	B	C	F	T	W	L						
ER-5	EL-5	3/8	3/8	2-1/2	1/16	1/8	1/4	1/2	11.80	10.80	9.80	9.30	8.80	
ER-6	EL-6	7/16	7/16	3	1/16	1/8	1/4	1/2	12.15	11.15	10.15	9.65	9.15	
ER-8	EL-8	1/2	1/2	3-1/2	3/32	1/8	1/4	5/8	13.35	12.35	11.35	10.85	10.35	
ER-10	EL-10	5/8	5/8	4	3/32	5/32	5/32	3/4	18.65	17.65	16.65	16.15	15.65	
ER-12	EL-12	3/4	3/4	4-1/2	1/8	3/16	13/16	13/16	22.80	21.80	20.80	20.30	19.80	

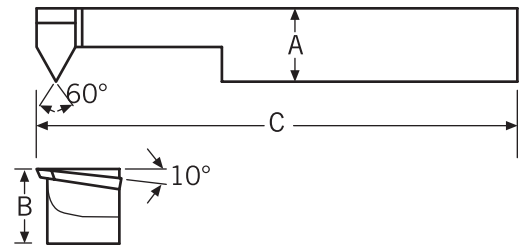
# STANDARD BRAZED TOOLS



## Styles IDRT and IDLT

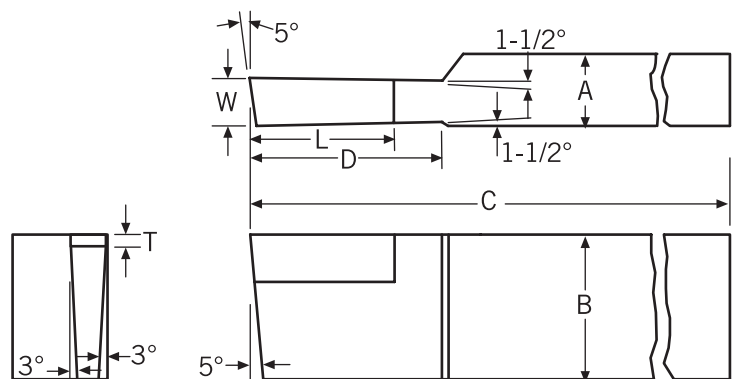


Style IDRT shown



RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	DIMENSIONS					QUANTITY – PRICE EACH				
		SHANK			MIN. THREAD DIA.	NECK LENGTH	1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
		A	B	C							
IDRT-60	IDLT-60	3/8	3/8	2-1/2	.450	0.500	22.25	21.25	20.25	19.75	19.25
IDRT-61	IDLT-61	3/8	3/8	2-1/2	.450	1.000	22.25	21.25	20.25	19.75	19.25
IDRT-80	IDLT-80	1/2	1/2	3-1/2	.575	0.750	23.60	22.60	21.60	21.10	20.60
IDRT-81	IDLT-81	1/2	1/2	3-1/2	.575	1.250	23.60	22.60	21.60	21.10	20.60

## Style CT



TOOL NO.	DIMENSIONS							QUANTITY – PRICE EACH				
	SHANK				TIP			1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
	A	B	C	D	T	W	L					
CT-122	5/16	1	2-1/4	2-1/4	3/32	5/16	3/8	22.50	21.50	20.50	20.00	19.50
CT-120	3/8	1	2-1/2	2-1/2	3/32	3/8	1/2	23.30	22.30	21.30	20.80	20.30
CT-121	1/2	1	3-1/2	3-1/2	1/8	1/8	1/2	23.10	22.10	21.10	20.60	20.10
CT-130	5/8	1-1/4	4	4	5/32	5/8	5/8	29.85	28.85	27.85	27.35	26.85
CT-140	3/4	1-1/2	4-1/2	4-1/2	3/16	3/4	3/4	36.15	35.15	34.15	33.65	33.15

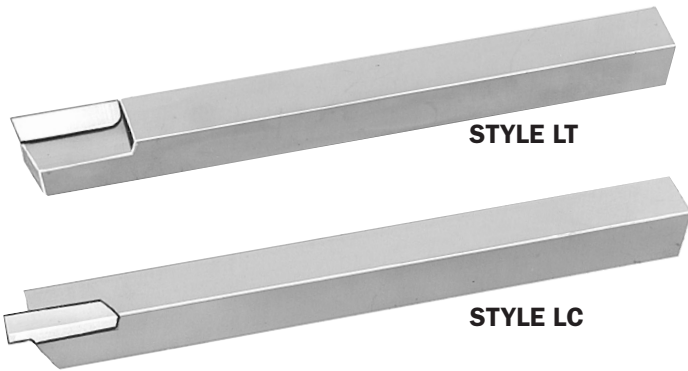


super carbide tools

# BRAZED SCREW MACHINE TOOLS



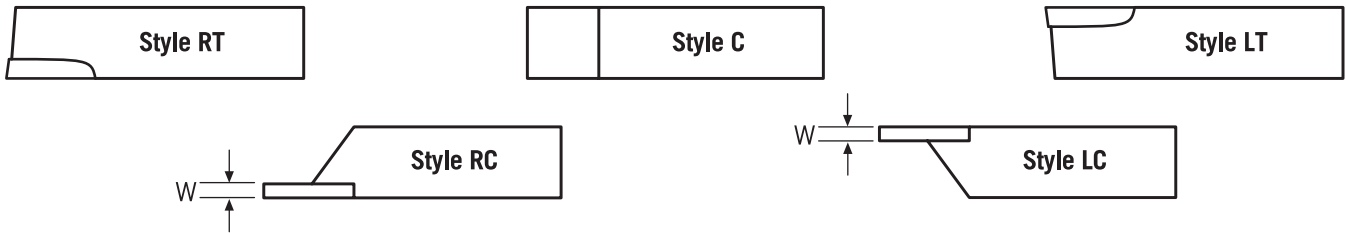
## Turning, Forming, & Cut-Off Right & Left Hand



All tools are ground with the required clearance angles.

Price: In quantities of 12 pieces per size and per style. For fewer number of pieces add \$.75 each.

CUT-OFF TOOLS: Carbide protrusion = 3 times thickness specified. Tolerance on thickness +.000 -.010".



**Priced in quantities of 12 pieces per size and per style. For fewer number of pieces add \$.75 each.**

Tool Description		*1/4" Square Shank 6" Long, <b>\$11.10 ea.</b>		9/32" Square Shank 6" Long, <b>\$11.65 ea.</b>		5/16" Square Shank 6" Long, <b>\$11.65 ea.</b>	
TYPE	WIDTH W	RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.
TURNING		RT-250	LT-250	RT-281	LT-281	RT-312	LT-312
FORMING		C -250	C -250	C -281	C -281	C -312	C -312
CUT-OFF	.040"	RC-250040	LC-250040	RC-281040	LC-281040	RC-312040	LC-312040
CUT-OFF	.060"	RC-250060	LC-250060	RC-281060	LC-281060	RC-312060	LC-312060
CUT-OFF	.080"	—	—	RC-281080	LC-281080	RC-312080	LC-312080
CUT-OFF	.100"	—	—	RC-281100	LC-281100	RC-312100	LC-312100

\*Ground to 6 mm square shank.

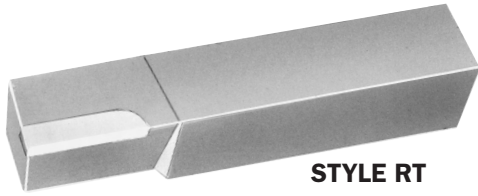
**Priced in quantities of 12 pieces per size and per style. For fewer number of pieces add \$.75 each.**

Tool Description		3/8" Square Shank 6" Long, <b>\$11.85 ea.</b>		7/16" Square Shank 6" Long, <b>\$14.90 ea.</b>		1/2" Square Shank 6" Long, <b>\$15.30 ea.</b>	
TYPE	WIDTH W	RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.
TURNING		RT-375	LT-375	RT-437	LT-437	RT-500	LT-500
FORMING		C -375	C -375	C -437	C -437	C -500	C -500
CUT-OFF	.040"	RC-375040	LC-375040	—	—	—	—
CUT-OFF	.060"	RC-375060	LC-375060	RC-437060	LC-437060	RC-500060	LC-500060
CUT-OFF	.080"	RC-375080	LC-375080	RC-437080	LC-437080	RC-500080	LC-500080
CUT-OFF	.100"	RC-375100	LC-375100	RC-437100	LC-437100	RC-500100	LC-500100
CUT-OFF	.120"	RC-375120	LC-375120	RC-437120	LC-437120	RC-500120	LC-500120

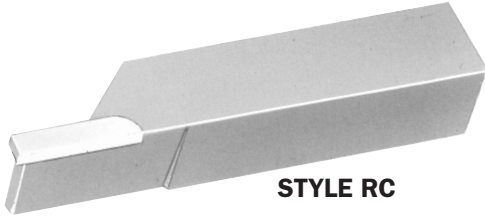
# BRAZED SCREW MACHINE TOOLS



## Turning, Forming, & Cut-Off, for CNC Screw Machines Right & Left Hand



STYLE RT



STYLE RC

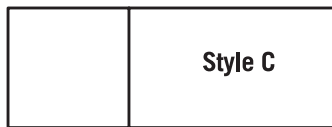
All tools are ground with the required clearance angles.

Price: In quantities of 12 pieces per size and per style. For fewer number of pieces add \$.75 each.

CUT-OFF TOOLS: Carbide protrusion = 3 times thickness specified, 3/8" maximum. Tolerance on thickness +.000 -.010".



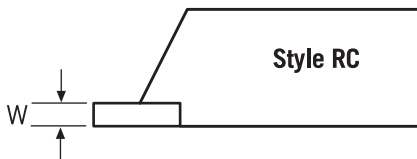
Style RT



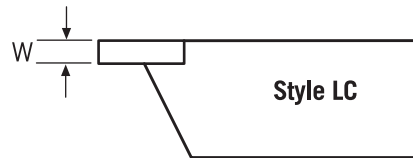
Style C



Style LT



Style RC



Style LC

Priced in quantities of 12 pieces per size and per style. For fewer number of pieces add \$.75 each.

Tool Description		5/8" Square Shank 4" Long, \$20.15 ea.		3/4" Square Shank 4" Long, \$23.65 ea.	
TYPE	WIDTH W	RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.
TURNING		RT-625	LT-625	RT-750	LT-750
FORMING		C -625	C -625	C -750	C -750
CUT-OFF	.060"	RC-625060	LC-625060	RC-750060	LC-750060
CUT-OFF	.080"	RC-625080	LC-625080	RC-750080	LC-750080
CUT-OFF	.100"	RC-625100	LC-625100	RC-750100	LC-750100
CUT-OFF	.125"	RC-625125	LC-625125	RC-750125	LC-750125
CUT-OFF	.187"	RC-625187	LC-625187	RC-750187	LC-750187

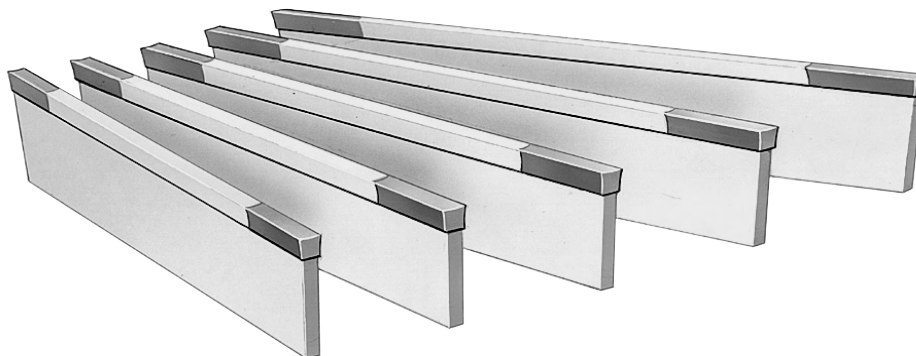


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# BRAZED CUT-OFF BLADES

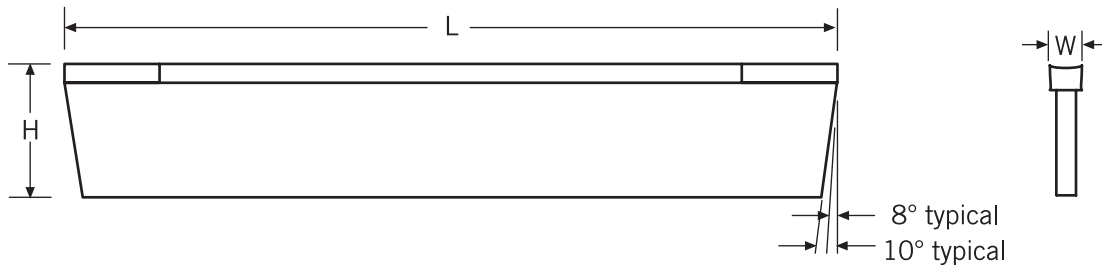


## Double End "T" Blades for Double Performance



Hardened and precision ground steel blades

Tips are hollow ground all over for longer tool life



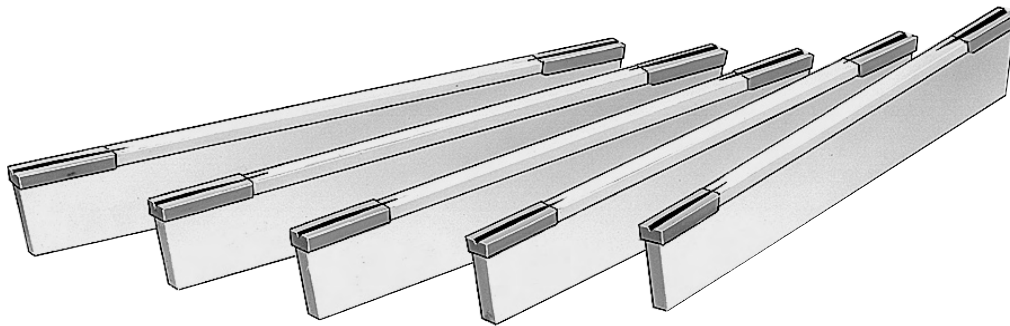
"T" styled over entire blade length to fit all "T" type holders

TOOL NUMBER	DIMENSIONS			QUANTITY – PRICE EACH				
	W	H	L	1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
T-100	1/16	1/2	4-1/2	41.25	39.75	38.25	37.25	36.25
T-101	5/64			41.25	39.75	38.25	37.25	36.25
T-102	3/32			39.70	38.20	36.70	35.70	34.70
T-103	1/8			39.70	38.20	36.70	35.70	34.70
T-104	3/32	11/16	5	44.30	42.80	41.30	40.30	39.30
T-105	1/8							
T-106	5/32							
T-107	3/16							
T-108	1/8	3/4	5	46.10	44.60	43.10	42.10	41.10
T-109	5/32							
T-110	3/16							
T-111	1/8	7/8	6	47.95	46.45	44.95	43.95	42.95
T-112	5/32							
T-113	3/16							
T-115	1/8	1-1/8	6	54.70	53.20	51.70	50.70	49.70
T-116	3/16							

# BRAZED CUT-OFF BLADES

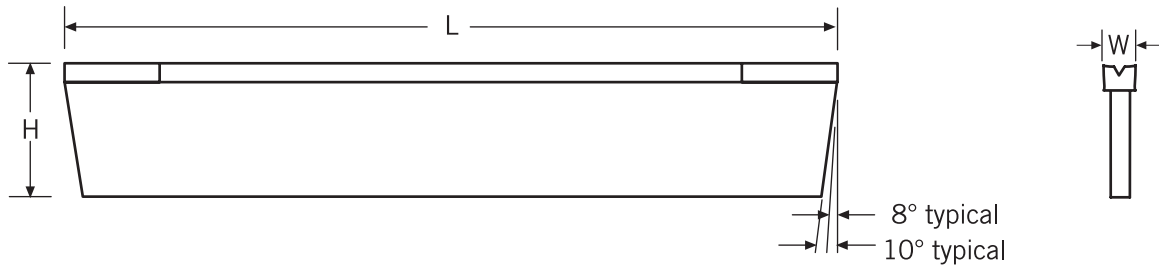


## Double End "T" Blades for Double Performance with V-Groove



Hardened and precision ground steel blades

Tips are hollow ground all over for longer tool life



"T" styled over entire blade length to fit all "T" type holders

TOOL NUMBER	DIMENSIONS			QUANTITY – PRICE EACH				
	W	H	L	1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
T-100-V	1/16			47.30	45.80	44.30	43.30	42.30
T-101-V	5/64	1/2	4-1/2	47.30	45.80	44.30	43.30	42.30
T-102-V	3/32			45.40	43.90	42.40	41.40	40.40
T-103-V	1/8			45.40	43.90	42.40	41.40	40.40
T-104-V	3/32							
T-105-V	1/8	11/16	5	50.05	48.55	47.05	46.05	45.05
T-106-V	5/32							
T-107-V	3/16							
T-108-V	1/8							
T-109-V	5/32	3/4	5	51.95	50.45	48.95	47.95	46.95
T-110-V	3/16							
T-111-V	1/8							
T-112-V	5/32	7/8	6	53.75	52.25	50.75	49.75	48.75
T-113-V	3/16							
T-115-V	1/8	1-1/8	6	60.45	58.95	57.45	56.45	55.45
T-116-V	3/16							



super carbide tools

# BRAZED CUT-OFF BLADES

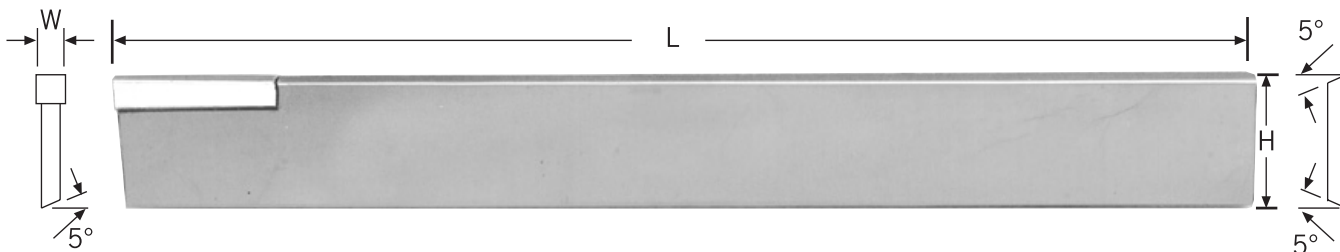


**For Brown & Sharpe Automatics, P & W Holders,  
and Dovetail Slot Holders**

## Hardened Steel Blades

### Style CR

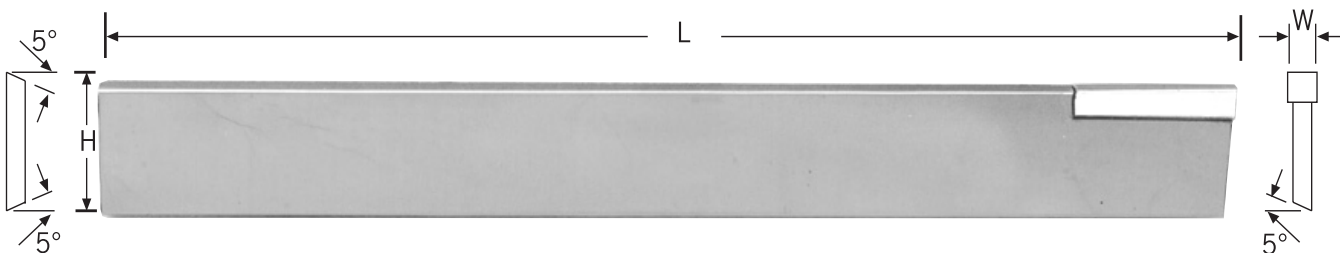
For: Vertical Slide — Backward L.H.  
Back Slide — High Back R.H.  
Front Slide — Low Front R.H.



Tips are hollow ground all over for improved chip control

### Style CL

For: Vertical Slide — Forward R.H.  
Back Slide — Low Back L.H.  
Front Slide — High Front L.H.

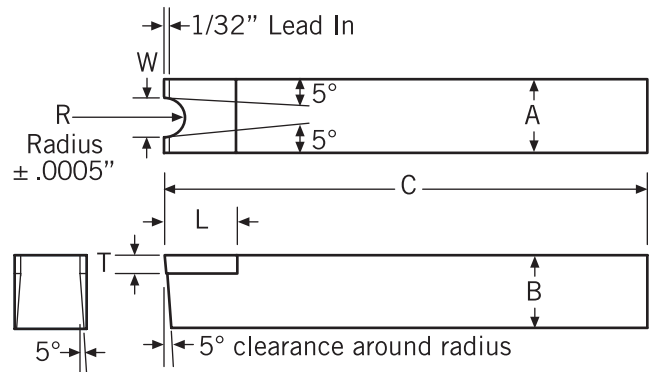
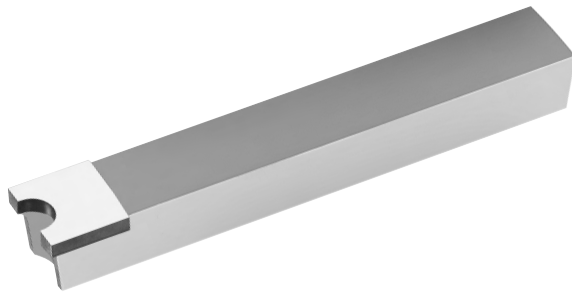


RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	DIMENSIONS			QUANTITY — PRICE EACH				
		W	H	L	1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
CR-101	CL-101	5/64			33.50	32.00	30.50	29.50	28.50
CR-102	CL-102	3/32	1/2	4-1/2	32.20	30.70	29.20	28.20	27.20
CR-103	CL-103	1/8			32.20	30.70	29.20	28.20	27.20
CR-104	CL-104	3/32			35.05	33.55	32.05	31.05	30.05
CR-105	CL-105	1/8	11/16	5					
CR-106	CL-106	5/32							
CR-107	CL-107	3/16							
CR-108	CL-108	3/32			38.10	36.60	35.10	34.10	33.10
CR-109	CL-109	1/8	13/16	6					
CR-110	CL-110	5/32							
CR-111	CL-111	3/16							
CR-113	CL-113	3/32			41.00	39.50	38.00	37.00	36.00
CR-114	CL-114	1/8	1	6					
CR-115	—	3/16							

# BRAZED RADIUS TOOLS

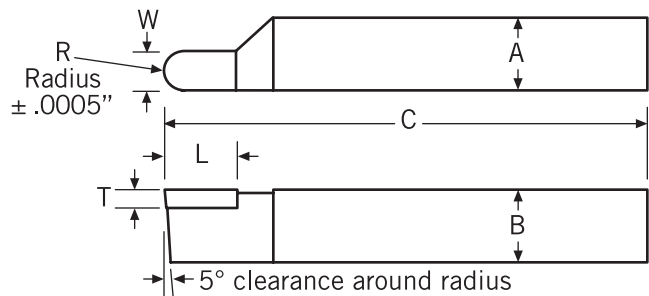
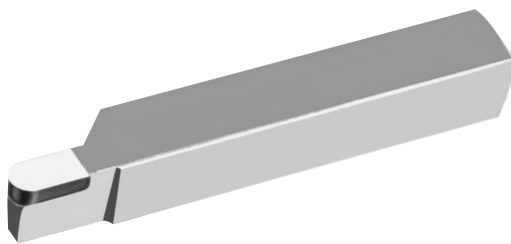


## Full Radius Concave



TOOL NUMBER	DIMENSIONS							PRICE EACH
	SHANK			TIP				
	A	B	C	T	W	L	R	
<b>CRT-1</b>	3/8	3/8	2-1/2	3/32	1/16	3/8	1/32	<b>35.55</b>
<b>CRT-2</b>	3/8	3/8	2-1/2	3/32	1/8	3/8	1/16	<b>35.55</b>
<b>CRT-3</b>	3/8	3/8	2-1/2	3/32	3/16	3/8	3/32	<b>35.55</b>
<b>CRT-4</b>	1/2	1/2	3-1/2	1/8	1/4	1/2	1/8	<b>38.60</b>
<b>CRT-6</b>	1/2	1/2	3-1/2	1/8	3/8	1/2	3/16	<b>38.60</b>
<b>CRT-8</b>	3/4	3/4	4-1/2	3/16	1/2	3/4	1/4	<b>43.45</b>

## Full Radius Convex



TOOL NUMBER	DIMENSIONS							PRICE EACH
	SHANK			TIP				
	A	B	C	T	W	L	R	
<b>FRT-1</b>	3/8	3/8	2-1/2	3/32	1/16	3/8	1/32	<b>35.20</b>
<b>FRT-2</b>					1/8		1/16	
<b>FRT-3</b>					3/16		3/32	
<b>FRT-4</b>	3/8	3/8	2-1/2	3/32	1/4	3/8	1/8	<b>35.20</b>
<b>FRT-5</b>	3/8	3/8	2-1/2	3/32	5/16	3/8	5/32	<b>35.20</b>
<b>FRT-6</b>	1/2	1/2	3-1/2	1/8	3/8	1/2	3/16	<b>38.25</b>
<b>FRT-8</b>	1/2	1/2	3-1/2	1/8	1/2	1/2	1/4	<b>38.25</b>
<b>FRT-10</b>	5/8	5/8	4	5/32	5/8	5/8	5/16	<b>40.70</b>
<b>FRT-12</b>	3/4	3/4	4-1/2	3/16	3/4	3/4	3/8	<b>43.05</b>





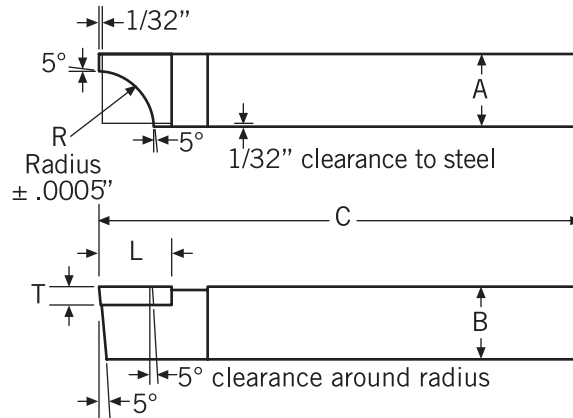
# BRAZED RADIUS TOOLS



## Concave Radius



Style RAD shown



RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	DIMENSIONS						PRICE EACH
		SHANK			TIP			
		A	B	C	T	L	R	
RAD-1 RAD-2 RAD-3 RAD-4	RAL-1 RAL-2 RAL-3 RAL-4	3/8	3/8	2-1/2	3/32	3/8	1/32 1/16 3/32 1/8	32.25
RAD-5 RAD-6 RAD-7 RAD-8	RAL-5 RAL-6 RAL-7 RAL-8	3/8	3/8	2-1/2	3/32	3/8	5/32 3/16 7/32 1/4	32.25
RAD-9 RAD-10 RAD-11 RAD-12	RAL-9 RAL-10 RAL-11 RAL-12	1/2	1/2	3-1/2	1/8	1/2	9/32 5/16 11/32 3/8	35.05
RAD-13 RAD-14 RAD-15 RAD-16	RAL-13 RAL-14 RAL-15 RAL-16	3/4	3/4	4-1/2	3/16	3/4	13/32 7/16 15/32 1/2	39.50
RAD-21 RAD-22 RAD-23 RAD-24	RAL-21 RAL-22 RAL-23 RAL-24	Set of 4: 1/16, 1/8, 1/4, 3/8 radius *Set of 8: 1/32 to 1/4 radius in 1/32 increments Set of 8: 1/16 to 1/2 radius in 1/16 increments Set of 16: 1/32 to 1/2 radius in 1/32 increments						124.90 243.65 254.80 498.50

\*All 3/8" square shanks, ideal for use on chucks.

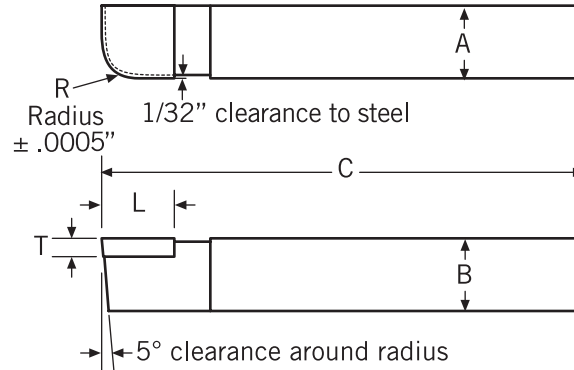
# BRAZED RADIUS TOOLS



## Convex Radius



Style RXD shown



RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	DIMENSIONS						PRICE EACH
		SHANK			TIP			
		A	B	C	T	L	R	
RXD-1 RXD-2 RXD-3 RXD-4	RXL-1 RXL-2 RXL-3 RXL-4	3/8	3/8	2-1/2	3/32	3/8	1/32 1/16 3/32 1/8	32.25
RXD-5 RXD-6 RXD-7 RXD-8	RXL-5 RXL-6 RXL-7 RXL-8	3/8	3/8	2-1/2	3/32	3/8	5/32 3/16 7/32 1/4	32.25
RXD-9 RXD-10 RXD-11 RXD-12	RXL-9 RXL-10 RXL-11 RXL-12	1/2	1/2	3-1/2	1/8	1/2	9/32 5/16 11/32 3/8	35.05
RXD-13 RXD-14 RXD-15 RXD-16	RXL-13 RXL-14 RXL-15 RXL-16	3/4	3/4	4-1/2	3/16	3/4	13/32 7/16 15/32 1/2	39.50
RXD-21 RXD-22 RXD-23 RXD-24	RXL-21 RXL-22 RXL-23 RXL-24	Set of 4: 1/16, 1/8, 1/4, 3/8 radius *Set of 8: 1/32 to 1/4 radius in 1/32 increments Set of 8: 1/16 to 1/2 radius in 1/16 increments Set of 16: 1/32 to 1/2 radius in 1/32 increments						124.90 243.65 254.80 498.50

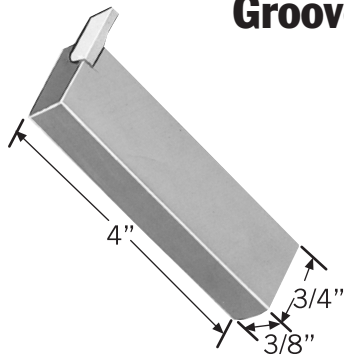
\*All 3/8" square shanks, ideal for use on chuckers.



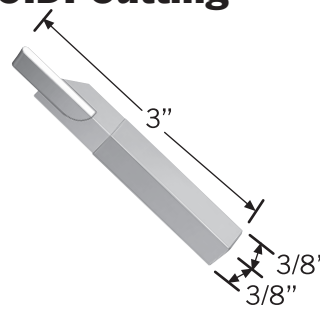
# BRAZED GROOVE TOOLS



## Groove, Relief, and O.D. Cutting



Style GR



Style GS

TOOL NUMBER		GROOVE WIDTH	RADIUS	MAXIMUM DEPTH OF CUT	PRICE EACH
STYLE GR	STYLE GS				
GR-012002	GS-012002	.012/.014	.003 max.	.030	21.00
GR-012F	GS-012F	.012/.014	Full	.030	24.30
GR-018002	GS-018002	.018/.020	.003 max.	.060	21.00
GR-018F	GS-018F	.018/.020	Full	.060	24.30
GR-022002	GS-022002	.022/.024	.003 max.	.090	21.00
GR-022F	GS-022F	.022/.024	Full	.090	24.30
GR-028002	GS-028002	.028/.030	.003 max.	.090	21.00
GR-028F	GS-028F	.028/.030	Full	.090	24.30
GR-038002	GS-038002	.038/.040	.003 max.	.120	21.00
GR-038F	GS-038F	.038/.040	Full	.120	24.30
GR-040002	GS-040002	.040/.042	.003 max.	.150	21.00
GR-040F	GS-040F	.040/.042	Full	.150	24.30
GR-046002	GS-046002	.046/.048	.003 max.	.150	21.00
GR-046F	GS-046F	.046/.048	Full	.150	24.30
GR-054002	GS-054002	.054/.056	.003 max.	.180	21.00
GR-054F	GS-054F	.054/.056	Full	.180	24.30
GR-060002	GS-060002	.060/.062	.003 max.	.210	21.00
GR-060F	GS-060F	.060/.062	Full	.210	24.30
GR-068002	GS-068002	.068/.070	.003 max.	.210	21.00
GR-068F	GS-068F	.068/.070	Full	.210	24.30
GR-072002	GS-072002	.072/.074	.003 max.	.240	21.00
GR-072F	GS-072F	.072/.074	Full	.240	24.30
GR-080002	GS-080002	.080/.082	.003 max.	.270	21.00
GR-080F	GS-080F	.080/.082	Full	.270	24.30
GR-086002	GS-086002	.086/.088	.003 max.	.270	21.00
GR-086F	GS-086F	.086/.088	Full	.270	24.30
GR-090002	GS-090002	.090/.092	.003 max.	.300	21.00
GR-090F	GS-090F	.090/.092	Full	.300	24.30
GR-096002	GS-096002	.096/.098	.003 max.	.300	21.00
GR-096F	GS-096F	.096/.098	Full	.300	24.30
GR-102002	GS-102002	.102/.104	.003 max.	.400	21.00
GR-102F	GS-102F	.102/.104	Full	.400	24.30
GR-114002	GS-114002	.114/.116	.003 max.	.400	21.00
GR-114F	GS-114F	.114/.116	Full	.400	24.30
GR-120002	GS-120002	.120/.122	.003 max.	.400	21.00
GR-120F	GS-120F	.120/.122	Full	.400	24.30
GR-122002	GS-122002	.122/.124	.003 max.	.400	21.00
GR-122F	GS-122F	.122/.124	Full	.400	24.30

Other widths and/or radii also available

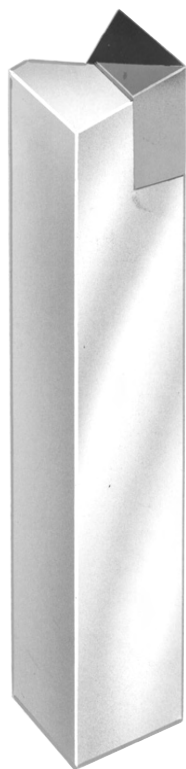
# BRAZED BOX-TURNING TOOLS



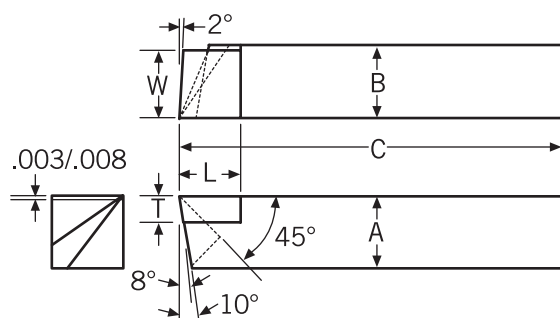
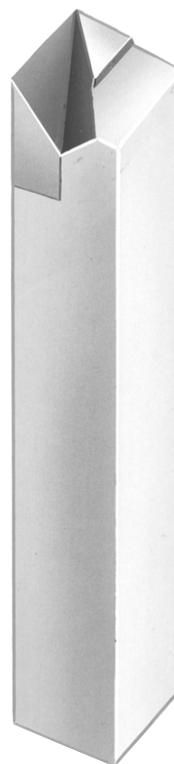
For Box-Turning up to 5/8" Depth per Pass

Regrinding quoted upon request.

Style BT shown



Hardened Shanks

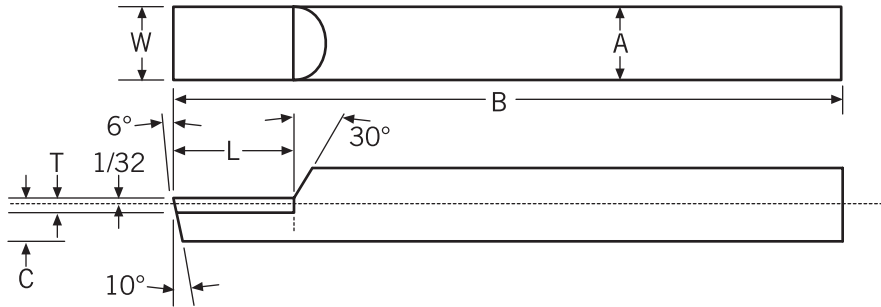
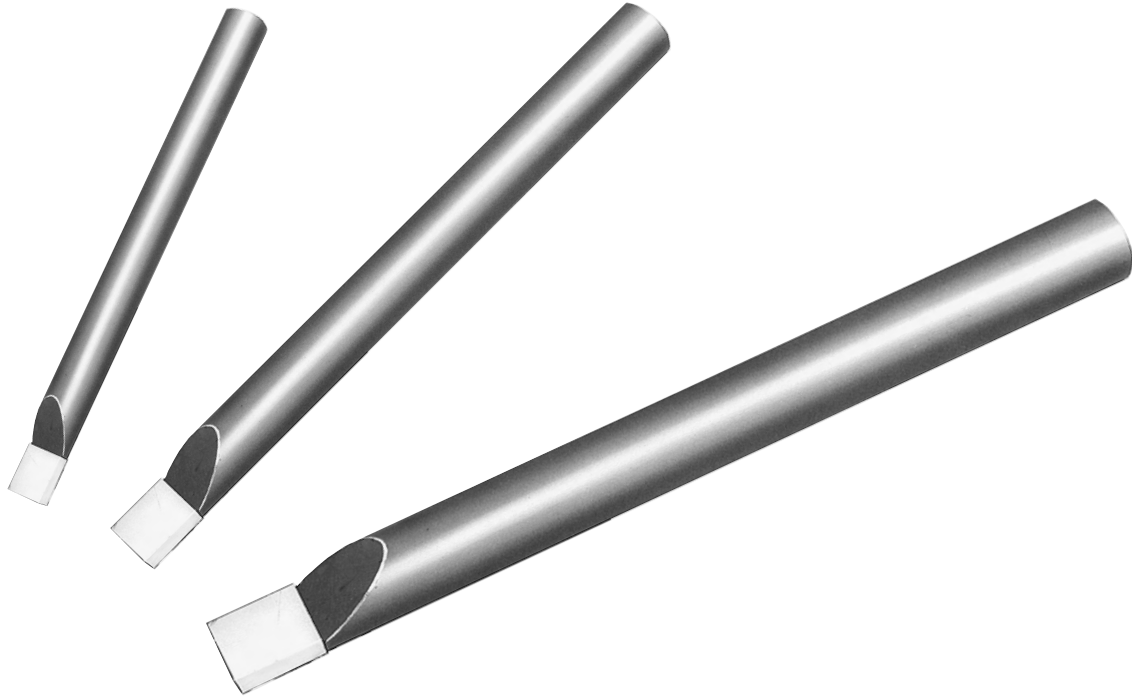


RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	DIMENSIONS						QUANTITY – PRICE EACH				
		SHANK			TIP			1 TO 5	6 TO 11	12 TO 23	24 TO 47	48 OR MORE
		A	B	C	T	W	L					
BT-4	BTL-4	1/4	1/4	1-1/2	1/8	3/16	1/4	22.35	20.85	19.35	18.35	17.35
BT-5	BTL-5	5/16	5/16	1-3/4	1/8	3/16	5/16	24.10	22.60	21.10	20.10	19.10
BT-6	BTL-6	3/8	3/8	2	3/16	5/16	3/8	26.00	24.50	23.00	22.00	21.00
BT-7	BTL-7	7/16	7/16	2-1/4	3/16	3/8	7/16	27.15	25.65	24.15	23.15	22.15
BT-8	BTL-8	1/2	1/2	2-1/2	3/16	3/8	1/2	29.75	28.25	26.75	25.75	24.75
BT-9	BTL-9	9/16	9/16	2-3/4	3/16	1/2	9/16	32.80	31.30	29.80	28.80	27.80
BT-10	BTL-10	5/8	5/8	3	1/4	1/2	5/8	33.75	32.25	30.75	29.75	28.75



super carbide tools

# BRAZED BORING BARS

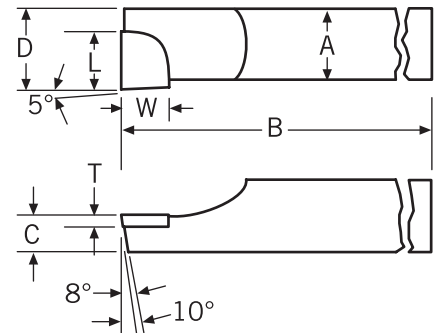


TOOL NO.	DIMENSIONS						QUANTITY – PRICE EACH		
	SHANK			TIP			1 TO 5	6 TO 11	12 OR MORE
	A	B	C	T	W	L			
TRG-4	1/4	2-1/2	5/32	1/16	1/4	1/4	20.15	18.65	17.15
TRG-5	5/16	3	3/16	3/32	5/16	3/8	20.90	19.40	17.90
TRG-6	3/8	3-1/2	7/32	3/32	3/8	3/8	22.25	20.75	19.25
TRG-7	7/16	4	1/4	3/32	7/16	1/2	24.05	22.55	21.05
TRG-8	1/2	5	9/32	1/8	1/2	1/2	27.25	25.75	24.25
TRG-10	5/8	6	11/32	5/32	5/8	5/8	28.60	27.10	25.60

# BRAZED BORING BARS



Style TBB shown



RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	DIMENSIONS							QUANTITY - PRICE EACH		
		SHANK				TIP			1 TO 5	6 TO 11	12 OR MORE
		A	B	C	D	T	W	L			
TBB-250	TBBL-250	1/4	4	1/8	0.320	1/16	3/16	1/4	20.15	18.65	17.15
TBB-312	TBBL-312	5/16	5	5/32	0.413	1/16	1/4	5/16	20.90	19.40	17.90
TBB-375	TBBL-375	3/8	6	3/16	0.463	1/16	1/4	5/16	22.25	20.75	19.25
TBB-500	TBBL-500	1/2	7	1/4	0.625	1/8	1/4	1/2	27.25	25.75	24.25
TBB-625	TBBL-625	5/8	8	5/16	0.795	1/8	1/4	5/8	28.60	27.10	25.60
TBB-750	TBBL-750	3/4	9	3/8	0.935	1/8	1/4	5/8	29.95	28.45	26.95
TBB-001	TBBL-001	1	10	1/2	1.233	3/16	7/16	13/16	31.45	29.95	28.45



## Boring Bar Sets

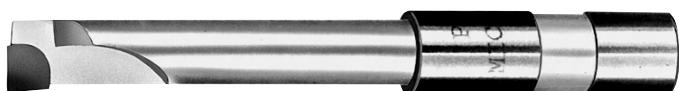
Five Boring Bars  
1/4", 3/8", 1/2", 5/8" and 3/4"

SET No. TBB-5	106.25
SET No. TBBL-5	106.25



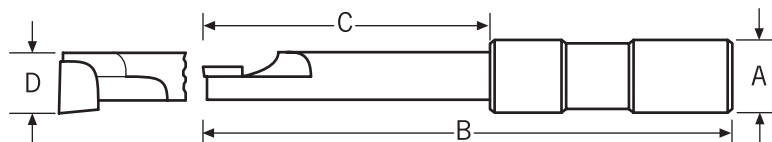
super carbide tools

# BRAZED BORING TOOLS



A lockdown groove completely encircles the tool so that the cutting point can be turned to any desired position.

Hardened and precision ground shanks.



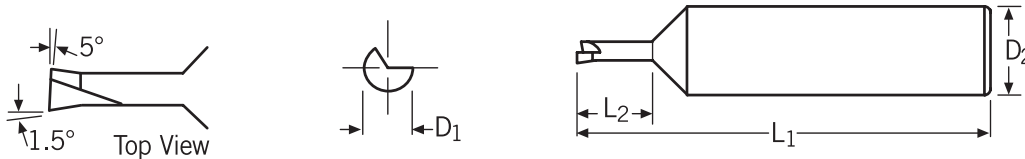
TOOL NUMBER	DIMENSIONS				PRICE EACH	
	A	B	C	D		
PB-1 PB-2 PB-3	3/8	2	3/4	5/16	25.95	
		2-3/8	1-1/8			
		2-3/4	1-1/2			
PB-4 PB-5 PB-6		2-3/16	15/16	3/8		
		2-21/32	1-13/32			
		3-1/8	1-7/8			
PB-7 PB-8 PB-9	7/16	2-3/8	1-1/8	7/16		
		2-15/16	1-11/16			
		3-1/2	2-1/4			
PB-10 PB-11 PB-12	1/2	2-1/4	3/4	5/16		27.20
		2-5/8	1-1/8			
		3	1-1/2			
PB-13 PB-14 PB-15		2-5/8	1-1/8	3/8		
		3-3/16	1-11/16			
		3-3/4	2-1/4			
PB-16 PB-17 PB-18	7/16	3	1-1/2	7/16		
		3-3/4	2-1/4			
		4-1/2	3			
PB-19 PB-20 —	5/8	2-1/4	3/4	5/16	30.65	
		2-5/8	1-1/8			
		—	—			
PB-22 PB-23 PB-24		2-5/8	1-1/8	7/16		
		3-3/16	1-11/16			
		3-3/4	2-1/4			
PB-25 PB-26 PB-27	9/16	3	1-1/2	9/16		
		3-3/4	2-1/4			
		4-1/2	3			
PB-28 PB-29 PB-30	11/16	3-3/8	1-7/8	11/16		
		4-5/16	2-13/16			
		5-1/4	3-3/4			

## Miniature Boring Tools



Shank Diameter                     $-.0001$  to  $-.0002$ "  
 Minimum Bore Dia.                 $+.000$   $-.002$ "  
 Maximum Bore Depth                $+.025$   $-.000$ "  
 Overall Length                        $\pm 1/64$ "

Lockdown flat automatically locates tool on center.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

Left-hand boring tools also available upon request. *Steel Holders, see Page 41.*

TOOL NUMBER	MINIMUM BORE DIAMETER $D_1$	SHANK DIAMETER $D_2$	OVERALL LENGTH $L_1$	MAXIMUM BORE DEPTH $L_2$	PRICE EACH
MBB-015050 MBB-020075	.015 .020	1/8	1-1/2	.050 .075	30.85
MBB-025100 MBB-030100	.025 .030			.100	
MBB-035100 MBB-035150	.035			.100 .150	27.15
MBB-040100 MBB-040150	.040			.100 .150	
MBB-045100 MBB-045150	.045			.100 .150	

## Miniature Boring Tool Set

Furnished in fitted wood case.

SET No. MBB-0 \$ 166.40



TOOL NUMBER	MINIMUM BORE DIAMETER $D_1$	MAXIMUM BORE DEPTH $L_2$
MBB-020075	.020	.075
MBB-025100	.025	.100
MBB-030100	.030	.100
MBB-035100	.035	.100
MBB-040150	.040	.150
MBB-045150	.045	.150

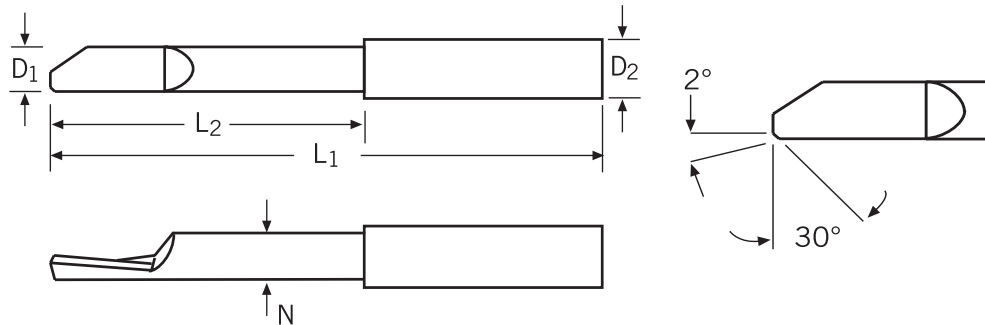


## Helical Back Rake Boring Tools



Shank Diameter             $-.0001$  to  $-.0002''$   
 Minimum Bore Dia.         $+.001$   $-.000''$   
 Maximum Bore Depth       $+.030$   $-.000''$   
 Overall Length               $\pm 1/64''$

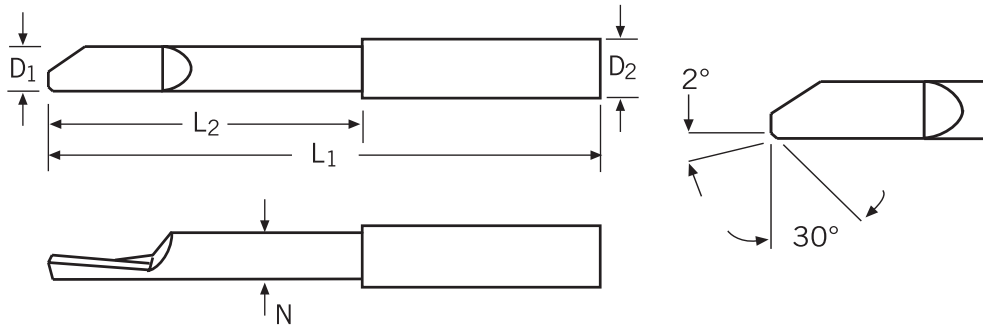
Neck is centered to shank for use in jig boring machines. The helical grind provides an ideal top rake for better chip control.



Left-hand boring tools and other sizes also available upon request. *Steel Holders, see Page 41.*

TOOL NUMBER	MINIMUM BORE DIAMETER $D_1$	SHANK DIAMETER $D_2$	OVERALL LENGTH $L_1$	MAXIMUM BORE DEPTH $L_2$	NECK DIAMETER $N$	PRICE EACH
HBB-020062	.020			1/16	.015	26.90
HBB-025062	.025			1/16	.020	
HBB-025125	.025			1/8	.020	
HBB-030125	.030			1/8	.025	
HBB-030187	.030			3/16	.025	
HBB-035125	.035	1/8	1-1/2	1/8	.030	20.75
HBB-035187	.035			3/16	.030	
HBB-040187	.040			3/16	.035	
HBB-040250	.040			1/4	.035	
HBB-050312	.050			5/16	.040	
HBB-060375	.060			3/8	.050	
HBB-070437	.070			7/16	.060	
HBB-080500	.080			1/2	.070	
HBB-090500	.090			1/2	.080	
HBB-100562	.100			9/16	.090	
HBB-120625	.120			5/8	.100	
HBB-1201000	.120			1	.100	

## Helical Back Rake Boring Tools



Left-hand boring tools and other sizes also available upon request. *Steel Holders, see Page 41.*

TOOL NUMBER	MINIMUM BORE DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAXIMUM BORE DEPTH L <sub>2</sub>	NECK DIAMETER N	PRICE EACH
HBB-135750	.135	3/16	2	3/4	.110	22.20
HBB-1351000	.135			1	.110	
HBB-1501000	.150			1	.130	
HBB-1501250	.150			1-1/4	.130	
HBB-1801000	.180			1	.160	
HBB-1801250	.180			1-1/4	.160	
HBB-1801500	.180			1-1/2	.160	
HBB-2101000	.210	1/4	2-1/2	1	.185	24.10
HBB-2101250	.210			1-1/4	.185	
HBB-2101500	.210			1-1/2	.185	
HBB-2401000	.240			1	.215	
HBB-2401500	.240			1-1/2	.215	
HBB-2401750	.240			1-3/4	.215	
HBB-3001000	.300	5/16	2-1/2	1	.250	32.95
HBB-3001500				1-1/2		
HBB-3001750				1-3/4		
HBB-3601000	.360	3/8	2-1/2	1	.320	45.75
HBB-3601500				1-1/2		
HBB-3601750				1-3/4		
HBB-3602000	.360	3/8	4	2	.320	58.95
HBB-3602250				2-1/4		
HBB-3602500				2-1/2		
HBB-4801500	.480	1/2	3	1-1/2	.440	64.40
HBB-4802000				2		
HBB-4802500	.480	1/2	4	2-1/2	.440	70.70
HBB-4803000				3		
HBB-4803500	.480	1/2	6	3-1/2	.440	89.10
HBB-4804000				4		
HBB-4804500				4-1/2		

# BORING TOOLS

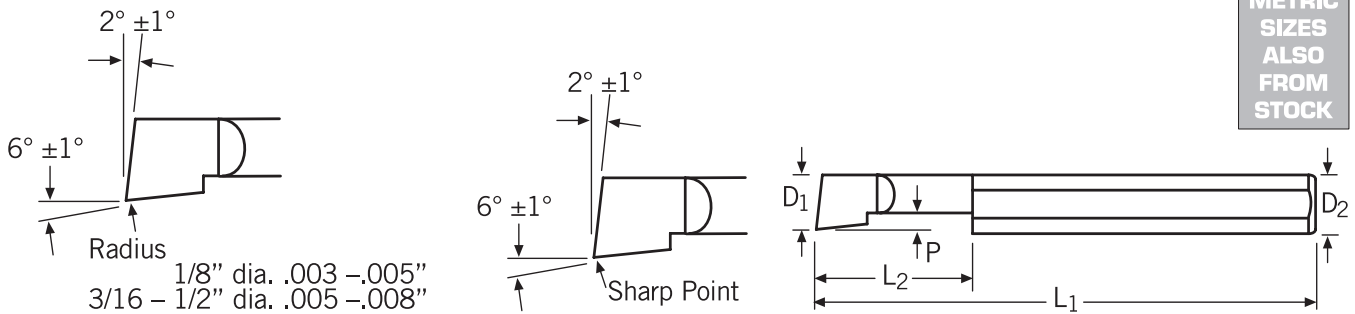


Style BB shown



Shank Diameter  $-.0001$  to  $-.0002$ "  
 Minimum Bore Dia.  $+.000$ – $.005$ "  
 Maximum Bore Depth  $+.050$ – $.000$ "  
 Overall Length  $\pm 1/64$ "

Lockdown flat automatically locates tool on center.



Other sizes also available upon request. Steel Holders, see Page 41.

MIN. BORE DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	OVER-ALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PRO-JECTION P	WITH RADIUS			SHARP POINT	
					RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	PRICE EACH	RIGHT HAND TOOL NO.	PRICE EACH
.050	1/8	1-1/2	.150	.013	BB-050150 BB-050200 BB-050300 BB-050400	BBL-050150 BBL-050200 BBL-050300 BBL-050400	21.15	BB-050150S BB-050200S BB-050300S BB-050400S	19.90
			.200						
			.300						
			.400						
			.500						
.060	1/8	1-1/2	.150	.015	BB-060150 BB-060200 BB-060300 BB-060400 BB-060500	BBL-060150 BBL-060200 BBL-060300 BBL-060400 BBL-060500	21.15	BB-060150S BB-060200S BB-060300S BB-060400S BB-060500S	19.90
			.200						
			.300						
			.400						
			.500						
.080	1/8	1-1/2	.150	.020	BB-080150 BB-080200 BB-080300 BB-080400 BB-080500 BB-080600	BBL-080150 BBL-080200 BBL-080300 BBL-080400 BBL-080500 BBL-080600	21.15	BB-080150S BB-080200S BB-080300S BB-080400S BB-080500S BB-080600S	19.90
			.200						
			.300						
			.400						
			.500						
.100	1/8	1-1/2	.150	.025	BB-100150 BB-100200 BB-100300 BB-100400 BB-100500 BB-100600 BB-100700	BBL-100150 BBL-100200 BBL-100300 BBL-100400 BBL-100500 BBL-100600 BBL-100700	21.15	BB-100150S BB-100200S BB-100300S BB-100400S BB-100500S BB-100600S BB-100700S	19.90
			.200						
			.300						
			.400						
			.500						
.110	1/8	1-1/2	.150	.028	BB-110150 BB-110200 BB-110300 BB-110400 BB-110500 BB-110600 BB-110700	BBL-110150 BBL-110200 BBL-110300 BBL-110400 BBL-110500 BBL-110600 BBL-110700	21.15	BB-110150S BB-110200S BB-110300S BB-110400S BB-110500S BB-110600S BB-110700S	19.90
			.200						
			.300						
			.400						
			.500						

# BORING TOOLS



Other sizes also available upon request. Steel Holders, see Page 41.

MIN. BORE DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	OVER-ALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PROJECTION P	WITH RADIUS			SHARP POINT	
					RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	PRICE EACH	RIGHT HAND TOOL NO.	PRICE EACH
.120	3/16	2	.250 .350 .500 .600 .700 .800	.030	BB-120250 BB-120350 BB-120500 BB-120600 BB-120700 BB-120800	BBL-120250 BBL-120350 BBL-120500 BBL-120600 BBL-120700 BBL-120800	22.45	BB-120250S BB-120350S BB-120500S BB-120600S BB-120700S BB-120800S	21.25
.140			.250 .400 .500 .600 .700 .750 .800	.035	BB-140250 BB-140400 BB-140500 BB-140600 BB-140700 BB-140750 BB-140800	BBL-140250 BBL-140400 BBL-140500 BBL-140600 BBL-140700 BBL-140750 BBL-140800		BB-140250S BB-140400S BB-140500S BB-140600S BB-140700S BB-140750S BB-140800S	
.160			.250 .400 .500 .600 .750 .900 1.000	.040	BB-160250 BB-160400 BB-160500 BB-160600 BB-160750 BB-160900 BB-1601000	BBL-160250 BBL-160400 BBL-160500 BBL-160600 BBL-160750 BBL-160900 BBL-1601000		BB-160250S BB-160400S BB-160500S BB-160600S BB-160750S BB-160900S BB-1601000S	
.180	1/4	2-1/2	.350 .500 .600 .750 .900 1.000 1.100 1.250 1.500	.045	BB-180350 BB-180500 BB-180600 BB-180750 BB-180900 BB-1801000 BB-1801100 BB-1801250 BB-1801500	BBL-180350 BBL-180500 BBL-180600 BBL-180750 BBL-180900 BBL-1801000 BBL-1801100 BBL-1801250 BBL-1801500	24.25	BB-180350S BB-180500S BB-180600S BB-180750S BB-180900S BB-1801000S BB-1801100S BB-1801250S BB-1801500S	22.95
.200			.400 .500 .600 .700 .800 .900 1.000 1.100 1.200 1.300	.050	BB-200400 BB-200500 BB-200600 BB-200700 BB-200800 BB-200900 BB-2001000 BB-2001100 BB-2001200 BB-2001300	BBL-200400 BBL-200500 BBL-200600 BBL-200700 BBL-200800 BBL-200900 BBL-2001000 BBL-2001100 BBL-2001200 BBL-2001300		BB-200400S BB-200500S BB-200600S BB-200700S BB-200800S BB-200900S BB-2001000S BB-2001100S BB-2001200S BB-2001300S	
.230	5/16	2-1/2	.400 .500 .600 .700 .800 .900 1.000 1.100 1.150 1.200 1.250 1.400 1.500 1.600	.058	BB-230400 BB-230500 BB-230600 BB-230700 BB-230800 BB-230900 BB-2301000 BB-2301100 BB-2301150 BB-2301200 BB-2301250 BB-2301400 BB-2301500 BB-2301600	BBL-230400 BBL-230500 BBL-230600 BBL-230700 BBL-230800 BBL-230900 BBL-2301000 BBL-2301100 BBL-2301150 BBL-2301200 BBL-2301250 BBL-2301400 BBL-2301500 BBL-2301600	32.60	BB-230400S BB-230500S BB-230600S BB-230700S BB-230800S BB-230900S BB-2301000S BB-2301100S BB-2301150S BB-2301200S BB-2301250S BB-2301400S BB-2301500S BB-2301600S	31.45



super carbide tools

# BORING TOOLS



Other sizes also available upon request. Steel Holders, see Page 41.

