HIGH PERFORMANCE

END MILL PRODUCT LINE

SC TOOL CORP

MADE IN USA

CUT WITH PRECISION, PASSION, AND PRIDE

Engineering High Performance Solid Carbide Tools & Strong Relationships

Our relationship with our customers is one of the pillars of our business. Our customers find that we are very flexible and proactively respond to challenges while holding the tightest of industry tolerances. We are constantly improving our systems and services based on our customers' feedback. SCTool is looking to the future by constantly evolving our manufacturing techniques, research and development, technology, and communication.

Serving Diverse Industries

Our drills, end mills, reamers, and special carbide tooling products are currently producing the needed results in a multitude of applications across a broad range of industries.

- Aerospace
- Medical
- Automotive
- Custom Metal Working
- Energy
- Heavy Equipment
- Die & Mold

Engineering Capabilities

SCTool is an ISO 9001 certified company with over 100 years of combined experience within the carbide cutting tool industry. We have a fully staffed engineering team who is always willing and able to answer your technical questions and machining concerns.

TOOL LIFE
Cradle to Grave

Design & Engineering → Manufacturing → Technical Assistance at the Spindle → Reconditioning to Original Condition

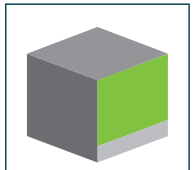
WHAT'S INSIDE

	Icon Guide	AX2 PG 7	AX3 PG 11	AX3 CB PG 15	AX3 NR PG 17	AX4 PG 19	SV4 PG 23	SV4NR PG 27	SV5 PG 29	SV5 CB PG 33	SV5 NR PG 35	SV6 PG 37	SV7 PG 41	SV7 CB PG 45	S2F PG 47	S4F PG 51	Epic Solutions	QwikMod Services	Technical Information
	PG 3																PG 53	PG 55	PG 57
Flutes		2	3	3	3	4	4	4	5	5	5	6	7	7	2	4			
Coating		SC-13	SC-13	SC-13	SC-13	SC-13	SC-3	SC-3	SC-3	SC-3	SC-3	SC-3	SC-3	SC-3					
Uncoated		✓	✓	✓	✓	✓									✓	✓			
Tool Series		AX2	AX3	AX3	AX3	AX4	SV4	SV4	SV5	SV5	SV5	SV6	SV7	SV7	S2F	S4F			
Neck Relieved					✓			✓			✓								
Corner Type																			
Square		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Corner Radius		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Ball		✓	✓				✓	✓				✓			✓	✓			
Materials																			
Steel							●	●	●	●	●	●	●	●	○	○			
Stainless Steel							●	●	●	●	●	●	●	●	○	○			
Cast Iron							○	○	○	○	○	○	○	○	○	○			
Hi-Temp Alloys							●	●	●	●	●	●	●	●	○	○			
Hardened Steel							○	○	○	○	○	○	○	○		○			
Alum< 10% Si		●	●	●	●	●									○				
Alum> or = 10% Si		○	○	○	○	○									○				
Copper/Brass		●	●	●	●	●									○				
Carbon/Graphite															○				
Plastic/Phenolic															○				

● Excellent Performance
○ Good Performance

ICON GUIDE

Types of Cut


Finishing

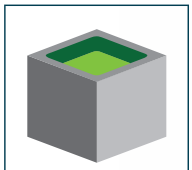
Slotting

Roughing

Ramping

Plunging

Profiling


Pocketing

Tool Specifications

Square End

Radius

Ball Nose

Center Cutting

Variable

Flutes

Shank

Neck Relieved

Chip Breakers

Cut Materials

ISO 513 Color Coding System

Ferrous Materials

- STEEL
- STAINLESS STEEL
- CAST IRON
- HI-TEMP ALLOYS
- HARDENED STEEL

Non-Ferrous Materials

- ALUM < 10% Si
- ALUM > or = 10% Si
- COPPER/BRASS

End Mill Coatings

- Uncoated
- SC-2
- SC-13
- SC-3

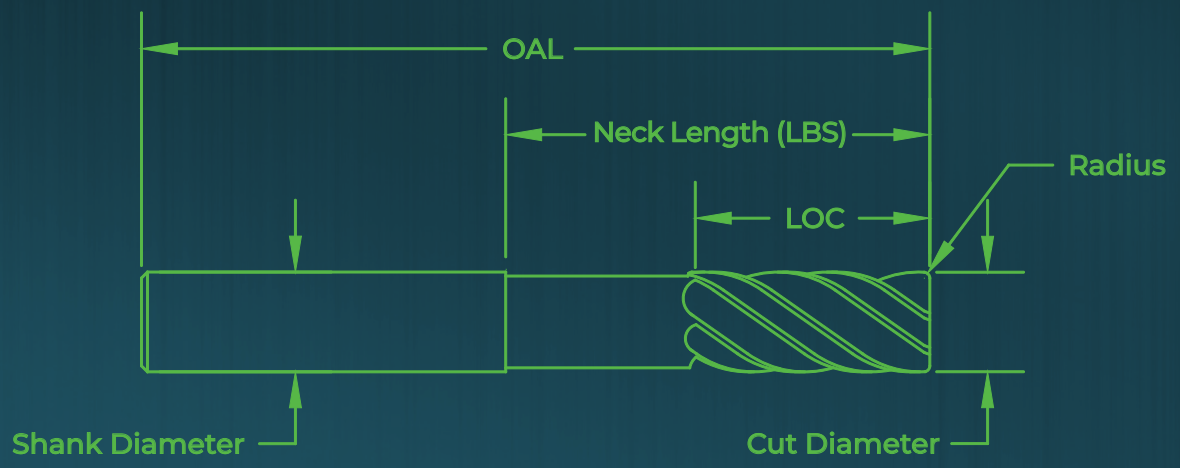
PVD Coatings

We offer the most advanced coatings available in the industry.

Coating Designation	SC-2	SC-3	SC-13
Coating Type	TiAlN	AlCrN	ZrN
Hardness	3365 HV	3671 HV	2600 HV
Coefficient of Friction	.3-.35	0.35	0.5
Thickness	4µm	4µm	2-4µm
Max Working Temp	900 C°	1100 C°	500 C°
Coating Color	Violet-Grey	Bright Grey	Pale Gold

EDP NUMBERS EXPLAINED

The easiest and most accurate way to order SCTool end mills is by referring to the EDP number listed on our product charts. Each unique EDP number inherently contains specific information concerning every individual tool and ensures that you receive the tool you are expecting.



Ex. SV60500-1024-06

Series #	Cutting Diameter		Length of Cut	Overall Length		Corner Radius	Features
SV6	**0500**	**-**	**10**	**24**	**-**	**06**	**N*****
Formula			x 1/8"(.125)	x 1/8"(.125)		x .005"	(LBS) x 1/8"(.125)
Example	0500 : .500"		10 x 1/8 = 1.250	24 x 1/8 = 3.00		06 x .005" = .030"	
Additional Options						S: Square Corner BN: Ball Nose	N**: Neck Length WF: Weldon Flat CB: Chip Breaker

FX2

AX2 END MILLS

Available Coated & Uncoated

The AX2 is an end mill solution for aluminum applications where balance and micro-geometries vastly improve your metal removal rates.

Our circular land reduces chatter and improves surface finishes on aluminum and other non-ferrous metals. Its double-rake flute design provides effective chip evacuation and improved feed rates.

Our AX2 series is designed for applications requiring high-speed machining of aluminum and other non-ferrous metals.

Superb in high-speed machining of aluminum

Excellent finishes

Stocked and ready to order in diameters of 1/4" to 1" including a variety of options: square end, corner radius, and ball nose

2 FLUTE

AX2 Series

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Uncoated								Coated
				Corner Option								SC-13
				Square	R.015	R.030	R.060	R.090	R.120	R.190	Ball Nose	
0.2500	0.2500	0.750	2.500	AX20250-0620-S	AX20250-0620-03	AX20250-0620-06	AX20250-0620-12	-	-	-	AX20250-0620-BN	-SC13
0.3125	0.3125	0.875	2.500	AX20313-0720-S	AX20313-0720-03	AX20313-0720-06	AX20313-0720-12	-	-	-	AX20313-0720-BN	-SC13
0.3750	0.3750	0.875	2.500	AX20375-0720-S	AX20375-0720-03	AX20375-0720-06	AX20375-0720-12	AX20375-0720-18	-	-	AX20375-0720-BN	-SC13
		1.250	3.000	AX20375-1024-S	AX20375-1024-03	AX20375-1024-06	AX20375-1024-12	AX20375-1024-18	-	-	-	-SC13
0.5000	0.5000	1.250	3.000	AX20500-1024-S	AX20500-1024-03	AX20500-1024-06	AX20500-1024-12	AX20500-1024-18	AX20500-1024-24	-	AX20500-1024-BN	-SC13
		2.000	4.000	AX20500-1632-S	AX20500-1632-03	AX20500-1632-06	AX20500-1632-12	AX20500-1632-18	AX20500-1632-24	-	-	-SC13
0.6250	0.6250	1.250	3.500	AX20625-1028-S	-	AX20625-1028-06	AX20625-1028-12	AX20625-1028-18	AX20625-1028-24	-	AX20625-1028-BN	-SC13
		2.125	4.000	AX20625-1732-S	-	AX20625-1732-06	AX20625-1732-12	AX20625-1732-18	AX20625-1732-24	-	-	-SC13
0.7500	0.7500	1.750	4.000	AX20750-1432-S	-	AX20750-1432-06	AX20750-1432-12	AX20750-1432-18	AX20750-1432-24	AX20750-1432-38	AX20750-1432-BN	-SC13
		2.250	5.000	AX20750-1840-S	-	AX20750-1840-06	AX20750-1840-12	AX20750-1840-18	AX20750-1840-24	AX20750-1840-38	-	-SC13
1.0000	1.0000	1.750	4.000	AX21000-1432-S	-	AX21000-1432-06	AX21000-1432-12	AX21000-1432-18	AX21000-1432-24	AX21000-1432-38	AX21000-1432-BN	-SC13
		2.500	5.000	AX21000-2040-S	-	AX21000-2040-06	AX21000-2040-12	AX21000-2040-18	AX21000-2040-24	AX21000-2040-38	-	-SC13

For coated option, add -SC13 to EPD (ex. AX21000-2040-38-SC13)

Cut Materials

ALUM < 10% Si

ALUM > or = 10% Si

COPPER/BRASS

Ramping

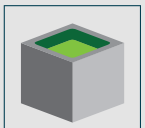
Profiling

Finishing

Roughing

Plunging

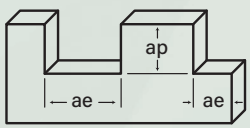
Slotting


Pocketing

AX2 Recommended Starting Speeds and Feeds

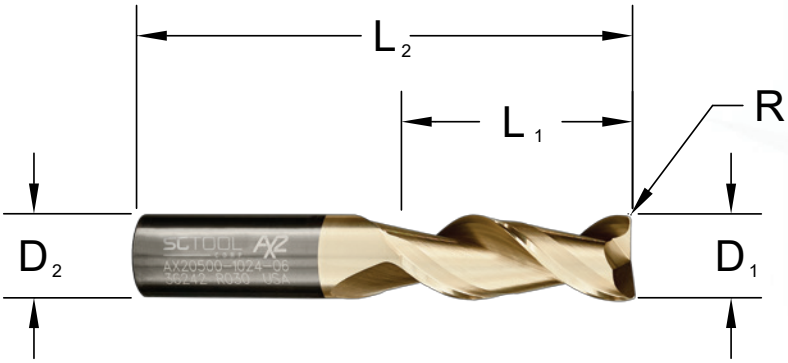
Material Group		Side Milling (A) and Slotting (B)			Uncoated		Feed per Tooth (IPT=inch/th) for side milling (A), for slotting (B) reduce IPT by 20%					
							D - Diameter					
		A		B	Speed (SFM)	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	ap		dec.	0.250	0.375	0.500	0.625	0.750	1.000
N	Aluminum (<10% Si)	Ap1 max	<0.5 x D	<1 x D	Up to 6000	IPT	0.0023	0.0033	0.0044	0.0055	0.0068	0.0081
N	Aluminum (> or= to 10% Si)	Ap1 max	<0.5 x D	<1 x D	Up to 5000	IPT	0.0019	0.0029	0.0039	0.0049	0.0059	0.0069
N	Copper / Brass	Ap1 max	<0.5 x D	<1 x D	Up to 3000	IPT	0.0019	0.0029	0.0039	0.0049	0.0059	0.0069

Side Milling (A) and Slotting (B)



2 FLUTE

Note:
- Ap1 max = Full length of cut of the tool
- For cutting aluminum with high silicon content, coating is recommended.
- For better surface finish, reduce feed per tooth.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.



SQ | RAD | BALL | CC | h6 | 2FL

Uncoated | SC-13

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .0006"

FX3

AX3 END MILLS

Available Coated & Uncoated

The AX3 is an end mill solution for aluminum applications where balance and micro-geometries vastly improve your metal removal rates.

Our circular land reduces chatter and improves surface finishes on aluminum and other non-ferrous metals. Its double-rake flute design provides effective chip evacuation and improved feed rates. The symmetrical end gashing greatly improves balance for high speed applications.

Our AX3 series is designed for applications requiring high-speed machining of aluminum and other non-ferrous metals where balance, high metal removal rates, and finish are essential.

Superb in high-speed machining of aluminum

Excellent finishes

Stocked and ready to order in diameters of 1/4" to 1" including a variety of options: square end, corner radius, ball nose, OD chipbreakers, and neck relieved

3 FLUTE

AX3 Series

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Uncoated								Coated
				Corner Option								SC-13
				Square	R.015	R.030	R.060	R.090	R.120	R.190	Ball Nose	
0.2500	0.2500	0.750	2.500	AX30250-0620-S	AX30250-0620-03	AX30250-0620-06	AX30250-0620-12	-	-	-	AX30250-0620-BN	-SC13
		1.250	3.000	AX30250-1024-S	AX30250-1024-03	AX30250-1024-06	AX30250-1024-12	-	-	-	-	-SC13
0.3125	0.3125	0.875	2.500	AX30313-0720-S	AX30313-0720-03	AX30313-0720-06	AX30313-0720-12	-	-	-	AX30313-0720-BN	-SC13
		1.250	3.000	AX30313-1024-S	AX30313-1024-03	AX30313-1024-06	AX30313-1024-12	-	-	-	-	-SC13
0.3750	0.3750	0.875	2.500	AX30375-0720-S	AX30375-0720-03	AX30375-0720-06	AX30375-0720-12	AX30375-0720-18	-	-	AX30375-0720-BN	-SC13
		1.250	3.000	AX30375-1024-S	AX30375-1024-03	AX30375-1024-06	AX30375-1024-12	AX30375-1024-18	AX30375-1024-24	-	-	-SC13
		1.750	3.500	AX30375-1428-S	AX30375-1428-03	AX30375-1428-06	AX30375-1428-12	AX30375-1428-18	-	-	-	-SC13
0.4375	0.4375	0.875	2.500	AX30438-0720-S	AX30438-0720-03	AX30438-0720-06	AX30438-0720-12	AX30438-0720-18	-	-	-	-SC13
		1.250	3.000	AX30438-1024-S	AX30438-1024-03	AX30438-1024-06	AX30438-1024-12	AX30438-1024-18	-	-	-	-SC13
0.5000	0.5000	1.000	3.000	AX30500-0824-S	AX30500-0824-03	AX30500-0824-06	AX30500-0824-12	AX30500-0824-18	AX30500-0824-24	-	-	-SC13
		1.250	3.000	AX30500-1024-S	AX30500-1024-03	AX30500-1024-06	AX30500-1024-12	AX30500-1024-18	AX30500-1024-24	-	AX30500-1024-BN	-SC13
		1.500	3.000	AX30500-1224-S	AX30500-1224-03	AX30500-1224-06	AX30500-1224-12	AX30500-1224-18	AX30500-1224-24	-	-	-SC13
		2.000	4.000	AX30500-1632-S	AX30500-1632-03	AX30500-1632-06	AX30500-1632-12	AX30500-1632-18	AX30500-1632-24		-	-SC13
		2.500	5.000	AX30500-2040-S	AX30500-2040-03	AX30500-2040-06	AX30500-2040-12	AX30500-2040-18	AX30500-2040-24	-	-	-SC13
0.6250	0.6250	1.250	3.500	AX30625-1028-S	-	AX30625-1028-06	AX30625-1028-12	AX30625-1028-18	AX30625-1028-24	-	AX30625-1028-BN	-SC13
		1.750	4.000	AX30625-1432-S	-	AX30625-1432-06	AX30625-1432-12	AX30625-1432-18	AX30625-1432-24	-	-	-SC13
		2.125	4.000	AX30625-1732-S	-	AX30625-1732-06	AX30625-1732-12	AX30625-1732-18	AX30625-1732-24	-	-	-SC13
0.7500	0.7500	1.250	4.000	AX30750-1032-S	-	AX30750-1032-06	AX30750-1032-12	AX30750-1032-18	AX30750-1032-24	AX30750-1032-38	-	-SC13
		1.750	4.000	AX30750-1432-S	-	AX30750-1432-06	AX30750-1432-12	AX30750-1432-18	AX30750-1432-24	AX30750-1432-38	AX30750-1432-BN	-SC13
		2.250	5.000	AX30750-1840-S	-	AX30750-1840-06	AX30750-1840-12	AX30750-1840-18	AX30750-1840-24	AX30750-1840-38	-	-SC13
1.0000	1.0000	1.500	4.000	AX31000-1232-S	-	AX31000-1232-06	AX31000-1232-12	AX31000-1232-18	AX31000-1232-24	AX31000-1232-38	-	-SC13
		2.000	4.000	AX31000-1632-S	-	AX31000-1632-06	AX31000-1632-12	AX31000-1632-18	AX31000-1632-24	AX31000-1632-38	AX31000-1632-BN	-SC13
		2.500	5.000	AX31000-2040-S	-	AX31000-2040-06	AX31000-2040-12	AX31000-2040-18	AX31000-2040-24	AX31000-2040-38	-	-SC13

