



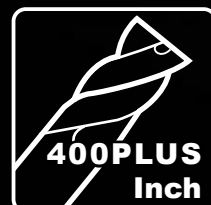
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amazon

2018-2019

SPEED TIGER

**HIGH PERFORMANCE FOR EXOTIC MATERIALS
GENERAL APPLICATION**

<http://www.speedtiger.com.tw/en/>



Speed Tiger Precision Technology Co., Ltd. was founded in 1998. It is not only the largest cutting tools manufacturer, but also the first one that combined coating technology. We have up to 160 sales locations in 42 major industrial countries from Europe, America, Japan, etc.

Speed Tiger offers not only the high efficient cutting tools, but also advice and guidance about the idea through to implementation of the customized machining process. In collaboration with customers, we work continuously to develop innovative solutions to the most varied of problems in the most varied of processing requests. We are the people to contact if you need special tools for special machining tasks.

VISION

Be the BEST Asian manufacturer in cutting tools market, and assist enterprises in using high efficient cutting tools to produce high quality and innovative products.

VALUES

Eco Friendly

Quality Assurance

Innovation & R&D

Pursuing Excellence

Customer Orientation

QUALITY POLICY

Quality Priority, Customer Satisfaction, Continual Improvement



ISO 9001:2015 Certificate



The 24th National Award of Outstanding SMEs



1998

Founded in Taichung, Taiwan

2000

1st expanding factory
Set up International trade Dept.

2002

2nd expanding factory

2004

3rd expanding factory
Set up Coating Dept.
Changed name to "Speed Tiger Precision Technology Co.,Ltd."

2006

China Branch: TOP TIGER (SHANGHAI) PERCISION TOOL CO., LTD.

2011

4th expanding factory

2014

Inserts released

2016

New Head Office

2018

Taiwan Excellence Award



2019

Taiwan Excellence Award





■ ADVENTAGES



★ Advanced Production Technology

SPEED TIGER introduced the latest technology and facilities, and have more than 100 sets of grinding machine from Germany, Switzerland, Japan and Taiwan. We have been increasing our productivity to do mass production and produce customized tools in a short time, and match up with the updating requests.



★ Professional Coating Technology

Speed Tiger introduced coating technology and equipments from Switzerland in 2004, and became the first manufacturer combining cutting tools with coating techniques. We are also good at developing many kinds of coating based on customers' processed requests and eventually become an eco friendly cutting tools company.



★ Strict Quality Control System

Ahead of others, Speed Tiger developed auto-inspect machines with our collaboration factory. From raw materials to finished products, we insist on high standard of inspection system, to make sure every product share equivalent and stable quality.



★ Highest Precision Indication $\pm 2 \mu\text{m}$

Speed Tiger cutting tool's tolerance indication entered the nanometer level precision; the world highest precision size $\pm 2\mu\text{m}$ in faith value enables the user to grasp the cutting tool's news thoroughly, understood how to request the cutting tool quality.

★ Taiwan No.1- Identity Number

Speed Tiger built the End Mills Traceability System in order to ensure the accountability of each process participants, from incoming raw material to finished products, of any production procedure. Once there is any doubt about our cutting tools, we will track its "identity number", and then clarify the problem and recall the products promptly, to lower the damage and loss caused by the issue.



SPEED TIGER

★ Well-rounded and Rapid Service

Speed Tiger Test Center is dedicated to innovative R&D and cutting test, in order to quickly solve our customers' various processing problems, and help them reduce processing time and costs. That's why we can become the best milling adviser.



★ Taiwan No.1- Identity Number

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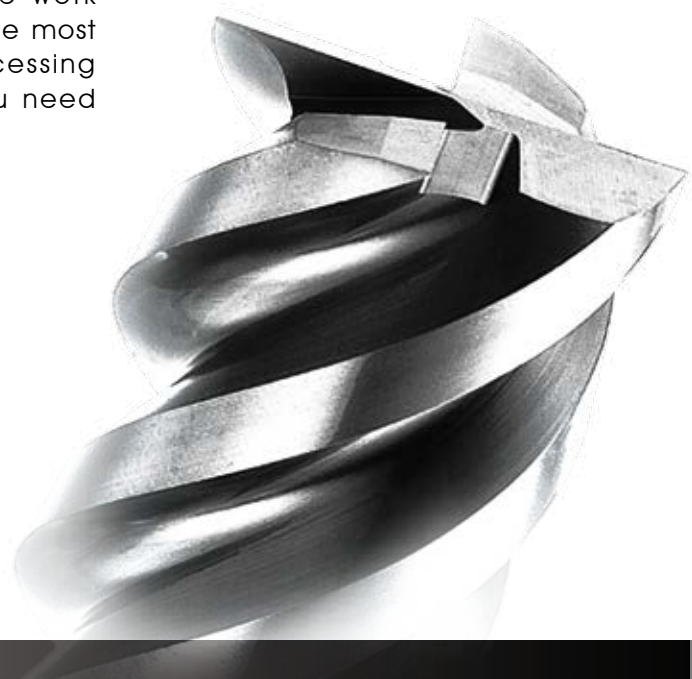
★ Well-rounded and Rapid Service

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★ Customized Services

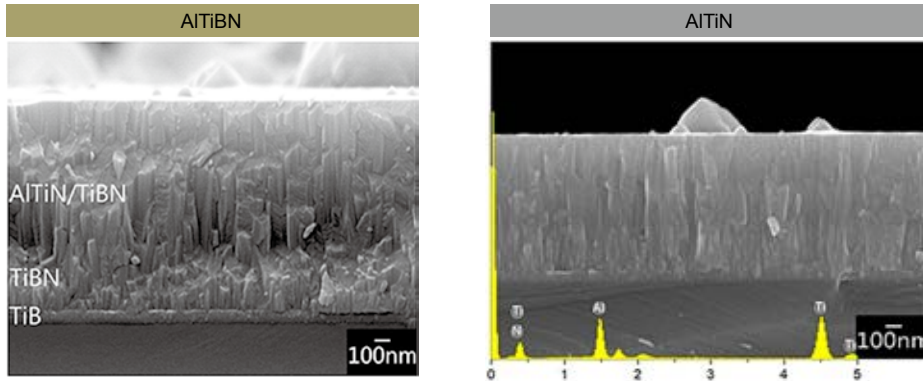
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Introduction of AlTiBN Coating

Coating Structural Analysis-SEM

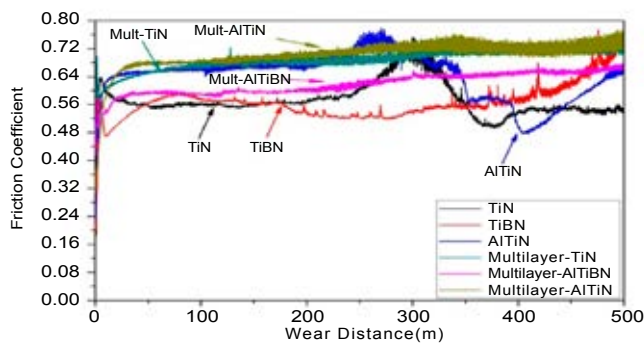


Normal Temperature - Mechanical analysis

	Hardness(Hv)	Impact of Diameter	Lc2-Lc1	Wear Rate	Roughness (μm)
AlTiN	3672	305(um)	8.28N	6.49x10-6	0.233
AlTiBN	4088 ✓	280.9(um)	17.6N	5.11x10-6 ✓	0.166 ✓

In normal temperature mechanical analysis, the performance of AlTiBN is superior to AlTiN in hardness, wear rate and coating roughness.

The Oxidation Wear of 700°C



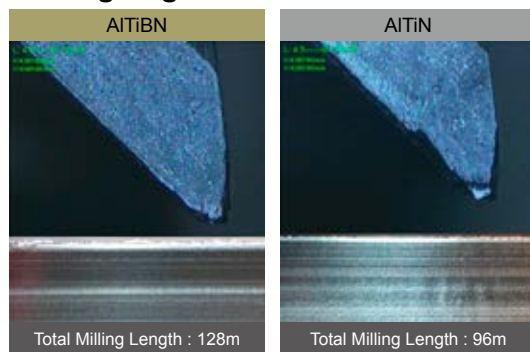
	Friction Coefficient	Wear Distance	Wear Rate
TiN	0.5662	316.3	6.4x10-6
TiBN	0.5664	281.2	5.69x10-6
AlTiN	0.6402	281.4	4.97x10-6
Mult-TiN	0.686	277.4	4.82x10-6
AlTiBN	0.618	281.8	4.66x10-6 ✓
Mult-AlTiN	0.7014	290.1	5.5x10-6

The wear rate of AlTiBN at high temperatures is also superior to the above coatings.

Test Report



Cutting Edges



Cutting Conditions

Milling Type	Side Milling	Feed Rate	1082mm/min
Work Piece	S45C	Depth of Cut	ap=20 ae=1.2
Tool Size	10mm x 30 x 75L	Coolant Way	Air
Rotation Speed	3183	CNC Machine CNC	FV102A



■ INDEX

■ 600Nano – GENERAL APPLICATION	007
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Icon Guide

SPEED TIGER

■ Tool Materials

600 Tungsten Carbide
Nano 600 Nano

400 Tungsten Carbide
PLUS 400 PLUS

■ Coating

ALTIBN ALTIBN Coating

ZrN-A ZrN-A Coating

■ Helix Angle

35° Helix Angle 35°

50° Helix Angle 50°

Irregular Irregular Helix Angle

■ ADDITIONAL GEOMETRY

A
B Unequal Flute Spacing

R Corner Radius

Protective Protective Chamfer

Partially Partially Polished
Edge

Special Special Chip Breaker



600 Nano

SERIES


GENERAL APPLICATION



600 Nano

GENERAL APPLICATION

FRACTIONAL
METRIC

FOR STEEL, CAST IRON							
Shape	Flute	Type	Mode	Photo	Coating	Spec.	Cutting Condition
Square	2	Square Type	ISE SE			09	21-29
	4	Square Type	ISE SE			10	
Ball Nose	2	Ball Nose Type	ISB SB			11	
FOR ALUMINUM							
Shape	Flute	Type	Mode	Photo	Coating	Spec.	Cutting Condition
Square	3	High Feed U-Type Aluminum	IAUE AUE			12	30-31
	2	2 Flutes Square Type for Aluminum	IAE5			13	30

Available at


SPEED TIGER

600Nano

■ Square Type - 2 flutes

600
Nano

ALTiBN

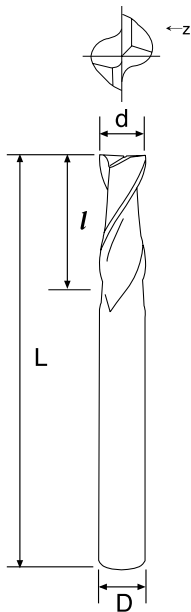
FRACTIONAL

Cutting Condition
P21-26

MODE	Diameter	Flute Length	Full Length	Shank Diameter	Flutes
	d	Z	L	D	Z
ISE1/16"2T	1/16	3/16	1-1/2	1/8	2
ISE5/64"2T	5/64	3/16	1-1/2	1/8	2
ISE3/32"2T	3/32	9/32	1-1/2	1/8	2
ISE7/64"2T	7/64	3/8	1-1/2	1/8	2
ISE1/8"2T	1/8	3/8	1-1/2	1/8	2
ISE3/16"2T	3/16	5/8	2	3/16	2
ISE1/4"2T	1/4	3/4	2-1/2	1/4	2
ISE5/16"2T	5/16	13/16	2-1/2	5/16	2
ISE3/8"2T	3/8	1	2-1/2	3/8	2
ISE1/2"2T	1/2	1	3	1/2	2
ISE5/8"2T	5/8	1-1/4	3-1/2	5/8	2

Unit:inch

METRIC

Cutting Condition
P27

MODE	Diameter	Flute Length	Full Length	Shank Diameter	Flutes
	d	Z	L	D	Z
MSE0402T	4	11	50	4	2
SE0602T	6	16	50	6	2
SE0802T	8	20	60	8	2
SE1002T	10	25	75	10	2
SE1202T	12	32	75	12	2
SE1602T	16	40	100	16	2

Unit:mm

◎ : Excellent ○ : Good

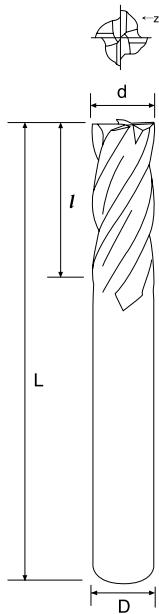
P				H	M	K	N		S		
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Copper	Aluminum	Titanium	High Temperature Alloy
~HB225	HB225~325	HRC30~40	HRC40~45	HRC45~55	HRC55~70						
○	◎	◎	◎	○			○				



■ Square Type - 4 flutes

600
Nano

ALTiBN



FRACTIONAL

Cutting Condition
P21-26

MODE	Diameter	Flute Length	Full Length	Shank Diameter	Flutes
	d	l	L	D	Z
ISE1/16"4T	1/16	3/16	1-1/2	1/8	4
ISE5/64"4T	5/64	3/16	1-1/2	1/8	4
ISE3/32"4T	3/32	9/32	1-1/2	1/8	4
ISE7/64"4T	7/64	3/8	1-1/2	1/8	4
ISE1/8"4T	1/8	3/8	1-1/2	1/8	4
ISE3/16"4T	3/16	5/8	2	3/16	4
ISE1/4"4T	1/4	3/4	2-1/2	1/4	4
ISE5/16"4T	5/16	13/16	2-1/2	5/16	4
ISE3/8"4T	3/8	1	2-1/2	3/8	4
ISE1/2"4T	1/2	1	3	1/2	4
ISE5/8"4T	5/8	1-1/4	3-1/2	5/8	4

Unit:inch

METRIC

Cutting Condition
P28

MODE	Diameter	Flute Length	Full Length	Shank Diameter	Flutes
	d	l	L	D	Z
MSE0404T	4	11	50	4	4
SE0604T	6	16	50	6	4
SE0804T	8	20	60	8	4
SE1004T	10	30	75	10	4
SE1204T	12	32	75	12	4
SE1604T	16	40	100	16	4

Unit:mm

◎ : Excellent ○ : Good

P				H	M	K	N		S		
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Copper	Aluminum	Titanium	High Temperature Alloy
~HB225	HB225~325	HRC30~40	HRC40~45	HRC45~55	HRC55~70						
○	◎	◎	◎	○			○				

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600Nano

Ball Nose Type - 2 flutes

600
Nano

ALTiBN

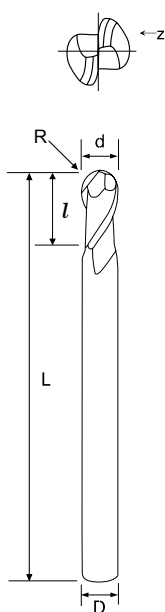
FRACTIONAL

Cutting Condition
P21-26

MODE	Diameter	Flute Length	Full Length	Shank Diameter	Flutes
	d	Z	L	D	Z
ISB1/16"2T	1/16	3/16	1-1/2	1/8	2
ISB5/64"2T	5/64	3/16	1-1/2	1/8	2
ISB3/32"2T	3/32	9/32	1-1/2	1/8	2
ISB7/64"2T	7/64	3/8	1-1/2	1/8	2
ISB1/8"2T	1/8	3/8	1-1/2	1/8	2
ISB3/16"2T	3/16	5/8	2	3/16	2
ISB1/4"2T	1/4	3/4	2-1/2	1/4	2
ISB5/16"2T	5/16	13/16	2-1/2	5/16	2
ISB3/8"2T	3/8	1	2-1/2	3/8	2
ISB1/2"2T	1/2	1	3	1/2	2
ISB5/8"2T	5/8	1-1/4	3-1/2	5/8	2

Unit:inch

METRIC

Cutting Condition
P29

MODE	Diameter	Radius	Flute Length	Full Length	Shank Diameter	Flutes
	d	R	Z	L	D	Z
MSB0402T	4	2	8	50	4	2
SB0602T	6	3	12	50	6	2
SB0802T	8	4	16	60	8	2
SB1002T	10	5	20	75	10	2
SB1202T	12	6	24	75	12	2
SB1602T	16	8	32	100	16	2

Unit:mm

◎ : Excellent ○ : Good

P				H	M	K	N		S		
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Copper	Aluminum	Titanium	High Temperature Alloy
~HB225	HB225~325	HRC30~40	HRC40~45	HRC45~55	HRC55~70						
○	◎	◎	◎	○			○				



High Feed U-Type For Aluminum Application



FRACTIONAL

Cutting Condition **P30**



MODE	Diameter	Flute Length	Full Length	Shank Diameter	Flutes
	d	l	L	D	Z
IAUE1/8"3	1/8	3/8	1-1/2	1/8	3
IAUE3/16"3	3/16	9/16	2	3/16	3
IAUE1/4"3	1/4	3/4	2	1/4	3
IAUE5/16"3	5/16	5/8	2-1/2	5/16	3
IAUE3/8"3	3/8	1-1/4	2-1/2	3/8	3
IAUE1/2"3	1/2	1-1/4	3	1/2	3
IAUE5/8"3	5/8	1-5/8	3-1/2	5/8	3

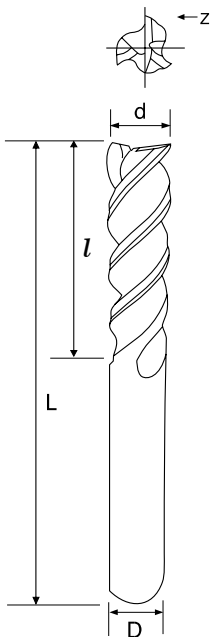
Unit:inch

METRIC

Cutting Condition **P31**

MODE	Diameter	Flute Length	Full Length	Shank Diameter	Flutes
	d	l	L	D	Z
AUE0303	3	9	50	6	3
AUE0403	4	12	50	6	3
AUE0603	6	18	50	6	3
AUE0803	8	20	60	8	3
AUE1003	10	30	75	10	3
AUE1203	12	32	75	12	3
AUE1603	16	45	100	16	3

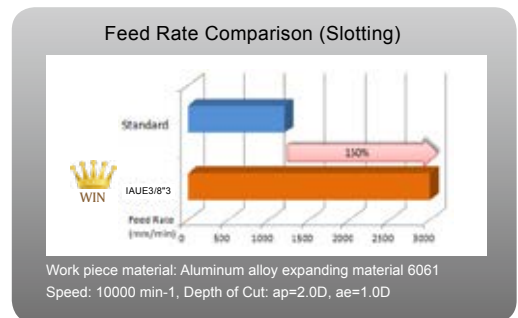
Unit:mm



※ Special U-Type design:
Material removal rate (MRR) and surface finishes are greatly improved due to effective chip removal at high rate.