MIN. BORE DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	OVER-ALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PRO-JECTION P	WITH RADIUS			SHARP POINT							
					RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	PRICE EACH	RIGHT HAND TOOL NO.	PRICE EACH						
.290	5/16	2-1/2	.500	.073	BB-290500	BBL-290500	32.60	BB-290500S	31.45						
			.600		BB-290600	BBL-290600		BB-290600S							
			.750		BB-290750	BBL-290750		BB-290750S							
			.900		BB-290900	BBL-290900		BB-290900S							
			1.000		BB-2901000	BBL-2901000		BB-2901000S							
			1.100		BB-2901100	BBL-2901100		BB-2901100S							
			1.250		BB-2901250	BBL-2901250		BB-2901250S							
			1.350		BB-2901350	BBL-2901350		BB-2901350S							
			1.500		BB-2901500	BBL-2901500		BB-2901500S							
			1.600		BB-2901600	BBL-2901600		BB-2901600S							
			1.750		BB-2901750	BBL-2901750		BB-2901750S							
			.320		3/8	2-1/2		.500		.080	BB-320500	BBL-320500	44.55	BB-320500S	43.30
								.600			BB-320600	BBL-320600		BB-320600S	
.750	BB-320750	BBL-320750		BB-320750S											
.900	BB-320900	BBL-320900		BB-320900S											
1.000	BB-3201000	BBL-3201000		BB-3201000S											
1.100	BB-3201100	BBL-3201100		BB-3201100S											
1.250	BB-3201250	BBL-3201250		BB-3201250S											
1.500	BB-3201500	BBL-3201500		BB-3201500S											
1.600	BB-3201600	BBL-3201600		BB-3201600S											
1.800	BB-3201800	BBL-3201800		BB-3201800S											
.320	4	2.000		.080			BB-3202000	BBL-3202000	56.95		BB-3202000S	55.70			
.320		2.500					BB-3202500	BBL-3202500			BB-3202500S				
		3.000					BB-3203000	BBL-3203000			BB-3203000S				
.360	3/8	2-1/2	.500	.090	BB-360500	BBL-360500	44.55	BB-360500S	43.30						
			.600		BB-360600	BBL-360600		BB-360600S							
			.750		BB-360750	BBL-360750		BB-360750S							
			.900		BB-360900	BBL-360900		BB-360900S							
			1.000		BB-3601000	BBL-3601000		BB-3601000S							
			1.150		BB-3601150	BBL-3601150		BB-3601150S							
			1.250		BB-3601250	BBL-3601250		BB-3601250S							
			1.500		BB-3601500	BBL-3601500		BB-3601500S							
			1.600		BB-3601600	BBL-3601600		BB-3601600S							
			1.800		BB-3601800	BBL-3601800		BB-3601800S							
			.360		4	2.000		.090		BB-3602000	BBL-3602000	56.95	BB-3602000S	55.70	
			.360			2.500				BB-3602500	BBL-3602500		BB-3602500S		
						3.000				BB-3603000	BBL-3603000		BB-3603000S		
.490	1/2	3	.750	.123	BB-490750	BBL-490750	62.10	BB-490750S	60.90						
			1.000		BB-4901000	BBL-4901000		BB-4901000S							
			1.250		BB-4901250	BBL-4901250		BB-4901250S							
			1.500		BB-4901500	BBL-4901500		BB-4901500S							
			.490		4	2.000		.123		BB-4902000	BBL-4902000	68.10	BB-4902000S	66.85	
2.500	BB-4902500	BBL-4902500		BB-4902500S											
2.600	BB-4902600	BBL-4902600		BB-4902600S											
2.750	BB-4902750	BBL-4902750		BB-4902750S											
.490	1/2	6	3.000	.123	BB-4903000	BBL-4903000	85.45	BB-4903000S	84.25						
			3.500		BB-4903500	BBL-4903500		BB-4903500S							
			4.000		BB-4904000	BBL-4904000		BB-4904000S							
			4.500		BB-4904500	BBL-4904500		BB-4904500S							

# COATED BORING TOOLS



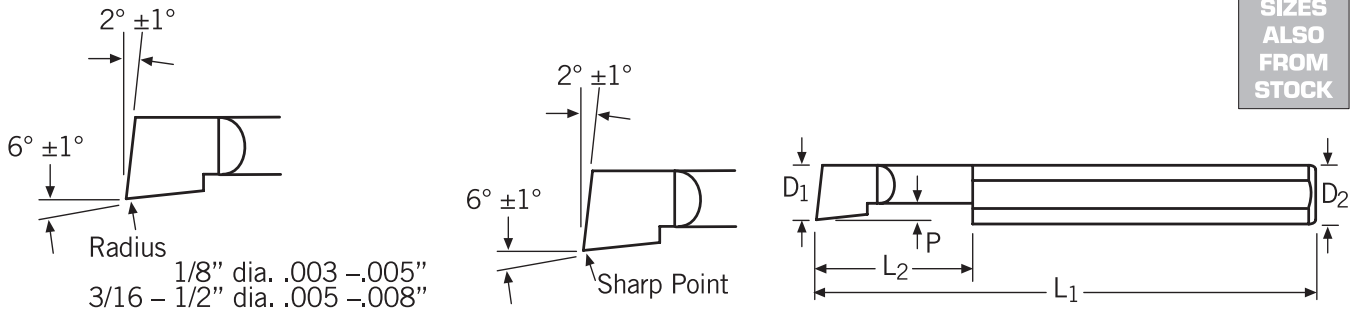
Style BB shown



Shank Diameter            -.0001 to -.0002"  
 Minimum Bore Dia.       +.000-.005"  
 Maximum Bore Depth     +.050-.000"  
 Overall Length           ±1/64"

Lockdown flat automatically locates tool on center.

METRIC  
SIZES  
ALSO  
FROM  
STOCK



Other sizes also available upon request. Steel Holders, see Page 41.

MIN. BORE DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	OVER-ALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PRO-JECTION P	WITH RADIUS			SHARP POINT	
					RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	TIN COATED PRICE EACH	RIGHT HAND TOOL NO.	TIN COATED PRICE EACH
.050	1/8	1-1/2	.150	.013	BB-050150G	BBL-050150G	23.35	BB-050150SG	22.10
			.200		BB-050200G	BBL-050200G		BB-050200SG	
			.300		BB-050300G	BBL-050300G		BB-050300SG	
			.400		BB-050400G	BBL-050400G		BB-050400SG	
.060			.150	.015	BB-060150G	BBL-060150G		BB-060150SG	
			.200		BB-060200G	BBL-060200G		BB-060200SG	
			.300		BB-060300G	BBL-060300G		BB-060300SG	
			.400		BB-060400G	BBL-060400G		BB-060400SG	
			.500		BB-060500G	BBL-060500G		BB-060500SG	
.080			.150	.020	BB-080150G	BBL-080150G		BB-080150SG	
			.200		BB-080200G	BBL-080200G		BB-080200SG	
			.300		BB-080300G	BBL-080300G		BB-080300SG	
			.400		BB-080400G	BBL-080400G		BB-080400SG	
			.500		BB-080500G	BBL-080500G		BB-080500SG	
			.600		BB-080600G	BBL-080600G		BB-080600SG	
.100			.150	.025	BB-100150G	BBL-100150G		BB-100150SG	
	.200	BB-100200G	BBL-100200G		BB-100200SG				
	.300	BB-100300G	BBL-100300G		BB-100300SG				
	.400	BB-100400G	BBL-100400G		BB-100400SG				
	.500	BB-100500G	BBL-100500G		BB-100500SG				
	.600	BB-100600G	BBL-100600G		BB-100600SG				
	.700	BB-100700G	BBL-100700G		BB-100700SG				
.110	.150	.028	BB-110150G	BBL-110150G	BB-110150SG				
	.200		BB-110200G	BBL-110200G	BB-110200SG				
	.300		BB-110300G	BBL-110300G	BB-110300SG				
	.400		BB-110400G	BBL-110400G	BB-110400SG				
	.500		BB-110500G	BBL-110500G	BB-110500SG				
	.600		BB-110600G	BBL-110600G	BB-110600SG				
	.700		BB-110700G	BBL-110700G	BB-110700SG				



super carbide tools

# COATED BORING TOOLS



Other sizes also available upon request. Steel Holders, see Page 41.

MIN. BORE DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	OVER-ALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PROJECTION P	WITH RADIUS			SHARP POINT			
					RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	TIN COATED PRICE EACH	RIGHT HAND TOOL NO.	TIN COATED PRICE EACH		
.120	3/16	2	.250	.030	BB-120250G	BBL-120250G	25.45	BB-120250SG	24.25		
			.350		BB-120350G	BBL-120350G		BB-120350SG			
			.500		BB-120500G	BBL-120500G		BB-120500SG			
.140	3/16	2	.600	.035	BB-120600G	BBL-120600G	25.45	BB-120600SG	24.25		
			.700		BB-120700G	BBL-120700G		BB-120700SG			
			.800		BB-120800G	BBL-120800G		BB-120800SG			
			.250		BB-140250G	BBL-140250G		25.45		BB-140250SG	24.25
			.400		BB-140400G	BBL-140400G				BB-140400SG	
			.500		BB-140500G	BBL-140500G				BB-140500SG	
.600	BB-140600G	BBL-140600G	BB-140600SG								
.700	BB-140700G	BBL-140700G	BB-140700SG								
.750	BB-140750G	BBL-140750G	BB-140750SG								
.160	3/16	2	.800	.035	BB-140800G	BBL-140800G	25.45	BB-140800SG	24.25		
			.250		BB-160250G	BBL-160250G		BB-160250SG			
.160	3/16	2	.400	.040	BB-160400G	BBL-160400G	25.45	BB-160400SG	24.25		
			.500		BB-160500G	BBL-160500G		BB-160500SG			
			.600		BB-160600G	BBL-160600G		BB-160600SG			
			.750		BB-160750G	BBL-160750G		BB-160750SG			
			.900		BB-160900G	BBL-160900G		BB-160900SG			
			1.000		BB-1601000G	BBL-1601000G		BB-1601000SG			
.180	1/4	2-1/2	.250	.045	BB-180250G	BBL-180250G	27.30	BB-180250SG	26.05		
			.350		BB-180350G	BBL-180350G		BB-180350SG			
			.500		BB-180500G	BBL-180500G		BB-180500SG			
			.600		BB-180600G	BBL-180600G		BB-180600SG			
			.750		BB-180750G	BBL-180750G		BB-180750SG			
			.900		BB-180900G	BBL-180900G		BB-180900SG			
			1.000		BB-1801000G	BBL-1801000G		BB-1801000SG			
			1.100		BB-1801100G	BBL-1801100G		BB-1801100SG			
			1.250		BB-1801250G	BBL-1801250G		BB-1801250SG			
			1.500		BB-1801500G	BBL-1801500G		BB-1801500SG			
.200	1/4	2-1/2	.350	.050	BB-200350G	BBL-200350G	27.30	BB-200350SG	26.05		
			.400		BB-200400G	BBL-200400G		BB-200400SG			
			.500		BB-200500G	BBL-200500G		BB-200500SG			
			.600		BB-200600G	BBL-200600G		BB-200600SG			
			.700		BB-200700G	BBL-200700G		BB-200700SG			
			.800		BB-200800G	BBL-200800G		BB-200800SG			
			.900		BB-200900G	BBL-200900G		BB-200900SG			
			1.000		BB-2001000G	BBL-2001000G		BB-2001000SG			
			1.100		BB-2001100G	BBL-2001100G		BB-2001100SG			
			1.200		BB-2001200G	BBL-2001200G		BB-2001200SG			
.230	5/16	2-1/2	1.300	.058	BB-2001300G	BBL-2001300G	37.30	BB-2001300SG	36.05		
			.400		BB-230400G	BBL-230400G		BB-230400SG			
			.500		BB-230500G	BBL-230500G		BB-230500SG			
			.600		BB-230600G	BBL-230600G		BB-230600SG			
			.700		BB-230700G	BBL-230700G		BB-230700SG			
			.800		BB-230800G	BBL-230800G		BB-230800SG			
			.900		BB-230900G	BBL-230900G		BB-230900SG			
			1.000		BB-2301000G	BBL-2301000G		BB-2301000SG			
			1.100		BB-2301100G	BBL-2301100G		BB-2301100SG			
			1.150		BB-2301150G	BBL-2301150G		BB-2301150SG			
			1.200		BB-2301200G	BBL-2301200G		BB-2301200SG			
			1.250		BB-2301250G	BBL-2301250G		BB-2301250SG			
			1.400		BB-2301400G	BBL-2301400G		BB-2301400SG			
			1.500		BB-2301500G	BBL-2301500G		BB-2301500SG			
			1.600		BB-2301600G	BBL-2301600G		BB-2301600SG			

# COATED BORING TOOLS



Other sizes also available upon request. Steel Holders, see Page 41.

MIN. BORE DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	OVER-ALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PROJECTION P	WITH RADIUS			SHARP POINT	
					RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	TIN COATED PRICE EACH	RIGHT HAND TOOL NO.	TIN COATED PRICE EACH
.290	5/16	2-1/2	.500	.073	BB-290500G	BBL-290500G	37.30	BB-290500SG	36.05
			.600		BB-290600G	BBL-290600G		BB-290600SG	
			.750		BB-290750G	BBL-290750G		BB-290750SG	
			.900		BB-290900G	BBL-290900G		BB-290900SG	
			1.000		BB-2901000G	BBL-2901000G		BB-2901000SG	
			1.100		BB-2901100G	BBL-2901100G		BB-2901100SG	
			1.250		BB-2901250G	BBL-2901250G		BB-2901250SG	
			1.350		BB-2901350G	BBL-2901350G		BB-2901350SG	
			1.500		BB-2901500G	BBL-2901500G		BB-2901500SG	
			1.600		BB-2901600G	BBL-2901600G		BB-2901600SG	
			1.750		BB-2901750G	BBL-2901750G		BB-2901750SG	
.320	3/8	2-1/2	.500	.080	BB-320500G	BBL-320500G	49.35	BB-320500SG	48.15
			.600		BB-320600G	BBL-320600G		BB-320600SG	
			.750		BB-320750G	BBL-320750G		BB-320750SG	
			.900		BB-320900G	BBL-320900G		BB-320900SG	
			1.000		BB-3201000G	BBL-3201000G		BB-3201000SG	
			1.100		BB-3201100G	BBL-3201100G		BB-3201100SG	
			1.250		BB-3201250G	BBL-3201250G		BB-3201250SG	
			1.500		BB-3201500G	BBL-3201500G		BB-3201500SG	
			1.600		BB-3201600G	BBL-3201600G		BB-3201600SG	
			1.800		BB-3201800G	BBL-3201800G		BB-3201800SG	
			.320		3/8	4		2.000	
2.500	BB-3202500G	BBL-3202500G	BB-3202500SG						
3.000	BB-3203000G	BBL-3203000G	BB-3203000SG						
.360	3/8	2-1/2	.500	.090	BB-360500G	BBL-360500G	49.35	BB-360500SG	48.15
			.600		BB-360600G	BBL-360600G		BB-360600SG	
			.750		BB-360750G	BBL-360750G		BB-360750SG	
			.900		BB-360900G	BBL-360900G		BB-360900SG	
			1.000		BB-3601000G	BBL-3601000G		BB-3601000SG	
			1.150		BB-3601150G	BBL-3601150G		BB-3601150SG	
			1.250		BB-3601250G	BBL-3601250G		BB-3601250SG	
			1.500		BB-3601500G	BBL-3601500G		BB-3601500SG	
			1.600		BB-3601600G	BBL-3601600G		BB-3601600SG	
			1.800		BB-3601800G	BBL-3601800G		BB-3601800SG	
			.360		3/8	4		2.000	
2.500	BB-3602500G	BBL-3602500G	BB-3602500SG						
3.000	BB-3603000G	BBL-3603000G	BB-3603000SG						
.490	1/2	3	.750	.123	BB-490750G	BBL-490750G	68.25	BB-490750SG	66.95
			1.000		BB-4901000G	BBL-4901000G		BB-4901000SG	
			1.250		BB-4901250G	BBL-4901250G		BB-4901250SG	
			1.500		BB-4901500G	BBL-4901500G		BB-4901500SG	
.490	1/2	4	2.000	.123	BB-4902000G	BBL-4902000G	76.70	BB-4902000SG	75.50
			2.500		BB-4902500G	BBL-4902500G		BB-4902500SG	
			2.600		BB-4902600G	BBL-4902600G		BB-4902600SG	
			2.750		BB-4902750G	BBL-4902750G		BB-4902750SG	
.490	1/2	6	3.000	.123	BB-4903000G	BBL-4903000G	94.40	BB-4903000SG	93.20
			3.500		BB-4903500G	BBL-4903500G		BB-4903500SG	
			4.000		BB-4904000G	BBL-4904000G		BB-4904000SG	
			4.500		BB-4904500G	BBL-4904500G		BB-4904500SG	



super carbide tools



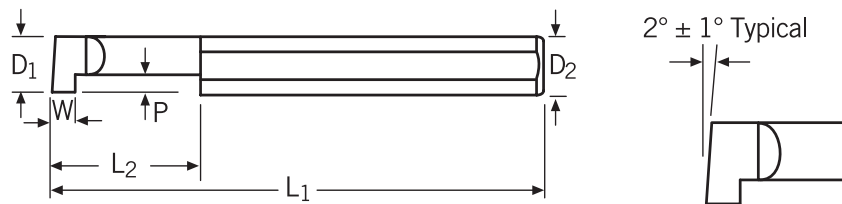
## For Retaining Ring Grooves

Style RR shown



Shank Diameter            -.0001 to -.0002"  
 Minimum Hole Dia.       +.000 -.005"  
 Maximum Hole Depth      +.050 -.000"  
 Overall Length           ±1/64"

Lockdown flat automatically locates tool on center.



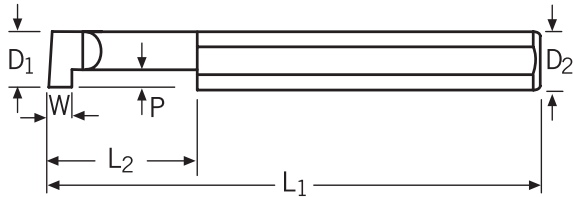
METRIC  
SIZES  
ALSO  
FROM  
STOCK

Other sizes also available upon request. Steel Holders, see Page 41.

RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAXIMUM HOLE DEPTH L <sub>2</sub>	PROJECTION P	GROOVE TOOL WIDTH W	PRICE EACH
RR-017-4 RR-017-6 RR-017-8 RR-017-10	RRL-017-4 RRL-017-6 RRL-017-8 RRL-017-10	.250	1/4	2-1/2	1/4	.050	.017/.018	28.30
					3/8			
					1/2			
		5/8						
RR-025-4 RR-025-6 RR-025-8 RR-025-10	RRL-025-4 RRL-025-6 RRL-025-8 RRL-025-10				1/4		.025/.026	
					3/8			
					1/2			
					5/8			
RR-030-4 RR-030-6 RR-030-8 RR-030-10	RRL-030-4 RRL-030-6 RRL-030-8 RRL-030-10				1/4		.030/.031	
					3/8			
					1/2			
					5/8			
RR-033-4 RR-033-6 RR-033-8 RR-033-12	RRL-033-4 RRL-033-6 RRL-033-8 RRL-033-12	.312	5/16	2-1/2	1/4	.100	.033/.034	35.35
					3/8			
					1/2			
					3/4			
RR-038-4 RR-038-6 RR-038-8 RR-038-12	RRL-038-4 RRL-038-6 RRL-038-8 RRL-038-12				1/4		.038/.039	
					3/8			
					1/2			
					3/4			

## For Retaining Ring Grooves

Shank Diameter            -.0001 to -.0002"  
 Minimum Hole Dia.       +.000 -.005"  
 Maximum Hole Depth     +.050 -.000"  
 Overall Length           ±1/64"



METRIC  
SIZES  
ALSO  
FROM  
STOCK

Other sizes also available upon request. *Steel Holders, see Page 41.*

RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAXIMUM HOLE DEPTH L <sub>2</sub>	PROJECTION P	GROOVE TOOL WIDTH W	PRICE EACH						
RR-039-4 RR-039-6 RR-039-8 RR-039-12 RR-039-16 RR-039-20	RRL-039-4 RRL-039-6 RRL-039-8 RRL-039-12 RRL-039-16 RRL-039-20	.375	3/8	2-1/2	1/4	.100	.039/.041	46.10						
					3/8									
					1/2									
					3/4									
					1									
					1-1/4									
RR-046-4 RR-046-6 RR-046-8 RR-046-12 RR-046-16 RR-046-20	RRL-046-4 RRL-046-6 RRL-046-8 RRL-046-12 RRL-046-16 RRL-046-20										1/4		.046/.048	
					3/8						1/2			
					3/4						1			
					1-1/4									
RR-055-4 RR-055-6 RR-055-8 RR-055-12 RR-055-16 RR-055-20	RRL-055-4 RRL-055-6 RRL-055-8 RRL-055-12 RRL-055-16 RRL-055-20										1/4		.055/.057	
					3/8						3/8			
		1/2			1/2									
		3/4			3/4									
		1			1									
		1-1/4			1-1/4									
RR-062-4 RR-062-6 RR-062-8 RR-062-12 RR-062-16 RR-062-20	RRL-062-4 RRL-062-6 RRL-062-8 RRL-062-12 RRL-062-16 RRL-062-20				1/4		.062/.064							
		3/8			3/8									
		1/2			1/2									
		3/4			3/4									
		1			1									
		1-1/4			1-1/4									
RR-069-4 RR-069-6 RR-069-8 RR-069-12 RR-069-16 RR-069-20	RRL-069-4 RRL-069-6 RRL-069-8 RRL-069-12 RRL-069-16 RRL-069-20				1/4		.069/.071							
		3/8			3/8									
		1/2			1/2									
		3/4			3/4									
		1			1									
		1-1/4			1-1/4									
RR-087-4 RR-087-6 RR-087-8 RR-087-12 RR-087-16 RR-087-20	RRL-087-4 RRL-087-6 RRL-087-8 RRL-087-12 RRL-087-16 RRL-087-20				1/4		.087/.089							
		3/8			3/8									
		1/2			1/2									
		3/4			3/4									
		1			1									
		1-1/4			1-1/4									

# GROOVE TOOLS



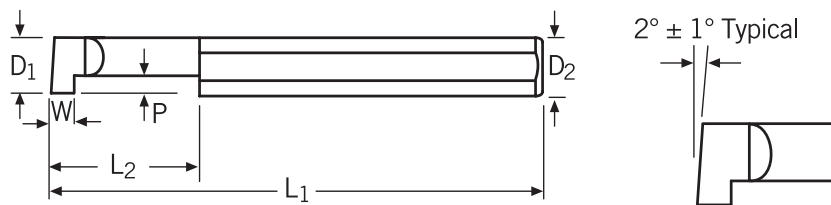
## For Retaining Ring Grooves

Style RR shown



Shank Diameter             $-.0001$  to  $-.0002$ "  
 Minimum Hole Dia.         $+.000$   $-.005$ "  
 Maximum Hole Depth        $+.050$   $-.000$ "  
 Overall Length               $\pm 1/64$ "

Lockdown flat automatically locates tool on center.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

Other sizes also available upon request. Steel Holders, see Page 41.

RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	MINIMUM HOLE DIA. $D_1$	SHANK DIAMETER $D_2$	OVERALL LENGTH $L_1$	MAXIMUM HOLE DEPTH $L_2$	PROJECTION $P$	GROOVE TOOL WIDTH $W$	PRICE EACH
RR-093-8 RR-093-12 RR-093-16 RR-093-20 RR-093-24	RRL-093-8 RRL-093-12 RRL-093-16 RRL-093-20 RRL-093-24	.500	1/2	3	1/2	.150	.093/.095	64.65
					3/4			
					1			
					1-1/4			
					1-1/2			
RR-125-8 RR-125-12 RR-125-16 RR-125-20 RR-125-24	RRL-125-8 RRL-125-12 RRL-125-16 RRL-125-20 RRL-125-24				1/2		.125/.127	
					3/4			
					1			
					1-1/4			
					1-1/2			
RR-156-8 RR-156-12 RR-156-16 RR-156-20 RR-156-24	RRL-156-8 RRL-156-12 RRL-156-16 RRL-156-20 RRL-156-24				1/2		.156/.158	
					3/4			
					1			
					1-1/4			
					1-1/2			
RR-187-8 RR-187-12 RR-187-16 RR-187-20 RR-187-24	RRL-187-8 RRL-187-12 RRL-187-16 RRL-187-20 RRL-187-24				1/2		.187/.189	
					3/4			
					1			
					1-1/4			
					1-1/2			
RR-250-8 RR-250-12 RR-250-16 RR-250-20 RR-250-24	RRL-250-8 RRL-250-12 RRL-250-16 RRL-250-20 RRL-250-24				1/2		.250/.252	
					3/4			
					1			
					1-1/4			
					1-1/2			

# GROOVE TOOLS

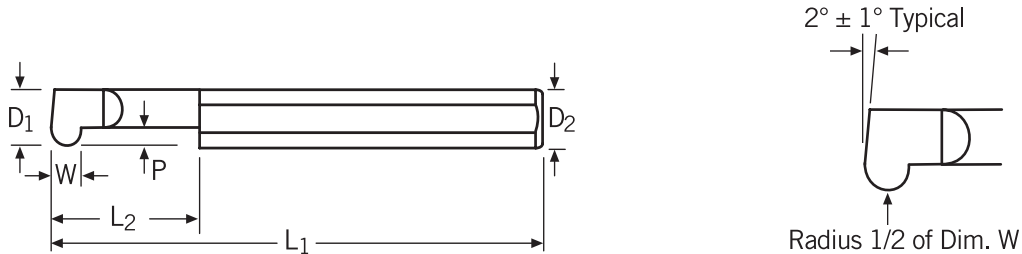


## For Full Radius Grooves



Shank Diameter            -.0001 to -.0002"  
 Minimum Hole Dia.       +.000 -.005"  
 Maximum Hole Depth     +.050 -.000"  
 Overall Length           ±1/64"

Lockdown flat automatically locates tool on center.



Left-hand groove tools and other sizes also available upon request. **Steel Holders, see Page 41.**

TOOL NUMBER	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAXIMUM HOLE DEPTH L <sub>2</sub>	PROJECTION P	GROOVE TOOL WIDTH W	PRICE EACH
FR-017-4 FR-017-6 FR-017-8 FR-017-10	.250	1/4	2-1/2	1/4	.050	.017/.018	32.55
3/8							
1/2							
5/8							
FR-025-4 FR-025-6 FR-025-8 FR-025-10				1/4			
3/8							
1/2							
5/8							
FR-030-4 FR-030-6 FR-030-8 FR-030-10	.312	5/16	2-1/2	1/4	.100	.033/.034	40.65
3/8							
1/2							
5/8							
FR-033-4 FR-033-6 FR-033-8 FR-033-10				1/4			
3/8							
1/2							
5/8							
FR-038-4 FR-038-6 FR-038-8 FR-038-10	.312	5/16	2-1/2	1/4	.100	.038/.039	40.65
3/8							
1/2							
5/8							
FR-038-4 FR-038-6 FR-038-8 FR-038-10				1/4			
3/8							
1/2							
5/8							

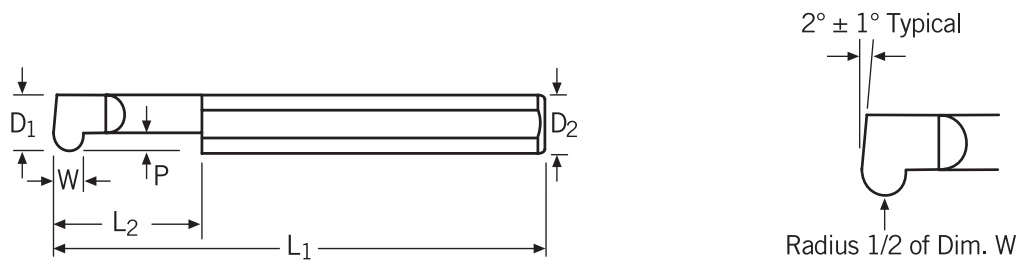


super carbide tools

# GROOVE TOOLS



## For Full Radius Grooves



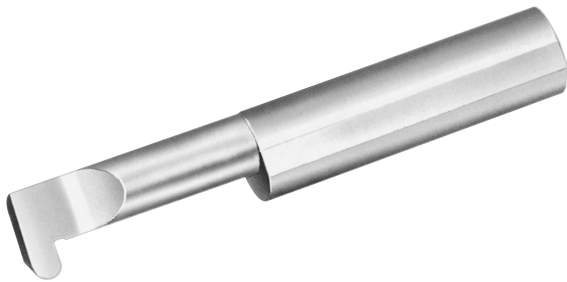
Left-hand groove tools and other sizes also available upon request. **Steel Holders, see Page 41.**

TOOL NUMBER	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAXIMUM HOLE DEPTH L <sub>2</sub>	PROJECTION P	GROOVE TOOL WIDTH W	PRICE EACH	
FR-039-4 FR-039-6 FR-039-8 FR-039-12 FR-039-16 FR-039-20	.375	3/8	2-1/2	1/4	.100	.039/.041	51.50	
FR-046-4 FR-046-6 FR-046-8 FR-046-12 FR-046-16 FR-046-20				3/8				.046/.048
FR-055-4 FR-055-6 FR-055-8 FR-055-12 FR-055-16 FR-055-20				1/2				.055/.057
FR-062-4 FR-062-6 FR-062-8 FR-062-12 FR-062-16 FR-062-20				3/4				.062/.064
FR-069-4 FR-069-6 FR-069-8 FR-069-12 FR-069-16 FR-069-20				1				.069/.071
FR-087-4 FR-087-6 FR-087-8 FR-087-12 FR-087-16 FR-087-20				1-1/4				.087/.089

# GROOVE TOOLS

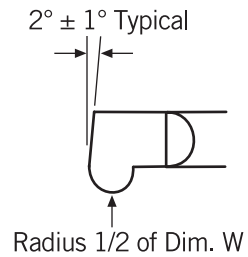
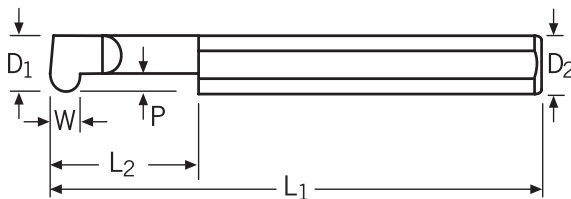


## For Full Radius Grooves



Shank Diameter            -.0001 to -.0002"  
 Minimum Hole Dia.       +.000 -.005"  
 Maximum Hole Depth     +.050 -.000"  
 Overall Length           ±1/64"

Lockdown flat automatically locates tool on center.



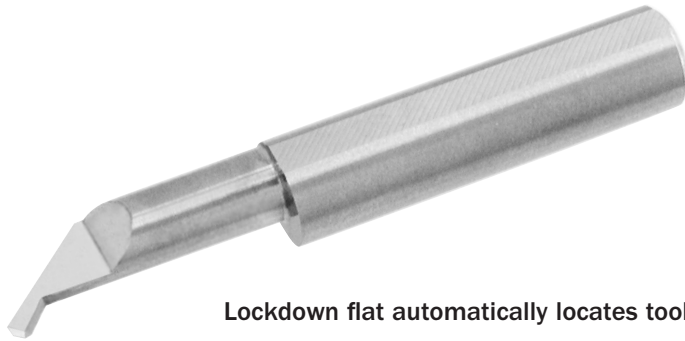
Left-hand groove tools and other sizes also available upon request. **Steel Holders, see Page 41.**

TOOL NUMBER	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAXIMUM HOLE DEPTH L <sub>2</sub>	PROJECTION P	GROOVE TOOL WIDTH W	PRICE EACH
FR-093-8 FR-093-12 FR-093-16 FR-093-20 FR-093-24	.500	1/2	3	1/2	.150	.093/.095	70.85
FR-093-12				3/4			
FR-093-16				1			
FR-093-20				1-1/4			
FR-093-24				1-1/2			
FR-125-8 FR-125-12 FR-125-16 FR-125-20 FR-125-24	.500	1/2	3	1/2	.150	.125/.127	70.85
FR-125-12				3/4			
FR-125-16				1			
FR-125-20				1-1/4			
FR-125-24				1-1/2			
FR-156-8 FR-156-12 FR-156-16 FR-156-20 FR-156-24	.500	1/2	3	1/2	.150	.156/.158	70.85
FR-156-12				3/4			
FR-156-16				1			
FR-156-20				1-1/4			
FR-156-24				1-1/2			
FR-187-8 FR-187-12 FR-187-16 FR-187-20 FR-187-24	.500	1/2	3	1/2	.150	.187/.189	70.85
FR-187-12				3/4			
FR-187-16				1			
FR-187-20				1-1/4			
FR-187-24				1-1/2			
FR-250-8 FR-250-12 FR-250-16 FR-250-20 FR-250-24	.500	1/2	3	1/2	.150	.250/.252	70.85
FR-250-12				3/4			
FR-250-16				1			
FR-250-20				1-1/4			
FR-250-24				1-1/2			



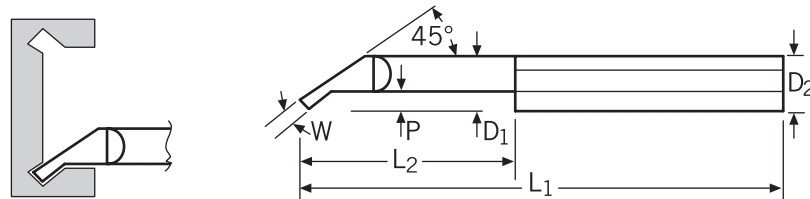
super carbide tools

## Undercut Groove Tools



Shank Diameter             $-.0001$  to  $-.0002$ "  
 Maximum Hole Depth         $+.050$   $-.000$ "  
 Overall Length                 $\pm 1/64$ "

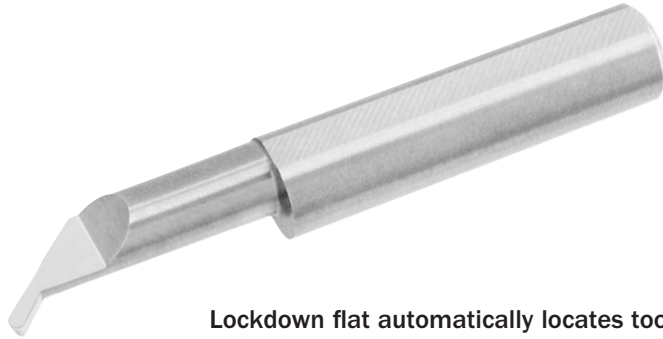
Lockdown flat automatically locates tool on center.



Other sizes also available upon request.

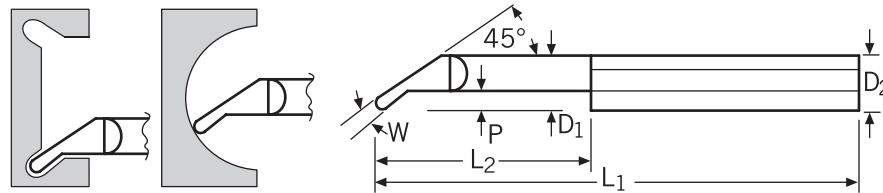
TOOL NUMBER	MINIMUM HOLE DIA. $D_1$	SHANK DIAMETER $D_2$	OVERALL LENGTH $L_1$	MAXIMUM HOLE DEPTH $L_2$	PROJECTION $P$	TOOL WIDTH $W$	PRICE EACH
UC-25030-8 UC-25030-16	.260	1/4	2-1/2	1/2 1	.050	.030/.032	29.40
UC-31050-8 UC-31050-16 UC-31062-16 UC-31062-20	.325	5/16		1/2 1 1 1-1/4	.100	.050/.052 .050/.052 .062/.064 .062/.064	36.65
UC-37062-16 UC-37062-20 UC-37093-16 UC-37093-20 UC-37125-16 UC-37125-20	.385	3/8		1 1-1/4 1 1-1/4 1 1-1/4		.062/.064 .062/.064 .093/.095 .093/.095 .125/.127 .125/.127	48.30
UC-50062-16 UC-50062-24 UC-50093-16 UC-50093-24 UC-50125-16 UC-50125-24	.510	1/2		3	1 1-1/2 1 1-1/2 1 1-1/2	.150	.062/.064 .062/.064 .093/.095 .093/.095 .125/.127 .125/.127

## Undercut & Profile Groove Tools



Shank Diameter             $-.0001$  to  $-.0002$ "  
 Maximum Hole Depth         $+.050$   $-.000$ "  
 Overall Length                 $\pm 1/64$ "

Lockdown flat automatically locates tool on center.

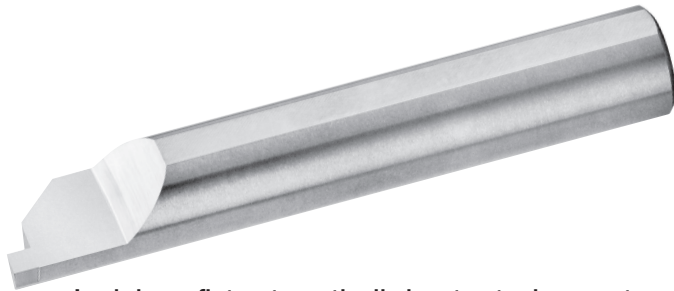


Other sizes also available upon request.

TOOL NUMBER	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAXIMUM HOLE DEPTH L <sub>2</sub>	PROJECTION P	TOOL WIDTH W	PRICE EACH
UP-25030-8 UP-25030-16	.260	1/4	2-1/2	1/2 1	.050	.030/.032	33.80
UP-31050-8 UP-31050-16 UP-31062-16 UP-31062-20	.325	5/16		1/2 1 1 1-1/4			
UP-37062-16 UP-37062-20 UP-37093-16 UP-37093-20 UP-37125-16 UP-37125-20	.385	3/8	2-1/2	1 1-1/4 1 1-1/4 1 1-1/4	.100	.062/.064 .062/.064 .093/.095 .093/.095 .125/.127 .125/.127	53.85
UP-50062-16 UP-50062-24 UP-50093-16 UP-50093-24 UP-50125-16 UP-50125-24	.510	1/2		3			
							74.25

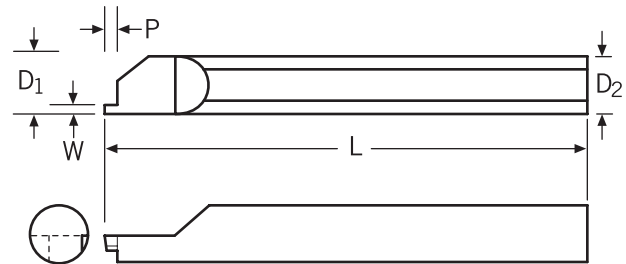


## Face Groove Tools



Lockdown flat automatically locates tool on center.

Shank Diameter       $-.0001$  to  $-.0002$ "  
 Projection             $+.020$   $-.000$ "  
 Overall Length        $\pm 1/64$ "



Other sizes also available upon request.

TOOL NUMBER	MINIMUM GROOVE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L	PROJECTION P	TOOL WIDTH W	PRICE EACH		
FG-250-020 FG-250-030 FG-250-040 FG-250-050	.260	1/4	2-1/2	.050	.020/.022 .030/.032 .040/.042 .050/.052	22.75		
FG-312-030 FG-312-040 FG-312-050 FG-312-062	.320	5/16			.050 .050 .050 .075		.030/.032 .040/.042 .050/.052 .062/.064	31.10
FG-375-030 FG-375-062 FG-375-093 FG-375-125	.385	3/8			.050 .075 .100 .100		.030/.032 .062/.064 .093/.095 .125/.127	
FG-500-062 FG-500-093 FG-500-125 FG-500-156	.510	1/2	3	.075 .100 .100 .100	.062/.064 .093/.095 .125/.127 .156/.158	49.05		
FG-625-062 FG-625-093 FG-625-125 FG-625-156 FG-625-187	.635	5/8	3-1/2	.075 .100 .100 .100 .150	.062/.064 .093/.095 .125/.127 .156/.158 .187/.189		79.90	
FG-750-062 FG-750-093 FG-750-125 FG-750-156 FG-750-187 FG-750-250	.760	3/4	4	.075 .100 .100 .100 .150 .250	.062/.064 .093/.095 .125/.127 .156/.158 .187/.189 .250/.252	127.20		

# GROOVE TOOLS

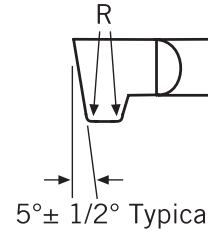
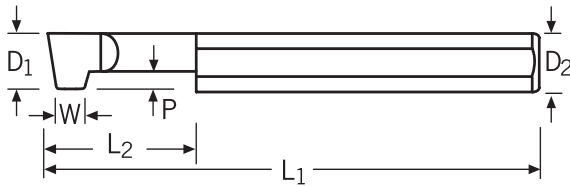


## For "O" Ring Grooves



Lockdown flat automatically locates tool on center.

Shank Diameter            -.0001 to -.0002"  
 Minimum Hole Dia.       +.000 -.005"  
 Maximum Hole Depth      +.050 -.000"  
 Overall Length            ±1/64"



TOOL NUMBER	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAXIMUM HOLE DEPTH L <sub>2</sub>	PROJECTION P	RADIUS R	GROOVE TOOL WIDTH W	PRICE EACH
OR-096-8 OR-141-9 OR-144-10	.250	1/4	2-1/2	1/2 9/16 5/8	.100	.010/.020 .035/.045 .035/.045	.096/.098 .141/.143 .144/.146	<b>28.30</b>
OR-174-12 OR-208-13 OR-241-15	.375	3/8		3/4 13/16 15/16	.115	.010/.020 .035/.045 .035/.045	.174/.176 .208/.210 .241/.243	

## Steel Holders

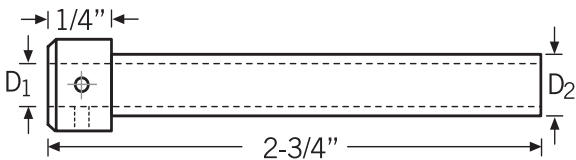


Heat treated and precision ground.  
 Two lockdowns at 90° for secure fastening.\*

\*Except on TH-84, TH-104 and TH-204  
 having only ONE set screw.

T.I.R. Maximum .002"

METRIC SIZES ALSO FROM STOCK



TOOL NUMBER	INSIDE DIAMETER D <sub>1</sub>	OUTSIDE DIAMETER D <sub>2</sub>	PRICE EACH	
TH-84 TH-85 TH-86 TH-87 TH-88	1/8 3/16 1/4 5/16 3/8	1/2	<b>25.00</b>	
TH-104 TH-105 TH-106 TH-107 TH-108	1/8 3/16 1/4 5/16 3/8	5/8		
TH-204 TH-205 TH-206 TH-207 TH-208 TH-210	1/8 3/16 1/4 5/16 3/8 1/2	3/4		<b>31.00</b>



super carbide tools

# THREADING TOOLS



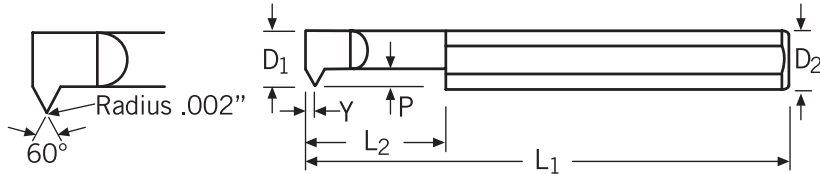
## 60° Internal Threading Tools

Style IT shown



Lockdown flat automatically locates tool on center.

Shank Diameter            -.0001 to -.0002"  
 Minimum Hole Dia.       +.000 -.005"  
 Depth                       +.050-.000"  
 Overall Length           ±1/64"  
 Radius                      ±.001"



METRIC  
SIZES  
ALSO  
FROM  
STOCK

Other sizes also available upon request. *Steel Holders, see Page 41.*

RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	DEPTH L <sub>2</sub>	PROJECTION P	OFFSET POINT Y	PRICE EACH
IT-040075 IT-040100 IT-040150	ITL-040075 ITL-040100 ITL-040150	.040	1/8	1-1/2	0.075 0.100 0.150	.015	.009	33.10
IT-050100 IT-050150 IT-050200	ITL-050100 ITL-050150 ITL-050200	.050			0.100 0.150 0.200	.020	.012	
IT-060200 IT-060250 IT-060300	ITL-060200 ITL-060250 ITL-060300	.060			0.200 0.250 0.300	.020	.012	28.85
IT-080250 IT-080350 IT-080500	ITL-080250 ITL-080350 ITL-080500	.080			0.250 0.350 0.500	.020	.012	
IT-100250 IT-100350 IT-100500 IT-100600	ITL-100250 ITL-100350 ITL-100500 ITL-100600	.100			0.250 0.350 0.500 0.600	.025	.014	26.25
IT-120250 IT-120400 IT-120500 IT-120600 IT-120750	ITL-120250 ITL-120400 ITL-120500 ITL-120600 ITL-120750	.120			0.250 0.400 0.500 0.600 0.750	.030	.017	
IT-140250 IT-140400 IT-140500 IT-140750	ITL-140250 ITL-140400 ITL-140500 ITL-140750	.140	3/16	2	0.250 0.400 0.500 0.750	.035	.020	28.00
IT-160250 IT-160400 IT-160500 IT-160750 IT-1601000	ITL-160250 ITL-160400 ITL-160500 ITL-160750 ITL-1601000	.160			0.250 0.400 0.500 0.750 1.000	.040	.023	

# THREADING TOOLS



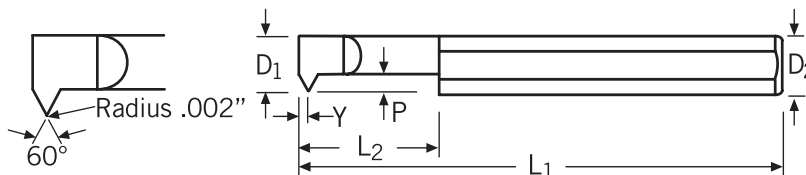
## 60° Internal Threading Tools

Style IT shown



Lockdown flat automatically locates tool on center.

Shank Diameter             $-.0001$  to  $-.0002$ "  
 Minimum Hole Dia.         $+.000$   $-.005$ "  
 Depth                          $+.050$   $-.000$ "  
 Overall Length              $\pm 1/64$ "  
 Radius                          $\pm .001$ "



METRIC  
SIZES  
ALSO  
FROM  
STOCK

Other sizes also available upon request. Steel Holders, see Page 41.

RIGHT HAND TOOL NO.	LEFT HAND TOOL NO.	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	DEPTH L <sub>2</sub>	PROJECTION P	OFFSET POINT Y	PRICE EACH
IT-180350 IT-180500 IT-180750 IT-1801000	ITL-180350 ITL-180500 ITL-180750 ITL-1801000	.180	1/4	2-1/2	0.350 0.500 0.750 1.000	.040	.023	29.95
IT-200400 IT-200600 IT-200750 IT-2001000	ITL-200400 ITL-200600 ITL-200750 ITL-2001000	.200			0.400 0.600 0.750 1.000	.045	.026	
IT-230400 IT-230600 IT-230750 IT-2301000 IT-2301500	ITL-230400 ITL-230600 ITL-230750 ITL-2301000 ITL-2301500	.230	5/16	2-1/2	0.400 0.600 0.750 1.000 1.500	.055	.032	37.40
IT-290500 IT-290750 IT-2901000 IT-2901250 IT-2901750	ITL-290500 ITL-290750 ITL-2901000 ITL-2901250 ITL-2901750	.290			0.500 0.750 1.000 1.250 1.750	.070	.040	
IT-320500 IT-320750 IT-3201000 IT-3201250 IT-3201800	ITL-320500 ITL-320750 ITL-3201000 ITL-3201250 ITL-3201800	.320	3/8	2-1/2	0.500 0.750 1.000 1.250 1.800	.075	.043	48.75
IT-360500 IT-360750 IT-3601000 IT-3601250 IT-3601800	ITL-360500 ITL-360750 ITL-3601000 ITL-3601250 ITL-3601800	.360			0.500 0.750 1.000 1.250 1.800	.085	.049	
IT-490750 IT-4901500 IT-4902000	ITL-490750 ITL-4901500 ITL-4902000	.490	1/2	3	0.750 1.500 2.000	.120	.069	68.40

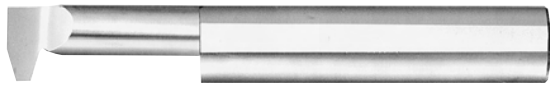


super carbide tools

# THREADING TOOLS

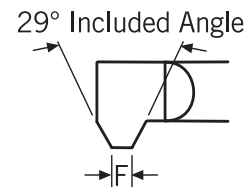
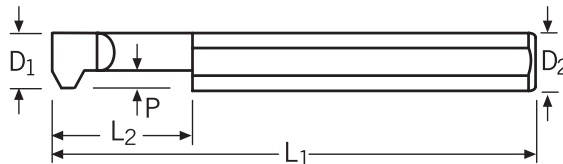


## Stub ACME Threading Tools 29° Included Angle



Lockdown flat automatically locates tool on center.

Shank Diameter       $-.0001$  to  $-.0002$ "  
 Minimum Hole Dia.       $+.000$   $-.005$ "  
 Depth       $+.050$   $-.000$ "  
 Flat       $\pm .001$ "  
 Overall Length       $\pm 1/64$ "



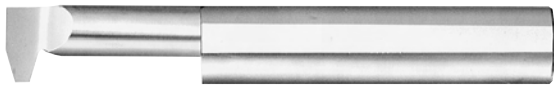
**Steel Holders, see Page 41.**

TOOL NUMBER	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	FLAT F	OVERALL LENGTH L <sub>1</sub>	DEPTH L <sub>2</sub>	PROJECTION P	THREADS PER INCH	PRICE EACH
SAT-400-16 SAT-600-16 SAT-750-16 SAT-1000-16	.200	1/4	.024	2-1/2	0.400 0.600 0.750 1.000	.045	16	29.95
SAT-500-14 SAT-750-14 SAT-1000-14 SAT-1250-14 SAT-1750-14	.235	5/16	.028	2-1/2	0.500 0.750 1.000 1.250 1.750	.070	14	37.00
SAT-500-12 SAT-750-12 SAT-1000-12 SAT-1250-12 SAT-1800-12	.360	3/8	.033	2-1/2	0.500 0.750 1.000 1.250 1.800	.085	12	48.75
SAT-750-10 SAT-1500-10 SAT-2000-10	.490	1/2	.037	3	0.750 1.500 2.000	.120	10	68.40
SAT-750-9 SAT-1500-9 SAT-2000-9			.042		0.750 1.500 2.000		9	
SAT-750-8 SAT-1500-8 SAT-2000-8			.048		0.750 1.500 2.000		8	
SAT-750-7 SAT-1500-7 SAT-2000-7			.055		0.750 1.500 2.000		7	
SAT-750-6 SAT-1500-6 SAT-2000-6			.065		0.750 1.500 2.000		6	
SAT-750-5 SAT-1500-5 SAT-2000-5			.079		0.750 1.500 2.000		5	

# THREADING TOOLS

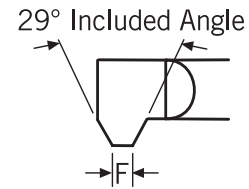


## Internal ACME Threading Tools 29° Included Angle



Lockdown flat automatically locates tool on center.

Shank Diameter       $-.0001$  to  $-.0002$ "  
 Minimum Hole Dia.       $+.000$   $-.005$ "  
 Depth       $+.050$   $-.000$ "  
 Flat       $\pm .001$ "  
 Overall Length       $\pm 1/64$ "



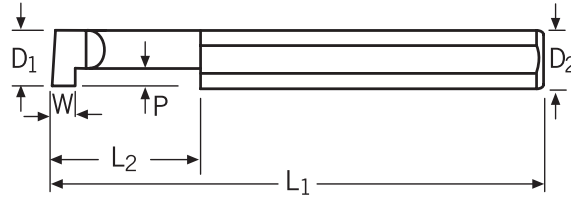
**Steel Holders, see Page 41.**

TOOL NUMBER	MINIMUM HOLE DIA. D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	FLAT F	OVERALL LENGTH L <sub>1</sub>	DEPTH L <sub>2</sub>	PROJECTION P	THREADS PER INCH	PRICE EACH	
IAT-400-16 IAT-600-16 IAT-750-16 IAT-1000-16	.200	1/4	.021	2-1/2	0.400 0.600 0.750 1.000	.045	16	<b>29.95</b>	
IAT-500-14 IAT-750-14 IAT-1000-14 IAT-1250-14 IAT-1750-14	.255	5/16	.024	2-1/2	0.500 0.750 1.000 1.250 1.750	.070	14		<b>37.00</b>
IAT-500-12 IAT-750-12 IAT-1000-12 IAT-1250-12 IAT-1800-12	.360	3/8	.028	2-1/2	0.500 0.750 1.000 1.250 1.800	.085	12		
IAT-750-10 IAT-1500-10 IAT-2000-10	.490	1/2	.032	3	0.750 1.500 2.000	.120	10		
IAT-750-8 IAT-1500-8 IAT-2000-8			.041		0.750 1.500 2.000		8		
IAT-750-6 IAT-1500-6 IAT-2000-6			.057		0.750 1.500 2.000		6		
IAT-750-5 IAT-1500-5 IAT-2000-5			.069		0.750 1.500 2.000		5		



**super carbide tools**

## Groove Tool Sets For Retaining Ring Grooves Furnished in fitted wood case.



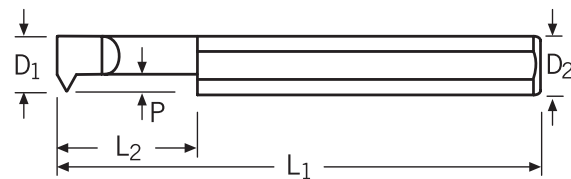
SET No. RR-1 \$183.50

TOOL NUMBER	MIN. HOLE DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAX. HOLE DEPTH L <sub>2</sub>	PROJECTION P	GROOVE TOOL WIDTH W
RR-017-4	.250	1/4	2-1/2	1/4	.050	.017/.018
RR-025-10	.250	1/4		5/8	.050	.025/.026
RR-030-8	.250	1/4		1/2	.050	.030/.031
RR-030-10	.250	1/4		5/8	.050	.030/.031
RR-038-8	.312	5/16		1/2	.100	.038/.039
RR-038-12	.312	5/16		3/4	.100	.038/.039

SET No. RR-2 \$276.00

TOOL NUMBER	MIN. HOLE DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAX. HOLE DEPTH L <sub>2</sub>	PROJECTION P	GROOVE TOOL WIDTH W
RR-039-12	.375	3/8	2-1/2	3/4	.100	.039/.041
RR-046-16				1		.046/.048
RR-055-20				1-1/4		.055/.057
RR-062-12				3/4		.062/.064
RR-087-12				3/4		.087/.089
RR-087-20				1-1/4		.087/.089

## Threading Tool Set 60° Internal Threading Tools Furnished in fitted wood case.



SET No. IT-1 \$231.75

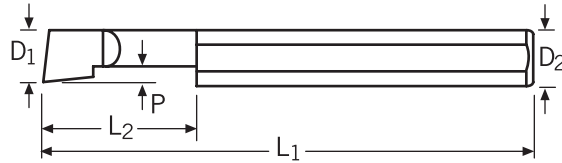
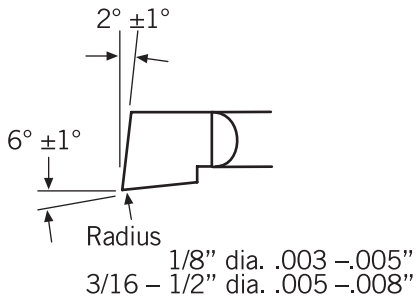
TOOL NUMBER	MINIMUM HOLE DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	DEPTH L <sub>2</sub>	PROJECTION P
IT-180500	.180	1/4	2-1/2	.500	.040
IT-200600	.200	1/4		.600	.045
IT-230600	.230	5/16		.600	.055
IT-290750	.290	5/16		.750	.070
IT-320750	.320	3/8		.750	.075
IT-360750	.360	3/8		.750	.085

# SET CONVENIENCE



## Boring Tool Sets

Furnished in fitted wood case. *Miniature Boring Tool Set, see Page 23.*



SET No. BB-1 \$126.30

TOOL NUMBER	MIN. BORE DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PROJECTION P
BB-050300	.050	1/8	1-1/2	0.300	.013
BB-060300	.060			0.300	.015
BB-080300	.080			0.300	.020
BB-100400	.100			0.400	.025
BB-100600	.100			0.600	.025
BB-110500	.110			0.500	.028

SET No. BB-2 \$134.35

TOOL NUMBER	MIN. BORE DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PROJECTION P
BB-120500	.120	3/16	2	0.500	.030
BB-120700	.120			0.700	.030
BB-140400	.140			0.400	.035
BB-140700	.140			0.700	.035
BB-160400	.160			0.400	.040
BB-160750	.160			0.750	.040

SET No. BB-3 \$145.00

TOOL NUMBER	MIN. BORE DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PROJECTION P
BB-180500	.180	1/4	2-1/2	0.500	.045
BB-180750	.180			0.750	.045
BB-1801000	.180			1.000	.045
BB-200400	.200			0.400	.050
BB-200600	.200			0.600	.050
BB-2001000	.200			1.000	.050

SET No. BB-4 \$195.65

TOOL NUMBER	MIN. BORE DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PROJECTION P
BB-230400	.230	5/16	2-1/2	0.400	.058
BB-230600	.230			0.600	.058
BB-230800	.230			0.800	.058
BB-2301000	.230			1.000	.058
BB-290500	.290			0.500	.073
BB-2901000	.290			1.000	.073

SET No. BB-5 \$266.85

TOOL NUMBER	MIN. BORE DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	MAX. BORE DEPTH L <sub>2</sub>	PROJECTION P
BB-320500	.320	3/8	2-1/2	0.500	.080
BB-3201000	.320			1.000	.080
BB-3201500	.320			1.500	.080
BB-360750	.360			0.750	.090
BB-3601250	.360			1.250	.090
BB-3601800	.360			1.800	.090



super carbide tools



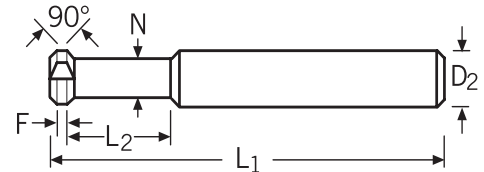
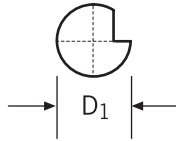
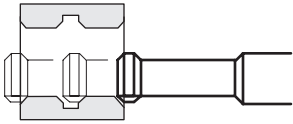
# BACK CHAMFERING TOOLS



## Back Chamfering Tools For Lathes



Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                 +.000 -.005"  
 Neck Diameter                   +.000 -.005"  
 Flat                                 +.000 -.005"  
 Depth                             +.050 -.000"  
 Overall Length                 ±1/64"



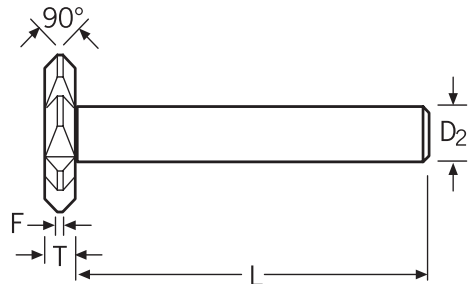
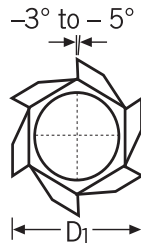
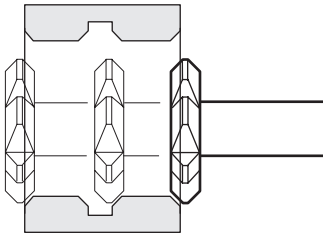
TOOL NUMBER	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	FLAT F	OVERALL LENGTH L <sub>1</sub>	DEPTH L <sub>2</sub>	NECK DIAMETER N	PRICE EACH
LBC-125-8	.115	1/8	1/32	1-1/2	1/2	.075	23.65
LBC-125-12	.115	1/8		1-1/2	3/4	.075	23.65
LBC-187-12	.177	3/16		2	3/4	.125	27.75
LBC-187-16	.177	3/16		2	1	.125	27.75
LBC-250-12	.240	1/4		2-1/2	3/4	.170	33.30
LBC-250-20	.240	1/4		2-1/2	1-1/4	.170	33.30
LBC-312-12	.300	5/16		2-1/2	3/4	.210	41.50
LBC-312-20	.300	5/16		2-1/2	1-1/4	.210	41.50
LBC-375-12	.360	3/8		2-1/2	3/4	.250	54.10
LBC-375-20	.360	3/8		2-1/2	1-1/4	.250	54.10
LBC-500-16	.490	1/2		3	1	.350	94.20
LBC-500-24	.490	1/2		3	1-1/2	.350	94.20

## Brazed Back Chamfering Tools For Milling Machines



Solid carbide cutter head  
brazed to solid carbide shank.

Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                 +.000 -.005"  
 Flat                                 +.000 -.005"  
 Overall Length                 ±1/32"



TOOL NUMBER	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	FLAT F	SHANK LENGTH L	THICKNESS T	NUMBER OF FLUTES	PRICE EACH
MBC-375	3/8	1/4	1/32	2-1/2	1/8	4	61.85
MBC-500	1/2	5/16		2-1/2	1/8	5	75.35
MBC-750	3/4	3/8		2-1/2	5/32	6	93.50
MBC-001	1	1/2		3	3/16	7	122.05

# THREAD RELIEF TOOLS

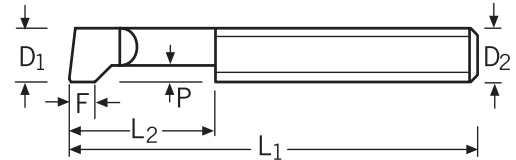
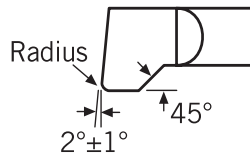
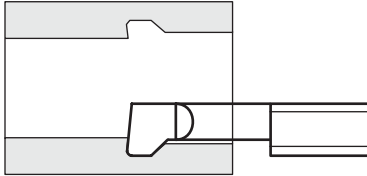


## Thread Relief Tools For Lathes



Lockdown flat automatically locates tool on center.

Shank Diameter             $-.0001$  to  $-.0002$ "  
 Cutter Diameter         $+.000$   $-.005$ "  
 Depth                       $+.050$   $-.000$ "  
 Overall Length          $\pm 1/64$ "



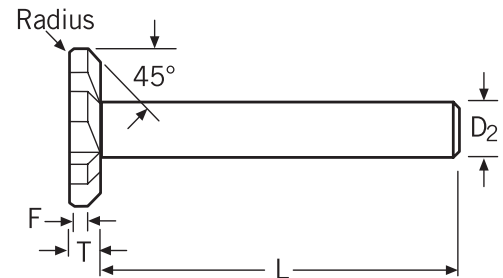
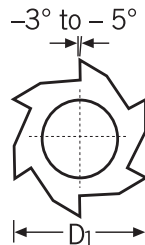
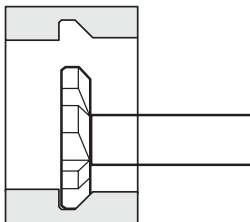
TOOL NUMBER	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	FLAT F	OVERALL LENGTH L <sub>1</sub>	DEPTH L <sub>2</sub>	PROJECTION P	RADIUS R	PRICE EACH
LTR-125-6	.125	1/8	1/16	1-1/2	3/8	.040	.002-.004	21.75
LTR-187-6	.1875	3/16	5/64	2	3/8	.040	.003-.007	25.00
LTR-187-12	.1875	3/16	5/64	2	3/4	.040	.003-.007	25.00
LTR-250-8	.250	1/4	3/32	2-1/2	1/2	.050	.003-.007	29.95
LTR-250-16	.250	1/4	3/32	2-1/2	1	.050	.003-.007	29.95
LTR-312-12	.3125	5/16	3/32	2-1/2	3/4	.075	.003-.007	37.40
LTR-312-20	.3125	5/16	3/32	2-1/2	1-1/4	.075	.003-.007	37.40
LTR-375-12	.375	3/8	1/8	2-1/2	3/4	.100	.003-.007	49.25
LTR-375-20	.375	3/8	1/8	2-1/2	1-1/4	.100	.003-.007	49.25
LTR-500-16	.500	1/2	5/32	3	1	.125	.008-.012	69.80
LTR-500-24	.500	1/2	5/32	3	1-1/2	.125	.008-.012	69.80

## Brazed Thread Relief Tools For Milling Machines



Solid carbide cutter head  
brazed to solid carbide shank.

Shank Diameter             $-.0001$  to  $-.0002$ "  
 Cutter Diameter         $+.000$   $-.005$ "  
 Flat                          $+.000$   $-.005$ "  
 Overall Length          $\pm 1/32$ "



TOOL NUMBER	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	FLAT F	SHANK LENGTH L	THICKNESS T	NUMBER OF FLUTES	RADIUS R	PRICE EACH
MTR-375	3/8	1/4	.075	2-1/2	9/64	4	.010±.003	61.85
MTR-500	1/2	5/16	.100	2-1/2	7/32	5	.010±.003	75.35
MTR-750	3/4	3/8	.125	2-1/2	1/4	6	.015±.003	93.50
MTR-001	1	1/2	.125	3	1/4	7	.015±.003	122.05

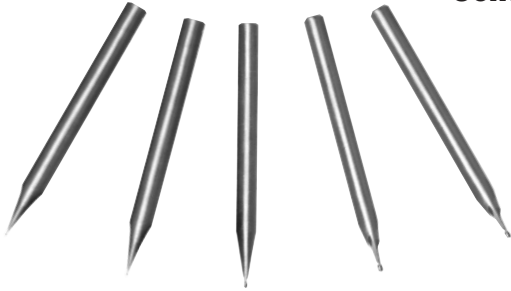


super carbide tools

# END MILLS



## SME Series, Miniature, Stub Length Center Cutting — 30° Helix



Shank Diameter     -.0001 to -.0002"  
Cutter Diameter     ±.0005"  
T.I.R. Maximum     .0005"

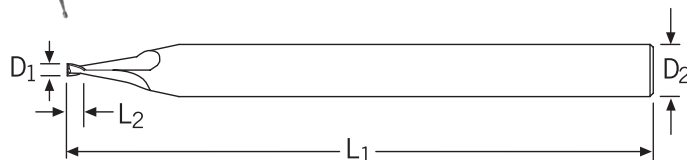


2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
SME-005-2	.005	1/8	1-1/2	.007	36.65
SME-006-2	.006			.009	36.65
SME-007-2	.007			.010	31.05
SME-008-2	.008			.012	31.05
SME-009-2	.009			.013	28.20
SME-010-2	.010	1/8	1-1/2	.015	28.20
SME-011-2	.011			.016	25.50
SME-012-2	.012			.018	25.50
SME-013-2	.013			.019	21.70
SME-014-2	.014			.021	21.70
SME-015-2	.015	1/8	1-1/2	.022	17.25
SME-016-2	.016			.024	
SME-017-2	.017			.025	
SME-018-2	.018			.027	
SME-019-2	.019			.028	
SME-020-2	.020	1/8	1-1/2	.030	15.90
SME-021-2	.021			.031	
SME-022-2	.022			.033	
SME-023-2	.023			.034	
SME-024-2	.024			.036	
SME-025-2	.025	1/8	1-1/2	.037	15.90
SME-026-2	.026			.039	13.95
SME-027-2	.027			.040	13.95
SME-028-2	.028			.042	13.95
SME-029-2	.029			.043	13.95
SME-030-2	.030	1/8	1-1/2	.045	13.95
SME-031-2	.031			.047	
SME-032-2	.032			.048	
SME-033-2	.033			.050	
SME-034-2	.034			.051	
SME-035-2	.035	1/8	1-1/2	.053	13.95
SME-040-2	.040			.060	
SME-045-2	.045			.068	
SME-050-2	.050			.075	

## Coated SME Series, Miniature, Stub Length Center Cutting — 30° Helix

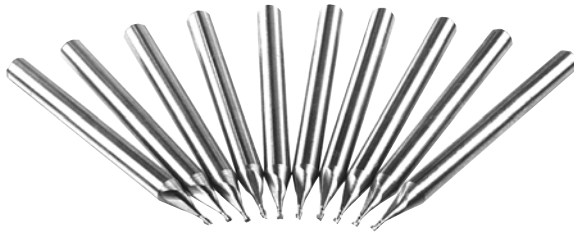


Shank Diameter — .0001 to .0002"  
Cutter Diameter ±.0005"  
T.I.R. Maximum .0005"

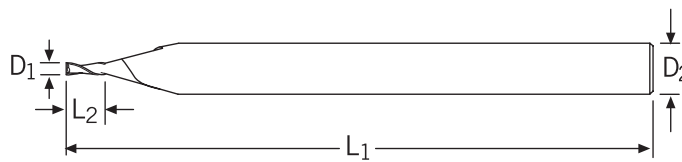


2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITIN COATED PRICE EACH
SME-005-2X	.005	1/8	1-1/2	.007	40.15
SME-006-2X	.006			.009	40.15
SME-007-2X	.007			.010	34.45
SME-008-2X	.008			.012	34.45
SME-009-2X	.009			.013	31.55
SME-010-2X	.010	1/8	1-1/2	.015	31.55
SME-011-2X	.011			.016	28.80
SME-012-2X	.012			.018	28.80
SME-013-2X	.013			.019	24.95
SME-014-2X	.014			.021	24.95
SME-015-2X	.015	1/8	1-1/2	.022	20.45
SME-016-2X	.016			.024	
SME-017-2X	.017			.025	
SME-018-2X	.018			.027	
SME-019-2X	.019			.028	
SME-020-2X	.020	1/8	1-1/2	.030	19.00
SME-021-2X	.021			.031	
SME-022-2X	.022			.033	
SME-023-2X	.023			.034	
SME-024-2X	.024			.036	
SME-025-2X	.025	1/8	1-1/2	.037	19.00
SME-026-2X	.026			.039	17.05
SME-027-2X	.027			.040	17.05
SME-028-2X	.028			.042	17.05
SME-029-2X	.029			.043	17.05
SME-030-2X	.030	1/8	1-1/2	.045	17.05
SME-031-2X	.031			.047	
SME-032-2X	.032			.048	
SME-033-2X	.033			.050	
SME-034-2X	.034			.051	
SME-035-2X	.035	1/8	1-1/2	.053	17.05
SME-040-2X	.040			.060	
SME-045-2X	.045			.068	
SME-050-2X	.050			.075	

## RME Series, Miniature Center Cutting — 30° Helix



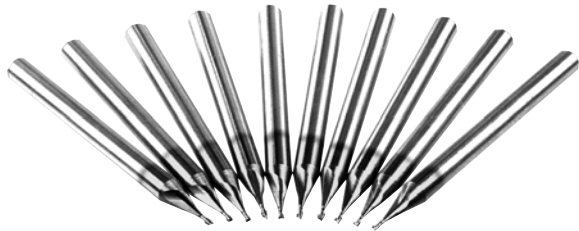
Shank Diameter —.0001 to —.0002"  
Cutter Diameter ±.0005"  
T.I.R. Maximum .0005"



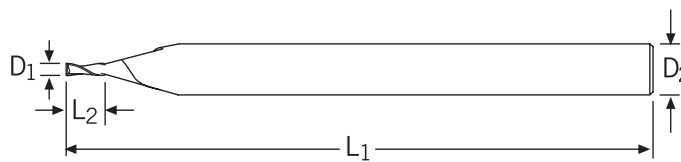
METRIC  
SIZES  
ALSO  
FROM  
STOCK

2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
RME-010-2	.010	1/8	1-1/2	.030	29.50
RME-011-2	.011			.033	26.70
RME-012-2	.012			.036	26.70
RME-013-2	.013			.039	22.70
RME-014-2	.014			.042	22.70
RME-015-2	.015	1/8	1-1/2	.045	18.00
RME-016-2	.016			.048	
RME-017-2	.017			.051	
RME-018-2	.018			.054	
RME-019-2	.019			.057	
RME-020-2	.020	1/8	1-1/2	.060	16.60
RME-021-2	.021			.063	
RME-022-2	.022			.066	
RME-023-2	.023			.069	
RME-024-2	.024			.072	
RME-025-2	.025	1/8	1-1/2	.075	16.60
RME-026-2	.026			.078	14.05
RME-027-2	.027			.081	14.05
RME-028-2	.028			.084	14.05
RME-029-2	.029			.087	14.05
RME-030-2	.030	1/8	1-1/2	.090	14.05
RME-031-2	.031			.093	
RME-032-2	.032			.096	
RME-033-2	.033			.099	
RME-034-2	.034			.102	
RME-035-2	.035	1/8	1-1/2	.105	14.05
RME-040-2	.040			.120	
RME-045-2	.045			.135	
RME-050-2	.050			.150	

## Coated RME Series, Miniature Center Cutting — 30° Helix



Shank Diameter —.0001 to —.0002"  
Cutter Diameter ±.0005"  
T.I.R. Maximum .0005"



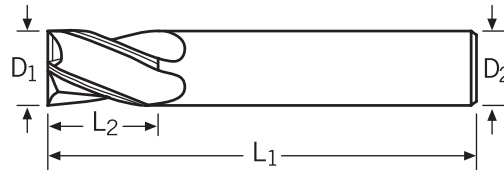
METRIC  
SIZES  
ALSO  
FROM  
STOCK

2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITIN COATED PRICE EACH
RME-010-2X	.010	1/8	1-1/2	.030	32.95
RME-011-2X	.011			.033	
RME-012-2X	.012			.036	
RME-013-2X	.013			.039	
RME-014-2X	.014			.042	
RME-015-2X	.015	1/8	1-1/2	.045	21.10
RME-016-2X	.016			.048	
RME-017-2X	.017			.051	
RME-018-2X	.018			.054	
RME-019-2X	.019			.057	
RME-020-2X	.020	1/8	1-1/2	.060	19.70
RME-021-2X	.021			.063	
RME-022-2X	.022			.066	
RME-023-2X	.023			.069	
RME-024-2X	.024			.072	
RME-025-2X	.025	1/8	1-1/2	.075	19.70
RME-026-2X	.026			.078	
RME-027-2X	.027			.081	
RME-028-2X	.028			.084	
RME-029-2X	.029			.087	
RME-030-2X	.030	1/8	1-1/2	.090	17.15
RME-031-2X	.031			.093	
RME-032-2X	.032			.096	
RME-033-2X	.033			.099	
RME-034-2X	.034			.102	
RME-035-2X	.035	1/8	1-1/2	.105	17.15
RME-040-2X	.040			.120	
RME-045-2X	.045			.135	
RME-050-2X	.050			.150	

## SEM Series, Stub Length Center Cutting — 30° Helix



Shank Diameter                     -.0001 to -.0002"  
 Cutter Diameter       1/32-1/4"   +.000-.002"  
                                    17/64-1/2"   +.000-.003"  
 T.I.R. Maximum                                     .0005"

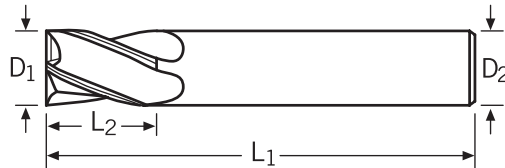


2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
SEM-031-02 SEM-046-02 SEM-062-02	SEM-031-03 SEM-046-03 SEM-062-03	SEM-031-04 SEM-046-04 SEM-062-04	1/32 3/64 1/16	1/8	1-1/2	1/16 3/32 1/8	12.00 12.00 10.90
SEM-078-02 SEM-093-02 SEM-109-02 SEM-125-02	SEM-078-03 SEM-093-03 SEM-109-03 SEM-125-03	SEM-078-04 SEM-093-04 SEM-109-04 SEM-125-04	5/64 3/32 7/64 1/8	1/8	1-1/2	5/32 3/16 3/16 1/4	10.90 10.90 10.90 9.65
SEM-140-02 SEM-156-02 SEM-171-02 SEM-187-02	SEM-140-03 SEM-156-03 SEM-171-03 SEM-187-03	SEM-140-04 SEM-156-04 SEM-171-04 SEM-187-04	9/64 5/32 11/64 3/16	3/16	1-1/2	1/4 5/16 5/16 3/8	15.45
SEM-203-02 SEM-218-02 SEM-234-02 SEM-250-02	SEM-203-03 SEM-218-03 SEM-234-03 SEM-250-03	SEM-203-04 SEM-218-04 SEM-234-04 SEM-250-04	13/64 7/32 15/64 1/4	1/4	2	3/8 7/16 7/16 1/2	19.20
SEM-265-02 SEM-281-02 SEM-296-02 SEM-312-02	SEM-265-03 SEM-281-03 SEM-296-03 SEM-312-03	SEM-265-04 SEM-281-04 SEM-296-04 SEM-312-04	17/64 9/32 19/64 5/16	5/16	2	1/2	21.30
SEM-328-02 SEM-343-02 SEM-359-02 SEM-375-02	SEM-328-03 SEM-343-03 SEM-359-03 SEM-375-03	SEM-328-04 SEM-343-04 SEM-359-04 SEM-375-04	21/64 11/32 23/64 3/8	3/8	2	1/2 1/2 1/2 5/8	25.45
SEM-390-02 SEM-406-02 SEM-421-02 SEM-437-02	— SEM-406-03 SEM-421-03 SEM-437-03	SEM-390-04 SEM-406-04 SEM-421-04 SEM-437-04	25/64 13/32 27/64 7/16	7/16	2-1/2	5/8	38.10
SEM-453-02 — SEM-484-02 SEM-500-02	SEM-453-03 SEM-468-03 SEM-484-03 SEM-500-03	SEM-453-04 SEM-468-04 SEM-484-04 SEM-500-04	29/64 15/32 31/64 1/2	1/2	2-1/2	5/8	41.90

## Coated SEM Series, Stub Length Center Cutting — 30° Helix



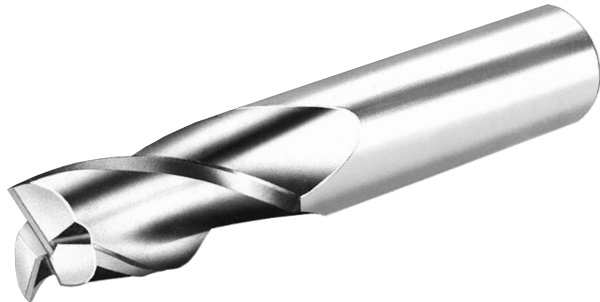
Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter         1/32–1/4"    +.000–.002"  
                                        17/64–1/2"   +.000–.003"  
 T.I.R. Maximum                         .0005"



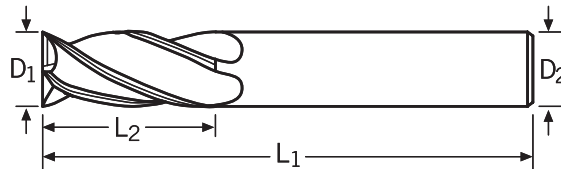
2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITiN COATED PRICE EACH
SEM-031-02X SEM-046-02X SEM-062-02X	SEM-031-03X SEM-046-03X SEM-062-03X	SEM-031-04X SEM-046-04X SEM-062-04X	1/32 3/64 1/16	1/8	1-1/2	1/16 3/32 1/8	15.00 15.00 13.90
SEM-078-02X SEM-093-02X SEM-109-02X SEM-125-02X	SEM-078-03X SEM-093-03X SEM-109-03X SEM-125-03X	SEM-078-04X SEM-093-04X SEM-109-04X SEM-125-04X	5/64 3/32 7/64 1/8	1/8	1-1/2	5/32 3/16 3/16 1/4	13.90 13.90 13.90 12.70
SEM-140-02X SEM-156-02X SEM-171-02X SEM-187-02X	SEM-140-03X SEM-156-03X SEM-171-03X SEM-187-03X	SEM-140-04X SEM-156-04X SEM-171-04X SEM-187-04X	9/64 5/32 11/64 3/16	3/16	1-1/2	1/4 5/16 5/16 3/8	19.65
SEM-203-02X SEM-218-02X SEM-234-02X SEM-250-02X	SEM-203-03X SEM-218-03X SEM-234-03X SEM-250-03X	SEM-203-04X SEM-218-04X SEM-234-04X SEM-250-04X	13/64 7/32 15/64 1/4	1/4	2	3/8 7/16 7/16 1/2	23.55
SEM-265-02X SEM-281-02X SEM-296-02X SEM-312-02X	SEM-265-03X SEM-281-03X SEM-296-03X SEM-312-03X	SEM-265-04X SEM-281-04X SEM-296-04X SEM-312-04X	17/64 9/32 19/64 5/16	5/16	2	1/2	27.70
SEM-328-02X SEM-343-02X SEM-359-02X SEM-375-02X	SEM-328-03X SEM-343-03X SEM-359-03X SEM-375-03X	SEM-328-04X SEM-343-04X SEM-359-04X SEM-375-04X	21/64 11/32 23/64 3/8	3/8	2	1/2 1/2 1/2 5/8	31.95
SEM-390-02X SEM-406-02X SEM-421-02X SEM-437-02X	— SEM-406-03X SEM-421-03X SEM-437-03X	SEM-390-04X SEM-406-04X SEM-421-04X SEM-437-04X	25/64 13/32 27/64 7/16	7/16	2-1/2	5/8	46.15
SEM-453-02X — SEM-484-02X SEM-500-02X	SEM-453-03X SEM-468-03X SEM-484-03X SEM-500-03X	SEM-453-04X SEM-468-04X SEM-484-04X SEM-500-04X	29/64 15/32 31/64 1/2	1/2	2-1/2	5/8	50.00



## GEM Series Center Cutting — 30° Helix



Shank Diameter — .0001 to -.0002”  
 Cutter Diameter 1/32 – 1/4” +.000 –.002”  
 9/32 – 1” +.000 –.003”  
 T.I.R. Maximum .0005”

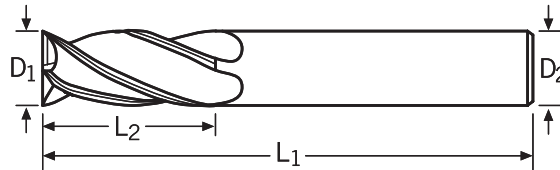
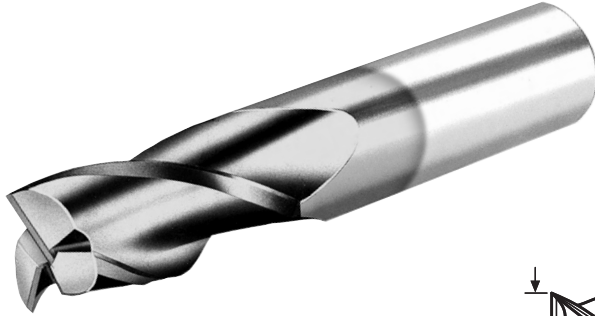


METRIC  
SIZES  
ALSO  
FROM  
STOCK

2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
GEM-031-2	GEM-031-3	GEM-031-4	1/32			5/64	12.55
GEM-046-2	GEM-046-3	GEM-046-4	3/64			7/64	12.55
GEM-062-2	GEM-062-3	GEM-062-4	1/16			3/16	11.45
GEM-078-2	GEM-078-3	GEM-078-4	5/64	1/8	1-1/2	3/16	11.45
GEM-093-2	GEM-093-3	GEM-093-4	3/32			3/8	11.45
GEM-109-2	GEM-109-3	GEM-109-4	7/64			3/8	11.45
GEM-125-2	GEM-125-3	GEM-125-4	1/8			1/2	10.20
GEM-140-2	GEM-140-3	GEM-140-4	9/64			1/2	16.20
GEM-156-2	GEM-156-3	GEM-156-4	5/32	3/16	2	9/16	
GEM-171-2	GEM-171-3	GEM-171-4	11/64			5/8	
GEM-187-2	GEM-187-3	GEM-187-4	3/16			5/8	
GEM-203-2	GEM-203-3	GEM-203-4	13/64			5/8	20.25
GEM-218-2	—	GEM-218-4	7/32	1/4	2-1/2	5/8	
GEM-234-2	—	GEM-234-4	15/64			3/4	
GEM-250-2	GEM-250-3	GEM-250-4	1/4			3/4	
GEM-281-2	GEM-281-3	GEM-281-4	9/32	5/16		3/4	23.65
GEM-312-2	GEM-312-3	GEM-312-4	5/16	5/16	2-1/2	13/16	23.65
GEM-375-2	GEM-375-3	GEM-375-4	3/8	3/8		7/8	26.80
GEM-437-2	GEM-437-3	GEM-437-4	7/16	7/16		1	42.30
GEM-500-2	GEM-500-3	GEM-500-4	1/2	1/2	3	1	46.55
GEM-562-2	GEM-562-3	GEM-562-4	9/16	9/16	3-1/2	1-1/4	71.45
GEM-625-2	GEM-625-3	GEM-625-4	5/8	5/8	3-1/2	1-1/4	82.20
GEM-687-2	GEM-687-3	GEM-687-4	11/16	3/4	4	1-3/8	101.25
GEM-750-2	GEM-750-3	GEM-750-4	3/4	3/4			125.30
GEM-875-2	GEM-875-3	GEM-875-4	7/8	7/8	4	1-1/2	173.70
GEM-001-2	GEM-001-3	GEM-001-4	1	1			189.90

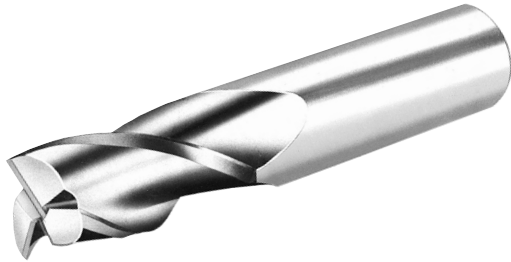
## Coated GEM Series Center Cutting — 30° Helix

Shank Diameter                      -.0001 to -.0002"  
 Cutter Diameter    1/32 – 1/4"   +.000 –.002"  
   9/32 – 1"   +.000 –.003"  
 T.I.R. Maximum                                 .0005"

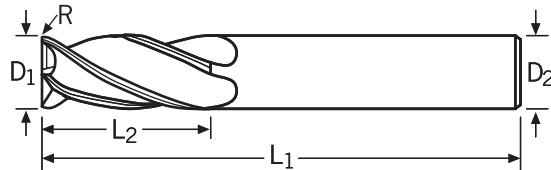


2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITIN COATED PRICE EACH
GEM-031-2X	GEM-031-3X	GEM-031-4X	1/32			5/64	15.55
GEM-046-2X	GEM-046-3X	GEM-046-4X	3/64			7/64	15.55
GEM-062-2X	GEM-062-3X	GEM-062-4X	1/16			3/16	14.45
GEM-078-2X	GEM-078-3X	GEM-078-4X	5/64	1/8	1-1/2	3/16	14.45
GEM-093-2X	GEM-093-3X	GEM-093-4X	3/32			3/8	14.45
GEM-109-2X	GEM-109-3X	GEM-109-4X	7/64			3/8	14.45
GEM-125-2X	GEM-125-3X	GEM-125-4X	1/8			1/2	13.20
GEM-140-2X	GEM-140-3X	GEM-140-4X	9/64			1/2	
GEM-156-2X	GEM-156-3X	GEM-156-4X	5/32	3/16	2	9/16	20.50
GEM-171-2X	GEM-171-3X	GEM-171-4X	11/64			5/8	
GEM-187-2X	GEM-187-3X	GEM-187-4X	3/16			5/8	
GEM-203-2X	GEM-203-3X	GEM-203-4X	13/64			5/8	
GEM-218-2X	—	GEM-218-4X	7/32	1/4	2-1/2	5/8	24.55
GEM-234-2X	—	GEM-234-4X	15/64			3/4	
GEM-250-2X	GEM-250-3X	GEM-250-4X	1/4			3/4	
GEM-281-2X	GEM-281-3X	GEM-281-4X	9/32	5/16		3/4	30.00
GEM-312-2X	GEM-312-3X	GEM-312-4X	5/16	5/16	2-1/2	13/16	30.00
GEM-375-2X	GEM-375-3X	GEM-375-4X	3/8	3/8		7/8	33.25
GEM-437-2X	GEM-437-3X	GEM-437-4X	7/16	7/16		1	50.40
GEM-500-2X	GEM-500-3X	GEM-500-4X	1/2	1/2	3	1	54.75
GEM-562-2X	GEM-562-3X	GEM-562-4X	9/16	9/16	3-1/2	1-1/4	83.20
GEM-625-2X	GEM-625-3X	GEM-625-4X	5/8	5/8	3-1/2	1-1/4	93.90
GEM-687-2X	GEM-687-3X	GEM-687-4X	11/16	3/4	4	1-3/8	115.30
GEM-750-2X	GEM-750-3X	GEM-750-4X	3/4	3/4			139.35
GEM-875-2X	GEM-875-3X	GEM-875-4X	7/8	7/8	4	1-1/2	193.95
GEM-001-2X	GEM-001-3X	GEM-001-4X	1	1			210.20

## GEC Series, Corner Radius 30° Helix

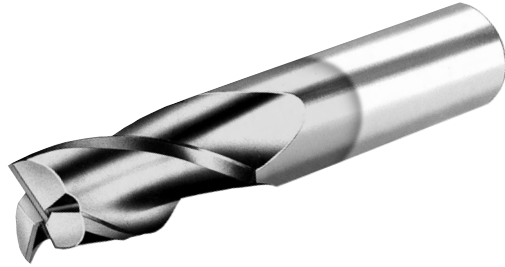


Shank Diameter                    -0.0001 to -0.0002"  
 Cutter Diameter                1/32 - 1/4"    +.000 -0.002"  
     9/32 - 1"    +.000 -0.003"  
 T.I.R. Maximum                    .0005"  
 Corner Radius                      ±.0005"

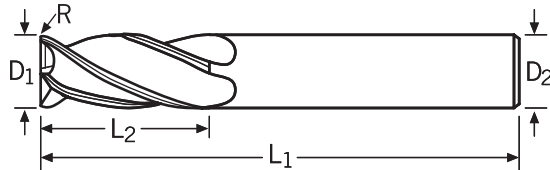


2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	CORNER RADIUS R	PRICE EACH
GEC-031-2-005	GEC-031-3-005	GEC-031-4-005	1/32	1/8	1-1/2	5/64	.005	14.50
GEC-062-2-005	GEC-062-3-005	GEC-062-4-005	1/16	1/8	1-1/2	3/16	.005	13.10
GEC-062-2-010	GEC-062-3-010	GEC-062-4-010	1/16	1/8	1-1/2	3/16	.010	13.10
GEC-093-2-005	GEC-093-3-005	GEC-093-4-005	3/32	1/8	1-1/2	3/8	.005	13.10
GEC-093-2-010	GEC-093-3-010	GEC-093-4-010	3/32	1/8	1-1/2	3/8	.010	13.10
GEC-125-2-010	GEC-125-3-010	GEC-125-4-010	1/8	1/8	1-1/2	1/2	.010	13.10
GEC-125-2-020	GEC-125-3-020	GEC-125-4-020	1/8	1/8	1-1/2	1/2	.020	13.10
GEC-187-2-010	GEC-187-3-010	GEC-187-4-010	3/16	3/16	2	5/8	.010	18.60
GEC-187-2-020	GEC-187-3-020	GEC-187-4-020	3/16	3/16	2	5/8	.020	18.60
GEC-187-2-030	GEC-187-3-030	GEC-187-4-030	3/16	3/16	2	5/8	.030	18.60
GEC-250-2-010	GEC-250-3-010	GEC-250-4-010	1/4	1/4		3/4	.010	23.30
GEC-250-2-020	GEC-250-3-020	GEC-250-4-020	1/4	1/4		3/4	.020	23.30
GEC-250-2-030	GEC-250-3-030	GEC-250-4-030	1/4	1/4		3/4	.030	23.30
GEC-312-2-010	GEC-312-3-010	GEC-312-4-010	5/16	5/16		13/16	.010	27.15
GEC-312-2-020	GEC-312-3-020	GEC-312-4-020	5/16	5/16	2-1/2	13/16	.020	27.15
GEC-312-2-030	GEC-312-3-030	GEC-312-4-030	5/16	5/16		13/16	.030	27.15
GEC-375-2-010	GEC-375-3-010	GEC-375-4-010	3/8	3/8		7/8	.010	30.85
GEC-375-2-020	GEC-375-3-020	GEC-375-4-020	3/8	3/8		7/8	.020	30.85
GEC-375-2-030	GEC-375-3-030	GEC-375-4-030	3/8	3/8		7/8	.030	30.85
GEC-375-2-060	GEC-375-3-060	GEC-375-4-060	3/8	3/8		7/8	.060	30.85
GEC-500-2-010	GEC-500-3-010	GEC-500-4-010	1/2	1/2	3	1	.010	53.40
GEC-500-2-020	GEC-500-3-020	GEC-500-4-020	1/2	1/2	3	1	.020	53.40
GEC-500-2-030	GEC-500-3-030	GEC-500-4-030	1/2	1/2	3	1	.030	53.40
GEC-500-2-060	GEC-500-3-060	GEC-500-4-060	1/2	1/2	3	1	.060	53.40
GEC-625-2-020	GEC-625-3-020	GEC-625-4-020	5/8	5/8	3-1/2	1-1/4	.020	94.50
GEC-625-2-030	GEC-625-3-030	GEC-625-4-030	5/8	5/8	3-1/2	1-1/4	.030	94.50
GEC-625-2-060	GEC-625-3-060	GEC-625-4-060	5/8	5/8	3-1/2	1-1/4	.060	94.50
GEC-625-2-090	GEC-625-3-090	GEC-625-4-090	5/8	5/8	3-1/2	1-1/4	.090	94.50
GEC-750-2-020	GEC-750-3-020	GEC-750-4-020	3/4	3/4			.020	144.20
GEC-750-2-030	GEC-750-3-030	GEC-750-4-030	3/4	3/4			.030	144.20
GEC-750-2-060	GEC-750-3-060	GEC-750-4-060	3/4	3/4			.060	144.20
GEC-750-2-090	GEC-750-3-090	GEC-750-4-090	3/4	3/4			.090	144.20
GEC-750-2-125	GEC-750-3-125	GEC-750-4-125	3/4	3/4			.125	144.20
GEC-001-2-020	GEC-001-3-020	GEC-001-4-020	1	1	4	1-1/2	.020	218.35
GEC-001-2-030	GEC-001-3-030	GEC-001-4-030	1	1			.030	218.35
GEC-001-2-060	GEC-001-3-060	GEC-001-4-060	1	1			.060	218.35
GEC-001-2-090	GEC-001-3-090	GEC-001-4-090	1	1			.090	218.35
GEC-001-2-125	GEC-001-3-125	GEC-001-4-125	1	1			.125	218.35

## Coated GEC Series, Corner Radius 30° Helix



Shank Diameter                    - .0001 to - .0002"  
 Cutter Diameter                1/32 - 1/4"    +.000 - .002"  
     9/32 - 1"    +.000 - .003"  
 T.I.R. Maximum                    .0005"  
 Corner Radius                      ±.0005"



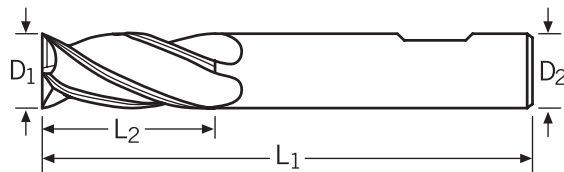
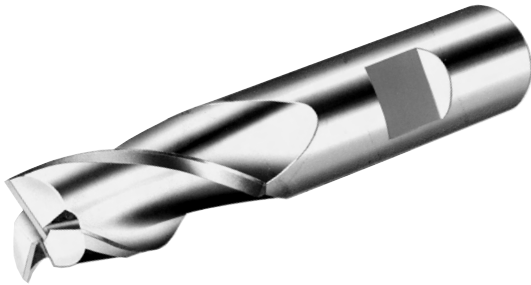
2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	CORNER RADIUS R	AITiN COATED PRICE EACH
GEC-031-2-005X	GEC-031-3-005X	GEC-031-4-005X	1/32	1/8	1-1/2	5/64	.005	17.50
GEC-062-2-005X	GEC-062-3-005X	GEC-062-4-005X	1/16	1/8	1-1/2	3/16	.005	16.20
GEC-062-2-010X	GEC-062-3-010X	GEC-062-4-010X	1/16	1/8	1-1/2	3/16	.010	16.20
GEC-093-2-005X	GEC-093-3-005X	GEC-093-4-005X	3/32	1/8	1-1/2	3/8	.005	16.20
GEC-093-2-010X	GEC-093-3-010X	GEC-093-4-010X	3/32	1/8	1-1/2	3/8	.010	16.20
GEC-125-2-010X	GEC-125-3-010X	GEC-125-4-010X	1/8	1/8	1-1/2	1/2	.010	16.20
GEC-125-2-020X	GEC-125-3-020X	GEC-125-4-020X	1/8	1/8	1-1/2	1/2	.020	16.20
GEC-187-2-010X	GEC-187-3-010X	GEC-187-4-010X	3/16	3/16	2	5/8	.010	22.85
GEC-187-2-020X	GEC-187-3-020X	GEC-187-4-020X	3/16	3/16	2	5/8	.020	22.85
GEC-187-2-030X	GEC-187-3-030X	GEC-187-4-030X	3/16	3/16	2	5/8	.030	228.5
GEC-250-2-010X	GEC-250-3-010X	GEC-250-4-010X	1/4	1/4		3/4	.010	27.70
GEC-250-2-020X	GEC-250-3-020X	GEC-250-4-020X	1/4	1/4		3/4	.020	27.70
GEC-250-2-030X	GEC-250-3-030X	GEC-250-4-030X	1/4	1/4		3/4	.030	27.70
GEC-312-2-010X	GEC-312-3-010X	GEC-312-4-010X	5/16	5/16		13/16	.010	33.70
GEC-312-2-020X	GEC-312-3-020X	GEC-312-4-020X	5/16	5/16	2-1/2	13/16	.020	33.70
GEC-312-2-030X	GEC-312-3-030X	GEC-312-4-030X	5/16	5/16		13/16	.030	33.70
GEC-375-2-010X	GEC-375-3-010X	GEC-375-4-010X	3/8	3/8		7/8	.010	37.40
GEC-375-2-020X	GEC-375-3-020X	GEC-375-4-020X	3/8	3/8		7/8	.020	37.40
GEC-375-2-030X	GEC-375-3-030X	GEC-375-4-030X	3/8	3/8		7/8	.030	37.40
GEC-375-2-060X	GEC-375-3-060X	GEC-375-4-060X	3/8	3/8		7/8	.060	37.40
GEC-500-2-010X	GEC-500-3-010X	GEC-500-4-010X	1/2	1/2	3	1	.010	61.75
GEC-500-2-020X	GEC-500-3-020X	GEC-500-4-020X	1/2	1/2	3	1	.020	61.75
GEC-500-2-030X	GEC-500-3-030X	GEC-500-4-030X	1/2	1/2	3	1	.030	61.75
GEC-500-2-060X	GEC-500-3-060X	GEC-500-4-060X	1/2	1/2	3	1	.060	61.75
GEC-625-2-020X	GEC-625-3-020X	GEC-625-4-020X	5/8	5/8	3-1/2	1-1/4	.020	106.25
GEC-625-2-030X	GEC-625-3-030X	GEC-625-4-030X	5/8	5/8	3-1/2	1-1/4	.030	106.25
GEC-625-2-060X	GEC-625-3-060X	GEC-625-4-060X	5/8	5/8	3-1/2	1-1/4	.060	106.25
GEC-625-2-090X	GEC-625-3-090X	GEC-625-4-090X	5/8	5/8	3-1/2	1-1/4	.090	106.25
GEC-750-2-020X	GEC-750-3-020X	GEC-750-4-020X	3/4	3/4			.020	158.20
GEC-750-2-030X	GEC-750-3-030X	GEC-750-4-030X	3/4	3/4			.030	158.20
GEC-750-2-060X	GEC-750-3-060X	GEC-750-4-060X	3/4	3/4			.060	158.20
GEC-750-2-090X	GEC-750-3-090X	GEC-750-4-090X	3/4	3/4			.090	158.20
GEC-750-2-125X	GEC-750-3-125X	GEC-750-4-125X	3/4	3/4			.125	158.20
GEC-001-2-020X	GEC-001-3-020X	GEC-001-4-020X	1	1	4	1-1/2	.020	238.65
GEC-001-2-030X	GEC-001-3-030X	GEC-001-4-030X	1	1			.030	238.65
GEC-001-2-060X	GEC-001-3-060X	GEC-001-4-060X	1	1			.060	238.65
GEC-001-2-090X	GEC-001-3-090X	GEC-001-4-090X	1	1			.090	238.65
GEC-001-2-125X	GEC-001-3-125X	GEC-001-4-125X	1	1			.125	238.65

## EMS Series Center Cutting — 30° Helix

Shank Diameter      -.0001 to -.0002"  
Cutter Diameter      +.001 -.000"  
T.I.R. Maximum      .0005"

These end mills feature a plus tolerance on the cutting diameter. Tools are suitable for multiple resharpening.

Sizes 3/8" and larger feature a Weldon flat.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
EMS-031-2 EMS-062-2 EMS-093-2 EMS-125-2	EMS-031-3 EMS-062-3 EMS-093-3 EMS-125-3	EMS-031-4 EMS-062-4 EMS-093-4 EMS-125-4	1/32 1/16 3/32 1/8	1/8	1-1/2	5/64 3/16 3/8 1/2	15.10 13.70 13.70 12.25
EMS-156-2 EMS-187-2 EMS-218-2 EMS-250-2	EMS-156-3 EMS-187-3 EMS-218-3 EMS-250-3	EMS-156-4 EMS-187-4 EMS-218-4 EMS-250-4	5/32 3/16 7/32 1/4	3/16 3/16 1/4 1/4	2 2 2-1/2 2-1/2	9/16 5/8 5/8 3/4	19.40 19.40 24.35 24.35
EMS-281-2 EMS-312-2 EMS-375-2 EMS-437-2	EMS-281-3 EMS-312-3 EMS-375-3 EMS-437-3	EMS-281-4 EMS-312-4 EMS-375-4 EMS-437-4	9/32 5/16 3/8 7/16	5/16 5/16 3/8 7/16	2-1/2	3/4 13/16 7/8 1	28.30 28.30 32.15 50.75
EMS-500-2 EMS-562-2 EMS-625-2 EMS-687-2	EMS-500-3 EMS-562-3 EMS-625-3 EMS-687-3	EMS-500-4 EMS-562-4 EMS-625-4 EMS-687-4	1/2 9/16 5/8 11/16	1/2 9/16 5/8 11/16	3 3-1/2 3-1/2 4	1 1-1/4 1-1/4 1-3/8	55.75 82.15 98.65 121.45
EMS-750-2 EMS-001-2	EMS-750-3 EMS-001-3	EMS-750-4 EMS-001-6*	3/4 1	3/4 1	4 5	1-1/2 2-1/2	150.40 227.80

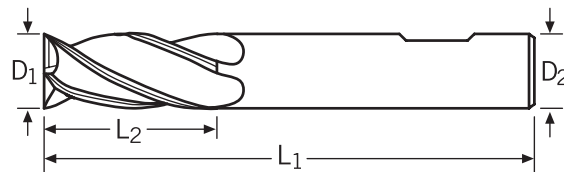
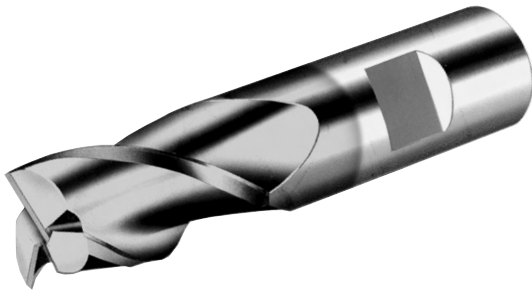
\*6 Flute

## Coated EMS Series Center Cutting — 30° Helix

Shank Diameter            -.0001 to -.0002  
Cutter Diameter           +.001 -.000"  
T.I.R. Maximum             .0005"

These end mills feature a plus tolerance on the cutting diameter. Tools are suitable for multiple resharpening.

Sizes 3/8" and larger feature a Weldon flat.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITiN COATED PRICE EACH
EMS-031-2X	EMS-031-3X	EMS-031-4X	1/32	1/8	1-1/2	5/64	18.00
EMS-062-2X	EMS-062-3X	EMS-062-4X	1/16			3/16	16.75
EMS-093-2X	EMS-093-3X	EMS-093-4X	3/32			3/8	16.75
EMS-125-2X	EMS-125-3X	EMS-125-4X	1/8			1/2	15.30
EMS-156-2X	EMS-156-3X	EMS-156-4X	5/32	3/16	2	9/16	23.75
EMS-187-2X	EMS-187-3X	EMS-187-4X	3/16	3/16	2	5/8	23.75
EMS-218-2X	EMS-218-3X	EMS-218-4X	7/32	1/4	2-1/2	5/8	28.75
EMS-250-2X	EMS-250-3X	EMS-250-4X	1/4	1/4	2-1/2	3/4	28.75
EMS-281-2X	EMS-281-3X	EMS-281-4X	9/32	5/16	2-1/2	3/4	34.85
EMS-312-2X	EMS-312-3X	EMS-312-4X	5/16	5/16		13/16	34.85
EMS-375-2X	EMS-375-3X	EMS-375-4X	3/8	3/8		7/8	38.75
EMS-437-2X	EMS-437-3X	EMS-437-4X	7/16	7/16		1	59.00
EMS-500-2X	EMS-500-3X	EMS-500-4X	1/2	1/2	3	1	64.15
EMS-562-2X	EMS-562-3X	EMS-562-4X	9/16	9/16	3-1/2	1-1/4	93.85
EMS-625-2X	EMS-625-3X	EMS-625-4X	5/8	5/8	3-1/2	1-1/4	110.40
EMS-687-2X	EMS-687-3X	EMS-687-4X	11/16	11/16	4	1-3/8	135.50
EMS-750-2X	EMS-750-3X	EMS-750-4X	3/4	3/4	4	1-1/2	164.45
EMS-001-2X	EMS-001-3X	EMS-001-6X*	1	1	5	2-1/2	248.15

\*6 Flute

## TSM Series, Stub Length, Tapered Center Cutting — 30° Helix

Shank Diameter                    -.0001 to -.0002"  
 Small Diameter                 +.003 -.000"  
 T.I.R. Maximum                 .0005"



3-FLUTE TOOL NO.	SMALL DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	ANGLE PER SIDE	PRICE EACH
TSM-250-0 TSM-250-1 TSM-250-3 TSM-250-5 TSM-250-7	1/8	1/4	2-1/2	1/2	1° 1° 30' 3° 5° 7°	36.35 36.35 36.35 36.35 36.35
TSM-375-0 TSM-375-1 TSM-375-3 TSM-375-5 TSM-375-7	3/16 3/16 5/32 1/8 5/32	3/8	2-1/2	3/4	1° 1° 30' 3° 5° 7°	55.35 55.35 55.35 55.35 55.35
TSM-500-3 TSM-500-5 TSM-500-7	1/4 1/4 3/16	1/2	3	1	3° 5° 7°	84.05 84.05 84.05

## TEM Series, Tapered Center Cutting — 30° Helix

Shank Diameter  
Small Diameter  
T.I.R. Maximum

-.0001 to -.0002"  
+.003 -.000"  
.0005"



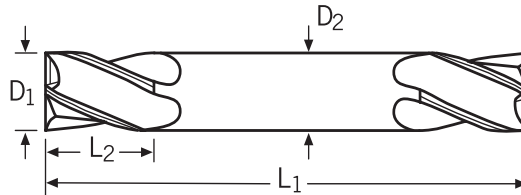
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3-FLUTE TOOL NO.	SMALL DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	ANGLE PER SIDE	PRICE EACH
TEM-250-0 TEM-250-1 TEM-250-3 TEM-250-5 TEM-250-7	1/8	1/4	3	1 1-1/2 1 3/4 1/2	1° 1° 30' 3° 5° 7°	44.75
TEM-375-0 TEM-375-1 TEM-375-3 TEM-375-5 TEM-375-7	3/16 3/16 5/32 1/8 5/32	3/8	3-1/2	1-3/4 1-3/4 1-3/4 1-1/2 3/4	1° 1° 30' 3° 5° 7°	68.40
TEM-500-3 TEM-500-5 TEM-500-7	1/4 1/4 3/16	1/2	4	2 1-1/4 1-1/4	3° 5° 7°	103.80



## SED Series, Stub Length, Double End Center Cutting — 30° Helix

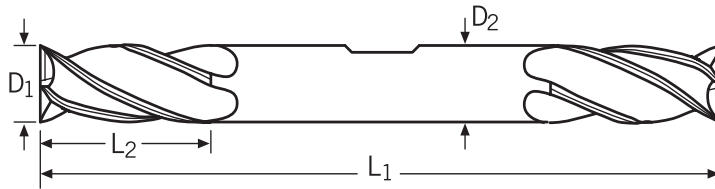
Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                1/16–1/4" +.000–.002"  
   9/32–1/2" +.000–.003"  
 T.I.R. Maximum                                   .0005"



2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
<b>SED-062-2</b>	<b>SED-062-4</b>	1/16	1/8	2	1/8	<b>15.85</b>
<b>SED-093-2</b>	<b>SED-093-4</b>	3/32	1/8		3/16	
<b>SED-125-2</b>	<b>SED-125-4</b>	1/8	1/8		1/4	
<b>SED-156-2</b>	<b>SED-156-4</b>	5/32	3/16		5/16	
<b>SED-187-2</b>	<b>SED-187-4</b>	3/16	3/16	2	3/8	<b>20.65</b>
<b>SED-218-2</b>	<b>SED-218-4</b>	7/32	1/4	2-1/2	1/2	
<b>SED-250-2</b>	<b>SED-250-4</b>	1/4	1/4	2-1/2	1/2	
<b>SED-281-2</b>	<b>SED-281-4</b>	9/32	5/16	2-1/2	1/2	
<b>SED-312-2</b>	<b>SED-312-4</b>	5/16	5/16	2-1/2	1/2	<b>38.60</b>
<b>SED-375-2</b>	<b>SED-375-4</b>	3/8	3/8	2-1/2	9/16	
<b>SED-437-2</b>	<b>SED-437-4</b>	7/16	7/16	2-1/2	9/16	
<b>SED-500-2</b>	<b>SED-500-4</b>	1/2	1/2	3	5/8	

## EMD Series, Double End Center Cutting — 30° Helix

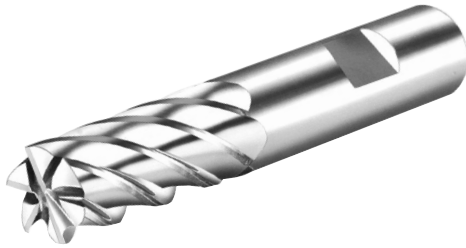
Shank Diameter                     -.0001 to -.0002"  
 Cutter Diameter                 1/8 – 1/4" +.000-.002"  
   9/32–1/2" +.000-.003"  
 T.I.R. Maximum                     .0005"



2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
EMD-125-2	EMD-125-4	1/8	3/8	3-1/16	3/8	35.85
EMD-156-2	EMD-156-4	5/32	3/8	3-1/8	7/16	39.15
EMD-187-2	EMD-187-4	3/16	3/8	3-1/4	1/2	40.30
EMD-218-2	EMD-218-4	7/32	3/8	3-3/8	9/16	46.10
EMD-250-2	EMD-250-4	1/4	3/8	3-3/8	5/8	47.75
EMD-281-2	EMD-281-4	9/32	3/8	3-1/2	11/16	55.85
EMD-312-2	EMD-312-4	5/16	3/8	3-1/2	3/4	57.80
EMD-343-2	EMD-343-4	11/32	3/8	3-1/2	3/4	61.65
EMD-375-2	EMD-375-4	3/8	3/8	3-1/2	3/4	61.65
EMD-437-2	EMD-437-4	7/16	1/2	4	7/8	99.55
EMD-500-2	EMD-500-4	1/2	1/2	4	1	100.00

## EMH Series Center Cutting — 38° Helix

Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                1/4" +.000-.002"  
   9/32-1" +.000-.003"  
 T.I.R. Maximum                   .0005"

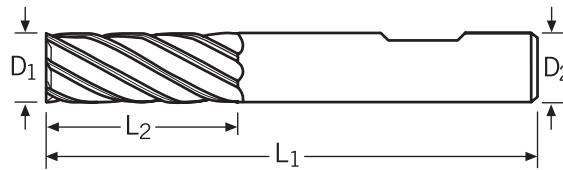


These 38° high helix end mills provide a superior work piece finish in all milling applications.

These tools are very suitable for milling steels, stainless steels, and heat treated materials.

The 6-flute geometry provides excellent shearing action, resulting in the highest dimensional accuracy and reduced work piece distortion, especially in thin wall slotting applications.

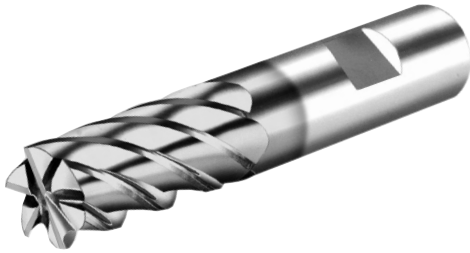
Sizes 3/8" and larger feature a Weldon flat.



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6-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
EMH-250-06	1/4	1/4	2-1/2	3/4	24.35
EMH-281-06	9/32	5/16		3/4	28.30
EMH-312-06	5/16	5/16		13/16	28.30
EMH-375-06	3/8	3/8	2-1/2	7/8	32.15
EMH-437-06	7/16	7/16	2-1/2	1	50.75
EMH-500-06	1/2	1/2	3	1	55.75
EMH-625-06	5/8	5/8	3-1/2	1-1/4	98.65
EMH-750-06	3/4	3/4	4	1-1/2	150.40
EMH-000-06	1	1	4	1-1/2	227.80
EMH-001-06	1	1	5	2-1/2	283.90

## Coated EMH Series Center Cutting — 38° Helix



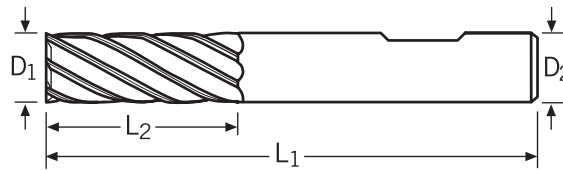
Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                1/4" +.000-.002"  
   9/32-1" +.000-.003"  
 T.I.R. Maximum                   .0005"

These 38° high helix end mills provide a superior work piece finish in all milling applications.

These tools are very suitable for milling steels, stainless steels, and heat treated materials.

The 6-flute geometry provides excellent shearing action, resulting in the highest dimensional accuracy and reduced work piece distortion, especially in thin wall slotting applications.

Sizes 3/8" and larger feature a Weldon flat.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

6-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITiN COATED PRICE EACH
EMH-250-06X	1/4	1/4	2-1/2	3/4	28.75
EMH-281-06X	9/32	5/16		3/4	34.85
EMH-312-06X	5/16	5/16		13/16	34.85
EMH-375-06X	3/8	3/8	2-1/2	7/8	38.75
EMH-437-06X	7/16	7/16	2-1/2	1	59.00
EMH-500-06X	1/2	1/2	3	1	64.15
EMH-625-06X	5/8	5/8	3-1/2	1-1/4	110.40
EMH-750-06X	3/4	3/4	4	1-1/2	164.45
EMH-000-06X	1	1	4	1-1/2	248.15
EMH-001-06X	1	1	5	2-1/2	304.15

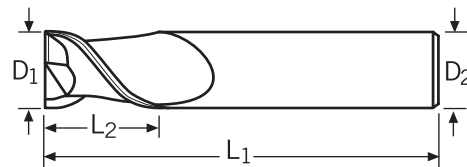
## ASM-2 Series, Stub Length Center Cutting — 45° Helix

Shank Diameter                     -.0001 to -.0002"  
 Cutter Diameter     1/16 – 1/4" +.000–.002"  
                                   9/32– 1/2" +.000–.003"  
 T.I.R. Maximum                     .0005"

“Stealth” cutter-profile. These high performance stub end mills feature a 45° helix and are engineered for high speed cutting in aluminum, non-ferrous and soft materials.