For coated option, add -SC13 to EPD (ex. AX31000-2040-38-SC13)

Cut Materials

ALUM < 10% Si

ALUM > or = 10% Si

COPPER/BRASS

Ramping

Profiling

Finishing

Roughing

Plunging

Slotting

Pocketing

AX3 Recommended Starting Speeds and Feeds

Material Group		Side Milling (A) and Slotting (B)			Uncoated		Feed per Tooth (IPT=inch/th) for side milling (A), for slotting (B) reduce IPT by 20%					
							D - Diameter					
		A		B	Speed (SFM)	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	ap		dec.	0.250	0.375	0.500	0.625	0.750	1.000
N	Aluminum (<10% Si)	Ap1 max	<0.5 x D	<1 x D	Up to 6000	IPT	0.0023	0.0033	0.0044	0.0055	0.0068	0.0081
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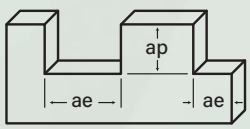
N	Copper / Brass	Ap1 max	<0.5 x D	<1 x D	Up to 3000	IPT	0.0019	0.0029	0.0039	0.0049	0.0059	0.0069

Side Milling (A) and Slotting (B)



3 FLUTE

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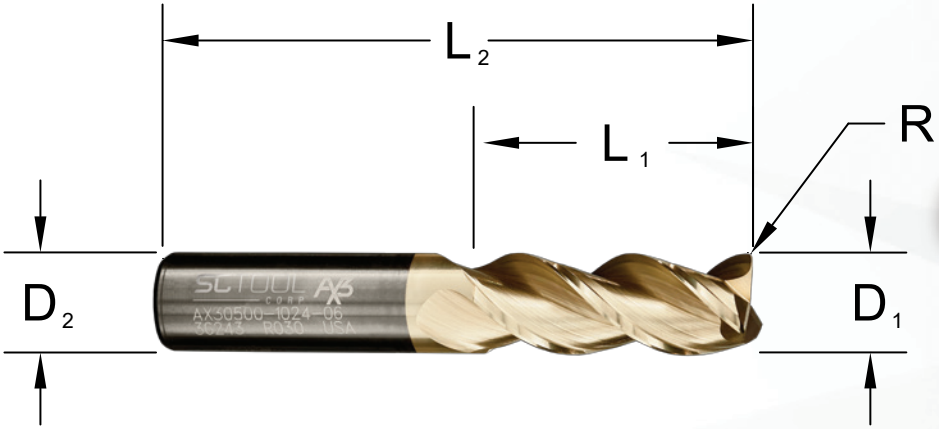


SQ | RAD | BALL | CC | h6 | 3FL

Uncoated | SC-13

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .0006"

3 FLUTE

AX3 Series with Chipbreakers

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Uncoated							Coated
				Corner Option							SC-13
				Square	R.015	R.030	R.060	R.090	R.120	R.190	
0.3750	0.3750	0.875	2.500	AX30375-0720-SCB	AX30375-0720-03CB	AX30375-0720-06CB	AX30375-0720-12CB	AX30375-0720-18CB	-	-	-SC13
		1.250	3.000	AX30375-1024-SCB	AX30375-1024-03CB	AX30375-1024-06CB	AX30375-1024-12CB	AX30375-1024-18CB	-	-	-SC13
0.5000	0.5000	1.000	3.000	AX30500-0824-SCB	AX30500-0824-03CB	AX30500-0824-06CB	AX30500-0824-12CB	AX30500-0824-18CB	AX30500-0824-24CB	-	-SC13
		1.250	3.000	AX30500-1024-SCB	AX30500-1024-03CB	AX30500-1024-06CB	AX30500-1024-12CB	AX30500-1024-18CB	AX30500-1024-24CB	-	-SC13
		1.500	3.000	AX30500-1224-SCB	AX30500-1224-03CB	AX30500-1224-06CB	AX30500-1224-12CB	AX30500-1224-18CB	AX30500-1224-24CB	-	-SC13
		2.500	5.000	AX30500-2040-SCB	AX30500-2040-03CB	AX30500-2040-06CB	AX30500-2040-12CB	AX30500-2040-18CB	AX30500-2040-24CB	-	-SC13
0.6250	0.6250	1.250	3.500	AX30625-1028-SCB	-	AX30625-1028-06CB	AX30625-1028-12CB	AX30625-1028-18CB	AX30625-1028-24CB	-	-SC13
		1.750	4.000	AX30625-1432-SCB	-	AX30625-1432-06CB	AX30625-1432-12CB	AX30625-1432-18CB	AX30625-1432-24CB	-	-SC13
		2.125	4.000	AX30625-1732-SCB	-	AX30625-1732-06CB	AX30625-1732-12CB	AX30625-1732-18CB	AX30625-1732-24CB	-	-SC13
0.7500	0.7500	1.250	4.000	AX30750-1032-SCB	-	AX30750-1032-06CB	AX30750-1032-12CB	AX30750-1032-18CB	AX30750-1032-24CB	AX30750-1032-38CB	-SC13
		1.750	4.000	AX30750-1432-SCB	-	AX30750-1432-06CB	AX30750-1432-12CB	AX30750-1432-18CB	AX30750-1432-24CB	AX30750-1432-38CB	-SC13
		2.250	5.000	AX30750-1840-SCB	-	AX30750-1840-06CB	AX30750-1840-12CB	AX30750-1840-18CB	AX30750-1840-24CB	AX30750-1840-38CB	-SC13
1.0000	1.0000	1.500	4.000	AX31000-1232-SCB	-	AX31000-1232-06CB	AX31000-1232-12CB	AX31000-1232-18CB	AX31000-1232-24CB	AX31000-1232-38CB	-SC13
		2.000	4.000	AX31000-1632-SCB	-	AX31000-1632-06CB	AX31000-1632-12CB	AX31000-1632-18CB	AX31000-1632-24CB	AX31000-1632-38CB	-SC13
		2.500	5.000	AX31000-2040-SCB	-	AX31000-2040-06CB	AX31000-2040-12CB	AX31000-2040-18CB	AX31000-2040-24CB	AX31000-2040-38CB	-SC13

For coated option, add -SC13 to EPD (ex. AX31000-2040-18CB-SC13)

Cut Materials

ALUM < 10% Si

ALUM > or = 10% Si

COPPER/BRASS

Ramping

Profiling

Finishing

Roughing

Plunging

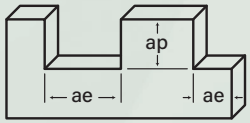
Slotting

Pocketing

AX3CB Recommended Starting Speeds and Feeds

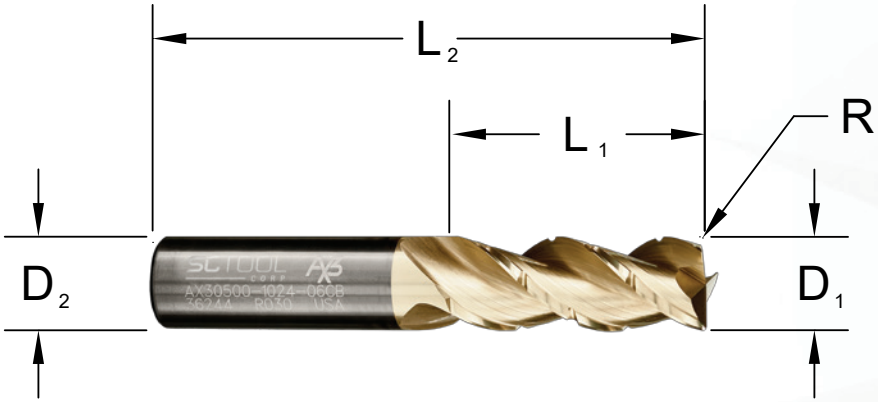
Material Group		Side Milling (A) and Slotting (B)			Uncoated		Feed per Tooth (IPT=inch/th) for side milling (A), for slotting (B) reduce IPT by 20%					
							D - Diameter					
		A		B	Speed (SFM)	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	ap		dec.	0.250	0.375	0.500	0.625	0.750	1.000
N	Aluminum (<10% Si)	Ap1 max	<0.5 x D	<1 x D	Up to 6000	IPT	0.0023	0.0033	0.0044	0.0055	0.0068	0.0081
N	Aluminum (> or= to 10% Si)	Ap1 max	<0.5 x D	<1 x D	Up to 5000	IPT	0.0019	0.0029	0.0039	0.0049	0.0059	0.0069
N	Copper / Brass	Ap1 max	<0.5 x D	<1 x D	Up to 3000	IPT	0.0019	0.0029	0.0039	0.0049	0.0059	0.0069

Side Milling (A) and Slotting (B)



3 FLUTE

Note:
- Ap1 max = Full length of cut of the tool
- For cutting aluminum with high silicon content, coating is recommended.
- For better surface finish, reduce feed per tooth.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.



SQ | RAD | CC | h6 | 3FL

Uncoated | SC-13

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .0006"

3 FLUTE

AX3 Series Neck Relieved

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	LBS	Uncoated Corner Option Square	R.015	R.030	R.060	R.090	R.120	R.190	Coated SC-13
0.2500	0.2500	0.375	3.000	0.875	AX30250-0324-SN07	AX30250-0324-03N07	AX30250-0324-06N07	AX30250-0324-12N07	-	-	-	-SC13
		0.375	3.500	1.500	AX30250-0328-SN12	AX30250-0328-03N12	AX30250-0328-06N12	AX30250-0328-12N12	-	-	-	-SC13
0.3750	0.3750	0.500	3.000	1.125	AX30375-0424-SN09	AX30375-0424-03N09	AX30375-0424-06N09	AX30375-0424-12N09	AX30375-0424-18N09	-	-	-SC13
		0.500	4.000	2.125	AX30375-0432-SN17	AX30375-0432-03N17	AX30375-0432-06N17	AX30375-0432-12N17	AX30375-0432-18N17	-	-	-SC13
0.5000	0.5000	0.625	4.000	1.375	AX30500-0532-SN11	AX30500-0532-03N11	AX30500-0532-06N11	AX30500-0532-12N11	AX30500-0532-18N11	AX30500-0532-24N11	-	-SC13
		0.625	5.000	2.375	AX30500-0540-SN19	AX30500-0540-03N19	AX30500-0540-06N19	AX30500-0540-12N19	AX30500-0540-18N19	AX30500-0540-24N19	-	-SC13
		0.625	6.000	3.375	AX30500-0548-SN27	AX30500-0548-03N27	AX30500-0548-06N27	AX30500-0548-12N27	AX30500-0548-18N27	AX30500-0548-24N27	-	-SC13
0.6250	0.6250	0.750	4.000	1.625	AX30625-0632-SN13	-	AX30625-0632-06N13	AX30625-0632-12N13	AX30625-0632-18N13	AX30625-0632-24N13	-	-SC13
		0.750	5.000	2.375	AX30625-0640-SN19	-	AX30625-0640-06N19	AX30625-0640-12N19	AX30625-0640-18N19	AX30625-0640-24N19	-	-SC13
		0.750	6.000	3.375	AX30625-0648-SN27	-	AX30625-0648-06N27	AX30625-0648-12N27	AX30625-0648-18N27	AX30625-0648-24N27	-	-SC13
0.7500	0.7500	1.000	5.000	1.750	AX30750-0840-SN14	-	AX30750-0840-06N14	AX30750-0840-12N14	AX30750-0840-18N14	AX30750-0840-24N14	AX30750-0840-38N14	-SC13
		1.000	6.000	2.625	AX30750-0848-SN21	-	AX30750-0848-06N21	AX30750-0848-12N21	AX30750-0848-18N21	AX30750-0848-24N21	AX30750-0848-38N21	-SC13
		1.000	6.000	3.375	AX30750-0848-SN27	-	AX30750-0848-06N27	AX30750-0848-12N27	AX30750-0848-18N27	AX30750-0848-24N27	AX30750-0848-38N27	-SC13
1.0000	1.0000	1.125	6.000	2.250	AX31000-0948-SN18	-	AX31000-0948-06N18	AX31000-0948-12N18	AX31000-0948-18N18	AX31000-0948-24N18	AX31000-0948-38N18	-SC13
		1.125	6.000	3.250	AX31000-0948-SN26	-	AX31000-0948-06N26	AX31000-0948-12N26	AX31000-0948-18N26	AX31000-0948-24N26	AX31000-0948-38N26	-SC13
		1.125	7.000	4.250	AX31000-0956-SN34	-	AX31000-0956-06N34	AX31000-0956-12N34	AX31000-0956-18N34	AX31000-0956-24N34	AX31000-0956-38N34	-SC13

For coated option, add -SC13 to EPD (ex. AX31000-0956-12N34-SC13)

Cut Materials

ALUM < 10% Si

ALUM > or = 10% Si

COPPER/BRASS

Ramping

Profiling

Finishing

Roughing

Plunging

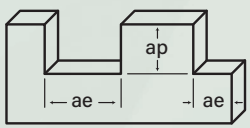
Slotting

Pocketing

AX3NR Recommended Starting Speeds and Feeds

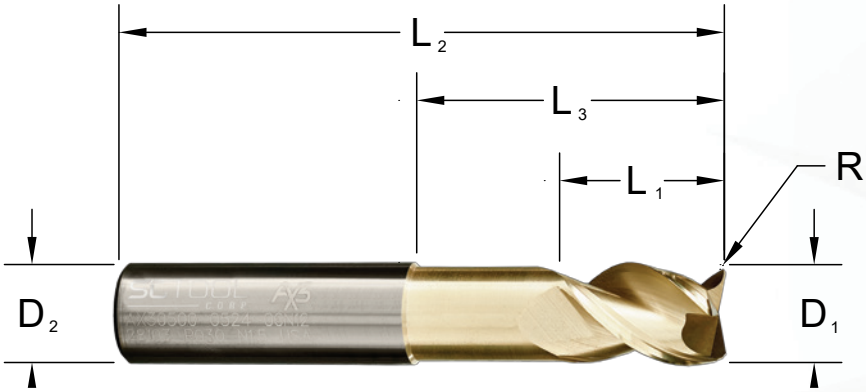
Material Group		Side Milling (A) and Slotting (B)			Uncoated		Feed per Tooth (IPT=inch/th) for side milling (A), for slotting (B) reduce IPT by 20%					
							D - Diameter					
		A		B	Speed (SFM)	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	ap		dec.	0.250	0.375	0.500	0.625	0.750	1.000
N	Aluminum (<10% Si)	Ap1 max	<0.5 x D	<1 x D	Up to 6000	IPT	0.0018	0.0026	0.0035	0.0044	0.0054	0.0065
N	Aluminum (> or= to 10% Si)	Ap1 max	<0.5 x D	<1 x D	Up to 5000	IPT	0.0015	0.0023	0.0031	0.0039	0.0047	0.0055
N	Copper / Brass	Ap1 max	<0.5 x D	<1 x D	Up to 3000	IPT	0.0015	0.0023	0.0031	0.0039	0.0047	0.0055

Side Milling (A) and Slotting (B)



3 FLUTE

Note:
- Ap1 max = Full length of cut of the tool
- For cutting aluminum with high silicon content, coating is recommended.
- For better surface finish, reduce feed per tooth.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.



NR SQ RAD CC h6 3FL

Uncoated SC-13

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .0006"

FX4

AX4 END MILLS

Available Coated & Uncoated

The AX4 is an end mill solution for aluminum applications where balance and micro-geometries vastly improve your metal removal rates.

Our circular land reduces chatter and improves surface finishes on aluminum and other non-ferrous metals. Its double-rake flute design provides effective chip evacuation and improved feed rates. The 4-flute design provides the maximum for metal removal rates in aluminum.

Our AX4 series is designed for applications requiring high metal removal rates of aluminum and other non-ferrous metals where finish is essential.

Superb in high-speed machining of aluminum

Excellent finishes

Stocked and ready to order in diameters of 1/2", 5/8" and ¾" with square end or corner radius options

4FLUTE

AX4 Series

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Uncoated					Coated
				Corner Option					SC-13
				Square	R.030	R.060	R.090	R.120	
0.5000	0.5000	1.250	3.000	AX40500-1024-S	AX40500-1024-06	AX40500-1024-12	AX40500-1024-18	AX40500-1024-24	-SC13
		2.000	4.000	AX40500-1632-S	AX40500-1632-06	AX40500-1632-12	AX40500-1632-18	AX40500-1632-24	-SC13
		2.500	5.000	AX40500-2040-S	AX40500-2040-06	AX40500-2040-12	AX40500-2040-18	AX40500-2040-24	-SC13
0.6250	0.6250	1.750	4.000	AX40625-1432-S	AX40625-1432-06	AX40625-1432-12	AX40625-1432-18	AX40625-1432-24	-SC13
		2.125	4.000	AX40625-1732-S	AX40625-1732-06	AX40625-1732-12	AX40625-1732-18	AX40625-1732-24	-SC13
0.7500	0.7500	1.750	4.000	AX40750-1432-S	AX40750-1432-06	AX40750-1432-12	AX40750-1432-18	AX40750-1432-24	-SC13
		2.250	5.000	AX40750-1840-S	AX40750-1840-06	AX40750-1840-12	AX40750-1840-18	AX40750-1840-24	-SC13

For coated option, add -SC13 to EPD (ex. AX40625-1732-18-SC13)

Cut Materials

ALUM < 10% Si

ALUM > or = 10% Si

COPPER/BRASS

Ramping

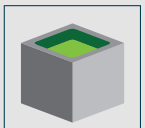
Profiling

Finishing

Roughing

Plunging

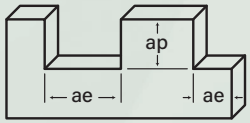
Slotting


Pocketing

AX4 Recommended Starting Speeds and Feeds

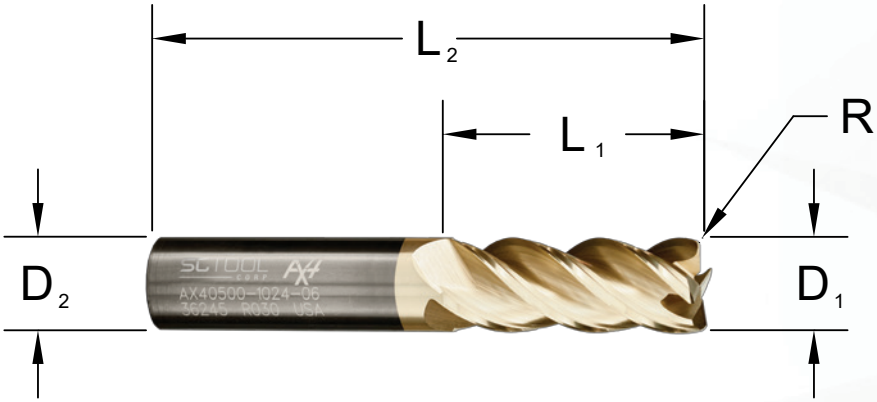
Material Group		Side Milling (A) and Slotting (B)			Uncoated		Feed per Tooth (IPT=inch/th) for side milling (A), for slotting (B) reduce IPT by 20%					
							D - Diameter					
		A		B	Speed (SFM)	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	ap		dec.	0.250	0.375	0.500	0.625	0.750	1.000
N	Aluminum (<10% Si)	Ap1 max	<0.5 x D	<1 x D	Up to 6000	IPT	0.0023	0.0033	0.0044	0.0055	0.0068	0.0081
N	Aluminum (> or= to 10% Si)	Ap1 max	<0.5 x D	<1 x D	Up to 5000	IPT	0.0019	0.0029	0.0039	0.0049	0.0059	0.0069
N	Copper / Brass	Ap1 max	<0.5 x D	<1 x D	Up to 3000	IPT	0.0019	0.0029	0.0039	0.0049	0.0059	0.0069

Side Milling (A) and Slotting (B)



4FLUTE

Note:
- Ap1 max = Full length of cut of the tool
- For cutting aluminum with high silicon content, coating is recommended.
- For better surface finish, reduce feed per tooth.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.