※ Strong tooth with double relief angles:
Excellent production rates become 100% possible due to the improvement of tooth hardness.

※ Sharp aluminum alloy tooth design. Applicable for roughing and finishing.



◎ : Excellent ○ : Good

P				H	M	K	N		S	
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels	High Hardened Steels	Stainless Steels	Cast Iron	Copper	Aluminum	Titanium	High Temperature Alloy
~HB225	HB225~325	HRC30~40	HRC40~45 HRC45~55	HRC55~70			○	◎		

SPEED TIGER

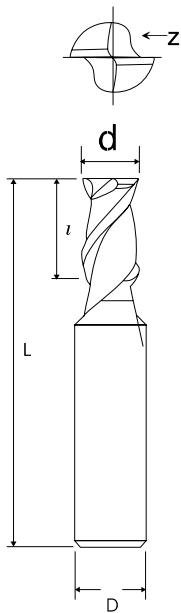
600Nano

■ 2 Flutes Square Type for Aluminum Application

600
Nano **ZrN-A**
Cutting Condition
P30
FRACTIONAL


MODE 型號	Diameter	Flute Length	Full Length	Shank Diameter	Flutes
	d 直徑	l 刃長	L 全長	D 柄徑	Z 刃數
IAE5 1/4"2 ZrN	1/4	3/4	2	1/4	2
IAE5 5/16"2 ZrN	5/16	5/8	2-1/2	5/16	2
IAE5 3/8"2 ZrN	3/8	1-1/4	2-1/2	3/8	2
IAE5 1/2"2 ZrN	1/2	1-1/4	3	1/2	2
IAE5 5/8"2 ZrN	5/8	1-5/8	3-1/2	5/8	2

Unit: inch



◎ : Excellent ○ : Good

P				H	M	K	N		S		
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Copper	Aluminum	Titanium	High Temperature Alloy
~HB225	HB225~325	HRC30~40	HRC40~45	HRC45~55	HRC55~70			○	◎		

400 PLUS

SERIES

Unequal Flute Spacing & Helix

- Excellent vibration absorption provides stability.
- Less chatter and high efficiency finishing.
- Reduce metal burr when machining.



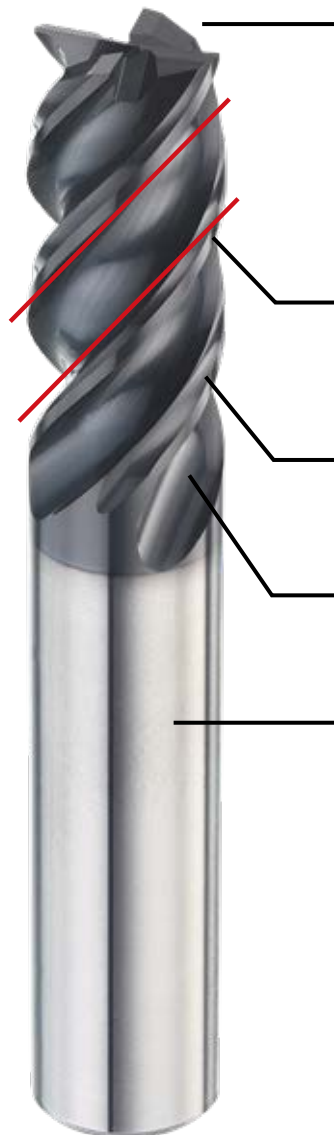
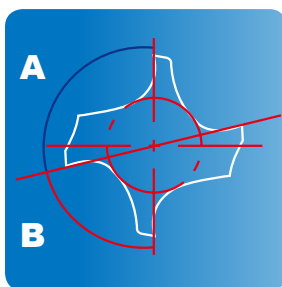
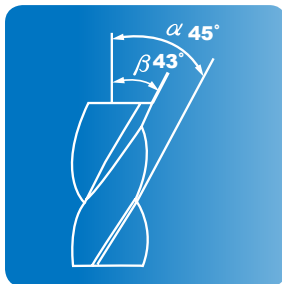
400 PLUS Series

SPEED TIGER

Unequal Flute Spacing & Helix



TAIWAN
EXCELLENCE 2019



Strong edge to prevent chipping at corners.

**Unequal Flute Spacing , $A \neq B$
Irregular Helix Flutes, $\alpha \neq \beta$**

Ensures stable machining of difficult-to-cut materials, and achieve high efficient performance.

Tool diameter tolerance 0~0.02mm.

Special flute geometry to improve chip disposal.

Superior wear and chipping resistance due to optimally matched coating and carbide material

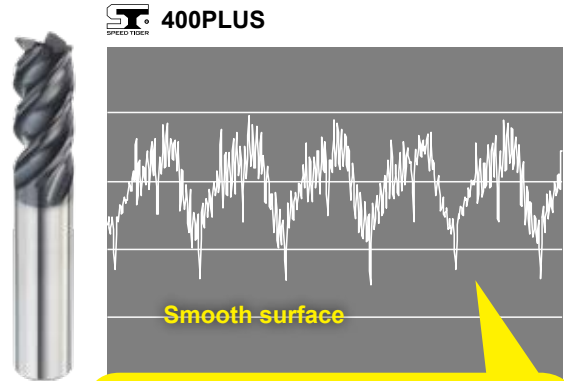
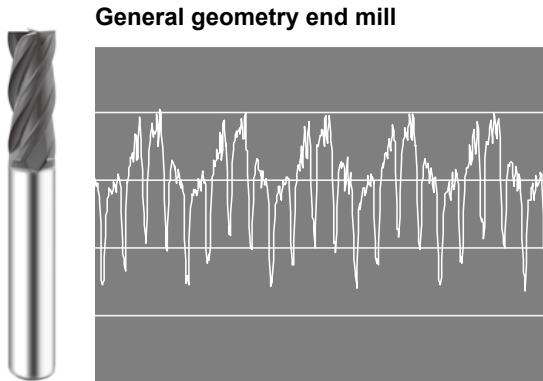
- 1.Excellent vibration absorption provides stability.**
- 2.Less chatter and high efficiency finishing.**
- 3.Reduce metal burr when machining.**



Cutting Performance

Cutting Analysis

Use Dynamometer Measure System to inspect the vibration of general end mills and 400PLUS during milling.



Vibration frequency is more intensive, it means that the force of the workpiece is more even.

Equal V.S Unequal - Performance of Slotting SUS316

General geometry end mill



Metal Burr: A lot
Surface: Not smooth



PVE1004 (ø10mm)



Metal Burr: Less
Surface : Excellent

Unequal Design



Special Flute Geometry

- ✓ **Prevent Burr**
- ✓ **Excellent Surface**
- ✓ **Improve Chip Disposal**
- ✓ **Longer Tool Life**

Equal vs. Unequal - Shouldering and Corner Part

General geometry end mill



Surface: Chattering



PVE0804 (8mm)
400PLUS



Excellent Surface

Smooth cutting at shouldering and corner part.





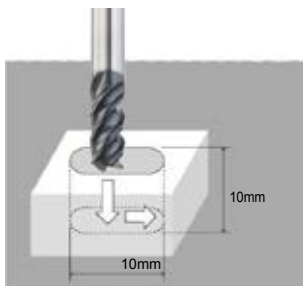
Cutting Performance

SPEED TIGER

400PLUS

Unequal V.S Unequal - Surface and Tool Life Comparison

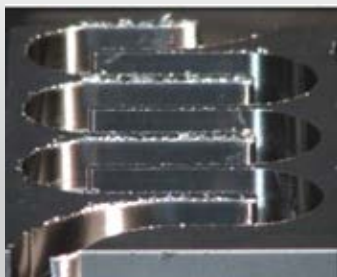
End mill	PVE1004 (Ø10mm)
Workpiece Material	SUS316
Milling Type	Slotting
Rotation Speed (S)	2644rpm
Milling Speed (Vc)	83m/min
Feed Rate (min-1) (F)	646 mm/min
Depth of cut	ap=10mm
	ae: 10mm
Feed of teeth (Fz)	0.062
Machine	Vertical Machining Center



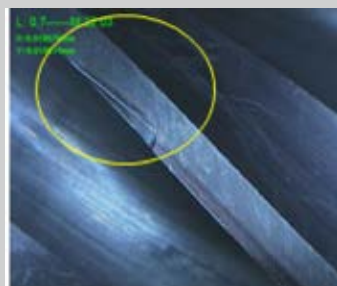
400PLUS video



Competitor A

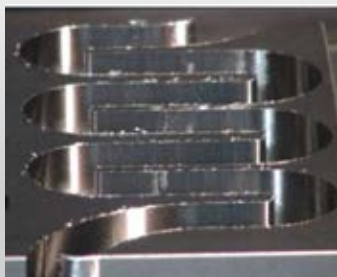


Metal Burr: Heavy
Surface: Fine



The cutting edge broke.

Competitor B

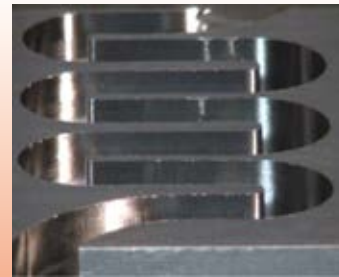


Metal Burr: Some
Surface: Chattering



The cutting edge got chipping.

PVE1004 (Ø10mm)



Metal Burr: Less
Surface : Excellent



The cutting edge is fine!

Maximized Rigidity

Different Cutting Conditions on milling Carbon Steel (S45C)

Slotting
S2546rpm F500
ae:10mm ap:10mm

Helical Slot Milling
S3183rpm F1273
ae:2mm ap:10mm

Wave Slotting
S2228rpm F446
ae:10mm ap:10mm

5° Ramping
S2228rpm F624
ae:6mm ap:13.8mm

Helical Milling
S3183rpm F1273
ae:2mm ap:12mm

Wave Side Milling
S3183rpm F1273
ae:2mm ap:20mm

Side Milling
S3183rpm F637
ae:2mm ap:20mm





400 PLUS Series

Unequal Flute Spacing & Helix

FRACTIONAL

FOR EXOTIC MATERIALS

Shape	Flute	Mode	Photo	Coating	Spec.	Cutting Condition
Square	4	IPVE		ALTiBN	19	32-37
Corner Radius	4	IPVR1T		ALTiBN	20	38

Available at
amazon

SPEED TIGER

400 PLUS

■ Square Type

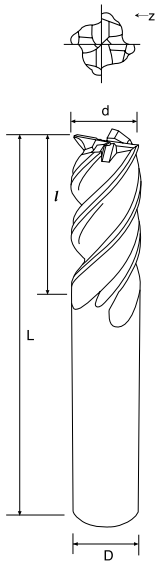


FRACTIONAL

Cutting Condition
P32-37

MODE	Diameter	Flute Length	Full Length	Shank Diameter	Flutes
	d	Z	L	D	Z
IPVE1/4"4	1/4	1/2	2-1/2	1/4	4
IPVE5/16"4	5/16	13/16	2-1/2	5/16	4
IPVE3/8"4	3/8	7/8	2-1/2	3/8	4
IPVE1/2"4	1/2	1	3	1/2	4
IPVE5/8"4	5/8	1-1/4	3-1/2	5/8	4

Unit:inch



◎ : Excellent ○ : Good

P				H	M	K	S		
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Titanium	High Temperature Alloy
~HB225	HB225~325	HRC30~40	HRC40~45	HRC45~55	HRC55~70				
◎	◎	◎	◎	○		◎	○	○	○



Corner Radius Type

400 PLUS

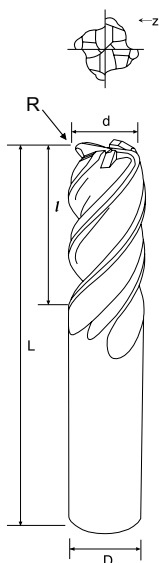


FRACTIONAL

Cutting Condition
P38

MODE	Diameter	Corner Radius	Flute Length	Full Length	Shank Diameter	Flutes
	d	R	l	L	D	Z
IPVR1T1/4"0.015"4	1/4	R.015	9/16	2-1/2	1/4	4
IPVR1T1/4"0.03"4	1/4	R.030	9/16	2-1/2	1/4	4
IPVR1T1/4"0.06"4	1/4	R.060	9/16	2-1/2	1/4	4
IPVR1T5/16"0.015"4	5/16	R.015	11/16	2-1/2	5/16	4
IPVR1T5/16"0.03"4	5/16	R.030	11/16	2-1/2	5/16	4
IPVR1T5/16"0.06"4	5/16	R.060	11/16	2-1/2	5/16	4
IPVR1T3/8"0.02"4	3/8	R.020	13/16	2-1/2	3/8	4
IPVR1T3/8"0.03"4	3/8	R.030	13/16	2-1/2	3/8	4
IPVR1T3/8"0.06"4	3/8	R.060	13/16	2-1/2	3/8	4
IPVR1T3/8"0.09"4	3/8	R.090	13/16	2-1/2	3/8	4
IPVR1T1/2"0.02"4	1/2	R.020	1	3	1/2	4
IPVR1T1/2"0.03"4	1/2	R.030	1	3	1/2	4
IPVR1T1/2"0.06"4	1/2	R.060	1	3	1/2	4
IPVR1T1/2"0.09"4	1/2	R.090	1	3	1/2	4
IPVR1T1/2"0.125"4	1/2	R.125	1	3	1/2	4
IPVR1T5/8"0.03"4	5/8	R.030	1-1/4	3-1/2	5/8	4
IPVR1T5/8"0.06"4	5/8	R.060	1-1/4	3-1/2	5/8	4
IPVR1T5/8"0.09"4	5/8	R.090	1-1/4	3-1/2	5/8	4
IPVR1T5/8"0.125"4	5/8	R.125	1-1/4	3-1/2	5/8	4

Unit:inch



◎ : Excellent ○ : Good


P				H	M	K	S		
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		High Hardened Steels	Stainless Steels	Cast Iron	Titanium	High Temperature Alloy
~HB225	HB225~325	HRC30~40	HRC40~45	HRC45~55	HRC55~70				
◎	◎	◎	◎	○		○	○	◎	○

