

SFS CARBIDE TOOL



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Aside from standard solid carbide cutting tools shown in this catalog, your inquiries are invited on special tools to solve your special needs. For a professional answer to your specific machining problem send us blueprints, specifications, tolerances, type of material being machined, and the type of machine the cutting tools will be used on.

ORDERING INFORMATION FOR BURRS

EXAMPLE: Tool No. CODE SA5 Cylindrical Shape— $\frac{1}{2} \times 1 \times \frac{1}{4}$ Shank
Diamond, Medium Cut With End Cut

SFS ORDER:

SA-5 M4 EC

TOOL NUMBER CODE HEAD SHAPE/SIZE SHANK		CUT-CODE	MODIFICATION	
SA	CYLINDRICAL	M-1	MEDIUM STANDARD	OO STANDARD
SC	BALL NOSE	M-2	MEDIUM MASTER CUT	EC END CUT
SD	BALL	M-3	MEDIUM CHIP BREAKER	OL LONGER
SE	OVAL	M-4	MEDIUM DIAMOND	OS SHORTER
SF	TREE RADIUS	C-1	COARSE STANDARD	38 $\frac{3}{8}$ SHANK
SG	TREE POINT	C-2	COURSE MASTER CUT	3M 3 mm
SH	FLAME	C-3	COARSE CHIP BREAKER	6M 6 mm
SJ	60° INC. ANGLE	C-4	COARSE DIAMOND	
SK	90° INC. ANGLE	F-1	FINE STANDARD	
SL	14° INC. ANGLE	F-2	FINE MASTER CUT	
SM	CONE	F-3	FINE CHIP BREAKER	
SN	INVERTED CONE	F-4	FINE DIAMOND	
		NF	NON-FERROUS	

SOLID CARBIDE BURRS

We manufacture the most popular burrs in $\frac{1}{8}$ ", $\frac{3}{16}$ ", and $\frac{1}{4}$ " diameters. The $\frac{1}{8}$ " diameter tools are $1\frac{1}{2}$ " long (OAL); the $\frac{3}{16}$ " and $\frac{1}{4}$ " diameter tools are 2" long (OAL).

SA-TYPE

(CYLINDRICAL)



TOOL NO.	HEAD & SHANK DIAMETER	HEAD LENGTH
SA-42	1/8	9/16
SA-81	3/16	5/8
SA-1	1/4	5/8

SG-TYPE

(TREE POINT)



TOOL NO.	HEAD & SHANK DIAMETER	HEAD LENGTH
SG-42	1/8	1/2
SG-81	3/16	1/2
SG-1	1/4	5/8

SC-TYPE

(CYLINDRICAL BALL NOSE)



TOOL NO.	HEAD & SHANK DIAMETER	HEAD LENGTH
SC-42	1/8	9/16
SC-81	3/16	5/8
SC-1	1/4	5/8

SJ-TYPE

(60° INC. ANGLE)



TOOL NO.	HEAD & SHANK DIAMETER	HEAD LENGTH
SJ-42	1/8	60°
SJ-81	3/16	60°
SJ-1	1/4	60°

SD-TYPE

(BALL)



TOOL NO.	HEAD & SHANK DIAMETER	HEAD LENGTH
SD-42	1/8	1/8
SD-81	3/16	3/16
SD-1	1/4	1/4

SK-TYPE

(90° INC. ANGLE)



TOOL NO.	HEAD & SHANK DIAMETER	HEAD LENGTH
SK-42	1/8	90°
SK-81	3/16	90°
SK-1	1/4	90°

SE-TYPE

(OVAL)



TOOL NO.	HEAD & SHANK DIAMETER	HEAD LENGTH
SE-42	1/8	7/32
SE-81	3/16	9/32
SE-1	1/4	3/8

SL-TYPE

(14° INC. ANGLE)



TOOL NO.	HEAD & SHANK DIAMETER	HEAD LENGTH
SL-42	1/8	1/2-8°
SL-81	3/16	5/8-14°
SL-1	1/4	5/8-14°

SF-TYPE

(TREE RADIUS)



TOOL NO.	HEAD & SHANK DIAMETER	HEAD LENGTH
SF-42	1/8	1/2
SF-81	3/16	1/2
SF-1	1/4	5/8

SN-TYPE

(INVERTED CONE)



TOOL NO.	HEAD & SHANK DIAMETER	HEAD LENGTH
SN-42	1/8	3/16-10°
SN-81	3/16	1/4-10°
SN-1	1/4	5/16-10°

CARBIDE BURRS WITH 1/4" HARDENED STEEL SHANK

FINE CUT



Fine fluting. Recommended where better finishes are required and stock removal is not an important factor. Not recommended for use on non-ferrous materials.