The special flute geometry and short flute length provide an extremely smooth and silent cutting action for an exceptional surface finish.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
ASM-062-2	1/16	1/8	1-1/2	1/8	12.05
ASM-093-2	3/32	1/8		3/16	12.05
ASM-125-2	1/8	1/8		1/4	10.70
ASM-156-2	5/32	3/16		5/16	17.10
ASM-187-2	3/16	3/16	1-1/2	3/8	17.10
ASM-218-2	7/32	1/4	2	7/16	21.30
ASM-250-2	1/4	1/4	2	1/2	21.30
ASM-312-2	5/16	5/16	2	1/2	23.45
ASM-375-2	3/8	3/8	2	5/8	28.10
ASM-437-2	7/16	7/16	2-1/2	5/8	42.15
ASM-500-2	1/2	1/2	2-1/2	5/8	46.30

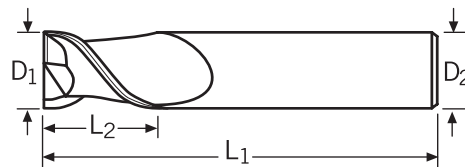
## Coated ASM-2 Series, Stub Length Center Cutting — 45° Helix

Shank Diameter                     -.0001 to -.0002"  
 Cutter Diameter         1/16 – 1/4" +.000–.002"  
                                       9/32– 1/2" +.000–.003"  
 T.I.R. Maximum                     .0005"



“Stealth” cutter-profile. These high performance stub end mills feature a 45° helix and are engineered for high speed cutting in aluminum, non-ferrous and soft materials.

The special flute geometry and short flute length provide an extremely smooth and silent cutting action for an exceptional surface finish.



COATING  
DEVELOPED  
SPECIFICALLY  
FOR USE IN  
ALUMINUM

METRIC  
SIZES  
ALSO  
FROM  
STOCK

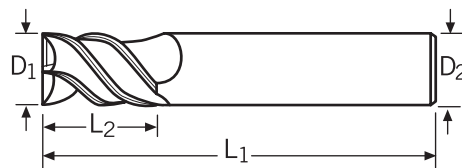
2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	ALU-S COATED PRICE EACH
ASM-062-2S	1/16	1/8	1-1/2	1/8	15.05
ASM-093-2S	3/32	1/8		3/16	15.05
ASM-125-2S	1/8	1/8		1/4	13.75
ASM-156-2S	5/32	3/16		5/16	21.35
ASM-187-2S	3/16	3/16	1-1/2	3/8	21.35
ASM-218-2S	7/32	1/4	2	7/16	25.60
ASM-250-2S	1/4	1/4	2	1/2	25.60
ASM-312-2S	5/16	5/16	2	1/2	29.90
ASM-375-2S	3/8	3/8	2	5/8	34.70
ASM-437-2S	7/16	7/16	2-1/2	5/8	50.25
ASM-500-2S	1/2	1/2	2-1/2	5/8	54.45

## ASM-5 Series, Stub Length Center Cutting — 45° Helix

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	3/16 – 1/4" +.000–.002"
	5/16 – 1" +.000–.003"
T.I.R. Maximum	.0005"

These 5-flute high tech end mills feature a 45° helix for finishing, roughing, and slotting, in medium to hard steels, stainless steels, and high temperature alloys.

The special flute geometry and high helix angle reduce chattering, increase metal removal rates, and provide the highest surface finish quality.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

5-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
ASM-187-5	3/16	3/16	1-1/2	3/8	17.50
ASM-250-5	1/4	1/4	2	1/2	20.65
ASM-312-5	5/16	5/16	2	1/2	24.20
ASM-375-5	3/8	3/8	2	5/8	30.15
ASM-500-5	1/2	1/2	2-1/2	5/8	47.45

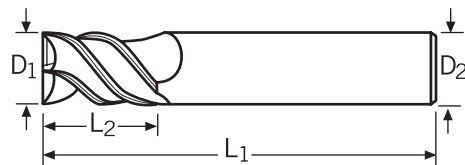
## Coated ASM-5 Series, Stub Length Center Cutting — 45° Helix



Shank Diameter		-.0001 to -.0002"
Cutter Diameter	3/16 – 1/4"	+.000–.002"
	5/16 – 1"	+.000–.003"
T.I.R. Maximum		.0005"

These 5-flute high tech end mills feature a 45° helix for finishing, roughing, and slotting, in medium to hard steels, stainless steels, and high temperature alloys.

The special flute geometry and high helix angle reduce chattering, increase metal removal rates, and provide the highest surface finish quality.



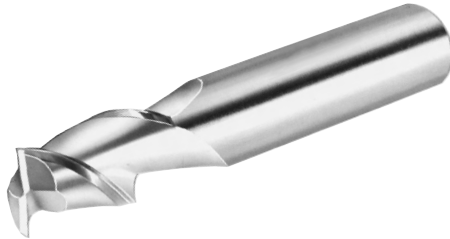
METRIC  
SIZES  
ALSO  
FROM  
STOCK

5-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITIN COATED PRICE EACH
ASM-187-5X	3/16	3/16	1-1/2	3/8	21.75
ASM-250-5X	1/4	1/4	2	1/2	25.00
ASM-312-5X	5/16	5/16	2	1/2	30.60
ASM-375-5X	3/8	3/8	2	5/8	36.70
ASM-500-5X	1/2	1/2	2-1/2	5/8	55.65



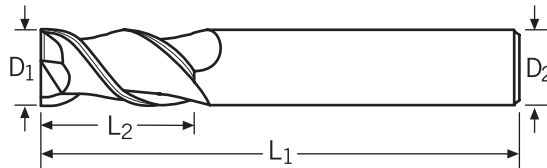
## ARM-2 & ARM-3 Series Center Cutting — 45° Helix

Shank Diameter -.0001 to -.0002"  
 Cutter Diameter 1/16 – 1/4" +.000–.002"  
9/32– 1" +.000–.003"  
 T.I.R. Maximum .0005"



“Stealth” cutter-profile. These high performance end mills feature a 45° helix and are engineered for high speed cutting in aluminum, nonferrous and soft materials.

The special flute geometry provides an extremely smooth and silent cutting action for an exceptional surface finish.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

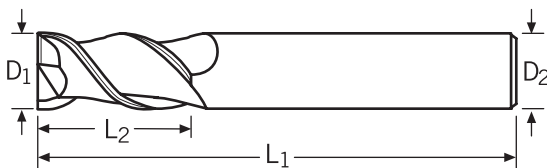
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ARM-062-2	—	1/16	1/8	1-1/2	3/16	12.60
ARM-093-2	—	3/32			3/8	12.60
ARM-125-2	—	1/8			1/2	11.25
ARM-156-2	—	5/32	3/16	2	9/16	17.85
ARM-187-2	—	3/16	3/16	2	5/8	17.85
ARM-218-2	—	7/32	1/4	2-1/2	5/8	22.40
ARM-250-2	ARM-250-3	1/4	1/4	2-1/2	3/4	22.40
ARM-281-2	ARM-281-3	9/32	5/16	2-1/2	3/4	26.10
ARM-312-2	ARM-312-3	5/16	5/16	2-1/2	13/16	26.10
ARM-375-2	ARM-375-3	3/8	3/8	2-1/2	7/8	29.55
—	ARM-437-3	7/16	7/16	2-1/2	1	46.75
ARM-500-2	ARM-500-3	1/2	1/2	3	1	51.40
ARM-562-2	ARM-562-3	9/16	9/16	3-1/2	1-1/4	79.10
ARM-625-2	ARM-625-3	5/8	5/8	3-1/2	1-1/4	90.90
ARM-687-2	ARM-687-3	11/16	3/4	4	1-3/8	111.95
ARM-750-2	ARM-750-3	3/4	3/4	4	1-1/2	138.55
ARM-001-2	ARM-001-3	1	1	4	1-1/2	209.95

## Coated ARM-2 & ARM-3 Series Center Cutting — 45° Helix

Shank Diameter                                    -.0001 to -.0002"  
 Cutter Diameter     1/16 – 1/4" +.000-.002"  
                                   9/32– 1"   +.000-.003"  
 T.I.R. Maximum                                   .0005"

“Stealth” cutter-profile. These high performance end mills feature a 45° helix and are engineered for high speed cutting in aluminum, nonferrous and soft materials.

The special flute geometry provides an extremely smooth and silent cutting action for an exceptional surface finish.



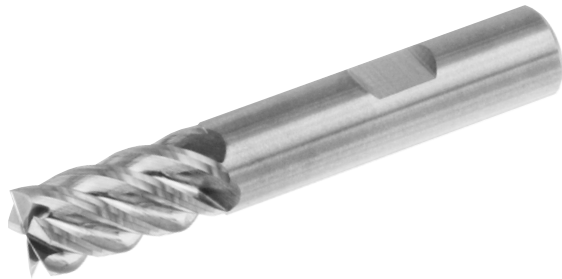
COATING  
DEVELOPED  
SPECIFICALLY  
FOR USE IN  
ALUMINUM

METRIC  
SIZES  
ALSO  
FROM  
STOCK

2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	ALU-S COATED PRICE EACH
ARM-062-2S	—	1/16	1/8	1-1/2	3/16	15.60
ARM-093-2S	—	3/32	1/8		3/8	15.60
ARM-125-2S	—	1/8	1/8		1/2	14.30
ARM-156-2S	—	5/32	3/16	2	9/16	22.10
ARM-187-2S	—	3/16	3/16	2	5/8	22.10
ARM-218-2S	—	7/32	1/4	2-1/2	5/8	26.75
ARM-250-2S	ARM-250-3S	1/4	1/4	2-1/2	3/4	26.75
ARM-281-2S	ARM-281-3S	9/32	5/16	2-1/2	3/4	32.60
ARM-312-2S	ARM-312-3S	5/16	5/16	2-1/2	13/16	32.60
ARM-375-2S	ARM-375-3S	3/8	3/8	2-1/2	7/8	36.15
—	ARM-437-3S	7/16	7/16	2-1/2	1	55.00
ARM-500-2S	ARM-500-3S	1/2	1/2	3	1	59.70
ARM-562-2S	ARM-562-3S	9/16	9/16	3-1/2	1-1/4	90.80
ARM-625-2S	ARM-625-3S	5/8	5/8	3-1/2	1-1/4	102.60
ARM-687-2S	ARM-687-3S	11/16	3/4	4	1-3/8	126.00
ARM-750-2S	ARM-750-3S	3/4	3/4	4	1-1/2	152.65
ARM-001-2S	ARM-001-3S	1	1	4	1-1/2	230.25

## ARM-5 Series Center Cutting — 45° Helix

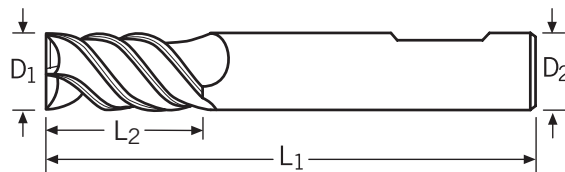
Shank Diameter                   -.0001 to -.0002"  
 Cutter Diameter           3/16 – 1/4"   +.000–.002"  
   5/16 – 1"     +.000–.003"  
 T.I.R. Maximum                                   .0005"



These 5-flute high tech end mills feature a 45° helix for finishing, roughing, and slotting, in medium to hard steels, stainless steels, and high temperature alloys.

The special flute geometry and high helix angle reduce chattering, increase metal removal rates, and provide the highest surface finish quality.

Sizes 3/8" and larger feature a Weldon flat.

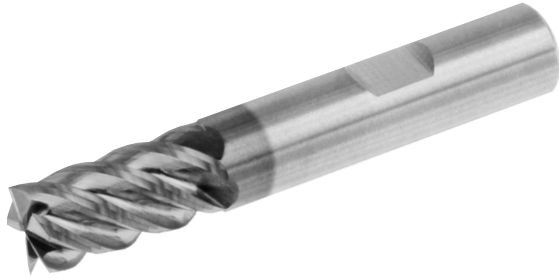


METRIC  
SIZES  
ALSO  
FROM  
STOCK

5-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
ARM-187-5	3/16	3/16	2	5/8	19.45
ARM-250-5	1/4	1/4	2-1/2	3/4	24.35
ARM-312-5	5/16	5/16	2-1/2	13/16	28.30
ARM-375-5	3/8	3/8	2-1/2	7/8	32.15
ARM-500-5	1/2	1/2	3	1	53.60
ARM-625-5	5/8	5/8	3-1/2	1-1/4	98.65
ARM-750-5	3/4	3/4	4	1-1/2	150.40
ARM-001-5	1	1	4	1-1/2	227.80

## Coated ARM-5 Series Center Cutting — 45° Helix

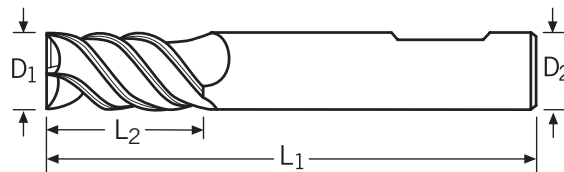
Shank Diameter	-.0001 to -.0002"
Cutter Diameter	3/16 – 1/4" +.000–.002"
	5/16 – 1" +.000–.003"
T.I.R. Maximum	.0005"



These 5-flute high tech end mills feature a 45° helix for finishing, roughing, and slotting, in medium to hard steels, stainless steels, and high temperature alloys.

The special flute geometry and high helix angle reduce chattering, increase metal removal rates, and provide the highest surface finish quality.

Sizes 3/8" and larger feature a Weldon flat.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

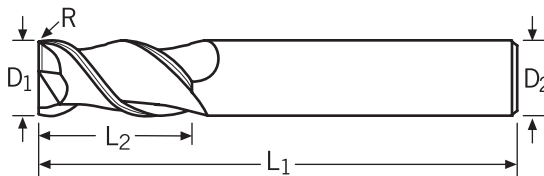
5-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITIN COATED PRICE EACH
ARM-187-5X	3/16	3/16	2	5/8	23.75
ARM-250-5X	1/4	1/4	2-1/2	3/4	28.75
ARM-312-5X	5/16	5/16	2-1/2	13/16	34.85
ARM-375-5X	3/8	3/8	2-1/2	7/8	38.75
ARM-500-5X	1/2	1/2	3	1	60.50
ARM-625-5X	5/8	5/8	3-1/2	1-1/4	110.40
ARM-750-5X	3/4	3/4	4	1-1/2	164.45
ARM-001-5X	1	1	4	1-1/2	248.15

## ARC -2, -3 Series, Corner Radius Center Cutting — 45° Helix



Shank Diameter                     -.0001 to -.0002"  
 Cutter Diameter     1/16 – 1/4" +.000-.002"  
                                     9/32– 1"   +.000-.003"  
 T.I.R. Maximum                     .0005"  
 Corner Radius                         ±.0005"

*Essential features, same as ARM series, see Page 72.*



COATING  
 DEVELOPED  
 SPECIFICALLY  
 FOR USE IN  
 ALUMINUM

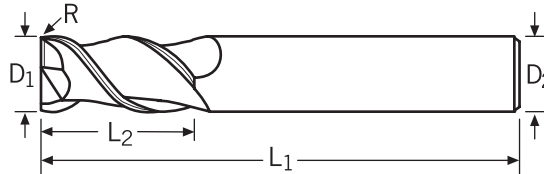
2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	CORNER RADIUS R	PRICE EACH
ARC-062-2-005		1/16	1/8	1-1/2	3/16	.005	14.55
ARC-062-2-010		1/16	1/8	1-1/2	3/16	.010	14.55
ARC-093-2-005		3/32	1/8	1-1/2	3/8	.005	14.55
ARC-093-2-010		3/32	1/8	1-1/2	3/8	.010	14.55
ARC-125-2-010		1/8	1/8	1-1/2	1/2	.010	14.55
ARC-125-2-020		1/8	1/8	1-1/2	1/2	.020	14.55
ARC-187-2-010		3/16	3/16	2	5/8	.010	20.55
ARC-187-2-020		3/16	3/16	2	5/8	.020	20.55
ARC-187-2-030		3/16	3/16	2	5/8	.030	20.55
ARC-250-2-010	ARC-250-3-010	1/4	1/4	2-1/2	3/4	.010	25.75
ARC-250-2-020	ARC-250-3-020	1/4	1/4		3/4	.020	25.75
ARC-250-2-030	ARC-250-3-030	1/4	1/4		3/4	.030	25.75
ARC-312-2-010	ARC-312-3-010	5/16	5/16		13/16	.010	28.80
ARC-312-2-020	ARC-312-3-020	5/16	5/16		13/16	.020	28.80
ARC-312-2-030	ARC-312-3-030	5/16	5/16		13/16	.030	28.80
ARC-375-2-010	ARC-375-3-010	3/8	3/8		7/8	.010	32.55
ARC-375-2-020	ARC-375-3-020	3/8	3/8		7/8	.020	32.55
ARC-375-2-030	ARC-375-3-030	3/8	3/8		7/8	.030	32.55
ARC-375-2-060	ARC-375-3-060	3/8	3/8		7/8	.060	32.55
ARC-500-2-010	ARC-500-3-010	1/2	1/2	3	1	.010	56.55
ARC-500-2-020	ARC-500-3-020	1/2	1/2	3	1	.020	56.55
ARC-500-2-030	ARC-500-3-030	1/2	1/2	3	1	.030	56.55
ARC-500-2-060	ARC-500-3-060	1/2	1/2	3	1	.060	56.55
ARC-625-2-020	ARC-625-3-020	5/8	5/8	3-1/2	1-1/4	.020	99.95
ARC-625-2-030	ARC-625-3-030	5/8	5/8	3-1/2	1-1/4	.030	99.95
ARC-625-2-060	ARC-625-3-060	5/8	5/8	3-1/2	1-1/4	.060	99.95
ARC-625-2-090	ARC-625-3-090	5/8	5/8	3-1/2	1-1/4	.090	99.95
ARC-750-2-020	ARC-750-3-020	3/4	3/4	4	1-1/2	.020	145.50
ARC-750-2-030	ARC-750-3-030	3/4	3/4			.030	145.50
ARC-750-2-060	ARC-750-3-060	3/4	3/4			.060	145.50
ARC-750-2-090	ARC-750-3-090	3/4	3/4			.090	145.50
ARC-750-2-125	ARC-750-3-125	3/4	3/4			.125	145.50
ARC-001-2-020	ARC-001-3-020	1	1			.020	220.45
ARC-001-2-030	ARC-001-3-030	1	1			.030	220.45
ARC-001-2-060	ARC-001-3-060	1	1			.060	220.45
ARC-001-2-090	ARC-001-3-090	1	1			.090	220.45
ARC-001-2-125	ARC-001-3-125	1	1			.125	220.45

## Coated ARC -2, -3 Series, Corner Radius Center Cutting — 45° Helix



Shank Diameter  $-.0001$  to  $-.0002$ "  
 Cutter Diameter  $1/16 - 1/4$ "  $+.000 - .002$ "  
 $9/32 - 1$ "  $+.000 - .003$ "  
 T.I.R. Maximum  $.0005$ "  
 Corner Radius  $\pm .0005$ "

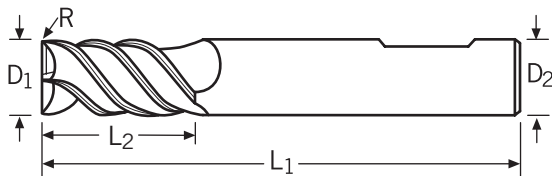
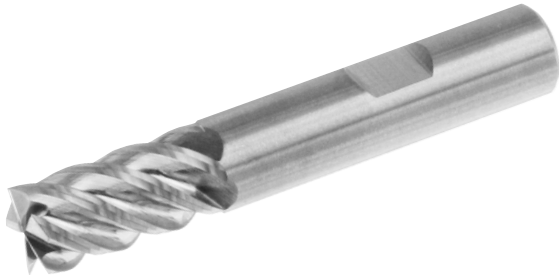
Essential features, same as ARM series, see Page 72.



COATING  
DEVELOPED  
SPECIFICALLY  
FOR USE IN  
ALUMINUM

2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	CORNER RADIUS R	ALU-S COATED PRICE EACH
ARC-062-2-005S		1/16	1/8	1-1/2	3/16	.005	17.55
ARC-062-2-010S		1/16	1/8	1-1/2	3/16	.010	17.55
ARC-093-2-005S		3/32	1/8	1-1/2	3/8	.005	17.55
ARC-093-2-010S		3/32	1/8	1-1/2	3/8	.010	17.55
ARC-125-2-010S		1/8	1/8	1-1/2	1/2	.010	17.55
ARC-125-2-020S		1/8	1/8	1-1/2	1/2	.020	17.55
ARC-187-2-010S		3/16	3/16	2	5/8	.010	24.90
ARC-187-2-020S		3/16	3/16	2	5/8	.020	24.90
ARC-187-2-030S		3/16	3/16	2	5/8	.030	24.90
ARC-250-2-010S	ARC-250-3-010S	1/4	1/4		3/4	.010	30.10
ARC-250-2-020S	ARC-250-3-020S	1/4	1/4		3/4	.020	30.10
ARC-250-2-030S	ARC-250-3-030S	1/4	1/4		3/4	.030	30.10
ARC-312-2-010S	ARC-312-3-010S	5/16	5/16		13/16	.010	35.25
ARC-312-2-020S	ARC-312-3-020S	5/16	5/16	2-1/2	13/16	.020	35.25
ARC-312-2-030S	ARC-312-3-030S	5/16	5/16		13/16	.030	35.25
ARC-375-2-010S	ARC-375-3-010S	3/8	3/8		7/8	.010	39.25
ARC-375-2-020S	ARC-375-3-020S	3/8	3/8		7/8	.020	39.25
ARC-375-2-030S	ARC-375-3-030S	3/8	3/8		7/8	.030	39.25
ARC-375-2-060S	ARC-375-3-060S	3/8	3/8		7/8	.060	39.25
ARC-500-2-010S	ARC-500-3-010S	1/2	1/2	3	1	.010	64.95
ARC-500-2-020S	ARC-500-3-020S	1/2	1/2	3	1	.020	64.95
ARC-500-2-030S	ARC-500-3-030S	1/2	1/2	3	1	.030	64.95
ARC-500-2-060S	ARC-500-3-060S	1/2	1/2	3	1	.060	64.95
ARC-625-2-020S	ARC-625-3-020S	5/8	5/8	3-1/2	1-1/4	.020	111.65
ARC-625-2-030S	ARC-625-3-030S	5/8	5/8	3-1/2	1-1/4	.030	111.65
ARC-625-2-060S	ARC-625-3-060S	5/8	5/8	3-1/2	1-1/4	.060	111.65
ARC-625-2-090S	ARC-625-3-090S	5/8	5/8	3-1/2	1-1/4	.090	111.65
ARC-750-2-020S	ARC-750-3-020S	3/4	3/4			.020	159.55
ARC-750-2-030S	ARC-750-3-030S	3/4	3/4			.030	159.55
ARC-750-2-060S	ARC-750-3-060S	3/4	3/4			.060	159.55
ARC-750-2-090S	ARC-750-3-090S	3/4	3/4			.090	159.55
ARC-750-2-125S	ARC-750-3-125S	3/4	3/4			.125	159.55
ARC-001-2-020S	ARC-001-3-020S	1	1	4	1-1/2	.020	240.80
ARC-001-2-030S	ARC-001-3-030S	1	1			.030	240.80
ARC-001-2-060S	ARC-001-3-060S	1	1			.060	240.80
ARC-001-2-090S	ARC-001-3-090S	1	1			.090	240.80
ARC-001-2-125S	ARC-001-3-125S	1	1			.125	240.80

## ARC-5 Series, Corner Radius Center Cutting — 45° Helix



Shank Diameter  $-.0001$  to  $-.0002$ "  
 Cutter Diameter  $3/16 - 1/4$ "  $+.000 - .002$ "  
 $5/16 - 1$ "  $+.000 - .003$ "  
 T.I.R. Maximum  $.0005$ "  
 Corner Radius  $\pm .0005$ "

These 5-flute high tech end mills feature a 45° helix for finishing, roughing, and slotting in medium to hard steels, stainless steels, and high temperature alloys.

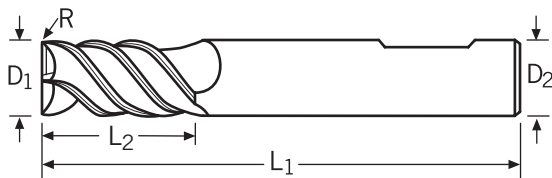
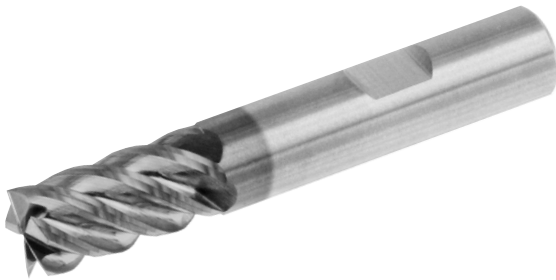
Higher metal removal rates as well as excellent finishes are achieved with these 5-flute end mills.

45° helix diminishes chatter in corner milling applications.

Sizes 3/8" and larger feature a Weldon flat.

5-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	CORNER RADIUS R	PRICE EACH
ARC-187-5-010	3/16	3/16	2	5/8	.010	22.40
ARC-187-5-020	3/16	3/16	2	5/8	.020	22.40
ARC-187-5-030	3/16	3/16	2	5/8	.030	22.40
ARC-250-5-010	1/4	1/4	2-1/2	3/4	.010	28.00
ARC-250-5-020	1/4	1/4	2-1/2	3/4	.020	28.00
ARC-250-5-030	1/4	1/4	2-1/2	3/4	.030	28.00
ARC-312-5-010	5/16	5/16		13/16	.010	31.20
ARC-312-5-020	5/16	5/16		13/16	.020	31.20
ARC-312-5-030	5/16	5/16		13/16	.030	31.20
ARC-375-5-010	3/8	3/8	2-1/2	7/8	.010	35.45
ARC-375-5-020	3/8	3/8		7/8	.020	35.45
ARC-375-5-030	3/8	3/8		7/8	.030	35.45
ARC-375-5-060	3/8	3/8		7/8	.060	35.45
ARC-500-5-010	1/2	1/2	3	1	.010	61.40
ARC-500-5-020	1/2	1/2	3	1	.020	61.40
ARC-500-5-030	1/2	1/2	3	1	.030	61.40
ARC-500-5-060	1/2	1/2	3	1	.060	61.40
ARC-625-5-020	5/8	5/8	3-1/2	1-1/4	.020	103.60
ARC-625-5-030	5/8	5/8	3-1/2	1-1/4	.030	103.60
ARC-625-5-060	5/8	5/8	3-1/2	1-1/4	.060	103.60
ARC-625-5-090	5/8	5/8	3-1/2	1-1/4	.090	103.60
ARC-750-5-020	3/4	3/4			.020	157.95
ARC-750-5-030	3/4	3/4			.030	157.95
ARC-750-5-060	3/4	3/4			.060	157.95
ARC-750-5-090	3/4	3/4			.090	157.95
ARC-750-5-125	3/4	3/4			.125	157.95
ARC-001-5-020	1	1	4	1-1/2	.020	239.25
ARC-001-5-030	1	1			.030	239.25
ARC-001-5-060	1	1			.060	239.25
ARC-001-5-090	1	1			.090	239.25
ARC-001-5-125	1	1			.125	239.25

## Coated ARC-5 Series, Corner Radius Center Cutting — 45° Helix



Shank Diameter  $-.0001$  to  $-.0002$ "  
 Cutter Diameter  $3/16 - 1/4$ "  $+.000 - .002$ "  
 $5/16 - 1$ "  $+.000 - .003$ "  
 T.I.R. Maximum  $.0005$ "  
 Corner Radius  $\pm .0005$ "

These 5-flute high tech end mills feature a 45° helix for finishing, roughing, and slotting in medium to hard steels, stainless steels, and high temperature alloys.

Higher metal removal rates as well as excellent finishes are achieved with these 5-flute end mills.

45° helix diminishes chatter in corner milling applications.

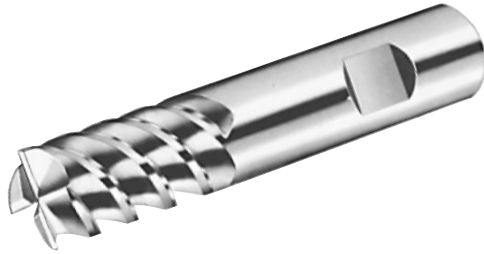
Sizes 3/8" and larger feature a Weldon flat.

5-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	CORNER RADIUS R	AITiN COATED PRICE EACH
ARC-187-5-010X	3/16	3/16	2	5/8	.010	26.75
ARC-187-5-020X	3/16	3/16	2	5/8	.020	26.75
ARC-187-5-030X	3/16	3/16	2	5/8	.030	26.75
ARC-250-5-010X	1/4	1/4	2-1/2	3/4	.010	32.50
ARC-250-5-020X	1/4	1/4	2-1/2	3/4	.020	32.50
ARC-250-5-030X	1/4	1/4	2-1/2	3/4	.030	32.50
ARC-312-5-010X	5/16	5/16	2-1/2	13/16	.010	37.75
ARC-312-5-020X	5/16	5/16		13/16	.020	37.75
ARC-312-5-030X	5/16	5/16		13/16	.030	37.75
ARC-375-5-010X	3/8	3/8		7/8	.010	42.05
ARC-375-5-020X	3/8	3/8		7/8	.020	42.05
ARC-375-5-030X	3/8	3/8		7/8	.030	42.05
ARC-375-5-060X	3/8	3/8		7/8	.060	42.05
ARC-500-5-010X	1/2	1/2	3	1	.010	69.80
ARC-500-5-020X	1/2	1/2	3	1	.020	69.80
ARC-500-5-030X	1/2	1/2	3	1	.030	69.80
ARC-500-5-060X	1/2	1/2	3	1	.060	69.80
ARC-625-5-020X	5/8	5/8	3-1/2	1-1/4	.020	115.30
ARC-625-5-030X	5/8	5/8	3-1/2	1-1/4	.030	115.30
ARC-625-5-060X	5/8	5/8	3-1/2	1-1/4	.060	115.30
ARC-625-5-090X	5/8	5/8	3-1/2	1-1/4	.090	115.30
ARC-750-5-020X	3/4	3/4	4	1-1/2	.020	171.95
ARC-750-5-030X	3/4	3/4			.030	171.95
ARC-750-5-060X	3/4	3/4			.060	171.95
ARC-750-5-090X	3/4	3/4			.090	171.95
ARC-750-5-125X	3/4	3/4			.125	171.95
ARC-001-5-020X	1	1			.020	259.55
ARC-001-5-030X	1	1			.030	259.55
ARC-001-5-060X	1	1			.060	259.55
ARC-001-5-090X	1	1			.090	259.55
ARC-001-5-125X	1	1			.125	259.55



## SDH Series 60° Helix

Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                1/4" +.000-.002"  
   9/32-1" +.000-.003"  
 T.I.R. Maximum                    .0005"

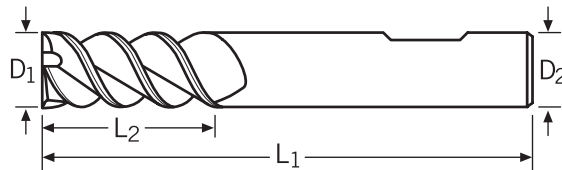


These 60° high helix end mills generate the highest metal removal rate in most applications.

The 3-flute geometry is ideal for roughing and slotting in all mild steels and stainless steels.

The 4-flute geometry is ideally suited for milling Inconel, Waspalloy, titanium, and high temperature alloys.

Sizes 3/8" and larger feature a Weldon flat.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
SDH-250-03	—	1/4	1/4	2-1/2	3/4	22.30
SDH-281-03	—	9/32	5/16		3/4	25.95
SDH-312-03	—	5/16	5/16		13/16	25.95
SDH-375-03	SDH-375-04	3/8	3/8		7/8	29.45
SDH-437-03	SDH-437-04	7/16	7/16	2-1/2	1	46.60
SDH-500-03	SDH-500-04	1/2	1/2	3	1	51.20
SDH-562-03	SDH-562-04	9/16	9/16	3-1/2	1-1/4	75.30
SDH-625-03	SDH-625-04	5/8	5/8	3-1/2	1-1/4	90.35
SDH-750-03	SDH-750-04	3/4	3/4	4	1-1/2	137.90
SDH-000-03	SDH-000-04	1	1	4	1-1/2	208.90
SDH-001-03	SDH-001-04	1	1	5	2-1/2	267.20

## Coated SDH Series 60° Helix

Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                1/4" +.000-.002"  
   9/32-1" +.000-.003"  
 T.I.R. Maximum                    .0005"

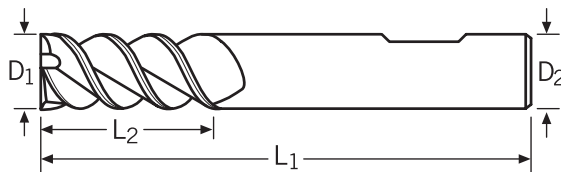


These 60° high helix end mills generate the highest metal removal rate in most applications.

The 3-flute geometry is ideal for roughing and slotting in all mild steels and stainless steels.

The 4-flute geometry is ideally suited for milling Inconel, Waspalloy, titanium, and high temperature alloys.

Sizes 3/8" and larger feature a Weldon flat.

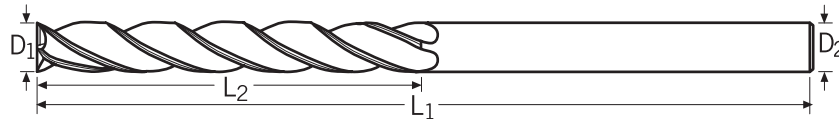
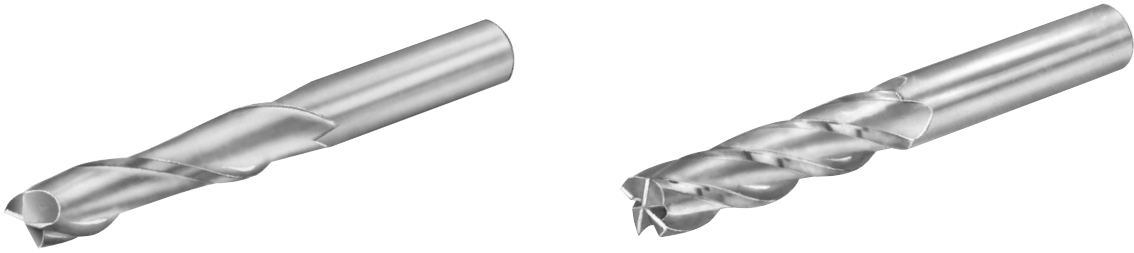


METRIC  
SIZES  
ALSO  
FROM  
STOCK

3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AI TiN COATED PRICE EACH
SDH-250-03X	—	1/4	1/4	2-1/2	3/4	26.65
SDH-281-03X	—	9/32	5/16		3/4	32.50
SDH-312-03X	—	5/16	5/16		13/16	32.50
SDH-375-03X	SDH-375-04X	3/8	3/8		7/8	36.05
SDH-437-03X	SDH-437-04X	7/16	7/16	2-1/2	1	54.80
SDH-500-03X	SDH-500-04X	1/2	1/2	3	1	59.50
SDH-562-03X	SDH-562-04X	9/16	9/16	3-1/2	1-1/4	87.00
SDH-625-03X	SDH-625-04X	5/8	5/8	3-1/2	1-1/4	102.10
SDH-750-03X	SDH-750-04X	3/4	3/4	4	1-1/2	151.90
SDH-000-03X	SDH-000-04X	1	1	4	1-1/2	229.20
SDH-001-03X	SDH-001-04X	1	1	5	2-1/2	287.45

## GLL Series, Long Length Center Cutting — 30° Helix

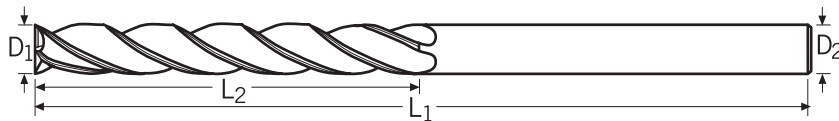
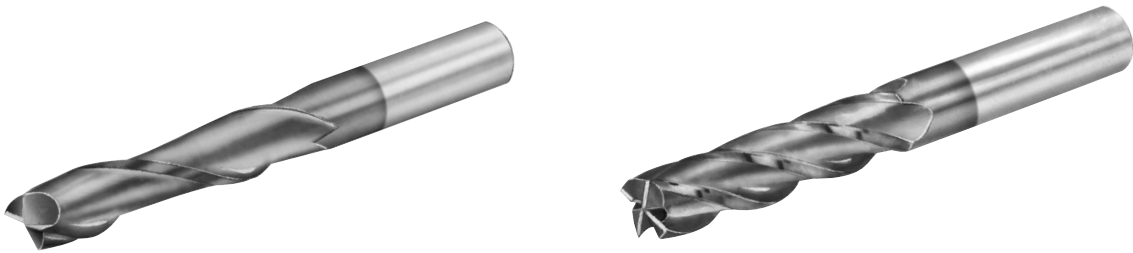
Shank Diameter                     -.0001 to -.0002"  
 Cutter Diameter                3/16 - 1/4" +.000-.002"  
   5/16 - 1"   +.000-.003"  
 T.I.R. Maximum                             .0005"



2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
GLL-187-2	GLL-187-4	3/16	3/16	2-1/2	3/4	22.45
GLL-250-2	GLL-250-4	1/4	1/4	3	1-1/8	27.00
GLL-312-2	GLL-312-4	5/16	5/16	3	1-1/8	31.55
GLL-375-2	GLL-375-4	3/8	3/8	3	1-1/8	35.85
GLL-437-2	GLL-437-4	7/16	7/16	4-1/2	2	56.60
GLL-500-2	GLL-500-4	1/2	1/2	4-1/2	2	62.15
GLL-625-2	GLL-625-4	5/8	5/8	5	2-1/4	109.95
GLL-750-2	GLL-750-4	3/4	3/4			167.60
GLL-001-2	GLL-001-4	1	1			253.95

## Coated GLL Series, Long Length Center Cutting — 30° Helix

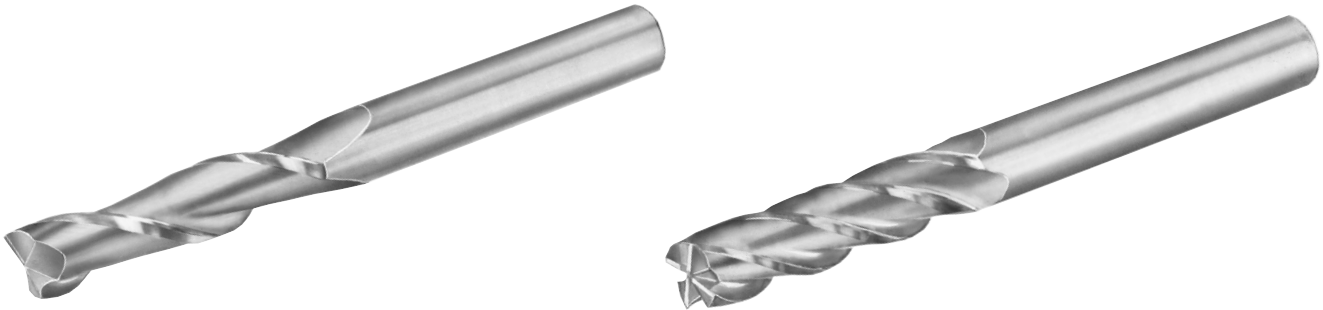
Shank Diameter                     -.0001 to -.0002"  
 Cutter Diameter                 3/16 – 1/4" +.000-.002"  
   5/16 – 1" +.000-.003"  
 T.I.R. Maximum                     .0005"



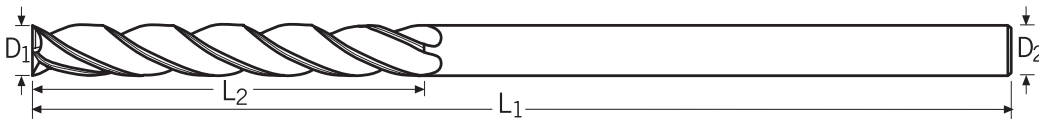
2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AI TiN COATED PRICE EACH
GLL-187-2X	GLL-187-4X	3/16	3/16	2-1/2	3/4	26.80
GLL-250-2X	GLL-250-4X	1/4	1/4	3	1-1/8	31.50
GLL-312-2X	GLL-312-4X	5/16	5/16	3	1-1/8	38.20
GLL-375-2X	GLL-375-4X	3/8	3/8	3	1-1/8	42.55
GLL-437-2X	GLL-437-4X	7/16	7/16	4-1/2	2	68.80
GLL-500-2X	GLL-500-4X	1/2	1/2	4-1/2	2	74.50
GLL-625-2X	GLL-625-4X	5/8	5/8	5	2-1/4	121.65
GLL-750-2X	GLL-750-4X	3/4	3/4			181.65
GLL-001-2X	GLL-001-4X	1	1			274.25

## GEL Series, Extra Long Center Cutting — 30° Helix

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	3/16 - 1/4" +.000-.002" 5/16 - 1" +.000-.003"
T.I.R. Maximum	.0005"



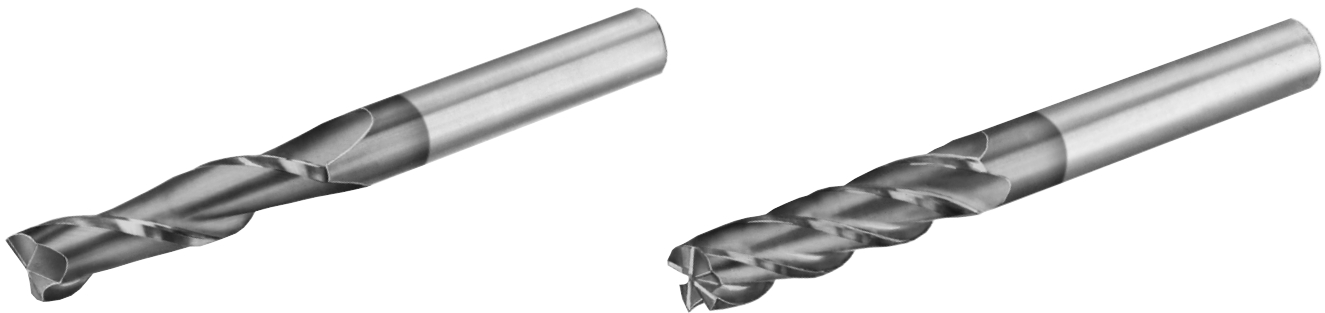
METRIC  
SIZES  
ALSO  
FROM  
STOCK



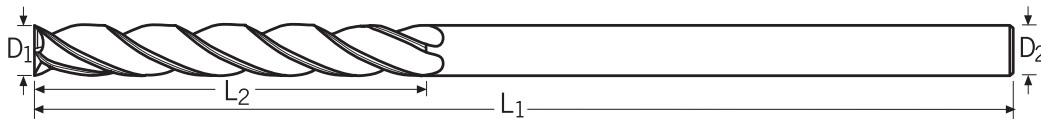
2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
GEL-187-2	GEL-187-4	3/16	3/16	3	1-1/8	23.75
GEL-250-2	GEL-250-4	1/4	1/4	4	1-1/2	28.55
GEL-312-2	GEL-312-4	5/16	5/16	4	1-5/8	32.85
GEL-375-2	GEL-375-4	3/8	3/8	4	1-3/4	37.90
GEL-437-2	GEL-437-4	7/16	7/16	6	3	59.65
GEL-500-2	GEL-500-4	1/2	1/2	6	3	68.25
GEL-625-2	GEL-625-4	5/8	5/8	6	3	120.70
GEL-750-2	GEL-750-4	3/4	3/4			183.95
GEL-001-2	GEL-001-4	1	1			278.80

## Coated GEL Series, Extra Long Center Cutting — 30° Helix

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	3/16 - 1/4" +.000-.002" 5/16 - 1" +.000-.003"
T.I.R. Maximum	.0005"



METRIC  
SIZES  
ALSO  
FROM  
STOCK

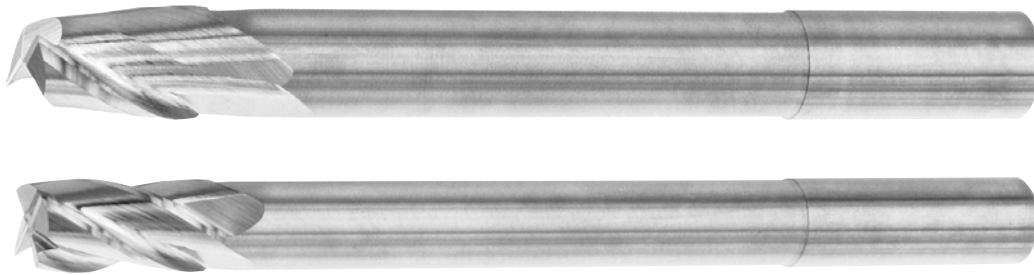


2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AIN COATED PRICE EACH
GEL-187-2X	GEL-187-4X	3/16	3/16	3	1-1/8	28.10
GEL-250-2X	GEL-250-4X	1/4	1/4	4	1-1/2	34.80
GEL-312-2X	GEL-312-4X	5/16	5/16	4	1-5/8	42.20
GEL-375-2X	GEL-375-4X	3/8	3/8	4	1-3/4	47.30
GEL-437-2X	GEL-437-4X	7/16	7/16	6	3	71.95
GEL-500-2X	GEL-500-4X	1/2	1/2	6	3	80.70
GEL-625-2X	GEL-625-4X	5/8	5/8	6	3	132.45
GEL-750-2X	GEL-750-4X	3/4	3/4			197.95
GEL-001-2X	GEL-001-4X	1	1			299.10

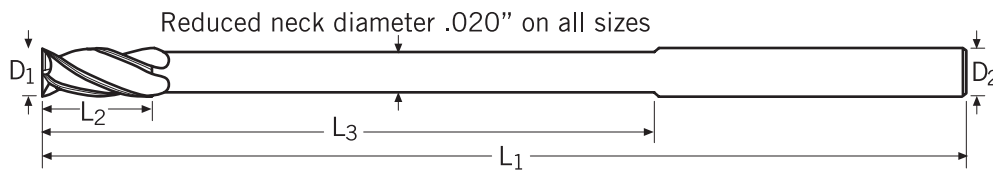
## GLR Series, Long Reach Center Cutting — 30° Helix

Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter       3/16 – 1/4" +.000–.002"  
                                   5/16 – 1" +.000–.003"  
 T.I.R. Maximum                   .0005"

Neck diameter is reduced .020" on all sizes for required clearance in long reach applications.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

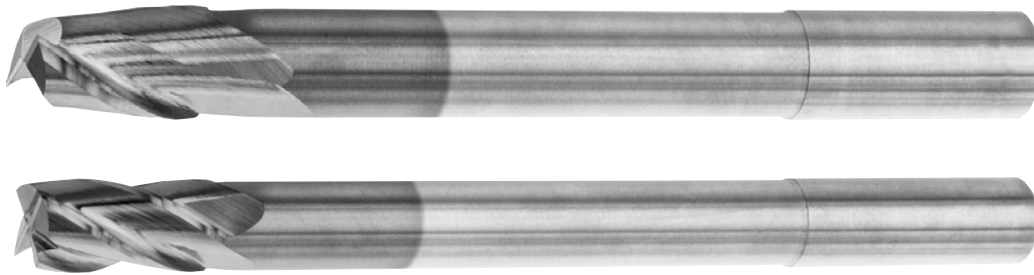


2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	REDUCED NECK LENGTH L <sub>3</sub>	PRICE EACH
GLR-187-2	GLR-187-4	3/16	3/16	3	3/8	2	27.20
GLR-250-2	GLR-250-4	1/4	1/4	4	1/2	2-1/2	32.85
GLR-312-2	GLR-312-4	5/16	5/16	4	5/8	2-5/8	37.75
GLR-375-2	GLR-375-4	3/8	3/8	4	3/4	2-3/4	43.55
GLR-437-2	GLR-437-4	7/16	7/16	6	1	4-1/2	65.70
GLR-500-2	GLR-500-4	1/2	1/2	6	1	4-1/2	75.15
GLR-625-2	GLR-625-4	5/8	5/8	6	1-1/4	4-1/2	133.25
—	GLR-750-4	3/4	3/4		1-1/2		202.30
—	GLR-001-4	1	1		1-1/2		306.65

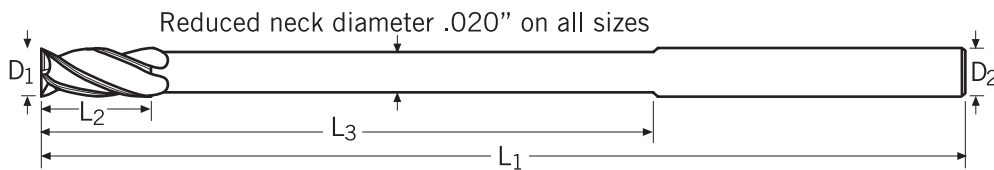
## Coated GLR Series, Long Reach Center Cutting — 30° Helix

Shank Diameter —.0001 to —.0002"  
 Cutter Diameter 3/16 – 1/4" +.000–.002"  
 5/16 – 1" +.000–.003"  
 T.I.R. Maximum .0005"

Neck diameter is reduced .020" on all sizes for required clearance in long reach applications.



METRIC  
SIZES  
ALSO  
FROM  
STOCK



2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	REDUCED NECK LENGTH L <sub>3</sub>	AITIN COATED PRICE EACH
GLR-187-2X	GLR-187-4X	3/16	3/16	3	3/8	2	31.65
GLR-250-2X	GLR-250-4X	1/4	1/4	4	1/2	2-1/2	39.20
GLR-312-2X	GLR-312-4X	5/16	5/16	4	5/8	2-5/8	47.25
GLR-375-2X	GLR-375-4X	3/8	3/8	4	3/4	2-3/4	53.15
GLR-437-2X	GLR-437-4X	7/16	7/16	6	1	4-1/2	78.10
GLR-500-2X	GLR-500-4X	1/2	1/2	6	1	4-1/2	87.70
GLR-625-2X	GLR-625-4X	5/8	5/8	6	1-1/4	4-1/2	144.95
—	GLR-750-4X	3/4	3/4		1-1/2		216.35
—	GLR-001-4X	1	1		1-1/2		327.00



## ALM Series, Long Length Center Cutting — 45° Helix



Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                1/4" +.000-.002"  
   5/16 - 1" +.000-.003"  
 T.I.R. Maximum                    .0005"

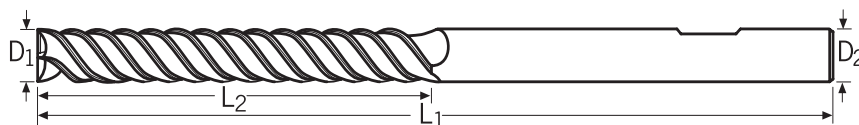
These 5-flute high tech end mills feature a 45° helix for finishing, roughing, and slotting in medium to hard steels, stainless steels, and high temperature alloys.

Ideal for continuous full depth milling.

Higher metal removal rates as well as excellent finishes are achieved with these 5-flute end mills.

45° helix diminishes chatter in corner milling applications.

Sizes 3/8" and larger feature a Weldon Flat.



5-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
ALM-250-5	1/4	1/4	3	1-1/4	29.05
ALM-312-5	5/16	5/16	3	1-1/4	33.85
ALM-375-5	3/8	3/8	4	1-1/2	38.50
ALM-500-5	1/2	1/2	4	2	66.85
ALM-625-5	5/8	5/8	6	3	118.10
ALM-750-5	3/4	3/4	6	3	180.15
ALM-001-5	1	1	6	3	286.55

## Coated MEM Series Center Cutting — 45° Helix

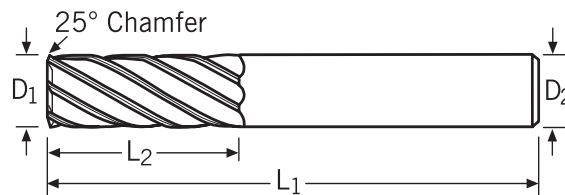
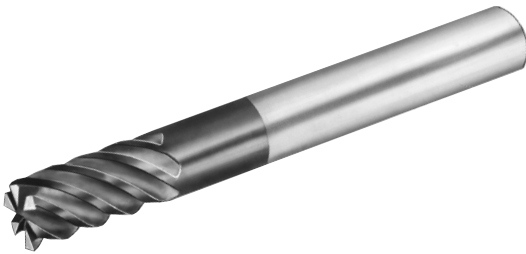
Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter       3/16 – 1/4" +.000-.002"  
                                   5/16 – 1" +.000-.003"  
 T.I.R. Maximum                                   .0005"

These 6-flute high performance end mills are specifically developed for HSC milling of heat treated and tough to machine materials.

Ideal for dry machining applications.

Extensively used in the mold and die industries.

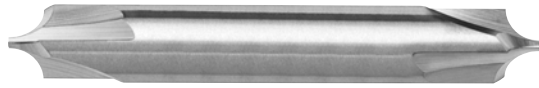
These end mills are only available with AITiN coating.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

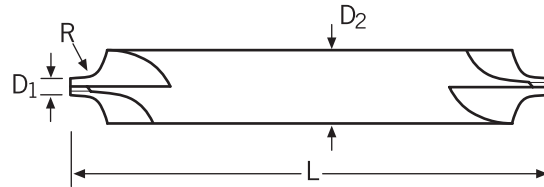
6-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	25° CHAMFER	AITiN COATED PRICE EACH
MEM-187-6X	3/16	3/16	2	5/8	.003	23.75
MEM-250-6X	1/4	1/4	2-1/2	3/4	.004	28.75
MEM-312-6X	5/16	5/16	2-1/2	13/16	.007	34.85
MEM-375-6X	3/8	3/8	2-1/2	7/8	.009	38.75
MEM-500-6X	1/2	1/2	3	1	.011	64.15
MEM-625-6X	5/8	5/8	3-1/2	1-1/4	.015	110.40
MEM-750-6X	3/4	3/4	4	1-1/2	.017	164.45
MEM-001-6X	1	1	4	1-1/2	.019	248.15

## CRE Series, Corner Rounding Double End



Shank Diameter  
Radius

-.0001 to -.0002"  
+.0000 to -.0005"



3-FLUTE TOOL NO.	MINOR DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L	RADIUS R	PRICE EACH
CRE-125-010 CRE-125-015 CRE-125-020 CRE-125-025 CRE-125-030 CRE-125-031	.060	1/8	2	.0100 .0156 .0200 .0250 .0300 .0312	26.45
CRE-187-035 CRE-187-040 CRE-187-045 CRE-187-047 CRE-187-050 CRE-187-055 CRE-187-060 CRE-187-062	.060	3/16	2	.0350 .0400 .0450 .0469 .0500 .0550 .0600 .0625	28.55
CRE-250-070 CRE-250-075 CRE-250-078 CRE-250-080 CRE-250-090 CRE-250-093	.060	1/4	2-1/2	.0700 .0750 .0781 .0800 .0900 .0938	37.00
CRE-312-100 CRE-312-109 CRE-312-125 CRE-375-140 CRE-375-156	.060	5/16 5/16 5/16 3/8 3/8	2-1/2	.1000 .1094 .1250 .1406 .1562	44.70 44.70 44.70 60.75 60.75
CRE-500-171 CRE-500-187 CRE-625-203 CRE-625-218 CRE-625-234 CRE-625-250	.120	1/2 1/2 5/8 5/8 5/8 5/8	3 3 3-1/2 3-1/2 3-1/2 3-1/2	.1718 .1875 .2031 .2188 .2344 .2500	94.15 94.15 100.95 100.95 100.95 100.95
CRE-750-281 CRE-750-296 CRE-750-312 CRE-001-375 CRE-001-437	.120	3/4 3/4 3/4 1 1	4	.2812 .2969 .3125 .3750 .4370	141.60 141.60 141.60 264.25 264.25

# END MILLS

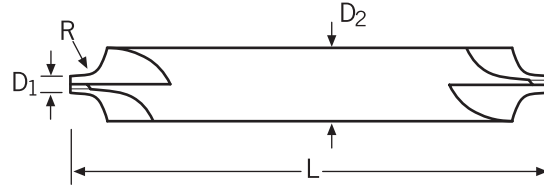


## Coated CRE Series, Corner Rounding Double End



Shank Diameter  
Radius

-.0001 to -.0002"  
+.0000 to -.0005"



3-FLUTE TOOL NO.	MINOR DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L	RADIUS R	AITIN COATED PRICE EACH
CRE-125-010X CRE-125-015X CRE-125-020X CRE-125-025X CRE-125-030X CRE-125-031X	.060	1/8	2	.0100 .0156 .0200 .0250 .0300 .0312	32.75
CRE-187-035X CRE-187-040X CRE-187-045X CRE-187-047X CRE-187-050X CRE-187-055X CRE-187-060X CRE-187-062X	.060	3/16	2	.0350 .0400 .0450 .0469 .0500 .0550 .0600 .0625	37.20
CRE-250-070X CRE-250-075X CRE-250-078X CRE-250-080X CRE-250-090X CRE-250-093X	.060	1/4	2-1/2	.0700 .0750 .0781 .0800 .0900 .0938	45.85
CRE-312-100X CRE-312-109X CRE-312-125X CRE-375-140X CRE-375-156X	.060	5/16 5/16 5/16 3/8 3/8	2-1/2	.1000 .1094 .1250 .1406 .1562	57.95 57.95 57.95 74.35 74.35
CRE-500-171X CRE-500-187X CRE-625-203X CRE-625-218X CRE-625-234X CRE-625-250X	.120	1/2 1/2 5/8 5/8 5/8 5/8	3 3 3-1/2 3-1/2 3-1/2 3-1/2	.1718 .1875 .2031 .2188 .2344 .2500	111.05 111.05 124.35 124.35 124.35 124.35
CRE-750-281X CRE-750-296X CRE-750-312X CRE-001-375X CRE-001-437X	.120	3/4 3/4 3/4 1 1	4	.2812 .2969 .3125 .3750 .4370	169.75 169.75 169.75 304.80 304.80



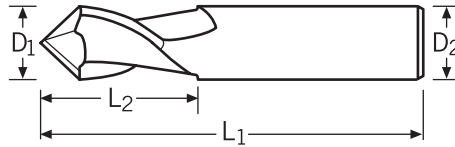
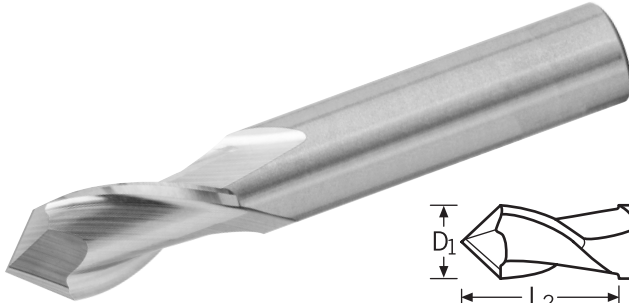
super carbide tools

## Drill Point End Mills

### 2 Flute – 90° Included Point Angle

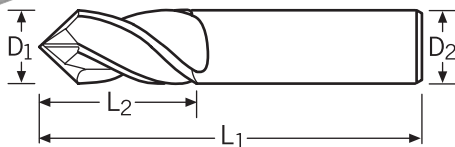
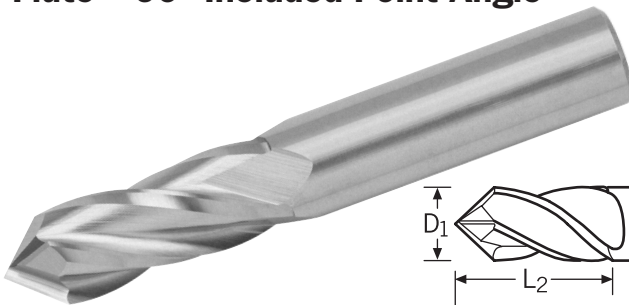
Shank Diameter  $-.0001$  to  $-.0002$ "  
 Cutter Diameter  $1/32 - 1/4$ "  $+.000 - .002$ "  
 $9/32 - 1$ "  $+.000 - .003$ "  
 T.I.R. Maximum  $.0005$ "

Multipurpose tool for drilling, milling, spotting, chamfering, and countersinking.