SPEED TIGER

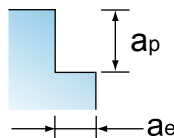
Cutting Condition

CUTTING CONDITION – ISE/ISB SERIES

FRACTIONAL

Side Milling 	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536				ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100				TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2				TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2							
	Hardness BRINELL ≦ 175				≦ 275				≦ 375				≧ 375 ≦ 475							
HRC ≦ 6.4				≦ 28				≦ 39.8				≧ 39.8 ≦ 49.1								
Vc (SFM) 437 (350-525)				318 (255-382)				320 (256-384)				166 (133-199)								
ae/ap		ae(2)=0.05D ae(4)=0.25D ap(3)=1.5D		ae(3)=0.25D ap(2)=1.5D ap(4)=1.5D		ae(2)=0.05D ae(4)=0.25D ap(3)=1.5D		ae(3)=0.25D ap(2)=1.5D ap(4)=1.5D		ae(2)=0.05D ae(4)=0.25D ap(3)=1.5D		ae(3)=0.25D ap(2)=1.5D ap(4)=1.5D								
MILL DIA. (inch)	RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)		
			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes
1/64	106,838	0.00003	6.4	9.6	12.8	77,806	0.00002	3.11	4.67	6.22	77992	0.00003	4.7	7.0	9.4	40598	0.00002	1.6	2.4	3.2
1/32	53,419	0.00006	6.4	9.6	12.8	38,903	0.00005	3.89	5.84	7.78	38996	0.00006	4.7	7.0	9.4	20299	0.00005	2.0	3.0	4.1
3/64	35,613	0.00010	7.1	10.7	14.2	25,935	0.00007	3.63	5.45	7.26	25997	0.00010	5.2	7.8	10.4	13533	0.00007	1.9	2.8	3.8
1/16	26,709	0.00013	6.9	10.4	13.9	19,451	0.00009	3.50	5.25	7.00	19498	0.00013	5.1	7.6	10.1	10150	0.00009	1.8	2.7	3.7
5/64	21,368	0.00018	7.7	11.5	15.4	15,561	0.00012	3.66	5.49	7.31	15598	0.00018	5.6	8.4	11.2	8120	0.00012	1.9	2.9	3.8
3/32	17,806	0.00023	8.2	12.3	16.4	12,968	0.00015	3.76	5.64	7.52	12999	0.00023	6.0	9.0	12.0	6766	0.00015	2.0	2.9	3.9
7/64	15,263	0.00027	8.2	12.4	16.5	11,115	0.00017	3.83	5.75	7.67	11142	0.00027	6.0	9.0	12.0	5800	0.00017	2.0	3.0	4.0
1/8	13,355	0.00030	8.0	12.0	16.0	9,726	0.00020	3.89	5.84	7.78	9749	0.00030	5.8	8.8	11.7	5075	0.00020	2.0	3.0	4.1
9/64	11,871	0.00036	8.6	12.9	17.2	8,645	0.00025	4.32	6.48	8.65	8666	0.00036	6.3	9.4	12.6	4511	0.00025	2.3	3.4	4.5
5/32	10,684	0.00043	9.1	13.6	18.2	7,781	0.00030	4.67	7.00	9.34	7799	0.00043	6.6	9.9	13.3	4060	0.00030	2.4	3.7	4.9
11/64	9,713	0.00049	9.5	14.2	18.9	7,073	0.00035	4.95	7.43	9.90	7090	0.00049	6.9	10.4	13.8	3691	0.00035	2.6	3.9	5.2
3/16	8,903	0.00055	9.8	14.7	19.6	6,484	0.00040	5.19	7.78	10.37	6499	0.00055	7.1	10.7	14.3	3383	0.00040	2.7	4.1	5.4
13/64	8,218	0.00061	10.1	15.1	20.1	5,985	0.00045	5.39	8.08	10.77	5999	0.00061	7.3	11.0	14.7	3123	0.00045	2.8	4.2	5.6
7/32	7,631	0.00068	10.3	15.5	20.6	5,558	0.00050	5.56	8.34	11.12	5571	0.00068	7.5	11.3	15.0	2900	0.00050	2.9	4.3	5.8
15/64	7,123	0.00074	10.5	15.8	21.0	5,187	0.00055	5.71	8.56	11.41	5199	0.00074	7.7	11.5	15.3	2707	0.00055	3.0	4.5	6.0
1/4	6,677	0.00080	10.7	16.0	21.4	4,863	0.00060	5.84	8.75	11.67	4874	0.00080	7.8	11.7	15.6	2537	0.00060	3.0	4.6	6.1
17/64	6,285	0.00089	11.2	16.7	22.3	4,577	0.00066	6.06	9.10	12.13	4588	0.00089	8.1	12.2	16.3	2388	0.00066	3.2	4.7	6.3
9/32	5,935	0.00098	11.6	17.4	23.1	4,323	0.00073	6.27	9.40	12.54	4333	0.00098	8.4	12.7	16.9	2255	0.00073	3.3	4.9	6.5
19/64	5,623	0.00106	11.9	17.9	23.9	4,095	0.00079	6.45	9.67	12.90	4105	0.00106	8.7	13.1	17.4	2137	0.00079	3.4	5.0	6.7
5/16	5,342	0.00115	12.3	18.4	24.6	3,890	0.00085	6.61	9.92	13.23	3900	0.00115	9.0	13.5	17.9	2030	0.00085	3.5	5.2	6.9
21/64	5,088	0.00124	12.6	18.9	25.2	3,705	0.00091	6.76	10.14	13.52	3714	0.00124	9.2	13.8	18.4	1933	0.00091	3.5	5.3	7.1
11/32	4,856	0.00133	12.9	19.3	25.7	3,537	0.00098	6.90	10.34	13.79	3545	0.00133	9.4	14.1	18.8	1845	0.00098	3.6	5.4	7.2
23/64	4,645	0.00141	13.1	19.7	26.2	3,383	0.00104	7.02	10.53	14.04	3391	0.00141	9.6	14.4	19.2	1765	0.00104	3.7	5.5	7.3
3/8	4,452	0.00150	13.4	20.0	26.7	3,242	0.00110	7.13	10.70	14.26	3250	0.00150	9.7	14.6	19.5	1692	0.00110	3.7	5.6	7.4
25/64	4,274	0.00156	13.4	20.0	26.7	3,112	0.00115	7.16	10.74	14.32	3120	0.00156	9.7	14.6	19.5	1624	0.00115	3.7	5.6	7.5
13/32	4,109	0.00163	13.4	20.0	26.7	2,993	0.00120	7.18	10.77	14.36	3000	0.00163	9.7	14.6	19.5	1561	0.00120	3.7	5.6	7.5
27/64	3,957	0.00169	13.4	20.0	26.7	2,882	0.00125	7.20	10.81	14.41	2889	0.00169	9.7	14.6	19.5	1504	0.00125	3.8	5.6	7.5
7/16	3,816	0.00175	13.4	20.0	26.7	2,779	0.00130	7.22	10.84	14.45	2785	0.00175	9.7	14.6	19.5	1450	0.00130	3.8	5.7	7.5
29/64	3,684	0.00181	13.4	20.0	26.7	2,683	0.00135	7.24	10.87	14.49	2689	0.00181	9.7	14.6	19.5	1400	0.00135	3.8	5.7	7.6
15/32	3,561	0.00188	13.4	20.0	26.7	2,594	0.00140	7.26	10.89	14.52	2600	0.00188	9.7	14.6	19.5	1353	0.00140	3.8	5.7	7.6
31/64	3,446	0.00194	13.4	20.0	26.7	2,510	0.00145	7.28	10.92	14.56	2516	0.00194	9.7	14.6	19.5	1310	0.00145	3.8	5.7	7.6
1/2	3,339	0.00200	13.4	20.0	26.7	2,431	0.00150	7.29	10.94	14.59	2437	0.00200	9.7	14.6	19.5	1269	0.00150	3.8	5.7	7.6
9/16	2,968	0.00210	12.5	18.7	24.9	2,161	0.00158	6.81	10.21	13.62	2166	0.00210	9.1	13.6	18.2	1128	0.00158	3.6	5.3	7.1
5/8	2,671	0.00220	11.8	17.6	23.5	1,945	0.00165	6.42	9.63	12.84	1950	0.00220	8.6	12.9	17.2	1015	0.00165	3.3	5.0	6.7
11/16	2,428	0.00230	11.2	16.8	22.3	1,768	0.00173	6.10	9.15	12.20	1773	0.00230	8.2	12.2	16.3	923	0.00173	3.2	4.8	6.4
3/4	2,226	0.00240	10.7	16.0	21.4	1,621	0.00180	5.84	8.75	11.67	1625	0.00240	7.8	11.7	15.6	846	0.00180	3.0	4.6	6.1
7/8	1,908	0.00260	9.9	14.9	19.8	1,389	0.00195	5.42	8.13	10.84	1393	0.00260	7.2	10.9	14.5	725	0.00195	2.8	4.2	5.7
1	1,669	0.00280	9.3	14.0	18.7	1,216	0.00210	5.11	7.66	10.21	1219	0.00280	6.8	10.2	13.6	634	0.00210	2.7	4.0	5.3

rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm

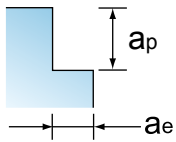




CUTTING CONDITION – ISE/ISB SERIES

FRACTIONAL

Side Milling	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2				CAST IRONS Gray, Malleable, Ductile				STAINLESS STEELS (Free Machining) 303, 416, 420F, 430F 440F				STAINLESS STEELS (Difficult) 304, 304L, 316, 316L							
	Hardness BRINELL V 475 ≡ 655				≡ 220				≡ 275				≡ 275							
HRC V 50 ≡ 65				≡ 18.8				≡ 28				≡ 28								
Vc (SFM) 71 (57-85)				335 (255-382)				318 (281-422)				242 (194-290)								
ae/ap ae(2)=0.05D ae(3)=0.25D ae(4)=0.25D ap(2)=1.5D ap(3)=1.5D ap(4)=1.5D				ae(2)=0.05D ae(3)=0.25D ae(4)=0.25D ap(2)=1.5D ap(3)=1.5D ap(4)=1.5D				ae(2)=0.05D ae(3)=0.25D ae(4)=0.25D ap(2)=1.5D ap(3)=1.5D ap(4)=1.5D				ae(2)=0.05D ae(3)=0.25D ae(4)=0.25D ap(2)=1.5D ap(3)=1.5D ap(4)=1.5D								
MILL DIA. (inch)	RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)		
			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes
1/64	17094	0.00001	0.3	0.5	0.7	77,806	0.00003	4.7	7.0	9.3	85,935	0.00002	3.4	5.2	6.9	59,225	0.00002	2.4	3.6	4.7
1/32	8547	0.00003	0.4	0.6	0.9	38,903	0.00006	4.7	7.0	9.3	42,967	0.00005	4.3	6.4	8.6	29,613	0.00004	2.4	3.6	4.7
3/64	5698	0.00004	0.4	0.6	0.8	25,935	0.00010	5.2	7.8	10.4	28,645	0.00007	4.0	6.0	8.0	19,742	0.00006	2.4	3.6	4.7
1/16	4274	0.00005	0.4	0.6	0.8	19,451	0.00013	5.1	7.6	10.1	21,484	0.00009	3.9	5.8	7.7	14,806	0.00008	2.4	3.6	4.7
5/64	3419	0.00006	0.4	0.6	0.8	15,561	0.00018	5.6	8.4	11.2	17,187	0.00012	4.0	6.1	8.1	11,845	0.00011	2.6	3.9	5.2
3/32	2849	0.00007	0.4	0.6	0.8	12,968	0.00023	6.0	8.9	11.9	14,322	0.00015	4.2	6.2	8.3	9,871	0.00014	2.8	4.1	5.5
7/64	2442	0.00009	0.4	0.6	0.8	11,115	0.00027	6.0	9.0	12.0	12,276	0.00017	4.2	6.4	8.5	8,461	0.00017	2.9	4.3	5.8
1/8	2137	0.00010	0.4	0.6	0.9	9,726	0.00030	5.8	8.8	11.7	10,742	0.00020	4.3	6.4	8.6	7,403	0.00020	3.0	4.4	5.9
9/64	1899	0.00013	0.5	0.7	0.9	8,645	0.00036	6.3	9.4	12.5	9,548	0.00025	4.8	7.2	9.5	6,581	0.00024	3.1	4.7	6.3
5/32	1709	0.00015	0.5	0.8	1.0	7,781	0.00043	6.6	9.9	13.2	8,593	0.00030	5.2	7.7	10.3	5,923	0.00028	3.3	4.9	6.5
11/64	1554	0.00018	0.5	0.8	1.1	7,073	0.00049	6.9	10.3	13.8	7,812	0.00035	5.5	8.2	10.9	5,384	0.00031	3.4	5.0	6.7
3/16	1425	0.00020	0.6	0.9	1.1	6,484	0.00055	7.1	10.7	14.3	7,161	0.00040	5.7	8.6	11.5	4,935	0.00035	3.5	5.2	6.9
13/64	1315	0.00023	0.6	0.9	1.2	5,985	0.00061	7.3	11.0	14.7	6,610	0.00045	5.9	8.9	11.9	4,556	0.00039	3.5	5.3	7.1
7/32	1221	0.00025	0.6	0.9	1.2	5,558	0.00068	7.5	11.3	15.0	6,138	0.00050	6.1	9.2	12.3	4,230	0.00043	3.6	5.4	7.2
15/64	1140	0.00028	0.6	0.9	1.3	5,187	0.00074	7.7	11.5	15.3	5,729	0.00055	6.3	9.5	12.6	3,948	0.00046	3.7	5.5	7.3
1/4	1068	0.00030	0.6	1.0	1.3	4,863	0.00080	7.8	11.7	15.6	5,371	0.00060	6.4	9.7	12.9	3,702	0.00050	3.7	5.6	7.4
17/64	1006	0.00033	0.7	1.0	1.3	4,577	0.00089	8.1	12.2	16.2	5,055	0.00066	6.7	10.0	13.4	3,484	0.00055	3.8	5.7	7.7
9/32	950	0.00036	0.7	1.0	1.4	4,323	0.00098	8.4	12.6	16.9	4,774	0.00073	6.9	10.4	13.8	3,290	0.00060	3.9	5.9	7.9
19/64	900	0.00039	0.7	1.1	1.4	4,095	0.00106	8.7	13.1	17.4	4,523	0.00079	7.1	10.7	14.2	3,117	0.00065	4.1	6.1	8.1
5/16	855	0.00043	0.7	1.1	1.5	3,890	0.00115	8.9	13.4	17.9	4,297	0.00085	7.3	11.0	14.6	2,961	0.00070	4.1	6.2	8.3
21/64	814	0.00046	0.7	1.1	1.5	3,705	0.00124	9.2	13.8	18.3	4,092	0.00091	7.5	11.2	14.9	2,820	0.00075	4.2	6.3	8.5
11/32	777	0.00049	0.8	1.1	1.5	3,537	0.00133	9.4	14.1	18.7	3,906	0.00098	7.6	11.4	15.2	2,692	0.00080	4.3	6.5	8.6
23/64	743	0.00052	0.8	1.2	1.5	3,383	0.00141	9.6	14.3	19.1	3,736	0.00104	7.8	11.6	15.5	2,575	0.00085	4.4	6.6	8.8
3/8	712	0.00055	0.8	1.2	1.6	3,242	0.00150	9.7	14.6	19.5	3,581	0.00110	7.9	11.8	15.8	2,468	0.00090	4.4	6.7	8.9
25/64	684	0.00058	0.8	1.2	1.6	3,112	0.00156	9.7	14.6	19.5	3,437	0.00115	7.9	11.9	15.8	2,369	0.00094	4.4	6.7	8.9
13/32	657	0.00060	0.8	1.2	1.6	2,993	0.00163	9.7	14.6	19.5	3,305	0.00120	7.9	11.9	15.9	2,278	0.00098	4.4	6.7	8.9
27/64	633	0.00063	0.8	1.2	1.6	2,882	0.00169	9.7	14.6	19.5	3,183	0.00125	8.0	11.9	15.9	2,194	0.00101	4.4	6.7	8.9
7/16	611	0.00065	0.8	1.2	1.6	2,779	0.00175	9.7	14.6	19.5	3,069	0.00130	8.0	12.0	16.0	2,115	0.00105	4.4	6.7	8.9
29/64	589	0.00068	0.8	1.2	1.6	2,683	0.00181	9.7	14.6	19.5	2,963	0.00135	8.0	12.0	16.0	2,042	0.00109	4.4	6.7	8.9
15/32	570	0.00070	0.8	1.2	1.6	2,594	0.00188	9.7	14.6	19.5	2,864	0.00140	8.0	12.0	16.0	1,974	0.00125	4.9	7.4	9.9
31/64	551	0.00073	0.8	1.2	1.6	2,510	0.00194	9.7	14.6	19.5	2,772	0.00145	8.0	12.1	16.1	1,910	0.00116	4.4	6.7	8.9
1/2	534	0.00075	0.8	1.2	1.6	2,431	0.00200	9.7	14.6	19.5	2,685	0.00150	8.1	12.1	16.1	1,851	0.00120	4.4	6.7	8.9
9/16	475	0.00079	0.7	1.1	1.5	2,161	0.00210	9.1	13.6	18.2	2,387	0.00158	7.5	11.3	15.0	1,645	0.00125	4.1	6.2	8.2
5/8	427	0.00083	0.7	1.1	1.4	1,945	0.00220	8.6	12.8	17.1	2,148	0.00165	7.1	10.6	14.2	1,481	0.00130	3.8	5.8	7.7
11/16	389	0.00086	0.7	1.0	1.3	1,768	0.00230	8.1	12.2	16.3	1,953	0.00173	6.7	10.1	13.5	1,346	0.00135	3.6	5.5	7.3
3/4	356	0.00090	0.6	1.0	1.3	1,621	0.00240	7.8	11.7	15.6	1,790	0.00180	6.4	9.7	12.9	1,234	0.00140	3.5	5.2	6.9
7/8	305	0.00098	0.6	0.9	1.2	1,389	0.00260	7.2	10.8	14.4	1,535	0.00195	6.0	9.0	12.0	1,058	0.00155	3.3	4.9	6.6
1	267	0.00105	0.6	0.8	1.1	1,216	0.00280	6.8	10.2	13.6	1,343	0.00210	5.6	8.5	11.3	925	0.00170	3.1	4.7	6.3




rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm

SPEED TIGER

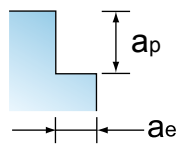
Cutting Condition

CUTTING CONDITION – ISE/ISB SERIES

FRACTIONAL

Side Milling 	SUPER ALLOYS (NICKEL, COBALT, IRON, BASE) Inconel 601, 617, 625, 718, Incoloy 800, Monel 400, Rene, Waspalloy					TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti52 Cr3Sn3Al					GRAPHITE				
	≦ 300					≦ 350									
Hardness BRINELL	≦ 32					≦ 37.9									
HRC															
Vc (SFM)	62	(49-74)				170	(137-205)				627	(502-752)			
ae/ap	ae(2)=0.05D ap(2)=1.5D	ae(3)=0.25D ap(3)=1.5D	ae(4)=0.25D ap(4)=1.5D			ae(2)=0.05D ap(2)=1.5D	ae(3)=0.25D ap(3)=1.5D	ae(4)=0.25D ap(4)=1.5D			ae(2)=0.05D ap(2)=1.5D	ae(3)=0.25D ap(3)=1.5D	ae(4)=0.25D ap(4)=1.5D		
MILL DIA. (inch)	RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)		
			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes
1/64	15,097	0.00002	0.6	0.9	1.2	41,806	0.00002	1.7	2.5	3.3	153,289	0.00006	18.4	27.6	36.8
1/32	7,548	0.00003	0.5	0.7	0.9	20,903	0.00004	1.7	2.5	3.3	76,644	0.00012	18.4	27.6	36.8
3/64	5,032	0.00005	0.5	0.7	0.9	13,935	0.00006	1.7	2.5	3.3	51,096	0.00020	20.4	30.7	40.9
1/16	3,774	0.00006	0.5	0.7	0.9	10,452	0.00008	1.7	2.5	3.3	38,322	0.00026	19.9	29.9	39.9
5/64	3,019	0.00010	0.6	0.9	1.1	8,361	0.00011	1.8	2.8	3.7	30,658	0.00036	22.1	33.1	44.1
3/32	2,516	0.00013	0.7	1.0	1.3	6,968	0.00014	2.0	2.9	3.9	25,548	0.00046	23.5	35.3	47.0
7/64	2,157	0.00017	0.7	1.1	1.4	5,972	0.00017	2.0	3.0	4.1	21,898	0.00054	23.7	35.5	47.3
1/8	1,887	0.00020	0.8	1.1	1.5	5,226	0.00020	2.1	3.1	4.2	19,161	0.00060	23.0	34.5	46.0
9/64	1,677	0.00023	0.8	1.1	1.5	4,645	0.00024	2.2	3.3	4.4	17,032	0.00073	24.7	37.0	49.4
5/32	1,510	0.00025	0.8	1.1	1.5	4,181	0.00028	2.3	3.4	4.6	15,329	0.00085	26.1	39.1	52.1
11/64	1,372	0.00028	0.8	1.1	1.5	3,801	0.00031	2.4	3.6	4.8	13,935	0.00098	27.2	40.8	54.3
3/16	1,258	0.00030	0.8	1.1	1.5	3,484	0.00035	2.4	3.7	4.9	12,774	0.00110	28.1	42.2	56.2
13/64	1,161	0.00033	0.8	1.1	1.5	3,216	0.00039	2.5	3.7	5.0	11,791	0.00123	28.9	43.3	57.8
7/32	1,078	0.00035	0.8	1.1	1.5	2,986	0.00043	2.5	3.8	5.1	10,949	0.00135	29.6	44.3	59.1
15/64	1,006	0.00038	0.8	1.1	1.5	2,787	0.00046	2.6	3.9	5.2	10,219	0.00148	30.1	45.2	60.3
1/4	944	0.00040	0.8	1.1	1.5	2,613	0.00050	2.6	3.9	5.2	9,581	0.00160	30.7	46.0	61.3
17/64	888	0.00045	0.8	1.2	1.6	2,459	0.00055	2.7	4.1	5.4	9,017	0.00178	32.0	48.0	64.0
9/32	839	0.00050	0.8	1.3	1.7	2,323	0.00060	2.8	4.2	5.6	8,516	0.00195	33.2	49.8	66.4
19/64	795	0.00055	0.9	1.3	1.7	2,200	0.00065	2.9	4.3	5.7	8,068	0.00213	34.3	51.4	68.6
5/16	755	0.00060	0.9	1.4	1.8	2,090	0.00070	2.9	4.4	5.9	7,664	0.00230	35.3	52.9	70.5
21/64	719	0.00065	0.9	1.4	1.9	1,991	0.00075	3.0	4.5	6.0	7,299	0.00248	36.1	54.2	72.3
11/32	686	0.00070	1.0	1.4	1.9	1,900	0.00080	3.0	4.6	6.1	6,968	0.00265	36.9	55.4	73.9
23/64	656	0.00075	1.0	1.5	2.0	1,818	0.00085	3.1	4.6	6.2	6,665	0.00283	37.7	56.5	75.3
3/8	629	0.00080	1.0	1.5	2.0	1,742	0.00090	3.1	4.7	6.3	6,387	0.00300	38.3	57.5	76.6
25/64	604	0.00083	1.0	1.5	2.0	1,672	0.00094	3.1	4.7	6.3	6,132	0.00313	38.3	57.5	76.6
13/32	581	0.00085	1.0	1.5	2.0	1,608	0.00098	3.1	4.7	6.3	5,896	0.00325	38.3	57.5	76.6
27/64	559	0.00088	1.0	1.5	2.0	1,548	0.00101	3.1	4.7	6.3	5,677	0.00338	38.3	57.5	76.6
7/16	539	0.00090	1.0	1.5	1.9	1,493	0.00105	3.1	4.7	6.3	5,475	0.00350	38.3	57.5	76.6
29/64	521	0.00093	1.0	1.4	1.9	1,442	0.00109	3.1	4.7	6.3	5,286	0.00363	38.3	57.5	76.6
15/32	503	0.00095	1.0	1.4	1.9	1,394	0.00125	3.5	5.2	7.0	5,110	0.00375	38.3	57.5	76.6
31/64	487	0.00098	0.9	1.4	1.9	1,349	0.00116	3.1	4.7	6.3	4,945	0.00388	38.3	57.5	76.6
1/2	472	0.00100	0.9	1.4	1.9	1,306	0.00120	3.1	4.7	6.3	4,790	0.00400	38.3	57.5	76.6
9/16	419	0.00105	0.9	1.3	1.8	1,161	0.00125	2.9	4.4	5.8	4,258	0.00420	35.8	53.7	71.5
5/8	377	0.00110	0.8	1.2	1.7	1,045	0.00130	2.7	4.1	5.4	3,832	0.00440	33.7	50.6	67.4
11/16	343	0.00115	0.8	1.2	1.6	950	0.00135	2.6	3.8	5.1	3,484	0.00460	32.1	48.1	64.1
3/4	315	0.00120	0.8	1.1	1.5	871	0.00140	2.4	3.7	4.9	3,194	0.00480	30.7	46.0	61.3
7/8	270	0.00155	0.8	1.3	1.7	747	0.00155	2.3	3.5	4.6	2,737	0.00520	28.5	42.7	56.9
1	236	0.00140	0.7	1.0	1.3	653	0.00170	2.2	3.3	4.4	2,395	0.00560	26.8	40.2	53.7