SQ | RAD | CC | h6 | 4FL

Uncoated | SC-13

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .0006"

SV4 END MILLS

Super-Variable Flute Design Featuring Varying Helix Angles and Indexing

- Optimizes performance
- Maximizes stock removal
- Reduces chatter
- Increases tool life
- Improves productivity

Our SV4 end mills are manufactured with certified, premium, sub-micron grain carbide and they feature a super-variable flute design to increase metal removal rates and reduce chatter.

The SV4 can be run at aggressive rates while tackling heavy milling tasks like roughing and slotting.

Excels in a wide range of aggressive machining applications in all materials including stainless, Inconel, titanium, tool steels, and hardened materials

Stocked and ready to order in diameters of 1/8" to 1" including a variety of options: square end, corner radius, ball nose, and neck relieved – all with SC-3 coating

4FLUTE

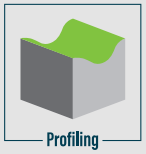
SV4 Series

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Corner Option								
				Square	R.015	R.030	R.060	R.090	R.120	R.190	R.250	Ball Nose
0.1250	0.1250	0.250	1.500	SV40125-0212-S	SV40125-0212-03	SV40125-0212-06	-	-	-	-	-	-
		0.500	1.500	SV40125-0412-S	SV40125-0412-03	SV40125-0412-06	-	-	-	-	-	SV40125-0412-BN
		0.625	1.500	SV40125-0512-S	SV40125-0512-03	-						
0.1875	0.1875	0.375	2.000	SV40188-0316-S	SV40188-0316-03	SV40188-0316-06	-	-	-	-	-	-
		0.625	2.000	SV40188-0516-S	SV40188-0516-03	SV40188-0516-06	-	-	-	-	-	SV40188-0516-BN
0.2500	0.2500	0.625	2.000	SV40250-0516-S	SV40250-0516-03	SV40250-0516-06	SV40250-0516-12	-	-	-	-	-
		0.750	2.500	SV40250-0620-S	SV40250-0620-03	SV40250-0620-06	SV40250-0620-12	-	-	-	-	SV40250-0620-BN
		1.250	3.000	SV40250-1024-S	SV40250-1024-03	SV40250-1024-06	SV40250-1024-12	-	-	-	-	-
0.3125	0.3125	0.625	2.000	SV40313-0516-S	SV40313-0516-03	SV40313-0516-06	SV40313-0516-12	-	-	-	-	-
		0.875	2.500	SV40313-0720-S	SV40313-0720-03	SV40313-0720-06	SV40313-0720-12	-	-	-	-	SV40313-0720-BN
		1.250	3.000	SV40313-1024-S	SV40313-1024-03	SV40313-1024-06	SV40313-1024-12	-	-	-	-	-
0.3750	0.3750	0.875	2.500	SV40375-0720-S	SV40375-0720-03	SV40375-0720-06	SV40375-0720-12	SV40375-0720-18	SV40375-0720-24	-	-	SV40375-0720-BN
		1.250	3.000	SV40375-1024-S	SV40375-1024-03	SV40375-1024-06	SV40375-1024-12	SV40375-1024-18	SV40375-1024-24	-	-	-
		1.750	3.500	SV40375-1428-S	SV40375-1428-03	SV40375-1428-06	SV40375-1428-12	SV40375-1428-18	-	-	-	-
0.4375	0.4375	0.875	2.500	SV40438-0720-S	SV40438-0720-03	SV40438-0720-06	SV40438-0720-12	SV40438-0720-18	-	-	-	-
		1.250	3.000	SV40438-1024-S	SV40438-1024-03	SV40438-1024-06	SV40438-1024-12	SV40438-1024-18	-	-	-	SV40438-1024-BN
0.5000	0.5000	0.625	2.500	SV40500-0520-S	SV40500-0520-03	SV40500-0520-06	SV40500-0520-12	SV40500-0520-18	SV40500-0520-24	-	-	-
		1.000	3.000	SV40500-0824-S	SV40500-0824-03	SV40500-0824-06	SV40500-0824-12	SV40500-0824-18	SV40500-0824-24	-	-	-
		1.250	3.000	SV40500-1024-S	SV40500-1024-03	SV40500-1024-06	SV40500-1024-12	SV40500-1024-18	SV40500-1024-24	-	-	SV40500-1024-BN
		1.375	3.000	SV40500-1124-S	SV40500-1124-03	SV40500-1124-06	SV40500-1124-12	SV40500-1124-18	SV40500-1124-24	-	-	-
		2.000	4.000	SV40500-1632-S	SV40500-1632-03	SV40500-1632-06	SV40500-1632-12	SV40500-1632-18	SV40500-1632-24	-	-	-
0.6250	0.6250	1.250	3.500	SV40625-1028-S	-	SV40625-1028-06	SV40625-1028-12	SV40625-1028-18	SV40625-1028-24	-	-	SV40625-1028-BN
		1.750	4.000	SV40625-1432-S	-	SV40625-1432-06	SV40625-1432-12	SV40625-1432-18	SV40625-1432-24	-	-	-
		2.125	4.000	SV40625-1732-S	-	SV40625-1732-06	SV40625-1732-12	SV40625-1732-18	SV40625-1732-24	-	-	-
0.7500	0.7500	1.250	4.000	SV40750-1032-S	-	SV40750-1032-06	SV40750-1032-12	SV40750-1032-18	SV40750-1032-24	SV40750-1032-38	SV40750-1032-50	-
		1.750	4.000	SV40750-1432-S	-	SV40750-1432-06	SV40750-1432-12	SV40750-1432-18	SV40750-1432-24	SV40750-1432-38	SV40750-1432-50	SV40750-1432-BN
		2.250	5.000	SV40750-1840-S	-	SV40750-1840-06	SV40750-1840-12	SV40750-1840-18	SV40750-1840-24	SV40750-1840-38	SV40750-1840-50	-
1.0000	1.0000	1.500	4.000	SV41000-1232-S	-	SV41000-1232-06	SV41000-1232-12	SV41000-1232-18	SV41000-1232-24	SV41000-1232-38	SV41000-1232-50	SV41000-1232-BN
		2.250	5.000	SV41000-1840-S	-	SV41000-1840-06	SV41000-1840-12	SV41000-1840-18	SV41000-1840-24	SV41000-1840-38	SV41000-1840-50	-
		3.000	6.000	SV41000-2448-S	-	SV41000-2448-06	SV41000-2448-12	SV41000-2448-18	SV41000-2448-24	SV41000-2448-38	SV41000-2448-50	-

Cut Materials

STEEL | STAINLESS STEEL | CAST IRON | HI-TEMP ALLOYS | HARDENED STEEL

Ramping


Profiling

Finishing

Roughing

Plunging

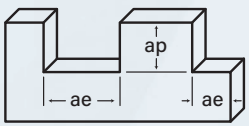
Slotting

Pocketing

SV4 Recommended Starting Speeds and Feeds

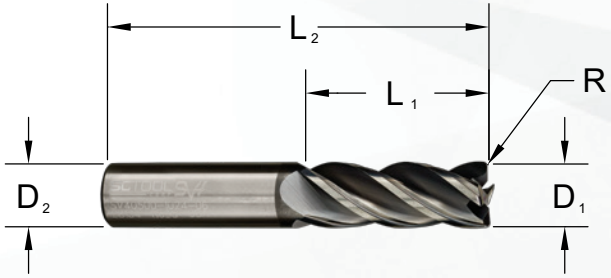
	Material Group	Side Milling (A) and Slotting (B)			Speed			Effective Feed per Tooth (IPT=inch/th) for side milling (A) (Use Chip Thinning Calculations to correct for stepover), for slotting (B) reduce IPT by 20%					
								D - Diameter					
		A		B	A	B	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	ap	(SFM)	(SFM)	dec.	0.250	0.375	0.500	0.625	0.750	1.000
P	Unalloyed Steel (AISI 1000, 1100, 1200, 1500 Series)	Ap1 max	<0.5 x D	<1 x D	500	200	IPT	0.0011	0.0018	0.0031	0.0035	0.0042	0.0049
P	Low-alloy Steel (AISI 3000, 4000, 5000, 6000, 8000, 9000 Series)	Ap1 max	<0.5 x D	<1 x D	400	200	IPT	0.0011	0.0018	0.0031	0.0035	0.0042	0.0049
P	High-alloy Steel/Tool Steel (SAE Classes A, D, H, O, S, M, T)	Ap1 max	<0.5 x D	<0.75 x D	350	175	IPT	0.001	0.002	0.0026	0.0029	0.0034	0.0038
M	Austenitic (AISI 200 & 300 Series)	Ap1 max	<0.5 x D	<1 x D	300	150	IPT	0.0015	0.0019	0.0022	0.0026	0.0031	0.0034
M	Marensitic (AISI 400 & 500 Series)	Ap1 max	<0.5 x D	<1 x D	350	175	IPT	0.0016	0.002	0.0023	0.0028	0.0033	0.0036
M	Precipitation (PH 15-7 Mo, 15-5 PH, 17-7 PH)	Ap1 max	<0.5 x D	<1 x D	300	150	IPT	0.001	0.0021	0.0027	0.0032	0.0036	0.004
K	Gray Iron GG	Ap1 max	<0.5 x D	<1 x D	450	200	IPT	0.0017	0.0025	0.003	0.0035	0.0041	0.0048
K	Nodular Iron GGG	Ap1 max	<0.5 x D	<1 x D	500	200	IPT	0.0017	0.0025	0.003	0.0035	0.0041	0.0048
K	Malleable Iron GTS/GTW	Ap1 max	<0.5 x D	<1 x D	400	200	IPT	0.0017	0.0025	0.003	0.0035	0.0041	0.0048
S	HRSA Iron-Based (Incoloy 800/909, A286)	Ap1 max	<0.5 x D	N/A	100	N/A	IPT	0.0007	0.001	0.0015	0.0019	0.0025	0.0033
S	HRSA Cobalt-Based (Stelite, Haynes 21/25/188)	Ap1 max	<0.5 x D	N/A	80	N/A	IPT	0.0007	0.001	0.0015	0.0019	0.0025	0.0033
S	HRSA Nickel-Based (Inconel 601/617/625/700/706/718, Hastelloy, Monel, Nimonic, Rene, Udimet, Waspaloy)	Ap1 max	<0.5 x D	<0.3 x D	120	50	IPT	0.0007	0.001	0.0015	0.0019	0.0025	0.0033
S	Titanium (Pure, ASTM 1/2/3, Ti6AL-4V, Ti6Al-2Sn-4Zr-2Mo-SI)	Ap1 max	<0.5 x D	N/A	300	N/A	IPT	0.0008	0.0011	0.0023	0.0026	0.0031	0.0035
H	Hardened Steels and Cast Irons (42-48HRc)	Ap1 max	<0.16 x D	N/A	180	N/A	IPT	0.0008	0.0012	0.0017	0.002	0.0022	0.0025

Side Milling (A) and Slotting (B)



4FLUTE

Note:
- Ap1 max = Full length of cut of the tool
- Lower cutting speed value is recommended for high stock removal applications or higher hardness within group.
- Higher cutting speed value is recommended for finishing applications or lower hardness within group.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.



SQ RAD BALL CC VAR h6 4FL | SC-3

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .002"

4FLUTE

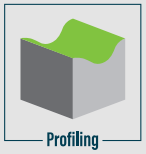
SV4 Series Neck Relieved

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	LBS	Corner Option							
					Square	R.015	R.030	R.060	R.090	R.120	R.190	R.250
0.2500	0.2500	0.375	3.000	0.875	SV40250-0324-SN07	SV40250-0324-03N07	SV40250-0324-06N07	SV40250-0324-12N07	-	-	-	-
		0.375	3.500	1.500	SV40250-0328-SN12	SV40250-0328-03N12	SV40250-0328-06N12	SV40250-0328-12N12	-	-	-	-
0.3750	0.3750	0.500	3.000	1.125	SV40375-0424-SN09	SV40375-0424-03N09	SV40375-0424-06N09	SV40375-0424-12N09	SV40375-0424-18N09	-	-	-
		0.500	4.000	2.125	SV40375-0432-SN17	SV40375-0432-03N17	SV40375-0432-06N17	SV40375-0432-12N17	SV40375-0432-18N17	-	-	-
0.5000	0.5000	0.625	4.000	1.375	SV40500-0532-SN11	SV40500-0532-03N11	SV40500-0532-06N11	SV40500-0532-12N11	SV40500-0532-18N11	SV40500-0532-24N11	-	-
		0.625	5.000	2.375	SV40500-0540-SN19	SV40500-0540-03N19	SV40500-0540-06N19	SV40500-0540-12N19	SV40500-0540-18N19	SV40500-0540-24N19	-	-
		0.625	6.000	3.375	SV40500-0548-SN27	SV40500-0548-03N27	SV40500-0548-06N27	SV40500-0548-12N27	SV40500-0548-18N27	SV40500-0548-24N27	-	-
0.6250	0.6250	0.750	4.000	1.625	SV40625-0632-SN13	-	SV40625-0632-06N13	SV40625-0632-12N13	SV40625-0632-18N13	SV40625-0632-24N13	-	-
		0.750	5.000	2.375	SV40625-0640-SN19	-	SV40625-0640-06N19	SV40625-0640-12N19	SV40625-0640-18N19	SV40625-0640-24N19	-	-
		0.750	6.000	3.375	SV40625-0648-SN27	-	SV40625-0648-06N27	SV40625-0648-12N27	SV40625-0648-18N27	SV40625-0648-24N27	-	-
0.7500	0.7500	1.000	5.000	1.750	SV40750-0840-SN14	-	SV40750-0840-06N14	SV40750-0840-12N14	SV40750-0840-18N14	SV40750-0840-24N14	SV40750-0840-38N14	SV40750-0840-50N14
		1.000	6.000	2.625	SV40750-0848-SN21	-	SV40750-0848-06N21	SV40750-0848-12N21	SV40750-0848-18N21	SV40750-0848-24N21	SV40750-0848-38N21	SV40750-0848-50N21
		1.000	6.000	3.375	SV40750-0848-SN27	-	SV40750-0848-06N27	SV40750-0848-12N27	SV40750-0848-18N27	SV40750-0848-24N27	SV40750-0848-38N27	SV40750-0848-50N27
1.0000	1.0000	1.125	6.000	2.250	SV41000-0948-SN18	-	SV41000-0948-06N18	SV41000-0948-12N18	SV41000-0948-18N18	SV41000-0948-24N18	SV41000-0948-38N18	SV41000-0948-50N18
		1.125	6.000	3.250	SV41000-0948-SN26	-	SV41000-0948-06N26	SV41000-0948-12N26	SV41000-0948-18N26	SV41000-0948-24N26	SV41000-0948-38N26	SV41000-0948-50N26
		1.125	7.000	4.250	SV41000-0956-SN34	-	SV41000-0956-06N34	SV41000-0956-12N34	SV41000-0956-18N34	SV41000-0956-24N34	SV41000-0956-38N34	SV41000-0956-50N34

