



2018 Global Product Catalog Metric Tools





KYOCERA SGS Precision Tools (KSPT) is an ISO-certified manufacturer of industry leading round solid carbide cutting tools. State of the art manufacturing and warehouse facilities have the capacity and processes to meet the quality and delivery demands of customers in all markets around the world. Complete inspections performed within its metallurgical lab and manufacturing quality departments ensure the use of high quality carbide and reliable manufacturing consistency regardless of when a cutting tool is produced.

KSPT is proud to have pioneered some of the world's most advanced cutting technologies due to rigorous testing of tools, coatings, and materials within its Global Innovation Center. It is this commitment to innovation that has launched patented products and technologies like the Z-Carb with its variable geometry and cutting edge preparation, Series 43 APR[®] and APF[®] ultra high performance aluminum cutting tools, and the JetStream coolant technology.

SGS has become an important part of the KYOCERA Precision Tools family, and while the name has changed, one thing has not. Its dedicated people and their relentless commitment to the customer. KSPT Technical Sales Engineers, Application Specialists, and Distribution Partners blanket the globe, delivering reliable service and support to all market segments. It is these people and products that drive innovative application strategies and cutting tool technologies into the end user, continually exceeding expectations and providing the most Value at the Spindle[®].



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MORE THAN JUST ANOTHER CUTTING TOOL SUPPLIER

KYOCERA SGS PRECISION TOOLS EUROPE, LTD.

The state of the art KYOCERA SGS Precision Tools Europe facility is located in Wokingham, England and is focused on the manufacture of special cutting tools, high accuracy form tools, tool modifications and regrinds. A highly skilled team of professionals specialize in the supply and support of high performance tools for the Aerospace, Medical, Power Generation and Motorsport markets.

KYOCERA SGS Precision Tools Europe also offers a full range of end mill and drill products as follows:

- Multi-Million Euro Warehouse Stocking Full Range of Catalog Products
- Same Day Shipment on Stock Items
- Multi-Lingual Sales and Technical Support
- Online Portal for Stock Availability, Pricing, Discount Information and 24-Hour Order Placement
- High Performance Product and Application Training, Including the New KYOCERA SGS Tool Clinic

Additional services provided at this facility include:

- A Fast Track for Special Tools Via Our Rapid Response Centre
- Product Research and Development
- Product Engineering and Tool Application Support
- CAD/CAM Software Support





GLOBAL INNOVATION CENTER

INNOVATIVE CUTTING TOOL TECHNOLOGIES

The Global Innovation Center is an environment conducive to innovation. Through testing and development, the dedicated KYOCERA SGS Precision Tools Team focuses on the latest technical competence and machining techniques to bring a continuous stream of new products and advancements to market.

- Cutting Edge Equipment
- Highly Engineered Technology
- Incorporation of innovative machine tool technology for Research and Development

TECHNICAL TRAINING & EDUCATION

Our knowledge-based selling programs are specifically designed to challenge and educate by facilitating programs that mix classroom presentation with hands-on experience. Our own KSPT team members go through the same core training we provide to our valued distribution partners.

- KSPT Campus Tool Clinics
- On-Site Customer Training
- Basic, Advanced and Expert Level Material
- Market-Driven Knowledge

APPLICATION ENGINEERING

The KSPT expertise and global market knowledge allows us to translate customer needs into a commercial sales strategy. The portfolio of KSPT products and services offer an unparalleled track record in performance, cost savings, quality and value at the spindle.

- Market-Driven Productivity Improvements, including the Z-Carb HPR and S-Carb APR/APF®
- Tooling Solutions which include development of new tool geometries, extreme lab testing parameters and extensive field testing
- Technical Support and Troubleshooting
- Research and Development



TOOLING SERVICES

KSPT is committed to providing superior tooling services in the areas of Reconditioning, Recoating, Regrinding, Specials and Alterations. These services are offered to provide unique solutions and enhanced tool life with involvement from the KSPT Technical Support Team.

KSPT proudly offers Tooling Services in North America and Europe.



KSPT TOOLING SERVICES FACILITIES

UNITED STATES OF AMERICA KSPT

P.O. Box 187
55 South Main Street
Munroe Falls, Ohio 44262 U.S.A.
customer service -
US and Canada: (330) 686-5700
fax - US & Canada: (800) 447-4017
international fax: (330) 686-2146

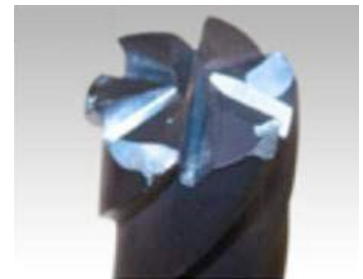
KSPT

1021 N. Shephard Street
Anaheim, California 92806
phone: (714) 632-3000
fax: (714) 632-3003

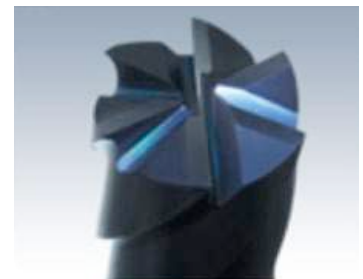
EUROPE KSPT

10 Ashville Way
Wokingham, Berkshire
RG41 2PL England
phone: (44) 1189-795-200
fax: (44) 1189-795-295
e-mail: SalesEU@kyocera-sgstool.com

BEFORE



AFTER



USE THE TOOLWIZARD[®] TO:

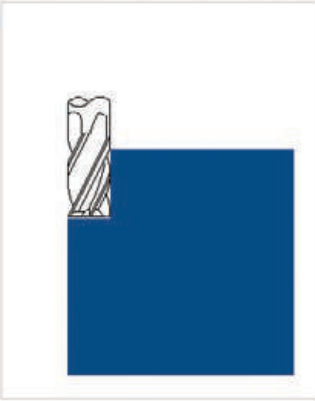
- Calculate application parameters
- Search the KSPT catalog
- Select products based on machining needs

TO SIGN UP FOR THE TOOLWIZARD[®]:

1. Visit www.sgstoolwizard.com
2. Sign up for an account
3. Start calculating
4. Start saving

TOOL WIZARD

[Create a new wizard](#)[History](#)[Logout](#)

TOOL	MATERIAL	APPLICATION
<h3>New Usage</h3> <p>Endmills Drills</p> <p>Cutting Diameter: <input type="text" value="1"/></p> <p>Radial width: <input type="text" value="1"/> inches <input checked="" type="checkbox"/> Slot Cut?</p> <p>Total axial depth: <input type="text" value=".9"/> inches</p> <p>Maximum rpm: <input type="text" value="50000"/></p> <p>Cutting Depth: <input type="text" value="1.125"/></p> 		
<input type="button" value="SAVE"/>		<input type="button" value="NEXT"/>

 **Common Legend**
 **Leyenda habitual**
 **Légende commune**
 **Gemeinsame Legende**

TO ORDER: Please specify quantity and EDP number.
PARA SU PEDIDO: Por favor especifique cantidad y número de EDP.
POUR COMMANDER: Veuillez préciser la quantité et le code article EDP.
BESTELLEN: Bitte Menge und EDV-Nummer angeben.
RETURN POLICY: An RMA number must accompany all product returns.
Contact your Customer Service Representative for an RMA number.
DEVOLUCIONES: Todo material devuelto debe ir acompañado de un número de RMA correspondiente.
Para solicitarlo, póngase en contacto con su Representante de Servicio.
POLITIQUE DE RETOUR: Tous les produits retournés doivent être accompagnés d'un numéro RMA.
Contacter votre interlocuteur commercial pour obtenir un numéro RMA.
RÜCKNAHMEGARANTIE: Eine RMA-Nummer (Rücksendegenehmigung) muss bei allen Produktrücksendungen beiliegen.
Wenden Sie sich bitte an Ihren Kunden Kundendienstmitarbeiter für RMA-Nummer.

REGULATION SAFETY GLASSES SHOULD ALWAYS BE WORN WHEN USING HIGH-SPEED CUTTING EQUIPMENT

DEBEN USARSE GAFAS PROTECTORAS CUANDO SE UTILIZA UN EQUIPO DE ALTA VELOCIDAD

DES LUNETTES DE SÉCURITE DOIVENT ÊTRE IMPÉRATIVEMENT PORTÉES LORS D'UTILISATION D'OUTILS À GRANDE VITESSE

BEI SCHNELLLAUFENDEN SPANABHEBENDEN MASCHINEN MÜSSEN IMMER DIE VORGESCHRIEBENEN SICHERHEITSBRILLEN GETRAGEN WERDEN



**INTELLECTUAL PROPERTY
PROPIEDAD INTELECTUAL
PROPRIÉTÉ INTELLECTUELLE
GEISTIGES EIGENTUM**

KYOCERA SGS Precision Tools holds more than 10 patents globally. Please visit our website at www.kyocera-sgstool.com to learn more.

KYOCERA SGS Precision Tools posee más de 10 patentes a nivel mundial. Para más información, visita nuestra página web www.kyocera-sgstool.com.

KYOCERA SGS Precision Tools possède plus de 10 brevets mondialement reconnus. Pour plus d'information, veuillez consulter notre site web www.kyocera-sgstool.com.

KYOCERA SGS Precision Tools besitzt mehr als 10 Patente weltweit. Bitte besuchen Sie unsere Webseite www.kyocera-sgstool.com für weitere Informationen.

Common Legend

Leyenda habitual

Légende commune

Gemeinsame Legende

MATERIALS MATERIALES MATÉRIAUX WERKSTOFFE



Steels
Aceros
Aciers
Stähle



Stainless Steels
Aceros Inoxidables
Inox
Nichtrostende Stähle



Cast Iron
Hierro Fundido
Fonte
Grauguss



High Temp Alloys
Aleaciones a Altas Temperaturas
Alliages Haute Temp
Warmfeste Legierungen



Titanium
Titanio
Titane
Titan



Non-Ferrous
No Férrico
Non Ferreux
Nichteisenmetalle



Plastics/Composites
Plásticos/Resinas
Plastiques/Composites
Kunststoffe/Verbundkunststoffe



Hardened Steels
Aceros Endurecidos
Aciers Trempés
Gehärteter Stahl

TOOL LENGTH LONGITUD FRESA LONGUEUR DE L'OUTIL WERKZEUGLÄNGE



Stub
Corta
Court
Kurze Bauform



Regular
Media
Moyen
Standard



Long
Larga
Long
Lang



Long Reach Neck
Larga con cuello
Gorge de dégagement
longue portée
Weiter Ansatz



Extra Long
Extra-larga
Extra-long
Extra-Lang

FLUTES FILOS GOJURES SCHNEIDEKANTEN



2 Flutes
2 Filos
2 Goujures
2 Schneidekanten



3 Flutes
3 Filos
3 Goujures
3 Schneidekanten



4 Flutes
4 Filos
4 Goujures
4 Schneidekanten



5 Flutes
5 Filos
5 Goujures
5 Schneidekanten



6 Flutes
6 Filos
6 Goujures
6 Schneidekanten



7 Flutes
7 Filos
7 Goujures
7 Schneidekanten



8 Flutes
8 Filos
8 Goujures
8 Schneidekanten



9 Flutes
9 Filos
9 Goujures
9 Schneidekanten



10 Flutes
10 Filos
10 Goujures
10 Schneidekanten



11 Flutes
11 Filos
11 Goujures
11 Schneidekanten



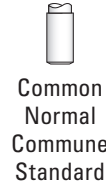
12 Flutes
12 Filos
12 Goujures
12 Schneidekanten

 **End Mill Legend**
 **Leyenda fresas**
 **Légende fraise**
 **Fräser-Legende**

END CONFIGURATIONS
CONFIGURACIONES DE LA PUNTA
CONFIGURATIONS TERMINALES
ENDENAUSFÜHRUNG



SHANK TYPE
TIPO DE VÁSTAGO
TYPE DE TIGE
SCHAFTART



HELIX ANGLES
ÁNGULOS HELICOIDALES
SPANWINKEL
ANGLES DE L'HÉLICE



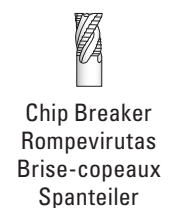
COOLANT OPTIONS
OPCIONES DE REFRIGERACIÓN
OPTIONS DE REFRIGÉRISEMENT
KÜHLSCHMIERMITTEL-OPTIONEN



RAKE ANGLE
ÁNGULO DE ATAQUE
ANGLE DE PENTE
SPANWINKEL



ADDITIONAL GEOMETRY
CARACTERÍSTICAS GEOMÉTRICAS ADICIONALES
GÉOMÉTRIE SUPPLÉMENTAIRE
WEITERE BAUFORMEN



All tools are in Right Cut Direction unless noted
 Todas las herramientas son con corte a la derecha a menos que se indique lo contrario
 Tous les outils ont une coupe à droite, sauf indications contraires
 Alle Werkzeuge schneiden rechtsdrehend, soweit nicht anders angegeben

Drill Legend

Leyenda taladros

Légende perçage

Bohrer-Legende

SHANK TYPE TIPO DE VÁSTAGO TYPE DE TIGE SCHAFTART



Common
Normal
Commune
Standard



Straight
Recto
Droite
Gerade

REACH ALCANCE LONGUEUR NUTENLÄNGE

3xD

>3xD Reach
Alcance >3xD
>Longueur 3xD
>3xD Nutenlänge

5xD

5xD Reach
Alcance 5xD
Longueur 5xD
5xD Nutenlänge

8xD

8xD Reach
Alcance 8xD
Longueur 8xD
8xD Nutenlänge

HELIX ANGLES ÁNGULOS HELICOIDALES ANGLES DE L'HÉLICE SPANWINKEL



Right Spiral
Espiral sentido derecho
Spirale droite
Rechtsläufig



None
Ninguno
Aucun
Ohne

COOLANT OPTIONS OPCIONES DE REFRIGERACIÓN OPTIONS DE REFRROIDISSEMENT KÜHLSCHMIERMITTEL-OPTIONEN



Internal Coolant
Refrigerante externo
Refrroidissement interne
Innenkühlung



External Coolant
Refrigerante interno
Refrroidissement
externe
Außenkühlung

 **Router Legend**
 **Leyenda ranuradores**
 **Légende détourage**
 **Oberfräsen-Legende**

SHANK TYPE
TIPO DE VÁSTAGO
TYPE DE TIGE
SCHAFTART



Straight
 Recto
 Droite
 Gerade



Positive
 Positivo
 Positif
 Positiv



Neutral
 Neutro
 Neutre
 Neutral



Negative
 Negativo
 Négatif
 Negativ



Variable
 Variable
 Variable
 Variabel

HELIX ANGLES
ÁNGULOS HELICOIDALES
ANGLES DE L'HÉLICE
SPANWINKEL



Right Spiral
 Espiral sentido derecho
 Spirale droite
 Rechtsläufig



Left Spiral
 Espiral sentido izquierdo
 Spirale gauche
 Linksläufig

ADDITIONAL GEOMETRY
CARACTERÍSTICAS GEOMÉTRICAS ADICIONALES
GÉOMÉTRIE SUPPLÉMENTAIRE
WEITERE BAUFORMEN



Left Hand Cut Direction
 Fresado sentido
 izquierda
 Coupe vers la gauche
 Rechtsschneidend










Right Hand Cut Direction
 Fresado sentido
 derecha
 Coupe vers la droite
 Linksschneidend



Chip Breaker
 Rompevirutas
 Brise-copeaux
 Spanteiler

Ti-NAMITE and Di-NAMITE® Tool Coatings are specifically engineered for KSPT solid carbide rotary tools. The coating lineup includes proprietary processes that result in optimized tool life and increased speed and feed rates in a variety of applications.



	Coating	Identifying Color	Layer Structure	Thickness	Hardness (HV)	Coefficient of Friction (Fretting)	Thermal Stability	General Information
	Titanium Nitride (TiN)	gold	Multilayer	1–4 microns	2200	0.4–0.65	600°C / 1112°F	A general purpose coating with good adhesion and abrasion resistant properties. Suitable for a wide variety of materials.
	Aluminum Titanium Nitride (AlTiN)	dark grey	Nano structure	1–4 microns	3700	0.30	1100°C / 2010°F	Excellent thermal and chemical resistance allows for dry cutting and improvements in performance of carbide. The coating has a high hardness giving great protection against abrasive wear and erosion.
	Titanium DiBoride (TiB ₂)	light grey-silver	Monolayer	1–2 microns	4000	0.45	850°C / 1562°F	This ceramic based coating ensures a smooth surface and a low affinity to cold welding or edge build up, which makes it optimal for Aluminum and copper applications. It has high toughness and high hardness.
	Titanium Carbonitride (TiCN)	pink-red	Multilayer	1–4 microns	3000	0.3–0.45	400°C / 752°F	A very wear resistant coating with high toughness and shock resistance. Good in interrupted cuts found in applications like milling.
	Proprietary (TX)	black	Nano Composite	1–4 microns	3600	0.45	1150°C / 2100°F	The structural design of Ti-Namite-X is adapted to meet a diverse range of applications; everything from high- and low-alloy steels to hardened materials (up to 65 HRC core hardness). Ti-Namite-X is suitable for operations which require high cutting speeds, high temperatures at the cutting edge, and high metal removal rates.
	Crystalline Diamond (Diamond)	black	Monolayer	6–20 microns	>8000	0.15–0.2	800°C / 1470°F	This is the hardest coating available with the best abrasion resistance. It is carbon based so it is limited in application capabilities. This coating is suitable for machining highly abrasive, non-ferrous materials such as CFRP and graphite.
	Proprietary (TM)	copper	Nano Composite	1–4 microns	3600	0.45	1150°C / 2100°F	Features include high wear resistance, reduced friction, and excellent prevention of edge build up. This coating provides superior material removal rates and tool life when used in high performance operations with difficult to machine materials like Titanium.

High Performance End Mills



Milling

HIGH PERFORMANCE END MILLS	SERIES	DESCRIPTION	PAGE
Z-Carb-HPR	Z5MCR	5 Flute Rougher Corner Radius Metric	24
Z-Carb-AP	Z1MPCR	4 Flute Variable Rake Corner Radius Metric	27
	Z1MPIC	4 Flute Variable Rake Intermediate Reach Corner Radius Metric	28
	Z1MPLC	4 Flute Variable Rake Long Reach Corner Radius Metric	29
Z-Carb	Z1M	4 Flute Variable Geometry Square End Metric	32
	Z1MB	4 Flute Variable Geometry Ball End Metric	33
Z-Carb-HTA	ZH1MCR	4 Flute Variable Geometry High Temp Alloys Corner Radius Metric	36
	ZH1MCRS	4 Flute Variable Geometry High Temp Alloys Stub Corner Radius Metric	36
Z-Carb-MD	ZD1MCR	4 Flute Variable Geometry Hard Materials Long Reach Corner Radius Metric	38
Series 7	7M	4 Flute Variable Geometry Long Length Square End Metric	61
	7MB	4 Flute Variable Geometry Long Length Ball End Metric	62
V-Carb	55M	5 Flute Finisher & Semi-Finisher Square End Metric	40
	55MCR	5 Flute Finisher & Semi-Finisher Corner Radius Metric	41
	55MB	5 Flute Finisher & Semi-Finisher Ball End Metric	43
T-Carb®	51M	6 Flute High Speed Machining Square End Metric	47
	51ML	6 Flute High Speed Machining Square End Long Reach Metric	49
	51MCR	6 Flute High Speed Machining Corner Radius Metric	48
	51MLC	6 Flute High Speed Machining Long Reach Corner Radius Metric	50
Multi-Carb	66M	Multi-Flute Finisher Square End Metric	53
	66MCR	Multi-Flute Finisher Corner Radius Metric	54
Turbo-Carb	56MB	2 Flute Contouring Long Reach Ball End Metric	64
Power-Carb	57M	6 Flute Finisher Square End Metric	66
Series 33	33MCR	3 Flute Difficult to Machine Materials Corner Radius Metric	58
CFRP Slow Helix	27M	4 Flute Slow Helix Square End Metric	68

Speed & Feed Recommendations listed after each series

Fresado

FRESAS DE ALTO RENDIMIENTO	SERIE	DESCRIPCIÓN	PÁGINA
Z-Carb-HPR	Z5MCR	5 filos, desbastador, radio angulado, métrico	24
Z-Carb-AP	Z1MPCR	4 filos, inclinación variable, radio angulado, métrico	27
	Z1MPIC	4 filos, inclinación variable, medio alcance, radio angulado, métrico	28
	Z1MPLC	4 filos, inclinación variable, largo alcance, radio angulado, métrico	29
Z-Carb	Z1M	4 filos, geometría variable, punta cuadrada, métrico	32
	Z1MB	4 filos, geometría variable, punta esférica, métrico	33
Z-Carb-HTA	ZH1MCR	4 filos, geometría variable, aleaciones a altas temperaturas, radio angulado, métrico	36
	ZH1MCRS	4 filos, geometría variable, aleaciones a altas temperaturas, versión corta, radio angulado, métrico	36
Z-Carb-MD	ZD1MCR	4 filos, geometría variable, materiales duros, largo alcance, radio angulado, métrico	38
Serie 7	7M	4 filos, geometría variable, longitud larga, punta cuadrada, métrico	61
	7MB	4 filos, geometría variable, longitud larga, punta esférica, métrico	62
V-Carb	55M	5 filos, acabador y semiacabador, punta cuadrada, métrico	40
	55MCR	5 filos, acabador y semiacabador, radio angulado, métrico	41
	55MB	5 filos, acabador y semiacabador, punta esférica, métrico	43
T-Carb®	51M	6 filos, mecanizado de alta velocidad, punta cuadrada, métrico	47
	51ML	6 filos, mecanizado de alta velocidad, punta cuadrada, largo alcance, métrico	49
	51MCR	6 filos mecanizado de alta velocidad, radio angulado, métrico	48
	51MLC	6 filos mecanizado de alta velocidad, largo alcance, radio angulado, métrico	50
Multi-Carb	66M	Filo múltiple, acabador, punta cuadrada, métrico	53
	66MCR	Filo múltiple, acabador, radio angulado, métrico	54
Turbo-Carb	56MB	2 filos, contorneado, largo alcance, punta esférica, métrico	64
Power-Carb	57M	6 filos, acabador, punta cuadrada, métrico	66
Serie 33	33MCR	3 filos, materiales difíciles de mecanizar, radio angulado, métrico	58
Helicoidal de avance lento CFRP	27M	4 filos, helicoidal de avance lento, punta cuadrada, métrico	68

Recomendaciones de velocidades y avances mostradas tras cada serie

Fraisage

FRAISES A DETOURER UNIVERSELLES	SÉRIES	DESCRIPTION	PAGE
Z-Carb-HPR	Z5MCR	5 dents rayon en coin d'ébauche (métrique)	24
Z-Carb-AP	Z1MPCR	4 dents à vague de coupe variable rayon en coin (métrique)	27
	Z1MPIC	4 dents à vague de coupe variable portée intermédiaire rayon en coin (métrique)	28
	Z1MPLC	4 dents à vague de coupe variable longue portée rayon en coin (métrique)	29
Z-Carb	Z1M	4 dents géométrie variable à bout plat (métrique)	32
	Z1MB	4 dents géométrie variable à bout hémisphérique (métrique)	33
Z-Carb-HTA	ZH1MCR	4 dents géométrie variable alliages haute température rayon en coin (métrique)	36
	ZH1MCRS	4 dents géométrie variable, alliages haute température, longueur de l'outil court, rayon en coin (métrique)	36
Z-Carb-MD	ZD1MCR	4 dents géométrie variable matériaux durs longue portée rayon en coin (métrique)	38
Série 7	7M	4 dents géométrie variable à queue longue à bout plat (métrique)	61
	7MB	4 dents géométrie variable à queue longue à bout hémisphérique (métrique)	62
V-Carb	55M	5 dents en bout finition et semi-finition plat (métrique)	40
	55MCR	5 dents en bout finition et semi-finition rayon en coin (métrique)	41
	55MB	5 dents en bout de finition et semi-finition hémisphérique (métrique)	43

FRAISES A DETOURER UNIVERSELLES	SÉRIES	DESCRIPTION	PAGE
T-Carb®	51M	6 dents pour usinage grande vitesse à bout plat (métrique)	47
	51ML	6 dents pour usinage grande vitesse à bout plat longue portée (métrique)	49
	51MCR	6 dents pour usinage grande vitesse rayon en coin (métrique)	48
	51MLC	6 dents pour usinage grande vitesse longue portée rayon en coin (métrique)	50
Multi-Carb	66M	Multi-dents en bout de finition plat (métrique)	53
	66MCR	Multi-dents en bout de finition rayon en coin (métrique)	54
Turbo-Carb	56MB	2 dents contournage longue portée à bout hémisphérique (métrique)	64
Power-Carb	57M	6 dents en bout de finition plat (métrique)	66
Série 33	33MCR	3 dents usinage des matériaux difficiles rayon en coin (métrique)	58
CFRP hélice lente	27M	4 dents hélice lente à bout plat (métrique)	68






Recommandatíons de vitesse et avance indiquées après chaque série

Fräsen



HOCHLEISTUNGS- SCHAFTFRÄSER	SERIE	BESCHREIBUNG	SEITE
Z-Carb-HPR	Z5MCR	Metrischer Schruppfräser mit 5 Schneidekanten und Eckenradien	24
Z-Carb-AP	Z1MPCR	Metrischer Fräser mit 4 Schneidekanten und variablen Spanwinkel	27
	Z1MPIC	Metrischer Fräser mittlerer Länge mit 4 variablen Schneidekanten und Eckenradien	28
	Z1MPLC	Metrischer Tiefbohr-fräser mit 4 variablen Schneidekanten und Eckenradien	29
Z-Carb	Z1M	Metrischer Schaftfräser mit 4 Schneidekanten ohne Eckenradien und variabler Form	32
	Z1MB	Metrischer Radiuschaftfräser mit 4 Schneidekanten und variabler Form	33
Z-Carb-HTA	ZH1MCR	Hochwarmfester metrischer Fräser mit 4 variablen Schneidekanten und Eckenradien	36
	ZH1MCRS	Hochwarmfester metrischer Fräser mit 4 variablen Schneidekanten und Eckenradien	36
Z-Carb-MD	ZD1MCR	Metrischer Tiefbohr-fräser mit 4 variablen Schneidekanten, Eckenradien und Form aus Hartmetall	38
Serie 7	7M	Metrischer Langloch-Schaftfräser mit 4 Schneidekanten ohne Eckenradien und variabler Form	61
	7MB	Metrischer Langloch-Radiuschaftfräser mit 4 Schneidekanten und variabler Form	62
V-Carb	55M	Metrischer Schlicht- und Halbschlichtfräser mit 5 Schneidekanten ohne Eckenradien und variabler Form	40
	55MCR	Metrischer Schlicht- und Halbschlichtfräser mit 5 Schneidekanten und Eckenradien	41
	55MB	Metrischer Schlicht- und Halbschlicht-Radiuschaftfräser mit 5 Schneidekanten und variabler Form	43
T-Carb®	51M	Metrischer Schaftfräser aus Schnellstahl mit 6 Schneidekanten ohne Eckenradien	47
	51ML	Metrischer Langloch-Schaftfräser aus Schnellstahl mit 6 Schneidekanten ohne Eckenradien	49
	51MCR	Metrischer Fräser aus Schnellstahl mit 6 Schneidekanten und Eckenradien aus Schnellstahl	48
	51MLC	Metrischer Tiefbohr-fräser aus Schnellstahl mit 6 Schneidekanten und Eckenradien	50
Multi-Carb	66M	Metrischer mehrschneidiger Schlichtfräser ohne Eckenradien	53
	66MCR	Metrischer mehrschneidiger Schlichtfräser mit Eckenradien	54
Turbo-Carb	56MB	Metrischer Langloch-Profil-Radiuschaftfräser mit 2 Schneidekanten	64
Power-Carb	57M	Metrischer Schlichtfräser mit 6 Schneidekanten ohne Eckenradien	66
Serie 33	33MCR	Metrischer Fräser aus Schnellstahl mit 3 Schneidekanten und Eckenradien für schwerspanbare Werkstoffe	58
CFRP Slow Helix	27M	Metrischer Schaftfräser mit 4 steilen Schneidekanten ohne Eckenradien	68

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

End Mill Matrix

Name	Series	Page No.	Material								No. Flutes	Helix °	Flute Index	Rake	Relief	Center Cutting
			Steel	Stainless Steels 	Cast Iron	High Temp Alloys 	Titanium Alloys 	Non Ferrous 	Plastics, Composites	Hardened Steels 						
Z-Carb HPR	Z5	24	★	★	★	★	★		☆	5	37	≠	+	E	N	
Z-Carb	Z1 / Z16 / Z1B	32	★	★	★	☆	★		☆	4	35 / 38	≠	+	E	Y	
Z-Carb-AP	Z1P	27	★	★	★	☆	★		☆	4	35 / 38	≠	+	E	Y	
Z-Carb-HTA	ZH1	36	☆	☆	★	★	☆		☆	4	38 / 41	≠	+	E	Y	
Z-Carb-MD	ZD1	38	★						★	4	42 / 45	≠	-	E	Y	
Series 33	33	58	★	★	★	☆	★		☆	3	32 / 48	≠	+	E	Y	
T-Carb®	51	47	★	★	★	★	★		☆	6	41	≠	+	E	Y	
Series 7	7	61	★	★	★	★	★		☆	4	38	≠	+	P-S	Y	
V-Carb	55	40	★	★	★	★	★		☆	5	45	≠	+	P-S	Y	
Multi-Carb	66	53	★	★	★	☆	★		☆	7, 9, 11	35	=	+	E	N	
Turbo-Carb	56B	64	★						★	2	30	=	+	E	Y	
Power-Carb	57	66							★	6	45	=	-	E	Y	
Ski-Carb	44	94						★	☆	2	45	=	+	P-S	Y	
S-Carb® 3 Flute	43	78						★	☆	3	38	=	+	E	Y	
S-Carb® Chipbreaker	43CB	87						★	☆	3	38	=	+	E	Y	
S-Carb® 2 Flute	47	89						★	☆	2	35	=	+	E	Y	
S-Carb APR®	43APR	74						★		3	38	=	+	E	Y	
S-Carb APF®	43APF	76						★		4	38 / 41	≠	+	E	Y	
Slow Helix	27	68							★	4	10 / 12	≠	+	P-S	Y	
CCR *	20-CCR	232							★	8, 10, 12	15	=	+	C	EM or DR	
CCR *	31-CCR	235							★	5, 7, 10	15	=	+	C	EM or DR	
PCR *	29-PCR	230							★	8, 9, 12	15	=	0	E	EM or DR	
Compression Router	25	237							★	4, 6, 8	30	=	+	P-S	Y	
Up Cut Router	21	239						★	★	2	35	=	+	P-S	Y	
Down Cut Router	22	240						★	★	2	35	=	+	P-S	Y	

Main Key

- ★ Primary Function
- ☆ Secondary Function
-  Coolant Required
-  Plunging NOT Recommended

Coating Key

- Ti-Namite-A (TA) = AlTiN
- Ti-Namite-X (TX) = Proprietary nanocomposite
- Ti-Namite-M (TM) = AlTiSiN nanocomposite
- Ti-Namite-B (TB) = TiB₂
- Di-Namite® = polycrystalline diamond

Rake Key

- + = Positive
- = Negative
- 0 = Neutral

Center Cutting Key

- Y = Yes
- N = No
- EM = End Mill End
- DR = Drill End

Relief Key

- E = Eccentric
- P-S = Primary - Secondary
- C = Concave

End Mill Matrix

Coating	Ae % Ap %	Finishing					HSM				Profiling						Slotting						Ramping			Plunging				
		2	2	5	5	5	5	5	10	10	25	50	25	50	25	50	100	100	100	100	100	100	1°	3°	6°	Ap 50%	Ap 100%			
		100	200	100	200	300	100	200	100	200	100	100	150	150	200	200	25	50	75	100	150	200								
TM / TA		☆	☆	☆	☆		★	★	★	★	★	★	★	★	☆	★	★	★	★	★	☆	★	★	★						
TA / TX		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	☆	★	★	★	★	☆		★	★	☆						
TX		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	☆	★	★	★	★	☆		★	★	★	☆					
TA		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	☆	★	★	★	☆			★	★	☆						
TX		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	☆	★	★	★				★	★	☆						
TA		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	☆	★	★	★	★	★		★	★	★	★	☆				
TX		☆	☆	☆	☆		★	★	★	★	☆		☆									★	☆							
TX		★	★	★	★	★																★								
TA		★	★	★	★		☆	☆			☆		☆						☆	☆		★	☆							
TX		★	★	★	★																	★								
TX		★	★	★	★		★	★	☆		☆	☆							☆			★	☆							
TX		★	★	★	★		★	★	★		★	☆	☆						★	☆		★								
TB		★	★	★	★		★	★	★	☆	★	★	★	★	☆				★	★	★	★	☆	☆	★	★	★	★	☆	
TB		★	★	★	★		★	★	★	☆	★	★	★	★	☆				★	★	★	★	☆	☆	★	★	★	★	★	
TB							★	★	★	★	★	★	★	★	☆	☆			★	★	★	★	★	☆	★	★	★	★	★	
TB		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	☆				★	★	★	★	☆	☆	★	★	★	★	★	
TB							★	★	★	★	★	★	★	★	☆	☆			★	★	★	★	★	☆	★	★	★	★	★	
TB		★	★	★	★	★	★	★	★	☆																★	★	☆		
Di-Namite® (opt.)		☆	☆	☆	☆	☆						★	★	★	★	★	☆	★	★	★	★	☆	☆	★	★	☆	☆			
Di-Namite® (opt.)		☆	☆	☆	☆	☆						★	★	★	★	★	☆	★	★	★	★	☆	☆	★	★	☆	☆			
Di-Namite® (opt.)		☆	☆	☆	☆	☆						★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Di-Namite® (opt.)		☆	☆	☆	☆	☆						★	★	★	★	★	☆	★	★	★	★	☆	☆	★	★	★	★	★	★	★
Di-Namite® (opt.)		★	★	★	★	★						☆	☆	☆	☆	☆	☆										★			
various (opt.)		☆	☆	☆	☆	☆						★	★	★	★	★	★	★	★	★	★	☆	★	★	★	★	★	★	★	★
various (opt.)		☆	☆	☆	☆	☆						★	★	★	★	★	★	★	★	★	★	☆	★	★	★	★	★	★	★	★

Ramping Basics

Use 100% of slotting feed rates for 1° ramp
 Use 50% of slotting feed rates for 3° ramp
 Use 25% of slotting feed rates for 6° ramp

Plunging Basics

Use 50% of slotting feed rates in Non-Ferrous materials
 Use 20% of slotting feed rates for all other plungable materials

Notes

Reduce speed, feed, and cut depths as material hardness increases—see KYOCERA SGS Tool Wizard® for recommendations
 Long flute or long reach tools also require reduced rates and cut depths
 Machine, tool holding, work holding, and coolant also affect rates and cut depths

*For Ramping and Plunging:

Non-end cut version not intended for ramping or plunging
 End cut version intended for ramping only
 Drill end intended for plunging only

Application Tips

Tool	<ul style="list-style-type: none"> Whenever possible, select an end mill with the largest diameter, shortest flute length, and shortest overall length for the best rigidity Long flute tools are not intended for pocketing, slotting, or heavy profiling – limit Ae to .02D High Performance tools minimize cycle time and extend tool life
Tool Holders	<ul style="list-style-type: none"> Holders with adequate gripping pressure and TIR are required Stub holders or zero length collet style holders are recommended for heavy stock removal When using solid holders, hand ground screw flats are not recommended
Workpiece	<ul style="list-style-type: none"> Secure clamping of the workpiece will reduce chatter and deflection
Machine	<ul style="list-style-type: none"> Spindle must be in optimum condition for precise TIR and maximum tool life Sufficient horsepower is required to perform at recommended speeds and feeds Reduce rates for low power machines to prevent workpiece and / or tool damage
Coolant	<ul style="list-style-type: none"> Avoid re-milling chips through use of air blast or liquid coolant as necessary Maintain clean coolant with appropriate concentration General recommendations: <ul style="list-style-type: none"> —Water Soluble Oil or Air Blast: Tool Steels, Mold & Die Steels, Carbon or Alloy Steels —Water Soluble Oil: Stainless Steels, Titanium, High Temperature Alloys, Non-Ferrous Alloys
Methods	<ul style="list-style-type: none"> Climb milling is generally preferred Attention to programming details, tool holders, TIR, balance, fixturing, etc. improve cutting tool performance and extend tool life

END MILLING GUIDELINE

D_1 = cutting diameter L_2 = flute length


Speeds and Feeds for Cut Types are based on Radial Width (A_e) and Axial Depth (A_p)

Reductions to Speeds and Feeds may be necessary when:

- Ae and Ap exceed recommendations
- Using long flute or extended reach tools
- Using long tool holders
- Machining materials harder than listed


ENTRY METHODS

Pre-Drilled Hole

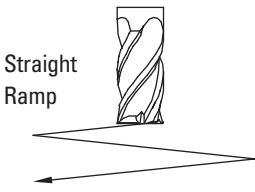


Pre-drilling is the preferred entry method for most applications.

Helical Ramp




Straight Ramp



Alternative methods are helical and straight ramping. High ramp angles require reduced feed. Lower ramp angles will allow higher feed rates and extend tool life. Use slotting speeds and feeds for ramp angles of 1° to 2°. Reduce feed to 25% when ramp angles approach 6°. General purpose tools and/or difficult to machine materials will require lower ramp angles and reduced feed.

Plunge



Plunge only in non-ferrous and short-chipping materials using slotting speeds and 25% slotting feeds.

Herramientas	<ul style="list-style-type: none"> • Siempre que sea posible, seleccione el cortador con el mayor diámetro, largo de filo y largo total mas corto posible para obtener una mejor rigidez. • Las herramientas con filos largos no son recomendadas para operaciones de apertura de cajas en el maquinado, operación de ranurado o perfilado pesado – limitar la profundidad radial (Ae) a .02D • Las herramientas de alto desempeño minimizan el tiempo de ciclo del maquinado y extienden la vida útil de la herramienta
Portaherramientas	<ul style="list-style-type: none"> • Los Portaherramientas deberán tener buena presión de agarre para la sujeción de la herramienta y una concentricidad máxima indicada (TIR) • Se recomienda usar portaherramientas de agarre directo cortos, o de boquilla con longitud cero para lograr un máximo arranque de viruta • Cuando se utilicen portaherramientas de agarre directo, no se recomienda hacer manualmente el plano para la sujeción del tornillo en el zanco de la herramienta
Pieza a maquinar	<ul style="list-style-type: none"> • La buena sujeción de la pieza a maquinar reducirá la vibración y la desviación de la herramienta
Máquina	<ul style="list-style-type: none"> • El usillo de la maquina debe estar en condiciones optimas, para asegurar la concentricidad de giro (TIR) y asegurar el máximo rendimiento de la herramienta • Para lograr los avances y velocidades recomendados, se necesita suficiente potencia (HP) en la maquina • Reducir los parámetros de corte en maquinas de baja potencia (HP) para prevenir el daño en la herramienta o pieza de trabajo
Refrigerante	<ul style="list-style-type: none"> • Evite el re-maquinado de virutas usando aire a presión o líquido refrigerante según sea necesario • Mantener limpio el refrigerante con su concentración adecuada • Recomendaciones generales: <ul style="list-style-type: none"> –Para el maquinado de Aceros Grado Herramienta, para Moldes y Dados o Aleaciones de Bajo Carbón, utilice Aceite Soluble en Agua o aire a presión –Para el maquinado de Aleaciones Inoxidables, Aleaciones de Alta Temperatura, Titanio y Aleaciones No Ferrosas, utilice solamente Aceite Soluble en Agua
Métodos	<ul style="list-style-type: none"> • Se recomienda el maquinado en sentido ascendente o trepado • El cuidado en los detalles de la programación, la concentricidad de giro (TIR) el balance de los portaherramientas, la sujeción de la pieza a maquinar, etc. son factores que contribuyen a prolongar la vida de la herramienta

GUÍAS DE FRESADO

D_1 = diámetro de corte L_2 = largo de filo

Las velocidades y avances para cortes están basados en la profundidad radial (A_e), y profundidad axial (A_p)

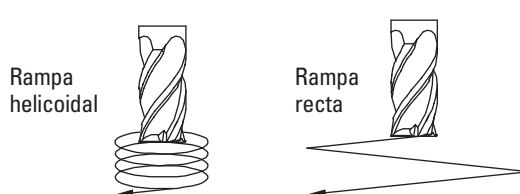
Reducciones en velocidades y avances serán necesarias cuando:

- A_e y A_p exceda las recomendaciones
- Se utilicen filos largos o herramientas de largo alcance
- Se utilicen portaherramientas largos
- Se maquinen materiales más duros que los recomendados

MÉTODOS DE ENTRADA



Preferentemente usar un barreno previo como método de entrada para la mayor parte de las aplicaciones.



Los métodos alternativos son las rampas helicoidales y rectas. Un ángulo elevado de rampa necesita un avance reducido. Un ángulo de rampa inferior permitirá tasas de avance más elevadas y una mayor duración de la herramienta. Usar velocidades y alcances de ranurado para ángulos de rampa de 1° a 2° . Disminuir el avance un 25% cuando los ángulos de rampa se aproximan a 6° . Las herramientas de uso general y/o materiales difíciles de mecanizar precisarán ángulos de rampa inferiores y un avance reducido.



Este método se puede utilizar únicamente en materiales no ferrosos y materiales de formación de virutas cortas, usando la velocidad de ranurado y el 25% de su avance.

Conseils relatifs à l'application

Outil	<ul style="list-style-type: none"> • Chaque fois que possible, choisissez une fraise de plus grand diamètre possible, la plus courte possible, elle garantira la meilleure rigidité • Les outils longs ne sont pas optimum pour l'ébauche, le pocketing, le rainurage – Ae limité à 0,02 D • Les outils Haute performance optimisent les temps de cycle et de augmentent la durée de vie
Porte-outils	<ul style="list-style-type: none"> • Des attachements à serrage puissant et à faux rond précis sont recommandés • Attachements à méplats ou pinces à serrage nominale sont recommandées pour les ébauches • Lorsque vous utilisez des attachement rigides, les serrage de l'outil par vis ne sont pas recommandés
Pièce	<ul style="list-style-type: none"> • Le système de fixation et de bridage de la pièce devra permettre de réduire les vibrations et la déformation
Machine	<ul style="list-style-type: none"> • Broche doit être en bon état optimal au niveau de son faux rond • Suffisamment puissance est nécessaire pour effectuer à des vitesses recommandées et se nourrit • Réduire les efforts pour les machines de faible puissance pour éviter l'endommagement de la pièce et / ou de l'outil
Liquide de refroidissement	<ul style="list-style-type: none"> • Évitez les recyclage de copeaux par l'utilisation de soufflage d'air comprimé ou de liquide de refroidissement. • Maintenir le lubrifiant propre à la concentration appropriée • Recommandations générales – <ul style="list-style-type: none"> –Huile soluble ou Air comprimé: aciers à outils, aciers pour moules, aciers au carbone ou alliés –Huile soluble: aciers inoxydables, titane, alliages à haute température, alliages non ferreux
Méthodes	<ul style="list-style-type: none"> • L'usinage en avalant est généralement préconisé • Attention à la programmation, porte-outils, faux rond, équilibrage, fixation, etc améliorent les performances de l'outil en coupe et prolonge la durée de vie

GUIDE DU FRAISAGE

D_1 = diamètre de coupe L_2 = longueur de coupe

Vitesses & avances pour ces cas d'usinage sont basées sur l'engagement radial (A_e), et axial (A_p)

La réduction de la vitesse et de l'avance doit être nécessaire quand:

- Les engagements Ae et Ap sont importants
- Des dentures longues ou des séries longues sont utilisées
- Des attachement longs sont utilisés
- Lors d'usinage de matériaux durs

TYPES D'ENTREE MATIERE

Preperçage

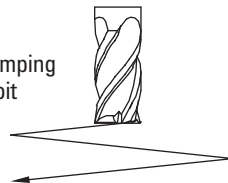


Le préperçage est la méthode préférable dans la plupart de applications.

Ramping hélicoïdal



Ramping droit



Les autres méthodes sont un ramping hélicoïdal et un ramping droit. Les angles de ramping élevés exigent une avance inférieure. Les angles de ramping inférieurs permettent les taux d'avance supérieurs et prolongeront la vie de l'outil. Utilisez des avances et vitesses de mortaisage pour les angles de ramping de 1° à 2°. Réduisez l'avance à 25 % lorsque les angles de ramping avoisinent 6°. Les outils tout usage et/ou les matériaux difficiles à usiner exigeront des angles de ramping inférieurs et une charge réduite.

Plongée



Plongée uniquement dans les non ferreux. Vitesse rainurage et avances réduites de 25%.

Werkzeug	<ul style="list-style-type: none"> • Wählen Sie möglichst immer den Schafffräser mit dem größten Durchmesser, der kürzesten Schneidekante und Gesamtlänge, um eine hohe Steifigkeit zu erhalten • Langlochschaftfräser sind nicht zum Taschen-, Schlitz- oder Profilverfräsen bestimmt – die Dehnung auf A_e 0,2 der Streckgrenze begrenzen • Hochleistungswerkzeuge minimieren die Zykluszeit und verlängern die Werkzeugstandzeit
Werkzeughalter	<ul style="list-style-type: none"> • Es werden Spannzangen mit ausreichendem Kraftschluss und TIR benötigt • Steilkegel oder bündige Spannfutter werden bei hohem Materialabtrag empfohlen • Von der Verwendung fester handverschraubter Halterungen wird abgeraten
Werkstück	<ul style="list-style-type: none"> • Sicheres Werkzeugspannen verringert Vibrationen und das Auswandern aus der Ziellinie
Werkzeugmaschine	<ul style="list-style-type: none"> • Die Spindel muss für in optimalem Zustand sein, um genaue TIR und maximale Standzeit zu erzielen • Für die empfohlenen Drehzahlen und Vorschubgeschwindigkeiten ist genügend Leistung bereitzustellen • Bei leistungsschwachen Antrieben sind die Werte zu verringern, um Beschädigungen am Werkstück und/oder Werkzeug zu vermeiden
Kühlmittel	<ul style="list-style-type: none"> • Das Überfräsen der Späne durch Luftstrahl oder flüssige Kühlmittel möglichst verhindern • Kühlmittel in geeigneter Konzentration vorhalten • Allgemeine Empfehlungen: <ul style="list-style-type: none"> – Wasser-Öl-Emulsionen oder Luftstrahl: Werkzeugstähle, Form- und Schneidstähle, unlegierte oder legierte Stähle – Wasser-Öl-Emulsion: Nichtrostender Stahl, Titan, Warmfeste Legierungen, Nichteisenlegierungen
Verfahren	<ul style="list-style-type: none"> • Vorzugsweise Gleichlaufräsen anwenden • Das Beachten der Fräsparameter, Werkzeughalter, TIR, Auswuchten, Einspannen, usw. verbessert die Schnittleistung und verlängert die Standzeit

RICHTWERTE ZUM FRÄSEN

D_1 = Fräsdurchmesser L_2 = Schnittlänge


Drehzahl und Vorschub für Fräsarbeiten hängen von Radialbreite (A_e) und Frästiefe (A_p) ab

Drehzahl und Vorschub müssen ggfs. verringert werden wenn:

- die empfohlenen Werte für A_e und A_p überschritten werden
- lange Schneidekantenn oder Langschaftfräser verwendet werden
- lange Werkzeughalter verwendet werden
- die Werkstoffe härter als vorgesehen sind


VORBEREITUNGEN

Vorbohrung




Vorbohren ist in den meisten Fällen ratsam.

Zirkulareintauchfräsen




Schrägeintauchfräsen



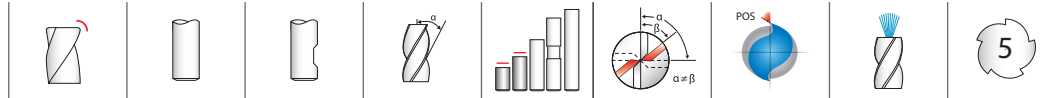
Alternative Verfahren sind Zirkulareintauchen und Schrägeintauchen. Starke Tauchwinkel erfordern verringerte Vorschubgeschwindigkeiten. Geringe Tauchwinkel ermöglichen höhere Vorschubgeschwindigkeiten und verlängern die Standzeit. Verwenden Sie die Drehzahlen und Vorschübe zum Schlitzfräsen für Tauchwinkel von 1° bis 2° . Den Vorschub auf 25 % verringern, wenn der Tauchwinkel 6° erreicht. Allzweckwerkzeuge und / oder schwer zu bearbeitende Werkstoffe verlangen kleine Tauchwinkel und verringerte Vorschubgeschwindigkeiten.

Stechen

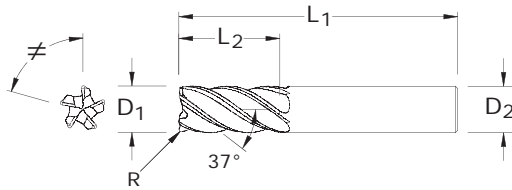


Stechen Sie in Nichteisenmetalle und kurzspanende Werkstoffe nur mit Schlitzfräsdrehzahl und 25 % der Schlitzvorschubgeschwindigkeit ein.

Z-Carb-HPR



Z5MCR METRIC SERIES

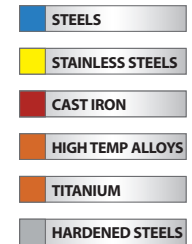


- An ideal balance of helix, indexing, flute depth, rake and relief
- Variable indexing for chatter suppression and proprietary edge geometry for shearing and strength
- Chatter-free geometry allows deep cutting and high speed machining
- Central coolant hole delivers coolant effectively to the cutting zone enhancing chip removal when pocketing or slotting
- Enhanced corner geometry with tight tolerance corner radii
- Excels at roughing, ramping, high speed machining and finishing in a variety of materials
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

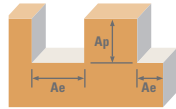
mm					EDP NO.					
CUTTING DIAMETER OF CUT D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	TI-NAMITE-A (TA)	TI-NAMITE-A (TA) W/FLAT	TI-NAMITE-A (TA) EDP NO. W/INTERNAL COOLANT	TI-NAMITE-M (TM) EDP NO.	TI-NAMITE-M (TM) EDP NO. W/FLAT	TI-NAMITE-M (TM) EDP NO. W/INTERNAL COOLANT
6,0	9,0	54,0	6,0	0,5	—	—	—	47000	—	—
6,0	13,0	57,0	6,0	0,3	—	—	—	47001	—	—
6,0	13,0	57,0	6,0	0,5	47120	—	—	47002	—	—
6,0	13,0	57,0	6,0	1,0	—	—	—	47003	—	—
6,0	13,0	57,0	6,0	1,5	48003	—	—	47004	—	—
8,0	11,0	58,0	8,0	0,5	—	—	—	47005	—	—
8,0	18,0	63,0	8,0	0,5	47121	—	—	47006	—	—
8,0	18,0	63,0	8,0	1,0	47122	—	—	47007	—	—
8,0	18,0	63,0	8,0	1,5	—	—	—	47008	—	—
8,0	18,0	63,0	8,0	2,0	—	—	—	47009	—	—
10,0	13,0	66,0	10,0	1,0	—	—	—	47010	—	—
10,0	22,0	72,0	10,0	0,5	47123	—	—	47011	—	—
10,0	22,0	72,0	10,0	1,0	47124	—	—	47012	—	—
10,0	22,0	72,0	10,0	1,5	—	—	—	47013	—	—
10,0	22,0	72,0	10,0	2,0	—	—	—	47014	—	—
10,0	22,0	72,0	10,0	2,5	—	—	—	47015	—	—
12,0	15,0	73,0	12,0	1,0	—	—	—	47016	47024	—
12,0	26,0	83,0	12,0	0,5	47125	47128	47160	47017	47025	47161
12,0	26,0	83,0	12,0	0,76	47126	47129	47162	47018	47026	47163
12,0	26,0	83,0	12,0	1,0	47127	47130	47164	47019	47027	47165
12,0	26,0	83,0	12,0	1,5	48012	—	47166	47020	47028	47167
12,0	26,0	83,0	12,0	2,0	—	—	47168	47021	47029	47169
12,0	26,0	83,0	12,0	2,5	—	—	47170	47022	47030	47171
12,0	26,0	83,0	12,0	3,0	—	—	47172	47023	47031	47173
16,0	19,0	82,0	16,0	1,0	—	—	—	47032	47039	47046
16,0	19,0	82,0	16,0	1,5	48070	—	—	—	—	—
16,0	35,0	92,0	16,0	1,0	47131	—	47134	47033	47040	47047
16,0	35,0	92,0	16,0	1,5	—	—	—	47034	47041	47048
16,0	35,0	92,0	16,0	2,0	47132	—	47135	47035	47042	47049
16,0	35,0	92,0	16,0	2,5	—	—	—	47036	47043	47050
16,0	35,0	92,0	16,0	3,0	47133	—	47136	47037	47044	47051
16,0	35,0	92,0	16,0	4,0	—	—	—	47038	47045	47052
20,0	23,0	92,0	20,0	1,0	48020	—	—	47053	47061	47069
20,0	43,0	104,0	20,0	1,0	47137	—	47140	47054	47062	47070
20,0	43,0	104,0	20,0	1,5	—	—	—	47055	47063	47071
20,0	43,0	104,0	20,0	2,0	47138	—	47141	47056	47064	47072
20,0	43,0	104,0	20,0	2,5	—	—	—	47057	47065	47073
20,0	43,0	104,0	20,0	3,0	47139	—	47142	47058	47066	47074
20,0	43,0	104,0	20,0	4,0	—	—	—	47059	47067	47075
20,0	43,0	104,0	20,0	5,0	—	—	—	47060	47068	47076
25,0	28,0	100,0	25,0	1,0	—	—	—	47077	47084	47091
25,0	53,0	121,0	25,0	1,0	47143	—	47146	47078	47085	47092
25,0	53,0	121,0	25,0	2,0	47144	—	47147	47079	47086	47093
25,0	53,0	121,0	25,0	2,5	—	—	—	47080	47087	47094
25,0	53,0	121,0	25,0	3,0	47145	—	47148	47081	47088	47095
25,0	53,0	121,0	25,0	4,0	—	—	—	47082	47089	47096
25,0	53,0	121,0	25,0	5,0	—	—	—	47083	47090	47097

TOLERANCES (mm)

- 6 DIAMETER**
D₁ = +0,000/-0,030
D₂ = h₆
R = +0,000/-0,050
- >6-10 DIAMETER**
D₁ = +0,000/-0,040
D₂ = h₆
R = +0,000/-0,050
- >10-25 DIAMETER**
D₁ = +0,000/-0,050
D₂ = h₆
R = +0,000/-0,050



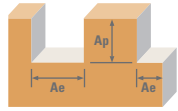
For patent information visit www.ksptpatents.com













Series Z5MCR Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)									
					6	8	10	12	16	20	25			
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	169	RPM	8967	6725	5380	4484	3363	2690	2152	
					(135-203)	Fz	0.029	0.049	0.061	0.074	0.087	0.099	0.108	
					Feed (mm/min)	1291	1650	1650	1668	1463	1327	1157		
		Slot 	1	≤ 1	134	RPM	7109	5332	4265	3555	2666	2133	1706	
					(107-161)	Fz	0.029	0.049	0.061	0.074	0.087	0.099	0.108	
					Feed (mm/min)	1024	1308	1308	1322	1160	1052	917		
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.5	≤ 1.5	96	RPM	5089	3817	3054	2545	1909	1527	1221
						(77-115)	Fz	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	550	692	692	702	635	570	489	
			Slot 	1	≤ 1	76	RPM	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	436	549	549	557	504	452	388	
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.5	≤ 1.5	56	RPM	2989	2242	1793	1495	1121	897	717	
					(45-68)	Fz	0.017	0.030	0.037	0.043	0.051	0.059	0.065	
					Feed (mm/min)	251	335	335	323	287	263	233		
		Slot 	1	≤ 1	44	RPM	2343	1757	1406	1171	879	703	562	
					(35-53)	Fz	0.017	0.030	0.037	0.043	0.051	0.059	0.065	
					Feed (mm/min)	197	262	262	253	225	206	183		
	K CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ 0.5	≤ 1.5	136	RPM	7190	5392	4314	3595	2696	2157	1726
						(109-163)	Fz	0.026	0.045	0.056	0.067	0.079	0.091	0.098
						Feed (mm/min)	949	1208	1208	1208	1070	978	841	
			Slot 	1	≤ 1	108	RPM	5736	4302	3441	2868	2151	1721	1377
						(87-130)	Fz	0.026	0.045	0.056	0.067	0.079	0.091	0.098
						Feed (mm/min)	757	964	964	964	853	780	671	
CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile		≤ 260 Bhn or ≤ 26 HRc	Profile 	≤ 0.5	≤ 1.5	104	RPM	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.020	0.034	0.043	0.050	0.059	0.067	0.073
						Feed (mm/min)	554	703	703	692	606	549	478	
			Slot 	1	≤ 1	82	RPM	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.020	0.034	0.043	0.050	0.059	0.067	0.073
						Feed (mm/min)	440	558	558	550	482	436	380	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	149	RPM	7917	5938	4750	3958	2969	2375	1900	
					(119-179)	Fz	0.022	0.036	0.045	0.055	0.067	0.075	0.080	
					Feed (mm/min)	855	1077	1077	1092	988	887	760		
		Slot 	1	≤ 1	119	RPM	6301	4726	3781	3151	2363	1890	1512	
					(95-143)	Fz	0.022	0.036	0.045	0.055	0.067	0.075	0.080	
					Feed (mm/min)	680	857	857	869	786	706	605		
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	104	RPM	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.017	0.030	0.037	0.043	0.051	0.059	0.063
						Feed (mm/min)	461	615	615	593	527	483	412	
			Slot 	1	≤ 1	82	RPM	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.017	0.030	0.037	0.043	0.051	0.059	0.063
						Feed (mm/min)	366	489	489	471	419	384	327	

continued on next page

METRIC Z-Carb-HPR



Series Z5MCR Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)								
					6	8	10	12	16	20	25		
M	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	Profile 	≤ 0.5	≤ 1.5	94	RPM	5009	3756	3005	2504	1878	1503	1202
					(76-113)	Fz	0.017	0.030	0.037	0.043	0.051	0.059	0.063
					Feed (mm/min)	421	561	561	541	481	441	376	
		Slot 	1	≤ 1	76	RPM	4039	3029	2424	2020	1515	1212	969
					(61-91)	Fz	0.017	0.030	0.037	0.043	0.051	0.059	0.063
					Feed (mm/min)	339	452	452	436	388	355	303	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	Profile 	≤ 0.5	≤ 1.5	24	RPM	1293	969	776	646	485	388	310
					(20-29)	Fz	0.0160	0.0272	0.0340	0.0409	0.0478	0.0531	0.0599
					Feed (mm/min)	103	132	132	132	116	103	93	
		Slot 	1	≤ 1	20	RPM	1050	788	630	525	394	315	252
					(16-24)	Fz	0.0160	0.0272	0.0340	0.0409	0.0478	0.0531	0.0599
					Feed (mm/min)	84	107	107	107	94	84	75	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	Profile 	≤ 0.5	≤ 1.5	19	RPM	1002	751	601	501	376	301	240
					(15-23)	Fz	0.0112	0.0192	0.0239	0.0284	0.0333	0.0371	0.0420
					Feed (mm/min)	56	72	72	71	63	56	50	
		Slot 	1	≤ 1	15	RPM	808	606	485	404	303	242	194
					(12-18)	Fz	0.0112	0.0192	0.0239	0.0284	0.0333	0.0371	0.0420
					Feed (mm/min)	45	58	58	57	50	45	41	
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	Profile 	≤ 0.5	≤ 1.5	66	RPM	3474	2605	2084	1737	1303	1042	834	
				(52-79)	Fz	0.019	0.032	0.040	0.048	0.056	0.064	0.070	
				Feed (mm/min)	333	417	417	417	367	333	292		
	Slot 	1	≤ 1	52	RPM	2747	2060	1648	1373	1030	824	659	
				(41-62)	Fz	0.019	0.032	0.040	0.048	0.056	0.064	0.070	
				Feed (mm/min)	264	330	330	330	290	264	231		
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	Profile 	≤ 0.5	≤ 1.5	23	RPM	1212	909	727	606	454	364	291	
				(18-27)	Fz	0.019	0.032	0.040	0.048	0.056	0.064	0.071	
				Feed (mm/min)	116	145	145	145	128	116	103		
	Slot 	1	≤ 1	18	RPM	969	727	582	485	364	291	233	
				(15-22)	Fz	0.019	0.032	0.040	0.048	0.056	0.064	0.071	
				Feed (mm/min)	93	116	116	116	102	93	83		

Bhn (Brinell) HRC (Rockwell C)

rpm = (Vc x 1000) / (D₁ x 3.14)

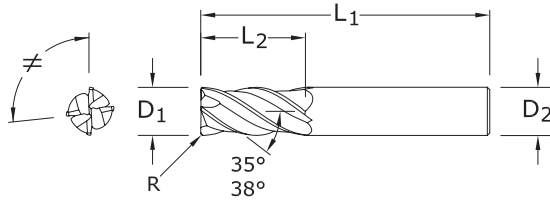
mm/min = Fz x 5 x rpm

ramp up to 5 degrees using slotting speed and feed rates. Do not plunge.

reduce speed and feed for materials harder than listed

reduce feed and Ae when finish milling (.02 x D₁ maximum)

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



TOLERANCES (mm)

<3 DIAMETER

$D_1 = +0,012/-0,012$

$D_2 = h_6$

$R = +0,000/-0,025$

3-6 DIAMETER

$D_1 = +0,000/-0,030$

$D_2 = h_6$

$R = +0,000/-0,050$

>6-10 DIAMETER

$D_1 = +0,000/-0,040$

$D_2 = h_6$

$R = +0,000/-0,050$

>10-25 DIAMETER

$D_1 = +0,000/-0,050$

$D_2 = h_6$

$R = +0,000/-0,050$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

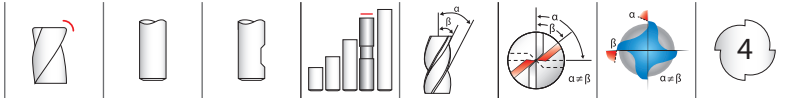
For patent information visit www.ksptpatents.com

Z1MPCR
METRIC SERIES

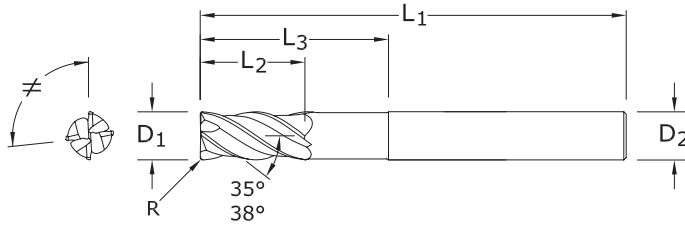
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			EDP NO.		
		OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT	JetStream
1,0	3,0	57,0	6,0	0,1	46873	—	—
1,5	4,5	57,0	6,0	0,1	46849	—	—
2,0	6,0	57,0	6,0	0,2	46850	—	—
2,5	7,0	57,0	6,0	0,2	46874	—	—
3,0	8,0	57,0	6,0	0,3	46851	—	—
3,0	8,0	57,0	6,0	0,5	46880	—	—
4,0	11,0	57,0	6,0	0,3	46852	—	—
4,0	11,0	57,0	6,0	0,5	46881	—	—
5,0	13,0	57,0	6,0	0,3	46853	—	—
6,0	13,0	57,0	6,0	0,25	46882	—	—
6,0	13,0	57,0	6,0	0,5	46854	—	—
6,0	13,0	57,0	6,0	1,0	46855	—	—
6,0	13,0	57,0	6,0	1,5	46884	—	—
8,0	19,0	63,0	8,0	0,5	46856	—	—
8,0	19,0	63,0	8,0	1,0	46857	—	—
8,0	19,0	63,0	8,0	1,5	46886	—	—
8,0	19,0	63,0	8,0	2,0	46887	—	—
10,0	22,0	72,0	10,0	0,5	46858	—	—
10,0	22,0	72,0	10,0	1,0	46859	—	—
10,0	22,0	72,0	10,0	1,5	46889	—	—
10,0	22,0	72,0	10,0	2,0	46890	—	—
10,0	22,0	72,0	10,0	2,5	46891	—	—
12,0	26,0	83,0	12,0	0,5	46860	46909	—
12,0	26,0	83,0	12,0	0,75	46861	46910	46493
12,0	26,0	83,0	12,0	1,0	46893	46911	—
12,0	26,0	83,0	12,0	1,5	46894	46912	—
12,0	26,0	83,0	12,0	2,0	46895	46913	—
12,0	26,0	83,0	12,0	2,5	46896	46914	—
12,0	26,0	83,0	12,0	3,0	42718	46915	42719
14,0	26,0	83,0	14,0	1,0	46862	46916	46494
16,0	32,0	92,0	16,0	1,0	46863	46917	46495
16,0	32,0	92,0	16,0	1,5	46898	46918	—
16,0	32,0	92,0	16,0	2,0	46899	46919	—
16,0	32,0	92,0	16,0	2,5	46900	46920	—
16,0	32,0	92,0	16,0	3,0	46864	46921	42721
16,0	32,0	92,0	16,0	4,0	46867	46944	—
20,0	38,0	104,0	20,0	1,0	46865	46922	46497
20,0	38,0	104,0	20,0	1,5	46903	46923	—
20,0	38,0	104,0	20,0	2,0	46904	46924	—
20,0	38,0	104,0	20,0	2,5	46905	46925	—
20,0	38,0	104,0	20,0	3,0	42722	46926	42723
20,0	38,0	104,0	20,0	4,0	46868	46945	—
20,0	38,0	104,0	20,0	5,0	46869	46946	—
25,0	38,0	104,0	25,0	1,0	46866	46927	46498

- Variable rake geometry alters and controls the cutting dynamic taking chatter suppression to an unprecedented level
- Unequal helix design changes the cutting angle to improve harmonics
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging harmonics
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)

METRIC Z-Carb-AP



Z1MPIC METRIC SERIES

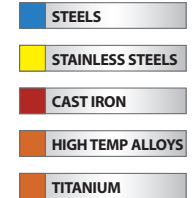


- Variable rake geometry alters and controls the cutting dynamic taking chatter suppression to an unprecedented level
- Unequal helix design changes the cutting angle to improve harmonics
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging harmonics
- Long reach design allows for deeper and faster cuts
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)

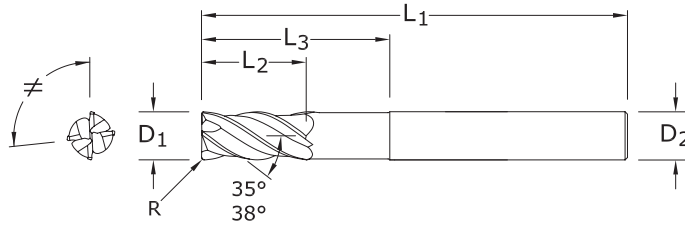
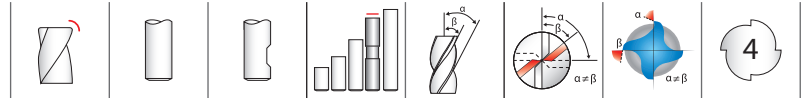
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			CORNER RADIUS R	EDP NO. Ti-NAMITE-X W/FLAT
		OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3		
12,0	26,0	83,0	12,0	36,0	2,5	42731
12,0	26,0	83,0	12,0	36,0	3,0	42732
12,0	26,0	83,0	12,0	36,0	4,0	42733
16,0	32,0	92,0	16,0	42,0	2,5	42734
16,0	32,0	92,0	16,0	42,0	4,0	42735
16,0	32,0	92,0	16,0	42,0	6,0	42736
20,0	38,0	104,0	20,0	52,0	2,5	42737
20,0	38,0	104,0	20,0	52,0	4,0	42738
20,0	38,0	104,0	20,0	52,0	6,0	42739

TOLERANCES (mm)

>12-20 DIAMETER
 $D_1 = +0,000/-0,050$
 $D_2 = h_6$
 $R = +0,000/-0,050$



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TOLERANCES (mm)

6 DIAMETER

$D_1 = +0,000/-0,030$

$D_2 = h_6$

$R = +0,000/-0,050$

>6-10 DIAMETER

$D_1 = +0,000/-0,040$

$D_2 = h_6$

$R = +0,000/-0,050$

>10-20 DIAMETER

$D_1 = +0,000/-0,050$

$D_2 = h_6$

$R = +0,000/-0,050$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

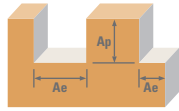
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Z1MPLC
METRIC SERIES

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	EDP NO.	
						Ti-NAMITE-X	Ti-NAMITE-X W/FLAT
6,0	8,0	75,0	6,0	24,0	0,5	46821	—
8,0	10,0	75,0	8,0	32,0	1,0	46822	—
8,0	10,0	75,0	8,0	32,0	2,0	46823	—
10,0	12,0	100,0	10,0	40,0	1,0	46824	—
10,0	12,0	100,0	10,0	40,0	2,0	46825	—
12,0	15,0	100,0	12,0	48,0	1,0	46826	46928
12,0	15,0	100,0	12,0	48,0	1,5	46827	46929
12,0	15,0	100,0	12,0	48,0	2,0	46828	46930
12,0	15,0	100,0	12,0	48,0	3,0	46829	46931
16,0	20,0	115,0	16,0	65,0	1,0	46830	46932
16,0	20,0	115,0	16,0	65,0	1,5	46831	46933
16,0	20,0	115,0	16,0	65,0	2,0	46832	46934
16,0	20,0	115,0	16,0	65,0	3,0	46833	46935
16,0	20,0	115,0	16,0	65,0	4,0	46834	46936
16,0	20,0	115,0	16,0	65,0	5,0	46835	46937
20,0	24,0	140,0	20,0	80,0	1,0	46836	46938
20,0	24,0	140,0	20,0	80,0	1,5	46837	46939
20,0	24,0	140,0	20,0	80,0	2,0	46838	46940
20,0	24,0	140,0	20,0	80,0	3,0	46839	46941
20,0	24,0	140,0	20,0	80,0	4,0	46840	46942
20,0	24,0	140,0	20,0	80,0	5,0	46841	46943