Depth of cut



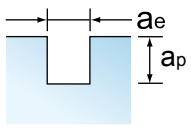
rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm



CUTTING CONDITION – ISE/ISB SERIES

FRACTIONAL

Slot Milling		CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536				ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100				TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2				TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2						
Hardness BRINELL		≤ 175				≤ 275				≤ 375				≥ 375 ≤ 475						
HRC		≤ 6.4				≤ 28				≤ 39.8				≥ 39.8 ≤ 49.1						
Vc (SFM)		350		(278-418)		255		(203-306)		256		(205-307)		133		(106-159)				
ae/ap		ae(2)=1D ae(4)=1D ap(3)=0.5D		ae(3)=1D ap(2)=1D ap(4)=0.4D		ae(2)=1D ae(4)=1D ap(3)=0.5D		ae(3)=1D ap(2)=1D ap(4)=0.4D		ae(2)=1D ae(4)=1D ap(3)=0.5D		ae(3)=1D ap(2)=1D ap(4)=0.4D		ae(2)=1D ae(4)=1D ap(3)=0.5D		ae(3)=1D ap(2)=1D ap(4)=0.4D				
MILL DIA. (inch)	RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)		
			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes
1/64	85,470	0.00003	5.1	7.7	10.3	62,245	0.00002	2.49	3.73	4.98	62,393	0.00003	3.7	5.6	7.5	32,479	0.00002	1.3	1.9	2.6
1/32	42,735	0.00006	5.1	7.7	10.3	31,122	0.00005	3.11	4.67	6.22	31,197	0.00006	3.7	5.6	7.5	16,239	0.00005	1.6	2.4	3.2
3/64	28,490	0.00010	5.7	8.5	11.4	20,748	0.00007	2.90	4.36	5.81	20,798	0.00010	4.2	6.2	8.3	10,826	0.00007	1.5	2.3	3.0
1/16	21,368	0.00013	5.6	8.3	11.1	15,561	0.00009	2.80	4.20	5.60	15,598	0.00013	4.1	6.1	8.1	8,120	0.00009	1.5	2.2	2.9
5/64	17,094	0.00018	6.2	9.2	12.3	12,449	0.00012	2.93	4.39	5.85	12,479	0.00018	4.5	6.7	9.0	6,496	0.00012	1.5	2.3	3.1
3/32	14,245	0.00023	6.6	9.8	13.1	10,374	0.00015	3.01	4.51	6.02	10,399	0.00023	4.8	7.2	9.6	5,413	0.00015	1.6	2.4	3.1
7/64	12,210	0.00027	6.6	9.9	13.2	8,892	0.00017	3.07	4.60	6.14	8,913	0.00027	4.8	7.2	9.6	4,640	0.00017	1.6	2.4	3.2
1/8	10,684	0.00030	6.4	9.6	12.8	7,781	0.00020	3.11	4.67	6.22	7,799	0.00030	4.7	7.0	9.4	4,060	0.00020	1.6	2.4	3.2
9/64	9,497	0.00036	6.9	10.3	13.8	6,916	0.00025	3.46	5.19	6.92	6,933	0.00036	5.0	7.5	10.1	3,609	0.00025	1.8	2.7	3.6
5/32	8,547	0.00043	7.3	10.9	14.5	6,224	0.00030	3.73	5.60	7.47	6,239	0.00043	5.3	8.0	10.6	3,248	0.00030	1.9	2.9	3.9
11/64	7,770	0.00049	7.6	11.4	15.2	5,659	0.00035	3.96	5.94	7.92	5,672	0.00049	5.5	8.3	11.1	2,953	0.00035	2.1	3.1	4.1
3/16	7,123	0.00055	7.8	11.8	15.7	5,187	0.00040	4.15	6.22	8.30	5,199	0.00055	5.7	8.6	11.4	2,707	0.00040	2.2	3.2	4.3
13/64	6,575	0.00061	8.1	12.1	16.1	4,788	0.00045	4.31	6.46	8.62	4,799	0.00061	5.9	8.8	11.8	2,498	0.00045	2.2	3.4	4.5
7/32	6,105	0.00068	8.2	12.4	16.5	4,446	0.00050	4.45	6.67	8.89	4,457	0.00068	6.0	9.0	12.0	2,320	0.00050	2.3	3.5	4.6
15/64	5,698	0.00074	8.4	12.6	16.8	4,150	0.00055	4.56	6.85	9.13	4,160	0.00074	6.1	9.2	12.3	2,165	0.00055	2.4	3.6	4.8
1/4	5,342	0.00080	8.5	12.8	17.1	3,890	0.00060	4.67	7.00	9.34	3,900	0.00080	6.2	9.4	12.5	2,030	0.00060	2.4	3.7	4.9
17/64	5,028	0.00089	8.9	13.4	17.8	3,661	0.00066	4.85	7.28	9.70	3,670	0.00089	6.5	9.8	13.0	1,911	0.00066	2.5	3.8	5.1
9/32	4,748	0.00098	9.3	13.9	18.5	3,458	0.00073	5.01	7.52	10.03	3,466	0.00098	6.8	10.1	13.5	1,804	0.00073	2.6	3.9	5.2
19/64	4,498	0.00106	9.6	14.3	19.1	3,276	0.00079	5.16	7.74	10.32	3,284	0.00106	7.0	10.5	14.0	1,709	0.00079	2.7	4.0	5.4
5/16	4,274	0.00115	9.8	14.7	19.7	3,112	0.00085	5.29	7.94	10.58	3,120	0.00115	7.2	10.8	14.4	1,624	0.00085	2.8	4.1	5.5
21/64	4,070	0.00124	10.1	15.1	20.1	2,964	0.00091	5.41	8.11	10.82	2,971	0.00124	7.4	11.0	14.7	1,547	0.00091	2.8	4.2	5.6
11/32	3,885	0.00133	10.3	15.4	20.6	2,829	0.00098	5.52	8.28	11.03	2,836	0.00133	7.5	11.3	15.0	1,476	0.00098	2.9	4.3	5.8
23/64	3,716	0.00141	10.5	15.7	21.0	2,706	0.00104	5.62	8.42	11.23	2,713	0.00141	7.7	11.5	15.3	1,412	0.00104	2.9	4.4	5.9
3/8	3,561	0.00150	10.7	16.0	21.4	2,594	0.00110	5.71	8.56	11.41	2,600	0.00150	7.8	11.7	15.6	1,353	0.00110	3.0	4.5	6.0
25/64	3,419	0.00156	10.7	16.0	21.4	2,490	0.00115	5.73	8.59	11.45	2,496	0.00156	7.8	11.7	15.6	1,299	0.00115	3.0	4.5	6.0
13/32	3,287	0.00163	10.7	16.0	21.4	2,394	0.00120	5.75	8.62	11.49	2,400	0.00163	7.8	11.7	15.6	1,249	0.00120	3.0	4.5	6.0
27/64	3,166	0.00169	10.7	16.0	21.4	2,305	0.00125	5.76	8.65	11.53	2,311	0.00169	7.8	11.7	15.6	1,203	0.00125	3.0	4.5	6.0
7/16	3,053	0.00175	10.7	16.0	21.4	2,223	0.00130	5.78	8.67	11.56	2,228	0.00175	7.8	11.7	15.6	1,160	0.00130	3.0	4.5	6.0
29/64	2,947	0.00181	10.7	16.0	21.4	2,146	0.00135	5.80	8.69	11.59	2,151	0.00181	7.8	11.7	15.6	1,120	0.00135	3.0	4.5	6.0
15/32	2,849	0.00188	10.7	16.0	21.4	2,075	0.00140	5.81	8.71	11.62	2,080	0.00188	7.8	11.7	15.6	1,083	0.00140	3.0	4.5	6.1
31/64	2,757	0.00194	10.7	16.0	21.4	2,008	0.00145	5.82	8.73	11.65	2,013	0.00194	7.8	11.7	15.6	1,048	0.00145	3.0	4.6	6.1
1/2	2,671	0.00200	10.7	16.0	21.4	1,945	0.00150	5.84	8.75	11.67	1,950	0.00200	7.8	11.7	15.6	1,015	0.00150	3.0	4.6	6.1
9/16	2,374	0.00210	10.0	15.0	19.9	1,729	0.00158	5.45	8.17	10.89	1,733	0.00210	7.3	10.9	14.6	902	0.00158	2.8	4.3	5.7
5/8	2,137	0.00220	9.4	14.1	18.8	1,556	0.00165	5.14	7.70	10.27	1,560	0.00220	6.9	10.3	13.7	812	0.00165	2.7	4.0	5.4
11/16	1,943	0.00230	8.9	13.4	17.9	1,415	0.00173	4.88	7.32	9.76	1,418	0.00230	6.5	9.8	13.0	738	0.00173	2.5	3.8	5.1
3/4	1,781	0.00240	8.5	12.8	17.1	1,297	0.00180	4.67	7.00	9.34	1,300	0.00240	6.2	9.4	12.5	677	0.00180	2.4	3.7	4.9
7/8	1,526	0.00260	7.9	11.9	15.9	1,112	0.00195	4.33	6.50	8.67	1,114	0.00260	5.8	8.7	11.6	580	0.00195	2.3	3.4	4.5
1	1,335	0.00280	7.5	11.2	15.0	973	0.00210	4.08	6.13	8.17	975	0.00280	5.5	8.2	10.9	507	0.00210	2.1	3.2	4.3




rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm

SPEED TIGER

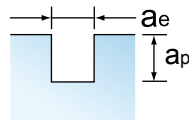
Cutting Condition

CUTTING CONDITION – ISE/ISB SERIES

FRACTIONAL

Slot Milling 	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2					CAST IRONS Gray, Malleable, Ductile					STAINLESS STEELS (Free Machining) 303, 416, 420F, 430F 440F					STAINLESS STEELS (Difficult) 304, 304L, 316, 316L				
	Hardness BRINELL V > 475 ≡ 655					≡ 220					≡ 275					≡ 275				
HRC V > 50 ≡ 65					≡ 18.8					≡ 28					≡ 28					
Vc (SFM) 57 (46-68)					255 (204-306)					281 (225-337)					194 (154-231)					
ae/ap ae(2)=1D ae(4)=1D ap(3)=0.5D					ae(3)=1D ap(2)=1D ap(4)=0.4D					ae(2)=1D ae(4)=1D ap(3)=0.5D					ae(3)=1D ap(2)=1D ap(4)=0.4D					
MILL DIA. (inch)	RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)		
			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes
1/64	13675	0.00001	0.3	0.4	0.5	62,245	0.00003	3.7	5.6	7.5	68,748	0.00002	2.7	4.1	5.5	47,380	0.00002	1.9	2.8	3.8
1/32	6838	0.00003	0.3	0.5	0.7	31,122	0.00006	3.7	5.6	7.5	34,374	0.00005	3.4	5.2	6.9	23,690	0.00004	1.9	2.8	3.8
3/64	4558	0.00004	0.3	0.5	0.6	20,748	0.00010	4.1	6.2	8.3	22,916	0.00007	3.2	4.8	6.4	15,793	0.00006	1.9	2.8	3.8
1/16	3419	0.00005	0.3	0.5	0.6	15,561	0.00013	4.0	6.1	8.1	17,187	0.00009	3.1	4.6	6.2	11,845	0.00008	1.9	2.8	3.8
5/64	2735	0.00006	0.3	0.5	0.6	12,449	0.00018	4.5	6.7	9.0	13,750	0.00012	3.2	4.8	6.5	9,476	0.00011	2.1	3.1	4.2
3/32	2279	0.00007	0.3	0.5	0.7	10,374	0.00023	4.8	7.2	9.5	11,458	0.00015	3.3	5.0	6.6	7,897	0.00014	2.2	3.3	4.4
7/64	1954	0.00009	0.3	0.5	0.7	8,892	0.00027	4.8	7.2	9.6	9,821	0.00017	3.4	5.1	6.8	6,769	0.00017	2.3	3.5	4.6
1/8	1709	0.00010	0.3	0.5	0.7	7,781	0.00030	4.7	7.0	9.3	8,593	0.00020	3.4	5.2	6.9	5,923	0.00020	2.4	3.6	4.7
9/64	1519	0.00013	0.4	0.6	0.8	6,916	0.00036	5.0	7.5	10.0	7,639	0.00025	3.8	5.7	7.6	5,264	0.00024	2.5	3.8	5.0
5/32	1368	0.00015	0.4	0.6	0.8	6,224	0.00043	5.3	7.9	10.6	6,875	0.00030	4.1	6.2	8.2	4,738	0.00028	2.6	3.9	5.2
11/64	1243	0.00018	0.4	0.7	0.9	5,659	0.00049	5.5	8.3	11.0	6,250	0.00035	4.4	6.6	8.7	4,307	0.00031	2.7	4.0	5.4
3/16	1140	0.00020	0.5	0.7	0.9	5,187	0.00055	5.7	8.6	11.4	5,729	0.00040	4.6	6.9	9.2	3,948	0.00035	2.8	4.1	5.5
13/64	1052	0.00023	0.5	0.7	0.9	4,788	0.00061	5.9	8.8	11.7	5,288	0.00045	4.8	7.1	9.5	3,645	0.00039	2.8	4.2	5.6
7/32	977	0.00025	0.5	0.7	1.0	4,446	0.00068	6.0	9.0	12.0	4,911	0.00050	4.9	7.4	9.8	3,384	0.00043	2.9	4.3	5.8
15/64	912	0.00028	0.5	0.8	1.0	4,150	0.00074	6.1	9.2	12.2	4,583	0.00055	5.0	7.6	10.1	3,159	0.00046	2.9	4.4	5.8
1/4	855	0.00030	0.5	0.8	1.0	3,890	0.00080	6.2	9.3	12.4	4,297	0.00060	5.2	7.7	10.3	2,961	0.00050	3.0	4.4	5.9
17/64	804	0.00033	0.5	0.8	1.1	3,661	0.00089	6.5	9.7	13.0	4,044	0.00066	5.4	8.0	10.7	2,787	0.00055	3.1	4.6	6.1
9/32	760	0.00036	0.6	0.8	1.1	3,458	0.00098	6.7	10.1	13.5	3,819	0.00073	5.5	8.3	11.1	2,632	0.00060	3.2	4.7	6.3
19/64	720	0.00039	0.6	0.9	1.1	3,276	0.00106	7.0	10.4	13.9	3,618	0.00079	5.7	8.5	11.4	2,494	0.00065	3.2	4.9	6.5
5/16	684	0.00043	0.6	0.9	1.2	3,112	0.00115	7.2	10.7	14.3	3,437	0.00085	5.8	8.8	11.7	2,369	0.00070	3.3	5.0	6.6
21/64	651	0.00046	0.6	0.9	1.2	2,964	0.00124	7.3	11.0	14.7	3,274	0.00091	6.0	9.0	11.9	2,256	0.00075	3.4	5.1	6.8
11/32	622	0.00049	0.6	0.9	1.2	2,829	0.00133	7.5	11.2	15.0	3,125	0.00098	6.1	9.1	12.2	2,154	0.00080	3.4	5.2	6.9
23/64	595	0.00052	0.6	0.9	1.2	2,706	0.00141	7.6	11.5	15.3	2,989	0.00104	6.2	9.3	12.4	2,060	0.00085	3.5	5.3	7.0
3/8	570	0.00055	0.6	0.9	1.3	2,594	0.00150	7.8	11.7	15.6	2,864	0.00110	6.3	9.5	12.6	1,974	0.00090	3.6	5.3	7.1
25/64	547	0.00058	0.6	0.9	1.3	2,490	0.00156	7.8	11.7	15.6	2,750	0.00115	6.3	9.5	12.6	1,895	0.00094	3.6	5.3	7.1
13/32	526	0.00060	0.6	0.9	1.3	2,394	0.00163	7.8	11.7	15.6	2,644	0.00120	6.3	9.5	12.7	1,822	0.00098	3.6	5.3	7.1
27/64	506	0.00063	0.6	0.9	1.3	2,305	0.00169	7.8	11.7	15.6	2,546	0.00125	6.4	9.5	12.7	1,755	0.00101	3.6	5.3	7.1
7/16	488	0.00065	0.6	1.0	1.3	2,223	0.00175	7.8	11.7	15.6	2,455	0.00130	6.4	9.6	12.8	1,692	0.00105	3.6	5.3	7.1
29/64	472	0.00068	0.6	1.0	1.3	2,146	0.00181	7.8	11.7	15.6	2,371	0.00135	6.4	9.6	12.8	1,634	0.00109	3.6	5.3	7.1
15/32	456	0.00070	0.6	1.0	1.3	2,075	0.00188	7.8	11.7	15.6	2,292	0.00140	6.4	9.6	12.8	1,579	0.00125	3.9	5.9	7.9
31/64	441	0.00073	0.6	1.0	1.3	2,008	0.00194	7.8	11.7	15.6	2,218	0.00145	6.4	9.6	12.9	1,528	0.00116	3.6	5.3	7.1
1/2	427	0.00075	0.6	1.0	1.3	1,945	0.00200	7.8	11.7	15.6	2,148	0.00150	6.4	9.7	12.9	1,481	0.00120	3.6	5.3	7.1
9/16	380	0.00079	0.6	0.9	1.2	1,729	0.00210	7.3	10.9	14.5	1,910	0.00158	6.0	9.0	12.0	1,316	0.00125	3.3	4.9	6.6
5/8	342	0.00083	0.6	0.8	1.1	1,556	0.00220	6.8	10.3	13.7	1,719	0.00165	5.7	8.5	11.3	1,185	0.00130	3.1	4.6	6.2
11/16	311	0.00086	0.5	0.8	1.1	1,415	0.00230	6.5	9.8	13.0	1,562	0.00173	5.4	8.1	10.8	1,077	0.00135	2.9	4.4	5.8
3/4	285	0.00090	0.5	0.8	1.0	1,297	0.00240	6.2	9.3	12.4	1,432	0.00180	5.2	7.7	10.3	987	0.00140	2.8	4.1	5.5
7/8	244	0.00098	0.5	0.7	1.0	1,112	0.00260	5.8	8.7	11.6	1,228	0.00195	4.8	7.2	9.6	846	0.00155	2.6	3.9	5.2
1	214	0.00105	0.4	0.7	0.9	973	0.00280	5.4	8.2	10.9	1,074	0.00210	4.5	6.8	9.0	740	0.00170	2.5	3.8	5.0