Cut Materials

STEEL | STAINLESS STEEL | CAST IRON | HI-TEMP ALLOYS | HARDENED STEEL

Ramping


Profiling

Finishing

Roughing

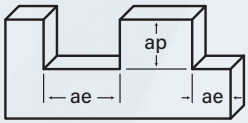
Slotting

Pocketing

SV4NR Recommended Starting Speeds and Feeds

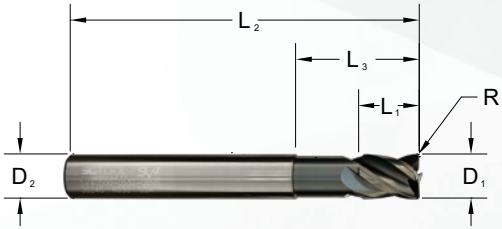
	Material Group	Side Milling (A) and Slotting (B)			Speed			Effective Feed per Tooth (IPT=inch/th) for side milling (A) (Use Chip Thinning Calculations to correct for stepover), for slotting (B) reduce IPT by 20%					
								D - Diameter					
		A		B	A	B	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	ap	(SFM)	(SFM)	dec.	0.250	0.375	0.500	0.625	0.750	1.000
P	Unalloyed Steel (AISI 1000, 1100, 1200, 1500 Series)	Ap1 max	<0.5 x D	<1 x D	500	200	IPT	0.0009	0.0014	0.0025	0.0028	0.0034	0.0039
P	Low-alloy Steel (AISI 3000, 4000, 5000, 6000, 8000, 9000 Series)	Ap1 max	<0.5 x D	<1 x D	400	200	IPT	0.0009	0.0014	0.0025	0.0028	0.0034	0.0039
P	High-alloy Steel/Tool Steel (SAE Classes A, D, H, O, S, M, T)	Ap1 max	<0.5 x D	<0.75 x D	350	175	IPT	0.0008	0.0016	0.0021	0.0023	0.0027	0.0030
M	Austenitic (AISI 200 & 300 Series)	Ap1 max	<0.5 x D	<1 x D	300	150	IPT	0.0012	0.0015	0.0018	0.0021	0.0025	0.0027
M	Marensitic (AISI 400 & 500 Series)	Ap1 max	<0.5 x D	<1 x D	350	175	IPT	0.0013	0.0016	0.0018	0.0022	0.0026	0.0029
M	Precipitation (PH 15-7 Mo, 15-5 PH, 17-7 PH)	Ap1 max	<0.5 x D	<1 x D	300	150	IPT	0.0008	0.0017	0.0022	0.0026	0.0029	0.0032
K	Gray Iron GG	Ap1 max	<0.5 x D	<1 x D	450	200	IPT	0.0014	0.0020	0.0024	0.0028	0.0033	0.0038
K	Nodular Iron GGG	Ap1 max	<0.5 x D	<1 x D	500	200	IPT	0.0014	0.0020	0.0024	0.0028	0.0033	0.0038
K	Malleable Iron GTS/GTW	Ap1 max	<0.5 x D	<1 x D	400	200	IPT	0.0014	0.0020	0.0024	0.0028	0.0033	0.0038
S	HRSA Iron-Based (Incoloy 800/909, A286)	Ap1 max	<0.5 x D	N/A	100	N/A	IPT	0.0006	0.0008	0.0012	0.0015	0.0020	0.0026
S	HRSA Cobalt-Based (Stelite, Haynes 21/25/188)	Ap1 max	<0.5 x D	N/A	80	N/A	IPT	0.0006	0.0008	0.0012	0.0015	0.0020	0.0026
S	HRSA Nickel-Based (Inconel 601/617/625/700/706/718, Hastelloy, Monel, Nimonic, Rene, Udimet, Waspaloy)	Ap1 max	<0.5 x D	<0.3 x D	120	50	IPT	0.0006	0.0008	0.0012	0.0015	0.0020	0.0026
S	Titanium (Pure, ASTM 1/2/3, Ti6AL-4V, Ti6Al-2Sn-4Zr-2Mo-SI)	Ap1 max	<0.5 x D	N/A	300	N/A	IPT	0.0006	0.0009	0.0018	0.0021	0.0025	0.0028
H	Hardened Steels and Cast Irons (42-48HRc)	Ap1 max	<0.16 x D	N/A	180	N/A	IPT	0.0006	0.0010	0.0014	0.0016	0.0018	0.0020

Side Milling (A) and Slotting (B)



4FLUTE

Note:
- Ap1 max = Full length of cut of the tool
- Lower cutting speed value is recommended for high stock removal applications or higher hardness within group.
- Higher cutting speed value is recommended for finishing applications or lower hardness within group.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.



NR SQ RAD CC VAR h6 4FL

SC-3

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .002"

SV5 END MILLS

Super-Variable Flute Design Featuring Varying Helix Angles and Indexing

- Optimizes performance
- Maximizes stock removal
- Reduces chatter
- Increases tool life
- Improves productivity

Our SV5 end mills are manufactured with certified, premium, sub-micron grain carbide and they feature a super-variable flute design to increase metal removal rates, enhance finishes, and eliminate chatter.

The SV5 can be run at higher production rates and still produce an exceptional finish while tackling heavy milling tasks like roughing and slotting.

Excels in a wide range of roughing and finishing applications such as helical interpolation, ramping, peel, high speed, dynamic, trochoidal, and peripheral milling

Stocked and ready to order in diameters of 1/8" to 1" including a variety of options: square corner, corner radius, OD chipbreakers, and neck relieved - all with SC-3 coating

SV5 Series

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Corner Option							
				Square	R.015	R.030	R.060	R.090	R.120	R.190	R.250
0.1250	0.1250	0.250	1.500	SV50125-0212-S	SV50125-0212-03	SV50125-0212-06	-	-	-	-	-
		0.500	1.500	SV50125-0412-S	SV50125-0412-03	SV50125-0412-06	-	-	-	-	-
0.1875	0.1875	0.375	2.000	SV50188-0316-S	SV50188-0316-03	SV50188-0316-06	-	-	-	-	-
		0.625	2.000	SV50188-0516-S	SV50188-0516-03	SV50188-0516-06	-	-	-	-	-
0.2500	0.2500	0.625	2.000	SV50250-0516-S	SV50250-0516-03	SV50250-0516-06	SV50250-0516-12	-	-	-	-
		0.750	2.500	SV50250-0620-S	SV50250-0620-03	SV50250-0620-06	SV50250-0620-12	-	-	-	-
		1.250	3.000	SV50250-1024-S	SV50250-1024-03	SV50250-1024-06	SV50250-1024-12	-	-	-	-
0.3125	0.3125	0.625	2.000	SV50313-0516-S	SV50313-0516-03	SV50313-0516-06	SV50313-0516-12	-	-	-	-
		0.875	2.500	SV50313-0720-S	SV50313-0720-03	SV50313-0720-06	SV50313-0720-12	-	-	-	-
		1.250	3.000	SV50313-1024-S	SV50313-1024-03	SV50313-1024-06	SV50313-1024-12	-	-	-	-
0.3750	0.3750	0.875	2.500	SV50375-0720-S	SV50375-0720-03	SV50375-0720-06	SV50375-0720-12	SV50375-0720-18	-	-	-
		1.250	3.000	SV50375-1024-S	SV50375-1024-03	SV50375-1024-06	SV50375-1024-12	SV50375-1024-18	SV50375-1024-24	-	-
		1.750	3.500	SV50375-1428-S	SV50375-1428-03	SV50375-1428-06	SV50375-1428-12	SV50375-1428-18	-	-	-
0.4375	0.4375	0.875	2.500	SV50438-0720-S	SV50438-0720-03	SV50438-0720-06	SV50438-0720-12	SV50438-0720-18	-	-	-
		1.250	3.000	SV50438-1024-S	SV50438-1024-03	SV50438-1024-06	SV50438-1024-12	SV50438-1024-18	-	-	-
0.5000	0.5000	0.625	2.500	SV50500-0520-S	SV50500-0520-03	SV50500-0520-06	SV50500-0520-12	SV50500-0520-18	SV50500-0520-24	-	-
		1.000	3.000	SV50500-0824-S	SV50500-0824-03	SV50500-0824-06	SV50500-0824-12	SV50500-0824-18	SV50500-0824-24	-	-
		1.250	3.000	SV50500-1024-S	SV50500-1024-03	SV50500-1024-06	SV50500-1024-12	SV50500-1024-18	SV50500-1024-24	-	-
		1.375	3.000	SV50500-1124-S	SV50500-1124-03	SV50500-1124-06	SV50500-1124-12	SV50500-1124-18	SV50500-1124-24	-	-
		2.000	4.000	SV50500-1632-S	SV50500-1632-03	SV50500-1632-06	SV50500-1632-12	SV50500-1632-18	SV50500-1632-24	-	-
0.6250	0.6250	1.250	3.500	SV50625-1028-S	-	SV50625-1028-06	SV50625-1028-12	SV50625-1028-18	SV50625-1028-24	-	-
		1.750	4.000	SV50625-1432-S	-	SV50625-1432-06	SV50625-1432-12	SV50625-1432-18	SV50625-1432-24	-	-
		2.125	4.000	SV50625-1732-S	-	SV50625-1732-06	SV50625-1732-12	SV50625-1732-18	SV50625-1732-24	-	-
0.7500	0.7500	1.250	4.000	SV50750-1032-S	-	SV50750-1032-06	SV50750-1032-12	SV50750-1032-18	SV50750-1032-24	SV50750-1032-38	SV50750-1032-50
		1.750	4.000	SV50750-1432-S	-	SV50750-1432-06	SV50750-1432-12	SV50750-1432-18	SV50750-1432-24	SV50750-1432-38	SV50750-1432-50
		2.250	5.000	SV50750-1840-S	-	SV50750-1840-06	SV50750-1840-12	SV50750-1840-18	SV50750-1840-24	SV50750-1840-38	SV50750-1840-50
1.0000	1.0000	1.500	4.000	SV51000-1232-S	-	SV51000-1232-06	SV51000-1232-12	SV51000-1232-18	SV51000-1232-24	SV51000-1232-38	SV51000-1232-50
		2.250	5.000	SV51000-1840-S	-	SV51000-1840-06	SV51000-1840-12	SV51000-1840-18	SV51000-1840-24	SV51000-1840-38	SV51000-1840-50
		3.000	6.000	SV51000-2448-S	-	SV51000-2448-06	SV51000-2448-12	SV51000-2448-18	SV51000-2448-24	SV51000-2448-38	SV51000-2448-50

5 FLUTE

Cut Materials

STEEL | STAINLESS STEEL | CAST IRON | HI-TEMP ALLOYS | HARDENED STEEL

Ramping

Finishing

Roughing

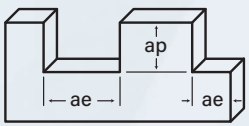
Slotting

Pocketing

SV5 Recommended Starting Speeds and Feeds

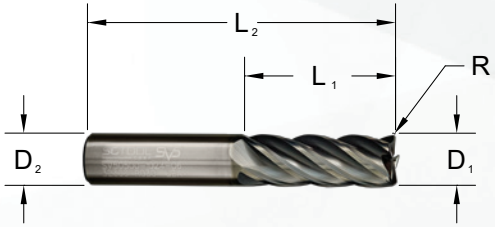
	Material Group	Side Milling (A) and Slotting (B)			Speed			Effective Feed per Tooth (IPT=inch/th) for side milling (A) (Use Chip Thinning Calculations to correct for stepover), for slotting (B) reduce IPT by 20%					
								D - Diameter					
		A		B	A	B	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	ap	(SFM)	(SFM)	dec.	0.250	0.375	0.500	0.625	0.750	1.000
P	Unalloyed Steel (AISI 1000, 1100, 1200, 1500 Series)	Ap1 max	<0.35 x D	<1 x D	500	250	IPT	0.0011	0.0018	0.0031	0.0035	0.0042	0.0049
P	Low-alloy Steel (AISI 3000, 4000, 5000, 6000, 8000, 9000 Series)	Ap1 max	<0.35 x D	<1 x D	400	200	IPT	0.0011	0.0018	0.0031	0.0035	0.0042	0.0049
P	High-alloy Steel/Tool Steel (SAE Classes A, D, H, O, S, M, T)	Ap1 max	<0.35 x D	<0.75 x D	350	175	IPT	0.001	0.002	0.0026	0.0029	0.0034	0.0038
M	Austenitic (AISI 200 & 300 Series)	Ap1 max	<0.35 x D	<1 x D	300	165	IPT	0.0015	0.0019	0.0022	0.0026	0.0031	0.0034
M	Marensitic (AISI 400 & 500 Series)	Ap1 max	<0.35 x D	<1 x D	350	180	IPT	0.0016	0.002	0.0023	0.0028	0.0033	0.0036
M	Precipitation (PH 15-7 Mo, 15-5 PH, 17-7 PH)	Ap1 max	<0.35 x D	<1 x D	300	160	IPT	0.001	0.0021	0.0027	0.0032	0.0036	0.004
K	Gray Iron GG	Ap1 max	<0.35 x D	<1 x D	450	180	IPT	0.0017	0.0025	0.003	0.0035	0.0041	0.0048
K	Nodular Iron GGG	Ap1 max	<0.35 x D	<1 x D	500	180	IPT	0.0017	0.0025	0.003	0.0035	0.0041	0.0048
K	Malleable Iron GTS/GTW	Ap1 max	<0.35 x D	<1 x D	600	180	IPT	0.0017	0.0025	0.003	0.0035	0.0041	0.0048
S	HRSA Iron-Based (Incoloy 800/909, A286)	Ap1 max	<0.35 x D	N/A	100	N/A	IPT	0.0007	0.001	0.0015	0.0019	0.0025	0.0033
S	HRSA Cobalt-Based (Stelite, Haynes 21/25/188)	Ap1 max	<0.35 x D	N/A	80	N/A	IPT	0.0007	0.001	0.0015	0.0019	0.0025	0.0033
S	HRSA Nickel-Based (Inconel 601/617/625/700/706/718, Hastelloy, Monel, Nimonic, Rene, Udimet, Waspaloy)	Ap1 max	<0.35 x D	<0.3 x D	120	60	IPT	0.0007	0.001	0.0015	0.0019	0.0025	0.0033
S	Titanium (Pure, ASTM 1/2/3, Ti6AL-4V, Ti6Al-2Sn-4Zr-2Mo-SI)	Ap1 max	<0.35 x D	N/A	300	N/A	IPT	0.0008	0.0011	0.0023	0.0026	0.0031	0.0035
H	Hardened Steels and Cast Irons (42-48HRc)	Ap1 max	<0.16 x D	N/A	180	N/A	IPT	0.0008	0.0012	0.0017	0.002	0.0022	0.0025

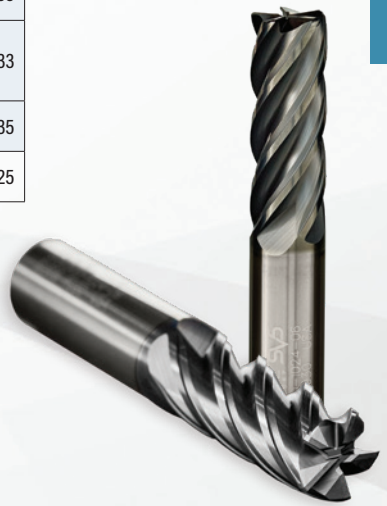
Side Milling (A) and Slotting (B)



5 FLUTE

Note:
- Ap1 max = Full length of cut of the tool
- Lower cutting speed value is recommended for high stock removal applications or higher hardness within group.
- Higher cutting speed value is recommended for finishing applications or lower hardness within group.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.





SQ | RAD | CC | VAR | h6 | 5FL

SC-3

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .002"

SV5 Series with Chipbreakers

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Corner Option							
				Square	R.015	R.030	R.060	R.090	R.120	R.190	R.250
0.3750	0.3750	0.875	2.500	SV50375-0720-SCB	SV50375-0720-03CB	SV50375-0720-06CB	SV50375-0720-12CB	SV50375-0720-18CB	-	-	-
		1.250	3.000	SV50375-1024-SCB	SV50375-1024-03CB	SV50375-1024-06CB	SV50375-1024-12CB	SV50375-1024-18CB	-	-	-
		1.750	3.500	SV50375-1428-SCB	SV50375-1428-03CB	SV50375-1428-06CB	SV50375-1428-12CB	SV50375-1428-18CB	-	-	-
0.5000	0.5000	1.000	3.000	SV50500-0824-SCB	SV50500-0824-03CB	SV50500-0824-06CB	SV50500-0824-12CB	SV50500-0824-18CB	SV50500-0824-24CB	-	-
		1.250	3.000	SV50500-1024-SCB	SV50500-1024-03CB	SV50500-1024-06CB	SV50500-1024-12CB	SV50500-1024-18CB	SV50500-1024-24CB	-	-
		2.000	4.000	SV50500-1632-SCB	SV50500-1632-03CB	SV50500-1632-06CB	SV50500-1632-12CB	SV50500-1632-18CB	SV50500-1632-24CB	-	-
0.6250	0.6250	1.250	3.500	SV50625-1028-SCB	-	SV50625-1028-06CB	SV50625-1028-12CB	SV50625-1028-18CB	SV50625-1028-24CB	-	-
		1.750	4.000	SV50625-1432-SCB	-	SV50625-1432-06CB	SV50625-1432-12CB	SV50625-1432-18CB	SV50625-1432-24CB	-	-
		2.125	4.000	SV50625-1732-SCB	-	SV50625-1732-06CB	SV50625-1732-12CB	SV50625-1732-18CB	SV50625-1732-24CB	-	-
0.7500	0.7500	1.250	4.000	SV50750-1032-SCB	-	SV50750-1032-06CB	SV50750-1032-12CB	SV50750-1032-18CB	SV50750-1032-24CB	SV50750-1032-38CB	SV50750-1032-50CB
		1.750	4.000	SV50750-1432-SCB	-	SV50750-1432-06CB	SV50750-1432-12CB	SV50750-1432-18CB	SV50750-1432-24CB	SV50750-1432-38CB	SV50750-1432-50CB
		2.250	5.000	SV50750-1840-SCB	-	SV50750-1840-06CB	SV50750-1840-12CB	SV50750-1840-18CB	SV50750-1840-24CB	SV50750-1840-38CB	SV50750-1840-50CB
1.0000	1.0000	1.500	4.000	SV51000-1232-SCB	-	SV51000-1232-06CB	SV51000-1232-12CB	SV51000-1232-18CB	SV51000-1232-24CB	SV51000-1232-38CB	SV51000-1232-50CB
		2.250	5.000	SV51000-1840-SCB	-	SV51000-1840-06CB	SV51000-1840-12CB	SV51000-1840-18CB	SV51000-1840-24CB	SV51000-1840-38CB	SV51000-1840-50CB
		3.000	6.000	SV51000-2448-SCB	-	SV51000-2448-06CB	SV51000-2448-12CB	SV51000-2448-18CB	SV51000-2448-24CB	SV51000-2448-38CB	SV51000-2448-50CB