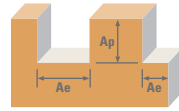
- Variable rake geometry alters and controls the cutting dynamic taking chatter suppression to an unprecedented level
- Unequal helix design changes the cutting angle to improve harmonics
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging harmonics
- Long reach design allows for deeper and faster cuts
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

Z-Carb-AP



Series Z1MPCR, Z1MPIC, Z1MPLC Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)											
					1	3	6	8	10	12	16	20	25			
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	169	RPM	53803	17934	8967	6725	5380	4484	3363	2690	2152
						(135-203)	Fz	0.0030	0.0109	0.029	0.049	0.061	0.074	0.087	0.099	0.108
						Feed (mm/min)	646	782	1040	1318	1313	1327	1170	1065	930	
			Slot 	1	≤ 1	134	RPM	42654	14218	7109	5332	4265	3555	2666	2133	1706
						(107-161)	Fz	0.0030	0.0109	0.029	0.049	0.061	0.074	0.087	0.099	0.108
						Feed (mm/min)	512	620	825	1045	1041	1052	928	845	737	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.5	≤ 1.5	96	RPM	30537	10179	5089	3817	3054	2545	1909	1527	1221
						(77-115)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	281	330	448	550	550	560	511	458	391	
			Slot 	1	≤ 1	76	RPM	24235	8078	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	223	262	355	436	436	444	406	364	310	
H	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.5	≤ 1.5	56	RPM	17934	5978	2989	2242	1793	1495	1121	897	717	
					(45-68)	Fz	0.0018	0.0066	0.017	0.030	0.037	0.043	0.051	0.059	0.065	
					Feed (mm/min)	129	158	203	269	265	257	229	212	187		
		Slot 	1	≤ 1	44	RPM	14057	4686	2343	1757	1406	1171	879	703	562	
					(35-53)	Fz	0.0018	0.0066	0.017	0.030	0.037	0.043	0.051	0.059	0.065	
					Feed (mm/min)	101	124	159	211	208	201	179	166	146		
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ 0.5	≤ 1.5	136	RPM	43139	14380	7190	5392	4314	3595	2696	2157	1726
						(109-163)	Fz	0.0028	0.0099	0.026	0.045	0.056	0.067	0.079	0.091	0.098
						Feed (mm/min)	483	569	748	971	966	963	852	785	676	
			Slot 	1	≤ 1	108	RPM	34414	11471	5736	4302	3441	2868	2151	1721	1377
						(87-130)	Fz	0.0028	0.0099	0.026	0.045	0.056	0.067	0.079	0.091	0.098
						Feed (mm/min)	385	454	597	774	771	769	680	626	540	
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile 	≤ 0.5	≤ 1.5	104	RPM	32960	10987	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.0020	0.0074	0.020	0.034	0.043	0.050	0.059	0.067	0.074
						Feed (mm/min)	264	325	439	560	567	549	486	442	390	
			Slot 	1	≤ 1	82	RPM	26174	8725	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.0020	0.0074	0.020	0.034	0.043	0.050	0.059	0.067	0.074
						Feed (mm/min)	209	258	349	445	450	436	386	351	310	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	149	RPM	47501	15834	7917	5938	4750	3958	2969	2375	1900
						(119-179)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	437	513	697	855	855	871	796	713	608	
			Slot 	1	≤ 1	119	RPM	37807	12602	6301	4726	3781	3151	2363	1890	1512
						(95-143)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	348	408	555	681	681	693	633	567	484	

continued on next page



Series Z1MPCR, Z1MPIC, Z1MPLC Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)											
					1	3	6	8	10	12	16	20	25			
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	104	RPM	32960	10987	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.0018	0.0064	0.017	0.030	0.037	0.043	0.051	0.059	0.063
						Feed (mm/min)	237	281	374	494	488	472	420	389	332	
			Slot 	1	≤ 1	82	RPM	26174	8725	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.0018	0.0064	0.017	0.030	0.037	0.043	0.051	0.059	0.063
						Feed (mm/min)	188	223	297	393	387	375	334	309	264	
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Profile 	≤ 0.5	≤ 1.5	94	RPM	30052	10017	5009	3756	3005	2504	1878	1503	1202
						(76-113)	Fz	0.0018	0.0064	0.017	0.030	0.037	0.043	0.051	0.059	0.063
						Feed (mm/min)	216	256	341	451	445	431	383	355	303	
			Slot 	1	≤ 1	76	RPM	24235	8078	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.0018	0.0064	0.017	0.030	0.037	0.043	0.051	0.059	0.063
						Feed (mm/min)	174	207	275	364	359	347	309	286	244	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile 	≤ 0.5	≤ 1.5	24	RPM	7755	2585	1293	969	776	646	485	388	310
						(20-29)	Fz	0.0018	0.0061	0.016	0.027	0.034	0.041	0.048	0.053	0.060
						Feed (mm/min)	56	63	83	105	105	106	93	82	74	
			Slot 	1	≤ 1	20	RPM	6301	2100	1050	788	630	525	394	315	252
						(16-24)	Fz	0.0018	0.0061	0.016	0.027	0.034	0.041	0.048	0.053	0.060
						Feed (mm/min)	45	51	67	85	86	86	76	67	60	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile 	≤ 0.5	≤ 1.5	19	RPM	6010	2003	1002	751	601	501	376	301	240
						(15-23)	Fz	0.0013	0.0043	0.011	0.019	0.024	0.028	0.033	0.037	0.042
						Feed (mm/min)	31	34	44	57	58	56	50	44	40	
			Slot 	1	≤ 1	15	RPM	4847	1616	808	606	485	404	303	242	194
						(12-18)	Fz	0.0013	0.0043	0.011	0.019	0.024	0.028	0.033	0.037	0.042
						Feed (mm/min)	25	28	36	46	47	45	40	36	33	
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile 	≤ 0.5	≤ 1.5	66	RPM	20842	6947	3474	2605	2084	1737	1303	1042	834	
					(52-79)	Fz	0.0020	0.0071	0.019	0.032	0.040	0.048	0.056	0.064	0.070	
					Feed (mm/min)	167	197	264	333	333	333	292	267	233		
		Slot 	1	≤ 1	52	RPM	16480	5493	2747	2060	1648	1373	1030	824	659	
					(41-62)	Fz	0.0020	0.0071	0.019	0.032	0.040	0.048	0.056	0.064	0.070	
					Feed (mm/min)	132	156	209	264	264	264	231	211	185		
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile 	≤ 0.5	≤ 1.5	23	RPM	7271	2424	1212	909	727	606	454	364	291	
					(18-27)	Fz	0.0020	0.0071	0.019	0.032	0.040	0.048	0.056	0.064	0.070	
					Feed (mm/min)	58	69	92	116	116	116	102	93	81		
		Slot 	1	≤ 1	18	RPM	5816	1939	969	727	582	485	364	291	233	
					(15-22)	Fz	0.0020	0.0071	0.019	0.032	0.040	0.048	0.056	0.064	0.070	
					Feed (mm/min)	47	55	74	93	93	93	81	74	65		

Bhn (Brinell) HRc (Rockwell C)

$$rpm = (Vc \times 1000) / (D_1 \times 3.14)$$

$$ipm = Fz \times 4 \times rpm$$

maximum Slotting Ap for Z1PCR <3mm diameter and all Z1MPLC / Z1MPLB is .25 x D₁

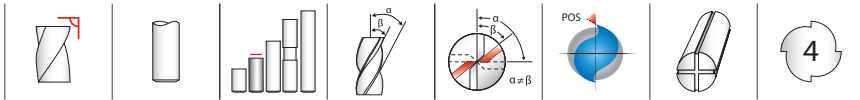
maximum Profile Ae for Z1PCR <3mm diameter and all Z1MPLC / Z1MPLB is .20 x D₁

reduce speed and feed for materials harder than listed

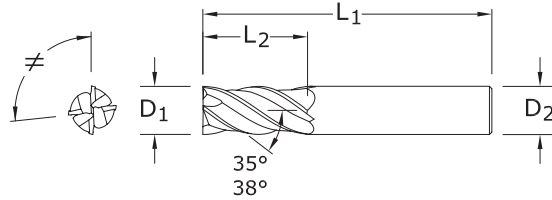
reduce feed and Ae when finish milling (.02 x D₁ maximum)

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC Z-Carb



Z1M METRIC SERIES



- Unequal helix design aids in damping harmonics by changing the angle at which each cutting edge enters and exits the material
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging harmonics
- Optimal material removal rates through increased feed and depths of cut
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

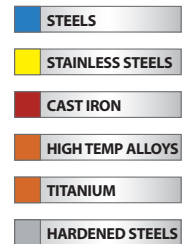
CUTTING DIAMETER D_1	mm			EDP NO.	
	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	JetStream
3,0	8,0	57,0	6,0	46357	—
4,0	11,0	57,0	6,0	46358	—
5,0	13,0	57,0	6,0	46359	—
6,0	13,0	57,0	6,0	46360	—
8,0	19,0	63,0	8,0	46362	—
10,0	22,0	72,0	10,0	46364	—
12,0	26,0	83,0	12,0	46366	—
14,0	26,0	83,0	14,0	46368	46506
16,0	32,0	92,0	16,0	46370	46507
18,0	32,0	92,0	18,0	46372	46508
20,0	38,0	104,0	20,0	46374	46509
25,0	38,0	104,0	25,0	46376	46510

TOLERANCES (mm)

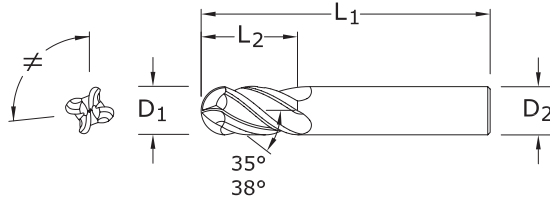
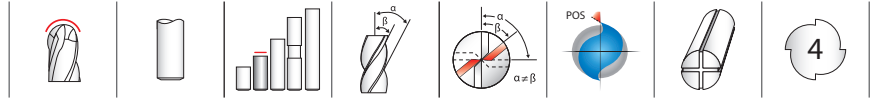
3–6 DIAMETER
 $D_1 = +0,000/-0,030$
 $D_2 = h_6$

>6–10 DIAMETER
 $D_1 = +0,000/-0,040$
 $D_2 = h_6$

>10–25 DIAMETER
 $D_1 = +0,000/-0,050$
 $D_2 = h_6$



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TOLERANCES (mm)

3–6 DIAMETER

$D_1 = +0,000/-0,030$

$D_2 = h_6$

>6–10 DIAMETER

$D_1 = +0,000/-0,040$

$D_2 = h_6$

>10–25 DIAMETER

$D_1 = +0,000/-0,050$

$D_2 = h_6$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

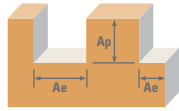
For patent information visit www.ksptpatents.com








Z1MB
METRIC SERIES

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-X (TX)	JetStream
3,0	8,0	57,0	6,0	46354	—
4,0	11,0	57,0	6,0	46355	—
5,0	13,0	57,0	6,0	46356	—
6,0	13,0	57,0	6,0	46343	—
8,0	19,0	63,0	8,0	46344	—
10,0	22,0	72,0	10,0	46345	—
12,0	26,0	83,0	12,0	46346	—
14,0	26,0	83,0	14,0	46347	46518
16,0	32,0	92,0	16,0	46348	46519
18,0	32,0	92,0	18,0	46349	46520
20,0	38,0	104,0	20,0	46350	46521
25,0	38,0	104,0	25,0	46351	46522

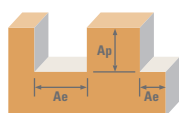
- Unequal helix design aids in damping harmonics by changing the angle at which each cutting edge enters and exits the material
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging harmonics
- Optimal material removal rates through increased feed and depths of cut
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

METRIC Z-Carb



Series Z1M, Z1MB Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)									
					3	6	8	10	12	16	20	25		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	169	RPM	17934	8967	6725	5380	4484	3363	2690	2152
					(135-203)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.086	0.088
					Feed (mm/min)	654	861	1091	1090	1076	1067	927	753	
					134	RPM	14218	7109	5332	4265	3555	2666	2133	1706
					(107-161)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.086	0.088
					Feed (mm/min)	519	682	865	864	853	846	735	597	
	≤ 375 Bhn or ≤ 40 HRc	Slot 	1	≤ 1	96	RPM	10179	5089	3817	3054	2545	1909	1527	1221
					(77-115)	Fz	0.007	0.019	0.030	0.037	0.046	0.061	0.067	0.068
					Feed (mm/min)	274	391	456	456	464	469	407	330	
					76	RPM	8078	4039	3029	2424	2020	1515	1212	969
					(61-91)	Fz	0.007	0.019	0.030	0.037	0.046	0.061	0.067	0.068
					Feed (mm/min)	217	310	362	362	368	372	323	262	
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.5	≤ 1.5	56	RPM	5978	2989	2242	1793	1495	1121	897	717
					(45-68)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
					Feed (mm/min)	115	143	191	191	186	184	163	129	
					44	RPM	4686	2343	1757	1406	1171	879	703	562
					(35-53)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
					Feed (mm/min)	90	112	150	150	146	144	127	101	
	≤ 220 Bhn or ≤ 19 HRc	Slot 	1	≤ 1	136	RPM	14380	7190	5392	4314	3595	2696	2157	1726
					(109-163)	Fz	0.008	0.024	0.038	0.048	0.058	0.077	0.083	0.085
					Feed (mm/min)	483	690	828	828	828	828	713	587	
					108	RPM	11471	5736	4302	3441	2868	2151	1721	1377
					(87-130)	Fz	0.008	0.024	0.038	0.048	0.058	0.077	0.083	0.085
					Feed (mm/min)	385	551	661	661	661	661	569	468	
K CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile 	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648	1318
					(83-124)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
					Feed (mm/min)	316	369	492	492	475	485	422	330	
					82	RPM	8725	4362	3272	2617	2181	1636	1309	1047
					(66-99)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
					Feed (mm/min)	251	293	391	391	377	385	335	262	
	≤ 275 Bhn or ≤ 28 HRc	Slot 	1	≤ 1	149	RPM	15834	7917	5938	4750	3958	2969	2375	1900
					(119-179)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
					Feed (mm/min)	456	532	709	709	684	699	608	475	
					119	RPM	12602	6301	4726	3781	3151	2363	1890	1512
					(95-143)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
					Feed (mm/min)	363	423	565	565	544	557	484	378	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	149	RPM	15834	7917	5938	4750	3958	2969	2375	1900
					(119-179)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
					Feed (mm/min)	456	532	709	709	684	699	608	475	
					119	RPM	12602	6301	4726	3781	3151	2363	1890	1512
					(95-143)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
					Feed (mm/min)	363	423	565	565	544	557	484	378	

continued on next page



Series Z1M, Z1MB Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)									
					3	6	8	10	12	16	20	25		
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L ≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648	1318
					(83-124)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
					Feed (mm/min)	211	316	387	387	369	380	334	264	
		Slot	1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309	1047
					(66-99)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
					Feed (mm/min)	168	251	307	307	293	302	265	209	
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450 ≤ 325 Bhn or ≤ 35 HRc	Profile	≤ 0.5	≤ 1.5	94	RPM	10017	5009	3756	3005	2504	1878	1503	1202
					(76-113)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
					Feed (mm/min)	192	288	353	353	337	346	305	240	
		Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212	969
					(61-91)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
					Feed (mm/min)	155	233	284	284	271	279	246	194	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400 ≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.5	≤ 1.5	24	RPM	2585	1293	969	776	646	485	388	310
					(20-29)	Fz	0.005	0.010	0.017	0.021	0.024	0.033	0.037	0.038
					Feed (mm/min)	55	50	66	53	62	65	58	47	
		Slot	1	≤ 1	20	RPM	2100	1050	788	630	525	394	315	252
					(16-24)	Fz	0.005	0.010	0.017	0.021	0.024	0.033	0.037	0.038
					Feed (mm/min)	40	40	54	54	50	52	47	38	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene ≤ 400 Bhn or ≤ 43 HRc	Profile	≤ 0.5	≤ 1.5	19	RPM	2003	1002	751	601	501	376	301	240
					(15-23)	Fz	0.002	0.007	0.011	0.013	0.017	0.020	0.024	0.025
					Feed (mm/min)	19	29	32	32	34	31	29	24	
		Slot	1	≤ 1	15	RPM	1583	792	594	475	396	297	238	190
					(12-18)	Fz	0.002	0.007	0.011	0.013	0.017	0.020	0.024	0.025
					Feed (mm/min)	15	23	25	25	27	24	23	19	
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si ≤ 350 Bhn or ≤ 38 HRc	Profile	≤ 0.5	≤ 1.5	66	RPM	6947	3474	2605	2084	1737	1303	1042	834	
				(52-79)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045	
				Feed (mm/min)	133	167	222	222	217	213	189	150		
	Slot	1	≤ 1	52	RPM	5493	2747	2060	1648	1373	1030	824	659	
				(41-62)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045	
				Feed (mm/min)	105	132	176	176	171	169	149	119		
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al ≤ 440 Bhn or ≤ 47 HRc	Profile	≤ 0.5	≤ 1.5	23	RPM	2424	1212	909	727	606	454	364	291	
				(18-27)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045	
				Feed (mm/min)	47	58	78	78	76	74	66	52		
	Slot	1	≤ 1	18	RPM	1939	969	727	582	485	364	291	233	
				(15-22)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045	
				Feed (mm/min)	37	47	62	62	60	60	53	42		

Bhn (Brinell) HRc (Rockwell C)

$$rpm = (Vc \times 1000) / (D_1 \times 3.14)$$

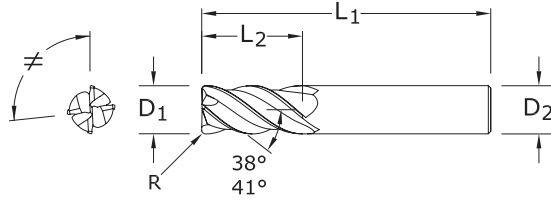
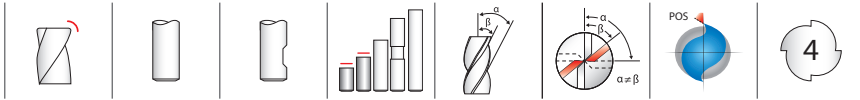
$$ipm = Fz \times 4 \times rpm$$

reduce speed and feed for materials harder than listed

reduce feed and Ae when finish milling (.02 x D₁ maximum)

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Z-Carb-HTA



ZH1MCRS

METRIC SERIES

- The original Z-Carb design with an enhanced core and higher helix suited for the demands of high temperature alloys
- Unequal helix design aids in damaging harmonics by changing the angle at which each cutting edge enters and exits the material
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging harmonics
- Optimal material removal rates through increased feed and depths of cut for difficult to machine materials
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			CORNER RADIUS R	EDP NO. Ti-NAMITE-A (AITiN)
		OVERALL LENGTH L_1	SHANK DIAMETER D_2			
6,0	10,0	54,0	6,0	0,50	42712	
8,0	12,0	58,0	8,0	0,50	42713	
10,0	14,0	66,0	10,0	0,50	42714	
12,0	16,0	73,0	12,0	0,75	42715	
16,0	22,0	82,0	16,0	1,00	42716	
20,0	26,0	92,0	20,0	1,00	42717	

TOLERANCES (mm)

- 6 DIAMETER**
 $D_1 = +0,000/-0,030$
 $D_2 = h_6$
 $R = +0,000/-0,050$
- >6-10 DIAMETER**
 $D_1 = +0,000/-0,040$
 $D_2 = h_6$
 $R = +0,000/-0,050$
- >10-20 DIAMETER**
 $D_1 = +0,000/-0,050$
 $D_2 = h_6$
 $R = +0,000/-0,050$

HIGH TEMP ALLOYS

TITANIUM

For patent information visit www.ksptpatents.com

ZH1MCR

METRIC SERIES

- The original Z-Carb design with an enhanced core and higher helix suited for the demands of high temperature alloys
- Unequal helix design aids in damaging harmonics by changing the angle at which each cutting edge enters and exits the material
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging harmonics
- Optimal material removal rates through increased feed and depths of cut for difficult to machine materials
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			CORNER RADIUS R	EDP NO.	
		OVERALL LENGTH L_1	SHANK DIAMETER D_2			Ti-NAMITE-A (AITiN)	Ti-NAMITE-A (AITiN) W/FLAT
6,0	13,0	57,0	6,0	0,5	46450	—	
6,0	13,0	57,0	6,0	1,0	46451	—	
6,0	13,0	57,0	6,0	1,5	46452	—	
8,0	19,0	63,0	8,0	0,5	46453	—	
8,0	19,0	63,0	8,0	1,0	46454	—	
8,0	19,0	63,0	8,0	1,5	46455	—	
10,0	22,0	72,0	10,0	0,5	46456	—	
10,0	22,0	72,0	10,0	1,0	46457	—	
10,0	22,0	72,0	10,0	1,5	46458	—	
10,0	22,0	72,0	10,0	2,0	46459	—	
12,0	26,0	83,0	12,0	0,5	46460	46471	
12,0	26,0	83,0	12,0	1,0	46461	46472	
12,0	26,0	83,0	12,0	1,5	46462	46473	
12,0	26,0	83,0	12,0	2,0	46463	46474	
12,0	26,0	83,0	12,0	3,0	46464	46475	
16,0	32,0	92,0	16,0	1,5	46465	46476	
16,0	32,0	92,0	16,0	2,0	46466	46477	
16,0	32,0	92,0	16,0	3,0	46467	46478	
16,0	32,0	92,0	16,0	4,0	46482	46483	
20,0	38,0	104,0	20,0	3,0	46468	46479	
20,0	38,0	104,0	20,0	4,0	46469	46480	
20,0	38,0	104,0	20,0	5,0	46470	46481	

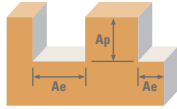
TOLERANCES (mm)









- 6 DIAMETER**
 $D_1 = +0,000/-0,030$
 $D_2 = h_6$
 $R = +0,000/-0,050$
- >6-10 DIAMETER**
 $D_1 = +0,000/-0,040$
 $D_2 = h_6$
 $R = +0,000/-0,050$
- >10-20 DIAMETER**
 $D_1 = +0,000/-0,050$
 $D_2 = h_6$
 $R = +0,000/-0,050$

HIGH TEMP ALLOYS

TITANIUM

For patent information visit www.ksptpatents.com



Series ZH1MCRS, ZH1MCR Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)					
					6	10	12	20		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile 	≤ 0.5	≤ 1.5	26	RPM	1373	824	687	412
					(21-31)	Fz	0.017	0.032	0.041	0.053
	Slot 	1	≤ 1	21	RPM	1131	679	565	339	
				(17-26)	Fz	0.017	0.032	0.041	0.053	
						Feed (mm/min)	93	105	113	87
						77	87	93	72	
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile 	≤ 0.5	≤ 1.5	21	RPM	1131	679	565	339
					(17-26)	Fz	0.012	0.024	0.029	0.037
	Slot 	1	≤ 1	17	RPM	889	533	444	267	
				(13-20)	Fz	0.012	0.024	0.029	0.037	
						Feed (mm/min)	43	51	52	39
						209	270	269	188	
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile 	≤ 0.5	≤ 1.5	66	RPM	3474	2084	1737	1042
					(52-79)	Fz	0.019	0.041	0.049	0.057
	Slot 	1	≤ 1	52	RPM	2747	1648	1373	824	
				(41-62)	Fz	0.019	0.041	0.049	0.057	
						Feed (mm/min)	264	342	340	238
						209	270	269	188	
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile 	≤ 0.5	≤ 1.5	23	RPM	1212	727	606	364
					(18-27)	Fz	0.019	0.041	0.049	0.057
	Slot 	1	≤ 1	18	RPM	969	582	485	291	
				(15-22)	Fz	0.019	0.041	0.049	0.057	
						Feed (mm/min)	74	95	95	66

Bhn (Brinell) HRc (Rockwell C)

rpm = (Vc x 1000) / (D₁ x 3.14)

ipm = Fz x 4 x rpm

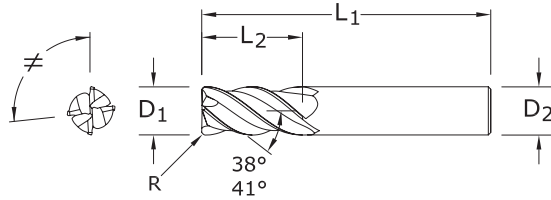
reduce speed and feed for materials harder than listed

reduce feed and Ae when finish milling (.02 x D₁ maximum)

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC

Z-Carb-MD



ZD1MCR METRIC SERIES

- The original Z-Carb design with negative rake, heavy core, and higher helix for strength and shearing of hard mold & die materials
- Unequal helix design aids in damping harmonics by changing the angle at which each cutting edge enters and exits the material
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging harmonics
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials 35-60HRc (327 to 654 Bhn)

mm						EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	REACH L ₃	CORNER RADIUS R	Ti-NAMITE-X
3,0	4,0	57,0	6,0	15,0	0,2	46560
4,0	5,0	57,0	6,0	15,0	0,3	46561
5,0	6,0	57,0	6,0	15,0	0,5	46562
6,0	7,0	57,0	6,0	15,0	1,0	46563
8,0	10,0	63,0	8,0	25,0	1,0	46564
10,0	12,0	72,0	10,0	30,0	1,0	46565
12,0	15,0	83,0	12,0	35,0	1,0	46566
16,0	20,0	92,0	16,0	45,0	1,5	46567
20,0	24,0	104,0	20,0	55,0	2,0	46568

TOLERANCES (mm)

3-6 DIAMETER

D₁ = +0,000/-0,030

D₂ = h₆

R = +0,000/-0,050

>6-10 DIAMETER

D₁ = +0,000/-0,040

D₂ = h₆

R = +0,000/-0,050

>10-20 DIAMETER

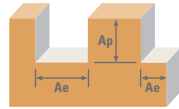
D₁ = +0,000/-0,050







D₂ = h₆

R = +0,000/-0,050

HARDENED STEELS

For patent information visit www.ksptpatents.com



Series ZD1MCR Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)								
					3	6	8	10	12	16	20		
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.4	≤ 1	123	RPM	13087	6544	4908	3926	3272	2454	1963
					(99-148)	Fz	0.012	0.029	0.049	0.061	0.072	0.083	0.112
					Feed (mm/min)	628	754	963	963	942	817	879	
	Slot 	1	≤ 0.4	98	RPM	10340	5170	3878	3102	2585	1939	1551	
				(78-117)	Fz	0.012	0.029	0.049	0.061	0.072	0.083	0.112	
				Feed (mm/min)	496	596	761	761	744	645	695		
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRc	Profile 	≤ 0.4	≤ 1	64	RPM	6786	3393	2545	2036	1696	1272	1018
					(51-77)	Fz	0.010	0.024	0.041	0.051	0.060	0.068	0.093
					Feed (mm/min)	261	326	413	413	407	347	380	
	Slot 	1	≤ 0.4	52	RPM	5493	2747	2060	1648	1373	1030	824	
				(41-62)	Fz	0.010	0.024	0.041	0.051	0.060	0.068	0.093	
				Feed (mm/min)	211	264	334	334	330	281	308		
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 655 Bhn or ≤ 60 HRc	Profile 	≤ 0.4	≤ 1	27	RPM	2908	1454	1091	872	727	545	436
					(22-33)	Fz	0.005	0.012	0.021	0.027	0.031	0.036	0.048
					Feed (mm/min)	56	70	93	93	91	79	84	
	Slot 	1	≤ 0.4	21	RPM	2262	1131	848	679	565	424	339	
				(17-26)	Fz	0.005	0.012	0.021	0.027	0.031	0.036	0.048	
				Feed (mm/min)	43	54	72	72	71	62	65		

Bhn (Brinell) HRc (Rockwell C)

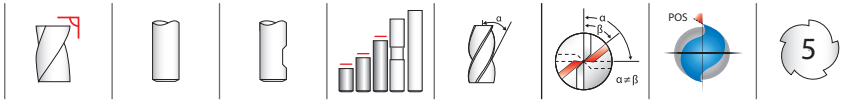
rpm = (Vc x 1000) / (D₁ x 3.14)

ipm = Fz x 4 x rpm

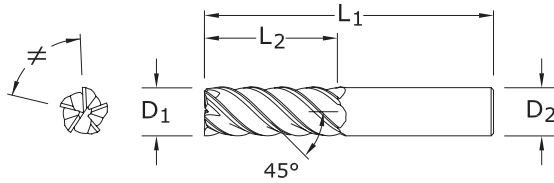
reduce speed and feed for materials harder than listed

reduce feed and Ae when finish milling (.02 x D₁ maximum)

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



55M
METRIC SERIES



- Unequal indexing, high helix and an ideal rake and relief combination for unmatched finishing capability
- The choice when peak finish quality is the requirement
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	EDP NO.	
				Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
6,0	12,0	50,0	6,0	42606	—
6,0	19,0	63,0	6,0	42607	—
6,0	25,0	75,0	6,0	42608	—
8,0	12,0	50,0	8,0	42609	—
8,0	20,0	63,0	8,0	42610	—
8,0	25,0	75,0	8,0	42611	—
10,0	16,0	50,0	10,0	42612	—
10,0	22,0	75,0	10,0	42622	42613
10,0	38,0	100,0	10,0	42614	—
12,0	19,0	63,0	12,0	42615	—
12,0	25,0	75,0	12,0	42616	42623
12,0	50,0	100,0	12,0	42617	—
16,0	32,0	89,0	16,0	42618	42624
16,0	50,0	100,0	16,0	42626	—
16,0	75,0	150,0	16,0	42619	—
20,0	38,0	100,0	20,0	42620	42625
20,0	50,0	100,0	20,0	42627	—
20,0	75,0	150,0	20,0	42621	—

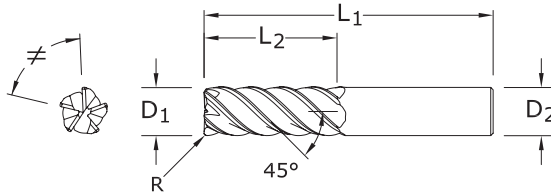
TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

For patent information visit www.ksptpatents.com



TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

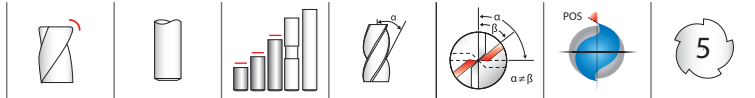
For patent information visit www.ksptpatents.com

55MCR
METRIC SERIES

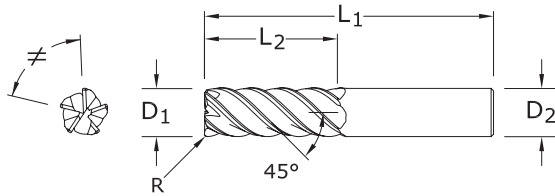
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm		CORNER RADIUS R	EDP NO. Ti-NAMITE-A (AITiN)
		OVERALL LENGTH L_1	SHANK DIAMETER D_2		
6,0	12,0	50,0	6,0	0,5	42660
6,0	19,0	63,0	6,0	0,25	42661
6,0	19,0	63,0	6,0	0,5	42662
6,0	19,0	63,0	6,0	1,0	42663
6,0	19,0	63,0	6,0	1,5	42664
6,0	25,0	75,0	6,0	0,5	42665
8,0	12,0	50,0	8,0	0,5	42666
8,0	20,0	63,0	8,0	0,5	42667
8,0	20,0	63,0	8,0	1,0	42668
8,0	20,0	63,0	8,0	1,5	42669
8,0	20,0	63,0	8,0	2,0	42670
8,0	25,0	75,0	8,0	0,5	42671
10,0	16,0	50,0	10,0	0,5	42672
10,0	22,0	75,0	10,0	0,5	42673
10,0	22,0	75,0	10,0	1,0	42674
10,0	22,0	75,0	10,0	1,5	42675
10,0	22,0	75,0	10,0	2,0	42676
10,0	22,0	75,0	10,0	2,5	42677
10,0	38,0	100,0	10,0	0,5	42678
12,0	19,0	63,0	12,0	0,5	42679
12,0	25,0	75,0	12,0	0,5	42680
12,0	25,0	75,0	12,0	1,0	42681
12,0	25,0	75,0	12,0	1,5	42682
12,0	25,0	75,0	12,0	2,0	42683
12,0	25,0	75,0	12,0	2,5	42684
12,0	25,0	75,0	12,0	3,0	42685
12,0	50,0	100,0	12,0	0,5	42686
12,0	50,0	100,0	12,0	3,0	42630
12,0	50,0	100,0	12,0	4,0	42631
16,0	32,0	89,0	16,0	1,0	42687
16,0	32,0	89,0	16,0	1,5	42688
16,0	32,0	89,0	16,0	2,0	42689

- Unequal indexing, high helix and an ideal rake and relief combination for unmatched finishing capability
- The choice when peak finish quality is the requirement
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

continued on next page



55MCR
METRIC SERIES



CONTINUED

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	mm			CORNER RADIUS R	EDP NO. Ti-NAMITE-A (AlTiN)
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂			
16,0	32,0	89,0	16,0	2,5	42690	
16,0	32,0	89,0	16,0	3,0	42691	
16,0	32,0	89,0	16,0	4,0	42692	
16,0	50,0	100,0	16,0	2,0	42656	
16,0	50,0	100,0	16,0	2,5	42657	
16,0	50,0	100,0	16,0	3,0	42658	
16,0	50,0	100,0	16,0	4,0	42659	
16,0	50,0	100,0	16,0	5,0	42628	
16,0	75,0	150,0	16,0	1,0	42693	
16,0	75,0	150,0	16,0	3,0	42632	
16,0	75,0	150,0	16,0	4,0	42633	
20,0	38,0	100,0	20,0	1,0	42694	
20,0	38,0	100,0	20,0	1,5	42695	
20,0	38,0	100,0	20,0	2,0	42696	
20,0	38,0	100,0	20,0	2,5	42697	
20,0	38,0	100,0	20,0	3,0	42698	
20,0	38,0	100,0	20,0	4,0	42699	
20,0	38,0	100,0	20,0	5,0	42700	
20,0	38,0	100,0	20,0	6,0	42648	
20,0	50,0	100,0	20,0	2,0	42649	
20,0	50,0	100,0	20,0	2,5	42650	
20,0	50,0	100,0	20,0	3,0	42651	
20,0	50,0	100,0	20,0	4,0	42652	
20,0	50,0	100,0	20,0	5,0	42653	
20,0	50,0	100,0	20,0	6,0	42654	
20,0	75,0	150,0	20,0	1,0	42701	
20,0	75,0	150,0	20,0	2,0	42702	
20,0	75,0	150,0	20,0	3,0	42703	
20,0	75,0	150,0	20,0	4,0	42704	
20,0	75,0	150,0	20,0	5,0	42705	
20,0	75,0	150,0	20,0	6,0	42655	

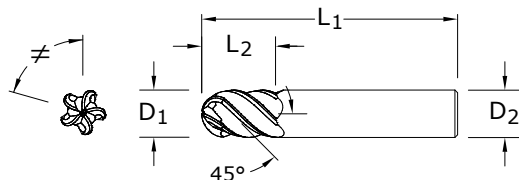
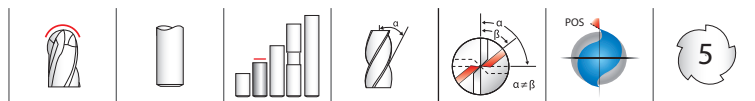
TOLERANCES (mm)

D₁ = +0,000/-0,050

D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

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TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

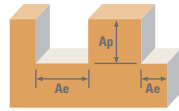
For patent information visit www.ksptpatents.com






55MB
METRIC SERIES

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AITiN)
6,0	13,0	57,0	6,0	42750
8,0	19,0	63,0	8,0	42751
10,0	22,0	72,0	10,0	42752
12,0	26,0	83,0	12,0	42753
16,0	32,0	92,0	16,0	42754
20,0	38,0	104,0	20,0	42755

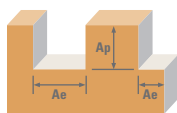
- Unequal indexing, high helix and an ideal rake and relief combination for unmatched finishing capability
- The choice when peak finish quality is the requirement
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)

METRIC V-Carb



Series 55M, 55MCR, 55MB Metric	Hardness	Ae x D ₁	Ap x D ₁	V _c (m/min)	Diameter (D ₁) (mm)								
					6	8	10	12	16	20			
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.25	≤ 1.5	117	RPM	6220	4665	3732	3110	2333	1866	
					(94-141)	Fz	0.022	0.036	0.061	0.070	0.072	0.085	
						Feed (mm/min)	672	846	1145	1082	836	796	
					192	RPM	10179	7634	6107	5089	3817	3054	
					(154-230)	Fz	0.043	0.073	0.123	0.137	0.141	0.154	
						Feed (mm/min)	2198	2769	3746	3481	2687	2345	
	≤ 375 Bhn or ≤ 40 HRc	HSM 	≤ 0.05	≤ 2	99	RPM	5251	3938	3151	2626	1969	1575	
					(79-119)	Fz	0.017	0.028	0.045	0.053	0.054	0.064	
						Feed (mm/min)	441	546	571	693	529	504	
					162	RPM	8563	6422	5138	4282	3211	2569	
					(129-194)	Fz	0.034	0.055	0.091	0.103	0.105	0.128	
						Feed (mm/min)	1438	1781	2329	2209	1685	1644	
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.25	≤ 1.5	53	RPM	2827	2121	1696	1414	1060	848	
					(43-64)	Fz	0.012	0.021	0.035	0.038	0.044	0.048	
						Feed (mm/min)	170	226	294	271	231	204	
					88	RPM	4686	3514	2811	2343	1757	1406	
					(71-106)	Fz	0.024	0.041	0.067	0.077	0.084	0.093	
						Feed (mm/min)	562	712	937	900	742	656	
	K CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ 0.25	≤ 1.5	143	RPM	7594	5695	4556	3797	2848	2278
						(115-172)	Fz	0.022	0.036	0.061	0.070	0.077	0.085
							Feed (mm/min)	820	1033	1397	1321	1093	972
						215	RPM	11391	8543	6834	5695	4271	3417
						(172-258)	Fz	0.043	0.073	0.123	0.137	0.151	0.171
							Feed (mm/min)	2460	3099	4192	3895	3226	2916
≤ 260 Bhn or ≤ 26 HRc		HSM 	≤ 0.05	≤ 2	110	RPM	5816	4362	3490	2908	2181	1745	
					(88-132)	Fz	0.017	0.028	0.045	0.053	0.059	0.064	
						Feed (mm/min)	489	605	791	768	642	558	
					165	RPM	8725	6544	5235	4362	3272	2617	
					(132-198)	Fz	0.034	0.055	0.091	0.103	0.113	0.128	
						Feed (mm/min)	1466	1815	2373	2251	1843	1675	

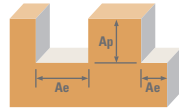
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Series	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)						
					6	8	10	12	16	20	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F ≤ 275 Bhn or ≤ 28 HRc	Profile ≤ 0.25 ≤ 1.5		113	RPM	5978	4484	3587	2989	2242	1793
				(90-135)	Fz	0.017	0.028	0.045	0.053	0.059	0.064
					Feed (mm/min)	502	622	813	789	660	574
		HSM ≤ 0.05 ≤ 2		171	RPM	9048	6786	5429	4524	3393	2714
				(137-205)	Fz	0.034	0.055	0.091	0.103	0.113	0.128
					Feed (mm/min)	1520	1882	2461	2334	1911	1737
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L ≤ 275 Bhn or ≤ 28 HRc	Profile ≤ 0.25 ≤ 1.5		78	RPM	4120	3090	2472	2060	1545	1236
				(62-93)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
					Feed (mm/min)	297	396	527	494	415	379
		HSM ≤ 0.05 ≤ 2		117	RPM	6220	4665	3732	3110	2333	1866
				(94-141)	Fz	0.031	0.051	0.085	0.096	0.105	0.120
					Feed (mm/min)	970	1194	1592	1493	1224	1120
M	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450 ≤ 325 Bhn or ≤ 35 HRc	Profile ≤ 0.25 ≤ 1.5		72	RPM	3797	2848	2278	1898	1424	1139
				(57-86)	Fz	0.014	0.021	0.037	0.041	0.046	0.051
					Feed (mm/min)	273	13260	425	387	328	289
		HSM ≤ 0.05 ≤ 2		108	RPM	5736	4302	3441	2868	2151	1721
				(87-130)	Fz	0.026	0.045	0.075	0.082	0.092	0.104
					Feed (mm/min)	757	14850	1285	1170	991	895
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400 ≤ 300 Bhn or ≤ 32 HRc	Profile ≤ 0.25 ≤ 1.5		21	RPM	1131	848	679	565	424	339
				(17-26)	Fz	0.014	0.021	0.037	0.041	0.046	0.051
					Feed (mm/min)	81	16530	196792	115	98	86
		HSM ≤ 0.05 ≤ 2		33	RPM	1729	1297	1037	864	648	519
				(26-39)	Fz	0.026	0.045	0.075	0.082	0.092	0.104
					Feed (mm/min)	228	290	387	353	299	270
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene ≤ 400 Bhn or ≤ 43 HRc	Profile ≤ 0.25 ≤ 1.5		17	RPM	889	666	533	444	333	267
				(13-20)	Fz	0.010	0.017	0.027	0.031	0.036	0.040
					Feed (mm/min)	43	57	71	69	60	53
		HSM ≤ 0.05 ≤ 2		26	RPM	1373	1030	824	687	515	412
				(21-31)	Fz	0.019	0.032	0.056	0.062	0.069	0.077
					Feed (mm/min)	132	165	231	214	178	159

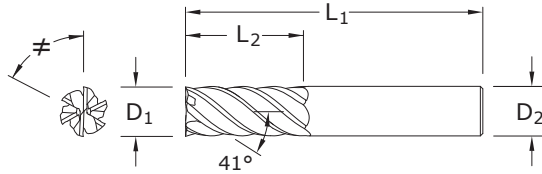
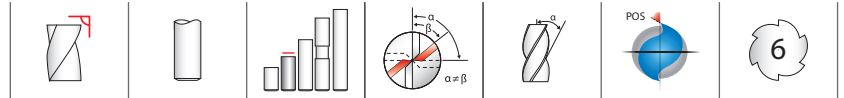
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METRIC V-Carb



Series 55M, 55MCR, 55MB Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)							
					6	8	10	12	16	20		
S TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile 	≤ 0.25	≤ 1.5	72	RPM	3797	2848	2278	1898	1424	1139
					(57-86)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
						Feed (mm/min)	273	365	486	456	383	349
	≤ 440 Bhn or ≤ 47 HRc	HSM 	≤ 0.05	≤ 2	119	RPM	6301	4726	3781	3151	2363	1890
					(95-143)	Fz	0.031	0.051	0.085	0.096	0.105	0.120
						Feed (mm/min)	983	1210	1613	1512	1240	1134
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile 	≤ 0.25	≤ 1.5	26	RPM	1373	1030	824	687	515	412
					(21-31)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
						Feed (mm/min)	99	132	176	165	138	126
	≤ 440 Bhn or ≤ 47 HRc	HSM 	≤ 0.05	≤ 2	43	RPM	2262	1696	1357	1131	848	679
					(34-51)	Fz	0.031	0.051	0.085	0.096	0.108	0.120
						Feed (mm/min)	353	434	579	543	456	407

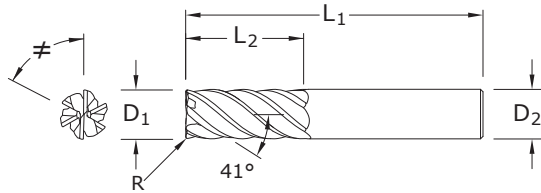
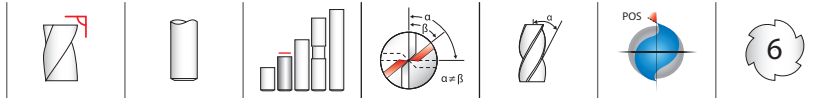
Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times 5 \times rpm$
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x D₁ maximum)
 reduce Ap to 1 x D₁ (maximum) when profile milling with long or extra long flute length tools
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstoool.com)


TOLERANCES (mm)
 $D_1 = +0,000/-0,050$
 $D_2 = h6$
 **STEELS**
 **STAINLESS STEELS**
 **HIGH TEMP ALLOYS**
 **TITANIUM**
 **HARDENED STEELS**

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51M
METRIC SERIES

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	TI-NAMITE-X (TX)
6,0	19,0	63,0	6,0	45100
8,0	20,0	63,0	8,0	45101
10,0	22,0	75,0	10,0	45102
12,0	26,0	83,0	12,0	45103
16,0	32,0	92,0	16,0	45104
20,0	38,0	104,0	20,0	45105

- Engineered for High Speed Milling using Trochoidal and Peel Milling techniques
- Eccentric relief provides superior strength and smoother surface finish
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



51MCR
METRIC SERIES

- Engineered for High Speed Milling using Trochoidal and Peel Milling techniques
- Eccentric relief provides superior strength and smoother surface finish
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	mm			CORNER RADIUS R	EDP NO. TI-NAMITE-X (TX)
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂			
6,0	19,0	63,0	6,0	0,5	45112	
6,0	19,0	63,0	6,0	1,0	45170	
6,0	19,0	63,0	6,0	1,5	45171	
8,0	20,0	63,0	8,0	0,5	45113	
8,0	20,0	63,0	8,0	1,0	45114	
8,0	20,0	63,0	8,0	1,2	45150	
8,0	20,0	63,0	8,0	1,5	45172	
8,0	20,0	63,0	8,0	2,0	45173	
10,0	22,0	75,0	10,0	0,5	45174	
10,0	22,0	75,0	10,0	1,0	45115	
10,0	22,0	75,0	10,0	1,5	45116	
10,0	22,0	75,0	10,0	2,0	45117	
10,0	22,0	75,0	10,0	2,5	45175	
12,0	26,0	83,0	12,0	0,5	45176	
12,0	26,0	83,0	12,0	0,76	45177	
12,0	26,0	83,0	12,0	1,0	45118	
12,0	26,0	83,0	12,0	1,5	45119	
12,0	26,0	83,0	12,0	2,0	45120	
12,0	26,0	83,0	12,0	2,5	45178	
12,0	26,0	83,0	12,0	3,0	45179	
16,0	32,0	92,0	16,0	1,0	45121	
16,0	32,0	92,0	16,0	1,5	45122	
16,0	32,0	92,0	16,0	2,0	45123	
16,0	32,0	92,0	16,0	2,5	45180	
16,0	32,0	92,0	16,0	3,0	45181	
16,0	32,0	92,0	16,0	4,0	45182	
20,0	38,0	104,0	20,0	1,0	45124	
20,0	38,0	104,0	20,0	1,5	45125	
20,0	38,0	104,0	20,0	2,0	45126	
20,0	38,0	104,0	20,0	2,5	45183	
20,0	38,0	104,0	20,0	3,0	45184	
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TOLERANCES (mm)

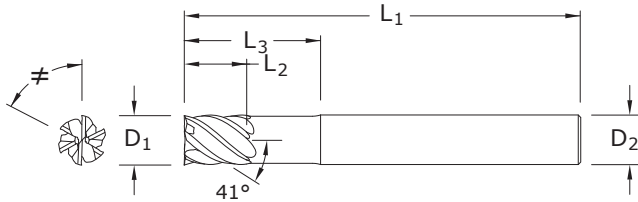
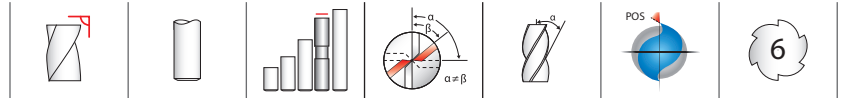
D₁ = +0,000/-0,050

D₂ = h6

R = +0,000/-0,050

- STEELS
- STAINLESS STEELS
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

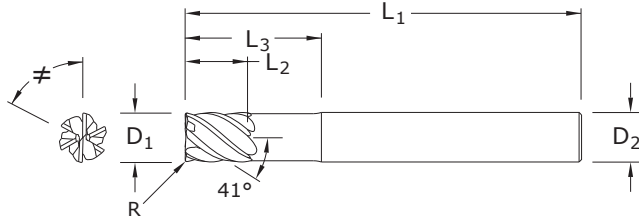
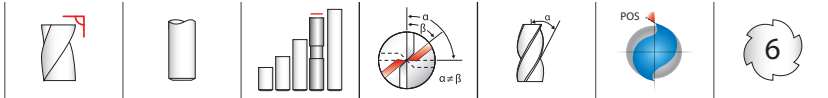
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TOLERANCES (mm)
 $D_1 = +0,000/-0,050$
 $D_2 = h6$
STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

 For patent
 information visit
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51ML
METRIC SERIES

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			REACH L_3	EDP NO. TI-NAMITE-X (TX)
		OVERALL LENGTH L_1	SHANK DIAMETER D_2			
6,0	8,0	75,0	6,0	32,0	45106	
8,0	10,0	75,0	8,0	32,0	45107	
10,0	12,0	100,0	10,0	40,0	45108	
12,0	15,0	100,0	12,0	48,0	45109	
16,0	20,0	115,0	16,0	65,0	45110	
20,0	24,0	150,0	20,0	80,0	45111	

- Engineered for High Speed Milling using Trochoidal and Peel Milling techniques
- Eccentric relief provides superior strength and smoother surface finish
- Necked design with blended diameter transitions provide clearance to reach
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



51MLC
METRIC SERIES

- Engineered for High Speed Milling using Trochoidal and Peel Milling techniques
- Eccentric relief provides superior strength and smoother surface finish
- Necked design with blended diameter transitions provide clearance to reach
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

mm						EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	REACH L ₃	CORNER RADIUS R	TI-NAMITE-X (TX)
6,0	8,0	75,0	6,0	32,0	0,5	45127
6,0	8,0	75,0	6,0	32,0	1,0	45187
6,0	8,0	75,0	6,0	32,0	1,5	45188
8,0	10,0	75,0	8,0	32,0	0,5	45128
8,0	10,0	75,0	8,0	32,0	1,0	45129
8,0	10,0	75,0	8,0	32,0	1,5	45189
8,0	10,0	75,0	8,0	32,0	2,0	45190
10,0	12,0	100,0	10,0	40,0	0,5	45191
10,0	12,0	100,0	10,0	40,0	1,0	45130
10,0	12,0	100,0	10,0	40,0	1,5	45131
10,0	12,0	100,0	10,0	40,0	2,0	45132
10,0	12,0	100,0	10,0	40,0	2,5	45192
12,0	15,0	100,0	12,0	48,0	0,5	45193
12,0	15,0	100,0	12,0	48,0	0,76	45194
12,0	15,0	100,0	12,0	48,0	1,0	45133
12,0	15,0	100,0	12,0	48,0	1,5	45134
12,0	15,0	100,0	12,0	48,0	2,0	45135
12,0	15,0	100,0	12,0	48,0	2,5	45195
12,0	15,0	100,0	12,0	48,0	3,0	45196
16,0	20,0	115,0	16,0	65,0	1,0	45136
16,0	20,0	115,0	16,0	65,0	1,5	45137
16,0	20,0	115,0	16,0	65,0	2,0	45138
16,0	20,0	115,0	16,0	65,0	2,5	45197
16,0	20,0	115,0	16,0	65,0	3,0	45198
16,0	20,0	115,0	16,0	65,0	4,0	45199
20,0	24,0	150,0	20,0	80,0	1,0	45139
20,0	24,0	150,0	20,0	80,0	1,5	45140
20,0	24,0	150,0	20,0	80,0	2,0	45141
20,0	24,0	150,0	20,0	80,0	2,5	45200
20,0	24,0	150,0	20,0	80,0	3,0	45201
20,0	24,0	150,0	20,0	80,0	4,0	45202
20,0	24,0	150,0	20,0	80,0	5,0	45203

TOLERANCES (mm)

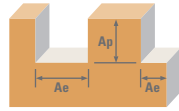
D₁ = +0,000/-0,050













D₂ = h6

R = +0,000/-0,050

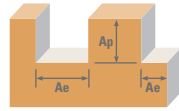
- STEELS
- STAINLESS STEELS
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

For patent information visit www.ksptpatents.com



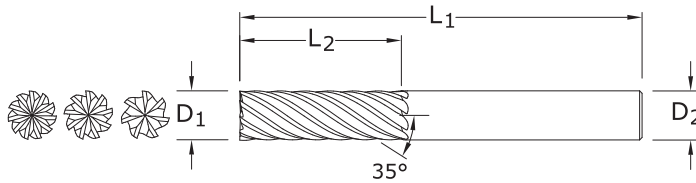
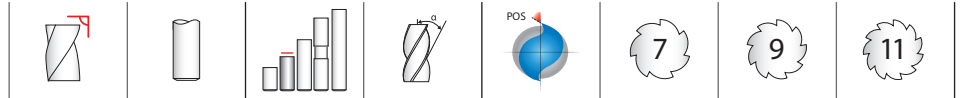
Series	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)										
					6	8	10	12	16	20					
Series 51M, 51MCR, 51ML, 51MLC Metric CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	≤ 0.1	≤ 1	Profile 	219	RPM	11633	8725	6980	5816	4362	3490			
					(176-263)	Fz	0.048	0.081	0.101	0.121	0.142	0.158			
				HSM 	≤ 0.05	≤ 2	279	RPM	14784	11088	8870	7392	5544	4435	
							(223-335)	Fz	0.066	0.113	0.141	0.169	0.197	0.220	
							Feed (mm/min)	5854	7517	7504	7495	6553	5854		
								2990	3741	3750	3756	3291	2939		
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	≤ 0.1	≤ 1	Profile 	149	RPM	7917	5938	4750	3958	2969	2375		
						(119-179)	Fz	0.036	0.061	0.077	0.092	0.107	0.119		
					HSM 	≤ 0.05	≤ 2	189	RPM	10017	7513	6010	5009	3756	3005
								(151-227)	Fz	0.049	0.083	0.104	0.125	0.146	0.163
								Feed (mm/min)	2945	3741	3750	3756	3291	2939	
									1183	1530	1526	1523	1331	1189	
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 375 Bhn or ≤ 40 HRc	≤ 0.1	≤ 1	Profile 	73	RPM	3878	2908	2327	1939	1454	1163		
						(59-88)	Fz	0.029	0.049	0.061	0.073	0.086	0.096		
					HSM 	≤ 0.05	≤ 2	93	RPM	4928	3696	2957	2464	1848	1478
								(74-112)	Fz	0.040	0.069	0.086	0.103	0.120	0.134
								Feed (mm/min)	1183	1530	1526	1523	1331	1189	
									1183	1530	1526	1523	1331	1189	
	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	≤ 0.1	≤ 1	Profile 	155	RPM	8240	6180	4944	4120	3090	2472		
						(140-171)	Fz	0.035	0.060	0.075	0.090	0.105	0.117		
					HSM 	≤ 0.05	≤ 2	198	RPM	10502	7877	6301	5251	3938	3151
								(178-218)	Fz	0.048	0.082	0.102	0.122	0.143	0.159
								Feed (mm/min)	3025	3875	3856	3844	3379	3006	
									3025	3875	3856	3844	3379	3006	
STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L		≤ 275 Bhn or ≤ 28 HRc	≤ 0.1	≤ 1	Profile 	107	RPM	5655	4241	3393	2827	2121	1696		
						(96-117)	Fz	0.029	0.049	0.061	0.073	0.086	0.096		
					HSM 	≤ 0.05	≤ 2	137	RPM	7271	5453	4362	3635	2726	2181
								(123-151)	Fz	0.040	0.069	0.086	0.103	0.120	0.134
								Feed (mm/min)	1745	2258	2251	2247	1963	1754	
									1745	2258	2251	2247	1963	1754	
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	≤ 0.1	≤ 1	Profile 	99	RPM	5251	3938	3151	2626	1969	1575		
						(89-109)	Fz	0.029	0.049	0.061	0.073	0.086	0.096		
					HSM 	≤ 0.05	≤ 2	125	RPM	6624	4968	3975	3312	2484	1987
								(112-137)	Fz	0.040	0.069	0.086	0.103	0.120	0.134
								Feed (mm/min)	1590	2057	2051	2047	1789	1598	
									1590	2057	2051	2047	1789	1598	

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Series 51M, 51MCR, 51ML, 51MLC Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)							
					6	8	10	12	16	20		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile 	≤ 0.1	≤ 1	32	RPM	1696	1272	1018	848	636	509
					(26-38)	Fz	0.034	0.057	0.071	0.085	0.100	0.110
					Feed (mm/min)	346	435	434	433	382	336	
	HSM 	≤ 0.05	≤ 2	40	RPM	2100	1575	1260	1050	788	630	
				(32-48)	Fz	0.046	0.077	0.097	0.120	0.140	0.150	
				Feed (mm/min)	580	728	733	756	662	567		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile 	≤ 0.1	≤ 1	24	RPM	1293	969	776	646	485	388
					(20-29)	Fz	0.023	0.039	0.049	0.059	0.068	0.077
					Feed (mm/min)	178	227	228	229	198	179	
	HSM 	≤ 0.05	≤ 2	30	RPM	1616	1212	969	808	606	485	
				(24-37)	Fz	0.032	0.054	0.068	0.081	0.095	0.110	
				Feed (mm/min)	310	393	396	393	345	320		
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile 	≤ 0.1	≤ 1	85	RPM	4524	3393	2714	2262	1696	1357
					(68-102)	Fz	0.023	0.039	0.049	0.059	0.068	0.077
					Feed (mm/min)	624	794	798	801	692	627	
	HSM 	≤ 0.05	≤ 2	108	RPM	5736	4302	3441	2868	2151	1721	
				(87-130)	Fz	0.032	0.054	0.068	0.081	0.095	0.110	
				Feed (mm/min)	1101	1394	1404	1394	1226	1136		
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile 	≤ 0.1	≤ 1	47	RPM	2504	1878	1503	1252	939	751
					(38-57)	Fz	0.023	0.039	0.049	0.059	0.068	0.077
					Feed (mm/min)	346	440	442	443	383	347	
	HSM 	≤ 0.05	≤ 2	61	RPM	3231	2424	1939	1616	1212	969	
				(49-73)	Fz	0.032	0.054	0.068	0.081	0.095	0.110	
				Feed (mm/min)	620	785	791	785	691	640		

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times 6 \times rpm$
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x D₁ maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

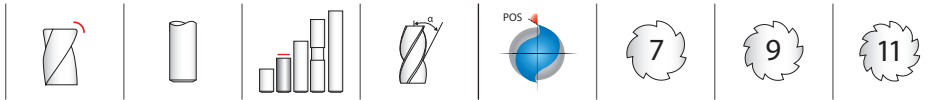
For patent information visit www.ksptpatents.com

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	EDP NO.
					TI-NAMITE-X
6,0	19,0	63,0	6,0	7	46620
8,0	20,0	63,0	8,0	7	46621
10,0	22,0	75,0	10,0	7	46622
12,0	26,0	83,0	12,0	9	46623
16,0	32,0	92,0	16,0	9	46624
20,0	38,0	104,0	20,0	11	46625
25,0	38,0	104,0	25,0	11	46626

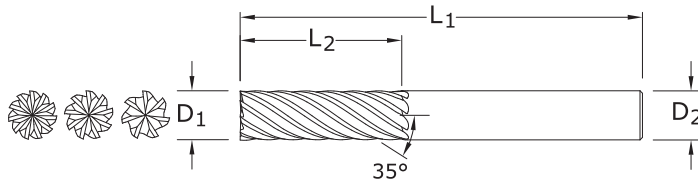
Neck Option Available

66M
METRIC SERIES

- Heavy core and rigid design allow for straight walls
- High flute count design results in smoother cutting performance and enhanced tool life in precise finishing applications
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



66MCR
METRIC SERIES



- Heavy core and rigid design allow for straight walls
- High flute count design results in smoother cutting performance and enhanced tool life in precise finishing applications
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

mm						EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	NO. OF FLUTES	TI-NAMITE-X
6,0	19,0	63,0	6,0	0,5	7	46627
6,0	19,0	63,0	6,0	1,0	7	46628
8,0	20,0	63,0	8,0	0,5	7	46629
8,0	20,0	63,0	8,0	1,0	7	46630
8,0	20,0	63,0	8,0	1,5	7	46631
10,0	22,0	75,0	10,0	0,5	7	46632
10,0	22,0	75,0	10,0	1,0	7	46633
10,0	22,0	75,0	10,0	1,5	7	46634
10,0	22,0	75,0	10,0	2,0	7	46635
12,0	26,0	83,0	12,0	1,0	9	46636
12,0	26,0	83,0	12,0	1,5	9	46637
12,0	26,0	83,0	12,0	2,0	9	46638
12,0	26,0	83,0	12,0	2,5	9	46639
12,0	26,0	83,0	12,0	3,0	9	46640
16,0	32,0	92,0	16,0	1,0	9	46641
16,0	32,0	92,0	16,0	1,5	9	46642
16,0	32,0	92,0	16,0	2,0	9	46643
16,0	32,0	92,0	16,0	2,5	9	46644
16,0	32,0	92,0	16,0	3,0	9	46645
16,0	32,0	92,0	16,0	4,0	9	46646

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Neck Option Available

TOLERANCES (mm)

D₁ = +0,000/-0,050
D₂ = h₆
R = +0,000/-0,050

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

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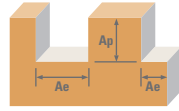
66MCR
METRIC SERIES

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	mm			NO. OF FLUTES	EDP NO.
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R		TI-NAMITE-X
20,0	38,0	104,0	20,0	1,0	11	46647
20,0	38,0	104,0	20,0	1,5	11	46648
20,0	38,0	104,0	20,0	2,0	11	46649
20,0	38,0	104,0	20,0	2,5	11	46650
20,0	38,0	104,0	20,0	3,0	11	46651
20,0	38,0	104,0	20,0	4,0	11	46652
20,0	38,0	104,0	20,0	5,0	11	46653
25,0	38,0	104,0	25,0	1,0	11	46654
25,0	38,0	104,0	25,0	1,5	11	46655
25,0	38,0	104,0	25,0	2,0	11	46656
25,0	38,0	104,0	25,0	2,5	11	46657
25,0	38,0	104,0	25,0	3,0	11	46658
25,0	38,0	104,0	25,0	4,0	11	46659
25,0	38,0	104,0	25,0	5,0	11	46660

CONTINUED

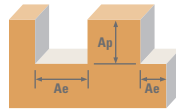
Neck Option Available

Multi-Carb



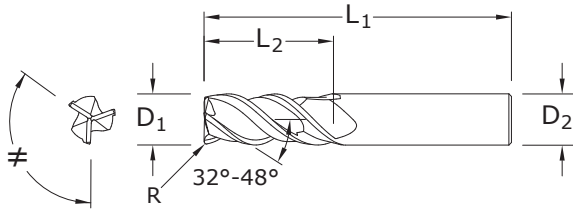
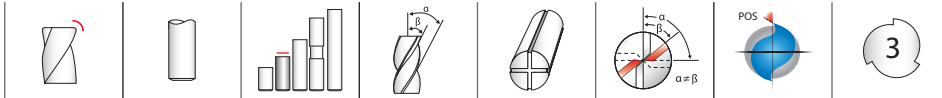
Series 66M, 66MCR Metric	Hardness	Ae x D ₁	Ap x D ₁	V _c (m/min)	Diameter (D ₁) (mm)										
					6	8	10	12	16	20	25				
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.05	≤ 1	194	RPM	10260	7695	6156	5130	3847	3078	2462	
						(155-232)	Fz	0.029	0.047	0.059	0.072	0.095	0.101	0.105	
							Feed (mm/min)	2068	2528	2528	3324	3280	3431	2844	
			Finish 	≤ 0.02	≤ 2	232	RPM	12312	9234	7387	6156	4617	3693	2955	
						(186-279)	Fz	0.023	0.038	0.047	0.058	0.076	0.081	0.084	
							Feed (mm/min)	1985	2427	2427	3191	3149	3294	2730	
	H	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.05	≤ 1	110	RPM	5816	4362	3490	2908	2181	1745	1396
							(88-132)	Fz	0.022	0.036	0.045	0.055	0.074	0.080	0.080
								Feed (mm/min)	879	1108	1107	1445	1457	1536	1229
				Finish 	≤ 0.02	≤ 2	132	RPM	6980	5235	4188	3490	2617	2094	1675
							(105-158)	Fz	0.017	0.029	0.036	0.044	0.059	0.064	0.064
								Feed (mm/min)	844	1063	1063	1387	1399	1474	1179
K	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.05	≤ 1	88	RPM	4686	3514	2811	2343	1757	1406	1125	
						(71-106)	Fz	0.014	0.026	0.032	0.038	0.051	0.056	0.055	
							Feed (mm/min)	472	630	630	810	810	866	680	
			Finish 	≤ 0.02	≤ 2	106	RPM	5623	4217	3374	2811	2108	1687	1349	
						(85-127)	Fz	0.012	0.020	0.026	0.031	0.041	0.045	0.044	
							Feed (mm/min)	453	605	605	777	777	831	653	
	M	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ 0.05	≤ 1	215	RPM	11391	8543	6834	5695	4271	3417	2734
							(172-258)	Fz	0.029	0.047	0.059	0.072	0.095	0.101	0.105
								Feed (mm/min)	2296	2807	2807	3690	3641	3809	3158
				Finish 	≤ 0.02	≤ 2	258	RPM	13669	10252	8201	6834	5126	4101	3281
							(206-309)	Fz	0.023	0.038	0.047	0.058	0.076	0.081	0.084
								Feed (mm/min)	2204	2695	2694	3543	3496	3657	3031
M		CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile 	≤ 0.05	≤ 1	165	RPM	8725	6544	5235	4362	3272	2617	2094
							(132-198)	Fz	0.022	0.036	0.045	0.055	0.074	0.080	0.080
								Feed (mm/min)	1319	1661	1661	2167	2186	2303	1843
				Finish 	≤ 0.02	≤ 2	198	RPM	10470	7852	6282	5235	3926	3141	2513
							(158-237)	Fz	0.017	0.029	0.036	0.044	0.059	0.064	0.064
								Feed (mm/min)	1266	1595	1595	2080	2099	2211	1769
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.05	≤ 1	171	RPM	9048	6786	5429	4524	3393	2714	2171	
						(137-205)	Fz	0.022	0.036	0.045	0.055	0.074	0.080	0.080	
							Feed (mm/min)	1368	1723	1723	2247	2267	2389	1911	
			Finish 	≤ 0.02	≤ 2	137	RPM	7238	5429	4343	3619	2714	2171	1737	
						(109-164)	Fz	0.017	0.029	0.036	0.044	0.059	0.064	0.064	
							Feed (mm/min)	875	1103	1103	1438	1451	1529	1223	

continued on next page



Series 66M, 66MCR Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)								
					6	8	10	12	16	20	25		
M STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.05	≤ 1	117	RPM	6220	4665	3732	3110	2333	1866	1493
					(94-141)	Fz	0.017	0.030	0.037	0.043	0.059	0.064	0.065
						Feed (mm/min)	731	975	975	1209	1236	1314	1067
					141	RPM	7465	5598	4479	3732	2799	2239	1791
					(113-169)	Fz	0.013	0.024	0.030	0.035	0.047	0.051	0.052
						Feed (mm/min)	702	17	936	1161	1187	1261	1025
	≤ 325 Bhn or ≤ 35 HRc	Finish 	≤ 0.02	≤ 2	108	RPM	5736	4302	3441	2868	2151	1721	1377
					(87-130)	Fz	0.017	0.030	0.037	0.043	0.059	0.064	0.065
						Feed (mm/min)	674	899	899	1115	1140	1211	984
					130	RPM	6883	5162	4130	3441	2581	2065	1652
					(104-156)	Fz	0.013	0.024	0.030	0.035	0.047	0.051	0.052
						Feed (mm/min)	647	863	863	1070	1094	1163	945
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile 	≤ 0.05	≤ 1	32	RPM	1696	1272	1018	848	636	509	407
					(26-38)	Fz	0.017	0.030	0.037	0.043	0.059	0.064	0.065
						Feed (mm/min)	199	266	213	330	337	358	291
					38	RPM	2036	1527	1221	1018	763	611	489
					(31-46)	Fz	0.013	0.024	0.030	0.035	0.047	0.051	0.052
						Feed (mm/min)	192	255	255	317	324	344	279
	≤ 400 Bhn or ≤ 43 HRc	Finish 	≤ 0.02	≤ 2	26	RPM	1373	1030	824	687	515	412	330
					(21-31)	Fz	0.012	0.019	0.024	0.026	0.036	0.040	0.040
						Feed (mm/min)	115	138	138	163	166	181	145
					31	RPM	1648	1236	989	824	618	494	396
					(25-37)	Fz	0.010	0.015	0.019	0.021	0.029	0.032	0.032
						Feed (mm/min)	111	133	133	157	159	174	139
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile 	≤ 0.05	≤ 1	119	RPM	6301	4726	3781	3151	2363	1890	1512
					(95-143)	Fz	0.019	0.032	0.040	0.050	0.067	0.072	0.073
						Feed (mm/min)	847	1059	1059	1429	1415	1497	1206
					143	RPM	7561	5671	4537	3781	2836	2268	1815
					(114-171)	Fz	0.015	0.026	0.032	0.040	0.053	0.058	0.058
						Feed (mm/min)	813	1016	1016	1372	1359	1437	1158
	≤ 440 Bhn or ≤ 47 HRc	Finish 	≤ 0.02	≤ 2	43	RPM	2262	1696	1357	1131	848	679	543
					(34-51)	Fz	0.019	0.032	0.040	0.050	0.067	0.072	0.073
						Feed (mm/min)	304	380	380	513	508	537	433
					51	RPM	2714	2036	1629	1357	1018	814	651
					(41-61)	Fz	0.015	0.026	0.032	0.040	0.053	0.058	0.058
						Feed (mm/min)	292	365	365	492	488	516	416