Note: Fine Cut is not stocked but available on order.



MEDIUM CUT

General purpose fluting. Recommended where fair stock removal and finish is required.

Note: Medium Cut is available from stock and will be furnished unless otherwise specified.



COARSE CUT

Coarse fluting. Recommended where rapid stock removal is required and finish is not an important factor, primarily for use on non-ferrous materials.



SA-TYPE
(CYLINDRICAL)

TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SA-2	5/16	3/4
SA-3	3/8	3/4
SA-4	7/16	1
SA-5	1/2	1
SA-6	5/8	1
SA-7	3/4	1
SA-9	1	1



SE-TYPE
(OVAL)

TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SE-3	3/8	5/8
SE-5	1/2	7/8
SE-6	5/8	1
SE-7	3/4	1



SC-TYPE
(CYLINDRICAL BALL NOSE)

TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SC-2	5/16	3/4
SC-3	3/8	3/4
SC-4	7/16	1
SC-5	1/2	1
SC-6	5/8	1
SC-7	3/4	1



SF-TYPE
(TREE RADIUS)

TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SF-3	3/8	3/4
SF-4	7/16	1
SF-5	1/2	1
SF-6	5/8	1
SF-13	1/2	3/4
SF-14	3/4	1-1/4
SF-15	3/4	1-1/2



SD-TYPE
(BALL)

TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SD-2	5/16	1/4
SD-3	3/8	5/16
SD-4	7/16	3/8
SD-5	1/2	7/16
SD-6	5/8	9/16
SD-7	3/4	11/16
SD-9	1	15/16



SG-TYPE
(TREE POINT)

TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SG-2	5/16	3/4
SG-3	3/8	3/4
SG-5	1/2	1
SG-6	5/8	1
SG-7	3/4	1
SG-13	1/2	3/4
SG-15	3/4	1-1/2

AND CARBIDE (BRAZED) HEADS $\frac{5}{16}$ " AND LARGER

CHIP BREAKER

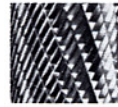


Standard tools can be furnished with a chip breaker. This chip breaker will substantially reduce and break up long stringy chips.



DIAMOND CUT

This design is especially adaptable for burring heat treated and tough alloy steels and on Tool and Die room applications. This type of cut is also commonly used in production applications.



MASTER CUT

Extremely suitable for use on soft material at high speeds. Also recommended for heavy stock removal operations, for better finishes and breaking up long chips.

SH-TYPE (FLAME)



TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SH-2	$\frac{5}{16}$	$\frac{3}{4}$
SH-5	$\frac{1}{2}$	$1\frac{1}{4}$
SH-6	$\frac{5}{8}$	$1\frac{7}{16}$
SH-7	$\frac{3}{4}$	$1\frac{5}{8}$

SL-TYPE (14° INC. ANGLE)



TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SL-2	$\frac{5}{16}$	$\frac{7}{8}$
SL-3	$\frac{3}{8}$	$1\frac{1}{16}$
SL-4	$\frac{1}{2}$	$1\frac{1}{8}$
SL-6	$\frac{5}{8}$	$1\frac{5}{16}$
SL-7	$\frac{3}{4}$	$1\frac{1}{2}$

SJ-TYPE (60° INC. ANGLE)



TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SJ-3	$\frac{3}{8}$	$\frac{5}{16}$
SJ-5	$\frac{1}{2}$	$\frac{7}{16}$
SJ-6	$\frac{5}{8}$	$\frac{9}{16}$
SJ-7	$\frac{3}{4}$	$1\frac{1}{16}$
SJ-9	1	$\frac{7}{8}$

SM-TYPE (CONE)



TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SM-3	$\frac{3}{8}$	$\frac{5}{8}$
SM-5	$\frac{1}{2}$	$\frac{7}{8}$
SM-6	$\frac{5}{8}$	1

SK-TYPE (90° INC. ANGLE)



TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SK-3	$\frac{3}{8}$	$\frac{3}{16}$
SK-5	$\frac{1}{2}$	$\frac{1}{4}$
SK-6	$\frac{5}{8}$	$\frac{5}{16}$
SK-7	$\frac{3}{4}$	$\frac{3}{8}$
SK-9	1	$\frac{7}{16}$

SN-TYPE (INVERTED CONE)