5 FLUTE

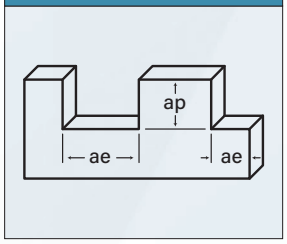
Cut Materials

STEEL | STAINLESS STEEL | CAST IRON | HI-TEMP ALLOYS | HARDENED STEEL

SV5CB Recommended Starting Speeds and Feeds

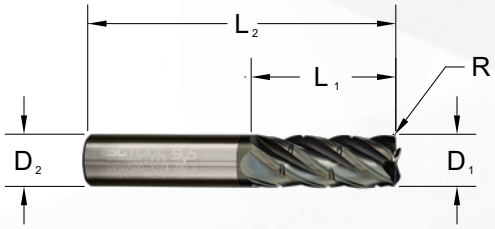
	Material Group	Side Milling (A) and Slotting (B)			Speed			Effective Feed per Tooth (IPT=inch/th) for side milling (A) (Use Chip Thinning Calculations to correct for stepover), for slotting (B) reduce IPT by 20%					
								D - Diameter					
		A		B	A	B	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	ap	(SFM)	(SFM)	dec.	0.250	0.375	0.500	0.625	0.750	1.000
P	Unalloyed Steel (AISI 1000, 1100, 1200, 1500 Series)	Ap1 max	<0.35 x D	<1 x D	500	250	IPT	0.0011	0.0018	0.0031	0.0035	0.0042	0.0049
P	Low-alloy Steel (AISI 3000, 4000, 5000, 6000, 8000, 9000 Series)	Ap1 max	<0.35 x D	<1 x D	400	200	IPT	0.0011	0.0018	0.0031	0.0035	0.0042	0.0049
P	High-alloy Steel/Tool Steel (SAE Classes A, D, H, O, S, M, T)	Ap1 max	<0.35 x D	<0.75 x D	350	175	IPT	0.001	0.002	0.0026	0.0029	0.0034	0.0038
M	Austenitic (AISI 200 & 300 Series)	Ap1 max	<0.35 x D	<1 x D	300	165	IPT	0.0015	0.0019	0.0022	0.0026	0.0031	0.0034
M	Marensitic (AISI 400 & 500 Series)	Ap1 max	<0.35 x D	<1 x D	350	180	IPT	0.0016	0.002	0.0023	0.0028	0.0033	0.0036
M	Precipitation (PH 15-7 Mo, 15-5 PH, 17-7 PH)	Ap1 max	<0.35 x D	<1 x D	300	160	IPT	0.001	0.0021	0.0027	0.0032	0.0036	0.004
K	Gray Iron GG	Ap1 max	<0.35 x D	<1 x D	450	180	IPT	0.0017	0.0025	0.003	0.0035	0.0041	0.0048
K	Nodular Iron GGG	Ap1 max	<0.35 x D	<1 x D	500	180	IPT	0.0017	0.0025	0.003	0.0035	0.0041	0.0048
K	Malleable Iron GTS/GTW	Ap1 max	<0.35 x D	<1 x D	600	180	IPT	0.0017	0.0025	0.003	0.0035	0.0041	0.0048
S	HRSA Iron-Based (Incoloy 800/909, A286)	Ap1 max	<0.35 x D	N/A	100	N/A	IPT	0.0007	0.001	0.0015	0.0019	0.0025	0.0033
S	HRSA Cobalt-Based (Stelite, Haynes 21/25/188)	Ap1 max	<0.35 x D	N/A	80	N/A	IPT	0.0007	0.001	0.0015	0.0019	0.0025	0.0033
S	HRSA Nickel-Based (Inconel 601/617/625/700/706/718, Hastelloy, Monel, Nimonic, Rene, Udimet, Waspaloy)	Ap1 max	<0.35 x D	<0.3 x D	120	60	IPT	0.0007	0.001	0.0015	0.0019	0.0025	0.0033
S	Titanium (Pure, ASTM 1/2/3, Ti6AL-4V, Ti6Al-2Sn-4Zr-2Mo-SI)	Ap1 max	<0.35 x D	N/A	300	N/A	IPT	0.0008	0.0011	0.0023	0.0026	0.0031	0.0035
H	Hardened Steels and Cast Irons (42-48HRc)	Ap1 max	<0.16 x D	N/A	180	N/A	IPT	0.0008	0.0012	0.0017	0.002	0.0022	0.0025

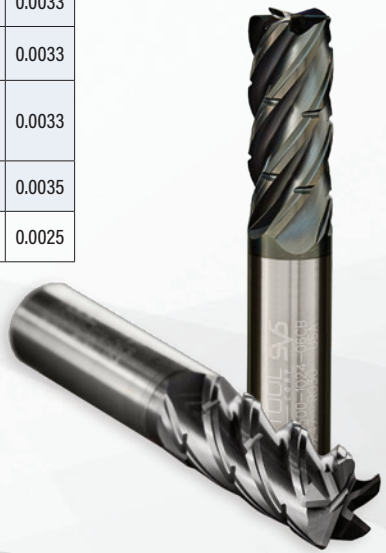
Side Milling (A) and Slotting (B)



5 FLUTE

Note:
- Ap1 max = Full length of cut of the tool
- Lower cutting speed value is recommended for high stock removal applications or higher hardness within group.
- Higher cutting speed value is recommended for finishing applications or lower hardness within group.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.





SQ RAD CC VAR h6 5FL

SC-3

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .002"

SV5 Series Neck Relieved

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	LBS	Corner Option							
					Square	R.015	R.030	R.060	R.090	R.120	R.190	R.250
0.2500	0.2500	0.375	3.000	0.875	SV50250-0324-SN07	SV50250-0324-03N07	SV50250-0324-06N07	SV50250-0324-12N07	-	-	-	-
		0.375	3.500	1.500	SV50250-0328-SN12	SV50250-0328-03N12	SV50250-0328-06N12	SV50250-0328-12N12	-	-	-	-
0.3750	0.3750	0.500	3.000	1.125	SV50375-0424-SN09	SV50375-0424-03N09	SV50375-0424-06N09	SV50375-0424-12N09	SV50375-0424-18N09	-	-	-
		0.500	4.000	2.125	SV50375-0432-SN17	SV50375-0432-03N17	SV50375-0432-06N17	SV50375-0432-12N17	SV50375-0432-18N17	-	-	-
0.5000	0.5000	0.625	4.000	1.375	SV50500-0532-SN11	SV50500-0532-03N11	SV50500-0532-06N11	SV50500-0532-12N11	SV50500-0532-18N11	SV50500-0532-24N11	-	-
		0.625	5.000	2.375	SV50500-0540-SN19	SV50500-0540-03N19	SV50500-0540-06N19	SV50500-0540-12N19	SV50500-0540-18N19	SV50500-0540-24N19	-	-
		0.625	6.000	3.375	SV50500-0548-SN27	SV50500-0548-03N27	SV50500-0548-06N27	SV50500-0548-12N27	SV50500-0548-18N27	SV50500-0548-24N27	-	-
0.6250	0.6250	0.750	4.000	1.625	SV50625-0632-SN13	-	SV50625-0632-06N13	SV50625-0632-12N13	SV50625-0632-18N13	SV50625-0632-24N13	-	-
		0.750	5.000	2.375	SV50625-0640-SN19	-	SV50625-0640-06N19	SV50625-0640-12N19	SV50625-0640-18N19	SV50625-0640-24N19	-	-
		0.750	6.000	3.375	SV50625-0648-SN27	-	SV50625-0648-06N27	SV50625-0648-12N27	SV50625-0648-18N27	SV50625-0648-24N27	-	-
0.7500	0.7500	1.000	5.000	1.750	SV50750-0840-SN14	-	SV50750-0840-06N14	SV50750-0840-12N14	SV50750-0840-18N14	SV50750-0840-24N14	SV50750-0840-38N14	SV50750-0840-50N14
		1.000	6.000	2.625	SV50750-0848-SN21	-	SV50750-0848-06N21	SV50750-0848-12N21	SV50750-0848-18N21	SV50750-0848-24N21	SV50750-0848-38N21	SV50750-0848-50N21
		1.000	6.000	3.375	SV50750-0848-SN27	-	SV50750-0848-06N27	SV50750-0848-12N27	SV50750-0848-18N27	SV50750-0848-24N27	SV50750-0848-38N27	SV50750-0848-50N27
1.0000	1.0000	1.125	6.000	2.250	SV51000-0948-SN18	-	SV51000-0948-06N18	SV51000-0948-12N18	SV51000-0948-18N18	SV51000-0948-24N18	SV51000-0948-38N18	SV51000-0948-50N18
		1.125	6.000	3.250	SV51000-0948-SN26	-	SV51000-0948-06N26	SV51000-0948-12N26	SV51000-0948-18N26	SV51000-0948-24N26	SV51000-0948-38N26	SV51000-0948-50N26
		1.125	7.000	4.250	SV51000-0956-SN34	-	SV51000-0956-06N34	SV51000-0956-12N34	SV51000-0956-18N34	SV51000-0956-24N34	SV51000-0956-38N34	SV51000-0956-50N34

5 FLUTE

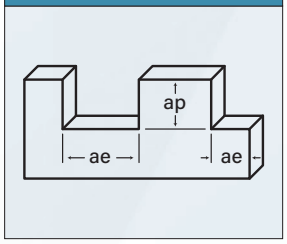
Cut Materials

STEEL | STAINLESS STEEL | CAST IRON | HI-TEMP ALLOYS | HARDENED STEEL

SV5NR Recommended Starting Speeds and Feeds

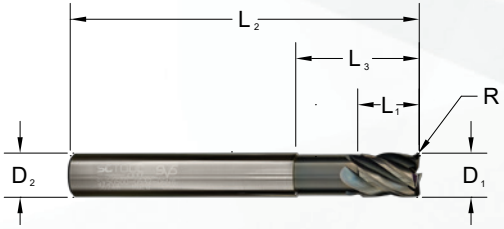
	Material Group	Side Milling (A) and Slotting (B)			Speed			Effective Feed per Tooth (IPT=inch/th) for side milling (A) (Use Chip Thinning Calculations to correct for stepover), for slotting (B) reduce IPT by 20%					
								D - Diameter					
		A		B	A	B	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	ap	(SFM)	(SFM)	dec.	0.250	0.375	0.500	0.625	0.750	1.000
P	Unalloyed Steel (AISI 1000, 1100, 1200, 1500 Series)	Ap1 max	<0.35 x D	<1 x D	500	250	IPT	0.0009	0.0014	0.0025	0.0028	0.0034	0.0039
P	Low-alloy Steel (AISI 3000, 4000, 5000, 6000, 8000, 9000 Series)	Ap1 max	<0.35 x D	<1 x D	400	200	IPT	0.0009	0.0014	0.0025	0.0028	0.0034	0.0039
P	High-alloy Steel/Tool Steel (SAE Classes A, D, H, O, S, M, T)	Ap1 max	<0.35 x D	<0.75 x D	350	175	IPT	0.0008	0.0016	0.0021	0.0023	0.0027	0.0030
M	Austenitic (AISI 200 & 300 Series)	Ap1 max	<0.35 x D	<1 x D	300	165	IPT	0.0012	0.0015	0.0018	0.0021	0.0025	0.0027
M	Marensitic (AISI 400 & 500 Series)	Ap1 max	<0.35 x D	<1 x D	350	180	IPT	0.0013	0.0016	0.0018	0.0022	0.0026	0.0029
M	Precipitation (PH 15-7 Mo, 15-5 PH, 17-7 PH)	Ap1 max	<0.35 x D	<1 x D	300	160	IPT	0.0008	0.0017	0.0022	0.0026	0.0029	0.0032
K	Gray Iron GG	Ap1 max	<0.35 x D	<1 x D	450	180	IPT	0.0014	0.0020	0.0024	0.0028	0.0033	0.0038
K	Nodular Iron GGG	Ap1 max	<0.35 x D	<1 x D	500	180	IPT	0.0014	0.0020	0.0024	0.0028	0.0033	0.0038
K	Malleable Iron GTS/GTW	Ap1 max	<0.35 x D	<1 x D	600	180	IPT	0.0014	0.0020	0.0024	0.0028	0.0033	0.0038
S	HRSA Iron-Based (Incoloy 800/909, A286)	Ap1 max	<0.35 x D	N/A	100	N/A	IPT	0.0006	0.0008	0.0012	0.0015	0.0020	0.0026
S	HRSA Cobalt-Based (Stelite, Haynes 21/25/188)	Ap1 max	<0.35 x D	N/A	80	N/A	IPT	0.0006	0.0008	0.0012	0.0015	0.0020	0.0026
S	HRSA Nickel-Based (Inconel 601/617/625/700/706/718, Hastelloy, Monel, Nimonic, Rene, Udimet, Waspaloy)	Ap1 max	<0.35 x D	<0.3 x D	120	60	IPT	0.0006	0.0008	0.0012	0.0015	0.0020	0.0026
S	Titanium (Pure, ASTM 1/2/3, Ti6AL-4V, Ti6Al-2Sn-4Zr-2Mo-SI)	Ap1 max	<0.35 x D	N/A	300	N/A	IPT	0.0006	0.0009	0.0018	0.0021	0.0025	0.0028
H	Hardened Steels and Cast Irons (42-48HRc)	Ap1 max	<0.16 x D	N/A	180	N/A	IPT	0.0006	0.0010	0.0014	0.0016	0.0018	0.0020

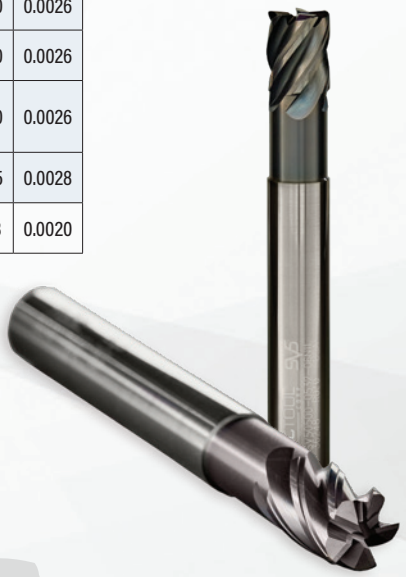
Side Milling (A) and Slotting (B)



5 FLUTE

Note:
- Ap1 max = Full length of cut of the tool
- Lower cutting speed value is recommended for high stock removal applications or higher hardness within group.
- Higher cutting speed value is recommended for finishing applications or lower hardness within group.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.





NR SQ RAD CC VAR h6 5FL

SC-3

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .002"

SV6 END MILLS

Super-Variable Flute Design Featuring Varying Helix Angles and Indexing

- Optimizes performance
- Maximizes stock removal
- Eliminates chatter
- Increases tool life
- Improves productivity

Our SV6 end mills are manufactured with certified, premium, sub-micron grain carbide and they feature a super-variable flute design to increase metal removal rates, enhance finishes, and eliminate chatter.

With the SV6, our clients have seen an increase in feeds while maintaining cutting-edge strength and sharpness for improved tool life.

Created for difficult-to-machine materials while obtaining high feed rates with traditional and high-efficiency machining techniques

Dominates in a wide range of semi-roughing and finishing applications such as high speed, dynamic, trochoidal, peel, and peripheral milling

Stocked and ready to order in diameters of ¼" to 1" including a variety of options: square end, corner radius, ball nose - all with SC-3 coating

SV6 Series

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Corner Option								
				Square	R.015	R.030	R.060	R.090	R.120	R.190	R.250	Ball Nose
0.2500	0.2500	0.625	2.000	SV60250-0516-S	SV60250-0516-03	SV60250-0516-06	SV60250-0516-12	-	-	-	-	SV60250-0516-BN
		0.750	2.500	SV60250-0620-S	SV60250-0620-03	SV60250-0620-06	SV60250-0620-12	-	-	-	-	-
0.3125	0.3125	0.625	2.000	SV60313-0516-S	SV60313-0516-03	SV60313-0516-06	SV60313-0516-12	-	-	-	-	-
		0.875	2.500	SV60313-0720-S	SV60313-0720-03	SV60313-0720-06	SV60313-0720-12	-	-	-	-	SV60313-0720-BN
0.3750	0.3750	0.875	2.500	SV60375-0720-S	SV60375-0720-03	SV60375-0720-06	SV60375-0720-12	SV60375-0720-18	-	-	-	SV60375-0720-BN
		1.250	3.000	SV60375-1024-S	SV60375-1024-03	SV60375-1024-06	SV60375-1024-12	SV60375-1024-18	SV60375-1024-24	-	-	-
0.5000	0.5000	1.250	3.000	SV60500-1024-S	SV60500-1024-03	SV60500-1024-06	SV60500-1024-12	SV60500-1024-18	SV60500-1024-24	-	-	SV60500-1024-BN
		1.375	3.000	SV60500-1124-S	SV60500-1124-03	SV60500-1124-06	SV60500-1124-12	SV60500-1124-18	SV60500-1124-24	-	-	-
		2.000	4.000	SV60500-1632-S	SV60500-1632-03	SV60500-1632-06	SV60500-1632-12	SV60500-1632-18	SV60500-1632-24	-	-	-
0.6250	0.6250	1.250	3.500	SV60625-1028-S	-	SV60625-1028-06	SV60625-1028-12	SV60625-1028-18	SV60625-1028-24	-	-	SV60625-1028-BN
		2.000	4.000	SV60625-1632-S	-	SV60625-1632-06	SV60625-1632-12	SV60625-1632-18	SV60625-1632-24	-	-	-
0.7500	0.7500	1.750	4.000	SV60750-1432-S	-	SV60750-1432-06	SV60750-1432-12	SV60750-1432-18	SV60750-1432-24	SV60750-1432-38	SV60750-1432-50	SV60750-1432-BN
		2.250	5.000	SV60750-1840-S	-	SV60750-1840-06	SV60750-1840-12	SV60750-1840-18	SV60750-1840-24	SV60750-1840-38	SV60750-1840-50	-
1.0000	1.0000	1.500	4.000	SV61000-1232-S	-	SV61000-1232-06	SV61000-1232-12	SV61000-1232-18	SV61000-1232-24	SV61000-1232-38	SV61000-1232-50	SV61000-1232-BN
		2.250	5.000	SV61000-1840-S	-	SV61000-1840-06	SV61000-1840-12	SV61000-1840-18	SV61000-1840-24	SV61000-1840-38	SV61000-1840-50	-