Bhn (Brinell) HRc (Rockwell C)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times \text{number of flutes} \times rpm$
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



33MCR METRIC SERIES

- Specially engineered step core design provides stability for aggressive ramping and rigidity when flutes are completely engaged
- Open design at axial end accommodates material flow and load reduction during machining operations
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			CORNER RADIUS R	EDP NO. TI-NAMITE-A (AITiN)
		OVERALL LENGTH L_1	SHANK DIAMETER D_2			
3,0	9,0	57,0	6,0	0,3	43445	
3,0	9,0	57,0	6,0	0,5	43470	
4,0	12,0	57,0	6,0	0,3	43446	
4,0	12,0	57,0	6,0	0,5	43471	
5,0	15,0	57,0	6,0	0,3	43447	
5,0	15,0	57,0	6,0	0,5	43472	
6,0	18,0	57,0	6,0	0,5	43448	
6,0	18,0	57,0	6,0	1,0	43473	
6,0	18,0	57,0	6,0	1,5	43474	
6,0	18,0	57,0	6,0	2,0	43475	
8,0	20,0	63,0	8,0	0,5	43449	
8,0	20,0	63,0	8,0	1,0	43476	
8,0	20,0	63,0	8,0	1,5	43477	
8,0	20,0	63,0	8,0	2,0	43478	
10,0	27,0	72,0	10,0	0,5	43450	
10,0	27,0	72,0	10,0	1,0	43479	
10,0	27,0	72,0	10,0	1,5	43480	
10,0	27,0	72,0	10,0	2,0	43481	
10,0	27,0	72,0	10,0	2,5	43482	
12,0	30,0	83,0	12,0	0,5	43451	
12,0	30,0	83,0	12,0	1,0	43483	
12,0	30,0	83,0	12,0	1,5	43484	
12,0	30,0	83,0	12,0	2,0	43485	
12,0	30,0	83,0	12,0	2,5	43486	
12,0	30,0	83,0	12,0	3,0	43487	
12,0	30,0	83,0	12,0	4,0	43488	
16,0	38,0	92,0	16,0	1,0	43452	
16,0	38,0	92,0	16,0	1,5	43489	
16,0	38,0	92,0	16,0	2,0	43490	
16,0	38,0	92,0	16,0	2,5	43491	
16,0	38,0	92,0	16,0	3,0	43492	
16,0	38,0	92,0	16,0	4,0	43493	
20,0	46,0	104,0	20,0	1,0	43453	
20,0	46,0	104,0	20,0	2,0	43494	
20,0	46,0	104,0	20,0	2,5	43495	
20,0	46,0	104,0	20,0	3,0	43496	
20,0	46,0	104,0	20,0	4,0	43497	

TOLERANCES (mm)

3-6 DIAMETER

$D_1 = +0,000/-0,030$

$D_2 = h_6$

$R = +0,000/-0,050$

>6-10 DIAMETER

$D_1 = +0,000/-0,040$

$D_2 = h_6$

$R = +0,000/-0,050$

>10-20 DIAMETER

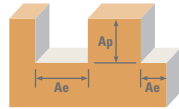
$D_1 = +0,000/-0,050$

$D_2 = h_6$

$R = +0,000/-0,050$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

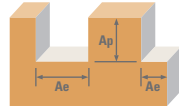
For patent information visit www.ksptpatents.com



Series 33MCR Metric	Hardness	Profile Ae x D1	Slot Ap x D1	Vc (m/min)	Diameter (D1) (mm)								
					3	6	8	10	12	16	20		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile ≤ 0.5	≤ 1.5	168	RPM	17773	8886	6665	5332	4443	3332	2666	
				(134-201)	Fz	0.012	0.029	0.049	0.061	0.074	0.100	0.107	
				Feed (mm/min)	640	768	981	981	992	998	853		
		Slot 1	≤ 1	134	RPM	14218	7109	5332	4265	3555	2666	2133	
				(107-161)	Fz	0.012	0.029	0.049	0.061	0.074	0.100	0.107	
				Feed (mm/min)	512	614	785	785	793	798	682		
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile ≤ 0.5	≤ 1.5	96	RPM	10179	5089	3817	3054	2545	1909	1527
					(77-115)	Fz	0.010	0.022	0.036	0.045	0.055	0.074	0.080
					Feed (mm/min)	293	330	415	415	421	425	366	
			Slot 1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212
					(61-91)	Fz	0.010	0.022	0.036	0.045	0.055	0.074	0.080
					Feed (mm/min)	233	262	330	330	334	337	291	
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile ≤ 0.5	≤ 1.5	56	RPM	5978	2989	2242	1793	1495	1121	897	
				(45-68)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	
				Feed (mm/min)	129	151	201	201	194	198	172		
		Slot 1	≤ 1	44	RPM	4686	2343	1757	1406	1171	879	703	
				(35-53)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	
				Feed (mm/min)	101	118	157	157	152	155	135		
K CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile ≤ 0.5	≤ 1.5	136	RPM	14380	7190	5392	4314	3595	2696	2157	
				(109-163)	Fz	0.008	0.026	0.045	0.056	0.067	0.090	0.096	
				Feed (mm/min)	362	569	725	725	725	725	621		
		Slot 1	≤ 1	108	RPM	11471	5736	4302	3441	2868	2151	1721	
				(87-130)	Fz	0.008	0.026	0.045	0.056	0.067	0.090	0.096	
				Feed (mm/min)	289	454	578	578	578	578	496		
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile ≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648
					(83-124)	Fz	0.007	0.019	0.034	0.043	0.050	0.067	0.072
					Feed (mm/min)	237	316	422	422	415	411	356	
			Slot 1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309
					(66-99)	Fz	0.007	0.019	0.034	0.043	0.050	0.067	0.072
					Feed (mm/min)	188	251	335	335	330	327	283	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile ≤ 0.5	≤ 1.5	149	RPM	15834	7917	5938	4750	3958	2969	2375	
				(119-179)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.085	
				Feed (mm/min)	433	570	722	722	712	707	608		
		Slot 1	≤ 1	119	RPM	12602	6301	4726	3781	3151	2363	1890	
				(95-143)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.085	
				Feed (mm/min)	345	454	575	575	567	563	484		

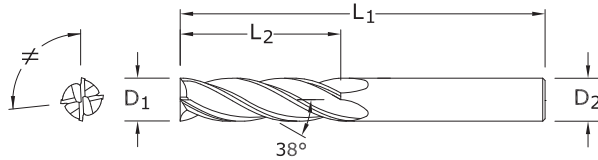
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Series 33



Series 33MCR Metric	Hardness	Profile Ae x D ₁	Slot Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)							
					3	6	8	10	12	16	20	
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	Profile ≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648
				(83-124)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069
				Feed (mm/min)	237	316	396	396	395	396	343	
		Slot 1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309
				(66-99)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069
				Feed (mm/min)	188	251	314	314	314	314	272	
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	Profile ≤ 0.5	≤ 1.5	94	RPM	10017	5009	3756	3005	2504	1878	1503
				(76-113)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069
				Feed (mm/min)	216	288	361	361	361	361	313	
		Slot 1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212
				(61-91)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069
				Feed (mm/min)	174	233	291	291	291	291	252	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	Profile ≤ 0.5	≤ 1.5	24	RPM	2585	1293	969	776	646	485	388
				(20-29)	Fz	0.006	0.017	0.028	0.035	0.041	0.054	0.059
				Feed (mm/min)	48	65	81	65	79	78	68	
		Slot 1	≤ 1	20	RPM	2100	1050	788	630	525	394	315
				(16-24)	Fz	0.006	0.017	0.028	0.035	0.041	0.054	0.059
				Feed (mm/min)	39	53	66	66	64	64	55	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	Profile ≤ 0.5	≤ 1.5	19	RPM	2003	1002	751	601	501	376	301
				(15-23)	Fz	0.005	0.012	0.019	0.024	0.029	0.038	0.043
				Feed (mm/min)	29	36	43	43	43	43	38	
		Slot 1	≤ 1	15	RPM	1583	792	594	475	396	297	238
				(12-18)	Fz	0.005	0.012	0.019	0.024	0.029	0.038	0.043
				Feed (mm/min)	23	28	34	34	34	34	30	
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	Profile ≤ 0.5	≤ 1.5	66	RPM	6947	3474	2605	2084	1737	1303	1042	
			(52-79)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	
			Feed (mm/min)	150	200	250	250	250	250	217		
	Slot 1	≤ 1	52	RPM	5493	2747	2060	1648	1373	1030	824	
			(41-62)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	
			Feed (mm/min)	119	158	198	198	198	198	171		
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	Profile ≤ 0.5	≤ 1.5	23	RPM	2424	1212	909	727	606	454	364	
			(18-27)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	
			Feed (mm/min)	52	70	87	87	87	87	76		
	Slot 1	≤ 1	18	RPM	1939	969	727	582	485	364	291	
			(15-22)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	
			Feed (mm/min)	42	56	70	70	70	70	60		

Bhn (Brinell) HRC (Rockwell C)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times 3 \times rpm$
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x D₁ maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



TOLERANCES (mm)

$D_1 = +0,000/+0,050$

$D_2 = h_6$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

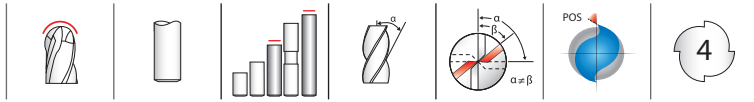
For patent information visit www.ksptpatents.com

7M
METRIC SERIES

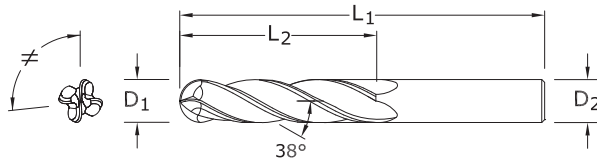
mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-X
3,0	25,0	75,0	3,0	70551
4,0	25,0	75,0	4,0	70552
5,0	25,0	75,0	5,0	70553
6,0	25,0	75,0	6,0	70554
8,0	25,0	75,0	8,0	70555
10,0	38,0	100,0	10,0	70556
12,0	50,0	100,0	12,0	70557
12,0	75,0	150,0	12,0	70558
14,0	75,0	150,0	14,0	70559
16,0	75,0	150,0	16,0	70560
18,0	75,0	150,0	18,0	70561
20,0	75,0	150,0	20,0	70562
25,0	75,0	150,0	25,0	70563

- Variable pitch allows for improved chatter suppression along with improved surface finish and enhanced tool life
- Raised land and increased core diameter designed to enhance tool life and decrease tool deflection
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)

METRIC
Series 7



7MB
METRIC SERIES



- Variable pitch allows for improved chatter suppression along with improved surface finish and enhanced tool life
- Raised land and increased core diameter designed to enhance tool life and decrease tool deflection
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

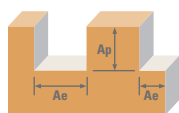
	mm			EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-X
3,0	25,0	75,0	3,0	70527
4,0	25,0	75,0	4,0	70529
5,0	25,0	75,0	5,0	70531
6,0	25,0	75,0	6,0	70533
8,0	25,0	75,0	8,0	70535
10,0	38,0	100,0	10,0	70537
12,0	50,0	100,0	12,0	70539
12,0	75,0	150,0	12,0	70540
14,0	75,0	150,0	14,0	70542
16,0	75,0	150,0	16,0	70544
18,0	75,0	150,0	18,0	70546
20,0	75,0	150,0	20,0	70548
25,0	75,0	150,0	25,0	70550

TOLERANCES (mm)

$D_1 = +0,000/+0,050$
 $D_2 = h_6$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

For patent information visit www.ksptpatents.com

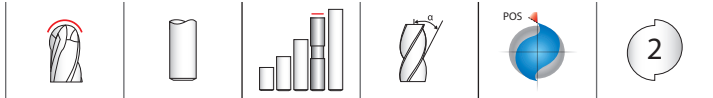


Series 7M, 7MB Metric	Hardness	Finish	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)									
						3	6	8	10	12	16	20	25		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Finish	≤ 0.02	≤ 2	146	RPM	15511	7755	5816	4653	3878	2908	2327	1861
						(117-176)	Fz	0.0166	0.043	0.075	0.093	0.110	0.125	0.147	0.160
						Feed (mm/min)	1030	1334	1745	1731	1706	1454	1368	1191	
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Finish	≤ 0.02	≤ 2	84	RPM	8886	4443	3332	2666	2222	1666	1333	1066
						(67-101)	Fz	0.0122	0.034	0.051	0.069	0.082	0.091	0.109	0.120
						Feed (mm/min)	434	604	680	736	729	606	581	512	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Finish	≤ 0.02	≤ 2	70	RPM	7432	3716	2787	2230	1858	1394	1115	892
						(56-84)	Fz	0.0070	0.019	0.040	0.043	0.048	0.057	0.064	0.070
						Feed (mm/min)	208	282	446	384	357	318	285	250	
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Finish	≤ 0.02	≤ 2	184	RPM	19550	9775	7331	5865	4887	3666	2932	2346
						(148-221)	Fz	0.0132	0.036	0.052	0.075	0.089	0.099	0.117	0.130
						Feed (mm/min)	1032	1408	1525	1759	1740	1452	1372	1220	
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Finish	≤ 0.02	≤ 2	142	RPM	15026	7513	5635	4508	3756	2817	2254	1803
						(113-170)	Fz	0.0132	0.036	0.052	0.075	0.089	0.099	0.117	0.130
						Feed (mm/min)	793	1082	1172	1352	1337	1116	1055	938	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Finish	≤ 0.02	≤ 2	128	RPM	13572	6786	5089	4072	3393	2545	2036	1629
						(102-154)	Fz	0.0086	0.024	0.040	0.048	0.058	0.065	0.077	0.087
						Feed (mm/min)	467	651	814	782	787	662	627	567	
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Finish	≤ 0.02	≤ 2	88	RPM	9371	4686	3514	2811	2343	1757	1406	1125
						(71-106)	Fz	0.0082	0.022	0.037	0.045	0.048	0.060	0.072	0.078
						Feed (mm/min)	307	412	520	506	450	422	405	351	
M	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Finish	≤ 0.02	≤ 2	81	RPM	8563	4282	3211	2569	2141	1606	1284	1028
						(65-97)	Fz	0.0070	0.019	0.029	0.040	0.048	0.055	0.064	0.070
						Feed (mm/min)	240	325	372	411	411	353	329	288	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Finish	≤ 0.02	≤ 2	24	RPM	2585	1293	969	776	646	485	388	310
						(20-29)	Fz	0.0072	0.019	0.029	0.037	0.046	0.053	0.061	0.085
						Feed (mm/min)	74	98	112	90	119	103	95	105	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Finish	≤ 0.02	≤ 2	20	RPM	2100	1050	788	630	525	394	315	252
						(16-24)	Fz	0.0075	0.016	0.021	0.030	0.038	0.044	0.051	0.070
						Feed (mm/min)	63	67	66	76	80	69	64	71	
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Finish	≤ 0.02	≤ 2	91	RPM	9694	4847	3635	2908	2424	1818	1454	1163
						(73-110)	Fz	0.0091	0.024	0.004	0.005	0.060	0.070	0.080	0.088
						Feed (mm/min)	353	465	51	59	582	509	465	409	
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Finish	≤ 0.02	≤ 2	32	RPM	3393	1696	1272	1018	848	636	509	407
						(26-38)	Fz	0.0082	0.019	0.029	0.037	0.046	0.053	0.061	0.085
						Feed (mm/min)	111	129	148	151	156	135	124	138	

Bhn (Brinell) HRc (Rockwell C)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times 4 \times rpm$
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

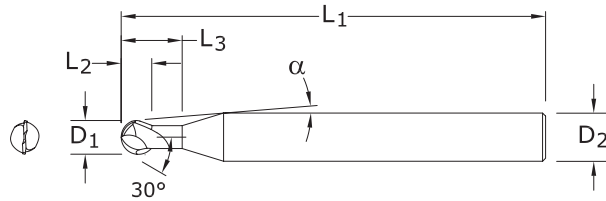
METRIC

Turbo-Carb



56MB METRIC SERIES

- Short flute length and rigid design to reduce deflection
- S-Gash Ball geometry minimizes load and heat produced during the cutting process, ultimately enhancing tool life
- Ideal for machining complex contoured shapes in hardened steels
- Recommended for materials 35 to 60 HRc (327 to 654 Bhn)



mm						EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	α	REACH L ₃	Ti-NAMITE-X
1,0	1,0	76,0	6,0	8°10'	2,0	91349
1,5	1,5	76,0	6,0	7°45'	3,0	91350
2,0	2,0	76,0	6,0	7°10'	4,0	91351
2,5	2,5	76,0	6,0	6°35'	5,0	91352
3,0	3,0	76,0	6,0	6°	6,0	91353
4,0	4,0	76,0	6,0	4°30'	8,0	91354
5,0	5,0	89,0	6,0	2°30'	10,0	91355
6,0	6,0	89,0	6,0	—	12,0	91356
8,0	8,0	102,0	8,0	—	16,0	91357
10,0	10,0	102,0	10,0	—	20,0	91358
12,0	12,0	114,0	12,0	—	24,0	91359
16,0	16,0	140,0	16,0	—	32,0	91360
20,0	20,0	165,0	20,0	—	40,0	91361

Neck Option Available

TOLERANCES (mm)

1–2,5 DIAMETER

D₁ = +0,000/–0,025

D₂ = h₆

>2,5–6 DIAMETER

D₁ = +0,000/–0,030

D₂ = h₆

>6–10 DIAMETER

D₁ = +0,000/–0,040

D₂ = h₆

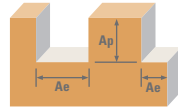
>10–20 DIAMETER

D₁ = +0,000/–0,050

D₂ = h₆

HARDENED STEELS

For patent information visit www.ksptpatents.com



Series 56MB Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)									
					1	1.5	3	5	6	10	12	20		
TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Rough 	≤ 0.4	≤ 0.1	191	RPM	60748	40498	20249	12150	10125	6075	5062	3037
					(153-229)	Fz	0.015	0.038	0.076	0.102	0.127	0.203	0.254	0.305
						Feed (mm/min)	1822	3078	3078	2479	2572	2466	2572	1853
	HSM 	≤ 0.4	≤ 0.03	290	RPM	92235	61490	46117	18447	15372	9223	7686	4612	
				(232-348)	Fz	0.018	0.043	0.084	0.112	0.117	0.224	0.279	0.330	
					Feed (mm/min)	3320	5288	7748	4132	3597	4132	4289	3044	
TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRc	Rough 	≤ 0.4	≤ 0.05	229	RPM	72833	48556	24278	14567	12139	7283	6069	3642
					(183-275)	Fz	0.013	0.028	0.058	0.076	0.097	0.152	0.191	0.216
						Feed (mm/min)	1894	2719	2816	2214	2355	2214	2319	1573
	HSM 	≤ 0.4	≤ 0.02	351	RPM	111636	74424	37212	22327	18606	11164	9303	5582	
				(281-421)	Fz	0.015	0.030	0.064	0.084	0.107	0.168	0.208	0.254	
					Feed (mm/min)	3349	4465	4763	3751	3982	3751	3870	2836	
TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 655 Bhn or ≤ 60 HRc	Rough 	≤ 0.4	≤ 0.04	152	RPM	48344	32229	16115	9669	8057	4834	4029	2417
					(122-182)	Fz	0.010	0.020	0.043	0.058	0.074	0.114	0.145	0.160
						Feed (mm/min)	967	1289	1386	1122	1192	1102	1168	773
	HSM 	≤ 0.4	≤ 0.01	305	RPM	97005	64670	32335	19401	16168	9701	8084	4850	
				(244-366)	Fz	0.013	0.023	0.048	0.064	0.081	0.127	0.160	0.180	
					Feed (mm/min)	2522	2975	3104	2483	2619	2464	2587	1746	

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times 2 \times rpm$
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x D₁ maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

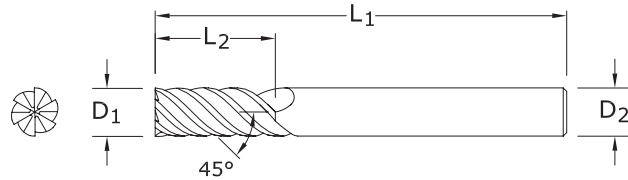
METRIC

Power-Carb



57M METRIC SERIES

- Ideal in Trochoidal milling applications in hardened steels and dry machining
- Short flute length and large core design to reduce deflection
- Unsurpassed edge strength with extreme negative rake and eccentric relief
- Recommended for materials 45 to 65 HRc (421 to 739 Bhn)



mm				EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	Ti-NAMITE-X
6,0	13,0	89,0	6,0	46140
8,0	18,0	102,0	8,0	46141
10,0	22,0	102,0	10,0	46142
12,0	26,0	114,0	12,0	46143
16,0	32,0	140,0	16,0	46145
20,0	38,0	165,0	20,0	46147

Neck Option Available

TOLERANCES (mm)

6 DIAMETER

D₁ = +0,000/-0,030

D₂ = h₆

8 DIAMETER

D₁ = +0,000/-0,040

D₂ = h₆

10 DIAMETER

D₁ = +0,000/-0,040

D₂ = h₆

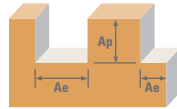
12-20 DIAMETER










D₁ = +0,000/-0,050

D₂ = h₆

HARDENED STEELS

For patent information visit www.ksptpatents.com

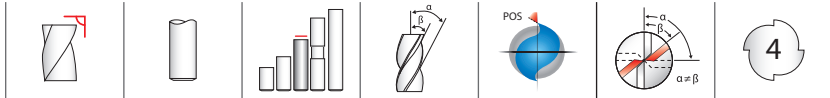


Series 57M Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)								
					6	8	10	12	16	20			
TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 420 Bhn or ≤ 45 HRC	Slot 	1	≤ 0.3	66	RPM	3499	2624	2099	1749	1312	1050	
					(53-79)	Fz	0.032	0.048	0.064	0.079	0.094	0.109	
					Feed (mm/min)	672	756	806	829	740	686		
		Profile 	≤ 0.1	≤ 1.5	81	RPM	4294	3220	2576	2147	1610	1288	
					(65-97)	Fz	0.046	0.066	0.089	0.112	0.132	0.152	
					Feed (mm/min)	1185	1275	1376	1443	1275	1175		
	HSM 	≤ 0.04	≤ 1.5	171	RPM	9064	6798	5439	4532	3399	2719		
				(137-205)	Fz	0.056	0.084	0.112	0.140	0.170	0.200		
				Feed (mm/min)	3046	3426	3655	3807	3467	3263			
	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 560 Bhn or ≤ 55 HRC	Slot 	1	≤ 0.3	37	RPM	1961	1471	1177	981	735	588
						(30-44)	Fz	0.025	0.038	0.051	0.064	0.077	0.090
						Feed (mm/min)	294	335	360	377	340	318	
Profile 			≤ 0.1	≤ 1.5	46	RPM	2438	1829	1463	1219	914	732	
					(37-55)	Fz	0.036	0.053	0.071	0.089	0.107	0.125	
					Feed (mm/min)	527	582	623	651	587	549		
HSM 		≤ 0.04	≤ 1.5	149	RPM	7898	5924	4739	3949	2962	2369		
				(119-179)	Fz	0.046	0.066	0.089	0.112	0.135	0.158		
				Feed (mm/min)	2180	2346	2531	2654	2399	2246			
TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 740 Bhn or ≤ 65 HRC	Slot 	1	≤ 0.3	20	RPM	1060	795	636	530	398	318
						(16-24)	Fz	0.020	0.028	0.038	0.048	0.058	0.068
						Feed (mm/min)	127	134	145	153	138	130	
	Profile 		≤ 0.1	≤ 1.5	24	RPM	1272	954	763	636	477	382	
					(19-29)	Fz	0.028	0.041	0.053	0.066	0.078	0.090	
					Feed (mm/min)	214	235	243	252	223	206		
	HSM 	≤ 0.04	≤ 1.5	76	RPM	4029	3021	2417	2014	1511	1209		
				(61-91)	Fz	0.033	0.048	0.064	0.079	0.094	0.109		
				Feed (mm/min)	798	870	928	955	852	790			

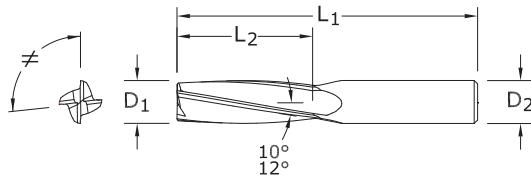
Bhn (Brinell) HRC (Rockwell C) HSM (High Speed Machining)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times 6 \times rpm$
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x D₁ maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC

Series 27



27M METRIC SERIES



- Slow helix design adds strength to the edge allowing ease for milling highly abrasive materials
- Two levels of chatter suppression: variable helix and indexing
- Excels at roughing (slotting, profiling) and finishing in a variety of plastics and composites

CUTTING DIAMETER D_1	mm			EDP NO.	
	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Di-NAMITE® (Diamond)
6,0	25,0	63,0	6,0	83056	83057
8,0	25,0	63,0	8,0	83058	83059
10,0	28,0	63,0	10,0	83060	83061
12,0	38,0	89,0	12,0	83062	83063
16,0	48,0	115,0	16,0	83064	83065

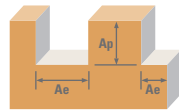
TOLERANCES (mm)

$D_1 = +0,000/-0,080$

$D_2 = h_6$

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



Series 27M Metric	Ae x D1	Ap x D1	Vc (m/min)	Diameter (D1) (mm)						
				6	8	10	12	16		
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot 	1	≤ 1	120	RPM	6361	4771	3817	3181	2385
				(96-164)	Fz	0.040	0.065	0.075	0.100	0.120
				Feed (mm/min)	1018	1240	1145	1272	1145	
	Profile 	≤ 0.5	≤ 1.5	150	RPM	7951	5963	4771	3976	2982
				(120-180)	Fz	0.040	0.065	0.075	0.100	0.120
				Feed (mm/min)	1272	1550	1431	1590	1431	
	HSM 	≤ 0.5	≤ 2	250	RPM	13252	9939	7951	6626	4970
				(200-300)	Fz	0.095	0.145	0.175	0.235	0.280
				Feed (mm/min)	5036	5765	5566	6228	5566	
GFRP (FIBERGLASS)	Slot 	1	≤ 1	100	RPM	5301	3976	3181	2650	1988
				(80-120)	Fz	0.040	0.065	0.075	0.100	0.120
				Feed (mm/min)	848	1034	954	1060	954	
	Profile 	≤ 0.5	≤ 1.5	120	RPM	6361	4771	3817	3181	2385
				(96-164)	Fz	0.040	0.065	0.075	0.100	0.120
				Feed (mm/min)	1018	1240	1145	1272	1145	
	HSM 	≤ 0.5	≤ 2	200	RPM	10602	7951	6361	5301	3976
				(160-240)	Fz	0.095	0.145	0.175	0.235	0.280
				Feed (mm/min)	4029	4612	4453	4983	4453	
N CARBON, GRAPHITE	Slot 	1	≤ 1	145	RPM	7686	5765	4612	3843	2882
				(116-174)	Fz	0.050	0.080	0.095	0.125	0.150
				Feed (mm/min)	1537	1845	1752	1922	1729	
	Profile 	≤ 0.5	≤ 1.5	185	RPM	9807	7355	5884	4903	3677
				(148-222)	Fz	0.050	0.080	0.095	0.125	0.150
				Feed (mm/min)	1961	2354	2236	2452	2206	
	HSM 	≤ 0.5	≤ 2	300	RPM	15903	11927	9542	7951	5963
				(240-360)	Fz	0.115	0.185	0.220	0.290	0.350
				Feed (mm/min)	7315	8826	8397	9223	8349	
PLASTICS	Slot 	1	≤ 1	245	RPM	12987	9740	7792	6494	4870
				(196-294)	Fz	0.050	0.080	0.095	0.125	0.150
				Feed (mm/min)	2597	3117	2961	3247	2922	
	Profile 	≤ 0.5	≤ 1.5	305	RPM	16168	12126	9701	8084	6063
				(244-366)	Fz	0.050	0.080	0.095	0.125	0.150
				Feed (mm/min)	3234	3880	3686	4042	3638	
	HSM 	≤ 0.5	≤ 2	505	RPM	26769	20077	16062	13385	10038
				(404-606)	Fz	0.115	0.185	0.220	0.290	0.350
				Feed (mm/min)	12314	14857	14134	15526	14054	
MACHINABLE CERAMICS MACHINABLE GLASS	Slot 	1	≤ 1	10	RPM	530	398	318	265	199
				(8-12)	Fz	0.020	0.035	0.045	0.050	0.060
				Feed (mm/min)	42	56	57	53	48	
	Profile 	≤ 0.5	≤ 1.5	15	RPM	795	596	477	398	298
				(12-18)	Fz	0.020	0.035	0.045	0.050	0.060
				Feed (mm/min)	64	83	86	80	72	
	HSM 	≤ 0.5	≤ 2	25	RPM	1325	994	795	663	497
				(20-30)	Fz	0.045	0.075	0.085	0.115	0.140
				Feed (mm/min)	239	298	270	305	278	

HSM (High Speed Machining)
 $rpm = Vc \times 3.82 / D_1$
 $ipm = Fz \times 4 \times rpm$
 adjust parameters based on resin type and fiber structure
 reduce speed when overheating causes melting or damage to resin
 reduce feed if delamination or fraying occur
 finish cuts typically required reduced feed and cutting depths

rates shown are for use without coolant; rates may be increased with coolant
 dust collection is vital when machining dry
 diamond coating will increase tool life in graphite and composite materials
 refer to the KYOCERA SGS Tool Wizard® for complete technical information
 (www.kyocera-sgstool.com)

High Performance Aluminum End Mills



Milling

HIGH PERFORMANCE ALUMINUM END MILLS	SERIES	DESCRIPTION	PAGE
S-Carb APR® & APF®	43MAPR	3 Flute Advanced Productivity Rougher Metric	74
	43MAPF	4 Flute Advanced Productivity Finisher Metric	76
S-Carb® (3 Flute)	43M	3 Flute Non-Ferrous Square End Metric (Unpolished Flutes)	78
	43M	3 Flute Non-Ferrous Square End Metric (Polished Flutes)	79
	43MCR	3 Flute Non-Ferrous Corner Radius Metric (Unpolished Flutes)	80
	43MCR	3 Flute Non-Ferrous Corner Radius Metric (Polished Flutes)	81
	43MCR	3 Flute Non-Ferrous Corner Radius 4xD Metric (Polished Flutes)	82
	43MLC	3 Flute Non-Ferrous Long Reach Corner Radius Metric (Unpolished Flutes)	84
	43MLC	3 Flute Non-Ferrous Long Reach Corner Radius Metric (Polished Flutes)	85
	43ML	3 Flute Non-Ferrous Square End Long Reach Metric	83
	43MB	3 Flute Non-Ferrous Ball End Metric (Polished Flutes)	86
	S-Carb® Rougher (3 Flute)	43MCB	3 Flute Rougher Non-Ferrous Chip Breaker Metric
S-Carb® (2 Flute)	47M	2 Flute Non-Ferrous Square End Metric	89
	47MB	2 Flute Non-Ferrous Ball End Metric	91
	47ML	2 Flute Non-Ferrous Square End Long Reach Metric	90
	47MLB	2 Flute Non-Ferrous Ball End Long Reach Metric	92
Ski-Carb	44M	2 Flute Non-Ferrous Materials Square End Metric	94

Speed & Feed Recommendations listed after each series

Fresado

FRESAS DE ALTO RENDIMIENTO PARA ALUMINIO	SERIE	DESCRIPCIÓN	PÁGINA
S-Carb APR® y APF®	43MAPR	3 filos, productividad avanzada, desbastador, métrico	74
	43MAPF	4 filos, productividad avanzada, acabador, métrico	76
S-Carb® (3 filos)	43M	3 filos, no férrico, punta cuadrada, métrico (filos no pulidos)	78
	43M	3 filos, no férrico, punta cuadrada, métrico (filos pulidos)	79
	43MCR	3 filos, no férrico, radio angulado, métrico (filos no pulidos)	80
	43MCR	3 filos, no férrico, radio angulado, métrico (filos pulidos)	81
	43MCR	3 filos, no férrico, radio angulado 4xD, métrico (filos pulidos)	82
	43MLC	3 filos, no férrico, largo alcance, radio angulado, métrico (filos no pulidos)	84
	43MLC	3 filos, no férrico, largo alcance, radio angulado, métrico (filos pulidos)	85
	43ML	3 filos, no férrico, punta cuadrada, largo alcance, métrico	83
	43MB	3 filos, no férrico, punta esférica, métrico (filos pulidos)	86
Desbastador S-Carb® (3 filos)	43MCB	3 filos, desbastador, no férrico, rompevirutas, métrico	87
S-Carb® (2 filos)	47M	2 filos, no férrico, punta cuadrada, métrico	89
	47MB	2 filos, no férrico, punta esférica, métrico	91
	47ML	2 filos, no férrico, punta cuadrada, largo alcance, métrico	90
	47MLB	2 filos, no férrico, punta esférica, largo alcance, métrico	92
Ski-Carb	44M	2 filos, materiales no férricos, punta cuadrada, métrico	94

Recomendaciones de velocidades y avances mostradas tras cada serie

Fraisage

FRAISE HAUTE PERFORMANCE POUR ALUMINIUM	SÉRIES	DESCRIPTION	PAGE
S-Carb APR®/APF®	43MAPR	3 dents productivité avancée d'ébauche (métrique)	74
	43MAPF	4 dents productivité avancée de finition (métrique)	76
S-Carb® (3 dents)	43M	3 dents non-ferreux à bout plat (métrique) (goujures non polies)	78
	43M	3 dents non-ferreux à bout plat (métrique) (goujures polies)	79
	43MCR	3 dents matériaux non-ferreux rayon en coin (métrique) (goujures non polies)	80
	43MCR	3 dents matériaux non-ferreux rayon en coin (métrique) (goujures polies)	81
	43MCR	3 dents matériaux non-ferreux rayon en coin 4xD (métrique) (goujures polies)	82
	43MLC	3 dents non-ferreux longue portée rayon en coin (métrique) (goujures non polies)	84
	43MLC	3 dents non-ferreux longue portée rayon en coin (métrique) (goujures polies)	85
	43ML	3 dents non-ferreux à bout plat longue portée (métrique)	83
	43MB	3 dents non-ferreux à bout hémisphérique (métrique) (goujures polies)	86
S-Carb® d'ébauche (3 dents)	43MCB	3 dents d'ébauche non-ferreux brise-copeaux (métrique)	87
S-Carb® (2 dents)	47M	2 dents non-ferreux à bout plat (métrique)	89
	47MB	2 dents non-ferreux à bout hémisphérique (métrique)	91
	47ML	2 dents non-ferreux à bout plat longue portée (métrique)	90
	47MLB	2 dents non-ferreux à bout hémisphérique longue portée (métrique)	92
Ski-Carb	44M	2 dents matériaux non-ferreux à bout plat (métrique)	94

Recommandations de vitesse et avance indiquées après chaque série

HOCHLEISTUNGS-SCHAFTFRÄSER	SERIE	BESCHREIBUNG	SEITE
S-Carb APR® & APF®	43MAPR	Metrischer Hochleistungs-Stirnschrupfräser mit 3 Schneidekanten	74
	43MAPF	Metrischer Hochleistungs-Schlichfräser mit 4 Schneidekanten	76
S-Carb® (3 Schneidekanten)	43M	Metrischer Nichteisenmetall-Schaftfräser mit 3 unpolierten Schneidekanten ohne Eckenradien	78
	43M	Metrischer Nichteisenmetall-Schaftfräser mit 3 polierten Schneidekanten ohne Eckenradien	79
	43MCR	Metrischer Nichteisenmetall-Fräser mit 3 unpolierten Schneidekanten und Eckenradien	80
	43MCR	Metrischer Nichteisenmetall-Fräser mit 3 polierten Schneidekanten und Eckenradien	81
	43MCR	Metrischer Nichteisenmetall-Fräser mit 3 polierten Schneidekanten und 4xD-Eckenradien	82
	43MLC	Metrischer Nichteisenmetall-Tiefbohrfräser mit 3 unpolierten Schneidekanten und Eckenradien	84
	43MLC	Metrischer Nichteisenmetall-Tiefbohrfräser mit 3 polierten Schneidekanten und Eckenradien	85
	43ML	Metrischer Nichteisenmetall-Langloch-Schaftfräser mit 3 Schneidekanten ohne Eckenradien	83
	43MB	Metrischer Nichteisenmetall-Radiuschaftfräser mit 3 polierten Schneidekanten	86
	S-Carb® Schruppfräser (3 Schneidekanten)	43MCB	Metrischer Nichteisenmetall-Schrupfräser mit 3 Spanteilernuten
S-Carb® (2 Schneidekanten)	47M	Metrischer Nichteisenmetall-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	89
	47MB	Metrischer Nichteisenmetall-Radiuschaftfräser mit 2 Schneidekanten	91
	47ML	Metrischer Nichteisenmetall-Langloch-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	90
	47MLB	Metrischer Nichteisenmetall-Langloch-Radiuschaftfräser mit 2 Schneidekanten	92
Ski-Carb	44M	Metrischer Schaftfräser mit 2 Schneidekanten ohne Eckenradien für Nichteisenmetalle	94

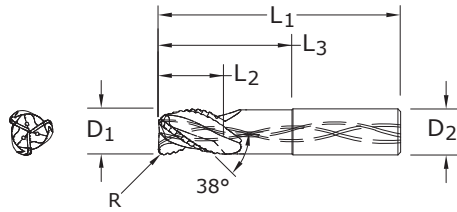
Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

METRIC

S-Carb APR®



43MAPR METRIC SERIES



- Ultra high-productivity rougher for Aluminum alloys, specifically for aircraft components
- Designed for machine tools with capability of 600 in³ per minute material removal rates
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Polished flutes maximize chip evacuation and provides enhanced finish
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

mm						EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	REACH L ₃	CORNER RADIUS R	Ti-NAMITE-B (TiB ₂)
12,0	18,0	83,0	12,0	38,0	–	44650
12,0	18,0	83,0	12,0	38,0	2,0	44685
12,0	18,0	83,0	12,0	38,0	3,0	44686
12,0	18,0	83,0	12,0	38,0	4,0	44687
16,0	24,0	92,0	16,0	51,0	–	44652
16,0	24,0	92,0	16,0	51,0	2,0	44688
16,0	24,0	92,0	16,0	51,0	3,0	44689
16,0	24,0	92,0	16,0	51,0	4,0	44690
20,0	30,0	86,0	20,0	45,0	–	44646
20,0	30,0	86,0	20,0	45,0	3,0	44647
20,0	30,0	86,0	20,0	45,0	4,0	44648
20,0	30,0	86,0	20,0	45,0	5,0	44649
20,0	35,0	104,0	20,0	64,0	–	44653
20,0	35,0	104,0	20,0	64,0	3,0	44691
20,0	35,0	104,0	20,0	64,0	4,0	44692
20,0	35,0	104,0	20,0	64,0	5,0	44693
25,0	35,0	108,0	25,0	55,0	3,0	44809
25,0	35,0	108,0	25,0	55,0	4,0	44810
25,0	35,0	108,0	25,0	55,0	5,0	44811
25,0	35,0	140,0	25,0	80,0	–	44654
25,0	35,0	140,0	25,0	80,0	3,0	44694
25,0	35,0	140,0	25,0	80,0	4,0	44695
25,0	35,0	140,0	25,0	80,0	5,0	44696
25,0	35,0	140,0	25,0	90,0	3,0	44645

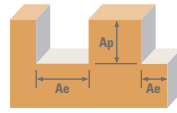
TOLERANCES (mm)

12–25 DIAMETER
 D₁ = +0,010/–0,050
 D₂ = h₆
 R = +0,000/–0,030

NON-FERROUS

For patent information visit www.ksptpatents.com

Available on request: • JetStream Technology • Side exit coolant holes

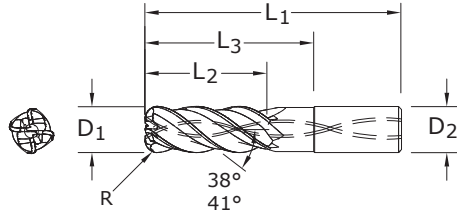
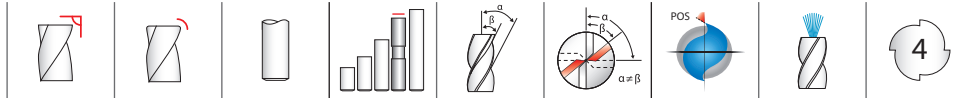


Series 43MAPR Metric	Hardness		Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)				
						12	16	20	25	
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	Slot 	1	≤ 1	1500	RPM	39788	29841	23873	19098
					(1200-1800)	Fz	0.080	0.110	0.150	0.180
					Feed (mm/min)	9549	9848	10743	10313	
		Profile 	≤ 0.5	≤ 1.5	2000	RPM	53050	39788	31830	25464
					(1600-2400)	Fz	0.080	0.110	0.150	0.180
					Feed (mm/min)	12732	13130	14324	13751	
	ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	Slot 	1	≤ 1	1200	RPM	31830	23873	19098	15278
					(960-1440)	Fz	0.060	0.083	0.110	0.140
		Profile 	≤ 0.5	≤ 1.5	1500	RPM	39788	29841	23873	19098
					(1200-1800)	Fz	0.060	0.083	0.110	0.140
						Feed (mm/min)	7162	7430	7878	8021

Bhn (Brinell) HRc (Rockwell C)
 surface speed is dependent on machine spindle and fixturing
 balancing is recommended at ultra high surface speeds
 tool life may be reduced when machining Lithium Alloys
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times 3 \times rpm$
 maximum recommended depths shown
 reduce speed and feed for materials harder than listed
 ramp angle = 15° (feed rate = 50%)
 plunge depth = 1 x D₁ (feed rate = 30%)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC

S-Carb APF®



43MAPF METRIC SERIES

- Ultra high-productivity finisher for Aluminum alloys, specifically for aircraft components
- Two levels of chatter suppression: variable helix and indexing
- Designed for single axial pass semi-finishing and finishing
- Polished flutes maximize chip evacuation and provides enhanced finish
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

mm						EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	REACH L ₃	CORNER RADIUS R	Ti-NAMITE-B (TiB ₂)
6,0	24,0	58,0	6,0	30,0	–	44627
8,0	32,0	64,0	8,0	40,0	–	44628
10,0	40,0	80,0	10,0	50,0	–	44629
12,0	30,0	83,0	12,0	40,0	–	44630
12,0	30,0	83,0	12,0	40,0	2,0	44745
12,0	30,0	83,0	12,0	40,0	3,0	44746
12,0	30,0	83,0	12,0	40,0	4,0	44747
12,0	30,0	83,0	12,0	50,0	0,5	44641
12,0	30,0	83,0	12,0	50,0	5,0	44642
12,0	48,0	100,0	12,0	62,0	–	44631
12,0	48,0	100,0	12,0	62,0	2,0	44748
12,0	48,0	100,0	12,0	62,0	3,0	44749
12,0	48,0	100,0	12,0	62,0	4,0	44750
16,0	42,0	93,0	16,0	51,0	5,0	44643
16,0	40,0	92,0	16,0	51,0	–	44634
16,0	40,0	92,0	16,0	51,0	2,0	44751
16,0	40,0	92,0	16,0	51,0	3,0	44752
16,0	40,0	92,0	16,0	51,0	4,0	44753
16,0	64,0	125,0	16,0	82,0	–	44635
16,0	64,0	125,0	16,0	82,0	2,0	44754
16,0	64,0	125,0	16,0	82,0	3,0	44755
16,0	64,0	125,0	16,0	82,0	4,0	44756
20,0	50,0	108,0	20,0	63,0	–	44636
20,0	50,0	108,0	20,0	63,0	3,0	44757
20,0	50,0	108,0	20,0	63,0	4,0	44758
20,0	50,0	108,0	20,0	63,0	5,0	44759
20,0	80,0	150,0	20,0	102,0	–	44637
20,0	80,0	150,0	20,0	102,0	3,0	44760
20,0	80,0	150,0	20,0	102,0	4,0	44761
20,0	80,0	150,0	20,0	102,0	5,0	44762
25,0	63,0	130,0	25,0	79,0	–	44638
25,0	63,0	130,0	25,0	79,0	3,0	44763
25,0	63,0	130,0	25,0	79,0	4,0	44764
25,0	63,0	130,0	25,0	79,0	5,0	44765
25,0	100,0	175,0	25,0	120,0	–	44639
25,0	100,0	175,0	25,0	120,0	3,0	44766
25,0	100,0	175,0	25,0	120,0	4,0	44767
25,0	100,0	175,0	25,0	120,0	5,0	44768

Available on request: • JetStream Technology

TOLERANCES (mm)

6–25 DIAMETER

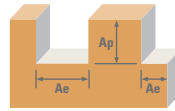
D₁ = +0,010/–0,050

D₂ = h₆

R = +0,000/–0,030

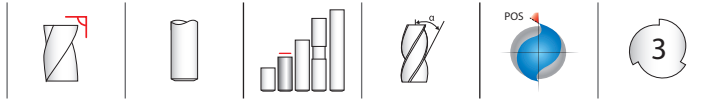
NON-FERROUS

For patent information visit www.ksptpatents.com

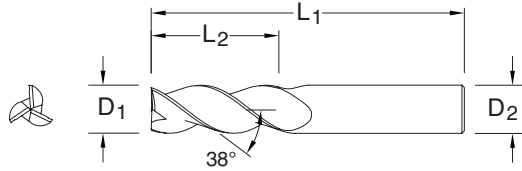


Series 43MAPF Metric	Hardness	Profile	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)							
						6	8	10	12	16	20	25	
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	Profile 	≤ 0.1	≤ 2.5	800	RPM	42440	31830	25464	21220	15915	12732	10186
					(640-960)	Fz	0.050	0.055	0.060	0.070	0.100	0.140	0.170
					Feed (mm/min)	8488	7003	6111	5942	6366	7130	6926	
	ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	Profile 	≤ 0.1	≤ 4	800	RPM	42440	31830	25464	21220	15915	12732	10186
					(640-960)	Fz	0.040	0.045	0.050	0.050	0.070	0.100	0.120
					Feed (mm/min)	6790	5729	5093	4244	4456	5093	4889	
ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	Profile 	≤ 0.1	≤ 2.5	600	RPM	31830	23873	19098	15915	11936	9549	7639	
				(480-720)	Fz	0.050	0.055	0.060	0.070	0.100	0.140	0.170	
				Feed (mm/min)	6366	5252	4584	4456	4774	5347	5195		
ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	Profile 	≤ 0.1	≤ 4	600	RPM	31830	23873	19098	15915	11936	9549	7639	
				(480-720)	Fz	0.040	0.045	0.050	0.050	0.070	0.100	0.120	
				Feed (mm/min)	5093	4297	3820	3183	3342	3820	3667		

Bhn (Brinell) HRc (Rockwell C)
 surface speed is dependent on machine spindle and fixturing
 balancing is recommended at ultra high surface speeds
 *tool life may be reduced when machining Lithium Alloys
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times 4 \times rpm$
 maximum recommended depths shown
 reduce speed and feed for materials harder than listed
 finish cuts typically require reduced feed and cutting depths of 0.02 X D₁ maximum
 ramp angle = 6° (feed rate = 50%)
 plunging not recommended
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



43M
METRIC SERIES



- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

CUTTING DIAMETER D_1	mm			EDP NO.	
	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-B (TiB ₂)
6,0	13,0	57,0	6,0	44701	44715
6,0	13,0	72,0	6,0	44702	44716
8,0	19,0	63,0	8,0	44703	44717
10,0	22,0	72,0	10,0	44705	44719
12,0	26,0	83,0	12,0	44708	44722
16,0	32,0	92,0	16,0	44711	44725
20,0	38,0	104,0	20,0	44714	44728
25,0	50,0	125,0	25,0	—	44731

TOLERANCES (mm)

6 DIAMETER

$D_1 = +0,000/-0,008$

$D_2 = h_6$

>6–10 DIAMETER

$D_1 = +0,000/-0,009$

$D_2 = h_6$

>10–18 DIAMETER

$D_1 = +0,000/-0,011$

$D_2 = h_6$

>18–25 DIAMETER

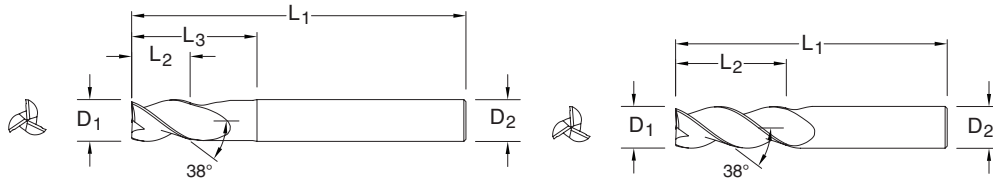
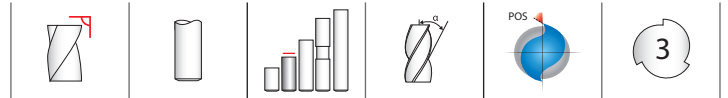
$D_1 = +0,000/-0,013$

$D_2 = h_6$

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



43M
METRIC SERIES

TOLERANCES (mm)

3 DIAMETER

$D_1 = +0,000/-0,006$

$D_2 = h_6$

>3-6 DIAMETER

$D_1 = +0,000/-0,008$

$D_2 = h_6$

>6-10 DIAMETER

$D_1 = +0,000/-0,009$

$D_2 = h_6$

>10-18 DIAMETER

$D_1 = +0,000/-0,011$

$D_2 = h_6$

>18-20 DIAMETER

$D_1 = +0,000/-0,013$

$D_2 = h_6$

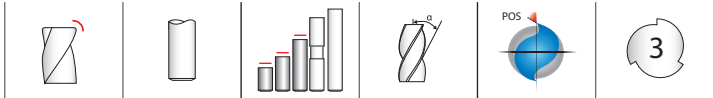
NON-FERROUS

PLASTICS/COMPOSITES

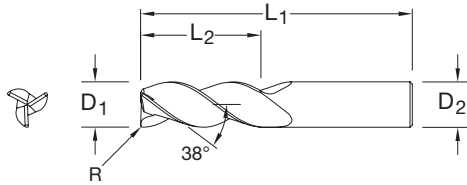
For patent information visit www.ksptpatents.com

mm						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	POLISHED FLUTE	Ti-NAMITE-B (TiB ₂)
3,0	8,0	52,0	6,0	—	•	44890
4,0	11,0	55,0	6,0	—	•	44891
5,0	13,0	57,0	6,0	—	•	44892
6,0	24,0	75,0	6,0	—	•	44893
8,0	32,0	75,0	8,0	—	•	44895
10,0	40,0	100,0	10,0	—	•	44896
12,0	48,0	100,0	12,0	—	•	44897
14,0	30,0	89,0	14,0	—	•	44898
14,0	18,0	125,0	14,0	45,0	•	44899
16,0	64,0	125,0	16,0	—	•	44900
20,0	80,0	150,0	20,0	—	•	44901

- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Polished flutes maximize chip evacuation and provides enhanced finish
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



43MCR
METRIC SERIES



- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

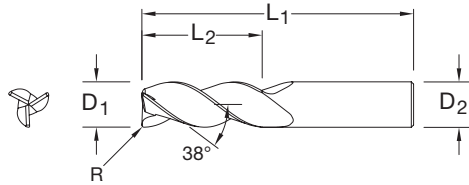
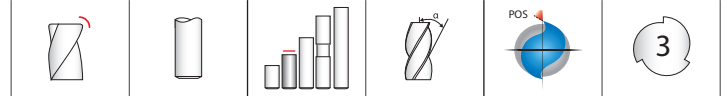
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			EDP NO.	
		OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB ₂)
6,0	13,0	57,0	6,0	1,5	—	44732
12,0	26,0	83,0	12,0	1,5	44814	44733
12,0	26,0	83,0	12,0	2,0	44815	44826
12,0	26,0	83,0	12,0	2,5	44816	44827
12,0	26,0	83,0	12,0	3,0	44817	44734
16,0	32,0	92,0	16,0	1,5	44818	44735
16,0	32,0	92,0	16,0	2,0	44819	44828
16,0	32,0	92,0	16,0	2,5	44820	44829
16,0	32,0	92,0	16,0	3,0	44821	44736
20,0	38,0	104,0	20,0	2,0	44822	44830
20,0	38,0	104,0	20,0	2,5	44823	44831
20,0	38,0	104,0	20,0	3,0	44824	44737

TOLERANCES (mm)

- 6 DIAMETER**
 $D_1 = +0,000/-0,008$
 $D_2 = h_6$
- >6-10 DIAMETER**
 $D_1 = +0,000/-0,009$
 $D_2 = h_6$
- >10-18 DIAMETER**
 $D_1 = +0,000/-0,011$
 $D_2 = h_6$
- >18-20 DIAMETER**
 $D_1 = +0,000/-0,013$
 $D_2 = h_6$



For patent information visit www.ksptpatents.com



TOLERANCES (mm)

6 DIAMETER

$D_1 = +0,000/-0,008$

$D_2 = h_6$

$R = +0,00/-0,05$

>6-10 DIAMETER

$D_1 = +0,000/-0,009$

$D_2 = h_6$

$R = +0,00/-0,05$

>10-18 DIAMETER

$D_1 = +0,000/-0,011$

$D_2 = h_6$

$R = +0,00/-0,05$

>18-20 DIAMETER

$D_1 = +0,000/-0,013$

$D_2 = h_6$

$R = +0,00/-0,05$

NON-FERROUS

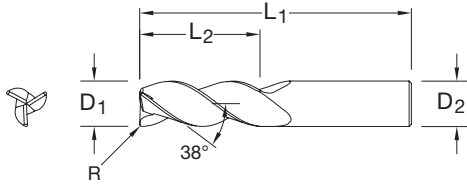
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

43MCR
METRIC SERIES

mm						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	POLISHED FLUTE	Ti-NAMITE-B (TiB ₂)
6,0	13,0	57,0	6,0	0,5	•	44902
6,0	13,0	57,0	6,0	1,0	•	44894
6,0	13,0	72,0	6,0	0,8	•	44842
6,0	13,0	72,0	6,0	1,2	•	44843
8,0	19,0	63,0	8,0	0,3	•	44846
8,0	19,0	63,0	8,0	0,5	•	44847
8,0	19,0	63,0	8,0	1,0	•	44848
8,0	19,0	63,0	8,0	1,5	•	44849
10,0	22,0	72,0	10,0	0,3	•	44854
10,0	22,0	72,0	10,0	0,5	•	44855
10,0	22,0	72,0	10,0	1,0	•	44856
10,0	22,0	72,0	10,0	1,5	•	44857
14,0	30,0	89,0	14,0	1,0	•	44868
14,0	30,0	89,0	14,0	2,0	•	44869
14,0	30,0	89,0	14,0	3,0	•	44870
16,0	32,0	92,0	16,0	4,0	•	44871
20,0	38,0	104,0	20,0	4,0	•	44879

- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Polished flutes maximize chip evacuation and provides enhanced finish
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



43MCR 4xD
METRIC SERIES

- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Polished flutes maximize chip evacuation and provides enhanced finish
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

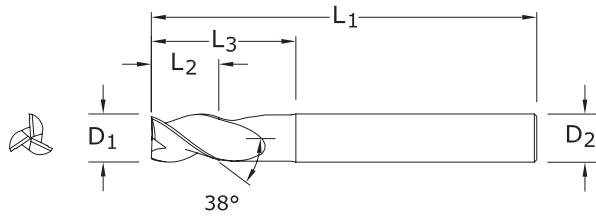
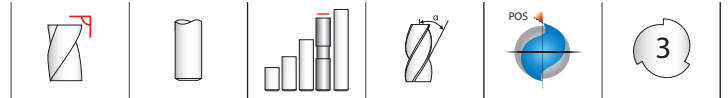
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			CORNER RADIUS R	POLISHED FLUTE	EDP NO. Ti-NAMITE-B (TiB ₂)
		OVERALL LENGTH L_1	SHANK DIAMETER D_2				
6,0	24,0	75,0	6,0	0,5	•	44844	
6,0	24,0	75,0	6,0	1,0	•	44845	
8,0	32,0	75,0	8,0	0,5	•	44850	
8,0	32,0	75,0	8,0	1,0	•	44851	
8,0	32,0	75,0	8,0	1,5	•	44852	
8,0	32,0	75,0	8,0	2,0	•	44853	
10,0	40,0	100,0	10,0	0,5	•	44858	
10,0	40,0	100,0	10,0	1,0	•	44859	
10,0	40,0	100,0	10,0	1,5	•	44860	
10,0	40,0	100,0	10,0	2,0	•	44861	
12,0	48,0	100,0	12,0	0,5	•	44862	
12,0	48,0	100,0	12,0	1,0	•	44863	
12,0	48,0	100,0	12,0	1,5	•	44864	
12,0	48,0	100,0	12,0	2,0	•	44865	
12,0	48,0	100,0	12,0	2,5	•	44866	
12,0	48,0	100,0	12,0	3,0	•	44867	
16,0	64,0	125,0	16,0	0,5	•	44872	
16,0	64,0	125,0	16,0	1,0	•	44873	
16,0	64,0	125,0	16,0	1,5	•	44874	
16,0	64,0	125,0	16,0	2,0	•	44875	
16,0	64,0	125,0	16,0	2,5	•	44876	
16,0	64,0	125,0	16,0	3,0	•	44877	
16,0	64,0	125,0	16,0	4,0	•	44878	
20,0	80,0	150,0	20,0	0,5	•	44880	
20,0	80,0	150,0	20,0	1,0	•	44881	
20,0	80,0	150,0	20,0	1,5	•	44882	
20,0	80,0	150,0	20,0	2,0	•	44883	
20,0	80,0	150,0	20,0	2,5	•	44884	
20,0	80,0	150,0	20,0	3,0	•	44885	
20,0	80,0	150,0	20,0	4,0	•	44886	

TOLERANCES (mm)

- 6 DIAMETER**
 $D_1 = +0,000/-0,008$
 $D_2 = h_6$
 $R = +0,00/-0,05$
- >6-10 DIAMETER**
 $D_1 = +0,000/-0,009$
 $D_2 = h_6$
 $R = +0,00/-0,05$
- >10-18 DIAMETER**
 $D_1 = +0,000/-0,011$
 $D_2 = h_6$
 $R = +0,00/-0,05$
- >18-20 DIAMETER**
 $D_1 = +0,000/-0,013$
 $D_2 = h_6$
 $R = +0,00/-0,05$

- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



TOLERANCES (mm)

6 DIAMETER

$D_1 = +0,000/-0,008$

$D_2 = h_6$

>6-10 DIAMETER

$D_1 = +0,000/-0,009$

$D_2 = h_6$

>10-18 DIAMETER

$D_1 = +0,000/-0,011$

$D_2 = h_6$

>18-20 DIAMETER

$D_1 = +0,000/-0,013$

$D_2 = h_6$

NON-FERROUS

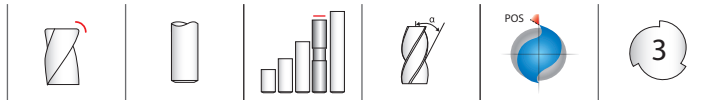
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

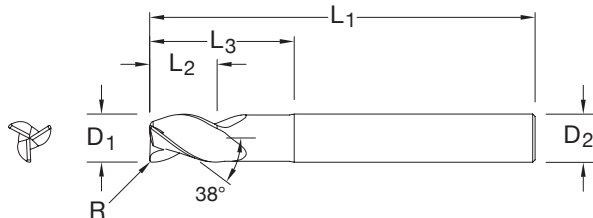
43ML
METRIC SERIES

mm					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	Ti-NAMITE-B (TiB ₂)
6,0	10,0	75,0	6,0	20,0	42706
8,0	12,0	75,0	8,0	25,0	42707
10,0	14,0	100,0	10,0	35,0	42708
12,0	16,0	100,0	12,0	40,0	42709
16,0	20,0	125,0	16,0	50,0	42710
20,0	25,0	150,0	20,0	65,0	42711

- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Necked design with blended diameter transitions provide clearance to reach
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



43MLC
METRIC SERIES



- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Necked design with blended diameter transitions provide clearance to reach
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 150 Bhn (≤ 7 HRc)

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	mm				EDP NO.	
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	REACH L ₃	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB ₂)
6,0	10,0	63,0	6,0	20,0	0,5	44769	44789
6,0	10,0	63,0	6,0	20,0	1,0	44770	44790
6,0	13,0	72,0	6,0	30,0	0,5	44771	44791
6,0	13,0	72,0	6,0	30,0	1,0	44772	44792
8,0	12,0	75,0	8,0	25,0	0,3	44773	44793
8,0	12,0	75,0	8,0	25,0	0,5	44774	44794
8,0	12,0	75,0	8,0	25,0	1,0	44775	44795
8,0	12,0	75,0	8,0	25,0	1,5	44776	44796
10,0	14,0	100,0	10,0	35,0	0,3	44777	44797
10,0	14,0	100,0	10,0	35,0	0,5	44778	44798
10,0	14,0	100,0	10,0	35,0	1,0	44779	44799
10,0	14,0	100,0	10,0	35,0	1,5	44780	44800
12,0	16,0	100,0	12,0	40,0	0,5	44781	44801
12,0	16,0	100,0	12,0	40,0	1,0	44782	44802
12,0	16,0	100,0	12,0	40,0	1,5	44783	44803
12,0	16,0	100,0	12,0	40,0	2,0	44784	44804
12,0	16,0	100,0	12,0	40,0	2,5	44832	44839
12,0	16,0	100,0	12,0	40,0	3,0	44833	44738
12,0	16,0	100,0	12,0	40,0	4,0	44834	44741
16,0	20,0	125,0	16,0	50,0	2,0	44785	44805
16,0	20,0	125,0	16,0	50,0	2,5	44835	44840
16,0	20,0	125,0	16,0	50,0	3,0	44836	44739
16,0	20,0	125,0	16,0	50,0	4,0	44786	44806
20,0	25,0	150,0	20,0	65,0	2,0	44787	44807
20,0	25,0	150,0	20,0	65,0	2,5	44837	44841
20,0	25,0	150,0	20,0	65,0	3,0	44838	44740
20,0	25,0	150,0	20,0	65,0	4,0	44788	44808

TOLERANCES (mm)

>6–10 DIAMETER

D₁ = +0,000/–0,009

D₂ = h₆

R = +0,00/–0,05

>10–18 DIAMETER

D₁ = +0,000/–0,011

D₂ = h₆

R = +0,00/–0,05

>18–20 DIAMETER

D₁ = +0,000/–0,013

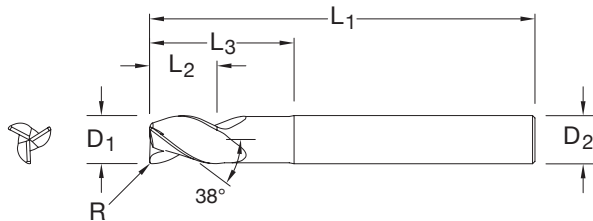
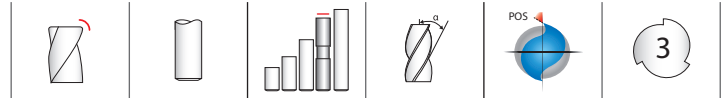
D₂ = h₆

R = +0,00/–0,05

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
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43MLC Aero Radius Range

METRIC SERIES

TOLERANCES (mm)

>6–10 DIAMETER

$D_1 = +0,000/-0,009$

$D_2 = h_6$

$R = +0,00/-0,05$

>10–18 DIAMETER

$D_1 = +0,000/-0,011$

$D_2 = h_6$

$R = +0,00/-0,05$

>18–20 DIAMETER

$D_1 = +0,000/-0,013$

$D_2 = h_6$

$R = +0,00/-0,05$

$D_1 = +0,000/-0,013$

$D_2 = h_6$

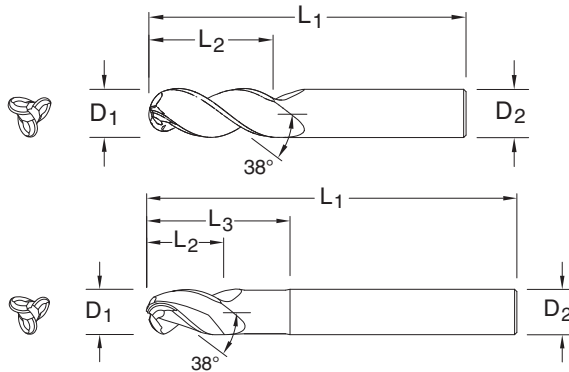
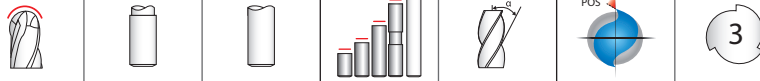
NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	mm				POLISHED FLUTE	EDP NO. Ti-NAMITE-B (TiB ₂)
			SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R			
8,0	12,0	75,0	8,0	25,0	0,8	•	44950	
8,0	12,0	75,0	8,0	25,0	1,2	•	44951	
8,0	12,0	75,0	8,0	25,0	1,6	•	44952	
10,0	14,0	100,0	10,0	35,0	0,8	•	44953	
10,0	14,0	100,0	10,0	35,0	1,2	•	44954	
10,0	14,0	100,0	10,0	35,0	1,6	•	44955	
10,0	14,0	100,0	10,0	35,0	2,4	•	44956	
12,0	16,0	100,0	12,0	40,0	0,8	•	44957	
12,0	16,0	100,0	12,0	40,0	1,2	•	44958	
12,0	16,0	100,0	12,0	40,0	1,6	•	44959	
12,0	16,0	100,0	12,0	40,0	2,4	•	44960	
14,0	18,0	125,0	14,0	45,0	1,0	•	44961	
14,0	18,0	125,0	14,0	45,0	2,0	•	44962	
14,0	18,0	125,0	14,0	45,0	3,0	•	44963	
14,0	18,0	125,0	14,0	45,0	4,0	•	44964	
16,0	20,0	125,0	16,0	50,0	0,8	•	44965	
16,0	20,0	125,0	16,0	50,0	1,2	•	44966	
16,0	20,0	125,0	16,0	50,0	1,6	•	44967	
16,0	20,0	125,0	16,0	50,0	2,4	•	44968	
16,0	20,0	125,0	16,0	50,0	3,2	•	44969	
20,0	25,0	150,0	20,0	65,0	0,8	•	44970	
20,0	25,0	150,0	20,0	65,0	1,2	•	44971	
20,0	25,0	150,0	20,0	65,0	1,6	•	44972	
20,0	25,0	150,0	20,0	65,0	2,4	•	44973	
20,0	25,0	150,0	20,0	65,0	3,2	•	44974	

- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Polished flutes maximize chip evacuation and provides enhanced finish
- Necked design with blended diameter transitions provide clearance to reach
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



43MB
METRIC SERIES

- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Open fluting for deep slotting and profiling
- Polished flutes maximize chip evacuation and provides enhanced finish
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

mm						EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	REACH L ₃	POLISHED FLUTE	Ti-NAMITE-B (TiB ₂)
3,0	4,5	57,0	6,0	—	•	44916
3,0	6,0	57,0	6,0	10,0	•	44917
3,0	9,0	57,0	6,0	16,0	•	44918
4,0	6,0	57,0	6,0	—	•	44919
4,0	8,0	57,0	6,0	13,0	•	44920
4,0	12,0	57,0	6,0	21,0	•	44921
5,0	7,5	57,0	6,0	—	•	44922
5,0	10,0	63,0	6,0	16,0	•	44923
5,0	15,0	63,0	6,0	26,0	•	44924
6,0	9,0	57,0	6,0	—	•	44925
6,0	12,0	63,0	6,0	19,0	•	44926
6,0	18,0	75,0	6,0	31,0	•	44927
8,0	12,0	63,0	8,0	—	•	44928
8,0	16,0	75,0	8,0	25,0	•	44929
8,0	24,0	83,0	8,0	41,0	•	44930
10,0	15,0	75,0	10,0	—	•	44931
10,0	20,0	83,0	10,0	31,0	•	44932
10,0	30,0	100,0	10,0	51,0	•	44933
12,0	18,0	83,0	12,0	—	•	44934
12,0	24,0	100,0	12,0	37,0	•	44935
12,0	36,0	130,0	12,0	61,0	•	44936
16,0	24,0	100,0	16,0	—	•	44937
16,0	32,0	130,0	16,0	49,0	•	44938
16,0	48,0	150,0	16,0	81,0	•	44939
20,0	30,0	108,0	20,0	—	•	44940
20,0	40,0	130,0	20,0	61,0	•	44941
20,0	60,0	150,0	20,0	101,0	•	44942
25,0	37,5	127,0	25,0	—	•	44943
25,0	50,0	152,0	25,0	76,0	•	44944
25,0	75,0	170,0	25,0	126,0	•	44945

TOLERANCES (mm)

3 DIAMETER

D₁ = +0,000/-0,006
D₂ = h₆

>3-6 DIAMETER

D₁ = +0,000/-0,008
D₂ = h₆

>6-10 DIAMETER

D₁ = +0,000/-0,009
D₂ = h₆

>10-18 DIAMETER

D₁ = +0,000/-0,011
D₂ = h₆

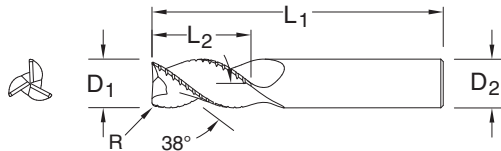
>18-25 DIAMETER

D₁ = +0,000/-0,013
D₂ = h₆

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



TOLERANCES (mm)

>6-10 DIAMETER

$D_1 = +0,000/-0,009$

$D_2 = h_6$

$R = +0,00/-0,05$

>10-18 DIAMETER

$D_1 = +0,000/-0,011$

$D_2 = h_6$

$R = +0,00/-0,05$

>18-20 DIAMETER

$D_1 = +0,000/-0,013$

$D_2 = h_6$

$R = +0,00/-0,05$

- NON-FERROUS
- PLASTICS/COMPOSITES

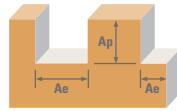
For patent information visit www.ksptpatents.com

