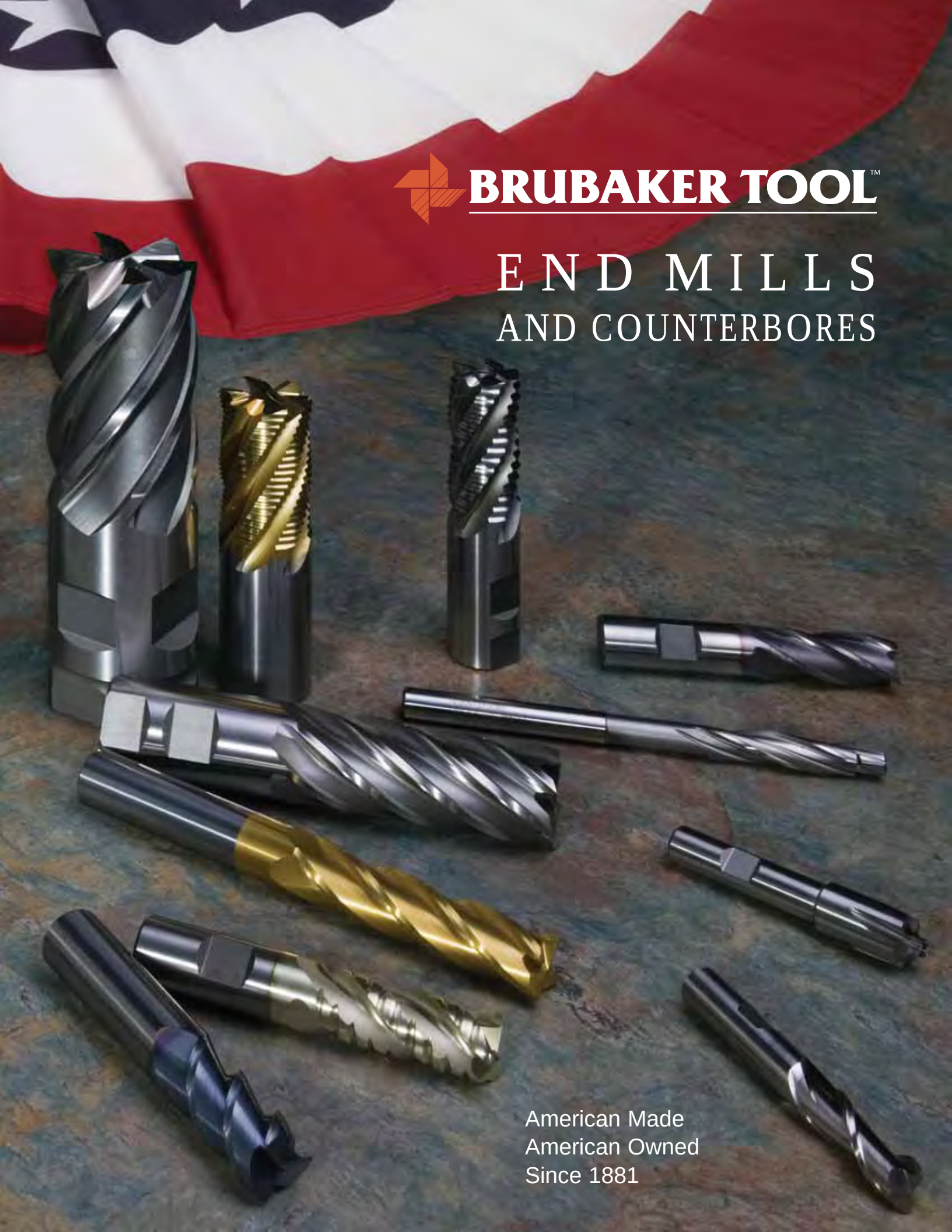


BRUBAKER TOOL™

END MILLS
AND COUNTERBORES

American Made
American Owned
Since 1881

Since 1881 Brubaker Tool has been a leading supplier of American-made, industrial cutting tools. Brubaker's longstanding stability, reliability, quality and commitment to American industry have made us a trusted source for distributors and manufacturers for generations. Our channel partners include traditional distributors, multi-location distributors and specialized cutting tool houses. Our end-user customer list includes major aerospace companies, automotive and automotive parts suppliers, large capital equipment manufacturers, fastener, pipe fitting and valve manufacturers, as well as large, mid-sized and small machine shops. All are vitally important to us and reflect our commitment to American manufacturing.

Much has changed in business in the last 125 years. Our commitment to providing the finest high-speed steel, cobalt, powdered metal and solid carbide round tools has not. For over a century and a quarter, Brubaker has continued to manufacture in Millersburg, PA, in the same location on the banks of the Susquehanna River. While our location has not changed, our methods and equipment certainly have. Our modern manufacturing facilities are equipped with the latest CNC equipment in the cutting tool industry. Our quality assurance systems, including ISO 9001 certification, ensure consistent, quality products and superior service levels.

Whether your manufacturing needs call for a standard end mill or a large diameter tool with custom geometry, standard or special taps, we can meet all of your round tool cutting needs. Please call us and let us show you why Brubaker has remained a leading supplier to American industry for over 125 years.

American Made
American Owned
Since 1881

CONTINUE THE TRADITION.

BRUBAKER TOOL™

How the catalog is organized...

We have organized this catalog in what we believe to be an easy to use systematic format, allowing the user to readily find the needed information.

TABLE OF CONTENTS

PAGE

This section allows you to quickly reference the substrate or type of tool you are looking for. We have divided the catalog into five sections; Solid Carbide, High Speed Steel, Cobalt, Powdered Metal and Roughing / Finishing & Roughing End Mills. At the beginning of each section there is an expanded listing that provides information such as; number of flutes, single end / double end, helix angle and center cutting / non-center cutting.

COATINGS AND TECHNICAL INFORMATION

This technical information provides guidance on surface treatments and coatings, speeds and feeds, resharpening and a blank quotation form to use when requesting a quote on a special. As always, should you have any questions regarding what tool to use for your application call us toll free at 800-522-8665 and ask to speak to our Technical Support Department.

EDP NUMBER INDEX

New for this catalog, we have placed an EDP index in the back of the catalog that allows you to find the page number of a specific tool when the EDP number is known.

CONTACT US

Located on the inside back cover of the catalog, this important page contains information on how to contact us by mail, phone (local and toll free) and fax. Also listed is our website address and information on how to find a distributor.

BRUBAKER TOOL™

SOLID CARBIDE END MILLS

SOLID CARBIDE END MILLS

Our micro-grain carbide substrate offers excellent hardness, wear resistance and high strength. These tools can provide increased feeds and speeds and enhanced tool life in applications that have rigid set-ups.

SOLID CARBIDE

BRUBAKER TOOL™

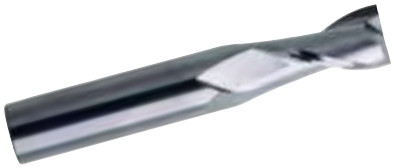
SINGLE END TWO FLUTE MICRO MINIATURE

- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is +.0005/-.0005

(Former List Number 2007 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
.0050	1/8	.0150	1-1/2	98200	98278
.0060	1/8	.0180	1-1/2	98201	98279
.0070	1/8	.0210	1-1/2	98202	98280
.0080	1/8	.0240	1-1/2	98203	98281
.0090	1/8	.0270	1-1/2	98204	98282
.0100	1/8	.0300	1-1/2	98205	98283
.0110	1/8	.0330	1-1/2	98206	98284
.0120	1/8	.0360	1-1/2	98207	98285
.0130	1/8	.0390	1-1/2	98208	98286
.0140	1/8	.0420	1-1/2	98209	98287
.0150	1/8	.0450	1-1/2	98210	98288
.0160	1/8	.0480	1-1/2	98211	98289
.0170	1/8	.0510	1-1/2	98212	98290
.0180	1/8	.0540	1-1/2	98213	98291
.0190	1/8	.0570	1-1/2	98214	98292
.0200	1/8	.0600	1-1/2	98215	98293
.0210	1/8	.0630	1-1/2	98216	98294
.0220	1/8	.0660	1-1/2	98217	98295
.0230	1/8	.0690	1-1/2	98218	98296
.0240	1/8	.0720	1-1/2	98219	98297
.0250	1/8	.0750	1-1/2	98220	98298
.0260	1/8	.0780	1-1/2	98221	98299
.0270	1/8	.0810	1-1/2	98222	98312
.0280	1/8	.0840	1-1/2	98223	98313
.0290	1/8	.0870	1-1/2	98224	98314
.0300	1/8	.0900	1-1/2	98225	98315
.0350	1/8	.1050	1-1/2	98331	98336
.0400	1/8	.1200	1-1/2	98332	98337
.0450	1/8	.1350	1-1/2	98333	98338
.0500	1/8	.1500	1-1/2	98334	98339
.0550	1/8	.1650	1-1/2	98335	98340

SINGLE END TWO FLUTE, 1/32 – 5/16



- Most Ferrous, Non-Ferrous and Non-Metallic Materials
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- Cutting Diameter Tolerance is:
  Sizes less than 1/8, +.000/-.001
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Numbers 2009, 2010, 2011, 2012 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
1/32	1/8	3/32	1-1/2	90802	90303
1/32	1/8	1/8	1-1/2	90984	90986
3/64	1/8	1/8	1-1/2	90811	90304
3/64	1/8	3/16	1-1/2	90987	90991
1/16	1/8	1/8	1-1/2	90800	90305
1/16	1/8	3/16	1-1/2	90839	90841
5/64	1/8	1/8	1-1/2	90992	90994
5/64	1/8	3/16	1-1/2	90842	90844
3/32	1/8	3/16	1-1/2	90803	90306
3/32	1/8	3/8	1-1/2	90845	90847
7/64	1/8	1/4	1-1/2	90995	90997
7/64	1/8	3/8	1-1/2	90848	90850
1/8	1/8	1/4	1-1/2	90806	90808
1/8	1/8	1/2	1-1/2	90851	90853
1/8	1/8	3/4	2-1/4	90944	90946
1/8	1/8	1	3	95600	95670
9/64	3/16	5/16	2	90998	91027
9/64	3/16	9/16	2	90854	90856
5/32	3/16	5/16	2	90809	90307
5/32	3/16	9/16	2	90857	90859
11/64	3/16	3/8	2	91028	91030
11/64	3/16	5/8	2	90860	90862
3/16	3/16	3/8	2	90812	90308
3/16	3/16	5/8	2	90863	90865
3/16	3/16	3/4	2-1/2	90947	90949
3/16	3/16	1-1/8	3	95602	95671
13/64	1/4	5/8	2-1/2	90866	90868
7/32	1/4	1/2	2	90815	90817
7/32	1/4	5/8	2-1/2	90869	90871
15/64	1/4	3/4	2-1/2	90872	90874
1/4	1/4	1/2	2	90818	90820
1/4	1/4	3/4	2-1/2	90875	90877
1/4	1/4	1	4	90974	90976
1/4	1/4	1-1/8	3	90950	90952
1/4	1/4	1-1/2	4	95604	95672
1/4	1/4	1-1/2	6	95606	95673
17/64	5/16	3/4	2-1/2	90878	90880
9/32	5/16	3/4	2-1/2	90881	90883
19/64	5/16	13/16	2-1/2	90884	90886
5/16	5/16	1/2	2	90821	90823
5/16	5/16	13/16	2-1/2	90887	90889
5/16	5/16	1-1/8	3	90953	90955
5/16	5/16	1-5/8	4	95608	95674

SINGLE END TWO FLUTE CONTINUED ON NEXT PAGE

SINGLE END TWO FLUTE, 21/64 – 1

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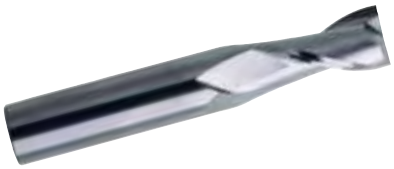
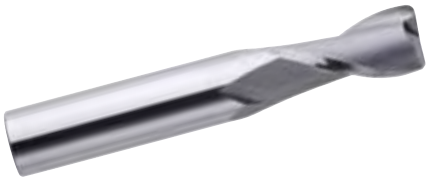


(Former List Numbers 2009, 2010, 2011, 2012 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
21/64	3/8	1	2-1/2	90890	90892
11/32	3/8	1	2-1/2	90893	90895
23/64	3/8	1	2-1/2	90896	90898
3/8	3/8	5/8	2	90824	90826
3/8	3/8	1	2-1/2	90899	90901
3/8	3/8	1	4	90978	90977
3/8	3/8	1-1/8	3	90956	90958
3/8	3/8	1-1/2	6	95612	95676
3/8	3/8	1-3/4	4	95610	95675
25/64	7/16	1	2-3/4	90902	90904
13/32	7/16	1	2-3/4	90905	90907
27/64	7/16	1	2-3/4	90908	90910
7/16	7/16	5/8	2-1/2	90827	90829
7/16	7/16	1	2-3/4	90911	90913
7/16	7/16	2	4	90959	90961
7/16	7/16	3	6	95614	95677
29/64	1/2	1	3	90914	90916
15/32	1/2	1	3	90917	90919
31/64	1/2	1	3	90920	90922
1/2	1/2	5/8	2-1/2	90830	90832
1/2	1/2	1	3	90923	90925
1/2	1/2	1	4	90982	90980
1/2	1/2	1-1/2	6	95616	95678
1/2	1/2	2	4	90962	90964
1/2	1/2	3	6	95618	95679
9/16	9/16	1-1/4	3-1/2	90926	90928
5/8	5/8	3/4	3	90833	90835
5/8	5/8	1-1/4	3-1/2	90929	90931
5/8	5/8	2-1/4	5	90965	90967
5/8	5/8	3	6	95620	95680
11/16	3/4	1-3/8	4	90932	90934
3/4	3/4	1	3	90836	90838
3/4	3/4	1-1/2	4	90935	90937
3/4	3/4	2-1/4	5	90968	90970
3/4	3/4	3	6	95622	95681
7/8	7/8	1-1/2	4	90938	90940
7/8	7/8	2-1/4	5	90989	90981
7/8	7/8	3	6	95624	95682
1	1	1-1/2	4	90941	90943
1	1	2-1/4	5	90971	90973
1	1	3	6	95626	95683

SINGLE END TWO FLUTE - CORNER RADIUS



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  Sizes larger than 1/4, +.000/-.003

(New Offering)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	Radius	EDP No. Uncoated	TiCN
1/8	1/8	1/2	1-1/2	.015	98400	98401
1/8	1/8	1/2	1-1/2	.020	98402	98403
3/16	3/16	5/8	2	.015	98404	98405
3/16	3/16	5/8	2	.020	98406	98407
1/4	1/4	3/4	2-1/2	.015	98408	98409
1/4	1/4	3/4	2-1/2	.020	98410	98411
1/4	1/4	3/4	2-1/2	.030	98412	98413
1/4	1/4	3/4	2-1/2	.045	98414	98415
5/16	5/16	13/16	2-1/2	.020	98416	98417
5/16	5/16	13/16	2-1/2	.030	98418	98419
5/16	5/16	13/16	2-1/2	.045	98420	98421
3/8	3/8	1	2-1/2	.020	98422	98423
3/8	3/8	1	2-1/2	.030	98424	98425
3/8	3/8	1	2-1/2	.045	98426	98427
7/16	7/16	1	2-3/4	.020	98428	98429
7/16	7/16	1	2-3/4	.030	98430	98431
7/16	7/16	1	2-3/4	.045	98432	98433
7/16	7/16	1	2-3/4	.060	98434	98435
7/16	7/16	1	2-3/4	.090	98436	98437
7/16	7/16	1	2-3/4	.125	98438	98439
1/2	1/2	1	3	.020	98440	98441
1/2	1/2	1	3	.030	98442	98443
1/2	1/2	1	3	.045	98444	98445
1/2	1/2	1	3	.060	98446	98447
1/2	1/2	1	3	.090	98448	98449
1/2	1/2	1	3	.125	98450	98451
5/8	5/8	1-1/4	3-1/2	.020	98452	98453
5/8	5/8	1-1/4	3-1/2	.030	98454	98455
5/8	5/8	1-1/4	3-1/2	.045	98456	98457
5/8	5/8	1-1/4	3-1/2	.060	98458	98459
5/8	5/8	1-1/4	3-1/2	.090	98460	98461
5/8	5/8	1-1/4	3-1/2	.125	98462	98463
3/4	3/4	1-1/2	4	.020	98464	98465
3/4	3/4	1-1/2	4	.030	98466	98467
3/4	3/4	1-1/2	4	.045	98468	98469
3/4	3/4	1-1/2	4	.060	98470	98471
3/4	3/4	1-1/2	4	.090	98472	98473
3/4	3/4	1-1/2	4	.125	98474	98475
3/4	3/4	1-1/2	4	.190	98476	98477
1	1	1-1/2	4	.020	98478	98479
1	1	1-1/2	4	.030	98480	98481
1	1	1-1/2	4	.045	98482	98483
1	1	1-1/2	4	.060	98484	98485
1	1	1-1/2	4	.090	98486	98487
1	1	1-1/2	4	.125	98488	98489
1	1	1-1/2	4	.190	98490	98491

SOLID CARBIDE

BRUBAKER TOOL™

SINGLE END TWO FLUTE BALL, 1/32 – 5/16

- Most Ferrous, Non-Ferrous and Non-Metallic Materials
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(Former List Numbers 2015, 2016, 2017, 2018 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
1/32	1/8	3/32	1-1/2	95100	95160
1/32	1/8	1/8	1-1/2	95216	95218
3/64	1/8	1/8	1-1/2	95102	95161
3/64	1/8	3/16	1-1/2	95219	95221
1/16	1/8	1/8	1-1/2	95104	95162
1/16	1/8	3/16	1-1/2	91800	91802
5/64	1/8	1/8	1-1/2	95222	95224
5/64	1/8	3/16	1-1/2	91854	91962
3/32	1/8	3/16	1-1/2	95106	95163
3/32	1/8	3/8	1-1/2	91803	91805
7/64	1/8	1/4	1-1/2	95225	95227
7/64	1/8	3/8	1-1/2	91856	91963
1/8	1/8	1/4	1-1/2	95108	95164
1/8	1/8	1/2	1-1/2	91806	91808
1/8	1/8	3/4	2-1/4	95300	95356
1/8	1/8	1	3	95500	95556
9/64	3/16	5/16	2	95231	95233
9/64	3/16	9/16	2	91858	91965
5/32	3/16	5/16	1-1/2	95110	95165
5/32	3/16	9/16	2	91809	91811
11/64	3/16	3/8	2	95234	95239
11/64	3/16	5/8	2	91860	91966
3/16	3/16	5/16	1-1/2	95112	95166
3/16	3/16	5/8	2	91812	91814
3/16	3/16	3/4	2-1/2	95302	95357
3/16	3/16	1-1/8	3	95502	95557
13/64	1/4	5/8	2-1/2	91862	91967
7/32	1/4	1/2	2	95114	95167
7/32	1/4	5/8	2-1/2	91815	91817
15/64	1/4	3/4	2-1/2	91864	91899
1/4	1/4	1/2	2	95116	95168
1/4	1/4	3/4	2-1/2	91818	91820
1/4	1/4	1	4	95306	95359
1/4	1/4	1-1/8	3	95304	95358
1/4	1/4	1-1/2	4	95504	95558
1/4	1/4	1-1/2	6	95506	95559
17/64	5/16	3/4	2-1/2	91866	91898
9/32	5/16	3/4	2-1/2	91821	91823
19/64	5/16	13/16	2-1/2	91868	91897
5/16	5/16	1/2	2	95118	95169
5/16	5/16	13/16	2-1/2	91824	91826
5/16	5/16	1-1/8	3	95308	95360
5/16	5/16	1-5/8	4	95508	95560

SINGLE END TWO FLUTE BALL CONTINUED ON NEXT PAGE

SINGLE END TWO FLUTE BALL, 21/64 – 1

CONTINUED FROM PREVIOUS PAGE

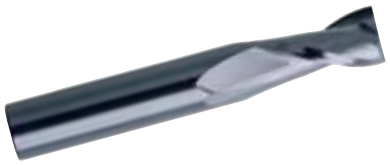
(Former List Numbers 2015, 2016, 2017, 2018 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
21/64	3/8	7/8	2-1/2	91870	91896
11/32	3/8	7/8	2-1/2	91872	91895
23/64	3/8	7/8	2-1/2	91874	91894
3/8	3/8	5/8	2	95120	95170
3/8	3/8	7/8	2-1/2	91827	91829
3/8	3/8	1	4	95312	95362
3/8	3/8	1-1/8	3	95310	95361
3/8	3/8	1-1/2	6	95512	95562
3/8	3/8	1-3/4	4	95510	95561
25/64	7/16	7/8	2-1/2	91876	91893
13/32	7/16	7/8	2-1/2	91878	91892
27/64	7/16	7/8	2-1/2	91880	91891
7/16	7/16	5/8	2-1/2	95122	95171
7/16	7/16	1	2-3/4	91830	91832
7/16	7/16	2	4	95314	95363
7/16	7/16	3	6	95514	95563
29/64	1/2	1	3	91882	91890
15/32	1/2	1	3	91884	91889
31/64	1/2	1	3	91886	91888
1/2	1/2	5/8	2-1/2	95124	95172
1/2	1/2	1	3	91833	91835
1/2	1/2	1	4	95316	95364
1/2	1/2	1-1/2	6	95516	95564
1/2	1/2	2	4	95318	95365
1/2	1/2	3	6	95518	95565
9/16	9/16	1-1/4	3-1/2	91836	91838
5/8	5/8	3/4	3	95126	95173
5/8	5/8	1-1/4	3-1/2	91839	91841
5/8	5/8	2-1/4	5	95320	95366
5/8	5/8	3	6	95520	95566
11/16	3/4	1-1/2	4	95240	95242
3/4	3/4	1	3	95128	95174
3/4	3/4	1-1/2	4	91845	91847
3/4	3/4	2-1/4	5	95322	95367
3/4	3/4	3	6	95522	95567
7/8	7/8	1-1/2	4	91848	91850
7/8	7/8	2-1/4	5	95324	95368
7/8	7/8	3	6	95524	95568
1	1	1-1/2	4	91851	91853
1	1	2-1/4	5	95326	95369
1	1	3	6	95526	95569

SOLID CARBIDE

BRUBAKER TOOL™

SINGLE END TWO FLUTE METRIC

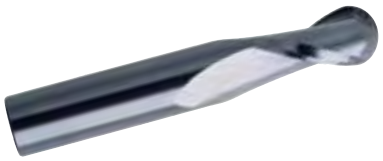


- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is (mm):
  Sizes 1 through 6, +.00/-.05
  Sizes larger than 6, +.00/-.08

(Former List Number 2013 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
1.0	3.0	5.5	38.0	95837	95839
1.5	3.0	6.5	38.0	95841	95843
2.0	3.0	6.0	38.0	95700	95768
2.5	3.0	8.0	38.0	95702	95769
3.0	3.0	10.0	38.0	95704	95770
3.5	4.0	12.0	50.0	95706	95771
4.0	4.0	12.0	50.0	95708	95772
4.5	5.0	14.0	50.0	95710	95773
5.0	5.0	15.0	50.0	95712	95774
6.0	6.0	18.0	63.0	95714	95775
7.0	8.0	20.0	63.0	95716	95776
8.0	8.0	20.0	63.0	95718	95777
9.0	10.0	22.0	63.0	95720	95778
10.0	10.0	22.0	75.0	95722	95779
11.0	12.0	25.0	75.0	95847	95851
12.0	12.0	25.0	75.0	95724	95780
14.0	14.0	25.0	90.0	95726	95781
16.0	16.0	32.0	100.0	95728	95783
18.0	18.0	32.0	100.0	95730	95784
20.0	20.0	38.0	100.0	95732	95785

SINGLE END TWO FLUTE METRIC BALL



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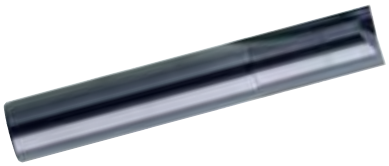
  Sizes larger than 6, +.00/-.08

(Former List Number 2019 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
1.0	3.0	5.5	38.0	95985	95986
1.5	3.0	6.5	38.0	95987	95988
2.0	3.0	6.0	38.0	95900	95968
2.5	3.0	8.0	38.0	95902	95969
3.0	3.0	10.0	38.0	95904	95970
3.5	4.0	12.0	50.0	95906	95971
4.0	4.0	12.0	50.0	95908	95972
4.5	5.0	14.0	50.0	95910	95973
5.0	5.0	15.0	50.0	95912	95974
6.0	6.0	18.0	63.0	95914	95975
7.0	8.0	20.0	63.0	95916	95976
8.0	8.0	20.0	63.0	95918	95977
9.0	10.0	22.0	63.0	95920	95978
10.0	10.0	22.0	75.0	95922	95979
11.0	12.0	25.0	75.0	95989	95990
12.0	12.0	25.0	75.0	95924	95980
14.0	14.0	25.0	90.0	95926	95981
16.0	16.0	32.0	100.0	95928	95982
18.0	18.0	32.0	100.0	95930	95983
20.0	20.0	38.0	100.0	95932	95984

SINGLE END TWO FLUTE STRAIGHT



- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide
- Right Hand Cut

- Center Cutting
- Plain Round Shank
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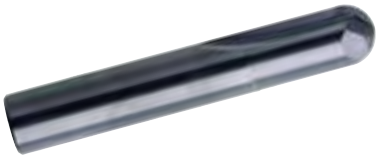
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes less than 1/8, +.000/-.001
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2008)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
1/16	1/8	3/16	1-1/2	94500	94528
1/8	1/8	1/2	1-1/2	94502	94529
3/16	3/16	5/8	2	94504	94530
1/4	1/4	3/4	2-1/2	94506	94531
5/16	5/16	13/16	2-1/2	94508	94532
3/8	3/8	7/8	2-1/2	94510	94533
1/2	1/2	1	3	94512	94534

SINGLE END TWO FLUTE BALL STRAIGHT



- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide
- Right Hand Cut

- Center Cutting
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
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  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

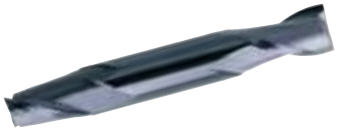
(Former List Number 2014)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
1/16	1/8	3/16	1 1/2	94550	94535
1/8	1/8	1/2	1-1/2	94552	94536
3/16	3/16	5/8	2	94554	94537
1/4	1/4	3/4	2-1/2	94556	94538
5/16	5/16	13/16	2-1/2	94558	94539
3/8	3/8	7/8	2-1/2	94560	94540
1/2	1/2	1	3	94562	94541

SOLID CARBIDE

BRUBAKER TOOL™

DOUBLE END TWO FLUTE - STUB LENGTH



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- Optimum Speeds and Feeds
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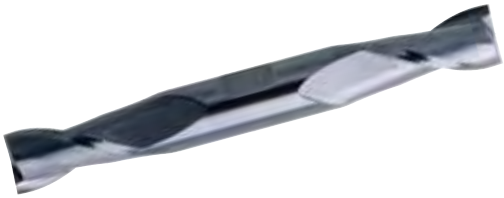
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2000 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
1/32	1/8	3/32	1-1/2	91567	91569
3/64	1/8	1/8	1-1/2	91570	91572
1/16	1/8	1/8	1-1/2	91563	90301
5/64	1/8	1/8	1-1/2	91573	91575
3/32	1/8	3/16	1-1/2	91565	90302
7/64	1/8	1/4	1-1/2	91576	91578
1/8	1/8	1/4	1-1/2	91500	91502
9/64	3/16	5/16	2	91579	91581
5/32	3/16	5/16	2	91503	91505
11/64	3/16	3/8	2	91582	91584
3/16	3/16	3/8	2	91506	91508
7/32	1/4	1/2	2-1/2	91509	91511
1/4	1/4	1/2	2-1/2	91512	91514
5/16	5/16	1/2	2-1/2	91518	91520
3/8	3/8	9/16	2-1/2	91521	91523
7/16	7/16	5/8	3	91524	91526
1/2	1/2	5/8	3	91527	91529
5/8	5/8	3/4	4	91585	91587
3/4	3/4	1	4	91588	91590

DOUBLE END TWO FLUTE



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- Plunge and Ramp
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- Center Cutting
- Weldon Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
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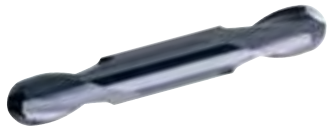
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2001)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
1/8	3/8	3/8	3-1/8	91530	91532
5/32	3/8	7/16	3-1/8	91533	91535
3/16	3/8	1/2	3-1/4	91536	91538
7/32	3/8	9/16	3-3/8	91539	91541
1/4	3/8	5/8	3-3/8	91542	91544
9/32	3/8	11/16	3-3/8	91545	91547
5/16	3/8	3/4	3-1/2	91548	91550
11/32	3/8	3/4	3-1/2	91551	91553
3/8	3/8	3/4	3-1/2	91554	91556
7/16	1/2	7/8	4	91557	91559
1/2	1/2	1	4	91560	91562

DOUBLE END TWO FLUTE BALL - STUB LENGTH



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  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2003 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
1/32	1/8	3/32	1-1/2	94969	94971
3/64	1/8	3/32	1-1/2	94972	94974
1/16	1/8	1/8	1-1/2	94900	94947
5/64	1/8	1/8	1-1/2	94975	94977
3/32	1/8	3/16	1-1/2	94902	94948
7/64	1/8	1/4	1-1/2	94978	94980
1/8	1/8	1/4	1-1/2	94904	94949
9/64	3/16	5/16	2	94981	94983
5/32	3/16	5/16	2	94906	94950
11/64	3/16	3/8	2	94984	94986
3/16	3/16	3/8	2	94908	94951
7/32	1/4	1/2	2-1/2	94910	94952
1/4	1/4	1/2	2-1/2	94912	94953
5/16	5/16	1/2	2-1/2	94914	94954
3/8	3/8	9/16	2-1/2	94916	94955
7/16	7/16	5/8	3	94918	94956
1/2	1/2	5/8	3	94920	94957
5/8	5/8	3/4	4	94987	94989
3/4	3/4	1	4	94990	94992

DOUBLE END TWO FLUTE BALL

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  Sizes larger than 1/4, +.000/-.003

(Former List Number 2004)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
1/8	3/8	3/8	3-1/8	94700	94744
5/32	3/8	7/16	3-1/4	94702	94745
3/16	3/8	1/2	3-1/4	94704	94746
7/32	3/8	9/16	3-1/2	94706	94747
1/4	3/8	5/8	3-1/2	94708	94748
9/32	3/8	11/16	3-1/2	94710	94749
5/16	3/8	3/4	3-1/2	94712	94750
11/32	3/8	3/4	3-1/2	94714	94751
3/8	3/8	3/4	3-1/2	94716	94752
7/16	1/2	7/8	4	94718	94753
1/2	1/2	1	4	94720	94754

SOLID CARBIDE

BRUBAKER TOOL™

DOUBLE END TWO FLUTE METRIC

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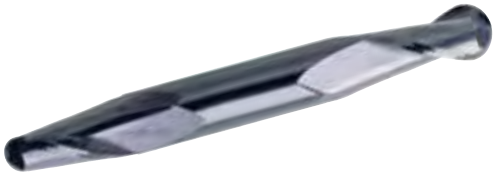
  Sizes larger than 6, +.00/-.08

(Former List Number 2002)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
2.0	3.0	3.0	38.0	97300	97326
2.5	3.0	4.0	38.0	97302	97327
3.0	3.0	6.0	38.0	97304	97328
3.5	4.0	8.0	50.0	97306	97329
4.0	4.0	8.0	50.0	97308	97330
4.5	5.0	10.0	50.0	97310	97331
5.0	5.0	10.0	50.0	97312	97332
6.0	6.0	12.0	63.0	97314	97333
7.0	8.0	12.0	63.0	97316	97334
8.0	8.0	12.0	63.0	97318	97335
9.0	10.0	14.0	75.0	97320	97336
10.0	10.0	14.0	75.0	97322	97337
12.0	12.0	14.0	75.0	97324	97338