Depth of cut




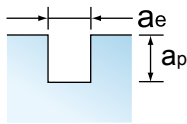
rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm



CUTTING CONDITION – ISE/ISB SERIES

FRACTIONAL



Slot Milling 	SUPER ALLOYS (NICKEL, COBALT, IRON, BASE) Inconel 601, 617, 625, 718, Incoloy 800, Monel 400, Rene, Waspalloy					TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti52 Cr3Sn3Al					GRAPHITE				
	≦ 300					≦ 350									
Hardness BRINELL	≦ 32					≦ 37.9									
HRC															
Vc (SFM)	50	(37-56)				137	(108-162)				500	(399-599)			
ae/ap	ae(2)=1D ap(2)=1D	ae(3)=1D ap(3)=0.5D	ae(4)=1D ap(4)=0.4D			ae(2)=1D ap(2)=1D	ae(3)=1D ap(3)=0.5D	ae(4)=1D ap(4)=0.4D			ae(2)=1D ap(2)=1D	ae(3)=1D ap(3)=0.5D	ae(4)=1D ap(4)=0.4D		
MILL DIA. (inch)	RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)			RPM	Fz	Feed (IPM)		
			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes			2 flutes	3 flutes	4 flutes
1/64	12,077	0.00002	0.5	0.7	1.0	33,445	0.00002	1.3	2.0	2.7	122,631	0.00006	14.7	22.1	29.4
1/32	6,039	0.00003	0.4	0.5	0.7	16,722	0.00004	1.3	2.0	2.7	61,316	0.00012	14.7	22.1	29.4
3/64	4,026	0.00005	0.4	0.5	0.7	11,148	0.00006	1.3	2.0	2.7	40,877	0.00020	16.4	24.5	32.7
1/16	3,019	0.00006	0.4	0.5	0.7	8,361	0.00008	1.3	2.0	2.7	30,658	0.00026	15.9	23.9	31.9
5/64	2,415	0.00010	0.5	0.7	0.9	6,689	0.00011	1.5	2.2	2.9	24,526	0.00036	17.7	26.5	35.3
3/32	2,013	0.00013	0.5	0.8	1.0	5,574	0.00014	1.6	2.3	3.1	20,439	0.00046	18.8	28.2	37.6
7/64	1,725	0.00017	0.6	0.9	1.1	4,778	0.00017	1.6	2.4	3.2	17,519	0.00054	18.9	28.4	37.8
1/8	1,510	0.00020	0.6	0.9	1.2	4,181	0.00020	1.7	2.5	3.3	15,329	0.00060	18.4	27.6	36.8
9/64	1,342	0.00023	0.6	0.9	1.2	3,716	0.00024	1.8	2.6	3.5	13,626	0.00073	19.8	29.6	39.5
5/32	1,208	0.00025	0.6	0.9	1.2	3,344	0.00028	1.8	2.8	3.7	12,263	0.00085	20.8	31.3	41.7
11/64	1,098	0.00028	0.6	0.9	1.2	3,040	0.00031	1.9	2.9	3.8	11,148	0.00098	21.7	32.6	43.5
3/16	1,006	0.00030	0.6	0.9	1.2	2,787	0.00035	2.0	2.9	3.9	10,219	0.00110	22.5	33.7	45.0
13/64	929	0.00033	0.6	0.9	1.2	2,573	0.00039	2.0	3.0	4.0	9,433	0.00123	23.1	34.7	46.2
7/32	863	0.00035	0.6	0.9	1.2	2,389	0.00043	2.0	3.0	4.1	8,759	0.00135	23.7	35.5	47.3
15/64	805	0.00038	0.6	0.9	1.2	2,230	0.00046	2.1	3.1	4.1	8,175	0.00148	24.1	36.2	48.2
1/4	755	0.00040	0.6	0.9	1.2	2,090	0.00050	2.1	3.1	4.2	7,664	0.00160	24.5	36.8	49.1
17/64	710	0.00045	0.6	1.0	1.3	1,967	0.00055	2.2	3.2	4.3	7,214	0.00178	25.6	38.4	51.2
9/32	671	0.00050	0.7	1.0	1.3	1,858	0.00060	2.2	3.3	4.5	6,813	0.00195	26.6	39.9	53.1
19/64	636	0.00055	0.7	1.0	1.4	1,760	0.00065	2.3	3.4	4.6	6,454	0.00213	27.4	41.1	54.9
5/16	604	0.00060	0.7	1.1	1.4	1,672	0.00070	2.3	3.5	4.7	6,132	0.00230	28.2	42.3	56.4
21/64	575	0.00065	0.7	1.1	1.5	1,593	0.00075	2.4	3.6	4.8	5,840	0.00248	28.9	43.4	57.8
11/32	549	0.00070	0.8	1.2	1.5	1,520	0.00080	2.4	3.6	4.9	5,574	0.00265	29.5	44.3	59.1
23/64	525	0.00075	0.8	1.2	1.6	1,454	0.00085	2.5	3.7	4.9	5,332	0.00283	30.1	45.2	60.2
3/8	503	0.00080	0.8	1.2	1.6	1,394	0.00090	2.5	3.8	5.0	5,110	0.00300	30.7	46.0	61.3
25/64	483	0.00083	0.8	1.2	1.6	1,338	0.00094	2.5	3.8	5.0	4,905	0.00313	30.7	46.0	61.3
13/32	465	0.00085	0.8	1.2	1.6	1,286	0.00098	2.5	3.8	5.0	4,717	0.00325	30.7	46.0	61.3
27/64	447	0.00088	0.8	1.2	1.6	1,239	0.00101	2.5	3.8	5.0	4,542	0.00338	30.7	46.0	61.3
7/16	431	0.00090	0.8	1.2	1.6	1,194	0.00105	2.5	3.8	5.0	4,380	0.00350	30.7	46.0	61.3
29/64	416	0.00093	0.8	1.2	1.5	1,153	0.00109	2.5	3.8	5.0	4,229	0.00363	30.7	46.0	61.3
15/32	403	0.00095	0.8	1.1	1.5	1,115	0.00125	2.8	4.2	5.6	4,088	0.00375	30.7	46.0	61.3
31/64	390	0.00098	0.8	1.1	1.5	1,079	0.00116	2.5	3.8	5.0	3,956	0.00388	30.7	46.0	61.3
1/2	377	0.00100	0.8	1.1	1.5	1,045	0.00120	2.5	3.8	5.0	3,832	0.00400	30.7	46.0	61.3
9/16	335	0.00105	0.7	1.1	1.4	929	0.00125	2.3	3.5	4.6	3,406	0.00420	28.6	42.9	57.2
5/8	302	0.00110	0.7	1.0	1.3	836	0.00130	2.2	3.3	4.3	3,066	0.00440	27.0	40.5	54.0
11/16	274	0.00115	0.6	0.9	1.3	760	0.00135	2.1	3.1	4.1	2,787	0.00460	25.6	38.5	51.3
3/4	252	0.00120	0.6	0.9	1.2	697	0.00140	2.0	2.9	3.9	2,555	0.00480	24.5	36.8	49.1
7/8	216	0.00155	0.7	1.0	1.3	597	0.00155	1.9	2.8	3.7	2,190	0.00520	22.8	34.2	45.5
1	189	0.00140	0.5	0.8	1.1	523	0.00170	1.8	2.7	3.6	1,916	0.00560	21.5	32.2	42.9



rpm=sfm×3.82/D1
ipm=(inch/flute)×4×rpm

CUTTING CONDITION – MSE/SE 2FLUTES SERIES


METRIC

Slot Milling 	COPPER, COPPER ALLOY		MILD STEELS, CARBON STEELS, SS400 · S55C · FC250 · NAK55		HARDENED STEELS, PREHARDENED STEELS, STAINLESS STEELS SKT · SKD61 · NAK80 · HPM1 · DH			
			~32HRC		33~41HRC		42~50HRC	
			MILL DIA. (mm)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)
1	47,500	280	17,500	96	12,500	72	11,000	52
1.5	32,000	256	12,500	96	8,900	72	7,900	52
2	24,000	248	9,700	104	7,000	72	6,300	56
2.5	20,000	280	8,200	128	6,100	72	5,300	56
3	16,000	320	6,900	136	5,300	80	4,400	60
3.5	14,000	336	6,000	152	4,600	96	3,800	64
4	12,000	360	5,400	168	4,200	100	3,500	72
4.5	10,500	400	5,100	192	3,900	104	3,200	76
5	9,500	432	4,800	216	3,500	104	3,000	80
5.5	8,800	432	4,400	216	3,200	104	2,700	80
6	7,900	424	4,000	216	2,900	104	2,500	80
6.5	7,500	424	3,700	216	2,700	104	2,300	80
7	6,900	424	3,400	216	2,500	104	2,100	80
7.5	6,400	424	3,200	216	2,300	104	2,000	80
8	5,900	416	3,000	208	2,200	100	1,900	80
8.5	5,600	416	2,800	208	2,000	100	1,700	80
9	5,300	408	2,600	208	1,900	100	1,500	80
9.5	5,100	408	2,500	208	1,800	100	1,400	76
10	4,700	400	2,400	200	1,700	100	1,500	76
11	4,400	400	2,200	200	1,600	100	1,100	76
12	4,000	408	2,000	200	1,400	100	1,200	76
16	3,000	320	1,500	160	1,100	92	800	64
18	2,700	288	1,300	144	900	80	700	56
20	2,400	240	1,200	120	800	72	600	48
Depth of cut								




CUTTING CONDITION - MSE/SE 4FLUTES SERIES

METRIC

Side Milling 	MILD STEELS, CARBON STEELS, CAST IRON SS400 - S55C - FC250 (~750N/mm ²)		ALLOY STEELS, TOOL STEELS SCM - SKT - SKS - SKD (~30HRC)		HARDENED STEELS, PREHARDENED STEELS SKT - SKD - NAK55 - HPM1 (30~38HRC)		STAINLESS STEELS, HARDENED STEELS SUS304 - SKD (38~45HRC)		HARDENED STEELS, TITANIUM ALLOY STEELS (45~55HRC)		HEAT RESISTANT ALLOY STEELS INCONEL	
	MILL DIA. (mm)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)
3	12,500	880	9,550	672	8,100	500	7,650	492	7,400	436	3,800	176
4	9,750	960	7,550	788	6,400	544	6,050	568	5,850	504	3,000	192
5	7,950	1,040	6,150	840	5,250	580	4,950	620	4,800	536	2,450	196
6	6,750	1,280	5,250	960	4,450	712	4,200	668	4,050	556	2,100	200
8	5,050	1,240	3,950	880	3,350	652	3,150	648	3,050	540	1,600	180
10	4,100	1,160	3,200	840	2,700	580	2,550	572	2,450	508	1,250	172
12	3,400	1,120	2,650	800	2,250	576	2,100	540	2,050	484	1,050	168
16	2,550	960	2,000	752	1,700	508	1,600	444	1,550	404	765	168
20	2,050	788	1,600	604	1,350	472	1,250	412	1,250	368	635	160
25	1,650	704	1,250	540	1,100	428	1,000	388	990	316	510	148
Depth of cut												

METRIC

Slot Milling 	MILD STEELS, CARBON STEELS, CAST IRON SS400 - S55C - FC250 (~750N/mm ²)		ALLOY STEELS, TOOL STEELS SCM - SKT - SKS - SKD (~30HRC)		HARDENED STEELS, PREHARDENED STEELS SKT - SKD - NAK55 - HPM1 (30~38HRC)		STAINLESS STEELS, HARDENED STEELS SUS304 - SKD (38~45HRC)		HARDENED STEELS, TITANIUM ALLOY STEELS (45~55HRC)		HEAT RESISTANT ALLOY STEELS INCONEL	
	MILL DIA. (mm)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)	FEED (mm/min)	SPEED (min ⁻¹)
3	10,500	584	8,550	544	7,850	416	7,450	368	7,200	352	2,500	100
4	7,750	584	6,400	620	5,900	416	5,550	412	5,400	396	1,900	108
5	6,200	588	5,100	604	4,700	436	4,450	436	4,300	428	1,500	116
6	5,150	592	4,250	508	3,950	460	3,700	456	3,600	436	1,250	116
8	3,850	480	3,200	440	2,950	440	2,800	420	2,700	408	945	124
10	3,100	464	2,550	432	2,350	384	2,250	380	2,150	364	760	116
12	2,600	448	2,150	380	1,950	368	1,850	352	1,800	348	630	116
16	1,950	444	1,600	344	1,500	296	1,400	296	1,350	292	475	88
20	1,550	380	1,300	304	1,200	284	1,100	264	1,100	264	380	88
25	1,250	360	1,000	292	945	252	890	228	865	188	300	84
Depth of cut												

SPEED TIGER

CUTTING CONDITION - MSB/SB 2FLUTES SERIES for REGULAR MILLING
METRIC

WORK MATERIAL	COPPER, COPPER ALLOY				MILD STEELS, CARBON STEELS, SS400 · S55C · FC250 · NAK55				HARDENED STEELS, PREHARDENED STEELS, STAINLESS STEELS SKT · SKD61 · NAK80 · HPM1 · DH							
					~32HRC				33~41HRC				42~50HRC			
	R	SPEED (min ⁻¹)	FEED (mm/min)	DEPTH OF CUT		SPEED (min ⁻¹)	FEED (mm/min)	DEPTH OF CUT		SPEED (min ⁻¹)	FEED (mm/min)	DEPTH OF CUT		SPEED (min ⁻¹)	FEED (mm/min)	DEPTH OF CUT
			ap	pf			ap	pf			ap	pf			ap	pf
R 0.05	40,000	120	0.003	0.005	32,000	60	0.005	0.005	32,000	40	0.005	0.005	32,000	28	0.005	0.005
R 0.1	40,000	240	0.010	0.020	32,000	160	0.010	0.010	32,000	160	0.010	0.010	32,000	160	0.005	0.005
R0.2	40,000	392	0.020	0.080	32,000	328	0.020	0.080	32,000	264	0.040	0.080	32,000	164	0.020	0.040
R0.3	40,000	464	0.030	0.120	32,000	392	0.030	0.120	32,000	336	0.060	0.120	32,000	212	0.030	0.060
R0.4	40,000	528	0.040	0.160	32,000	440	0.040	0.160	31,500	336	0.080	0.160	27,500	232	0.040	0.080
R0.5	32,000	600	0.050	0.200	31,500	496	0.050	0.200	25,000	320	0.100	0.200	22,000	228	0.050	0.100
R1	19,000	600	0.200	0.400	15,500	496	0.200	0.400	12,500	320	0.200	0.400	11,000	232	0.100	0.200
R1.5	12,500	608	0.300	0.600	10,500	504	0.300	0.600	8,450	324	0.300	0.600	7,400	232	0.150	0.300
R2	9,500	608	0.400	0.800	7,950	504	0.400	0.800	6,350	356	0.400	0.800	5,550	296	0.200	0.400
R3	6,300	640	0.600	1.200	5,300	536	0.600	1.200	4,200	372	0.600	1.200	3,700	312	0.300	0.600
R4	4,750	760	0.800	1.600	3,950	632	0.800	1.600	3,150	444	0.800	1.600	2,750	364	0.400	0.800
R5	3,800	712	1.000	2.000	3,150	596	1.000	2.000	2,500	420	1.000	2.000	2,200	344	0.500	1.000
R6	3,170	672	1.200	2.400	2,650	560	1.200	2.400	2,100	392	1.200	2.400	1,850	344	0.600	1.200
R8	2,400	504	1.600	3.200	1,990	420	1.600	3.200	1,580	296	1.600	3.200	1,390	260	0.800	1.600
R10	1,900	400	2.000	4.000	1,590	336	2.000	4.000	1,260	232	2.000	4.000	1,110	208	1.000	2.000