43MCB
METRIC SERIES

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			EDP NO.	
		OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB ₂)
6,0	19,0	63,0	6,0	0,3	—	44299
8,0	19,0	63,0	8,0	0,3	44300	44305
10,0	22,0	72,0	10,0	0,3	44301	44306
12,0	26,0	83,0	12,0	1,0	44302	44307
16,0	32,0	92,0	16,0	1,0	44303	44308
20,0	38,0	104,0	20,0	1,0	44304	44309

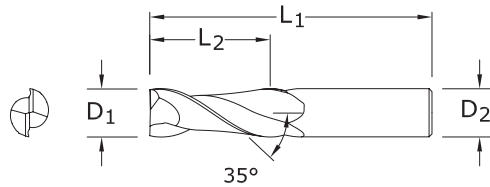
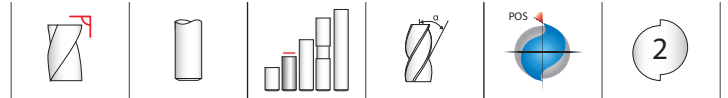
- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Chip breakers reduce machine loads up to 15% for increased roughing feed rate capability
- Open fluting for deep slotting and profiling
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

Series
43M, 43MB, 43MCR,
43ML, 43MLC,
43MCB
Metric



Metric	Hardness	Ae x D ₁	Ap x D ₁	V _c (m/min)	Diameter (D ₁) (mm)								
					3	6	10	12	16	20	25		
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc	Slot 	1	≤ 1	490	RPM	52022	26011	15607	13005	9754	7803	6243
					(392-588)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
					Feed (mm/min)	3371	4682	5618	5618	4869	4370	3980	
		Profile 	≤ 0.5	≤ 1.5	610	RPM	64762	32381	19429	16190	12143	9714	7771
					(488-732)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
					Feed (mm/min)	4196	5828	6994	6994	6061	5440	4955	
		HSM 	≤ 0.05	≤ 2	1005	RPM	106698	53349	32009	26674	20006	16005	12804
					(804-1206)	Fz	0.050	0.132	0.280	0.336	0.384	0.440	0.488
					Feed (mm/min)	16131	21124	26888	26885	23046	21126	18726	
ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B-390	≤ 125 Bhn or ≤ 77 HRb	Slot 	1	≤ 1	185	RPM	19641	9820	5892	4910	3683	2946	2357
					(148-222)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
					Feed (mm/min)	1273	1768	2121	2121	1838	1650	1503	
		Profile 	≤ 0.5	≤ 1.5	230	RPM	24418	12209	7326	6105	4578	3663	2930
					(184-276)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
					Feed (mm/min)	1582	2197	2637	2637	2285	2051	1868	
		HSM 	≤ 0.05	≤ 2	380	RPM	40343	20172	12103	10086	7564	6052	4841
					(304-456)	Fz	0.050	0.132	0.280	0.336	0.384	0.440	0.488
					Feed (mm/min)	6099	7987	10166	10166	8714	7988	7081	
COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass	≤ 140 Bhn or ≤ 3 HRc	Slot 	1	≤ 1	265	RPM	28134	14067	8440	7034	5275	4220	3376
					(212-318)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
					Feed (mm/min)	1620	2025	2701	2532	2228	2026	1773	
		Profile 	≤ 0.5	≤ 1.5	330	RPM	35035	17518	10511	8759	6569	5255	4204
					(264-396)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
					Feed (mm/min)	2018	2522	3363	3153	2775	2523	2207	
		HSM 	≤ 0.05	≤ 2	545	RPM	57861	28930	17358	14465	10849	8679	6943
					(436-654)	Fz	0.041	0.108	0.227	0.276	0.320	0.373	0.400
					Feed (mm/min)	7082	9373	11804	11976	10415	9721	8332	
COPPER ALLOYS Beryllium Copper C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc	Slot 	1	≤ 1	105	RPM	11148	5574	3344	2787	2090	1672	1338
					(84-126)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
					Feed (mm/min)	642	803	1070	1003	883	803	702	
		Profile 	≤ 0.5	≤ 1.5	130	RPM	13802	6901	4141	3450	2588	2070	1656
					(104-156)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
					Feed (mm/min)	795	994	1325	1242	1093	994	870	
		HSM 	≤ 0.05	≤ 2	215	RPM	22826	11413	6848	5706	4280	3424	2739
					(172-258)	Fz	0.041	0.108	0.227	0.276	0.320	0.373	0.400
					Feed (mm/min)	2794	3697	4656	4725	4109	3835	3287	
PLASTICS ABS, Polycarbonate, PVC, Polypropylene		Slot 	1	≤ 1	490	RPM	52022	26011	15607	13005	9754	7803	6243
					(392-588)	Fz	0.036	0.096	0.200	0.240	0.282	0.320	0.350
					Feed (mm/min)	5618	7490	9364	9363	8240	7491	6555	
		Profile 	≤ 0.5	≤ 1.5	610	RPM	64762	32381	19429	16190	12143	9714	7771
					(488-732)	Fz	0.036	0.096	0.200	0.240	0.282	0.320	0.350
					Feed (mm/min)	6994	9325	11657	11656	10258	9326	8160	
		HSM 	≤ 0.05	≤ 2	1005	RPM	106698	53349	32009	26674	20006	16005	12804
					(804-1206)	Fz	0.082	0.216	0.453	0.552	0.640	0.733	0.800
					Feed (mm/min)	26117	34567	43532	44169	38410	35210	30730	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times 3 \times rpm$
 reduce speed and feed for materials harder than listed
 reduce cut depth and feed by 50% for long flute and long reach tools
 reduce feed and Ae when finish milling (.02 x D₁ maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



TOLERANCES (mm)

>3 DIAMETER

$D_1 = +0,000/-0,008$

$D_2 = h_6$

>3-6 DIAMETER

$D_1 = +0,000/-0,008$

$D_2 = h_6$

>6-10 DIAMETER

$D_1 = +0,000/-0,009$

$D_2 = h_6$

>10-18 DIAMETER

$D_1 = +0,000/-0,012$

$D_2 = h_6$

>18-25 DIAMETER

$D_1 = +0,000/-0,013$

$D_2 = h_6$

NON-FERROUS

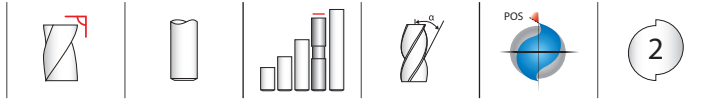
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

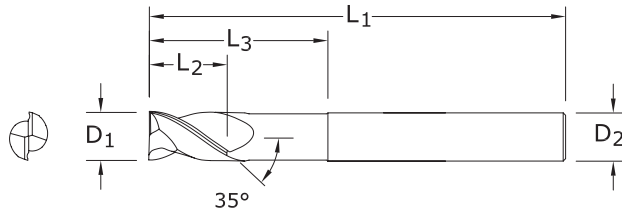
47M
METRIC SERIES

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-B (TiB ₂)
3,0	8,0	38,0	3,0	44550	44587
4,0	11,0	50,0	4,0	44551	44588
5,0	13,0	50,0	5,0	44552	44589
6,0	13,0	57,0	6,0	44553	44590
8,0	19,0	63,0	8,0	44554	44591
10,0	22,0	72,0	10,0	44555	44592
12,0	26,0	83,0	12,0	44556	44593
14,0	26,0	83,0	14,0	44557	44594
16,0	32,0	92,0	16,0	44558	44595
20,0	38,0	104,0	20,0	44559	44596
25,0	44,0	104,0	25,0	44560	44597

- Circular land reduces edge aggressiveness for varied speed and feed rates
- 2 Flutes effectively manage the large size and volume of chips produced during the aggressive machining process
- Excellent balance at high speeds and aggressive plunging capability
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



47ML
METRIC SERIES



- Circular land reduces edge aggressiveness for varied speed and feed rates
- 2 Flutes effectively manage the large size and volume of chips produced during the aggressive machining process
- Excellent balance at high speeds and aggressive plunging capability
- Necked design with blended diameter transitions provide clearance to reach
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

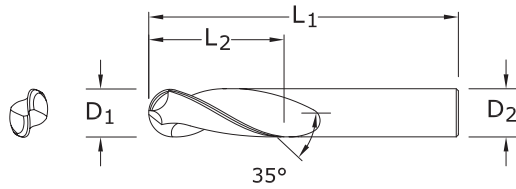
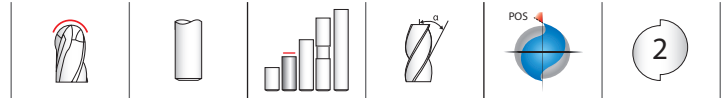
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			EDP NO.	
		OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	Ti-NAMITE-B (TiB ₂)
6,0	10,0	100,0	6,0	54,0	44561	44609
8,0	12,0	100,0	8,0	54,0	44562	44610
10,0	12,0	100,0	10,0	54,0	44563	44611
12,0	16,0	150,0	12,0	80,0	44564	44612
16,0	20,0	150,0	16,0	80,0	44565	44613
20,0	25,0	150,0	20,0	80,0	44566	44614

TOLERANCES (mm)

- 6 DIAMETER**
 $D_1 = +0,000/-0,008$
 $D_2 = h_6$
- >6-10 DIAMETER**
 $D_1 = +0,000/-0,009$
 $D_2 = h_6$
- >10-18 DIAMETER**
 $D_1 = +0,000/-0,011$
 $D_2 = h_6$
- >18-20 DIAMETER**
 $D_1 = +0,000/-0,013$
 $D_2 = h_6$



For patent information visit www.ksptpatents.com



47MB
METRIC SERIES

TOLERANCES (mm)

3 DIAMETER

$D_1 = +0,000/-0,008$

$D_2 = h_6$

>3-6 DIAMETER

$D_1 = +0,000/-0,008$

$D_2 = h_6$

>6-10 DIAMETER

$D_1 = +0,000/-0,009$

$D_2 = h_6$

>10-18 DIAMETER

$D_1 = +0,000/-0,012$

$D_2 = h_6$

>18-25 DIAMETER

$D_1 = +0,000/-0,013$

$D_2 = h_6$

NON-FERROUS

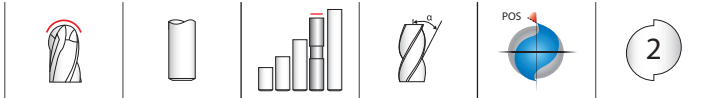
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

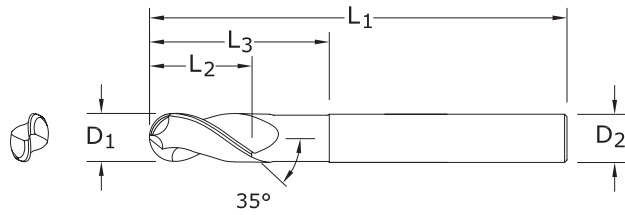
mm				EDP NO.	
CUTTING DIAMETER	LENGTH OF CUT	OVERALL LENGTH	SHANK DIAMETER	UNCOATED	Ti-NAMITE-B (TiB ₂)
D ₁	L ₂	L ₁	D ₂		
3,0	8,0	38,0	3,0	44570	44598
4,0	11,0	50,0	4,0	44571	44599
5,0	13,0	50,0	5,0	44572	44600
6,0	13,0	57,0	6,0	44573	44601
8,0	19,0	63,0	8,0	44574	44602
10,0	22,0	72,0	10,0	44575	44603
12,0	26,0	83,0	12,0	44576	44604
14,0	26,0	83,0	14,0	44577	44605
16,0	32,0	92,0	16,0	44578	44606
20,0	37,3	104,0	20,0	44579	44607
25,0	38,0	104,0	25,0	44580	44608

- Circular land reduces edge aggressiveness for varied speed and feed rates
- 2 Flutes effectively manage the large size and volume of chips produced during the aggressive machining process
- Excellent balance at high speeds and aggressive plunging capability
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

METRIC
S-Carb®



47MLB
METRIC SERIES



- Circular land reduces edge aggressiveness for varied speed and feed rates
- 2 Flutes effectively manage the large size and volume of chips produced during the aggressive machining process
- Excellent balance at high speeds and aggressive plunging capability
- Necked design with blended diameter transitions provide clearance to reach
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			EDP NO.	
		OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	Ti-NAMITE-B (TiB ₂)
6,0	10,0	100,0	6,0	54,0	44581	44615
8,0	12,0	100,0	8,0	54,0	44582	44616
10,0	12,0	100,0	10,0	54,0	44583	44617
12,0	16,0	150,0	12,0	80,0	44584	44618
16,0	20,0	150,0	16,0	80,0	44585	44619
20,0	25,0	150,0	20,0	80,0	44586	44620

TOLERANCES (mm)

6 DIAMETER
 $D_1 = +0,000/-0,008$
 $D_2 = h_6$

>6-10 DIAMETER
 $D_1 = +0,000/-0,009$
 $D_2 = h_6$

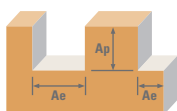
>10-18 DIAMETER
 $D_1 = +0,000/-0,011$
 $D_2 = h_6$

>18-20 DIAMETER
 $D_1 = +0,000/-0,013$
 $D_2 = h_6$

NON-FERROUS

PLASTICS/COMPOSITES

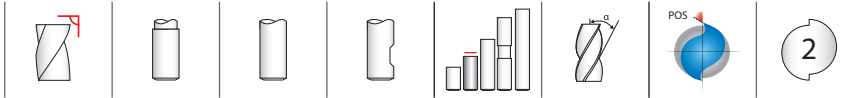
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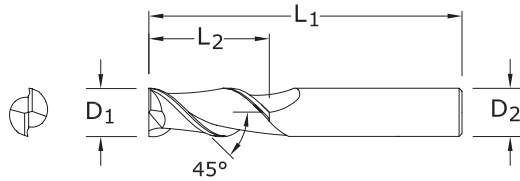
Series 47M, 47MB, 47ML, 47MLB Metric	Hardness	Ae x D1	Ap x D1	Vc (m/min)	Diameter (D1) (mm)								
					3	6	10	12	16	20	25		
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc	Slot 	1	≤ 1	490	RPM	52022	26011	15607	13005	9754	7803	6243
					(392-588)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
						Feed (mm/min)	2247	3121	3746	3745	3246	2913	2653
	Profile 	≤ 0.5	≤ 1.5	610	RPM	64762	32381	19429	16190	12143	9714	7771	
				(488-732)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213	
					Feed (mm/min)	2797	3885	4663	4662	4041	3627	3303	
	HSM 	≤ 0.05	≤ 2	1005	RPM	106698	53349	32009	26674	20006	16005	12804	
				(804-1206)	Fz	0.050	0.132	0.280	0.336	0.384	0.440	0.488	
					Feed (mm/min)	10754	14083	17925	17924	15364	14084	12484	
ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B- 390	≤ 125 Bhn or ≤ 77 HRb	Slot 	1	≤ 1	185	RPM	19641	9820	5892	4910	3683	2946	2357
					(148-222)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
						Feed (mm/min)	848	1178	1414	1414	1226	1100	1002
	Profile 	≤ 0.5	≤ 1.5	230	RPM	24418	12209	7326	6105	4578	3663	2930	
				(184-276)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213	
					Feed (mm/min)	1055	1465	1758	1758	1524	1367	1245	
	HSM 	≤ 0.05	≤ 2	380	RPM	40343	20172	12103	10086	7564	6052	4841	
				(304-456)	Fz	0.050	0.132	0.280	0.336	0.384	0.440	0.488	
					Feed (mm/min)	4066	5325	6778	6777	5809	5325	4720	
COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass	≤ 140 Bhn or ≤ 3 HRc	Slot 	1	≤ 1	265	RPM	28134	14067	8440	7034	5275	4220	3376
					(212-318)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
						Feed (mm/min)	1080	1350	1801	1688	1485	1350	1182
	Profile 	≤ 0.5	≤ 1.5	330	RPM	35035	17518	10511	8759	6569	5255	4204	
				(264-396)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175	
					Feed (mm/min)	1345	1682	2242	2102	1850	1682	1472	
	HSM 	≤ 0.05	≤ 2	545	RPM	57861	28930	17358	14465	10849	8679	6943	
				(436-654)	Fz	0.041	0.108	0.227	0.276	0.320	0.373	0.400	
					Feed (mm/min)	4721	6248	7869	7984	6943	6480	5555	
COPPER ALLOYS Beryllium Copper C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc	Slot 	1	≤ 1	105	RPM	11148	5574	3344	2787	2090	1672	1338
					(84-126)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
						Feed (mm/min)	428	535	713	669	589	535	468
	Profile 	≤ 0.5	≤ 1.5	130	RPM	13802	6901	4141	3450	2588	2070	1656	
				(104-156)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175	
					Feed (mm/min)	530	662	883	828	729	662	580	
	HSM 	≤ 0.05	≤ 2	215	RPM	22826	11413	6848	5706	4280	3424	2739	
				(172-258)	Fz	0.041	0.108	0.227	0.276	0.320	0.373	0.400	
					Feed (mm/min)	1862	2465	3104	3150	2739	2556	2191	
PLASTICS ABS, Polycarbonate, PVC, Polypropylene	≤ 150 Bhn or ≤ 7 HRc	Slot 	1	≤ 1	490	RPM	52022	26011	15607	13005	9754	7803	6243
					(392-588)	Fz	0.036	0.096	0.200	0.240	0.282	0.320	0.350
						Feed (mm/min)	3745	4994	6243	6242	5493	4994	4370
	Profile 	≤ 0.5	≤ 1.5	610	RPM	64762	32381	19429	16190	12143	9714	7771	
				(488-732)	Fz	0.036	0.096	0.200	0.240	0.282	0.320	0.350	
					Feed (mm/min)	4662	6217	7771	7771	6839	6217	5440	
	HSM 	≤ 0.05	≤ 2	1005	RPM	106698	53349	32009	26674	20006	16005	12804	
				(804-1206)	Fz	0.082	0.216	0.453	0.552	0.640	0.733	0.800	
					Feed (mm/min)	17412	23045	29022	29446	25607	23473	20487	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times 2 \times rpm$
 reduce speed and feed for materials harder than listed
 reduce cut depth and feed by 50% for long flute and long reach tools
 reduce feed and Ae when finish milling (.02 x D1 maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstoool.com)

METRIC
Ski-Carb



44M
METRIC SERIES



- Polished ski land with primary and secondary flute wall design minimizes chip interference by directing chips away from secondary flute
- Circular land allows for increased control at various speed and feed rates ultimately reducing chatter
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

CUTTING DIAMETER D_1	mm			EDP NO.			
	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED W/FLAT	UNCOATED	Ti-NAMITE-B (TiB ₂) W/FLAT	Ti-NAMITE-B (TiB ₂)
3,0	8,0	52,0	6,0	44505	49663	44506	49674
4,0	11,0	55,0	6,0	44509	49664	44510	49675
5,0	13,0	57,0	6,0	44513	49665	44514	49676
6,0	13,0	57,0	6,0	44517	49666	44518	49677
8,0	19,0	69,0	10,0	44521	49667	44522	49678
10,0	22,0	72,0	10,0	44525	49668	44526	49679
12,0	26,0	83,0	12,0	44529	49669	44530	49680
14,0	26,0	83,0	14,0	44533	49670	44534	49681
16,0	32,0	92,0	16,0	44537	49671	44538	49682
18,0	32,0	92,0	18,0	44541	49672	44542	49683
20,0	38,0	104,0	20,0	44545	49673	44546	49684

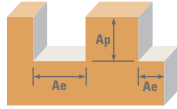
Contact your KSPT Sales Representative for more information on Corner Radius options.

TOLERANCES (mm)

- ≤3 DIAMETER**
 $D_1 = +0,000/-0,006$
 $D_2 = h_6$
 $R = +0,000/-0,050$
- >3-6 DIAMETER**
 $D_1 = +0,000/-0,008$
 $D_2 = h_6$
 $R = +0,000/-0,050$
- >6-10 DIAMETER**
 $D_1 = +0,000/-0,009$
 $D_2 = h_6$
 $R = +0,000/-0,050$
- >10-18 DIAMETER**
 $D_1 = +0,000/-0,011$
 $D_2 = h_6$
 $R = +0,000/-0,050$
- >18-20 DIAMETER**
 $D_1 = +0,000/-0,013$
 $D_2 = h_6$
 $R = +0,000/-0,050$

- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



Series 44M Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)								
					3	6	10	12	16	20	25		
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc	Slot 	1	≤ 1	490	RPM	52022	26011	15607	13005	9754	7803	6243
					(392-588)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
					Feed (mm/min)	2247	3121	3746	3745	3246	2913	2653	
	Profile 	≤ 0.5	≤ 1.5	610	RPM	64762	32381	19429	16190	12143	9714	7771	
				(488-732)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213	
				Feed (mm/min)	2797	3885	4663	4662	4041	3627	3303		
	HSM 	≤ 0.05	≤ 2	1005	RPM	106698	53349	32009	26674	20006	16005	12804	
				(804-1206)	Fz	0.050	0.132	0.280	0.336	0.384	0.440	0.488	
				Feed (mm/min)	10754	14083	17925	17924	15364	14084	12484		
ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B-390	≤ 125 Bhn or ≤ 77 HRb	Slot 	1	≤ 1	185	RPM	19641	9820	5892	4910	3683	2946	2357
					(148-222)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
					Feed (mm/min)	848	1178	1414	1414	1226	1100	1002	
	Profile 	≤ 0.5	≤ 1.5	230	RPM	24418	12209	7326	6105	4578	3663	2930	
				(184-276)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213	
				Feed (mm/min)	1055	1465	1758	1758	1524	1367	1245		
	HSM 	≤ 0.05	≤ 2	380	RPM	40343	20172	12103	10086	7564	6052	4841	
				(304-456)	Fz	0.050	0.132	0.280	0.336	0.384	0.440	0.488	
				Feed (mm/min)	4066	5325	6778	6777	5809	5325	4720		
COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass	≤ 140 Bhn or ≤ 3 HRc	Slot 	1	≤ 1	265	RPM	28134	14067	8440	7034	5275	4220	3376
					(212-318)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
					Feed (mm/min)	1080	1350	1801	1688	1485	1350	1182	
	Profile 	≤ 0.5	≤ 1.5	330	RPM	35035	17518	10511	8759	6569	5255	4204	
				(264-396)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175	
				Feed (mm/min)	1345	1682	2242	2102	1850	1682	1472		
	HSM 	≤ 0.05	≤ 2	545	RPM	57861	28930	17358	14465	10849	8679	6943	
				(436-654)	Fz	0.041	0.108	0.227	0.276	0.320	0.373	0.400	
				Feed (mm/min)	4721	6248	7869	7984	6943	6480	5555		
COPPER ALLOYS Beryllium Copper C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc	Slot 	1	≤ 1	105	RPM	11148	5574	3344	2787	2090	1672	1338
					(84-126)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
					Feed (mm/min)	428	535	713	669	589	535	468	
	Profile 	≤ 0.5	≤ 1.5	130	RPM	13802	6901	4141	3450	2588	2070	1656	
				(104-156)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175	
				Feed (mm/min)	530	662	883	828	729	662	580		
	HSM 	≤ 0.05	≤ 2	215	RPM	22826	11413	6848	5706	4280	3424	2739	
				(172-258)	Fz	0.041	0.108	0.227	0.276	0.320	0.373	0.400	
				Feed (mm/min)	1862	2465	3104	3150	2739	2556	2191		
PLASTICS ABS, Polycarbonate, PVC, Polypropylene	Slot 	1	≤ 1	490	RPM	52022	26011	15607	13005	9754	7803	6243	
				(392-588)	Fz	0.036	0.096	0.200	0.240	0.282	0.320	0.350	
				Feed (mm/min)	3745	4994	6243	6242	5493	4994	4370		
	Profile 	≤ 0.5	≤ 1.5	610	RPM	64762	32381	19429	16190	12143	9714	7771	
				(488-732)	Fz	0.036	0.096	0.200	0.240	0.282	0.320	0.350	
				Feed (mm/min)	4662	6217	7771	7771	6839	6217	5440		
	HSM 	≤ 0.05	≤ 2	1005	RPM	106698	53349	32009	26674	20006	16005	12804	
				(804-1206)	Fz	0.082	0.216	0.453	0.552	0.640	0.733	0.800	
				Feed (mm/min)	17412	23045	29022	29446	25607	23473	20487		

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
 rpm = (Vc x 1000) / (D₁ x 3.14)
 mm/min = Fz x 2 x rpm
 reduce speed and feed for materials harder than listed
 reduce cut depth and feed by 50% for long flute and long reach tools
 reduce feed and Ae when finish milling (.02 x D₁ maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

General Purpose End Mills



Milling

SERIES	GENERAL PURPOSE END MILLS DESCRIPTION	PAGE
16M	4 Flute Square End Stub Metric	110
1M	4 Flute Square End Standard Length Metric	111
1XLM	4 Flute Square End Extra Long Reach Metric	111
14M	4 Flute Double End Square Stub Metric	113
1MB	4 Flute Ball End Standard Length Metric	114
1XLMB	4 Flute Ball End Extra Long Reach Metric	114
14MB	4 Flute Double End Ball Stub Metric	115
1MCR	4 Flute Corner Radius Standard Length Metric	112
54M	4 Flute High Shear Square End Standard Length Metric	123
17M	2 Flute Square End Stub Metric	101
3M	2 Flute Square End Standard Length Metric	102
3XLM	2 Flute Square End Extra Long Reach Metric	102
59M	2 Flute Square End Long Reach Metric	103
15M	2 Flute Double End Square Stub Metric	104
3MB	2 Flute Ball End Standard Length Metric	105
3XLMB	2 Flute Ball End Extra Long Reach Metric	105
59MB	2 Flute Ball End Long Reach Metric	106
15MB	2 Flute Double End Ball Stub Metric	107
52M	2 Flute High Shear Square End Standard Length Metric	122
5M	3 Flute Square End Standard Length Metric	108
5XLM	3 Flute Square End Extra Long Reach Metric	108
5MB	3 Flute Ball End Standard Length Metric	109
5XLMB	3 Flute Ball End Extra Long Reach Metric	109
61M	Multi-Flute Coarse Pitch Rougher Metric	120
62M	Multi-Flute Fine Pitch Rougher Metric	118

Speed & Feed Recommendations listed after each series

Fresado

SERIE	DESCRIPCIÓN DE FRESAS DE USO GENERAL	PÁGINA
16M	4 filos, pieza de punta cuadrada, métrico	110
1M	4 filos, punta cuadrada, longitud estándar, métrico	111
1XLM	4 filos, punta cuadrada, alcance extralargo, métrico	111
14M	4 filos, pieza doble de punta cuadrada, métrico	113
1MB	4 filos, punta esférica, longitud estándar, métrico	114
1XLMB	4 filos, punta esférica, alcance extralargo, métrico	114
14MB	4 filos, pieza doble de punta esférica, métrico	115
1MCR	4 filos, radio angulado, longitud estándar, métrico	112
54M	4 filos, alto rendimiento, punta cuadrada, longitud estándar, métrico	123
17M	2 filos, pieza de punta cuadrada, métrico	101
3M	2 filos, punta cuadrada, longitud estándar, métrico	102
3XLM	2 filos, punta cuadrada, alcance extralargo, métrico	102
59M	2 filos, punta cuadrada, largo alcance, métrico	103
15M	2 filos, pieza doble de punta cuadrada, métrico	104
3MB	2 filos, punta esférica, longitud estándar, métrico	105
3XLMB	2 filos, punta esférica, alcance extralargo, métrico	105
59MB	2 filos, punta esférica, largo alcance, métrico	106
15MB	2 filos, pieza doble de punta esférica, métrico	107
52M	2 filos, alto rendimiento, punta cuadrada, longitud estándar, métrico	122
5M	3 filos, punta cuadrada, longitud estándar, métrico	108
5XLM	3 filos, punta cuadrada, alcance extralargo, métrico	108
5MB	3 filos, punta esférica, longitud estándar, métrico	109
5XLMB	3 filos, punta esférica, alcance extralargo, métrico	109
61M	Filo múltiple, paso grueso, desbastador, métrico	120
62M	Filo múltiple, paso fino, desbastador, métrico	118

Recomendaciones de velocidades y avances mostradas tras cada serie

Fraissage

SERIES	DESCRIPTION DE FRAISES À USAGE GÉNÉRAL	PAGE
16M	4 dents à bout plat court (métrique)	110
1M	4 dents à bout plat longueur standard (métrique)	111
1XLM	4 dents à bout plat portée extra-longue (métrique)	111
14M	4 dents à double bouts plats court (métrique)	113
1MB	4 dents à bout hémisphérique longueur standard (métrique)	114
1XLMB	4 dents à bout hémisphérique portée extra-longue (métrique)	114
14MB	4 dents à double bouts hémisphériques court (métrique)	115
1MCR	4 dents rayon en coin longueur standard (métrique)	112
54M	4 dents cisaillement élevé à bout plat longueur standard (métrique)	123
17M	2 dents à bout plat court (métrique)	101
3M	2 dents à bout plat longueur standard (métrique)	102
3XLM	2 dents à bout plat portée extra-longue (métrique)	102
59M	2 dents à bout plat longue portée (métrique)	103
15M	2 dents à double bouts plats court (métrique)	104
3MB	2 dents à bout hémisphérique longueur standard (métrique)	105
3XLMB	2 dents à bout hémisphérique portée extra-longue (métrique)	105
59MB	2 dents à bout hémisphérique longue portée (métrique)	106
15MB	2 dents à double bouts hémisphériques court (métrique)	107
52M	2 dents cisaillement élevé à bout plat longueur standard (métrique)	122
5M	3 dents à bout plat longueur standard (métrique)	108
5XLM	3 dents à bout plat portée extra-longue (métrique)	108
5MB	3 dents à bout hémisphérique longueur standard (métrique)	109
5XLMB	3 dents à bout hémisphérique portée extra-longue (métrique)	109
61M	Multi-dents à pas gros d'ébauche (métrique)	120
62M	Multi-dents à pas fin d'ébauche (métrique)	118

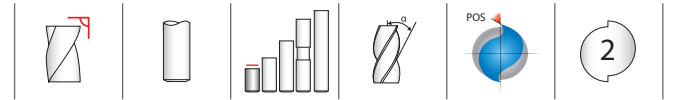
Recommandations de vitesse et avance indiquées après chaque série

Fräsen

SERIE	BESCHREIBUNG DER ALLZWECK-SCHAFTFRÄSER	SEITE
16M	Metrischer Schaftfräser mit 4 Schneidekanten ohne Eckenradien, kurze Ausführung	110
1M	Metrischer Schaftfräser mit 4 Schneidekanten ohne Eckenradien, Standardlänge	111
1XLM	Metrischer Superlangloch-Schaftfräser mit 4 Schneidekanten ohne Eckenradien	111
14M	Metrischer Schaftfräser mit 4 Schneidekanten, kurze Ausführung	113
1MB	Metrischer Schaftfräser mit 4 Schneidekanten, Standardlänge	114
1XLMB	Metrischer Superlangloch-Radiusschaftfräser mit 4 Schneidekanten	114
14MB	Metrischer Doppelend-Radiusschaftfräser mit 4 Schneidekanten, kurze Ausführung	115
1MCR	Metrischer Schaftfräser mit 4 Schneidekanten mit Eckenradien, Standardlänge	112
54M	Metrischer Schaftfräser hoher Scherfestigkeit mit 4 Schneidekanten ohne Eckenradien, Standardlänge	123
17M	Metrischer Schaftfräser mit 2 Schneidekanten ohne Eckenradien, kurze Ausführung	101
3M	Metrischer Schaftfräser mit 2 Schneidekanten ohne Eckenradien, Standardlänge	102
3XLM	Metrischer Superlangloch-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	102
59M	Metrischer Langloch-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	103
15M	Metrischer Schaftfräser mit 2 Schneidekanten, kurze Ausführung	104
3MB	Metrischer Schaftfräser mit 2 Schneidekanten, Standardlänge	105
3XLMB	Metrischer Superlangloch-Schaftfräser mit 2 Schneidekanten	105
59MB	Metrischer Langloch-Radiusschaftfräser mit 2 Schneidekanten	106
15MB	Metrischer Doppelend-Radiusschaftfräser mit 2 Schneidekanten, kurze Ausführung	107
52M	Metrischer Schaftfräser hoher Scherfestigkeit mit 2 Schneidekanten ohne Eckenradien, Standardlänge	122
5M	Metrischer Schaftfräser mit 3 Schneidekanten ohne Eckenradien, Standardlänge	108
5XLM	Metrischer Superlangloch-Schaftfräser mit 3 Schneidekanten ohne Eckenradien	108
5MB	Metrischer Schaftfräser mit 3 Schneidekanten, Standardlänge	109
5XLMB	Metrischer Superlangloch-Schaftfräser mit 3 Schneidekanten	109
61M	Metrischer mehrschneidiger fein verzahnter Schruppfräser	120
62M	Metrischer mehrschneidiger fein verzahnter Schruppfräser	118

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

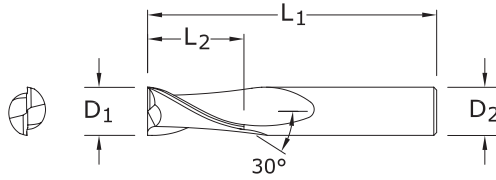
2 Flute Square End Stub



TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$



17M
METRIC SERIES

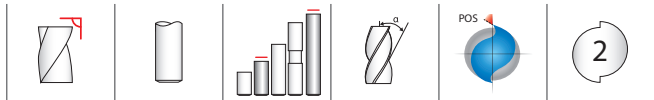
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	EDP NO.			
				UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41705	49262	49283	49304
1,5	3,0	38,0	3,0	41709	49263	49284	49305
2,0	4,0	38,0	3,0	41713	49264	49285	49306
2,5	5,0	38,0	3,0	41717	49265	49286	49307
3,0	6,0	38,0	3,0	41721	49266	49287	49308
3,5	7,0	50,0	4,0	41725	49267	49288	49309
4,0	8,0	50,0	4,0	41729	49268	49289	49310
4,5	9,5	50,0	4,5	41733	49269	49290	49311
5,0	10,0	50,0	5,0	41737	49270	49291	49312
6,0	12,0	50,0	6,0	41741	49271	49292	49313
7,0	12,0	50,0	8,0	41745	49272	49293	49314
8,0	12,0	50,0	8,0	41749	49273	49294	49315
9,0	14,0	50,0	9,0	41753	49274	49295	49316
10,0	16,0	50,0	10,0	41757	49275	49296	49317
11,0	19,0	63,0	12,0	41761	49276	49297	49318
12,0	19,0	63,0	12,0	41765	49277	49298	49319

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

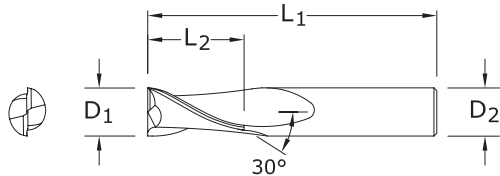
For patent information visit www.ksptpatents.com

METRIC

2 Flute Square End



3M•3XLM
METRIC SERIES



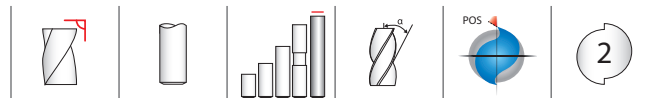
TOLERANCES (mm)
D₁ = +0,000/-0,050
D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	EDP NO.				SERIES
				UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40305	48628	48650	48671	3M
1,5	4,5	38,0	3,0	40309	48629	48651	48672	3M
2,0	6,3	38,0	3,0	40313	48630	48652	48673	3M
2,5	9,5	38,0	3,0	40317	48631	48653	48674	3M
3,0	12,0	38,0	3,0	40321	48632	48654	48675	3M
3,0	25,0	75,0	3,0	43301	49427	49440	49453	3XLM
3,5	12,0	50,0	4,0	40325	48633	48655	48676	3M
4,0	14,0	50,0	4,0	40329	48634	48656	48677	3M
4,0	25,0	75,0	4,0	43303	49428	49441	49454	3XLM
4,5	16,0	50,0	6,0	40333	48635	48657	48678	3M
5,0	16,0	50,0	6,0	40337	48636	48658	48679	3M
5,0	25,0	75,0	5,0	43307	49430	49443	49456	3XLM
6,0	19,0	50,0	6,0	40341	48637	48659	48680	3M
6,0	25,0	75,0	6,0	43305	49429	49442	49455	3XLM
7,0	19,0	63,0	8,0	40345	48638	48660	48681	3M
8,0	20,0	63,0	8,0	40349	48639	48661	48682	3M
8,0	25,0	75,0	8,0	43315	49431	49444	49457	3XLM
9,0	22,0	75,0	10,0	40353	48640	48662	48683	3M
10,0	22,0	75,0	10,0	40357	48641	48663	48684	3M
10,0	38,0	100,0	10,0	43325	49432	49445	49458	3XLM
11,0	25,0	75,0	12,0	40361	48642	48664	48685	3M
12,0	25,0	75,0	12,0	40365	48643	48665	48686	3M
12,0	50,0	100,0	12,0	43335	49433	49446	49459	3XLM
12,0	75,0	150,0	12,0	43345	49434	49447	49460	3XLM
14,0	32,0	89,0	14,0	40369	48644	48666	48687	3M
14,0	75,0	150,0	14,0	43355	49435	49448	49461	3XLM
16,0	32,0	89,0	16,0	40373	48645	48667	48688	3M
16,0	75,0	150,0	16,0	43365	49436	49449	49462	3XLM
18,0	38,0	100,0	18,0	40377	48646	48668	48689	3M
18,0	75,0	150,0	18,0	43375	49437	49450	49463	3XLM
20,0	38,0	100,0	20,0	40381	48647	48669	48690	3M
20,0	75,0	150,0	20,0	43385	49438	49451	49464	3XLM
25,0	38,0	100,0	25,0	40385	48648	48670	48691	3M
25,0	75,0	150,0	25,0	43395	49439	49452	49465	3XLM

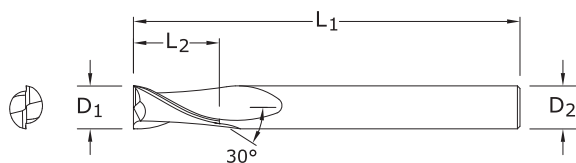
2 Flute Square End Long Reach



TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$



59M
METRIC SERIES

CUTTING DIAMETER D_1	mm			EDP NO.			
	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
3,0	9,0	60,0	6,0	43910	43920	43930	43950
4,0	12,0	70,0	6,0	43911	43921	43931	43951
6,0	15,0	80,0	6,0	43912	43922	43932	43952
8,0	20,0	89,0	8,0	43913	43923	43933	43953
10,0	25,0	100,0	10,0	43914	43924	43934	43954
12,0	30,0	110,0	12,0	43915	43925	43935	43955
14,0	35,0	120,0	16,0	43916	43926	43936	43956
16,0	40,0	120,0	16,0	43917	43927	43937	43957
18,0	40,0	130,0	20,0	43918	43928	43938	43958
20,0	45,0	130,0	20,0	43919	43929	43939	43959

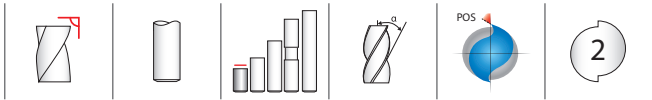
Neck Option Available

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

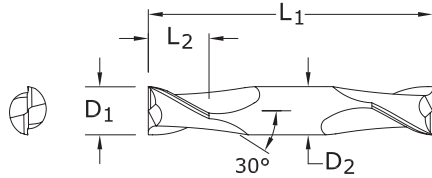
For patent information visit www.ksptpatents.com

METRIC

2 Flute Double End Mills



15M
METRIC SERIES



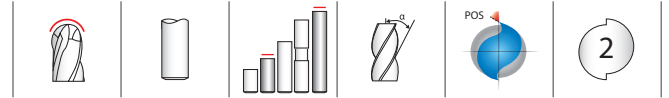
TOLERANCES (mm)
D₁ = +0,000/-0,050
D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	EDP NO.			
				UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41505	49010	49031	49052
1,5	3,0	38,0	3,0	41509	49011	49032	49053
2,0	4,0	38,0	3,0	41513	49012	49033	49054
2,5	5,0	38,0	3,0	41517	49013	49034	49055
3,0	6,0	38,0	3,0	41521	49014	49035	49056
3,5	7,0	50,0	4,0	41525	49015	49036	49057
4,0	8,0	50,0	4,0	41529	49016	49037	49058
4,5	9,5	63,0	4,5	41533	49017	49038	49059
5,0	10,0	63,0	5,0	41537	49018	49039	49060
6,0	12,0	63,0	6,0	41541	49019	49040	49061
7,0	12,0	63,0	8,0	41545	49020	49041	49062
8,0	12,0	63,0	8,0	41549	49021	49042	49063
9,0	14,0	75,0	9,0	41553	49022	49043	49064
10,0	14,0	75,0	10,0	41557	49023	49044	49065
11,0	14,0	75,0	12,0	41561	49024	49045	49066
12,0	16,0	75,0	12,0	41565	49025	49046	49067

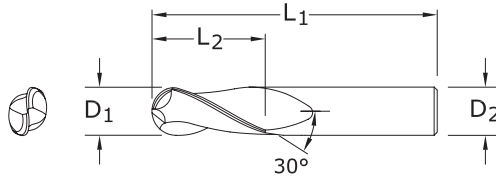
2 Flute Ball End



TOLERANCES (mm)

D₁ = +0,000/-0,050

D₂ = h₆



3MB•3XLMB

METRIC SERIES

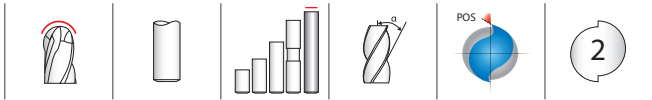
mm				EDP NO.				SERIES
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40306	48692	48714	48735	3MB
1,5	4,5	38,0	3,0	40310	48693	48715	48736	3MB
2,0	6,3	38,0	3,0	40314	48694	48716	48737	3MB
2,5	9,5	38,0	3,0	40318	48695	48717	48738	3MB
3,0	12,0	38,0	3,0	40322	48696	48718	48739	3MB
3,0	25,0	75,0	3,0	43302	49544	49557	49570	3XLMB
3,5	12,0	50,0	4,0	40326	48697	48719	48740	3MB
4,0	14,0	50,0	4,0	40330	48698	48720	48741	3MB
4,0	25,0	75,0	4,0	43304	49545	49558	49571	3XLMB
4,5	16,0	50,0	6,0	40334	48699	48721	48742	3MB
5,0	16,0	50,0	6,0	40338	48700	48722	48743	3MB
5,0	25,0	75,0	5,0	43308	49547	49560	49573	3XLMB
6,0	19,0	50,0	6,0	40342	48701	48723	48744	3MB
6,0	25,0	75,0	6,0	43306	49546	49559	49572	3XLMB
7,0	19,0	63,0	8,0	40346	48702	48724	48745	3MB
8,0	20,0	63,0	8,0	40350	48703	48725	48746	3MB
8,0	25,0	75,0	8,0	43316	49548	49561	49574	3XLMB
9,0	22,0	75,0	10,0	40354	48704	48726	48747	3MB
10,0	22,0	75,0	10,0	40358	48705	48727	48748	3MB
10,0	38,0	100,0	10,0	43326	49549	49562	49575	3XLMB
11,0	25,0	75,0	12,0	40362	48706	48728	48749	3MB
12,0	25,0	75,0	12,0	40366	48707	48729	48750	3MB
12,0	50,0	100,0	12,0	43336	49550	49563	49576	3XLMB
12,0	75,0	150,0	12,0	43346	49551	49564	49577	3XLMB
14,0	32,0	89,0	14,0	40370	48708	48730	48751	3MB
14,0	75,0	150,0	14,0	43356	49552	49565	49578	3XLMB
16,0	32,0	89,0	16,0	40374	48709	48731	48752	3MB
16,0	75,0	150,0	16,0	43366	49553	49566	49579	3XLMB
18,0	38,0	100,0	18,0	40378	48710	48732	48753	3MB
18,0	75,0	150,0	18,0	43376	49554	49567	49580	3XLMB
20,0	38,0	100,0	20,0	40382	48711	48733	48754	3MB
20,0	75,0	150,0	20,0	43386	49555	49568	49581	3XLMB
25,0	38,0	100,0	25,0	40386	48712	48734	48755	3MB
25,0	75,0	150,0	25,0	43396	49556	49569	49582	3XLMB

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

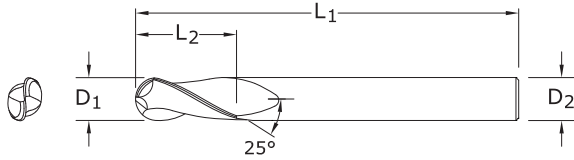
For patent information visit www.ksptpatents.com

METRIC

2 Flute Ball End Long Reach



59MB
METRIC SERIES



TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$

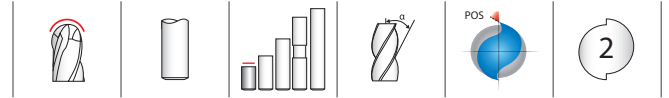
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	EDP NO.			
				UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
3,0	9,0	60,0	6,0	43900	49622	49632	49642
4,0	12,0	70,0	6,0	43901	49623	49633	49643
6,0	15,0	80,0	6,0	43902	49624	49634	49644
8,0	20,0	89,0	8,0	43903	49625	49635	49645
10,0	25,0	100,0	10,0	43904	49626	49636	49646
12,0	30,0	110,0	12,0	43905	49627	49637	49647
14,0	35,0	120,0	16,0	43906	49628	49638	49648
16,0	40,0	120,0	16,0	43907	49629	49639	49649
18,0	40,0	130,0	20,0	43908	49630	49640	49650
20,0	45,0	130,0	20,0	43909	49631	49641	49651

Neck Option Available

For patent information visit www.ksptpatents.com

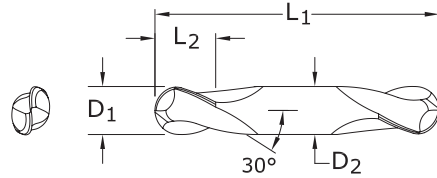
2 Flute Double End Ball End



TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$



15MB
METRIC SERIES

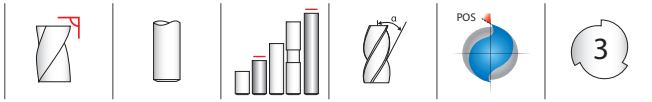
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	EDP NO.			
				UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41506	49073	49094	49115
1,5	3,0	38,0	3,0	41510	49074	49095	49116
2,0	4,0	38,0	3,0	41514	49075	49096	49117
2,5	5,0	38,0	3,0	41518	49076	49097	49118
3,0	6,0	38,0	3,0	41522	49077	49098	49119
3,5	7,0	50,0	4,0	41526	49078	49099	49120
4,0	8,0	50,0	4,0	41530	49079	49100	49121
4,5	9,5	63,0	4,5	41534	49080	49101	49122
5,0	10,0	63,0	5,0	41538	49081	49102	49123
6,0	12,0	63,0	6,0	41542	49082	49103	49124
7,0	12,0	63,0	8,0	41546	49083	49104	49125
8,0	12,0	63,0	8,0	41550	49084	49105	49126
9,0	14,0	75,0	9,0	41554	49085	49106	49127
10,0	14,0	75,0	10,0	41558	49086	49107	49128
11,0	14,0	75,0	12,0	41562	49087	49108	49129
12,0	16,0	75,0	12,0	41566	49088	49109	49130

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

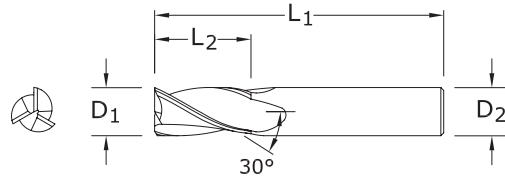
For patent information visit www.ksptpatents.com

METRIC

3 Flute Square End



5M•5XLM
METRIC SERIES



TOLERANCES (mm)

D₁ = +0,000/-0,050

D₂ = h₆

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

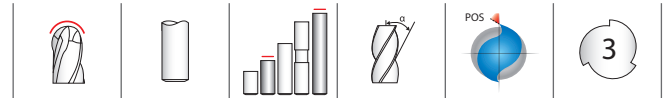
NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit www.kspatents.com

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	EDP NO.				SERIES
				UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40505	48756	48778	48799	5M
1,5	4,5	38,0	3,0	40509	48757	48779	48800	5M
2,0	6,3	38,0	3,0	40513	48758	48780	48801	5M
2,5	9,5	38,0	3,0	40517	48759	48781	48802	5M
3,0	12,0	38,0	3,0	40521	48760	48782	48803	5M
3,0	25,0	75,0	3,0	43501	49466	49479	49492	5XLM
3,5	12,0	50,0	4,0	40525	48761	48783	48804	5M
4,0	14,0	50,0	4,0	40529	48762	48784	48805	5M
4,0	25,0	75,0	4,0	43503	49467	49480	49493	5XLM
4,5	16,0	50,0	6,0	40533	48763	48785	48806	5M
5,0	16,0	50,0	6,0	40537	48764	48786	48807	5M
5,0	25,0	75,0	5,0	43507	49469	49482	49495	5XLM
6,0	19,0	50,0	6,0	40541	48765	48787	48808	5M
6,0	25,0	75,0	6,0	43505	49468	49481	49494	5XLM
7,0	19,0	63,0	8,0	40545	48766	48788	48809	5M
8,0	20,0	63,0	8,0	40549	48767	48789	48810	5M
8,0	25,0	75,0	8,0	43515	49470	49483	49496	5XLM
9,0	22,0	75,0	10,0	40553	48768	48790	48811	5M
10,0	22,0	75,0	10,0	40557	48769	48791	48812	5M
10,0	38,0	100,0	10,0	43525	49471	49484	49497	5XLM
11,0	25,0	75,0	12,0	40561	48770	48792	48813	5M
12,0	25,0	75,0	12,0	40565	48771	48793	48814	5M
12,0	50,0	100,0	12,0	43535	49472	49485	49498	5XLM
12,0	75,0	150,0	12,0	43545	49473	49486	49499	5XLM
14,0	32,0	89,0	14,0	40569	48772	48794	48815	5M
14,0	75,0	150,0	14,0	43555	49474	49487	49500	5XLM
16,0	32,0	89,0	16,0	40573	48773	48795	48816	5M
16,0	75,0	150,0	16,0	43565	49475	49488	49501	5XLM
18,0	38,0	100,0	18,0	40577	48774	48796	48817	5M
18,0	75,0	150,0	18,0	43575	49476	49489	49502	5XLM
20,0	38,0	100,0	20,0	40581	48775	48797	48818	5M
20,0	75,0	150,0	20,0	43585	49477	49490	49503	5XLM
25,0	38,0	100,0	25,0	40585	48776	48798	48819	5M
25,0	75,0	150,0	25,0	43595	49478	49491	49504	5XLM

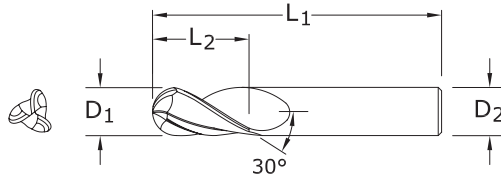
3 Flute Ball End



TOLERANCES (mm)

D₁ = +0,000/-0,050

D₂ = h₆



5MB • 5XLMB

METRIC SERIES

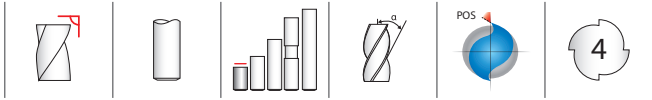
mm				EDP NO.				SERIES
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40506	48820	48842	48863	5MB
1,5	4,5	38,0	3,0	40510	48821	48843	48864	5MB
2,0	6,3	38,0	3,0	40514	48822	48844	48865	5MB
2,5	9,5	38,0	3,0	40518	48823	48845	48866	5MB
3,0	12,0	38,0	3,0	40522	48824	48846	48867	5MB
3,0	25,0	75,0	3,0	43502	49583	49596	49609	5XLMB
3,5	12,0	50,0	4,0	40526	48825	48847	48868	5MB
4,0	14,0	50,0	4,0	40530	48826	48848	48869	5MB
4,0	25,0	75,0	4,0	43504	49584	49597	49610	5XLMB
4,5	16,0	50,0	6,0	40534	48827	48849	48870	5MB
5,0	16,0	50,0	6,0	40538	48828	48850	48871	5MB
5,0	25,0	75,0	5,0	43508	49586	49599	49612	5XLMB
6,0	19,0	50,0	6,0	40542	48829	48851	48872	5MB
6,0	25,0	75,0	6,0	43506	49585	49598	49611	5XLMB
7,0	19,0	63,0	8,0	40546	48830	48852	48873	5MB
8,0	20,0	63,0	8,0	40550	48831	48853	48874	5MB
8,0	25,0	75,0	8,0	43516	49587	49600	49613	5XLMB
9,0	22,0	75,0	10,0	40554	48832	48854	48875	5MB
10,0	22,0	75,0	10,0	40558	48833	48855	48876	5MB
10,0	38,0	100,0	10,0	43526	49588	49601	49614	5XLMB
11,0	25,0	75,0	12,0	40562	48834	48856	48877	5MB
12,0	25,0	75,0	12,0	40566	48835	48857	48878	5MB
12,0	50,0	100,0	12,0	43536	49589	49602	49615	5XLMB
12,0	75,0	150,0	12,0	43546	49590	49603	49616	5XLMB
14,0	32,0	89,0	14,0	40570	48836	48858	48879	5MB
14,0	75,0	150,0	14,0	43556	49591	49604	49617	5XLMB
16,0	32,0	89,0	16,0	40574	48837	48859	48880	5MB
16,0	75,0	150,0	16,0	43566	49592	49605	49618	5XLMB
18,0	38,0	100,0	18,0	40578	48838	48860	48881	5MB
18,0	75,0	150,0	18,0	43576	49593	49606	49619	5XLMB
20,0	38,0	100,0	20,0	40582	48839	48861	48882	5MB
20,0	75,0	150,0	20,0	43586	49594	49607	49620	5XLMB
25,0	38,0	100,0	25,0	40586	48840	48862	48883	5MB
25,0	75,0	150,0	25,0	43596	49595	49608	49621	5XLMB

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

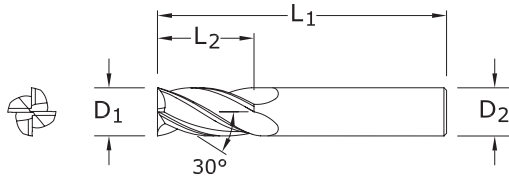
For patent information visit www.ksptpatents.com

METRIC

4 Flute Square End Stub



16M
METRIC SERIES



TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

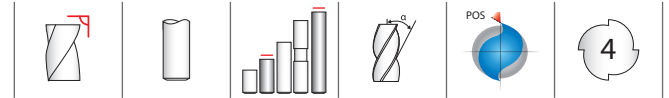
NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

CUTTING DIAMETER D_1	mm			EDP NO.			
	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41605	49136	49157	49178
1,5	3,0	38,0	3,0	41609	49137	49158	49179
2,0	4,0	38,0	3,0	41613	49138	49159	49180
2,5	5,0	38,0	3,0	41617	49139	49160	49181
3,0	6,0	38,0	3,0	41621	49140	49161	49182
3,5	7,0	50,0	4,0	41625	49141	49162	49183
4,0	8,0	50,0	4,0	41629	49142	49163	49184
4,5	9,5	50,0	4,5	41633	49143	49164	49185
5,0	10,0	50,0	5,0	41637	49144	49165	49186
6,0	12,0	50,0	6,0	41641	49145	49166	49187
7,0	12,0	50,0	8,0	41645	49146	49167	49188
8,0	12,0	50,0	8,0	41649	49147	49168	49189
9,0	14,0	50,0	9,0	41653	49148	49169	49190
10,0	16,0	50,0	10,0	41657	49149	49170	49191
11,0	19,0	63,0	12,0	41661	49150	49171	49192
12,0	19,0	63,0	12,0	40165	49151	49172	49193

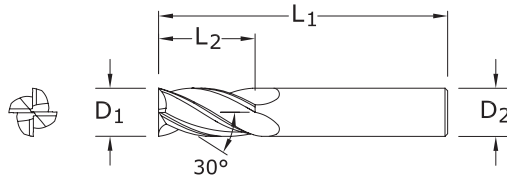
METRIC
4 Flute End Mills



TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$



1M • 1XLM
METRIC SERIES

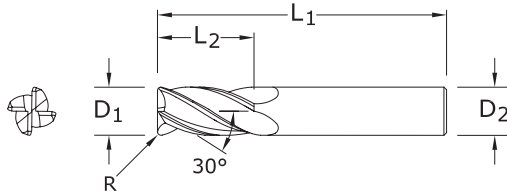
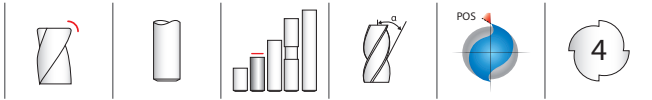
mm				EDP NO.				SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40105	48500	48522	48543	1M
1,5	4,5	38,0	3,0	40109	48501	48523	48544	1M
2,0	6,3	38,0	3,0	40113	48502	48524	48545	1M
2,5	9,5	38,0	3,0	40117	48503	48525	48546	1M
3,0	12,0	38,0	3,0	40121	48504	48526	48547	1M
3,0	25,0	75,0	3,0	43101	49388	49401	49414	1XLM
3,5	12,0	50,0	4,0	40125	48505	48527	48548	1M
4,0	14,0	50,0	4,0	40129	48506	48528	48549	1M
4,0	25,0	75,0	4,0	43103	49389	49402	49415	1XLM
4,5	16,0	50,0	6,0	40133	48507	48529	48550	1M
5,0	16,0	50,0	6,0	40137	48508	48530	48551	1M
5,0	25,0	75,0	5,0	43107	49391	49404	49417	1XLM
6,0	19,0	50,0	6,0	40141	48509	48531	48552	1M
6,0	25,0	75,0	6,0	43105	49390	49403	49416	1XLM
7,0	19,0	63,0	8,0	40145	48510	48532	48553	1M
8,0	20,0	63,0	8,0	40149	48511	48533	48554	1M
8,0	25,0	75,0	8,0	43115	49392	49405	49418	1XLM
9,0	22,0	75,0	10,0	40153	48512	48534	48555	1M
10,0	22,0	75,0	10,0	40157	48513	48535	48556	1M
10,0	38,0	100,0	10,0	43125	49393	49406	49419	1XLM
11,0	25,0	75,0	12,0	40161	48514	48536	48557	1M
12,0	25,0	75,0	12,0	41665	48515	48537	48558	1M
12,0	50,0	100,0	12,0	43135	49394	49407	49420	1XLM
12,0	75,0	150,0	12,0	43145	49395	49408	49421	1XLM
14,0	32,0	89,0	14,0	40169	48516	48538	48559	1M
14,0	75,0	150,0	14,0	43155	49396	49409	49422	1XLM
16,0	32,0	89,0	16,0	40173	48517	48539	48560	1M
16,0	75,0	150,0	16,0	43165	49397	49410	49423	1XLM
18,0	38,0	100,0	18,0	40177	48518	48540	48561	1M
18,0	75,0	150,0	18,0	43175	49398	49411	49424	1XLM
20,0	38,0	100,0	20,0	40181	48519	48541	48562	1M
20,0	75,0	150,0	20,0	43185	49399	49412	49425	1XLM
25,0	38,0	100,0	25,0	40185	48520	48542	48563	1M
25,0	75,0	150,0	25,0	43195	49400	49413	49426	1XLM

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

METRIC

4 Flute Corner Radius



1MCR
METRIC SERIES

TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$

$R = +0,000/-0,050$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

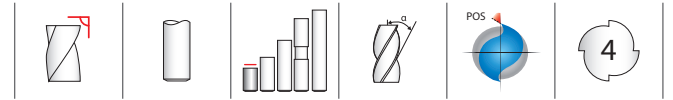
NON-FERROUS

PLASTICS/COMPOSITES

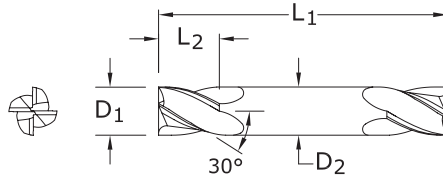
For patent information visit www.ksptpatents.com

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			SHANK DIAMETER D_2	EDP NO. Ti-NAMITE-A (AITiN)
		OVERALL LENGTH L_1	CORNER RADIUS R			
4,0	14,0	50,0	0,25	4,0	40000	
4,0	14,0	50,0	0,50	4,0	40001	
4,0	14,0	50,0	1,00	4,0	40003	
5,0	16,0	50,0	0,25	6,0	40004	
5,0	16,0	50,0	0,50	6,0	40005	
5,0	16,0	50,0	1,00	6,0	40007	
6,0	19,0	50,0	0,25	6,0	40009	
6,0	19,0	50,0	0,50	6,0	40010	
6,0	19,0	50,0	0,75	6,0	40011	
6,0	19,0	50,0	1,00	6,0	40012	
8,0	20,0	63,0	0,50	8,0	40015	
8,0	20,0	63,0	0,75	8,0	40016	
8,0	20,0	63,0	1,00	8,0	40017	
8,0	20,0	63,0	1,50	8,0	40019	
8,0	20,0	63,0	2,00	8,0	40020	
10,0	22,0	75,0	0,50	10,0	40021	
10,0	22,0	75,0	1,00	10,0	40023	
10,0	22,0	75,0	1,50	10,0	40024	
10,0	22,0	75,0	2,00	10,0	40025	
12,0	25,0	75,0	0,50	12,0	40028	
12,0	25,0	75,0	1,00	12,0	40030	
12,0	25,0	75,0	1,50	12,0	40031	
12,0	25,0	75,0	2,00	12,0	40032	
16,0	32,0	89,0	0,50	16,0	40035	
16,0	32,0	89,0	1,00	16,0	40037	
16,0	32,0	89,0	1,50	16,0	40038	
16,0	32,0	89,0	2,00	16,0	40039	

4 Flute Double End Mills



TOLERANCES (mm)
 $D_1 = +0,000/-0,050$
 $D_2 = h_6$



14M
 METRIC SERIES

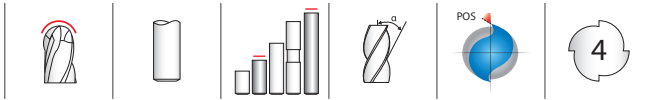
mm				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41405	48884	48905	48926
1,5	3,0	38,0	3,0	41409	48885	48906	48927
2,0	4,0	38,0	3,0	41413	48886	48907	48928
2,5	5,0	38,0	3,0	41417	48887	48908	48929
3,0	6,0	38,0	3,0	41421	48888	48909	48930
3,5	7,0	50,0	4,0	41425	48889	48910	48931
4,0	8,0	50,0	4,0	41429	48890	48911	48932
4,5	9,5	63,0	4,5	41433	48891	48912	48933
5,0	10,0	63,0	5,0	41437	48892	48913	48934
6,0	12,0	63,0	6,0	41441	48893	48914	48935
7,0	12,0	63,0	8,0	41445	48894	48915	48936
8,0	12,0	63,0	8,0	41449	48895	48916	48937
9,0	14,0	75,0	9,0	41453	48896	48917	48938
10,0	14,0	75,0	10,0	41457	48897	48918	48939
11,0	14,0	75,0	12,0	41461	48898	48919	48940
12,0	16,0	75,0	12,0	41465	48899	48920	48941

- STEELS
- STAINLESS STEELS
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- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

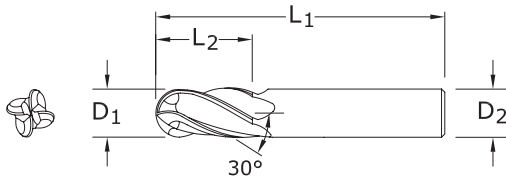
METRIC

4 Flute Ball End



1MB•1XLMB

METRIC SERIES



TOLERANCES (mm)

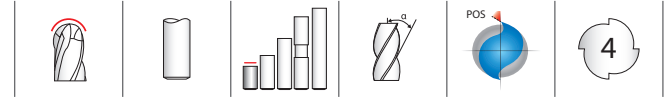
D₁ = +0,000/-0,050
D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
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- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

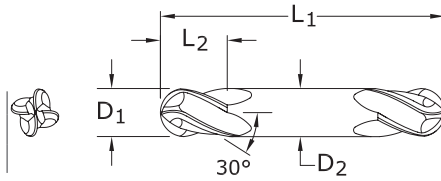
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	EDP NO.				SERIES
				UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40106	48564	48586	48607	1MB
1,5	4,5	38,0	3,0	40110	48565	48587	48608	1MB
2,0	6,3	38,0	3,0	40114	48566	48588	48609	1MB
2,5	9,5	38,0	3,0	40118	48567	48589	48610	1MB
3,0	12,0	38,0	3,0	40122	48568	48590	48611	1MB
3,0	25,0	75,0	3,0	43102	49505	49518	49531	1XLMB
3,5	12,0	50,0	4,0	40126	48569	48591	48612	1MB
4,0	14,0	50,0	4,0	40130	48570	48592	48613	1MB
4,0	25,0	75,0	4,0	43104	49506	49519	49532	1XLMB
4,5	16,0	50,0	6,0	40134	48571	48593	48614	1MB
5,0	16,0	50,0	6,0	40138	48572	48594	48615	1MB
5,0	25,0	75,0	5,0	43108	49508	49521	49534	1XLMB
6,0	19,0	50,0	6,0	40142	48573	48595	48616	1MB
6,0	25,0	75,0	6,0	43106	49507	49520	49533	1XLMB
7,0	19,0	63,0	8,0	40146	48574	48596	48617	1MB
8,0	20,0	63,0	8,0	40150	48575	48597	48618	1MB
8,0	25,0	75,0	8,0	43116	49509	49522	49535	1XLMB
9,0	22,0	75,0	10,0	40154	48576	48598	48619	1MB
10,0	22,0	75,0	10,0	40158	48577	48599	48620	1MB
10,0	38,0	100,0	10,0	43126	49510	49523	49536	1XLMB
11,0	25,0	75,0	12,0	40162	48578	48600	48621	1MB
12,0	25,0	75,0	12,0	40166	48579	48601	48622	1MB
12,0	50,0	100,0	12,0	43136	49511	49524	49537	1XLMB
12,0	75,0	150,0	12,0	43146	49512	49525	49538	1XLMB
14,0	32,0	89,0	14,0	40170	48580	48602	48623	1MB
14,0	75,0	150,0	14,0	43156	49513	49526	49539	1XLMB
16,0	32,0	89,0	16,0	40174	48581	48603	48624	1MB
16,0	75,0	150,0	16,0	43166	49514	49527	49540	1XLMB
18,0	38,0	100,0	18,0	40178	48582	48604	48625	1MB
18,0	75,0	150,0	18,0	43176	49515	49528	49541	1XLMB
20,0	38,0	100,0	20,0	40182	48583	48605	48626	1MB
20,0	75,0	150,0	20,0	43186	49516	49529	49542	1XLMB
25,0	38,0	100,0	25,0	40186	48584	48606	48627	1MB
25,0	75,0	150,0	25,0	43196	49517	49530	49543	1XLMB

4 Flute Double End Ball End



TOLERANCES (mm)

$D_1 = +0,000/-0,050$
 $D_2 = h_6$



14MB
 METRIC SERIES

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	EDP NO.			
				UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41406	48947	48968	48989
1,5	3,0	38,0	3,0	41410	48948	48969	48990
2,0	4,0	38,0	3,0	41414	48949	48970	48991
2,5	5,0	38,0	3,0	41418	48950	48971	48992
3,0	6,0	38,0	3,0	41422	48951	48972	48993
3,5	7,0	50,0	4,0	41426	48952	48973	48994
4,0	8,0	50,0	4,0	41430	48953	48974	48995
4,5	9,5	63,0	4,5	41434	48954	48975	48996
5,0	10,0	63,0	5,0	41438	48955	48976	48997
6,0	12,0	63,0	6,0	41442	48956	48977	48998
7,0	12,0	63,0	8,0	41446	48957	48978	48999
8,0	12,0	63,0	8,0	41450	48958	48979	49000
9,0	14,0	75,0	9,0	41454	48959	48980	49001
10,0	14,0	75,0	10,0	41458	48960	48981	49002
11,0	14,0	75,0	12,0	41462	48961	48982	49003
12,0	16,0	75,0	12,0	41466	48962	48983	49004

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

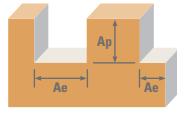
For patent information visit www.ksptpatents.com

METRIC

2 Flute: Square, Double, Stub, Long Reach, Ball

3 Flute: Square, Long Reach, Ball

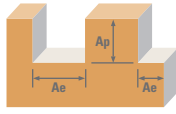
4 Flute: Square, Double, Stub, Long Reach, Ball, Corner Radius