DOUBLE END TWO FLUTE METRIC BALL



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  Sizes larger than 6, +.00/-.08

(Former List Number 2005)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN
2.0	3.0	3.0	38.0	97350	97339
2.5	3.0	4.0	38.0	97352	97340
3.0	3.0	6.0	38.0	97354	97341
3.5	4.0	8.0	50.0	97356	97342
4.0	4.0	8.0	50.0	97358	97343
4.5	5.0	10.0	50.0	97360	97344
5.0	5.0	10.0	50.0	97362	97345
6.0	6.0	12.0	63.0	97364	97346
7.0	8.0	12.0	63.0	97366	97347
8.0	8.0	12.0	63.0	97368	97348
9.0	10.0	14.0	75.0	97370	97349
10.0	10.0	14.0	75.0	97372	97376
12.0	12.0	14.0	75.0	97374	97377

SINGLE END THREE FLUTE

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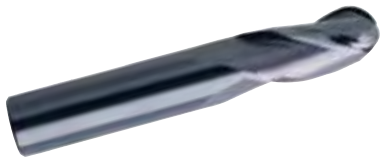
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2020)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/16	1/8	3/16	1-1/2	91300	91302	92514
5/64	1/8	3/16	1-1/2	91363	91400	92515
3/32	1/8	3/8	1-1/2	91303	91305	92516
7/64	1/8	3/8	1-1/2	91365	91401	92517
1/8	1/8	1/2	1-1/2	91306	91308	92518
9/64	3/16	9/16	2	91367	91402	92519
5/32	3/16	9/16	2	91369	91403	92520
11/64	3/16	5/8	2	91371	91404	92521
3/16	3/16	5/8	2	91312	91314	92522
13/64	1/4	5/8	2-1/2	91373	91405	92523
7/32	1/4	5/8	2-1/2	91315	91317	92524
15/64	1/4	3/4	2-1/2	91375	91406	92525
1/4	1/4	3/4	2-1/2	91318	91320	92526
17/64	5/16	3/4	2-1/2	91378	91407	92527
9/32	5/16	3/4	2-1/2	91321	91323	92528
19/64	5/16	13/16	2-1/2	91380	91408	92529
5/16	5/16	13/16	2-1/2	91324	91326	92530
21/64	3/8	1	2-1/2	91382	91409	92531
11/32	3/8	1	2-1/2	91327	91329	92532
23/64	3/8	1	2-1/2	91384	91410	92533
3/8	3/8	1	2-1/2	91330	91332	92534
25/64	7/16	1	2-3/4	91386	91411	92535
13/32	7/16	1	2-3/4	91333	91335	92536
27/64	7/16	1	2-3/4	91388	91412	92537
7/16	7/16	1	2-3/4	91336	91338	92538
29/64	1/2	1	3	91390	91413	92539
15/32	1/2	1	3	91339	91341	92540
31/64	1/2	1	3	91392	91414	92541
1/2	1/2	1	3	91342	91344	92542
9/16	9/16	1-1/4	3-1/2	91345	91347	92543
5/8	5/8	1-1/4	3-1/2	91348	91350	92544
3/4	3/4	1-1/2	4	91354	91356	92545
7/8	7/8	1-1/2	4	91357	91359	92546
1	1	1-1/2	4	91360	91362	92547

SINGLE END THREE FLUTE BALL



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- 30° Right Hand Helix, Right Hand Cut
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  Sizes less than 1/8, +.000/-.001
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2021)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/16	1/8	3/16	1-1/2	94300	94368	92548
5/64	1/8	3/16	1-1/2	94302	94369	92549
3/32	1/8	3/8	1-1/2	94304	94370	92550
7/64	1/8	3/8	1-1/2	94306	94371	92551
1/8	1/8	1/2	1-1/2	94308	94372	92552
9/64	3/16	9/16	2	94310	94373	92553
5/32	3/16	9/16	2	94312	94374	92554
11/64	3/16	5/8	2	94314	94375	92555
3/16	3/16	5/8	2	94316	94376	92556
13/64	1/4	5/8	2-1/2	94318	94377	92557
7/32	1/4	5/8	2-1/2	94320	94378	92558
15/64	1/4	3/4	2-1/2	94322	94379	92559
1/4	1/4	3/4	2-1/2	94324	94380	92560
17/64	5/16	3/4	2-1/2	94326	94381	92561
9/32	5/16	3/4	2-1/2	94328	94382	92562
19/64	5/16	13/16	2-1/2	94330	94383	92563
5/16	5/16	13/16	2-1/2	94332	94384	92564
21/64	3/8	7/8	2-1/2	94334	94385	92565
11/32	3/8	7/8	2-1/2	94336	94386	92566
23/64	3/8	7/8	2-1/2	94338	94387	92567
3/8	3/8	7/8	2-1/2	94340	94388	92568
25/64	7/16	7/8	2-1/2	94342	94389	92569
13/32	7/16	7/8	2-1/2	94344	94390	92570
27/64	7/16	7/8	2-1/2	94346	94391	92571
7/16	7/16	7/8	2-1/2	94348	94392	92572
29/64	1/2	1	3	94350	94393	92573
15/32	1/2	1	3	94352	94394	92574
31/64	1/2	1	3	94354	94395	92575
1/2	1/2	1	3	94356	94396	92576
9/16	9/16	1-1/4	3-1/2	94358	94397	92577
5/8	5/8	1-1/4	3-1/2	94360	94398	92578
3/4	3/4	1-1/2	4	94362	94399	92579
7/8	7/8	1-1/2	4	94364	94400	92580
1	1	1-1/2	4	94366	94401	92581

SINGLE END THREE FLUTE

- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide
- 50° Right Hand Helix, Right Hand Cut
- Center Cutting
- Plain Round Shank
  *Weldon Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes 3/16 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Numbers 2040, 2041)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
3/16	3/16	3/8	2	97850	97851	92854
3/16	3/16	5/8	2	97800	97801	92862
1/4	1/4	1/2	2	97852	97853	92855
1/4	1/4	3/4	2-1/2	97802	97803	92863
5/16	5/16	1/2	2	97854	97855	92856
5/16	5/16	13/16	2-1/2	97804	97805	92864
3/8	3/8	1/2	2	97856	97857	92857
3/8	3/8	1	2-1/2	97806	97807	92865
7/16	7/16	5/8	2-1/2	97858	97859	92858
7/16	7/16	1	2-1/2	97808	97809	92866
*1/2	1/2	5/8	2-1/2	97860	97861	92859
*1/2	1/2	1	3	97810	97811	92867
*5/8	5/8	7/8	3	97862	97863	92860
*5/8	5/8	1-1/4	3-1/2	97812	97813	92868
*3/4	3/4	1	3-1/2	97864	97865	92861
*3/4	3/4	1-1/2	4	97814	97815	92869
*1	1	1-1/2	4	97816	97817	92870

SINGLE END THREE FLUTE

- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide
- 60° Right Hand Helix, Right Hand Cut
- Center Cutting
- Plain Round Shank
  *Weldon Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2042)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/4	1/4	3/4	2-1/2	97870	97846	92871
5/16	5/16	13/16	2-1/2	97872	97818	92872
3/8	3/8	7/8	2-1/2	97874	97819	92873
7/16	7/16	1	2-1/2	97876	97820	92874
*1/2	1/2	1	3	97878	97821	92875
*5/8	5/8	1-1/4	3-1/2	97880	97822	92876
*3/4	3/4	1-1/2	4	97882	97823	92877
*1	1	1-1/2	4	97884	97824	92878

SINGLE END FOUR FLUTE MICRO MINIATURE CENTER CUTTING

- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide
- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is +.0005/-.0005

(New Offering)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
.0100	1/8	.0300	1-1/2	91700	91702	91703
.0150	1/8	.0450	1-1/2	91704	91706	91707
.0200	1/8	.0600	1-1/2	91708	91710	91711
.0250	1/8	.0750	1-1/2	91712	91714	91715
.0300	1/8	.0900	1-1/2	91716	91718	91719
.0350	1/8	.1050	1-1/2	91720	91722	91723
.0400	1/8	.1200	1-1/2	91724	91726	91727
.0450	1/8	.1350	1-1/2	91728	91730	91731
.0500	1/8	.1500	1-1/2	91732	91734	91735
.0550	1/8	.1650	1-1/2	91736	91738	91739

SINGLE END FOUR FLUTE, 1/32 – 5/16
CENTER CUTTING

- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide
- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes less than 1/8, +.000/-.001
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Numbers 2029, 2030, 2031, 2032 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/32	1/8	3/32	1-1/2	91102	91000	92659
1/32	1/8	1/8	1-1/2	91006	91008	92934
3/64	1/8	1/8	1-1/2	91111	91001	92660
3/64	1/8	3/16	1-1/2	91009	91011	92935
1/16	1/8	1/8	1-1/2	91100	91002	92661
1/16	1/8	3/16	1-1/2	91139	91141	92674
5/64	1/8	1/8	1-1/2	91012	91014	92936
5/64	1/8	3/16	1-1/2	91142	91144	92675
3/32	1/8	3/16	1-1/2	91103	91003	92662
3/32	1/8	3/8	1-1/2	91145	91147	92676
7/64	1/8	1/4	1-1/2	91015	91017	92937
7/64	1/8	3/8	1-1/2	91148	91150	92677
1/8	1/8	1/4	1-1/2	91106	91108	92663
1/8	1/8	1/2	1-1/2	91151	91153	92678
1/8	1/8	3/4	2-1/4	91244	91246	92708
1/8	1/8	1	3	95628	95684	92722
9/64	3/16	5/16	2	91018	91020	92938
9/64	3/16	9/16	2	91154	91156	92679
5/32	3/16	5/16	2	91109	91004	92664
5/32	3/16	9/16	2	91157	91159	92680
11/64	3/16	3/8	2	91021	91023	92939
11/64	3/16	5/8	2	91160	91162	92681
3/16	3/16	3/8	2	91112	91005	92665
3/16	3/16	5/8	2	91163	91165	92682
3/16	3/16	3/4	2-1/2	91247	91249	92709
3/16	3/16	1-1/8	3	95630	95685	92723
13/64	1/4	5/8	2-1/2	91166	91168	92683
7/32	1/4	1/2	2	91115	91117	92666
7/32	1/4	5/8	2-1/2	91169	91171	92684
15/64	1/4	3/4	2-1/2	91172	91174	92685
1/4	1/4	1/2	2	91118	91120	92667
1/4	1/4	3/4	2-1/2	91175	91177	92686
1/4	1/4	1	4	91274	91276	92711
1/4	1/4	1-1/8	3	91250	91252	92710
1/4	1/4	1-1/2	4	95632	95686	92724
1/4	1/4	1-1/2	6	95634	95687	92725
17/64	5/16	3/4	2-1/2	91178	91180	92687
9/32	5/16	3/4	2-1/2	91181	91183	92688
19/64	5/16	13/16	2-1/2	91184	91186	92689
5/16	5/16	1/2	2	91121	91123	92668
5/16	5/16	13/16	2-1/2	91187	91189	92690
5/16	5/16	1-1/8	3	91253	91255	92712
5/16	5/16	1-5/8	4	95636	95688	92726

SINGLE END FOUR FLUTE CONTINUED ON NEXT PAGE

SINGLE END FOUR FLUTE, 21/64 – 1 CENTER CUTTING

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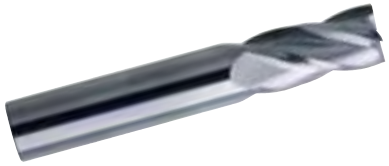


(Former List Numbers 2029, 2030, 2031, 2032 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
21/64	3/8	1	2-1/2	91190	91192	92691
11/32	3/8	1	2-1/2	91193	91195	92692
23/64	3/8	1	2-1/2	91196	91198	92693
3/8	3/8	5/8	2	91124	91126	92669
3/8	3/8	1	2-1/2	91199	91201	92694
3/8	3/8	1	4	91278	91277	92714
3/8	3/8	1-1/8	3	91256	91258	92713
3/8	3/8	1-3/4	4	95638	95689	92727
3/8	3/8	1-1/2	6	95640	95690	92728
25/64	7/16	1	2-3/4	91202	91204	92695
13/32	7/16	1	2-3/4	91205	91207	92696
27/64	7/16	1	2-3/4	91208	91210	92697
7/16	7/16	5/8	2-1/2	91127	91129	92670
7/16	7/16	1	2-3/4	91211	91213	92698
7/16	7/16	2	4	91259	91261	92715
7/16	7/16	3	6	95642	95691	92729
29/64	1/2	1	3	91214	91216	92699
15/32	1/2	1	3	91217	91219	92700
31/64	1/2	1	3	91220	91222	92701
1/2	1/2	5/8	2-1/2	91130	91132	92671
1/2	1/2	1	3	91223	91225	92702
1/2	1/2	1	4	91282	91280	92716
1/2	1/2	1-1/2	6	95644	95692	92730
1/2	1/2	2	4	91262	91264	92717
1/2	1/2	3	6	95646	95693	92731
9/16	9/16	1-1/4	3-1/2	91226	91228	92703
5/8	5/8	3/4	3	91133	91135	92672
5/8	5/8	1-1/4	3-1/2	91229	91231	92704
5/8	5/8	2-1/4	5	91265	91267	92718
5/8	5/8	3	6	95648	95666	92732
11/16	3/4	1-3/8	4	91024	91026	92940
3/4	3/4	1	3	91136	91138	92673
3/4	3/4	1-1/2	4	91235	91237	92705
3/4	3/4	2-1/4	5	91268	91270	92719
3/4	3/4	3	6	95650	95694	92733
7/8	7/8	1-1/2	4	91238	91240	92706
7/8	7/8	2-1/4	5	91289	91291	92720
7/8	7/8	3	6	95652	95695	92734
1	1	1-1/2	4	91241	91243	92707
1	1	2-1/4	5	91271	91273	92721
1	1	3	6	95654	95696	92735

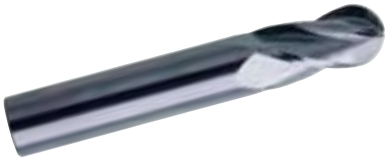
SINGLE END FOUR FLUTE - CORNER RADIUS

- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(New Offering)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	Radius	EDP No. Uncoated	TiCN	ALTiN
1/8	1/8	1/2	1-1/2	.015	98500	98501	98502
1/8	1/8	1/2	1-1/2	.020	98503	98504	98505
3/16	3/16	5/8	2	.015	98506	98507	98508
3/16	3/16	5/8	2	.020	98511	98512	98513
1/4	1/4	3/4	2-1/2	.015	98514	98515	98516
1/4	1/4	3/4	2-1/2	.020	98517	98518	98519
1/4	1/4	3/4	2-1/2	.030	98521	98522	98523
1/4	1/4	3/4	2-1/2	.045	98524	98525	98526
5/16	5/16	13/16	2-1/2	.020	98527	98528	98529
5/16	5/16	13/16	2-1/2	.030	98531	98532	98533
5/16	5/16	13/16	2-1/2	.045	98534	98535	98536
3/8	3/8	1	2-1/2	.020	98537	98538	98539
3/8	3/8	1	2-1/2	.030	98541	98542	98543
3/8	3/8	1	2-1/2	.045	98544	98545	98546
7/16	7/16	1	2-3/4	.020	98547	98548	98549
7/16	7/16	1	2-3/4	.030	98550	98551	98552
7/16	7/16	1	2-3/4	.045	98553	98554	98555
7/16	7/16	1	2-3/4	.060	98556	98557	98558
7/16	7/16	1	2-3/4	.090	98559	98560	98561
7/16	7/16	1	2-3/4	.125	98562	98563	98564
1/2	1/2	1	3	.020	98565	98566	98567
1/2	1/2	1	3	.030	98568	98569	98570
1/2	1/2	1	3	.045	98571	98572	98573
1/2	1/2	1	3	.060	98574	98575	98576
1/2	1/2	1	3	.090	98577	98578	98579
1/2	1/2	1	3	.125	98580	98581	98582
5/8	5/8	1-1/4	3-1/2	.020	98583	98584	98585
5/8	5/8	1-1/4	3-1/2	.030	98586	98587	98588
5/8	5/8	1-1/4	3-1/2	.045	98589	98590	98591
5/8	5/8	1-1/4	3-1/2	.060	98592	98593	98594
5/8	5/8	1-1/4	3-1/2	.090	98595	98596	98597
5/8	5/8	1-1/4	3-1/2	.125	98598	98599	98600
3/4	3/4	1-1/2	4	.020	98601	98602	98603
3/4	3/4	1-1/2	4	.030	98604	98605	98606
3/4	3/4	1-1/2	4	.045	98607	98608	98609
3/4	3/4	1-1/2	4	.060	98614	98615	98616
3/4	3/4	1-1/2	4	.090	98617	98618	98619
3/4	3/4	1-1/2	4	.125	98623	98624	98625
3/4	3/4	1-1/2	4	.190	98626	98627	98628
1	1	1-1/2	4	.020	98633	98634	98635
1	1	1-1/2	4	.030	98636	98637	98638
1	1	1-1/2	4	.045	98643	98644	98645
1	1	1-1/2	4	.060	98646	98647	98648
1	1	1-1/2	4	.090	98651	98652	98653
1	1	1-1/2	4	.125	98654	98655	98656
1	1	1-1/2	4	.190	98657	98658	98659

SINGLE END FOUR FLUTE BALL, 1/32 – 5/16
CENTER CUTTING



- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide
- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes less than 1/8, +.000/-.001
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Numbers 2035, 2036, 2037, 2038 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/32	1/8	3/32	1-1/2	95130	95175	92760
1/32	1/8	1/8	1-1/2	95195	95197	92927
3/64	1/8	1/8	1-1/2	95132	95176	92761
3/64	1/8	3/16	1-1/2	95198	95200	92928
1/16	1/8	1/8	1-1/2	95134	95177	92762
1/16	1/8	3/16	1-1/2	91900	91902	92775
5/64	1/8	1/8	1-1/2	95201	95203	92929
5/64	1/8	3/16	1-1/2	91954	92010	92776
3/32	1/8	3/16	1-1/2	95136	95178	92763
3/32	1/8	3/8	1-1/2	91903	91905	92777
7/64	1/8	1/4	1-1/2	95204	95206	92930
7/64	1/8	3/8	1-1/2	91956	91968	92778
1/8	1/8	1/4	1-1/2	95138	95179	92764
1/8	1/8	1/2	1-1/2	91906	91908	92779
1/8	1/8	3/4	2-1/4	95328	95370	92809
1/8	1/8	1	3	95528	95570	92823
9/64	3/16	5/16	2	95207	95209	92931
9/64	3/16	9/16	2	91958	91969	92780
5/32	3/16	5/16	1-1/2	95140	95180	92765
5/32	3/16	9/16	2	91909	91911	92781
11/64	3/16	3/8	2	95210	95212	92932
11/64	3/16	5/8	2	91960	91996	92782
3/16	3/16	5/16	1-1/2	95142	95181	92766
3/16	3/16	5/8	2	91912	91914	92783
3/16	3/16	3/4	2-1/2	95330	95371	92810
3/16	3/16	1-1/8	3	95530	95571	92824
13/64	1/4	5/8	2-1/2	91970	91997	92784
7/32	1/4	1/2	2	95144	95182	92767
7/32	1/4	5/8	2-1/2	91915	91917	92785
15/64	1/4	3/4	2-1/2	91972	91998	92786
1/4	1/4	1/2	2	95146	95183	92768
1/4	1/4	3/4	2-1/2	91918	91920	92787
1/4	1/4	1	4	95334	95373	92812
1/4	1/4	1-1/8	3	95332	95372	92811
1/4	1/4	1-1/2	4	95532	95572	92825
1/4	1/4	1-1/2	6	95534	95573	92826
17/64	5/16	3/4	2-1/2	91974	91999	92788
9/32	5/16	3/4	2-1/2	91921	91923	92789
19/64	5/16	13/16	2-1/2	91976	92000	92790
5/16	5/16	1/2	2	95148	95184	92769
5/16	5/16	13/16	2-1/2	91924	91926	92791
5/16	5/16	1-1/8	3	95336	95374	92813
5/16	5/16	1-5/8	4	95536	95574	92827

SINGLE END FOUR FLUTE BALL CONTINUED ON NEXT PAGE

SINGLE END FOUR FLUTE BALL, 21/64 – 1 CENTER CUTTING

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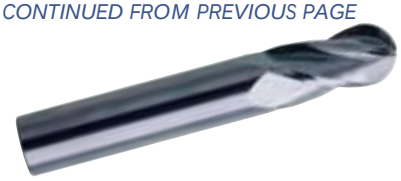
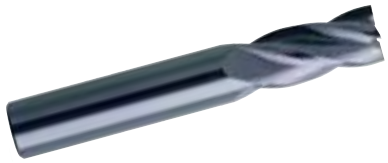


(Former List Numbers 2035, 2036, 2037, 2038 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
21/64	3/8	7/8	2-1/2	91978	92001	92792
11/32	3/8	7/8	2-1/2	91980	92002	92793
23/64	3/8	7/8	2-1/2	91982	92003	92794
3/8	3/8	5/8	2	95150	95185	92770
3/8	3/8	7/8	2-1/2	91927	91929	92795
3/8	3/8	1	4	95340	95376	92815
3/8	3/8	1-1/8	3	95338	95375	92814
3/8	3/8	1-1/2	6	95540	95576	92829
3/8	3/8	1-3/4	4	95538	95575	92828
25/64	7/16	7/8	2-1/2	91984	92004	92796
13/32	7/16	7/8	2-1/2	91986	92005	92797
27/64	7/16	7/8	2-1/2	91988	92006	92798
7/16	7/16	5/8	2-1/2	95152	95186	92771
7/16	7/16	1	2-3/4	91930	91932	92799
7/16	7/16	2	4	95342	95377	92816
7/16	7/16	3	6	95542	95577	92830
29/64	1/2	1	3	91990	92007	92800
15/32	1/2	1	3	91992	92008	92801
31/64	1/2	1	3	91994	92009	92802
1/2	1/2	5/8	2-1/2	95154	95187	92772
1/2	1/2	1	3	91933	91935	92803
1/2	1/2	1	4	95344	95378	92817
1/2	1/2	1-1/2	6	95544	95578	92831
1/2	1/2	2	4	95346	95379	92818
1/2	1/2	3	6	95546	95579	92832
9/16	9/16	1-1/4	3-1/2	91936	91938	92804
5/8	5/8	3/4	3	95156	95188	92773
5/8	5/8	1-1/4	3-1/2	91939	91941	92805
5/8	5/8	2-1/4	5	95348	95380	92819
5/8	5/8	3	6	95548	95580	92833
11/16	3/4	1-1/2	4	95213	95215	92933
3/4	3/4	1	3	95158	95189	92774
3/4	3/4	1-1/2	4	91945	91947	92806
3/4	3/4	2-1/4	5	95350	95381	92820
3/4	3/4	3	6	95550	95581	92834
7/8	7/8	1-1/2	4	91948	91950	92807
7/8	7/8	2-1/4	5	95352	95382	92821
7/8	7/8	3	6	95552	95582	92835
1	1	1-1/2	4	91951	91953	92808
1	1	2-1/4	5	95354	95383	92822
1	1	3	6	95554	95583	92836

SINGLE END FOUR FLUTE METRIC CENTER CUTTING



- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is (mm):
  Sizes 1 through 6, +.00/-.05
  Sizes larger than 6, +.00/-.08

(Former List Number 2033 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1.0	3.0	5.5	38.0	95859	95863	95867
1.5	3.0	6.5	38.0	95871	95872	95873
2.0	3.0	6.0	38.0	95734	95792	92736
2.5	3.0	8.0	38.0	95736	95793	92737
3.0	3.0	10.0	38.0	95738	95794	92738
3.5	4.0	12.0	50.0	95740	95795	92739
4.0	4.0	12.0	50.0	95742	95796	92740
4.5	5.0	14.0	50.0	95744	95797	92741
5.0	5.0	15.0	50.0	95746	95798	92742
6.0	6.0	18.0	63.0	95748	95799	92743
7.0	8.0	20.0	63.0	95750	95800	92744
8.0	8.0	20.0	63.0	95752	95801	92745
9.0	10.0	22.0	75.0	95754	95802	92746
10.0	10.0	22.0	75.0	95756	95803	92747
11.0	12.0	25.0	75.0	95874	95875	95876
12.0	12.0	25.0	75.0	95758	95804	92748
14.0	14.0	25.0	90.0	95760	95807	92749
16.0	16.0	32.0	100.0	95762	95808	92750
18.0	18.0	32.0	100.0	95764	95809	92751
20.0	20.0	38.0	100.0	95766	95810	92752

SINGLE END FOUR FLUTE METRIC BALL CENTER CUTTING

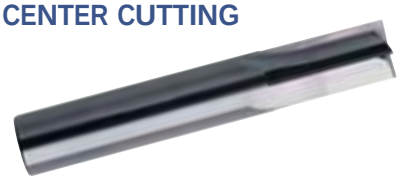
- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is (mm):
  Sizes 1 through 6, +.00/-.05
  Sizes larger than 6, +.00/-.08

(Former List Number 2039 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1.0	3.0	5.5	38.0	95877	95878	95879
1.5	3.0	6.5	38.0	95880	95881	95882
2.0	3.0	6.0	38.0	95934	95811	92837
2.5	3.0	8.0	38.0	95936	95812	92838
3.0	3.0	10.0	38.0	95938	95813	92839
3.5	4.0	12.0	50.0	95940	95814	92840
4.0	4.0	12.0	50.0	95942	95815	92841
4.5	5.0	14.0	50.0	95944	95816	92842
5.0	5.0	15.0	50.0	95946	95817	92843
6.0	6.0	18.0	50.0	95948	95818	92844
7.0	8.0	20.0	63.0	95950	95819	92845
8.0	8.0	20.0	63.0	95952	95820	92846
9.0	10.0	22.0	63.0	95954	95821	92847
10.0	10.0	22.0	75.0	95956	95822	92848
11.0	12.0	25.0	75.0	95883	95884	95885
12.0	12.0	25.0	75.0	95958	95823	92849
14.0	14.0	25.0	90.0	95960	95824	92850
16.0	16.0	32.0	100.0	95962	95825	92851
18.0	18.0	32.0	100.0	95964	95826	92852
20.0	20.0	38.0	100.0	95966	95827	92853

SINGLE END FOUR FLUTE STRAIGHT CENTER CUTTING



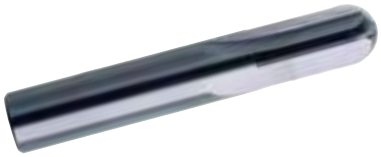
- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  - Sizes less than 1/8, +.000/-.001
  - Sizes 1/8 through 1/4, +.000/-.002
  - Sizes larger than 1/4, +.000/-.003

(Former List Number 2028)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/16	1/8	3/16	1-1/2	94514	94542	92652
1/8	1/8	1/2	1-1/2	94516	94543	92653
3/16	3/16	5/8	2	94518	94544	92654
1/4	1/4	3/4	2-1/2	94520	94545	92655
5/16	5/16	13/16	2-1/2	94522	94546	92656
3/8	3/8	7/8	2-1/2	94524	94547	92657
1/2	1/2	1	3	94526	94548	92658

SINGLE END FOUR FLUTE BALL STRAIGHT CENTER CUTTING



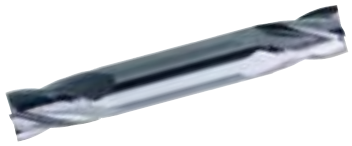
- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  - Sizes less than 1/8, +.000/-.001
  - Sizes 1/8 through 1/4, +.000/-.002
  - Sizes larger than 1/4, +.000/-.003

(Former List Number 2034)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/16	1/8	3/16	1 1/2	94564	94549	92753
1/8	1/8	1/2	1-1/2	94566	94578	92754
3/16	3/16	5/8	2	94568	94579	92755
1/4	1/4	3/4	2-1/2	94570	94580	92756
5/16	5/16	13/16	2-1/2	94572	94581	92757
3/8	3/8	7/8	2-1/2	94574	94582	92758
1/2	1/2	1	3	94576	94583	92759

DOUBLE END FOUR FLUTE - STUB LENGTH CENTER CUTTING



- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes less than 1/8, +.000/-.001
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2022 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/32	1/8	3/32	1-1/2	91693	91670	92910
3/64	1/8	3/32	1-1/2	91671	91673	92911
1/16	1/8	1/8	1-1/2	91663	91667	92582
5/64	1/8	1/8	1-1/2	91674	91676	92912
3/32	1/8	3/16	1-1/2	91665	91668	92583
7/64	1/8	1/4	1-1/2	91678	91680	92913
1/8	1/8	1/4	1-1/2	91600	91602	92584
9/64	3/16	5/16	2	91681	91683	92914
5/32	3/16	5/16	2	91603	91605	92585
11/64	3/16	3/8	2	91684	91686	92915
3/16	3/16	3/8	2	91606	91608	92586
7/32	1/4	1/2	2-1/2	91609	91611	92587
1/4	1/4	1/2	2-1/2	91612	91614	92588
5/16	5/16	1/2	2-1/2	91618	91620	92589
3/8	3/8	9/16	2-1/2	91621	91623	92590
7/16	7/16	5/8	3	91624	91626	92591
1/2	1/2	5/8	3	91627	91629	92592
5/8	5/8	3/4	4	91687	91689	92916
3/4	3/4	1	4	91690	91692	92917

DOUBLE END FOUR FLUTE CENTER CUTTING

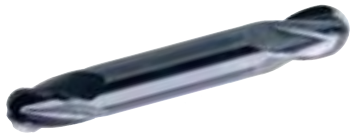
- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- 30° Right Hand Helix, Right Hand Cut
- Weldon Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2023)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/8	3/8	3/8	3-1/8	91630	91632	92593
5/32	3/8	7/16	3-1/8	91633	91635	92594
3/16	3/8	1/2	3-1/4	91636	91638	92595
7/32	3/8	9/16	3-3/8	91639	91641	92596
1/4	3/8	5/8	3-3/8	91642	91644	92597
9/32	3/8	11/16	3-3/8	91645	91647	92598
5/16	3/8	3/4	3-1/2	91648	91650	92599
11/32	3/8	3/4	3-1/2	91651	91653	92600
3/8	3/8	3/4	3-1/2	91654	91656	92601
7/16	1/2	7/8	4	91657	91659	92602
1/2	1/2	1	4	91660	91662	92603

DOUBLE END FOUR FLUTE BALL - STUB LENGTH CENTER CUTTING



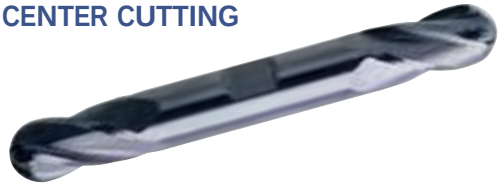
- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes less than 1/8, +.000/-.001
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2025 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/32	1/8	3/32	1-1/2	94993	94995	92918
3/64	1/8	3/32	1-1/2	94996	94999	92919
1/16	1/8	1/8	1-1/2	94922	94958	92617
5/64	1/8	1/8	1-1/2	94766	94768	92920
3/32	1/8	3/16	1-1/2	94924	94959	92618
7/64	1/8	1/4	1-1/2	94769	94771	92921
1/8	1/8	1/4	1-1/2	94926	94960	92619
9/64	3/16	5/16	2	94772	94774	92922
5/32	3/16	5/16	2	94928	94961	92620
11/64	3/16	3/8	2	94775	94777	92923
3/16	3/16	3/8	2	94930	94962	92621
7/32	1/4	1/2	2-1/2	94932	94963	92622
1/4	1/4	1/2	2-1/2	94934	94964	92623
5/16	5/16	1/2	2-1/2	94936	94965	92624
3/8	3/8	9/16	2-1/2	94938	94966	92625
7/16	7/16	5/8	3	94940	94967	92626
1/2	1/2	5/8	3	94942	94968	92627
5/8	5/8	3/4	4	94778	94780	92924
3/4	3/4	1	4	94781	94783	92925