6 FLUTE

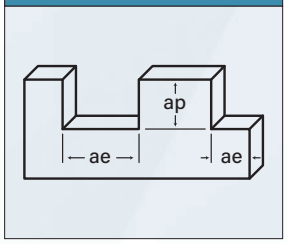
Cut Materials

STEEL | STAINLESS STEEL | CAST IRON | HI-TEMP ALLOYS | HARDENED STEEL

SV6 Recommended Starting Speeds and Feeds

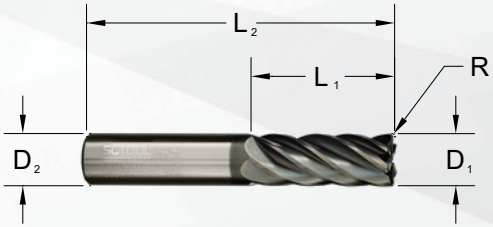
	Material Group	Side Milling (A)		Speed		Effective Feed per Tooth (IPT=inch/th) for side milling (A) (Use Chip Thinning Calculations to correct for stepover					
						D - Diameter					
		A		A	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	(SFM)	dec.	0.250	0.375	0.500	0.625	0.750	1.000
P	Unalloyed Steel (AISI 1000, 1100, 1200, 1500 Series)	Ap1 max	<0.25 x D	500	IPT	0.00099	0.00162	0.00279	0.00315	0.00378	0.00441
P	Low-alloy Steel (AISI 3000, 4000, 5000, 6000, 8000, 9000 Series)	Ap1 max	<0.25 x D	400	IPT	0.00099	0.00162	0.00279	0.00315	0.00378	0.00441
P	High-alloy Steel/Tool Steel (SAE Classes A, D, H, O, S, M, T)	Ap1 max	<0.25 x D	350	IPT	0.0009	0.0018	0.00234	0.00261	0.00306	0.00342
M	Austenitic (AISI 200 & 300 Series)	Ap1 max	<0.25 x D	300	IPT	0.00135	0.00171	0.00198	0.00234	0.00279	0.00306
M	Marensitic (AISI 400 & 500 Series)	Ap1 max	<0.25 x D	350	IPT	0.00144	0.0018	0.00207	0.00252	0.00297	0.00324
M	Precipitation (PH 15-7 Mo, 15-5 PH, 17-7 PH)	Ap1 max	<0.25 x D	300	IPT	0.0009	0.00189	0.00243	0.00288	0.00324	0.0036
K	Gray Iron GG	Ap1 max	<0.25 x D	450	IPT	0.00153	0.00225	0.0027	0.00315	0.00369	0.00432
K	Nodular Iron GGG	Ap1 max	<0.25 x D	500	IPT	0.00153	0.00225	0.0027	0.00315	0.00369	0.00432
K	Malleable Iron GTS/GTW	Ap1 max	<0.25 x D	600	IPT	0.00153	0.00225	0.0027	0.00315	0.00369	0.00432
S	HRSA Iron-Based (Incoloy 800/909, A286)"	Ap1 max	<0.25 x D	100	IPT	0.00063	0.0009	0.00135	0.00171	0.00225	0.00297
S	HRSA Cobalt-Based (Stelite, Haynes 21/25/188)	Ap1 max	<0.25 x D	80	IPT	0.00063	0.0009	0.00135	0.00171	0.00225	0.00297
S	HRSA Nickel-Based (Inconel 601/617/625/700/706/718, Hastelloy, Monel, Nimonic, Rene, Udimet, Waspaloy)	Ap1 max	<0.25 x D	120	IPT	0.00063	0.0009	0.00135	0.00171	0.00225	0.00297
S	Titanium (Pure, ASTM 1/2/3, Ti6AL-4V, Ti6Al-2Sn-4Zr-2Mo-SI)	Ap1 max	<0.25 x D	300	IPT	0.00072	0.00099	0.00207	0.00234	0.00279	0.00315
H	Hardened Steels and Hardened or Chilled Cast Irons (42-48HRc)	Ap1 max	<0.16 x D	180	IPT	0.0008	0.0012	0.0017	0.002	0.0022	0.0025

Side Milling (A)



6 FLUTE

Note:
- Ap1 max = Full length of cut of the tool
- Lower cutting speed value is recommended for high stock removal applications or higher hardness within group.
- Higher cutting speed value is recommended for finishing applications or lower hardness within group.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.
- Slotting is not recommend with this end mill.



SQ RAD BALL CC VAR h6 6FL | SC-3

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .002"

SV7

SV7 END MILLS

Super-Variable Flute Indexing

- Optimizes performance
- Eliminates chatter
- Increases tool life
- Improves productivity

Our SV7 end mills are manufactured with certified, premium, sub-micron grain carbide and they feature a super-variable flute indexing design to increase metal removal rates, enhance finishes, and eliminate chatter.

The SV7 is designed to be run at higher production rates while still producing an exceptional finish.

Created for difficult-to-machine materials while obtaining high feed rates with high-efficiency machining techniques

Dominates in a wide range of finishing applications such as high speed, dynamic, trochoidal, peel, and peripheral milling

Stocked and ready to order in diameters of ¼" to 1" including a variety of options: square end, corner radius, and OD chipbreakers - all with SC-3 coating

SV7 Series

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Corner Option							
				Square	R.015	R.030	R.060	R.090	R.120	R.190	R.250
0.2500	0.2500	0.625	2.000	SV70250-0516-S	SV70250-0516-03	SV70250-0516-06	SV70250-0516-12	-	-	-	-
		0.750	2.500	SV70250-0620-S	SV70250-0620-03	SV70250-0620-06	SV70250-0620-12	-	-	-	-
		1.250	3.000	SV70250-1024-S	SV70250-1024-03	SV70250-1024-06	SV70250-1024-12	-	-	-	-
0.3125	0.3125	0.625	2.000	SV70313-0516-S	SV70313-0516-03	SV70313-0516-06	SV70313-0516-12	-	-	-	-
		0.875	2.500	SV70313-0720-S	SV70313-0720-03	SV70313-0720-06	SV70313-0720-12	-	-	-	-
		1.250	3.000	SV70313-1024-S	SV70313-1024-03	SV70313-1024-06	SV70313-1024-12	-	-	-	-
0.3750	0.3750	0.875	2.500	SV70375-0720-S	SV70375-0720-03	SV70375-0720-06	SV70375-0720-12	SV70375-0720-18	-	-	-
		1.250	3.000	SV70375-1024-S	SV70375-1024-03	SV70375-1024-06	SV70375-1024-12	SV70375-1024-18	-	-	-
		1.750	3.500	SV70375-1428-S	SV70375-1428-03	SV70375-1428-06	SV70375-1428-12	SV70375-1428-18	-	-	-
0.4375	0.4375	0.875	2.500	SV70438-0720-S	SV70438-0720-03	SV70438-0720-06	SV70438-0720-12	SV70438-0720-18	-	-	-
		1.250	3.000	SV70438-1024-S	SV70438-1024-03	SV70438-1024-06	SV70438-1024-12	SV70438-1024-18	-	-	-
0.5000	0.5000	1.000	3.000	SV70500-0824-S	SV70500-0824-03	SV70500-0824-06	SV70500-0824-12	SV70500-0824-18	SV70500-0824-24	-	-
		1.250	3.000	SV70500-1024-S	SV70500-1024-03	SV70500-1024-06	SV70500-1024-12	SV70500-1024-18	SV70500-1024-24	-	-
		1.625	3.500	SV70500-1328-S	SV70500-1328-03	SV70500-1328-06	SV70500-1328-12	SV70500-1328-18	SV70500-1328-24	-	-
		2.000	4.000	SV70500-1632-S	SV70500-1632-03	SV70500-1632-06	SV70500-1632-12	SV70500-1632-18	SV70500-1632-24	-	-
0.6250	0.6250	1.250	3.500	SV70625-1028-S	-	SV70625-1028-06	SV70625-1028-12	SV70625-1028-18	SV70625-1028-24	-	-
		1.750	4.000	SV70625-1432-S	-	SV70625-1432-06	SV70625-1432-12	SV70625-1432-18	SV70625-1432-24	-	-
		2.125	4.000	SV70625-1732-S	-	SV70625-1732-06	SV70625-1732-12	SV70625-1732-18	SV70625-1732-24	-	-
0.7500	0.7500	1.250	4.000	SV70750-1032-S	-	SV70750-1032-06	SV70750-1032-12	SV70750-1032-18	SV70750-1032-24	SV70750-1032-38	SV70750-1032-50
		1.750	4.000	SV70750-1432-S	-	SV70750-1432-06	SV70750-1432-12	SV70750-1432-18	SV70750-1432-24	SV70750-1432-38	SV70750-1432-50
		2.250	5.000	SV70750-1840-S	-	SV70750-1840-06	SV70750-1840-12	SV70750-1840-18	SV70750-1840-24	SV70750-1840-38	SV70750-1840-50
1.0000	1.0000	1.500	4.000	SV71000-1232-S	-	SV71000-1232-06	SV71000-1232-12	SV71000-1232-18	SV71000-1232-24	SV71000-1232-38	SV71000-1232-50
		2.250	5.000	SV71000-1840-S	-	SV71000-1840-06	SV71000-1840-12	SV71000-1840-18	SV71000-1840-24	SV71000-1840-38	SV71000-1840-50
		3.000	6.000	SV71000-2448-S	-	SV71000-2448-06	SV71000-2448-12	SV71000-2448-18	SV71000-2448-24	SV71000-2448-38	SV71000-2448-50

7 FLUTE

Cut Materials

STEEL | STAINLESS STEEL | CAST IRON | HI-TEMP ALLOYS | HARDENED STEEL

Profiling

Finishing

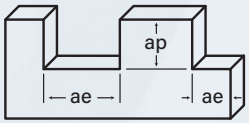
Roughing

Pocketing

SV7 Recommended Starting Speeds and Feeds

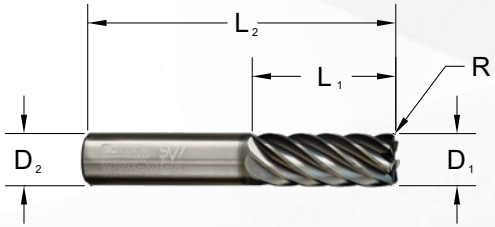
	Material Group	Side Milling (A)		Speed		Effective Feed per Tooth (IPT=inch/th) for side milling (A) (Use Chip Thinning Calculations to correct for stepover)					
						D - Diameter					
		A		A	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae	(SFM)	dec.	0.250	0.375	0.500	0.625	0.750	1.000
P	Unalloyed Steel (AISI 1000, 1100, 1200, 1500 Series)	Ap1 max	<0.25 x D	500	IPT	0.00099	0.00162	0.00279	0.00315	0.00378	0.00441
P	Low-alloy Steel (AISI 3000, 4000, 5000, 6000, 8000, 9000 Series)	Ap1 max	<0.25 x D	400	IPT	0.00099	0.00162	0.00279	0.00315	0.00378	0.00441
P	High-alloy Steel/Tool Steel (SAE Classes A, D, H, O, S, M, T)	Ap1 max	<0.25 x D	350	IPT	0.0009	0.0018	0.00234	0.00261	0.00306	0.00342
M	Austenitic (AISI 200 & 300 Series)	Ap1 max	<0.25 x D	300	IPT	0.00135	0.00171	0.00198	0.00234	0.00279	0.00306
M	Marensitic (AISI 400 & 500 Series)	Ap1 max	<0.25 x D	350	IPT	0.00144	0.0018	0.00207	0.00252	0.00297	0.00324
M	Precipitation (PH 15-7 Mo, 15-5 PH, 17-7 PH)	Ap1 max	<0.25 x D	300	IPT	0.0009	0.00189	0.00243	0.00288	0.00324	0.0036
K	Gray Iron GG	Ap1 max	<0.25 x D	450	IPT	0.00153	0.00225	0.0027	0.00315	0.00369	0.00432
K	Nodular Iron GGG	Ap1 max	<0.25 x D	500	IPT	0.00153	0.00225	0.0027	0.00315	0.00369	0.00432
K	Malleable Iron GTS/GTW	Ap1 max	<0.25 x D	600	IPT	0.00153	0.00225	0.0027	0.00315	0.00369	0.00432
S	HRSA Iron-Based (Incoloy 800/909, A286)	Ap1 max	<0.25 x D	100	IPT	0.00063	0.0009	0.00135	0.00171	0.00225	0.00297
S	HRSA Cobalt-Based (Stelite, Haynes 21/25/188)	Ap1 max	<0.25 x D	80	IPT	0.00063	0.0009	0.00135	0.00171	0.00225	0.00297
S	HRSA Nickel-Based (Inconel 601/617/625/700/706/718, Hastelloy, Monel, Nimonic, Rene, Udimet, Waspaloy)	Ap1 max	<0.25 x D	120	IPT	0.00063	0.0009	0.00135	0.00171	0.00225	0.00297
S	Titanium (Pure, ASTM 1/2/3, Ti6AL-4V, Ti6Al-2Sn-4Zr-2Mo-SI)	Ap1 max	<0.25 x D	300	IPT	0.00072	0.00099	0.00207	0.00234	0.00279	0.00315
H	Hardened Steels and Hardened or Chilled Cast Irons (42-48HRc)	Ap1 max	<0.16 x D	180	IPT	0.0008	0.0012	0.0017	0.002	0.0022	0.0025

Side Milling (A)



Note:

- Ap1 max = Full length of cut of the tool
- Lower cutting speed value is recommended for high stock removal applications or higher hardness within group.
- Higher cutting speed value is recommended for finishing applications or lower hardness within group.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.
- Slotting is not recommend with this end mill.



7 FLUTE

SQ | RAD | CC | VAR | h6 | 7FL

SC-3

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .002"

SV7 Series with Chipbreakers

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Corner Option							
				Square	R.015	R.030	R.060	R.090	R.120	R.190	R.250
0.3750	0.3750	0.875	2.500	SV70375-0720-SCB	SV70375-0720-03CB	SV70375-0720-06CB	SV70375-0720-12CB	SV70375-0720-18CB	-	-	-
		1.250	3.000	SV70375-1024-SCB	SV70375-1024-03CB	SV70375-1024-06CB	SV70375-1024-12CB	SV70375-1024-18CB	-	-	-
		1.750	3.500	SV70375-1428-SCB	SV70375-1428-03CB	SV70375-1428-06CB	SV70375-1428-12CB	SV70375-1428-18CB	-	-	-
0.5000	0.5000	1.000	3.000	SV70500-0824-SCB	SV70500-0824-03CB	SV70500-0824-06CB	SV70500-0824-12CB	SV70500-0824-18CB	SV70500-0824-24CB	-	-
		1.250	3.000	SV70500-1024-SCB	SV70500-1024-03CB	SV70500-1024-06CB	SV70500-1024-12CB	SV70500-1024-18CB	SV70500-1024-24CB	-	-
		2.000	4.000	SV70500-1632-SCB	SV70500-1632-03CB	SV70500-1632-06CB	SV70500-1632-12CB	SV70500-1632-18CB	SV70500-1632-24CB	-	-
0.6250	0.6250	1.250	3.500	SV70625-1028-SCB	-	SV70625-1028-06CB	SV70625-1028-12CB	SV70625-1028-18CB	SV70625-1028-24CB	-	-
		1.750	4.000	SV70625-1432-SCB	-	SV70625-1432-06CB	SV70625-1432-12CB	SV70625-1432-18CB	SV70625-1432-24CB	-	-
		2.125	4.000	SV70625-1732-SCB	-	SV70625-1732-06CB	SV70625-1732-12CB	SV70625-1732-18CB	SV70625-1732-24CB	-	-
0.7500	0.7500	1.250	4.000	SV70750-1032-SCB	-	SV70750-1032-06CB	SV70750-1032-12CB	SV70750-1032-18CB	SV70750-1032-24CB	SV70750-1032-38CB	SV70750-1032-50CB
		1.750	4.000	SV70750-1432-SCB	-	SV70750-1432-06CB	SV70750-1432-12CB	SV70750-1432-18CB	SV70750-1432-24CB	SV70750-1432-38CB	SV70750-1432-50CB
		2.250	5.000	SV70750-1840-SCB	-	SV70750-1840-06CB	SV70750-1840-12CB	SV70750-1840-18CB	SV70750-1840-24CB	SV70750-1840-38CB	SV70750-1840-50CB
1.0000	1.0000	1.500	4.000	SV71000-1232-SCB	-	SV71000-1232-06CB	SV71000-1232-12CB	SV71000-1232-18CB	SV61000-1232-24CB	SV71000-1232-38CB	SV71000-1232-50CB
		2.250	5.000	SV71000-1840-SCB	-	SV71000-1840-06CB	SV71000-1840-12CB	SV71000-1840-18CB	SV71000-1840-24CB	SV71000-1840-38CB	SV71000-1840-50CB
		3.000	6.000	SV71000-2448-SCB	-	SV71000-2448-06CB	SV71000-2448-12CB	SV71000-2448-18CB	SV71000-2448-24CB	SV71000-2448-38CB	SV71000-2448-50CB

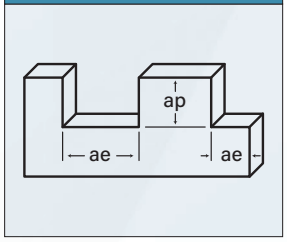
Cut Materials

STEEL | STAINLESS STEEL | CAST IRON | HI-TEMP ALLOYS | HARDENED STEEL

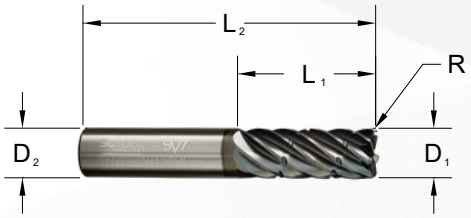
SV7CB Recommended Starting Speeds and Feeds