Series	Hardness	Flutes	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)									
						0.4	0.75	1.5	3	6	10	12	20	25	
CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRC	Profile	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	(112-168)	140 RPM	111483	59458	29729	14864	7432	4459	3716	2230	1784	
					Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070	
					Feed (mm/min)	178	178	184	208	282	357	357	285	250	
		Slot	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	102 RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299		
				Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070		
				Feed (mm/min)	130	130	134	152	206	260	260	208	182		
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRC	Profile	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	(82-123)	102 RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299
						Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
						Feed (mm/min)	81	104	95	130	152	188	195	156	135
			Slot	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	75 RPM	59377	31668	15834	7917	3958	2375	1979	1188	950	
					Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052	
					Feed (mm/min)	59	76	70	95	111	138	143	114	99	
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRC	Profile	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	(77-115)	96 RPM	76342	40715	20358	10179	5089	3054	2545	1527	1221
						Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
						Feed (mm/min)	76	98	90	122	143	177	183	147	127
			Slot	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	70 RPM	55741	29729	14864	7432	3716	2230	1858	1115	892	
					Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052	
					Feed (mm/min)	56	71	65	89	104	129	134	107	93	
	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRC	Profile	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	(82-123)	102 RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299
						Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
						Feed (mm/min)	130	130	134	152	206	260	260	208	182
			Slot	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	75 RPM	59377	31668	15834	7917	3958	2375	1979	1188	950	
					Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070	
					Feed (mm/min)	95	95	98	111	150	190	190	152	133	
STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F		≤ 275 Bhn or ≤ 28 HRC	Profile	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	(90-135)	113 RPM	89671	47825	23912	11956	5978	3587	2989	1793	1435
						Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
						Feed (mm/min)	90	115	105	143	167	208	215	172	149
			Slot	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	82 RPM	65436	34899	17449	8725	4362	2617	2181	1309	1047	
					Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052	
					Feed (mm/min)	65	84	77	105	122	152	157	126	109	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4 PH, 15-5, 13-4, Custom 450	≤ 275 Bhn or ≤ 28 HRC	Profile	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	(62-93)	78 RPM	61800	32960	16480	8240	4120	2472	2060	1236	989
						Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
						Feed (mm/min)	62	66	63	66	99	119	119	91	83
			Slot	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	56 RPM	44836	23912	11956	5978	2989	1793	1495	897	717	
					Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042	
					Feed (mm/min)	45	48	45	48	72	86	87	66	60	
Slot		2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	45 RPM	44836	23912	11956	5978	2989	1793	1495	897	717			
			Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042			
			Feed (mm/min)	67	72	68	72	108	129	130	100	90			

continued on next page

2 Flute: Square, Double, Stub, Long Reach, Ball 3 Flute: Square, Long Reach, Ball 4 Flute: Square, Double, Stub, Long Reach, Ball, Corner Radius



Series
1M, 3M, 5M,
14M, 15M, 16M,
17M, 59M
Metric

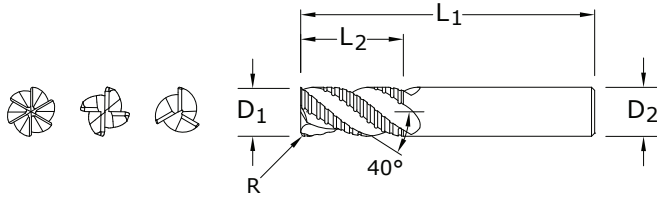
Material	Hardness	Flutes	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)										
						0.4	0.75	1.5	3	6	10	12	20	25		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, 718, Incoloy 800, Monel 400, Rene, Waspalloy	≤ 300 Bhn or ≤ 32 HRc	Profile	2 ≤ 0.50 ≤ 1.5	3 ≤ 0.25 ≤ 1.5	(16-24)	RPM	15753	8402	4201	2100	1050	630	525	315	252	
						Fz	0.0005	0.0007	0.0014	0.004	0.010	0.021	0.024	0.032	0.035	
						Feed (mm/min)	16	12	12	17	21	26	25	20	18	
		Slot	2 1 ≤ 1	3 1 ≤ 0.5	4 1 ≤ 0.4	(11-16)	RPM	10906	5816	2908	1454	727	436	364	218	174
							Fz	0.0005	0.0007	0.0014	0.004	0.010	0.021	0.024	0.032	0.035
							Feed (mm/min)	11	8	8	12	15	18	17	14	12
	≤ 350 Bhn or ≤ 38 HRc	Profile	2 ≤ 0.50 ≤ 1.5	3 ≤ 0.25 ≤ 1.5	4 ≤ 0.25 ≤ 1.5	(44-66)	RPM	43624	23266	11633	5816	2908	1745	1454	872	698
							Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
							Feed (mm/min)	44	47	44	47	70	84	84	65	59
		Slot	2 1 ≤ 1	3 1 ≤ 0.5	4 1 ≤ 0.4	(32-48)	RPM	31506	16803	8402	4201	2100	1260	1050	630	504
							Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
							Feed (mm/min)	32	34	32	34	50	60	61	47	42
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	2 ≤ 0.50 ≤ 1.5	3 ≤ 0.25 ≤ 1.5	(215-322)	RPM	213272	113745	56872	28436	14218	8531	7109	4265	3412	
						Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140	
						Feed (mm/min)	640	728	682	796	1081	1365	1365	1092	955	
		Slot	2 1 ≤ 1	3 1 ≤ 0.5	4 1 ≤ 0.4	(156-234)	RPM	155107	82724	41362	20681	10340	6204	5170	3102	2482
							Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
							Feed (mm/min)	465	529	496	579	786	993	993	794	695
COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	2 ≤ 0.50 ≤ 1.5	3 ≤ 0.25 ≤ 1.5	(118-177)	RPM	117542	62689	31344	15672	7836	4702	3918	2351	1881	
						Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070	
						Feed (mm/min)	188	188	194	219	298	376	376	301	263	
		Slot	2 1 ≤ 1	3 1 ≤ 0.5	4 1 ≤ 0.4	(156-234)	RPM	84824	45239	22620	11310	5655	3393	2827	1696	1357
							Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
							Feed (mm/min)	136	136	140	158	215	271	271	217	190
PLASTICS Polycarbonate, PVC, Polypropylene	≤ 140 Bhn or ≤ 3 HRc	Profile	2 ≤ 0.50 ≤ 1.5	3 ≤ 0.25 ≤ 1.5	(215-322)	RPM	213272	113745	56872	28436	14218	8531	7109	4265	3412	
						Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140	
						Feed (mm/min)	640	728	682	796	1081	1365	1365	1092	955	
		Slot	2 1 ≤ 1	3 1 ≤ 0.5	4 1 ≤ 0.4	(156-234)	RPM	155107	82724	41362	20681	10340	6204	5170	3102	2482
							Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
							Feed (mm/min)	465	529	496	579	786	993	993	794	695
GRAPHITE	≤ 140 Bhn or ≤ 3 HRc	Profile	2 ≤ 0.50 ≤ 1.5	3 ≤ 0.25 ≤ 1.5	(161-241)	RPM	159954	85309	42654	21327	10664	6398	5332	3199	2559	
						Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140	
						Feed (mm/min)	480	546	512	597	810	1024	1024	819	717	
		Slot	2 1 ≤ 1	3 1 ≤ 0.5	4 1 ≤ 0.4	(117-176)	RPM	116330	62043	31021	15511	7755	4653	3878	2327	1861
							Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
							Feed (mm/min)	349	397	372	434	589	745	745	596	521

Bhn (Brinell) HRc (Rockwell C)
 rpm = (Vc x 1000) / (D₁ x 3.14)
 mm/min = Fz x number of flutes x rpm
 reduce speed and feed for materials harder than listed

limit cut depths of long and extra long flute mills to .05 x D₁ when slotting or profiling
 reduce feed and Ae when finish milling (.02 x D₁ maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information
 (www.kyocera-sgstool.com)

METRIC

Single End Roughers (Fine Pitch)



62M
METRIC SERIES

TOLERANCES h10 (mm)

$D_1 = +0,000 / -0,100$

$D_2 = h_6$

$R = +0,127 / -0,127$

mm						EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	NO. OF FLUTES	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
6,0	19,0	63,0	6,0	1,14	3	46207	46206	46210
8,0	19,0	63,0	8,0	1,14	3	46209	46208	46211
10,0	22,0	72,0	10,0	1,52	3	46213	46212	46214
12,0	26,0	83,0	12,0	1,52	4	46217	46216	46218
16,0	32,0	92,0	16,0	1,52	4	46221	46220	46222
20,0	38,0	104,0	20,0	1,52	4	46229	46228	46232
25,0	44,0	104,0	25,0	1,52	6	46231	46230	46233

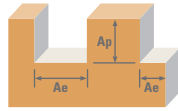
STAINLESS STEELS









HIGH TEMP ALLOYS

TITANIUM

For patent information visit www.ksptpatents.com

Single End Roughers (Fine Pitch)



Series 62M Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)							
					6	10	12	20	25			
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	123	RPM	6544	3926	3272	1963	1570
						(99-148)	Fz	0.014	0.029	0.036	0.051	0.053
						Feed (mm/min)	283	345	471	398	495	
			Slot 	1	≤ 1	99	RPM	5251	3151	2626	1575	1260
						(79-119)	Fz	0.014	0.029	0.036	0.051	0.053
						Feed (mm/min)	227	277	378	319	397	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4PH, 15-5PH, 13-4PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	85	RPM	4524	2714	2262	1357	1086
						(68-102)	Fz	0.012	0.024	0.029	0.040	0.043
						Feed (mm/min)	163	195	261	217	277	
			Slot 	1	≤ 1	69	RPM	3635	2181	1818	1091	872
						(55-82)	Fz	0.012	0.024	0.029	0.040	0.043
						Feed (mm/min)	131	157	209	174	222	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspalloy	≤ 300 Bhn or ≤ 32 HRc	Profile 	≤ 0.5	≤ 1.5	21	RPM	1131	679	565	339	271
						(17-26)	Fz	0.010	0.021	0.024	0.035	0.035
						Feed (mm/min)	33	43	54	47	57	
			Slot 	1	≤ 1	17	RPM	905	543	452	271	217
						(14-20)	Fz	0.010	0.021	0.024	0.035	0.035
						Feed (mm/min)	26	35	43	38	46	
	TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	≤ 350 Bhn or ≤ 38 HRc	Profile 	≤ 0.5	≤ 1.5	47	RPM	2504	1503	1252	751	601
						(38-57)	Fz	0.012	0.024	0.029	0.040	0.043
						Feed (mm/min)	90	108	144	120	153	
			Slot 	1	≤ 1	59	RPM	3151	1890	1575	945	756
						(48-71)	Fz	0.012	0.024	0.029	0.040	0.043
						Feed (mm/min)	113	136	181	151	193	

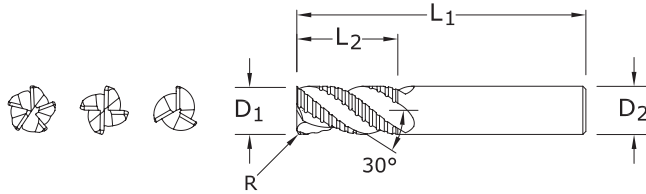
Bhn (Brinell) HRc (Rockwell C)
 rpm = (Vc x 1000) / (D₁ x 3.14)
 mm/min = Fz x number of flutes x rpm
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstoool.com)

METRIC

Single End Roughers (Coarse Pitch)



61M
METRIC SERIES



TOLERANCES h10 (mm)

$D_1 = +0,000 / -0,100$

$D_2 = h_6$

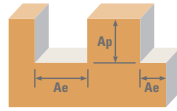
$R = +0,127 / -0,127$









CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	mm			EDP NO.		
			SHANK DIAMETER D_2	CORNER RADIUS R	NO. OF FLUTES	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
6,0	19,0	63,0	6,0	1,14	3	46107	46106	46110
8,0	19,0	63,0	8,0	1,14	3	46109	46108	46111
10,0	22,0	72,0	10,0	1,52	3	46113	46112	46114
12,0	26,0	83,0	12,0	1,52	4	46117	46116	46118
16,0	32,0	92,0	16,0	1,52	4	46121	46120	46122
20,0	38,0	104,0	20,0	1,52	4	46129	46128	46132
25,0	44,0	104,0	25,0	1,52	5	46131	46130	46133

- STEELS
- CAST IRON
- HARDENED STEELS

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Single End Roughers (Coarse Pitch)

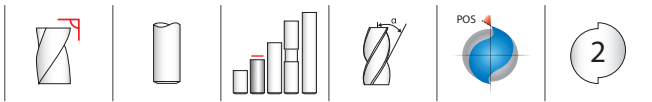


Series 61M Metric	Hardness	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)							
					6	10	12	20	25			
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	Profile 	≤ 0.5	≤ 1.5	152	RPM	8078	4847	4039	2424	1939
						(122-183)	Fz	0.014	0.029	0.034	0.045	0.050
						Feed (mm/min)	339	422	549	436	485	
			Slot 	1	≤ 1	122	RPM	6463	3878	3231	1939	1551
						(98-146)	Fz	0.014	0.029	0.034	0.045	0.050
						Feed (mm/min)	271	337	439	349	388	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HR	Profile 	≤ 0.5	≤ 1.5	111	RPM	5897	3538	2949	1769	1415
						(89-134)	Fz	0.010	0.021	0.026	0.035	0.038
						Feed (mm/min)	177	223	307	248	269	
			Slot 	1	≤ 1	90	RPM	4766	2860	2383	1430	1144
						(72-108)	Fz	0.010	0.021	0.026	0.035	0.038
						Feed (mm/min)	143	180	248	200	217	
H	≤ 250 Bhn or ≤ 24 HRc	Profile 	≤ 0.5	≤ 1.5	105	RPM	5574	3344	2787	1672	1338	
					(84-126)	Fz	0.014	0.024	0.036	0.048	0.053	
					Feed (mm/min)	234	241	401	321	355		
		Slot 	1	≤ 1	84	RPM	4443	2666	2222	1333	1066	
					(67-101)	Fz	0.014	0.024	0.036	0.048	0.053	
					Feed (mm/min)	187	192	320	256	283		
K	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ 0.5	≤ 1.5	111	RPM	5897	3538	2949	1769	1415	
					(89-134)	Fz	0.019	0.040	0.048	0.064	0.070	
					Feed (mm/min)	336	425	566	453	495		
		Slot 	1	≤ 1	90	RPM	4766	2860	2383	1430	1144	
					(72-108)	Fz	0.019	0.040	0.048	0.064	0.070	
					Feed (mm/min)	272	343	458	366	400		

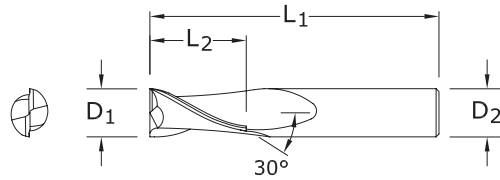
Bhn (Brinell) HRc (Rockwell C)
 rpm = (Vc x 1000) / (D₁ x 3.14)
 mm/min = Fz x number of flutes x rpm
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC

2 Flute High Shear End Mills



52M
METRIC SERIES



TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
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CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	EDP NO.	
				UNCOATED	Ti-NAMITE-C (TiCN)
3,0	7,0	38,0	3,0	45277	49829
3,5	7,0	57,0	6,0	45279	49830
4,0	8,0	57,0	6,0	45281	49831
4,5	8,0	57,0	6,0	45283	49832
5,0	10,0	57,0	6,0	45285	49833
6,0	10,0	57,0	6,0	45287	49834
8,0	16,0	63,0	8,0	45289	49835
10,0	19,0	72,0	10,0	45291	49836
12,0	22,0	83,0	12,0	45293	49837
14,0	22,0	83,0	14,0	45295	49838
16,0	26,0	92,0	16,0	45297	49839
20,0	32,0	104,0	20,0	45299	49840

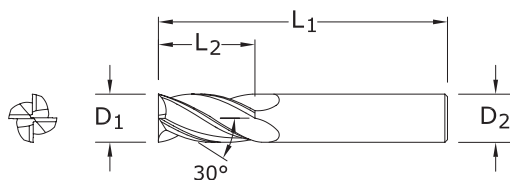
4 Flute High Shear End Mills



TOLERANCES (mm)

$D_1 = +0,000/-0,050$

$D_2 = h_6$



54M
METRIC SERIES

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	EDP NO.	
				UNCOATED	Ti-NAMITE-C (TiCN)
3,0	8,0	38,0	3,0	45477	45478
3,5	10,0	57,0	6,0	45479	45480
4,0	11,0	57,0	6,0	45481	45482
4,5	11,0	57,0	6,0	45483	45484
5,0	13,0	57,0	6,0	45485	45486
6,0	13,0	57,0	6,0	45487	45488
8,0	19,0	63,0	8,0	45489	45490
10,0	22,0	72,0	10,0	45491	45492
12,0	26,0	83,0	12,0	45493	45494
14,0	26,0	83,0	14,0	45495	45496
16,0	32,0	92,0	16,0	45497	45498
20,0	38,0	104,0	20,0	45499	45500

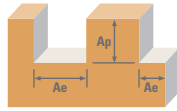
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

METRIC

2 Flute: High Shear End Mills

4 Flute: High Shear End Mills

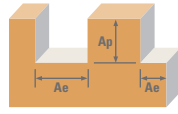




Series 52M, 54M Metric	Hardness	Flutes	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)								
						3	6	10	12	20	25			
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile 	2	≤ 0.3	≤ 1.5	415	RPM	43947	21973	13184	10987	6592	5274	
						(332-497)	Fz	0.0166	0.043	0.091	0.110	0.147	0.160	
							Feed (mm/min)	1459	1890	2399	2417	1938	1688	
		Slot 	4	≤ 0.3	≤ 1.5	332	RPM	35222	17611	10567	8806	5283	4227	
						(266-399)	Fz	0.0151	0.041	0.085	0.101	0.133	0.148	
							Feed (mm/min)	1064	1444	1796	1779	1405	1251	
	≤ 125 Bhn or ≤ 77 HRb	Profile 	2	≤ 0.3	≤ 1.5	155	RPM	16480	8240	4944	4120	2472	1978	
						(124-187)	Fz	0.0166	0.043	0.091	0.110	0.147	0.160	
							Feed (mm/min)	547	709	900	906	727	633	
		Slot 	4	≤ 0.3	≤ 1.5	125	RPM	13249	6624	3975	3312	1987	1590	
						(100-150)	Fz	0.0151	0.041	0.085	0.101	0.133	0.148	
							Feed (mm/min)	400	543	676	669	529	471	
COPPER ALLOYS Aluminum Bronze, Muntz Brass, Naval, Brass, Red Brass	≤ 140 Bhn or ≤ 3 HRc	Profile 	2	≤ 0.3	≤ 1.5	180	RPM	19065	9533	5720	4766	2860	2288	
						(144-216)	Fz	0.0094	0.024	0.053	0.062	0.083	0.093	
							Feed (mm/min)	358	458	606	591	475	426	
		Slot 	4	≤ 0.3	≤ 1.5	145	RPM	15349	7675	4605	3837	2302	1842	
						(116-174)	Fz	0.0086	0.024	0.048	0.058	0.077	0.085	
							Feed (mm/min)	264	368	442	445	355	313	
	≤ 200 Bhn or ≤ 23 HRc	Profile 	2	≤ 0.3	≤ 1.5	72	RPM	7594	3797	2278	1898	1139	911	
						(57-86)	Fz	0.0094	0.024	0.053	0.062	0.083	0.093	
							Feed (mm/min)	143	182	241	235	189	169	
		Slot 	4	≤ 0.3	≤ 1.5	58	RPM	6140	3070	1842	1535	921	737	
						(46-69)	Fz	0.0086	0.024	0.048	0.058	0.077	0.085	
							Feed (mm/min)	106	147	177	178	142	125	
≤ 200 Bhn or ≤ 23 HRc	Slot 	2	1	≤ 1	(46-69)	Feed (mm/min)	106	147	177	178	142	125		
							(46-69)	Fz	0.0086	0.024	0.048	0.058	0.077	0.085
								Feed (mm/min)	211	295	354	356	284	250

continued on next page

2 Flute: High Shear End Mills

4 Flute: High Shear End Mills



Series 52M, 54M Metric	Hardness	Flutes	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)							
						3	6	10	12	20	25		
N PLASTICS ABS, Polycarbonate, PVC, Polypropylene	Profile 	2	≤ 0.3	≤ 1.5	488 (390-585)	RPM	51702	25851	15511	12926	7755	6204	
						Fz	0.0264	0.072	0.149	0.178	0.237	0.250	
		4	≤ 0.3	≤ 1.5	390	Feed (mm/min)	2730	3723	4622	4601	3676	3102	
						RPM	5460	7445	9244	9203	7352	6204	
		Slot 	2	1	≤ 1	(312-468)	Fz	0.0240	0.065	0.136	0.163	0.210	0.238
							Feed (mm/min)	1985	2689	3375	3371	2606	2363
	4		1	≤ 0.25	175	RPM	3971	5377	6750	6742	5212	4725	
						Fz	0.0197	0.053	0.109	0.132	0.173	0.190	
	PLASTICS Fiberglass, Glass Filled		2	≤ 0.3	≤ 1.5	(176-263)	Feed (mm/min)	917	1233	1522	1536	1208	1061
							RPM	1833	2466	3043	3071	2415	2122
		4	≤ 0.3	≤ 1.5	140-210	Fz	0.0180	0.048	0.101	0.120	0.160	0.175	
						Feed (mm/min)	669	892	1126	1115	892	780	
4		1	≤ 0.25	175	RPM	1338	1784	2252	2230	1784	1561		
					Fz	0.0180	0.048	0.101	0.120	0.160	0.175		

Bhn (Brinell) HRC (Rockwell C) HRB (Rockwell B)
 rpm = (Vc x 1000) / (D₁ x 3.14)
 mm/min = Fz x number of flutes x rpm
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x D₁ maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

High Performance Drills



Hole Making

HIGH PERFORMANCE DRILLS	SERIES	DESCRIPTION	PAGE
Hi-PerCarb	135 (3xD)	2 Flute External Coolant Double Margin 3xD	133
	135 (5xD)	2 Flute External Coolant Double Margin 5xD	142
	131N (5xD)	3 Flute External Coolant Triple Margin 5xD	152
Ice-Carb®	140 (5xD)	2 Flute Internal Coolant 5xD	158
	140 (8xD)	2 Flute Internal Coolant 8xD	166
CFRP 8 Facet	120	2 Flute External Coolant Double Margin CFRP	174

Speed & Feed Recommendations listed after each series

Taladrado

TALADROS DE ALTO RENDIMIENTO	SERIE	DESCRIPCIÓN	PÁGINA
Hi-PerCarb	135 (3xD)	2 filos, refrigerante externo, doble margen, 3xD	133
	135 (5xD)	2 filos, refrigerante externo, doble margen, 5xD	142
	131N (5xD)	3 filos, refrigerante externo, triple margen, 5xD	152
Ice-Carb®	140 (5xD)	2 filos, refrigerante interno, 5xD	158
	140 (8xD)	2 filos, refrigerante interno, 8xD	166
De 8 caras CFRP	120	2 filos, refrigerante externo, doble margen, CFRP	174

Recomendaciones de velocidades y avances mostradas tras cada serie

Outils de perçage

FORETS HAUTE PERFORMANCE	SÉRIES	DESCRIPTION	PAGE
Hi-PerCarb	135 (3xD)	2 dents refroidissement externe à double listel 3xD	133
	135 (5xD)	2 dents refroidissement externe à double listel 5xD	142
	131N (5xD)	3 dents refroidissement externe à triple listel 5xD	152
Ice-Carb®	140 (5xD)	2 dents refroidissement interne 5xD	158
	140 (8xD)	2 dents refroidissement interne 8xD	166
CFRP à 8 facettes	120	2 dents refroidissement externe à double listel CFRP	174

Recommandations de vitesse et avance indiquées après chaque série

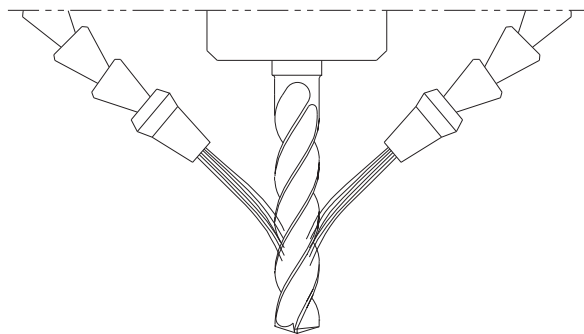
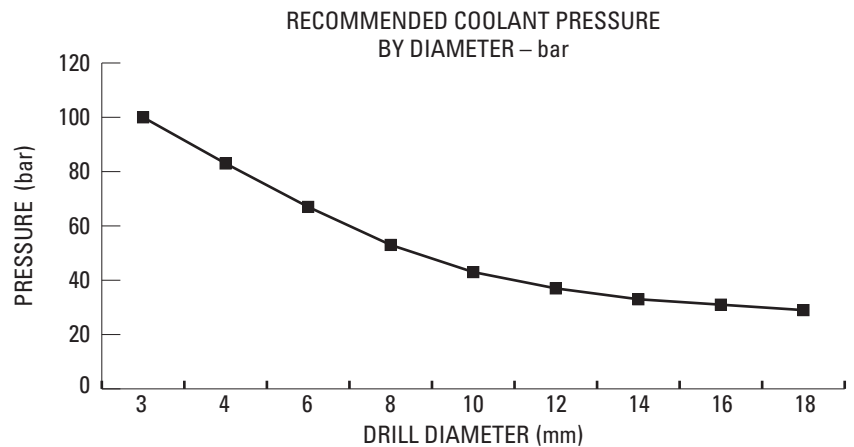
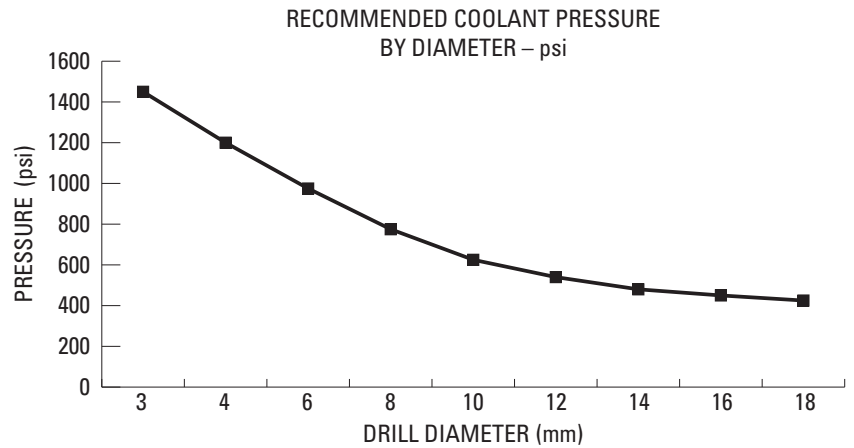
Bohren

HOCHLEISTUNGS-BOHRER	SERIE	BESCHREIBUNG	SEITE
Hi-PerCarb	135 (3xD)	Doppelfasenbohrer 3xD mit 2 Schneidekanten und Außenkühlung	133
	135 (5xD)	Doppelfasenbohrer 5xD mit 2 Schneidekanten und Außenkühlung	142
	131N (5xD)	Dreifasenbohrer 5xD mit 3 Schneidekanten und Außenkühlung	152
Ice-Carb®	140 (5xD)	Bohrer 5xD mit 2 Schneidekanten und Innenkühlung	158
	140 (8xD)	Bohrer 8xD mit 2 Schneidekanten und Innenkühlung	166
CFRP 8 Facet	120	Doppelfasenbohrer CFRP mit 2 Schneidekanten und Außenkühlung	174

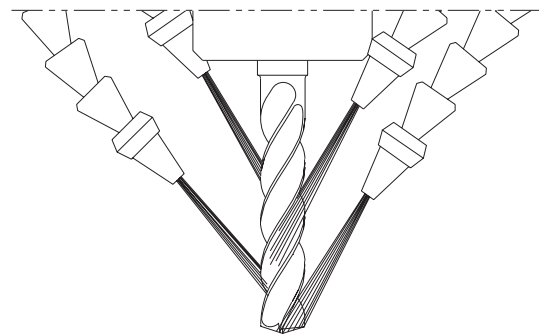
Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

Drilling Operations Coolant Recommendations

- Coolant works to mobilize chips away from the cut zone, reduce the heat created during the cutting process and minimize friction.
- It is important to optimize the coolant pressure and position in order to gain the full benefits coolant offers the cutting process.
- Proper coolant application promotes greater operating parameters, greater material removal rates, improved surface finishes, predictable tool life, reduced power consumption and reduced cycle times.
- Pressure is important, but more importantly is consistency of the pressure and application onto the tool; intermittent cooling of carbide leads to thermal stressing of the material and the formation of “microcracks.”
- Proper cleanliness and filtration of coolants is important in order for the coolant to maintain its beneficial properties, and also to avoid a reduction in coolant pressure or the possibility of clogging the coolant channels in coolant through drills.



LARGE TIP – LOW VELOCITY
NO COVERAGE AT MAXIMUM DEPTH



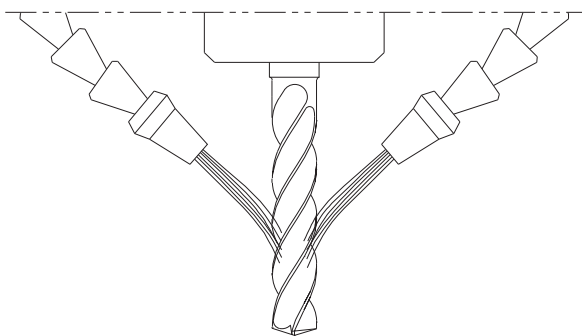
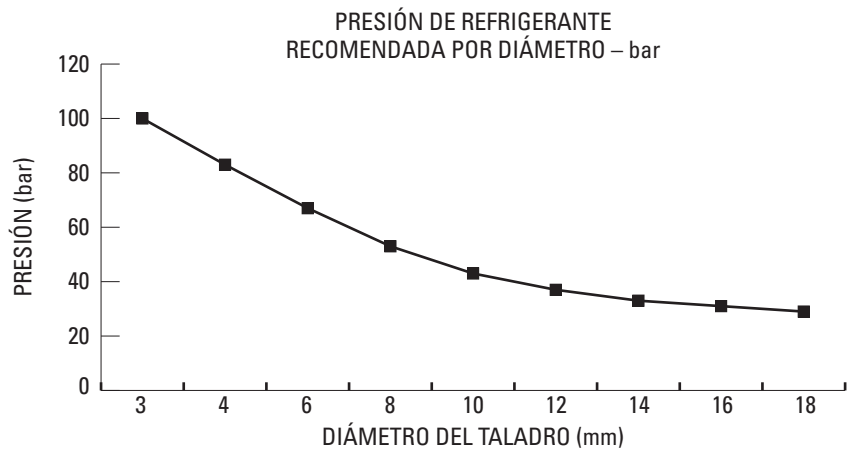
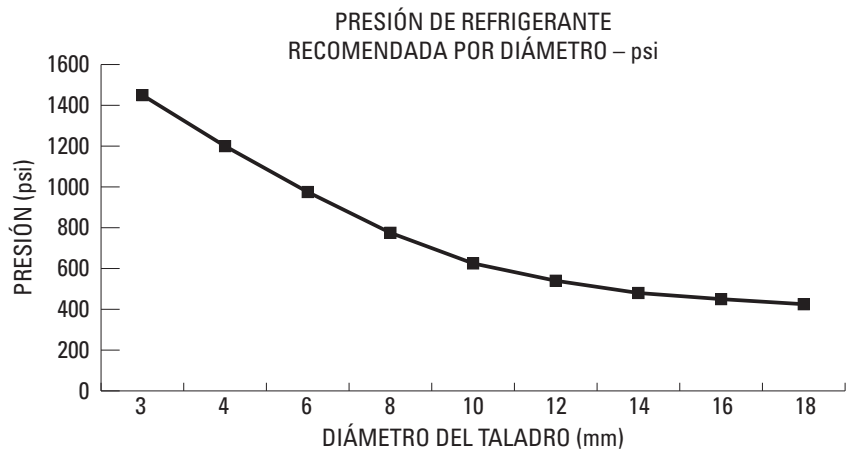
SMALL TIP – HIGH VELOCITY
COMPLETE COVERAGE

- Reducing the nozzle size helps maximize the cooling benefits of the unique double margin design on the Hi-PerCarb drill by increasing velocity. Aim the nozzles in line with the secondary flute located between the two margins as well as the flute for best results.

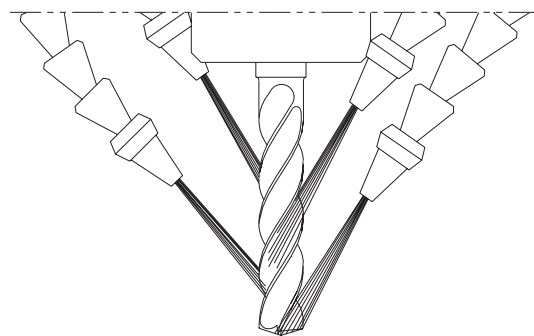
Operaciones de taladrado

Refrigerantes recomendados

- El líquido refrigerante actúa movilizandando las virutas fuera de la zona de corte, disminuyendo el calor generado durante el proceso de corte y minimizando la fricción.
- Es importante optimizar la presión del refrigerante y la posición para poder obtener todos los beneficios del refrigerante durante el proceso de corte.
- Una aplicación apropiada del refrigerante fomenta mayores parámetros de operación, mayores índices de eliminación de material, acabados de superficie mejorados, una duración de la herramienta más predecible, bajo consumo de energía y un tiempo de ciclo reducido.
- La presión es importante pero lo es más la estabilidad de la presión y la aplicación en la herramienta; la refrigeración intermitente del carburo conlleva un estrés térmico del material y la formación de "microfisuras".
- La limpieza adecuada y la filtración de refrigerantes es importante para que el mismo mantenga sus propiedades beneficiosas, y también para evitar una reducción en la presión o la posibilidad de obstruir los canales del refrigerante del taladro.



PUNTA GRANDE – BAJA VELOCIDAD
SIN ALCANCE A PROFUNDIDAD MÁXIMA



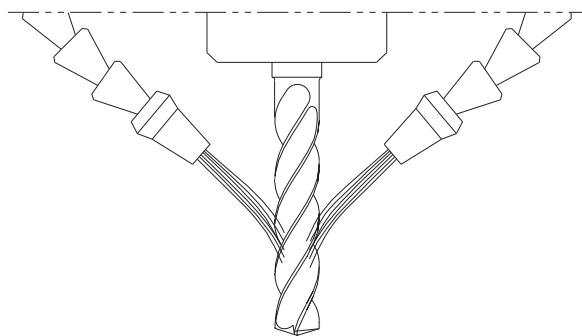
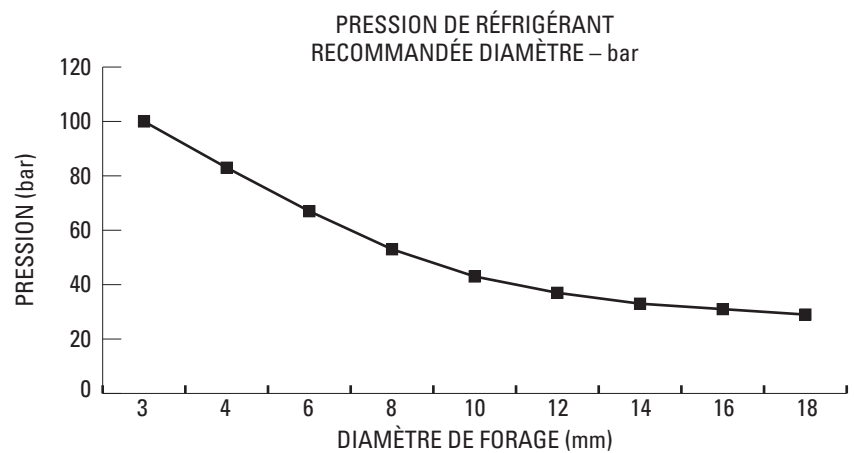
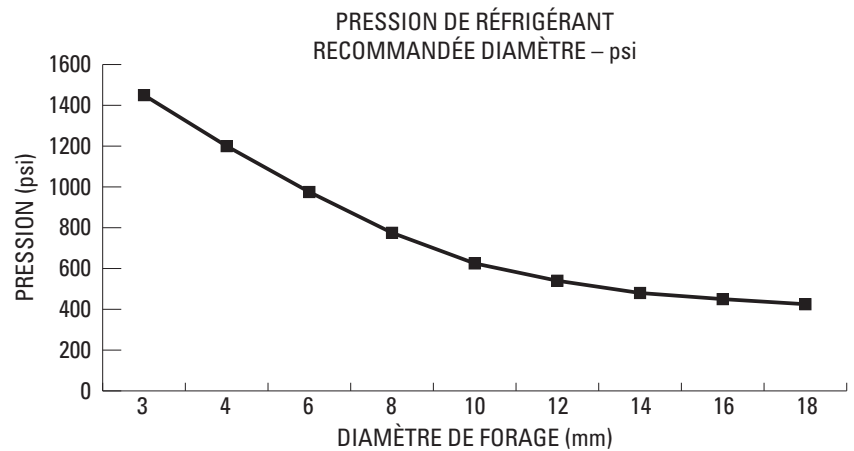
PUNTA PEQUEÑA – ALTA VELOCIDAD
COMPLETO ALCANCE

- Reducir el tamaño de la boquilla ayuda a maximizar los beneficios de refrigeración del exclusivo diseño de doble margen del taladro Hi-PerCarb aumentando la velocidad. Coloque las boquillas en línea con el segundo filo que se encuentra entre los dos márgenes y también el filo para obtener mejores resultados.

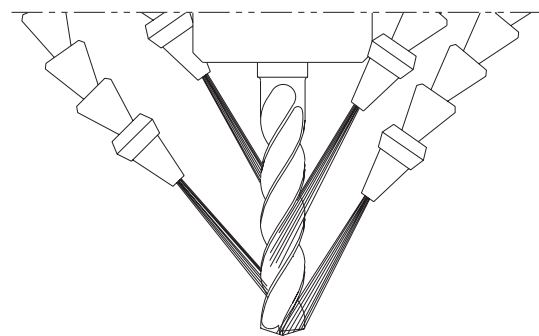
Opérations de forage

Recommandations en matière de refroidissement

- Le réfrigérant sert à éloigner les copeaux de la zone de coupe, à réduire la chaleur dégagée durant la coupe et à minimiser la friction.
- Il est important d'optimiser la pression et la position du réfrigérant pour en retirer les bénéfices maximums durant la coupe.
- L'application adéquate de réfrigérant se traduit par des paramètres opératoires supérieurs, des taux d'élimination supérieurs des matériaux, de plus belles finitions des surfaces, une durée de vie des outils prévisible, moins de consommation d'énergie et des temps de cycle réduits.
- La pression est importante, mais une pression régulière et l'application sur l'outil sont des facteurs encore plus importants ; le refroidissement intermittent du carbure se traduit par des contraintes thermiques pour le matériau et la formation de microfissures.
- La propreté et le filtrage adéquats des réfrigérants sont importants pour qu'ils conservent leur propriétés, mais aussi pour éviter la réduction de pression du réfrigérant ou le risque d'obturation des conduits à réfrigérant dans les perceuses à réfrigérant intégré.



POINTE LARGE – BASSE VITESSE
PAS DE COUVERTURE À LA PROFONDEUR MAXIMUM



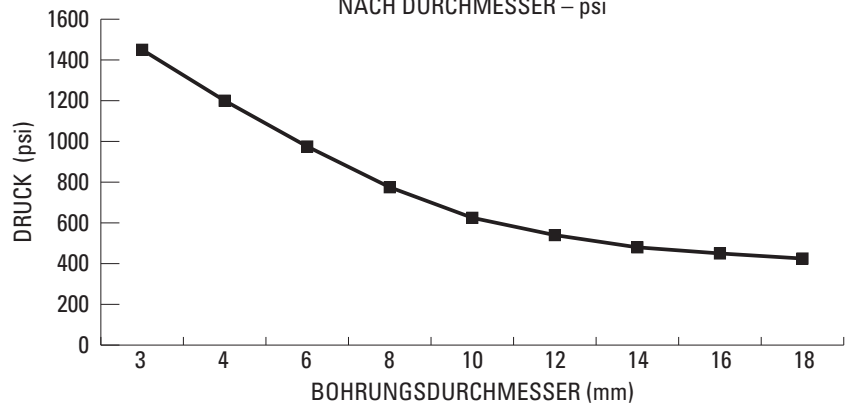
POINTE FINE – GRANDE VITESSE
COUVERTURE COMPLÈTE

- La réduction de la taille de l'embout permet de maximiser les bienfaits du refroidissement du concept à double listel original de la perceuse Hi-PerCarb en augmentant la vitesse. Pour les meilleurs résultats, orientez les embouts dans l'axe de la goujure secondaire située entre les deux listels, de même que la goujure primaire.

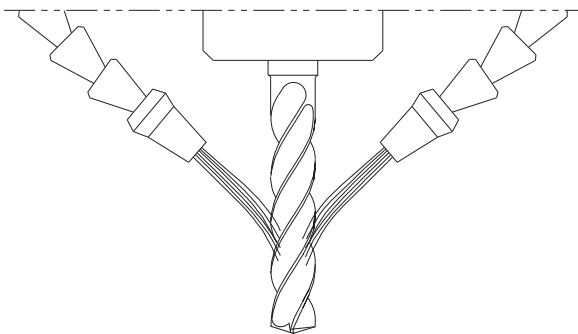
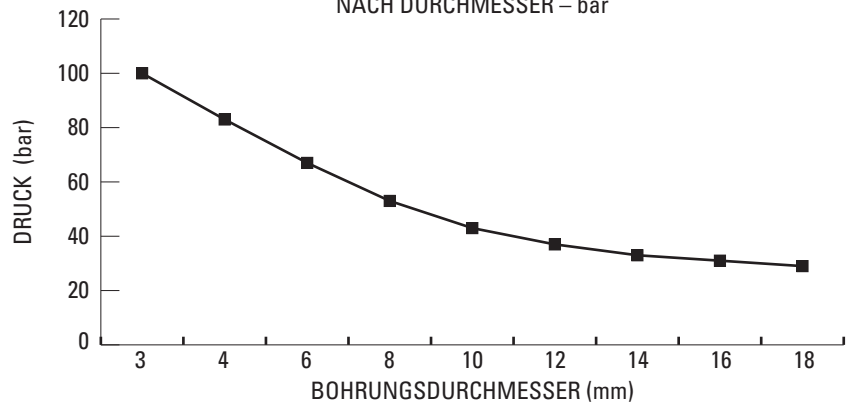
Bohrarbeiten Kühlmittelempfehlungen

- Kühlmittel dienen dazu, die Späne aus dem Schneidbereich zu entfernen, die beim Schneiden erzeugte Wärme abzutransportieren und die Reibung zu verringern.
- Es kommt darauf an, den Kühlschmiermitteldruck und die Zufuhr zu optimieren, um alle Vorteile beim Bohren nutzen zu können.
- Der richtige Kühlschmiermitteleinsatz ermöglicht höhere Schnittparameter, höheren Materialabtrag, geringere Oberflächenrauheit, vorhersehbare Standzeiten und geringere Leitungsaufnahme und Zykluszeiten.
- Der Druck ist wichtig, aber wichtiger ist dessen Konstanz und die Zufuhr zum Werkzeug. Unterbrochene Kühlung des Hartmetalls führt zur thermischen Belastung und Bildung von "Mikrorissen".
- Kühlmitteln sind sauber zu halten und zu filtern, damit die Qualität des Kühlmittels erhalten bleibt und der Kühlmitteldruck durch Verstopfung der Kühlmittelkanäle im Bohrer nicht absinkt.

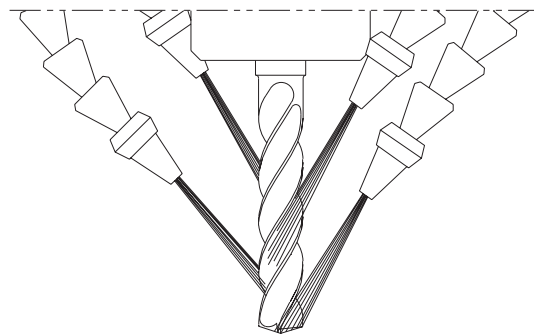
EMPFOHLENER KÜHLSCHMIERMITTELDRUCK
NACH DURCHMESSER – psi



EMPFOHLENER KÜHLMITTELDRUCK
NACH DURCHMESSER – bar



BREITE QUERSCHNEIDE – GERINGE DREHZAHL
KEINE VOLLSTÄNDIGE BENETZUNG BEI MAX. BOHRUNGSTIEFE



SCHMALE QUERSCHNEIDE – HOHE DREHZAHL
VOLLSTÄNDIGE BENETZUNG

- Durch Verringern der Düsendröße können die vorteilhaften Eigenschaften der Doppelfase genutzt werden, um die Drehzahl des Hi-PerCarb-Bohrers zu steigern. Richten Sie die Düsen auf die Nebennut zwischen beiden Fasen sowie auf die Schneidekante aus, um beste Ergebnisse zu erzielen.



3xD



2

TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047

D₂ = h₆

>.1181–.2362 DIAMETER

D₁ = +.00016/+0.00063

D₂ = h₆

>.2362–.3937 DIAMETER

D₁ = +.00024/+0.00083

D₂ = h₆

>.3937–.7087 DIAMETER

D₁ = +.00028/+0.00098

D₂ = h₆

>.7087–1.1811 DIAMETER

D₁ = +.00031/+0.00114

D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012

D₂ = h₆

>3–6 DIAMETER

D₁ = +0,004/+0,016

D₂ = h₆

>6–10 DIAMETER

D₁ = +0,006/+0,021

D₂ = h₆

>10–18 DIAMETER

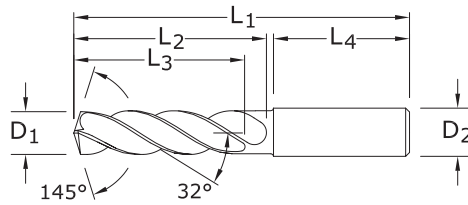
D₁ = +0,007/+0,025

D₂ = h₆

>18–30 DIAMETER

D₁ = +0,008/+0,029

D₂ = h₆



CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AITiN)	EDP NO.
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄		
1/64	0.0156	0.40		1/8	1-1/2	1/8	5/64	1		51752*
1/32	0.0312	0.79		1/8	1-1/2	1/4	3/16	1		51269*
3/64	0.0469	1.19	1/16-64	1/8	1-1/2	3/8	5/16	1		51270*
1,25 mm	0.0492			3,0	38,0	9,5	8,0	25,0		64500*
1,45 mm	0.0571			3,0	38,0	9,5	8,0	25,0		64501*
#53	0.0595	1.51		1/8	1-1/2	3/8	5/16	1		64502*
1/16	0.0625	1.59	5/64-60	1/8	2	7/16	3/8	1-1/4		51271*
1,6 mm	0.0630			3,0	50,0	11,0	9,0	32,0		64503*
1,75 mm	0.0689			3,0	50,0	11,0	9,0	32,0		64504*
#50	0.0700	1.78		1/8	2	7/16	3/8	1-1/4		64505*
5/64	0.0781	1.98		1/8	2	1/2	7/16	1-1/4		51272*
#47	0.0785	1.99		1/8	2	1/2	7/16	1-1/4		64506*
2,05 mm	0.0807			3,0	50,0	12,0	11,0	32,0		64507*
#46	0.0810	2.06		1/8	2	1/2	7/16	1-1/4		64508*
#43	0.0890	2.26		1/8	2	1/2	7/16	1-1/4		64509*
#42	0.0935	2.37		1/8	2	1/2	7/16	1-1/4		64510*
3/32	0.0938	2.38	1/8-32	1/8	2	1/2	7/16	1-1/4		51273
#40	0.0980	2.49		1/8	2	9/16	1/2	1-1/4		51274
2,5 mm	0.0984			3,0	50,0	14,0	12,0	32,0		64511
#39	0.0995	2.53		1/8	2	9/16	1/2	1-1/4		51753
#38	0.1015	2.58	5-40	1/8	2	9/16	1/2	1-1/4		51754
#37	0.1040	2.64	5-44	1/8	2	9/16	1/2	1-1/4		51755
#36	0.1065	2.71	6-32	1/8	2	9/16	1/2	1-1/4		51756
7/64	0.1094	2.78		1/8	2	5/8	9/16	1-1/4		51275
#35	0.1100	2.79		1/8	2	5/8	9/16	1-1/4		51276
#34	0.1110	2.82		1/8	2	5/8	9/16	1-1/4		51277
#33	0.1130	2.87	6-40	1/8	2	5/8	9/16	1-1/4		51757
2,9 mm	0.1142			3,0	50,0	16,0	14,0	32,0		64512
#32	0.1160	2.95		1/8	2	5/8	9/16	1-1/4		51758
3,0 mm	0.1181			6,0	62,0	20,0	17,0	36,0		63155
#31	0.1200	3.05		1/8	2	5/8	9/16	1-1/4		51759
3,1 mm	0.1220			6,0	62,0	20,0	17,0	36,0		63741
1/8	0.1250	3.18		1/4	2-1/2	3/4	21/32	1-7/16		51330
3,2 mm	0.1260		M3,5 X 0,35	6,0	62,0	20,0	17,0	36,0		63156
#30	0.1285	3.26		1/4	2-1/2	3/4	21/32	1-7/16		51278
3,3 mm	0.1299		M4 X 0,7	6,0	62,0	20,0	17,0	36,0		63157
3,4 mm	0.1339			6,0	62,0	20,0	17,0	36,0		63158
#29	0.1360	3.45	8-32,8-36	1/4	2-1/2	3/4	21/32	1-7/16		51331
3,5 mm	0.1378		M4 X 0,5	6,0	62,0	20,0	17,0	36,0		63159
#28	0.1405	3.57	8-40	1/4	2-1/2	3/4	21/32	1-7/16		51760
9/64	0.1406	3.57		1/4	2-1/2	3/4	21/32	1-7/16		51332
3,6 mm	0.1417		M4 X 0,35	6,0	62,0	20,0	17,0	36,0		63160
#27	0.1440	3.66		1/4	2-1/2	3/4	21/32	1-7/16		51761
3,7 mm	0.1457		M4,5 X 0,75	6,0	62,0	20,0	17,0	36,0		63161
#26	0.1470	3.73	3/16-24	1/4	2-1/2	3/4	21/32	1-7/16		51762
#25	0.1495	3.80	10-24	1/4	2-5/8	7/8	23/32	1-7/16		51333

*Single Margin

continued on next page

135 3xD
FRACTIONAL & METRIC SERIES

- Double margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRC (≤ 577 Bhn)

- STEELS**
- STAINLESS STEELS**
- CAST IRON**
- HIGH TEMP ALLOYS**
- TITANIUM**
- NON-FERROUS**
- HARDENED STEELS**

For patent information visit www.ksptpatents.com



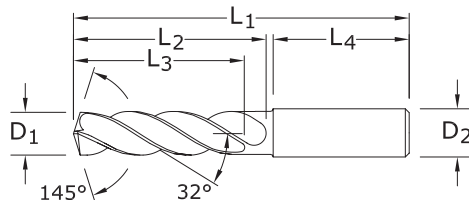
3xD



2

135 3xD

FRACTIONAL & METRIC SERIES



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CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	TI-NAMITE-A (AITIN)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
3,8 mm	0.1496			6,0	66,0	24,0	21,0	36,0	63742
#24	0.1520	3.86	10-28	1/4	2-5/8	7/8	23/32	1-7/16	51763
3,9 mm	0.1535			6,0	66,0	24,0	21,0	36,0	63743
#23	0.1540	3.91		1/4	2-5/8	7/8	23/32	1-7/16	51764
5/32	0.1562	3.97		1/4	2-5/8	7/8	23/32	1-7/16	51334
#22	0.1570	3.99	10-30	1/4	2-5/8	7/8	23/32	1-7/16	51765
4,0 mm	0.1575		M4,5 X 0,5	6,0	66,0	24,0	21,0	36,0	63162
#21	0.1590	4.04	10-32	1/4	2-5/8	7/8	23/32	1-7/16	51335
#20	0.1610	4.09	13/64-24	1/4	2-5/8	7/8	23/32	1-7/16	51279
4,1 mm	0.1614			6,0	66,0	24,0	21,0	36,0	63744
4,2 mm	0.1654		M5 / M5 X 0,75	6,0	66,0	24,0	21,0	36,0	63163
#19	0.1660	4.22		1/4	2-5/8	7/8	23/32	1-7/16	51766
4,3 mm	0.1693			6,0	66,0	24,0	21,0	36,0	63164
#18	0.1695	4.31		1/4	2-5/8	7/8	23/32	1-7/16	51767
11/64	0.1719	4.37		1/4	2-5/8	7/8	23/32	1-7/16	51336
#17	0.1730	4.39		1/4	2-5/8	7/8	23/32	1-7/16	51768
4,4 mm	0.1732			6,0	66,0	24,0	21,0	36,0	63745
#16	0.1770	4.50	12-24	1/4	2-5/8	7/8	23/32	1-7/16	51769
4,5 mm	0.1772		M5 X 0,5	6,0	66,0	24,0	21,0	36,0	63165
#15	0.1800	4.57		1/4	2-5/8	7/8	23/32	1-7/16	51770
4,6 mm	0.1811		12-28	6,0	66,0	24,0	21,0	36,0	63166
#14	0.1820	4.62		1/4	2-5/8	7/8	23/32	1-7/16	51771
#13	0.1850	4.70	12-32	1/4	2-5/8	7/8	23/32	1-7/16	51772
4,7 mm	0.1850			6,0	66,0	24,0	21,0	36,0	63746
3/16	0.1875	4.76		1/4	2-5/8	1	53/64	1-7/16	51337
#12	0.1890	4.80	7/32-32	1/4	2-5/8	1	53/64	1-7/16	51773
4,8 mm	0.1890			6,0	66,0	28,0	24,0	36,0	63167
#11	0.1910	4.85		1/4	2-5/8	1	53/64	1-7/16	51774
4,9 mm	0.1929			6,0	66,0	28,0	24,0	36,0	63747
#10	0.1935	4.91	14-20	1/4	2-5/8	1	53/64	1-7/16	51775
#9	0.1960	4.98		1/4	2-5/8	1	53/64	1-7/16	51776
5,0 mm	0.1969		M6 X 1	6,0	66,0	28,0	24,0	36,0	63168
#8	0.1990	5.05		1/4	2-5/8	1	53/64	1-7/16	51777
5,1 mm	0.2008			6,0	66,0	28,0	24,0	36,0	63748
#7	0.2010	5.11	1/4-20	1/4	2-5/8	1	53/64	1-7/16	51338
13/64	0.2031	5.16		1/4	2-5/8	1	53/64	1-7/16	51339
#6	0.2040	5.18		1/4	2-5/8	1	53/64	1-7/16	51778
5,2 mm	0.2047		M6 X 0,75	6,0	66,0	28,0	24,0	36,0	63749
#5	0.2055	5.22		1/4	2-5/8	1	53/64	1-7/16	51779
5,25 mm	0.2067			6,0	66,0	28,0	24,0	36,0	63169
5,3 mm	0.2087			6,0	66,0	28,0	24,0	36,0	63170
#4	0.2090	5.31	1/4-24	1/4	2-5/8	1	53/64	1-7/16	51780
5,4 mm	0.2126			6,0	66,0	28,0	24,0	36,0	63750
#3	0.2130	5.41	1/4-28	1/4	2-5/8	1	53/64	1-7/16	51340
5,5 mm	0.2165		M6 X 0,5	6,0	66,0	28,0	24,0	36,0	63171
7/32	0.2188	5.56	1/4-32	1/4	2-5/8	1	53/64	1-7/16	51341

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TOLERANCES (inch)

$\leq .1181$ DIAMETER

D₁ = +.00008/+0.00047
D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063
D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083
D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098
D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.00114
D₂ = h₆

TOLERANCES (mm)

≤ 3 DIAMETER

D₁ = +0,002/+0,012
D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016
D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021
D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025
D₂ = h₆

>18-30 DIAMETER

D₁ = +0,008/+0,029
D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- HARDENED STEELS

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FRACTIONAL & METRIC SERIES

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	TI-NAMITE-A (AITiN)	EDP NO.
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄		
5,6 mm	0.2205			6,0	66,0	28,0	24,0	36,0		63751
#2	0.2210	5.61		1/4	2-5/8	1	53/64	1-7/16		51781
5,7 mm	0.2244			6,0	66,0	28,0	24,0	36,0		63752
#1	0.2280	5.79		1/4	2-5/8	1	53/64	1-7/16		51782
5,8 mm	0.2283			6,0	66,0	28,0	24,0	36,0		63172
5,9 mm	0.2323			6,0	66,0	28,0	24,0	36,0		63753
A	0.2340	5.94		1/4	2-5/8	1	53/64	1-7/16		51601
15/64	0.2344	5.95		1/4	2-5/8	1	53/64	1-7/16		51342
6,0	0.2362	6.00	M7 X 1	6,0	66,0	28,0	24,0	36,0		63173
B	0.2380	6.05		1/4	3-1/8	1-5/16	1-3/64	1-7/16		51602
6,1 mm	0.2402			8,0	79,0	34,0	28,0	36,0		63754
C	0.2420	6.15		1/4	3-1/8	1-5/16	1-3/64	1-7/16		51603
6,2 mm	0.2441			8,0	79,0	34,0	28,0	36,0		63755
D	0.2460	6.25		1/4	3-1/8	1-5/16	1-3/64	1-7/16		51604
6,25 mm	0.2461		M7 X 0,75	8,0	79,0	34,0	28,0	36,0		63174
6,3 mm	0.2480			8,0	79,0	34,0	28,0	36,0		63756
1/4	0.2500	6.35		1/4	3-1/8	1-5/16	1-3/64	1-7/16		51343
E	0.2500	6.35		1/4	3-1/8	1-5/16	1-3/64	1-7/16		51605
6,4 mm	0.2520			8,0	79,0	34,0	28,0	36,0		63175
6,5 mm	0.2559			8,0	79,0	34,0	28,0	36,0		63213
F	0.2570	6.53	5/16-18	5/16	3-1/8	1-5/16	1-3/64	1-7/16		51344
6,6 mm	0.2598			8,0	79,0	34,0	28,0	36,0		63757
G	0.2610	6.63		5/16	3-1/8	1-5/16	1-3/64	1-7/16		51606
6,7 mm	0.2638			8,0	79,0	34,0	28,0	36,0		63758
17/64	0.2656	6.75	5/16-20	5/16	3-1/8	1-5/16	1-3/64	1-7/16		51345
H	0.2660	6.76		5/16	3-1/8	1-5/16	1-3/64	1-7/16		51607
6,8 mm	0.2677		M8 X 1,25	8,0	79,0	34,0	28,0	36,0		63176
6,9 mm	0.2717			8,0	79,0	34,0	28,0	36,0		63759
I	0.2720	6.91	5/16-24	5/16	3-1/8	1-5/16	1-3/64	1-7/16		51346
7,0 mm	0.2756		M8 X 1	8,0	79,0	34,0	28,0	36,0		63177
J	0.2770	7.04		5/16	3-1/8	1-5/16	1-3/64	1-7/16		51608
7,1 mm	0.2795			8,0	79,0	41,0	34,0	36,0		63760
K	0.2810	7.14		5/16	3-1/8	1-9/16	1-3/16	1-7/16		51609
9/32	0.2812	7.14	5/16-32	5/16	3-1/8	1-9/16	1-3/16	1-7/16		51347
7,2 mm	0.2835			8,0	79,0	41,0	34,0	36,0		63761
7,25 mm	0.2854		M8 X 0,75	8,0	79,0	41,0	34,0	36,0		63178
7,3 mm	0.2874			8,0	79,0	41,0	34,0	36,0		63762
L	0.2900	7.37		5/16	3-1/8	1-9/16	1-3/16	1-7/16		51610
7,4 mm	0.2913			8,0	79,0	41,0	34,0	36,0		63763
M	0.2950	7.49		5/16	3-1/8	1-9/16	1-3/16	1-7/16		51611
7,5 mm	0.2953		M8 X 0,5	8,0	79,0	41,0	34,0	36,0		63179
19/64	0.2969	7.54		5/16	3-1/8	1-9/16	1-3/16	1-7/16		51348
7,6 mm	0.2992			8,0	79,0	41,0	34,0	36,0		63764
N	0.3020	7.67		5/16	3-1/8	1-9/16	1-3/16	1-7/16		51612
7,7 mm	0.3031			8,0	79,0	41,0	34,0	36,0		63765
7,8 mm	0.3071		M9 X 1,25	8,0	79,0	41,0	34,0	36,0		63180
7,9 mm	0.3110			8,0	79,0	41,0	34,0	36,0		63766
5/16	0.3125	7.94	3/8-16	5/16	3-1/8	1-9/16	1-3/16	1-7/16		51349
8,0 mm	0.3150		M9 x 1	8,0	79,0	41,0	34,0	36,0		63181
O	0.3160	8.03		3/8	3-1/2	1-27/32	1-37/64	1-9/16		51613
8,1 mm	0.3189			10,0	89,0	47,0	40,0	40,0		63767
8,2 mm	0.3228			10,0	89,0	47,0	40,0	40,0		63768
P	0.3230	8.20		3/8	3-1/2	1-27/32	1-37/64	1-9/16		51614
8,3 mm	0.3268			10,0	89,0	47,0	40,0	40,0		63769
21/64	0.3281	8.33	3/8-20	3/8	3-1/2	1-27/32	1-37/64	1-9/16		51350
8,4 mm	0.3307			10,0	89,0	47,0	40,0	40,0		63182
Q	0.3320	8.43	3/8-24	3/8	3-1/2	1-27/32	1-37/64	1-9/16		51351
8,5 mm	0.3346		M10 X 1,5	10,0	89,0	47,0	40,0	40,0		63183

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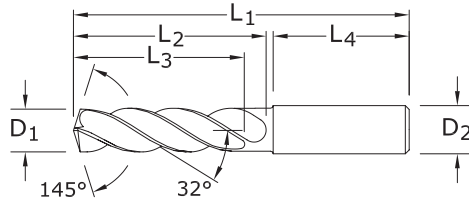


3xD



135 3xD

FRACTIONAL & METRIC SERIES



- Double margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRc (≤ 577 Bhn)

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	TI-NAMITE-A (AlTiN)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
8,6 mm	0.3386			10,0	89,0	47,0	40,0	40,0	63770
R	0.3390	8.61		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51615
8,7 mm	0.3425			10,0	89,0	47,0	40,0	40,0	63771
11/32	0.3438	8.73	3/8-32	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51352
8,8 mm	0.3465		M10 X 1,25	10,0	89,0	47,0	40,0	40,0	63184
S	0.3480	8.84		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51616
8,9 mm	0.3504			10,0	89,0	47,0	40,0	40,0	63772
9,0 mm	0.3543		M10 X 1	10,0	89,0	47,0	40,0	40,0	63185
T	0.3580	9.09		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51617
9,1 mm	0.3583			10,0	89,0	47,0	40,0	40,0	63773
23/64	0.3594	9.13		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51353
9,2 mm	0.3622		M10 X 0,75	10,0	89,0	47,0	40,0	40,0	63774
9,25 mm	0.3642	9.25		10,0	89,0	47,0	40,0	40,0	63186
9,3 mm	0.3661			10,0	89,0	47,0	40,0	40,0	63775
U	0.3680	9.35	7/16-14	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51354
9,4 mm	0.3701			10,0	89,0	47,0	40,0	40,0	63776
9,5 mm	0.3740		M10 X 0,5	10,0	89,0	47,0	40,0	40,0	63187
3/8	0.3750	9.53		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51355
V	0.3770	9.58		1/2	3-1/2	1-27/32	1-37/64	1-9/16	51618
9,6 mm	0.3780			10,0	89,0	47,0	40,0	40,0	63777
9,7 mm	0.3819			10,0	89,0	47,0	40,0	40,0	63778
9,8 mm	0.3858			10,0	89,0	47,0	40,0	40,0	63779
W	0.3860			1/2	3-1/2	1-27/32	1-37/64	1-9/16	51619
9,9 mm	0.3898			10,0	89,0	47,0	40,0	40,0	63780
25/64	0.3906	9.92	7/16-20	1/2	3-1/2	1-27/32	1-37/64	1-9/16	51356
10,0 mm	0.3937			10,0	89,0	47,0	40,0	40,0	63188
X	0.3970	10.08	7/16-24	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51620
10,1 mm	0.3976			12,0	102,0	55,0	45,0	45,0	63781
10,2 mm	0.4016		M12 X 1,75	12,0	102,0	55,0	45,0	45,0	63189
Y	0.4040	10.26	7/16-28	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51621
10,3 mm	0.4055			12,0	102,0	55,0	45,0	45,0	63782
13/32	0.4062	10.32		1/2	4-1/16	2-3/16	1-51/64	1-49/64	51357
10,4 mm	0.4094			12,0	102,0	55,0	45,0	45,0	63783
Z	0.4130	10.49		1/2	4-1/16	2-3/16	1-51/64	1-49/64	51622
10,5 mm	0.4134		M12 X 1,5	12,0	102,0	55,0	45,0	45,0	63190
10,6 mm	0.4173			12,0	102,0	55,0	45,0	45,0	63784
10,7 mm	0.4213			12,0	102,0	55,0	45,0	45,0	63785
27/64	0.4219	10.72	1/2-13	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51358
10,8 mm	0.4252		M12 X 1,25	12,0	102,0	55,0	45,0	45,0	63191
10,9 mm	0.4291			12,0	102,0	55,0	45,0	45,0	63786
11,0 mm	0.4331		M12 X 1	12,0	102,0	55,0	45,0	45,0	63192
11,1 mm	0.4370			12,0	102,0	55,0	45,0	45,0	63787
7/16	0.4375	11.11	1/4-18 NPT	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51359
11,2 mm	0.4409			12,0	102,0	55,0	45,0	45,0	63788
11,25 mm	0.4429			12,0	102,0	55,0	45,0	45,0	63193
11,3 mm	0.4449			12,0	102,0	55,0	45,0	45,0	63789
11,4 mm	0.4488			12,0	102,0	55,0	45,0	45,0	63790

TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047

D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063

D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083

D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098

D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.00114

D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012

D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016

D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021

D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025

D₂ = h₆

>18-30 DIAMETER

D₁ = +0,008/+0,029

D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
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FRACTIONAL & METRIC SERIES

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	TI-NAMITE-A (AITIN)	EDP NO.
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄		
11,5 mm	0.4528		M12 X 0,5	12,0	102,0	55,0	45,0	45,0		63194
29/64	0.4531	11.51	1/2-20	1/2	4-1/16	2-3/16	1-51/64	1-49/64		51360
11,6 mm	0.4567			12,0	102,0	55,0	45,0	45,0		63791
11,7 mm	0.4606			12,0	102,0	55,0	45,0	45,0		63792
11,8 mm	0.4646			12,0	102,0	55,0	45,0	45,0		63793
11,9 mm	0.4685			12,0	102,0	55,0	45,0	45,0		63794
15/32	0.4688	11.91	1/2-28	1/2	4-1/16	2-3/16	1-51/64	1-49/64		51361
12,0 mm	0.4724		M14 X 2	12,0	102,0	55,0	45,0	45,0		63195
31/64	0.4844	12.30	9/16-12	1/2	4-1/4	2-5/16	1-7/8	1-49/64		51362
12,5 mm	0.4921		M14 X 1,5	14,0	107,0	60,0	49,0	45,0		63196
1/2	0.5000	12.70		1/2	4-1/4	2-5/16	1-7/8	1-49/64		51363
12,8 mm	0.5039		M14 X 1,25	14,0	107,0	60,0	49,0	45,0		63197
13,0 mm	0.5118		M14 X 1	14,0	107,0	60,0	49,0	45,0		63198
33/64	0.5156	13.10	9/16-18	5/8	4-1/4	2-5/16	1-7/8	1-49/64		51364
17/32	0.5312	13.49	5/8-11	5/8	4-1/4	2-5/16	1-7/8	1-49/64		51365
13,5 mm	0.5315			14,0	107,0	60,0	49,0	45,0		63199
35/64	0.5469	13.89	5/8-12	5/8	4-1/4	2-5/16	1-7/8	1-49/64		51783
14,0 mm	0.5512		M16 X 2	14,0	107,0	60,0	49,0	45,0		63200
9/16	0.5625	14.29		5/8	4-9/16	2-1/2	2	1-57/64		51366
14,5 mm	0.5709		M16 X 1,5	16,0	115,0	65,0	51,0	48,0		63201
37/64	0.5781	14.68	5/8-18	5/8	4-9/16	2-1/2	2	1-57/64		51367
15,0 mm	0.5906		M16 X 1	16,0	115,0	65,0	51,0	48,0		63202
19/32	0.5938	15.08	11/16-11	5/8	4-9/16	2-1/2	2	1-57/64		51784
39/64	0.6094	15.48	11/16-12	5/8	4-9/16	2-1/2	2	1-57/64		51785
15,5 mm	0.6102		M18 X 2,5	16,0	115,0	65,0	51,0	48,0		63203
5/8	0.6250	15.88	11/16-16	5/8	4-9/16	2-1/2	2	1-57/64		51368
16,0 mm	0.6299			16,0	115,0	65,0	51,0	48,0		63204
41/64	0.6406	16.27	11/16-24	3/4	4-7/8	2-3/4	2-5/16	1-57/64		51786
16,5 mm	0.6496		M18 X 1,5	18,0	123,0	73,0	58,0	48,0		63205
21/32	0.6562	16.67	3/4-10	3/4	4-7/8	2-3/4	2-5/16	1-57/64		51369
17,0 mm	0.6693			18,0	123,0	73,0	58,0	48,0		63206
43/64	0.6719	17.07	3/4-12	3/4	4-7/8	2-3/4	2-5/16	1-57/64		51787
11/16	0.6875	17.46	3/4-16	3/4	4-7/8	2-3/4	2-5/16	1-57/64		51370
17,5 mm	0.6890		M20 X 2,5	18,0	123,0	73,0	58,0	48,0		63207
45/64	0.7031	17.86	3/4-20, 1/2-14 NPT	3/4	4-7/8	2-3/4	2-5/16	1-57/64		51788
18,0 mm	0.7087			18,0	123,0	73,0	58,0	48,0		63208
23/32	0.7188	18.26		3/4	4-7/8	2-3/4	2-5/16	1-57/64		51789
18,5 mm	0.7283		M20 X 1,5	20,0	131,0	79,0	63,0	50,0		63209
47/64	0.7344	18.65	13/16-12	3/4	4-7/8	2-3/4	2-5/16	1-57/64		51790
19,0 mm	0.7480			20,0	131,0	79,0	63,0	50,0		63210
3/4	0.7500	19.05	13/16-16	3/4	5-1/4	3-1/16	2-7/16	1-31/32		51371
49/64	0.7656	19.45	7/8-9	7/8	5-1/4	3-1/16	2-7/16	1-31/32		51372
19,5 mm	0.7677		M22 X 2,5	20,0	131,0	79,0	63,0	50,0		63211
25/32	0.7812	19.84		7/8	6	3-11/16	2-11/16	2-1/8		51791
20,0 mm	0.7874			20,0	131,0	79,0	63,0	50,0		63212
51/64	0.7969	20.24	7/8-12	7/8	6	3-11/16	2-11/16	2-1/8		51792
20,5 mm	0.8071			22,0	150,0	93,0	73,0	53,0		64513
13/16	0.8125	20.64	7/8-14	7/8	6	3-11/16	2-11/16	2-1/8		51373
21,0 mm	0.8268			22,0	150,0	93,0	73,0	53,0		64514
22,0 mm	0.8661			22,0	150,0	93,0	73,0	53,0		64515
7/8	0.8750	22.23	15/16-16, 1-8	7/8	6	3-11/16	2-11/16	2-1/8		51374
59/64	0.9219	23.42	1-12	1	6	3-11/16	2-11/16	2-1/8		51375