DOUBLE END FOUR FLUTE BALL CENTER CUTTING



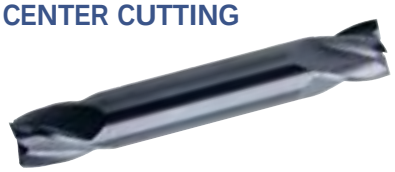
- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- 30° Right Hand Helix, Right Hand Cut
- Weldon Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes 1/8 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2026)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/8	3/8	3/8	3-1/8	94722	94755	92628
5/32	3/8	7/16	3-1/4	94724	94756	92629
3/16	3/8	1/2	3-1/4	94726	94757	92630
7/32	3/8	9/16	3-1/2	94728	94758	92631
1/4	3/8	5/8	3-1/2	94730	94759	92632
9/32	3/8	11/16	3-1/2	94732	94760	92633
5/16	3/8	3/4	3-1/2	94734	94761	92634
11/32	3/8	3/4	3-1/2	94736	94762	92635
3/8	3/8	3/4	3-1/2	94738	94763	92636
7/16	1/2	7/8	4	94740	94764	92637
1/2	1/2	1	4	94742	94765	92638

DOUBLE END FOUR FLUTE METRIC CENTER CUTTING



- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is (mm):
  Sizes 2 through 6, +.00/-.05
  Sizes larger than 6, +.00/-.08

(Former List Number 2024 and New Sizes)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
2.0	3.0	3.0	38.0	97301	97378	92604
2.5	3.0	4.0	38.0	97303	97379	92605
3.0	3.0	6.0	38.0	97305	97380	92606
3.5	4.0	8.0	50.0	97307	97381	92607
4.0	4.0	8.0	50.0	97309	97382	92608
4.5	5.0	10.0	50.0	97311	97383	92609
5.0	5.0	10.0	50.0	97313	97384	92610
6.0	6.0	12.0	63.0	97315	97385	92611
7.0	8.0	12.0	63.0	97317	97386	92612
8.0	8.0	12.0	63.0	97319	97387	92613
9.0	10.0	14.0	75.0	97321	97388	92614
10.0	10.0	14.0	75.0	97323	97389	92615
12.0	12.0	14.0	75.0	97325	97390	92616

DOUBLE END FOUR FLUTE METRIC BALL CENTER CUTTING

- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is (mm):
  Sizes 2 through 6, +.00/-.05
  Sizes larger than 6, +.00/-.08

(Former List Number 2027)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
2.0	3.0	3.0	38.0	97351	97391	92639
2.5	3.0	4.0	38.0	97353	97392	92640
3.0	3.0	6.0	38.0	97355	97393	92641
3.5	4.0	8.0	50.0	97357	97394	92642
4.0	4.0	8.0	50.0	97359	97395	92643
4.5	5.0	10.0	50.0	97361	97396	92644
5.0	5.0	10.0	50.0	97363	97397	92645
6.0	6.0	12.0	63.0	97365	97398	92646
7.0	8.0	12.0	63.0	97367	97399	92647
8.0	8.0	12.0	63.0	97369	97400	92648
9.0	10.0	14.0	75.0	97371	97401	92649
10.0	10.0	14.0	75.0	97373	97403	92650
12.0	12.0	14.0	75.0	97375	97405	92651

SINGLE END MULTI-FLUTE CENTER CUTTING

- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is:
  Sizes 3/16 through 1/4, +.000/-.002
  Sizes larger than 1/4, +.000/-.003

(Former List Number 2043)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	AlTiN
3/16	3/16	5/8	2	6	98350	98322	92879
1/4	1/4	3/4	2-1/2	6	98352	98323	92880
5/16	5/16	13/16	2-1/2	6	98354	98324	92881
3/8	3/8	7/8	2-1/2	6	98356	98325	92882
7/16	7/16	1	2-1/2	6	98358	98326	92883
1/2	1/2	1	3	6	98360	98327	92884
9/16	9/16	1-1/4	3-1/2	6	98362	98328	92885
5/8	5/8	1-1/4	3-1/2	8	98364	98329	92886
3/4	3/4	1-1/2	4	8	98366	98330	92887

SINGLE END MULTI-FLUTE ROUGHER/FINISHER CENTER CUTTING

- Most Ferrous, Non-Ferrous and Non-Metallic Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Micrograin Solid Carbide

- 30° Right Hand Helix, Right Hand Cut
- Plain Round Shank
- High Rigidity from Substrate
- Optimum Speeds and Feeds
- Cutting Diameter Tolerance is +.000/-.003

(Former List Number 2044)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	AlTiN
1/2	1/2	1	3	4	98300	98316	92888
5/8	5/8	1-1/4	3-1/2	6	98302	98317	92889
3/4	3/4	1-1/2	4	6	98304	98318	92890
1	1	1-1/2	4	6	98306	98319	92891
1-1/4	1	2-1/2	5	6	98308	98320	92892
1-1/2	1	2-1/2	5	6	98310	98321	92893

BRUBAKER TOOL™

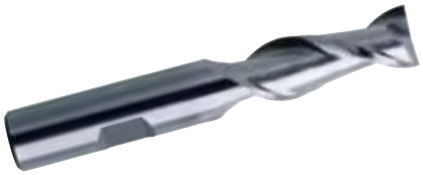
HIGH SPEED STEEL END MILLS AND MISCELLANEOUS CUTTERS

We offer a variety of general purpose and special application end mills and cutters that have been designed to ANSI and NAS specifications in our high speed steel grouping. These tools are made from a substrate that offers very good abrasion resistance for wear and red hardness at higher milling temperatures than other high speed steels.

HIGH SPEED STEEL

BRUBAKER TOOL™

SINGLE END TWO FLUTE

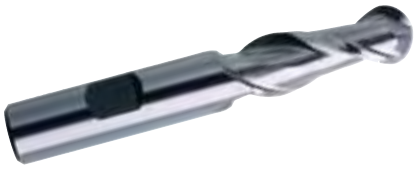


- Aluminum, Magnesium, Copper and Zinc
- Plunge and Ramp
- Pocket, Profile, and Slot
- High Speed Steel
- 38° Right Hand Helix, Right Hand Cut
- Center Cutting
- Deep Flutes for Chip Evacuation
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 700, 702, 704, 706)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/4	3/8	5/8	2-7/16	70004	70005	70006
1/4	3/8	1-1/4	3-1/16	70406	70407	70408
1/4	3/8	1-3/4	3-9/16	70607	70608	70609
5/16	3/8	3/4	2-1/2	70009	70010	70011
5/16	3/8	1-3/8	3-1/8	70411	70412	70413
5/16	3/8	2	3-3/4	70612	70613	70614
3/8	3/8	3/4	2-1/2	70014	70015	70016
3/8	3/8	1-1/2	3-1/4	70416	70417	70418
3/8	3/8	2-1/2	4-1/4	70617	70618	70619
7/16	3/8	1	2-11/16	70021	70022	70023
7/16	1/2	1-3/4	3-3/4	70423	70424	70425
7/16	1/2	2-3/4	4-3/4	70624	70625	70626
1/2	1/2	1-1/4	3-1/4	70028	70007	70008
1/2	1/2	1-5/8	3-5/8	70029	70030	70031
1/2	1/2	2	4	70430	70431	70432
1/2	1/2	3	5	70631	70632	70633
5/8	1/2	1-3/8	3-3/8	70035	70012	70013
5/8	5/8	1-5/8	3-3/4	70036	70017	70018
5/8	5/8	2	4-1/8	70037	70038	70039
5/8	5/8	2-1/2	4-5/8	70438	70439	70440
5/8	5/8	3	5-1/8	70237	70238	70239
5/8	5/8	4	6-1/8	70639	70640	70641
3/4	1/2	1-5/8	3-5/8	70043	70040	70041
3/4	3/4	1-5/8	3-7/8	70045	70042	70044
3/4	3/4	2-1/4	4-1/2	70046	70047	70048
3/4	3/4	3	5-1/4	70447	70448	70449
3/4	3/4	4	6-1/4	70648	70649	70650
7/8	3/4	1-7/8	4-1/8	70053	70049	70050
7/8	7/8	1-7/8	4-1/8	70054	70055	70056
7/8	7/8	3-1/2	5-3/4	70456	70457	70458
7/8	7/8	5	7-1/4	70657	70658	70659
1	3/4	1-7/8	4-1/8	70064	70051	70052
1	1	2	4-1/2	70066	70067	70068
1	1	3	5-1/2	70267	70268	70269
1	1	4	6-1/2	70468	70469	70470
1	1	6	8-1/2	70669	70670	70671
1-1/4	1-1/4	2	4-1/2	70075	70076	70077
1-1/4	1-1/4	3	5-1/2	70276	70277	70278
1-1/4	1-1/4	4	6-1/2	70477	70478	70479
1-1/4	1-1/4	6	8-1/2	70678	70679	70680
1-1/2	1-1/4	2	4-1/2	70083	70084	70085
1-1/2	1-1/4	3	5-1/2	70284	70285	70286
1-1/2	1-1/4	4	6-1/2	70485	70486	70487
1-1/2	1-1/4	6	8-1/2	70684	70685	70687
1-1/2	1-1/4	8	10-1/2	70686	70688	70689
1-3/4	1-1/4	2	4-1/2	70088	70089	70090
1-3/4	1-1/4	4	6-1/2	70488	70489	70490
2	1-1/4	2	4-1/2	70092	70093	70094
2	1-1/4	3	5-1/2	70293	70294	70295
2	1-1/4	4	6-1/2	70494	70495	70496
2	2	2	5-3/4	71300	71301	71302
2	2	4	7-3/4	71304	71305	71306
2	2	6	9-3/4	71308	71313	71314
2	2	8	11-3/4	71310	71311	71312
2-1/2	2	6	9-3/4	71324		

SINGLE END TWO FLUTE BALL



- Aluminum, Magnesium, Copper and Zinc
- Plunge and Ramp
- Pocket, Profile, and Slot
- High Speed Steel
- 38° Right Hand Helix, Right Hand Cut
- Center Cutting
- Deep Flutes for Chip Evacuation
- Cutting Diameter Tolerance is +.003/-.000

(Former List Numbers 708, 710, 712)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/4	3/8	5/8	2-7/16	70804	70805	70806
1/4	3/8	1-1/4	3-1/16	71006	71007	71008
1/4	3/8	1-3/4	3-9/16	71207	71208	71209
5/16	3/8	3/4	2-1/2	70809	70810	70811
5/16	3/8	1-3/8	3-1/8	71011	71012	71013
5/16	3/8	2	3-3/4	71212	71213	71214
3/8	3/8	3/4	2-1/2	70814	70815	70816
3/8	3/8	1-1/2	3-1/4	71016	71017	71018
3/8	3/8	2-1/2	4-1/4	71217	71218	71219
7/16	3/8	1	2-11/16	70821	70822	70823
7/16	1/2	1-3/4	3-3/4	71023	71024	71025
7/16	1/2	2-3/4	4-3/4	71224	71225	71226
1/2	1/2	1-1/4	3-1/4	70828	70829	70830
1/2	1/2	2	4	71030	71031	71032
1/2	1/2	3	5	71231	71232	71233
5/8	5/8	1-5/8	3-3/4	70836	70837	70838
5/8	5/8	2-1/2	4-5/8	71038	71039	71040
5/8	5/8	4	6-1/8	71239	71240	71241
3/4	3/4	1-5/8	3-7/8	70845	70846	70847
3/4	3/4	3	5-1/4	71047	71048	71049
3/4	3/4	4	6-1/4	71248	71249	71250
7/8	7/8	3-1/2	5-3/4	71056	71057	71058
1	1	2	4-1/2	70866	70867	70868
1	1	4	6-1/2	71068	71069	71070
1	1	6	8-1/2	71269	71270	71271
1-1/4	1-1/4	4	6-1/2	71077	71078	71079
1-1/2	1-1/4	4	6-1/2	71085	71086	71087

HIGH SPEED STEEL

BRUBAKER TOOL™

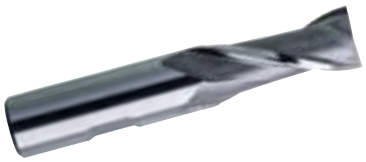
SINGLE END TWO FLUTE LEFT HAND

- Aluminum, Magnesium, Copper and Zinc
- Plunge and Ramp
- Pocket, Profile, and Slot
- High Speed Steel
- **38° Left Hand Helix, Left Hand Cut**
- Center Cutting
- Deep Flutes for Chip Evacuation
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 701, 703, 705, 707)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
3/8	3/8	1-1/2	3-1/4	70516	70517	70518
3/8	3/8	2-1/2	4-1/4	70717	70718	70719
1/2	1/2	1-1/4	3-1/4	70128	70100	70101
1/2	1/2	1-5/8	3-5/8	70129	70130	70131
1/2	1/2	2	4	70530	70531	70532
1/2	1/2	3	5	70731	70732	70733
5/8	5/8	1-5/8	3-3/4	70136	70102	70103
5/8	5/8	2	4-1/8	70137	70138	70139
5/8	5/8	2-1/2	4-5/8	70538	70539	70540
5/8	5/8	3	5-1/8	70337	70338	70339
5/8	5/8	4	6-1/8	70739	70740	70741
3/4	3/4	1-5/8	3-7/8	70145	70104	70105
3/4	3/4	2-1/4	4-1/2	70146	70147	70148
3/4	3/4	3	5-1/4	70547	70548	70549
3/4	3/4	4	6-1/4	70748	70749	70750
1	1	2	4-1/2	70166	70167	70168
1	1	3	5-1/2	70367	70368	70369
1	1	4	6-1/2	70568	70569	70570
1	1	6	8-1/2	70769	70770	70771
1-1/4	1-1/4	2	4-1/2	70175	70176	70177
1-1/4	1-1/4	3	5-1/2	70376	70377	70378
1-1/4	1-1/4	4	6-1/2	70577	70578	70579
1-1/4	1-1/4	6	8-1/2	70778	70779	70780
1-1/2	1-1/4	2	4-1/2	70183	70184	70185
1-1/2	1-1/4	3	5-1/2	70384	70385	70386
1-1/2	1-1/4	4	6-1/2	70585	70581	70582
1-1/2	1-1/4	6	8-1/2	70586	70587	70588
2	1-1/4	2	4-1/2	70192	70193	70194
2	1-1/4	3	5-1/2	70393	70394	70395
2	1-1/4	4	6-1/2	70592	70593	70594
2	2	2	5-3/4	70196	70197	70198
2	2	4	7-3/4	70598	70583	70584
2	2	6	9-3/4	70599	70589	70590

SINGLE END TWO FLUTE, 1/8 – 15/16



- Medium Hardness Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks and Larger Furnished with Dual Drive Feature

(Former List Numbers 740, 744, 746)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/16	2-1/8	74000	74010	74011
1/8	3/8	3/8	2-5/16	74001	86200	74034
5/32	3/8	3/8	2-5/16	74002	74012	74013
3/16	3/8	9/32	2-3/16	74003	74016	74017
3/16	3/8	7/16	2-5/16	74004	86202	74039
7/32	3/8	7/16	2-5/16	74005	86203	74042
1/4	3/8	3/8	2-1/4	74006	74018	74019
1/4	3/8	1/2	2-5/16	74007	86204	74048
1/4	3/8	1	2-13/16	74405	74406	74407
1/4	3/8	1-1/2	3-5/16	74606	74607	74608
9/32	3/8	1/2	2-5/16	74008	74021	74022
5/16	3/8	9/16	2-5/16	74009	86209	74051
5/16	3/8	1	2-3/4	74410	74411	74412
5/16	3/8	1-1/2	3-1/4	74611	74612	74613
3/8	3/8	9/16	2-5/16	74014	86214	74057
3/8	3/8	1	2-3/4	74415	74416	74417
3/8	3/8	1-1/2	3-1/4	74616	74617	74618
7/16	3/8	13/16	2-1/2	74020	74023	74024
1/2	3/8	13/16	2-1/2	74027	74025	74026
1/2	1/2	1	3	74028	86228	74061
1/2	1/2	1-1/2	3-1/2	74429	74430	74431
1/2	1/2	2	4	74630	74631	74632
9/16	1/2	1-1/8	3-1/8	74033	74029	74030
5/8	1/2	1-1/8	3-1/8	74035	74031	74032
5/8	5/8	1-5/16	3-7/16	74036	74037	74038
5/8	5/8	1-5/8	3-3/4	74437	74438	74439
5/8	5/8	2	4-1/8	74638	74639	74640
11/16	1/2	1-5/16	3-5/16	74040	74064	74067
11/16	5/8	1-5/16	3-7/16	74041	74046	74047
3/4	1/2	1-5/16	3-5/16	74043	74055	74056
3/4	5/8	1-5/16	3-7/16	74044	74068	74069
3/4	3/4	1-5/16	3-9/16	74045	74076	74077
3/4	3/4	1-3/4	4	74446	74447	74448
3/4	3/4	2-1/4	4-1/2	74647	74648	74649
13/16	5/8	1-1/2	3-5/8	74049	74080	74081
13/16	3/4	1-1/2	3-3/4	74050	74085	74086
7/8	5/8	1-1/2	3-5/8	74052	74094	74095
7/8	3/4	1-1/2	3-3/4	74053	74097	74098
7/8	7/8	1-1/2	3-3/4	74054	74105	74106
7/8	7/8	2	4-1/4	74455	74456	74457
7/8	7/8	2-1/2	4-3/4	74656	74657	74658
15/16	5/8	1-1/2	3-5/8	74058	74109	74110
15/16	3/4	1-1/2	3-3/4	74059	74116	74117
15/16	7/8	1-1/2	3-3/4	74060	74123	74122

SINGLE END TWO FLUTE CONTINUED ON NEXT PAGE

HIGH SPEED STEEL

BRUBAKER TOOL™

SINGLE END TWO FLUTE, 1 – 2-1/2

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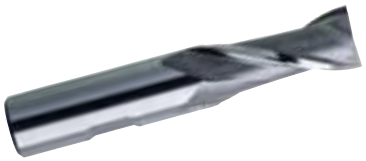
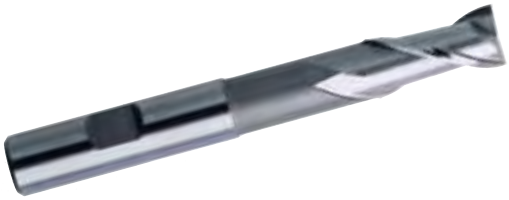


(Former List Numbers 740, 744, 746)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1	5/8	1-1/2	3-5/8	74062	74127	74128
1	3/4	1-1/2	3-3/4	74063	74131	74133
1	7/8	1-1/2	3-3/4	74065	74137	74138
1	1	1-5/8	4-1/8	74066	74141	74142
1	1	2-1/4	4-3/4	74467	74468	74469
1	1	3	5-1/2	74668	74669	74670
1-1/8	7/8	1-5/8	3-7/8	74070	74145	74146
1-1/8	1	1-5/8	4-1/8	74071	74149	74150
1-1/8	1	2-1/4	4-3/4	74471	74472	74473
1-1/8	1	3	5-1/2	74671	74672	74673
1-1/4	7/8	1-5/8	3-7/8	74073	74153	74154
1-1/4	1	1-5/8	4-1/8	74074	74157	74158
1-1/4	1	2-1/4	4-3/4	74474	74432	74433
1-1/4	1	3	5-1/2	74674	74675	74676
1-1/4	1-1/4	1-5/8	4-1/8	74075	74161	74162
1-1/4	1-1/4	2-1/4	4-3/4	74476	74477	74478
1-1/4	1-1/4	3	5-1/2	74677	74619	74620
1-3/8	1	1-5/8	4-1/8	74079	74165	74166
1-3/8	1	2-1/4	4-3/4	74479	74480	74481
1-3/8	1	3	5-1/2	74679	74680	74681
1-1/2	1	1-5/8	4-1/8	74082	74169	74170
1-1/2	1-1/4	1-5/8	4-1/8	74083	74173	74174
1-1/2	1-1/4	2-1/4	4-3/4	74484	74485	74486
1-1/2	1-1/4	3	5-1/2	74685	74621	74622
1-5/8	1-1/4	1-5/8	4-1/8	74087	74177	74178
1-5/8	1-1/4	2-1/4	4-3/4	74487	74434	74435
1-5/8	1-1/4	3	5-1/2	74687	74623	74624
1-3/4	1-1/4	1-5/8	4-1/8	74088	74181	74182
1-3/4	1-1/4	2-1/4	4-3/4	74488	74440	74441
1-3/4	1-1/4	3	5-1/2	74688	74625	74626
1-7/8	1-1/4	1-5/8	4-1/8	74090	74185	74186
1-7/8	1-1/4	2-1/4	4-3/4	74490	74491	74492
1-7/8	1-1/4	3	5-1/2	74690	74691	74692
2	1-1/4	1-5/8	4-1/8	74092	74189	74190
2	1-1/4	2-1/4	4-3/4	74493	74494	74495
2	1-1/4	3	5-1/2	74694	74695	74696
2	2	3	6-3/4	74102	74193	74194
2	2	4	7-3/4	74104	74195	74196
2	2	6	9-3/4	74108	74197	74198
2-1/2	2	4	7-3/4	74120		
2-1/2	2	6	9-3/4	74124		
2-1/2	2-1/2	4	8	74136		
2-1/2	2-1/2	6	10	74140		

SINGLE END TWO FLUTE EXTENDED LENGTH



- Medium Hardness Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 748)

Cutter Dia.	Shank Dia.	Length of Cut	Length Below Shank	Overall Length	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/8	13/16	2-3/8	74800	74807	74808
3/16	3/8	1/2	1-1/8	2-11/16	74802	74812	74813
1/4	3/8	5/8	1-1/2	3-1/16	74804	74805	74806
5/16	3/8	3/4	1-3/4	3-5/16	74809	74810	74811
3/8	3/8	3/4	1-3/4	3-5/16	74814	74815	74816
1/2	1/2	1	2-7/32	4	74828	74829	74830
5/8	5/8	1-3/8	2-23/32	4-5/8	74836	74837	74838
3/4	3/4	1-5/8	3-11/32	5-3/8	74845	74846	74847
7/8	7/8	2	3-31/32	6-1/16	74854	74855	74856
1	1	2-1/2	4-31/32	7-1/4	74866	74867	74868
1-1/4	1-1/4	3	4-31/32	7-1/4	74875	74876	74877

SINGLE END TWO FLUTE BRIDGEPORT

- Medium Hardness Materials
- Plunge and Ramp
- Keyway, Slot and Pocket
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

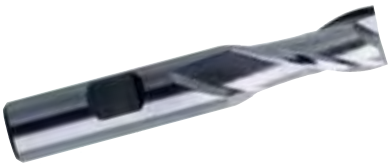
(Former List Number 738)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
3/4	1/2	5/8	2-5/8	73843	73844	73845
7/8	1/2	5/8	2-5/8	73852	73853	73854
1	1/2	3/4	2-3/4	73862	73846	73847
1	5/8	3/4	2-7/8	73864	73848	73849
1	3/4	3/4	3	73866	73867	73868
1-1/8	3/4	3/4	3	73870	73850	73851
1-1/8	3/4	1-1/2	3-7/8	73871	73857	73858
1-1/4	1/2	3/4	2-3/4	73872	73859	73860
1-1/4	5/8	3/4	2-7/8	73874	73800	73801
1-1/4	3/4	3/4	3	73876	73802	73803
1-1/4	3/4	1-1/2	3-7/8	73877	73878	73879
1-3/8	3/4	3/4	3	73880	73804	73805
1-3/8	3/4	1-1/2	3-7/8	73881	73806	73807
1-1/2	5/8	3/4	2-7/8	73883	73808	73809
1-1/2	3/4	3/4	3	73884	73810	73811
1-1/2	3/4	1-1/2	3-7/8	73885	73886	73887
1-3/4	3/4	1-1/2	3-7/8	73888	73889	73890
2	3/4	1-1/2	3-7/8	73891	73892	73893

HIGH SPEED STEEL

BRUBAKER TOOL™

SINGLE END TWO FLUTE KEYWAY

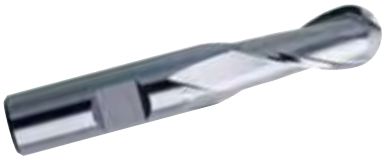


- Medium Hardness Materials
- Plunge and Ramp
- Keyway, Slot and Pocket
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.001/-.000

(Former List Number 742)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
.124	3/8	3/8	2-5/16	74203	74300	74301
.123	3/8	3/8	2-5/16	74204	74302	74303
.122	3/8	3/8	2-5/16	74205	74304	74305
.1865	3/8	7/16	2-5/16	74209	74306	74307
.1855	3/8	7/16	2-5/16	74210	74308	74309
.1845	3/8	7/16	2-5/16	74211	74310	74311
.249	3/8	1/2	2-5/16	74215	74312	74313
.248	3/8	1/2	2-5/16	74216	74314	74315
.247	3/8	1/2	2-5/16	74217	74316	74317
.3115	3/8	9/16	2-5/16	74221	74318	74319
.3105	3/8	9/16	2-5/16	74222	74320	74321
.3095	3/8	9/16	2-5/16	74223	74322	74323
.374	3/8	9/16	2-5/16	74227	74324	74325
.373	3/8	9/16	2-5/16	74228	74326	74327
.372	3/8	9/16	2-5/16	74229	74328	74329
.499	1/2	1	3	74233	74330	74331
.498	1/2	1	3	74234	74332	74333
.497	1/2	1	3	74235	74334	74335
.624	5/8	1-5/16	3-7/16	74239	74336	74337
.623	5/8	1-5/16	3-7/16	74240	74338	74339
.622	5/8	1-5/16	3-7/16	74241	74340	74341
.749	5/8	1-5/16	3-7/16	74245	74342	74343
.748	5/8	1-5/16	3-7/16	74246	74344	74345
.747	5/8	1-5/16	3-7/16	74247	74346	74347
.874	7/8	1-1/2	3-3/4	74251	74348	74349
.873	7/8	1-1/2	3-3/4	74252	74350	74351
.872	7/8	1-1/2	3-3/4	74253	74352	74353
.999	1	1-5/8	4-1/8	74257	74354	74355
.998	1	1-5/8	4-1/8	74258	74356	74357
.997	1	1-5/8	4-1/8	74259	74358	74359
1.249	1-1/4	1-5/8	4-1/8	74263	74360	74361
1.248	1-1/4	1-5/8	4-1/8	74264	74362	74363
1.247	1-1/4	1-5/8	4-1/8	74265	74364	74365
1.499	1-1/4	1-5/8	4-1/8	74269	74366	74367
1.498	1-1/4	1-5/8	4-1/8	74270	74368	74369
1.497	1-1/4	1-5/8	4-1/8	74271	74370	74371

SINGLE END TWO FLUTE BALL

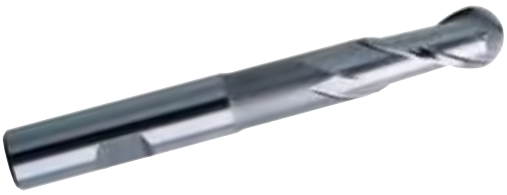


- Medium Hardness Materials
- Plunge and Ramp
- Pocket, Profile, and Slot
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 750)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/8	2-5/16	75000	75007	75008
3/16	3/8	1/2	2-3/8	75002	75012	75013
1/4	3/8	5/8	2-7/16	75004	75005	75006
5/16	3/8	3/4	2-1/2	75009	75010	75011
3/8	3/8	3/4	2-1/2	75014	75015	75016
7/16	1/2	1	3	75021	75022	75023
1/2	1/2	1	3	75028	75029	75030
9/16	1/2	1	3-1/16	75033	75039	75040
5/8	1/2	1-3/8	3-3/8	75035	75017	75018
5/8	5/8	1-3/8	3-1/2	75036	75037	75038
3/4	1/2	1-5/8	3-5/8	75043	75041	75042
3/4	3/4	1-5/8	3-7/8	75045	75046	75047
13/16	3/4	2	4-1/4	75050	75051	75052
7/8	3/4	2	4-1/4	75053	75057	75058
7/8	7/8	2	4-1/4	75054	75055	75056
1	3/4	2-1/4	4-1/2	75064	75062	75063
1	1	2-1/4	4-3/4	75066	75067	75068
1-1/8	1	2-1/4	4-3/4	75071	75072	75073
1-1/4	1-1/4	2-1/2	5	75075	75076	75077
1-3/8	1-1/4	2-1/2	5	75080	75081	75082
1-1/2	1-1/4	2-1/2	5	75083	75084	75085

SINGLE END TWO FLUTE BALL EXTENDED LENGTH



- Medium Hardness Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

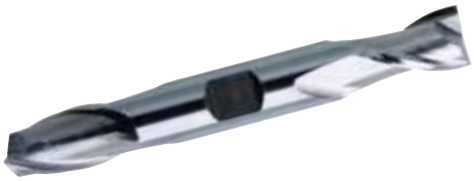
(Former List Number 752)

Cutter Dia.	Shank Dia.	Length of Cut	Length Below Shank	Overall Length	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/8	13/16	2-3/8	75200	75207	75208
3/16	3/8	1/2	1-1/8	2-11/16	75202	75212	75213
1/4	3/8	5/8	1-1/2	3-1/16	75204	75205	75206
5/16	3/8	3/4	1-3/4	3-5/16	75209	75210	75211
3/8	3/8	3/4	1-3/4	3-5/16	75214	75215	75216
7/16	1/2	1	1-7/8	3-11/16	75221	75222	75223
1/2	1/2	1	2-7/32	4	75228	75229	75230
5/8	5/8	1-3/8	2-23/32	4-5/8	75236	75237	75238
3/4	3/4	1-5/8	3-11/32	5-3/8	75245	75246	75247
7/8	7/8	2	3-31/32	6-1/16	75254	75255	75256
1	1	2-1/2	4-31/32	7-1/4	75266	75267	75268
1-1/4	1-1/4	3	4-31/32	7-1/4	75275	75276	75277

HIGH SPEED STEEL

BRUBAKER TOOL™

DOUBLE END TWO FLUTE

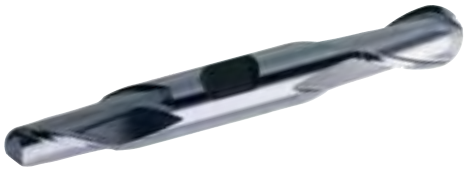


- Medium Hardness Materials
- Plunge and Ramp
- Pocket, Profile, and Slot
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.0000/-.0015

(Former List Numbers 721, 722)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
7/64	3/8	3/8	3-1/16	72205	72265	72266
1/8	3/8	3/16	2-3/4	72100	72105	72106
1/8	3/8	3/8	3-1/16	72206	86100	72201
9/64	3/8	7/16	3-1/8	72207	72267	72268
5/32	3/8	1/4	2-3/4	72101	72107	72108
5/32	3/8	7/16	3-1/8	72208	86101	72202
11/64	3/8	7/16	3-1/8	72209	72269	72270
3/16	3/8	9/32	2-3/4	72102	72109	72110
3/16	3/8	7/16	3-1/8	72210	86102	72203
13/64	3/8	1/2	3-1/8	72211	72271	72272
7/32	3/8	11/32	2-7/8	72103	72111	72112
7/32	3/8	1/2	3-1/8	72212	86103	72204
15/64	3/8	1/2	3-1/8	72213	72273	72274
1/4	3/8	1/2	3-1/8	72214	86104	72231
1/4	3/8	3/8	2-7/8	72104	72113	72114
17/64	3/8	9/16	3-1/8	72215	72275	72276
9/32	3/8	9/16	3-1/8	72216	86108	72232
19/64	3/8	9/16	3-1/8	72217	72277	72278
5/16	3/8	9/16	3-1/8	72218	86109	72233
21/64	3/8	9/16	3-1/8	72219	72279	72280
11/32	3/8	9/16	3-1/8	72220	86113	72237
23/64	3/8	9/16	3-1/8	72221	72281	72282
3/8	3/8	9/16	3-1/8	72222	86114	72241
25/64	1/2	13/16	3-3/4	72223	72283	72284
13/32	1/2	13/16	3-3/4	72224	72285	72286
27/64	1/2	13/16	3-3/4	72225	72287	72288
7/16	1/2	13/16	3-3/4	72226	86121	72245
29/64	1/2	13/16	3-3/4	72227	72289	72290
15/32	1/2	13/16	3-3/4	72228	72291	72292
31/64	1/2	13/16	3-3/4	72229	72293	72294
1/2	1/2	13/16	3-3/4	72230	86128	72249
9/16	5/8	1-1/8	4-1/2	72234	72235	72236
5/8	5/8	1-1/8	4-1/2	72238	72239	72240
11/16	3/4	1-5/16	5	72242	72243	72244
3/4	3/4	1-5/16	5	72246	72247	72248
13/16	7/8	1-9/16	5-1/2	72250	72251	72252
7/8	7/8	1-9/16	5-1/2	72254	72255	72256
15/16	1	1-5/8	5-7/8	72258	72259	72260
1	1	1-5/8	5-7/8	72262	72263	72264