2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
DM-125-290	1/8	1/8	1-1/2	1/2	13.00
DM-187-290	3/16	3/16	2	5/8	18.20
DM-250-290	1/4	1/4	2-1/2	3/4	22.80
DM-312-290	5/16	5/16	2-1/2	13/16	28.35
DM-375-290	3/8	3/8	2-1/2	1	35.55
DM-437-290	7/16	7/16	2-1/2	1	48.05
DM-500-290	1/2	1/2	3	1	53.95
DM-625-290	5/8	5/8	3-1/2	1-1/4	108.10
DM-750-290	3/4	3/4	4	1-1/2	159.00

### 4 Flute – 90° Included Point Angle



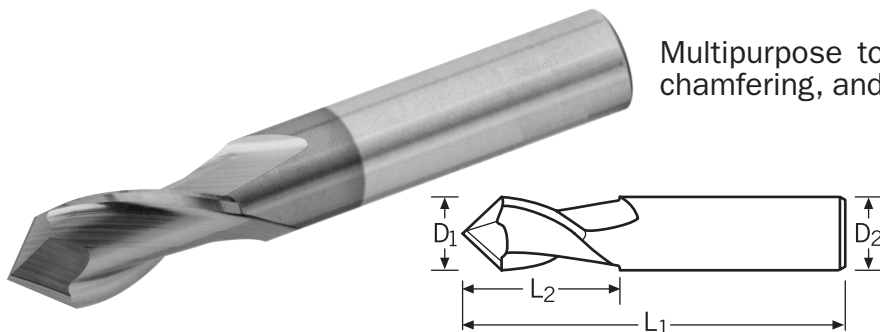
4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
DM-125-490	1/8	1/8	1-1/2	1/2	13.60
DM-187-490	3/16	3/16	2	5/8	19.10
DM-250-490	1/4	1/4	2-1/2	3/4	23.85
DM-312-490	5/16	5/16	2-1/2	13/16	29.85
DM-375-490	3/8	3/8	2-1/2	1	37.45
DM-437-490	7/16	7/16	2-1/2	1	50.60
DM-500-490	1/2	1/2	3	1	58.90
DM-625-490	5/8	5/8	3-1/2	1-1/4	113.20
DM-750-490	3/4	3/4	4	1-1/2	166.45

## Coated Drill Point End Mills

### 2 Flute – 90° Included Point Angle

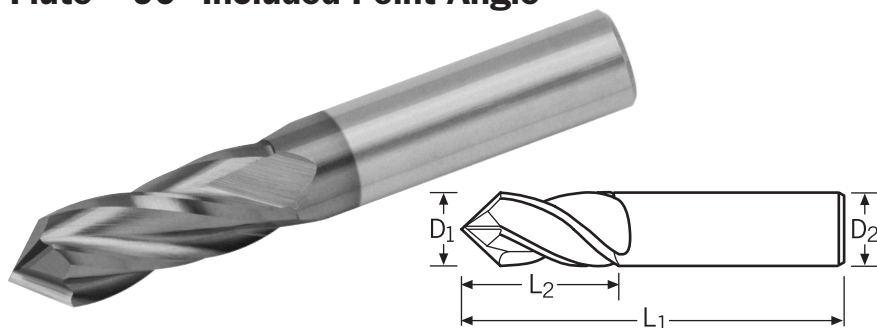
Shank Diameter  $-.0001$  to  $-.0002$ "  
 Cutter Diameter  $1/32 - 1/4$ "  $+.000 - .002$ "  
 $9/32 - 1$  "  $+.000 - .003$ "  
 T.I.R. Maximum  $.0005$ "

Multipurpose tool for drilling, milling, spotting, chamfering, and countersinking.



2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITIN COATED PRICE EACH
DM-125-290X	1/8	1/8	1-1/2	1/2	16.10
DM-187-290X	3/16	3/16	2	5/8	22.55
DM-250-290X	1/4	1/4	2-1/2	3/4	27.20
DM-312-290X	5/16	5/16	2-1/2	13/16	34.90
DM-375-290X	3/8	3/8	2-1/2	1	42.20
DM-437-290X	7/16	7/16	2-1/2	1	56.30
DM-500-290X	1/2	1/2	3	1	62.15
DM-625-290X	5/8	5/8	3-1/2	1-1/4	119.85
DM-750-290X	3/4	3/4	4	1-1/2	173.00

### 4 Flute – 90° Included Point Angle

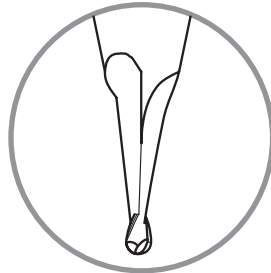
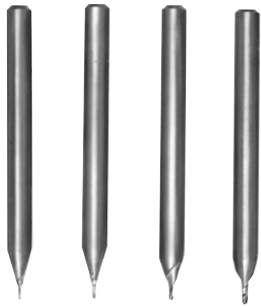


4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITIN COATED PRICE EACH
DM-125-490X	1/8	1/8	1-1/2	1/2	16.60
DM-187-490X	3/16	3/16	2	5/8	23.35
DM-250-490X	1/4	1/4	2-1/2	3/4	28.25
DM-312-490X	5/16	5/16	2-1/2	13/16	36.40
DM-375-490X	3/8	3/8	2-1/2	1	44.10
DM-437-490X	7/16	7/16	2-1/2	1	58.85
DM-500-490X	1/2	1/2	3	1	67.35
DM-625-490X	5/8	5/8	3-1/2	1-1/4	124.90
DM-750-490X	3/4	3/4	4	1-1/2	180.50

# END MILLS



## BMS Series, Miniature, Ball Nose, Stub Length Center Cutting — 30° Helix



Shank Diameter —.0001 to -.0002"  
Cutter Diameter ±.0005"  
T.I.R. Maximum .0005"



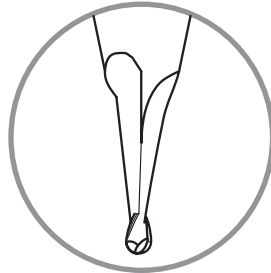
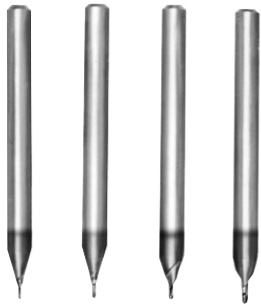
METRIC  
SIZES  
ALSO  
FROM  
STOCK

2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
BMS-010-2	.010	1/8	1-1/2	.015	<b>32.45</b>
BMS-011-2	.011			.016	
BMS-012-2	.012			.018	
BMS-013-2	.013			.019	
BMS-014-2	.014			.021	
BMS-015-2	.015	1/8	1-1/2	.022	<b>19.90</b>
BMS-016-2	.016			.024	
BMS-017-2	.017			.025	
BMS-018-2	.018			.027	
BMS-019-2	.019			.028	
BMS-020-2	.020	1/8	1-1/2	.030	<b>18.25</b>
BMS-021-2	.021			.031	
BMS-022-2	.022			.033	
BMS-023-2	.023			.034	
BMS-024-2	.024			.036	
BMS-025-2	.025	1/8	1-1/2	.037	<b>18.25</b>
BMS-026-2	.026			.039	
BMS-027-2	.027			.040	
BMS-028-2	.028			.042	
BMS-029-2	.029			.043	
BMS-030-2	.030	1/8	1-1/2	.045	<b>16.65</b>
BMS-031-2	.031			.047	
BMS-032-2	.032			.048	
BMS-033-2	.033			.050	
BMS-034-2	.034			.051	
BMS-035-2	.035	1/8	1-1/2	.053	<b>16.65</b>
BMS-040-2	.040			.060	
BMS-045-2	.045			.068	
BMS-050-2	.050			.075	

# END MILLS



## Coated BMS Series, Miniature, Ball Nose, Stub Length Center Cutting — 30° Helix



Shank Diameter —.0001 to —.0002"  
Cutter Diameter ±.0005"  
T.I.R. Maximum .0005"



METRIC  
SIZES  
ALSO  
FROM  
STOCK

2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITiN COATED PRICE EACH
BMS-010-2X	.010	1/8	1-1/2	.015	35.90
BMS-011-2X	.011			.016	
BMS-012-2X	.012			.018	
BMS-013-2X	.013			.019	
BMS-014-2X	.014			.021	
BMS-015-2X	.015	1/8	1-1/2	.022	23.10
BMS-016-2X	.016			.024	
BMS-017-2X	.017			.025	
BMS-018-2X	.018			.027	
BMS-019-2X	.019			.028	
BMS-020-2X	.020	1/8	1-1/2	.030	21.50
BMS-021-2X	.021			.031	
BMS-022-2X	.022			.033	
BMS-023-2X	.023			.034	
BMS-024-2X	.024			.036	
BMS-025-2X	.025	1/8	1-1/2	.037	21.50
BMS-026-2X	.026			.039	
BMS-027-2X	.027			.040	
BMS-028-2X	.028			.042	
BMS-029-2X	.029			.043	
BMS-030-2X	.030	1/8	1-1/2	.045	19.75
BMS-031-2X	.031			.047	
BMS-032-2X	.032			.048	
BMS-033-2X	.033			.050	
BMS-034-2X	.034			.051	
BMS-035-2X	.035	1/8	1-1/2	.053	19.75
BMS-040-2X	.040			.060	
BMS-045-2X	.045			.068	
BMS-050-2X	.050			.075	



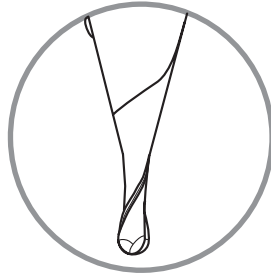
super carbide tools



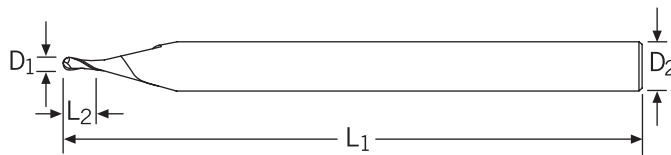
# END MILLS



## BMR Series, Miniature, Ball Nose Center Cutting — 30° Helix



Shank Diameter —.0001 to -.0002"  
Cutter Diameter ±.0005"  
T.I.R. Maximum .0005"

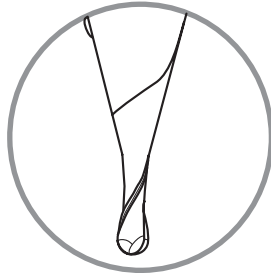


2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
BMR-010-2	.010	1/8	1-1/2	.030	33.90
BMR-011-2	.011			.033	
BMR-012-2	.012			.036	
BMR-013-2	.013			.039	
BMR-014-2	.014			.042	
BMR-015-2	.015	1/8	1-1/2	.045	20.65
BMR-016-2	.016			.048	
BMR-017-2	.017			.051	
BMR-018-2	.018			.054	
BMR-019-2	.019			.057	
BMR-020-2	.020	1/8	1-1/2	.060	19.15
BMR-021-2	.021			.063	
BMR-022-2	.022			.066	
BMR-023-2	.023			.069	
BMR-024-2	.024			.072	
BMR-025-2	.025	1/8	1-1/2	.075	19.15
BMR-026-2	.026			.078	
BMR-027-2	.027			.081	
BMR-028-2	.028			.084	
BMR-029-2	.029			.087	
BMR-030-2	.030	1/8	1-1/2	.090	17.40
BMR-031-2	.031			.093	
BMR-032-2	.032			.096	
BMR-033-2	.033			.099	
BMR-034-2	.034			.102	
BMR-035-2	.035	1/8	1-1/2	.105	17.40
BMR-040-2	.040			.120	
BMR-045-2	.045			.135	
BMR-050-2	.050			.150	

# END MILLS



## Coated BMR Series, Miniature, Ball Nose Center Cutting — 30° Helix



Shank Diameter —.0001 to -.0002"  
Cutter Diameter ±.0005"  
T.I.R. Maximum .0005"



2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITIN COATED PRICE EACH
BMR-010-2X BMR-011-2X BMR-012-2X BMR-013-2X BMR-014-2X	.010 .011 .012 .013 .014	1/8	1-1/2	.030 .033 .036 .039 .042	37.40 34.10 34.10 29.45 29.45
BMR-015-2X BMR-016-2X BMR-017-2X BMR-018-2X BMR-019-2X	.015 .016 .017 .018 .019	1/8	1-1/2	.045 .048 .051 .054 .057	23.85
BMR-020-2X BMR-021-2X BMR-022-2X BMR-023-2X BMR-024-2X	.020 .021 .022 .023 .024	1/8	1-1/2	.060 .063 .066 .069 .072	22.30
BMR-025-2X BMR-026-2X BMR-027-2X BMR-028-2X BMR-029-2X	.025 .026 .027 .028 .029	1/8	1-1/2	.075 .078 .081 .084 .087	22.30 20.60 20.60 20.60 20.60
BMR-030-2X BMR-031-2X BMR-032-2X BMR-033-2X BMR-034-2X	.030 .031 .032 .033 .034	1/8	1-1/2	.090 .093 .096 .099 .102	20.60
BMR-035-2X BMR-040-2X BMR-045-2X BMR-050-2X	.035 .040 .045 .050	1/8	1-1/2	.105 .120 .135 .150	20.60

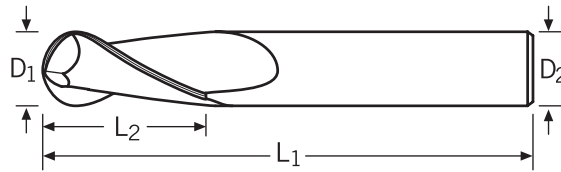


super carbide tools

## BEM Series, Ball Nose Center Cutting — 30° Helix



Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter            1/32-1/4" +.000-.002"  
                                       9/32 - 1"   +.000-.003"  
 Ball Radius                       +.001-.000"  
 T.I.R. Maximum                   .0005"

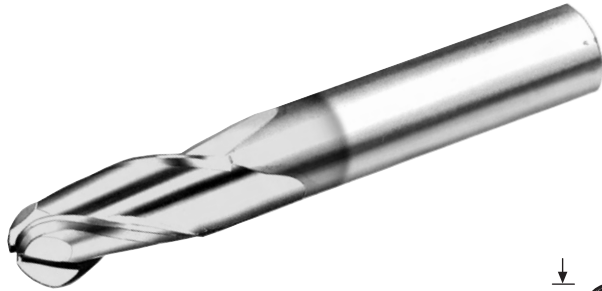


METRIC  
SIZES  
ALSO  
FROM  
STOCK

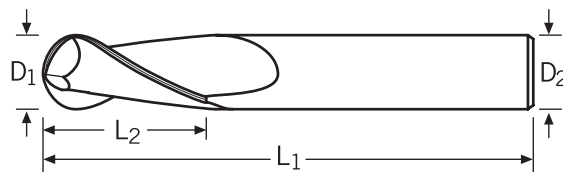
2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
BEM-031-02 BEM-046-02 BEM-062-02 BEM-078-02	BEM-031-03 BEM-046-03 BEM-062-03 BEM-078-03	BEM-031-04 BEM-046-04 BEM-062-04 BEM-078-04	1/32 3/64 1/16 5/64	1/8	1-1/2	5/64 7/64 3/16 3/16	14.50 14.50 13.10 13.10
BEM-093-02 BEM-109-02 BEM-125-02	BEM-093-03 BEM-109-03 BEM-125-03	BEM-093-04 BEM-109-04 BEM-125-04	3/32 7/64 1/8	1/8	1-1/2	3/8 3/8 1/2	13.10 13.10 11.70
BEM-140-02 BEM-156-02 BEM-171-02 BEM-187-02	BEM-140-03 BEM-156-03 BEM-171-03 BEM-187-03	BEM-140-04 BEM-156-04 BEM-171-04 BEM-187-04	9/64 5/32 11/64 3/16	3/16	2	1/2 9/16 5/8 5/8	18.60
BEM-203-02 BEM-218-02 BEM-234-02 BEM-250-02	BEM-203-03 BEM-218-03 BEM-234-03 BEM-250-03	BEM-203-04 BEM-218-04 BEM-234-04 BEM-250-04	13/64 7/32 15/64 1/4	1/4	2-1/2	5/8 5/8 3/4 3/4	23.30
BEM-281-02 BEM-312-02 BEM-375-02 BEM-437-02	BEM-281-03 BEM-312-03 BEM-375-03 BEM-437-03	BEM-281-04 BEM-312-04 BEM-375-04 BEM-437-04	9/32 5/16 3/8 7/16	5/16 5/16 3/8 7/16	2-1/2	3/4 13/16 7/8 1	27.15 27.15 30.85 48.70
BEM-500-02 BEM-562-02 BEM-625-02 BEM-687-02	BEM-500-03 BEM-562-03 BEM-625-03 BEM-687-03	BEM-500-04 BEM-562-04 BEM-625-04 BEM-687-04	1/2 9/16 5/8 11/16	1/2 9/16 5/8 11/16	3 3-1/2 3-1/2 4	1 1-1/4 1-1/4 1-3/8	53.40 78.70 94.50 116.35
BEM-750-02 BEM-875-02 BEM-001-02 —	BEM-750-03 BEM-875-03 BEM-001-03 —	BEM-750-04 BEM-875-04 BEM-001-04 BEM-001-06*	3/4 7/8 1 1	3/4 7/8 1 1	4 4 4 5	1-1/2 1-1/2 1-1/2 1-3/4	144.20 199.75 218.35 256.60

\*6 Flute

## Coated BEM Series, Ball Nose Center Cutting — 30° Helix



Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                1/32–1/4" +.000–.002"  
   9/32 – 1"   +.000–.003"  
 Ball Radius                       +.001–.005"  
 T.I.R. Maximum                   .0005"



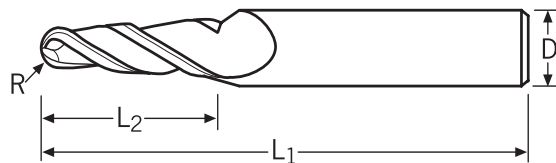
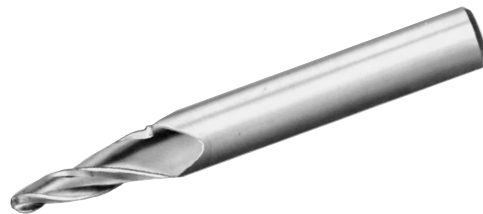
METRIC  
SIZES  
ALSO  
FROM  
STOCK

2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITiN COATED PRICE EACH
BEM-031-02X BEM-046-02X BEM-062-02X BEM-078-02X	BEM-031-03X BEM-046-03X BEM-062-03X BEM-078-03X	BEM-031-04X BEM-046-04X BEM-062-04X BEM-078-04X	1/32 3/64 1/16 5/64	1/8	1-1/2	5/64 7/64 3/16 3/16	17.50 17.50 16.25 16.25
BEM-093-02X BEM-109-02X BEM-125-02X	BEM-093-03X BEM-109-03X BEM-125-03X	BEM-093-04X BEM-109-04X BEM-125-04X	3/32 7/64 1/8	1/8	1-1/2	3/8 3/8 1/2	16.25 16.25 14.80
BEM-140-02X BEM-156-02X BEM-171-02X BEM-187-02X	BEM-140-03X BEM-156-03X BEM-171-03X BEM-187-03X	BEM-140-04X BEM-156-04X BEM-171-04X BEM-187-04X	9/64 5/32 11/64 3/16	3/16	2	1/2 9/16 5/8 5/8	22.85
BEM-203-02X BEM-218-02X BEM-234-02X BEM-250-02X	BEM-203-03X BEM-218-03X BEM-234-03X BEM-250-03X	BEM-203-04X BEM-218-04X BEM-234-04X BEM-250-04X	13/64 7/32 15/64 1/4	1/4	2-1/2	5/8 5/8 3/4 3/4	27.70
BEM-281-02X BEM-312-02X BEM-375-02X BEM-437-02X	BEM-281-03X BEM-312-03X BEM-375-03X BEM-437-03X	BEM-281-04X BEM-312-04X BEM-375-04X BEM-437-04X	9/32 5/16 3/8 7/16	5/16 5/16 3/8 7/16	2-1/2	3/4 13/16 7/8 1	33.70 33.70 37.40 56.95
BEM-500-02X BEM-562-02X BEM-625-02X BEM-687-02X	BEM-500-03X BEM-562-03X BEM-625-03X BEM-687-03X	BEM-500-04X BEM-562-04X BEM-625-04X BEM-687-04X	1/2 9/16 5/8 11/16	1/2 9/16 5/8 11/16	3 3-1/2 3-1/2 4	1 1-1/4 1-1/4 1-3/8	61.75 90.45 106.25 130.40
BEM-750-02X BEM-875-02X BEM-001-02X —	BEM-750-03X BEM-875-03X BEM-001-03X —	BEM-750-04X BEM-875-04X BEM-001-04X BEM-001-06X*	3/4 7/8 1 1	3/4 7/8 1 1	4 4 4 5	1-1/2 1-1/2 1-1/2 1-3/4	158.20 220.00 238.65 276.85

\*6 Flute

## TSB Series, Ball Nose, Stub Length, Tapered Center Cutting — 30° Helix

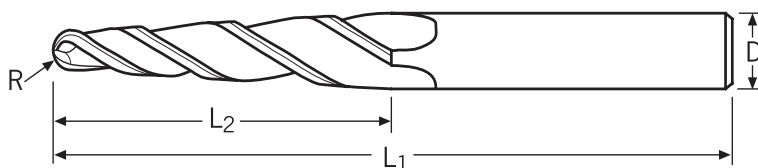
Shank Diameter                    -.0001 to -.0002"  
 Small Diameter                   +.003 -.000"  
 T.I.R. Maximum                   .0005"



3-FLUTE TOOL NO.	RADIUS R	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	ANGLE PER SIDE	PRICE EACH
TSB-250-0 TSB-250-1 TSB-250-3 TSB-250-5 TSB-250-7	.062	1/4	2-1/2	1/2	1° 1° 30' 3° 5° 7°	41.85
TSB-375-0 TSB-375-1 TSB-375-3 TSB-375-5 TSB-375-7	.093 .093 .078 .062 .078	3/8	2-1/2	3/4	1° 1° 30' 3° 5° 7°	63.95
TSB-500-3 TSB-500-5 TSB-500-7	.125 .125 .093	1/2	3	1	3° 5° 7°	97.10

## TEB Series, Ball Nose, Tapered Center Cutting — 30° Helix

Shank Diameter                    −.0001 to −.0002”  
 Small Diameter                 +.003 −.000”  
 T.I.R. Maximum                    .0005”



METRIC  
SIZES  
ALSO  
FROM  
STOCK

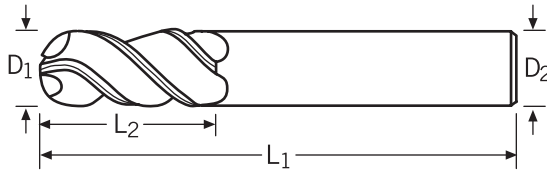
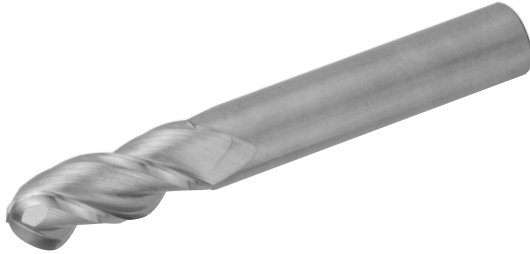
3-FLUTE TOOL NO.	RADIUS R	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	ANGLE PER SIDE	PRICE EACH
TEB-250-0 TEB-250-1 TEB-250-3 TEB-250-5 TEB-250-7	.062	1/4	3	1 1-1/2 1 3/4 1/2	1° 1° 30' 3° 5° 7°	46.25
TEB-375-0 TEB-375-1 TEB-375-3 TEB-375-5 TEB-375-7	.093 .093 .078 .062 .078	3/8	3-1/2	1-3/4 1-3/4 1-3/4 1-1/2 3/4	1° 1° 30' 3° 5° 7°	70.60
TEB-500-3 TEB-500-5 TEB-500-7	.125 .125 .093	1/2	4	2 1-1/4 1-1/4	3° 5° 7°	107.25

## ARB Series, Ball Nose Center Cutting

Shank Diameter  $-.0001$  to  $-.0002$ "  
 Cutter Diameter  $1/8 - 1/4$ "  $+.000$ – $-.002$ "  
 $5/16 - 1$ "  $+.000$ – $-.003$ "  
 T.I.R. Maximum  $.0005$ "

“Stealth” cutter-profile. These high performance end mills are engineered for high speed cutting in aluminum, nonferrous and soft materials.

The special flute geometry provides an extremely smooth and silent cutting action for an exceptional surface finish.



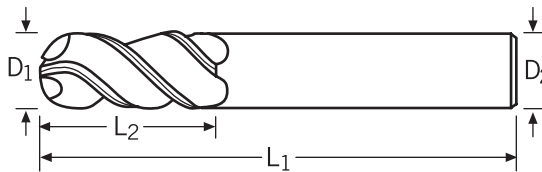
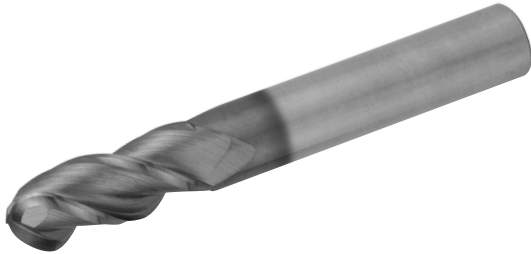
2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
ARB-125-2	—	1/8	1/8	1-1/2	1/2	14.55
ARB-187-2	—	3/16	3/16	2	5/8	20.55
ARB-250-2	ARB-250-3	1/4	1/4	2-1/2	3/4	25.75
ARB-312-2	ARB-312-3	5/16	5/16	2-1/2	13/16	28.20
ARB-375-2	ARB-375-3	3/8	3/8	2-1/2	7/8	32.55
ARB-500-2	ARB-500-3	1/2	1/2	3	1	56.55
ARB-625-2	ARB-625-3	5/8	5/8	3-1/2	1-1/4	99.95
ARB-750-2	ARB-750-3	3/4	3/4	4	1-1/2	145.50
ARB-001-2	ARB-001-3	1	1	4	1-1/2	220.45

## Coated ARB Series, Ball Nose Center Cutting

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	1/8 – 1/4" +.000-.002" 5/16– 1" +.000-.003"
T.I.R. Maximum	.0005"

“Stealth” cutter-profile. These high performance end mills are engineered for high speed cutting in aluminum, nonferrous and soft materials.

The special flute geometry provides an extremely smooth and silent cutting action for an exceptional surface finish.

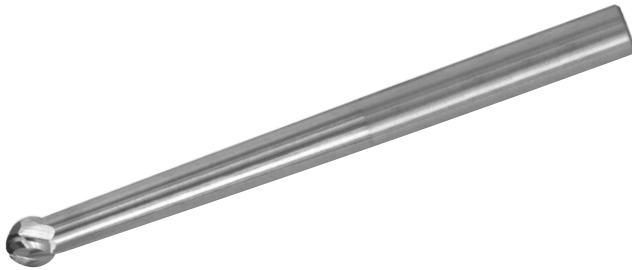


COATING DEVELOPED SPECIFICALLY FOR USE IN ALUMINUM

2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	ALU-S COATED PRICE EACH
ARB-125-2S ARB-187-2S ARB-250-2S	— — ARB-250-3S	1/8 3/16 1/4	1/8 3/16 1/4	1-1/2 2 2-1/2	1/2 5/8 3/4	17.55 24.90 30.10
ARB-312-2S ARB-375-2S ARB-500-2S	ARB-312-3S ARB-375-3S ARB-500-3S	5/16 3/8 1/2	5/16 3/8 1/2	2-1/2 2-1/2 3	13/16 7/8 1	35.25 39.25 64.95
ARB-625-2S ARB-750-2S ARB-001-2S	ARB-625-3S ARB-750-3S ARB-001-3S	5/8 3/4 1	5/8 3/4 1	3-1/2 4 4	1-1/4 1-1/2 1-1/2	111.65 159.55 240.80



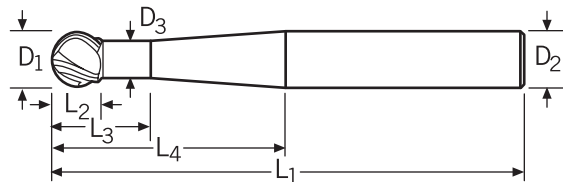
## SBM Series, Spherical Ball Nose Center Cutting — 30° Helix



Shank Diameter - .0001 to -.0002"  
 Cutter Diameter 1/8 - 1/4" +.000-.002"  
 5/16-5/8" +.000-.003"  
 T.I.R. Maximum .0005"  
 Radius ±.0005"

These short flute 220° ball nose end mills feature a reduced neck diameter and are ideal for copy milling and deep pocket milling applications.

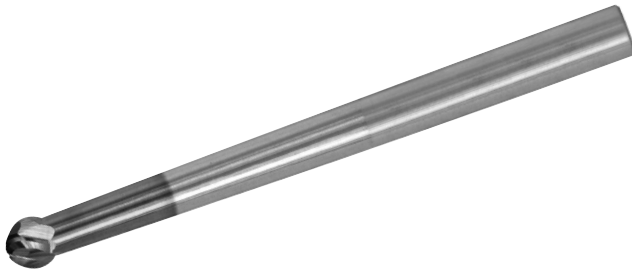
The special geometry allows a tool inclination of up to 15° with optimal chip evacuation for increased feed rates.



2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	RADIUS	CUTTER DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	NECK DIA. D <sub>3</sub>	OVER- ALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	NECK LENGTH L <sub>3</sub>	REDUCED NECK LENGTH L <sub>4</sub>	PRICE EACH
SBM-125-2	SBM-125-3	SBM-125-4	.0620	1/8		.100		.100	0.250	1.100	61.75
SBM-187-2	SBM-187-3	SBM-187-4	.0938	3/16	1/4	.150	3	.150	0.350	1.200	
SBM-250-2	SBM-250-3	SBM-250-4	.1250	1/4		.200		.200	0.500	1.200	
SBM-312-2	SBM-312-3	SBM-312-4	.1562	5/16	5/16	.250		.250	0.600	1.200	77.65
SBM-375-2	SBM-375-3	SBM-375-4	.1875	3/8	3/8	.300	4	.300	0.800	1.200	99.70
SBM-500-2	SBM-500-3	SBM-500-4	.2500	1/2	1/2	.400		.400	0.900	1.500	124.10
SBM-625-2	SBM-625-3	SBM-625-4	.3125	5/8	5/8	.500		.500	1.000	1.700	154.25

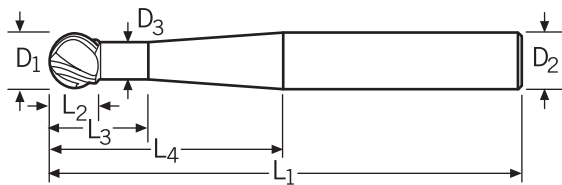
## Coated SBM Series, Spherical Ball Nose Center Cutting — 30° Helix

Shank Diameter -.0001 to -.0002"  
 Cutter Diameter 1/8 – 1/4" +.000–.002"  
5/16–5/8" +.000–.003"  
 T.I.R. Maximum .0005"  
 Radius ±.0005"



These short flute 220° ball nose end mills feature a reduced neck diameter and are ideal for copy milling and deep pocket milling applications.

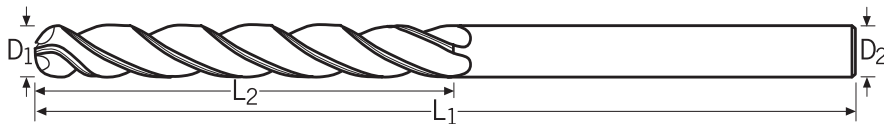
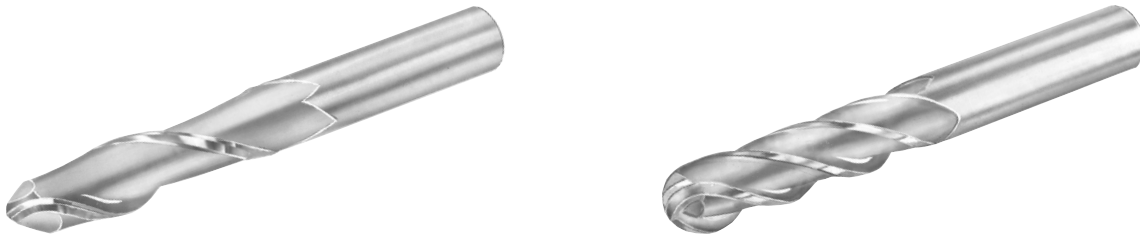
The special geometry allows a tool inclination of up to 15° with optimal chip evacuation for increased feed rates.



2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	RADIUS	CUTTER DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	NECK DIA. D <sub>3</sub>	OVER- ALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	NECK LENGTH L <sub>3</sub>	REDUCED NECK LENGTH L <sub>4</sub>	AITIN COATED PRICE EACH	
SBM-125-2X	SBM-125-3X	SBM-125-4X	.0620	1/8		.100		.100	0.250	1.100	66.95	
SBM-187-2X	SBM-187-3X	SBM-187-4X	.0938	3/16	1/4	.150	3	.150	0.350	1.200		
SBM-250-2X	SBM-250-3X	SBM-250-4X	.1250	1/4		.200		.200	0.500	1.200		
SBM-312-2X	SBM-312-3X	SBM-312-4X	.1562	5/16	5/16	.250		.250	0.600	1.200	88.05	
SBM-375-2X	SBM-375-3X	SBM-375-4X	.1875	3/8	3/8	.300	4	.300	0.800	1.200		110.50
SBM-500-2X	SBM-500-3X	SBM-500-4X	.2500	1/2	1/2	.400		.400	0.900	1.500		137.75
SBM-625-2X	SBM-625-3X	SBM-625-4X	.3125	5/8	5/8	.500		.500	1.000	1.700		169.80

## BLL Series, Ball Nose, Long Length Center Cutting — 30° Helix

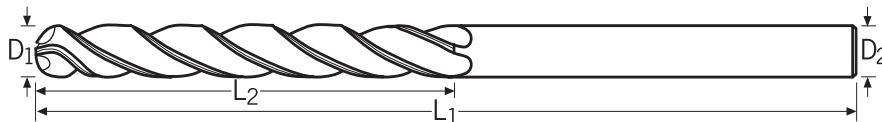
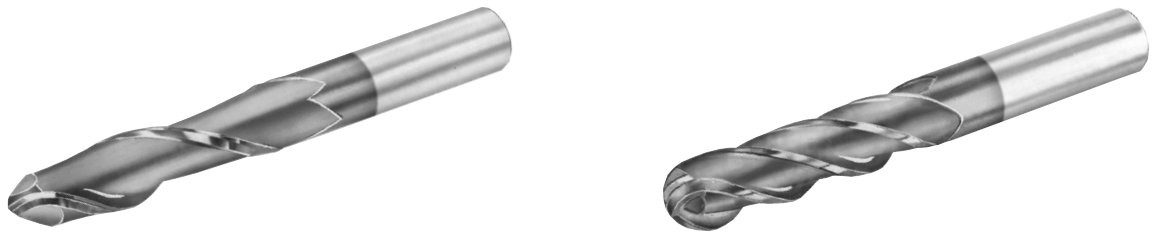
Shank Diameter	-.0001 to -.0002"
Cutter Diameter	3/16 - 1/4" +.000-.002"
	5/16 - 1" +.000-.003"
Ball Radius	+.000-.005"
T.I.R. Maximum	.0005"



2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
BLL-187-2	BLL-187-4	3/16	3/16	2-1/2	3/4	24.75
BLL-250-2	BLL-250-4	1/4	1/4	3	1-1/8	29.80
BLL-312-2	BLL-312-4	5/16	5/16	3	1-1/8	34.65
BLL-375-2	BLL-375-4	3/8	3/8	3	1-1/8	39.40
BLL-437-2	BLL-437-4	7/16	7/16	4-1/2	2	62.30
BLL-500-2	BLL-500-4	1/2	1/2	4-1/2	2	68.35
BLL-625-2	BLL-625-4	5/8	5/8	5	2-1/4	120.95
BLL-750-2	BLL-750-4	3/4	3/4			184.45
BLL-001-2	BLL-001-4	1	1			279.30

## Coated BLL Series, Ball Nose, Long Length Center Cutting — 30° Helix

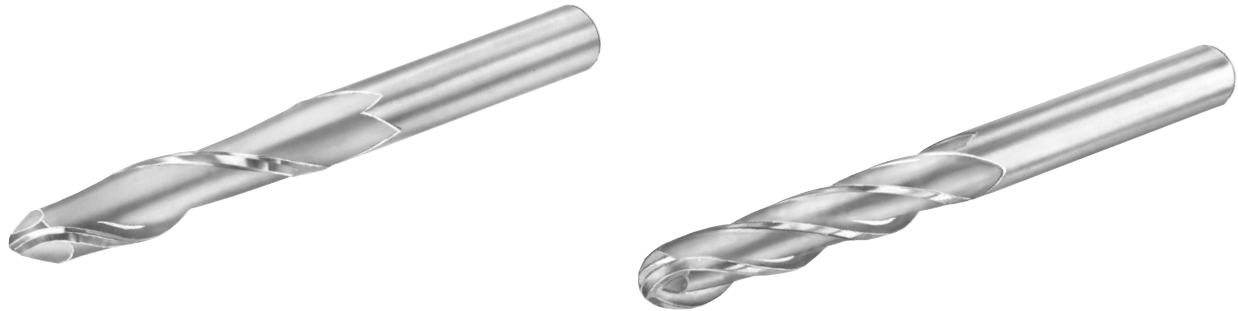
Shank Diameter	-.0001 to -.0002"
Cutter Diameter	3/16 – 1/4" +.000–.002"
	5/16 – 1" +.000–.003"
Ball Radius	+.000–.005"
T.I.R. Maximum	.0005"



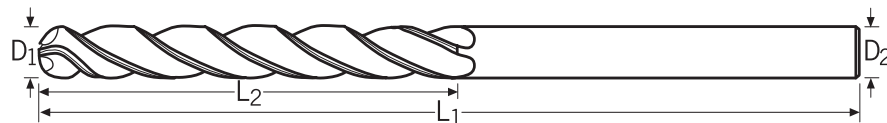
2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITIN COATED PRICE EACH
BLL-187-2X	BLL-187-4X	3/16	3/16	2-1/2	3/4	29.15
BLL-250-2X	BLL-250-4X	1/4	1/4	3	1-1/8	34.25
BLL-312-2X	BLL-312-4X	5/16	5/16	3	1-1/8	39.30
BLL-375-2X	BLL-375-4X	3/8	3/8	3	1-1/8	46.15
BLL-437-2X	BLL-437-4X	7/16	7/16	4-1/2	2	74.60
BLL-500-2X	BLL-500-4X	1/2	1/2	4-1/2	2	80.80
BLL-625-2X	BLL-625-4X	5/8	5/8	5	2-1/4	132.65
BLL-750-2X	BLL-750-4X	3/4	3/4			198.45
BLL-001-2X	BLL-001-4X	1	1			299.65

## BEL Series, Ball Nose, Extra Long Center Cutting — 30° Helix

Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                3/16 – 1/4" +.000–.002"  
   5/16 – 1"   +.000–.003"  
 Ball Radius                         +.000–.005"  
 T.I.R. Maximum                    .0005"



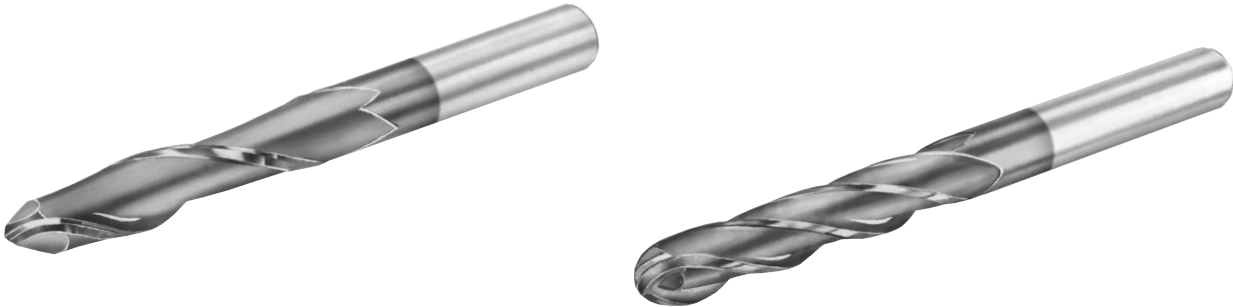
METRIC  
SIZES  
ALSO  
FROM  
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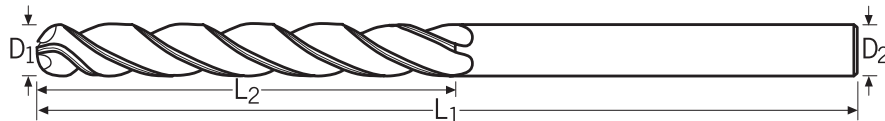
2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
BEL-187-2	BEL-187-4	3/16	3/16	3	1-1/8	27.20
BEL-250-2	BEL-250-4	1/4	1/4	4	1-1/2	32.85
BEL-312-2	BEL-312-4	5/16	5/16	4	1-5/8	37.75
BEL-375-2	BEL-375-4	3/8	3/8	4	1-3/4	42.20
BEL-437-2	BEL-437-4	7/16	7/16	6	3	65.70
BEL-500-2	BEL-500-4	1/2	1/2	6	3	75.15
BEL-625-2	BEL-625-4	5/8	5/8	6	3	133.25
BEL-750-2	BEL-750-4	3/4	3/4			202.30
BEL-001-2	BEL-001-4	1	1			306.65

## Coated BEL Series, Ball Nose, Extra Long Center Cutting — 30° Helix

Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                3/16 - 1/4" +.000-.002"  
   5/16 - 1" +.000-.003"  
 Ball Radius                       +.000-.005"  
 T.I.R. Maximum                   .0005"



METRIC  
SIZES  
ALSO  
FROM  
STOCK

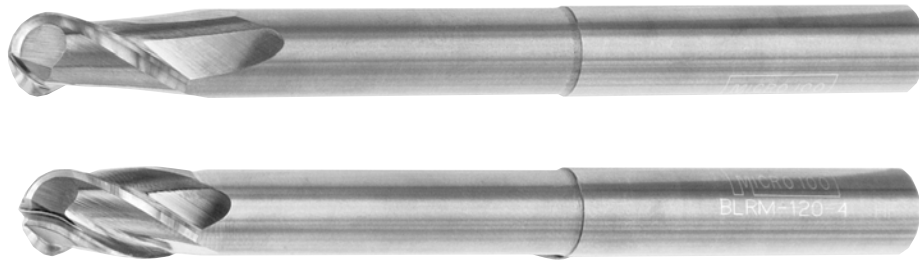


2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AI TiN COATED PRICE EACH
BEL-187-2X	BEL-187-4X	3/16	3/16	3	1-1/8	31.65
BEL-250-2X	BEL-250-4X	1/4	1/4	4	1-1/2	39.20
BEL-312-2X	BEL-312-4X	5/16	5/16	4	1-5/8	47.25
BEL-375-2X	BEL-375-4X	3/8	3/8	4	1-3/4	51.75
BEL-437-2X	BEL-437-4X	7/16	7/16	6	3	78.10
BEL-500-2X	BEL-500-4X	1/2	1/2	6	3	87.70
BEL-625-2X	BEL-625-4X	5/8	5/8	6	3	144.95
BEL-750-2X	BEL-750-4X	3/4	3/4			216.35
BEL-001-2X	BEL-001-4X	1	1			327.00

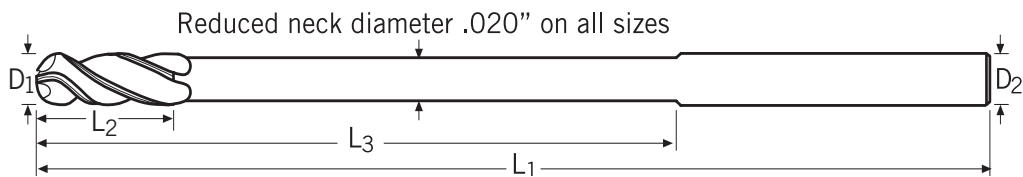
## BLR Series, Ball Nose, Long Reach Center Cutting — 30° Helix

Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter    3/16 – 1/4"   +.000–.002"  
                                   5/16 – 1"     +.000–.003"  
 Ball Radius                         +.000–.005"  
 T.I.R. Maximum                         .0005"

Neck diameter is reduced .020" on all sizes for required clearance in long reach applications.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

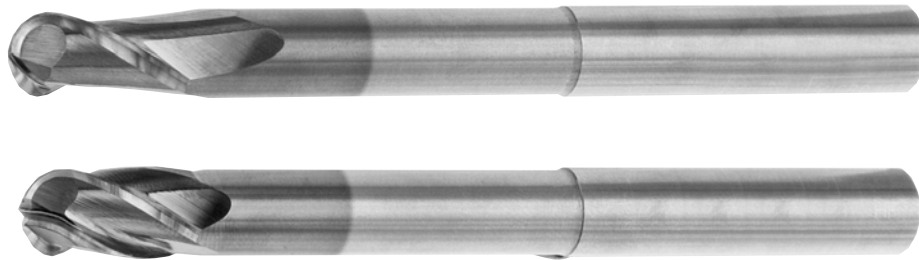


2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	L <sub>3</sub>	PRICE EACH
BLR-187-2	BLR-187-4	3/16	3/16	3	3/8	2	29.95
BLR-250-2	BLR-250-4	1/4	1/4	4	1/2	2-1/2	36.10
BLR-312-2	BLR-312-4	5/16	5/16	4	5/8	2-5/8	41.55
BLR-375-2	BLR-375-4	3/8	3/8	4	3/4	2-3/4	47.90
BLR-437-2	BLR-437-4	7/16	7/16	6	1	4-1/2	72.30
BLR-500-2	BLR-500-4	1/2	1/2	6	1	4-1/2	82.70
BLR-625-2	BLR-625-4	5/8	5/8	6	1-1/4	4-1/2	146.55
BLR-750-2	BLR-750-4	3/4	3/4		1-1/2		222.60
BLR-001-2	BLR-001-4	1	1		1-1/2		337.45

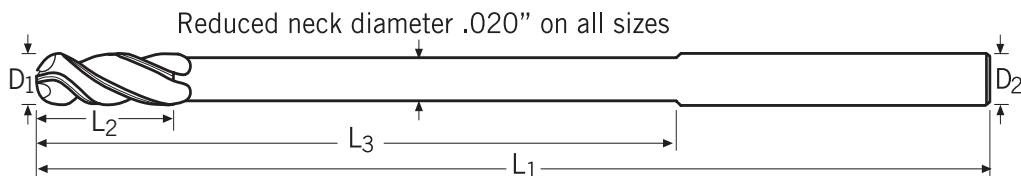
## Coated BLR Series, Ball Nose, Long Reach Center Cutting — 30° Helix

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	3/16 – 1/4" +.000–.002"
	5/16 – 1" +.000–.003"
Ball Radius	+.000–.005"
T.I.R. Maximum	.0005"

Neck diameter is reduced .020" on all sizes for required clearance in long reach applications.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

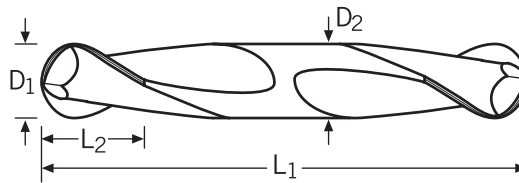
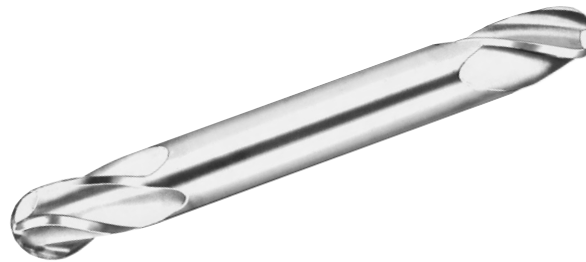


2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	L <sub>3</sub>	AITIN COATED PRICE EACH
BLR-187-2X	BLR-187-4X	3/16	3/16	3	3/8	2	34.45
BLR-250-2X	BLR-250-4X	1/4	1/4	4	1/2	2-1/2	42.55
BLR-312-2X	BLR-312-4X	5/16	5/16	4	5/8	2-5/8	51.10
BLR-375-2X	BLR-375-4X	3/8	3/8	4	3/4	2-3/4	57.60
BLR-437-2X	BLR-437-4X	7/16	7/16	6	1	4-1/2	84.75
BLR-500-2X	BLR-500-4X	1/2	1/2	6	1	4-1/2	95.35
BLR-625-2X	BLR-625-4X	5/8	5/8	6	1-1/4	4-1/2	158.25
BLR-750-2X	BLR-750-4X	3/4	3/4		1-1/2		236.65
BLR-001-2X	BLR-001-4X	1	1		1-1/2		357.70



## BED Series, Ball Nose, Stub Length, Double End Center Cutting — 30° Helix

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	1/8-1/4" +.000-.002" 9/32-1/2" +.000-.003"
Ball Radius	+.000-.005"
T.I.R. Maximum	.0005"



2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
BED-125-2	BED-125-4	1/8	1/8	2	1/4	19.15
BED-156-2	BED-156-4	5/32	3/16		5/16	25.50
BED-187-2	BED-187-4	3/16	3/16		3/8	25.50
BED-218-2	BED-218-4	7/32	1/4	2-1/2	1/2	32.05
BED-250-2	BED-250-4	1/4	1/4			32.05
BED-281-2	BED-281-4	9/32	5/16			46.65
BED-312-2	BED-312-4	5/16	5/16	2-1/2	1/2	46.65
BED-375-2	BED-375-4	3/8	3/8	2-1/2	9/16	50.10
BED-437-2	BED-437-4	7/16	7/16	2-1/2	9/16	69.50
BED-500-2	BED-500-4	1/2	1/2	3	5/8	84.65

## the SHREDDER ROUGHING END MILL Coated SHR Series 38° Helix

Shank Diameter                    -.0001 to -.0002"  
Cutter Diameter                   +.000-.003"  
T.I.R. Maximum                   .0005"

- Designed to generate the maximum metal removal rates in most applications.
- All tools 3/8" and over have Weldon flats



METRIC  
SIZES  
ALSO  
FROM  
STOCK

4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITIN COATED PRICE EACH
SHR-250-4X	1/4	1/4	2-1/2	3/4	36.75
SHR-312-4X	5/16	5/16	2-1/2	13/16	42.50
SHR-375-4X	3/8	3/8	2-1/2	7/8	51.95
SHR-500-4X	1/2	1/2	3	1	74.80
SHR-625-4X	5/8	5/8	3-1/2	1-1/4	130.00
SHR-750-4X	3/4	3/4	4	1-1/4	179.85
SHR-001-4X	1	1	4	1-1/4	245.60

## the SHREDDER

### LONG LENGTH ROUGHING END MILL

#### Coated SHL Series

#### 38° Helix

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	+.000-.003"
T.I.R. Maximum	.0005"

- Designed to generate the maximum metal removal rates in most applications.
- All tools 3/8" and over have Weldon flats



METRIC  
SIZES  
ALSO  
FROM  
STOCK

4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITiN COATED PRICE EACH
SHL-250-4X	1/4	1/4	3	1-1/8	45.95
SHL-312-4X	5/16	5/16	3	1-1/8	53.15
SHL-375-4X	3/8	3/8	3	1-1/4	64.95
SHL-500-4X	1/2	1/2	4-1/2	2	93.50
SHL-625-4X	5/8	5/8	5	2-1/4	162.50
SHL-750-4X	3/4	3/4	5	2-1/2	224.85
SHL-001-4X	1	1	5	2-1/2	307.00

## the SHREDDER

### ROUGHING END MILL - For Aluminum

#### SAR Series

#### 38° Helix

Shank Diameter                      -.0001 to -.0002"  
 Cutter Diameter                   +.000-.003"  
 T.I.R. Maximum                     .0005"



- Designed to generate the maximum metal removal rates in most applications.
- Designed specifically for aluminum applications.
- All tools 3/8" and over have Weldon flats

METRIC  
SIZES  
ALSO  
FROM  
STOCK

3-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
SAR-250-3	1/4	1/4	2-1/2	3/4	32.40
SAR-312-3	5/16	5/16	2-1/2	13/16	36.15
SAR-375-3	3/8	3/8	2-1/2	7/8	45.50
SAR-500-3	1/2	1/2	3	1	66.60
SAR-625-3	5/8	5/8	3-1/2	1-1/4	118.30
SAR-750-3	3/4	3/4	4	1-1/4	165.80
SAR-001-3	1	1	4	1-1/4	225.30

## LONG LENGTH, ROUGHING END MILL - For Aluminum

### SAL Series

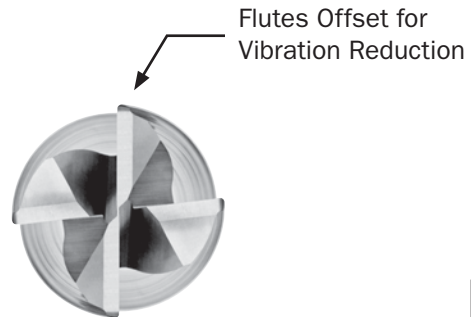
### 38° Helix

3-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
SAL-250-3	1/4	1/4	3	1-1/8	41.45
SAL-312-3	5/16	5/16	3	1-1/8	46.50
SAL-375-3	3/8	3/8	3	1-1/4	58.25
SAL-500-3	1/2	1/2	4-1/2	2	84.00
SAL-625-3	5/8	5/8	5	2-1/4	149.80
SAL-750-3	3/4	3/4	5	2-1/2	210.80
SAL-001-3	1	1	5	2-1/2	286.70

## the V-HEMOTH HIGH VELOCITY VARIABLE HELIX END MILL Coated VHM Series, Corner Radius

Shank Diameter	-0.0001 to -0.0002"
Cutter Diameter	1/4" +.000-.002"
	5/16 - 1" +.000-.003"
T.I.R. Maximum	.0005"
Corner Radius	± .0005"

- Variable pitch
- High production/high speed milling
- Excellent surface finishes
- Eliminates chatter
- Reduces machine vibration
- All tools 3/8" and over have Weldon flats



METRIC  
SIZES  
ALSO  
FROM  
STOCK

4-FLUTE TOOL NO.	CUTTER DIAMETER	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CORNER RADIUS	AI TiN COATED PRICE EACH
VHM-125-4X	1/8	1/8	1-1/2	1/2	0.010	14.80
VHM-187-4X	3/16	3/16	2	5/8	0.010	22.85
VHM-250-4X	1/4	1/4	2-1/2	3/4	0.020	27.70
VHM-312-4X	5/16	5/16	2-1/2	13/16	0.020	33.70
VHM-375-4X	3/8	3/8	2-1/2	3/4	0.020	37.40
VHM-437-4X	7/16	7/16	2-1/2	1	0.020	56.45
VHM-500-4X	1/2	1/2	3	1	0.030	61.75
VHM-625-4X	5/8	5/8	3-1/2	1-1/4	0.030	112.65
VHM-750-4X	3/4	3/4	4	1-1/2	0.030	167.70
VHM-001-4X	1	1	4	1-1/2	0.030	252.95

## the V-HEMOTH

### LONG LENGTH, HIGH VELOCITY VARIABLE HELIX END MILL

#### Coated VHM Series, Corner Radius

Shank Diameter	-0.0001 to -0.0002"
Cutter Diameter	1/4" +.000-.002"
	5/16 - 1" +.000-.003"
T.I.R. Maximum	.0005"
Corner Radius	± .0005"

- Variable pitch
- High production/high speed milling
- Excellent surface finishes
- Eliminates chatter
- Reduces machine vibration
- All tools 3/8" and over have Weldon flats



METRIC  
SIZES  
ALSO  
FROM  
STOCK

4-FLUTE TOOL NO.	CUTTER DIAMETER	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CORNER RADIUS	AIN COATED PRICE EACH
VLM-187-4X	3/16	3/16	2-1/2	3/4	0.010	29.20
VLM-250-4X	1/4	1/4	3	1-1/8	0.020	34.25
VLM-312-4X	5/16	5/16	3	1-1/8	0.020	39.30
VLM-375-4X	3/8	3/8	3	1-1/4	0.020	46.15
VLM-437-4X	7/16	7/16	4-1/2	2	0.020	74.60
VLM-500-4X	1/2	1/2	4-1/2	2-1/4	0.030	80.80
VLM-625-4X	5/8	5/8	5	2-1/4	0.030	140.65
VLM-750-4X	3/4	3/4	5	2-1/2	0.030	210.40
VLM-001-4X	1	1	5	2-1/2	0.030	317.65

**the V-HEMOTH**  
**EXTRA-LONG LENGTH, HIGH VELOCITY**  
**VARIABLE HELIX END MILL**  
**Coated VLR Series, Corner Radius**

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	1/4" +.000-.002"
	5/16 - 1" +.000-.003"
T.I.R. Maximum	.0005"
Corner Radius	± .0005"

- Variable pitch
- Reduced neck allows for greater clearance
- High production/high speed milling
- Excellent surface finishes
- Eliminates chatter
- Reduces machine vibration
- All tools 3/8" and over have Weldon flats



Flutes Offset for  
Vibration Reduction

**METRIC  
SIZES  
ALSO  
FROM  
STOCK**

4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	REDUCED NECK L <sub>3</sub>	CORNER RADIUS	AITIN COATED PRICE EACH
VLR-187-4X	3/16	3/16	3	3/8	2	0.010	33.75
VLR-250-4X	1/4	1/4	4	1/2	2-1/2	0.020	46.25
VLR-312-4X	5/16	5/16	4	5/8	2-5/8	0.020	52.10
VLR-375-4X	3/8	3/8	4	3/4	2-3/4	0.020	67.95
VLR-437-4X	7/16	7/16	6	1	4-1/2	0.020	79.70
VLR-500-4X	1/2	1/2	6	1	4-1/2	0.030	117.10
VLR-625-4X	5/8	5/8	6	1-1/4	4-1/2	0.030	203.65
VLR-750-4X	3/4	3/4	6	1-1/2	4-1/2	0.030	230.50
VLR-001-4X	1	1	6	1-1/2	4-1/2	0.030	344.00

## the V-HEMOTH BALL NOSE, HIGH VELOCITY VARIABLE HELIX END MILL Coated VHB Series

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	+.000 - .001"
T.I.R. Maximum	.0005"
Ball Radius	-.0005"

- Variable pitch
- High production/high speed milling
- Excellent surface finishes
- Eliminates chatter
- Reduces machine vibration
- All tools 3/8" and over have Weldon flats



METRIC  
SIZES  
ALSO  
FROM  
STOCK

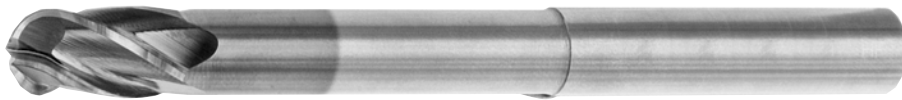
4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	AITiN COATED PRICE EACH
VHB-125-4X	1/8	1/8	1-1/2	1/2	14.80
VHB-187-4X	3/16	3/16	2	5/8	22.85
VHB-250-4X	1/4	1/4	2-1/2	3/4	27.70
VHB-312-4X	5/16	5/16	2-1/2	13/16	33.70
VHB-375-4X	3/8	3/8	2-1/2	3/4	37.40
VHB-500-4X	1/2	1/2	3	1	61.75
VHB-625-4X	5/8	5/8	3-1/2	1-1/4	112.65
VHB-750-4X	3/4	3/4	4	1-1/2	167.70
VHB-001-4X	1	1	4	1-1/2	252.95



**the V-HEMOTH**  
**BALL NOSE, LONG LENGTH, HIGH VELOCITY**  
**VARIABLE HELIX END MILL**  
**Coated VLB Series**

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	+.000-.001"
T.I.R. Maximum	.0005"
Ball Radius	-.0005"

- Variable pitch
- High production/high speed milling
- Excellent surface finishes
- Eliminates chatter
- Reduces machine vibration
- All tools 3/8" and over have Weldon flats



METRIC  
SIZES  
ALSO  
FROM  
STOCK

4-FLUTE TOOL NO.	CUTTER DIAMETER	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	REDUCED NECK	AIN COATED PRICE EACH
VLB-187-4X	3/16	3/16	3	3/8	2	33.75
VLB-250-4X	1/4	1/4	4	1/2	2-1/2	46.25
VLB-312-4X	5/16	5/16	4	5/8	2-5/8	52.10
VLB-375-4X	3/8	3/8	4	3/4	2-3/4	67.95
VLB-437-4X	7/16	7/16	6	1	4-1/2	79.70
VLB-500-4X	1/2	1/2	6	1	4-1/2	117.10
VLB-625-4X	5/8	5/8	6	1-1/4	4-1/2	203.65
VLB-750-4X	3/4	3/4	6	1-1/2	4-1/2	230.50
VLB-001-4X	1	1	6	1-1/2	4-1/2	344.00

## Coated HMBM Series, Universal Hard Milling, Ball Nose Center Cutting

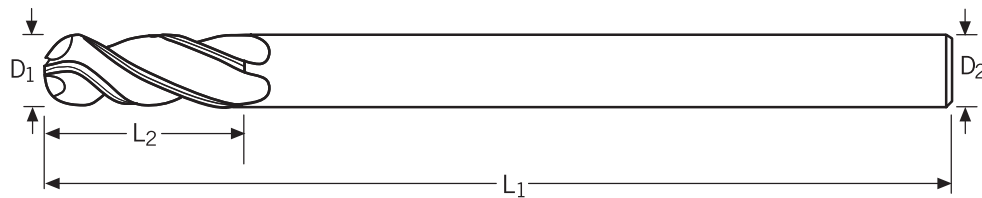


Shank Dia.		-0.0025 to -0.005 mm
Cutter Dia.	1 to 3 mm	+0.000 -0.014 mm
	4 to 6 mm	+0.000 -0.018 mm
	8 to 10 mm	+0.000 -0.022 mm
	12 to 16 mm	+0.000 -0.027 mm
	20 mm	+0.000 -0.033 mm
T.I.R. Maximum		0.012 mm

Engineered with a negative rake angle, these high-tech ball nose end mills are specifically engineered for numerous milling applications in hard materials.