TOOL NO.	HEAD DIAMETER	FLUTE LENGTH
SN-3	$\frac{3}{8}$	$\frac{3}{8}$
SN-5	$\frac{1}{2}$	$\frac{1}{2}$
SN-6	$\frac{5}{8}$	$\frac{5}{8}$
SN-7	$\frac{3}{4}$	$\frac{3}{4}$

ALUMA CUT BURRS 1/4" HARDENED STEEL SHANKS



SA-TYPE
(CYLINDER)

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SA-1NF	1/4	3/4	1/4
SA-3NF	3/8	3/4	1/4
SA-5NF	1/2	1	1/4
SA-6NF	5/8	1	1/4 or 3/8
SA-7NF	3/4	1	1/4 or 3/8



SC-TYPE
(CYLINDER BALL NOSE)

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SC-1NF	1/4	3/4	1/4
SC-3NF	3/8	3/4	1/4
SC-5NF	1/2	1	1/4
SC-6NF	5/8	1	1/4 or 3/8
SC-7NF	3/4	1	1/4 or 3/8



SD-TYPE
(BALL)

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SD-1NF	1/4	1/4	1/4
SD-3NF	3/8	3/8	1/4
SD-5NF	1/2	1/2	1/4
SD-6NF	5/8	5/8	1/4 or 3/8
SD-7NF	3/4	3/4	1/4 or 3/8



SE-TYPE
(OVAL)

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SE-1NF	1/4	5/8	1/4
SE-3NF	3/8	3/4	1/4
SE-5NF	1/2	1	1/4
SE-6NF	5/8	1	1/4 or 3/8
SE-7NF	3/4	1	1/4 or 3/8



SF-TYPE
(TREE RADIUS)

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SF-1NF	1/4	3/4	1/4
SF-3NF	3/8	3/4	1/4
SF-5NF	1/2	1	1/4
SF-6NF	5/8	1	1/4 or 3/8
SF-7NF	3/4	1	1/4 or 3/8



SL-TYPE
(14° TAPER-RADIUS END)

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SL-1NF	1/4	3/4	1/4
SL-3NF	3/8	1	1/4
SL-5NF	1/2	1-1/8	1/4
SL-6NF	5/8	1-1/4	1/4 or 3/8
SL-7NF	3/4	1-1/2	1/4 or 3/8

NOTE: 3/8" diameter shanks are recommended on tools with head diameters 5/8" or larger.

NF designates Non-Ferrous Tools.

CARBIDE BURRS WITH 1/8" HARDENED STEEL SHANKS BRAZED TO 1/4" CARBIDE HEADS

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SA-51	1/4	1/2	1/8

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SC-51	1/4	1/2	1/8

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SD-51	1/4	1/4	1/8

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SE-51	1/4	3/8	1/8

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SF-51	1/4	1/2	1/8

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SG-51	1/4	1/2	1/8

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SM-51	1/4	1/2	1/8

TOOL NO.	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER
SN-51	1/4	1/4	1/8

SA-TYPE

(CYLINDRICAL)



SC-TYPE

(CYLINDRICAL BALL NOSE)



SD-TYPE

(BALL)



SE-TYPE

(OVAL)



SF-TYPE

(TREE RADIUS)



SG-TYPE

(TREE POINT)



SM-TYPE

(22° ANGLE CONE)



SN-TYPE

(10° ANGLE INVERTED CONE)



END MILLS

END MILL ORDERING INFORMATION

Single End, Standard Spiral, 4 Flute End Mill,
1/4" dia., Center Cut, Standard Overall Length

SFS ORDER:

<u>SE</u>	<u>100</u>	<u>4</u>	<u>1/4</u>	<u>C</u>	<u>O</u>
TOOL TYPE	SERIES	# OF FLUTES	CUTTER DIA.	END TYPE	OVERALL LENGTH
SE SINGLE END	100 STD. SPIRAL			O FLAT END	O STANDARD
SES SINGLE END SPECIAL	200 SLOW SPIRAL			C CENTER CUT	S SHORT
DE DOUBLE END	300 STRAIGHT FLUTES			B BALL NOSE	L LONG
DES DOUBLE END SPECIAL	400 LHS RHC			L L. H. SPIRAL	
SSE STUB SINGLE END	500 MULTI FLUTE			R R. H. SPIRAL	
SDE STUB DOUBLE END	600 MULTI FLUTE				
	700 MULTI FLUTE				
	800 DIE SINKING MILL				