DOUBLE END TWO FLUTE BALL



- Medium Hardness Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.0000/-.0015

(Former List Numbers 736, 737)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/16	2-3/4	73600	73605	73606
1/8	3/8	3/8	3-1/16	73700	73723	73724
5/32	3/8	7/16	3-1/8	73701	73725	73726
3/16	3/8	9/32	2-3/4	73602	73607	73608
3/16	3/8	7/16	3-1/8	73702	73731	73732
7/32	3/8	1/2	3-1/8	73703	73733	73734
1/4	3/8	3/8	2-7/8	73604	73609	73610
1/4	3/8	1/2	3-1/8	73704	73739	73740
9/32	3/8	9/16	3-1/8	73708	73741	73742
5/16	3/8	9/16	3-1/8	73709	73710	73711
11/32	3/8	9/16	3-1/8	73713	73743	73744
3/8	3/8	9/16	3-1/8	73714	73749	73750
13/32	1/2	13/16	3-3/4	73719	73751	73752
7/16	1/2	13/16	3-3/4	73721	73720	73722
1/2	1/2	13/16	3-3/4	73728	73729	73730
5/8	5/8	1-1/8	4-1/2	73736	73737	73738
3/4	3/4	1-5/16	5	73745	73746	73747
7/8	7/8	1-9/16	5-1/2	73754	73755	73756
1	1	1-5/8	5-7/8	73766	73767	73768

DOUBLE END TWO FLUTE STRAIGHT

- Medium Hardness Materials
- Plunge and Ramp
- Slot
- High Speed Steel
- Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.0000/-.0015

(Former List Number 720)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/8	3-1/16	72000	72007	72008
3/16	3/8	7/16	3-1/8	72002	72012	72013
1/4	3/8	1/2	3-1/8	72004	72005	72006
5/16	3/8	9/16	3-1/8	72009	72010	72011
3/8	3/8	9/16	3-1/8	72014	72015	72016
7/16	1/2	13/16	3-3/4	72021	72022	72023
1/2	1/2	13/16	3-3/4	72028	72029	72030
5/8	5/8	1-1/8	4-1/2	72036	72037	72038
3/4	3/4	1-5/16	5	72045	72046	72047
7/8	7/8	1-9/16	5-1/2	72054	72055	72056
1	1	1-5/8	5-7/8	72066	72067	72068

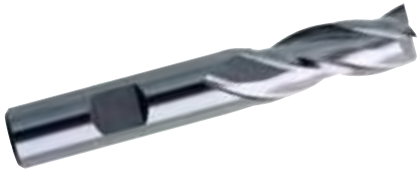
SINGLE END THREE FLUTE

- Aluminum, Magnesium, Copper and Zinc
- Plunge and Ramp
- Profile, Slot and Pocket
- High Speed Steel
- 38° Right Hand Helix, Right Hand Cut
- Center Cutting
- Deep Flutes for Chip Evacuation
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 762, 764, 766, 768)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/2	1/2	1-1/4	3-1/4	76228	76229	76230
1/2	1/2	2	4	76428	76429	76430
1/2	1/2	3	5	76628	76629	76630
3/4	3/4	1-5/8	3-7/8	76245	76246	76247
3/4	3/4	3	5-1/4	76445	76446	76447
3/4	3/4	4	6-1/4	76645	76646	76647
1	1	2	4-1/2	76266	76267	76268
1	1	3	5-1/2	76467	76468	76469
1	1	4	6-1/2	76668	76669	76670
1	1	6	8-1/2	76828	76829	76830
1-1/4	1-1/4	2	4-1/2	76275	76276	76277
1-1/4	1-1/4	3	5-1/2	76476	76477	76478
1-1/4	1-1/4	4	6-1/2	76677	76678	76679
1-1/4	1-1/4	6	8-1/2	76845	76846	76847
1-1/2	1-1/4	2	4-1/2	76283	76284	76285
1-1/2	1-1/4	3	5-1/2	76484	76485	76486
1-1/2	1-1/4	4	6-1/2	76685	76686	76687
1-1/2	1-1/4	6	8-1/2	76869	76870	76871
1-1/2	1-1/4	8	10-1/2	76878	76879	76880
2	2	2	5-3/4	76296	76297	76298
2	2	3	6-3/4	76497	76498	76499
2	2	4	7-3/4	76698	76699	76680
2	2	6	9-3/4	76886	76887	76888
2	2	8	11-3/4	76899	76897	76898

SINGLE END THREE FLUTE



- Medium Hardness Materials
- Plunge and Ramp
- Pocket, Profile, and Slot
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks and Larger Furnished with Dual Drive Feature

(Former List Numbers 772, 774)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/8	2-5/16	77200	77212	77213
3/16	3/8	1/2	2-3/8	77202	77217	77218
1/4	3/8	5/8	2-7/16	77204	77205	77206
1/4	3/8	1-1/4	3-1/16	77404	77405	77406
5/16	3/8	3/4	2-1/2	77209	77210	77211
5/16	3/8	1-3/8	3-1/8	77409	77410	77411
3/8	3/8	3/4	2-1/2	77214	77215	77216
3/8	3/8	1-1/2	3-1/4	77414	77415	77416
7/16	3/8	1	2-11/16	77220	77221	77222
7/16	1/2	1-3/4	3-3/4	77421	77422	77423
1/2	3/8	1	2-11/16	77227	77223	77224
1/2	1/2	1-1/4	3-1/4	77228	77229	77230
1/2	1/2	2	4	77428	77429	77430
9/16	1/2	1-3/8	3-3/8	77233	77231	77232
5/8	1/2	1-3/8	3-3/8	77235	77239	77240
5/8	5/8	1-5/8	3-3/4	77236	77237	77238
5/8	5/8	2-1/2	4-5/8	77436	77437	77438
3/4	1/2	1-5/8	3-5/8	77243	77241	77242
3/4	5/8	1-5/8	3-3/4	77244	77248	77249
3/4	3/4	1-5/8	3-7/8	77245	77246	77247
3/4	3/4	3	5-1/4	77445	77446	77447
7/8	5/8	1-7/8	4	77252	77250	77251
7/8	3/4	1-7/8	4-1/8	77253	77257	77258
7/8	7/8	1-7/8	4-1/8	77254	77255	77256
7/8	7/8	3-1/2	5-3/4	77454	77455	77456
1	5/8	1-7/8	4	77262	77269	77270
1	3/4	1-7/8	4-1/8	77263	77278	77279
1	7/8	1-7/8	4-1/8	77265	77281	77282
1	1	2	4-1/2	77266	77267	77268
1	1	4	6-1/2	77466	77467	77468
1-1/8	1	2	4-1/2	77271	77272	77273
1-1/4	1	2	4-1/2	77274	77286	77287
1-1/4	1-1/4	2	4-1/2	77275	77276	77277
1-1/4	1-1/4	4	6-1/2	77475	77476	77477
1-1/2	1-1/4	2	4-1/2	77283	77284	77285
1-1/2	1-1/4	4	6-1/2	77483	77484	77485
1-3/4	1-1/4	2	4-1/2	77288	77289	77290
2	1-1/4	2	4-1/2	77292	77293	77294
2	1-1/4	4	6-1/2	77492	77493	77494
2	2	3	6-3/4	77302	77300	77301
2	2	4	7-3/4	77304	77305	77306
2	2	6	9-3/4	77308	77307	77309
2	2	8	11-3/4	77310	77311	77312
2-1/2	2	4	7-3/4	77320		
2-1/2	2	6	9-3/4	77324		
2-1/2	2-1/2	4	8	77336		
2-1/2	2-1/2	6	10	77340		
2-1/2	2-1/2	8	12	77342		

DOUBLE END THREE FLUTE

- Medium Hardness Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.0000/-.0015

(Former List Number 770)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/8	3-1/16	77000	77007	77008
3/16	3/8	1/2	3-1/4	77002	77012	77013
1/4	3/8	5/8	3-3/8	77004	77005	77006
5/16	3/8	3/4	3-1/2	77009	77010	77011
3/8	3/8	3/4	3-1/2	77014	77015	77016
7/16	1/2	1	4-1/8	77021	77022	77023
1/2	1/2	1	4-1/8	77028	77029	77030
9/16	5/8	1-3/8	5	77034	77031	77032
5/8	5/8	1-3/8	5	77036	77037	77038
3/4	3/4	1-5/8	5-5/8	77045	77046	77047
7/8	7/8	1-7/8	6-1/8	77054	77055	77056
1	1	1-7/8	6-3/8	77066	77067	77068

SINGLE END MULTI-FLUTE CENTER CUTTING

- Medium Hardness Materials
- Plunge and Ramp
- Pocket, Profile, and Slot
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks and Larger Furnished with Dual Drive Feature

(Former List Numbers 802, 804, 806)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/8	2-5/16	4	80200	80207	80208
3/16	3/8	1/2	2-3/8	4	80202	80212	80213
1/4	3/8	5/8	2-7/16	4	80204	80205	80206
1/4	3/8	1-1/4	3-1/16	4	80406	80407	80408
1/4	3/8	1-3/4	3-9/16	4	80607	80608	80609
5/16	3/8	3/4	2-1/2	4	80209	80210	80211
5/16	3/8	1-3/8	3-1/8	4	80411	80412	80413
5/16	3/8	2	3-3/4	4	80612	80613	80614
3/8	3/8	3/4	2-1/2	4	80214	80215	80216
3/8	3/8	1-1/2	3-1/4	4	80416	80417	80418
3/8	3/8	2-1/2	4-1/4	4	80617	80618	80619
1/2	1/2	1-1/4	3-1/4	4	80228	80229	80230
1/2	1/2	2	4	4	80430	80431	80432
1/2	1/2	3	5	4	80631	80632	80633
5/8	5/8	1-5/8	3-3/4	4	80236	80237	80238
5/8	5/8	2-1/2	4-5/8	4	80438	80439	80440
5/8	5/8	4	6-1/8	4	80639	80640	80641
3/4	3/4	1-5/8	3-7/8	4	80245	80246	80247
3/4	3/4	3	5-1/4	4	80447	80448	80449
3/4	3/4	4	6-1/4	4	80648	80649	80650
7/8	7/8	1-7/8	4-1/8	4	80254	80255	80256
7/8	7/8	3-1/2	5-3/4	4	80456	80457	80458
7/8	7/8	5	7-1/4	4	80657	80658	80659
1	1	2	4-1/2	4	80266	80226	80227
1	1	3	5-1/2	4	80267	80233	80234
1	1	4	6-1/2	4	80468	80469	80470
1	1	6	8-1/2	4	80669	80670	80671
1-1/8	1	2	4-1/2	4	80271	80272	80273
1-1/4	1-1/4	2	4-1/2	4	80275	80239	80240
1-1/4	1-1/4	2	4-1/2	6	80276	80241	80242
1-1/4	1-1/4	3	5-1/2	4	80277	80243	80244
1-1/4	1-1/4	3	5-1/2	6	80278	80279	80280
1-1/4	1-1/4	4	6-1/2	4	80477	80475	80476
1-1/4	1-1/4	4	6-1/2	6	80478	80479	80480
1-1/4	1-1/4	6	8-1/2	4	80677	80675	80676
1-1/4	1-1/4	6	8-1/2	6	80678	80679	80680
1-1/2	1-1/4	2	4-1/2	4	80283	80250	80251
1-1/2	1-1/4	2	4-1/2	6	80284	80248	80249
1-1/2	1-1/4	3	5-1/2	4	80285	80252	80253
1-1/2	1-1/4	3	5-1/2	6	80286	80257	80258
1-1/2	1-1/4	4	6-1/2	4	80485	80488	80489
1-1/2	1-1/4	4	6-1/2	6	80486	80490	80491
1-1/2	1-1/4	6	8-1/2	6	80685	80683	80684
1-1/2	1-1/4	8	10-1/2	6	80686	80687	80688
1-3/4	1-1/4	2	4-1/2	6	80288	80289	80290
2	1-1/4	2	4-1/2	6	80293	80259	80260
2	1-1/4	3	5-1/2	6	80294	80261	80262
2	1-1/4	4	6-1/2	6	80494	80495	80496
2	2	2	5-3/4	6	80301	80317	80318
2	2	3	6-3/4	6	80303	80319	80320
2	2	4	7-3/4	4	80304	80321	80322
2	2	4	7-3/4	6	80305	80323	80324
2	2	6	9-3/4	4	80308	80325	80326
2	2	6	9-3/4	6	80309	80327	80328
2	2	8	11-3/4	4	80310	80315	80316
2	2	8	11-3/4	6	80311	80312	80313
2-1/2	2-1/2	8	12	4	80342		

SINGLE END FOUR FLUTE BALL CENTER CUTTING

- Medium Hardness Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 814, 815)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/4	3/8	3/4	2-9/16	81404	81402	81403
1/4	3/8	1	2-13/16	81405	81400	81401
1/4	3/8	1-1/4	3-1/16	81406	81407	81408
1/4	3/8	1-1/2	3-5/16	81504	81505	81506
5/16	3/8	1	2-3/4	81409	81420	81421
5/16	3/8	1-1/2	3-1/4	81411	81412	81413
3/8	3/8	1	2-3/4	81414	81422	81423
3/8	3/8	1-1/2	3-1/4	81416	81424	81425
3/8	3/8	2	3-13/16	81514	81515	81516
3/8	3/8	2-1/2	4-5/16	81417	81418	81419
1/2	1/2	1	3	81428	81426	81427
1/2	1/2	1-1/2	3-1/2	81429	81451	81452
1/2	1/2	2	4	81430	81453	81454
1/2	1/2	2-1/2	4-1/2	81528	81529	81530
1/2	1/2	3	5	81431	81432	81433
5/8	5/8	1-1/4	3-3/8	81436	81434	81435
5/8	5/8	1-3/4	3-7/8	81437	81455	81456
5/8	5/8	2-1/2	4-5/8	81438	81457	81458
5/8	5/8	3	5-1/8	81536	81537	81538
5/8	5/8	3-3/4	5-7/8	81439	81440	81441
3/4	3/4	1-1/2	3-3/4	81445	81443	81444
3/4	3/4	2-1/4	4-1/2	81446	81459	81460
3/4	3/4	3	5-1/4	81447	81461	81462
3/4	3/4	3-3/4	6	81545	81546	81547
3/4	3/4	4-1/2	6-3/4	81448	81449	81450
1	1	2	4-1/2	81466	81464	81465
1	1	3	5-1/2	81467	81479	81480
1	1	4	6-1/2	81468	81488	81489
1	1	5	7-1/2	81566	81567	81568
1	1	6	8-1/2	81469	81470	81471
1-1/4	1-1/4	2	4-1/2	81475	81473	81474
1-1/4	1-1/4	3	5-1/2	81476	81477	81478
1-1/4	1-1/4	4-1/2	7	81575	81576	81577
1-1/2	1-1/4	2	4-1/2	81483	81481	81482
1-1/2	1-1/4	4	6-1/2	81485	81486	81487
2	2	3	6-3/4	81495	81493	81494
2	2	4	7-3/4	81496	81490	81491
2	2	6	9-3/4	81498	81472	81484
2	2	8	11-3/4	81499	81492	81497

DOUBLE END FOUR FLUTE CENTER CUTTING

- Medium Hardness Materials
- Plunge and Ramp
- Pocket, Profile, and Slot
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.0000/-.0015

(Former List Number 810)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/8	3-1/16	81000	81007	81008
3/16	3/8	1/2	3-1/4	81002	81012	81013
1/4	3/8	5/8	3-3/8	81004	81005	81006
5/16	3/8	3/4	3-1/2	81009	81010	81011
3/8	3/8	3/4	3-1/2	81014	81015	81016
1/2	1/2	1	4-1/8	81028	81029	81030
5/8	5/8	1-3/8	5	81036	81037	81038
3/4	3/4	1-5/8	5-5/8	81045	81046	81047
7/8	7/8	1-7/8	6-1/8	81054	81055	81056
1	1	1-7/8	6-3/8	81066	81067	81068

SINGLE END MULTI-FLUTE, 1/8 – 13/16 NON-CENTER CUTTING

- Medium Hardness Materials
- Will Not Plunge
- Profile, Open-Ended Slot and Keyway
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks and Larger Furnished with Dual Drive Feature

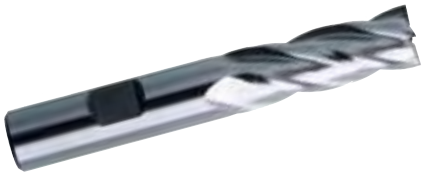
(Former List Numbers 794, 797, 798, 800)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/8	2-5/16	4	79400	86700	79426
5/32	3/8	3/8	2-5/16	4	79401	79477	79478
3/16	3/8	9/32	2-3/16	4	79402	79480	79481
3/16	3/8	1/2	2-3/8	4	79403	86702	79434
7/32	3/8	1/2	2-3/8	4	79404	86703	79439
1/4	3/8	3/8	2-1/4	4	79405	79485	79486
1/4	3/8	5/8	2-7/16	4	79406	86704	79407
1/4	3/8	1-1/4	3-1/16	4	79806	79807	79808
1/4	3/8	1-3/4	3-9/16	4	80007	80008	80009
9/32	3/8	11/16	2-1/2	4	79408	79495	79496
5/16	3/8	3/4	2-1/2	4	79409	86709	79410
5/16	3/8	1-3/8	3-1/8	4	79811	79812	79813
5/16	3/8	2	3-3/4	4	80012	80013	80014
11/32	3/8	3/4	2-1/2	4	79413	79411	79412
3/8	3/8	3/4	2-1/2	4	79414	86714	79415
3/8	3/8	1-1/2	3-1/4	4	79816	79817	79818
3/8	3/8	2-1/2	4-1/4	4	80017	80018	80019
13/32	3/8	3/4	2-1/2	4	79419	79417	79418
7/16	3/8	1	2-11/16	4	79420	79421	79422
7/16	1/2	1-3/4	3-3/4	4	79823	79824	79825
15/32	3/8	1	2-11/16	4	79425	79423	79424
1/2	3/8	1	2-11/16	4	79427	79497	79498
1/2	1/2	1-1/4	3-1/4	4	79428	86728	79429
1/2	1/2	2	4	4	79830	79831	79832
1/2	1/2	3	5	4	80031	80029	80030
17/32	1/2	1-1/4	3-1/4	4	79432	79430	79431
9/16	1/2	1-3/8	3-3/8	4	79433	79442	79448
9/16	1/2	2	4	4	79833	79834	79835
9/16	1/2	3	5	4	80033	80034	80035
5/8	1/2	1-3/8	3-3/8	4	79435	79451	79457
5/8	5/8	1-5/8	3-3/4	4	79436	79437	79438
5/8	5/8	2-1/2	4-5/8	4	79838	79839	79840
5/8	5/8	4	6-1/8	4	80039	80037	80038
11/16	1/2	1-5/8	3-5/8	4	79440	79461	79464
11/16	5/8	1-5/8	3-3/4	4	79441	79469	79472
11/16	5/8	2-1/2	4-5/8	4	79841	79842	79843
11/16	5/8	4	6-1/8	4	80041	80042	80043
3/4	1/2	1-5/8	3-5/8	4	79443	79491	79499
3/4	5/8	1-5/8	3-3/4	4	79444	79506	79507
3/4	3/4	1-5/8	3-7/8	4	79445	79446	79447
3/4	3/4	3	5-1/4	4	79847	79848	79849
3/4	3/4	4	6-1/4	4	80048	80046	80047
13/16	5/8	1-7/8	4	6	79449	79517	79518
13/16	3/4	1-7/8	4-1/8	4	79450	79522	79523
13/16	3/4	3	5-1/4	4	79850	79851	79852
13/16	3/4	4	6-1/4	4	80050	80051	80052

SINGLE END MULTI-FLUTE CONTINUED ON NEXT PAGE

SINGLE END MULTI-FLUTE, 7/8 – 1-7/8
NON-CENTER CUTTING

CONTINUED FROM PREVIOUS PAGE



(Former List Numbers 794, 797, 798, 800)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiN	TiCN
7/8	5/8	1-7/8	4	6	79452	79528	79529
7/8	3/4	1-7/8	4-1/8	4	79453	79530	79531
7/8	7/8	1-7/8	4-1/8	4	79454	79455	79456
7/8	7/8	3-1/2	5-3/4	4	79856	79857	79858
7/8	7/8	5	7-1/4	4	80057	80058	80059
15/16	5/8	1-7/8	4	6	79458	79532	79533
15/16	3/4	1-7/8	4-1/8	4	79459	79534	79535
15/16	7/8	1-7/8	4-1/8	4	79460	79538	79539
1	5/8	1-7/8	4	6	79462	79548	79549
1	3/4	1-7/8	4-1/8	4	79463	79550	79551
1	7/8	1-7/8	4-1/8	4	79465	79554	79555
1	1	2	4-1/2	4	79466	79467	79468
1	1	3	5-1/2	4	79767	79768	79769
1	1	4	6-1/2	4	79868	79869	79870
1	1	6	8-1/2	4	80069	80070	80071
1-1/8	7/8	2	4-1/4	6	79470	80000	80001
1-1/8	1	2	4-1/2	6	79471	80002	80003
1-1/8	1	4	6-1/2	6	79871	79872	79873
1-1/4	7/8	2	4-1/4	6	79473	80004	80005
1-1/4	1	2	4-1/2	6	79474	80006	80010
1-1/4	1	4	6-1/2	6	79874	79836	79837
1-1/4	1-1/4	2	4-1/2	4	79475	80011	80015
1-1/4	1-1/4	2	4-1/2	6	79476	80016	80020
1-1/4	1-1/4	3	5-1/2	4	79776	79777	79778
1-1/4	1-1/4	4	6-1/2	4	79876	79845	79846
1-1/4	1-1/4	4	6-1/2	6	79877	79853	79854
1-1/4	1-1/4	6	8-1/2	6	80078	80079	80080
1-3/8	1	2	4-1/2	6	79479	80021	80022
1-3/8	1	4	6-1/2	6	79879	79880	79881
1-1/2	1	2	4-1/2	6	79482	80023	80024
1-1/2	1	4	6-1/2	6	79882	79859	79860
1-1/2	1-1/4	2	4-1/2	4	79483	80025	80026
1-1/2	1-1/4	2	4-1/2	6	79484	80027	80028
1-1/2	1-1/4	3	5-1/2	4	79784	79785	79786
1-1/2	1-1/4	4	6-1/2	4	79884	79861	79862
1-1/2	1-1/4	4	6-1/2	6	79885	79886	79887
1-1/2	1-1/4	6	8-1/2	6	80085	80083	80084
1-1/2	1-1/4	8	10-1/2	6	80086	80087	80088
1-5/8	1-1/4	2	4-1/2	6	79487	80032	80036
1-3/4	1-1/4	2	4-1/2	4	79488	80040	80044
1-3/4	1-1/4	2	4-1/2	6	79489	80045	80049
1-3/4	1-1/4	3	5-1/2	6	79789	79790	79791
1-3/4	1-1/4	4	6-1/2	6	79889	79890	79891
1-7/8	1-1/4	2	4-1/2	6	79490	80053	80054

SINGLE END MULTI-FLUTE CONTINUED ON NEXT PAGE

SINGLE END MULTI-FLUTE, 2 – 3 NON-CENTER CUTTING

CONTINUED FROM PREVIOUS PAGE

(Former List Numbers 794, 797, 798, 800)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiN	TiCN
2	1-1/4	2	4-1/2	4	79492	80055	80056
2	1-1/4	2	4-1/2	6	79493	80060	80061
2	1-1/4	2	4-1/2	8	79494	80062	80063
2	1-1/4	3	5-1/2	6	79793	79794	79795
2	1-1/4	4	6-1/2	6	79893	79863	79864
2	1-1/4	4	6-1/2	8	79894	79895	79896
2	2	2	5-3/4	6	79501	80064	80065
2	2	3	6-3/4	4	79502	80066	80067
2	2	3	6-3/4	6	79503	80068	80072
2	2	4	7-3/4	4	79504	80073	80074
2	2	4	7-3/4	6	79505	80075	80076
2	2	6	9-3/4	4	79508	80077	80081
2	2	6	9-3/4	6	79509	80082	80089
2	2	8	11-3/4	4	79510	80090	80091
2	2	8	11-3/4	6	79511	80092	80093
2	2	10	13-3/4	6	79513	80094	80095
2	2	12	15-3/4	6	79515	80096	80097
2-1/2	2	4	7-3/4	4	79520		
2-1/2	2	4	7-3/4	6	79521		
2-1/2	2	6	9-3/4	4	79524		
2-1/2	2	6	9-3/4	6	79525		
2-1/2	2	8	11-3/4	4	79526		
2-1/2	2	8	11-3/4	6	79527		
2-1/2	2-1/2	4	8	4	79536		
2-1/2	2-1/2	4	8	6	79537		
2-1/2	2-1/2	6	10	4	79540		
2-1/2	2-1/2	6	10	6	79541		
2-1/2	2-1/2	8	12	4	79542		
2-1/2	2-1/2	8	12	6	79543		
2-1/2	2-1/2	10	14	6	79545		
2-1/2	2-1/2	12	16	6	79547		
3	2-1/2	4	7-3/4	6	79552		
3	2-1/2	4	7-3/4	8	79553		
3	2-1/2	6	9-3/4	6	79556		
3	2-1/2	6	9-3/4	8	79557		
3	2-1/2	8	11-3/4	6	79558		
3	2-1/2	8	11-3/4	8	79559		
3	2-1/2	12	15-3/4	8	79563		

SINGLE END MULTI-FLUTE BRIDGEPORT NON-CENTER CUTTING

- Medium Hardness Materials
- Will Not Plunge
- Pocket, Profile, and Slot
- High Speed Steel
- Face and Shallow Profile
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 801)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiN	TiCN
1/8	3/8	3/8	2-5/16	4	79400	86700	79426
3/16	3/8	1/2	2-3/8	4	79403	86702	79434
1/4	3/8	5/8	2-7/16	4	79406	86704	79407
5/16	3/8	3/4	2-1/2	4	79409	86709	79410
3/8	3/8	3/4	2-1/2	4	79414	86714	79415
7/16	3/8	1	2-11/16	4	79420	79421	79422
1/2	1/2	1-1/4	3-1/4	4	79428	86728	79429
9/16	1/2	1-3/8	3-3/8	4	79433	79442	79448
5/8	1/2	1-3/8	3-3/8	4	79435	79451	79457
11/16	1/2	1-5/8	3-5/8	4	79440	79461	79464
3/4	3/4	1-5/8	3-7/8	4	79445	79446	79447
3/4	3/4	1-1/2	3-7/8	6	80146	80147	80148
13/16	3/4	1-7/8	4-1/8	4	79450	79522	79523
7/8	3/4	1-7/8	4-1/8	4	79453	79530	79531
15/16	3/4	1-7/8	4-1/8	4	79459	79534	79535
1	3/4	1-7/8	4-1/8	4	79463	79550	79551
1	3/4	1-1/2	3-7/8	8	80164	80165	80166
1-1/8	3/4	1-1/2	3-7/8	6	80170	80168	80169
1-1/4	3/4	1-1/2	3-7/8	6	80172	80161	80162
1-1/4	3/4	1-1/2	3-7/8	8	80173	80174	80175
1-3/8	3/4	1-1/2	3-7/8	6	80179	80159	80160
1-1/2	3/4	1-1/2	3-7/8	6	80181	80157	80158
1-1/2	3/4	2	4-1/4	8	80184	80185	80186
1-3/4	3/4	1-1/2	3-7/8	6	80188	80189	80190
2	3/4	1-1/2	3-7/8	8	80191	80196	80197
2	3/4	2	4-1/4	10	80193	80194	80195

SINGLE END MULTI-FLUTE LEFT HAND NON-CENTER CUTTING

- Soft and Medium Hardness Materials
- Will Not Plunge
- Profile Stacked Thin Parts or Thin Sections
- High Speed Steel
- **45° Left Hand Helix, Right Hand Cut**
- Non-Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

(Former List Numbers 796, 799)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiN	TiCN
1/4	3/8	5/8	2-7/16	4	79604	79605	79606
1/4	3/8	1-1/4	3-1/16	4	79904	79905	79906
5/16	3/8	3/4	2-1/2	4	79609	79610	79611
5/16	3/8	1-3/8	3-1/8	4	79909	79910	79911
3/8	3/8	3/4	2-1/2	4	79614	79615	79616
3/8	3/8	1-1/2	3-1/4	4	79914	79915	79916
7/16	3/8	1	2-11/16	4	79621	79622	79623
7/16	1/2	1-3/4	3-3/4	4	79921	79922	79923
1/2	1/2	1-1/4	3-1/4	4	79628	79629	79630
1/2	1/2	2	4	4	79928	79929	79930
5/8	5/8	1-5/8	3-3/4	4	79636	79637	79638
5/8	5/8	2-1/2	4-5/8	4	79936	79937	79938
3/4	3/4	1-3/4	4	4	79645	79646	79647
3/4	3/4	3	5-1/4	4	79945	79946	79947
1	1	2	4-1/2	4	79666	79667	79668
1	1	4	6-1/2	4	79966	79967	79968
1-1/4	1	2	4-1/2	6	79674	79675	79676
1-1/2	1	2	4-1/2	6	79682	79683	79684
2	1-1/4	2	4-1/2	8	79692	79693	79694

SINGLE END MULTI-FLUTE COARSE TOOTH NON-CENTER CUTTING

- Medium Hardness Materials
- Will Not Plunge
- Face and Shallow Profile
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 792)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiN	TiCN
3/4	1/2	5/8	2-5/8	4	79243	79244	79245
7/8	1/2	5/8	2-5/8	4	79252	79253	79254
1	1/2	3/4	2-3/4	4	79262	79263	79264
1	3/4	3/4	3	4	79266	79267	79268
1-1/8	3/4	3/4	3	6	79270	79271	79272
1-1/4	5/8	3/4	2-7/8	6	79274	79231	79232
1-1/4	3/4	3/4	3	6	79276	79233	79234
1-3/8	5/8	3/4	2-7/8	6	79278	79235	79236
1-3/8	3/4	3/4	3	6	79280	79237	79238
1-1/2	3/4	3/4	3	6	79283	79284	79285