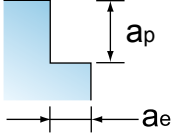
Depth of cut

CUTTING CONDITION - MSB/SB 2FLUTES SERIES for HIGH SPEED LIGHT MILLING
METRIC

WORK MATERIAL	COPPER, COPPER ALLOY				MILD STEELS, CARBON STEELS, SS400 · S55C · FC250 · NAK55				HARDENED STEELS, PREHARDENED STEELS, STAINLESS STEELS SKT · SKD61 · NAK80 · HPM1 · DH							
					~32HRC				33~41HRC				42~50HRC			
	R	SPEED (min ⁻¹)	FEED (mm/min)	DEPTH OF CUT		SPEED (min ⁻¹)	FEED (mm/min)	DEPTH OF CUT		SPEED (min ⁻¹)	FEED (mm/min)	DEPTH OF CUT		SPEED (min ⁻¹)	FEED (mm/min)	DEPTH OF CUT
			ap	pf			ap	pf			ap	pf			ap	pf
R 0.5	50,000	2,680	0.020	0.050	50,000	2,240	0.020	0.050	50,000	2,000	0.020	0.050	47,500	1,800	0.020	0.050
R1	31,500	2,680	0.040	0.100	25,000	2,240	0.040	0.100	24,500	2,000	0.040	0.100	23,500	1,800	0.040	0.100
R1.5	21,000	2,680	0.060	0.150	16,500	2,240	0.060	0.150	16,000	2,000	0.060	0.150	15,500	1,800	0.060	0.150
R2	15,500	3,264	0.080	0.200	15,500	2,720	0.080	0.200	15,000	2,200	0.080	0.200	13,500	1,960	0.080	0.200
R3	10,500	4,128	0.120	0.300	13,500	3,440	0.300	0.600	11,500	2,200	0.300	0.600	9,500	1,800	0.120	0.300
R4	7,900	3,072	0.160	0.400	10,000	2,560	0.400	0.800	8,950	1,680	0.400	0.800	7,150	1,360	0.160	0.400
R5	6,300	2,496	0.200	0.500	8,250	2,080	0.500	1.000	7,150	1,360	0.500	1.000	5,700	1,080	0.200	0.500
R6	5,250	2,064	0.240	0.600	6,850	1,720	0.500	2.400	5,950	1,120	0.500	2.400	4,750	880	0.240	0.600
R8	4,950	1,240	0.320	0.800	4,110	1,032	0.500	3.200	4,460	840	0.500	3.200	3,560	656	0.320	0.800
R10	3,950	992	0.400	1.000	3,290	824	0.500	4.000	3,570	672	0.500	4.000	2,850	528	0.320	1.000

Depth of cut


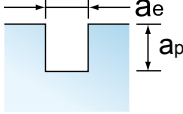

CUTTING CONDITION – IAUE/IAE5 for Aluminum Application
FRACTIONAL

Side Milling 		ALUMINUM ALLOYS 2017,2024,356,6061,7075				COPPER ALLOYS Alum Bronze,C110,Muntz Brass			
Hardness BRINELL	≦ 150				≦ 140				
HRC	≦ 80 HRB				≦ 76.4 HRB				
Vc (sfm)	968 (810~1214)				533 (446~669)				
MILL DIA. (inch)	RPM	Fz	Feed (IPM) IAUE-3Flutes	Feed (IPM) IAE5-2Flutes	RPM	Fz	Feed (IPM) IAUE-3Flutes	Feed (IPM) IAE5-2Flutes	
1/8	29,380	0.00060	52.9	35.3	16,193	0.00030	14.6	9.7	
3/16	19,587	0.00110	64.6	43.1	10,795	0.00055	17.8	11.9	
1/4	14,690	0.00160	70.5	47.0	8,096	0.00080	19.4	13.3	
5/16	11,752	0.00230	81.1	54.1	6,477	0.00115	22.3	14.9	
3/8	9,793	0.00300	88.1	58.8	5,398	0.00150	24.3	16.2	
1/2	7,345	0.00400	88.1	58.8	4,048	0.00200	24.3	16.2	
5/8	5,876	0.00440	77.6	51.7	3,239	0.00220	21.4	14.3	
3/4	4,897	0.00480	70.5	47.0	2,699	0.00240	19.4	13	
1	3,673	0.00560	61.7	41.1	2,024	0.00280	17.0	11.3	
Depth of cut									

$$\text{rpm} = \text{sfm} \times 3.82 / D1$$

$$\text{Feed(IPM)} = \text{RPM} \times Fz \times T(\text{Flute})$$

FRACTIONAL


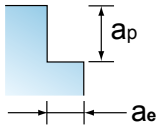
Slot Milling 		ALUMINUM ALLOYS 2017,2024,356,6061,7075				COPPER ALLOYS Alum Bronze,C110,Muntz Brass			
Hardness BRINELL	≦ 150				≦ 140				
HRC	≦ 80 HRB				≦ 76.4 HRB				
Vc (sfm)	810 (648~972)				446 (357~535)				
MILL DIA. (inch)	RPM	Fz	Feed (IPM) IAUE-3Flutes	Feed (IPM) IAE5-2Flutes	RPM	Fz	Feed (IPM) IAUE-3Flutes	Feed (IPM) IAE5-2Flutes	
1/8	23,504	0.00060	42.3	28.2	12,954	0.00030	11.7	7.8	
3/16	15,670	0.00110	51.7	34.5	8,636	0.00055	14.2	9.5	
1/4	11,752	0.00160	56.4	37.6	6,477	0.00080	15.5	10.4	
5/16	9,402	0.00230	64.9	43.2	5,182	0.00115	17.9	11.9	
3/8	7,835	0.00300	70.5	47.0	4,318	0.00150	19.4	13.0	
1/2	5,876	0.00400	70.5	47.0	3,239	0.00200	19.4	13.0	
5/8	4,701	0.00440	62.1	41.4	2,591	0.00220	17.1	11.4	
3/4	3,917	0.00480	56.4	37.6	2,159	0.00240	15.5	10.4	
1	2,938	0.00560	49.4	32.9	1,619	0.00280	13.6	9.1	
Depth of cut									

$$\text{rpm} = \text{sfm} \times 3.82 / D1$$


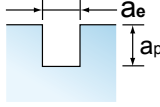
$$\text{Feed(IPM)} = \text{RPM} \times Fz \times T(\text{Flute})$$

AUCUTTING CONDITION - AUE for Aluminum Application

METRIC

Slot Milling 		Aluminum alloy expanding material A7075 Aluminum alloy casting<Sil 13%		Copper	
Max Cutting Speed(V)		240m/min		87m/min	
TYPE NO.	Diameter (mm)	Speed (min ⁻¹)	Feed Rate (mm/min)	Speed (min ⁻¹)	Feed Rate (mm/min)
AUE0253	2.5	30,000	2,600	11,000	800
AUE0303	3	25,000	2,900	9,250	1,000
AUE0403	4	18,750	3,300	6,950	1,300
AUE0503	5	15,000	3,700	5,550	1,600
AUE0603	6	12,500	4,150	4,650	2,000
AUE0803	8	9,400	3,150	3,500	1,520
AUE1003	10	7,500	2,500	2,800	1,200
AUE1203	12	6,250	2,100	2,300	1,000
AUE1603	16	4,700	1,550	1,750	760
AUE2003	20	3,750	1,250	1,400	600
Depth of cut		$a_p=2.0D$ $a_e=0.5D$ 			
		V	235.5	V	87.92
		Z	3	Z	3
		f	0.11	f	0.10


METRIC

Slot Milling 		Aluminum alloy expanding material A7075 Aluminum alloy casting<Sil 13%		Copper	
Max Cutting Speed(V)		250m/min		90m/min	
TYPE NO.	Diameter (mm)	Speed (min ⁻¹)	Feed Rate (mm/min)	Speed (min ⁻¹)	Feed Rate (mm/min)
AUE0253	2.5	20,000	1,500	11,800	850
AUE0303	3	18,000	1,800	9,840	990
AUE0403	4	15,000	2,300	7,440	1,100
AUE0503	5	13,000	2,800	5,920	1,200
AUE0603	6	12,000	4,000	4,960	1,350
AUE0803	8	10,000	3,040	3,680	1,050
AUE1003	10	8,000	2,400	2,960	850
AUE1203	12	6,660	2,000	2,480	700
AUE1603	16	5,000	1,300	1,840	500
AUE2003	20	4,000	1,000	1,520	400
Depth of cut		$a_p=1.5D$ $a_e=1.0D$ 			
		V	251.2	V	92.944
		Z	3	Z	3
		f	0.10	f	0.14

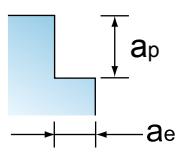


CUTTING CONDITION - 400 PLUS SERIES

FRACTIONAL

Side Milling 	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536			ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100			TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2			TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2			TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		
	Hardness BRINELL	≤ 275			≤ 375			≤ 375			≥ 375 ≤ 475			≥ 475 ≤ 655	
HRC	≤ 28.5			≤ 39.8			≤ 39.8			≥ 39.8 ≤ 49.1			≥ 50 ≤ 65		
Vc (SFM)	555	(442-662)		315	(253-378)		405	(324-486)		210	(168-252)		90	(72-108)	
ae/ap	ae=0.5D ap=1.5D			ae=0.5D ap=1.5D			ae=0.5D ap=1.5D			ae=0.5D ap=1.5D			ae=0.5D ap=1.5D		
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes
1/8	16,894	0.00040	27.0	9,629	0.00030	11.56	12,332	0.00050	24.7	6,420	0.00040	10.3	2,703	0.00020	2.2
9/64	15,017	0.00048	28.5	8,559	0.00028	9.42	10,962	0.00059	25.8	5,706	0.00048	10.8	2,403	0.00024	2.3
5/32	13,515	0.00055	29.7	7,704	0.00035	10.78	9,866	0.00068	26.6	5,136	0.00055	11.3	2,162	0.00028	2.4
11/64	12,286	0.00063	30.7	7,003	0.00043	11.91	8,969	0.00076	27.4	4,669	0.00063	11.7	1,966	0.00031	2.5
3/16	11,262	0.00070	31.5	6,420	0.00050	12.84	8,222	0.00085	28.0	4,280	0.00070	12.0	1,802	0.00035	2.5
13/64	10,396	0.00078	32.2	5,926	0.00058	13.63	7,589	0.00094	28.5	3,951	0.00078	12.2	1,663	0.00039	2.6
7/32	9,654	0.00085	32.8	5,503	0.00065	14.31	7,047	0.00103	28.9	3,668	0.00085	12.5	1,545	0.00043	2.6
15/64	9,010	0.00093	33.3	5,136	0.00073	14.89	6,577	0.00111	29.3	3,424	0.00093	12.7	1,442	0.00046	2.7
1/4	8,447	0.00100	33.8	4,815	0.00080	15.41	6,166	0.00120	29.6	3,210	0.00100	1.3	1,351	0.00005	0.3
17/64	7,950	0.00113	35.8	4,531	0.00088	15.86	5,803	0.00134	31.0	3,021	0.00113	13.6	1,272	0.00056	2.9
9/32	7,508	0.00123	36.9	4,280	0.00095	16.26	5,481	0.00148	32.3	2,853	0.00123	14.0	1,201	0.00061	2.9
19/64	7,113	0.00134	38.1	4,054	0.00103	16.62	5,193	0.00161	33.5	2,703	0.00134	14.5	1,138	0.00067	3.0
5/16	6,757	0.00145	39.2	3,852	0.00110	16.95	4,933	0.00175	34.5	2,568	0.00145	14.9	1,081	0.00073	3.1
21/64	6,436	0.00156	40.2	3,668	0.00118	17.24	4,698	0.00189	35.5	2,446	0.00156	15.3	1,030	0.00078	3.2
11/32	6,143	0.00168	41.3	3,502	0.00125	17.51	4,485	0.00203	36.3	2,334	0.00168	15.6	983	0.00084	3.3
23/64	5,876	0.00178	41.8	3,349	0.00133	17.75	4,290	0.00216	37.1	2,233	0.00178	16.0	940	0.00089	3.4
3/8	5,631	0.00190	42.8	3,210	0.00140	17.97	4,111	0.00230	37.8	2,140	0.00190	16.3	901	0.00095	3.4
25/64	5,406	0.00198	42.7	3,081	0.00146	18.03	3,946	0.00239	37.7	2,054	0.00198	16.2	865	0.00099	3.4
13/32	5,198	0.00205	42.6	2,963	0.00153	18.07	3,795	0.00248	37.6	1,975	0.00205	16.2	832	0.00103	3.4
27/64	5,006	0.00213	42.5	2,853	0.00159	18.12	3,654	0.00256	37.5	1,902	0.00213	16.2	801	0.00106	3.4
7/16	4,827	0.00220	42.5	2,751	0.00165	18.16	3,524	0.00265	37.3	1,834	0.00220	16.1	772	0.00110	3.4
29/64	4,660	0.00228	42.4	2,656	0.00171	18.20	3,402	0.00274	37.3	1,771	0.00228	16.1	746	0.00114	3.4
15/32	4,505	0.00235	42.3	2,568	0.00178	18.23	3,289	0.00283	37.2	1,712	0.00235	16.1	721	0.00118	3.4
31/64	4,360	0.00243	42.3	2,485	0.00184	18.26	3,183	0.00291	37.1	1,657	0.00243	16.1	698	0.00121	3.4
1/2	4,223	0.00250	42.2	2,407	0.00190	18.30	3,083	0.00300	37.0	1,605	0.00250	16.0	676	0.00125	3.4
9/16	3,754	0.00210	31.5	2,140	0.00215	18.40	2,741	0.00345	37.8	1,427	0.00285	16.3	601	0.00143	3.4
5/8	3,379	0.00310	41.9	1,926	0.00240	18.49	2,466	0.00390	38.5	1,284	0.00320	16.4	541	0.00160	3.5
11/16	3,072	0.00315	38.7	1,751	0.00245	17.16	2,242	0.00405	36.3	1,167	0.00335	15.6	491	0.00168	3.3
3/4	2,816	0.00320	36.0	1,605	0.00250	16.05	2,055	0.00420	34.5	1,070	0.00350	15.0	450	0.00175	3.2
7/8	2,413	0.00335	32.3	1,376	0.00260	14.31	1,762	0.00460	32.4	917	0.00365	13.4	386	0.00183	2.8
1	2,112	0.00350	29.6	1,204	0.00270	13.00	1,542	0.00500	30.8	802	0.00380	12.2	338	0.00190	2.6

Depth of cut




SPEED TIGER

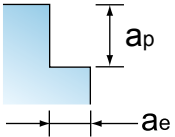
Cutting Condition

CUTTING CONDITION - 400 PLUS SERIES

FRACTIONAL

SideMilling 	CAST IRONS LOW&MEDIUM ALLOY Gray, Malleable, Ductile			CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile			STAINLESS STEELS (FREE MACHINING) 304, 416,420F,430F,440F			STAINLESS STEELS (DIFFICULT) 304, 304L,316,316L			STAINLESS STEELS(PH) 13-8 PH,15-5PH,17-4PH, Custom 450		
	Hardness BRINELL	≤ 220			≥ 220 ≤ 260			≤ 275			≤ 275			≤ 325	
HRC	≤ 18.8			≥ 18.8 ≤ 26.6			≤ 28.5			≤ 28.5			≤ 34.4		
Vc (SFM)	355	(284-426)		340	(272-408)		490	(392-588)		340	(272-408)		310	(248-372)	
ae/ap	ae=0.5D ap=1.5D			ae=0.5D ap=1.5D			ae=0.5D ap=1.5D			ae=0.5D ap=1.5D			ae=0.5D ap=1.5D		
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes
1/8	10,812	0.00040	17.3	10,305	0.00030	12.40	14,866	0.00030	17.8	10,305	0.00020	8.2	9,460	0.00020	7.6
9/64	9,611	0.00048	18.3	9,160	0.00035	12.80	13,215	0.00035	18.5	9,160	0.00025	9.2	8,409	0.00025	8.4
5/32	8,650	0.00055	19.0	8,244	0.00040	13.20	11,893	0.00040	19.0	8,244	0.00030	9.9	7,568	0.00030	9.1
11/64	7,863	0.00063	19.7	7,495	0.00045	13.50	10,812	0.00045	19.5	7,495	0.00035	10.5	6,880	0.00035	9.6
3/16	7,208	0.00070	20.2	6,870	0.00050	13.70	9,911	0.00050	19.8	6,870	0.00040	11.0	6,307	0.00040	10.1
13/64	6,654	0.00078	20.6	6,342	0.00055	14.00	9,149	0.00055	20.1	6,342	0.00045	11.4	5,822	0.00045	10.5
7/32	6,178	0.00085	21.0	5,889	0.00060	14.10	8,495	0.00060	20.4	5,889	0.00050	11.8	5,406	0.00050	10.8
15/64	5,766	0.00093	21.3	5,496	0.00065	14.30	7,929	0.00065	20.6	5,496	0.00055	12.1	5,046	0.00055	11.1
1/4	5,406	0.00100	21.6	5,153	0.00070	14.40	7,433	0.00070	20.8	5,153	0.00060	12.4	4,730	0.00060	11.4
17/64	5,088	0.00110	22.4	4,849	0.00079	15.30	6,996	0.00079	22.0	4,849	0.00066	12.9	4,452	0.00066	11.8
9/32	4,805	0.00120	23.1	4,580	0.00088	16.00	6,607	0.00088	23.1	4,580	0.00073	13.3	4,205	0.00073	12.2
19/64	4,552	0.00130	23.7	4,339	0.00096	16.70	6,260	0.00096	24.1	4,339	0.00079	13.7	3,983	0.00079	12.5
5/16	4,325	0.00140	24.2	4,122	0.00105	17.30	5,947	0.00105	25.0	4,122	0.00085	14.0	3,784	0.00085	12.9
21/64	4,119	0.00150	24.7	3,926	0.00114	17.90	5,663	0.00114	25.8	3,926	0.00091	14.3	3,604	0.00091	13.2
11/32	3,932	0.00160	25.2	3,747	0.00123	18.40	5,406	0.00123	26.5	3,747	0.00098	14.6	3,440	0.00098	13.4
23/64	3,761	0.00170	25.6	3,584	0.00131	18.80	5,171	0.00131	27.1	3,584	0.00104	14.9	3,291	0.00104	13.7
3/8	3,604	0.00180	25.9	3,435	0.00140	19.20	4,955	0.00140	27.8	3,435	0.00110	15.1	3,153	0.00110	13.9
25/64	3,460	0.00188	25.9	3,298	0.00145	19.10	4,757	0.00145	27.6	3,298	0.00114	15.0	3,027	0.00114	13.8
13/32	3,327	0.00195	25.9	3,171	0.00150	19.00	4,574	0.00150	27.4	3,171	0.00118	14.9	2,911	0.00118	13.7
27/64	3,204	0.00203	25.9	3,053	0.00155	18.90	4,405	0.00155	27.3	3,053	0.00121	14.8	2,803	0.00121	13.6
7/16	3,089	0.00210	25.9	2,944	0.00160	18.80	4,248	0.00160	27.2	2,944	0.00125	14.7	2,703	0.00125	13.5
29/64	2,983	0.00218	25.9	2,843	0.00165	18.80	4,101	0.00165	27.1	2,843	0.0013	14.6	2,610	0.0013	13.4
15/32	2,883	0.00225	25.9	2,748	0.00170	18.70	3,964	0.00170	27.0	2,748	0.00133	14.6	2,523	0.00133	13.4
31/64	2,790	0.00233	25.9	2,659	0.00175	18.60	3,837	0.00175	26.9	2,659	0.00136	14.5	2,441	0.00136	13.3
1/2	2,703	0.00240	25.9	2,576	0.00180	18.50	3,717	0.00180	26.8	2,576	0.00140	14.4	2,365	0.00140	13.2
9/16	2,403	0.00270	25.9	2,290	0.00205	18.80	3,304	0.00205	27.1	2,290	0.00160	14.7	2,102	0.00160	13.5
5/8	2,162	0.00300	25.9	2,061	0.00230	19.00	2,973	0.00230	27.4	2,061	0.00180	14.8	1,892	0.00180	13.6
11/16	1,966	0.00305	24.0	1,874	0.00245	18.40	2,703	0.00245	26.5	1,874	0.00185	13.9	1,720	0.00185	12.7
3/4	1,802	0.00310	22.3	1,718	0.00240	16.50	2,478	0.00240	23.8	1,718	0.00190	13.1	1,577	0.00190	12.0
7/8	1,545	0.00325	20.1	1,472	0.00245	14.40	2,124	0.00245	20.8	1,472	0.00195	11.5	1,351	0.00195	10.5
1	1,351	0.00340	18.4	1,288	0.00250	12.90	1,858	0.00250	18.6	1,288	0.00200	10.3	1,183	0.00200	9.5