**SOLID CARBIDE
FLAT DRILLS
SERIES 1104**

TOOL NO.	DIAMETER	OVERALL LENGTH	APPROX. LENGTH OF FLUTED PORTION	WEB THICKNESS AT POINT
FD-1	1/16	1-1/2	3/8	.015
FD-2	3/32	1-1/2	7/16	.015
FD-3	1/8	1-1/2	1/2	.015
FD-4	5/32	1-1/2	9/16	.020
FD-5	3/16	2	11/16	.020
FD-6	7/32	2	11/16	.025
FD-7	1/4	2	13/16	.025
FD-8	9/32	2	7/8	.030
FD-9	5/16	2	7/8	.030
FD-10	11/32	2	15/16	.035
FD-11	3/8	2	1-1/8	.035
FD-12	13/32	2	1-1/8	.045
FD-13	7/16	2	1-3/16	.050
FD-14	15/32	2	1-3/16	.055
FD-15	1/2	2	1-5/16	.060

TOLERANCES: Drill diameter, all sizes + .0000 - .0005

Shank diameter, all sizes; + .000 - .001

These drills are supplied with the Standard 118 degree drill point.

When ordering please specify Tool Number.

SINGLE END SOLID CARBIDE END MILLS

Standard Length and Stub Size "Econo Mills"

STANDARD END MILLS

CUTTER DIAMETER	SHANK DIAMETER	FLUTE LENGTH	OVERALL LENGTH
1/16	1/8	3/16	1-1/2
3/32	1/8	3/8	1-1/2
1/8	1/8	1/2	1-1/2
5/32	3/16	9/16	2
3/16	3/16	5/8	2
7/32	1/4	5/8	2-1/2
1/4	1/4	3/4	2-1/2
9/32	5/16	3/4	2-1/2
5/16	5/16	13/16	2-1/2
3/8	3/8	7/8	2-1/2
7/16	7/16	1	3
1/2	1/2	1	3
9/16	9/16	1-1/4	3
5/8	5/8	1-1/4	3
11/16	11/16	1-1/2	4
3/4	3/4	1-1/2	4

SERIES 100



4 Flutes Standard R.H. Spiral Square End

SERIES 200



4 Flutes Slow R.H. Spiral Square End

SERIES 300



4 Flutes Straight Flutes Square End

SERIES 400



4 Flutes L.H. Spiral, R.H. Cut Square End

SERIES 500



6 Flutes Standard R.H. Spiral Square End

SERIES 600



Multi-flute R.H. Spiral Square End

SERIES 700



Multi-Flute R.H. Spiral Square End

SERIES 800



2 Flute Straight 14° Std. Taper Radius End

STUB SIZE "ECONO MILL"

CUTTER DIAMETER	SHANK DIAMETER	FLUTE LENGTH	OVERALL LENGTH
1/16	1/8	3/16	1-1/2
1/8	1/8	3/16	1-1/2
5/32	3/16	1/4	2
3/16	3/16	1/4	2
1/4	1/4	5/16	2
5/16	5/16	5/16	2
3/8	3/8	3/8	2
7/16	7/16	7/16	2
1/2	1/2	1/2	2
5/8	5/8	5/8	3
3/4	3/4	3/4	3

TOLERANCES: Cutter diameters: 1/16" to 1/4" inclusive +.000 - .002
 9/32" to 3/4" inclusive +.000 - .003

Shank diameters: all sizes +.0000 - .0005

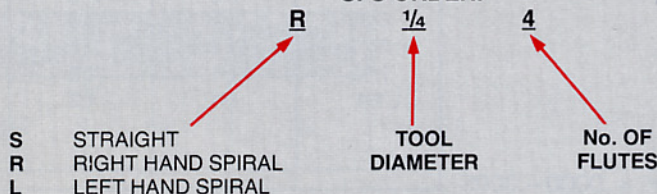
All ball end mills are approximately 1/8" shorter in flute length and overall length.

When ordering please specify 1) Tool Type, 2) Series, 3) Number of Flutes, 4) Tool Diameter, 5) End Type, 6) OAL. Longer End Mills are available upon request.

REAMER ORDERING INFORMATION SERIES 1200

EXAMPLE: Right Hand Spiral, 1/4" Diameter, Four Flutes

SFS ORDER:



SOLID CARBIDE CHUCKING REAMERS SERIES 1200

SINGLE END REAMERS

S (Straight)



R (Right Hand)



TOLERANCES:

Reamer diameters: up to and including 1/4" + .0001 + .0003; 17/64" to 3/8" inclusive + .0001 + .0004
Shank diameters, all sizes: + .0005 - .0005

NOTE: The above reamers are fractional sizes. Decimal reamers are also available from .050 up.