SINGLE END MULTI-FLUTE FINE TOOTH NON-CENTER CUTTING

- Medium Hardness Materials
- Will Not Plunge
- Face and Shallow Profile with Excellent Finish
- High Speed Steel
- 40° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 793)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiN	TiCN
3/4	1/2	5/8	2-5/8	6	79344	79345	79346
7/8	1/2	5/8	2-5/8	6	79353	79354	79355
1	1/2	3/4	2-3/4	8	79363	79317	79318
1	5/8	3/4	2-7/8	8	79365	79321	79322
1	3/4	3/4	3	8	79367	79325	79326
1-1/8	5/8	3/4	2-7/8	8	79369	79329	79330
1-1/8	3/4	3/4	3	8	79371	79333	79334
1-1/8	3/4	1-1/2	3-7/8	8	79372	79337	79338
1-1/4	1/2	3/4	2-3/4	10	79373	79341	79342
1-1/4	5/8	3/4	2-7/8	10	79375	79349	79350
1-1/4	3/4	3/4	3	10	79377	79357	79358
1-1/4	3/4	1-1/2	3-7/8	10	79378	79361	79362
1-3/8	5/8	3/4	2-7/8	10	79379	79364	79366
1-3/8	3/4	3/4	3	10	79381	79368	79370
1-3/8	3/4	1-1/2	3-7/8	10	79382	79374	79376
1-1/2	5/8	3/4	2-7/8	10	79383	79386	79387
1-1/2	3/4	3/4	3	10	79384	79388	79390
1-1/2	3/4	1-1/2	3-7/8	10	79385	79391	79393
1-3/4	3/4	1-1/2	3-7/8	10	79389	79396	79397
2	3/4	1-1/2	3-7/8	10	79392	79394	79395

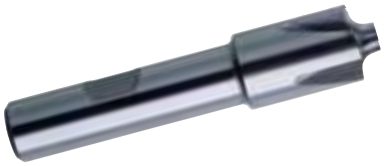
DOUBLE END FOUR FLUTE NON-CENTER CUTTING

- Medium Hardness Materials
- Will Not Plunge
- Profile, Open-Ended Slotting and Keyway
- High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
  *Cutting Diameter Tolerance is +.0000/-.0025

(Former List Numbers 779, 780)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
7/64	3/8	3/8	3-1/16	78005	78000	78001
1/8	3/8	3/16	2-3/4	77900	77907	77908
1/8	3/8	3/8	3-1/16	78006	86600	78002
9/64	3/8	7/16	3-1/8	78007	78003	78004
5/32	3/8	1/4	2-3/4	77901	77909	77910
5/32	3/8	7/16	3-1/8	78008	86601	78031
11/64	3/8	1/2	3-1/4	78009	78032	78033
3/16	3/8	9/32	2-3/4	77902	77911	77912
3/16	3/8	1/2	3-1/4	78010	86602	78035
13/64	3/8	9/16	3-1/4	78011	78036	78037
7/32	3/8	11/32	2-7/8	77903	77913	77914
7/32	3/8	9/16	3-1/4	78012	86603	78039
15/64	3/8	5/8	3-3/8	78013	78040	78041
1/4	3/8	3/8	2-7/8	77904	77905	77906
1/4	3/8	5/8	3-3/8	78014	86604	78043
17/64	3/8	11/16	3-3/8	78015	78044	78045
9/32	3/8	11/16	3-3/8	78016	86608	78047
19/64	3/8	3/4	3-1/2	78017	78048	78049
5/16	3/8	3/4	3-1/2	78018	86609	78051
21/64	3/8	3/4	3-1/2	78019	78052	78053
11/32	3/8	3/4	3-1/2	78020	86613	78055
23/64	3/8	3/4	3-1/2	78021	78056	78057
3/8*	3/8	3/4	3-1/2	78022	86614	78059
25/64	1/2	1	4-1/8	78023	78060	78061
13/32	1/2	1	4-1/8	78024	78063	78064
27/64	1/2	1	4-1/8	78025	78065	78066
7/16	1/2	1	4-1/8	78026	86621	78067
29/64	1/2	1	4-1/8	78027	78068	78069
15/32	1/2	1	4-1/8	78028	78070	78071
31/64	1/2	1	4-1/8	78029	78072	78073
1/2*	1/2	1	4-1/8	78030	86628	78074
9/16	5/8	1-3/8	5	78034	78076	78077
5/8*	5/8	1-3/8	5	78038	78078	78079
11/16	3/4	1-5/8	5-5/8	78042	78080	78081
3/4*	3/4	1-5/8	5-5/8	78046	78083	78084
13/16	7/8	1-7/8	6-1/8	78050	78086	78087
7/8*	7/8	1-7/8	6-1/8	78054	78088	78089
15/16	1	1-7/8	6-3/8	78058	78090	78091
1*	1	1-7/8	6-3/8	78062	78092	78093

SINGLE END CORNER ROUNDING



- Soft to Medium Hardness Materials
- Corner Radius
- Profile
- High Speed Steel
- Straight Flutes, Right Hand Cut
- Eccentrically Form-Relieved

(Former List Number 816)

Radius	Shank Dia.	Large Dia.	Overall Length	EDP No. Uncoated
1/32	3/8	7/16	2-1/2	81603
1/16	3/8	7/16	2-1/2	81606
3/32	3/8	1/2	2-1/2	81609
1/8	1/2	5/8	3	81618
5/32	1/2	3/4	3	81621
3/16	1/2	7/8	3	81624
1/4	1/2	1	3	81627
5/16	1/2	1-1/8	3-1/4	81630
3/8	1/2	1-1/4	3-1/2	81633
3/16	3/4	7/8	3-1/8	81642
1/4	3/4	1	3-1/4	81645
5/16	7/8	1-1/8	3-1/2	81666
3/8	7/8	1-1/4	3-3/4	81669
7/16	1	1-3/8	4	81684
1/2	1	1-1/2	4-1/8	81687

SHELL MILL
NON-CENTER CUTTING

- Soft to Medium Hardness Materials
- Profile and Open-Ended Slotting
- High Speed Steel
- 20° Right Hand Helix, Right Hand Cut
- Cutting Diameter Tolerance is +.015/-.000

(Former List Number 818)

Cutter Dia.	Length of Cut	Hole Size	Driving Slot Dimensions Width	Depth	No. of Teeth	EDP No. Uncoated
1-1/4	1	1/2	1/4	5/32	8	81830
1-1/2	1-1/8	1/2	1/4	5/32	8	81832
1-3/4	1-1/4	3/4	5/16	3/16	8	81834
2	1-3/8	3/4	5/16	3/16	8	81836
2-1/4	1-1/2	1	3/8	7/32	10	81838
2-1/2	1-5/8	1	3/8	7/32	10	81840
2-3/4	1-5/8	1	3/8	7/32	10	81842
3	1-3/4	1-1/4	1/2	9/32	12	81844
3-1/2	1-7/8	1-1/4	1/2	9/32	12	81848
4	2-1/4	1-1/2	5/8	3/8	14	81852
4-1/2	2-1/4	1-1/2	5/8	3/8	14	81856
5	2-1/4	1-1/2	5/8	3/8	16	81860
6	2-1/4	2	3/4	7/16	16	81868

STRAIGHT SHANK PILOTED COUNTERBORES

- Soft to Medium Hardness Materials
- For Use With 1960 Series Socket Head Cap Screws
- High Speed Steel
- 20° Right Hand Helix, Right Hand Cut
- Cutting Diameter Tolerance is +.001/-.000
- Pilot Diameter Tolerance is +.000/-.001

(Former List Number 560)

Pilot Dia.	Cutter Dia.	For U.S.S. Cap Screw	Shank Dia.	Overall Length	EDP No. Uncoated
.3095	.4738	5/16	7/16	6	56031
.3251	.4894	5/16	7/16	6	56033
.3408	.5050	5/16	7/16	6	56034
.4345	.6612	7/16	1/2	7	56043
.4501	.6769	7/16	1/2	7	56045
.4658	.6925	7/16	1/2	7	56046
.6210	.9425	5/8	3/4	8-1/4	56055
.6512	.9738	5/8	3/4	8-1/4	56056
.6825	1.0050	5/8	3/4	8-1/4	56057
.7450	1.1300	3/4	1	8-13/16	56059
.7762	1.1612	3/4	1	8-13/16	56060
.8075	1.1925	3 /4	1	8-13/16	56061
.9950	1.5050	1	1	8-13/16	56067
1.0575	1.5675	1	1	8-13/16	56069

STRAIGHT SHANK PILOTED COUNTERBORES

- Soft to Medium Hardness Materials
- For Use With 1936 Series Socket Head Cap Screws
- High Speed Steel
- 20° Right Hand Helix, Right Hand Cut
- Cutting Diameter Tolerance is +.001/-.000
- Pilot Diameter Tolerance is +.000/-.001

(Former List Number 562)

Pilot Dia.	Cutter Dia.	For U.S.S. Cap Screw	Shank Dia.	Overall Length	EDP No. Uncoated
.1350	.2300	6	7/32	3	56207
.1500	.2420	6	7/32	3	56209
.1610	.2740	8	1/4	3	56211
.1780	.2860	8	1/4	3	56213
.1870	.3160	10	5/16	3-1/2	56215
.2040	.3280	10	5/16	3-1/2	56219
.2130	.3480	12	11/32	3-1/2	56220
.2290	.3600	12	11/32	3-1/2	56222
.2470	.3800	1/4	3/8	5-3/4	56225
.2626	.3956	1/4	3/8	5-3/4	56227
.2782	.4112	1/4	3/8	5-3/4	56228
.3095	.4425	5/16	7/16	6	56231
.3251	.4581	5/16	7/16	6	56233
.3408	.4738	5/16	7/16	6	56234
.3720	.5675	3/8	1/2	6-1/2	56237
.3876	.5831	3/8	1/2	6-1/2	56239
.4032	.5988	3/8	1/2	6-1/2	56240
.4345	.6300	7/16	1/2	7	56243
.4501	.6456	7/16	1/2	7	56245
.4658	.6612	7/16	1/2	7	56246
.4960	.7550	1/2	1/2	7-1/4	56249
.5116	.7706	1/2	1/2	7-1/4	56251
.5272	.7860	1/2	1/2	7-1/4	56252
.5585	.8175	9/16	3/4	7-1/2	56253
.5898	.8488	9/16	3/4	7-1/2	56254
.6200	.8800	5/8	3/4	8-1/4	56255
.6512	.9112	5/8	3/4	8-1/4	56256
.6825	.9425	5/8	3/4	8-1/4	56257
.7450	1.0050	3/4	1	8-13/16	56259
.7762	1.0362	3/4	1	8-13/16	56260
.8075	1.0675	3/4	1	8-13/16	56261

MORSE TAPER SHANK PILOTED COUNTERBORES

- Soft to Medium Hardness Materials
- For Use With 1960 Series Socket Head Cap Screws
- High Speed Steel
- 20° Right Hand Helix, Right Hand Cut
- Cutting Diameter Tolerance is +.001/-.000
- Pilot Diameter Tolerance is +.000/-.001

(Former List Number 564)

Pilot Dia.	Cutter Dia.	For U.S.S. Cap Screw	Morse Taper	Overall Length	EDP No. Uncoated
.3095	.4738	5/16	1	6	56431
.3251	.4844	5/16	1	6	56433
.3408	.5050	5/16	1	6	56434
.4345	.6612	7/16	2	7	56443
.4657	.6925	7/16	2	7	56446
.6200	.9425	5/8	3	8-1/4	56455
.6512	.9738	5/8	3	8-1/4	56456
.6825	1.0050	5/8	3	8-1/4	56457
.7762	1.1612	3/4	3	8-13/16	56460
.8075	1.1925	3/4	3	8-13/16	56461
.9012	1.3488	7/8	3	8-13/16	56464
1.0262	1.5360	1	3	8-13/16	56468
1.0575	1.5680	1	3	8-13/16	56469

MORSE TAPER SHANK PILOTED COUNTERBORES

- Soft to Medium Hardness Materials
- For Use With 1936 Series Socket Head Cap Screws
- High Speed Steel
- 20° Right Hand Helix, Right Hand Cut
- Cutting Diameter Tolerance is +.001/-.000
- Pilot Diameter Tolerance is +.000/-.001

(Former List Number 566)

Pilot Dia.	Cutter Dia.	For U.S.S. Cap Screw	Morse Taper	Overall Length	EDP No. Uncoated
.2470	.3800	1/4	1	5-3/4	56625
.2626	.3956	1/4	1	5-3/4	56627
.2782	.4112	1/4	1	5-3/4	56628
.3095	.4425	5/16	1	6	56631
.3251	.4581	5/16	1	6	56633
.3408	.4738	5/16	1	6	56634
.3720	.5675	3/8	1	6-1/2	56637
.3876	.5831	3/8	1	6-1/2	56639
.4032	.5988	3/8	1	6-1/2	56640
.4345	.6300	7/16	2	7	56643
.4658	.6612	7/16	2	7	56646
.4960	.7550	1/2	2	7-1/4	56649
.5116	.7706	1/2	2	7-1/4	56651
.5272	.7862	1/2	2	7-1/4	56652
.5585	.8175	9/16	2	7-1/2	56653
.6512	.9112	5/8	3	8-1/4	56656
.7450	1.0050	3/4	3	8-13/16	56659
.7762	1.0362	3/4	3	8-13/16	56660
.8075	1.0675	3/4	3	8-13/16	56661
.9950	1.3175	1	3	8-13/16	56667

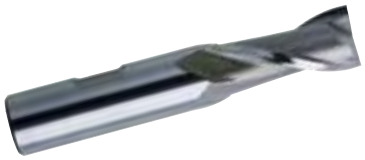
COBALT END MILLS

Our cobalt grouping also offers tools that meet the ANSI and NAS specifications and have been designed for general purpose and special applications. The 8% cobalt substrate in these tools allows a higher hardness, which provides better abrasion resistance and higher red hardness benefits, versus standard high speed steel substrates.

COBALT

BRUBAKER TOOL™

SINGLE END TWO FLUTE

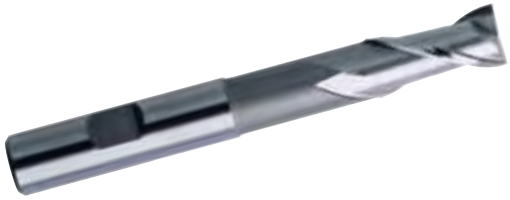


(Former List Numbers 820, 822, 824)

- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.001/-.000

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	2-5/16	82000	86400	80129
3/16	3/8	7/16	2-5/16	82002	86402	80130
1/4	3/8	1/2	2-5/16	82004	86404	80131
5/16	3/8	9/16	2-5/16	82009	86409	80132
3/8	3/8	9/16	2-5/16	82014	86414	80133
3/8	3/8	1	2-3/4	82215	82217	80134
3/8	3/8	1-1/2	3-1/4	82416	82418	80135
7/16	3/8	13/16	2-1/2	82020	86420	80136
1/2	3/8	13/16	2-1/2	82027	82026	80137
1/2	1/2	1	3	82028	86428	80138
1/2	1/2	1-1/2	3-1/2	82229	82231	80139
1/2	1/2	2	4	82430	82432	80140
9/16	1/2	1-1/8	3-1/8	82033	86433	80141
5/8	1/2	1-1/8	3-1/8	82035	82018	80142
5/8	5/8	1-5/16	3-7/16	82036	86436	80143
5/8	5/8	1-5/8	3-3/4	82237	82239	80144
5/8	5/8	2	4-1/8	82438	82440	80145
3/4	1/2	1-5/16	3-5/16	82043	82042	80149
3/4	5/8	1-5/16	3-7/16	82044	82024	80150
3/4	3/4	1-5/16	3-9/16	82045	86445	80151
3/4	3/4	1-3/4	4	82246	82248	80152
3/4	3/4	2-1/4	4-1/2	82447	82449	80153
7/8	5/8	1-1/2	3-5/8	82052	82051	80154
7/8	7/8	1-1/2	3-3/4	82054	82056	80155
1	5/8	1-1/2	3-5/8	82062	82061	80156
1	3/4	1-1/2	3-3/4	82063	82065	80163
1	1	1-5/8	4-1/8	82066	86466	80167
1	1	2-1/4	4-3/4	82267	82269	80171
1	1	3	5-1/2	82468	82470	80176
1-1/4	1-1/4	1-5/8	4-1/8	82075	82077	80177
1-1/4	1-1/4	2-1/4	4-3/4	82276	82278	80178
1-1/4	1-1/4	3	5-1/2	82477	82479	80180
1-1/2	1-1/4	1-5/8	4-1/8	82083	82085	80182
1-1/2	1-1/4	2-1/4	4-3/4	82284	82286	80183
2	1-1/4	1-5/8	4-1/8	82092	82094	80187
2	1-1/4	2-1/4	4-3/4	82293	82295	80192

SINGLE END TWO FLUTE EXTENDED LENGTH



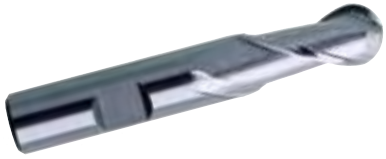
- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel

- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core and Un-Fluted Neck for Rigidity
- Cutting Diameter Tolerance is +.001/-.000

(Former List Number 826)

Cutter Dia.	Shank Dia.	Length of Cut	Length Below Shank	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	13/16	2-3/8	82600	82608	82601
3/16	3/8	1/2	1-1/8	2-11/16	82602	82613	82603
1/4	3/8	5/8	1-1/2	3-1/16	82604	82606	82617
5/16	3/8	3/4	1-3/4	3-5/16	82609	82611	82618
3/8	3/8	3/4	1-3/4	3-5/16	82614	82616	82619
1/2	1/2	1	2-7/32	4	82628	82630	82620
3/4	3/4	1-5/8	3-11/32	5-3/8	82645	82647	82621
1	1	2-1/2	4-31/32	7-1/4	82666	82668	82622

SINGLE END TWO FLUTE BALL



- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel

- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.001/-.000

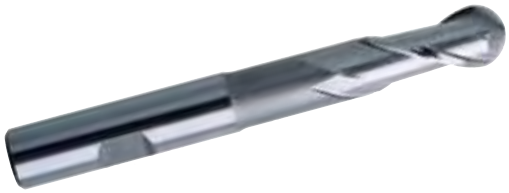
(Former List Number 827)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	2-5/16	82700	82708	80198
3/16	3/8	1/2	2-3/8	82702	82713	80199
1/4	3/8	5/8	2-7/16	82704	82706	80201
5/16	3/8	3/4	2-1/2	82709	82711	80203
3/8	3/8	3/4	2-1/2	82714	82716	80217
7/16	1/2	1	3	82721	82723	80218
1/2	1/2	1	3	82728	82730	80219
5/8	5/8	1-3/8	3-1/2	82736	82738	80220
3/4	3/4	1-5/8	3-7/8	82745	82747	80221
7/8	3/4	2	4-1/4	82754	82756	80222
1	1	2-1/4	4-3/4	82766	82768	80223
1-1/4	1-1/4	2-1/2	5	82775	82777	80224
1-1/2	1-1/4	2-1/2	5	82783	82785	80232

COBALT

BRUBAKER TOOL™

SINGLE END TWO FLUTE BALL EXTENDED LENGTH

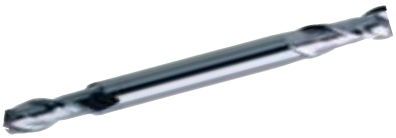


- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core and Un-fluted Neck for Rigidity
- Cutting Diameter Tolerance is +.001/-.000

(Former List Number 828)

Cutter Dia.	Shank Dia.	Length of Cut	Length Below Shank	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	13/16	2-3/8	82800	82808	82801
3/16	3/8	1/2	1-1/8	2-11/16	82802	82813	82803
1/4	3/8	5/8	1-1/2	3-1/16	82804	82806	82817
5/16	3/8	3/4	1-3/4	3-5/16	82809	82811	82818
3/8	3/8	3/4	1-3/4	3-5/16	82814	82816	82819
1/2	1/2	1	2-7/32	4	82828	82830	82820
3/4	3/4	1-5/8	3-11/32	5-3/8	82845	82847	82821
1	1	2-1/2	4-31/32	7-1/4	82866	82868	82822

DOUBLE END TWO FLUTE 3/16" SHANK



- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- 35° Right Hand Helix, Right Hand Cut
- Center Cutting
- Cutting Diameter Tolerance is +.000/-.0015
  *Cutting Diameter Tolerance is +.003/-.000
  **Cutting Diameter Tolerance is +.000/-.0025

(Former List Numbers 723, 724, 726)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/32	3/16	3/64	2	72308	72310	72301
1/32	3/16	3/32	2-1/4	72408	72410	72400
3/64	3/16	1/16	2	72312	72314	72302
3/64	3/16	9/64	2-1/4	72412	72414	72401
1/16	3/16	3/32	2	72316	72318	72303
1/16	3/16	3/16	2-1/4	72416	72418	72402
1/16*	3/16	7/32	2-1/2	72616	72618	72600
5/64	3/16	1/8	2	72320	72322	72304
5/64	3/16	15/64	2-1/4	72420	72422	72403
3/32	3/16	9/64	2	72324	72326	72305
3/32	3/16	9/32	2-1/4	72424	72426	72404
3/32*	3/16	9/32	2-5/8	72624	72626	72601
7/64	3/16	5/32	2	72328	72330	72306
7/64	3/16	21/64	2-1/4	72428	72430	72405
1/8	3/16	3/16	2	72332	72334	72307
1/8	3/16	3/8	2-1/4	72432	72434	72406
1/8*	3/16	3/4	3-1/8	72632	72634	72602
9/64	3/16	7/32	2	72336	72338	72311
9/64	3/16	13/32	2-1/4	72436	72438	72407
5/32	3/16	15/64	2	72340	72342	72315
5/32	3/16	7/16	2-1/4	72440	72442	72411
5/32*	3/16	7/8	3-1/4	72640	72642	72603
11/64	3/16	1/4	2	72344	72346	72319
11/64	3/16	1/2	2-1/4	72444	72446	72415
3/16	3/16	9/32	2	72348	72350	72323
3/16	3/16	1/2	2-1/4	72448	72450	72419
3/16**	3/16	1	3-3/8	72648	72650	72604

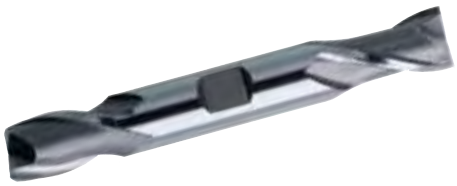
DOUBLE END TWO FLUTE BALL 3/16" SHANK

- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- 35° Right Hand Helix, Right Hand Cut
- Center Cutting
- Cutting Diameter Tolerance is +.000/-.0015
  *Cutting Diameter Tolerance is +.001/-.000

(Former List Numbers 727, 728, 729)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/32	3/16	3/64	2	72708	72710	72756
1/32	3/16	3/32	2-1/4	72808	72810	72757
3/64	3/16	1/16	2	72712	72714	72758
3/64	3/16	9/64	2-1/4	72812	72814	72759
1/16	3/16	3/32	2	72716	72718	72760
1/16	3/16	3/16	2-1/4	72816	72818	72761
1/16*	3/16	7/32	2-1/2	72916	72918	72762
5/64	3/16	1/8	2	72720	72722	72763
5/64	3/16	15/64	2-1/4	72820	72822	72764
3/32	3/16	9/64	2	72724	72726	72765
3/32	3/16	9/32	2-1/4	72824	72826	72766
3/32*	3/16	9/32	2-5/8	72924	72926	72767
7/64	3/16	5/32	2	72728	72730	72768
7/64	3/16	21/64	2-1/4	72828	72830	72769
1/8	3/16	3/16	2	72732	72734	72770
1/8	3/16	3/8	2-1/4	72832	72834	72771
1/8*	3/16	3/4	3-1/8	72932	72934	72772
9/64	3/16	7/32	2	72736	72738	72773
9/64	3/16	13/32	2-1/4	72836	72838	72774
5/32	3/16	15/64	2	72740	72742	72776
5/32	3/16	7/16	2-1/4	72840	72842	72777
5/32*	3/16	7/8	3-1/4	72940	72942	72778
11/64	3/16	1/4	2	72744	72746	72779
11/64	3/16	1/2	2-1/4	72844	72846	72780
3/16	3/16	9/32	2	72748	72750	72781
3/16	3/16	1/2	2-1/4	72848	72850	72782
3/16	3/16	1	3-3/8	72948	72950	72783

DOUBLE END TWO FLUTE

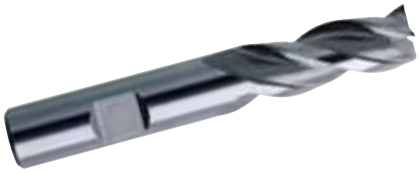


- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.000/-.001

(Former List Number 819)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	3-1/16	81900	86300	80111
5/32	3/8	7/16	3-1/8	81901	86301	80113
3/16	3/8	7/16	3-1/8	81902	86302	80114
7/32	3/8	1/2	3-1/8	81903	86303	80115
1/4	3/8	1/2	3-1/8	81904	86304	80116
9/32	3/8	9/16	3-1/8	81908	86308	80117
5/16	3/8	9/16	3-1/8	81909	86309	80118
11/32	3/8	9/16	3-1/8	81913	86313	80119
3/8	3/8	9/16	3-1/8	81914	86314	80120
13/32	1/2	13/16	3-3/4	81919	86319	80121
7/16	1/2	13/16	3-3/4	81921	86321	80122
1/2	1/2	13/16	3-3/4	81928	86328	80123
9/16	5/8	1-1/8	4-1/2	81934	86334	80124
5/8	5/8	1-1/8	4-1/2	81936	86336	80125
3/4	3/4	1-5/16	5	81945	86345	80126
7/8	7/8	1-9/16	5-1/2	81954	86354	80127
1	1	1-5/8	5-7/8	81966	86366	80128

SINGLE END THREE FLUTE



- Aluminum Alloys
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- 35° Right Hand Helix, Right Hand Cut
- Tool Geometry Provides Line Free Finish on Machined Part
- Center Cutting
- Deep Flutes for Chip Evacuation
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 777)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/2	1/2	1-1/4	3-1/4	77700	77702	77766
1/2	1/2	2	4	77718	77720	77767
1/2	1/2	3	5	77736	77738	77768
3/4	3/4	1-5/8	3-7/8	77703	77705	77769
3/4	3/4	3	5-1/4	77721	77723	77770
3/4	3/4	4	6-1/4	77739	77741	77771
1	1	2	4-1/2	77706	77708	77772
1	1	3	5-1/2	77724	77726	77773
1	1	4	6-1/2	77742	77744	77774
1	1	6	8-1/2	77754	77756	77775
1-1/4	1-1/4	2	4-1/2	77709	77711	77776
1-1/4	1-1/4	3	5-1/2	77727	77729	77777
1-1/4	1-1/4	4	6-1/2	77745	77747	77778
1-1/4	1-1/4	6	8-1/2	77757	77759	77779
1-1/2	1-1/4	2	4-1/2	77712	77714	77780
1-1/2	1-1/4	3	5-1/2	77730	77732	77781
1-1/2	1-1/4	4	6-1/2	77748	77750	77782
1-1/2	1-1/4	6	8-1/2	77760	77762	77783
2	2	2	5-3/4	77715	77717	77784
2	2	3	6-3/4	77733	77735	77785
2	2	4	7-3/4	77751	77753	77786
2	2	6	9-3/4	77763	77765	77787

SINGLE END MULTI-FLUTE SST SERIES
CENTER CUTTING

- NAS 986 Type 46 and 66
- Titanium and Stainless Steel Alloys
- Medium to Highest Hardness and Abrasive Materials
- Ramp
- Profile, Slot and Pocket

- 8% Cobalt High Speed Steel
- 35° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 850, 852, 854, 856)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	2-5/16	4	85000	85008	85001
3/16	3/8	1/2	2-3/8	4	85002	85013	85003
1/4	3/8	5/8	2-7/16	4	85004	85006	85017
5/16	3/8	3/4	2-1/2	4	85009	85011	85018
3/8	3/8	3/4	2-1/2	4	85014	85016	85019
3/8	3/8	1-1/2	3-1/4	4	85416	85418	85406
3/8	3/8	2-1/2	4-1/4	4	85617	85619	85600
7/16	3/8	1	2-11/16	4	85020	85022	85023
1/2	1/2	1-1/4	3-1/4	4	85028	85030	85024
1/2	1/2	2	4	4	85430	85432	85407
1/2	1/2	3	5	4	85631	85633	85601
5/8	5/8	1-5/8	3-3/4	4	85036	85038	85025
5/8	5/8	2-1/2	4-5/8	4	85438	85440	85408
5/8	5/8	3	5-1/8	4	85237	85239	85203
5/8	5/8	4	6-1/8	4	85639	85641	85602
3/4	3/4	1-5/8	3-7/8	4	85045	85044	85026
3/4	3/4	1-5/8	3-7/8	6	85046	85048	85027
3/4	3/4	3	5-1/4	4	85447	85446	85409
3/4	3/4	3	5-1/4	6	85448	85450	85410
3/4	3/4	4	6-1/4	4	85647	85646	85603
3/4	3/4	4	6-1/4	6	85648	85650	85604
7/8	7/8	1-7/8	4-1/8	4	85054	85056	85031
7/8	7/8	3-1/2	5-3/4	4	85456	85458	85411
1	1	2	4-1/2	4	85066	85065	85032
1	1	2	4-1/2	6	85067	85069	85033
1	1	3	5-1/2	4	85267	85266	85204
1	1	3	5-1/2	6	85268	85270	85205
1	1	4	6-1/2	4	85468	85467	85412
1	1	4	6-1/2	6	85469	85471	85413
1	1	6	8-1/2	4	85668	85667	85605
1	1	6	8-1/2	6	85669	85671	85606
1-1/4	1-1/4	2	4-1/2	6	85075	85077	85034
1-1/4	1-1/4	3	5-1/2	6	85276	85278	85206
1-1/4	1-1/4	4	6-1/2	6	85477	85479	85414
1-1/4	1-1/4	6	8-1/2	6	85678	85680	85607
1-1/2	1-1/4	2	4-1/2	6	85083	85085	85035
1-1/2	1-1/4	3	5-1/2	6	85284	85286	85207
1-1/2	1-1/4	4	6-1/2	6	85485	85487	85415
1-1/2	1-1/4	6	8-1/2	6	85686	85688	85608
2	1-1/4	2	4-1/2	6	85092	85094	85039
2	2	2	5-3/4	6	85096	85098	85040
2	2	3	6-3/4	6	85297	85299	85208
2	2	4	7-3/4	6	85498	85497	85419
2	2	6	9-3/4	6	85699	85698	85609

SINGLE END MULTI-FLUTE SST SERIES LEFT HAND CENTER CUTTING

- NAS 986 Type 46 and 66
- Titanium and Stainless Steel Alloys
- Medium to Highest Hardness and Abrasive Materials
- Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- **35° Left Hand Helix, Left Hand Cut**
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 851, 853, 855, 857)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/2	1/2	1-1/4	3-1/4	4	85128	85130	85100
3/4	3/4	1-5/8	3-7/8	4	85145	85144	85101
3/4	3/4	1-5/8	3-7/8	6	85146	85148	85102
3/4	3/4	3	5-1/4	4	85547	85546	85500
3/4	3/4	3	5-1/4	6	85548	85550	85501
3/4	3/4	4	6-1/4	4	85747	85746	85700
3/4	3/4	4	6-1/4	6	85748	85750	85701
1	1	2	4-1/2	4	85166	85165	85103
1	1	2	4-1/2	6	85167	85169	85104
1	1	3	5-1/2	4	85367	85366	85300
1	1	3	5-1/2	6	85368	85370	85301
1	1	4	6-1/2	4	85568	85567	85502
1	1	4	6-1/2	6	85569	85571	85503
1	1	6	8-1/2	4	85768	85767	85702
1	1	6	8-1/2	6	85769	85771	85703
1-1/4	1-1/4	2	4-1/2	6	85175	85177	85105
1-1/4	1-1/4	3	5-1/2	6	85376	85378	85302
1-1/4	1-1/4	4	6-1/2	6	85577	85579	85504
1-1/4	1-1/4	6	8-1/2	6	85778	85780	85704
1-1/2	1-1/4	2	4-1/2	6	85183	85185	85106
1-1/2	1-1/4	3	5-1/2	6	85384	85386	85303
1-1/2	1-1/4	4	6-1/2	6	85585	85587	85505
1-1/2	1-1/4	6	8-1/2	6	85786	85788	85705
2	2	2	5-3/4	6	85196	85198	85107
2	2	3	6-3/4	6	85397	85399	85304
2	2	4	7-3/4	6	85598	85597	85506