Depth of cut





CUTTING CONDITION - 400 PLUS SERIES

FRACTIONAL

SideMilling 	SUPER ALLOYS (NICKEL, COBALT, IRON, BASE) Inconel 601, 617, 625, Incoly 800, Monel 400			SUPER ALLOYS (NICKEL, COBALT, IRON, BASE) Inconel 718, 750X, Incoly 925, Waspalloy, Hastelloy, Rene			TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si			TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al		
	Hardness BRINELL	≤ 300			> 300			≤ 350			> 350 ≧ 440	
HRC	≤ 32.1			≤ 32.1								
Vc (SFM)	80	(64-96)		62	(50-74)		215	(172-258)		75	(60-90)	
ae/ap	ae=0.5D ap=1.5D			ae=0.5D ap=1.5D			ae=0.5D ap=1.5D			ae=0.5D ap=1.5D		
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes
1/8	2,365	0.00020	1.9	1,858	0.00010	0.70	6,757	0.00020	5.4	2,365	0.00020	1.9
9/64	2,102	0.00023	1.9	1,652	0.00013	0.80	6,007	0.00024	5.7	2,102	0.00024	2.0
5/32	1,892	0.00025	1.9	1,487	0.00015	0.90	5,406	0.00028	5.9	1,892	0.00028	2.1
11/64	1,720	0.00028	1.9	1,351	0.00018	0.90	4,915	0.00031	6.1	1,720	0.00031	2.2
3/16	1,577	0.00030	1.9	1,239	0.00020	1.00	4,505	0.00035	6.3	1,577	0.00035	2.2
13/64	1,455	0.00033	1.9	1,144	0.00023	1.00	4,158	0.00039	6.4	1,455	0.00039	2.3
7/32	1,351	0.00035	1.9	1,062	0.00025	1.10	3,861	0.00043	6.6	1,351	0.00043	2.3
15/64	1,261	0.00038	1.9	991	0.00028	1.10	3,604	0.00046	6.7	1,261	0.00046	2.3
1/4	1,183	0.00040	1.9	929	0.00030	1.10	3,379	0.00050	6.8	1,183	0.00050	2.4
17/64	1,113	0.00045	2.0	874	0.00033	1.10	3,180	0.00057	7.2	1,113	0.00057	2.5
9/32	1,051	0.00050	2.1	826	0.00035	1.20	3,003	0.00063	7.6	1,051	0.00063	2.6
19/64	996	0.00055	2.2	782	0.00038	1.20	2,845	0.00069	7.8	996	0.00069	2.7
5/16	946	0.00060	2.3	743	0.00040	1.20	2,703	0.00075	8.1	946	0.00075	2.8
21/64	901	0.00065	2.3	708	0.00043	1.20	2,574	0.00081	8.4	901	0.00081	2.9
11/32	860	0.00070	2.4	676	0.00045	1.20	2,457	0.00088	8.6	860	0.00088	3.0
23/64	823	0.00075	2.5	646	0.00048	1.20	2,350	0.00094	8.8	823	0.00094	3.1
3/8	788	0.00080	2.5	619	0.00050	1.20	2,252	0.00100	9.0	788	0.00100	3.2
25/64	757	0.00083	2.5	595	0.00053	1.20	2,162	0.00104	9.0	757	0.00104	3.1
13/32	728	0.00085	2.5	572	0.00055	1.30	2,079	0.00108	8.9	728	0.00108	3.1
27/64	701	0.00088	2.5	551	0.00058	1.30	2,002	0.00111	8.9	701	0.00111	3.1
7/16	676	0.00090	2.4	531	0.00060	1.30	1,931	0.00115	8.9	676	0.00115	3.1
29/64	652	0.00093	2.4	513	0.00063	1.30	1,864	0.00119	8.9	652	0.00119	3.1
15/32	631	0.00095	2.4	496	0.00065	1.30	1,802	0.00123	8.8	631	0.00123	3.1
31/64	610	0.00098	2.4	480	0.00068	1.30	1,744	0.00126	8.8	610	0.00126	3.1
1/2	591	0.00100	2.4	465	0.00070	1.30	1,689	0.00130	8.8	591	0.00130	3.1
9/16	526	0.00115	2.4	413	0.00080	1.30	1,502	0.00145	8.7	526	0.00145	3.0
5/8	473	0.00130	2.5	372	0.00090	1.30	1,351	0.00160	8.6	473	0.00160	3.0
11/16	430	0.00135	2.3	338	0.00095	1.30	1,229	0.00165	8.1	430	0.00165	2.8
3/4	394	0.00140	2.2	310	0.00100	1.20	1,126	0.00170	7.7	394	0.00170	2.7
7/8	338	0.00145	2.0	265	0.00011	0.10	965	0.00175	6.8	338	0.00175	2.4
1	296	0.00150	1.8	232	0.00110	1.00	845	0.00180	6.1	296	0.00180	2.1

Depth of cut




SPEED TIGER

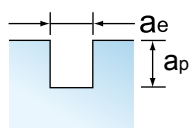
Cutting Condition

CUTTING CONDITION - 400 PLUS SERIES

FRACTIONAL

Slot Milling 	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536			ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100			TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2			TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2			TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		
Hardness BRINELL	≦ 275			≦ 375			≦ 375			≧ 375 ≧ 475			≧ 475 ≧ 655		
HRC	≦ 28.5			≦ 39.8			≦ 39.8			≧ 39.8 ≧ 49.1			≧ 50 ≧ 65		
Vc (SFM)	440	(352-528)		252	(201-303)		320	(256-384)		170	(136-204)		70	(56-84)	
ae/ap	ae=1D ap=1D			ae=1D ap=1D			ae=1D ap=1D			ae=1D ap=1D			ae=1D ap=1D		
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes
1/8	13,515	0.00040	21.6	6,163	0.00030	7.40	9,866	0.00050	19.7	5,136	0.00040	8.2	2,162	0.00020	1.7
9/64	12,013	0.00048	22.8	5,478	0.00028	6.03	8,770	0.00059	20.6	4,565	0.00048	8.7	1,922	0.00024	1.8
5/32	10,812	0.00055	23.8	4,930	0.00035	6.90	7,893	0.00068	21.3	4,109	0.00055	9.0	1,730	0.00028	1.9
11/64	9,829	0.00063	24.6	4,482	0.00043	7.62	7,175	0.00076	21.9	3,735	0.00063	9.3	1,573	0.00031	2.0
3/16	9,010	0.00070	25.2	4,109	0.00050	8.22	6,577	0.00085	22.4	3,424	0.00070	9.6	1,442	0.00035	2.0
13/64	8,317	0.00078	25.8	3,793	0.00058	8.72	6,071	0.00094	22.8	3,160	0.00078	9.8	1,331	0.00039	2.1
7/32	7,723	0.00085	26.3	3,522	0.00065	9.16	5,638	0.00103	23.1	2,935	0.00085	10.0	1,236	0.00043	2.1
15/64	7,208	0.00093	26.7	3,287	0.00073	9.53	5,262	0.00111	23.4	2,739	0.00093	10.1	1,153	0.00046	2.1
1/4	6,757	0.00100	27.0	3,081	0.00080	9.86	4,933	0.00120	23.7	2,568	0.00100	1.0	1,081	0.00050	2.2
17/64	6,360	0.00113	28.6	2,900	0.00088	10.15	4,643	0.00134	24.8	2,417	0.00113	10.9	1,018	0.00056	2.3
9/32	6,007	0.00123	29.6	2,739	0.00095	10.41	4,385	0.00148	25.9	2,283	0.00123	11.2	961	0.00061	2.4
19/64	5,691	0.00134	30.5	2,595	0.00103	10.64	4,154	0.00161	26.8	2,162	0.00134	11.6	910	0.00067	2.4
5/16	5,406	0.00145	31.4	2,465	0.00110	10.85	3,946	0.00175	27.6	2,054	0.00145	11.9	865	0.00073	2.5
21/64	5,149	0.00156	32.1	2,348	0.00118	11.03	3,758	0.00189	28.4	1,956	0.00156	12.2	824	0.00078	2.6
11/32	4,915	0.00168	33.0	2,241	0.00125	11.21	3,588	0.00203	29.1	1,868	0.00168	12.5	786	0.00084	2.6
23/64	4,701	0.00178	33.5	2,144	0.00133	11.36	3,432	0.00216	29.7	1,786	0.00178	12.8	752	0.00089	2.7
3/8	4,505	0.00190	34.2	2,054	0.00140	11.50	3,289	0.00230	30.3	1,712	0.00190	13.0	721	0.00095	2.7
25/64	4,325	0.00198	34.2	1,972	0.00146	11.54	3,157	0.00239	30.2	1,643	0.00198	13.0	692	0.00099	2.7
13/32	4,158	0.00205	34.1	1,896	0.00153	11.57	3,036	0.00248	30.1	1,580	0.00205	13.0	665	0.00103	2.7
27/64	4,004	0.00213	34.0	1,826	0.00159	11.60	2,923	0.00256	30.0	1,522	0.00213	12.9	641	0.00106	2.7
7/16	3,861	0.00220	34.0	1,761	0.00165	11.62	2,819	0.00265	29.9	1,467	0.00220	12.9	618	0.00110	2.7
29/64	3,728	0.00228	33.9	1,700	0.00171	11.65	2,722	0.00274	29.8	1,417	0.00228	12.9	597	0.00114	2.7
15/32	3,604	0.00235	33.9	1,643	0.00178	11.67	2,631	0.00283	29.7	1,370	0.00235	12.9	577	0.00118	2.7
31/64	3,488	0.00243	33.8	1,590	0.00184	11.69	2,546	0.00291	29.6	1,325	0.00243	12.9	558	0.00121	2.7
1/2	3,379	0.00250	33.8	1,541	0.00190	11.71	2,466	0.00300	29.6	1,284	0.00250	12.8	541	0.00125	2.7
9/16	3,003	0.00210	25.2	1,370	0.00215	11.78	2,192	0.00345	30.3	1,141	0.00285	13.0	481	0.00143	2.7
5/8	2,703	0.00310	33.5	1,233	0.00240	11.83	1,973	0.00390	30.8	1,027	0.00320	13.1	432	0.00160	2.8
11/16	2,457	0.00315	31.0	1,121	0.00245	10.98	1,794	0.00405	29.1	934	0.00335	12.5	393	0.00168	2.6
3/4	2,252	0.00320	28.8	1,027	0.00250	10.27	1,644	0.00420	27.6	856	0.00350	12.0	360	0.00175	2.5
7/8	1,931	0.00335	25.9	880	0.00260	9.16	1,409	0.00460	25.9	734	0.00365	10.7	309	0.00183	2.3
1	1,689	0.00350	23.7	770	0.00270	8.32	1,233	0.00500	24.7	642	0.00380	9.8	270	0.00190	2.1

Depth of cut





CUTTING CONDITION - 400 PLUS SERIES

FRACTIONAL

Slot Milling	CAST IRONS (LOW&MEDIUM ALLOY) Gray, Malleable, Ductile			CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile			STAINLESS STEELS (FREE MACHINING) 304, 416,420F,430F,440F			STAINLESS STEELS (DIFFICULT) 304, 304L,316,316L			STAINLESS STEELS(PH) 13-8 PH,15-5PH,17-4PH, Custom 450		
Hardness BRINELL	≦ 220			≧ 220 ≦ 260			≦ 275			≦ 275			≦ 325		
HRC	≦ 18.8			≧ 18.8 ≦ 26.6			≦ 28.5			≦ 28.5			≦ 34.4		
Vc (SFM)	284	(356-534)		272	(216-324)		390	(312-468)		270	(216-324)		250	(200-300)	
ae/ap	ae=1D ap=1D			ae=1D ap=1D			ae=1D ap=1D			ae=1D ap=1D			ae=1D ap=1D		
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes
1/8	6,920	0.00040	11.1	6,595	0.00030	7.90	9,515	0.00030	11.4	6,595	0.00020	5.3	6,055	0.00020	4.8
9/64	6,151	0.00048	11.7	5,862	0.00035	8.20	8,457	0.00035	11.8	5,862	0.00025	5.9	5,382	0.00025	5.4
5/32	5,536	0.00055	12.2	5,276	0.00040	8.40	7,612	0.00040	12.2	5,276	0.00030	6.3	4,844	0.00030	5.8
11/64	5,032	0.00063	12.6	4,797	0.00045	8.60	6,920	0.00045	12.5	4,797	0.00035	6.7	4,403	0.00035	6.2
3/16	4,613	0.00070	12.9	4,397	0.00050	8.80	6,343	0.00050	12.7	4,397	0.00040	7.0	4,036	0.00040	6.5
13/64	4,258	0.00078	13.2	4,059	0.00055	8.90	5,855	0.00055	12.9	4,059	0.00045	7.3	3,726	0.00045	6.7
7/32	3,954	0.00085	13.4	3,769	0.00060	9.00	5,437	0.00060	13.0	3,769	0.00050	7.5	3,460	0.00050	6.9
15/64	3,690	0.00093	13.7	3,517	0.00065	9.10	5,074	0.00065	13.2	3,517	0.00055	7.7	3,229	0.00055	7.1
1/4	3,460	0.00100	13.8	3,298	0.00070	9.20	4,757	0.00070	13.3	3,298	0.00060	7.9	3,027	0.00060	7.3
17/64	3,256	0.00110	14.3	3,104	0.00079	9.80	4,477	0.00079	14.1	3,104	0.00066	8.2	2,849	0.00066	7.6
9/32	3,075	0.00120	14.8	2,931	0.00088	10.30	4,229	0.00088	14.8	2,931	0.00073	8.5	2,691	0.00073	7.8
19/64	2,914	0.00130	15.2	2,777	0.00096	10.70	4,006	0.00096	15.4	2,777	0.00079	8.7	2,549	0.00079	8.0
5/16	2,768	0.00140	15.5	2,638	0.00105	11.10	3,806	0.00105	16.0	2,638	0.00085	9.0	2,422	0.00085	8.2
21/64	2,636	0.00150	15.8	2,512	0.00114	11.40	3,625	0.00114	16.5	2,512	0.00091	9.2	2,307	0.00091	8.4
11/32	2,516	0.00160	16.1	2,398	0.00123	11.80	3,460	0.00123	17.0	2,398	0.00098	9.4	2,202	0.00098	8.6
23/64	2,407	0.00170	16.4	2,294	0.00131	12.00	3,309	0.00131	17.4	2,294	0.00104	9.5	2,106	0.00104	8.7
3/8	2,307	0.00180	16.6	2,198	0.00140	12.30	3,172	0.00140	17.8	2,198	0.00110	9.7	2,018	0.00110	8.9
25/64	2,214	0.00188	16.6	2,110	0.00145	12.20	3,045	0.00145	17.7	2,110	0.00114	9.6	1,938	0.00114	8.8
13/32	2,129	0.00195	16.6	2,029	0.00150	12.20	2,928	0.00150	17.6	2,029	0.00118	9.5	1,863	0.00118	8.8
27/64	2,050	0.00203	16.6	1,954	0.00155	12.10	2,819	0.00155	17.5	1,954	0.00121	9.5	1,794	0.00121	8.7
7/16	1,977	0.00210	16.6	1,884	0.00160	12.10	2,718	0.00160	17.4	1,884	0.00125	9.4	1,730	0.00125	8.6
29/64	1,909	0.00218	16.6	1,819	0.00165	12.00	2,625	0.00165	17.3	1,819	0.0013	9.3	1,670	0.0013	8.6
15/32	1,845	0.00225	16.6	1,759	0.00170	12.00	2,537	0.00170	17.3	1,759	0.00133	9.3	1,615	0.00133	8.6
31/64	1,786	0.00233	16.6	1,702	0.00175	11.90	2,455	0.00175	17.2	1,702	0.00136	9.3	1,563	0.00136	8.5
1/2	1,730	0.00240	16.6	1,649	0.00180	11.90	2,379	0.00180	17.1	1,649	0.00140	9.2	1,514	0.00140	8.5
9/16	1,538	0.00270	16.6	1,466	0.00205	12.00	2,114	0.00205	17.3	1,466	0.00160	9.4	1,345	0.00160	8.6
5/8	1,384	0.00300	16.6	1,319	0.00230	12.10	1,903	0.00230	17.5	1,319	0.00180	9.5	1,211	0.00180	8.7
11/16	1,258	0.00305	15.3	1,199	0.00245	11.80	1,730	0.00245	17.0	1,199	0.00185	8.9	1,101	0.00185	8.1
3/4	1,153	0.00310	14.3	1,099	0.00240	10.60	1,586	0.00240	15.2	1,099	0.00190	8.4	1,009	0.00190	7.7
7/8	989	0.00325	12.9	942	0.00245	9.20	1,359	0.00245	13.3	942	0.00195	7.3	865	0.00195	6.7
1	865	0.00340	11.8	824	0.00250	8.20	1,189	0.00250	11.9	824	0.00200	6.6	757	0.00200	6.1