REAMER DIAMETER	FLUTE LENGTH	OVERALL LENGTH	SHANK DIAMETER	NO. OF FLUTES
1/16	3/8	1-1/2	Minimum of .005 under cutter diameter	4
5/64	1/2	1-3/4		4
3/32	1/2	2		4
7/64	5/8	2-1/4		4
1/8	5/8	2-1/4		5
9/64	3/4	2-1/2		5
5/32	3/4	2-1/2		5
11/64	7/8	2-3/4		5
3/16	7/8	2-3/4		5
13/64	1	3		5
7/32	1	3		5
15/64	1	3		5
1/4	1	3		5
17/64	1-1/8	3-1/4		5
9/32	1-1/8	3-1/4		5
19/64	1-1/8	3-1/4		5
5/16	1-1/8	3-1/4		5
21/64	1-1/4	3-1/2		5
11/32	1-1/4	3-1/2		5
23/64	1-1/4	3-1/2		5
3/8	1-1/4	3-1/2		5

When ordering please specify Flute Spiral, Diameter, Number of Flutes, Chamfer.

Left hand reamers are available.

DOUBLE END SOLID CARBIDE END MILLS SERIES 900



STRAIGHT SHANK RIGHT HAND CUTTING

CUTTER DIAMETER	SHANK DIAMETER	FLUTE LENGTH	OVERALL LENGTH
1/16	1/8	3/16	3
1/8	1/8	3/8	3
5/32	3/16	7/16	3
3/16	3/16	1/2	3
7/32	1/4	9/16	4
1/4	1/4	5/8	4
5/16	5/16	3/4	4
3/8	3/8	3/4	4
7/16	7/16	7/8	4
7/16	1/2	7/8	4
1/2	1/2	1	4



STUB SIZE DOUBLE END "ECONO MILL"

CUTTER DIAMETER	SHANK DIAMETER	FLUTE LENGTH	OVERALL LENGTH
1/16	1/8	3/16	1-1/2
3/32	1/8	1/4	1-1/2
1/8	1/8	5/16	1-1/2
5/32	3/16	3/8	2
3/16	3/16	7/16	2
7/32	1/4	1/2	2-1/2
1/4	1/4	1/2	2-1/2

TOLERANCES: Cutter diameter: + .0000 - .0005
Shank diameter: + .0000 - .0015

LARGER DIAMETERS ARE AVAILABLE.

SOLID CARBIDE MULTI-FLUTE END MILLS SERIES 500-600-700

CUTTER DIAMETER	SHANK DIAMETER	FLUTE LENGTH	OVERALL LENGTH
1/8	1/8	1/2	1-1/2
5/32	5/32	1/2	2
3/16	3/16	1/2	2
1/4	1/4	3/4	2
5/16	5/16	3/4	2-1/2
3/8	3/8	1	2-1/2
7/16	7/16	1	2-1/2
1/2	1/2	1	3

Refer to End Mill Ordering Chart Information.



SERIES 500



SERIES 600



SERIES 700

SOLID CARBIDE DIE SINKING MILLS SERIES 800

TOOL NUMBER	SHANK DIAMETER	RADIUS	OVERALL LENGTH
DM-1	1/8	.030	1-1/2
DM-2	5/32	.040	2
DM-3	3/16	.046	2
DM-4	1/4	.062	2-1/2
DM-5	5/16	.078	2-1/2
DM-6	3/8	.093	2-1/2
DM-7	7/16	.109	3
DM-8	1/2	.125	3

When Ordering Specify Tool Number.

14° is Standard—Please Specify if Other Than Standard

TOLERANCES: On Radius, all sizes: + .003 – .000

Shank Diameter, all sizes: + .0000 – .0005



SERIES 800

SOLID CARBIDE CENTER DRILL SERIES 1300 DOUBLE END 60° INCLUDED ANGLE

TOOL NUMBER	SHANK DIAMETER	RADIUS	OVERALL LENGTH
CD-1	1/8	3/64	1-1/2
CD-2	3/16	5/64	2
CD-3	1/4	7/64	2
CD-4	5/16	1/8	2
CD-5	3/8	3/16	3
CD-6	1/2	7/32	3

When Ordering Specify Tool Number.