DOUBLE END FOUR FLUTE 3/16" SHANK CENTER CUTTING

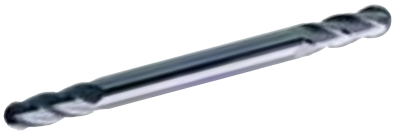
- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket

- 8% Cobalt High Speed Steel
- 35° Right Hand Helix, Right Hand Cut
- Cutting Diameter Tolerance is +.003/-.000
  *Cutting Diameter Tolerance is +.000/-.0025

(Former List Numbers 781, 782, 784)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/16	3/16	3/32	2	78116	78118	78100
1/16	3/16	3/16	2-1/4	78216	78218	78200
1/16	3/16	7/32	2-1/2	78416	78418	78400
3/32	3/16	9/64	2	78124	78126	78101
3/32	3/16	9/32	2-1/4	78224	78226	78201
3/32	3/16	9/32	2-5/8	78424	78426	78401
1/8	3/16	3/16	2	78132	78134	78102
1/8	3/16	3/8	2-1/4	78232	78234	78202
1/8	3/16	3/4	3-1/8	78432	78434	78402
5/32	3/16	15/64	2	78140	78142	78103
5/32	3/16	7/16	2-1/4	78240	78242	78203
5/32	3/16	7/8	3-1/4	78440	78442	78403
3/16*	3/16	9/32	2	78148	78150	78104
3/16*	3/16	1/2	2-1/4	78248	78250	78204
3/16*	3/16	1	3-3/8	78448	78450	78404

DOUBLE END FOUR FLUTE BALL 3/16" SHANK CENTER CUTTING



- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket

- 8% Cobalt High Speed Steel
- 35° Right Hand Helix, Right Hand Cut
- Cutting Diameter Tolerance is +.001/-.000
  *Cutting Diameter Tolerance is +.000/ -.0015

(Former List Numbers 785, 786)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
11/16	3/16	3/32	2	78516	78518	78500
1/16	3/16	3/16	2-1/4	78616	78618	78600
3/32	3/16	9/64	2	78524	78526	78501
3/32	3/16	9/32	2-1/4	78624	78626	78601
1/8	3/16	3/16	2	78532	78534	78502
1/8	3/16	3/8	2-1/4	78632	78634	78602
5/32	3/16	15/64	2	78540	78542	78503
5/32	3/16	7/16	2-1/4	78640	78642	78603
3/16*	3/16	9/32	2	78548	78550	78504
3/16*	3/16	1/2	2-1/4	78648	78650	78604

SINGLE END MULTI-FLUTE GEMINI SERIES
CENTER CUTTING

- NAS 986 Type 45, 65 and 85
- High Temperature and Nickel Base Alloys
- Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 858, 859, 860)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/2	1/2	1-1/4	3-1/4	4	85828	85830	80300
1/2	1/2	2	4	4	86030	86032	80302
5/8	5/8	1-5/8	3-3/4	4	85836	85838	80306
5/8	5/8	2-1/2	4-5/8	4	86038	86040	80307
3/4	3/4	1-5/8	3-7/8	4	85845	85847	80314
3/4	3/4	3	5-1/4	4	86047	86049	80329
7/8	7/8	1-7/8	4-1/8	4	85854	85856	80330
7/8	7/8	3-1/2	5-3/4	4	86056	86058	80331
1	1	2	4-1/2	6	85866	85868	80332
1	1	3	5-1/2	6	85967	85969	80333
1	1	4	6-1/2	6	86068	86070	80334
1-1/4	1-1/4	2	4-1/2	6	85875	85877	80335
1-1/4	1-1/4	3	5-1/2	6	85976	85978	80336
1-1/4	1-1/4	4	6-1/2	6	86077	86079	80337
1-1/2	1-1/4	2	4-1/2	8	85883	85885	80338
1-1/2	1-1/4	3	5-1/2	8	85984	85986	80339
1-1/2	1-1/4	4	6-1/2	8	86085	86087	80340
2	2	2	5-3/4	8	85896	85898	80341
2	2	3	6-3/4	8	85997	85999	80343
2	2	4	7-3/4	8	86098	86097	80344

SINGLE END MULTI-FLUTE CENTER CUTTING

- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.001/-.000 *Cutting Diameter Tolerance is +.002/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 838, 839, 841)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	2-5/16	4	83800	86900	80345
3/16	3/8	1/2	2-3/8	4	83802	86902	80346
1/4	3/8	5/8	2-7/16	4	83804	86904	80347
1/4	3/8	1-1/4	3-1/16	4	83906	83908	80348
1/4	3/8	1-3/4	3-9/16	4	84107	84109	80349
5/16	3/8	3/4	2-1/2	4	83809	86909	80350
5/16	3/8	1-3/8	3-1/8	4	83911	83913	80351
5/16	3/8	2	3-3/4	4	84112	84114	80352
3/8	3/8	3/4	2-1/2	4	83814	86914	80353
3/8	3/8	1-1/2	3-1/4	4	83916	83918	80354
3/8	3/8	2-1/2	4-1/4	4	84117	84119	80355
1/2	1/2	1-1/4	3-1/4	4	83828	86928	80356
1/2	1/2	1-1/4	3-1/4	6	83829	83831	80357
1/2	1/2	2	4	4	83930	83932	80358
1/2	1/2	3	5	4	84131	84133	80359
5/8	5/8	1-5/8	3-3/4	4	83836	86936	80360
5/8	5/8	1-5/8	3-3/4	6	83837	83839	80361
5/8	5/8	2-1/2	4-5/8	4	83938	83940	80362
5/8	5/8	4	6-1/8	4	84139	84141	80363
3/4	3/4	1-5/8	3-7/8	4	83845	86945	80364
3/4	3/4	1-5/8	3-7/8	6	83846	83848	80365
3/4	3/4	3	5-1/4	4	83947	83946	80366
3/4	3/4	3	5-1/4	6	83948	83950	80367
3/4	3/4	4	6-1/4	4	84147	84146	80368
3/4	3/4	4	6-1/4	6	84148	84150	80369
7/8	7/8	1-7/8	4-1/8	4	83854	86954	80370
1	1	2	4-1/2	4	83866	86966	80371
1	1	2	4-1/2	6	83867	83869	80372
1	1	3	5-1/2	4	83966	83965	80373
1	1	3	5-1/2	6	83967	83961	80374
1	1	4	6-1/2	4	83968	83963	80375
1	1	4	6-1/2	6	83969	83971	80376
1	1	6	8-1/2	4	84168	84167	80377
1	1	6	8-1/2	6	84169	84171	80378
1-1/4	1-1/4	2	4-1/2	4	83875	83874	80379
1-1/4	1-1/4	2	4-1/2	6	83876	83878	80380
1-1/4	1-1/4	3	5-1/2	6	83976	83975	80381
1-1/4	1-1/4	4	6-1/2	4	83977	83973	80382
1-1/4	1-1/4	4	6-1/2	6	83978	83980	80383
1-1/4	1-1/4	6	8-1/2	4	84177	84176	80384
1-1/4	1-1/4	6	8-1/2	6	84178	84180	80385
1-1/2	1-1/4	2	4-1/2	4	83883	83882	80386
1-1/2	1-1/4	2	4-1/2	6	83884	83886	80387
1-1/2	1-1/4	3	5-1/2	6	83984	83983	80388
1-1/2	1-1/4	4	6-1/2	6	83985	83987	80389
1-1/2	1-1/4	6	8-1/2	6	84184	84186	80390
1-3/4	1-1/4	2	4-1/2	6	83889	83891	80391
2	1-1/4	2	4-1/2	6	83892	83894	80392
2*	2	3	6-3/4	6	83895	83818	80393
2*	2	4	7-3/4	6	83896	83820	80394
2*	2	5	8-3/4	6	83897	83822	80395
2*	2	6	9-3/4	6	83898	83824	80396
2*	2	8	11-3/4	6	83899	83833	80397

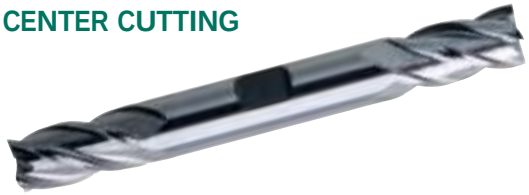
SINGLE END MULTI-FLUTE BALL CENTER CUTTING

- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.001/-.000

(Former List Number 843)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	2-5/16	4	84300	84319	80235
3/16	3/8	1/2	2-3/8	4	84302	84321	80263
1/4	3/8	5/8	2-7/16	4	84304	84323	80264
1/4	3/8	1	2-13/16	4	84305	84307	80265
5/16	3/8	3/4	2-1/2	4	84309	84311	80268
3/8	3/8	3/4	2-1/2	4	84314	84313	80269
3/8	3/8	1-1/2	3-5/16	4	84315	84317	80270
1/2	1/2	1-1/4	3-1/4	4	84328	84327	80274
1/2	1/2	2	4	4	84329	84331	80281
5/8	5/8	1-5/8	3-3/4	4	84336	84338	80282
3/4	3/4	1-5/8	3-7/8	4	84345	84344	80287
3/4	3/4	3	5-1/4	4	84346	84348	80291
1	1	2	4-1/2	4	84366	84365	80292
1	1	3	5-1/2	4	84367	84369	80295
1-1/4	1-1/4	2	4-1/2	4	84375	84374	80296
1-1/4	1-1/4	2	4-1/2	6	84376	84378	80297
1-1/2	1-1/4	2	4-1/2	4	84383	84382	80298
1-1/2	1-1/4	2	4-1/2	6	84384	84386	80299

DOUBLE END FOUR FLUTE CENTER CUTTING



- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- 8% Cobalt High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.000/-.001

(Former List Number 837)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	3-1/16	83700	83708	83701
3/16	3/8	1/2	3-1/4	83702	83713	83703
1/4	3/8	5/8	3-3/8	83704	83706	83717
5/16	3/8	3/4	3-1/2	83709	83711	83718
3/8	3/8	3/4	3-1/2	83714	83716	83719
1/2	1/2	1	4-1/8	83728	83730	83720
5/8	5/8	1-3/8	5	83736	83738	83721
3/4	3/4	1-5/8	5-5/8	83745	83747	83722

SINGLE END MULTI-FLUTE NON-CENTER CUTTING

- Medium to Medium Hard and Abrasive Materials
- Profile and Open-Ended Slotting
- 8% Cobalt High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.001/-.000

(Former List Numbers 831, 833, 835)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	2-5/16	4	83100	83108	83101
3/16	3/8	1/2	2-3/8	4	83102	83113	83103
1/4	3/8	5/8	2-7/16	4	83104	83106	83117
1/4	3/8	1-1/4	3-1/16	4	83306	83308	83300
1/4	3/8	1-3/4	3-9/16	4	83507	83509	83500
5/16	3/8	3/4	2-1/2	4	83109	83111	83118
5/16	3/8	1-3/8	3-1/8	4	83311	83313	83301
5/16	3/8	2	3-3/4	4	83512	83514	83501
3/8	3/8	3/4	2-1/2	4	83114	83116	83119
3/8	3/8	1-1/2	3-1/4	4	83316	83318	83302
3/8	3/8	2-1/2	4-1/4	4	83517	83519	83502
7/16	3/8	1	2-11/16	4	83120	83122	83123
7/16	1/2	1-3/4	3-3/4	4	83323	83325	83303
1/2	3/8	1	2-11/16	4	83127	83126	83124
1/2	1/2	1-1/4	3-1/4	4	83128	83130	83134
1/2	1/2	2	4	4	83330	83332	83304
1/2	1/2	3	5	4	83531	83533	83503
9/16	1/2	1-3/8	3-3/8	4	83133	83132	83150
5/8	1/2	1-3/8	3-3/8	4	83135	83140	83151
5/8	5/8	1-5/8	3-3/4	4	83136	83138	83152
5/8	5/8	2-1/2	4-5/8	4	83338	83340	83305
5/8	5/8	4	6-1/8	4	83539	83541	83504
3/4	1/2	1-5/8	3-5/8	4	83143	83142	83156
3/4	5/8	1-5/8	3-3/4	4	83144	83149	83157
3/4	3/4	1-5/8	3-7/8	4	83145	83147	83158
3/4	3/4	3	5-1/4	4	83347	83349	83309
3/4	3/4	4	6-1/4	4	83548	83550	83505
7/8	3/4	1-7/8	4-1/8	4	83153	83155	83159
7/8	7/8	3-1/2	5-3/4	4	83356	83358	83310
7/8	7/8	5	7-1/4	4	83557	83559	83506
1	5/8	1-7/8	6	4	83162	83161	83169
1	3/4	1-7/8	4-1/8	4	83163	83165	83170
1	1	2	4-1/2	4	83166	83168	83171
1	1	4	6-1/2	4	83368	83370	83314
1	1	6	8-1/2	4	83569	83571	83510
1-1/4	1-1/4	2	4-1/2	6	83175	83177	83172
1-1/4	1-1/4	4	6-1/2	6	83377	83379	83315
1-1/4	1-1/4	6	8-1/2	6	83578	83580	83511
1-1/2	1-1/4	2	4-1/2	6	83183	83185	83173
1-1/2	1-1/4	4	6-1/2	6	83385	83387	83319
1-1/2	1-1/4	8	10-1/2	6	83586	83588	83515
1-3/4	1-1/4	4	6-1/2	6	83389	83391	83320
2	1-1/4	2	4-1/2	8	83192	83194	83174
2	1-1/4	4	6-1/2	8	83394	83396	83321

DOUBLE END FOUR FLUTE NON-CENTER CUTTING

- Medium to Medium Hard and Abrasive Materials
- Profile and Open-Ended Slotting
- 8% Cobalt High Speed Steel
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.001/-.000
  *Cutting Diameter Tolerance is +.000/-.0015

(Former List Number 829)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/8	3/8	3/8	3-1/16	82900	86800	82907
5/32	3/8	7/16	3-1/8	82901	86801	82912
3/16	3/8	1/2	3-1/4	82902	86802	82920
7/32	3/8	9/16	3-1/4	82903	86803	82931
1/4	3/8	5/8	3-3/8	82904	86804	82935
9/32	3/8	11/16	3-3/8	82908	86808	82950
5/16	3/8	3/4	3-1/2	82909	86809	82951
11/32	3/8	3/4	3-1/2	82913	86813	82952
3/8*	3/8	3/4	3-1/2	82914	86814	82953
13/32	1/2	1	4-1/8	82919	86819	82957
7/16	1/2	1	4-1/8	82921	86821	82958
1/2*	1/2	1	4-1/8	82928	86828	82959
9/16	5/8	1-3/8	5	82934	86834	82960
5/8*	5/8	1-3/8	5	82936	86836	82961
3/4*	3/4	1-5/8	5-5/8	82945	86845	82962
7/8*	7/8	1-7/8	6-1/8	82954	86854	82963
1*	1	1-7/8	6-3/8	82966	86866	82964

BRUBAKER TOOL™

POWDERED METAL END MILLS

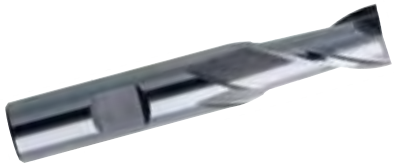
Powdered Metal tools provide a bridge between cobalt tool performance characteristics and carbide tool performance characteristics. These tools provide the following benefits:

- Our Powdered Metal substrates have finer carbide particle size and a more uniform distribution than standard HSS/Cobalt substrates.
- The tools have improved grindability, a feature that provides less chance of damage during the manufacturing and re-grind cycles and more uniform cutting edges that result in better finishes on the machined parts.
- The tools have increased toughness, a feature that provides greater resistance to edge chipping and tool breaking resulting in longer tool life and higher cutting feeds and speeds.
- The powder process allows higher alloy content in the substrates. This feature allows different grades that provide very high red hardness. These tools can machine very tough materials without excessive cutting edge wear.

POWDERED METAL

BRUBAKER TOOL™

SINGLE END TWO FLUTE

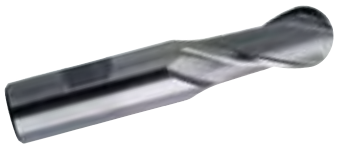


- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Powdered Metal Substrate of T15
- 30° Right Hand Helix, Right Hand Cut
- Substrate Provides Very High Edge Hardness and Abrasion Resistance
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 844)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
1/8	3/8	3/8	2-5/16	84400	84408	84401
3/16	3/8	3/8	2-3/8	84402	84413	84403
1/4	3/8	1/2	2-3/8	84404	84406	84417
5/16	3/8	9/16	2-3/8	84409	84411	84418
3/8	3/8	9/16	2-3/8	84414	84416	84419
7/16	3/8	13/16	2-1/2	84420	84422	84423
1/2	1/2	1	3	84428	84430	84424
5/8	5/8	1-5/16	3-7/16	84436	84438	84425
3/4	3/4	1-5/16	3-9/16	84445	84447	84426
7/8	7/8	1-1/2	3-3/4	84454	84456	84427
1	1	1-5/8	4-1/8	84466	84468	84431
1-1/4	1-1/4	1-5/8	4-1/8	84475	84477	84432
1-1/2	1-1/4	1-5/8	4-1/8	84483	84485	84433
2	1-1/4	1-5/8	4-1/8	84492	84494	84434

SINGLE END TWO FLUTE BALL



- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Powdered Metal Substrate of T15
- 30° Right Hand Helix, Right Hand Cut
- Substrate Provides Very High Edge Hardness and Abrasion Resistance
- Center Cutting
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 845)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	AlTiN
3/16	3/8	1/2	2-3/8	84502	84508	84500
1/4	3/8	5/8	2-1/2	84504	84506	84501
5/16	3/8	3/4	2-9/16	84509	84511	84503
3/8	3/8	3/4	2-9/16	84514	84516	84512
1/2	1/2	1	3-1/16	84528	84530	84513
5/8	5/8	1-3/8	3-9/16	84536	84538	84517
3/4	3/4	1-5/8	3-15/16	84545	84547	84518
1	1	2-1/4	4-13/16	84566	84568	84519

SINGLE END MULTI-FLUTE CENTER CUTTING

- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Powdered Metal Substrate of T15
- 30° Right Hand Helix, Right Hand Cut
- Substrate Provides Very High Edge Hardness and Abrasion Resistance
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 846, 847, 848)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	AlTiN
1/8	3/8	3/8	2-5/16	4	84600	84608	84601
3/16	3/8	1/2	2-3/8	4	84602	84613	84603
1/4	3/8	5/8	2-7/16	4	84604	84606	84617
5/16	3/8	3/4	2-1/2	4	84609	84611	84618
3/8	3/8	3/4	2-1/2	4	84614	84616	84619
3/8	3/8	1-1/2	3-1/4	4	84716	84718	84700
3/8	3/8	2-1/2	4-1/4	4	84817	84819	84800
7/16	3/8	1	2-11/16	4	84620	84622	84623
1/2	1/2	1-1/4	3-1/4	4	84628	84630	84624
1/2	1/2	2	4	4	84730	84732	84701
1/2	1/2	3	5	4	84831	84833	84801
5/8	5/8	1-5/8	3-3/4	4	84636	84635	84625
5/8	5/8	1-5/8	3-3/4	6	84637	84639	84626
5/8	5/8	2-1/2	4-5/8	4	84738	84740	84702
5/8	5/8	4	6-1/8	4	84839	84841	84802
3/4	3/4	1-5/8	3-7/8	4	84645	84644	84627
3/4	3/4	1-5/8	3-7/8	6	84646	84648	84631
3/4	3/4	3	5-1/4	4	84747	84749	84703
3/4	3/4	4	6-1/4	4	84848	84850	84803
7/8	7/8	1-7/8	4-1/8	4	84654	84653	84632
7/8	7/8	1-7/8	4-1/8	6	84655	84657	84633
7/8	7/8	3-1/2	5-3/4	4	84756	84758	84704
7/8	7/8	5	7-1/4	4	84857	84859	84804
1	1	2	4-1/2	4	84666	84665	84640
1	1	2	4-1/2	6	84667	84669	84641
1	1	4	6-1/2	4	84768	84770	84705
1	1	6	8-1/2	4	84869	84871	84805
1-1/4	1-1/4	2	4-1/2	6	84676	84678	84642
1-1/4	1-1/4	4	6-1/2	6	84777	84779	84706
1-1/2	1-1/4	2	4-1/2	6	84684	84686	84649
1-1/4	1-1/4	6	8-1/2	6	84878	84880	84806
2	1-1/4	2	4-1/2	6	84693	84695	84650
2	2	4	7-3/4	6	84798	84797	84707

SINGLE END MULTI-FLUTE BALL CENTER CUTTING

- Medium to Medium Hard and Abrasive Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- Powdered Metal Substrate of T15
- 30° Right Hand Helix, Right Hand Cut
- Substrate provides very high edge hardness and abrasion resistance
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 849)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	AlTiN
3/16	3/8	1/2	2-3/8	4	84902	84901	84903
1/4	3/8	5/8	2-7/16	4	84904	84906	84907
5/16	3/8	3/4	2-1/2	4	84909	84911	84908
3/8	3/8	3/4	2-1/2	4	84914	84916	84912
1/2	1/2	1-1/4	3-1/4	4	84928	84930	84913
5/8	5/8	1-5/8	3-3/4	4	84936	84938	84917
3/4	3/4	1-5/8	3-7/8	4	84945	84947	84918
1	1	2	4-1/2	4	84966	84968	84919

SINGLE END THREE FLUTE TRUNCATED ROUGHER CENTER CUTTING

- Aluminum and Copper Alloys
- Plunge and Ramp
- Profile, Slot, and Pocket
- Powdered Metal Substrate
- 41° Right Hand Helix, Right Hand Cut
- Tool Geometry Provides for Heavy Axial and Radial Cuts at Elevated Speeds and Feeds.
- Deep Flutes for Chip Evacuation
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 917)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	ZrN
1/2	1/2	1-1/4	3-1/4	77800	77801	77802
1/2	1/2	2	4	77833	77834	77835
5/8	5/8	1-5/8	3-3/4	77803	77804	77805
5/8	5/8	2-1/2	4-5/8	77836	77837	77838
3/4	3/4	1-5/8	3-7/8	77806	77807	77808
3/4	3/4	2-1/4	4-1/2	77818	77819	77820
3/4	3/4	3	5-1/4	77839	77840	77841
1	1	2	4-1/2	77809	77810	77811
1	1	3	5-1/2	77821	77822	77823
1	1	4	6-1/2	77842	77843	77844
1-1/4	1-1/4	2	4-1/2	77812	77813	77814
1-1/4	1-1/4	3	5-1/2	77824	77825	77826
1-1/4	1-1/4	4	6-1/2	77845	77846	77847
1-1/4	1-1/4	6	8-1/2	77857	77858	77859
1-1/2	1-1/4	2	4-1/2	77815	77816	77817
1-1/2	1-1/4	3	5-1/2	77827	77828	77829
1-1/2	1-1/4	4	6-1/2	77848	77849	77850
1-1/2	1-1/4	6	8-1/2	77860	77861	77862
2	2	2	5-3/4	77863	77864	77865
2	2	3	6-3/4	77830	77831	77832
2	2	4	7-3/4	77851	77852	77853
2	2	6	9-3/4	77854	77855	77856

SINGLE END MULTI-FLUTE COARSE PITCH ROUGHER NON-CENTER CUTTING

- Medium to Medium Hard and Abrasive Materials
- Will not Plunge
- Profile and Open End Slotting
- Powdered Metal Substrate of M4
- 30° Right Hand Helix, Right Hand Cut
- Substrate Provides Very High Edge Hardness and Abrasion Resistance
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.005/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 936, 940)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	AlTiN
1/2	1/2	1-1/4	3-1/4	4	93629	93631	93600
1/2	1/2	2	4	4	94029	94031	94000
5/8	5/8	1-5/8	3-3/4	4	93636	93638	93601
5/8	5/8	2-1/2	4-5/8	4	94037	94039	94001
3/4	3/4	1-5/8	3-7/8	4	93645	93647	93602
3/4	3/4	3	5-1/4	4	94046	94048	94002
7/8	3/4	1-7/8	4-1/8	5	93654	93656	93603
7/8	3/4	3-1/2	5-3/4	5	94055	94057	94003
1	1	2	4-1/2	5	93666	93668	93604
1	1	4	6-1/2	5	94067	94069	94004
1-1/8	1	2	4-1/2	6	93671	93673	93605
1-1/4	1-1/4	2	4-1/2	6	93675	93677	93606
1-1/4	1-1/4	4	6-1/2	6	94076	94078	94005
1-1/2	1-1/4	2	4-1/2	6	93683	93685	93607
1-1/2	1-1/4	4	6-1/2	6	94084	94086	94006
1-3/4	1-1/4	2-1/2	5	6	93689	93691	93608
1-3/4	1-1/4	4-1/2	7	6	94089	94091	94007
2	1-1/4	2	4-1/2	8	93692	93694	93609
2	1-1/4	4	6-1/2	8	94093	94095	94008
2	2	3	6-3/4	8	93703	93702	93700
2	2	4	7-3/4	8	93705	93715	93704
2	2	5	8-3/4	8	93707	93717	93706
2	2	6	9-3/4	8	93709	93719	93708
2	2	7	10-3/4	8	93710	93731	93720
2	2	8	11-3/4	8	93711	93713	93724
2-1/2	2	4	7-3/4	8	93721		
2-1/2	2	6	9-3/4	8	93725		
2-1/2	2	8	11-3/4	8	93727		

ROUGHING/FINISHING & ROUGHING

BRUBAKER TOOL™

ROUGHING / FINISHING AND ROUGHING END MILLS

Roughing / Finishing End Mills

These tools are capable of high metal removal rates while producing a finish which is usually equivalent to that produced by conventional finishing end mills. The roughing/finishing end mills are offered with different application specific substrates and specialized cutting geometries to maximize material removal.

Roughing End Mills

These tools have a sinusoidal chipbreaker form which produces small chips. This feature allows them to run at faster feed rates than conventional tools resulting in higher material removal rates. Parts machined with these tools usually require a finishing pass with a conventional tool. The roughing end mills are offered with different substrates and several forms that match tool design to specific applications.

Coarse Pitch Roughing End Mills

Fine Pitch Roughing End Mills

ROUGHING/ FINISHING

BRUBAKER TOOL™

SINGLE END MULTI-FLUTE ROUGHER/FINISHER STARCHIP II SERIES CENTER CUTTING

- Medium Hardness Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- **High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Geometry Provides Roughing Benefits with Good Part Finish
- Heavy Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature
- Steam Oxide Treatment to Retard Galling
- Pat. No. 4,721,421

(Former List Numbers 882, 884, 886, 888)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Steam Oxide
1/2	1/2	1-1/4	3-1/4	4	88228
1/2	1/2	2	4	4	88630
1/2	1/2	3	5	4	88831
5/8	5/8	1-5/8	3-3/4	4	88236
5/8	5/8	2-1/2	4-5/8	4	88638
5/8	5/8	4	6-1/8	4	88839
3/4	3/4	1-5/8	3-7/8	4	88245
3/4	3/4	3	5-1/4	4	88647
3/4	3/4	4	6-1/4	4	88848
7/8	7/8	1-7/8	4-1/8	4	88254
7/8	7/8	3-1/2	5-3/4	4	88656
1	1	2	4-1/2	4	88266
1	1	3	5-1/2	4	88467
1	1	4	6-1/2	4	88668
1	1	6	8-1/2	4	88869
1-1/4	1-1/4	2	4-1/2	4	88275
1-1/4	1-1/4	2	4-1/2	6	88276
1-1/4	1-1/4	3	5-1/2	4	88475
1-1/4	1-1/4	3	5-1/2	6	88476
1-1/4	1-1/4	4	6-1/2	4	88677
1-1/4	1-1/4	4	6-1/2	6	88678
1-1/4	1-1/4	6	8-1/2	4	88877
1-1/4	1-1/4	6	8-1/2	6	88878
1-1/2	1-1/4	2	4-1/2	4	88283
1-1/2	1-1/4	2	4-1/2	6	88284
1-1/2	1-1/4	3	5-1/2	4	88483
1-1/2	1-1/4	3	5-1/2	6	88484
1-1/2	1-1/4	4	6-1/2	4	88685
1-1/2	1-1/4	4	6-1/2	6	88686
2	1-1/4	2	4-1/2	6	88293
2	1-1/4	3	5-1/2	6	88493
2	1-1/4	4	6-1/2	6	88694
2	2	2	5-3/4	6	88296
2	2	3	6-3/4	6	88497
2	2	4	7-3/4	6	88698
2	2	6	9-3/4	6	88899

SINGLE END THREE FLUTE ROUGHER/FINISHER STARCHIP IV SERIES
CENTER CUTTING

- Soft Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- **High Speed Steel**
- 38° Right Hand Helix, Right Hand Cut
- Geometry Provides Roughing Benefits with Good Part Finish
- Deep Flutes for Rapid Chip Evacuation
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature
- Pat. No. 4,721,421

(Former List Numbers 897, 899, 901, 903)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
1/2	1/2	1-1/4	3-1/4	89728	89729	89730
1/2	1/2	2	4	89929	89930	89931
1/2	1/2	3	5	90130	90131	90132
3/4	3/4	1-5/8	3-7/8	89745	89746	89747
3/4	3/4	3	5-1/4	89946	89947	89948
3/4	3/4	4	6-1/4	90147	90148	90149
1	1	2	4-1/2	89766	89767	89768
1	1	3	5-1/2	89967	89968	89969
1	1	4	6-1/2	90168	90169	90170
1	1	6	8-1/2	90369	90370	90371
1-1/4	1-1/4	2	4-1/2	89775	89776	89777
1-1/4	1-1/4	3	5-1/2	89976	89977	89978
1-1/4	1-1/4	4	6-1/2	90177	90178	90179
1-1/4	1-1/4	6	8-1/2	90378	90379	90380
1-1/2	1-1/4	2	4-1/2	89783	89784	89785
1-1/2	1-1/4	3	5-1/2	89984	89985	89986
1-1/2	1-1/4	4	6-1/2	90185	90186	90187
1-1/2	1-1/4	6	8-1/2	90385	90383	90384
1-1/2	1-1/4	8	10-1/2	90386	90387	90388
2	2	2	5-3/4	89796	89797	89798
2	2	3	6-3/4	89997	89998	89999
2	2	4	7-3/4	90198	90196	90197
2	2	6	9-3/4	90398	90396	90397
2	2	8	11-3/4	90399	90394	90395

ROUGHING/ FINISHING

BRUBAKER TOOL™

SINGLE END THREE FLUTE TRUNCATED ROUGHER/FINISHER CENTER CUTTING

- Soft Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- **8% Cobalt High Speed Steel**
- 35° Right Hand Helix, Right Hand Cut
- Geometry Provides Roughing Benefits with Good Part Finish
- Deep Flutes for Chip Evacuation
- Cutting Diameter Tolerance is +.003/-.000

(Former List Number 776)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1/2	1/2	1-1/4	3-1/4	77600	77602	77666
1/2	1/2	2	4	77618	77620	77667
1/2	1/2	3	5	77636	77638	77668
3/4	3/4	1-5/8	3-7/8	77603	77605	77669
3/4	3/4	3	5-1/4	77621	77623	77670
3/4	3/4	4	6-1/4	77639	77641	77671
1	1	2	4-1/2	77606	77608	77672
1	1	3	5-1/2	77624	77626	77673
1	1	4	6-1/2	77642	77644	77674
1	1	6	8-1/2	77654	77656	77675
1-1/4	1-1/4	2	4-1/2	77609	77611	77676
1-1/4	1-1/4	3	5-1/2	77627	77629	77677
1-1/4	1-1/4	4	6-1/2	77645	77647	77678
1-1/4	1-1/4	6	8-1/2	77657	77659	77679
1-1/2	1-1/4	2	4-1/2	77612	77614	77680
1-1/2	1-1/4	3	5-1/2	77630	77632	77681
1-1/2	1-1/4	4	6-1/2	77648	77650	77682
1-1/2	1-1/4	6	8-1/2	77660	77662	77683
2	2	2	5-3/4	77615	77617	77684
2	2	3	6-3/4	77633	77635	77685
2	2	4	7-3/4	77651	77653	77686
2	2	6	9-34	77663	77665	77687