CONTINUED

FRACTIONAL Hi-PerCarb

Series 135 3D Fractional	Hardness	Vc (sfm)		Diameter (D ₁) (inch)							
				1/32	1/8	1/4	3/8	1/2	5/8	7/8	
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	385 (308-462)	RPM	47062	11766	5883	3922	2941	2353	1681	
			Fr	0.0010	0.0038	0.0076	0.0115	0.0153	0.0191	0.0268	
			Feed (ipm)	45.0	45.0	45.0	45.0	45.0	45.0	45.0	
	≤ 275 Bhn or ≤ 28 HRc	350 (280-420)	RPM	42784	10696	5348	3565	2674	2139	1528	
			Fr	0.0009	0.0036	0.0071	0.0107	0.0142	0.0178	0.0249	
			Feed (ipm)	38.0	38.0	38.0	38.0	38.0	38.0	38.0	
	≤ 425 Bhn or ≤ 45 HRc	200 (160-240)	RPM	24448	6112	3056	2037	1528	1222	873	
			Fr	0.0007	0.0029	0.0059	0.0088	0.0118	0.0147	0.0206	
			Feed (ipm)	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	300 (240-360)	RPM	36672	9168	4584	3056	2292	1834	1310
				Fr	0.0007	0.0029	0.0059	0.0088	0.0118	0.0147	0.0206
				Feed (ipm)	27.0	27.0	27.0	27.0	27.0	27.0	27.0
≤ 375 Bhn or ≤ 40 HRc		185 (148-222)	RPM	22614	5654	2827	1885	1413	1131	808	
			Fr	0.0006	0.0026	0.0051	0.0077	0.0103	0.0128	0.0180	
			Feed (ipm)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	
≤ 450 Bhn or ≤ 48 HRc		130 (104-156)	RPM	15891	3973	1986	1324	993	795	568	
			Fr	0.0004	0.0018	0.0035	0.0053	0.0070	0.0088	0.0123	
			Feed (ipm)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 200 Bhn or ≤ 13 HRc	130 (104-156)	RPM	15891	3973	1986	1324	993	795	568
				Fr	0.0007	0.0026	0.0053	0.0079	0.0106	0.0132	0.0185
				Feed (ipm)	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	≤ 375 Bhn or ≤ 40 HRc	90 (72-108)	RPM	11002	2750	1375	917	688	550	393	
			Fr	0.0003	0.0012	0.0023	0.0035	0.0047	0.0058	0.0081	
			Feed (ipm)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	
	≤ 475 Bhn or ≤ 50 HRc	75 (60-90)	RPM	9168	2292	1146	764	573	458	327	
			Fr	0.0002	0.0008	0.0016	0.0024	0.0031	0.0039	0.0055	
			Feed (ipm)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	320 (256-384)	RPM	39117	9779	4890	3260	2445	1956	1397
				Fr	0.0012	0.0046	0.0092	0.0138	0.0184	0.0230	0.0322
				Feed (ipm)	45.0	45.0	45.0	45.0	45.0	45.0	45.0
≤ 260 Bhn or ≤ 26 HRc		285 (228-342)	RPM	34838	8710	4355	2903	2177	1742	1244	
			Fr	0.0011	0.0046	0.0092	0.0138	0.0184	0.0230	0.0321	
			Feed (ipm)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	275 (220-330)	RPM	33616	8404	4202	2801	2101	1681	1201
				Fr	0.0006	0.0026	0.0051	0.0077	0.0102	0.0128	0.0179
				Feed (ipm)	21.5	21.5	21.5	21.5	21.5	21.5	21.5
		≤ 275 Bhn or ≤ 28 HRc	170 (136-204)	RPM	20781	5195	2598	1732	1299	1039	742
				Fr	0.0005	0.0020	0.0040	0.0061	0.0081	0.0101	0.0141
				Feed (ipm)	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	90 (72-108)	RPM	11002	2750	1375	917	688	550	393
				Fr	0.0005	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140
				Feed (ipm)	5.5	5.5	5.5	5.5	5.5	5.5	5.5
		≤ 375 Bhn or ≤ 40 HRc	65 (52-78)	RPM	7946	1986	993	662	497	397	284
				Fr	0.0004	0.0018	0.0035	0.0053	0.0070	0.0088	0.0123
				Feed (ipm)	3.5	3.5	3.5	3.5	3.5	3.5	3.5

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Series 135 3D Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/32	1/8	1/4	3/8	1/2	5/8	7/8		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	55 (44-66)	RPM	6723	1681	840	560	420	336	240	
			Fr	0.0002	0.0008	0.0015	0.0023	0.0031	0.0039	0.0054	
			Feed (ipm)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
	≤ 400 Bhn or ≤ 43 HRc	30 (24-36)	RPM	3667	917	458	306	229	183	131	
			Fr	0.0002	0.0007	0.0013	0.0020	0.0026	0.0033	0.0046	
			Feed (ipm)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	135 (108-162)	RPM	16502	4126	2063	1375	1031	825	589
				Fr	0.0004	0.0018	0.0035	0.0053	0.0071	0.0088	0.0124
				Feed (ipm)	7.3	7.3	7.3	7.3	7.3	7.3	7.3
≤ 350 Bhn or ≤ 38 HRc		100 (80-120)	RPM	12224	3056	1528	1019	764	611	437	
			Fr	0.0004	0.0016	0.0033	0.0049	0.0065	0.0082	0.0115	
			Feed (ipm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
≤ 440 Bhn or ≤ 47 HRc		55 (44-66)	RPM	6723	1681	840	560	420	336	240	
			Fr	0.0003	0.0012	0.0024	0.0036	0.0048	0.0059	0.0083	
			Feed (ipm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	700 (560-840)	RPM	85568	21392	10696	7131	5348	4278	3056	
			Fr	0.0012	0.0049	0.0098	0.0147	0.0196	0.0245	0.0344	
			Feed (ipm)	105.0	105.0	105.0	105.0	105.0	105.0	105.0	
	≤ 150 Bhn or ≤ 7 HRc	600 (480-720)	RPM	73344	18336	9168	6112	4584	3667	2619	
			Fr	0.0012	0.0050	0.0099	0.0149	0.0199	0.0248	0.0347	
			Feed (ipm)	91.0	91.0	91.0	91.0	91.0	91.0	91.0	
	≤ 140 Bhn or ≤ 3 HRc	500 (400-600)	RPM	61120	15280	7640	5093	3820	3056	2183	
			Fr	0.0005	0.0020	0.0039	0.0059	0.0079	0.0098	0.0137	
			Feed (ipm)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
≤ 200 Bhn or ≤ 23 HRc	400 (320-480)	RPM	48896	12224	6112	4075	3056	2445	1746		
		Fr	0.0005	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140		
		Feed (ipm)	24.5	24.5	24.5	24.5	24.5	24.5	24.5		
COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	500 (400-600)	RPM	61120	15280	7640	5093	3820	3056	2183	
			Fr	0.0005	0.0020	0.0039	0.0059	0.0079	0.0098	0.0137	
			Feed (ipm)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
	≤ 200 Bhn or ≤ 23 HRc	400 (320-480)	RPM	48896	12224	6112	4075	3056	2445	1746	
			Fr	0.0005	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140	
			Feed (ipm)	24.5	24.5	24.5	24.5	24.5	24.5	24.5	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 $rpm = Vc \times 3.82 / D_1$
 $ipm = Fr \times rpm$
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Hi-PerCarb

Series 135 3D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (inch)									
			1.5	3	6	8	10	12	16	20		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	117	RPM	24882	12441	6220	4665	3732	3110	2333	1866	
		(94-141)	Fr	0.047	0.094	0.189	0.252	0.315	0.378	0.504	0.630	
			Feed (mm/min)	1175	1175	1175	1175	1175	1175	1175	1175	1175
	≤ 275 Bhn or ≤ 28 HRc	107	RPM	22620	11310	5655	4241	3393	2827	2121	1696	
		(85-128)	Fr	0.043	0.086	0.172	0.229	0.286	0.343	0.457	0.572	
			Feed (mm/min)	970	970	970	970	970	970	970	970	970
	≤ 475 Bhn or ≤ 45 HRc	61	RPM	12926	6463	3231	2424	1939	1616	1212	969	
		(49-73)	Fr	0.036	0.071	0.142	0.190	0.237	0.285	0.380	0.475	
			Feed (mm/min)	460	460	460	460	460	460	460	460	460
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	91	RPM	19388	9694	4847	3635	2908	2424	1818	1454
			(73-110)	Fr	0.036	0.071	0.142	0.190	0.237	0.285	0.380	0.475
				Feed (mm/min)	690	690	690	690	690	690	690	690
≤ 375 Bhn or ≤ 40 HRc		56	RPM	11956	5978	2989	2242	1793	1495	1121	897	
		(45-68)	Fr	0.031	0.061	0.122	0.163	0.204	0.244	0.326	0.407	
			Feed (mm/min)	365	365	365	365	365	365	365	365	365
≤ 450 Bhn or ≤ 48 HRc		40	RPM	8402	4201	2100	1575	1260	1050	788	630	
		(32-48)	Fr	0.021	0.042	0.083	0.111	0.139	0.167	0.222	0.278	
			Feed (mm/min)	175	175	175	175	175	175	175	175	175
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 200 Bhn or ≤ 13 HRc	40	RPM	8402	4201	2100	1575	1260	1050	788	630
			(32-48)	Fr	0.032	0.063	0.126	0.168	0.210	0.252	0.336	0.421
				Feed (mm/min)	265	265	265	265	265	265	265	265
	≤ 375 Bhn or ≤ 40 HRc	27	RPM	5816	2908	1454	1091	872	727	545	436	
		(22-33)	Fr	0.014	0.028	0.055	0.073	0.092	0.110	0.147	0.183	
			Feed (mm/min)	80	80	80	80	80	80	80	80	80
	≤ 475 Bhn or ≤ 50 HRc	23	RPM	4847	2424	1212	909	727	606	454	364	
		(18-27)	Fr	0.009	0.019	0.037	0.050	0.062	0.074	0.099	0.124	
			Feed (mm/min)	45	45	45	45	45	45	45	45	45
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	98	RPM	20681	10340	5170	3878	3102	2585	1939	1551
			(78-117)	Fr	0.055	0.110	0.220	0.293	0.366	0.439	0.585	0.732
				Feed (mm/min)	1135	1135	1135	1135	1135	1135	1135	1135
≤ 260 Bhn or ≤ 26 HRc		87	RPM	18419	9209	4605	3454	2763	2302	1727	1381	
		(69-104)	Fr	0.055	0.110	0.219	0.292	0.366	0.439	0.585	0.731	
			Feed (mm/min)	1010	1010	1010	1010	1010	1010	1010	1010	1010
STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	84	RPM	17773	8886	4443	3332	2666	2222	1666	1333
			(67-101)	Fr	0.031	0.061	0.123	0.164	0.204	0.245	0.327	0.409
				Feed (mm/min)	545	545	545	545	545	545	545	545
		≤ 275 Bhn or ≤ 28 HRc	52	RPM	10987	5493	2747	2060	1648	1373	1030	824
			(41-62)	Fr	0.024	0.047	0.095	0.126	0.158	0.189	0.252	0.316
				Feed (mm/min)	260	260	260	260	260	260	260	260
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	27	RPM	5816	2908	1454	1091	872	727	545	436
			(22-33)	Fr	0.023	0.046	0.093	0.124	0.155	0.186	0.248	0.309
				Feed (mm/min)	135	135	135	135	135	135	135	135
		≤ 375 Bhn or ≤ 40 HRc	20	RPM	4201	2100	1050	788	630	525	394	315
			(16-24)	Fr	0.020	0.040	0.081	0.108	0.135	0.162	0.216	0.270
				Feed (mm/min)	85	85	85	85	85	85	85	85

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Series 135 3D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (inch)									
			1.5	3	6	8	10	12	16	20		
S SUPER ALLOYS (NICKEL , COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	17	RPM	3555	1777	889	666	533	444	333	267	
		(13-20)	Fr	0.010	0.020	0.039	0.053	0.066	0.079	0.105	0.131	
			Feed (mm/min)	35	35	35	35	35	35	35	35	
	≤ 400 Bhn or ≤ 43 HRc	9	RPM	1939	969	485	364	291	242	182	145	
		(7-11)	Fr	0.008	0.015	0.031	0.041	0.052	0.062	0.083	0.103	
			Feed (mm/min)	15	15	15	15	15	15	15	15	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	41	RPM	8725	4362	2181	1636	1309	1091	818	654
			(33-49)	Fr	0.021	0.042	0.085	0.113	0.141	0.170	0.226	0.283
				Feed (mm/min)	185	185	185	185	185	185	185	185
		≤ 350 Bhn or ≤ 38 HRc	30	RPM	6463	3231	1616	1212	969	808	606	485
			(24-37)	Fr	0.019	0.039	0.077	0.103	0.129	0.155	0.206	0.258
				Feed (mm/min)	125	125	125	125	125	125	125	125
≤ 440 Bhn or ≤ 47 HRc		17	RPM	3555	1777	889	666	533	444	333	267	
		(13-20)	Fr	0.014	0.028	0.056	0.075	0.094	0.113	0.150	0.188	
			Feed (mm/min)	50	50	50	50	50	50	50	50	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	213	RPM	45239	22620	11310	8482	6786	5655	4241	3393
			(171-256)	Fr	0.059	0.119	0.238	0.317	0.396	0.476	0.634	0.793
				Feed (mm/min)	2690	2690	2690	2690	2690	2690	2690	2690
	≤ 150 Bhn or ≤ 7 HRc	183	RPM	38777	19388	9694	7271	5816	4847	3635	2908	
		(146-219)	Fr	0.060	0.120	0.240	0.320	0.400	0.480	0.640	0.799	
			Feed (mm/min)	2325	2325	2325	2325	2325	2325	2325	2325	
	≤ 140 Bhn or ≤ 3 HRc	152	RPM	32314	16157	8078	6059	4847	4039	3029	2424	
		(122-183)	Fr	0.024	0.048	0.096	0.128	0.160	0.192	0.256	0.320	
			Feed (mm/min)	776	776	776	776	776	776	776	776	
	≤ 200 Bhn or ≤ 23 HRc	122	RPM	25851	12926	6463	4847	3878	3231	2424	1939	
		(98-146)	Fr	0.024	0.049	0.097	0.130	0.162	0.195	0.260	0.325	
			Feed (mm/min)	630	630	630	630	630	630	630	630	
COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	152	RPM	32314	16157	8078	6059	4847	4039	3029	2424	
		Fr	0.024	0.048	0.096	0.128	0.160	0.192	0.256	0.320		
		Feed (mm/min)	776	776	776	776	776	776	776	776		
≤ 200 Bhn or ≤ 23 HRc	122	RPM	25851	12926	6463	4847	3878	3231	2424	1939		
	Fr	0.024	0.049	0.097	0.130	0.162	0.195	0.260	0.325			
	Feed (mm/min)	630	630	630	630	630	630	630	630			

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

rpm = (Vc x 1000) / (D₁ x 3.14)

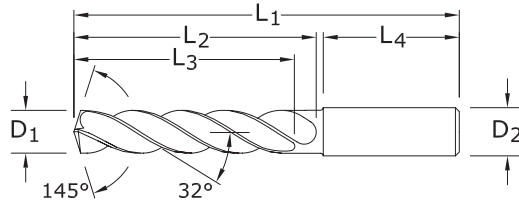
mm/min = Fr x rpm

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



5xD



135 5xD

FRACTIONAL & METRIC SERIES

- Double margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRc (≤ 577 Bhn)

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AlTiN)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
1/64	0.0156	0.40		1/8	1 1/2	5/32	7/64	1	52300*
1/32	0.0312	0.79		1/8	1 1/2	5/16	7/32	1	52301*
3/64	0.0469	1.19	1/16-64	1/8	1 1/2	25/64	19/64	1	52302*
1,25 mm	0.0492			3,0	38,0	10,0	7,5	25,0	64520*
1,45 mm	0.0571			3,0	38,0	10,0	7,5	25,0	64521*
#53	0.0595	1.51		1/8	1-1/2	25/64	19/64	1	64522*
1/16	0.0625	1.59	5/64-60	1/8	2	15/32	23/64	1-1/4	52303*
1,6 mm	0.0630			3,0	50,0	12,0	9,0	32,0	64523*
1,75 mm	0.0689			3,0	50,0	12,0	9,0	32,0	64524*
#50	0.0700	1.78		1/8	2	15/32	23/64	1-1/4	64525*
5/64	0.0781	1.98		1/8	2	35/64	27/64	1-1/4	52304*
#47	0.0785	1.99		1/8	2	35/64	27/64	1-1/4	64526*
2,05 mm	0.0807			3,0	50,0	14,0	11,0	32,0	64527*
#46	0.0810	2.06		1/8	2	35/64	27/64	1-1/4	64528*
#43	0.0890	2.26		1/8	2	19/32	15/32	1-1/4	64529*
#42	0.0935	2.37		1/8	2	5/8	1/2	1-1/4	64530*
3/32	0.0938	2.38	1/8-32	1/8	2	5/8	1/2	1-1/4	52305
#40	0.0980	2.49		1/8	2	43/64	17/32	1-1/4	52306
2,5 mm	0.0984			3,0	50,0	17,0	13,0	32,0	64531
#39	0.0995	2.53		1/8	2	43/64	17/32	1-1/4	52307
#38	0.1015	2.58	5-40	1/8	2	43/64	17/32	1-1/4	52308
#37	0.1040	2.64	5-44	1/8	2	45/64	9/16	1-1/4	52309
#36	0.1065	2.71	6-32	1/8	2	45/64	9/16	1-1/4	52310
7/64	0.1094	2.78		1/8	2	3/4	19/32	1-1/4	52311
#35	0.1100	2.79		1/8	2	3/4	19/32	1-1/4	52312
#34	0.1110	2.82		1/8	2	3/4	19/32	1-1/4	52313
#33	0.1130	2.87	6-40	1/8	2	3/4	19/32	1-1/4	52314
2,9 mm	0.1142			3,0	50,0	19,0	15,0	32,0	64532
#32	0.1160	2.95		1/8	2	3/4	39/64	1-1/4	52315
3,0 mm	0.1181			6,0	66,0	28,0	23,0	36,0	64100
#31	0.1200	3.05		1/8	2	3/4	39/64	1-1/4	52316
3,1 mm	0.1220			6,0	66,0	28,0	23,0	36,0	64101
1/8	0.1250	3.18		1/4	3	1	53/64	1-7/16	51580
3,2 mm	0.1260		M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	64102
#30	0.1285	3.26		1/4	3	1	53/64	1-7/16	51581
3,3 mm	0.1299		M4 X 0,7	6,0	66,0	28,0	23,0	36,0	64103
3,4 mm	0.1339		8-32,8-36	6,0	66,0	28,0	23,0	36,0	64104
#29	0.1360	3.45		1/4	3	1	53/64	1-7/16	51582

*Single Margin

continued on next page

TOLERANCES (inch)

- ≤.1181 DIAMETER
D₁ = +.00008/+0.00047
D₂ = h₆
- >.1181-.2362 DIAMETER
D₁ = +.00016/+0.00063
D₂ = h₆
- >.2362-.3937 DIAMETER
D₁ = +.00024/+0.00083
D₂ = h₆
- >.3937-.7087 DIAMETER
D₁ = +.00028/+0.00098
D₂ = h₆
- >.7087-1.1811 DIAMETER
D₁ = +.00031/+0.00114
D₂ = h₆

TOLERANCES (mm)

- ≤3 DIAMETER
D₁ = +0,002/+0,012
D₂ = h₆
- >3-6 DIAMETER
D₁ = +0,004/+0,016
D₂ = h₆
- >6-10 DIAMETER
D₁ = +0,006/+0,021
D₂ = h₆
- >10-18 DIAMETER
D₁ = +0,007/+0,025
D₂ = h₆
- >18-30 DIAMETER
D₁ = +0,008/+0,029
D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- HARDENED STEELS

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FRACTIONAL & METRIC SERIES

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AITiN)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
3,5 mm	0.1378			6,0	66,0	28,0	23,0	36,0	64105
#28	0.1405	3.57	8-40	1/4	3	1	53/64	1-7/16	52317
9/64	0.1406	3.57		1/4	3	1	53/64	1-7/16	51583
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	64106
#27	0.1440	3.66		1/4	3	1	53/64	1-7/16	52318
3,7 mm	0.1457		M4.5 X 0,75	6,0	66,0	28,0	23,0	36,0	64107
#26	0.1470	3.73	3/16-24	1/4	3	1	53/64	1-7/16	52319
#25	0.1495	3.80	10-24	1/4	3-1/4	1-1/4	1-5/64	1-7/16	51584
3,8 mm	0.1496			6,0	74,0	36,0	29,0	36,0	64108
#24	0.1520	3.86	10-28	1/4	3-1/4	1-1/4	1-5/64	1-7/16	52321
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	64109
#23	0.1540	3.91		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52322
5/32	0.1562	3.97		1/4	3-1/4	1-1/4	1-5/64	1-7/16	51585
#22	0.1570	3.99	10-30	1/4	3-1/4	1-1/4	1-5/64	1-7/16	52323
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	64110
#21	0.1590	4.04	10-32	1/4	3-1/4	1-1/4	1-5/64	1-7/16	51586
#20	0.1610	4.09	13/64-24	1/4	3-1/4	1-1/4	1-5/64	1-7/16	51587
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	64111
4,2 mm	0.1654		M5 / M5 X 0,75	6,0	74,0	36,0	29,0	36,0	64112
#19	0.1660	4.22		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52324
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	64113
#18	0.1695	4.31		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52325
11/64	0.1719	4.37		1/4	3-1/4	1-1/4	1-5/64	1-7/16	51588
#17	0.1730	4.39		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52326
4,4 mm	0.1732			6,0	74,0	36,0	29,0	36,0	64114
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	64115
#15	0.1800	4.57		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52327
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	64116
#14	0.1820	4.62		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52328
#13	0.1850	4.70	12-32	1/4	3-1/4	1-1/4	1-5/64	1-7/16	52329
4,7 mm	0.1850			6,0	74,0	36,0	29,0	36,0	64117
3/16	0.1875	4.76		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51589
#12	0.1890	4.80	7/32-32	1/4	3-1/4	1-3/4	1-37/64	1-7/16	52330
4,8 mm	0.1890			6,0	82,0	44,0	35,0	36,0	64118
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	64119
#10	0.1935	4.91	14-20	1/4	3-1/4	1-3/4	1-37/64	1-7/16	52331
#9	0.1960	4.98		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52332
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	64120
#8	0.1990	5.05		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52333
5,1 mm	0.2008			6,0	82,0	44,0	35,0	36,0	64121
#7	0.2010	5.11	1/4-20	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51506
13/64	0.2031	5.16		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51507
#6	0.2040	5.18		1/4	3 1/4	1 3/4	1 37/64	1 7/16	52334
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	64122
#5	0.2055	5.22		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51590
5,25 mm	0.2067			6,0	82,0	44,0	35,0	36,0	64123
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	64124
#4	0.2090	5.31	1/4-24	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51508

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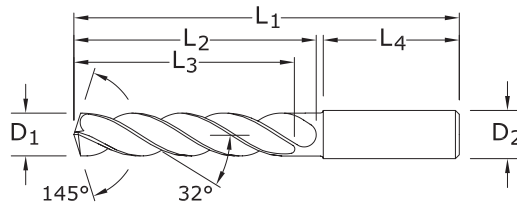
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5xD



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FRACTIONAL & METRIC SERIES

- Double margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRC (≤ 577 Bhn)

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	TI-NAMITE-A (AITIN)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
5,4 mm	0.2126			6,0	82,0	44,0	35,0	36,0	64125
#3	0.2130	5.41	1/4-28	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51509
5,5 mm	0.2165		M6 X 0,5	6,0	82,0	44,0	35,0	36,0	64126
7/32	0.2188	5.56	1/4-32	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51510
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	64127
#2	0.2210	5.61		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52335
5,7 mm	0.2244			6,0	82,0	44,0	35,0	36,0	64128
#1	0.2280	5.79		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52336
5,8 mm	0.2283			6,0	82,0	44,0	35,0	36,0	64129
A	0.2340	5.94		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52337
15/64	0.2344	5.95		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51591
6,0 mm	0.2362		M7 X 1	6,0	82,0	44,0	35,0	36,0	64131
B	0.2380	6.05		1/4	3 5/8	2-5/64	1-51/64	1-7/16	52338
6,1 mm	0.2402			8,0	91,0	53,0	43,0	36,0	64132
C	0.2420	6.15		1/4	3 5/8	2-5/64	1-51/64	1-7/16	52339
6,2 mm	0.2441			8,0	91,0	53,0	43,0	36,0	64133
D	0.2460	6.25		1/4	3 5/8	2-5/64	1-51/64	1-7/16	52340
6,25 mm	0.2461		M7 X 0,75	8,0	91,0	53,0	43,0	36,0	64134
6,3 mm	0.2480			8,0	91,0	53,0	43,0	36,0	64135
1/4	0.2500	6.35		1/4	3-5/8	2-5/64	1-51/64	1-7/16	51511
6,4 mm	0.2520			8,0	91,0	53,0	43,0	36,0	64136
6,5 mm	0.2559			8,0	91,0	53,0	43,0	36,0	64137
F	0.2570	6.53	5/16-18	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51512
6,6 mm	0.2598			8,0	91,0	53,0	43,0	36,0	64138
G	0.2610	6.63		5/16	3 5/8	2 5/64	1 51/64	1 7/16	52341
6,7 mm	0.2638			8,0	91,0	53,0	43,0	36,0	64139
17/64	0.2656	6.75	5/16-20	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51513
H	0.2660	6.76		5/16	3-5/8	2-5/64	1-51/64	1-7/16	52342
6,8 mm	0.2677		M8 X 1,25	8,0	91,0	53,0	43,0	36,0	64140
6,9 mm	0.2717			8,0	91,0	53,0	43,0	36,0	64141
I	0.2720	6.91	5/16-24	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51514
7,0 mm	0.2756		M8 X 1	8,0	91,0	53,0	43,0	36,0	64142
J	0.2770	7.04		5/16	3 5/8	2-5/64	1-51/64	1-7/16	52343
7,1 mm	0.2795			8,0	91,0	53,0	43,0	36,0	64143
K	0.2810	7.14		5/16	3 5/8	2-5/64	1-51/64	1-7/16	52344
9/32	0.2812	7.14	5/16-32	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51515
7,2 mm	0.2835			8,0	91,0	53,0	43,0	36,0	64144

TOLERANCES (inch)

- ≤.1181 DIAMETER
D₁ = +.00008/+0.00047
D₂ = h₆
- >.1181-.2362 DIAMETER
D₁ = +.00016/+0.00063
D₂ = h₆
- >.2362-.3937 DIAMETER
D₁ = +.00024/+0.00083
D₂ = h₆
- >.3937-.7087 DIAMETER
D₁ = +.00028/+0.00098
D₂ = h₆
- >.7087-1.1811 DIAMETER
D₁ = +.00031/+0.00114
D₂ = h₆

TOLERANCES (mm)

- ≤3 DIAMETER
D₁ = +0,002/+0,012
D₂ = h₆
- >3-6 DIAMETER
D₁ = +0,004/+0,016
D₂ = h₆
- >6-10 DIAMETER
D₁ = +0,006/+0,021
D₂ = h₆
- >10-18 DIAMETER
D₁ = +0,007/+0,025
D₂ = h₆
- >18-30 DIAMETER
D₁ = +0,008/+0,029
D₂ = h₆

- STEELS
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135 5xD

FRACTIONAL & METRIC SERIES

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH		FLUTE LENGTH			SHANK LENGTH	Ti-NAMITE-A (AlTiN)	EDP NO.
					L ₁	L ₂	L ₃	L ₄				
7,25 mm	0.2854		M8 X 0,75	8,0	91,0	53,0	43,0	36,0		64145		
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0		64146		
L	0.2900	7.37		5/16	3-5/8	2-5/64	1-51/64	1-7/16		52345		
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0		64147		
M	0.2950	7.49		5/16	3-5/8	2-5/64	1-51/64	1-7/16		52346		
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0		64148		
19/64	0.2969	7.54		5/16	3-5/8	2-5/64	1-51/64	1-7/16		51516		
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0		64149		
N	0.3020	7.67		5/16	3-5/8	2-5/64	1-51/64	1-7/16		52347		
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0		64150		
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0		64151		
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0		64152		
5/16	0.3125	7.94	3/8-16	5/16	3-5/8	2-5/64	1-51/64	1-7/16		51517		
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0		64153		
O	0.3160	8.03		3/8	4	2-13/32	2-1/8	1-9/16		52348		
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0		64154		
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0		64155		
P	0.3230	8.20		3/8	4	2-13/32	2-1/8	1-9/16		51518		
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0		64156		
21/64	0.3281	8.33	3/8-20	3/8	4	2-13/32	2-1/8	1-9/16		51519		
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0		64157		
Q	0.3320	8.43	3/8-24	3/8	4	2-13/32	2-1/8	1-9/16		51520		
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0		64158		
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0		64159		
R	0.3390	8.61	3/8-32	3/8	4	2-13/32	2-1/8	1-9/16		52349		
8,7 mm	0.3425		M10 X 1,25	10,0	103,0	61,0	49,0	40,0		64160		
11/32	0.3438	8.73		3/8	4	2-13/32	2-1/8	1-9/16		51521		
8,8 mm	0.3465			10,0	103,0	61,0	49,0	40,0		64161		
S	0.3480	8.84		3/8	4	2-13/32	2-1/8	1-9/16		51522		
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0		64162		
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0		64163		
T	0.3580	9.09		3/8	4	2-13/32	2-1/8	1-9/16		52350		
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0		64164		
23/64	0.3594	9.13		3/8	4	2-13/32	2-1/8	1-9/16		51523		
9,2 mm	0.3622		M10 X 0,75	10,0	103,0	61,0	49,0	40,0		64165		
9,25 mm	0.3642			10,0	103,0	61,0	49,0	40,0		64166		
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0		64167		
U	0.3680	9.35	7/16-14	3/8	4	2-13/32	2-1/8	1-9/16		51524		
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0		64168		
9,5 mm	0.3740		M10 X 0,5	10,0	103,0	61,0	49,0	40,0		64169		
3/8	0.3750	9.53		3/8	4	2-13/32	2-1/8	1-9/16		51525		
V	0.3770	9.58		1/2	4	2-13/32	2-1/8	1-9/16		52351		
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0		64170		
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0		64171		
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0		64172		
W	0.3860	9.80		1/2	4	2-13/32	2-1/8	1-9/16		51526		
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0		64173		
25/64	0.3906	9.92	7/16-20	1/2	4	2-13/32	2-1/8	1-9/16		51527		

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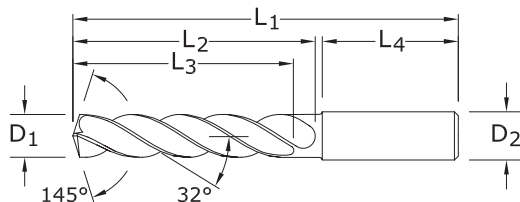
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5xD



2



135 5xD

FRACTIONAL & METRIC SERIES

- Double margin design improves accuracy and surface finish along with increased strength for aggressive drilling
- Specialized self-centering notched point eliminates the need for spot drilling decreasing thrust and deflection
- Engineered edge protection improves edge strength and reduces edge fatigue allowing for increased feed rates
- Recommended for materials ≤ 56 HRc (≤ 577 Bhn)

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AITIN)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	64174
X	0.3970	10.08	7/16-24	1/2	4-11/16	2-3/4	2-23/64	1-49/64	52352
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	64175
10,2 mm	0.4016			12,0	118,0	71,0	56,0	45,0	64176
Y	0.4040	10.26	7/16-28	1/2	4-11/16	2-3/4	2-23/64	1-49/64	52353
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	64177
13/32	0.4062	10.32		1/2	4-11/16	2-3/4	2-23/64	1-49/64	51528
10,4 mm	0.4095			12,0	118,0	71,0	56,0	45,0	64178
Z	0.4130	10.49		1/2	4-11/16	2-3/4	2-23/64	1-49/64	52354
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	64179
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	64180
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	64181
27/64	0.4219	10.72	1/2-13	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51529
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	64182
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	64183
11,0 mm	0.4331			12,0	118,0	71,0	56,0	45,0	64184
11,1 mm	0.4370		M12 X 1	12,0	118,0	71,0	56,0	45,0	64185
7/16	0.4375	11.11	1/4-18 NPT	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51530
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	64186
11,25 mm	0.4429			12,0	118,0	71,0	56,0	45,0	64187
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	64188
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	64189
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	64190
29/64	0.4531	11.51	1/2-20	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51531
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	64191
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	64192
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	64193
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	64194
15/32	0.4688	11.91	1/2-28	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51532
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	64195
31/64	0.4844	12.30	9/16-12	1/2	4-7/8	3-1/32	2-19/32	1-49/64	51533
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	64196
1/2	0.5000	12.70		1/2	4-7/8	3-1/32	2-19/32	1-49/64	51534
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	64197
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	64198
33/64	0.5156	13.10	9/16-18	5/8	4-7/8	3-1/32	2-19/32	1-49/64	51535
17/32	0.5312	13.49	5/8-11	5/8	4-7/8	3-1/32	2-19/32	1-49/64	51536
13,5 mm	0.5315			14,0	124,0	77,0	60,0	45,0	64199

TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047

D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063

D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083

D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098

D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.00114

D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012

D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016

D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021

D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025

D₂ = h₆

>18-30 DIAMETER

D₁ = +0,008/+0,029

D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- HARDENED STEELS

For patent information visit www.ksptpatents.com

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135 5xD

FRACTIONAL & METRIC SERIES

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH		FLUTE LENGTH			SHANK LENGTH	Ti-NAMITE-A (AlTiN)	EDP NO.
					L ₁	L ₂	L ₃	L ₄				
35/64	0.5469	13.89	5/8-12	5/8	4-7/8	3-1/32	2-19/32	1-49/64		51537		
14,0 mm	0.5512		M16 X 2	14,0	124,0	77,0	60,0	45,0		64200		
9/16	0.5625	14.29		5/8	5-1/4	3-1/4	2-3/4	1-57/64		51538		
14,5 mm	0.5709		M16 X 1,5	16,0	133,0	83,0	63,0	48,0		64201		
37/64	0.5781	14.68	5/8-18	5/8	5-1/4	3-1/4	2-3/4	1-57/64		51539		
15,0 mm	0.5906		M16 X 1	16,0	133,0	83,0	63,0	48,0		64202		
19/32	0.5938	15.08	11/16-11	5/8	5-1/4	3-1/4	2-3/4	1-57/64		51592		
39/64	0.6094	15.48	11/16-12	5/8	5-1/4	3-1/4	2-3/4	1-57/64		51593		
15,5 mm	0.6102		M18 X 2,5	16,0	133,0	83,0	63,0	48,0		64203		
5/8	0.6250	15.88	11/16-16	5/8	5-1/4	3-1/4	2-3/4	1-57/64		51540		
16,0 mm	0.6299			16,0	133,0	83,0	63,0	48,0		64204		
41/64	0.6406	16.27	11/16-24	3/4	5-5/8	3-5/8	3-3/16	1-57/64		51594		
16,5 mm	0.6496		M18 X 1,5	18,0	143,0	93,0	71,0	48,0		64205		
21/32	0.6562	16.67	3/4-10	3/4	5-5/8	3-5/8	3-3/16	1-57/64		51541		
17,0 mm	0.6693			18,0	143,0	93,0	71,0	48,0		64206		
43/64	0.6719	17.07	3/4-12	3/4	5-5/8	3-5/8	3-3/16	1-57/64		51595		
11/16	0.6875	17.46	3/4-16	3/4	5-5/8	3-5/8	3-3/16	1-57/64		51542		
17,5 mm	0.6890		M20 X 2,5	18,0	143,0	93,0	71,0	48,0		64207		
45/64	0.7031	17.86	3/4-20, 1/2-14 NPT	3/4	5-5/8	3-5/8	3-3/16	1-57/64		51543		
18,0 mm	0.7087			18,0	143,0	93,0	71,0	48,0		64208		
23/32	0.7188	18.26		3/4	6	4	3-3/8	1-31/32		51596		
18,5 mm	0.7283		M20 X 1,5	20,0	153,0	101,0	77,0	50,0		64209		
47/64	0.7344	18.65	13/16-12	3/4	6	4	3-3/8	1-31/32		51544		
19,0 mm	0.7480			20,0	153,0	101,0	77,0	50,0		64210		
3/4	0.7500	19.05	13/16-16	3/4	6	4	3-3/8	1-31/32		51545		
49/64	0.7656	19.45	7/8-9	7/8	6	4	3-3/8	1-31/32		52355		
19,5 mm	0.7677		M22 X 2,5	20,0	153,0	101,0	77,0	50,0		64211		
25/32	0.7812	19.84		7/8	6	4	3-3/8	1-31/32		52356		
20,0 mm	0.7874			20,0	153,0	101,0	77,0	50,0		64212		
51/64	0.7969	20.24	7/8-12	7/8	6	4	3-3/8	1-31/32		52357		
20,5 mm	0.8071			22,0	153,0	101,0	77,0	50,0		64533		
13/16	0.8125	20.64	7/8-14	7/8	6-1/2	4-1/2	3-7/8	1-31/32		52358		
21,0 mm	0.8268			22,0	153,0	101,0	77,0	50,0		64534		
22,0 mm	0.8661			22,0	178,0	127,0	108,0	50,0		64535		
7/8	0.8750	22.23	15/16-16, 1-8	7/8	6-1/2	4-1/2	3-7/8	1-31/32		52359		
59/64	0.9219	23.42	1-12	1	7	5	4-3/8	2-1/8		52360		

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FRACTIONAL Hi-PerCarb

Series 135 5D Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/32	1/8	1/4	3/8	1/2	5/8	7/8		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	345 (276-414)	RPM	42173	10543	5272	3514	2636	2109	1506	
			Fr	0.0010	0.0040	0.0080	0.0120	0.0159	0.0199	0.0279	
			Feed (ipm)	42.0	42.0	42.0	42.0	42.0	42.0	42.0	
	≤ 275 Bhn or ≤ 28 HRc	310 (248-372)	RPM	37894	9474	4737	3158	2368	1895	1353	
			Fr	0.0009	0.0036	0.0072	0.0108	0.0144	0.0179	0.0251	
			Feed (ipm)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
	≤ 425 Bhn or ≤ 45 HRc	180 (144-216)	RPM	22003	5501	2750	1834	1375	1100	786	
			Fr	0.0007	0.0030	0.0060	0.0090	0.0120	0.0150	0.0210	
			Feed (ipm)	16.5	16.5	16.5	16.5	16.5	16.5	16.5	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	270 (216-324)	RPM	33005	8251	4126	2750	2063	1650	1179
				Fr	0.0008	0.0030	0.0061	0.0091	0.0121	0.0151	0.0212
				Feed (ipm)	25.0	25.0	25.0	25.0	25.0	25.0	25.0
≤ 375 Bhn or ≤ 40 HRc		165 (132-198)	RPM	20170	5042	2521	1681	1261	1008	720	
			Fr	0.0006	0.0026	0.0052	0.0077	0.0103	0.0129	0.0180	
			Feed (ipm)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	
≤ 450 Bhn or ≤ 48 HRc		115 (92-138)	RPM	14058	3514	1757	1171	879	703	502	
			Fr	0.0004	0.0018	0.0035	0.0053	0.0071	0.0088	0.0123	
			Feed (ipm)	6.2	6.2	6.2	6.2	6.2	6.2	6.2	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 200 Bhn or ≤ 13 HRc	120 (96-144)	RPM	14669	3667	1834	1222	917	733	524
				Fr	0.0006	0.0026	0.0051	0.0077	0.0103	0.0128	0.0179
				Feed (ipm)	9.4	9.4	9.4	9.4	9.4	9.4	9.4
	≤ 375 Bhn or ≤ 40 HRc	80 (64-96)	RPM	9779	2445	1222	815	611	489	349	
			Fr	0.0003	0.0012	0.0024	0.0036	0.0047	0.0059	0.0083	
			Feed (ipm)	2.9	2.9	2.9	2.9	2.9	2.9	2.9	
	≤ 475 Bhn or ≤ 50 HRc	70 (56-84)	RPM	8557	2139	1070	713	535	428	306	
			Fr	0.0002	0.0008	0.0016	0.0024	0.0032	0.0040	0.0056	
			Feed (ipm)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	300 (240-360)	RPM	36672	9168	4584	3056	2292	1834	1310
				Fr	0.0011	0.0045	0.0089	0.0134	0.0179	0.0224	0.0313
				Feed (ipm)	41.0	41.0	41.0	41.0	41.0	41.0	41.0
≤ 260 Bhn or ≤ 26 HRc		265 (212-318)	RPM	32394	8098	4049	2699	2025	1620	1157	
			Fr	0.0011	0.0046	0.0091	0.0137	0.0183	0.0228	0.0320	
			Feed (ipm)	37.0	37.0	37.0	37.0	37.0	37.0	37.0	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	250 (200-300)	RPM	30560	7640	3820	2547	1910	1528	1091
				Fr	0.0006	0.0026	0.0051	0.0077	0.0102	0.0128	0.0179
				Feed (ipm)	19.5	19.5	19.5	19.5	19.5	19.5	19.5
		≤ 275 Bhn or ≤ 28 HRc	150 (120-180)	RPM	18336	4584	2292	1528	1146	917	655
				Fr	0.0005	0.0020	0.0039	0.0059	0.0079	0.0098	0.0137
				Feed (ipm)	9.0	9.0	9.0	9.0	9.0	9.0	9.0
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	80 (64-96)	RPM	9779	2445	1222	815	611	489	349
				Fr	0.0005	0.0020	0.0039	0.0059	0.0079	0.0098	0.0137
				Feed (ipm)	4.8	4.8	4.8	4.8	4.8	4.8	4.8
		≤ 375 Bhn or ≤ 40 HRc	55 (44-66)	RPM	6723	1681	840	560	420	336	240
				Fr	0.0004	0.0018	0.0036	0.0054	0.0071	0.0089	0.0125
				Feed (ipm)	3.0	3.0	3.0	3.0	3.0	3.0	3.0

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Series 135 5D Fractional	Hardness	Vc (sfm)		Diameter (D ₁) (inch)							
				1/32	1/8	1/4	3/8	1/2	5/8	7/8	
S SUPER ALLOYS (Nickel, Cobalt, Iron Base) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	40 (32-48)	RPM	4890	1222	611	407	306	244	175	
			Fr	0.0002	0.0008	0.0016	0.0025	0.0033	0.0041	0.0057	
			Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
	≤ 400 Bhn or ≤ 43 HRc	20 (16-24)	RPM	2445	611	306	204	153	122	87	
			Fr	0.0002	0.0007	0.0013	0.0020	0.0026	0.0033	0.0046	
			Feed (ipm)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	105 (84-126)	RPM	12835	3209	1604	1070	802	642	458
				Fr	0.0005	0.0018	0.0036	0.0054	0.0072	0.0090	0.0127
				Feed (ipm)	5.8	5.8	5.8	5.8	5.8	5.8	5.8
		≤ 350 Bhn or ≤ 38 HRc	80 (64-96)	RPM	9779	2445	1222	815	611	489	349
				Fr	0.0004	0.0016	0.0032	0.0048	0.0064	0.0080	0.0112
				Feed (ipm)	3.9	3.9	3.9	3.9	3.9	3.9	3.9
≤ 440 Bhn or ≤ 47 HRc		42 (34-50)	RPM	5134	1284	642	428	321	257	183	
			Fr	0.0003	0.0012	0.0025	0.0037	0.0050	0.0062	0.0087	
			Feed (ipm)	1.6	1.6	1.6	1.6	1.6	1.6	1.6	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	635 (508-762)	RPM	77622	19406	9703	6469	4851	3881	2772	
			Fr	0.0012	0.0049	0.0099	0.0148	0.0198	0.0247	0.0346	
			Feed (ipm)	96.0	96.0	96.0	96.0	96.0	96.0	96.0	
	≤ 150 Bhn or ≤ 7 HRc	540 (432-648)	RPM	66010	16502	8251	5501	4126	3300	2357	
			Fr	0.0012	0.0050	0.0099	0.0149	0.0199	0.0248	0.0348	
			Feed (ipm)	82.0	82.0	82.0	82.0	82.0	82.0	82.0	
	≤ 140 Bhn or ≤ 3 HRc	450 (360-540)	RPM	55008	13752	6876	4584	3438	2750	1965	
			Fr	0.0005	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140	
			Feed (ipm)	27.5	27.5	27.5	27.5	27.5	27.5	27.5	
	≤ 200 Bhn or ≤ 23 HRc	360 (288-432)	RPM	44006	11002	5501	3667	2750	2200	1572	
			Fr	0.0005	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140	
			Feed (ipm)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
COPPER ALLOYS Alum Bronze, C110, Muntz Brass											

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

$rpm = Vc \times 3.82 / D_1$

$ipm = Fr \times rpm$

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Hi-PerCarb

Series 135M 5D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)									
			1.5	3	6	8	10	12	16	20		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	105	RPM	22297	11148	5574	4181	3344	2787	2090	1672	
		(84-126)	Fr	0.048	0.095	0.190	0.254	0.317	0.380	0.507	0.634	
			Feed (mm/min)	1060	1060	1060	1060	1060	1060	1060	1060	
	≤ 275 Bhn or ≤ 28 HRc	94	RPM	20035	10017	5009	3756	3005	2504	1878	1503	
		(76-113)	Fr	0.043	0.085	0.171	0.228	0.285	0.341	0.455	0.569	
			Feed (mm/min)	855	855	855	855	855	855	855	855	
	≤ 425 Bhn or ≤ 45 HRc	55	RPM	11633	5816	2908	2181	1745	1454	1091	872	
		(44-66)	Fr	0.036	0.071	0.143	0.190	0.238	0.285	0.381	0.476	
			Feed (mm/min)	415	415	415	415	415	415	415	415	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	82	RPM	17449	8725	4362	3272	2617	2181	1636	1309
			(66-99)	Fr	0.036	0.072	0.143	0.191	0.239	0.287	0.382	0.478
				Feed (mm/min)	625	625	625	625	625	625	625	625
≤ 375 Bhn or ≤ 40 HRc		50	RPM	10664	5332	2666	1999	1600	1333	1000	800	
		(40-60)	Fr	0.031	0.062	0.124	0.165	0.206	0.248	0.330	0.413	
			Feed (mm/min)	330	330	330	330	330	330	330	330	
≤ 450 Bhn or ≤ 48 HRc		35	RPM	7432	3716	1858	1394	1115	929	697	557	
		(28-42)	Fr	0.022	0.043	0.086	0.115	0.144	0.172	0.230	0.287	
			Feed (mm/min)	160	160	160	160	160	160	160	160	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 200 Bhn or ≤ 13 HRc	37	RPM	7755	3878	1939	1454	1163	969	727	582
			(29-44)	Fr	0.031	0.062	0.124	0.165	0.206	0.248	0.330	0.413
				Feed (mm/min)	240	240	240	240	240	240	240	240
	≤ 375 Bhn or ≤ 40 HRc	24	RPM	5170	2585	1293	969	776	646	485	388	
		(20-29)	Fr	0.015	0.029	0.058	0.077	0.097	0.116	0.155	0.193	
			Feed (mm/min)	75	75	75	75	75	75	75	75	
	≤ 475 Bhn or ≤ 50 HRc	21	RPM	4524	2262	1131	848	679	565	424	339	
		(17-26)	Fr	0.010	0.020	0.040	0.053	0.066	0.080	0.106	0.133	
			Feed (mm/min)	45	45	45	45	45	45	45	45	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	91	RPM	19388	9694	4847	3635	2908	2424	1818	1454
			(73-110)	Fr	0.054	0.108	0.217	0.289	0.361	0.433	0.578	0.722
				Feed (mm/min)	1050	1050	1050	1050	1050	1050	1050	1050
≤ 260 Bhn or ≤ 26 HRc		81	RPM	17126	8563	4282	3211	2569	2141	1606	1284	
		(65-97)	Fr	0.055	0.109	0.218	0.291	0.364	0.437	0.582	0.728	
			Feed (mm/min)	935	935	935	935	935	935	935	935	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	76	RPM	16157	8078	4039	3029	2424	2020	1515	1212
			(61-91)	Fr	0.031	0.061	0.123	0.163	0.204	0.245	0.327	0.408
				Feed (mm/min)	495	495	495	495	495	495	495	495
		≤ 275 Bhn or ≤ 28 HRc	46	RPM	9694	4847	2424	1818	1454	1212	909	727
			(37-55)	Fr	0.024	0.047	0.095	0.127	0.158	0.190	0.253	0.316
				Feed (mm/min)	230	230	230	230	230	230	230	230
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	24	RPM	5170	2585	1293	969	776	646	485	388
			(20-29)	Fr	0.023	0.046	0.093	0.124	0.155	0.186	0.248	0.309
				Feed (mm/min)	120	120	120	120	120	120	120	120
		≤ 375 Bhn or ≤ 40 HRc	17	RPM	3555	1777	889	666	533	444	333	267
			(13-20)	Fr	0.021	0.042	0.084	0.113	0.141	0.169	0.225	0.281
				Feed (mm/min)	75	75	75	75	75	75	75	75

continued on next page

Series 135M 5D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)									
			1.5	3	6	8	10	12	16	20		
S SUPER ALLOYS (Nickel, Cobalt, Iron Base) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	12	RPM	2585	1293	646	485	388	323	242	194	
		(10-15)	Fr	0.010	0.019	0.039	0.052	0.064	0.077	0.103	0.129	
			Feed (mm/min)	25	25	25	25	25	25	25	25	
	≤ 400 Bhn or ≤ 43 HRc	6	RPM	1293	646	323	242	194	162	121	97	
		(5-7)	Fr	0.007	0.014	0.028	0.037	0.046	0.056	0.074	0.093	
			Feed (mm/min)	9	9	9	9	9	9	9	9	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	32	RPM	6786	3393	1696	1272	1018	848	636	509
			(26-38)	Fr	0.021	0.043	0.085	0.114	0.142	0.171	0.228	0.285
				Feed (mm/min)	145	145	145	145	145	145	145	145
		≤ 350 Bhn or ≤ 38 HRc	24	RPM	5170	2585	1293	969	776	646	485	388
			(20-29)	Fr	0.019	0.039	0.077	0.103	0.129	0.155	0.206	0.258
				Feed (mm/min)	100	100	100	100	100	100	100	100
≤ 440 Bhn or ≤ 47 HRc		13	RPM	2714	1357	679	509	407	339	254	204	
		(10-15)	Fr	0.015	0.029	0.059	0.079	0.098	0.118	0.157	0.196	
			Feed (mm/min)	40	40	40	40	40	40	40	40	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	194	RPM	41039	20519	10260	7695	6156	5130	3847	3078
			(155-232)	Fr	0.059	0.118	0.237	0.316	0.395	0.474	0.632	0.790
				Feed (mm/min)	2430	2430	2430	2430	2430	2430	2430	2430
	≤ 150 Bhn or ≤ 7 HRc	165	RPM	34899	17449	8725	6544	5235	4362	3272	2617	
		(132-198)	Fr	0.059	0.118	0.237	0.316	0.394	0.473	0.631	0.789	
			Feed (mm/min)	2065	2065	2065	2065	2065	2065	2065	2065	
	≤ 140 Bhn or ≤ 3 HRc	137	RPM	29082	14541	7271	5453	4362	3635	2726	2181	
		(110-165)	Fr	0.027	0.053	0.107	0.142	0.178	0.213	0.284	0.355	
			Feed (mm/min)	775	775	775	775	775	775	775	775	
	Copper Alloys Alum Bronze, C110, Muntz Brass	≤ 200 Bhn or ≤ 23 HRc	110	RPM	23266	11633	5816	4362	3490	2908	2181	1745
			(88-132)	Fr	0.027	0.054	0.108	0.144	0.181	0.217	0.289	0.361
				Feed (mm/min)	630	630	630	630	630	630	630	630

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fr \times rpm$
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

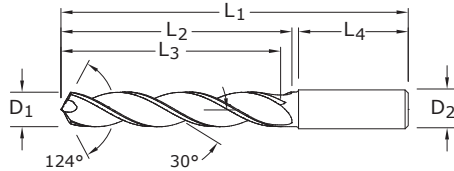


5xD



131N 5xD

FRACTIONAL & METRIC SERIES



- Triple margin design improves hole stability and size control while providing superior finish, roundness and hole cylindricity
- Self-stabilizing pyramid point design stabilizes the drill on contact with the workpiece
- Open flute structure efficiently transports chips while maintaining strength at high feed rates
- Sculpted gash allows chips to easily flow away from the drill center
- Recommended for materials ≤ 175 Bhn (≤ 16 HRC)

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-B (TiB ₂)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
3,0 mm	0.1181			6,0	66,0	28,0	23,0	36,0	64800
3,1 mm	0.1220			6,0	66,0	28,0	23,0	36,0	64801
1/8	0.1250	3.18		6,0	66,0	28,0	23,0	36,0	54800
3,2 mm	0.1260		M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	64802
3,3 mm	0.1299		M4 X 0,7	6,0	66,0	28,0	23,0	36,0	64803
3,4 mm	0.1339			6,0	66,0	28,0	23,0	36,0	64804
#29	0.1360	3.45	8-32,8-36	6,0	66,0	28,0	23,0	36,0	54801
3,5 mm	0.1378		M4 X 0,5	6,0	66,0	28,0	23,0	36,0	64805
9/64	0.1406	3.57		6,0	66,0	28,0	23,0	36,0	54802
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	64806
3,7 mm	0.1457		M4,5 X 0,75	6,0	66,0	28,0	23,0	36,0	64807
3,8 mm	0.1496		10-24	6,0	74,0	36,0	29,0	36,0	64808
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	64809
5/32	0.1562	3.97		6,0	74,0	36,0	29,0	36,0	54803
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	64810
#21	0.1590	4.04	10-32	6,0	74,0	36,0	29,0	36,0	54804
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	64811
4,2 mm	0.1654		M5 / M5 x 0,75	6,0	74,0	36,0	29,0	36,0	64812
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	64813
11/64	0.1719	4.37		6,0	74,0	36,0	29,0	36,0	54805
4,4 mm	0.1732		12-24	6,0	74,0	36,0	29,0	36,0	64814
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	64815
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	64816
4,7 mm	0.1850		12-32	6,0	74,0	36,0	29,0	36,0	64817
3/16	0.1875	4.76		6,0	82,0	44,0	35,0	36,0	54806
4,8 mm	0.1890		7/32-32	6,0	82,0	44,0	35,0	36,0	64818
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	64819
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	64820
5,1 mm	0.2008		1/4-20	6,0	82,0	44,0	35,0	36,0	64821
13/64	0.2031	5.16		6,0	82,0	44,0	35,0	36,0	54807
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	64822
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	64823
5,4 mm	0.2126			6,0	82,0	44,0	35,0	36,0	64824
5,5 mm	0.2165		M6 X 0,5	6,0	82,0	44,0	35,0	36,0	64825
7/32	0.2188	5.56	1/4-32	6,0	82,0	44,0	35,0	36,0	54808
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	64826

TOLERANCES (inch)

- ≤.1181 DIAMETER
D₁ = +.00008/+.00047
D₂ = h₆
- >.1181-.2362 DIAMETER
D₁ = +.00016/+.00063
D₂ = h₆
- >.2362-.3937 DIAMETER
D₁ = +.00024/+.00083
D₂ = h₆
- >.3937-.7087 DIAMETER
D₁ = +.00028/+.00098
D₂ = h₆
- >.7087-1.1811 DIAMETER
D₁ = +.00031/+.00114
D₂ = h₆

TOLERANCES (mm)

- ≤3 DIAMETER
D₁ = +0,002/+0,012
D₂ = h₆
- >3-6 DIAMETER
D₁ = +0,004/+0,016
D₂ = h₆
- >6-10 DIAMETER
D₁ = +0,006/+0,021
D₂ = h₆
- >10-18 DIAMETER
D₁ = +0,007/+0,025
D₂ = h₆

NON-FERROUS

PLASTICS/COMPOSITES

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FRACTIONAL & METRIC SERIES

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-B (TiB ₂)	EDP NO.
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄		
5,7 mm	0.2244			6,0	82,0	44,0	35,0	36,0		64827
5,8 mm	0.2283			6,0	82,0	44,0	35,0	36,0		64828
5,9 mm	0.2323			6,0	82,0	44,0	35,0	36,0		64829
15/64	0.2344	5.95		6,0	82,0	44,0	35,0	36,0		54809
6,0 mm	0.2362		M7 X 1	6,0	82,0	44,0	35,0	36,0		64830
6,1 mm	0.2402			8,0	91,0	53,0	43,0	36,0		64831
6,2 mm	0.2441		M7 X 0,75	8,0	91,0	53,0	43,0	36,0		64832
6,3 mm	0.2480			8,0	91,0	53,0	43,0	36,0		64833
1/4	0.2500	6.35		8,0	91,0	53,0	43,0	36,0		54810
6,4 mm	0.2520			8,0	91,0	53,0	43,0	36,0		64834
6,5 mm	0.2559			8,0	91,0	53,0	43,0	36,0		64835
F	0.2570	6.53	5/16-18	8,0	91,0	53,0	43,0	36,0		54811
6,6 mm	0.2598			8,0	91,0	53,0	43,0	36,0		64836
6,7 mm	0.2638			8,0	91,0	53,0	43,0	36,0		64837
17/64	0.2656	6.75	5/16-20	8,0	91,0	53,0	43,0	36,0		54812
6,8 mm	0.2677		M8 X 1,25	8,0	91,0	53,0	43,0	36,0		64838
6,9 mm	0.2717		5/16-24	8,0	91,0	53,0	43,0	36,0		64839
7,0 mm	0.2756		M8 X 1	8,0	91,0	53,0	43,0	36,0		64840
7,1 mm	0.2795			8,0	91,0	53,0	43,0	36,0		64841
9/32	0.2812	7.14	5/16-32	8,0	91,0	53,0	43,0	36,0		54813
7,2 mm	0.2835		M8 X 0,75	8,0	91,0	53,0	43,0	36,0		64842
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0		64843
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0		64844
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0		64845
19/64	0.2969	7.54		8,0	91,0	53,0	43,0	36,0		54814
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0		64846
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0		64847
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0		64848
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0		64849
5/16	0.3125	7.94	3/8-16	8,0	91,0	53,0	43,0	36,0		54815
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0		64850
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0		64851
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0		64852
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0		64853
21/64	0.3281	8.33	3/8-20	10,0	103,0	61,0	49,0	40,0		54816
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0		64854
Q	0.3320	8.43	3/8-24	10,0	103,0	61,0	49,0	40,0		54817
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0		64855
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0		64856
8,7 mm	0.3425			10,0	103,0	61,0	49,0	40,0		64857
11/32	0.3438	8.73	3/8-32	10,0	103,0	61,0	49,0	40,0		54818
8,8 mm	0.3465		M10 X 1,25	10,0	103,0	61,0	49,0	40,0		64858
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0		64859
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0		64860
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0		64861
23/64	0.3594	9.13		10,0	103,0	61,0	49,0	40,0		54819

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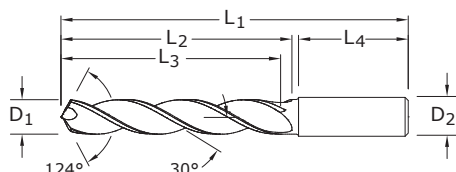


5xD



131N 5xD

FRACTIONAL & METRIC SERIES



- Triple margin design improves hole stability and size control while providing superior finish, roundness and hole cylindricity
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CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-B (TiB ₂)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
9,2 mm	0.3622		M10 X 0,75	10,0	103,0	61,0	49,0	40,0	64862
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0	64863
U	0.3680	9.35	7/16-14	10,0	103,0	61,0	49,0	40,0	54820
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0	64864
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	103,0	61,0	49,0	40,0	64865
3/8	0.3750	9.53		10,0	103,0	61,0	49,0	40,0	54821
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0	64866
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0	64867
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0	64868
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0	64869
25/64	0.3906	9.92	7/16-20	10,0	103,0	61,0	49,0	40,0	54822
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	64870
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	64871
10,2 mm	0.4016		M12 X 1,75	12,0	118,0	71,0	56,0	45,0	64872
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	64873
13/32	0.4062	10.32		12,0	118,0	71,0	56,0	45,0	54823
10,4 mm	0.4094			12,0	118,0	71,0	56,0	45,0	64874
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	64875
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	64876
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	64877
27/64	0.4219	10.72	1/2-13	12,0	118,0	71,0	56,0	45,0	54824
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	64878
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	64879
11,0 mm	0.4331		M12 X 1	12,0	118,0	71,0	56,0	45,0	64880
11,1 mm	0.4370			12,0	118,0	71,0	56,0	45,0	64881
7/16	0.4375	11.11	1/4-18NPT	12,0	118,0	71,0	56,0	45,0	54825
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	64882
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	64883
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	64884
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	64885
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	64886
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	64887
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	64888
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	64889

TOLERANCES (inch)

- ≤.1181 DIAMETER
D₁ = +.00008/+0.00047
D₂ = h₆
- >.1181-.2362 DIAMETER
D₁ = +.00016/+0.00063
D₂ = h₆
- >.2362-.3937 DIAMETER
D₁ = +.00024/+0.00083
D₂ = h₆
- >.3937-.7087 DIAMETER
D₁ = +.00028/+0.00098
D₂ = h₆
- >.7087-1.1811 DIAMETER
D₁ = +.00031/+0.00114
D₂ = h₆

TOLERANCES (mm)

- ≤3 DIAMETER
D₁ = +0,002/+0,012
D₂ = h₆
- >3-6 DIAMETER
D₁ = +0,004/+0,016
D₂ = h₆
- >6-10 DIAMETER
D₁ = +0,006/+0,021
D₂ = h₆
- >10-18 DIAMETER
D₁ = +0,007/+0,025
D₂ = h₆

- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

continued on next page



131N 5xD
FRACTIONAL & METRIC SERIES

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-B (TiB ₂)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
15/32	0.4688	11.91	1/2-28	12,0	118,0	71,0	56,0	45,0	54826
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	64890
31/64	0.4844	12.30	9/16-12	14,0	124,0	77,0	60,0	45,0	54827
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	64891
1/2	0.5000	12.70		14,0	124,0	77,0	60,0	45,0	54828
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	64892
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	64893
33/64	0.5156	13.10	9/16-18	14,0	124,0	77,0	60,0	45,0	54829
13,5 mm	0.5315		5/8-11	14,0	124,0	77,0	60,0	45,0	64894
13,8 mm	0.5433			14,0	124,0	77,0	60,0	45,0	64895
14,0 mm	0.5512		M16 X 2	14,0	124,0	77,0	60,0	45,0	64896
9/16	0.5625	14.29		16,0	133,0	83,0	63,0	48,0	54830
14,5 mm	0.5709		M16 X 1,5	16,0	133,0	83,0	63,0	48,0	64897
37/64	0.5781	14.68	5/8-18	16,0	133,0	83,0	63,0	48,0	54831
14,8 mm	0.5827			16,0	133,0	83,0	63,0	48,0	64898
15,0 mm	0.5906		M16 X 1	16,0	133,0	83,0	63,0	48,0	64899
15,5 mm	0.6102		M18 X 2,5	16,0	133,0	83,0	63,0	48,0	64900
15,8 mm	0.6220			16,0	133,0	83,0	63,0	48,0	64901
5/8	0.6250	15.88	11/16-16	16,0	133,0	83,0	63,0	48,0	54832
16,0 mm	0.6299			16,0	133,0	83,0	63,0	48,0	64902
21/32	0.6562	16.67	3/4-10	18,0	143,0	93,0	71,0	48,0	54833
11/16	0.6875	17.46	3/4-16	18,0	143,0	93,0	71,0	48,0	54834
3/4	0.7500	19.05	13/16-16	20,0	153,0	101,0	77,0	50,0	54835

CONTINUED

FRACTIONAL
Hi-PerCarb

Series 131N 5D Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)							
			1/8	3/16	1/4	3/8	1/2	5/8	3/4	
ALUMINUM ALLOYS < 12% SI 6061, 2024, 7075	≤ 150 Bhn or ≤ 7 HRc	800	RPM	24448	16299	12224	8149	6112	4890	4075
		(640-960)	Fr	0.0055	0.0083	0.0110	0.0166	0.0221	0.0276	0.0331
			Feed (ipm)	135	135	135	135	135	135	135
ALUMINUM ALLOYS > 12% SI A356.0, 390.0, 319.0	≤ 125 Bhn or ≤ 77 HRb	600	RPM	18336	12224	9168	6112	4584	3667	3056
		(480-720)	Fr	0.0055	0.0082	0.0109	0.0164	0.0218	0.0273	0.0327
			Feed (ipm)	100	100	100	100	100	100	100
COPPER ALLOYS Alum Bronze, Muntz Brass, Navel Brass	≤ 175 Bhn or ≤ 16 HRc	550	RPM	16808	11205	8404	5603	4202	3362	2801
		(440-660)	Fr	0.0020	0.0030	0.0040	0.0061	0.0081	0.0101	0.0121
			Feed (ipm)	34	34	34	34	34	34	34
PLASTICS Acrylic, PVC, Polypropylene		450	RPM	13752	9168	6876	4584	3438	2750	2292
		(360-540)	Fr	0.0025	0.0037	0.0049	0.0074	0.0099	0.0124	0.0148
			Feed (ipm)	34	34	34	34	34	34	34

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 $rpm = Vc \times 3.82 / D_1$
 $ipm = Fr \times rpm$
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Series 131N 5D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)							
			3	6	8	10	12	14	16	
ALUMINUM ALLOYS < 12% SI 6061, 2024, 7075	≤ 150 Bhn or ≤ 7 HRc	244	RPM	25851	12926	9694	7755	6463	5540	4847
		(195-293)	Fr	0.133	0.265	0.354	0.442	0.531	0.619	0.708
			Feed (mm/min)	3430	3430	3430	3430	3430	3430	3430
ALUMINUM ALLOYS > 12% SI A356.0, 390.0, 319.0	≤ 125 Bhn or ≤ 77 HRb	183	RPM	19388	9694	7271	5816	4847	4155	3635
		(146-219)	Fr	0.131	0.262	0.349	0.437	0.524	0.611	0.699
			Feed (mm/min)	2540	2540	2540	2540	2540	2540	2540
COPPER ALLOYS Alum Bronze, Muntz Brass, Naval Brass	≤ 175 Bhn or ≤ 16 HRc	168	RPM	17773	8886	6665	5332	4443	3808	3332
		(134-201)	Fr	0.049	0.097	0.130	0.162	0.194	0.227	0.259
			Feed (mm/min)	864	864	864	864	864	864	864
PLASTICS Acrylic, PVC, Polypropylene		137	RPM	14541	7271	5453	4362	3635	3116	2726
		(110-165)	Fr	0.059	0.119	0.158	0.198	0.238	0.277	0.317
			Feed (mm/min)	864	864	864	864	864	864	864

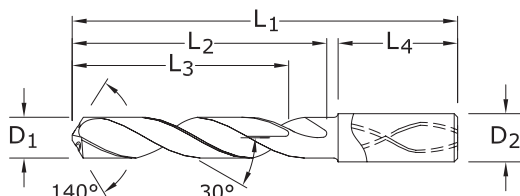
Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fr \times rpm$
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



5xD



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FRACTIONAL & METRIC SERIES

- Coolant through design promotes controlled and consistent operating temperatures improving coolant flow to the cut while maintaining strength
- Split point geometry for improved drill penetration and accuracy
- Controlled edge honing for longevity
- Negative corner position strengthens and protects
- Recommended for materials ≤ 60 HRc (≤ 654 Bhn)

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	mm					Ti-NAMITE-A (AlTiN)
				SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
3,0 mm	0.1181			6,0	66,0	28,0	23,0	36,0	63901
3,1 mm	0.1220			6,0	66,0	28,0	23,0	36,0	63902
1/8	0.1250	3.18		6,0	66,0	28,0	23,0	36,0	51901
3,2 mm	0.1260		M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	63903
3,3 mm	0.1299		M4 X 0,7	6,0	66,0	28,0	23,0	36,0	63904
3,4 mm	0.1339			6,0	66,0	28,0	23,0	36,0	63905
#29	0.1360	3.45	8-32,8-36	6,0	66,0	28,0	23,0	36,0	51902
3,5 mm	0.1378		M4 X 0,5	6,0	66,0	28,0	23,0	36,0	63906
9/64	0.1406	3.57		6,0	66,0	28,0	23,0	36,0	51903
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	63907
3,7 mm	0.1457		M4,5 X 0,75	6,0	66,0	28,0	23,0	36,0	63908
3,8 mm	0.1496		10-24	6,0	74,0	36,0	29,0	36,0	51904
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	63909
5/32	0.1562	3.97		6,0	74,0	36,0	29,0	36,0	51905
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	63910
#21	0.1590	4.04	10-32	6,0	74,0	36,0	29,0	36,0	51906
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	63911
4,2 mm	0.1654		M5 / M5 x 0,75	6,0	74,0	36,0	29,0	36,0	63912
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	63913
11/64	0.1719	4.37		6,0	74,0	36,0	29,0	36,0	51907
4,4 mm	0.1732		12-24	6,0	74,0	36,0	29,0	36,0	63914
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	63915
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	63916
4,7 mm	0.1850		12-32	6,0	74,0	36,0	29,0	36,0	63917
3/16	0.1875	4.76		6,0	82,0	44,0	35,0	36,0	51908
4,8 mm	0.1890		7/32-32	6,0	82,0	44,0	35,0	36,0	63918
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	63919
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	63920
5,1 mm	0.2008		1/4-20	6,0	82,0	44,0	35,0	36,0	63900
13/64	0.2031	5.16		6,0	82,0	44,0	35,0	36,0	51910
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	63921
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	63922
5,4 mm	0.2126			6,0	82,0	44,0	35,0	36,0	63998
5,5 mm	0.2165		M6 X 0,5	6,0	82,0	44,0	35,0	36,0	63923