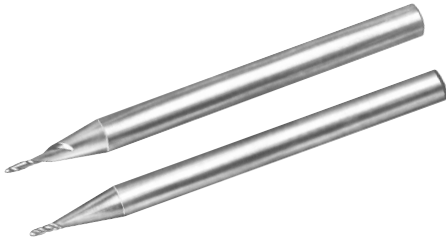
The unique tool geometry provides maximum milling performance in finishing, semi-finishing, and roughing cuts.

These end mills are only available with AlTiN coating.



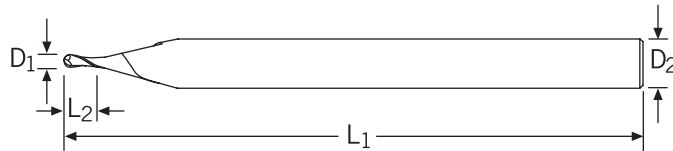
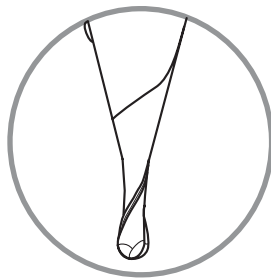
2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	AlTiN COATED PRICE EACH
HMBM-010-2X		1.0	4	50	1.5	44.40
HMBM-015-2X		1.5	4	50	2.0	44.40
HMBM-020-2X		2.0	6	57	3.0	63.60
HMBM-025-2X		2.5	6	57	4.0	63.60
HMBM-030-2X		3.0	6	70	4.5	72.10
HMBM-040-2X		4.0	6	70	6.0	72.10
HMBM-050-2X		5.0	6	80	7.5	77.30
HMBM-060-2X	HMBM-060-4X	6.0	6	90	9.0	80.90
HMBM-080-2X	HMBM-080-4X	8.0	8	100	12.0	103.30
HMBM-100-2X	HMBM-100-4X	10.0	10	100	15.0	115.35
HMBM-120-2X	HMBM-120-4X	12.0	12	110	18.0	149.35
HMBM-160-2X		16.0	16	140	24.0	249.35
HMBM-200-2X		20.0	20	160	30.0	320.80

## BMRM Series, Miniature Ball Nose Center Cutting – 30° Helix



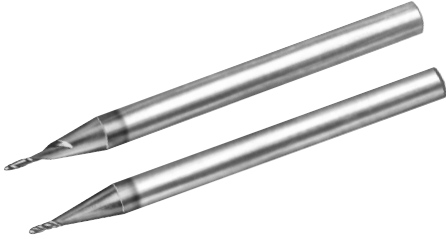
Shank Dia. -0.0025 to -0.005 mm  
 Cutter Dia. 0.2 to 3.0 mm +0.000 to -0.014 mm  
 3.5 mm +0.000 to -0.018 mm  
 T.I.R. Maximum 0.012 mm

These precision miniature end mills are ideally suited for finishing and semi-finishing cuts and universal milling applications in soft, medium, and hard materials.



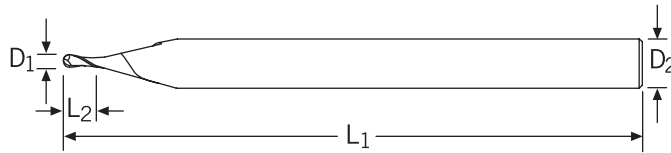
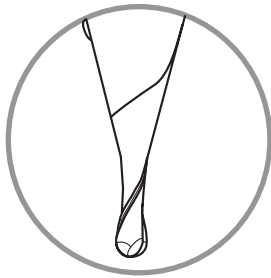
2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	PRICE EACH
BMRM-005-2 BMRM-006-2 BMRM-007-2 BMRM-008-2 BMRM-009-2		0.5 0.6 0.7 0.8 0.9	4	50	1.5 1.8 2.1 2.4 2.7	18.20
BMRM-010-2 BMRM-011-2 BMRM-012-2 BMRM-013-2	BMRM-010-4 BMRM-011-4 BMRM-012-4 BMRM-013-4	1.0 1.1 1.2 1.3	4	50	3.0 3.3 3.8 3.9	16.75
BMRM-014-2 BMRM-015-2 BMRM-016-2 BMRM-018-2	BMRM-014-4 BMRM-015-4 BMRM-016-4 BMRM-018-4	1.4 1.5 1.6 1.8	4	50	4.2 4.2 4.8 5.3	16.75
BMRM-020-2 BMRM-025-2 BMRM-030-2 BMRM-035-2	BMRM-020-4 BMRM-025-4 BMRM-030-4 BMRM-035-4	2.0 2.5 3.0 3.5	4	50	6.0 8.0 9.0 10.5	16.75

## Coated BMRM Series, Miniature Ball Nose Center Cutting – 30° Helix



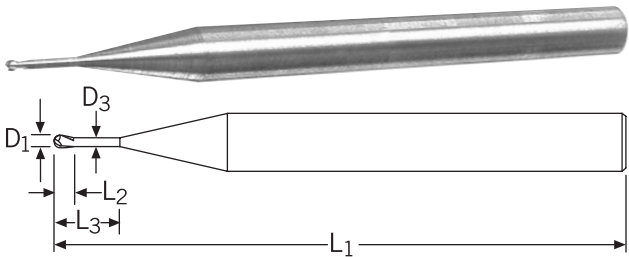
Shank Dia. -0.0025 to -0.005 mm  
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 3.5 mm +0.000 to -0.018 mm  
 T.I.R. Maximum 0.012 mm

These precision miniature end mills are ideally suited for finishing and semi-finishing cuts and universal milling applications in soft, medium, and hard materials.



2-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	AITiN COATED PRICE EACH
BMRM-005-2X BMRM-006-2X BMRM-007-2X BMRM-008-2X BMRM-009-2X		0.5 0.6 0.7 0.8 0.9	4	50	1.5 1.8 2.1 2.4 2.7	22.35
BMRM-010-2X BMRM-011-2X BMRM-012-2X BMRM-013-2X	BMRM-010-4X BMRM-011-4X BMRM-012-4X BMRM-013-4X	1.0 1.1 1.2 1.3	4	50	3.0 3.3 3.8 3.9	20.85
BMRM-014-2X BMRM-015-2X BMRM-016-2X BMRM-018-2X	BMRM-014-4X BMRM-015-4X BMRM-016-4X BMRM-018-4X	1.4 1.5 1.6 1.8	4	50	4.2 4.2 4.8 5.3	20.85
BMRM-020-2X BMRM-025-2X BMRM-030-2X BMRM-035-2X	BMRM-020-4X BMRM-025-4X BMRM-030-4X BMRM-035-4X	2.0 2.5 3.0 3.5	4	50	6.0 8.0 9.0 10.5	20.85

## MMBM Series, Ball Nose, Mold Making Center Cutting – 30° Helix



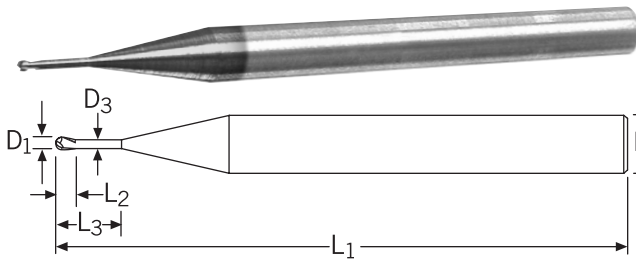
Shank Dia. -0.0025 to -0.005 mm  
 Cutter Dia. 0.3 to 3.0 mm +0.000 -0.014 mm  
 4.0 to 5.0 mm +0.000 -0.018 mm  
 T.I.R. Maximum 0.012 mm

These highest precision ball nose end mills feature multiple neck length dimensions in a wide range of cutting diameters to provide the best geometry for finishing cuts in mold making applications.

A positive rake angle supports maximum cutting performance in medium and hard materials for conventional side milling and slotting.

2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	REDUCED NECK DIAMETER D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	PRICE EACH
MMBM-003-3	0.3	4	0.28	50	0.3	3	39.55
MMBM-003-6	0.3		0.28		0.3	6	39.55
MMBM-004-3	0.4		0.38		0.4	3	34.05
MMBM-004-8	0.4		0.38		0.4	8	34.05
MMBM-005-5	0.5	4	0.48	50	0.5	5	30.00
MMBM-005-10	0.5		0.48		0.5	10	
MMBM-006-5	0.6		0.58		0.6	5	
MMBM-006-12	0.6		0.58		0.6	12	
MMBM-007-5	0.7	4	0.68	50	0.7	5	30.00
MMBM-007-12						12	
MMBM-008-5	0.8	4	0.78	50	0.8	5	25.75
MMBM-008-10						10	
MMBM-008-16						16	
MMBM-009-5	0.9	4	0.88	50	0.9	5	25.75
MMBM-009-10						10	
MMBM-009-16						16	
MMBM-010-6	1.0	6	0.95	50	1.0	6	28.20
MMBM-010-8						8	
MMBM-010-11						11	
MMBM-010-12						12	
MMBM-010-15						15	
MMBM-010-20	20						
MMBM-012-7	1.2	6	1.15	57	1.2	7	28.20
MMBM-012-15						15	
MMBM-012-20						20	
MMBM-015-7	1.5	6	1.45	57	1.5	7	28.20
MMBM-015-15						15	
MMBM-015-20						20	
MMBM-020-7	2.0	6	1.90	57	2.0	7	28.20
MMBM-020-15						15	
MMBM-020-20						20	
MMBM-030-12	3.0	6	2.90	57	3.0	12	28.20
MMBM-030-15	3.0		2.90		3.0	15	
MMBM-040-15	4.0		3.80		4.0	15	
MMBM-050-15	5.0		4.80		5.0	15	

## Coated MMBM Series, Ball Nose, Mold Making Center Cutting – 30° Helix



Shank Dia. -0.0025 to -0.005 mm  
 Cutter Dia. 0.3 to 3.0 mm +0.000 -0.014 mm  
 4.0 to 5.0 mm +0.000 -0.018 mm  
 T.I.R. Maximum 0.012 mm

These highest precision ball nose end mills feature multiple neck length dimensions in a wide range of cutting diameters to provide the best geometry for finishing cuts in mold making applications.

A positive rake angle supports maximum cutting performance in medium and hard materials for conventional side milling and slotting.

2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	REDUCED NECK DIAMETER D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	AITiN COATED PRICE EACH
MMBM-003-3X	0.3	4	0.28	50	0.3	3	44.05
MMBM-003-6X	0.3		0.28		0.3	6	44.05
MMBM-004-3X	0.4		0.38		0.4	3	38.45
MMBM-004-8X	0.4		0.38		0.4	8	38.45
MMBM-005-5X	0.5	4	0.48	50	0.5	5	34.40
MMBM-005-10X	0.5		0.48		0.5	10	
MMBM-006-5X	0.6		0.58		0.6	5	
MMBM-006-12X	0.6		0.58		0.6	12	
MMBM-007-5X	0.7	4	0.68	50	0.7	5	34.40
MMBM-007-12X						12	
MMBM-008-5X	0.8	4	0.78	50	0.8	5	30.00
MMBM-008-10X						10	
MMBM-008-16X						16	
MMBM-009-5X	0.9	4	0.88	50	0.9	5	30.00
MMBM-009-10X						10	
MMBM-009-16X						16	
MMBM-010-6X	1.0	6	0.95	50	1.0	6	32.55
MMBM-010-8X						8	
MMBM-010-11X						11	
MMBM-010-12X						12	
MMBM-010-15X						15	
MMBM-010-20X	20						
MMBM-012-7X	1.2	6	1.15	57	1.2	7	32.55
MMBM-012-15X						15	
MMBM-012-20X						20	
MMBM-015-7X	1.5	6	1.45	57	1.5	7	32.55
MMBM-015-15X						15	
MMBM-015-20X						20	
MMBM-020-7X	2.0	6	1.90	57	2.0	7	32.55
MMBM-020-15X						15	
MMBM-020-20X						20	
MMBM-030-12X	3.0	2.90	2.90	57	3.0	12	32.55
MMBM-030-15X	3.0	2.90	2.90		3.0	15	
MMBM-040-15X	4.0	3.80	3.80		4.0	15	
MMBM-050-15X	5.0	4.80	4.80		5.0	15	

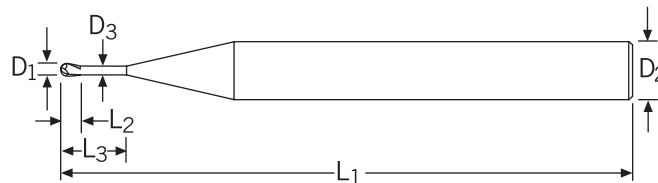
## SFBM Series, HSC Shrink Fit, Ball Nose Center Cutting – 30° Helix

Shank Dia.                                 –0.0025 to –0.005 mm  
 Cutter Dia.                                +0.000 –0.014 mm  
 T.I.R. Maximum                             0.012 mm



These highest precision finishing ball nose end mills are suitable for HSC applications and are engineered for shrink-fit tool holding.

A positive rake angle supports maximum cutting performance in soft, medium, and hard materials for conventional side milling and slotting.



2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	REDUCED NECK DIAMETER D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	PRICE EACH
SFBM-002-0	0.2	6	—	57	0.3	—	52.00
SFBM-003-0	0.3		—		—	45.90	
SFBM-003-1	0.3		0.25		1.0	45.90	
SFBM-004-0	0.4	6	—	57	0.5	—	44.70
SFBM-004-1	0.4		0.35		1.2	44.70	
SFBM-005-1	0.5		0.45		1.6	42.60	
SFBM-005-3	0.5		0.45		3.3	42.60	
SFBM-005-5	0.5		0.45		5.1	44.70	
SFBM-006-2	0.6	6	0.55	57	0.7	1.7	42.60
SFBM-006-4					0.6	4.5	42.60
SFBM-006-6					0.6	6.2	44.70
SFBM-008-2	0.8	6	0.75	57	1.0	2.5	40.60
SFBM-008-5					0.8	5.2	40.60
SFBM-008-8					0.8	8.0	44.40
SFBM-010-3	1.0	6	0.95	57	1.3	3.3	38.55
SFBM-010-8					8.0	40.60	

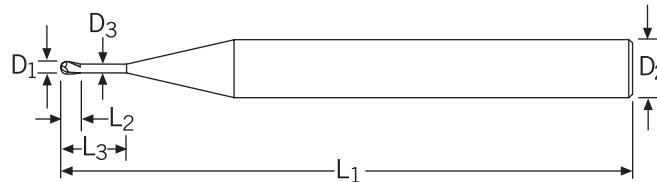
## SFBM Series, HSC Shrink Fit, Ball Nose Center Cutting – 30° Helix



Shank Dia. -0.0025 to -0.005 mm  
 Cutter Dia. 1.2 to 3.0 mm +0.000 -0.014 mm  
 3.5 to 6.0 mm +0.000 -0.018 mm  
 T.I.R. Maximum 0.012 mm

These highest precision finishing ball nose end mills are suitable for HSC applications and are engineered for shrink-fit tool holding.

A positive rake angle supports maximum cutting performance in soft, medium, and hard materials for conventional side milling and slotting.



2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	REDUCED NECK DIAMETER D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	PRICE EACH
SFBM-012-3	1.2	6	1.15	57	1.5	3.5	36.70
SFBM-012-8	1.2		1.15		1.2	8.0	38.75
SFBM-014-3	1.4		1.35		1.8	3.8	34.80
SFBM-014-15	1.4		1.35		2.3	15.0	36.65
SFBM-015-4	1.5	6	1.45	57	1.9	4.9	34.80
SFBM-015-9	1.5		1.45		1.5	9.5	36.65
SFBM-016-5	1.6		1.55		2.0	5.0	34.80
SFBM-016-22	1.8		1.55		2.3	22.0	36.65
SFBM-018-5	1.8		1.75		2.3	5.3	34.80
SFBM-020-5	2.0	6	1.95	57	2.5	5.5	33.20
SFBM-020-9	2.0		1.95		2.5	9.5	35.20
SFBM-025-6	2.5		2.40		3.0	6.0	33.20
SFBM-025-9	2.5		2.40		2.5	9.5	35.20
SFBM-030-8	3.0	6	2.90	57	4.0	8.0	31.50
SFBM-030-15	3.0		2.90		4.0	15.0	33.80
SFBM-035-9	3.5		3.40		4.5	9.5	31.50
SFBM-040-10	4.0		3.90		5.0	10.0	31.50
SFBM-040-20	4.0		3.90		5.0	20.0	35.20
SFBM-050-11	5.0	6	4.90	57	6.0	11.0	29.95
SFBM-050-25	5.0		4.90		6.0	25.0	31.75
SFBM-060-12	6.0		5.90		7.5	12.5	29.45
SFBM-060-25	6.0		5.90		7.5	25.0	31.75



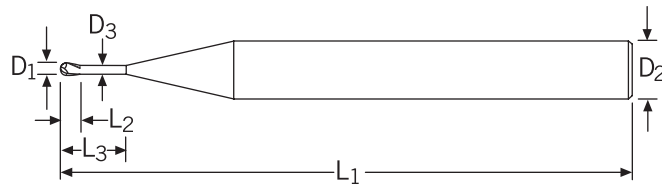
## Coated SFBM Series, HSC Shrink Fit, Ball Nose Center Cutting – 30° Helix

Shank Dia.                               –0.0025 to –0.005 mm  
 Cutter Dia.                             +0.000 –0.014 mm  
 T.I.R. Maximum                         0.012 mm



These highest precision finishing ball nose end mills are suitable for HSC applications and are engineered for shrink-fit tool holding.

A positive rake angle supports maximum cutting performance in soft, medium, and hard materials for conventional side milling and slotting.



2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	REDUCED NECK DIAMETER D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	AITiN COATED PRICE EACH	
SFBM-002-0X	0.2	6	—	57	0.3	—	56.85	
SFBM-003-0X	0.3		—		0.4	—		50.65
SFBM-003-1X	0.3		0.25		0.4	1.0		
SFBM-004-0X	0.4	6	—	57	0.5	—	49.35	
SFBM-004-1X	0.4		0.35		0.5	1.2	49.35	
SFBM-005-1X	0.5		0.45		0.6	1.6	47.25	
SFBM-005-3X	0.5		0.45		0.5	3.3	47.25	
SFBM-005-5X	0.5		0.45		0.5	5.1	49.35	
SFBM-006-2X	0.6	6	0.55	57	0.7	1.7	47.25	
SFBM-006-4X					0.6	4.5	47.25	
SFBM-006-6X					0.6	6.2	49.35	
SFBM-008-2X	0.8	6	0.75	57	1.0	2.5	45.10	
SFBM-008-5X					0.8	5.2	45.10	
SFBM-008-8X					0.8	8.0	49.05	
SFBM-010-3X	1.0	6	0.95	57	1.3	3.3	43.05	
SFBM-010-8X					8.0	45.10		

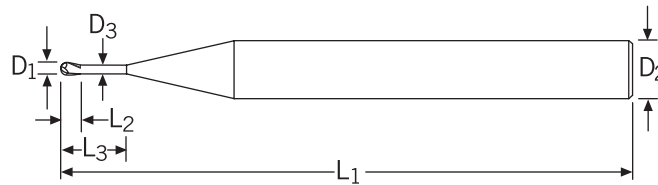
## Coated SFBM Series, HSC Shrink Fit, Ball Nose Center Cutting – 30° Helix



Shank Dia. –0.0025 to –0.005 mm  
 Cutter Dia. 1.2 to 3.0 mm +0.000 –0.014 mm  
 3.5 to 6.0 mm +0.000 –0.018 mm  
 T.I.R. Maximum 0.012 mm

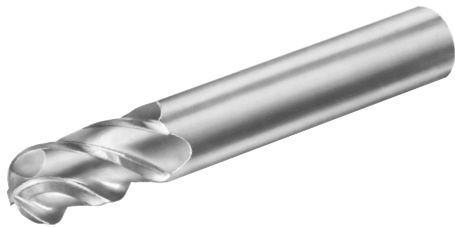
These highest precision finishing ball nose end mills are suitable for HSC applications and are engineered for shrink-fit tool holding.

A positive rake angle supports maximum cutting performance in soft, medium, and hard materials for conventional side milling and slotting.



2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	REDUCED NECK DIAMETER D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	AITiN COATED PRICE EACH
SFBM-012-3X	1.2	6	1.15	57	1.5	3.5	41.20
SFBM-012-8X	1.2		1.15		1.2	8.0	43.30
SFBM-014-3X	1.4		1.35		1.8	3.8	39.30
SFBM-014-15X	1.4		1.35		2.3	15.0	41.10
SFBM-015-4X	1.5	6	1.45	57	1.9	4.9	39.30
SFBM-015-9X	1.5		1.45		1.5	9.5	41.10
SFBM-016-5X	1.6		1.55		2.0	5.0	39.30
SFBM-016-22X	1.8		1.55		2.3	22.0	41.10
SFBM-018-5X	1.8		1.75		2.3	5.3	39.30
SFBM-020-5X	2.0	6	1.95	57	2.5	5.5	37.65
SFBM-020-9X	2.0		1.95		2.5	9.5	39.70
SFBM-025-6X	2.5		2.40		3.0	6.0	37.65
SFBM-025-9X	2.5		2.40		2.5	9.5	39.70
SFBM-030-8X	3.0	6	2.90	57	4.0	8.0	35.90
SFBM-030-15X	3.0		2.90		4.0	15.0	38.30
SFBM-035-9X	3.5		3.40		4.5	9.5	35.90
SFBM-040-10X	4.0		3.90		5.0	10.0	35.90
SFBM-040-20X	4.0		3.90		5.0	20.0	39.70
SFBM-050-11X	5.0	6	4.90	57	6.0	11.0	34.30
SFBM-050-25X	5.0		4.90		6.0	25.0	36.15
SFBM-060-12X	6.0		5.90		7.5	12.5	33.85
SFBM-060-25X	6.0		5.90		7.5	25.0	36.15

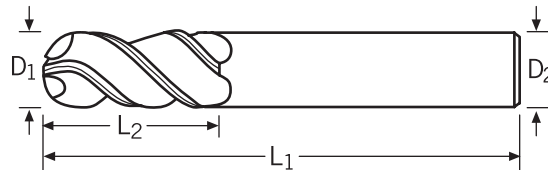
## BMHM Series, High Performance, Ball Nose Center Cutting – 38° Helix



Shank Dia.	-0.0025 to -0.008 mm	
Cutter Dia.	3 mm	+0.000 -0.014 mm
	4 to 6 mm	+0.000 -0.018 mm
	8 to 10 mm	+0.000 -0.022 mm
	12 to 18 mm	+0.000 -0.027 mm
	20 to 25 mm	+0.000 -0.033 mm
T.I.R. Maximum	0.012 mm	

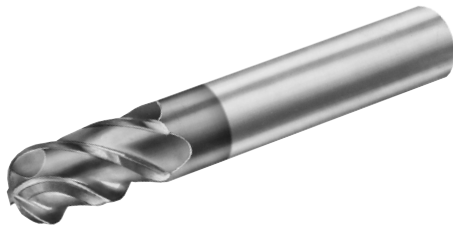
These high performance ball nose end mills feature a 4-flute geometry with a high helix of 38°.

The end mills are ideal for semi-finishing, finishing, and slotting cuts in steels, stainless steels, high temperature alloys, and other difficult to machine materials.



4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	PRICE EACH
BMHM-030-4	3	4	50	8	16.05
BMHM-040-4	4	4	50	12	16.05
BMHM-050-4	5	6	57	15	20.20
BMHM-060-4	6	6	57	18	20.20
BMHM-080-4	8	8	63	20	24.95
BMHM-100-4	10	10	72	22	29.40
BMHM-120-4	12	12	83	25	46.90
BMHM-140-4	14	14	83	35	54.50
BMHM-160-4	16	16	92	35	86.95
BMHM-180-4	18	18	92	45	116.85
BMHM-200-4	20	20	104	45	148.50
BMHM-250-4	25	25	127	50	230.90

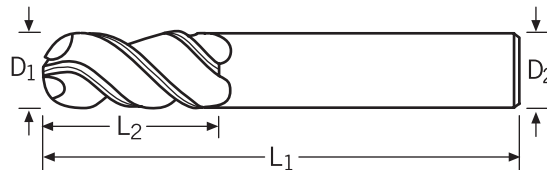
## Coated BMHM Series, High Performance, Ball Nose Center Cutting – 38° Helix



Shank Dia.	-0.0025 to -0.008 mm	
Cutter Dia.	3 mm	+0.000 -0.014 mm
	4 to 6 mm	+0.000 -0.018 mm
	8 to 10 mm	+0.000 -0.022 mm
	12 to 18 mm	+0.000 -0.027 mm
	20 to 25 mm	+0.000 -0.033 mm
T.I.R. Maximum	0.012 mm	

These high performance ball nose end mills feature a 4-flute geometry with a high helix of 38°.

The end mills are ideal for semi-finishing, finishing, and slotting cuts in steels, stainless steels, high temperature alloys, and other difficult to machine materials.



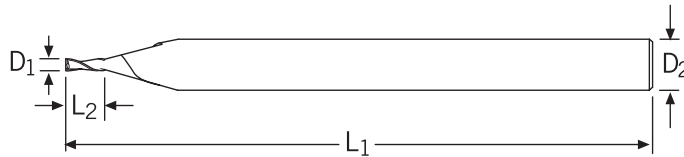
4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	AIN COATED PRICE EACH
BMHM-030-4X	3	4	50	8	20.10
BMHM-040-4X	4	4	50	12	20.10
BMHM-050-4X	5	6	57	15	24.35
BMHM-060-4X	6	6	57	18	24.35
BMHM-080-4X	8	8	63	20	31.15
BMHM-100-4X	10	10	72	22	35.70
BMHM-120-4X	12	12	83	25	58.50
BMHM-140-4X	14	14	83	35	65.65
BMHM-160-4X	16	16	92	35	98.15
BMHM-180-4X	18	18	92	45	130.25
BMHM-200-4X	20	20	104	45	167.90
BMHM-250-4X	25	25	127	50	250.30

## AMRM Series, Miniature Center Cutting — 30° Helix



Shank Dia. -0.0025 to -0.008 mm  
 Cutter Dia. 0.2 to 3.0 mm +0.000 to -0.014 mm  
 3.5 mm +0.000 to -0.018 mm  
 T.I.R. Maximum 0.012 mm

These precision miniature end mills are ideal for finishing and semi-finishing cuts and universal milling applications in soft, medium, and hard materials.



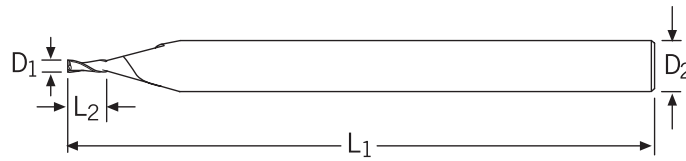
2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	PRICE EACH
AMRM-002-2	0.2	4	50	0.4	28.05
AMRM-003-2	0.3			0.9	24.45
AMRM-004-2	0.4			1.2	18.60
AMRM-005-2	0.5			1.5	16.25
AMRM-006-2	0.6			1.8	16.25
AMRM-007-2	0.7			4	50
AMRM-008-2	0.8	2.4			
AMRM-009-2	0.9	2.7			
AMRM-010-2	1.0	3.0			
AMRM-011-2	1.1	3.3			
AMRM-012-2	1.2	4	50	3.8	14.60
AMRM-013-2	1.3			3.9	
AMRM-014-2	1.4			4.2	
AMRM-015-2	1.5			4.2	
AMRM-016-2	1.6			4.8	
AMRM-017-2	1.7	4	50	5.1	14.60
AMRM-018-2	1.8			5.3	
AMRM-019-2	1.9			5.7	
AMRM-020-2	2.0			6.0	
AMRM-025-2	2.5			8.0	
AMRM-030-2	3.0			9.0	
AMRM-035-2	3.5			10.5	

## Coated AMRM Series, Miniature Center Cutting — 30° Helix



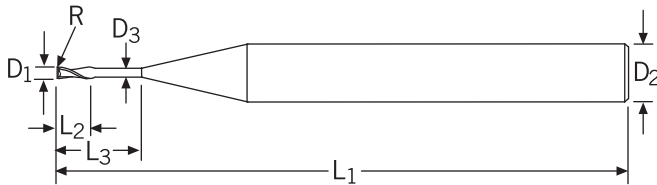
Shank Dia. —0.0025 to -0.008 mm  
 Cutter Dia. 0.2 to 3.0 mm +0.000 to -0.014 mm  
 3.5 mm +0.000 to -0.018 mm  
 T.I.R. Maximum 0.012 mm

These precision miniature end mills are ideal for finishing and semi-finishing cuts and universal milling applications in soft, medium, and hard materials.



2-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	AIN COATED PRICE EACH
AMRM-002-2X	0.2	4	50	0.4	32.45
AMRM-003-2X	0.3			0.9	
AMRM-004-2X	0.4			1.2	
AMRM-005-2X	0.5			1.5	
AMRM-006-2X	0.6			1.8	
AMRM-007-2X	0.7			4	
AMRM-008-2X	0.8	2.4			
AMRM-009-2X	0.9	2.7			
AMRM-010-2X	1.0	3.0			
AMRM-011-2X	1.1	3.3			
AMRM-012-2X	1.2	4	50	3.8	18.60
AMRM-013-2X	1.3			3.9	
AMRM-014-2X	1.4			4.2	
AMRM-015-2X	1.5			4.2	
AMRM-016-2X	1.6			4.8	
AMRM-017-2X	1.7	4	50	5.1	18.60
AMRM-018-2X	1.8			5.3	
AMRM-019-2X	1.9			5.7	
AMRM-020-2X	2.0			6.0	
AMRM-025-2X	2.5			8.0	
AMRM-030-2X	3.0			9.0	
AMRM-035-2X	3.5			10.5	

## MMRM Series, Mold Making Center Cutting — 30° Helix



Shank Dia.                    -0.0025 to -0.005 mm  
Cutter Dia.                   +0.000 -0.014 mm  
T.I.R. Maximum               0.012 mm

These highest precision end mills feature multiple corner radii and multiple neck length dimensions in a wide range of cutting diameters to provide the best available geometry for finishing cuts in mold making applications.

A positive rake angle supports maximum cutting performance in medium and hard materials for conventional side milling and slotting.

2-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	PRICE EACH
MMRM-005-5 MMRM-005-10 MMRM-006-5 MMRM-006-12	0.5 0.5 0.6 0.6	4	0.48 0.48 0.58 0.58	50	0.5 0.5 0.6 0.6	5 10 5 12	0.05	27.25
MMRM-007-5 MMRM-007-12	0.7	4	0.68	50	0.7	5 12	0.10	27.25
MMRM-008-5 MMRM-008-10 MMRM-008-16	0.8	4	0.78	50	0.8	5 10 16	0.10	23.20
MMRM-009-5 MMRM-009-10 MMRM-009-16	0.9	6	0.88	50	0.9	5 10 16	0.10	23.20
MMRM-010-6 MMRM-010-8 MMRM-010-11 MMRM-010-12 MMRM-010-15 MMRM-010-20	1.0	6	0.95	50	1.0	6 8 11 12 15 20	0.10	25.65
MMRM-012-7 MMRM-012-15 MMRM-012-20	1.2	6	1.15	57	1.2	7 15 20	0.10	25.65
MMRM-015-7 MMRM-015-15 MMRM-015-25	1.5	6	1.45	57	1.5	7 15 25	0.15	25.65

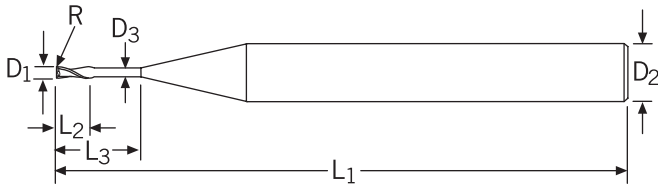
## MMRM Series, Mold Making Center Cutting — 30° Helix



Shank Dia. -0.0025 to -0.005 mm  
 Cutter Dia. 2 to 3 mm +0.000 -0.014 mm  
 4 to 6 mm +0.000 -0.018 mm  
 8 to 10 mm +0.000 -0.022 mm  
 12 mm +0.000 -0.027 mm  
 T.I.R. Maximum 0.012 mm

These highest precision end mills feature multiple corner radii and multiple neck length dimensions in a wide range of cutting diameters to provide the best available geometry for finishing cuts in mold making applications.

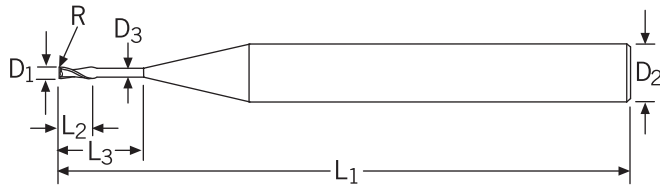
A positive rake angle supports maximum cutting performance in medium and hard materials for conventional side milling and slotting.



2-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	PRICE EACH
MMRM-020-7 MMRM-020-15 MMRM-020-30	2	6	1.90	57	2	7 15 30	0.20	25.65
MMRM-030-8 MMRM-030-15 MMRM-030-30	3	6	2.90	57	3	8 15 30	0.25	25.65
MMRM-040-9 MMRM-040-15 MMRM-040-30	4	6	3.80	57	4	9 15 30	0.25	25.65
MMRM-050-10 MMRM-050-15 MMRM-050-30	5	6	4.80	57	5	10 15 30	0.50	25.65
MMRM-060-11 MMRM-060-16 MMRM-060-30	6	6	5.80	57	6	11 16 30	1.00	25.65
MMRM-080-16 MMRM-080-25	8	8	7.80	63	8	16 25	1.00	33.15
MMRM-100-20 MMRM-100-25 MMRM-120-25	10 10 12	10 10 12	9.80 9.80 11.80	72 72 83	10 10 12	20 25 25	1.00 1.00 1.50	39.05 39.05 62.45



## Coated MMRM Series, Mold Making Center Cutting — 30° Helix



Shank Dia.                    –0.0025 to –0.005 mm  
Cutter Dia.                   +0.000 –0.014 mm  
T.I.R. Maximum               0.012 mm

These highest precision end mills feature multiple corner radii and multiple neck length dimensions in a wide range of cutting diameters to provide the best available geometry for finishing cuts in mold making applications.

A positive rake angle supports maximum cutting performance in medium and hard materials for conventional side milling and slotting.

2-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	AITIN COATED PRICE EACH
MMRM-005-5X MMRM-005-10X MMRM-006-5X MMRM-006-12X	0.5 0.5 0.6 0.6	4	0.48 0.48 0.58 0.58	50	0.5 0.5 0.6 0.6	5 10 5 12	0.05	31.60
MMRM-007-5X MMRM-007-12X	0.7	4	0.68	50	0.7	5 12	0.10	31.60
MMRM-008-5X MMRM-008-10X MMRM-008-16X	0.8	4	0.78	50	0.8	5 10 16	0.10	27.40
MMRM-009-5X MMRM-009-10X MMRM-009-16X	0.9	4	0.88	50	0.9	5 10 16	0.10	27.40
MMRM-010-6X MMRM-010-8X MMRM-010-11X MMRM-010-12X MMRM-010-15X MMRM-010-20X	1.0	6	0.95	50	1.0	6 8 11 12 15 20	0.10	29.90
MMRM-012-7X MMRM-012-15X MMRM-012-20X	1.2	6	1.15	57	1.2	7 15 20	0.10	29.90
MMRM-015-7X MMRM-015-15X MMRM-015-25X	1.5	6	1.45	57 57 75	1.5	7 15 25	0.15	29.90

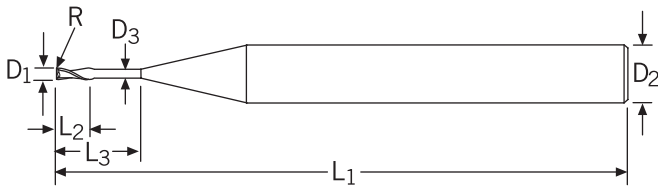
## Coated MMRM Series, Mold Making Center Cutting — 30° Helix



Shank Dia. -0.0025 to -0.005 mm  
 Cutter Dia. 2 to 3 mm +0.000 -0.014 mm  
 4 to 6 mm +0.000 -0.018 mm  
 8 to 10 mm +0.000 -0.022 mm  
 12 mm +0.000 -0.027 mm  
 T.I.R. Maximum 0.012 mm

These highest precision end mills feature multiple corner radii and multiple neck length dimensions in a wide range of cutting diameters to provide the best available geometry for finishing cuts in mold making applications.

A positive rake angle supports maximum cutting performance in medium and hard materials for conventional side milling and slotting.



2-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	AITiN COATED PRICE EACH
MMRM-020-7X MMRM-020-15X MMRM-020-30X	2	6	1.90	57	2	7 15 30	0.20	29.90
MMRM-030-8X MMRM-030-15X MMRM-030-30X	3	6	2.90	57	3	8 15 30	0.25	29.90
MMRM-040-9X MMRM-040-15X MMRM-040-30X	4	6	3.80	57	4	9 15 30	0.25	29.90
MMRM-050-10X MMRM-050-15X MMRM-050-30X	5	6	4.80	57	5	10 15 30	0.50	29.90
MMRM-060-11X MMRM-060-16X MMRM-060-30X	6	6	5.80	57	6	11 16 30	1.00	29.90
MMRM-080-16X MMRM-080-25X	8	8	7.80	63	8	16 25	1.00	39.50
MMRM-100-20X MMRM-100-25X MMRM-120-25X	10 10 12	10 10 12	9.80 9.80 11.80	72 72 83	10 10 12	20 25 25	1.00 1.00 1.50	45.55 45.55 74.20

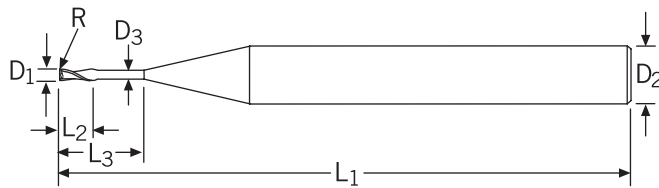
## SFRM Series, HSC Shrink Fit Center Cutting — 30° Helix



Shank Dia.                    -0.0025 to -0.005 mm  
 Cutter Dia.                 +0.000 -0.014 mm  
 T.I.R. Maximum             0.012 mm

These highest precision finishing end mills are suitable for HSC applications and engineered for shrink-fit tool holding.

A positive rake angle supports maximum cutting performance in soft, medium, and hard materials for conventional side milling and slotting.



2-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	PRICE EACH
SFRM-002-0	0.2	6	0.25	57	0.3	1.0		39.80
SFRM-003-0	0.3				39.80			
SFRM-003-1	0.3				39.80			
SFRM-004-0	0.4				38.90			
SFRM-004-1	0.4				38.90			
SFRM-005-1	0.5	6	0.45	57	0.6	1.6	0.1	37.05
SFRM-005-3	0.5		0.45		0.5	3.3		37.05
SFRM-005-5	0.5		0.45		0.5	5.1		38.90
SFRM-006-2	0.6		0.55		0.7	1.7		37.05
SFRM-006-4	0.6		0.55		0.6	4.5		37.05
SFRM-006-6	0.6		0.55		0.6	6.2		38.90
SFRM-008-2	0.8	6	0.75	57	1.0	2.5	0.1	35.20
SFRM-008-5	0.8		0.75		0.8	5.2		35.20
SFRM-008-8	0.8		0.75		0.8	8.0		38.60
SFRM-010-3	1.0		0.95		1.3	3.3		33.50
SFRM-010-8	1.0		0.95		1.3	8.0		35.20

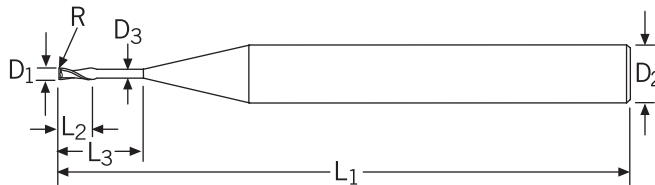
## SFRM Series, HSC Shrink Fit Center Cutting — 30° Helix



Shank Dia. -0.0025 to -0.005 mm  
 Cutter Dia. 1.2 to 3.0 mm +0.000 -0.014 mm  
 3.5 to 6.0 mm +0.000 -0.018 mm  
 T.I.R. Maximum 0.012 mm

These highest precision finishing end mills are suitable for HSC applications and engineered for shrink-fit tool holding.

A positive rake angle supports maximum cutting performance in soft, medium, and hard materials for conventional side milling and slotting.



2-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	PRICE EACH
SFRM-012-3	1.2		1.15		1.5	3.5		31.90
SFRM-012-8	1.2	6	1.15	57	1.2	8.0	0.1	33.65
SFRM-014-3	1.4		1.35		1.8	3.8		30.30
SFRM-014-15	1.4		1.35		2.3	15.0		31.90
SFRM-015-4	1.5		1.45		1.9	4.9		30.30
SFRM-015-9	1.5	6	1.45	57	1.5	9.5	0.1	31.90
SFRM-016-5	1.6		1.55		2.0	5.0		30.30
SFRM-016-22	1.6		1.55		2.3	22.0		31.90
SFRM-018-5	1.8		1.75		2.3	5.3		30.30
SFRM-020-5	2.0		1.95		2.5	5.5		28.85
SFRM-020-9	2.0	6	1.95	57	2.5	9.5	0.2	30.60
SFRM-025-6	2.5		2.40		3.0	6.0		28.85
SFRM-025-9	2.5		2.40		2.5	9.5		30.60
SFRM-030-8	3.0		2.90		4.0	8.0		27.35
SFRM-030-15	3.0	6	2.90	57	4.0	15.0	0.2	29.40
SFRM-035-9	3.5		3.40		4.5	9.5		27.35
SFRM-040-10	4.0		3.90		5.0	10.0		27.35
SFRM-040-20	4.0		3.90		5.0	20.0		29.40
SFRM-050-11	5.0		4.90		6.0	11.0		26.00
SFRM-050-25	5.0	6	4.90	57	6.0	25.0	0.2	27.60
SFRM-060-12	6.0		5.90		7.5	12.5		25.65
SFRM-060-25	6.0		5.90		7.5	25.0		27.60

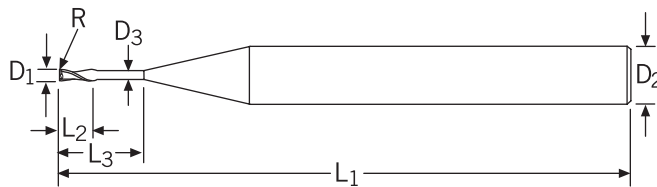
## Coated SFRM Series, HSC Shrink Fit Center Cutting — 30° Helix



Shank Dia.                    -0.0025 to -0.005 mm  
 Cutter Dia.                 +0.000 -0.014 mm  
 T.I.R. Maximum             0.012 mm

These highest precision finishing end mills are suitable for HSC applications and engineered for shrink-fit tool holding.

A positive rake angle supports maximum cutting performance in soft, medium, and hard materials for conventional side milling and slotting.



2-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	AITIN COATED PRICE EACH
SFRM-002-0X	0.2				0.3			44.40
SFRM-003-0X	0.3				0.4			44.40
SFRM-003-1X	0.3	6	0.25	57	0.4	1.0		44.40
SFRM-004-0X	0.4				0.5			43.45
SFRM-004-1X	0.4		0.35		0.5	1.2		43.45
SFRM-005-1X	0.5		0.45		0.6	1.6		41.55
SFRM-005-3X	0.5		0.45		0.5	3.3		41.55
SFRM-005-5X	0.5	6	0.45	57	0.5	5.1	0.1	43.45
SFRM-006-2X	0.6		0.55		0.7	1.7		41.55
SFRM-006-4X	0.6		0.55		0.6	4.5		41.55
SFRM-006-6X	0.6		0.55		0.6	6.2		43.45
SFRM-008-2X	0.8		0.75		1.0	2.5		39.70
SFRM-008-5X	0.8		0.75		0.8	5.2		39.70
SFRM-008-8X	0.8	6	0.75	57	0.8	8.0	0.1	43.10
SFRM-010-3X	1.0		0.95		1.3	3.3		37.90
SFRM-010-8X	1.0		0.95		1.3	8.0		39.70

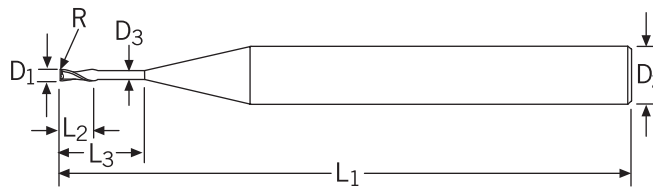
## Coated SFRM Series, HSC Shrink Fit Center Cutting — 30° Helix



Shank Dia. -0.0025 to -0.005 mm  
 Cutter Dia. 1.2 to 3.0 mm +0.000 -0.014 mm  
 3.5 to 6.0 mm +0.000 -0.018 mm  
 T.I.R. Maximum 0.012 mm

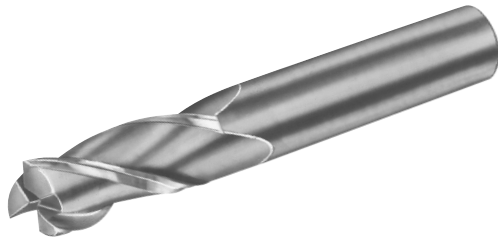
These highest precision finishing end mills are suitable for HSC applications and engineered for shrink-fit tool holding.

A positive rake angle supports maximum cutting performance in soft, medium, and hard materials for conventional side milling and slotting.



2-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	AITiN COATED PRICE EACH
SFRM-012-3X	1.2		1.15		1.5	3.5		36.25
SFRM-012-8X	1.2	6	1.15	57	1.2	8.0	0.1	38.20
SFRM-014-3X	1.4		1.35		1.8	3.8		36.25
SFRM-014-15X	1.4		1.35		2.3	15.0		34.70
SFRM-015-4X	1.5		1.45		1.9	4.9		34.70
SFRM-015-9X	1.5	6	1.45	57	1.5	9.5	0.1	36.25
SFRM-016-5X	1.6		1.55		2.0	5.0		34.70
SFRM-016-22X	1.6		1.55		2.3	22.0		36.25
SFRM-018-5X	1.8		1.75		2.3	5.3		34.70
SFRM-020-5X	2.0		1.95		2.5	5.5		33.15
SFRM-020-9X	2.0	6	1.95	57	2.5	9.5	0.2	35.05
SFRM-025-6X	2.5		2.40		3.0	6.0		33.15
SFRM-025-9X	2.5		2.40		2.5	9.5		35.05
SFRM-030-8X	3.0		2.90		4.0	8.0		31.70
SFRM-030-15X	3.0	6	2.90	57	4.0	15.0	0.2	33.80
SFRM-035-9X	3.5		3.40		4.5	9.5		31.70
SFRM-040-10X	4.0		3.90		5.0	10.0		31.70
SFRM-040-20X	4.0		3.90		5.0	20.0		33.80
SFRM-050-11X	5.0		4.90		6.0	11.0		30.40
SFRM-050-25X	5.0	6	4.90	57	6.0	25.0	0.2	31.95
SFRM-060-12X	6.0		5.90		7.5	12.5		29.90
SFRM-060-25X	6.0		5.90		7.5	25.0		31.95

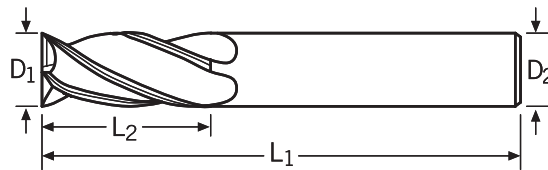
## AEMM Series, Universal Application Center Cutting — 30° Helix



Shank Dia.		-0.0025 to -0.005 mm
Cutter Dia.	1 to 3 mm	+0.000 -0.014 mm
	4 to 6 mm	+0.000 -0.018 mm
	7 to 10 mm	+0.000 -0.036 mm
	11 to 18 mm	+0.000 -0.043 mm
	20 mm	+0.000 -0.052 mm
	25 mm	+0.000 -0.062 mm
T.I.R. Maximum		0.012 mm

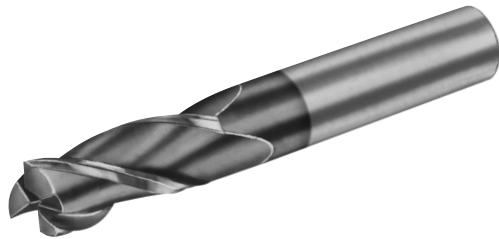
These universal application type end mills feature a slightly increased flute and overall length for greatest versatility.

The conventional tool geometry supports applications in a wide scope of different materials, ranging from soft to hard.



2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	PRICE EACH
AEMM-010-2 AEMM-015-2 AEMM-020-2 AEMM-025-2	AEMM-010-3 AEMM-015-3 AEMM-020-3 AEMM-025-3	AEMM-010-4 AEMM-015-4 AEMM-020-4 AEMM-025-4	1.0 1.5 2.0 2.5	4	50	4 4 5 6	14.60
AEMM-030-2 AEMM-035-2 AEMM-040-2 AEMM-045-2	AEMM-030-3 AEMM-035-3 AEMM-040-3 AEMM-045-3	AEMM-030-4 AEMM-035-4 AEMM-040-4 AEMM-045-4	3.0 3.5 4.0 4.5	6	57	8 10 11 11	18.30
AEMM-050-2 AEMM-055-2 AEMM-060-2 AEMM-070-2	AEMM-050-3 AEMM-055-3 AEMM-060-3 AEMM-070-3	AEMM-050-4 AEMM-055-4 AEMM-060-4 AEMM-070-4	5.0 5.5 6.0 7.0	6 6 6 8	57 57 57 63	16 16 16 22	18.30 18.30 18.30 22.70
AEMM-080-2 AEMM-090-2 AEMM-100-2 AEMM-110-2	AEMM-080-3 AEMM-090-3 AEMM-100-3 AEMM-110-3	AEMM-080-4 AEMM-090-4 AEMM-100-4 AEMM-110-4	8.0 9.0 10.0 11.0	8 10 10 12	63 72 72 83	22 25 25 30	22.70 26.75 26.75 42.65
AEMM-120-2 AEMM-140-2 AEMM-160-2 AEMM-180-2	AEMM-120-3 AEMM-140-3 AEMM-160-3 AEMM-180-3	AEMM-120-4 AEMM-140-4 AEMM-160-4 AEMM-180-4	12.0 14.0 16.0 18.0	12 14 16 18	83 83 92 92	30 35 35 45	42.65 49.55 79.05 106.20
AEMM-200-2 AEMM-250-2	AEMM-200-3 AEMM-250-3	AEMM-200-4 AEMM-250-4	20.0 25.0	20 25	104 127	45 50	135.00 160.55

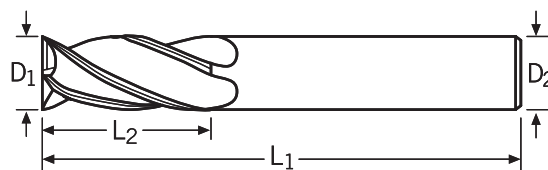
## Coated AEMM Series, Universal Application Center Cutting — 30° Helix



Shank Dia.		-0.0025 to -0.005 mm
Cutter Dia.	1 to 3 mm	+0.000 -0.014 mm
	4 to 6 mm	+0.000 -0.018 mm
	7 to 10 mm	+0.000 -0.036 mm
	11 to 18 mm	+0.000 -0.043 mm
	20 mm	+0.000 -0.052 mm
	25 mm	+0.000 -0.062 mm
T.I.R. Maximum		0.012 mm

These universal application type end mills feature a slightly increased flute and overall length for greatest versatility.

The conventional tool geometry supports applications in a wide scope of different materials, ranging from soft to hard.