SINGLE END MULTI-FLUTE ROUGHER/FINISHER STARCHIP I SERIES CENTER CUTTING

- Titanium and Stainless Steel Alloys
- Ramp
- Profile, Slot and Pocket
- **8% Cobalt High Speed Steel**
- 35° Right Hand Helix, Right Hand Cut
- Geometry Provides Roughing Benefits with Good Part Finish
- Heavy Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature
- Pat. No. 4,721,421

(Former List Numbers 872, 874, 876, 878)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/2	1/2	1-1/4	3-1/4	4	87228	86528	87200
1/2	1/2	2	4	4	87630	87632	87600
1/2	1/2	3	5	4	87831	87833	87800
5/8	5/8	1-5/8	3-3/4	4	87236	87238	87201
5/8	5/8	3	5-1/8	4	87437	87439	87400
5/8	5/8	2-1/2	4-5/8	4	87638	87640	87601
5/8	5/8	4	6-1/8	4	87839	87841	87801
3/4	3/4	1-5/8	3-7/8	4	87245	86545	87202
3/4	3/4	1-5/8	3-7/8	6	87246	86546	87203
3/4	3/4	3	5-1/4	4	87647	87646	87602
3/4	3/4	3	5-1/4	6	87648	87650	87603
3/4	3/4	4	6-1/4	4	87847	87846	87802
3/4	3/4	4	6-1/4	6	87848	87850	87803
7/8	7/8	1-7/8	4-1/8	4	87254	87256	87204
7/8	7/8	3-1/2	5-3/4	4	87656	87658	87604
1	1	2	4-1/2	4	87266	86566	87205
1	1	2	4-1/2	6	87267	86567	87206
1	1	3	5-1/2	4	87467	87466	87401
1	1	3	5-1/2	6	87468	87470	87402
1	1	4	6-1/2	4	87668	87667	87605
1	1	4	6-1/2	6	87669	87671	87606
1	1	6	8-1/2	4	87868	87867	87804
1	1	6	8-1/2	6	87869	87871	87805
1-1/4	1-1/4	2	4-1/2	6	87275	87277	87207
1-1/4	1-1/4	3	5-1/2	6	87476	87478	87403
1-1/4	1-1/4	4	6-1/2	6	87677	87679	87607
1-1/4	1-1/4	6	8-1/2	6	87878	87880	87806
1-1/2	1-1/4	2	4-1/2	6	87283	87285	87208
1-1/2	1-1/4	3	5-1/2	6	87484	87486	87404
1-1/2	1-1/4	4	6-1/2	6	87685	87687	87608
1-1/2	1-1/4	6	8-1/2	6	87886	87888	87807
2	1-1/4	2	4-1/2	6	87292	87294	87209
2	2	2	5-3/4	6	87296	87298	87210
2	2	3	6-3/4	6	87497	87499	87405
2	2	4	7-3/4	6	87698	87697	87609
2	2	6	9-3/4	6	87899	87898	87808

ROUGHING/ FINISHING

BRUBAKER TOOL™

SINGLE END MULTI-FLUTE ROUGHER/FINISHER STARCHIP III SERIES CENTER CUTTING

- Nickel Based Alloys, High Temperature Alloys and Cast Iron
- Ramp
- Profile, Slot and Pocket
- **8% Cobalt High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Geometry Provides Roughing Benefits with Good Part Finish
- Extra Heavy Core for Rigidity
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature
- Pat. No. 4,721,421

(Former List Numbers 892, 894, 896)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/2	1/2	1-1/4	3-1/4	4	89228	89230	89200
1/2	1/2	2	4	4	89630	89632	89600
5/8	5/8	1-5/8	3-3/4	4	89236	89238	89201
5/8	5/8	2-1/2	4-5/8	4	89638	89640	89601
3/4	3/4	1-5/8	3-7/8	4	89245	89247	89202
3/4	3/4	3	5-1/4	4	89647	89649	89602
7/8	7/8	1-7/8	4-1/8	4	89254	89256	89203
7/8	7/8	3-1/2	5-3/4	4	89656	89658	89603
1	1	2	4-1/2	6	89266	89268	89204
1	1	3	5-1/2	6	89467	89469	89400
1	1	4	6-1/2	6	89668	89670	89604
1-1/4	1-1/4	2	4-1/2	6	89275	89277	89205
1-1/4	1-1/4	3	5-1/2	6	89476	89478	89401
1-1/4	1-1/4	4	6-1/2	6	89677	89679	89605
1-1/2	1-1/4	2	4-1/2	8	89283	89285	89206
1-1/2	1-1/4	3	5-1/2	8	89484	89486	89402
1-1/2	1-1/4	4	6-1/2	8	89685	89687	89606
2	2	2	5-3/4	8	89296	89298	89207
2	2	3	6-3/4	8	89497	89499	89403
2	2	4	7-3/4	8	89698	89697	89607

SINGLE END FOUR FLUTE ROUGHER/FINISHER STARCHIP V SERIES CENTER CUTTING

- Soft Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- **8% Cobalt High Speed Steel**
- 38° Right Hand Helix, Right Hand Cut
- Geometry Provides Roughing Benefits with Good Part Finish
- High Helix and Deep Flutes for Chip Evacuation
- Cutting Diameter Tolerance is +.003/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature
- **Coolant Thru-Feed**
- Pat. No. 4,721,421

(Former List Numbers 904, 905, 906, 907)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiCN	TiAlN
1	1	2	4-1/2	90466	90468	90400
1	1	3	5-1/2	90567	90569	90500
1	1	4	6-1/2	90668	90670	90600
1	1	6	8-1/2	90769	90771	90700
1-1/4	1-1/4	2	4-1/2	90475	90477	90401
1-1/4	1-1/4	3	5-1/2	90576	90578	90501
1-1/4	1-1/4	4	6-1/2	90677	90679	90601
1-1/4	1-1/4	6	8-1/2	90778	90780	90701
1-1/2	1-1/4	2	4-1/2	90483	90485	90402
1-1/2	1-1/4	3	5-1/2	90584	90586	90502
1-1/2	1-1/4	4	6-1/2	90685	90687	90602
1-1/2	1-1/4	6	8-1/2	90786	90788	90702
2	2	2	5-3/4	90496	90498	90403
2	2	3	6-3/4	90597	90599	90503
2	2	4	7-3/4	90698	90697	90603
2	2	6	9-3/4	90799	90798	90703

SINGLE END THREE FLUTE COARSE PITCH ROUGHER CENTER CUTTING

- Soft Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- **High Speed Steel**
- 35° Right Hand Helix, Right Hand Cut
- Deep Flutes for Chip Evacuation
- Cutting Diameter Tolerance is +.005/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 944, 946)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	EDP No. Uncoated	TiN	TiCN
3/8	3/8	3/4	2-1/2	94414	94415	94416
1/2	1/2	1-1/4	3-1/4	94428	94429	94430
1/2	1/2	2	4	94629	94630	94631
5/8	5/8	1-5/8	3-3/4	94436	94437	94438
5/8	5/8	2-1/2	4-5/8	94637	94638	94639
3/4	3/4	1-5/8	3-7/8	94445	94446	94447
3/4	3/4	3	5-1/4	94646	94647	94648
7/8	3/4	1-7/8	4-1/8	94454	94455	94456
1	1	2	4-1/2	94466	94467	94468
1	1	3	5-1/2	94667	94665	94666
1	1	4	6-1/2	94668	94669	94670
1-1/4	1-1/4	2	4-1/2	94475	94476	94477
1-1/4	1-1/4	3	5-1/2	94676	94674	94675
1-1/4	1-1/4	4	6-1/2	94677	94678	94679
1-1/2	1-1/4	2	4-1/2	94483	94484	94485
1-1/2	1-1/4	3	5-1/2	94684	94682	94683
1-1/2	1-1/4	4	6-1/2	94685	94686	94687
2	2	2	5-3/4	94495	94493	94494
2	2	3	6-3/4	94496	94481	94482
2	2	4	7-3/4	94497	94486	94487
2	2	6	9-3/4	94498	94488	94489
2	2	8	11-3/4	94499	94490	94491

SINGLE END MULTI-FLUTE COARSE PITCH ROUGHER NON-CENTER CUTTING

- Medium Hardness Materials
- Will Not Plunge
- Profile and Open-Ended Slotting
- **High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Heavy Core for Rigidity
- Cutting Diameter Tolerance is +.005/-.000
- End Mills with 2" Diameter Shanks and Larger Furnished with Dual Drive Feature

(Former List Numbers 932, 938)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiN	TiCN
1/4	3/8	5/8	2-7/16	3	93204	93205	93206
5/16	3/8	3/4	2-1/2	3	93209	93210	93211
3/8	3/8	3/4	2-1/2	4	93214	93215	93216
1/2	1/2	1	3	4	93228	93226	93227
1/2	1/2	1-1/4	3-1/4	4	93229	93230	93231
1/2	1/2	2	4	4	93829	93830	93831
5/8	5/8	1-5/8	3-3/4	4	93236	93237	93238
5/8	5/8	2-1/2	4-5/8	4	93837	93838	93839
3/4	3/4	1-5/8	3-7/8	4	93245	93246	93247
3/4	3/4	3	5-1/4	4	93846	93847	93848
7/8	3/4	1-7/8	4-1/8	5	93254	93255	93256
7/8	3/4	3-1/2	5-3/4	5	93855	93856	93857
1	1	2	4-1/2	5	93266	93267	93268
1	1	3	5-1/2	5	93867	93865	93866
1	1	4	6-1/2	5	93868	93869	93870
1-1/8	1	2	4-1/2	6	93271	93272	93273
1-1/4	1-1/4	2	4-1/2	6	93275	93276	93277
1-1/4	1-1/4	3	5-1/2	6	93876	93874	93875
1-1/4	1-1/4	4	6-1/2	6	93877	93878	93879
1-1/2	1-1/4	2	4-1/2	6	93283	93284	93285
1-1/2	1-1/4	3	5-1/2	6	93884	93882	93883
1-1/2	1-1/4	4	6-1/2	6	93885	93896	93897
1-1/2	1-1/4	6	8-1/2	6	93886	93887	93888
1-3/4	1-1/4	2-1/2	5	6	93289	93290	93291
1-3/4	1-1/4	4-1/2	7	6	93889	93890	93891
2	1-1/4	2	4-1/2	8	93292	93293	93294
2	1-1/4	4	6-1/2	8	93893	93894	93895
2	2	3	6-3/4	8	93303	93301	93302
2	2	4	7-3/4	8	93305	93314	93315
2	2	5	8-3/4	8	93307	93316	93317
2	2	6	9-3/4	8	93309	93318	93319
2	2	7	10-3/4	8	93310	93334	93335
2	2	8	11-3/4	8	93311	93312	93313
2-1/2	2	4	7-3/4	8	93321		
2-1/2	2	6	9-3/4	8	93325		
2-1/2	2	8	11-3/4	8	93327		
2-1/2	2	10	13-3/4	8	93329		
2-1/2	2	12	15-3/4	8	93331		
3	2-1/2	4	7-3/4	10	93353		
3	2-1/2	6	9-3/4	10	93357		
3	2-1/2	8	11-3/4	10	93359		
3	2-1/2	10	13-3/4	10	93361		
3	2-1/2	12	15-3/4	10	93363		

SINGLE END MULTI-FLUTE COARSE PITCH ROUGHER FOR BRIDGEPORTS NON-CENTER CUTTING

- Medium Hardness Materials
- Will Not Plunge
- Profile and Open-Ended Slotting
- **High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Heavy Core for Rigidity
- Cutting Diameter Tolerance is +.005/-.000

(Former List Number 941)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiN	TiCN
3/4	3/4	1-5/8	3-7/8	4	93245	93246	93247
3/4	3/4	3	5-1/4	4	93846	93847	93848
7/8	3/4	1-7/8	4-1/8	5	93254	93255	93256
7/8	3/4	3-1/2	5-3/4	5	93855	93856	93857
1	3/4	3/4	3	5	94163	94161	94162
1	3/4	1-7/8	4-1/8	5	94164	94168	94169
1	3/4	4	6-1/4	5	94165	94166	94167
1-1/4	3/4	2	4-1/4	6	94173	94171	94172
1-1/4	3/4	4	6-1/4	6	94174	94175	94176
1-1/2	3/4	3/4	3	6	94181	94179	94180
1-1/2	3/4	2-1/4	4-1/2	6	94182	94186	94187
1-1/2	3/4	4	6-1/4	6	94183	94184	94185

SHELL TYPE MULTI-FLUTE COARSE PITCH ROUGHER NON-CENTER CUTTING

- Medium Hardness Materials
- Will Not Plunge
- Profile and Open-Ended Slotting
- **High Speed Steel**
- 20° Right Hand Helix, Right Hand Cut
- Cutting Diameter Tolerance is +.015/-.000

(Former List Number 958)

Cutter Dia.	Length of Cut	Hole Size	Driving Slot Dimensions Width	Depth	No. of Teeth	EDP No. Uncoated
2	2	3/4	5/16	3/16	8	95836
2-1/4	2	1	3/8	7/32	8	95838
2-1/2	2	1	3/8	7/32	8	95840
2-3/4	2	1	3/8	7/32	8	95842
3	2	1-1/4	1/2	9/32	10	95844
3-1/2	2	1-1/4	1/2	9/32	10	95848
4	2-1/4	1-1/2	5/8	3/8	12	95852
4-1/2	2-1/4	1-1/2	5/8	3/8	14	95856
5	2-1/4	1-1/2	5/8	3/8	14	95860
5-1/2	2-1/4	2	3/4	7/16	16	95864
6	2-1/4	2	3/4	7/16	16	95868

SINGLE END MULTI-FLUTE COARSE PITCH ROUGHER CENTER CUTTING

- Medium to Medium Hard Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- **8% Cobalt High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Stub Length for Rigidity
- Cutting Diameter Tolerance is +.005/-.000

(Former List Number 968)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/4	3/8	1/4	2-1/16	3	96804	96806	96800
3/8	3/8	3/8	2-5/32	4	96814	96816	96801
1/2	1/2	1/2	2-1/2	4	96828	96830	96802
5/8	5/8	5/8	2-3/4	4	96836	96838	96803
3/4	3/4	3/4	2-7/8	4	96845	96847	96807
1	1	1	3-1/2	5	96866	96868	96808
1-1/4	1-1/4	1-1/4	3-3/4	6	96875	96877	96809

SINGLE END MULTI-FLUTE COARSE PITCH ROUGHER CENTER CUTTING

- Medium to Medium Hard Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- **8% Cobalt High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.005/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 948, 950)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/2	1/2	1-1/4	3-1/4	4	94828	94830	94800
1/2	1/2	2	4	4	95029	95031	95000
5/8	5/8	1-5/8	3-3/4	4	94836	94838	94801
5/8	5/8	2-1/2	4-5/8	4	95037	95039	95001
3/4	3/4	1-5/8	3-7/8	4	94845	94847	94802
3/4	3/4	3	5-1/4	4	95046	95048	95002
7/8	3/4	1-7/8	4-1/8	5	94854	94856	94803
1	1	2	4-1/2	5	94866	94868	94804
1	1	3	5-1/2	5	95067	95066	95003
1	1	4	6-1/2	5	95068	95070	95004
1-1/4	1-1/4	2	4-1/2	6	94875	94877	94805
1-1/4	1-1/4	3	5-1/2	6	95076	95075	95005
1-1/4	1-1/4	4	6-1/2	6	95077	95079	95006
1-1/2	1-1/4	2	4-1/2	6	94883	94885	94806
1-1/2	1-1/4	3	5-1/2	6	95084	95083	95007
1-1/2	1-1/4	4	6-1/2	6	95085	95087	95008
2	2	2	5-3/4	8	94896	94895	94807
2	2	3	6-3/4	8	94897	94889	94808
2	2	4	7-3/4	8	94898	94891	94809
2	2	6	9-3/4	8	94899	94893	94810

SINGLE END MULTI-FLUTE BALL COARSE PITCH ROUGHER CENTER CUTTING

- Medium to Medium Hard Materials
- Plunge and Ramp
- Profile, Slot and Pocket
- **8% Cobalt High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Large Core for Rigidity
- Cutting Diameter Tolerance is +.005/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 952, 954)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/2	1/2	1-1/4	3-1/4	4	95228	95230	95243
1/2	1/2	2	4	4	95430	95432	95400
5/8	5/8	1-5/8	3-3/4	4	95236	95238	95244
5/8	5/8	2-1/2	4-5/8	4	95437	95439	95401
3/4	3/4	1-5/8	3-7/8	4	95245	95247	95248
3/4	3/4	3	5-1/4	4	95447	95449	95402
1	1	2	4-1/2	5	95266	95268	95249
1	1	4	6-1/2	5	95468	95470	95403
1-1/4	1-1/4	2	4-1/2	6	95275	95277	95250
1-1/4	1-1/4	4	6-1/2	6	95477	95479	95404
1-1/2	1-1/4	2	4-1/2	6	95283	95285	95251
1-1/2	1-1/4	4	6-1/2	6	95485	95487	95405
2	2	4	7-3/4	8	95297	95296	95252
2	2	6	9-3/4	8	95298	95294	95253

SINGLE END MULTI-FLUTE COARSE PITCH ROUGHER NON-CENTER CUTTING

- Medium to Medium Hard Materials
- Will Not Plunge
- Profile and Open-Ended Slotting
- **8% Cobalt High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Heavy Core for Rigidity
- Cutting Diameter Tolerance is +.005/-.000
- End Mills with 2" Diameter Shanks and Larger Furnished with Dual Drive Feature

(Former List Numbers 934, 939)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/4	3/8	5/8	2-7/16	3	93404	87004	93400
5/16	3/8	3/4	2-1/2	3	93409	87009	93401
3/8	3/8	3/4	2-1/2	4	93414	87014	93402
7/16	3/8	1	2-11/16	4	93419	93421	93403
1/2	1/2	1	3	4	93428	93427	93407
1/2	1/2	1-1/4	3-1/4	4	93429	87029	93408
1/2	1/2	2	4	4	93929	93931	93900
5/8	5/8	1-5/8	3-3/4	4	93436	87036	93412
5/8	5/8	2-1/2	4-5/8	4	93937	93939	93901
3/4	3/4	1-5/8	3-7/8	4	93445	87045	93413
3/4	3/4	3	5-1/4	4	93946	93948	93902
7/8	3/4	1-7/8	4-1/8	5	93454	93456	93417
7/8	3/4	3-1/2	5-3/4	5	93955	93957	93903
1	1	2	4-1/2	5	93466	87066	93418
1	1	3	5-1/2	5	93967	93966	93904
1	1	4	6-1/2	5	93968	93970	93905
1-1/8	1	2	4-1/2	6	93471	93473	93422
1-1/4	1-1/4	2	4-1/2	6	93475	93477	93423
1-1/4	1-1/4	3	5-1/2	6	93976	93975	93906
1-1/4	1-1/4	4	6-1/2	6	93977	93979	93907
1-1/2	1-1/4	2	4-1/2	6	93483	93485	93424
1-1/2	1-1/4	3	5-1/2	6	93984	93983	93908
1-1/2	1-1/4	4	6-1/2	6	93985	93997	93909
1-1/2	1-1/4	6	8-1/2	6	93986	93988	93910
1-3/4	1-1/4	2-1/2	5	6	93489	93491	93425
1-3/4	1-1/4	4-1/2	7	6	93989	93991	93911
2	1-1/4	2	4-1/2	8	93492	93494	93432
2	1-1/4	4	6-1/2	8	93993	93995	93912
2	2	3	6-3/4	8	93503	93502	93500
2	2	4	7-3/4	8	93505	93519	93504
2	2	5	8-3/4	8	93507	93535	93506
2	2	6	9-3/4	8	93509	93537	93508
2	2	7	10-3/4	8	93510	93539	93512
2	2	8	11-3/4	8	93511	93541	93514
2	2	10	13-3/4	8	93513	93543	93520
2	2	12	15-3/4	8	93515	93517	93524
2-1/2	2	4	7-3/4	8	93521		
2-1/2	2	6	9-3/4	8	93525		
2-1/2	2	8	11-3/4	8	93527		
2-1/2	2	10	13-3/4	8	93529		
2-1/2	2	12	15-3/4	8	93531		
3	2-1/2	4	7-3/4	10	93553		
3	2-1/2	6	9-3/4	10	93557		
3	2-1/2	8	11-3/4	10	93559		
3	2-1/2	10	13-3/4	10	93561		
3	2-1/2	12	15-3/4	10	93563		

SINGLE END MULTI-FLUTE COARSE PITCH ROUGHER FOR BRIDGEPORTS NON-CENTER CUTTING

- Medium to Medium Hard Materials
- Will Not Plunge
- Profile and Open-Ended Slotting
- **8% Cobalt High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Heavy Core for Rigidity
- Cutting Diameter Tolerance is +.005/-.000

(Former List Number 942)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
3/4	3/4	1-5/8	3-7/8	4	93445	87045	93413
3/4	3/4	3	5-1/4	4	93946	93948	93902
7/8	3/4	1-7/8	4-1/8	5	93454	93456	93417
7/8	3/4	3-1/2	5-3/4	5	93955	93957	93903
1	3/4	1-7/8	4-1/8	5	94263	94262	94200
1	3/4	4	6-1/4	5	94265	94267	94201
1-1/4	3/4	2	4-1/4	6	94273	94272	94202
1-1/4	3/4	4	6-1/4	6	94274	94276	94203
1-1/2	3/4	2-1/4	4-1/2	6	94282	94281	94204
1-1/2	3/4	4	6-1/4	6	94283	94285	94205

SHELL TYPE MULTI-FLUTE COARSE PITCH ROUGHER NON-CENTER CUTTING

- Medium to Medium Hard Materials
- Will Not Plunge
- Profile and Open-Ended Slotting
- **8% Cobalt High Speed Steel**
- 20° Right Hand Helix, Right Hand Cut
- Cutting Diameter Tolerance is +.015/-.000

(Former List Number 960)

Cutter Dia.	Length of Cut	Hole Size	Driving Slot Dimensions Width	Depth	No. of Teeth	EDP No. Uncoated
2	2	3/4	5/16	3/16	8	96036
2-1/4	2	1	3/8	7/32	8	96038
2-1/2	2	1	3/8	7/32	8	96040
2-3/4	2	1	3/8	7/32	8	96042
3	2	1-1/4	1/2	9/32	10	96044
3-1/2	2	1-1/4	1/2	9/32	10	96048
4	2-1/4	1-1/2	5/8	3/8	12	96052
4-1/2	2-1/4	1-1/2	5/8	3/8	14	96056
5	2-1/4	1-1/2	5/8	3/8	14	96060
5-1/2	2-1/4	2	3/4	7/16	16	96064
6	2-1/4	2	3/4	7/16	16	96068

SINGLE END MULTI-FLUTE FINE PITCH ROUGHER CENTER CUTTING

- High Temperature Alloys and Stainless Steel
- Plunge and Ramp
- Profile, Slot and Pocket
- **8% Cobalt High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Stub Length for Rigidity
- Fine Chip for Easier Evacuation
- Cutting Diameter Tolerance is +.005/-.000

(Former List Number 970)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/4	3/8	1/4	2-1/16	3	97004	97104	97000
3/8	3/8	3/8	2-5/32	4	97014	97114	97001
1/2	1/2	1/2	2-1/2	4	97028	97128	97002
5/8	5/8	5/8	2-3/4	4	97036	97136	97003
3/4	3/4	3/4	2-7/8	4	97045	97145	97006
1	1	1	3-1/2	5	97066	97166	97007
1-1/4	1-1/4	1-1/4	3-3/4	6	97075	97175	97008

SINGLE END MULTI-FLUTE FINE PITCH ROUGHER CENTER CUTTING

- High Temperature Alloys and Stainless Steel
- Plunge and Ramp
- Profile, Slot and Pocket
- **8% Cobalt High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Fine Chip for Easier Evacuation
- Cutting Diameter Tolerance is +.005/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 963, 964)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/2	1/2	1-1/4	3-1/4	4	96328	96330	96301
1/2	1/2	2	4	4	96429	96431	96400
5/8	5/8	1-5/8	3-3/4	4	96336	96338	96302
5/8	5/8	2-1/2	4-5/8	4	96437	96439	96401
3/4	3/4	1-5/8	3-7/8	4	96345	96347	96303
3/4	3/4	3	5-1/4	4	96446	96448	96402
7/8	3/4	1-7/8	4-1/8	5	96354	96356	96304
1	1	2	4-1/2	5	96366	96368	96305
1	1	3	5-1/2	5	96467	96466	96403
1	1	4	6-1/2	5	96468	96470	96404
1-1/4	1-1/4	2	4-1/2	6	96375	96377	96306
1-1/4	1-1/4	3	5-1/2	6	96476	96475	96405
1-1/4	1-1/4	4	6-1/2	6	96477	96479	96406
1-1/2	1-1/4	2	4-1/2	6	96383	96385	96307
1-1/2	1-1/4	3	5-1/2	6	96484	96483	96407
1-1/2	1-1/4	4	6-1/2	6	96485	96487	96408
2	2	2	5-3/4	8	96396	96489	96308
2	2	3	6-3/4	8	96397	96491	96309
2	2	4	7-3/4	8	96398	96493	96310
2	2	6	9-3/4	8	96399	96495	96311

SINGLE END MULTI-FLUTE BALL FINE PITCH ROUGHER CENTER CUTTING

- High Temperature Alloys and Stainless Steel
- Plunge and Ramp
- Profile, Slot and Pocket
- **8% Cobalt High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Fine Chip for Easier Evacuation
- Cutting Diameter Tolerance is +.005/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Number 965)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/2	1/2	1-1/4	3-1/4	4	96528	96530	96500
5/8	5/8	1-5/8	3-3/4	4	96536	96538	96501
3/4	3/4	1-5/8	3-7/8	4	96545	96547	96502
1	1	2	4-1/2	5	96566	96568	96503
1-1/4	1-1/4	2	4-1/2	6	96575	96577	96504
1-1/2	1-1/4	2	4-1/2	6	96583	96585	96505
2	2	4	7-3/4	8	96597	96596	96506
2	2	6	9-3/4	8	96598	96594	96511

SINGLE END MULTI-FLUTE FINE PITCH ROUGHER NON-CENTER CUTTING

- High Temperature Alloys and Stainless Steel
- Will Not Plunge
- Profile and Open-ended Slotting
- **8% Cobalt High Speed Steel**
- 30° Right Hand Helix, Right Hand Cut
- Fine Chip for Easier Evacuation
- Cutting Diameter Tolerance is +.005/-.000
- End Mills with 2" Diameter Shanks Furnished with Dual Drive Feature

(Former List Numbers 961, 962)

Cutter Dia.	Shank Dia.	Length of Cut	Overall Length	No. of Flutes	EDP No. Uncoated	TiCN	TiAlN
1/4	3/8	5/8	2-7/16	3	96104	87104	96123
5/16	3/8	3/4	2-1/2	3	96109	87109	96124
3/8	3/8	3/4	2-1/2	4	96114	87114	96125
7/16	3/8	1	2-11/16	4	96119	96121	96126
1/2	1/2	1-1/4	3-1/4	4	96129	87129	96127
1/2	1/2	2	4	4	96229	96231	96201
5/8	5/8	1-5/8	3-3/4	4	96136	87136	96128
5/8	5/8	2-1/2	4-5/8	4	96237	96239	96203
3/4	3/4	1-5/8	3-7/8	4	96145	87145	96131
3/4	3/4	3	5-1/4	4	96246	96248	96204
7/8	3/4	1-7/8	4-1/8	5	96154	96156	96132
7/8	3/4	3-1/2	5-3/4	5	96255	96257	96205
1	1	2	4-1/2	5	96166	87166	96133
1	1	3	5-1/2	5	96267	96266	96206
1	1	4	6-1/2	5	96268	96270	96207
1-1/8	1	2	4-1/2	6	96171	96173	96134
1-1/4	1-1/4	2	4-1/2	6	96175	96177	96135
1-1/4	1-1/4	3	5-1/2	6	96276	96275	96208
1-1/4	1-1/4	4	6-1/2	6	96277	96279	96209
1-1/2	1-1/4	2	4-1/2	6	96183	96185	96138
1-1/2	1-1/4	3	5-1/2	6	96284	96283	96210
1-1/2	1-1/4	4	6-1/2	6	96285	96281	96211
1-1/2	1-1/4	6	8-1/2	6	96286	96288	96212
1-3/4	1-1/4	2-1/2	5	6	96189	96191	96139
1-3/4	1-1/4	4-1/2	7	6	96289	96291	96213
2	1-1/4	2	4-1/2	8	96192	96101	96140
2	1-1/4	4	6-1/2	8	96293	96295	96214
2	2	3	6-3/4	8	96193	96103	96141
2	2	4	7-3/4	8	96194	96107	96142
2	2	5	8-3/4	8	96195	96111	96143
2	2	6	9-3/4	8	96196	96113	96144
2	2	7	10-3/4	8	96197	96117	96147
2	2	8	11-3/4	8	96198	96122	96148

SURFACE TREATMENTS AND COATINGS

All of our tools are available in a variety of application specific surface treatments and coatings. Please see individual tool listings for stocked treatments and coatings. Other treatments and coatings are available upon request. These surface treatments and coatings are designed to enhance performance as well as the life of the tool. The chart below is a handy reference outlining the surface treatment and coating composition as well as the suggested application. If the material you are preparing to machine is not listed, please give us a call and we can help.

Photo Illustration	Code No.	Composition	Characteristics	Applications
	02	Nitride (N)	A thin hardened case, penetrating the surface of the tool to a depth of .0005 to .0020. Improves wear resistance and reduces galling.	Most abrasive materials, both ferrous and non-ferrous. Not recommended where chipping may be a problem.
	03	Oxide (Ox)	A layer of ferrous oxide on the surface of the tool adding lubricant retaining properties and improving toughness.	Low Carbon, Stainless and Free Machining Steels. Not recommended for non-ferrous materials where it may cause galling.
	23	Nitride and Oxide (NOx)	A combination of two treatments which produces the favorable characteristics of both.	Iron, Cast Iron, Stainless Steel and High Tensile Steels. Not recommended for non-ferrous materials where it may cause galling.
	53	Hard Lube Coating - Standard (TiAlN+WC/C Std)	Multi-layer coating, consisting of a hard layer and a lubrication layer.	For improved chip flow and possible dry machining. Improved edge wear resistance and increased lubricity.
	84	Titanium Aluminum Nitride (TiAlN)	A very hard coating on the surface of the tool which has very good wear resistance, reduces friction and prevents galling.	Titanium, Titanium Alloys, Nickel-Base Alloys, Stainless Steel and Cast Iron. Effective at higher speeds. Not recommended for Wrought Aluminum, Copper or Brass.
	85	Aluminum Titanium Nitride (AlTiN)	An extremely hard coating very similar to TiAlN with outstanding wear resistance. AlTiN has a higher aluminum content which makes it harder and smoother than TiAlN.	Very effective in the same materials as TiAlN. Excellent for small depths of cut and excels in high speed and dry machining applications.
	86	Zirconium Nitride (ZrN)	A thin hard coating that improves lubricity and increases oxidation resistance. Specifically designed for machining abrasive and gummy materials.	Suitable for machining Aluminum Alloys, High Silica Aluminum, Cast Iron, High Temperature Alloys, Stainless Steel and Glass Filled Plastics. Not recommended for machining Carbon Steels.
	88	Titanium Nitride (TiN)	A general purpose coating which has excellent wear resistance, reduces friction and prevents galling.	Most Ferrous, Non-Ferrous and Non-Metallic materials. Although it's unlikely, galling may occur in Titanium and Titanium Alloys.
	89	Titanium Carbonitride (TiCN)	An extremely hard coating on the surface of the tool which has outstanding wear resistance, reduces friction and prevents galling.	Most Ferrous, Non-Ferrous and Non-Metallic materials. Very effective at higher speeds. Although it's unlikely, galling may occur in Titanium and Titanium Alloys.