	Material Group	Side Milling (A)		Speed		Effective Feed per Tooth (IPT=inch/th) for side milling (A) (Use Chip Thinning Calculations to correct for stepover)					
						D - Diameter					
		A		A (SFM)	frac.	1/4"	3/8"	1/2"	5/8"	3/4"	1"
		ap	ae		dec.	0.250	0.375	0.500	0.625	0.750	1.000
P	Unalloyed Steel (AISI 1000, 1100, 1200, 1500 Series)	Ap1 max	<0.25 x D	500	IPT	0.00099	0.00162	0.00279	0.00315	0.00378	0.00441
P	Low-alloy Steel (AISI 3000, 4000, 5000, 6000, 8000, 9000 Series)	Ap1 max	<0.25 x D	400	IPT	0.00099	0.00162	0.00279	0.00315	0.00378	0.00441
P	High-alloy Steel/Tool Steel (SAE Classes A, D, H, O, S, M, T)	Ap1 max	<0.25 x D	350	IPT	0.0009	0.0018	0.00234	0.00261	0.00306	0.00342
M	Austenitic (AISI 200 & 300 Series)	Ap1 max	<0.25 x D	300	IPT	0.00135	0.00171	0.00198	0.00234	0.00279	0.00306
M	Marensitic (AISI 400 & 500 Series)	Ap1 max	<0.25 x D	350	IPT	0.00144	0.0018	0.00207	0.00252	0.00297	0.00324
M	Precipitation (PH 15-7 Mo, 15-5 PH, 17-7 PH)	Ap1 max	<0.25 x D	300	IPT	0.0009	0.00189	0.00243	0.00288	0.00324	0.0036
K	Gray Iron GG	Ap1 max	<0.25 x D	450	IPT	0.00153	0.00225	0.0027	0.00315	0.00369	0.00432
K	Nodular Iron GGG	Ap1 max	<0.25 x D	500	IPT	0.00153	0.00225	0.0027	0.00315	0.00369	0.00432
K	Malleable Iron GTS/GTW	Ap1 max	<0.25 x D	600	IPT	0.00153	0.00225	0.0027	0.00315	0.00369	0.00432
S	HRSA Iron-Based (Incoloy 800/909, A286)	Ap1 max	<0.25 x D	100	IPT	0.00063	0.0009	0.00135	0.00171	0.00225	0.00297
S	HRSA Cobalt-Based (Stelite, Haynes 21/25/188)	Ap1 max	<0.25 x D	80	IPT	0.00063	0.0009	0.00135	0.00171	0.00225	0.00297
S	HRSA Nickel-Based (Inconel 601/617/625/700/706/718, Hastelloy, Monel, Nimonic, Rene, Udimet, Waspaloy)	Ap1 max	<0.25 x D	120	IPT	0.00063	0.0009	0.00135	0.00171	0.00225	0.00297
S	Titanium (Pure, ASTM 1/2/3, Ti6AL-4V, Ti6Al-2Sn-4Zr-2Mo-SI)	Ap1 max	<0.25 x D	300	IPT	0.00072	0.00099	0.00207	0.00234	0.00279	0.00315
H	Hardened Steels and Hardened or Chilled Cast Irons (42-48HRc)	Ap1 max	<0.16 x D	180	IPT	0.0008	0.0012	0.0017	0.002	0.0022	0.0025

Side Milling (A)



Note:
- Ap1 max = Full length of cut of the tool
- Lower cutting speed value is recommended for high stock removal applications or higher hardness within group.
- Higher cutting speed value is recommended for finishing applications or lower hardness within group.
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.
- Slotting is not recommend with this end mill.



7 FLUTE

SQ RAD CC VAR h6 7FL

SC-3

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .002"

STANDARD PERFORMANCE END MILLS

S2F

Our Standard Performance End Mills are not your everyday general purpose end mills. These end mills are manufactured with sub-micron grain carbide and extremely versatile in a multitude of materials.

S4F

Stocked and ready to order in diameters of 1/8" to 1" including a variety of options: square end, corner radius, and ball nose – all uncoated.

2 FLUTE

S2F Series Uncoated

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Corner Option								
				Square	R.015	R.030	R.060	R.090	R.120	R.190	R.250	Ball Nose
0.1250	0.1250	0.500	1.500	S2F0125-0412-S	S2F0125-0412-03	S2F0125-0412-06	-	-	-	-	-	S2F0125-0412-BN
		0.750	2.000	S2F0125-0616-S	-	-						-
0.1875	0.1875	0.625	2.000	S2F0188-0516-S	S2F0188-0516-03	S2F0188-0516-06	-	-	-	-	-	S2F0188-0516-BN
		1.125	2.500	S2F0188-0920-S	-	-	-	-	-	-	-	-
0.2500	0.2500	0.750	2.500	S2F0250-0620-S	S2F0250-0620-03	S2F0250-0620-06	S2F0250-0620-12	-	-	-	-	S2F0250-0620-BN
		1.250	3.000	S2F0250-1024-S	-	-	-	-	-	-	-	-
0.3125	0.3125	0.875	2.500	S2F0313-0720-S	S2F0313-0720-03	S2F0313-0720-06	S2F0313-0720-12	-	-	-	-	S2F0313-0720-BN
		1.250	3.000	S2F0313-1024-S	-	-	-	-	-	-	-	-
0.3750	0.3750	0.875	2.500	S2F0375-0720-S	S2F0375-0720-03	S2F0375-0720-06	S2F0375-0720-12	S2F0375-0720-18	-	-	-	S2F0375-0720-BN
		1.250	3.000	S2F0375-1024-S	-	-	-	-	-	-	-	-
		1.750	3.500	S2F0375-1428-S	-	-	-	-	-	-	-	-
0.4375	0.4375	1.250	3.000	S2F0438-1024-S	-	-	-	-	-	-	-	S2F0438-1024-BN
0.5000	0.5000	1.000	3.000	S2F0500-0824-S	S2F0500-0824-03	S2F0500-0824-06	S2F0500-0824-12	S2F0500-0824-18	S2F0500-0824-24	-	-	S2F0500-0824-BN
		1.500	3.500	S2F0500-1228-S	-	-	-	-	-	-	-	
		2.000	4.000	S2F0500-1632-S	-	-	-	-	-	-	-	-
0.5625	0.5625	1.250	3.500	S2F0563-1028-S								S2F0563-1028-BN
0.6250	0.6250	1.250	3.500	S2F0625-1028-S	-	S2F0625-1028-06	S2F0625-1028-12	S2F0625-1028-18	S2F0625-1028-24	-	-	S2F0625-1028-BN
		1.750	4.000	S2F0625-1432-S	-	-	-	-	-	-	-	-
		2.250	5.000	S2F0625-1840-S	-	-	-	-	-	-	-	-
0.7500	0.7500	1.500	4.000	S2F0750-1232-S	-	S2F0750-1232-06	S2F0750-1232-12	S2F0750-1232-18	S2F0750-1232-24	S2F0750-1232-38	S2F0750-1232-50	S2F0750-1232-BN
		2.000	5.000	S2F0750-1640-S	-	-	-	-	-	-	-	-
		3.000	6.000	S2F0750-2448-S	-	-	-	-	-	-	-	-
1.0000	1.0000	1.500	4.000	S2F1000-1232-S	-	S2F1000-1232-06	S2F1000-1232-12	S2F1000-1232-18	S2F1000-1232-24	S2F1000-1232-38	S2F1000-1232-50	S2F1000-1232-BN
		2.250	5.000	S2F1000-1840-S	-	-	-	-	-	-	-	-
		3.000	6.000	S2F1000-2448-S	-	-	-	-	-	-	-	-

**Add "-SC13" to end of the EDP for ZRN coating (Please allow 3-5 working days)*
**Add "-SC2" to end of the EDP for TiAlN coating (Please allow 3-5 working days)*

Cut Materials

ALUM < 10% Si | ALUM > or = 10% Si | COPPER/BRASS

STEEL | STAINLESS STEEL | CAST IRON | HI-TEMP ALLOYS

Ramping

Profiling

Finishing

Roughing

Plunging

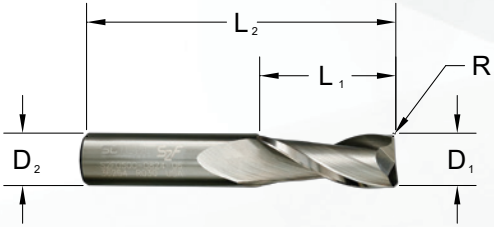
Slotting

Pocketing

S2F Recommended Starting Speeds and Feeds

	Material Group	Rc Hardness	Series S2F Speed (SFM)	Series S4F Speed (SFM)	frac. / dec.	D - Diameter 1/4" 0.250	3/8" 0.375	1/2" 0.500	5/8" 0.625	3/4" 0.750	1" 1.000
P	Unalloyed Steel (AISI 1000, 1100, 1200, 1500 Series)	>32	-	200-250	IPT	.0007-.0015	.0010-.0025	.0010-.0025	.0030-.0050	.0030-.0050	.0040-.0060
		<32	-	125-175	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
	Low-alloy Steel (AISI 3000, 4000, 5000, 6000, 8000, 9000 Series)	>32	-	200-250	IPT	.0007-.0015	.0010-.0025	.0010-.0025	.0030-.0050	.0030-.0050	.0040-.0060
		<32	-	125-175	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
	High-alloy Steel/Tool Steel (SAE Classes A, D, H, O, S, M, T)"	>32	-	150-225	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	60-125	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
M	Austenitic (AISI 200 & 300 Series)	>32	-	200-250	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	150-200	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
	Marensitic (AISI 400 & 500 Series)	>32	-	150-250	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	125-175	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
	Precipitation (PH 15-7 Mo, 15-5 PH, 17-7 PH)	>32	-	150-250	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	125-175	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
K	Gray Iron GG	-	225-325	250-350	IPT	.0010-.0020	.0015-.0040	.0015-.0040	.0030-.0100	.0030-.0100	.0050-.0100
	Nodular Iron GGG	-	250-350	300-400	IPT	.0010-.0020	.0015-.0040	.0015-.0040	.0030-.0100	.0030-.0100	.0050-.0100
	Malleable Iron GTS/GTW	-	250-350	300-400	IPT	.0010-.0020	.0015-.0040	.0015-.0040	.0030-.0100	.0030-.0100	.0050-.0100
S	HRSA Iron-Based (Incoloy 800/909, A286)	>32	-	175-225	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	125-175	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
	HRSA Cobalt-Based (Stelite, Haynes 21/25/188)	>32	-	175-225	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	125-175	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
	HRSA Nickel-Based (Inconel 601/617/625/700/706/718, Hastelloy, Monel, Nimonic, Rene, Udimet, Waspaloy)	>32	-	125-175	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	70-115	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
	"Titanium (Pure, ASTM 1/2/3, Ti6AL-4V, Ti6Al-2Sn-4Zr-2Mo-SI)	-	200-300	200-300	IPT	.0007-.0015	.0010-.0025	.0010-.0025	.0030-.0050	.0030-.0050	.0040-.0060
N	Aluminum (<10% Si)	-	500 min.	-	IPT	.0010-.0020	.0015-.0040	.0015-.0040	.0030-.0150	.0030-.0150	.0050-.0150
	Aluminum (> or= to 10% Si)	-	500 min.	-	IPT	.0010-.0020	.0015-.0040	.0015-.0040	.0030-.0150	.0030-.0150	.0050-.0150
	Copper / Brass	-	350-500	-	IPT	0.0015	0.0023	0.0031	0.0039	0.0047	0.0055
H	Hardened Steels and Hardened or Chilled Cast Irons (42-48HRc)	-	-	-	-	-	-	-	-	-	-

Note:
- These values are for uncoated tools.
- For coated tools increase SFM: SC-2 = +40%
- For tools with a LOC greater than 3xD lower SFM by no less than 15%
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.



SQ RAD BALL CC h6 2FL

Uncoated

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .002"

S4F Series Uncoated

Cutting Diameter D1	Shank Diameter D2	LOC	OAL	Corner Option								
				Square	R.015	R.030	R.060	R.090	R.120	R.190	R.250	Ball Nose
0.1250	0.1250	0.500	1.500	S4F0125-0412-S	S4F0125-0412-03	S4F0125-0412-06	-	-	-	-	-	S4F0125-0412-BN
		0.750	2.000	S4F0125-0616-S	-	-						-
0.1875	0.1875	0.625	2.000	S4F0188-0516-S	S4F0188-0516-03	S4F0188-0516-06	-	-	-	-	-	S4F0188-0516-BN
		1.125	2.500	S4F0188-0920-S	-	-	-	-	-	-	-	-
0.2500	0.2500	0.750	2.500	S4F0250-0620-S	S4F0250-0620-03	S4F0250-0620-06	S4F0250-0620-12	-	-	-	-	S4F0250-0620-BN
		1.250	3.000	S4F0250-1024-S	-	-	-	-	-	-	-	-
0.3125	0.3125	0.875	2.500	S4F0313-0720-S	S4F0313-0720-03	S4F0313-0720-06	S4F0313-0720-12	-	-	-	-	S4F0313-0720-BN
		1.250	3.000	S4F0313-1024-S	-	-	-	-	-	-	-	-
0.3750	0.3750	0.875	2.500	S4F0375-0720-S	S4F0375-0720-03	S4F0375-0720-06	S4F0375-0720-12	S4F0375-0720-18	-	-	-	S4F0375-0720-BN
		1.250	3.000	S4F0375-1024-S	-	-	-	-	-	-	-	-
		1.750	3.500	S4F0375-1428-S	-	-	-	-	-	-	-	-
0.4375	0.4375	1.250	3.000	S4F0438-1024-S	-	-	-	-	-	-	-	S4F0438-1024-BN
0.5000	0.5000	1.000	3.000	S4F0500-0824-S	S4F0500-0824-03	S4F0500-0824-06	S4F0500-0824-12	S4F0500-0824-18	S4F0500-0824-24	-	-	S4F0500-0824-BN
		1.500	3.500	S4F0500-1228-S	-	-	-	-	-	-	-	
		2.000	4.000	S4F0500-1632-S	-	-	-	-	-	-	-	-
0.5625	0.5625	1.250	3.500	S4F0563-1028-S								S4F0563-1028-BN
0.6250	0.6250	1.250	3.500	S4F0625-1028-S	-	S4F0625-1028-06	S4F0625-1028-12	S4F0625-1028-18	S4F0625-1028-24	-	-	S4F0625-1028-BN
		1.750	4.000	S4F0625-1432-S	-	-	-	-	-	-	-	-
		2.250	5.000	S4F0625-1840-S	-	-	-	-	-	-	-	-
0.7500	0.7500	1.500	4.000	S4F0750-1232-S	-	S4F0750-1232-06	S4F0750-1232-12	S4F0750-1232-18	S4F0750-1232-24	S4F0750-1232-38	S4F0750-1232-50	S4F0750-1232-BN
		2.000	5.000	S4F0750-1640-S	-	-	-	-	-	-	-	-
		3.000	6.000	S4F0750-2448-S	-	-	-	-	-	-	-	-
1.0000	1.0000	1.500	4.000	S4F1000-1232-S	-	S4F1000-1232-06	S4F1000-1232-12	S4F1000-1232-18	S4F1000-1232-24	S4F1000-1232-38	S4F1000-1232-50	S4F1000-1232-BN
		2.250	5.000	S4F1000-1840-S	-	-	-	-	-	-	-	-
		3.000	6.000	S4F1000-2448-S	-	-	-	-	-	-	-	-

** Add "-SC2" to end of the EDP for TiAlN coating (Please allow 3-5 working days)*

4FLUTE

Cut Materials

ALUM < 10% Si | ALUM > or = 10% Si | COPPER/BRASS

STEEL | STAINLESS STEEL | CAST IRON | HI-TEMP ALLOYS

Ramping

Profiling

Finishing

Roughing

Plunging

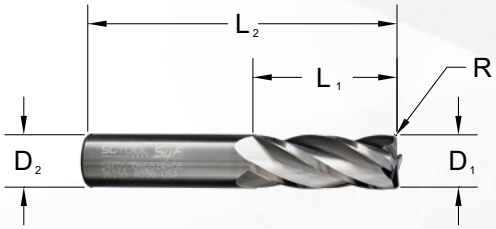
Slotting

Pocketing

S4F Recommended Starting Speeds and Feeds

	Material Group	Rc Hardness	Series S2F Speed (SFM)	Series S4F Speed (SFM)	frac. dec.	D - Diameter 1/4" 0.250	3/8" 0.375	1/2" 0.500	5/8" 0.625	3/4" 0.750	1" 1.000
P	Unalloyed Steel (AISI 1000, 1100, 1200, 1500 Series)	>32	-	200-250	IPT	.0007-.0015	.0010-.0025	.0010-.0025	.0030-.0050	.0030-.0050	.0040-.0060
		<32	-	125-175	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
	Low-alloy Steel (AISI 3000, 4000, 5000, 6000, 8000, 9000 Series)	>32	-	200-250	IPT	.0007-.0015	.0010-.0025	.0010-.0025	.0030-.0050	.0030-.0050	.0040-.0060
		<32	-	125-175	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
	High-alloy Steel/Tool Steel (SAE Classes A, D, H, O, S, M, T)	>32	-	150-225	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	60-125	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
M	Austenitic (AISI 200 & 300 Series)	>32	-	200-250	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	150-200	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
	Marensitic (AISI 400 & 500 Series)	>32	-	150-250	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	125-175	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
	Precipitation (PH 15-7 Mo, 15-5 PH, 17-7 PH)	>32	-	150-250	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	125-175	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
K	Gray Iron GG	-	225-325	250-350	IPT	.0010-.0020	.0015-.0040	.0015-.0040	.0030-.0100	.0030-.0100	.0050-.0100
	Nodular Iron GGG	-	250-350	300-400	IPT	.0010-.0020	.0015-.0040	.0015-.0040	.0030-.0100	.0030-.0100	.0050-.0100
	Malleable Iron GTS/GTW	-	250-350	300-400	IPT	.0010-.0020	.0015-.0040	.0015-.0040	.0030-.0100	.0030-.0100	.0050-.0100
S	HRSA Iron-Based (Incoloy 800/909, A286)	>32	-	175-225	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	125-175	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
	HRSA Cobalt-Based (Stelite, Haynes 21/25/188)	>32	-	175-225	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	125-175	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
	HRSA Nickel-Based (Inconel 601/617/625/700/706/718, Hastelloy, Monel, Nimonic, Rene, Udimet, Waspaloy)	>32	-	125-175	IPT	.0005-.0010	.0008-.0020	.0008-.0020	.0020-.0040	.0020-.0040	.0030-.0050
		<32	-	70-115	IPT	.0003-.0005	.0005-.0015	.0005-.0015	.0010-.0030	.0010-.0030	.0020-.0040
	Titanium (Pure, ASTM 1/2/3, Ti6AL-4V, Ti6Al-2Sn-4Zr-2Mo-SI)	-	200-300	200-300	IPT	.0007-.0015	.0010-.0025	.0010-.0025	.0030-.0050	.0030-.0050	.0040-.0060
N	Aluminum (<10% Si)	-	500 min.	-	IPT	.0010-.0020	.0015-.0040	.0015-.0040	.0030-.0150	.0030-.0150	.0050-.0150
	Aluminum (> or= to 10% Si)	-	500 min.	-	IPT	.0010-.0020	.0015-.0040	.0015-.0040	.0030-.0150	.0030-.0150	.0050-.0150
	Copper / Brass	-	350-500	-	IPT	0.0015	0.0023	0.0031	0.0039	0.0047	0.0055
H	Hardened Steels and Hardened or Chilled Cast Irons (42-48HRc)	-	-	-	-	-	-	-	-	-	-

Note:
- These values are for uncoated tools.
- For coated tools increase SFM: SC-2 = +40%
- For tools with a LOC greater than 3xD lower SFM by no less than 15%
- All values are recommended starting points based on ideal conditions. Adjust parameters accordingly for specific applications.