TOLERANCES (inch)

- ≤.1181 DIAMETER
D₁ = +.00008/+0.00047
D₂ = h₆
- >.1181-.2362 DIAMETER
D₁ = +.00016/+0.00063
D₂ = h₆
- >.2362-.3937 DIAMETER
D₁ = +.00024/+0.00083
D₂ = h₆
- >.3937-.7087 DIAMETER
D₁ = +.00028/+0.00098
D₂ = h₆
- >.7087-1.1811 DIAMETER
D₁ = +.00031/+0.00114
D₂ = h₆

TOLERANCES (mm)

- ≤3 DIAMETER
D₁ = +0,002/+0,012
D₂ = h₆
- >3-6 DIAMETER
D₁ = +0,004/+0,016
D₂ = h₆
- >6-10 DIAMETER
D₁ = +0,006/+0,021
D₂ = h₆
- >10-18 DIAMETER
D₁ = +0,007/+0,025
D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- HARDENED STEELS

For patent information visit www.ksptpatents.com

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FRACTIONAL & METRIC SERIES

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	mm					Ti-NAMITE-A (AITIN)
				SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
7/32	0.2188	5.56	1/4-32	6,0	82,0	44,0	35,0	36,0	51912
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	63924
5,7 mm	0.2244			6,0	82,0	44,0	35,0	36,0	63925
5,8 mm	0.2283			6,0	82,0	44,0	35,0	36,0	63926
5,9 mm	0.2323			6,0	82,0	44,0	35,0	36,0	63927
15/64	0.2344	5.95		6,0	82,0	44,0	35,0	36,0	51913
6,0 mm	0.2362		M7 X 1	6,0	82,0	44,0	35,0	36,0	63928
6,1 mm	0.2402			8,0	91,0	53,0	43,0	36,0	63929
6,2 mm	0.2441		M7 X 0,75	8,0	91,0	53,0	43,0	36,0	63930
6,3 mm	0.2480			8,0	91,0	53,0	43,0	36,0	63931
1/4	0.2500	6.35		8,0	91,0	53,0	43,0	36,0	51914
6,4 mm	0.2520			8,0	91,0	53,0	43,0	36,0	63932
6,5 mm	0.2559			8,0	91,0	53,0	43,0	36,0	63933
F	0.2570	6.53	5/16-18	8,0	91,0	53,0	43,0	36,0	51915
6,6 mm	0.2598			8,0	91,0	53,0	43,0	36,0	63934
6,7 mm	0.2638			8,0	91,0	53,0	43,0	36,0	63935
17/64	0.2656	6.75	5/16-20	8,0	91,0	53,0	43,0	36,0	51916
6,8 mm	0.2677		M8 X 1,25	8,0	91,0	53,0	43,0	36,0	63936
6,9 mm	0.2717		5/16-24	8,0	91,0	53,0	43,0	36,0	63999
7,0 mm	0.2756		M8 X 1	8,0	91,0	53,0	43,0	36,0	63937
7,1 mm	0.2795			8,0	91,0	53,0	43,0	36,0	63938
9/32	0.2812	7.14	5/16-32	8,0	91,0	53,0	43,0	36,0	51918
7,2 mm	0.2835		M8 X 0,75	8,0	91,0	53,0	43,0	36,0	63939
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0	63940
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0	63941
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0	63942
19/64	0.2969	7.54		8,0	91,0	53,0	43,0	36,0	51919
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0	63943
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0	63944
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0	63945
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0	63946
5/16	0.3125	7.94	3/8-16	8,0	91,0	53,0	43,0	36,0	51920
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0	63947
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0	63948
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0	63949
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0	63950
21/64	0.3281	8.33	3/8-20	10,0	103,0	61,0	49,0	40,0	51921
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0	63951
Q	0.3320	8.43	3/8-24	10,0	103,0	61,0	49,0	40,0	51922
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0	63952
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0	63953
8,7 mm	0.3425			10,0	103,0	61,0	49,0	40,0	63954

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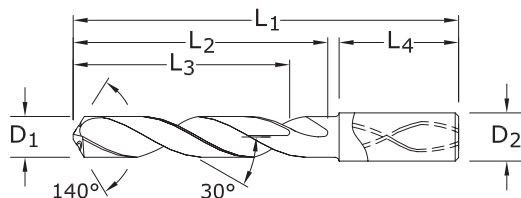
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5xD



2



140 5xD

FRACTIONAL & METRIC SERIES

- Coolant through design promotes controlled and consistent operating temperatures improving coolant flow to the cut while maintaining strength
- Split point geometry for improved drill penetration and accuracy
- Controlled edge honing for longevity
- Negative corner position strengthens and protects
- Recommended for materials ≤ 60 HRc (≤ 654 Bhn)

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	mm					Ti-NAMITE-A (AlTiN)
				SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
11/32	0.3438	8.73	3/8-32	10,0	103,0	61,0	49,0	40,0	51923
8,8 mm	0.3465		M10 X 1,25	10,0	103,0	61,0	49,0	40,0	63955
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0	63956
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0	63957
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0	63958
23/64	0.3594	9.13		10,0	103,0	61,0	49,0	40,0	51924
9,2 mm	0.3622		M10 X 0,75	10,0	103,0	61,0	49,0	40,0	63959
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0	63960
U	0.3680	9.35	7/16-14	10,0	103,0	61,0	49,0	40,0	51925
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0	63961
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	103,0	61,0	49,0	40,0	63962
3/8	0.3750	9.53		10,0	103,0	61,0	49,0	40,0	51926
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0	63963
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0	63964
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0	63965
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0	63966
25/64	0.3906	9.92	7/16-20	10,0	103,0	61,0	49,0	40,0	51927
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	63967
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	63968
10,2 mm	0.4016		M12 X 1,75	12,0	118,0	71,0	56,0	45,0	63969
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	63970
13/32	0.4062	10.32		12,0	118,0	71,0	56,0	45,0	51928
10,4 mm	0.4094			12,0	118,0	71,0	56,0	45,0	63971
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	63972
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	63973
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	63974
27/64	0.4219	10.72	1/2-13	12,0	118,0	71,0	56,0	45,0	51929
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	63975
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	63976
11,0 mm	0.4331		M12 X 1	12,0	118,0	71,0	56,0	45,0	63977
11,1 mm	0.4370			12,0	118,0	71,0	56,0	45,0	63978
7/16	0.4375	11.11	1/4-18NPT	12,0	118,0	71,0	56,0	45,0	51930
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	63979
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	63980

TOLERANCES (inch)

- ≤.1181 DIAMETER
D₁ = +.00008/+0.00047
D₂ = h₆
- >.1181-.2362 DIAMETER
D₁ = +.00016/+0.00063
D₂ = h₆
- >.2362-.3937 DIAMETER
D₁ = +.00024/+0.00083
D₂ = h₆
- >.3937-.7087 DIAMETER
D₁ = +.00028/+0.00098
D₂ = h₆
- >.7087-1.1811 DIAMETER
D₁ = +.00031/+0.00114
D₂ = h₆

TOLERANCES (mm)

- ≤3 DIAMETER
D₁ = +0,002/+0,012
D₂ = h₆
- >3-6 DIAMETER
D₁ = +0,004/+0,016
D₂ = h₆
- >6-10 DIAMETER
D₁ = +0,006/+0,021
D₂ = h₆
- >10-18 DIAMETER
D₁ = +0,007/+0,025
D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- HARDENED STEELS

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continued on next page

140 5xD

FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	mm					Ti-NAMITE-A (AITiN)
				SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	63981
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	64000
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	63982
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	63983
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	63984
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	63985
15/32	0.4688	11.91	1/2-28	12,0	118,0	71,0	56,0	45,0	51932
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	63986
31/64	0.4844	12.30	9/16-12	14,0	124,0	77,0	60,0	45,0	51933
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	63987
1/2	0.5000	12.70		14,0	124,0	77,0	60,0	45,0	51934
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	63988
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	63989
33/64	0.5156	13.10	9/16-18	14,0	124,0	77,0	60,0	45,0	51935
13,5 mm	0.5315		5/8-11	14,0	124,0	77,0	60,0	45,0	64001
13,8 mm	0.5433			14,0	124,0	77,0	60,0	45,0	63990
14,0 mm	0.5512		M16 X 2	14,0	124,0	77,0	60,0	45,0	63991
9/16	0.5625	14.29		16,0	133,0	83,0	63,0	48,0	51937
14,5 mm	0.5709		M16 X 1,5	16,0	133,0	83,0	63,0	48,0	63992
37/64	0.5781	14.68	5/8-18	16,0	133,0	83,0	63,0	48,0	51938
14,8 mm	0.5827			16,0	133,0	83,0	63,0	48,0	63993
15,0 mm	0.5906		M16 X 1	16,0	133,0	83,0	63,0	48,0	63994
15,5 mm	0.6102		M18 X 2,5	16,0	133,0	83,0	63,0	48,0	63995
15,8 mm	0.6220			16,0	133,0	83,0	63,0	48,0	63996
5/8	0.6250	15.88	11/16-16	16,0	133,0	83,0	63,0	48,0	51939
16,0 mm	0.6299			16,0	133,0	83,0	63,0	48,0	63997
21/32	0.6562	16.67	3/4-10	18,0	143,0	93,0	71,0	48,0	51940
11/16	0.6875	17.46	3/4-16	18,0	143,0	93,0	71,0	48,0	51941
3/4	0.7500	19.05	13/16-16	20,0	153,0	101,0	77,0	50,0	51942

FRACTIONAL Ice-Carb®

Series 140 5D Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/8	3/16	1/4	3/8	1/2	5/8	3/4		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	425 (340-510)	RPM	12988	8659	6494	4329	3247	2598	2165	
			Fr	0.0039	0.0059	0.0079	0.0118	0.0157	0.0196	0.0236	
			Feed (ipm)	51.0	51.0	51.0	51.0	51.0	51.0	51.0	
	≤ 275 Bhn or ≤ 28 HRc	380 (304-456)	RPM	11613	7742	5806	3871	2903	2323	1935	
			Fr	0.0035	0.0053	0.0071	0.0106	0.0141	0.0177	0.0212	
			Feed (ipm)	41.0	41.0	41.0	41.0	41.0	41.0	41.0	
	≤ 425 Bhn or ≤ 45 HRc	220 (176-264)	RPM	6723	4482	3362	2241	1681	1345	1121	
			Fr	0.0030	0.0045	0.0059	0.0089	0.0119	0.0149	0.0178	
			Feed (ipm)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	330 (264-396)	RPM	10085	6723	5042	3362	2521	2017	1681
				Fr	0.0030	0.0045	0.0059	0.0089	0.0119	0.0149	0.0178
				Feed (ipm)	30.0	30.0	30.0	30.0	30.0	30.0	30.0
≤ 375 Bhn or ≤ 40 HRc		200 (160-240)	RPM	6112	4075	3056	2037	1528	1222	1019	
			Fr	0.0025	0.0038	0.0051	0.0076	0.0101	0.0127	0.0152	
			Feed (ipm)	15.5	15.5	15.5	15.5	15.5	15.5	15.5	
≤ 450 Bhn or ≤ 48 HRc		140 (112-168)	RPM	4278	2852	2139	1426	1070	856	713	
			Fr	0.0018	0.0027	0.0036	0.0054	0.0072	0.0090	0.0108	
			Feed (ipm)	7.7	7.7	7.7	7.7	7.7	7.7	7.7	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 200 Bhn or ≤ 13 HRc	145 (116-174)	RPM	4431	2954	2216	1477	1108	886	739
				Fr	0.0026	0.0039	0.0052	0.0078	0.0104	0.0130	0.0156
				Feed (ipm)	11.5	11.5	11.5	11.5	11.5	11.5	11.5
	≤ 375 Bhn or ≤ 40 HRc	95 (76-114)	RPM	2903	1935	1452	968	726	581	484	
			Fr	0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072	
			Feed (ipm)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
	≤ 475 Bhn or ≤ 50 HRc	85 (68-102)	RPM	2598	1732	1299	866	649	520	433	
			Fr	0.0008	0.0012	0.0015	0.0023	0.0031	0.0038	0.0046	
			Feed (ipm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	360 (288-432)	RPM	11002	7334	5501	3667	2750	2200	1834
				Fr	0.0045	0.0068	0.0091	0.0136	0.0182	0.0227	0.0273
				Feed (ipm)	50.0	50.0	50.0	50.0	50.0	50.0	50.0
≤ 260 Bhn or ≤ 26 HRc		335 (268-402)	RPM	10238	6825	5119	3413	2559	2048	1706	
			Fr	0.0045	0.0068	0.0091	0.0136	0.0182	0.0227	0.0273	
			Feed (ipm)	46.5	46.5	46.5	46.5	46.5	46.5	46.5	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	305 (244-366)	RPM	9321	6214	4660	3107	2330	1864	1553
				Fr	0.0026	0.0039	0.0051	0.0077	0.0103	0.0129	0.0154
				Feed (ipm)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
		≤ 275 Bhn or ≤ 28 HRc	195 (156-234)	RPM	5959	3973	2980	1986	1490	1192	993
				Fr	0.0020	0.0030	0.0040	0.0060	0.0081	0.0101	0.0121
				Feed (ipm)	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	150 (120-180)	RPM	4584	3056	2292	1528	1146	917	764
				Fr	0.0020	0.0030	0.0040	0.0060	0.0079	0.0099	0.0119
				Feed (ipm)	9.1	9.1	9.1	9.1	9.1	9.1	9.1
		≤ 375 Bhn or ≤ 40 HRc	110 (88-132)	RPM	3362	2241	1681	1121	840	672	560
				Fr	0.0018	0.0027	0.0036	0.0054	0.0071	0.0089	0.0107
				Feed (ipm)	6.0	6.0	6.0	6.0	6.0	6.0	6.0

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Series 140 5D Fractional	Hardness	Vc (sfm)		Diameter (D ₁) (inch)							
				1/8	3/16	1/4	3/8	1/2	5/8	3/4	
S SUPER ALLOYS (NICKEL , COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	95 (76-114)	RPM	2903	1935	1452	968	726	581	484	
			Fr	0.0008	0.0012	0.0016	0.0024	0.0032	0.0040	0.0048	
			Feed (ipm)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
	≤ 400 Bhn or ≤ 43 HRc	50 (40-60)	RPM	1528	1019	764	509	382	306	255	
			Fr	0.0007	0.0010	0.0013	0.0020	0.0026	0.0033	0.0039	
			Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	215 (172-258)	RPM	6570	4380	3285	2190	1643	1314	1095
				Fr	0.0018	0.0026	0.0035	0.0053	0.0070	0.0088	0.0105
				Feed (ipm)	11.5	11.5	11.5	11.5	11.5	11.5	11.5
		≤ 350 Bhn or ≤ 38 HRc	160 (128-192)	RPM	4890	3260	2445	1630	1222	978	815
				Fr	0.0016	0.0024	0.0032	0.0048	0.0064	0.0080	0.0096
				Feed (ipm)	7.8	7.8	7.8	7.8	7.8	7.8	7.8
≤ 440 Bhn or ≤ 47 HRc		85 (68-102)	RPM	2598	1732	1299	866	649	520	433	
			Fr	0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072	
			Feed (ipm)	3.1	3.1	3.1	3.1	3.1	3.1	3.1	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	770 (616-924)	RPM	23531	15687	11766	7844	5883	4706	3922	
			Fr	0.0049	0.0073	0.0098	0.0147	0.0195	0.0244	0.0293	
			Feed (ipm)	115.0	115.0	115.0	115.0	115.0	115.0	115.0	
	≤ 150 Bhn or ≤ 7 HRc	660 (528-792)	RPM	20170	13446	10085	6723	5042	4034	3362	
			Fr	0.0050	0.0074	0.0099	0.0149	0.0198	0.0248	0.0297	
			Feed (ipm)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
	≤ 140 Bhn or ≤ 3 HRc	550 (440-660)	RPM	16808	11205	8404	5603	4202	3362	2801	
			Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120	
			Feed (ipm)	33.5	33.5	33.5	33.5	33.5	33.5	33.5	
≤ 200 Bhn or ≤ 23 HRc	440 (352-528)	RPM	13446	8964	6723	4482	3362	2689	2241		
		Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120		
		Feed (ipm)	27.0	27.0	27.0	27.0	27.0	27.0	27.0		
COPPER ALLOYS Alum Bronze, C110, Muntz Brass			RPM								
			Fr								
			Feed (ipm)								

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

$rpm = Vc \times 3.82 / D_1$

$ipm = Fr \times rpm$

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Series 140M 5D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			3	6	8	10	12	14	16		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	130 (104-155)	RPM	13733	6867	5150	4120	3433	2943	2575	
			Fr	0.095	0.189	0.252	0.316	0.379	0.442	0.505	
			Feed (mm/min)	1300	1300	1300	1300	1300	1300	1300	
	≤ 275 Bhn or ≤ 28 HRc	116 (93-139)	RPM	12279	6140	4605	3684	3070	2631	2302	
			Fr	0.086	0.171	0.228	0.285	0.342	0.399	0.456	
			Feed (mm/min)	1050	1050	1050	1050	1050	1050	1050	
	≤ 425 Bhn or ≤ 45 HRc	67 (54-80)	RPM	7109	3555	2666	2133	1777	1523	1333	
			Fr	0.071	0.142	0.189	0.237	0.284	0.332	0.379	
			Feed (mm/min)	505	505	505	505	505	505	505	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	101 (80-121)	RPM	10664	5332	3999	3199	2666	2285	1999
				Fr	0.071	0.143	0.190	0.238	0.285	0.333	0.380
				Feed (mm/min)	760	760	760	760	760	760	760
≤ 375 Bhn or ≤ 40 HRc		61 (49-73)	RPM	6463	3231	2424	1939	1616	1385	1212	
			Fr	0.062	0.124	0.165	0.206	0.248	0.289	0.330	
			Feed (mm/min)	400	400	400	400	400	400	400	
≤ 450 Bhn or ≤ 48 HRc		43 (34-51)	RPM	4524	2262	1696	1357	1131	969	848	
			Fr	0.043	0.086	0.115	0.144	0.172	0.201	0.230	
			Feed (mm/min)	195	195	195	195	195	195	195	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 200 Bhn or ≤ 13 HRc	44 (35-53)	RPM	4686	2343	1757	1406	1171	1004	879
				Fr	0.061	0.122	0.162	0.203	0.243	0.284	0.324
				Feed (mm/min)	285	285	285	285	285	285	285
	≤ 375 Bhn or ≤ 40 HRc	29 (23-35)	RPM	3070	1535	1151	921	767	658	576	
			Fr	0.029	0.059	0.078	0.098	0.117	0.137	0.156	
			Feed (mm/min)	90	90	90	90	90	90	90	
	≤ 475 Bhn or ≤ 50 HRc	26 (21-31)	RPM	2747	1373	1030	824	687	589	515	
			Fr	0.018	0.036	0.049	0.061	0.073	0.085	0.097	
			Feed (mm/min)	50	50	50	50	50	50	50	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	110 (88-132)	RPM	11633	5816	4362	3490	2908	2493	2181
				Fr	0.109	0.218	0.291	0.364	0.437	0.509	0.582
				Feed (mm/min)	1270	1270	1270	1270	1270	1270	1270
≤ 260 Bhn or ≤ 26 HRc		102 (82-123)	RPM	10825	5413	4059	3248	2706	2320	2030	
			Fr	0.109	0.218	0.291	0.363	0.436	0.509	0.581	
			Feed (mm/min)	1180	1180	1180	1180	1180	1180	1180	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	93 (74-112)	RPM	9856	4928	3696	2957	2464	2112	1848	
			Fr	0.061	0.123	0.164	0.205	0.246	0.286	0.327	
			Feed (mm/min)	605	605	605	605	605	605	605	
	≤ 275 Bhn or ≤ 28 HRc	59 (48-71)	RPM	6301	3151	2363	1890	1575	1350	1181	
			Fr	0.048	0.095	0.127	0.159	0.190	0.222	0.254	
			Feed (mm/min)	300	300	300	300	300	300	300	
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	46 (37-55)	RPM	4847	2424	1818	1454	1212	1039	909
				Fr	0.047	0.095	0.127	0.158	0.190	0.221	0.253
				Feed (mm/min)	230	230	230	230	230	230	230
		≤ 375 Bhn or ≤ 40 HRc	34 (27-40)	RPM	3555	1777	1333	1066	889	762	666
				Fr	0.042	0.084	0.113	0.141	0.169	0.197	0.225
				Feed (mm/min)	150	150	150	150	150	150	150

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Series 140M 5D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			3	6	8	10	12	14	16		
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	29	RPM	3070	1535	1151	921	767	658	576	
		(23-35)	Fr	0.020	0.039	0.052	0.065	0.078	0.091	0.104	
			Feed (mm/min)	60	60	60	60	60	60	60	
	≤ 400 Bhn or ≤ 43 HRc	15	RPM	1616	808	606	485	404	346	303	
		(12-18)	Fr	0.015	0.031	0.041	0.052	0.062	0.072	0.083	
			Feed (mm/min)	25	25	25	25	25	25	25	
	N TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	66	RPM	6947	3474	2605	2084	1737	1489	1303
			(52-79)	Fr	0.040	0.079	0.106	0.132	0.158	0.185	0.211
				Feed (mm/min)	275	275	275	275	275	275	275
		≤ 350 Bhn or ≤ 38 HRc	49	RPM	5170	2585	1939	1551	1293	1108	969
			(39-59)	Fr	0.039	0.077	0.103	0.129	0.155	0.181	0.206
				Feed (mm/min)	200	200	200	200	200	200	200
≤ 440 Bhn or ≤ 47 HRc		26	RPM	2747	1373	1030	824	687	589	515	
		(21-31)	Fr	0.029	0.058	0.078	0.097	0.117	0.136	0.155	
			Feed (mm/min)	80	80	80	80	80	80	80	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	235	RPM	24882	12441	9331	7465	6220	5332	4665
			(188-282)	Fr	0.118	0.237	0.316	0.395	0.473	0.552	0.631
				Feed (mm/min)	2945	2945	2945	2945	2945	2945	2945
	≤ 150 Bhn or ≤ 7 HRc	201	RPM	21327	10664	7998	6398	5332	4570	3999	
		(161-241)	Fr	0.119	0.238	0.318	0.397	0.476	0.556	0.635	
			Feed (mm/min)	2540	2540	2540	2540	2540	2540	2540	
	N COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	168	RPM	17773	8886	6665	5332	4443	3808	3332
			(134-201)	Fr	0.048	0.096	0.128	0.159	0.191	0.223	0.255
				Feed (mm/min)	850	850	850	850	850	850	850
		≤ 200 Bhn or ≤ 23 HRc	134	RPM	14218	7109	5332	4265	3555	3047	2666
			(107-161)	Fr	0.048	0.096	0.128	0.161	0.193	0.225	0.257
				Feed (mm/min)	685	685	685	685	685	685	685

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

rpm = (Vc x 1000) / (D₁ x 3.14)

mm/min = Fr x rpm

reduce speed and feed for materials harder than listed

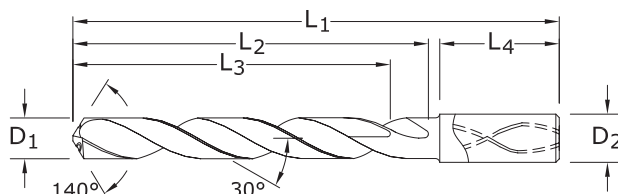
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



8xD



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FRACTIONAL & METRIC SERIES

- Coolant through design promotes controlled and consistent operating temperatures improving coolant flow to the cut while maintaining strength
- Split point geometry for improved drill penetration and accuracy
- Controlled edge honing for longevity
- Negative corner position strengthens and protects
- Recommended for materials ≤ 60 HRc (≤ 654 Bhn)

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	mm					Ti-NAMITE-A (AITIN) EDP NO.
				SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	
3,0 mm	0.1181			6,0	72,0	34,0	29,0	36,0	63575
3,1 mm	0.1220			6,0	72,0	34,0	29,0	36,0	63576
1/8	0.1250	3.18		6,0	72,0	34,0	29,0	36,0	51801
3,2 mm	0.1260		M3,5 X 0,35	6,0	72,0	34,0	29,0	36,0	63577
3,3 mm	0.1299		M4 X 0,7	6,0	72,0	34,0	29,0	36,0	63578
3,4 mm	0.1339			6,0	72,0	34,0	29,0	36,0	63579
#29	0.1360	3.45	8-32,8-36	6,0	72,0	34,0	29,0	36,0	51802
3,5 mm	0.1378		M4 X 0,5	6,0	72,0	34,0	29,0	36,0	63580
9/64	0.1406	3.57		6,0	72,0	34,0	29,0	36,0	51803
3,6 mm	0.1417		M4 X 0,35	6,0	72,0	34,0	29,0	36,0	63581
3,7 mm	0.1457		M4,5 X 0,75	6,0	72,0	34,0	29,0	36,0	63582
3,8 mm	0.1496		10-24	6,0	81,0	43,0	36,0	36,0	63583
3,9 mm	0.1535			6,0	81,0	43,0	36,0	36,0	63584
5/32	0.1562	3.97		6,0	81,0	43,0	36,0	36,0	51804
4,0 mm	0.1575		M4,5 X 0,5	6,0	81,0	43,0	36,0	36,0	63585
#21	0.1590	4.04	10-32	6,0	81,0	43,0	36,0	36,0	51805
4,1 mm	0.1614			6,0	81,0	43,0	36,0	36,0	63586
4,2 mm	0.1654		M5 / M5 X 0,75	6,0	81,0	43,0	36,0	36,0	63587
4,3 mm	0.1693			6,0	81,0	43,0	36,0	36,0	63588
11/64	0.1719	4.37		6,0	81,0	43,0	36,0	36,0	51806
4,4 mm	0.1732		12-24	6,0	81,0	43,0	36,0	36,0	63589
4,5 mm	0.1772		M5 X 0,5	6,0	81,0	43,0	36,0	36,0	63590
4,6 mm	0.1811		12-28	6,0	81,0	43,0	36,0	36,0	63591
4,7 mm	0.1850		12-32	6,0	81,0	43,0	36,0	36,0	63592
3/16	0.1875	4.76		6,0	95,0	57,0	48,0	36,0	51807
4,8 mm	0.1890		7/32-32	6,0	95,0	57,0	48,0	36,0	63593
4,9 mm	0.1929			6,0	95,0	57,0	48,0	36,0	63594
5,0 mm	0.1969		M6 X 1	6,0	95,0	57,0	48,0	36,0	63595
5,1 mm	0.2008		1/4-20	6,0	95,0	57,0	48,0	36,0	63596
13/64	0.2031	5.16		6,0	95,0	57,0	48,0	36,0	51808
5,2 mm	0.2047		M6 X 0,75	6,0	95,0	57,0	48,0	36,0	63597
5,3 mm	0.2087			6,0	95,0	57,0	48,0	36,0	63598
5,4 mm	0.2126			6,0	95,0	57,0	48,0	36,0	63599
5,5 mm	0.2165		M6 X 0,5	6,0	95,0	57,0	48,0	36,0	63600

TOLERANCES (inch)

- ≤.1181 DIAMETER
D₁ = +.00008/+0.00047
D₂ = h₆
- >.1181-.2362 DIAMETER
D₁ = +.00016/+0.00063
D₂ = h₆
- >.2362-.3937 DIAMETER
D₁ = +.00024/+0.00083
D₂ = h₆
- >.3937-.7087 DIAMETER
D₁ = +.00028/+0.00098
D₂ = h₆
- >.7087-1.1811 DIAMETER
D₁ = +.00031/+0.00114
D₂ = h₆

TOLERANCES (mm)

- ≤3 DIAMETER
D₁ = +0,002/+0,012
D₂ = h₆
- >3-6 DIAMETER
D₁ = +0,004/+0,016
D₂ = h₆
- >6-10 DIAMETER
D₁ = +0,006/+0,021
D₂ = h₆
- >10-18 DIAMETER
D₁ = +0,007/+0,025
D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- HARDENED STEELS

For patent information visit www.ksptpatents.com

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FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	mm					Ti-NAMITE-A (AITIN)
				SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
7/32	0.2188	5.56	1/4-32	6,0	95,0	57,0	48,0	36,0	51809
5,6 mm	0.2205			6,0	95,0	57,0	48,0	36,0	63601
5,7 mm	0.2244			6,0	95,0	57,0	48,0	36,0	63602
5,8 mm	0.2283			6,0	95,0	57,0	48,0	36,0	63603
5,9 mm	0.2323			6,0	95,0	57,0	48,0	36,0	63604
15/64	0.2344	5.95		6,0	95,0	57,0	48,0	36,0	51810
6,0 mm	0.2362		M7 X 1	6,0	95,0	57,0	48,0	36,0	63605
6,1 mm	0.2402			8,0	114,0	76,0	64,0	36,0	63606
6,2 mm	0.2441		M7 X 0,75	8,0	114,0	76,0	64,0	36,0	63607
6,3 mm	0.2480			8,0	114,0	76,0	64,0	36,0	63608
1/4	0.2500	6.35		8,0	114,0	76,0	64,0	36,0	51811
6,4 mm	0.2520			8,0	114,0	76,0	64,0	36,0	63609
6,5 mm	0.2559			8,0	114,0	76,0	64,0	36,0	63610
F	0.2570	6.53	5/16-18	8,0	114,0	76,0	64,0	36,0	51812
6,6 mm	0.2598			8,0	114,0	76,0	64,0	36,0	63611
6,7 mm	0.2638			8,0	114,0	76,0	64,0	36,0	63612
17/64	0.2656	6.75	5/16-20	8,0	114,0	76,0	64,0	36,0	51813
6,8 mm	0.2677		M8 X 1,25	8,0	114,0	76,0	64,0	36,0	63613
6,9 mm	0.2717			8,0	114,0	76,0	64,0	36,0	63614
7,0 mm	0.2756		M8 X 1	8,0	114,0	76,0	64,0	36,0	63615
7,1 mm	0.2795			8,0	114,0	76,0	64,0	36,0	63616
9/32	0.2812	7.14	5/16-32	8,0	114,0	76,0	64,0	36,0	51814
7,2 mm	0.2835		M8 X 0,75	8,0	114,0	76,0	64,0	36,0	63617
7,3 mm	0.2874			8,0	114,0	76,0	64,0	36,0	63618
7,4 mm	0.2913			8,0	114,0	76,0	64,0	36,0	63619
7,5 mm	0.2953		M8 X 0,5	8,0	114,0	76,0	64,0	36,0	63620
19/64	0.2969	7.54		8,0	114,0	76,0	64,0	36,0	51815
7,6 mm	0.2992			8,0	114,0	76,0	64,0	36,0	63621
7,7 mm	0.3031			8,0	114,0	76,0	64,0	36,0	63622
7,8 mm	0.3071		M9 X 1,25	8,0	114,0	76,0	64,0	36,0	63623
7,9 mm	0.3110			8,0	114,0	76,0	64,0	36,0	63624
5/16	0.3125	7.94	3/8-16	8,0	114,0	76,0	64,0	36,0	51816
8,0 mm	0.3150		M9 X 1	8,0	114,0	76,0	64,0	36,0	63625
8,1 mm	0.3189			10,0	142,0	95,0	80,0	40,0	63626
8,2 mm	0.3228			10,0	142,0	95,0	80,0	40,0	63627
8,3 mm	0.3268			10,0	142,0	95,0	80,0	40,0	63628
21/64	0.3281	8.33	3/8-20	10,0	142,0	95,0	80,0	40,0	51817
8,4 mm	0.3307			10,0	142,0	95,0	80,0	40,0	63629
Q	0.3320	8.43	3/8-24	10,0	142,0	95,0	80,0	40,0	51818
8,5 mm	0.3346		M10 X 1,5	10,0	142,0	95,0	80,0	40,0	63630
8,6 mm	0.3386			10,0	142,0	95,0	80,0	40,0	63631
8,7 mm	0.3425			10,0	142,0	95,0	80,0	40,0	63632

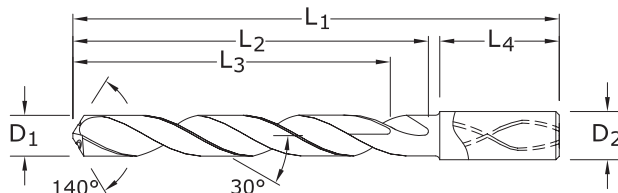
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8xD



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FRACTIONAL & METRIC SERIES

- Coolant through design promotes controlled and consistent operating temperatures improving coolant flow to the cut while maintaining strength
- Split point geometry for improved drill penetration and accuracy
- Controlled edge honing for longevity
- Negative corner position strengthens and protects
- Recommended for materials ≤ 60 HRc (≤ 654 Bhn)

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	mm					Ti-NAMITE-A (AITiN) EDP NO.
				SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	
11/32	0.3438	8.73	3/8-32	10,0	142,0	95,0	80,0	40,0	51819
8,8 mm	0.3465		M10 X 1,25	10,0	142,0	95,0	80,0	40,0	63633
8,9 mm	0.3504			10,0	142,0	95,0	80,0	40,0	63634
9,0 mm	0.3543		M10 X 1	10,0	142,0	95,0	80,0	40,0	63635
9,1 mm	0.3583			10,0	142,0	95,0	80,0	40,0	63636
23/64	0.3594	9.13		10,0	142,0	95,0	80,0	40,0	51820
9,2 mm	0.3622		M10 X 0,75	10,0	142,0	95,0	80,0	40,0	63637
9,3 mm	0.3661			10,0	142,0	95,0	80,0	40,0	63638
U	0.3680	9.35	7/16-14	10,0	142,0	95,0	80,0	40,0	51821
9,4 mm	0.3701			10,0	142,0	95,0	80,0	40,0	63639
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	142,0	95,0	80,0	40,0	63640
3/8	0.3750	9.53		10,0	142,0	95,0	80,0	40,0	51822
9,6 mm	0.3780			10,0	142,0	95,0	80,0	40,0	63641
9,7 mm	0.3819			10,0	142,0	95,0	80,0	40,0	63642
9,8 mm	0.3858			10,0	142,0	95,0	80,0	40,0	63643
9,9 mm	0.3898			10,0	142,0	95,0	80,0	40,0	63644
25/64	0.3906	9.92	7/16-20	10,0	142,0	95,0	80,0	40,0	51823
10,0 mm	0.3937			10,0	142,0	95,0	80,0	40,0	63645
10,1 mm	0.3976			12,0	162,0	114,0	96,0	45,0	63646
10,2 mm	0.4016		M12 X 1,75	12,0	162,0	114,0	96,0	45,0	63647
10,3 mm	0.4055			12,0	162,0	114,0	96,0	45,0	63648
13/32	0.4062	10.32		12,0	162,0	114,0	96,0	45,0	51824
10,4 mm	0.4094			12,0	162,0	114,0	96,0	45,0	63649
10,5 mm	0.4134		M12 X 1,5	12,0	162,0	114,0	96,0	45,0	63650
10,6 mm	0.4173			12,0	162,0	114,0	96,0	45,0	63651
10,7 mm	0.4213			12,0	162,0	114,0	96,0	45,0	63652
27/64	0.4219	10.72	1/2-13	12,0	162,0	114,0	96,0	45,0	51825
10,8 mm	0.4252		M12 X 1,25	12,0	162,0	114,0	96,0	45,0	63653
10,9 mm	0.4291			12,0	162,0	114,0	96,0	45,0	63654
11,0 mm	0.4331		M12 X 1	12,0	162,0	114,0	96,0	45,0	63655
11,1 mm	0.4370			12,0	162,0	114,0	96,0	45,0	63656
7/16	0.4375	11.11	1/4-18NPT	12,0	162,0	114,0	96,0	45,0	51826

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TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047

D₂ = h₆

>.2362-.2362 DIAMETER

D₁ = +.00016/+0.00063

D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083

D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098

D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.00114

D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012

D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016

D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021

D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025

D₂ = h₆

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140 8xD

FRACTIONAL & METRIC SERIES

CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	mm					Ti-NAMITE-A (AITiN) EDP NO.
				SHANK DIAMETER D ₂	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	SHANK LENGTH L ₄	
11,2 mm	0.4409			12,0	162,0	114,0	96,0	45,0	63657
11,3 mm	0.4449			12,0	162,0	114,0	96,0	45,0	63658
11,4 mm	0.4488			12,0	162,0	114,0	96,0	45,0	63659
11,5 mm	0.4528		M12 X 0,5	12,0	162,0	114,0	96,0	45,0	63660
11,6 mm	0.4567			12,0	162,0	114,0	96,0	45,0	63661
11,7 mm	0.4606			12,0	162,0	114,0	96,0	45,0	63662
11,8 mm	0.4646			12,0	162,0	114,0	96,0	45,0	63663
11,9 mm	0.4685			12,0	162,0	114,0	96,0	45,0	63664
15/32	0.4688	11.91	1/2-28	12,0	162,0	114,0	96,0	45,0	51827
12,0 mm	0.4724		M14 X 2	12,0	162,0	114,0	96,0	45,0	63665
31/64	0.4844	12.30	9/16-12	14,0	178,0	133,0	112,0	45,0	51828
12,5 mm	0.4921		M14 X 1,5	14,0	178,0	133,0	112,0	45,0	63666
1/2	0.5000	12.70		14,0	178,0	133,0	112,0	45,0	51829
12,8 mm	0.5039		M14 X 1,25	14,0	178,0	133,0	112,0	45,0	63667
13,0 mm	0.5118		M14 X 1	14,0	178,0	133,0	112,0	45,0	63668
33/64	0.5156	13.10	9/16-18	14,0	178,0	133,0	112,0	45,0	51830
13,5 mm	0.5315		5/8-11	14,0	178,0	133,0	112,0	45,0	63669
13,8 mm	0.5433			14,0	178,0	133,0	112,0	45,0	63670
14,0 mm	0.5512		M16 X 2	14,0	178,0	133,0	112,0	45,0	63671
9/16	0.5625	14.29		16,0	203,0	152,0	128,0	48,0	51831
14,5 mm	0.5709		M16 X 1,5	16,0	203,0	152,0	128,0	48,0	63672
37/64	0.5781	14.68	5/8-18	16,0	203,0	152,0	128,0	48,0	51832
14,8 mm	0.5827			16,0	203,0	152,0	128,0	48,0	63673
15,0 mm	0.5906		M16 X 1	16,0	203,0	152,0	128,0	48,0	63674
15,5 mm	0.6102		M18 X 2,5	16,0	203,0	152,0	128,0	48,0	63675
15,8 mm	0.6220			16,0	203,0	152,0	128,0	48,0	63676
5/8	0.6250	15.88	11/16-16	16,0	203,0	152,0	128,0	48,0	51833
16,0 mm	0.6299			16,0	203,0	152,0	128,0	48,0	63677
21/32	0.6562	16.67	3/4-10	18,0	222,0	171,0	144,0	48,0	51834
11/16	0.6875	17.46	3/4-16	18,0	222,0	171,0	144,0	48,0	51835
3/4	0.7500	19.05	13/16-16	20,0	243,0	190,0	160,0	50,0	51836

CONTINUED

FRACTIONAL Ice-Carb®

Series 140 8D Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/8	3/16	1/4	3/8	1/2	5/8	3/4		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	405 (324-486)	RPM	12377	8251	6188	4126	3094	2475	2063	
			Fr	0.0036	0.0053	0.0071	0.0107	0.0142	0.0178	0.0213	
			Feed (ipm)	44.0	44.0	44.0	44.0	44.0	44.0	44.0	
	≤ 275 Bhn or ≤ 28 HRc	370 (296-444)	RPM	11307	7538	5654	3769	2827	2261	1885	
			Fr	0.0030	0.0045	0.0060	0.0090	0.0120	0.0150	0.0180	
			Feed (ipm)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
	≤ 425 Bhn or ≤ 45 HRc	210 (168-252)	RPM	6418	4278	3209	2139	1604	1284	1070	
			Fr	0.0026	0.0039	0.0051	0.0077	0.0103	0.0129	0.0154	
			Feed (ipm)	16.5	16.5	16.5	16.5	16.5	16.5	16.5	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	320 (256-384)	RPM	9779	6519	4890	3260	2445	1956	1630
				Fr	0.0026	0.0038	0.0051	0.0077	0.0102	0.0128	0.0153
				Feed (ipm)	25.0	25.0	25.0	25.0	25.0	25.0	25.0
≤ 375 Bhn or ≤ 40 HRc		190 (152-228)	RPM	5806	3871	2903	1935	1452	1161	968	
			Fr	0.0020	0.0030	0.0040	0.0059	0.0079	0.0099	0.0119	
			Feed (ipm)	11.5	11.5	11.5	11.5	11.5	11.5	11.5	
≤ 450 Bhn or ≤ 48 HRc		135 (108-162)	RPM	4126	2750	2063	1375	1031	825	688	
			Fr	0.0016	0.0024	0.0032	0.0047	0.0063	0.0079	0.0095	
			Feed (ipm)	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 200 Bhn or ≤ 13 HRc	140 (112-168)	RPM	4278	2852	2139	1426	1070	856	713
				Fr	0.0020	0.0030	0.0040	0.0060	0.0079	0.0099	0.0119
				Feed (ipm)	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	≤ 375 Bhn or ≤ 40 HRc	90 (72-108)	RPM	2750	1834	1375	917	688	550	458	
			Fr	0.0011	0.0016	0.0022	0.0033	0.0044	0.0055	0.0065	
			Feed (ipm)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
	≤ 475 Bhn or ≤ 50 HRc	80 (64-96)	RPM	2445	1630	1222	815	611	489	407	
			Fr	0.0006	0.0009	0.0012	0.0018	0.0025	0.0031	0.0037	
			Feed (ipm)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	350 (280-420)	RPM	10696	7131	5348	3565	2674	2139	1783
				Fr	0.0037	0.0056	0.0075	0.0112	0.0150	0.0187	0.0224
				Feed (ipm)	40.0	40.0	40.0	40.0	40.0	40.0	40.0
≤ 260 Bhn or ≤ 26 HRc		310 (248-372)	RPM	9474	6316	4737	3158	2368	1895	1579	
			Fr	0.0039	0.0059	0.0078	0.0117	0.0156	0.0195	0.0234	
			Feed (ipm)	37.0	37.0	37.0	37.0	37.0	37.0	37.0	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	290 (232-348)	RPM	8862	5908	4431	2954	2216	1772	1477
				Fr	0.0020	0.0030	0.0039	0.0059	0.0079	0.0099	0.0118
				Feed (ipm)	17.5	17.5	17.5	17.5	17.5	17.5	17.5
		≤ 275 Bhn or ≤ 28 HRc	180 (144-216)	RPM	5501	3667	2750	1834	1375	1100	917
				Fr	0.0018	0.0027	0.0036	0.0055	0.0073	0.0091	0.0109
				Feed (ipm)	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	130 (104-156)	RPM	3973	2649	1986	1324	993	795	662
				Fr	0.0018	0.0026	0.0035	0.0053	0.0070	0.0088	0.0106
				Feed (ipm)	7.0	7.0	7.0	7.0	7.0	7.0	7.0
		≤ 375 Bhn or ≤ 40 HRc	95 (76-114)	RPM	2903	1935	1452	968	726	581	484
				Fr	0.0016	0.0023	0.0031	0.0047	0.0062	0.0078	0.0093
				Feed (ipm)	4.5	4.5	4.5	4.5	4.5	4.5	4.5

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Series 140 8D Fractional	Hardness	Vc (sfm)		Diameter (D ₁) (inch)							
				1/8	3/16	1/4	3/8	1/2	5/8	3/4	
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	65 (52-78)	RPM	1986	1324	993	662	497	397	331	
			Fr	0.0009	0.0013	0.0017	0.0026	0.0034	0.0043	0.0051	
			Feed (ipm)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
	≤ 400 Bhn or ≤ 43 HRc	35 (28-42)	RPM	1070	713	535	357	267	214	178	
			Fr	0.0006	0.0008	0.0011	0.0017	0.0022	0.0028	0.0034	
			Feed (ipm)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	185 (148-222)	RPM	5654	3769	2827	1885	1413	1131	942
				Fr	0.0016	0.0024	0.0032	0.0048	0.0064	0.0080	0.0096
				Feed (ipm)	9.0	9.0	9.0	9.0	9.0	9.0	9.0
		≤ 350 Bhn or ≤ 38 HRc	140 (112-168)	RPM	4278	2852	2139	1426	1070	856	713
				Fr	0.0012	0.0018	0.0023	0.0035	0.0047	0.0058	0.0070
				Feed (ipm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
≤ 440 Bhn or ≤ 47 HRc		75 (60-90)	RPM	2292	1528	1146	764	573	458	382	
			Fr	0.0010	0.0015	0.0020	0.0030	0.0040	0.0050	0.0060	
			Feed (ipm)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	730 (584-876)	RPM	22309	14873	11154	7436	5577	4462	3718	
			Fr	0.0045	0.0067	0.0090	0.0134	0.0179	0.0224	0.0269	
			Feed (ipm)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
	≤ 150 Bhn or ≤ 7 HRc	635 (508-762)	RPM	19406	12937	9703	6469	4851	3881	3234	
			Fr	0.0046	0.0070	0.0093	0.0139	0.0186	0.0232	0.0278	
			Feed (ipm)	90.0	90.0	90.0	90.0	90.0	90.0	90.0	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	255 (204-306)	RPM	7793	5195	3896	2598	1948	1559	1299
				Fr	0.0018	0.0027	0.0036	0.0054	0.0072	0.0090	0.0108
				Feed (ipm)	14.0	14.0	14.0	14.0	14.0	14.0	14.0
		≤ 200 Bhn or ≤ 23 HRc	235 (188-282)	RPM	7182	4788	3591	2394	1795	1436	1197
				Fr	0.0018	0.0027	0.0036	0.0054	0.0072	0.0091	0.0109
				Feed (ipm)	13.0	13.0	13.0	13.0	13.0	13.0	13.0

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

$rpm = Vc \times 3.82 / D_1$

$ipm = Fr \times rpm$

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Series 140M 8D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			3	6	8	10	12	14	16		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	123	RPM	13087	6544	4908	3926	3272	2804	2454	
		(100-170)	Fr	0.085	0.171	0.228	0.285	0.342	0.399	0.455	
			Feed (mm/min)	1118	1118	1118	1118	1118	1118	1118	
	≤ 275 Bhn or ≤ 28 HRc	113	RPM	11956	5978	4484	3587	2989	2562	2242	
		(90-135)	Fr	0.072	0.144	0.193	0.241	0.289	0.337	0.385	
			Feed (mm/min)	864	864	864	864	864	864	864	
	≤ 425 Bhn or ≤ 45 HRc	64	RPM	6786	3393	2545	2036	1696	1454	1272	
		(51-77)	Fr	0.062	0.124	0.165	0.206	0.247	0.288	0.329	
			Feed (mm/min)	419	419	419	419	419	419	419	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	98	RPM	10340	5170	3878	3102	2585	2216	1939
			(78-117)	Fr	0.061	0.123	0.164	0.205	0.246	0.287	0.328
				Feed (mm/min)	635	635	635	635	635	635	635
≤ 375 Bhn or ≤ 40 HRc		58	RPM	6140	3070	2302	1842	1535	1316	1151	
		(46-69)	Fr	0.048	0.095	0.127	0.159	0.190	0.222	0.254	
			Feed (mm/min)	292	292	292	292	292	292	292	
≤ 450 Bhn or ≤ 48 HRc		41	RPM	4362	2181	1636	1309	1091	935	818	
		(33-49)	Fr	0.038	0.076	0.101	0.126	0.151	0.177	0.202	
			Feed (mm/min)	165	165	165	165	165	165	165	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 200 Bhn or ≤ 13 HRc	43	RPM	4524	2262	1696	1357	1131	969	848
			(34-51)	Fr	0.048	0.095	0.127	0.159	0.191	0.223	0.255
				Feed (mm/min)	216	216	216	216	216	216	216
	≤ 375 Bhn or ≤ 40 HRc	27	RPM	2908	1454	1091	872	727	623	545	
		(22-33)	Fr	0.026	0.052	0.070	0.087	0.105	0.122	0.140	
			Feed (mm/min)	76	76	76	76	76	76	76	
	≤ 475 Bhn or ≤ 50 HRc	24	RPM	2585	1293	969	776	646	554	485	
		(20-29)	Fr	0.015	0.029	0.039	0.049	0.059	0.069	0.079	
			Feed (mm/min)	38	38	38	38	38	38	38	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	107	RPM	11310	5655	4241	3393	2827	2424	2121
			(85-128)	Fr	0.090	0.180	0.240	0.299	0.359	0.419	0.479
				Feed (mm/min)	1016	1016	1016	1016	1016	1016	1016
≤ 260 Bhn or ≤ 26 HRc		94	RPM	10017	5009	3756	3005	2504	2147	1878	
		(76-113)	Fr	0.094	0.188	0.250	0.313	0.375	0.438	0.500	
			Feed (mm/min)	940	940	940	940	940	940	940	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F		≤ 185 Bhn or ≤ 9 HRc	88	RPM	9371	4686	3514	2811	2343	2008	1757
			(71-106)	Fr	0.047	0.095	0.126	0.158	0.190	0.221	0.253
				Feed (mm/min)	445	445	445	445	445	445	445
		≤ 275 Bhn or ≤ 28 HRc	55	RPM	5816	2908	2181	1745	1454	1246	1091
			(44-66)	Fr	0.044	0.087	0.116	0.146	0.175	0.204	0.233
				Feed (mm/min)	254	254	254	254	254	254	254
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	40	RPM	4201	2100	1575	1260	1050	900	788
			(32-48)	Fr	0.042	0.085	0.113	0.141	0.169	0.198	0.226
				Feed (mm/min)	178	178	178	178	178	178	178
		≤ 375 Bhn or ≤ 40 HRc	29	RPM	3070	1535	1151	921	767	658	576
			(23-35)	Fr	0.037	0.074	0.099	0.124	0.149	0.174	0.199
				Feed (mm/min)	114	114	114	114	114	114	114

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Series 140M 8D Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			3	6	8	10	12	14	16		
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	20 (16-24)	RPM	2100	1050	788	630	525	450	394	
			Fr	0.021	0.041	0.055	0.069	0.082	0.096	0.110	
			Feed (mm/min)	43	43	43	43	43	43	43	
	≤ 400 Bhn or ≤ 43 HRc	11 (9-13)	RPM	1131	565	424	339	283	242	212	
			Fr	0.013	0.027	0.036	0.045	0.054	0.063	0.072	
			Feed (mm/min)	15	15	15	15	15	15	15	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	56 (45-68)	RPM	5978	2989	2242	1793	1495	1281	1121
				Fr	0.038	0.076	0.102	0.127	0.153	0.178	0.204
				Feed (mm/min)	229	229	229	229	229	229	229
		≤ 350 Bhn or ≤ 38 HRc	43 (34-51)	RPM	4524	2262	1696	1357	1131	969	848
				Fr	0.028	0.056	0.075	0.094	0.112	0.131	0.150
				Feed (mm/min)	127	127	127	127	127	127	127
≤ 440 Bhn or ≤ 47 HRc		23 (18-27)	RPM	2424	1212	909	727	606	519	454	
			Fr	0.024	0.048	0.064	0.080	0.096	0.112	0.129	
			Feed (mm/min)	58	58	58	58	58	58	58	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	223 (178-267)	RPM	23589	11795	8846	7077	5897	5055	4423	
			Fr	0.108	0.215	0.287	0.359	0.431	0.502	0.574	
			Feed (mm/min)	2540	2540	2540	2540	2540	2540	2540	
	≤ 150 Bhn or ≤ 7 HRc	194 (155-232)	RPM	20519	10260	7695	6156	5130	4397	3847	
			Fr	0.111	0.223	0.297	0.371	0.446	0.520	0.594	
			Feed (mm/min)	2286	2286	2286	2286	2286	2286	2286	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	78 (62-93)	RPM	8240	4120	3090	2472	2060	1766	1545
				Fr	0.043	0.086	0.115	0.144	0.173	0.201	0.230
				Feed (mm/min)	356	356	356	356	356	356	356
		≤ 200 Bhn or ≤ 23 HRc	72 (57-86)	RPM	7594	3797	2848	2278	1898	1627	1424
				Fr	0.043	0.087	0.116	0.145	0.174	0.203	0.232
				Feed (mm/min)	330	330	330	330	330	330	330

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

rpm = (Vc x 1000) / (D₁ x 3.14)

mm/min = Fr x rpm

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

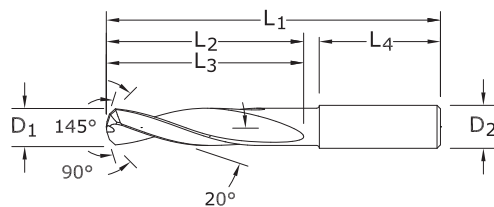
Series 120



3xD



2



120

FRACTIONAL & METRIC SERIES

- Double margin construction design stabilizes the drill for greater hole accuracy and improved surface finish
- Notched point reduces thrust force over conventional designs
- 8 facet point reduces fiber breakout and delamination on exit

CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	SHANK DIAMETER D ₂	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂ /L ₃	SHANK LENGTH L ₄	Di-NAMITE® (Diamond) EDP NO.
#40	0.0980	2.49	1/8	2	9/16	1-1/4	50000
2,7 mm	0.1063		6,0	63,0	20,0	32,0	50001
3,0 mm	0.1181		6,0	63,0	20,0	36,0	50002
1/8	0.1250	3.18	1/4	2-1/2	3/4	1-7/16	50003
3,2 mm	0.1260		6,0	63,0	20,0	36,0	50004
#30	0.1285	3.26	1/4	2-1/2	3/4	1-7/16	50005
#28	0.1405	3.57	1/4	2-1/2	3/4	1-7/16	50006
#22	0.1570	3.99	1/4	2-5/8	7/8	1-7/16	50007
#21	0.1590	4.04	1/4	2-5/8	7/8	1-7/16	50008
4,1 mm	0.1614		6,0	66,0	24,0	36,0	50009
#19	0.1660	4.22	1/4	2-5/8	7/8	1-7/16	50010
11/64	0.1719	4.37	1/4	2-5/8	7/8	1-7/16	50011
3/16	0.1875	4.76	1/4	2-5/8	1	1-7/16	50012
#11	0.1910	4.85	1/4	2-5/8	1	1-7/16	50013
#8	0.1990	5.05	1/4	2-5/8	1	1-7/16	50014
#7	0.2010	5.11	1/4	2-5/8	1	1-7/16	50015
#2	0.2210	5.61	1/4	2-5/8	1	1-7/16	50016
6,0 mm	0.2362		6,0	66,0	28,0	36,0	50017
1/4	0.2500	6.35	1/4	3-1/8	1-5/16	1-7/16	50018
.2510	0.2510	6.38	5/16	3-1/8	1-5/16	1-7/16	50019
F	0.2570	6.53	5/16	3-1/8	1-5/16	1-7/16	50020
I	0.2720	6.91	5/16	3-1/8	1-5/16	1-7/16	50021
J	0.2770	7.04	5/16	3-1/8	1-5/16	1-7/16	50022
K	0.2810	7.14	5/16	3-1/8	1-9/16	1-7/16	50023
5/16	0.3125	7.94	5/16	3-1/8	1-9/16	1-7/16	50024
8,0 mm	0.3150		8,0	79,0	41,0	36,0	50025
3/8	0.3750	9.53	3/8	3-1/2	1-27/32	1-9/16	50026
V	0.3770	9.58	1/2	3-1/2	1-27/32	1-9/16	50027
10,0 mm	0.3937		10,0	89,0	47,0	40,0	50028
7/16	0.4375	11.11	1/2	4-1/16	2-3/16	1-9/16	50029
12,0 mm	0.4724		12,0	102,0	55,0	45,0	50030
1/2	0.5000	12.70	1/2	4-1/4	2-5/16	1-3/4	50031

TOLERANCES (inch)

D₁ = +.0000/-0.0005

D₂ = h₆

TOLERANCES (mm)

D₁ = +0,000/-0,013

D₂ = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

FRACTIONAL & METRIC Series 120

Series 120 Fractional	Vc (sfm)		Diameter (D ₁) (inch)							
			1/8	3/16	1/4	5/16	3/8	7/16	1/2	
N CFRP, AFRP (Carbon Fiber, Aramid Fiber)	320 (256-384)	RPM	9779	6519	4890	3912	3260	2794	2445	
		Fr	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024	
		Feed (ipm)	5.9	5.9	5.9	5.9	5.9	5.9	5.9	
	GFRP (Fiberglass)	240 (192-288)	RPM	7334	4890	3667	2934	2445	2096	1834
			Fr	0.0006	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024
			Feed (ipm)	4.4	4.4	4.4	4.4	4.4	4.4	4.4
CARBON, GRAPHITE	400 (320-480)	RPM	12224	8149	6112	4890	4075	3493	3056	
		Fr	0.0008	0.0012	0.0016	0.0020	0.0024	0.0028	0.0032	
		Feed (ipm)	9.8	9.8	9.8	9.8	9.8	9.8	9.8	

$$\text{rpm} = \text{Vc} \times 3.82 / D_1$$

$$\text{ipm} = \text{Fr} \times \text{rpm}$$

adjust speed and / or feed based on resin type and / or fiber structure

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Series 120 Metric	Vc (m/min)		Diameter (D ₁) (mm)							
			2.5	3	4	6	8	10	12	
N CFRP, AFRP (Carbon Fiber, Aramid Fiber)	100 (80-120)	RPM	12722	10602	7951	5301	3976	3181	2650	
		Fr	0.012	0.014	0.019	0.028	0.038	0.047	0.057	
		Feed (mm/min)	150	150	150	150	150	150	150	
	GFRP (Fiberglass)	75 (65-90)	RPM	9542	7951	5963	3976	2982	2385	1988
			Fr	0.012	0.014	0.019	0.029	0.039	0.048	0.058
			Feed (mm/min)	115	115	115	115	115	115	115
CARBON, GRAPHITE	120 (96-144)	RPM	15266	12722	9542	6361	4771	3817	3181	
		Fr	0.015	0.018	0.025	0.037	0.049	0.062	0.074	
		Feed (mm/min)	235	235	235	235	235	235	235	

$$\text{rpm} = (\text{Vc} \times 1000) / (D_1 \times 3.14)$$

$$\text{mm/min} = \text{Fr} \times \text{rpm}$$

adjust speed and / or feed based on resin type and / or fiber structure

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

General Purpose Drills



Hole Making

GENERAL PURPOSE DRILLS	SERIES	DESCRIPTION	PAGE
2 Flute	101	2 Flute Slow Spiral	180
Short Length Self Centering (DIN6539)	108M Plus	2 Flute Short Length DIN 6539	185
Straight Flute	106	Straight Flute 140 Point Geometry	192
3 Flute with 150 Point Geometry	103	3 Flute 150 Point Geometry	196

GENERAL PURPOSE COUNTERSINKS	SERIES	DESCRIPTION	PAGE
Combined Drill & Countersink	301	2 Flute Straight Flute Combined Drill and Countersink Fractional	202
	301M	2 Flute Straight Flute Combined Drill and Countersink Metric	203
Single Flute Countersink	601	Single Flute Fractional	208
3 Flute Countersink	603	3 Flute Fractional	211
6 Flute Countersink	606	6 Flute Fractional	214

GENERAL PURPOSE REAMERS	SERIES	DESCRIPTION	PAGE
Straight Flute Accu-Reamer	200	Accu-Reamer	218
Straight Flute Reamer	201M	Metric Reamer	222

Speed & Feed Recommendations listed after each series

Taladrado

TALADROS DE USO GENERAL	SERIE	DESCRIPCIÓN	PÁGINA
2 filos	101	2 filos, espiral de avance lento	180
Autocentrante de longitud corta (DIN6539)	108M Plus	2 filos, longitud corta, DIN 6539	185
Filo recto	106	Filo recto, geometría de 140 puntos	192
3 filos con geometría de 150 puntos	103	3 filos, geometría de 150 puntos	196

TALADROS DE USO AVELLANADORES	SERIE	DESCRIPCIÓN	PÁGINA
Taladro y avellanador combinados	301	2 filos, filo recto, taladro y avellanador combinados, fraccional	202
	301M	2 filos, filo recto, taladro y avellanador combinados, métrico	203
Avellanador de filo único	601	Filo único, fraccional	208
Avellanador de 3 filos	603	3 filos, fraccional	211
Avellanador de 6 filos	606	6 filos, fraccional	214

TALADROS DE USO ESCARIADORES	SERIE	DESCRIPCIÓN	PÁGINA
Escariador Accu de filo recto	200	Escariador Accu	218
Escariador de filo recto	201M	Escariador métrico	222

Recomendaciones de velocidades y avances mostradas tras cada serie

Outils de perçage

FORETS UNIVERSELS	SERIES	DESCRIPTION	PAGE
2 dents	101	2 dents à spirale lente	180
Court autocentrant (DIN 6539)	108M Plus	2 dents court DIN 6539	185
Denture droite	106	Denture droite à angle de pointe 140°	192
3 dents à angle de pointe 150°	103	3 dents à angle de pointe 150°	196

FORETS À FRAISER	SERIES	DESCRIPTION	PAGE
Foret et foret à fraiser combinés	301	2 dents denture droite foret et foret à fraiser combinés (fractionnel)	202
	301M	2 dents denture droite foret et foret à fraiser combinés (métrique)	203
Foret à fraiser à dent simple	601	Foret à dent simple (fractionnel)	208
Foret à fraiser 3 dents	603	3 dents (fractionnel)	211
foret à fraiser 6 dents	606	6 dents (fractionnel)	214

FORETS À ALÉSOIRS	SERIES	DESCRIPTION	PAGE
Alésoir denture droite Accu-Reamer	200	Alésoir Accu-Reamer	218
Alésoir denture droite	201M	Alésoir (métrique)	222

Recommandations de vitesse et avance indiquées après chaque série

ALLZWECK-BOHRER	SERIE	BESCHREIBUNG	SEITE
2 Schneidekanten	101	2 Schneidekanten mit kleinem Spanwinkel	180
Kurze Bauform Selbstzentrierung (DIN 6539)	108M Plus	2 Schneidekanten Kurze Bauform DIN 6539	185
Gerade Schneidekante	106	Gerade Schneidekante Spitzengeometrie 140	192
3 Schneidekanten mit Spitzengeometrie 150	103	3 Schneidekanten Spitzengeometrie 150	196

ALLZWECK-BOHRER	SERIE	BESCHREIBUNG	SEITE
Senkbohrer	301	Zölliger Senkbohrer mit 2 geraden Schneidekanten	202
	301M	Metrischer Senkbohrer mit 2 geraden Schneidekanten	203
Senker mit 1 Schneidekante	601	Zölliger Bohrer mit 1 Schneidekante	208
Senkbohrer mit 1 Schneidekante	603	Zölliger Bohrer mit 3 Schneidekanten	211
Senkbohrer mit 6 Schneidekanten	606	Zölliger Bohrer mit 6 Schneidekanten	214

ALLZWECK-BOHRER	SERIE	BESCHREIBUNG	SEITE
Reibahlen mit gerader Schneidekante	200	Accu-Reamer	218
Reibahle mit gerader Schneidekante	201M	Metrische Reibahle	222

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

2 Flute Drills • Metric: DIN 338

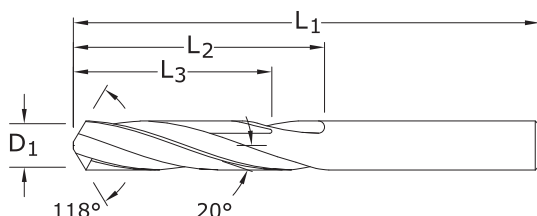


5xD



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FRACTIONAL & METRIC SERIES



CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AITiN)
#80	0.0135	0.34	3/4	3/16	—	51080	57076
#79	0.0145	0.37	3/4	3/16	—	51079	57077
1/64	0.0156	0.40	3/4	3/16	—	51101	57078
#78	0.0160	0.41	3/4	3/16	—	51078	57079
#77	0.0180	0.46	3/4	3/16	—	51077	57080
#76	0.0200	0.51	7/8	1/4	—	51076	57081
#75	0.0210	0.53	7/8	1/4	—	51075	57082
#74	0.0225	0.57	7/8	1/4	—	51074	57083
#73	0.0240	0.61	7/8	1/4	—	51073	57084
#72	0.0250	0.64	1	5/16	—	51072	57085
#71	0.0260	0.66	1	5/16	—	51071	57086
0,7 mm	0.0276		28,0	9,0	—	61001	68268
#70	0.0280	0.71	1-1/4	1/2	—	51070	57087
#69	0.0292	0.74	1-1/4	1/2	—	51069	57088
#68	0.0310	0.79	1-1/4	1/2	—	51068	57089
1/32	0.0312	0.79	1-1/4	1/2	—	51102	57090
0,8 mm	0.0315		30,0	10,0	—	61003	68269
#67	0.0320	0.81	1-1/4	1/2	—	51067	57091
#66	0.0330	0.84	1-1/4	1/2	—	51066	57092
#65	0.0350	0.89	1-3/8	5/8	1/2	51065	57093
0,9 mm	0.0354		32,0	11,0	8,0	61005	68270
#64	0.0360	0.91	1-3/8	5/8	1/2	51064	57094
#63	0.0370	0.94	1-3/8	5/8	1/2	51063	57095
#62	0.0380	0.97	1-3/8	5/8	1/2	51062	57096
#61	0.0390	0.99	1-3/8	5/8	1/2	51061	57097
1,0 mm	0.0394		34,0	12,0	9,0	61007	68271
#60	0.0400	1.02	1-1/2	3/4	39/64	51060	57098
#59	0.0410	1.04	1-1/2	3/4	39/64	51059	57099
#58	0.0420	1.07	1-1/2	3/4	39/64	51058	57100
#57	0.0430	1.09	1-1/2	3/4	39/64	51057	57101
1,1 mm	0.0433		36,0	14,0	11,0	61052	68294
#56	0.0465	1.18	1-1/2	3/4	39/64	51056	57102
3/64	0.0469	1.19	1-1/2	3/4	39/64	51103	57103
1,2 mm	0.0472		38,0	16,0	12,0	61053	68295
1,3 mm	0.0512		38,0	16,0	12,0	61054	68296
#55	0.0520	1.32	1-1/2	3/4	39/64	51055	57104
#54	0.0550	1.40	1-1/2	3/4	39/64	51054	57105
1,4 mm	0.0551		40,0	18,0	14,0	61055	68297
1,5 mm	0.0591		40,0	18,0	14,0	61009	68272
#53	0.0595	1.51	1-1/2	3/4	39/64	51053	57106
*1/16	0.0625	1.59	1-1/2	3/4	39/64	51104	57107
1,6 mm	0.0630		43,0	20,0	16,0	61056	68298
#52	0.0635	1.61	1-1/2	3/4	39/64	51052	57108
1,7 mm	0.0669		43,0	20,0	17,0	61057	68299
#51	0.0670	1.70	1-1/2	3/4	39/64	51051	57109

TOLERANCES (inch)

D₁ = +.0000/-.0005

TOLERANCES (mm)

D₁ = +0,0000/-0,0127

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

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FRACTIONAL & METRIC
2 Flute Drills • Metric: DIN 338