TOLERANCES: Shank Diameter, all sizes: + .000 – .001

Drill Diameter, all sizes: + .003 – .000



SOLID CARBIDE DRILLS SERIES 1100

FRACTIONAL SIZE DRILLS "DF"

DIAMETER	DECIMAL EQUIV.	OVERALL LENGTH	FLUTE LENGTH
1/64	.0156	1-1/4	1/2
1/32	.0312	1-1/4	1/2
3/64	.0469	1-1/2	3/4
1/16	.0625	1-1/2	3/4
5/64	.0781	1-3/4	7/8
3/32	.0937	2	1
7/64	.1094	2-1/4	1-1/4
1/8	.1250	2-1/4	1-1/4
9/64	.1406	2-1/2	1-3/8
5/32	.1562	2-1/2	1-3/8
11/64	.1719	2-3/4	1-5/8
3/16	.1875	2-3/4	1-5/8
13/64	.2031	3	1-3/4
7/32	.2185	3	1-3/4
15/64	.2344	3-1/4	2
1/4	.2500	3-1/4	2
17/64	.2656	3-1/2	2-1/8
9/32	.2812	3-1/2	2-1/8
19/64	.2969	3-3/4	2-3/8
5/16	.3125	3-3/4	2-3/8
21/64	.3281	4	2-1/2
11/32	.3437	4	2-1/2
23/64	.3594	4-1/4	2-3/4
3/8	.3750	4-1/4	2-3/4
25/64	.3906	4-1/2	2-7/8
13/32	.4062	4-1/2	2-7/8
27/64	.4218	4-1/2	2-7/8
7/16	.4375	4-1/2	2-7/8
29/64	.4531	4-3/4	3
15/32	.4687	4-3/4	3
31/64	.4843	4-3/4	3
1/2	.5000	4-3/4	3

When Ordering Specify Diameter.

LETTER SIZE DRILLS "DL"

LETTER SIZE	DECIMAL EQUIV.	OVERALL LENGTH	FLUTE LENGTH
A	.234	3-1/4	2
B	.238	3-1/4	2
C	.242	3-1/4	2
D	.246	3-1/4	2
E	.250	3-1/4	2
F	.257	3-1/4	2
G	.261	3-1/2	2-1/8
H	.266	3-1/2	2-1/8
I	.272	3-1/2	2-1/8
J	.277	3-1/2	2-1/8
K	.281	3-1/2	2-1/8
L	.290	3-1/2	2-1/8
M	.295	3-3/4	2-3/8
N	.302	3-3/4	2-3/8
O	.316	3-3/4	2-3/8
P	.323	3-3/4	2-3/8
Q	.332	4	2-1/2
R	.339	4	2-1/2
S	.348	4	2-1/2
T	.358	4-1/4	2-3/4
U	.368	4-1/4	2-3/4
V	.377	4-1/4	2-3/4
W	.386	4-1/2	2-7/8
X	.397	4-1/2	2-7/8
Y	.404	4-1/2	2-7/8
Z	.413	4-1/2	2-7/8

When Ordering Specify Letter Size.

WIRE SIZE DRILLS "DW"

WIRE GAUGE #	DEC. EQUIV.	OVERALL LENGTH	FLUTE LENGTH	WIRE GAUGE #	DEC. EQUIV.	OVERALL LENGTH	FLUTE LENGTH
1	.2280	3	1-3/4	41	.0960	2	1
2	.2210	3	1-3/4	42	.0935	2	1
3	.2130	3	1-3/4	43	.0890	2	1
4	.2090	3	1-3/4	44	.0860	2	1
5	.2055	3	1-3/4	45	.0820	1-3/4	7/8
6	.2040	3	1-3/4	46	.0810	1-3/4	7/8
7	.2010	3	1-3/4	47	.0785	1-3/4	7/8
8	.1990	3	1-3/4	48	.0760	1-3/4	7/8
9	.1960	3	1-3/4	49	.0730	1-3/4	7/8
10	.1935	2-3/4	1-5/8	50	.0700	1-3/4	7/8
11	.1910	2-3/4	1-5/8	51	.0670	1-1/2	3/4
12	.1890	2-3/4	1-5/8	52	.0635	1-1/2	3/4
13	.1850	2-3/4	1-5/8	53	.0595	1-1/2	3/4
14	.1820	2-3/4	1-5/8	54	.0550	1-1/2	3/4
15	.1800	2-3/4	1-5/8	55	.0520	1-1/2	3/4
16	.1770	2-3/4	1-5/8	56	.0465	1-1/2	3/4
17	.1730	2-3/4	1-5/8	57	.0430	1-1/2	3/4
18	.1695	2-3/4	1-5/8	58	.0420	1-1/2	3/4
19	.1660	2-3/4	1-5/8	59	.0410	1-1/2	3/4
20	.1610	2-1/2	1-3/8	60	.0400	1-1/2	3/4
21	.1590	2-1/2	1-3/8	61	.0390	1-1/4	1/2
22	.1570	2-1/2	1-3/8	62	.0380	1-1/4	1/2
23	.1540	2-1/2	1-3/8	63	.0370	1-1/4	1/2
24	.1520	2-1/2	1-3/8	64	.0360	1-1/4	1/2
25	.1495	2-1/2	1-3/8	65	.0350	1-1/4	1/2
26	.1470	2-1/2	1-3/8	66	.0330	1-1/4	1/2
27	.1440	2-1/2	1-3/8	67	.0320	1-1/4	1/2
28	.1405	2-1/2	1-3/8	68	.0310	1-1/4	1/2
29	.1360	2-1/2	1-3/8	69	.0292	1-1/4	1/2
30	.1285	2-1/4	1-1/4	70	.0280	1-1/4	1/2
31	.1200	2-1/4	1-1/4	71	.0260	1-1/4	1/2
32	.1160	2-1/4	1-1/4	72	.0250	1-1/4	1/2
33	.1130	2-1/4	1-1/4	73	.0240	1-1/4	1/2
34	.1110	2-1/4	1-1/4	74	.0225	1-1/4	1/2
35	.1100	2-1/4	1-1/4	75	.0210	1-1/4	1/2
36	.1065	2-1/4	1-1/4	76	.0200	1-1/4	1/2
37	.1040	2-1/4	1-1/4	77	.0180	1-1/4	1/2
38	.1015	2-1/4	1-1/4	78	.0160	1-1/4	1/2
39	.0995	2-1/4	1-1/4	79	.0145	1-1/4	1/2
40	.0980	2	1	80	.0135	1-1/4	1/2