4FLUTE

SQ RAD BALL CC h6 4FL

Uncoated

Tolerance	
Shank	h6
Cut Diameter	+ .000" - .002"

EPIC SOLUTIONS FOR YOUR EVERY NEED

Custom Tool Manufacturing

We specialize in personally connecting and creating solutions that meet the goals of our customer. For any drilling, reaming, routing, or milling applications, SCTool's Master Tool Makers can expertly build customized tooling solutions for your specific needs. Contact us to discuss a customized solution for any machining need!

Reconditioning

SCTool's abilities are not limited to manufacturing. We take pride in our ability to service a customer's product from inception all the way through the life cycle of the product – cradle to grave.

Our Reconditioning Capabilities

- Professional regrinding, original recoating, and high precision reconditioning of other cutting tool brands back to original specs
- CNC reconditioning of high-performance drills, reamers, end mills, and many other types of carbide, cobalt, and high-speed steel rotary cutting tools
- Upon request, expedited regrinding in case of an emergency
- Upon request, SCTool laser etches the tool each time the tool is reground to track the number of regrinds

We make it easy

Place your tools in our company regrind box and we will return them to you clean, sorted, sharpened, and sized – ready to be placed in the spindle. SCTool will send you an appropriately sized box for your application. Email us at *info@sctoolcorp.com* to start your reconditioning service.

Accommodating Special Requests

- Edge Prep
- End Work Only
- Laser Etch Each Tool's Shank for Tracking Number of Regrinds
- Recoating
- Cutting Diameter Only
- Additional Modifications

With our Reconditioning Program, our customers save **40-75%** per tool on average.

THE SCTOOL "QWIKMOD" SERVICE

Try our 5 day "QwikMod" modification service!

- Chipbreakers
- Corner Radius
- Corner Chamfer
- Weldon Flat
- Shank Coolant Grooves
- Neck Additions

Add a corner radius, corner chamfer, chipbreakers, LOC adjustment, weldon flat, shank coolant grooves, or neck additions to any end mill and we will ship in 5 business days. This includes all end mills in our catalog, including all our high-performance lines.

Distributor Information

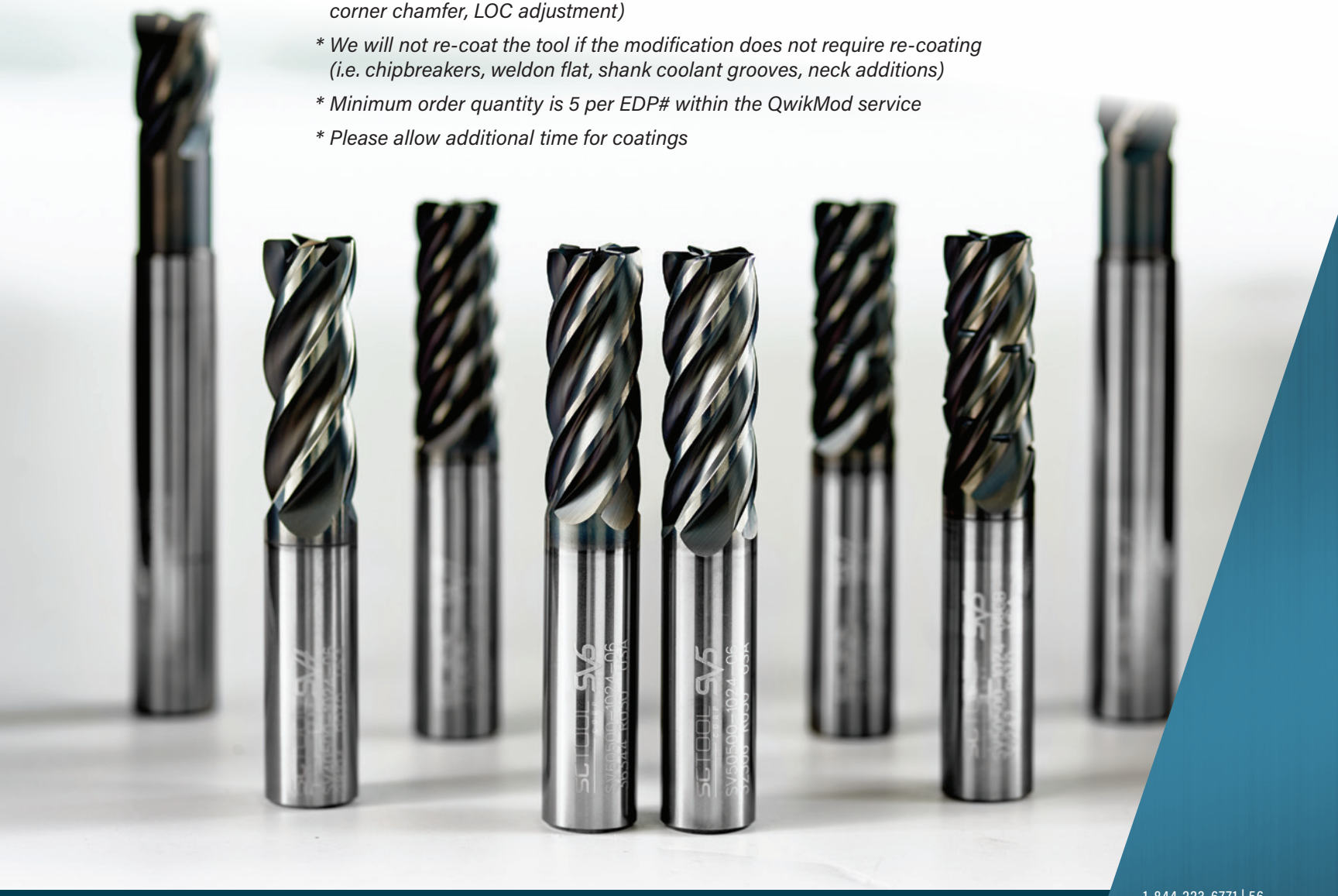
Please email *rfq@sctoolcorp.com* the EDP# and what modification your customer needs, and we will respond ASAP with pricing. Distributors can also login and add the modification to the end of the tool on our e-commerce website, www.sctoolcorp.com, for an immediate quote. We look forward to serving all your modification needs!

** We will coat the tool if the modification requires coating (i.e. corner radius, corner chamfer, LOC adjustment)*

** We will not re-coat the tool if the modification does not require re-coating (i.e. chipbreakers, weldon flat, shank coolant grooves, neck additions)*

** Minimum order quantity is 5 per EDP# within the QwikMod service*

** Please allow additional time for coatings*



END MILL TROUBLESHOOTING

Problem	Possible Cause	Possible Solution
Excessive Flank Wear	Speed too high	Reduce the cutting speed RPM's (n).
	Improper feed speed (too slow)	Increase feed per tooth (fz).
	Hard workpiece material >55 Rc	Try 90-100 SFM (vc) with multi-fluted tool (5 flutes+).
	Recutting chips	Change feed speed to change chip size or clear chips with coolant or air pressure.
	Milling strategy	Ensure you are climb milling unless workpiece material has hard/abrasive outer skin or high impact tool steel like D2, then conventional milling technique is preferred for breakthrough.
	Improper cutting angle	Change to correct cutting angle, tilt tool at 15 degrees.
	Too low a primary relief angle	Change to larger relief angle.
Excessive Corner Wear	No corner radius	Implementing corner radius on tool adds strength and increases tool life.
	Speed too high	Reduce the cutting speed RPM's (n).
	Tool runout	Check tool runout in holder/spindle. <.0003" (.0076mm) desired. Hand ground flats can be suspect and common cause. Use collet, milling chuck, or shrink fit holders if possible.
	Tool overhang	Ensure you are using shortest OAL possible, stub tool in holder. Utilize stronger necked tool for longer reaches.
Cutting Edge Chipping	Lack of rigidity (tool)	Use shortest end mill available, hold shank deeper in holder, investigate for tool slippage. Use short gage length holder.
	Lack of rigidity (workpiece)	Tighten workpiece fixture - a common problem.
	Feed too high	Decrease feed per tooth (fz).
	Feed too high on first pass	Decrease feed per tooth (fz) on first pass through workpiece skin or reduce radial width of cut (ae) first pass.
	Part entry	Reduce FPT on entry - implement radius in or sweeping entrances - avoid 90° (perpendicular) entry.
	Milling strategy	Ensure you are climb milling unless workpiece material has hard/abrasive outer skin or high impact tool steel like D2, then conventional milling technique is preferred for breakthrough.
	Tool overhang	Ensure you are using shortest OAL possible, stub tool in holder. Utilize stronger necked tool for longer reaches.
	Tool runout	Check tool runout in holder/spindle, <.0003" (.0076mm) desired. Hand ground flats can be suspect and common cause. Use collet, milling chuck, or shrink fit holders if possible.
	Not enough rigidity of machine tool & holder	Change rigid machine tool or holder.
	Cutting edge prep	Ensure tool has proper edge prep for workpiece material.
	Teeth too sharp	Change to lower cutting angle, primary relief.

Problem	Possible Cause	Possible Solution
Breakage	Lack of rigidity (workpiece)	Tighten workpiece fixture - a common problem.
	Lack of rigidity (workpiece)	Increase the cutting speed RPM's (n).
	Feed too high	Decrease feed per tooth (fz).
	Heavy depth of cut	Reduce width of cut, radial depth of cut (ae) & depth of cut, axial depth of cut (ap).
	Part entry	Reduce FPT on entry - implement radius in or sweeping entrances - avoid 90° (perpendicular) entry.
	Milling strategy	Review tool path and ensure there are no arbitrary moves, extreme arc of engagement increases & undesirable situations for the tool. Keep constant radial engagement.
	Tool overhang	Ensure you are using shortest OAL possible, stub tool in holder. Utilize stronger necked tool for longer reaches.
	Tool runout	Check tool runout in holder/spindle, <.0003" (.007 6mm) desired. Hand ground flats can be suspect and common cause. Use collet, milling chuck, or shrink fit holders if possible.
	Excessive edge wear	Recondition at earlier stage. Factory recondition service is recommended.
Built Up Edge (BUE)	Chip welding to cutting edge	Utilize proper tool coating for workpiece material being cut. Climb mill preferred.
	Feed too low	Increase feed per tooth (fz).
	Speed too low	Increase the cutting speed RPM's (n).
	Coolant strategy	Add coolant or readjust coolant flow, use through tool coolant if available. Check coolant mixture concentration.
Chip Packing	Insufficient chip room	Use end mill with fewer flutes.
	Feed too high	Decrease feed per tooth (fz).
	Heavy depth of cut	Reduce width of cut, radial depth of cut (ae) & depth of cut, axial depth of cut (ap).
	Not enough coolant	Apply more coolant to flush chips. Use air pressure or op. stop to clear chips away.
	Large heavy chip	Utilize chipbreaker style tool to cut chip size.
Poor Surface Finish	Feed too high	Decrease feed per tooth (fz).
	Speed too low	Increase width of cut, radial depth of cut (ae) to stabilize tool in cut.
	Too light width of cut	Increase width of cut, radial depth of cut (ae) to stabilize tool in cut.
	Tool runout	Check tool runout in holder/spindle, <.0003" (.00 76mm) desired. Hand ground flats can be suspect and common cause. Use collet, milling chuck, or shrink fit holders.
	Built up edge	Use flood coolant.
	Recutting chips	Redirect/Evaluate coolant flush – or use fewer number of flutes.
	No end tooth concavity	Add margin (touch primary with oilstone).

Problem	Possible Cause	Possible Solution
Chatter/Vibration	Lack of rigidity (workpiece)	Tighten workpiece figure – a common problem.
	Lack of rigidity (machine & holder)	Use better machine tool holder or change condition.
	Tool runout	Check tool runout in holder/spindle, <.0003" (.0076mm) desired. Hand ground flats can be suspect and common cause. Use collet, milling chuck, or shrink fit holders if possible.
	Speed too high	Reduce the cutting speed RPM's (n).
	Feed too low	Increase feed per tooth (fz).
	Chip too thin	Utilize chip thinning adjustment multiplier.
	Arc of engagement violation	Use smaller tools and generate corner radii in pockets. Avoid tools that diameter matches workpiece corner radius, or rough plunge corners.
	Milling strategy	Ensure you are climb milling unless workpiece material has hard/abrasive outer skin or high impact tool steel like D2, then conventional milling technique is preferred for breakthrough.
Tool Deflection	Tool overhang	Ensure you are using shortest OAL possible, stub tool in holder. Utilize stronger necked tool for longer reaches.
	End mill diameter	Increase diameter of end mill for higher strength to length ratio.
	Increase number of flutes	Higher number of flutes = larger core diameter = increased strength.
	Feed too high	Decrease feed per tooth (fz).
	Too high width of cut	Decrease width of cut, radial depth of cut (ae).
	Milling strategy	Climb milling can help reduce the amount of deflection in some cases.
No Dimensional Accuracy (Wall Tapered)	Coolant strategy	Add coolant or readjust coolant flow, use through tool coolant if available. Check coolant mixture concentration.
	Tool deflection	See Tool Deflection section above.
	Feed too high	Decrease feed per tooth (fz).
	Too high width of cut	Decrease width of cut, radial depth of cut (ae).
	Tool runout	Check tool runout in holder/spindle, <.0003" (.0076mm) desired. Hand ground flats can be suspect and common cause. Use collet, milling chuck, or shrink fit holders if possible.

RADIAL CHIP THINNING

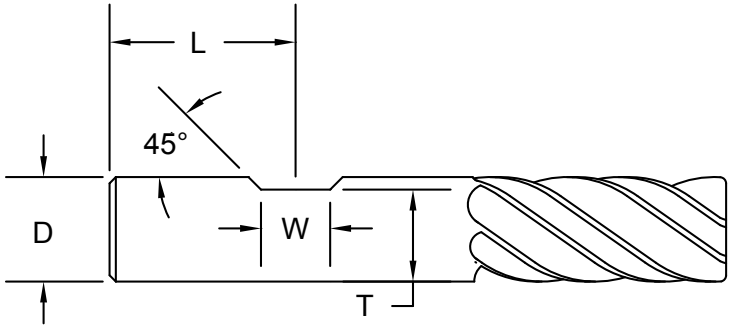
During profile or side milling with a solid carbide end mill at 50% (ae) radial width of cut, the chip formed is at full programmed thickness. When your radial depth of cut decreases to something less than 50%, the chip formed is not as thick. This is known as "radial chip thinning." When less than 50% (ae) radial depths are used, it becomes necessary to increase your feed to achieve full chip thickness.

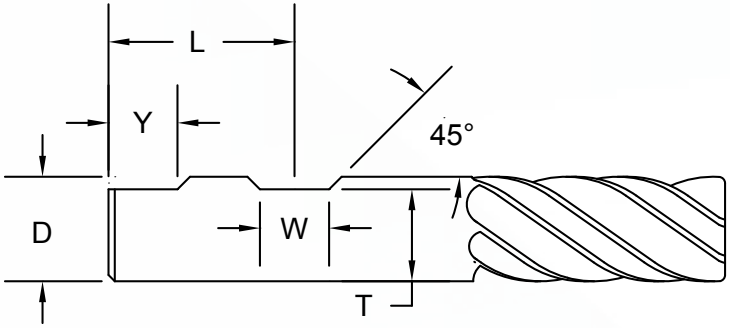
With the utilization of new programming methods, such as trochoidal and peel milling, manufacturers can increase productivity and tool life. These methods take advantage of much deeper (ap) axial cuts with less (ae) radial width of cut. With these methods, it's possible to run higher surface footages (SFM or m/min) along with these higher feed rates (IPM or mm/min) because less heat is generated at the cutting zone. Plus, you're utilizing chip thinning.

With SCTool's super variable tools, harmonics have virtually been eliminated. Advancements in coatings enable our tools to withstand 900°F, thus eliminating heat concerns. In addition, machine tools have advanced greatly to take advantage of these new methods. Use the following chart as a reference to increase feed rates by multiplying recommended feed rate by the increase feed factor, according to your (ae) radial depth of cut as % of (Dc) cutter diameter.

(ae) Radial Depth of Cut as to % of (Dc Cutter Diameter	Increase Feed Factor
30%	1.10
25%	1.20
20%	1.20
15%	1.41
10%	1.80
7%	2.00
5%	2.30
3%	2.93
2%	3.60
1%	5.00

SHANK FLAT DIMENSIONS





D Diameter	L ± .015	W ± .002	T +0/-.010	Y ± .020
1/4	.500	.281	.230	-
3/8	.781	.281	.325	-
1/2	.890	.331	.440	-
5/8	.953	.401	.560	-
3/4	1.016	.456	.675	-
7/8	1.016	.456	.810	.500
1	1.141	.516	.925	.500
1-1/4	1.141	.516	1.156	.500

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SV7 S2F S4F

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