2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	AITiN COATED PRICE EACH
AEMM-010-2X	AEMM-010-3X	AEMM-010-4X	1.0			4	18.60
AEMM-015-2X	AEMM-015-3X	AEMM-015-4X	1.5	4	50	4	
AEMM-020-2X	AEMM-020-3X	AEMM-020-4X	2.0			5	
AEMM-025-2X	AEMM-025-3X	AEMM-025-4X	2.5			6	
AEMM-030-2X	AEMM-030-3X	AEMM-030-4X	3.0			8	22.55
AEMM-035-2X	AEMM-035-3X	AEMM-035-4X	3.5	6	57	10	
AEMM-040-2X	AEMM-040-3X	AEMM-040-4X	4.0			11	
AEMM-045-2X	AEMM-045-3X	AEMM-045-4X	4.5			11	
AEMM-050-2X	AEMM-050-3X	AEMM-050-4X	5.0	6	57	16	22.55
AEMM-055-2X	AEMM-055-3X	AEMM-055-4X	5.5	6	57	16	22.55
AEMM-060-2X	AEMM-060-3X	AEMM-060-4X	6.0	6	57	16	22.55
AEMM-070-2X	AEMM-070-3X	AEMM-070-4X	7.0	8	63	22	28.85
AEMM-080-2X	AEMM-080-3X	AEMM-080-4X	8.0	8	63	22	38.85
AEMM-090-2X	AEMM-090-3X	AEMM-090-4X	9.0	10	72	25	33.00
AEMM-100-2X	AEMM-100-3X	AEMM-100-4X	10.0	10	72	25	33.00
AEMM-110-2X	AEMM-110-3X	AEMM-110-4X	11.0	12	83	30	54.15
AEMM-120-2X	AEMM-120-3X	AEMM-120-4X	12.0	12	83	30	54.15
AEMM-140-2X	AEMM-140-3X	AEMM-140-4X	14.0	14	83	35	60.70
AEMM-160-2X	AEMM-160-3X	AEMM-160-4X	16.0	16	92	35	90.15
AEMM-180-2X	AEMM-180-3X	AEMM-180-4X	18.0	18	92	45	119.60
AEMM-200-2X	AEMM-200-3X	AEMM-200-4X	20.0	20	104	45	154.35
AEMM-250-2X	AEMM-250-3X	AEMM-250-4X	25.0	25	127	50	180.00

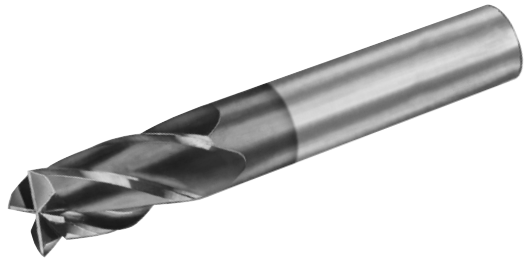


# METRIC END MILLS



## Coated AECM Series, Universal Application, with Corner Radius Center Cutting — 30° Helix

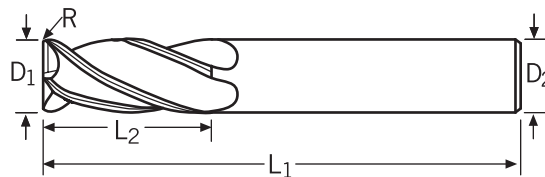
Shank Dia.		-0.0025 to -0.005 mm
Cutter Dia.	1 to 3 mm	+0.000 -0.014 mm
	4 to 6 mm	+0.000 -0.018 mm
	8 to 10 mm	+0.000 -0.036 mm
	12 mm	+0.000 -0.043 mm
T.I.R. Maximum		0.012 mm



These universal application type end mills feature a slightly increased flute and overall length for greatest versatility.

Engineered with various corner radii per cutting diameter, the tools are ideally suited for heavier cuts in medium and hard materials.

These end mills are only available with AlTiN coating.



2-FLUTE TOOL NO.	3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	CORNER RADIUS R, mm	AlTiN COATED PRICE EACH
AECM-0101-2X	AECM-0101-3X	AECM-0101-4X	1	4	50	4	0.1	20.10
AECM-0102-2X	AECM-0102-3X	AECM-0102-4X	1	4	50	4	0.2	20.10
AECM-0202-2X	AECM-0202-3X	AECM-0202-4X	2	4	50	5	0.2	20.10
AECM-0205-2X	AECM-0205-3X	AECM-0205-4X	2	4	50	5	0.5	20.10
AECM-0302-2X	AECM-0302-3X	AECM-0302-4X	3	6	57	8	0.2	24.35
AECM-0305-2X	AECM-0305-3X	AECM-0305-4X	3	6	57	8	0.5	24.35
AECM-0402-2X	AECM-0402-3X	AECM-0402-4X	4			11	0.2	24.35
AECM-0405-2X	AECM-0405-3X	AECM-0405-4X	4			11	0.5	
AECM-0410-2X	AECM-0410-3X	AECM-0410-4X	4	6	57	11	1.0	
AECM-0502-2X	AECM-0502-3X	AECM-0502-4X	5			16	0.2	
AECM-0505-2X	AECM-0505-3X	AECM-0505-4X	5			16	0.5	
AECM-0510-2X	AECM-0510-3X	AECM-0510-4X	5			16	1.0	
AECM-0603-2X	AECM-0603-3X	AECM-0603-4X	6	6	57	16	0.3	24.35
AECM-0605-2X	AECM-0605-3X	AECM-0605-4X	6	6	57	16	0.5	24.35
AECM-0610-2X	AECM-0610-3X	AECM-0610-4X	6	6	57	22	1.0	24.35
AECM-0805-2X	AECM-0805-3X	AECM-0805-4X	8	8	63	22	0.5	31.15
AECM-0810-2X	AECM-0810-3X	AECM-0810-4X	8	8	63	22	1.0	31.15
AECM-0815-2X	AECM-0815-3X	AECM-0815-4X	8	8	63	25	1.5	31.15
AECM-1005-2X	AECM-1005-3X	AECM-1005-4X	10	10	72	25	0.5	35.70
AECM-1010-2X	AECM-1010-3X	AECM-1010-4X	10	10	72	25	1.0	35.70
AECM-1015-2X	AECM-1015-3X	AECM-1015-4X	10	10	72	25	1.5	35.70
AECM-1205-2X	AECM-1205-3X	AECM-1205-4X	12	12	83	30	0.5	58.50
AECM-1210-2X	AECM-1210-3X	AECM-1210-4X	12	12	83	30	1.0	58.50
AECM-1215-2X	AECM-1215-3X	AECM-1215-4X	12	12	83	30	1.5	58.50

## Coated HMSM Series, Hard Milling, Stub Length Center Cutting

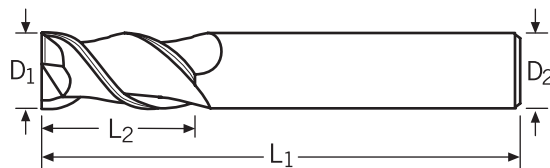
Shank Dia.	-0.0025 to -0.005 mm	
Cutter Dia.	3 to 6 mm	+0.000 -0.018 mm
	8 to 10 mm	+0.000 -0.022 mm
	12 to 16 mm	+0.000 -0.027 mm
	20 mm	+0.000 -0.033 mm
T.I.R. Maximum	0.012 mm	



Engineered with a special 4-flute stub length tool geometry, specifically suitable for milling operations with a shallow cutting depth in hard materials.

The unique tool geometry provides maximum milling performance in finishing and semi-finishing as well as in roughing cuts.

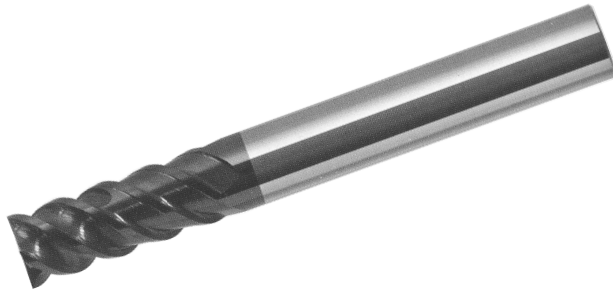
These end mills are only available with AlTiN coating.



4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	AlTiN COATED PRICE EACH
HMSM-030-4X	3	6	57	4.5	49.35
HMSM-040-4X	4			6.0	49.35
HMSM-050-4X	5			7.5	53.15
HMSM-060-4X	6			9.0	53.15
HMSM-080-4X	8	8	75	12.0	58.75
HMSM-100-4X	10	10	80	15.0	66.80
HMSM-120-4X	12	12	100	18.0	84.65
HMSM-160-4X	16	16	110	24.0	169.20
HMSM-200-4X	20	20	125	30.0	233.00

## Coated HMUM Series, Universal Hard Milling Center Cutting

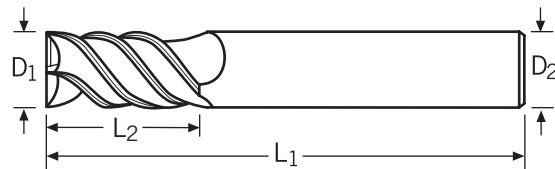
Shank Dia.	-0.0025 to -0.005 mm	
Cutter Dia.	4 to 6 mm	+0.000 -0.018 mm
	8 to 10 mm	+0.000 -0.022 mm
	12 to 16 mm	+0.000 -0.027 mm
	20 mm	+0.000 -0.033 mm
T.I.R. Maximum	0.012 mm	



Engineered with a negative rake angle, these high-tech end mills are specifically engineered for numerous milling applications in hard materials.

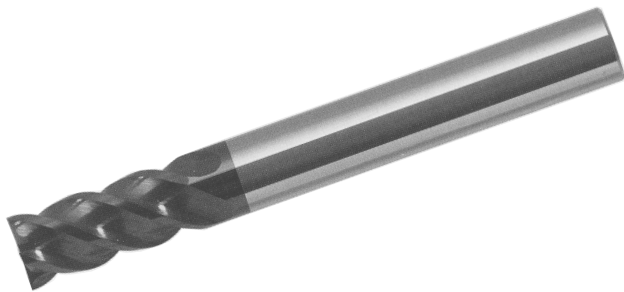
The unique tool geometry provides maximum milling performance in semi-finishing and roughing cuts.

These end mills are only available with AlTiN coating.



4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	AlTiN COATED PRICE EACH
HMUM-040-4X	4	6	57	12	51.85
HMUM-060-4X	6	6	57	15	55.85
HMUM-080-4X	8	8	75	20	61.60
HMUM-100-4X	10	10	80	25	70.00
HMUM-120-4X	12	12	100	30	88.60
HMUM-160-4X	16	16	110	40	177.40
HMUM-200-4X	20	20	125	45	244.20

## Coated HMRM Series, Hard Milling, High Performance Center Cutting

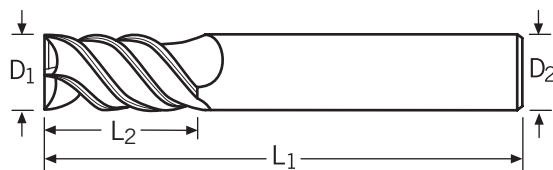


Shank Dia.	-0.0025 to -0.005 mm		
Cutter Dia.	3 to 6 mm	+0.000	-0.018 mm
	8 to 10 mm	+0.000	-0.022 mm
	12 to 16 mm	+0.000	-0.027 mm
	20 mm	+0.000	-0.033 mm
T.I.R. Maximum	0.012 mm		

These high performance end mills feature a special 4-flute geometry and are specifically engineered for numerous milling applications in hard materials.

The unique tool geometry provides maximum milling performance in finishing and semi-finishing as well as in roughing cuts.

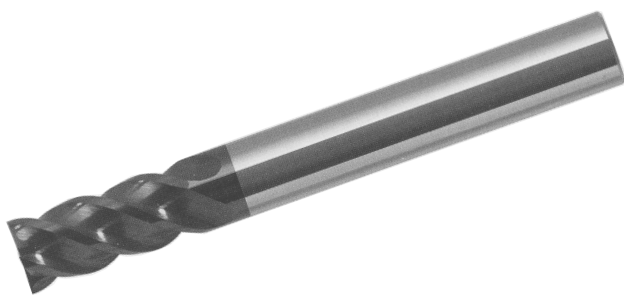
These end mills are only available with AlTiN coating.



4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	AlTiN COATED PRICE EACH
HMRM-030-4X	3	6	57	8	51.85
HMRM-040-4X	4			11	51.85
HMRM-050-4X	5			13	55.85
HMRM-060-4X	6			13	55.85
HMRM-080-4X	8	8	75	19	61.60
HMRM-100-4X	10	10	80	22	70.00
HMRM-120-4X	12	12	100	26	88.60
HMRM-160-4X	16	16	110	32	177.40
HMRM-200-4X	20	20	125	38	244.20

## Coated HMCM Series, Hard Milling, with Corner Radius Center Cutting

Shank Dia. -0.0025 to -0.005 mm  
 Cutter Dia. 3 to 6 mm +0.000 -0.018 mm  
 8 mm +0.000 -0.022 mm  
 T.I.R. Maximum 0.012 mm

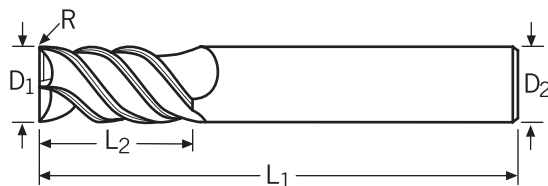


Engineered with multiple corner radii per cutting diameter and a special 4-flute tool geometry, these high tech end mills are designed for hard material milling.

The various corner radii reduce cutting forces on the tip of the cutting edge and therefore support heavier cuts and longer tool life.

The unique tool geometry provides maximum milling performance in finishing and semi-finishing as well as in roughing cuts.

These end mills are only available with AlTiN coating.

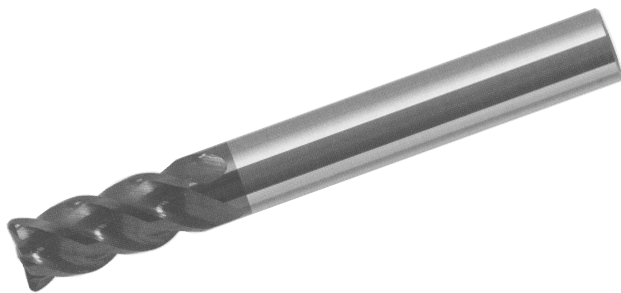


4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	CORNER RADIUS R, mm	AlTiN COATED PRICE EACH
HMCM-0302-4X HMCM-0305-4X	3	6	57	8	0.2 0.5	59.05
HMCM-0402-4X HMCM-0405-4X HMCM-0410-4X	4	6	57	11	0.2 0.5 1.0	59.05
HMCM-0502-4X HMCM-0505-4X HMCM-0510-4X	5	6	57	13	0.2 0.5 1.0	63.60
HMCM-0603-4X HMCM-0605-4X HMCM-0610-4X HMCM-0615-4X	6	6	57	13	0.3 0.5 1.0 1.5	63.60
HMCM-0803-4X HMCM-0805-4X HMCM-0810-4X HMCM-0815-4X HMCM-0820-4X	8	8	75	19	0.3 0.5 1.0 1.5 2.0	70.00

# METRIC END MILLS



## Coated HMCM Series, Hard Milling with Corner Radius Center Cutting



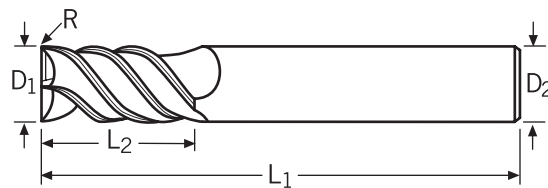
Shank Dia.	-0.0025 to -0.005 mm	
Cutter Dia.	10 mm	+0.000 -0.022 mm
	12 to 16 mm	+0.000 -0.027 mm
	20 mm	+0.000 -0.033 mm
T.I.R. Maximum	0.012 mm	

Engineered with multiple corner radii per cutting diameter and a special 4-flute tool geometry, these high tech end mills are designed for hard material milling.

The various corner radii reduce cutting forces on the tip of the cutting edge and therefore support heavier cuts and longer tool life.

The unique tool geometry provides maximum milling performance in finishing and semi-finishing as well as in roughing cuts.

These end mills are only available with AlTiN coating.

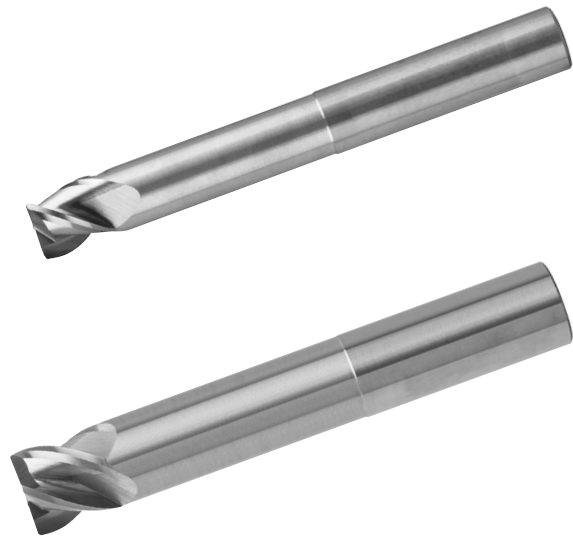


4-FLUTE TOOL NO.	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	CORNER RADIUS R, mm	AlTiN COATED PRICE EACH
HMCM-1005-4X HMCM-1010-4X HMCM-1015-4X HMCM-1020-4X	10	10	80	22	0.5 1.0 1.5 2.0	79.50
HMCM-1205-4X HMCM-1210-4X HMCM-1215-4X HMCM-1220-4X	12	12	100	26	0.5 1.0 1.5 2.0	100.35
HMCM-1610-4X HMCM-1615-4X HMCM-1620-4X HMCM-1630-4X	16	16	110	32	1.0 1.5 2.0 3.0	202.35
HMCM-2010-4X HMCM-2015-4X HMCM-2020-4X HMCM-2030-4X	20	20	125	38	1.0 1.5 2.0 3.0	276.90



super carbide tools

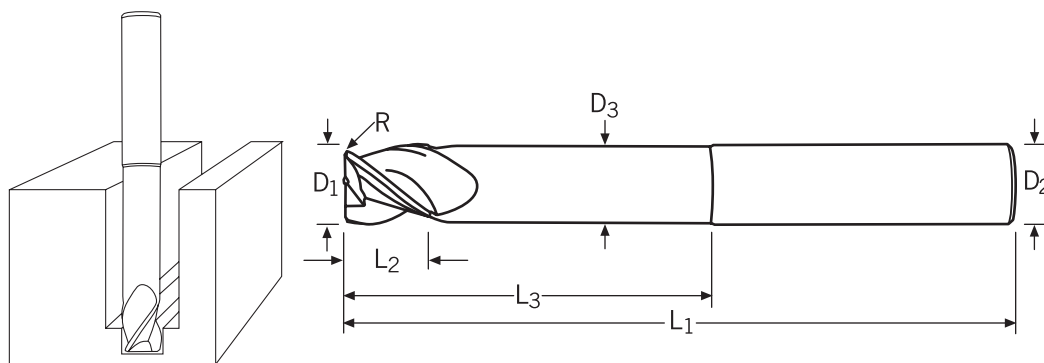
## RNMM Series, HSC for Soft Materials Center Cutting – 40° Helix



Shank Dia.		-0.0025 to -0.005 mm
Cutter Dia.	6 mm	+0.000 -0.018 mm
	8 to 10 mm	+0.000 -0.022 mm
	12 to 16 mm	+0.000 -0.027 mm
	20 mm	+0.000 -0.033 mm
T.I.R. Maximum		0.012 mm

These HSC end mills are specifically designed for semi-finishing and finishing cuts with highest cutting speeds in soft to medium-hard materials.

The unique tool geometries feature a high helix of 40°, a corner radius, and a reduced neck to ideally suit deep pocket milling with excellent material removal rates and optimized chip evacuation.

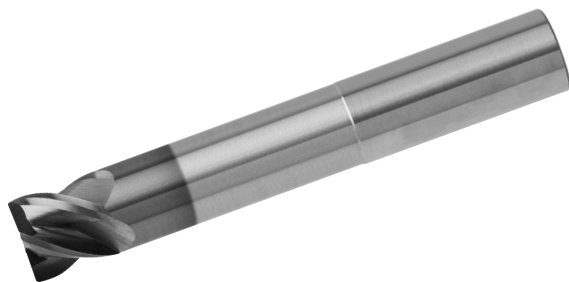


3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	PRICE EACH
RNMM-060-3		6	6	5.6	66	6	30	0.50	28.20
RNMM-080-3		8	8	7.6	81	8	45	0.50	51.40
RNMM-100-3		10	10	9.6	90	10	50	1.00	61.15
RNMM-120-3		12	12	11.6	100	12	55	1.00	79.55
RNMM-160-3		16	16	15.6	120	16	72	1.00	124.20
	RNMM-200-4	20	20	19.6	130	20	80	1.50	213.20

## Coated RNMM Series, HSC for Soft Materials Center Cutting – 40° Helix

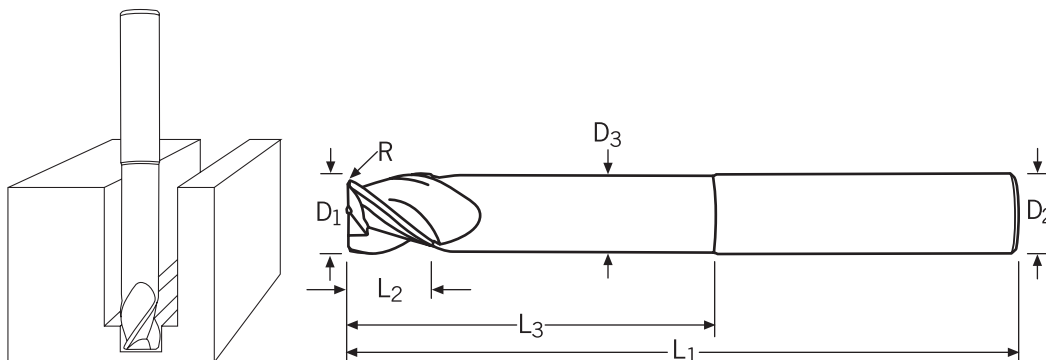


Shank Dia.	-0.0025 to -0.005 mm	
Cutter Dia.	6 mm	+0.000 -0.018 mm
	8 to 10 mm	+0.000 -0.022 mm
	12 to 16 mm	+0.000 -0.027 mm
	20 mm	+0.000 -0.033 mm
T.I.R. Maximum	0.012 mm	



These HSC end mills are specifically designed for semi-finishing and finishing cuts with highest cutting speeds in soft to medium-hard materials.

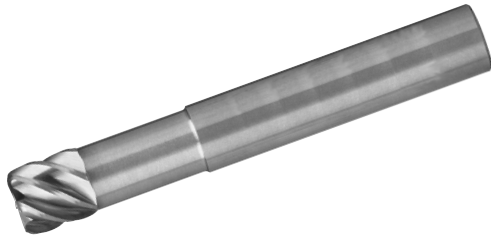
The unique tool geometries feature a high helix of 40°, a corner radius, and a reduced neck to ideally suit deep pocket milling with excellent material removal rates and optimized chip evacuation.



3-FLUTE TOOL NO.	4-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	AITiN COATED PRICE EACH
RNMM-060-3X	RNMM-200-4X	6	6	5.6	66	6	30	0.50	32.55
RNMM-080-3X		8	8	7.6	81	8	45	0.50	60.80
RNMM-100-3X		10	10	9.6	90	10	50	1.00	70.85
RNMM-120-3X		12	12	11.6	100	12	55	1.00	91.70
RNMM-160-3X		16	16	15.6	120	16	72	1.00	138.45
		20	20	19.6	130	20	80	1.50	237.85



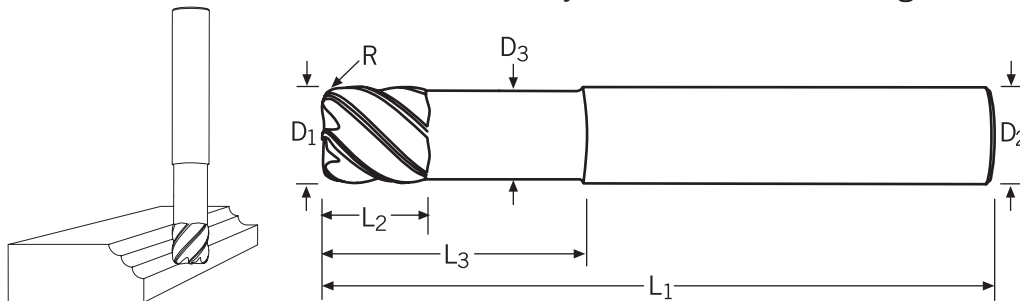
## RNRM Series, Mold Making Center Cutting – 45° Helix



Shank Dia. -0.0025 to -0.005 mm  
 Cutter Dia. 3 to 6 mm +0.000 -0.018 mm  
 8 to 10 mm +0.000 -0.022 mm  
 12 mm +0.000 -0.027 mm  
 T.I.R. Maximum 0.012 mm

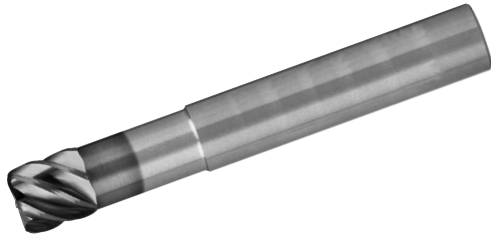
These end mills feature an optimized tool geometry for the highest precision requirements in mold making. They are engineered with multiple corner radii per cutting diameter and a short 4- and 6-flute geometry with a high helix of 45° for optimal milling performance and longest tool life.

Ideally suited for semi-finishing and finishing cuts.



4-FLUTE TOOL NO.	6-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	PRICE EACH
RNRM-305-4 RNRM-405-4 RNRM-505-4		3 4 5	6	2.75 3.70 4.60	57	4.5 6.0 7.5	12.0 13.5 15.0	0.5	42.25
RNRM-605-4 RNRM-608-4 RNRM-610-4 RNRM-615-4		6	6	5.50	66	9.0	24.0	0.5 0.8 1.0 1.5	43.75
	RNRM-805-6 RNRM-810-6 RNRM-815-6 RNRM-820-6	8	8	7.50	75	10.0	28.0	0.5 1.0 1.5 2.0	54.20
	RNRM-1005-6 RNRM-1010-6 RNRM-1015-6 RNRM-1020-6 RNRM-1025-6	10	10	9.25	75	12.0	30.0	0.5 1.0 1.5 2.0 2.5	72.80
	RNRM-1210-6 RNRM-1215-6 RNRM-1220-6 RNRM-1230-6	12	12	11.00	83	12.0	32.0	1.0 1.5 2.0 3.0	90.50

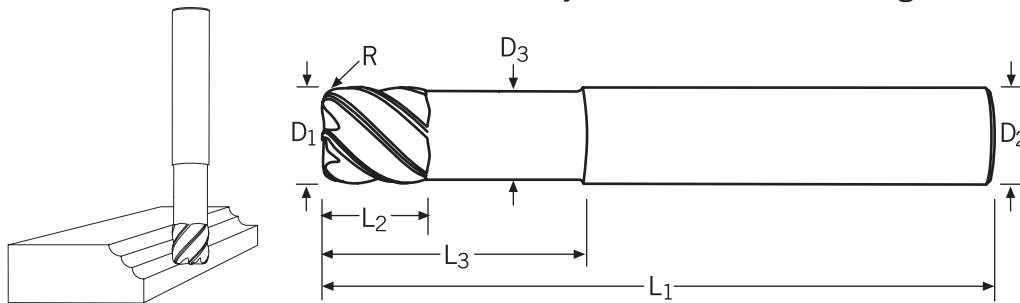
## Coated RNRM Series, Mold Making Center Cutting – 45° Helix



Shank Dia. –0.0025 to –0.005 mm  
 Cutter Dia. 3 to 6 mm +0.000 –0.018 mm  
 8 to 10 mm +0.000 –0.022 mm  
 12 mm +0.000 –0.027 mm  
 T.I.R. Maximum 0.012 mm

These end mills feature an optimized tool geometry for the highest precision requirements in mold making. They are engineered with multiple corner radii per cutting diameter and a short 4- and 6-flute geometry with a high helix of 45° for optimal milling performance and longest tool life.

Ideally suited for semi-finishing and finishing cuts.



4-FLUTE TOOL NO.	6-FLUTE TOOL NO.	CUTTER DIA. D <sub>1</sub> , mm	SHANK DIA. D <sub>2</sub> , mm	REDUCED NECK DIA. D <sub>3</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	FLUTE LENGTH L <sub>2</sub> , mm	REDUCED NECK LENGTH L <sub>3</sub> , mm	CORNER RADIUS R, mm	AITiN COATED PRICE EACH
RNRM-305-4X RNRM-405-4X RNRM-505-4X		3 4 5	6	2.75 3.70 4.60	57	4.5 6.0 7.5	12.0 13.5 15.0	0.5	46.95
RNRM-605-4X RNRM-608-4X RNRM-610-4X RNRM-615-4X		6	6	5.50	66	9.0	24.0	0.5 0.8 1.0 1.5	48.45
	RNRM-805-6X RNRM-810-6X RNRM-815-6X RNRM-820-6X	8	8	7.50	75	10.0	28.0	0.5 1.0 1.5 2.0	60.95
	RNRM-1005-6X RNRM-1010-6X RNRM-1015-6X RNRM-1020-6X RNRM-1025-6X	10	10	9.25	75	12.0	30.0	0.5 1.0 1.5 2.0 2.5	79.95
	RNRM-1210-6X RNRM-1215-6X RNRM-1220-6X RNRM-1230-6X	12	12	11.00	83	12.0	32.0	1.0 1.5 2.0 3.0	102.85

# THREAD MILLS



Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                   +.000-.010"  
 Overall Length                   ±1/32"

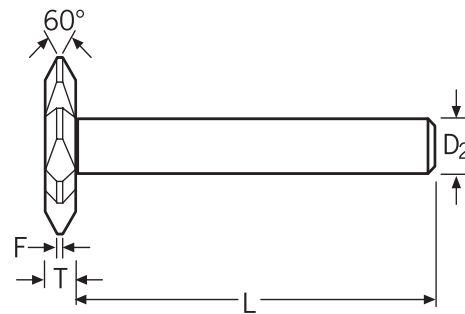
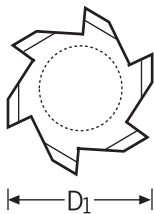
Designed for milling precision I.D. and O.D. threads in all types of steels, non-ferrous metals and exotic materials.

Equally effective in laminated plastics, fiberglass and composites used in the aircraft industry.

Thread form generated is American Standard thread.

Minimum pitch listed is for an internal thread.

Solid carbide cutter head brazed to solid carbide shank for maximum rigidity.

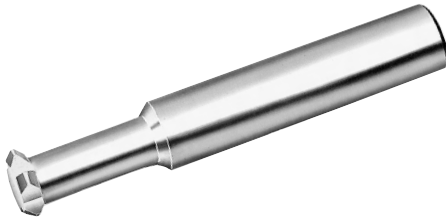


TOOL NUMBER	COATED TOOL NUMBER	CUTTER DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	FLAT F	SHANK LENGTH L	THICKNESS T	NO. OF FLUTES	T.P.I. RANGE	PRICE EACH	ALTIN COATED PRICE EA.
TM-375	TM-375X	3/8	1/4	.002	2-1/2	.093	4	12 - 32	60.70	66.05
TM-500	TM-500X	1/2	5/16	.0035	2-1/2	.125	5	11 - 32	73.95	80.45
TM-750	TM-750X	3/4	3/8	.0045	2-1/2	.156	6	7 - 16	91.75	102.90
TM-001	TM-001X	1	1/2	.009	3	.187	7	5 - 12	119.80	141.25

# THREAD MILLS



Shank Diameter                    -.0001 to -.0002"  
 Cutter Diameter                 +.000-.010"  
 Overall Length                   ±1/32"

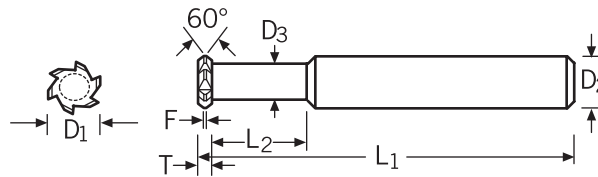


Designed for milling precision I.D. and O.D. threads in all types of steels, non-ferrous metals and exotic materials.

Equally effective in laminated plastics, fiberglass and composites used in the aircraft industry.

Thread form generated is American Standard thread.

Minimum pitch listed is for an internal thread.



TOOL NUMBER	COATED TOOL NUMBER	CUTTER DIA. D <sub>1</sub>	SHANK DIA. D <sub>2</sub>	NECK DIA. D <sub>3</sub>	FLAT F	OAL L <sub>1</sub>	NECK LENGTH L <sub>2</sub>	THICKNESS T	NO. OF FLUTES	T.P.I. RANGE	PRICE EACH	ALTN COATED PRICE EACH
TM-060-4	TM-060-4X	.060		.030			1/4			56 - 80	48.60	51.00
TM-060-6	TM-060-6X	.060		.030			3/8			56 - 80	48.60	51.00
TM-080-4	TM-080-4X	.080		.035			1/4			40 - 64	45.55	47.95
TM-080-8	TM-080-8X	.080	1/8	.035		1-1/2	1/2	.032	2	40 - 64	45.55	47.95
TM-100-6	TM-100-6X	.100		.050			3/8			32 - 64	39.35	41.75
TM-100-8	TM-100-8X	.100		.050			1/2			32 - 64	39.35	41.75
TM-100-10	TM-100-10X	.100		.050			5/8			32 - 64	39.35	41.75
TM-120-6	TM-120-6X	.120		.070			3/8	.032		32 - 56		
TM-120-8	TM-120-8X	.120		.070			1/2	.032		32 - 56		
TM-120-10	TM-120-10X	.120	3/16	.070	.001	2	5/8	.032	3	32 - 56	46.50	49.85
TM-140-8	TM-140-8X	.140		.075			1/2	.045		24 - 56		
TM-140-12	TM-140-12X	.140		.075			3/4	.045		24 - 56		
TM-180-8	TM-180-8X	.180	1/4	.100		2-1/2	1/2	.060		18 - 56	54.70	59.55
TM-180-12	TM-180-12X	.180	1/4	.100		2-1/2	3/4	.060		18 - 56	54.70	59.55
TM-180-16	TM-180-16X	.180	1/4	.100	.002	2-1/2	1	.060	4	18 - 56	54.70	59.55
TM-250-16	TM-250-16X	.250	1/4	.100		3-1/2	1	.065		16 - 48	54.70	59.55
TM-250-24	TM-250-24X	.240	5/16	.150		3-1/2	1-1/2	.065		16 - 48	61.10	66.40
TM-290-16	TM-290-16X	.290	3/8	.190	.002		1	.075	4	14 - 40	67.95	75.40
TM-360-16	TM-360-16X	.360	3/8	.230	.002		1	.085	4	12 - 32	67.95	75.40
TM-490-16	TM-490-16X	.490	1/2	.300	.0035		1	.095	5	11 - 32	78.50	87.95
TM-490-20	TM-490-20X	.490	1/2	.300	.0035	4	1-1/4	.095	5	11 - 32	78.50	87.95
TM-600-16	TM-600-16X	.600	5/8	.420	.004		1	.100	6	10 - 32	97.60	108.20
TM-600-20	TM-600-20X	.600	5/8	.420	.004		1-1/4	.100	6	10 - 32	97.60	108.20
TM-720-20	TM-720-20X	.720		.420	.0045		1-1/4	.200				
TM-720-32	TM-720-32X	.720	3/4	.420	.0045	4	2	.200	6	5 - 12	112.15	124.85
TM-720-40	TM-720-40X	.720		.420	.0045		2-1/2	.200				



super carbide tools

## Coated Helical Flute Thread Mills UN Threads



For programming and technical assistance, go to [www.micro100.com](http://www.micro100.com) to download our "Thread Mill Auto Assist" program, or call us to obtain your free disk.

Shank Diameter                    -.0001 to -.0002"  
Cutter Diameter                   ±.0005"  
Length of Cut                     +.050 to .000"  
Overall Length                   ±.015"  
T.I.R. Maximum                   .0005"

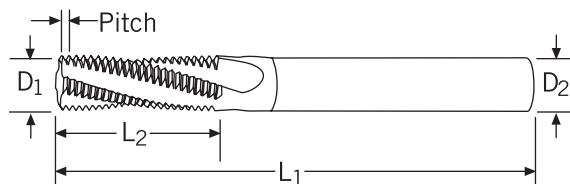
Helical flute design for reduced cutting forces, smoother cuts, longest tool life, and maximum thread milling performance.

100% thread form; superior threads vs. tapping.

Cuts right hand and left hand high quality threads.

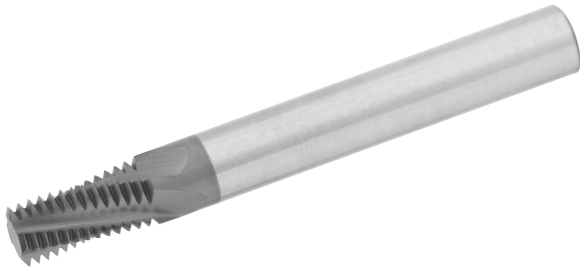
Suitable for all types of materials, especially heat treated and difficult to machine workpiece metals.

Uncoated thread mills are also available from stock.



TOOL NUMBER	MINIMUM THREAD & PITCH	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	LENGTH OF CUT L <sub>2</sub>	FLUTES	AITIN COATED PRICE EACH	
TM-112-40X	4-40	.080	1/4	2	3/16	2	140.30	
TM-138-32X	6-32	.100		2	1/4	2	140.30	
TM-164-32X	8-32	.115		2	1/4	3	140.30	
TM-190-24X	10-24	.120		2	5/16	3	147.00	
TM-190-28X	10-28	.120		2	5/16	3	147.00	
TM-190-32X	10-32	.120		2	5/16	3	147.00	
TM-250-20X	1/4-20	.180		2-1/2	1/2	3	154.70	
TM-250-28X	1/4-28	.180		2-1/2	1/2	3	154.70	
TM-312-18X	5/16-18	.235		1/4	2-1/2	5/8	3	168.80
TM-312-24X	5/16-24	.235		1/4	2-1/2	5/8	3	168.80
TM-375-16X	3/8-16	.285	5/16	2-1/2	3/4	4	205.25	
TM-375-24X	3/8-24	.285	5/16	2-1/2	3/4	4	205.25	
TM-437-14X	7/16-14	.305	5/16	2-1/2	3/4	4	205.25	
TM-437-20X	7/16-20	.335	3/8	3	7/8	4	215.25	
TM-500-13X	1/2-13	.350	3/8	3	7/8	4	215.25	
TM-562-12X	9/16-12	.370	3/8	3	7/8	4	215.25	
TM-562-18X	9/16-18	.370	3/8	3	7/8	4	215.25	
TM-625-11X	5/8-11	.470	1/2	4	1-1/4	4	250.45	
TM-750-10X	3/4-10	.495	1/2		1-1/4		250.45	
TM-750-12X	3/4-12	.495	1/2		1-1/4		250.45	
TM-750-16X	3/4-16	.495	1/2		1-1/4		250.45	
TM-875-09X	7/8- 9	.620	5/8		1-3/8		270.25	
TM-875-14X	7/8-14	.490	1/2		1-1/4		250.45	
TM-001-08X	1"- 8	.620	5/8		1-3/8		270.25	

## Coated Helical Flute Thread Mills NPT & NPTF Threads



For programming and technical assistance, go to [www.micro100.com](http://www.micro100.com) to download our "Thread Mill Auto Assist" program, or call us to obtain your free disk.

Shank Diameter	-.0001 to -.0002"
Cutter Diameter	±.0005"
Length of Cut	+.050 to .000"
Overall Length	±.015"
T.I.R. Maximum	.0005"

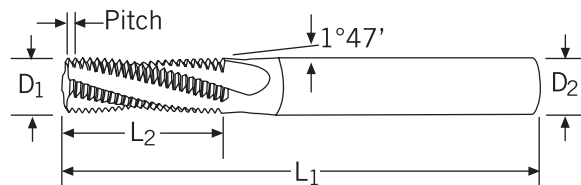
Helical flute design for reduced cutting forces, smoother cuts, longest tool life, and maximum thread milling performance.

100% thread form; superior threads vs. tapping.

Cuts right hand and left hand high quality threads.

Suitable for all types of materials, especially heat treated and difficult to machine workpiece metals.

Uncoated thread mills are also available from stock.



TOOL NUMBER	MINIMUM THREAD	PITCH	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	LENGTH OF CUT L <sub>2</sub>	FLUTES	AITiN COATED PRICE EACH
TM-27NPTX	1/16 & 1/8 NPT	27	.245	1/4	2-1/2	0.437	3	169.40
TM-18NPTX	1/4 & 3/8 NPT	18	.305	5/16	2-1/2	0.625	4	205.80
TM-14NPTX	1/2 & 3/4 NPT	14	.495	1/2	4	0.875	4	212.80
TM-11NPTX	1" & 2" NPT	11.5	.620	5/8	4	1.125	4	280.00
TM-27NPTFX	1/16 & 1/8 NPTF	27	.245	1/4	2-1/2	0.437	3	191.75
TM-18NPTFX	1/4 & 3/8 NPTF	18	.305	5/16	2-1/2	0.625	4	218.80
TM-14NPTFX	1/2 & 3/4 NPTF	14	.495	1/2	4	0.875	4	242.55
TM-11NPTFX	1" & 2" NPTF	11.5	.620	5/8	4	1.125	4	318.70

## Coated Helical Flute Thread Mills Metric Threads



For programming and technical assistance, go to [www.micro100.com](http://www.micro100.com) to download our "Thread Mill Auto Assist" program, or call us to obtain your free disk.

Shank Diameter	-0.0025 to 0.002 mm
Cutter Diameter	3.00 to 6.00 mm +0.000 -0.018 mm
	7.62 to 9.40 mm +0.000 -0.022 mm
	11.94 to 15.75 mm +0.000 -0.027 mm
T.I.R. Maximum	0.012 mm

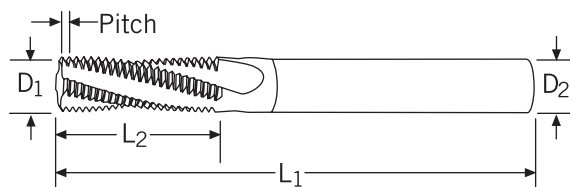
Helical flute design for reduced cutting forces, smoother cuts, longest tool life, and maximum thread milling performance.

100% thread form; superior threads vs. tapping.

Cuts right hand and left hand high quality threads.

Suitable for all types of materials, especially heat treated and difficult to machine workpiece metals.

Uncoated thread mills are also available from stock.

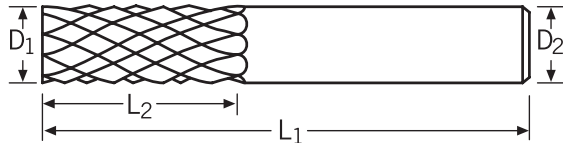


TOOL NUMBER	MINIMUM THREAD	PITCH, mm	CUTTER DIAMETER D <sub>1</sub> , mm	SHANK DIAMETER D <sub>2</sub> , mm	OVERALL LENGTH L <sub>1</sub> , mm	LENGTH OF CUT L <sub>2</sub> , mm	FLUTES	AITiN COATED PRICE EACH
TMM-045075X	M4.5	0.75	3.00			6		141.10
TMM-050080X	M5.0	0.80	3.00			8		141.10
TMM-060100X	M6.0	1.00	4.30	6	57	12	3	155.60
TMM-080075X	M8.0	0.75	6.00			16		194.95
TMM-080125X	M8.0	1.25	6.00			16		194.95
TMM-100150X	M10.0	1.50	7.62	8	75	20		223.15
TMM-120100X	M12.0	1.00	9.15	10	100	22		229.95
TMM-120175X	M12.0	1.75	9.15	10	100	22		229.95
TMM-140150X	M14.0	1.50	9.40	10	100	22		243.40
TMM-160200X	M16.0	2.00	11.94	12	100	32	4	276.40
TMM-180150X	M18.0	1.50	11.94	12	100	32		276.40
TMM-200250X	M20.0	2.50	11.94	12	100	32		276.40
TMM-240300X	M24.0	3.00	15.75	16	100	35		324.50

## Diamond-Cut Fluting Pattern



Style A Shown



Ideal for routing printed circuit boards made from glass fibre, epoxy resin and composites used in the aircraft industry.

Equally effective for routing plastic and other non-metallic materials.

The diamond-cut fluting pattern provides smooth, rapid cutting and leaves a clean edge.

STYLE A NO END CUT	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
RDA-10 RDA-20 RDA-30	1/16 3/32 1/8	1/8	1-1/2	3/16 3/8 1/2	9.50
RDA-40 RDA-50	3/16	3/16 1/4	2	5/8	13.45 15.25
RDA-60 RDA-70 RDA-80	1/4	1/4	2 2-1/2 3	3/4 3/4 1	16.35 17.40 22.80
RDA-90 RDA-100 RDA-110	5/16 3/8 1/2	5/16 3/8 1/2	2-1/2 2-1/2 3	1	30.40 40.30 55.50



Style B



Style C



Style D



Style E

STYLE B BURR TYPE END CUT	STYLE C END MILL TYPE END CUT	STYLE D 135° DRILL POINT	STYLE E FISHTAIL POINT	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
RDB-10 RDB-20 RDB-30	RDC-10 RDC-20 RDC-30	RDD-10 RDD-20 RDD-30	RDE-10 RDE-20 RDE-30	1/16 3/32 1/8	1/8	1-1/2	3/16 3/8 1/2	11.30
RDB-40 RDB-50	RDC-40 RDC-50	RDD-40 RDD-50	RDE-40 RDE-50	3/16 3/16	3/16 1/4	2	5/8	16.15 18.25
RDB-60 RDB-70 RDB-80	RDC-60 RDC-70 RDC-80	RDD-60 RDD-70 RDD-80	RDE-60 RDE-70 RDE-80	1/4 1/4 1/4	1/4	2 2-1/2 3	3/4 3/4 1	19.50 20.80 27.30
RDB-90 RDB-100 RDB-110	RDC-90 RDC-100 RDC-110	RDD-90 RDD-100 RDD-110	RDE-90 RDE-100 RDE-110	5/16 3/8 1/2	5/16 3/8 1/2	2-1/2 2-1/2 3	1	36.40 48.30 63.90



## Single Flute Routers for Aluminum



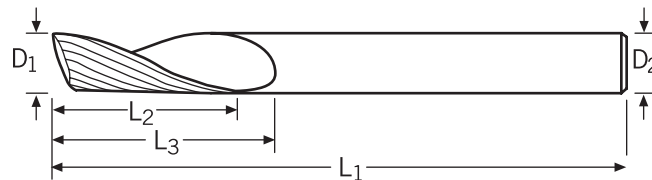
Shank Diameter            -.0001 to -.0002"  
 Cutter Diameter           +.000 -.002"  
 T.I.R. Maximum           .0005"

High speed, solid carbide routers for aluminum and non-ferrous cutting applications.

Optimized rake and clearance angles produce highest material removal rates and improved surface finishes.

Innovative single flute end mill geometry avoids chip melting and chip re-welding problems.

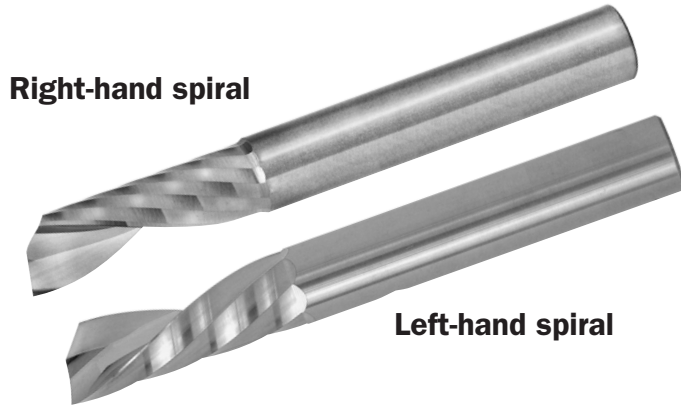
Unique open flute design with polished, mirror-like flute finish.



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TOOL NUMBER	CUTTER DIAMETER	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	PRICE EACH
	D <sub>1</sub>	D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	
SFA-062-22	1/16	1/8	1-1/2	1/4	22.30
SFA-125-22	1/8	1/8	1-1/2	1/4	19.65
SFA-125-24	1/8	1/8	1-1/2	1/2	19.65
SFA-187-33	3/16	3/16	2	1/2	21.75
SFA-187-35	3/16	3/16	2	5/8	21.75
SFA-062-42	1/16	1/4	2	1/4	26.20
SFA-125-42	1/8		2	1/4	22.95
SFA-125-44	1/8		2	1/2	22.95
SFA-156-45	5/32		2	5/8	22.95
SFA-187-44	3/16		2	1/2	22.95
SFA-187-45	3/16		2	5/8	22.95
SFA-218-46	7/32		2-1/2	3/4	22.95
SFA-250-43	1/4		2-1/2	3/8	22.95
SFA-250-46	1/4		2-1/2	3/4	22.95
SFA-250-410	1/4		3	1-1/4	25.90
SFA-375-69	3/8	3/8	3	1-1/8	34.40
SFA-500-88	1/2	1/2		1	57.00
SFA-500-812	1/2	1/2		1-1/2	60.00

## Single Flute Routers for Plastic Right- & Left- Hand Spiral, Right-Hand Cut



Shank Diameter            -.0001 to -.0002"  
Cutter Diameter           +.000 -.002"  
T.I.R. Maximum           .0005"

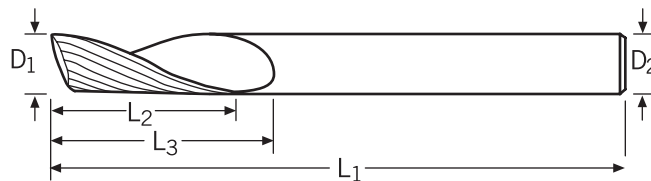
High speed, solid carbide routers for plastic and composite materials.

Optimized rake and clearance angles produce highest material removal rates and improved surface finishes.

Innovative "O" flute design avoids chip melting and chip re-welding problems and evacuates chips efficiently.

Open flute geometry with polished, mirror-like flute finish.

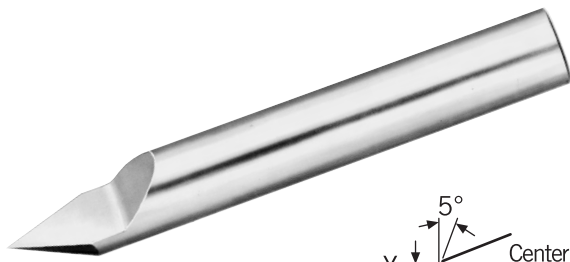
Left-hand spiral routers are ideal for driving chips downward and when cutting forces on multi-layer workpieces require a down-cut operation.



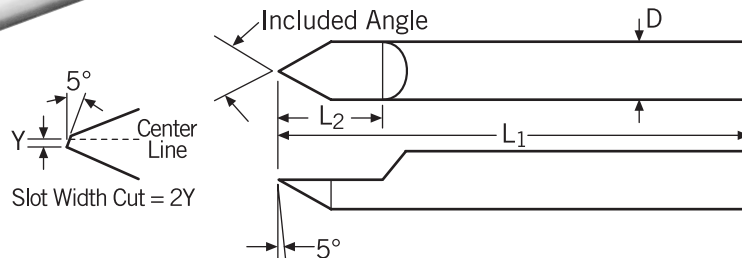
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FROM  
STOCK**

RIGHT-HAND SPIRAL TOOL NO.	LEFT-HAND SPIRAL TOOL NO.	CUTTER DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
SFP-062-22	SFL-062-22	1/16	1/8	1-1/2	1/4	22.30
SFP-125-22	SFL-125-22	1/8	1/8	1-1/2	1/4	19.65
SFP-125-24	SFL-125-24	1/8	1/8	1-1/2	1/2	19.65
SFP-187-33	SFL-187-33	3/16	3/16	2	1/2	21.75
SFP-187-35	SFL-187-35	3/16	3/16	2	5/8	21.75
SFP-062-42	SFL-062-42	1/16		2	1/4	26.20
SFP-125-42	SFL-125-42	1/8		2	1/4	22.95
SFP-125-44	SFL-125-44	1/8		2	1/2	22.95
SFP-156-45	SFL-156-45	5/32		2	5/8	22.95
SFP-187-44	SFL-187-44	3/16	1/4	2	1/2	22.95
SFP-187-45	SFL-187-45	3/16	1/4	2	5/8	22.95
SFP-218-46	SFL-218-46	7/32		2-1/2	3/4	22.95
SFP-250-43	SFL-250-43	1/4		2-1/2	3/8	22.95
SFP-250-46	SFL-250-46	1/4		2-1/2	3/4	22.95
SFP-250-410	SFL-250-410	1/4		3	1-1/4	25.90
SFP-375-69	SFL-375-69	3/8	3/8		1-1/8	34.40
SFP-500-88	SFL-500-88	1/2	1/2	3	1	57.00
SFP-500-812	SFL-500-812	1/2	1/2		1-1/2	60.00

## Split-End Engraving Tools One End Split — Relieved for Right-Hand Cut



Shank Diameter  $-.0001$  to  $-.0002$ " finish ground  
Split Tolerance  $+.001$ – $.000$ " of tool center  
Offset Point  $\pm .001$ "



METRIC  
SIZES  
ALSO  
FROM  
STOCK

### Conical Point — 30° Included Angle

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RTC-125-1	1/8	1-1/2	3/8	.004	16.20	14.95	12.95	11.95	11.20
RTC-187-1	3/16	2	7/16		19.25	18.00	16.00	15.00	14.25
RTC-250-1	1/4	2-1/2	1/2		22.25	21.00	19.00	18.00	17.25
RTC-312-1	5/16	2-1/2	1/2		32.90	31.65	29.65	28.65	27.90
RTC-375-1	3/8	2-1/2	1/2		42.40	41.15	39.15	38.15	37.40
RTC-500-1	1/2	3	5/8		62.55	61.30	59.30	58.30	57.55

### Conical Point — 60° Included Angle

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RSC-125-1	1/8	1-1/2	3/8	.004	16.20	14.95	12.95	11.95	11.20
RSC-187-1	3/16	2	7/16		19.25	18.00	16.00	15.00	14.25
RSC-250-1	1/4	2-1/2	1/2		22.25	21.00	19.00	18.00	17.25
RSC-312-1	5/16	2-1/2	1/2		32.90	31.65	29.65	28.65	27.90
RSC-375-1	3/8	2-1/2	1/2		42.40	41.15	39.15	38.15	37.40
RSC-500-1	1/2	3	5/8		62.55	61.30	59.30	58.30	57.55

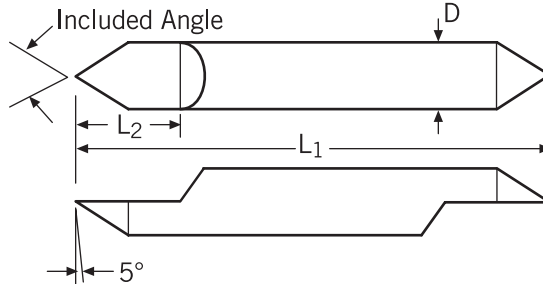
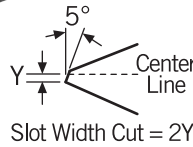
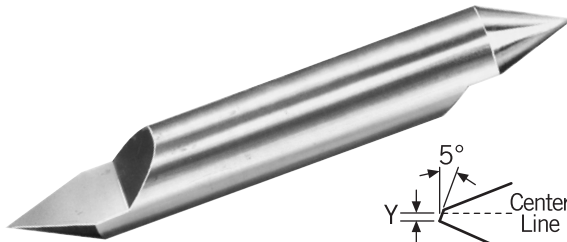
### Conical Point — 90° Included Angle; suitable for chamfering

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RNC-125-1	1/8	1-1/2	3/8	.004	16.20	14.95	12.95	11.95	11.20
RNC-187-1	3/16	2	7/16		19.25	18.00	16.00	15.00	14.25
RNC-250-1	1/4	2-1/2	1/2		22.25	21.00	19.00	18.00	17.25
RNC-312-1	5/16	2-1/2	1/2		32.90	31.65	29.65	28.65	27.90
RNC-375-1	3/8	2-1/2	1/2		42.40	41.15	39.15	38.15	37.40
RNC-500-1	1/2	3	5/8		62.55	61.30	59.30	58.30	57.55

Other sizes also available upon request.

## Split-End Engraving Tools

### Two Ends Split — Relieved for Right-Hand Cut



Shank Diameter  $-.0001$  to  $-.0002$ " finish ground  
 Split Tolerance  $+.001$ – $.000$ " of tool center  
 Offset Point  $\pm .001$ "

METRIC  
SIZES  
ALSO  
FROM  
STOCK

### Conical Point — 30° Included Angle

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RTC-125-2	1/8	2	3/8	.004	19.55	18.30	16.30	15.30	14.55
RTC-187-2	3/16	2	7/16		23.60	22.35	20.35	19.35	18.60
RTC-250-2	1/4	2-1/2	1/2		27.90	26.65	24.65	26.35	22.90
RTC-312-2	5/16	2-1/2	1/2		41.35	40.10	38.10	37.10	36.35
RTC-375-2	3/8	2-1/2	1/2		53.00	51.75	49.75	48.75	48.00
RTC-500-2	1/2	3	5/8		75.55	74.30	72.30	71.30	70.55

### Conical Point — 60° Included Angle

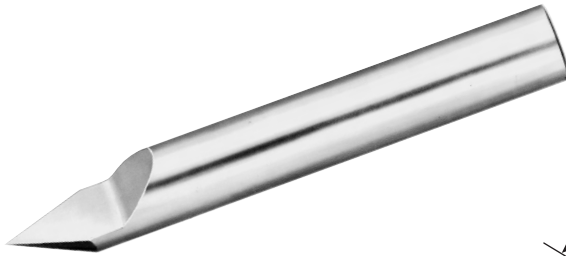
TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RSC-125-2	1/8	2	3/8	.004	19.55	18.30	16.30	15.30	14.55
RSC-187-2	3/16	2	7/16		23.60	22.35	20.35	19.35	18.60
RSC-250-2	1/4	2-1/2	1/2		27.90	26.65	24.65	23.65	22.90
RSC-312-2	5/16	2-1/2	1/2		41.35	40.10	38.10	37.10	36.35
RSC-375-2	3/8	2-1/2	1/2		53.00	51.75	49.75	48.75	48.00
RSC-500-2	1/2	3	5/8		75.55	74.30	72.30	71.30	70.55

### Conical Point — 90° Included Angle; suitable for chamfering

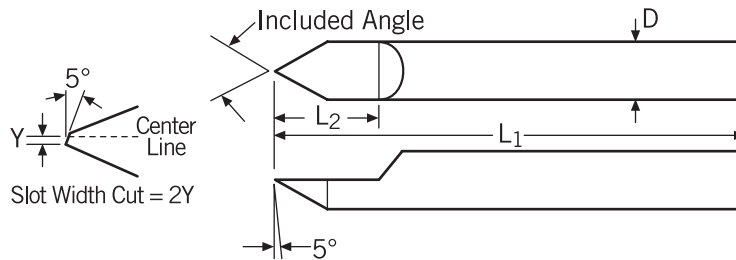
TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RNC-125-2	1/8	2	3/8	.004	19.55	18.30	16.30	15.30	14.55
RNC-187-2	3/16	2	7/16		23.60	22.35	20.35	19.35	18.60
RNC-250-2	1/4	2-1/2	1/2		27.90	26.65	24.65	23.65	22.90
RNC-312-2	5/16	2-1/2	1/2		41.35	40.10	38.10	37.10	36.35
RNC-375-2	3/8	2-1/2	1/2		53.00	51.75	49.75	48.75	48.00
RNC-500-2	1/2	3	5/8		75.55	74.30	72.30	71.30	70.55

Other sizes also available upon request.