When Ordering Specify Wire Gauge Number.



When ordering specify Standard spiral "S" or Fast spiral "F" (not shown). 118° drill point is standard.

TOLERANCES: Drill diameter, all sizes: + .000 - .0005
Shank diameters, all sizes: .000 - .001
118° drill point is standard.

Note: Metric size drills also available upon request.

SOLID CARBIDE PRECISION GROUND INTERNAL GRINDING TOOLS SERIES 1400

TOOL NUMBER	HEAD DIAMETER	SHANK DIAMETER	HEAD LENGTH	NECK LENGTH	OVERALL LENGTH
G-1	3/64	1/8	3/32	3/8	1-1/2
G-2	1/16	1/8	1/8	3/8	1-1/2
G-3	5/64	1/8	1/8	3/8	1-1/2
G-4	3/32	1/8	5/32	3/8	1-1/2
G-5	7/64	1/8	5/32	3/8	1-1/2
G-6	1/8	1/8	3/16	1/16	1-1/2
G-7	9/64	3/16	3/16	1/16	2
G-8	5/32	3/16	1/4	1/2	2
G-9	11/64	3/16	1/4	1/2	2
G-10	3/16	3/16	1/4	9/16	2
G-11	13/64	1/4	1/4	9/16	2
G-12	7/32	1/4	1/4	5/8	2
G-13	15/64	1/4	1/4	5/8	2
G-14	1/4	1/4	1/4	3/4	2



When Ordering Please Specify Tool Number.

"PRECISION" SOLID CARBIDE HEAD BRAZED TO SOLID CARBIDE SHANK

TOOL NUMBER	HEAD DIAMETER	HEAD LENGTH	SHANK DIAMETER	OVERALL LENGTH
G-17	5/16	5/16	1/4	2-1/2
G-18	3/8	3/8	1/4	2-1/2
G-19	7/16	7/16	1/4	2-1/2
G-20	1/2	1/2	1/4	2-1/2



When Ordering Please Specify Tool Number.

TOLERANCES: Shank diameters, all sizes: +.0000 -.0005

All Tools Right Hand Cutting

Tools are Available with 45° Chamfer, Corner Radius, or End Cut

SOLID CARBIDE JIG BORING TOOLS "BT" SERIES 1500



TOLERANCES: Shank Diameter, all sizes: —
.0000 — .0005

TOOL NUMBER	SHANK DIAMETER	MINIMUM HOLE DIAMETER	MAXIMUM DEPTH OF HOLE	OVERALL LENGTH
BT-1	1/8	.090	1/2	1-1/2
BT-2	1/8	.120	5/8	1-1/2
BT-3	3/16	.150	3/4	2
BT-4	3/16	.180	1	2
BT-5	1/4	.210	1-1/4	2
BT-6	1/4	.240	1-1/4	2
BT-7	5/16	.270	1-1/4	2-1/4
BT-8	5/16	.300	1-1/4	2-1/4
BT-9	3/8	.330	1-1/2	2-1/2
BT-0	3/8	.360	1-1/2	2-1/2

When Ordering Specify Tool Number.