For technical support and questions about you machining requirements, please call us at 1-800-522-8665.

SPEEDS AND FEEDS CHART EXPLANATION PAGE

The Speeds and Feeds Chart below provides an instruction on how the use the charts found on the following four pages after Type and Diameter of tool is determined.

1) RPM and IPM are dependent upon material being machined.
2) Locate material that will be machined (Precipitation Stainless Steel in example below)
3) Determine starting SFM (80 in example below)
4) Determine RPM based upon material and SFM. Multiply SFM by 3.82 divided by Tool Diameter = Starting RPMs
5) Determine IPM based upon RPM and application (SLOTTING, HP, or LP in example below). Multiply RPM by Feed Per Tooth by # of Flutes (4 in example below) = Starting IPM
6) Based upon material and SFM selected, the application below would have a starting RPM of 611 with a starting feedrate of 6.11 IPM.

As always, should you have any questions or you are unsure of starting parameters for your application, call us toll free at 800-522-8665 and ask to speak to our Technical Support Department.

SPEED (SFM) AND FEED (FEED PER TOOTH (FPT))

RPM = SFM X 3.82 / TOOL DIAMETER
RPM = 80 X 3.82 / .500
RPM = 611

IPM = RPM X FPT X # Of Flutes
IPM = 611 X .0025 X 4
IPM = 6.11

SOLID CARBIDE SPEEDS AND FEEDS CHART FOR FERROUS MATERIALS

MATERIALS		Carbon Steels	Alloy Steel	Stainless Steels 300 Series	Stainless Steels 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast / Wrought
DESCRIPTION		10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15-5PH, 16-6PH, 17-4PH, AM-xx Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast / Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
SFM < 32		200 - 450	150 - 300	150 - 350	200- 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
SFM > 32		100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
1/2"	S	0.0025	0.0020	0.0023	0.0023	0.0020	0.0020	0.0020	0.0015	0.0023	0.0020
	HP	0.0030	0.0025	0.0030	0.0030	0.0025	0.0025	0.0025	0.0020	0.0030	0.0025
	LP	0.0035	0.0030	0.0033	0.0033	0.0030	0.0030	0.0030	0.0025	0.0033	0.0030

S = SLOTTING
Axial Depth up to .5 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to Effective 1 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to 1.5 x Diameter
Radial width .15 x Diameter

For technical support and questions about you machining requirements, please call us at 1-800-522-8665.

SOLID CARBIDE SPEEDS AND FEEDS CHART FOR NON-FERROUS MATERIALS

Speed in Surface Feet per Minute (SFM) Feed in Feed Per Tooth (FPT)

	MATERIALS	Aluminum Alloys	Aluminum Cast	Aluminum >10% Silicon	Copper	Brass	Magnesium
	DESCRIPTION	6061, 7075	Sand & Permanent Mold	High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
Tool Dia.							
1/8"	S	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012
	HP	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014
	LP	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017
1/4"	S	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024
	HP	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029
	LP	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033
5/16"	S	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030
	HP	0.0036	0.0036	0.0036	0.0036	0.0036	0.0036
	LP	0.0042	0.0042	0.0042	0.0042	0.0042	0.0042
3/8"	S	0.0036	0.0036	0.0036	0.0036	0.0036	0.0036
	HP	0.0043	0.0043	0.0043	0.0043	0.0043	0.0043
	LP	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
1/2"	S	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
	HP	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
	LP	0.0070	0.0070	0.0070	0.0070	0.0070	0.0070
5/8"	S	0.0063	0.0063	0.0063	0.0063	0.0063	0.0063
	HP	0.0075	0.0075	0.0075	0.0075	0.0075	0.0075
	LP	0.0088	0.0088	0.0088	0.0088	0.0088	0.0088
3/4"	S	0.0075	0.0075	0.0075	0.0075	0.0075	0.0075
	HP	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090
	LP	0.0105	0.0105	0.0105	0.0105	0.0105	0.0105
1"	S	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
	HP	0.0120	0.0120	0.0120	0.0120	0.0120	0.0120
	LP	0.0140	0.0140	0.0140	0.0140	0.0140	0.0140

S = SLOTTING
Axial Depth up to .5 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to 1 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to 1.5 x Diameter
Radial width .15 x Diameter

CALCULATIONS FOR SPEED
RPM = (3.82 x SFM) / DIA.
SFM = (RPM x DIA.) / 3.82

CALCULATIONS FOR FEED
IPM = # of FLUTES x FPT x RPM
FPT = IPM / (RPM x # of FLUTES)

Notes: Horsepower will be the limiting factor with larger diameter end mills.
Using coated end mills will improve tool life.
See page 96 for an example of how to use the Speeds and Feeds Chart.

For technical support and questions about you machining requirements, please call us at 1-800-522-8665.

SOLID CARBIDE SPEEDS AND FEEDS CHART FOR FERROUS MATERIALS

Speed in Surface Feet per Minute (SFM) Feed in Feed Per Tooth (FPT)

MATERIALS		Carbon Steels	Alloy Steel	Stainless Steels 300 Series	Stainless Steels 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast / Wrought
DESCRIPTION		10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 312, 316, 316L,	416, 420, 420F, 430F, 440C	15-5PH, 16-6PH, 17-4PH, AM-xx Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast / Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32 Rc	200 - 450	150 - 300	150 - 350	200- 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32 Rc	100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
Tool Dia.											
1/8"	S	0.0006	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0004	0.0005	0.0005
	HP	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0005	0.0007	0.0006
	LP	0.0008	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0006	0.0008	0.0007
1/4"	S	0.0012	0.0010	0.0011	0.0011	0.0010	0.0010	0.0010	0.0007	0.0011	0.0010
	HP	0.0014	0.0012	0.0014	0.0014	0.0012	0.0012	0.0012	0.0010	0.0014	0.0012
	LP	0.0017	0.0014	0.0016	0.0016	0.0014	0.0014	0.0014	0.0012	0.0016	0.0014
5/16"	S	0.0015	0.0012	0.0014	0.0014	0.0012	0.0012	0.0012	0.0009	0.0014	0.0012
	HP	0.0018	0.0015	0.0018	0.0018	0.0015	0.0015	0.0015	0.0012	0.0018	0.0015
	LP	0.0021	0.0018	0.0020	0.0020	0.0018	0.0018	0.0018	0.0015	0.0020	0.0018
3/8"	S	0.0018	0.0014	0.0016	0.0016	0.0014	0.0014	0.0014	0.0011	0.0016	0.0014
	HP	0.0021	0.0018	0.0021	0.0021	0.0018	0.0018	0.0018	0.0014	0.0021	0.0018
	LP	0.0025	0.0021	0.0024	0.0024	0.0021	0.0021	0.0021	0.0018	0.0024	0.0021
1/2"	S	0.0025	0.0020	0.0023	0.0023	0.0020	0.0020	0.0020	0.0015	0.0023	0.0020
	HP	0.0030	0.0025	0.0030	0.0030	0.0025	0.0025	0.0025	0.0020	0.0030	0.0025
	LP	0.0035	0.0030	0.0033	0.0033	0.0030	0.0030	0.0030	0.0025	0.0033	0.0030
5/8"	S	0.0031	0.0025	0.0029	0.0029	0.0025	0.0025	0.0025	0.0019	0.0029	0.0025
	HP	0.0038	0.0031	0.0038	0.0038	0.0031	0.0031	0.0031	0.0025	0.0038	0.0031
	LP	0.0044	0.0038	0.0041	0.0041	0.0038	0.0038	0.0038	0.0031	0.0041	0.0038
3/4"	S	0.0038	0.0030	0.0035	0.0035	0.0030	0.0030	0.0030	0.0023	0.0035	0.0030
	HP	0.0045	0.0038	0.0045	0.0045	0.0038	0.0038	0.0038	0.0030	0.0045	0.0038
	LP	0.0053	0.0045	0.0050	0.0050	0.0045	0.0045	0.0045	0.0038	0.0050	0.0045
1"	S	0.0050	0.0040	0.0046	0.0046	0.0040	0.0040	0.0040	0.0030	0.0046	0.0040
	HP	0.0060	0.0050	0.0060	0.0060	0.0050	0.0050	0.0050	0.0040	0.0060	0.0050
	LP	0.0070	0.0060	0.0066	0.0066	0.0060	0.0060	0.0060	0.0050	0.0066	0.0060

S = SLOTTING
Axial Depth up to .5 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to 1 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to 1.5 x Diameter
Radial width .15 x Diameter

CALCULATIONS FOR SPEED
RPM = (3.82 x SFM) / DIA.
SFM = (RPM x DIA.) / 3.82

CALCULATIONS FOR FEED
IPM = # of FLUTES x FPT x RPM
FPT = IPM / (RPM x # of FLUTES)

Notes: When using coated end mills increase SFM by 20% - 35%.
See page 96 for an example of how to use the Speeds and Feeds Chart.

HSS, COBALT AND POWDERED METAL SPEEDS AND FEEDS CHART FOR NON-FERROUS MATERIALS

Speed in Surface Feet per Minute (SFM) Feed in Feed Per Tooth (FPT)

	MATERIALS	Aluminum Alloys	Aluminum Cast	Aluminum >10% Silicon	Copper	Brass
	DESCRIPTION	6061, 7075	Sand & Permanent Mold	High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass
	HSS SFM	450 - 650	150 - 300	200 - 400	250 - 450	250 - 450
	Cobalt SFM	600 - 800	200 - 400	250 - 500	300 - 600	300 - 600
	PM SFM	700 - Plus	300 - 600	400 - 700	450 - 800	450 - 900
Tool Dia.						
1/4"	S	0.0024	0.0022	0.0020	0.0020	0.0020
	HP	0.0027	0.0027	0.0023	0.0023	0.0023
	LP	0.0037	0.0037	0.0032	0.0032	0.0032
3/8"	S	0.0038	0.0035	0.0032	0.0032	0.0032
	HP	0.0041	0.0041	0.0034	0.0034	0.0034
	LP	0.0054	0.0054	0.0047	0.0047	0.0047
1/2"	S	0.0060	0.0055	0.0050	0.0050	0.0050
	HP	0.0060	0.0060	0.0050	0.0050	0.0050
	LP	0.0080	0.0080	0.0070	0.0070	0.0070
3/4"	S	0.0068	0.0062	0.0057	0.0057	0.0057
	HP	0.0077	0.0077	0.0064	0.0064	0.0064
	LP	0.0103	0.0103	0.0090	0.0090	0.0090
1"	S	0.0108	0.0099	0.0090	0.0090	0.0090
	HP	0.0114	0.0114	0.0095	0.0095	0.0095
	LP	0.0152	0.0152	0.0133	0.0133	0.0133
1-1/4"	S	0.0115	0.0106	0.0096	0.0096	0.0096
	HP	0.0122	0.0122	0.0102	0.0102	0.0102
	LP	0.0162	0.0162	0.0142	0.0142	0.0142
1-1/2"	S	0.0194	0.0178	0.0162	0.0162	0.0162
	HP	0.0217	0.0217	0.0181	0.0181	0.0181
	LP	0.0289	0.0289	0.0253	0.0253	0.0253
2"	S	0.0220	0.0202	0.0184	0.0184	0.0184
	HP	0.0278	0.0278	0.0231	0.0231	0.0231
	LP	0.0370	0.0370	0.0324	0.0324	0.0324

S = SLOTTING
Axial Depth up to 1 x Diameter
High Coolant Pressure

HP = HEAVY PERIPHERAL
Axial Depth up to 1.5 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to 2 x Diameter
Radial width .2 x Diameter

CALCULATIONS FOR SPEED
RPM = (3.82 x SFM) / DIA.
SFM = (RPM x DIA.) / 3.82

CALCULATIONS FOR FEED
IPM = # of FLUTES x FPT x RPM
FPT = IPM / (RPM x # of FLUTES)

Notes: Horsepower will be the limiting factor with larger diameter end mills.
Using coated end mills will improve tool life.
See page 96 for an example of how to use the Speeds and Feeds Chart.

HSS, COBALT AND POWDERED METAL SPEEDS AND FEEDS CHART FOR FERROUS MATERIALS

Speed in Surface Feet per Minute (SFM) Feed in Feed Per Tooth (FPT)

MATERIALS		Carbon Steels	Alloy Steel	Stainless Steels 300 Series	Stainless Steels 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast / Wrought
DESCRIPTION		10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 312, 316, 316L	416, 420, 420F, 430F, 440C	15-5PH, 16-6PH, 17-4PH, AM-xx Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast / Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	HSS SFM	50 - 110	30 - 80	30 - 80	50 - 100	30 - 65	55 - 150	35 - 75	5 - 30	40 - 90	35 - 80
	Cobalt SFM	60 - 120	30 - 100	30 - 90	50 - 110	30 - 70	60 - 160	40 - 80	5 - 35	55 - 100	40 - 90
	PM SFM	70 - 140	40 - 110	40 - 100	60 - 120	40 - 80	70 - 180	50 - 90	5 - 40	70 - 120	50 - 100
Tool Dia.											
1/4"	S	0.0013	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0008	0.0013	0.0010
	HP	0.0015	0.0010	0.0013	0.0013	0.0010	0.0010	0.0013	0.0008	0.0015	0.0012
	LP	0.0019	0.0018	0.0018	0.0018	0.0018	0.0023	0.0020	0.0018	0.0019	0.0018
3/8"	S	0.0019	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0011	0.0019	0.0015
	HP	0.0023	0.0015	0.0019	0.0019	0.0015	0.0015	0.0019	0.0011	0.0023	0.0017
	LP	0.0028	0.0026	0.0026	0.0026	0.0026	0.0034	0.0030	0.0026	0.0028	0.0026
1/2"	S	0.0025	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0015	0.0025	0.0020
	HP	0.0030	0.0020	0.0025	0.0025	0.0020	0.0020	0.0025	0.0015	0.0030	0.0023
	LP	0.0037	0.0035	0.0035	0.0035	0.0035	0.0045	0.0040	0.0035	0.0037	0.0035
3/4"	S	0.0038	0.0026	0.0032	0.0032	0.0026	0.0026	0.0032	0.0019	0.0038	0.0029
	HP	0.0043	0.0029	0.0036	0.0036	0.0029	0.0029	0.0036	0.0021	0.0043	0.0033
	LP	0.0053	0.0050	0.0050	0.0050	0.0050	0.0064	0.0057	0.0050	0.0053	0.0050
1"	S	0.0054	0.0036	0.0045	0.0045	0.0036	0.0036	0.0045	0.0027	0.0054	0.0041
	HP	0.0060	0.0040	0.0050	0.0050	0.0040	0.0040	0.0050	0.0030	0.0060	0.0046
	LP	0.0074	0.0070	0.0070	0.0070	0.0070	0.0090	0.0080	0.0070	0.0074	0.0070
1-1/4"	S	0.0069	0.0046	0.0058	0.0058	0.0046	0.0046	0.0058	0.0035	0.0069	0.0053
	HP	0.0075	0.0050	0.0063	0.0063	0.0050	0.0050	0.0063	0.0038	0.0075	0.0058
	LP	0.0093	0.0088	0.0088	0.0088	0.0088	0.0113	0.0100	0.0088	0.0093	0.0088
1-1/2"	S	0.0081	0.0054	0.0068	0.0068	0.0054	0.0054	0.0068	0.0041	0.0081	0.0062
	HP	0.0090	0.0060	0.0075	0.0075	0.0060	0.0060	0.0075	0.0045	0.0090	0.0069
	LP	0.0111	0.0105	0.0105	0.0105	0.0105	0.0135	0.0120	0.0105	0.0111	0.0105
2"	S	0.0108	0.0072	0.0090	0.0090	0.0072	0.0072	0.0090	0.0054	0.0108	0.0083
	HP	0.0120	0.0080	0.0100	0.0100	0.0080	0.0080	0.0100	0.0060	0.0120	0.0092
	LP	0.0148	0.0140	0.0140	0.0140	0.0140	0.0180	0.0160	0.0140	0.0148	0.0140

S = SLOTTING
Axial Depth up to 1 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to 2 x Diameter
Radial width >.3 x Diameter

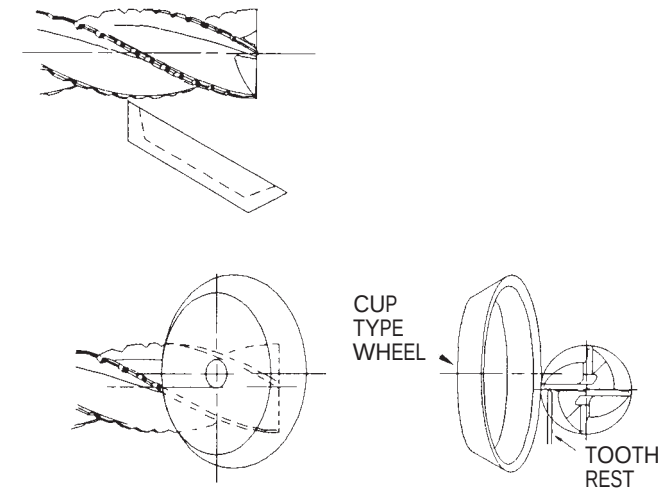
LP = LIGHT PERIPHERAL
Axial Depth up to 3 x Diameter
Radial width >.05 x Diameter

CALCULATIONS FOR SPEED
RPM = (3.82 x SFM) / DIA.
SFM = (RPM x DIA.) / 3.82

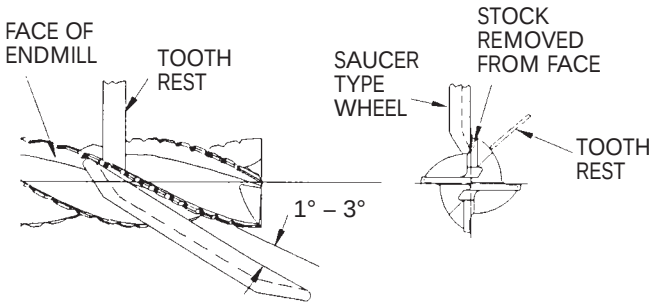
CALCULATIONS FOR FEED
IPM = # of FLUTES x FPT x RPM
FPT = IPM / (RPM x # of FLUTES)

Notes: When using coated end mills increase SFM by 20% - 35%.
See page 96 for an example of how to use the Speeds and Feeds Chart.

RESHARPENING STARCHIP END MILLS



Grinding the Radial Relief Angle



Grinding the Cutting Face

Starchip end mills can be resharpened by two methods:

1) Grinding the Radial Relief Angle – This is the easiest method and, while it will reduce the depth of the chipbreakers, it is satisfactory in many instances, as the end mill will function with up to a 60% reduction in chipbreaker depth. The radial clearance angle must also be resharpened in order to maintain the correct radial land width.

A tooth rest, placed on the cutting face at a point deeper than the chipbreaker, must be used to properly orient the cutting edge to the grinding wheel.

2) Grinding the Radial Relief Angle and the Cutting Face – This method will retain a greater chipbreaker depth for the life of the tool than just grinding the radial relief angle. The end mill will function with up to a 40% reduction in tooth width. When grinding the face, dress the wheel to match the form from the OD to the fillet. The grinding head should be turned to an angle slightly greater than the helix angle of the end mill (1° to 3° extra). This allows the leading edge of the wheel to hollow grind the cutting face. A tooth rest is required to insure that proper lead is maintained. It should be placed on the back of the tooth being resharpened at a point deeper than the chipbreaker. Now grind the radial relief and clearance as described above.

It is important to remove the entire wear land when resharpening tools. Therefore, tools should be inspected frequently during use and resharpened before the wear land becomes excessive. Regrinding can generate considerable heat and care should be taken not to burn the cutting edge.

RESHARPENING GEOMETRY FOR STARCHIP END MILLS

Dia. of Cut	Radial Rake				Radial Relief				Radial Land Width				Radial Clearance			
	I	II	III	IV, V	I	II	III	IV, V	I	II	III	IV, V	I	II	III	IV, V
1/2	10°	8°	5°	14°	12°	8°	8°	13°	.018	.023	.015	.019	20°	18°	16°	23°
5/8	10°	8°	5°	14°	12°	8°	8°	13°	.018	.023	.015	.021	20°	18°	16°	22°
3/4	10°	8°	5°	14°	11°	8°	7°	12°	.020	.025	.020	.024	20°	16°	14°	22°
7/8	10°	8°	5°	14°	11°	8°	7°	12°	.020	.030	.020	.026	20°	16°	14°	22°
1	10°	8°	5°	14°	10°	8°	6°	12°	.025	.030	.025	.028	20°	16°	12°	21°
1-1/4	10°	8°	5°	14°	10°	7°	6°	11°	.025	.030	.030	.032	20°	16°	12°	20°
1-1/2	10°	8°	5°	14°	10°	7°	5°	11°	.025	.035	.035	.033	20°	14°	10°	20°
2	10°	8°	5°	14°	9°	6°	5°	10°	.028	.040	.040	.036	18°	12°	10°	19°

Axial relief and clearance angles are the same as radial relief and clearance angles.
Axial land width is 1.5 times wider than radial land width.

For technical support and questions about you machining requirements, please call us at 1-800-522-8665.

RESHARPENING ROUGHING END MILLS

Roughers are sharpened by grinding the radial rake face and fillet of the flute on a tool and cutter grinding machine using a saucer shaped grinding wheel. Dress the wheel to match the form of the flute face from the OD to the fillet. The grinding head should be turned to an angle slightly greater than the helix angle of the end mill (1° to 3° extra). This allows the leading edge of the wheel to hollow grind the rake face. Typically, the finished hook measures 8° to 12° (Figure 1).

A tooth support finger is required to insure that proper lead is maintained. For this type of roughing cutter, the support finger rests on the back of the tooth being sharpened, located below the form (Figure 2).

It is important to remove the entire wear land when sharpening tools. The tool can be spun-ground on the periphery to establish a guide for the amount of OD metal to be removed. Regrinding can generate considerable heat and care should be taken not to burn the cutting edge.

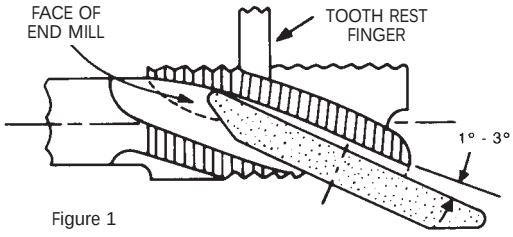


Figure 1

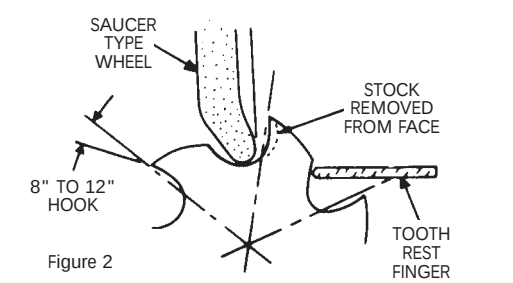
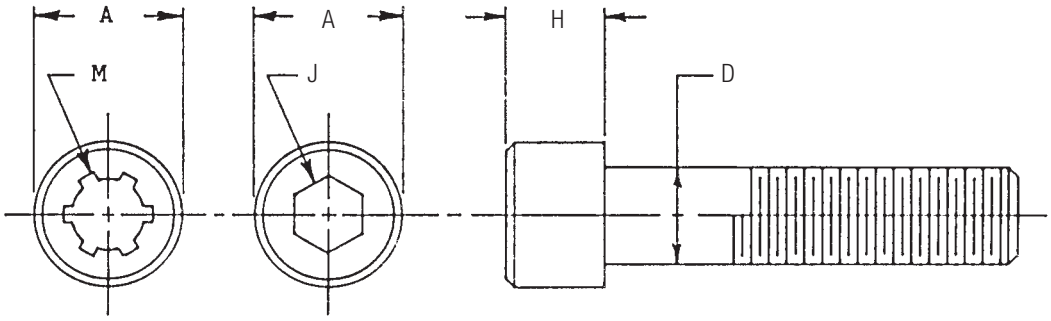


Figure 2

HEXAGON & SPLINE SOCKET HEAD CAP SCREWS

		D	A		H	M	J	
NOMINAL SCREW SIZE	BASIC MAJOR DIA.	MAXIMUM BODY DIA.	MAXIMUM HEAD DIA. 1960 series	MAXIMUM HEAD DIA. 1936 series	MAXIMUM HEAD HEIGHT	NOMINAL SPLINE SOCKET SIZE	Nominal HEXAGON SOCKET SIZE 1960 series	Nominal HEXAGON SOCKET SIZE 1936 series
0	.0600	.0600	.096	.096	.060	.060	.050	.050
1	.0730	.0730	.118	.118	.073	.072	1/16	.050
2	.0860	.0860	.140	.140	.086	.096	5/64	1/16
3	.0990	.0990	.161	.161	.099	.096	5/64	5/64
4	.1120	.1120	.183	.183	.112	.111	3/32	5/64
5	.1250	.1250	.205	.205	.125	.111	3/32	3/32
6	.1380	.1380	.226	.226	.138	.133	7/64	3/32
8	.1640	.1640	.270	.270	.164	.168	9/64	1/8
10	.1900	.1900	.312	.312	.190	.183	5/32	5/32
12	.2160	.2160	–	.344	.216	.183	–	5/32
1/4	.2500	.2500	.375	.375	.250	.216	3/16	3/16
5/16	.3125	.3125	.469	.437	.312	.291	1/4	7/32
3/8	.3750	.3750	.562	.562	.375	.372	5/16	5/16
7/16	.4375	.4375	.656	.625	.438	.454	3/8	5/16
1/2	.5000	.5000	.750	.750	.500	.454	3/8	3/8
5/8	.6250	.6250	.938	.875	.625	.595	1/2	1/2
3/4	.7500	.7500	1.125	1.000	.750	.620	5/8	9/16
7/8	.8750	.8750	1.312	1.125	.875	.698	3/4	9/16
1	1.0000	1.0000	1.500	1.312	1.000	.790	3/4	5/8



For technical support and questions about you machining requirements, please call us at 1-800-522-8665.

REQUEST FOR QUOTE

When requesting quotations for special end mills please specify:

Quantity* _____

Cutting Diameter* _____ Length Of Cut* _____

Shank Diameter* _____ Overall Length* _____

Neck Diameter (if applicable) _____ Length Below Shank (if applicable) _____

Number Of Flutes* _____ Helix Angle _____ RH or LH* _____

End Type* Center Cutting _____ Non-Center Cutting _____

End Feature* Ball End _____ Corner Radius _____ Corner Chamfer _____

Shank Type* Plain _____ Weldon _____ Whistle Notch _____ Combo _____

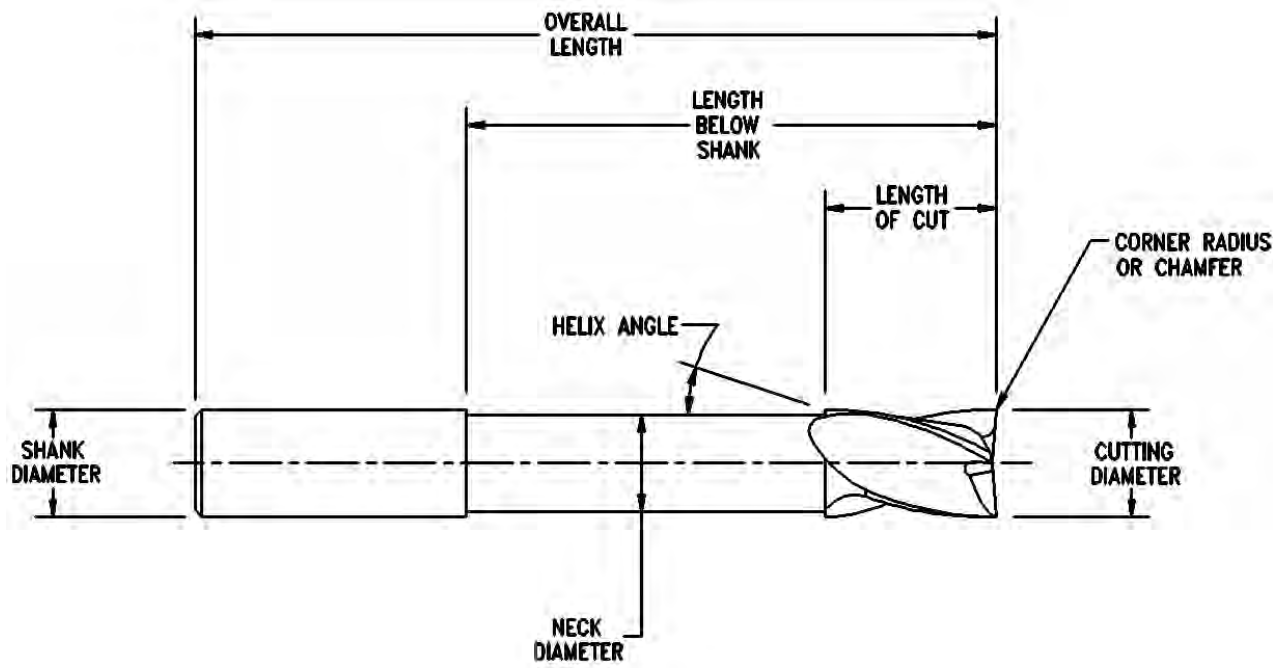
Tool Material* HSS _____ Cobalt _____ Powdered Metal _____ Carbide _____

Coating* _____

Material Being Cut _____ Material Hardness _____

Other _____

*Required Information



For technical support and questions about you machining requirements, please call us at 1-800-522-8665.

EDP NUMBER INDEX, 56031 - 72203

If the EDP number is known for the desired tool, it can be found in the numeric EDP listing. Find the desired EDP number and turn to the corresponding page.

EDP NUMBER INDEX, 72204-74198

EDP NUMBER INDEX, 74203 - 77227

EDP NUMBER INDEX, 77228 - 79252

EDP NUMBER INDEX, 79253 - 80060

EDP NUMBER INDEX, 80061 - 81481

EDP NUMBER INDEX, 81482 - 83973

EDP NUMBER INDEX, 83975 - 86079

EDP NUMBER INDEX, 86085 - 90838

EDP NUMBER INDEX, 90839-91860

EDP NUMBER INDEX, 91862 - 92887

EDP NUMBER INDEX, 92888 - 94497

EDP NUMBER INDEX, 94498-95540

EDP NUMBER INDEX, 95542-97306

EDP NUMBER INDEX, 97307-98659

CONTACT US

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Customer Service 800-522-8665
Technical Support 800-522-8665

www.brubakertool.com

To find a distributor, go to www.brubakertool.com and click on the "Distributor Search" button or simply contact customer service.

LIMITED WARRANTY

Brubaker Tool warrants to original equipment manufacturers, distributors and industrial and commercial users of its products that each new product which it manufactures or supplies is free from defects in material and workmanship. Its sole obligation under this warranty is limited to furnishing, without additional charge, a replacement for, or, at its option, repairing or issuing credit for any such product which shall, within one year from the date of sale by Brubaker Tool, be returned freight prepaid to Brubaker Tool and which, upon inspection, is determined by Brubaker Tool to be defective in materials or workmanship. The provisions of this warranty shall not apply to any product which has been subjected to misuse, improper operating conditions, or which has been repaired or altered, if such would adversely affect performance of the product. Complete written information with respect to all such matters must be furnished to Brubaker Tool as a prerequisite to its consideration of any claim or complaint under this warranty.

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WARNING

Any cutting tool may break or shatter under improper use. Government regulations require use of safety glasses and other appropriate safety equipment at all times in the vicinity of use. Wet or dry grinding of cutting tools produces potentially hazardous dusts or mists; to avoid adverse health effects, use adequate ventilation and read the material Safety Data Sheet for further applicable tool material or grade before grinding.

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Form No. 62-23001 3/06