## Split-End Engraving Tools One End Split — Relieved for Right-Hand Cut



Shank Diameter  $-.0001$  to  $-.0002$ " finish ground  
 Split Tolerance  $+.001$ – $.000$ " of tool center  
 Offset Point  $\pm .001$ "



METRIC  
SIZES  
ALSO  
FROM  
STOCK

### Conical Point — 30° Included Angle

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RTC-250-120 RTC-250-130 RTC-250-145 RTC-250-160	1/4	2-1/2	1/2	.010 .015 .022 .030	22.25	21.00	19.00	18.00	17.25

### Conical Point — 60° Included Angle

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RSC-250-120 RSC-250-130 RSC-250-145 RSC-250-160	1/4	2-1/2	3/8	.010 .015 .022 .030	22.25	21.00	19.00	18.00	17.25

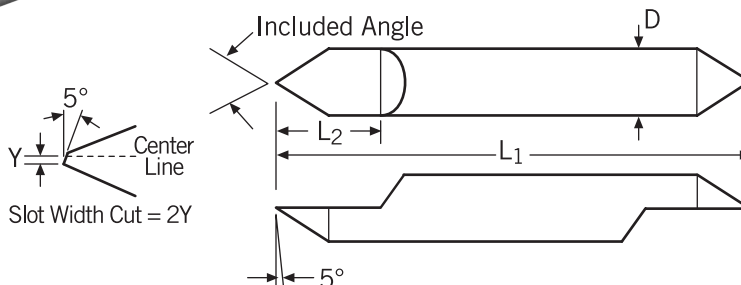
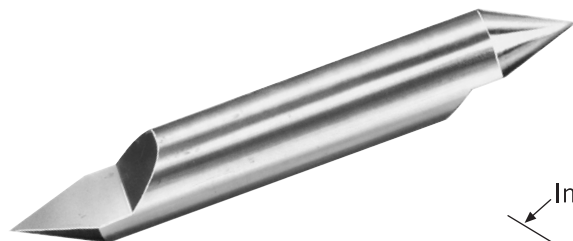
### Conical Point — 90° Included Angle; suitable for chamfering

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RNC-250-120 RNC-250-130 RNC-250-145 RNC-250-160	1/4	2-1/2	3/8	.010 .015 .022 .030	22.25	21.00	19.00	18.00	17.25

Other sizes also available upon request.

## Split-End Engraving Tools Two Ends Split — Relieved for Right-Hand Cut

Shank Diameter  $-.0001$  to  $-.0002$ " finish ground  
 Split Tolerance  $+.001$ – $.000$ " of tool center  
 Offset Point  $\pm .001$ "



METRIC  
SIZES  
ALSO  
FROM  
STOCK

### Conical Point — 30° Included Angle

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RTC-250-220 RTC-250-230 RTC-250-245 RTC-250-260	1/4	2-1/2	1/2	.010 .015 .022 .030	27.90	26.65	24.65	23.65	22.90

### Conical Point — 60° Included Angle

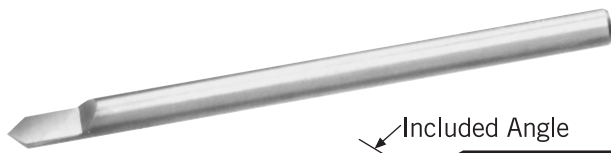
TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RSC-250-220 RSC-250-230 RSC-250-245 RSC-250-260	1/4	2-1/2	3/8	.010 .015 .022 .030	27.90	26.65	24.65	23.65	22.90

### Conical Point — 90° Included Angle; suitable for chamfering

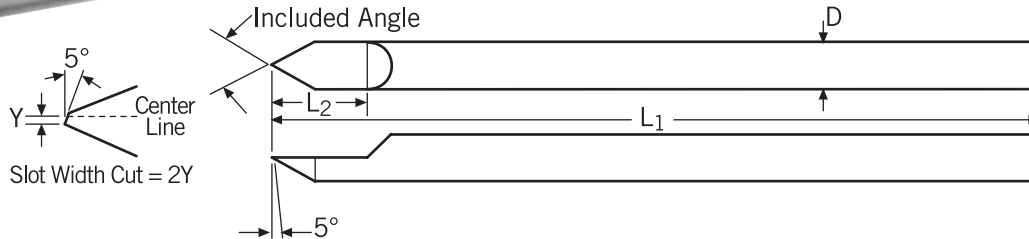
TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RNC-250-220 RNC-250-230 RNC-250-245 RNC-250-260	1/4	2-1/2	3/8	.010 .015 .022 .030	27.90	26.65	24.65	23.65	22.90

Other sizes also available upon request.

## Extended Length Split-End Engraving Tools One End Split — Relieved for Right-Hand Cut



Shank Diameter  $-.0001$  to  $-.0002$ " finish ground  
Split Tolerance  $+.001$ – $.000$ " of tool center  
Offset Point  $\pm .001$ "



METRIC  
SIZES  
ALSO  
FROM  
STOCK

### Conical Point — 30° Included Angle

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RTC-125-13	1/8	3	3/8	.004	18.10	16.85	14.85	13.85	13.10
RTC-187-13	3/16	3	7/16		20.00	18.75	16.75	15.75	15.00
RTC-250-14	1/4	4	1/2		27.70	26.45	24.45	23.45	22.70
RTC-312-14	5/16	4	1/2		41.35	40.10	38.10	37.10	36.35
RTC-375-14	3/8	4	1/2		53.70	52.45	50.45	49.45	48.70
RTC-500-14	1/2	4	5/8		83.40	82.15	80.15	79.15	78.40

### Conical Point — 60° Included Angle

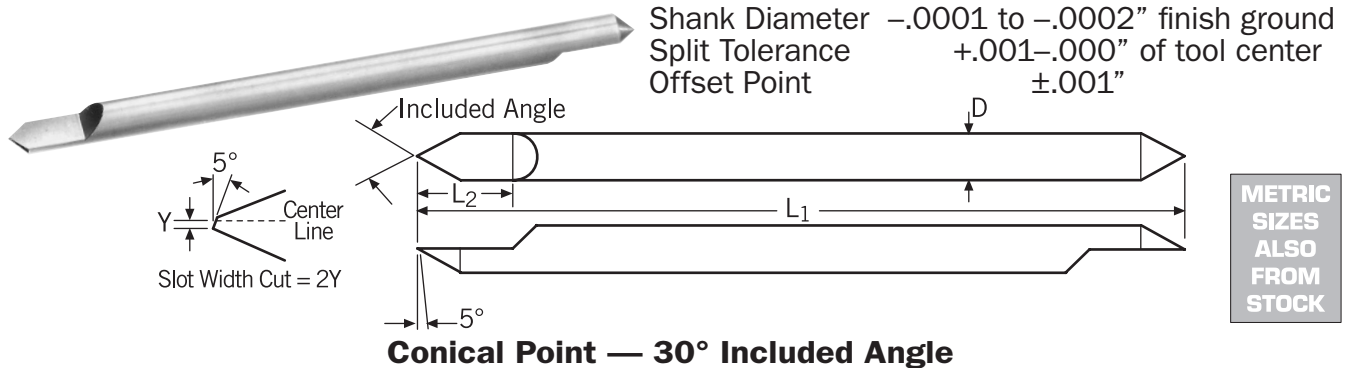
TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RSC-125-13	1/8	3	3/8	.004	18.10	16.85	14.85	13.85	13.10
RSC-187-13	3/16	3	7/16		20.00	18.75	16.75	15.75	15.00
RSC-250-14	1/4	4	1/2		27.70	26.45	24.45	23.45	22.70
RSC-312-14	5/16	4	1/2		41.35	40.10	38.10	37.10	36.35
RSC-375-14	3/8	4	1/2		53.70	52.45	50.45	49.45	48.70
RSC-500-14	1/2	4	5/8		83.40	82.15	80.15	79.15	78.40

### Conical Point — 90° Included Angle; suitable for chamfering

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RNC-125-13	1/8	3	3/8	.004	18.10	16.85	14.85	13.85	13.10
RNC-187-13	3/16	3	7/16		20.00	18.75	16.75	15.75	15.00
RNC-250-14	1/4	4	1/2		27.70	26.45	24.45	23.45	22.70
RNC-312-14	5/16	4	1/2		41.35	40.10	38.10	37.10	36.35
RNC-375-14	3/8	4	1/2		53.70	52.45	50.45	49.45	48.70
RNC-500-14	1/2	4	5/8		83.40	82.15	80.15	79.15	78.40

Other sizes also available upon request.

## Extended Length Split-End Engraving Tools Two Ends Split — Relieved for Right-Hand Cut



TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RTC-125-23	1/8	3	3/8	.004	22.45	21.20	19.20	18.20	17.45
RTC-187-23	3/16	3	7/16		27.00	25.75	23.75	22.75	22.00
RTC-250-24	1/4	4	1/2		35.95	34.70	32.70	31.70	30.95
RTC-312-24	5/16	4	1/2		50.40	49.15	47.15	46.15	45.40
RTC-375-24	3/8	4	1/2		65.05	63.80	61.80	60.80	60.05
RTC-500-24	1/2	4	5/8		93.25	92.00	90.00	89.00	88.25

### Conical Point — 60° Included Angle

TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RSC-125-23	1/8	3	3/8	.004	22.45	21.20	19.20	18.20	17.45
RSC-187-23	3/16	3	7/16		27.00	25.75	23.75	22.75	22.00
RSC-250-24	1/4	4	1/2		35.95	34.70	32.70	31.70	30.95
RSC-312-24	5/16	4	1/2		50.40	49.15	47.15	46.15	45.40
RSC-375-24	3/8	4	1/2		65.05	63.80	61.80	60.80	60.05
RSC-500-24	1/2	4	5/8		93.25	92.00	90.00	89.00	88.25

### Conical Point — 90° Included Angle; suitable for chamfering

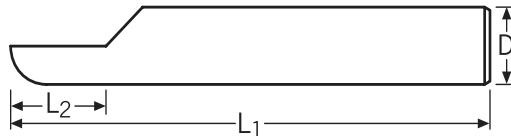
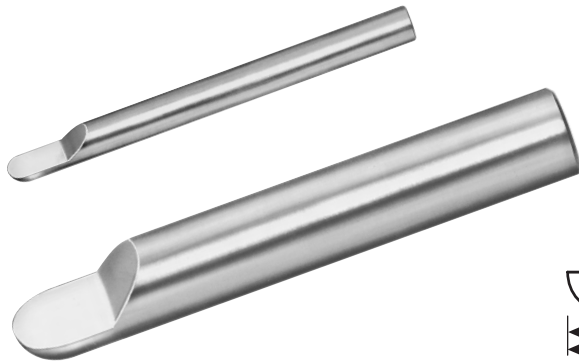
TOOL NUMBER	DIMENSIONS				QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	OFFSET POINT Y	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RNC-125-23	1/8	3	3/8	.004	22.45	21.20	19.20	18.20	17.45
RNC-187-23	3/16	3	7/16		27.00	25.75	23.75	22.75	22.00
RNC-250-24	1/4	4	1/2		35.95	34.70	32.70	31.70	30.95
RNC-312-24	5/16	4	1/2		50.40	49.15	47.15	46.15	45.40
RNC-375-24	3/8	4	1/2		65.05	63.80	61.80	60.80	60.05
RNC-500-24	1/2	4	5/8		93.25	92.00	90.00	89.00	88.25

Other sizes also available upon request.



## Split-End Radius Tools Full Radius, Relieved for Right-Hand Cut

Shank Diameter  $-.0001$  to  $-.0002$ " finish ground  
 Split Tolerance  $+.001-.000$ " of tool center  
 Split Length in proportion to length of tool.

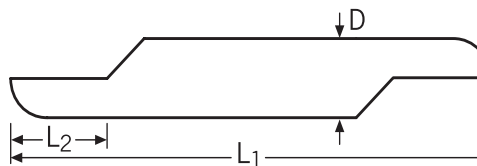
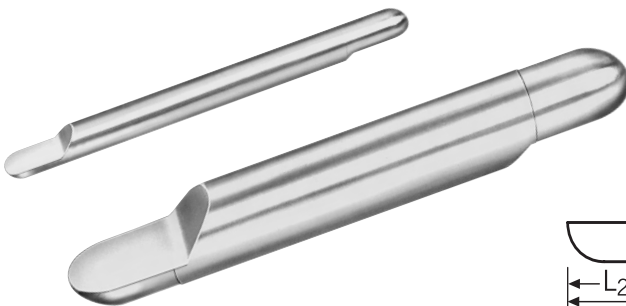


METRIC  
SIZES  
ALSO  
FROM  
STOCK

**One End Split**

TOOL NUMBER	DIMENSIONS			QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RSF-125-1	1/8	1-1/2	3/8	16.20	14.95	12.95	11.95	11.20
RSF-187-1	3/16	2	3/8	19.55	18.30	16.30	15.30	14.55
RSF-250-1	1/4	2-1/2	3/8	22.50	21.25	19.25	18.25	17.50
RSF-312-1	5/16	2-1/2	1/2	33.30	32.05	30.05	29.05	28.30
RSF-375-1	3/8	2-1/2	1/2	43.00	41.75	39.75	38.75	38.00
RSF-500-1	1/2	3	5/8	63.45	62.20	60.20	59.20	58.45

Other sizes also available.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

**Two Ends Split**

TOOL NUMBER	DIMENSIONS			QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RSF-125-2	1/8	2	3/8	20.10	18.85	16.85	15.85	15.10
RSF-187-2	3/16	2	3/8	24.35	23.10	21.10	20.10	19.35
RSF-250-2	1/4	2-1/2	3/8	29.00	27.75	25.75	24.75	24.00
RSF-312-2	5/16	2-1/2	1/2	43.00	41.75	39.75	38.75	38.00
RSF-375-2	3/8	2-1/2	1/2	55.20	53.95	51.95	50.95	50.20
RSF-500-2	1/2	3	5/8	78.70	77.45	75.45	74.45	73.70

Other sizes also available.

## Extended Length Split-End Radius Tools Full Radius, Relieved for Right-Hand Cut

Shank Diameter  $-.0001$  to  $-.0002$ " finish ground  
Split Tolerance  $+.001$ – $.000$ " of tool center

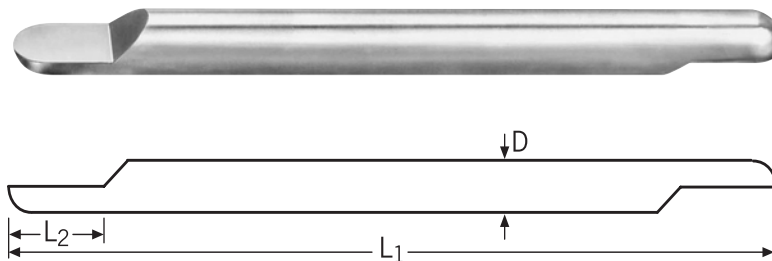


METRIC  
SIZES  
ALSO  
FROM  
STOCK

### One End Split

TOOL NUMBER	DIMENSIONS			QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RSF-125-13	1/8	3	3/8	18.10	16.85	14.85	13.85	13.10
RSF-187-13	3/16	3	3/8	20.20	18.95	16.98	15.95	15.20
RSF-250-14	1/4	4	3/8	27.80	26.55	24.55	23.55	22.80
RSF-312-14	5/16	4	1/2	41.50	40.25	38.25	37.25	36.50
RSF-375-14	3/8	4	1/2	53.95	52.70	50.70	49.70	48.95
RSF-500-14	1/2	4	5/8	83.80	82.55	80.55	79.55	78.80

Other sizes also available upon request.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

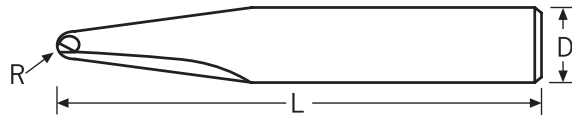
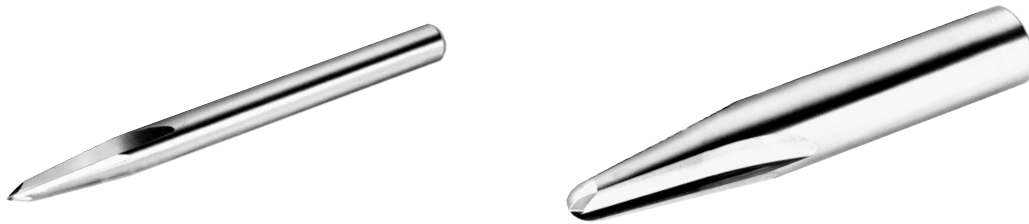
### Two Ends Split

TOOL NUMBER	DIMENSIONS			QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RSF-125-23	1/8	3	3/8	22.15	20.90	18.90	17.90	17.15
RSF-187-23	3/16	3	3/8	25.20	23.95	21.95	20.95	20.20
RSF-250-24	1/4	4	3/8	34.95	33.70	31.70	30.70	29.95
RSF-312-24	5/16	4	1/2	51.05	49.80	47.80	46.80	46.05
RSF-375-24	3/8	4	1/2	67.50	66.25	64.25	63.25	62.50
RSF-500-24	1/2	4	5/8	95.90	94.65	92.65	91.65	90.90

Other sizes also available upon request.

## Die Sinking Cutters Center Cutting — Single End — 14° Included Angle

Shank Diameter            -.0001 to -.0002"  
 Radius                       +.003 -.000"  
 T.I.R. Maximum            .0005"

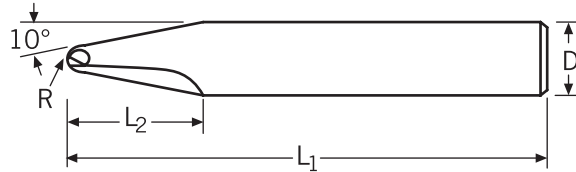
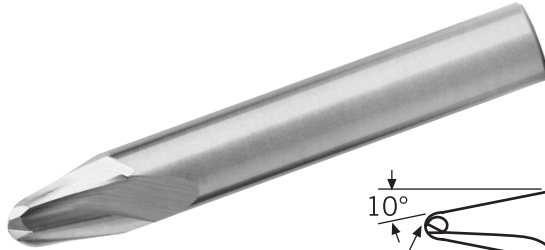


2-FLUTE TOOL NO.	SHANK DIAMETER D	OVERALL LENGTH L	RADIUS R	PRICE EACH
DSC-125	1/8	1-1/2	.030	19.40
DSC-156	5/32	2	.040	25.75
DSC-187	3/16	2	.046	27.25
DSC-250	1/4	2-1/2	.062	34.00
DSC-312	5/16	2-1/2	.070	42.55
DSC-375	3/8	2-1/2	.093	49.50
DSC-437	7/16	2-1/2	.109	66.00
DSC-500	1/2	3	.125	78.80

## Moldmaking Runner Cutters Single End — 12° Helix

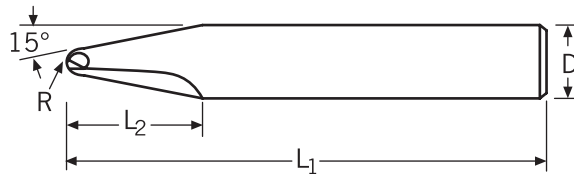
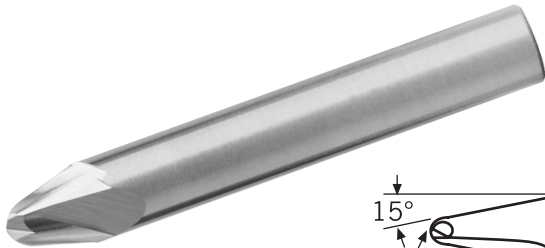
Shank Diameter  
Radius  
T.I.R. Maximum

-.0001 to -.0002"  
+.003 -.000"  
.0005"



**10° Runner Cutter — 20° Included Angle**

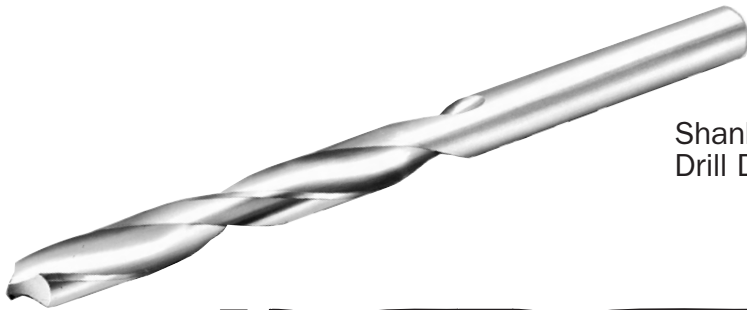
2-FLUTE TOOL NO.	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	RADIUS R	PRICE EACH
MRT-187-031	3/16	2	.383	1/32	32.15
MRT-187-046	3/16	2	.308	3/64	32.15
MRT-250-062	1/4	2-1/2	.414	1/16	35.65
MRT-250-078	1/4	2-1/2	.338	5/64	35.65
MRT-312-093	5/16	2-1/2	.437	3/32	43.30
MRT-312-109	5/16	2-1/2	.366	7/64	43.30
MRT-375-125	3/8	2-1/2	.468	1/8	45.55
MRT-500-156	1/2	3	.675	5/32	57.25



**15° Runner Cutter — 30° Included Angle**

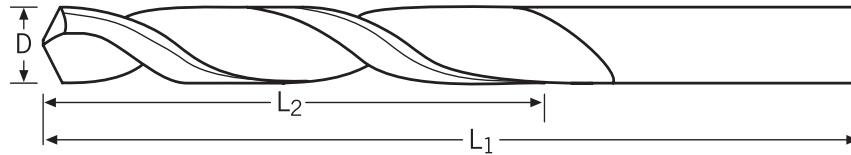
2-FLUTE TOOL NO.	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	RADIUS R	PRICE EACH
MRF-187-031	3/16	2	.262	1/32	32.15
MRF-187-046	3/16	2	.216	3/64	32.15
MRF-250-062	1/4	2-1/2	.287	1/16	35.65
MRF-250-078	1/4	2-1/2	.243	5/64	35.65
MRF-312-093	5/16	2-1/2	.313	3/32	43.30
MRF-312-109	5/16	2-1/2	.270	7/64	43.30
MRF-375-125	3/8	2-1/2	.341	1/8	45.55
MRF-500-156	1/2	3	.545	5/32	57.25

## Jobber Length Drills 118° Included Drill Point — 25° Spiral



Shank Diameter  
Drill Diameter

-.0001 to -.0002"  
+.000-.0005"



2-FLUTE TOOL NO.	DRILL DIAMETER D	DECIMAL EQUIVALENT	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	PRICE EACH
DR-031-2	1/32	.0312	1-1/4	1/2	9.70
DR-046-2	3/64	.0469	1-1/2	3/4	12.80
DR-062-2	1/16	.0625	1-1/2	3/4	13.10
DR-078-2	5/64	.0781	1-3/4	7/8	13.80
DR-093-2	3/32	.0938	2	1	15.15
DR-109-2	7/64	.1094	2-1/4	1-1/4	16.65
DR-125-2	1/8	.1250	2-1/4	1-1/4	17.55
DR-140-2	9/64	.1406	2-1/2	1-3/8	19.60
DR-156-2	5/32	.1562	2-1/2	1-3/8	21.70
DR-171-2	11/64	.1719	2-3/4	1-5/8	25.00
DR-187-2	3/16	.1875	2-3/4	1-5/8	25.90
DR-203-2	13/64	.2031	3	1-3/4	30.25
DR-218-2	7/32	.2188	3	1-3/4	32.50
DR-234-2	15/64	.2344	3-1/4	2	36.20
DR-250-2	1/4	.2500	3-1/4	2	38.40
DR-265-2	17/64	.2656	3-1/2	2-1/8	41.25
DR-281-2	9/32	.2812	3-1/2	2-1/8	44.40
DR-296-2	19/64	.2969	3-3/4	2-3/8	48.90
DR-312-2	5/16	.3125	3-3/4	2-3/8	51.05
DR-328-2	21/64	.3281	4	2-1/2	55.60
DR-343-2	11/32	.3438	4	2-1/2	61.45
DR-359-2	23/64	.3594	4-1/4	2-3/4	67.25
DR-375-2	3/8	.3750	4-1/4	2-3/4	72.65
DR-390-2	25/64	.3906	4-1/2	2-7/8	82.55
DR-406-2	13/32	.4062	4-1/2	2-7/8	91.70
DR-421-2	27/64	.4219	4-1/2	2-7/8	100.15
DR-437-2	7/16	.4375	4-1/2	2-7/8	108.20
DR-453-2	29/64	.4531	4-3/4	3	117.60
DR-468-2	15/32	.4688	4-3/4	3	125.65
DR-484-2	31/64	.4844	4-3/4	3	130.20
DR-500-2	1/2	.5000	4-3/4	3	134.80

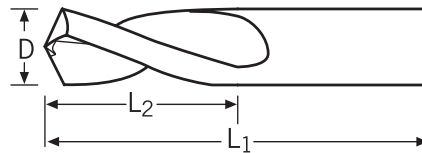
## Spotting and Centering Drills

82°, 90°, 100°, 120° Included Drill Point



Shank Diameter  
Drill Diameter

-.0001 to -.0002"  
+.000-.0005"

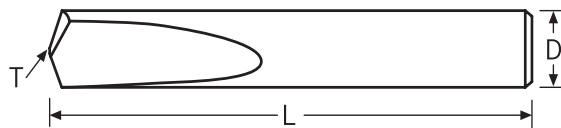
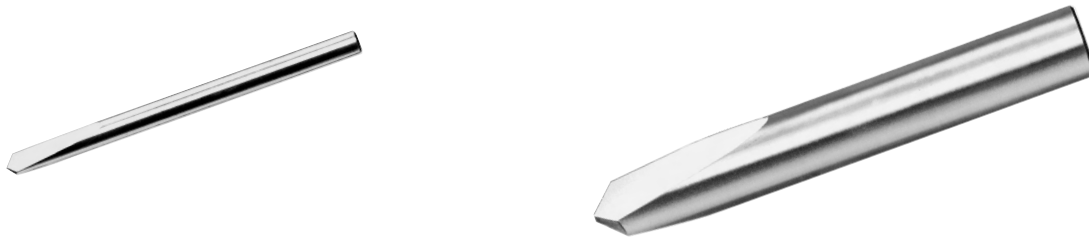


TOOL NUMBER	DRILL DIAMETER D	OVERALL LENGTH L <sub>1</sub>	FLUTE LENGTH L <sub>2</sub>	INCLUDED DRILL POINT	PRICE EACH
SPD-250-082 SPD-250-090 SPD-250-100 SPD-250-120	1/4	2-1/2	3/4	82° 90° 100° 120°	19.30
SPD-312-082 SPD-312-090 SPD-312-100 SPD-312-120	5/16	2-1/2	3/4	82° 90° 100° 120°	22.50
SPD-375-082 SPD-375-090 SPD-375-100 SPD-375-120	3/8	2-1/2	1	82° 90° 100° 120°	28.30
SPD-437-082 SPD-437-090 SPD-437-100 SPD-437-120	7/16	2-1/2	1	82° 90° 100° 120°	38.55
SPD-500-082 SPD-500-090 SPD-500-100 SPD-500-120	1/2	2-1/2	1	82° 90° 100° 120°	42.25
SPD-625-082 SPD-625-090 SPD-625-100 SPD-625-120	5/8	2-1/2	1-1/8	82° 90° 100° 120°	74.75
SPD-750-082 SPD-750-090 SPD-750-100 SPD-750-120	3/4	2-1/2	1-1/8	82° 90° 100° 120°	113.40
SPD-001-090 SPD-001-100 SPD-001-120	1	2-1/2	1-1/4	90° 100° 120°	171.95

## Spade Drills 118° Included Drill Point

Shank Diameter  
Drill Diameter

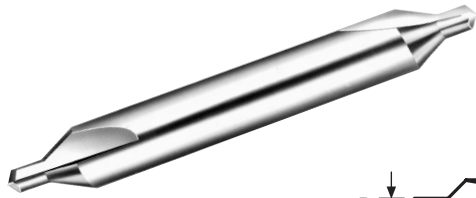
-.0001 to -.0002"  
+.000-.0005"



TOOL NUMBER	DRILL DIAMETER D	OVERALL LENGTH L	WEB THICKNESS T	INCLUDED ANGLE OF FLUTES	PRICE EACH
SD-031	1/32	1-1/4	.010	6°	10.85
SD-062	1/16	1-1/2	.012	10°	11.20
SD-093	3/32	1-1/2	.016	10°	11.50
SD-125	1/8	1-1/2	.020	14°	12.70
SD-156	5/32	2	.025	16°	13.90
SD-187	3/16		.028	16°	16.10
SD-218	7/32		.030	18°	19.05
SD-250	1/4		.035	18°	21.80
SD-281	9/32	2-1/2	.038	18°	27.15
SD-312	5/16		.040		30.15
SD-343	11/32		.042		34.50
SD-375	3/8		.046		36.40
SD-406	13/32	2-1/2	.048	20°	39.55
SD-437	7/16		.050	20°	41.70
SD-468	15/32		.055	21°	47.60
SD-500	1/2		.060	22°	50.95

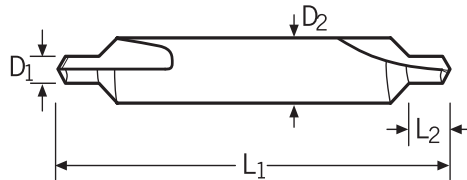
## Combined Drills & Countersinks

Straight Flute — Double End — 60° Included Countersink



Shank Diameter  
Drill Diameter

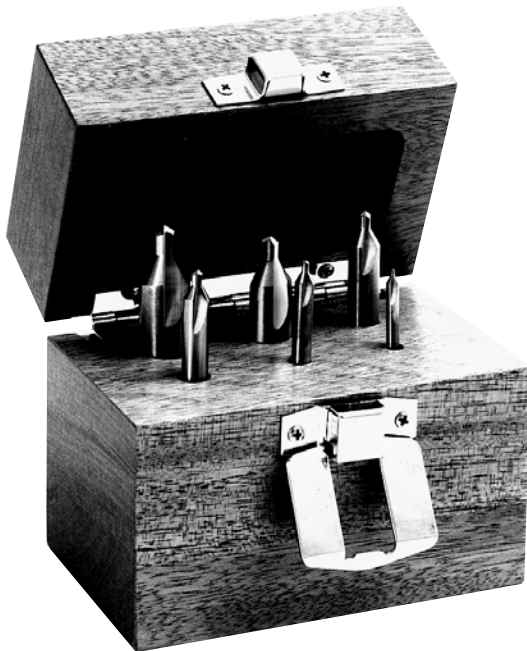
-.0001 to -.0002"  
+.003-.000"



METRIC  
SIZES  
ALSO  
FROM  
STOCK

TOOL NUMBER	DRILL DIAMETER D <sub>1</sub>	SHANK DIAMETER D <sub>2</sub>	OVERALL LENGTH L <sub>1</sub>	DRILL LENGTH L <sub>2</sub>	PRICE EACH
DC-00	.025	1/8	1-1/2	1/32	18.95
DC-01	1/32	1/8	1-1/2	1/32	18.95
DC-1	3/64	1/8	1-1/2	3/64	18.95
DC-2	5/64	3/16	1-7/8	5/64	29.85
DC-3	7/64	1/4	2	7/64	33.35
DC-4	1/8	5/16	2-1/8	1/8	44.60
DC-5	3/16	7/16	2-3/4	3/16	67.20
DC-6	7/32	1/2	3	7/32	86.15

## Combined Drill & Countersink Set

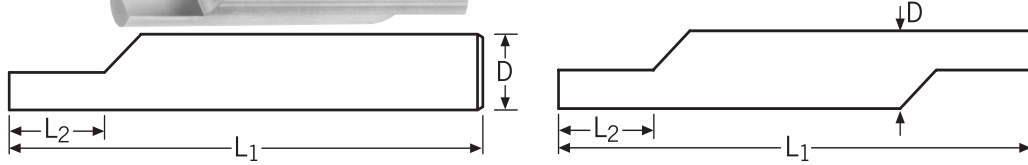


Set includes DC-1 through DC-6  
in fitted wood case.

SET No. DC-0      \$279.80



## Split-End Blanks



Shank Diameter  $-.0001$  to  $-.0002$ " finish ground  
 Split Tolerance  $+.001$ – $.000$ " of tool center  
 Split Length in proportion to length of tool.

METRIC  
SIZES  
ALSO  
FROM  
STOCK

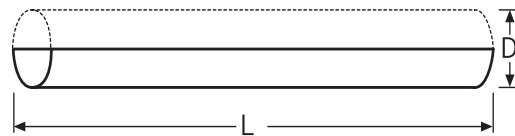
### One End Split

TOOL NUMBER	DIMENSIONS			QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RS-125-1	1/8	1-1/2	3/8	14.35	13.10	11.10	10.10	9.35
RS-187-1	3/16	2	3/8	16.65	15.40	13.40	12.40	11.65
RS-250-1	1/4	2-1/2	3/8	19.65	18.40	16.40	15.40	14.65
RS-312-1	5/16	2-1/2	1/2	28.60	27.35	25.35	24.35	23.60
RS-375-1	3/8	2-1/2	1/2	36.55	35.30	33.30	32.30	31.55
RS-500-1	1/2	3	5/8	55.80	54.55	52.55	51.55	50.80

### Two Ends Split

TOOL NUMBER	DIMENSIONS			QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RS-125-2	1/8	2	3/8	17.55	16.30	14.30	13.30	12.55
RS-187-2	3/16	2	3/8	20.45	19.20	17.20	16.20	15.45
RS-250-2	1/4	2-1/2	3/8	25.05	23.80	21.80	20.80	20.05
RS-312-2	5/16	2-1/2	1/2	36.55	35.30	33.30	32.30	31.55
RS-375-2	3/8	2-1/2	1/2	46.75	45.50	43.50	42.50	41.75
RS-500-2	1/2	3	5/8	69.10	67.85	65.85	64.85	64.10

## Half-Round Blanks



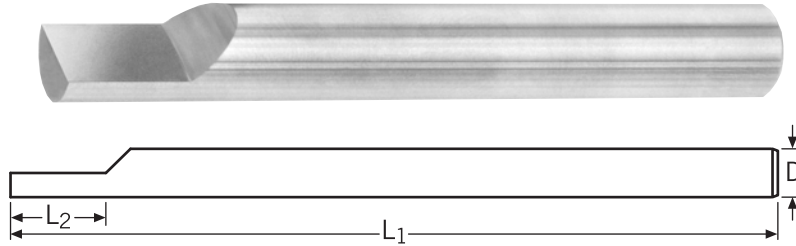
METRIC  
SIZES  
ALSO  
FROM  
STOCK

TOOL NUMBER	DIMENSIONS		QUANTITY – PRICE EACH				
	DIAMETER D	OVERALL LENGTH L	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
HR-125	1/8	1-1/2	16.00	14.25	13.75	13.25	13.00
HR-187	3/16	2	24.00	22.25	21.75	21.25	21.00
HR-250	1/4	2-1/2	30.15	28.40	27.90	27.40	27.15
HR-312	5/16	2-1/2	45.90	44.15	43.65	43.15	42.90
HR-375	3/8	2-1/2	59.60	57.85	57.35	56.85	56.60
HR-500	1/2	3	89.50	87.75	87.25	86.75	86.50

Other sizes also available upon request.

## Extended Length Split-End Blanks

Shank Diameter  $-.0001$  to  $-.0002$ " finish ground  
 Split Tolerance  $+.001$ – $.000$ " of tool center

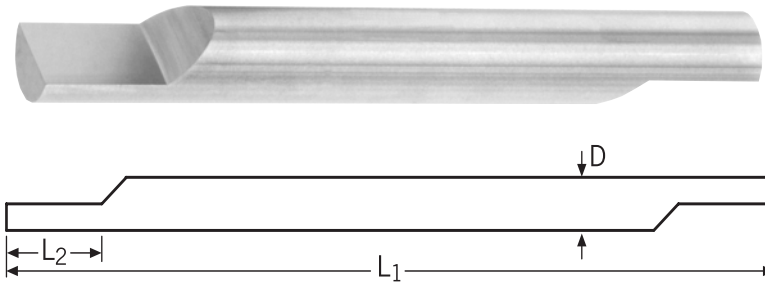


METRIC  
SIZES  
ALSO  
FROM  
STOCK

### One End Split

TOOL NUMBER	DIMENSIONS			QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RS-125-13	1/8	3	3/8	16.90	15.65	13.65	12.65	11.90
RS-187-13	3/16	3	3/8	19.75	18.50	16.50	15.50	14.75
RS-250-14	1/4	4	3/8	26.80	25.55	23.55	22.55	21.80
RS-312-14	5/16	4	1/2	37.50	36.25	34.25	33.25	32.50
RS-375-14	3/8	4	1/2	52.35	51.10	49.10	48.10	47.35
RS-500-14	1/2	4	5/8	81.20	79.95	77.95	76.95	76.20

Other sizes also available upon request.



METRIC  
SIZES  
ALSO  
FROM  
STOCK

### Two Ends Split

TOOL NUMBER	DIMENSIONS			QUANTITY – PRICE EACH				
	SHANK DIAMETER D	OVERALL LENGTH L <sub>1</sub>	SPLIT LENGTH L <sub>2</sub>	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
RS-125-23	1/8	3	3/8	20.45	19.20	17.20	16.20	15.45
RS-187-23	3/16	3	3/8	23.85	22.60	20.60	19.60	18.85
RS-250-24	1/4	4	3/8	33.10	31.85	29.85	28.85	28.10
RS-312-24	5/16	4	1/2	46.65	45.40	43.40	42.40	41.65
RS-375-24	3/8	4	1/2	64.40	63.15	61.15	60.15	59.40
RS-500-24	1/2	4	5/8	91.10	89.85	87.85	86.85	86.10

Other sizes also available upon request.

## Round Blanks

Diameter  $-.0001$  to  $-.0002$ " finish ground



METRIC  
SIZES  
ALSO  
FROM  
STOCK

TOOL NUMBER	DIMENSIONS		QUANTITY – PRICE EACH				
	DIAMETER D	LENGTH L	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
SR-062-1	1/16	1	5.15	3.65	2.90	2.40	2.15
SR-062-2		2	6.25	4.75	4.00	3.50	3.25
SR-062-3		3	6.40	4.90	4.15	3.65	3.40
SR-062-4		4	7.55	6.05	5.30	4.80	4.55
SR-062-6		6	9.90	8.40	7.65	7.15	6.90
SR-062-12		12	14.75	13.25	12.50	12.00	11.75
SR-093-1	3/32	1	5.50	4.00	3.25	2.75	2.50
SR-093-2		2	6.85	5.35	4.60	4.10	3.85
SR-093-3		3	7.05	5.55	4.80	4.30	4.05
SR-093-4		4	8.35	6.85	6.10	5.60	5.35
SR-093-6		6	11.00	9.50	8.75	8.25	8.00
SR-093-12		12	16.45	15.25	14.50	14.00	13.75
SR-125-1.5	1/8	1-1/2	7.70	6.20	5.45	4.95	4.70
SR-125-2		2	7.95	6.45	5.70	5.20	4.95
SR-125-3		3	8.35	6.85	6.10	5.60	5.35
SR-125-4		4	10.05	8.55	7.80	7.30	7.05
SR-125-6		6	13.55	12.05	11.30	10.80	10.55
SR-125-12		12	21.20	19.70	18.95	18.45	18.20
SR-156-1.5	5/32	1-1/2	9.05	7.55	6.80	6.30	6.05
SR-156-2		2	9.55	8.05	7.30	6.80	6.55
SR-156-3		3	11.55	10.05	9.30	8.80	8.55
SR-156-4		4	13.30	11.80	11.05	10.55	10.30
SR-156-6		6	18.80	17.30	16.55	16.05	15.80
SR-156-12		12	26.65	25.15	24.40	23.90	23.65
SR-187-1.5	3/16	1-1/2	10.50	9.00	8.25	7.75	7.50
SR-187-2		2	11.25	9.75	9.00	8.50	8.25
SR-187-4		4	16.05	14.55	13.80	13.30	13.05
SR-187-6		6	22.65	21.15	20.40	19.90	19.65
SR-187-12		12	37.05	35.55	34.80	34.30	34.05
SR-250-2		1/4	2	13.45	11.95	11.20	10.70
SR-250-2.5	2-1/2		14.30	12.80	12.05	11.55	11.30
SR-250-3	3		17.20	15.70	14.95	14.45	14.20
SR-250-4	4		21.95	20.45	19.70	19.20	18.95
SR-250-6	6		32.80	31.05	30.55	30.05	29.80
SR-250-12	12		52.25	50.75	50.00	49.50	49.25
SR-312-2	5/16	2	20.35	18.85	18.10	17.60	17.35
SR-312-2.5		2-1/2	22.00	20.50	19.75	19.25	19.00
SR-312-4		4	36.00	34.50	33.75	33.25	33.00
SR-312-6		6	50.05	48.55	47.80	47.30	47.05
SR-312-12		12	78.10	76.60	75.85	75.35	75.10

## Round Blanks

Diameter  $-.0001$  to  $-.0002$ " finish ground



METRIC  
SIZES  
ALSO  
FROM  
STOCK

TOOL NUMBER	DIMENSIONS		QUANTITY - PRICE EACH				
	DIAMETER D	LENGTH L	1 TO 5	6 TO 11	12 TO 47	48 TO 99	100 OR MORE
SR-375-2 SR-375-2.5 SR-375-4 SR-375-6 SR-375-12	3/8	2	26.15	24.65	23.90	23.40	23.15
		2-1/2	29.00	27.50	26.75	26.25	26.00
		4	48.90	47.40	46.65	46.15	45.90
		6	68.40	66.90	66.15	65.65	65.40
		12	107.60	106.10	105.35	104.85	104.60
SR-437-2.5 SR-437-4 SR-437-6 SR-437-12	7/16	2-1/2	33.00	31.50	30.75	30.25	30.00
		4	64.70	63.20	62.45	61.95	61.70
		6	91.20	89.70	88.95	88.45	88.20
		12	144.00	142.50	141.75	141.25	141.00
SR-500-2.5 SR-500-3 SR-500-4 SR-500-6 SR-500-12	1/2	2-1/2	36.75	35.25	34.50	34.00	33.75
		3	45.65	44.15	43.40	42.90	42.65
		4	78.30	76.80	76.05	75.55	75.30
		6	110.45	108.95	108.20	107.70	107.45
		12	174.80	173.50	172.55	172.05	171.80
SR-562-3.5 SR-562-4 SR-562-6 SR-562-12	9/16	3-1/2	77.60	76.10	75.35	74.85	74.60
		4	108.10	106.60	105.85	105.35	105.10
		6	153.05	151.55	150.80	150.30	150.05
		12	243.00	241.50	240.75	240.25	240.00
SR-625-3.5 SR-625-4 SR-625-6 SR-625-12	5/8	3-1/2	84.85	83.35	82.60	82.10	81.85
		4	113.10	111.60	110.85	110.35	110.10
		6	160.30	158.80	158.05	157.55	157.30
		12	254.70	253.20	252.45	251.95	251.70
SR-687-4 SR-687-6 SR-687-12	11/16	4	116.05	114.30	113.80	113.30	113.05
		6	212.65	211.15	210.40	209.90	209.65
		12	338.25	336.75	336.00	335.50	335.25
SR-750-4 SR-750-6 SR-750-12	3/4	4	117.45	115.95	115.20	114.70	114.45
		6	206.55	205.05	204.30	203.80	203.55
		12	328.60	327.10	326.35	325.85	325.60
SR-875-4 SR-875-6 SR-875-12	7/8	4	155.85	154.35	153.60	153.10	152.85
		6	290.10	288.35	287.85	287.35	287.10
		12	462.30	460.80	460.05	459.55	459.30
SR-001-4 SR-001-5 SR-001-6 SR-001-12	1	4	195.20	193.70	192.95	192.45	192.20
		5	285.05	283.55	282.80	282.30	282.05
		6	323.20	321.70	320.95	320.45	320.20
		12	515.15	513.65	512.90	512.40	512.15

# BLANKS



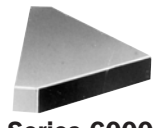
Series 1000



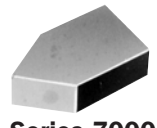
Series 2000



Series 5000



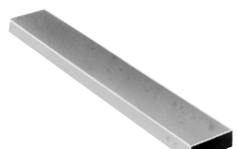
Series 6000



Series 7000



Series RT



Series STB



STB-48

TOOL NO.	SIZES				QUANTITY – PRICE EACH					
	T	W	L	R	1-5	6-11	12-23	24-47	48-99	100 OR MORE
1025	1/16	1/4	1/4		5.25	4.25	3.50	3.00	2.50	2.25
1035	3/32	1/8	3/4		5.70	4.70	3.95	3.45	2.95	2.70
1080	3/32	5/16	3/8		5.95	4.95	4.20	3.70	3.20	2.95
1090	3/32	3/8	3/8		6.35	5.35	4.60	4.10	3.60	3.35
1105	3/32	7/16	1/2		7.10	6.10	5.35	4.85	4.35	4.10
1110	1/8	3/16	3/4		6.75	5.75	5.00	4.50	4.00	3.75
1113	1/8	3/16	1/4		5.45	4.45	3.70	3.20	2.70	2.45
1114	1/8	3/16	5/16		5.55	4.55	3.80	3.30	2.80	2.55
1140	1/8	1/4	3/4		7.65	6.65	5.90	5.40	4.90	4.65
1200	1/8	1/2	1/2		8.65	7.65	6.90	6.40	5.90	5.65
1240	5/32	5/8	5/8		12.60	11.60	10.85	10.35	9.85	9.60
1250	3/16	5/16	7/16		7.85	6.85	6.10	5.60	5.10	4.85
1270	3/16	3/8	1/2		9.15	8.15	7.40	6.90	6.40	6.15
1280	3/16	3/8	5/8		10.30	9.30	8.55	8.05	7.55	7.30
1375	1/4	1/2	5/8		16.40	15.40	14.65	14.15	13.65	13.40
1380	1/4	1/2	3/4		17.00	16.00	15.25	14.75	14.25	14.00
2020	1/16	3/16	1/4		4.50	3.50	2.75	2.25	1.75	1.50
2030	1/16	1/4	5/16		4.75	3.75	3.00	2.50	2.00	1.75
2120	1/8	1/4	1/2	1/8	6.55	5.55	4.80	4.30	3.80	3.55
2130	1/8	1/4	5/8		6.95	5.95	5.20	4.70	4.20	3.95
2230	5/32	3/8	3/4		10.30	9.30	8.55	8.05	7.55	7.30
5030	1/16	1/4	5/16	1/64	4.55	3.55	2.80	2.30	1.80	1.55
5080	3/32	5/16	3/8	1/64	5.50	4.50	3.75	3.25	2.75	2.50
5100	3/32	3/8	1/2	1/64	6.05	5.05	4.30	3.80	3.30	3.05
5105	3/32	7/16	1/2	1/32	6.35	5.35	4.60	4.10	3.60	3.35
5200	1/8	1/2	1/2	1/32	7.35	6.35	5.60	5.10	4.60	4.35
5240	5/32	5/8	5/8	1/32	10.20	9.20	8.45	7.95	7.45	7.20
5410	1/4	1	3/4	1/32	13.30	12.30	11.55	11.05	10.55	10.30
6080	3/32	5/16	3/8		5.25	4.25	3.50	3.00	2.50	2.25
6100	3/32	3/8	1/2		5.95	4.95	4.20	3.70	3.20	2.95
6200	1/8	1/2	1/2		9.45	8.45	7.70	7.20	6.70	6.45
6240	5/32	5/8	5/8		10.45	9.45	8.70	8.20	7.70	7.45
6340	3/16	3/4	3/4		12.75	11.75	11.00	10.50	10.00	9.75
7060	3/32	1/4	3/8		5.00	4.00	3.25	2.75	2.25	2.00
7170	1/8	5/16	5/8		6.35	5.35	4.60	4.10	3.60	3.35
7230	5/32	3/8	3/4		9.15	8.15	7.40	6.90	6.40	6.15
RT-4	1/16	1/8	3/4	1/4	5.25	4.25	3.50	3.00	2.50	2.25
RT-6	3/32	3/16	7/8	5/16	6.50	5.50	4.75	4.25	3.75	3.50
STB-12A	1/32	1/16	3/4		4.70	3.70	2.95	2.45	1.95	1.70
STB-13A	3/64	3/32	13/16		4.95	3.95	3.20	2.70	2.20	1.95
STB-424	1/8	3/4	6		72.60	71.60	70.85	70.35	69.85	69.60
STB-616	3/16	1/2	6		69.95	68.95	68.20	67.70	67.20	66.95
STB-616A	3/16	1/2	3		37.50	36.50	35.75	35.25	34.75	34.50
STB-624	3/16	3/4	6		89.40	88.40	87.65	87.15	86.65	86.40
STB-824	1/4	3/4	6		115.00	114.00	113.25	112.75	112.25	112.00
STB-48	1/8	1/4	1	1/4	8.80	7.80	7.05	6.55	6.05	5.80

# INDEXABLE INSERTS

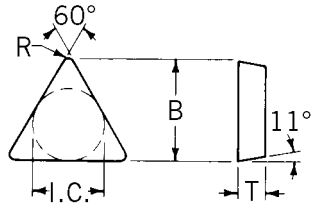
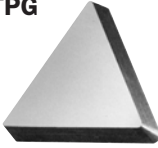


## Positive Inserts, All Surfaces Ground

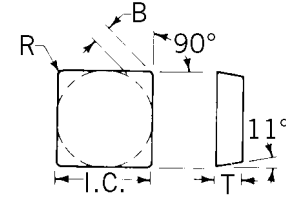
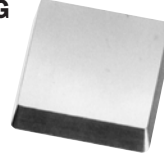
I.C.  
Thickness

±.001"  
±.005"

TPG



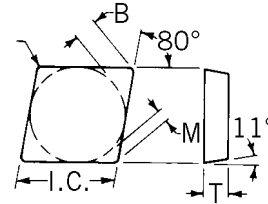
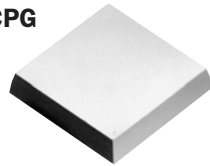
SPG



INSERT NUMBER	DIMENSIONS				1 TO 9	10 TO 99	100 TO 249	250 TO 499	500 TO 999
	I.C.	B	T	R					
TPG-222	1/4	.3440	1/8	1/32	7.70	6.20	5.70	5.20	4.70
TPG-321	3/8	.5465	1/8	1/64	10.35	8.85	8.35	7.85	7.35
TPG-322	3/8	.5315	1/8	1/32	10.35	8.85	8.35	7.85	7.35
TPG-432	1/2	.7190	3/16	1/32	11.55	10.05	9.55	9.05	8.55
TPG-433	1/2	.7030	3/16	3/64	11.55	10.05	9.55	9.05	8.55
SPG-322	3/8 SQ.	.0649	1/8	1/32	9.45	7.95	7.45	6.95	6.45
SPG-422	1/2 SQ.	.0908			10.85	9.35	8.85	8.35	7.85

### Diamond

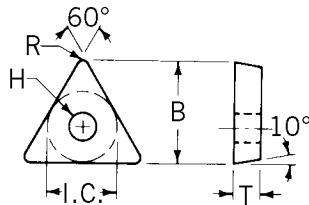
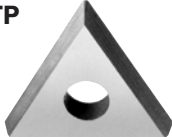
CPG



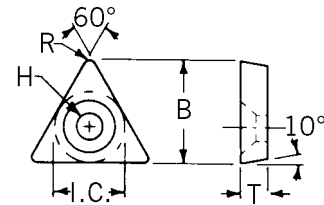
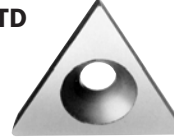
INSERT NUMBER	DIMENSIONS					1 TO 9	10 TO 99	100 TO 249	250 TO 499	500 TO 999
	I.C.	B	T	R	M					
CPG-4621	.464	.1220	1/8	1/64	.0660	10.45	8.95	8.45	7.95	7.45
CPG-4622	.464	.1137		1/32	.0614	10.45	8.95	8.45	7.95	7.45
CPG-421	1/2	.1300	1/64	.0715	10.85	9.35	8.85	8.35	7.85	
CPG-422	1/2	.1217	1/32	.0669	10.85	9.35	8.85	8.35	7.85	

### Screw-On

TP



TD



INSERT NUMBER	DIMENSIONS					SCREW SIZE	1 TO 9	10 TO 99	100 TO 249	250 TO 499	500 TO 999
	I.C.	B	T	R	H						
TP-41	1/4	.3590	3/32	1/64	.137	4-40	9.35	7.85	7.35	6.85	6.35
TP-42	1/4	.3440	3/32	1/32	.137	4-40	9.35	7.85	7.35	6.85	6.35
TP-61	3/8	.5465	1/8	1/64	.163	6-32	10.95	9.45	8.95	8.45	7.95
TP-62	3/8	.5315	1/8	1/32	.163	6-32	10.95	9.45	8.95	8.45	7.95
TD-6P-1	3/8	.5465	1/8	1/64	.125	4-40	10.95	9.45	8.95	8.45	7.95
TD-6P-2		.5315		1/32							

Packaged in quantities of 10 per type



super carbide tools

# APPLICATION



**MICRO 100** is a “space age,” micro-grain carbide developed for machining high-strength, thermal resistant alloys. The following is a partial list of materials **MICRO 100** is best suited for: **ALUMINUM • BRASS • BRONZE • COBALT • HASTALLOY • HIGH SPEED STEEL • “M” Series HIGH SPEED STEEL • INCONEL • MARAGING ALLOYS • MOLYBDENUM • RENE 41, 80 & 95 • STAINLESS STEELS (Precipitation – hardening) • SUPER ALLOYS (Iron & Nickel base) • TUNGSTEN • TITANIUM • WASPALLOY • ZIRCONIUM.**

## HELPFUL HINTS:

**BORING** When boring and tools do not meet your expectations, simply grind 5-10 degrees positive top rake, radius nose .010” to .020” and lightly hone cutting edge.

**BOX TURNING** When turning hex or square stock, grind a land across the entire face of tool .020” to .025”. Be sure to lightly hone cutting edge after grind.

**CUT-OFF** Depending on material, often removing and breaking the chip becomes necessary. Here are chip-breaker recommendations: Land = 1 to 1-1/2 times the feed per revolution. Width = 3 to 4 times the feed per revolution. Depth = .010” to .015”. Always use as much feed rate as possible.

**MILLING** It is important to select the End Mill not only in the appropriate diameter for the job but to

also choose the correct size with the number of flutes most efficient for the milling operation performed. In general, the harder the workpiece, the higher the number of flutes should be selected; and the softer the material, the fewer, but wider flutes are required for better chip clearance. After each resharpening, the feather edge on the flutes should be removed with a fine grit hone to avoid chipping.

**TURNING** Rigidity of your set-up and starting your cut at centerline is of utmost importance. A side rake angle of 15 degrees is desirable, and 30-45 degrees for your side cutting edge angles will distribute the cutting force and improve tool life. For heavy interrupted cuts or forgings, use as large a nose radius as possible. For light finishing cuts, grind a 45 degree land .010” deep across the nose, or radius .015”-.020”. All chip breakers should have a radius, equal to depth at rear.

**GRINDING** Use diamond wheels with coolant whenever possible. Hold the tool against the wheel with relatively light pressure and remember to keep moving the tool constantly. Start with the top face always, and follow with the side-end reliefs, grinding the radius last. By following this sequence it is possible to obtain a better cutting edge inasmuch as minute flaking at the cutting edge is avoided. Lightly hone cutting edge with a hand hone after each grind. Depending on the

depth of cut; hone .001”-.003” for light cuts, and .004”-.006” for heavy cuts. Never cool the tool after grinding by quenching in water or oil. Let cool naturally.

**BRAZING** “Micro-grain” carbide, because of density should be “sandwich-brazed”: A copper shim between two pieces of silver solder material. This will eliminate “stress-cracking” due to co-efficient of expansion.

## End Mill Speed & Feed Recommendations

**NOTE:** The recommendations listed below should be considered only as a starting point. To achieve optimum results, variations may be necessary.

MATERIAL	SPEED [SFM]	END MILL DIAMETER/Feed Per Tooth [inches]				
		1/8"	1/4"	1/2"	3/4"	1"
Aluminum/Aluminum Alloys	900-1500	.0005	.002	.004	.005	.008
Brass/Bronze	400- 750	.001	.002	.003	.004	.005
Copper/Copper Alloys	450- 850	.001	.002	.002	.004	.006
Cast Iron, Soft	300- 750	.001	.002	.003	.006	.008
Cast Iron, Hard	125- 350	.0004	.0008	.002	.003	.004
Ductile Iron	150- 450	.0005	.001	.002	.004	.006
Malleable Iron	300- 550	.0005	.001	.003	.005	.007
Magnesium/Magnesium Alloys	1100-1600	.001	.002	.004	.006	.010
Monel/High Nickel Steel	225- 350	.0005	.001	.002	.003	.004
Nickel Base Hi-Temp. Alloys	50- 125	.0004	.0008	.001	.001	.002
Plastics	900-1800	.0015	.003	.006	.010	.015
Plastics, Glass Filled	400-1000	.0015	.003	.004	.006	.012
Refractory Alloys	125- 350	.0005	.001	.001	.0015	.002
Steel, Low Carbon	300- 600	.0005	.001	.003	.005	.007
Steel, Medium Carbon	150- 450	.0006	.0015	.002	.004	.005
Steel, Hardened	50- 225	.0002	.0005	.001	.002	.003
Stainless Steel, Soft	250- 500	.0005	.001	.002	.004	.006
Stainless Steel, Hard	75- 275	.0002	.0005	.001	.003	.005
Titanium, Soft	175- 400	.0005	.001	.002	.004	.006
Titanium, Hard	75- 250	.0003	.0005	.001	.002	.004

### FOR LIGHTER RADIAL DEPTH OF CUT

Higher range of recommended surface speeds should be used.

### FOR GREATER RADIAL DEPTH OF CUT

Lower range of recommended surface speeds should be used.

### FOR SLOTTING APPLICATIONS

Speeds should be reduced to approximately 80% of the heavy cut value for the particular material being machined.

### AXIAL DEPTH OF CUT

These recommendations are for axial depths of cuts not to exceed 1-1/2 times the cutter diameter.





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