SOLID CARBIDE ROUTING TOOLS "RT" SERIES 1600

DRILL END



SAFE END OR BURR END



END MILL END



TOOL NUMBER	CUTTER DIAMETER	SHANK DIAMETER	FLUTE LENGTH	OVERALL LENGTH
RT-1	1/16	1/8	3/16	1-1/2
RT-2	3/32	1/8	3/8	1-1/2
RT-3	1/8	1/8	1/2	1-1/2
RT-4	3/16	3/16	5/8	2
RT-5	3/16	1/4	5/8	2
RT-6	1/4	1/4	3/4	2
RT-7	1/4	1/4	3/4	2-1/2
RT-8	1/4	1/4	1	3
RT-9	5/16	5/16	1	2-1/2
RT-10	3/8	3/8	1	2-1/2
RT-11	1/2	1/2	1	3

When Ordering Specify Tool Number & End

TECHNICAL INFORMATION

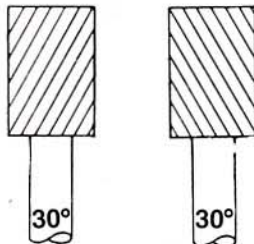
RECOMMENDED END MILLS FOR VARIOUS MATERIALS

MATERIALS	4 FLUTE	4 STRAIGHT FLUTE	2 STRAIGHT FLUTE	2 FLUTE R.H.S	2 FLUTE SLOW SPIRAL
Aluminum	•			•	
Brass and Bronze	•				
Carbon Steel					•
Cast Iron		•	•		
Copper	•				
Fibre	•				
Free Cutting Sheets					•
Hardened Steels					•
Hard Rubber	•				
Magnesium	•			•	
Malleable Iron					•
Monel Metal					•
Nikel					•
Nickel Chrome					•
Plastics	•				
Stainless Steels					•
Titanium					•
Toughened and Heat Treated Steels					•
Zinc Alloy	•				

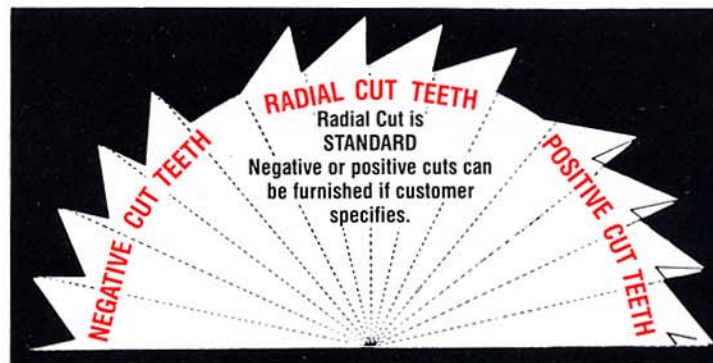
STANDARD SPIRAL ANGLES

Standard Spiral Angles

Right Hand Left Hand



Above are 30° angles, however in some cases other than the standard may have definite advantages and can be furnished.



LUBRICATION

In all of our years in this business, we've been looking for the ultimate lubrication and now we've found it—ACCU-LUBE.

Accu-Lube lubricant applied to cutting tools and abrasives presents a completely different concept for extending the life and performance of those tools and abrasives. The high lubricity factor of Accu-Lube reduces the generation of heat in the cut or grind rather than trying to carry away the heat after the damage is done—as with coolants.

Accu-Lube is also a very high strength lubricant able to sustain its lubricity through an unusually long cut. While not recommended for turning, it will remain effective through milling cuts of such length as with a 24" face mill. In small drilling (#70) and tapping (#0-80) Accu-Lube need be applied every 50 to 100 holes, depending on depth.

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Charlie Carbide^{T.M.}

It's hard to believe that I was only a small carbide when Service File Sharpening Co. began making carbide tools.

That was back in 1921 and almost 70 years later SFS continues to produce a wide variety of standard and special carbide tools, including burrs, end mills, reamers and other tools. We work with aircraft manufacturers, auto makers and other diversified industries throughout the world.

SFS also provides a complete resharpener service for your solid carbide cutting tools to save you money.

SFS is the experienced leader in today's competitive carbide tool industry. SFS combines state-of-the-art technology with old-fashioned service to effectively meet your needs.

We've been around a long time and have helped a lot of people in your industry. Now we'd like to help you. Please contact SFS if you have any machining problems or questions about our products.

SFS CARBIDE TOOL

Service File Sharpening Co.
27300 Fullerton Avenue
Detroit, Michigan 48239
(313) 535-5550