Depth of cut

SPEED TIGER

Cutting Condition

CUTTING CONDITION - 400 PLUS SERIES

FRACTIONAL


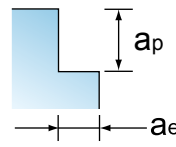
Slot Milling 	SUPER ALLOYS (NICKEL, COBALT, IRON, BASE) Inconel 601, 617, 625, Incoly 800, Monel 400			SUPER ALLOYS (NICKEL, COBALT, IRON, BASE) Inconel 718, 750X, Incoly 925, Waspalloy, Hastelloy, Rene			TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si			TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3Cr3Sn3Al		
Hardness BRINELL	≤ 300			> 300			≤ 350			> 350 ≤ 440		
HRC	≤ 32.1			≤ 32.1								
Vc (SFM)	65	(52-78)		50	(40-60)		170	(136-204)		60	(48-72)	
ae/ap	ae=1D ap=1D			ae=1D ap=1D			ae=1D ap=1D			ae=1D ap=1D		
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes	RPM	Fz	Feed (IPM) 4 flutes
1/8	1,514	0.00020	1.2	1,189	0.00010	0.50	4,325	0.00020	3.5	1,514	0.00020	1.2
9/64	1,345	0.00023	1.2	1,057	0.00013	0.50	3,844	0.00024	3.7	1,345	0.00024	1.3
5/32	1,211	0.00025	1.2	951	0.00015	0.60	3,460	0.00028	3.8	1,211	0.00028	1.3
11/64	1,101	0.00028	1.2	865	0.00018	0.60	3,145	0.00031	3.9	1,101	0.00031	1.4
3/16	1,009	0.00030	1.2	793	0.00020	0.60	2,883	0.00035	4.0	1,009	0.00035	1.4
13/64	931	0.00033	1.2	732	0.00023	0.70	2,661	0.00039	4.1	931	0.00039	1.4
7/32	865	0.00035	1.2	680	0.00025	0.70	2,471	0.00043	4.2	865	0.00043	1.5
15/64	807	0.00038	1.2	634	0.00028	0.70	2,307	0.00046	4.3	807	0.00046	1.5
1/4	757	0.00040	1.2	595	0.00030	0.70	2,162	0.00050	4.3	757	0.00050	1.5
17/64	712	0.00045	1.3	560	0.00033	0.70	2,035	0.00057	4.6	712	0.00057	1.6
9/32	673	0.00050	1.3	529	0.00035	0.70	1,922	0.00063	4.8	673	0.00063	1.7
19/64	637	0.00055	1.4	501	0.00038	0.80	1,821	0.00069	5.0	637	0.00069	1.8
5/16	605	0.00060	1.5	476	0.00040	0.80	1,730	0.00075	5.2	605	0.00075	1.8
21/64	577	0.00065	1.5	453	0.00043	0.80	1,648	0.00081	5.4	577	0.00081	1.9
11/32	550	0.00070	1.5	432	0.00045	0.80	1,573	0.00088	5.5	550	0.00088	1.9
23/64	526	0.00075	1.6	414	0.00048	0.80	1,504	0.00094	5.6	526	0.00094	2.0
3/8	505	0.00080	1.6	396	0.00050	0.80	1,442	0.00100	5.8	505	0.00100	2.0
25/64	484	0.00083	1.6	381	0.00053	0.80	1,384	0.00104	5.7	484	0.00104	2.0
13/32	466	0.00085	1.6	366	0.00055	0.80	1,331	0.00108	5.7	466	0.00108	2.0
27/64	448	0.00088	1.6	352	0.00058	0.80	1,281	0.00111	5.7	448	0.00111	2.0
7/16	432	0.00090	1.6	340	0.00060	0.80	1,236	0.00115	5.7	432	0.00115	2.0
29/64	418	0.00093	1.5	328	0.00063	0.80	1,193	0.00119	5.7	418	0.00119	2.0
15/32	404	0.00095	1.5	317	0.00065	0.80	1,153	0.00123	5.7	404	0.00123	2.0
31/64	391	0.00098	1.5	307	0.00068	0.80	1,116	0.00126	5.6	391	0.00126	2.0
1/2	378	0.00100	1.5	297	0.00070	0.80	1,081	0.00130	5.6	378	0.00130	2.0
9/16	336	0.00115	1.5	264	0.00080	0.80	961	0.00145	5.6	336	0.00145	2.0
5/8	303	0.00130	1.6	238	0.00090	0.90	865	0.00160	5.5	303	0.00160	1.9
11/16	275	0.00135	1.5	216	0.00095	0.80	786	0.00165	5.2	275	0.00165	1.8
3/4	252	0.00140	1.4	198	0.00100	0.80	721	0.00170	4.9	252	0.00170	1.7
7/8	216	0.00145	1.3	170	0.00011	0.10	618	0.00175	4.3	216	0.00175	1.5
1	189	0.00150	1.1	149	0.00110	0.70	541	0.00180	3.9	189	0.00180	1.4

Depth of cut


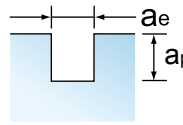




CUTTING CONDITION - IPVR1T

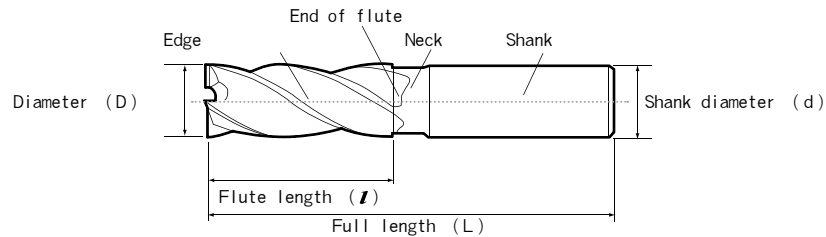
type		IPVR1T		
Side Milling 	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3			
Hardness BRINELL	≦ 300			
HRC	≦ 31			
Vc (SFM)	60			
ae/ap	ae=0.4D ap=1.5D			
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 4 flutes	
1/8	5,014	0.0005	9.4	
3/16	3,345	0.0007	10.0	
1/4	2,507	0.0008	8.4	
5/16	2,008	0.0010	7.8	
3/8	1,671	0.0013	8.8	
1/2	1,254	0.0017	8.4	
5/8	1,008	0.0019	7.8	
3/4	836	0.0023	7.5	
Depth of cut				

FRACTIONAL

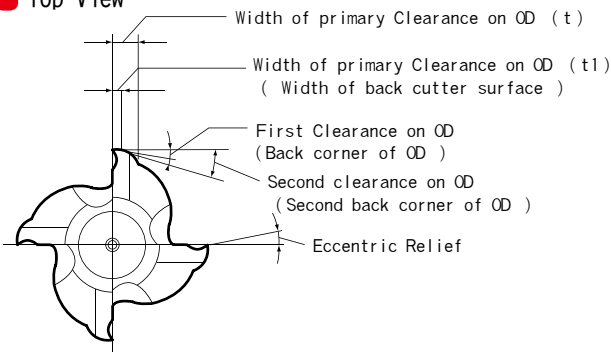
type		IPVR1T		
Slot Milling 	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3			
Hardness BRINELL	≦ 300			
HRC	≦ 31			
Vc (SFM)	60			
ae/ap	ae=1D ap=1.25D			
MILL DIA. (inch)	RPM	Fz	Feed (IPM) 4 flutes	
1/8	4,013	0.0003	5.0	
3/16	2,676	0.0006	6.0	
1/4	2,006	0.0008	6.7	
5/16	1,607	0.0010	6.3	
3/8	1,338	0.0011	6.0	
1/2	1,003	0.0017	6.7	
5/8	806	0.0017	5.6	
3/4	669	0.0021	5.5	
Depth of cut				

■ **Detail of the end mill**

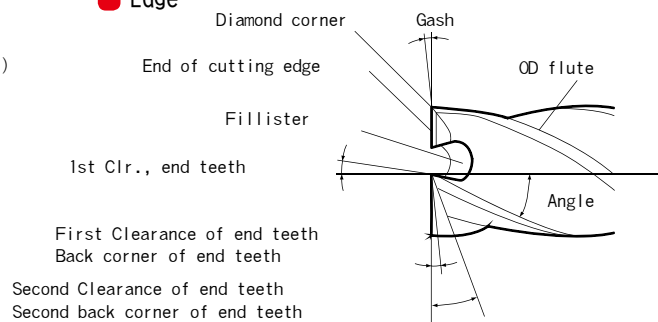
● **Side View**



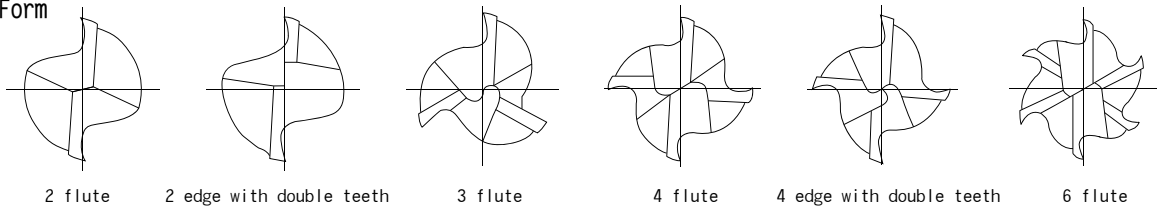
● **Top View**



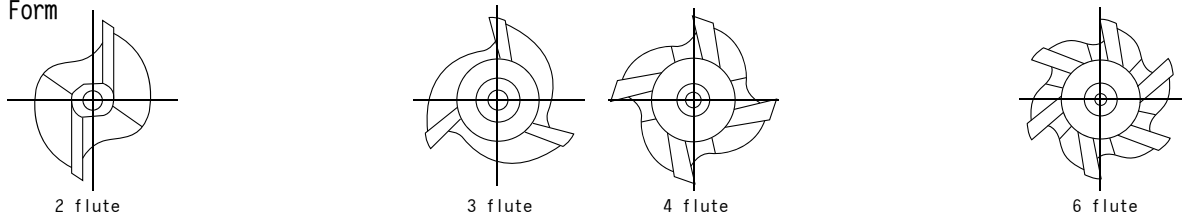
● **Edge**



● **Flute Form**



● **Flute Form**

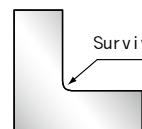


Shape in end teeth of the end mill

● **Tip Protection**



During the tip protection

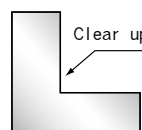


- Batter rigidity of the tip, protecting the edge.
- Tip sharp drop.

● **Tip**



During the tip



- Use for clear up tip.
- Sharp tip, easy to break.
- Can use in carbon steel and steel, specially using in Aluminum and non-ferrous material.




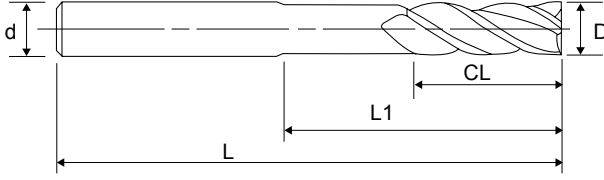
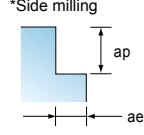
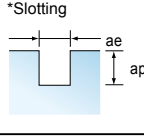


Failure analysis and solution

Item	Fault	Reason	Solution	
● Precision of cutting surface	● Rough surface	● Vibration	<ul style="list-style-type: none"> ▶ Fix the working material as well as posible ▶ Adjust the failed part of machine ▶ Reduce rotating speed ▶ Downcut ▶ Tools minimum lenght out of fixture 	
		● The heterogeneity in hardness of working material	▶ measuring the hardness of working material	
		● The tip was unsuitable	<ul style="list-style-type: none"> ▶ Tool rake angle and clearance angle ▶ Improve cutting roughness 	
		● Chip lump and fuse attach material	<ul style="list-style-type: none"> ▶ Remove chip lump and fuse attach material ▶ Check on the degenerative condition of cutting fluids 	
		● Passivation of cutting edge	▶ Determine the adequate time to regrinding	
		● Cutting rate (speed) too fast	▶ Reduce the cutting rate (speed)	
	● Buckling cracking of the of machined surface	● Buckling cracking of the of machined surface	● Misfit cutting fluids or deficient of cutting fluids	▶ Change cutting fluids
			● Unbalance friction of cutting edge	▶ Regrinding to reduce friction
			● Fuse attach material on the cutting edge	<ul style="list-style-type: none"> ▶ Remove fuse attach material ▶ Change cutting fluids
	● The corrugation of machined surface	● The corrugation of machined surface	● Cutting edge deformation	▶ To pay attention to use and safekeeping
			● lesser cutting flute	▶ Increase the number of flutes from 2 flutes to 4 flutes and then 6 flutes
			● Bigger cutting depth and feed rate	▶ To Reduce the Feed Rate of Machine
● Shape precision	● Perpendicularity	● A larger Helix Angle	▶ Decrease the Helix Angle	
		● Cutting depth and feed rate is too large	▶ Reduce the depth of cutting and feed rate	
		● Tool stretches out over longer	▶ Use the end mill stretches out shortest from chuck	
● End mill life	● Shorter life for regrinding end mill	● Perpendicularity of holder not reach	▶ Improve the perpendicularity of holder	
		● Work material hardness too high	<ul style="list-style-type: none"> ▶ Improve to suitable hardness by heat treatment process ▶ Reduce the feed rate for high hardness work material or change more hardness tool 	
		● Unsuitable feed rate	▶ Adjust to suitable feed rate	
		● Chip lump and fuse attach material	<ul style="list-style-type: none"> ▶ Remove chip lump and fuse attach material ▶ Use suitable cutting liquid 	
	● Huge friction of cutting edge	● Huge friction of cutting edge	● Unsuitable cutting liquid	<ul style="list-style-type: none"> ▶ Use suitable cutting liquid ▶ Use enough cutting liquid
			● The fault of work material	<ul style="list-style-type: none"> ▶ Achieve the average of inside form of work material ▶ clear up unbalance hardness
			● Unsuitable edge angle	▶ Regrind to suitable angle
			● End mill cutting function go down	▶ Surface treatment
			● Unsuitable cutting liquid	<ul style="list-style-type: none"> ▶ Adjust to suitable cutting liquid ▶ Adjust offer method of liquid
	● Flute damage	● Flute damage	● Unsuitable regrind schedule	▶ Manage the regrind schedule
			● Vibration	▶ Strengthen the install tool of work material
			● The fault of work material	<ul style="list-style-type: none"> ▶ Achieve the average of working material structure ▶ Use suitable hardness , clear up unbalance hardness ▶ Check the material may mix other hardness substance or gravel
			● Unsuitable feed rate	▶ Reduce the feed rate
			● Cutter become dull	▶ Regrind the tools
	● Break	● Break	● Cutting liquid go off	▶ Change the cutting liquid
			● Work material unsuitable fixed	<ul style="list-style-type: none"> ▶ Ineed fix the work material ▶ Improve install tool
			● Cutter become dull	▶ Regrind process
			● End mill with incorrect operation	▶ Be careful of keep and operate
		● Chip jam	▶ Use cutting liquid in large, during dry milling use air blow to remove chips	

Custom Tool Design Inquiry Form

SPEED TIGER

Work piece Material					
Hardness	<input type="checkbox"/> HRC_____ <input type="checkbox"/> HB_____ <input type="checkbox"/> Other_____				
Type of Coating	<input type="checkbox"/> ST standard(refer to our catalogue) <input type="checkbox"/> Uncoated <input type="checkbox"/> Customers Requirement _____				
Type of Flute Spiral	<input type="checkbox"/> Right <input type="checkbox"/> Left				
No of Flutes	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> Other_____				
Type of End Cut	 <input type="checkbox"/> Square	 <input type="checkbox"/> Corner Radius r=_____	 <input type="checkbox"/> Ball R=_____		
Type of Shank	<input type="checkbox"/> No Side Lock <input type="checkbox"/> Side Lock				
Specification					
	D_____ CL_____ L1_____ L_____ d_____				
Application	<input type="checkbox"/> Side Milling	Common side milling		ap:_____	
		Cavity		ae:_____	
	<input type="checkbox"/> Slotting	<input type="checkbox"/> Drilling & Milling			ap:_____
					ae:_____
	Machine Processing	<input type="checkbox"/> Finishing <input type="checkbox"/> Roughing <input type="checkbox"/> General Purpose <input type="checkbox"/> Other_____			
	Coolant Type	<input type="checkbox"/> Soluble <input type="checkbox"/> Oil Coolant <input type="checkbox"/> Oil Mist <input type="checkbox"/> Dry Cutting <input type="checkbox"/> Air Cooling <input type="checkbox"/> Other_____			
	Tool Life Standard	<input type="checkbox"/> Cutting Time <input type="checkbox"/> Load of Machine <input type="checkbox"/> Finish <input type="checkbox"/> Tool Wear <input type="checkbox"/> Vibration and Sound <input type="checkbox"/> Other_____			
	Desired Life				
Finish Requirement	<input type="checkbox"/> Required Roughness_____ <input type="checkbox"/> Not Required				
Other	Special Requirement				

ST-3500

3.5KW Induction Machine and Water Cooling Station



TAIWAN
EXCELLENCE 2019



Features

1. Generate an alternating electromagnetic field by using 3.5KW high-frequency thermal coil. Refer to the heating time sheet, it's easy to load and unload tools just need to set the diameter and heating seconds.
2. Save your time and conserve energy by heating only part of shrink chuck's surface, no need to heat the whole one.
3. By water-cooling with cutting liquid, it can clean most of carbon deposits and prevent the chuck become rusty.
4. Use with Speed Tiger Shrink Fit Chucks and Power Tips Series, will show the maximum performance and economic benefits of shrink system.
5. Combine 2 functions in 1 machine: Operate heating and cooling process at one machine, i.e. no need to remove the base. Save your time efficiently and use friendly.

Specifications

Power	3.5KW
Voltage	1ø220V 15A
Tools	Solid Carbide
Tool diameter	3~20mm
Maximum length of shrink fit chuck	300mm
Dimensions	(W)600x(L)430x(H)755 mm
Weight	80Kg



ST-3500 Catalogue



If you are interested in ST-3500, please do not hesitate to contact us by e-mail < sale@speedtiger.com.tw>.



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