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FRACTIONAL & METRIC SERIES

CONTINUED

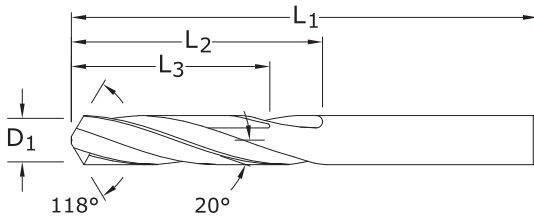
CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	TI-NAMITE-A (AlTiN)
#50	0.0700	1.78	1-3/4	7/8	45/64	51050	57110
1,8 mm	0.0709		46,0	22,0	17,0	61058	68300
#49	0.0730	1.85	1-3/4	7/8	45/64	51049	57111
1,9 mm	0.0748		46,0	22,0	17,0	61059	68301
#48	0.0760	1.93	1-3/4	7/8	45/64	51048	57112
5/64	0.0781	1.98	1-3/4	7/8	45/64	51105	57113
#47	0.0785	1.99	1-3/4	7/8	45/64	51047	57114
2,0 mm	0.0787		49,0	24,0	19,0	61011	68273
#46	0.0810	2.06	1-3/4	7/8	45/64	51046	57115
#45	0.0820	2.08	1-3/4	7/8	45/64	51045	57116
2,1 mm	0.0827		49,0	24,0	19,0	61060	68302
#44	0.0860	2.18	2	1	51/64	51044	57117
2,2 mm	0.0866		53,0	27,0	21,0	61061	68303
#43	0.0890	2.26	2	1	51/64	51043	57118
2,3 mm	0.0906		53,0	27,0	21,0	61062	68304
#42	0.0935	2.37	2	1	51/64	51042	57119
3/32	0.0938	2.38	2	1	51/64	51106	57120
2,4 mm	0.0945		57,0	30,0	24,0	61063	68305
#41	0.0960	2.44	2	1	51/64	51041	57121
#40	0.0980	2.49	2	1	51/64	51040	57122
2,5 mm	0.0984		57,0	30,0	24,0	61013	68274
#39	0.0995	2.53	2-1/4	1-1/4	1	51039	57123
#38	0.1015	2.58	2-1/4	1-1/4	1	51038	57124
2,6 mm	0.1024		57,0	30,0	24,0	61064	68306
#37	0.1040	2.64	2-1/4	1-1/4	1	51037	57125
2,7 mm	0.1063		61,0	33,0	26,0	61065	68307
#36	0.1065	2.71	2-1/4	1-1/4	1	51036	57126
7/64	0.1094	2.78	2-1/4	1-1/4	1	51107	57127
#35	0.1100	2.79	2-1/4	1-1/4	1	51035	57128
2,8 mm	0.1102		61,0	33,0	26,0	61066	68308
#34	0.1110	2.82	2-1/4	1-1/4	1	51034	57129
#33	0.1130	2.87	2-1/4	1-1/4	1	51033	57130
2,9 mm	0.1142		61,0	33,0	26,0	61067	68309
#32	0.1160	2.95	2-1/4	1-1/4	1	51032	57131
3,0 mm	0.1181		61,0	33,0	26,0	61015	68275
#31	0.1200	3.05	2-1/4	1-1/4	1	51031	57132
3,1 mm	0.1220		65,0	36,0	28,0	61068	68310
*1/8	0.1250	3.18	2-1/4	1-1/4	1	51108	57133
3,2 mm	0.1260		65,0	36,0	28,0	61069	68311
#30	0.1285	3.26	2-1/4	1-1/4	1	51030	57134
3,3 mm	0.1299		65,0	36,0	28,0	61070	68312
3,4 mm	0.1339		70,0	39,0	31,0	61071	68313
#29	0.1360	3.45	2-1/2	1-3/8	1-7/64	51029	57135
3,5 mm	0.1378		70,0	39,0	31,0	61017	68276
#28	0.1405	3.57	2-1/2	1-3/8	1-7/64	51028	57136
9/64	0.1406	3.57	2-1/2	1-3/8	1-7/64	51109	57137
3,6 mm	0.1417		70,0	39,0	31,0	61072	68314
#27	0.1440	3.66	2-1/2	1-3/8	1-7/64	51027	57138
3,7 mm	0.1457		70,0	39,0	31,0	61073	68315
#26	0.1470	3.73	2-1/2	1-3/8	1-7/64	51026	57139
#25	0.1495	3.80	2-1/2	1-3/8	1-7/64	51025	57140
3,8 mm	0.1496		75,0	43,0	34,0	61074	68316
#24	0.1520	3.86	2-1/2	1-3/8	1-7/64	51024	57141
3,9 mm	0.1535		75,0	43,0	34,0	61075	68317

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2 Flute Drills • Metric: DIN 338



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FRACTIONAL & METRIC SERIES

CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AITiN)
#23	0.1540	3.91	2-1/2	1-3/8	1-7/64	51023	57142
5/32	0.1562	3.97	2-1/2	1-3/8	1-7/64	51110	57143
#22	0.1570	3.99	2-1/2	1-3/8	1-7/64	51022	57144
4,0 mm	0.1575		75,0	43,0	34,0	61019	68277
#21	0.1590	4.04	2-1/2	1-3/8	1-7/64	51021	57145
#20	0.1610	4.09	2-1/2	1-3/8	1-7/64	51020	57146
4,1 mm	0.1614		75,0	43,0	34,0	61076	68318
4,2 mm	0.1654		75,0	43,0	34,0	61077	68319
#19	0.1660	4.22	2-1/2	1-5/8	1-19/64	51019	57147
4,3 mm	0.1693		80,0	47,0	37,0	61078	68320
#18	0.1695	4.31	2-3/4	1-5/8	1-19/64	51018	57148
11/64	0.1719	4.37	2-3/4	1-5/8	1-19/64	51111	57149
#17	0.1730	4.39	2-3/4	1-5/8	1-19/64	51017	57150
4,4 mm	0.1732		80,0	47,0	37,0	61079	68321
#16	0.1770	4.50	2-3/4	1-5/8	1-19/64	51016	57151
4,5 mm	0.1772		80,0	47,0	37,0	61021	68278
#15	0.1800	4.57	2-3/4	1-5/8	1-19/64	51015	57152
4,6 mm	0.1811		80,0	47,0	37,0	61080	68322
#14	0.1820	4.62	2-3/4	1-5/8	1-19/64	51014	57153
4,7 mm	0.1850		80,0	47,0	37,0	61081	68323
#13	0.1850	4.70	2-3/4	1-5/8	1-19/64	51013	57154
*3/16	0.1875	4.76	2-3/4	1-5/8	1-19/64	51112	57155
4,8 mm	0.1890		86,0	52,0	41,0	61082	68324
#12	0.1890	4.80	2-3/4	1-5/8	1-19/64	51012	57156
#11	0.1910	4.85	2-3/4	1-5/8	1-19/64	51011	57157
4,9 mm	0.1929		86,0	52,0	41,0	61083	68325
#10	0.1935	4.91	2-3/4	1-5/8	1-19/64	51010	57158
#9	0.1960	4.98	3	1-3/4	1-13/32	51009	57159
5,0 mm	0.1969		86,0	52,0	41,0	61023	68279
#8	0.1990	5.05	3	1-3/4	1-13/32	51008	57160
5,1 mm	0.2008		86,0	52,0	41,0	61084	68326
#7	0.2010	5.11	3	1-3/4	1-13/32	51007	57161
13/64	0.2031	5.16	3	1-3/4	1-13/32	51113	57162
#6	0.2040	5.18	3	1-3/4	1-13/32	51006	57163
5,2 mm	0.2047		86,0	52,0	41,0	61085	68327
#5	0.2055	5.22	3	1-3/4	1-13/32	51005	57164
5,3 mm	0.2087		86,0	52,0	41,0	61086	68328
#4	0.2090	5.31	3	1-3/4	1-13/32	51004	57165
5,4 mm	0.2126		93,0	57,0	45,0	61087	68329
#3	0.2130	5.41	3	1-3/4	1-13/32	51003	57166
5,5 mm	0.2165		93,0	57,0	45,0	61025	68280
7/32	0.2188	5.56	3	1-3/4	1-13/32	51114	57167
5,6 mm	0.2205		93,0	57,0	45,0	61088	68330
#2	0.2210	5.61	3	1-3/4	1-13/32	51002	57168

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TOLERANCES (inch)

D₁ = +.0000/-0.0005

TOLERANCES (mm)

D₁ = +0,0000/-0,0127

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

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2 Flute Drills • Metric: DIN 338

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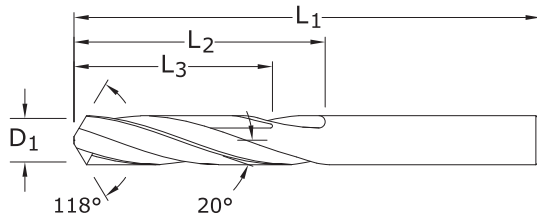
CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AITiN)
5,7 mm	0.2244		93,0	57,0	45,0	61089	68331
#1	0.2280	5.79	3	1-3/4	1-13/32	51001	57169
5,8 mm	0.2283		93,0	57,0	45,0	61090	68332
5,9 mm	0.2323		93,0	57,0	45,0	61091	68333
A	0.2340	5.94	3-1/4	2	1-39/64	51201	57170
15/64	0.2344	5.95	3-1/4	2	1-39/64	51115	57171
6,0 mm	0.2362		93,0	57,0	45,0	61027	68281
B	0.2380	6.05	3-1/4	2	1-39/64	51202	57172
6,1 mm	0.2402		101,0	63,0	50,0	61092	68334
C	0.2420	6.15	3-1/4	2	1-39/64	51203	57173
6,2 mm	0.2441		101,0	63,0	50,0	61093	68335
D	0.2460	6.25	3-1/4	2	1-39/64	51204	57174
6,3 mm	0.2480		101,0	63,0	50,0	61094	68336
*1/4	0.2500	6.35	3-1/4	2	1-39/64	51116	57175
6,4 mm	0.2520		101,0	63,0	50,0	61095	68337
6,5 mm	0.2559		101,0	63,0	50,0	61029	68282
F	0.2570	6.53	3-1/4	2	1-39/64	51206	57177
6,6 mm	0.2598		101,0	63,0	50,0	61096	68338
G	0.2610	6.63	3-1/2	2-1/8	1-45/64	51207	57178
6,7 mm	0.2638		101,0	63,0	50,0	61097	68339
17/64	0.2656	6.75	3-1/2	2-1/8	1-45/64	51117	57179
H	0.2660	6.76	3-1/2	2-1/8	1-45/64	51208	57180
6,8 mm	0.2677		109,0	69,0	55,0	61098	68340
6,9 mm	0.2717		109,0	69,0	55,0	61099	68341
I	0.2720	6.91	3-1/2	2-1/8	1-45/64	51209	57181
7,0 mm	0.2756		109,0	69,0	55,0	61031	68283
J	0.2770	7.04	3-1/2	2-1/8	1-45/64	51210	57182
7,1 mm	0.2795		109,0	69,0	55,0	61100	68342
K	0.2810	7.14	3-1/2	2-1/8	1-45/64	51211	57183
9/32	0.2812	7.14	3-1/2	2-1/8	1-45/64	51118	57184
7,2 mm	0.2835		109,0	69,0	55,0	61101	68343
7,3 mm	0.2874		109,0	69,0	55,0	61102	68344
L	0.2900	7.37	3-1/2	2-1/8	1-45/64	51212	57185
7,4 mm	0.2913		109,0	69,0	55,0	61103	68345
M	0.2950	7.49	3-3/4	2-3/8	1-29/32	51213	57186
7,5 mm	0.2953		109,0	69,0	55,0	61033	68284
19/64	0.2969	7.54	3-3/4	2-3/8	1-29/32	51119	57187
7,6 mm	0.2992		117,0	75,0	60,0	61104	68346
N	0.3020	7.67	3-3/4	2-3/8	1-29/32	51214	57188
7,7 mm	0.3031		117,0	75,0	60,0	61105	68347
7,8 mm	0.3071		117,0	75,0	60,0	61106	68348
7,9 mm	0.3110		117,0	75,0	60,0	61107	68349
*5/16	0.3125	7.94	3-3/4	2-3/8	1-29/32	51120	57189
8,0 mm	0.3150		117,0	75,0	60,0	61035	68285
O	0.3160	8.03	3-3/4	2-3/8	1-29/32	51215	57190
8,1 mm	0.3189		117,0	75,0	60,0	61108	68350
8,2 mm	0.3228		117,0	75,0	60,0	61109	68351
P	0.3230	8.20	3-3/4	2-3/8	1-29/32	51216	57191
8,3 mm	0.3268		117,0	75,0	60,0	61110	68352
21/64	0.3281	8.33	4	2-1/2	2	51121	57192
8,4 mm	0.3307		117,0	75,0	60,0	61111	68353
Q	0.3320	8.43	4	2-1/2	2	51217	57193
8,5 mm	0.3346		117,0	75,0	60,0	61037	68286
8,6 mm	0.3386		125,0	81,0	64,0	61112	68354

continued on next page

2 Flute Drills • Metric: DIN 338



5xD



101

FRACTIONAL & METRIC SERIES

CUTTING DIAMETER D ₁	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
R	0.3390	8.61	4	2-1/2	2	51218	57194
8,7 mm	0.3425		125,0	81,0	64,0	61113	68355
11/32	0.3438	8.73	4	2-1/2	2	51122	57195
8,8 mm	0.3465		125,0	81,0	64,0	61114	68356
S	0.3480	8.84	4	2-1/2	2	51219	57196
8,9 mm	0.3504		125,0	81,0	64,0	61115	68357
9,0 mm	0.3543		125,0	81,0	64,0	61039	68287
T	0.3580	9.09	4-1/4	2-3/4	2-13/64	51220	57197
9,1 mm	0.3583		125,0	81,0	64,0	61116	68358
23/64	0.3594	9.13	4-1/4	2-3/4	2-13/64	51123	57198
9,2 mm	0.3622		125,0	81,0	64,0	61117	68359
9,3 mm	0.3661		125,0	81,0	64,0	61118	68360
U	0.3680	9.35	4-1/4	2-3/4	2-13/64	51221	57199
9,4 mm	0.3701		125,0	81,0	64,0	61119	68361
9,5 mm	0.3740		125,0	81,0	64,0	61041	68288
*3/8	0.3750	9.53	4-1/4	2-3/4	2-13/64	51124	57200
V	0.3770	9.58	4-1/4	2-3/4	2-13/64	51222	57201
9,6 mm	0.3780		133,0	87,0	69,0	61120	68362
9,7 mm	0.3819		133,0	87,0	69,0	61121	68363
9,8 mm	0.3858		133,0	87,0	69,0	61122	68364
W	0.3860	9.80	4-1/2	2-7/8	2-19/64	51223	57202
9,9 mm	0.3898		133,0	87,0	69,0	61123	68365
25/64	0.3906	9.92	4-1/2	2-7/8	2-19/64	51125	57203
10,0 mm	0.3937		133,0	87,0	69,0	61043	68289
X	0.3970	10.08	4-1/2	2-7/8	2-19/64	51224	57204
10,2 mm	0.4016		133,0	87,0	69,0	61124	68366
Y	0.4040	10.26	4-1/2	2-7/8	2-19/64	51225	57205
13/32	0.4062	10.32	4-1/2	2-7/8	2-19/64	51126	57206
Z	0.4130	10.49	4-1/2	2-7/8	2-19/64	51226	57207
10,5 mm	0.4134		133,0	87,0	69,0	61045	68290
27/64	0.4219	10.72	4-1/2	2-7/8	2-19/64	51127	57208
11,0 mm	0.4331		142,0	94,0	75,0	61047	68291
7/16	0.4375	11.11	4-1/2	2-7/8	2-19/64	51128	57209
11,5 mm	0.4528		142,0	94,0	75,0	61049	68292
29/64	0.4531	11.51	4-3/4	3	2-13/32	51129	57210
15/32	0.4688	11.91	4-3/4	3	2-13/32	51130	57211
12,0 mm	0.4724		151,0	101,0	80,0	61051	68293
31/64	0.4844	12.30	4-3/4	3	2-13/32	51131	57212
1/2	0.5000	12.70	4-3/4	3	2-13/32	51132	57213
*Series 101 Set						61175	57351

TOLERANCES (inch)

D₁ = +0.0000/-0.0005

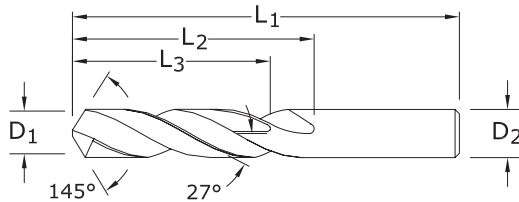
TOLERANCES (mm)

D₁ = +0,0000/-0,0127

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

Short Length Self Centering Drills • DIN 6539



108M Plus METRIC SERIES

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,000/-0,010

D₂ = h₆

>3-6 DIAMETER

D₁ = +0,000/-0,012

D₂ = h₆

>6-10 DIAMETER

D₁ = +0,000/-0,015

D₂ = h₆

>10-18 DIAMETER

D₁ = +0,000/-0,018

D₂ = h₆

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

CUTTING DIAMETER D ₁ /D ₂	mm			EDP NO.	
	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	UNCOATED	Ti-NAMITE-A (AITiN)
0,5	20,0	3,0	—	62001	68643
0,55	21,0	3,5	—	62003	68644
0,6	21,0	3,5	—	62005	68645
0,65	22,0	4,0	—	62007	68646
0,7	23,0	4,5	—	62009	68647
0,75	23,0	4,5	—	62011	68648
0,8	24,0	5,0	—	62013	68649
0,85	24,0	5,0	—	62015	68650
0,9	25,0	5,5	4,0	62017	68651
0,95	25,0	5,5	4,0	62019	68652
1,0	26,0	6,0	4,7	62021	68653
1,05	26,0	6,0	4,7	62023	68654
1,1	28,0	7,0	5,4	62025	68655
1,15	28,0	7,0	5,4	62027	68656
1,2	30,0	8,0	6,0	62029	68657
1,25	30,0	8,0	6,0	62031	68658
1,3	30,0	8,0	6,0	62033	68659
1,35	32,0	9,0	7,0	62035	68660
1,4	32,0	9,0	7,0	62037	68661
1,45	32,0	9,0	7,0	62039	68662
1,5	32,0	9,0	7,0	62041	68663
1,6	34,0	10,0	7,0	62043	68664
1,7	34,0	10,0	7,0	62045	68665
1,8	36,0	11,0	8,0	62047	68666
1,9	36,0	11,0	8,0	62049	68667
2,0	38,0	12,0	9,0	62051	68668
2,1	38,0	12,0	9,0	62053	68669
2,2	40,0	13,0	10,0	62055	68670
2,3	40,0	13,0	10,0	62057	68671
2,4	43,0	14,0	11,0	62059	68672
2,5	43,0	14,0	11,0	62061	68673
2,6	43,0	14,0	11,0	62063	68674
2,7	46,0	16,0	12,0	62065	68675
2,8	46,0	16,0	12,0	62067	68676

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METRIC

Short Length Self Centering Drills • DIN 6539

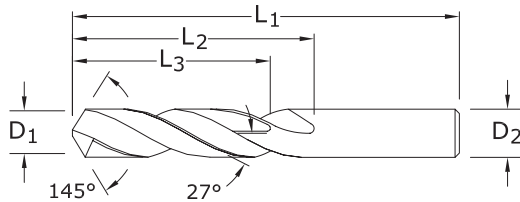


3xD



108M Plus

METRIC SERIES



- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

CUTTING DIAMETER D ₁ /D ₂	mm			EDP NO.	
	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	UNCOATED	Ti-NAMITE-A (AlTiN)
2,9	46,0	16,0	12,0	62069	68677
3,0	46,0	16,0	12,0	62071	68678
3,1	49,0	18,0	14,0	62073	68679
3,2	49,0	18,0	14,0	62075	68680
3,3	49,0	18,0	14,0	62077	68681
3,4	52,0	20,0	15,0	62079	68682
3,5	52,0	20,0	15,0	62081	68683
3,6	52,0	20,0	15,0	62083	68684
3,7	52,0	20,0	15,0	62085	68685
3,8	55,0	22,0	17,0	62087	68686
3,9	55,0	22,0	17,0	62089	68687
4,0	55,0	22,0	17,0	62091	68688
4,1	55,0	22,0	17,0	62093	68689
4,2	55,0	22,0	17,0	62095	68690
4,3	58,0	24,0	18,0	62097	68691
4,4	58,0	24,0	18,0	62099	68692
4,5	58,0	24,0	18,0	62101	68693
4,6	58,0	24,0	18,0	62103	68694
4,7	58,0	24,0	18,0	62105	68695
4,8	62,0	26,0	20,0	62107	68696
4,9	62,0	26,0	20,0	62109	68697
5,0	62,0	26,0	20,0	62111	68698
5,1	62,0	26,0	20,0	62113	68699
5,2	62,0	26,0	20,0	62115	68700
5,3	62,0	26,0	20,0	62117	68701
5,4	66,0	28,0	21,0	62119	68702
5,5	66,0	28,0	21,0	62121	68703
5,6	66,0	28,0	21,0	62123	68704
5,7	66,0	28,0	21,0	62125	68705
5,8	66,0	28,0	21,0	62127	68706
5,9	66,0	28,0	21,0	62129	68707
6,0	66,0	28,0	21,0	62131	68708

TOLERANCES (mm)

- ≤3 DIAMETER**
D₁ = +0,000/-0,010
D₂ = h₆
- >3-6 DIAMETER**
D₁ = +0,000/-0,012
D₂ = h₆
- >6-10 DIAMETER**
D₁ = +0,000/-0,015
D₂ = h₆
- >10-16 DIAMETER**
D₁ = +0,000/-0,018
D₂ = h₆

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

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Short Length Self Centering Drills • DIN 6539

108M Plus

METRIC SERIES

CUTTING DIAMETER D ₁ /D ₂	mm			EDP NO.		CONTINUED
	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	UNCOATED	Ti-NAMITE-A (AITiN)	
6,1	70,0	31,0	23,0	62133	68709	
6,2	70,0	31,0	23,0	62135	68710	
6,3	70,0	31,0	23,0	62137	68711	
6,4	70,0	31,0	23,0	62139	68712	
6,5	70,0	31,0	23,0	62141	68713	
6,8	70,0	31,0	23,0	62142	68603	
7,0	74,0	34,0	25,0	62143	68718	
7,5	74,0	34,0	25,0	62145	68723	
7,8	79,0	37,0	27,0	62146	68604	
8,0	79,0	37,0	27,0	62147	68728	
8,5	79,0	37,0	27,0	62149	68733	
9,0	84,0	40,0	29,0	62151	68738	
9,5	84,0	40,0	29,0	62153	68743	
9,8	89,0	43,0	31,0	62154	68606	
10,0	89,0	43,0	31,0	62155	68748	
10,2	89,0	43,0	31,0	62156	68607	
10,5	89,0	43,0	31,0	62066	68753	
11,0	95,0	47,0	33,0	62157	68758	
11,5	95,0	47,0	33,0	62084	68763	
11,8	102,0	51,0	35,0	62158	68608	
12,0	102,0	51,0	35,0	62159	68768	
12,5	102,0	51,0	35,0	62102	68773	
13,0	102,0	51,0	35,0	62112	68778	
13,8	107,0	54,0	37,0	62164	68609	
14,0	107,0	54,0	37,0	62116	68780	
14,5	111,0	56,0	38,0	62166	68611	
14,8	111,0	56,0	38,0	62167	68612	
15,0	111,0	56,0	38,0	62168	68613	
15,8	115,0	58,0	38,0	62170	68614	
16,0	115,0	58,0	38,0	62171	68616	

2 Flute Drills

Series	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/64	1/32	1/16	1/8	1/4	3/8	1/2		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	265 (212-318)	RPM	64787	32394	16197	8098	4049	2699	2025	
			Fr	0.00021	0.0004	0.0008	0.0017	0.0033	0.0050	0.0067	
			Feed (ipm)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	
	≤ 300 Bhn or ≤ 32 HRc	125 (100-150)	RPM	30560	15280	7640	3820	1910	1273	955	
			Fr	0.00020	0.0004	0.0008	0.0016	0.0031	0.0047	0.0063	
			Feed (ipm)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
	≤ 425 Bhn or ≤ 45 HRc	85 (68-102)	RPM	20781	10390	5195	2598	1299	866	649	
			Fr	0.00011	0.0002	0.0004	0.0008	0.0017	0.0025	0.0034	
			Feed (ipm)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	230 (184-276)	RPM	56230	28115	14058	7029	3514	2343	1757
				Fr	0.00019	0.0004	0.0007	0.0015	0.0030	0.0045	0.0060
				Feed (ipm)	10.5	10.5	10.5	10.5	10.5	10.5	10.5
≤ 375 Bhn or ≤ 40 HRc		145 (116-174)	RPM	35450	17725	8862	4431	2216	1477	1108	
			Fr	0.00019	0.0004	0.0007	0.0015	0.0030	0.0045	0.0060	
			Feed (ipm)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	
≤ 450 Bhn or ≤ 48 HRc		60 (48-72)	RPM	14669	7334	3667	1834	917	611	458	
			Fr	0.00008	0.0002	0.0003	0.0007	0.0013	0.0020	0.0026	
			Feed (ipm)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRc	85 (68-102)	RPM	20781	10390	5195	2598	1299	866	649
				Fr	0.00011	0.0002	0.0004	0.0009	0.0018	0.0027	0.0035
				Feed (ipm)	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	≤ 375 Bhn or ≤ 40 HRc	55 (44-66)	RPM	13446	6723	3362	1681	840	560	420	
			Fr	0.00005	0.0001	0.0002	0.0004	0.0008	0.0012	0.0017	
			Feed (ipm)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
	≤ 475 Bhn or ≤ 50 HRc	40 (32-48)	RPM	9779	4890	2445	1222	611	407	306	
			Fr	0.00005	0.0001	0.0002	0.0004	0.0008	0.0012	0.0016	
			Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	280 (224-336)	RPM	68454	34227	17114	8557	4278	2852	2139
				Fr	0.00026	0.0005	0.0010	0.0020	0.0041	0.0061	0.0082
				Feed (ipm)	17.5	17.5	17.5	17.5	17.5	17.5	17.5
≤ 330 Bhn or ≤ 36 HRc		250 (200-300)	RPM	61120	30560	15280	7640	3820	2547	1910	
			Fr	0.00025	0.0005	0.0010	0.0020	0.0041	0.0061	0.0081	
			Feed (ipm)	15.5	15.5	15.5	15.5	15.5	15.5	15.5	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F		≤ 250 Bhn or ≤ 24 HRc	210 (168-252)	RPM	51341	25670	12835	6418	3209	2139	1604
				Fr	0.00015	0.0003	0.0006	0.0012	0.0024	0.0036	0.0048
				Feed (ipm)	7.7	7.7	7.7	7.7	7.7	7.7	7.7
		≤ 330 Bhn or ≤ 36 HRc	110 (88-132)	RPM	26893	13446	6723	3362	1681	1121	840
				Fr	0.00009	0.0002	0.0004	0.0007	0.0015	0.0022	0.0030
				Feed (ipm)	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	65 (52-78)	RPM	15891	7946	3973	1986	993	662	497
				Fr	0.00010	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
				Feed (ipm)	1.7	1.7	1.7	1.7	1.7	1.7	1.7
		≤ 375 Bhn or ≤ 40 HRc	55 (44-66)	RPM	13446	6723	3362	1681	840	560	420
				Fr	0.00010	0.0002	0.0004	0.0008	0.0015	0.0023	0.0031
				Feed (ipm)	1.3	1.3	1.3	1.3	1.3	1.3	1.3

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FRACTIONAL 2 Flute Drills

Series 101 Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/64	1/32	1/16	1/8	1/4	3/8	1/2		
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	40 (32-48)	RPM	9779	4890	2445	1222	611	407	306
				Fr	0.00010	0.0002	0.0004	0.0008	0.0016	0.0025	0.0033
				Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		≤ 320 Bhn or ≤ 34 HRc	25 (20-30)	RPM	6112	3056	1528	764	382	255	191
				Fr	0.00010	0.0002	0.0004	0.0008	0.0016	0.0024	0.0031
				Feed (ipm)	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	≤ 425 Bhn or ≤ 45 HRc	20 (16-24)	RPM	4890	2445	1222	611	306	204	153	
			Fr	0.00004	0.0001	0.0002	0.0003	0.0007	0.0010	0.0013	
			Feed (ipm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
	≤ 275 Bhn or ≤ 28 HRc	85 (68-102)	RPM	20781	10390	5195	2598	1299	866	649	
			Fr	0.00020	0.0004	0.0008	0.0016	0.0032	0.0049	0.0065	
			Feed (ipm)	4.2	4.2	4.2	4.2	4.2	4.2	4.2	
TITANIUM ALLOYS (DIFFICULT) Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 350 Bhn or ≤ 38 HRc	65 (52-78)	RPM	15891	7946	3973	1986	993	662	497	
			Fr	0.00011	0.0002	0.0004	0.0009	0.0017	0.0026	0.0034	
			Feed (ipm)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
	≤ 440 Bhn or ≤ 47 HRc	55 (44-66)	RPM	13446	6723	3362	1681	840	560	420	
			Fr	0.00010	0.0002	0.0004	0.0008	0.0015	0.0023	0.0031	
			Feed (ipm)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	540 (432-648)	RPM	132019	66010	33005	16502	8251	5501	4126
				Fr	0.00030	0.0006	0.0012	0.0024	0.0048	0.0073	0.0097
				Feed (ipm)	40.0	40.0	40.0	40.0	40.0	40.0	40.0
		≤ 150 Bhn or ≤ 7 HRc	455 (364-546)	RPM	111238	55619	27810	13905	6952	4635	3476
				Fr	0.00031	0.0006	0.0013	0.0025	0.0050	0.0076	0.0101
				Feed (ipm)	35.0	35.0	35.0	35.0	35.0	35.0	35.0
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	190 (152-228)	RPM	46451	23226	11613	5806	2903	1935	1452
				Fr	0.00015	0.0003	0.0006	0.0012	0.0024	0.0036	0.0048
				Feed (ipm)	7.0	7.0	7.0	7.0	7.0	7.0	7.0
		≤ 200 Bhn or ≤ 23 HRc	175 (140-210)	RPM	42784	21392	10696	5348	2674	1783	1337
				Fr	0.00015	0.0003	0.0006	0.0012	0.0024	0.0036	0.0048
				Feed (ipm)	6.4	6.4	6.4	6.4	6.4	6.4	6.4
PLASTICS Polycarbonate, PVC	500		RPM	122240	61120	30560	15280	7640	5093	3820	
			Fr	0.00031	0.0006	0.0012	0.0025	0.0050	0.0075	0.0099	
	(400-600)		Feed (ipm)	38.0	38.0	38.0	38.0	38.0	38.0	38.0	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

$$\text{rpm} = \text{Vc} \times 3.82 / \text{D}_1$$

$$\text{ipm} = \text{Fz} \times \text{rpm}$$

reduce speed and feed 30 percent when using uncoated drills

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

2 Flute Drills

Short Length Self Centering Drills • DIN 6539

Series 101M, 108M Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			1	3	6	8	10	12	16		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	81	RPM	25690	8563	4282	3211	2569	2141	1606	
		(65-97)	Fr	0.014	0.041	0.082	0.109	0.136	0.163	0.218	
			Feed (mm/min)	350	350	350	350	350	350	350	
	≤ 300 Bhn or ≤ 32 HRc	38	RPM	12118	4039	2020	1515	1212	1010	757	
		(30-46)	Fr	0.012	0.036	0.072	0.096	0.120	0.144	0.191	
			Feed (mm/min)	145	145	145	145	145	145	145	
	≤ 425 Bhn or ≤ 45 HRc	26	RPM	8240	2747	1373	1030	824	687	515	
		(21-31)	Fr	0.007	0.020	0.040	0.053	0.067	0.080	0.107	
			Feed (mm/min)	55	55	55	55	55	55	55	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	70	RPM	22297	7432	3716	2787	2230	1858	1394
			(56-84)	Fr	0.012	0.036	0.073	0.097	0.121	0.145	0.194
				Feed (mm/min)	270	270	270	270	270	270	270
≤ 375 Bhn or ≤ 40 HRc		44	RPM	14057	4686	2343	1757	1406	1171	879	
		(35-53)	Fr	0.012	0.036	0.073	0.097	0.121	0.145	0.194	
			Feed (mm/min)	170	170	170	170	170	170	170	
≤ 450 Bhn or ≤ 48 HRc		18	RPM	5816	1939	969	727	582	485	364	
		(15-22)	Fr	0.005	0.015	0.030	0.040	0.050	0.060	0.080	
			Feed (mm/min)	29	29	29	29	29	29	29	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRc	26	RPM	8240	2747	1373	1030	824	687	515
			(21-31)	Fr	0.007	0.020	0.040	0.053	0.067	0.080	0.107
				Feed (mm/min)	55	55	55	55	55	55	55
	≤ 375 Bhn or ≤ 40 HRc	17	RPM	5332	1777	889	666	533	444	333	
		(13-20)	Fr	0.003	0.010	0.020	0.027	0.034	0.041	0.054	
			Feed (mm/min)	18	18	18	18	18	18	18	
	≤ 475 Bhn or ≤ 50 HRc	12	RPM	3878	1293	646	485	388	323	242	
		(10-15)	Fr	0.003	0.009	0.019	0.025	0.031	0.037	0.050	
			Feed (mm/min)	12	12	12	12	12	12	12	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	85	RPM	27144	9048	4524	3393	2714	2262	1696
			(68-102)	Fr	0.016	0.049	0.097	0.130	0.162	0.195	0.259
				Feed (mm/min)	440	440	440	440	440	440	440
≤ 330 Bhn or ≤ 36 HRc		76	RPM	24235	8078	4039	3029	2424	2020	1515	
		(61-91)	Fr	0.017	0.050	0.099	0.132	0.165	0.198	0.264	
			Feed (mm/min)	400	400	400	400	400	400	400	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250 Bhn or ≤ 24 HRc	64	RPM	20358	6786	3393	2545	2036	1696	1272	
		(51-77)	Fr	0.010	0.029	0.059	0.079	0.098	0.118	0.157	
			Feed (mm/min)	200	200	200	200	200	200	200	
	≤ 330 Bhn or ≤ 36 HRc	34	RPM	10664	3555	1777	1333	1066	889	666	
		(27-40)	Fr	0.006	0.017	0.034	0.045	0.056	0.068	0.090	
			Feed (mm/min)	60	60	60	60	60	60	60	
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	20	RPM	6301	2100	1050	788	630	525	394
			(16-24)	Fr	0.007	0.021	0.043	0.057	0.071	0.086	0.114
				Feed (mm/min)	45	45	45	45	45	45	45
		≤ 375 Bhn or ≤ 40 HRc	17	RPM	5332	1777	889	666	533	444	333
			(13-20)	Fr	0.007	0.020	0.039	0.053	0.066	0.079	0.105
				Feed (mm/min)	35	35	35	35	35	35	35

continued on next page

2 Flute Drills

Short Length Self Centering Drills • DIN 6539

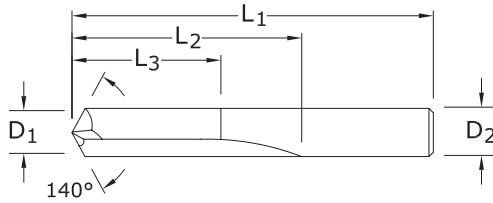
Series	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			1	3	6	8	10	12	16		
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	12 (10-15)	RPM	3878	1293	646	485	388	323	242	
			Fr	0.006	0.019	0.039	0.052	0.064	0.077	0.103	
			Feed (mm/min)	25	25	25	25	25	25	25	
	≤ 320 Bhn or ≤ 34 HRc	8 (6-9)	RPM	2424	808	404	303	242	202	151	
			Fr	0.006	0.019	0.037	0.050	0.062	0.074	0.099	
			Feed (mm/min)	15	15	15	15	15	15	15	
	≤ 425 Bhn or ≤ 45 HRc	6 (5-7)	RPM	1939	646	323	242	194	162	121	
			Fr	0.005	0.015	0.031	0.041	0.052	0.062	0.083	
			Feed (mm/min)	10	10	10	10	10	10	10	
	S TITANIUM ALLOYS (DIFFICULT) Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	26 (21-31)	RPM	8240	2747	1373	1030	824	687	515
				Fr	0.013	0.040	0.080	0.107	0.133	0.160	0.214
				Feed (mm/min)	110	110	110	110	110	110	110
≤ 350 Bhn or ≤ 38 HRc		20 (16-24)	RPM	6301	2100	1050	788	630	525	394	
			Fr	0.007	0.021	0.043	0.057	0.071	0.086	0.114	
			Feed (mm/min)	45	45	45	45	45	45	45	
≤ 440 Bhn or ≤ 47 HRc		17 (13-20)	RPM	5332	1777	889	666	533	444	333	
			Fr	0.007	0.020	0.039	0.053	0.066	0.079	0.105	
			Feed (mm/min)	35	35	35	35	35	35	35	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	165 (132-198)	RPM	52348	17449	8725	6544	5235	4362	3272
				Fr	0.020	0.060	0.120	0.160	0.200	0.240	0.319
				Feed (mm/min)	1045	1045	1045	1045	1045	1045	1045
	≤ 150 Bhn or ≤ 7 HRc	139 (111-166)	RPM	44108	14703	7351	5514	4411	3676	2757	
			Fr	0.020	0.060	0.120	0.160	0.200	0.239	0.319	
			Feed (mm/min)	880	880	880	880	880	880	880	
	≤ 140 Bhn or ≤ 3 HRc	58 (46-69)	RPM	18419	6140	3070	2302	1842	1535	1151	
			Fr	0.010	0.030	0.060	0.080	0.100	0.121	0.161	
			Feed (mm/min)	185	185	185	185	185	185	185	
	≤ 200 Bhn or ≤ 23 HRc	53 (43-64)	RPM	16965	5655	2827	2121	1696	1414	1060	
			Fr	0.010	0.030	0.060	0.080	0.100	0.120	0.160	
			Feed (mm/min)	170	170	170	170	170	170	170	
PLASTICS Polycarbonate, PVC	152 (122-183)	RPM	48471	16157	8078	6059	4847	4039	3029		
		Fr	0.020	0.060	0.120	0.160	0.200	0.240	0.320		
		Feed (mm/min)	970	970	970	970	970	970	970		

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times rpm$
 reduce speed and feed 30 percent when using uncoated drills
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

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FRACTIONAL & METRIC SERIES

CUTTING DIAMETER D ₁ /D ₂	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
1,0 mm	0.0394		26,0	6,0	4,5	66001	66002
#60	0.0400	1.02	1-1/2	1/2	13/32	56060	56269
#59	0.0410	1.04	1-1/2	1/2	13/32	56059	56268
#58	0.0420	1.07	1-1/2	1/2	13/32	56058	56267
#57	0.0430	1.09	1-1/2	1/2	13/32	56057	56266
#56	0.0465	1.18	1-1/2	1/2	13/32	56056	56265
3/64	0.0469	1.19	1-1/2	1/2	13/32	56103	56135
#55	0.0520	1.32	1-1/2	1/2	13/32	56055	56264
#54	0.0550	1.40	1-1/2	1/2	13/32	56054	56263
1,5 mm	0.0591		32,0	9,0	7,0	66003	66004
#53	0.0595	1.51	1-1/2	1/2	13/32	56053	56262
1/16	0.0625	1.59	1-1/2	5/8	1/2	56104	56136
#52	0.0635	1.61	1-11/16	11/16	35/64	56052	56261
#51	0.0670	1.70	1-11/16	11/16	35/64	56051	56260
#50	0.0700	1.78	1-11/16	11/16	35/64	56050	56259
#49	0.0730	1.85	1-11/16	11/16	35/64	56049	56258
#48	0.0760	1.93	1-11/16	11/16	35/64	56048	56257
5/64	0.0781	1.98	1-11/16	11/16	35/64	56105	56137
#47	0.0785	1.99	1-3/4	3/4	39/64	56047	56256
2,0 mm	0.0787		38,0	12,0	9,0	66005	66006
#46	0.0810	2.06	1-3/4	3/4	39/64	56046	56255
#45	0.0820	2.08	1-3/4	3/4	39/64	56045	56254
#44	0.0860	2.18	1-3/4	3/4	39/64	56044	56253
#43	0.0890	2.26	1-3/4	3/4	39/64	56043	56252
#42	0.0935	2.37	1-3/4	3/4	39/64	56042	56251
3/32	0.0938	2.38	1-3/4	3/4	39/64	56106	56138
#41	0.0960	2.44	1-13/16	13/16	21/32	56041	56250
#40	0.0980	2.49	1-13/16	13/16	21/32	56040	56249
2,5 mm	0.0984		43,0	14,0	11,0	66007	66008
#39	0.0995	2.53	1-13/16	13/16	21/32	56039	56248
#38	0.1015	2.58	1-13/16	13/16	21/32	56038	56247
#37	0.1040	2.64	1-13/16	13/16	21/32	56037	56246
#36	0.1065	2.71	1-13/16	13/16	21/32	56036	56245
7/64	0.1094	2.78	1-13/16	13/16	21/32	56107	56139
#35	0.1100	2.79	1-7/8	7/8	45/64	56035	56244
#34	0.1110	2.82	1-7/8	7/8	45/64	56034	56243

TOLERANCES (inch)

D₁ = +.0000/-0.0005
D₂ = h6

TOLERANCES (mm)

D₁ = +0,0000/-0,0127
D₂ = h6

- STEELS
- CAST IRON
- HARDENED STEELS

For patent information visit www.ksptpatents.com

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FRACTIONAL & METRIC SERIES

CONTINUED

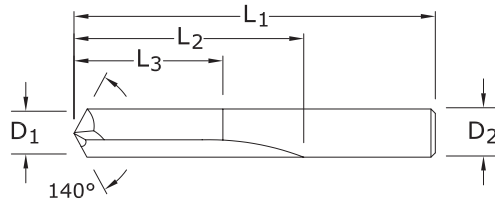
CUTTING DIAMETER D ₁ /D ₂	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AITiN)
#33	0.1130	2.87	1-7/8	7/8	45/64	56033	56242
#32	0.1160	2.95	1-7/8	7/8	45/64	56032	56241
3,0 mm	0.1181		46,0	16,0	12,0	66009	66010
#31	0.1200	3.05	1-7/8	7/8	45/64	56031	56240
1/8	0.1250	3.18	1-7/8	7/8	45/64	56108	56140
#30	0.1285	3.26	1-15/16	15/16	3/4	56030	56239
#29	0.1360	3.45	1-15/16	15/16	3/4	56029	56238
3,5 mm	0.1378		52,0	20,0	15,0	66011	66012
#28	0.1405	3.57	1-15/16	15/16	3/4	56028	56237
9/64	0.1406	3.57	1-15/16	15/16	3/4	56109	56141
#27	0.1440	3.66	2-1/16	1	51/64	56027	56236
#26	0.1470	3.73	2-1/16	1	51/64	56026	56235
#25	0.1495	3.80	2-1/16	1	51/64	56025	56234
#24	0.1520	3.86	2-1/16	1	51/64	56024	56233
#23	0.1540	3.91	2-1/16	1	51/64	56023	56232
5/32	0.1562	3.97	2-1/16	1	51/64	56110	56142
#22	0.1570	3.99	2-1/8	1-1/16	55/64	56022	56231
4,0 mm	0.1575		55,0	22,0	17,0	66013	66014
#21	0.1590	4.04	2-1/8	1-1/16	55/64	56021	56230
#20	0.1610	4.09	2-1/8	1-1/16	55/64	56020	56229
#19	0.1660	4.22	2-1/8	1-1/16	55/64	56019	56228
#18	0.1695	4.31	2-1/8	1-1/16	55/64	56018	56227
11/64	0.1719	4.37	2-1/8	1-1/16	55/64	56111	56143
#17	0.1730	4.39	2-3/16	1-1/8	29/32	56017	56226
#16	0.1770	4.50	2-3/16	1-1/8	29/32	56016	56225
4,5 mm	0.1772		58,0	24,0	18,0	66015	66016
#15	0.1800	4.57	2-3/16	1-1/8	29/32	56015	56224
#14	0.1820	4.62	2-3/16	1-1/8	29/32	56014	56223
#13	0.1850	4.70	2-3/16	1-1/8	29/32	56013	56222
3/16	0.1875	4.76	2-3/16	1-1/8	29/32	56112	56144
#12	0.1890	4.80	2-3/16	1-1/8	29/32	56012	56221
#11	0.1910	4.85	2-3/16	1-1/8	29/32	56011	56220
#10	0.1935	4.91	2-3/16	1-1/8	29/32	56010	56219
#9	0.1960	4.98	2-1/4	1-3/16	61/64	56009	56218
5,0 mm	0.1969		62,0	26,0	20,0	66017	66018
#8	0.1990	5.05	2-1/4	1-3/16	61/64	56008	56217
#7	0.2010	5.11	2-1/4	1-3/16	61/64	56007	56216
13/64	0.2031	5.16	2-1/4	1-3/16	61/64	56113	56145
#6	0.2040	5.18	2-3/8	1-1/4	1	56006	56215
#5	0.2055	5.22	2-3/8	1-1/4	1	56005	56214
#4	0.2090	5.31	2-3/8	1-1/4	1	56004	56213
#3	0.2130	5.41	2-3/8	1-1/4	1	56003	56212
5,5 mm	0.2165		66,0	28,0	21,0	66019	66020
7/32	0.2188	5.56	2-3/8	1-1/4	1	56114	56146
#2	0.2210	5.61	2-7/16	1-5/16	1-3/64	56002	56211
#1	0.2280	5.79	2-7/16	1-5/16	1-3/64	56001	56210

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FRACTIONAL & METRIC SERIES

CUTTING DIAMETER D ₁ /D ₂	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
15/64	0.2344	5.95	2-7/16	1-5/16	1-3/64	56115	56147
6,0 mm	0.2362		66,0	28,0	21,0	66021	66045
1/4	0.2500	6.35	2-1/2	1-3/8	1-7/64	56116	56148
6,5 mm	0.2559		70,0	31,0	23,0	66022	66046
17/64	0.2656	6.75	2-5/8	1-7/16	1-7/64	56117	56149
7,0 mm	0.2756		74,0	34,0	25,0	66023	66024
9/32	0.2812	7.14	2-11/16	1-1/2	1-13/64	56118	56150
7,5 mm	0.2953		74,0	34,0	25,0	66025	66026
19/64	0.2969	7.54	2-3/4	1-9/16	1-1/4	56119	56151
5/16	0.3125	7.94	2-13/16	1-5/8	1-19/64	56120	56152
8,0 mm	0.3150		79,0	37,0	27,0	66027	66028
21/64	0.3281	8.33	2-15/16	1-11/16	1-23/64	56121	56153
8,5 mm	0.3346		79,0	37,0	27,0	66029	66030
11/32	0.3438	8.73	3	1-11/16	1-23/64	56122	56154
9,0 mm	0.3543		84,0	40,0	29,0	66031	66032
23/64	0.3594	9.13	3-1/16	1-3/4	1-13/32	56123	56155
9,5 mm	0.3740		84,0	40,0	29,0	66033	66034
3/8	0.3750	9.53	3-1/8	1-13/16	1-29/64	56124	56156
25/64	0.3906	9.92	3-1/4	1-7/8	1-1/2	56125	56157
10,0 mm	0.3937		89,0	43,0	31,0	66035	66036
13/32	0.4062	10.32	3-5/16	1-15/16	1-35/64	56126	56158
10,5 mm	0.4134		95,0	43,0	31,0	66037	66038
27/64	0.4219	10.72	3-3/8	2	1-39/64	56127	56159
11,0 mm	0.4331		95,0	43,0	31,0	66039	66040
7/16	0.4375	11.11	3-7/16	2-1/16	1-21/32	56128	56160
11,5 mm	0.4528		95,0	43,0	31,0	66041	66042
29/64	0.4531	11.51	3-9/16	2-1/8	1-45/64	56129	56161
15/32	0.4688	11.91	3-5/8	2-1/8	1-45/64	56130	56162
12,0 mm	0.4724		102,0	51,0	35,0	66043	66044
31/64	0.4844	12.30	3-11/16	2-3/16	1-3/4	56131	56163
1/2	0.5000	12.70	3-3/4	2-1/4	1-51/64	56132	56164

TOLERANCES (inch)

D₁ = +.0000/-.0005
D₂ = h6

TOLERANCES (mm)

D₁ = +0,0000/-0,0127
D₂ = h6

- STEELS
- CAST IRON
- HARDENED STEELS

For patent information visit www.ksptpatents.com

FRACTIONAL & METRIC Straight Flute Drills

Series 106 Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)						
			1/16	1/8	3/16	1/4	3/8	1/2	
P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 500 Bhn or ≤ 52 HRc	60 (48-72)	RPM	3667	1834	1222	917	611	458
			Fr	0.0004	0.0007	0.0011	0.0014	0.0021	0.0028
			Feed (ipm)	1.3	1.3	1.3	1.3	1.3	1.3
	≤ 615 Bhn or ≤ 58 HRc	50 (40-60)	RPM	3056	1528	1019	764	509	382
			Fr	0.0004	0.0008	0.0012	0.0016	0.0024	0.0031
			Feed (ipm)	1.2	1.2	1.2	1.2	1.2	1.2
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 500 Bhn or ≤ 52 HRc	60 (48-72)	RPM	3667	1834	1222	917	611	458
			Fr	0.0004	0.0007	0.0011	0.0014	0.0021	0.0028
			Feed (ipm)	1.3	1.3	1.3	1.3	1.3	1.3
	≤ 615 Bhn or ≤ 58 HRc	50 (40-60)	RPM	3056	1528	1019	764	509	382
			Fr	0.0004	0.0008	0.0012	0.0016	0.0024	0.0031
			Feed (ipm)	1.2	1.2	1.2	1.2	1.2	1.2
K CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	250 (200-300)	RPM	15280	7640	5093	3820	2547	1910
			Fr	0.0010	0.0020	0.0030	0.0041	0.0061	0.0081
			Feed (ipm)	15.5	15.5	15.5	15.5	15.5	15.5
	≤ 330 Bhn or ≤ 36 HRc	195 (156-234)	RPM	11918	5959	3973	2980	1986	1490
			Fr	0.0010	0.0020	0.0030	0.0040	0.0060	0.0081
			Feed (ipm)	12.0	12.0	12.0	12.0	12.0	12.0

Bhn (Brinell) HRc (Rockwell C)
 $rpm = Vc \times 3.82 / D_1$
 $ipm = Fr \times rpm$
 reduce speed and feed 30 percent when using uncoated drills
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Series 106M Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)						
			1	3	6	8	10	12	
P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 500 Bhn or ≤ 52 HRc	18 (15-22)	RPM	5816	1939	969	727	582	485
			Fr	0.006	0.018	0.035	0.047	0.058	0.070
			Feed (mm/min)	34	34	34	34	34	34
	≤ 615 Bhn or ≤ 58 HRc	15 (12-18)	RPM	4847	1616	808	606	485	404
			Fr	0.006	0.017	0.033	0.045	0.056	0.067
			Feed (mm/min)	27	27	27	27	27	27
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 500 Bhn or ≤ 52 HRc	18 (15-22)	RPM	5816	1939	969	727	582	485
			Fr	0.006	0.018	0.035	0.047	0.058	0.070
			Feed (mm/min)	34	34	34	34	34	34
	≤ 615 Bhn or ≤ 58 HRc	15 (12-18)	RPM	4847	1616	808	606	485	404
			Fr	0.006	0.017	0.033	0.045	0.056	0.067
			Feed (mm/min)	27	27	27	27	27	27
K CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	76 (61-91)	RPM	24235	8078	4039	3029	2424	2020
			Fr	0.016	0.048	0.096	0.128	0.160	0.192
			Feed (mm/min)	395	395	395	395	395	395
	≤ 330 Bhn or ≤ 36 HRc	59 (48-71)	RPM	18904	6301	3151	2363	1890	1575
			Fr	0.016	0.048	0.096	0.128	0.160	0.192
			Feed (mm/min)	305	305	305	305	305	305

Bhn (Brinell) HRc (Rockwell C)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fr \times rpm$
 reduce speed and feed 30 percent when using uncoated drills
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

3 Flute Drills • Metric: DIN 6539



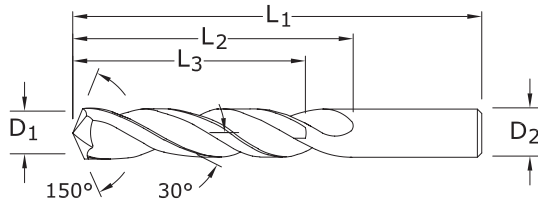
3xD
(mm)

5xD
(inch)



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FRACTIONAL & METRIC SERIES



CUTTING DIAMETER D ₁ /D ₂	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
#36	0.1065	2.71	2-1/4	1-1/4	1	53036	58011
7/64	0.1094	2.78	2-1/4	1-1/4	1	53107	58012
#35	0.1100	2.79	2-1/4	1-1/4	1	53035	58013
#34	0.1110	2.82	2-1/4	1-1/4	1	53034	58014
#33	0.1130	2.87	2-1/4	1-1/4	1	53033	58015
#32	0.1160	2.95	2-1/4	1-1/4	1	53032	58016
3,0 mm	0.1181		46,0	16,0	12,0	63000	68965
#31	0.1200	3.05	2-1/4	1-1/4	1	53031	58017
3,1 mm	0.1220		49,0	18,0	14,0	63044	68966
1/8	0.1250	3.18	2-1/4	1-1/4	1	53108	58018
3,2 mm	0.1260		49,0	18,0	14,0	63045	68967
#30	0.1285	3.26	2-1/4	1-1/4	1	53030	58019
3,3 mm	0.1299		49,0	18,0	14,0	63001	68968
3,4 mm	0.1339		52,0	20,0	15,0	63046	68969
#29	0.1360	3.45	2-1/2	1-3/8	1-7/64	53029	58020
3,5 mm	0.1378		52,0	20,0	15,0	63002	68970
#28	0.1405	3.57	2-1/2	1-3/8	1-7/64	53028	58021
9/64	0.1406	3.57	2-1/2	1-3/8	1-7/64	53109	58022
3,6 mm	0.1417		52,0	20,0	15,0	63047	68971
#27	0.1440	3.66	2-1/2	1-3/8	1-7/64	53027	58023
3,7 mm	0.1457		52,0	20,0	15,0	63003	68972
#26	0.1470	3.73	2-1/2	1-3/8	1-7/64	53026	58024
#25	0.1495	3.80	2-1/2	1-3/8	1-7/64	53025	58025
3,8 mm	0.1496		55,0	22,0	17,0	63048	68973
#24	0.1520	3.86	2-1/2	1-3/8	1-7/64	53024	58026
3,9 mm	0.1535		55,0	22,0	17,0	63049	68974
#23	0.1540	3.91	2-1/2	1-3/8	1-7/64	53023	58027
5/32	0.1562	3.97	2-1/2	1-3/8	1-7/64	53110	58028
#22	0.1570	3.99	2-1/2	1-3/8	1-7/64	53022	58029
4,0 mm	0.1575		55,0	22,0	17,0	63004	68975
#21	0.1590	4.04	2-1/2	1-3/8	1-7/64	53021	58030
#20	0.1610	4.09	2-1/2	1-3/8	1-7/64	53020	58031
4,1 mm	0.1614		55,0	22,0	17,0	63050	68976
4,2 mm	0.1654		55,0	22,0	17,0	63005	68977
#19	0.1660	4.22	2-3/4	1-5/8	1-19/64	53019	58032
4,3 mm	0.1693		58,0	24,0	18,0	63051	68978
#18	0.1695	4.31	2-3/4	1-5/8	1-19/64	53018	58033
11/64	0.1719	4.37	2-3/4	1-5/8	1-19/64	53111	58034
#17	0.1730	4.39	2-3/4	1-5/8	1-19/64	53017	58035
4,4 mm	0.1732		58,0	24,0	18,0	63052	68979

TOLERANCES (inch)

D₁ = +.0000/-0.0005
D₂ = h6

TOLERANCES (mm)

D₁ = +0,0000/-0,0127
D₂ = h6

- STEELS
- CAST IRON
- HARDENED STEELS
- NON-FERROUS

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continued on next page

FRACTIONAL & METRIC

3 Flute Drills • Metric: DIN 6539

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FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER D ₁ /D ₂	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AITiN)
#16	0.1770	4.50	2-3/4	1-5/8	1-19/64	53016	58036
4,5 mm	0.1772		58,0	24,0	18,0	63006	68980
#15	0.1800	4.57	2-3/4	1-5/18	1-19/64	53015	58037
4,6 mm	0.1811		58,0	24,0	18,0	63053	68981
#14	0.1820	4.62	2-3/4	1-5/8	1-19/64	53014	58038
#13	0.1850	4.70	2-3/4	1-5/8	1-19/64	53013	58039
4,7 mm	0.1850		58,0	24,0	18,0	63054	68982
3/16	0.1875	4.76	2-3/4	1-5/8	1-19/64	53112	58040
#12	0.1890	4.80	2-3/4	1-5/8	1-19/64	53012	58041
4,8 mm	0.1890		62,0	26,0	20,0	63055	68983
#11	0.1910	4.85	2-3/4	1-5/8	1-19/64	53011	58042
4,9 mm	0.1929		62,0	26,0	20,0	63056	68984
#10	0.1935	4.91	2-3/4	1-5/8	1-19/64	53010	58043
#9	0.1960	4.98	3	1-3/4	1-13/32	53009	58044
5,0 mm	0.1969		62,0	26,0	20,0	63007	68985
#8	0.1990	5.05	3	1-3/4	1-13/32	53008	58045
5,1 mm	0.2008		62,0	26,0	20,0	63057	68986
#7	0.2010	5.11	3	1-3/4	1-13/32	53007	58046
13/64	0.2031	5.16	3	1-3/4	1-13/32	53113	58047
#6	0.2040	5.18	3	1-3/4	1-13/32	53006	58048
5,2 mm	0.2047		62,0	26,0	20,0	63008	68987
#5	0.2055	5.22	3	1-3/4	1-13/32	53005	58049
5,3 mm	0.2087		62,0	26,0	20,0	63058	68988
#4	0.2090	5.31	3	1-3/4	1-13/32	53004	58050
5,4 mm	0.2126		66,0	28,0	21,0	63059	68989
#3	0.2130	5.41	3	1-3/4	1-13/32	53003	58051
5,5 mm	0.2165		66,0	28,0	21,0	63009	68990
7/32	0.2188	5.56	3	1-3/4	1-13/32	53114	58052
5,6 mm	0.2205		66,0	28,0	21,0	63060	68991
#2	0.2210	5.61	3	1-3/4	1-13/32	53002	58053
5,7 mm	0.2244		66,0	28,0	21,0	63061	68992
#1	0.2280	5.79	3	1-3/4	1-13/32	53001	58054
5,8 mm	0.2283		66,0	28,0	21,0	63062	68993
5,9 mm	0.2323		66,0	28,0	21,0	63063	68994
A	0.2340	5.94	3-1/4	2	1-39/64	53201	58055
15/64	0.2344	5.95	3-1/4	2	1-39/64	53115	58056
6,0 mm	0.2362		66,0	28,0	21,0	63010	68995
B	0.2380	6.05	3-1/4	2	1-39/64	53202	58057
6,1 mm	0.2402		70,0	31,0	23,0	63064	68996
C	0.2420	6.15	3-1/4	2	1-39/64	53203	58058
6,2 mm	0.2441		70,0	31,0	23,0	63011	68997
D	0.2460	6.25	3-1/4	2	1-39/64	53204	58059
6,3 mm	0.2480		70,0	31,0	23,0	63065	68998
1/4	0.2500	6.35	3-1/4	2	1-39/64	53116	58061
6,4 mm	0.2520		70,0	31,0	23,0	63066	68999
6,5 mm	0.2559		70,0	31,0	23,0	63012	69000
F	0.2570	6.53	3-1/4	2	1-39/64	53206	58062
6,6 mm	0.2598		70,0	31,0	23,0	63067	69001
G	0.2610	6.63	3-1/2	2-1/8	1-45/64	53207	58063
6,7 mm	0.2638		70,0	31,0	23,0	63068	69002

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3 Flute Drills • Metric: DIN 6539



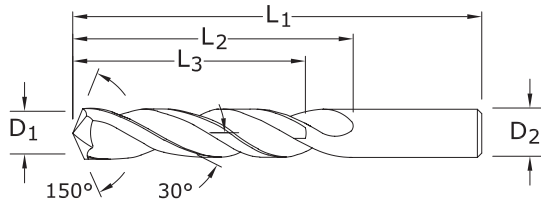
3xD
(mm)

5xD
(inch)



103

FRACTIONAL & METRIC SERIES



CUTTING DIAMETER D ₁ /D ₂	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
17/64	0.2656	6.75	3-1/2	2-1/8	1-45/64	53117	58064
H	0.2660	6.76	3-1/2	2-1/8	1-45/64	53208	58065
6,8 mm	0.2677		74,0	34,0	25,0	63013	69003
6,9 mm	0.2717		74,0	34,0	25,0	63069	69004
I	0.2720	6.91	3-1/2	2-1/8	1-45/64	53209	58066
7,0 mm	0.2756		74,0	34,0	25,0	63014	69005
J	0.2770	7.04	3-1/2	2-1/8	1-45/64	53210	58067
7,1 mm	0.2795		74,0	34,0	25,0	63070	69006
K	0.2810	7.14	3-1/2	2-1/8	1-45/64	53211	58068
9/32	0.2812	7.14	3-1/2	2-1/8	1-45/64	53118	58069
7,2 mm	0.2835		74,0	34,0	25,0	63015	69007
7,3 mm	0.2874		74,0	34,0	25,0	63071	69008
L	0.2900	7.37	3-1/2	2-1/8	1-45/64	53212	58070
7,4 mm	0.2913		74,0	34,0	25,0	63072	69009
M	0.2950	7.49	3-3/4	2-3/8	1-29/32	53213	58071
7,5 mm	0.2953		74,0	34,0	25,0	63016	69010
19/64	0.2969	7.54	3-3/4	2-3/8	1-29/32	53119	58072
7,6 mm	0.2992		79,0	37,0	27,0	63073	69011
N	0.3020	7.67	2-3/8	2-3/8	1-29/32	53214	58073
7,7 mm	0.3031		79,0	37,0	27,0	63074	69012
7,8 mm	0.3071		79,0	37,0	27,0	63075	69013
7,9 mm	0.3110		79,0	37,0	27,0	63076	69014
5/16	0.3125	7.94	3-3/4	2-3/8	1-29/32	53120	58074
8,0 mm	0.3150		79,0	37,0	27,0	63017	69015
O	0.3160	8.03	3-3/4	2-3/8	1-29/32	53215	58075
8,1 mm	0.3189		79,0	37,0	27,0	63077	69016
8,2 mm	0.3228		79,0	37,0	27,0	63018	69017
P	0.3230	8.20	3-3/4	2-3/8	1-29/32	53216	58076
8,3 mm	0.3268		79,0	37,0	27,0	63078	69018
21/64	0.3281	8.33	4	2-1/2	2	53121	58077
8,4 mm	0.3307		79,0	37,0	27,0	63019	69019
Q	0.3320	8.43	4	2-1/2	2	53217	58078
8,5 mm	0.3346		79,0	37,0	27,0	63020	69020
8,6 mm	0.3386		84,0	40,0	29,0	63021	69021
R	0.3390	8.61	4	2-1/2	2	53218	58079
8,7 mm	0.3425		84,0	40,0	29,0	63079	69022
11/32	0.3438	8.73	4	2-1/2	2	53122	58080
8,8 mm	0.3465		84,0	40,0	29,0	63022	69023
S	0.3480	8.84	4	2-1/2	2	53219	58081
8,9 mm	0.3504		84,0	40,0	29,0	63080	69024
9,0 mm	0.3543		84,0	40,0	29,0	63023	69025
T	0.3580	9.09	4-1/4	2-3/4	2-13/64	53220	58082

continued on next page

TOLERANCES (inch)

D₁ = +.0000/-0.0005
D₂ = h6

TOLERANCES (mm)

D₁ = +0,0000/-0,0127
D₂ = h6

- STEELS
- CAST IRON
- HARDENED STEELS
- NON-FERROUS

For patent information visit www.ksptpatents.com

FRACTIONAL & METRIC

3 Flute Drills • Metric: DIN 6539

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FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER D ₁ / D ₂	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AITiN)
9,1 mm	0.3583		84,0	40,0	29,0	63081	69026
23/64	0.3594	9.13	4-1/4	2-3/4	2-13/64	53123	58083
9,2 mm	0.3622		84,0	40,0	29,0	63024	69027
9,3 mm	0.3661		84,0	40,0	29,0	63082	69028
U	0.3680	9.35	4-1/4	2-3/4	2-13/64	53221	58084
9,4 mm	0.3701		84,0	40,0	29,0	63083	69029
9,5 mm	0.3740		84,0	40,0	29,0	63025	69030
3/8	0.3750	9.53	4-1/4	2-3/4	2-13/64	53124	58085
V	0.3770	9.58	4-1/4	2-3/4	2-13/64	53222	58086
9,6 mm	0.3780		89,0	43,0	31,0	63084	69031
9,7 mm	0.3819		89,0	43,0	31,0	63085	69032
9,8 mm	0.3858		89,0	43,0	31,0	63086	69033
W	0.3860	9.80	4-1/2	2-7/8	2-19/64	53223	58087
9,9 mm	0.3898		89,0	43,0	31,0	63087	69034
25/64	0.3906	9.92	4-1/2	2-7/8	2-19/64	53125	58088
10,0 mm	0.3937		89,0	43,0	31,0	63026	69035
X	0.3970	10.08	4-1/2	2-7/8	2-19/64	53224	58089
10,1 mm	0.3976		89,0	43,0	31,0	63088	69036
10,2 mm	0.4016		89,0	43,0	31,0	63027	69037
Y	0.4040	10.26	4-1/2	2-7/8	2-19/64	53225	58090
13/32	0.4062	10.32	4-1/2	2-7/8	2-19/64	53126	58091
10,4 mm	0.4094		89,0	43,0	31,0	63028	69038
Z	0.4130	10.49	4-1/2	2-7/8	2-19/64	53226	58092
10,5 mm	0.4134		89,0	43,0	31,0	63029	69039
10,7 mm	0.4213		95,0	47,0	33,0	63030	69040
27/64	0.4219	10.72	4-1/2	2-7/8	2-19/64	53127	58093
10,8 mm	0.4252		95,0	47,0	33,0	63031	69041
11,0 mm	0.4331		95,0	47,0	33,0	63032	69042
7/16	0.4375	11.11	4-1/2	2-7/8	2-19/64	53128	58094
11,5 mm	0.4528		95,0	47,0	33,0	63033	69043
29/64	0.4531	11.51	4-3/4	3	2-13/32	53129	58095
15/32	0.4688	11.91	4-3/4	3	2-13/32	53130	58096
12,0 mm	0.5039		102,0	51,0	35,0	63034	69044
31/64	0.4844	12.30	4-3/4	3	2-13/32	53131	58097
12,5 mm	0.4921		102,0	51,0	35,0	63035	69045
1/2	0.5000	12.70	4-3/4	3	2-13/32	53132	58098
12,8 mm	0.5039		102,0	51,0	35,0	63036	69046
13,0 mm	0.5118		102,0	51,0	35,0	63089	69047
33/64	0.5156	13.10	4-3/4	3	2-13/32	53135	58099
13,1 mm	0.5157		102,0	51,0	35,0	63037	69048
13,5 mm	0.5315		107,0	54,0	37,0	63090	69049
14,0 mm	0.5512		107,0	54,0	37,0	63038	69050
9/16	0.5625	14.29	4-3/4	3	2-13/32	53136	58100
14,3 mm	0.5630		111,0	56,0	38,0	63039	69051
14,5 mm	0.5709		111,0	56,0	38,0	63040	69052
15,0 mm	0.5906		111,0	56,0	38,0	63091	69053
5/8	0.6250	15.88	5-3/4	3-1/2	2-51/64	53133	58101
11/16	0.6875	17.46	5-3/4	3-1/2	2-51/64	53137	58102
17,5 mm	0.6890		123,0	62,0	40,0	63041	69054
3/4	0.7500	19.05	5-3/4	4-1/4	3 13/32	53134	58103
19,5 mm	0.7677		131,0	66,0	42,0	63042	69055
20,0 mm	0.7874		131,0	66,0	42,0	63043	69056

3 Flute Drills

Series 103 Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)							
			1/8	1/4	3/8	1/2	5/8	3/4		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	295 (236-354)	RPM	9015	4508	3005	2254	1803	1503	
			Fr	0.0026	0.0051	0.0077	0.0102	0.0128	0.0153	
			Feed (ipm)	23.0	23.0	23.0	23.0	23.0	23.0	
	≤ 300 Bhn or ≤ 32 HRc	260 (208-312)	RPM	7946	3973	2649	1986	1589	1324	
			Fr	0.0023	0.0045	0.0068	0.0091	0.0113	0.0136	
			Feed (ipm)	18.0	18.0	18.0	18.0	18.0	18.0	
	≤ 425 Bhn or ≤ 45 HRc	150 (120-180)	RPM	4584	2292	1528	1146	917	764	
			Fr	0.0013	0.0026	0.0039	0.0052	0.0065	0.0079	
			Feed (ipm)	6.0	6.0	6.0	6.0	6.0	6.0	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	230 (184-276)	RPM	7029	3514	2343	1757	1406	1171
				Fr	0.0019	0.0038	0.0058	0.0077	0.0096	0.0115
				Feed (ipm)	13.5	13.5	13.5	13.5	13.5	13.5
≤ 375 Bhn or ≤ 40 HRc		145 (116-174)	RPM	4431	2216	1477	1108	886	739	
			Fr	0.0019	0.0038	0.0058	0.0077	0.0096	0.0115	
			Feed (ipm)	8.5	8.5	8.5	8.5	8.5	8.5	
≤ 450 Bhn or ≤ 48 HRc	115 (92-138)	RPM	3514	1757	1171	879	703	586		
		Fr	0.0005	0.0010	0.0015	0.0020	0.0026	0.0031		
		Feed (ipm)	1.8	1.8	1.8	1.8	1.8	1.8		
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	85 (68-102)	RPM	2598	1299	866	649	520	433	
			Fr	0.0013	0.0026	0.0039	0.0052	0.0065	0.0079	
			Feed (ipm)	3.4	3.4	3.4	3.4	3.4	3.4	
	≤ 375 Bhn or ≤ 40 HRc	65 (52-78)	RPM	1986	993	662	497	397	331	
			Fr	0.0007	0.0013	0.0020	0.0026	0.0033	0.0039	
			Feed (ipm)	1.3	1.3	1.3	1.3	1.3	1.3	
≤ 475 Bhn or ≤ 50 HRc	50 (40-60)	RPM	1528	764	509	382	306	255		
		Fr	0.0007	0.0013	0.0020	0.0026	0.0033	0.0039		
		Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0		
K CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	250 (200-300)	RPM	7640	3820	2547	1910	1528	1273	
			Fr	0.0026	0.0052	0.0079	0.0105	0.0131	0.0157	
			Feed (ipm)	20.0	20.0	20.0	20.0	20.0	20.0	
	≤ 330 Bhn or ≤ 36 HRc	195 (156-234)	RPM	5959	2980	1986	1490	1192	993	
			Fr	0.0026	0.0052	0.0078	0.0104	0.0130	0.0156	
			Feed (ipm)	15.5	15.5	15.5	15.5	15.5	15.5	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	540 (432-648)	RPM	16502	8251	5501	4126	3300	2750	
			Fr	0.0032	0.0064	0.0096	0.0128	0.0161	0.0193	
			Feed (ipm)	53.0	53.0	53.0	53.0	53.0	53.0	
	≤ 150 Bhn or ≤ 7 HRc	455 (364-546)	RPM	13905	6952	4635	3476	2781	2317	
			Fr	0.0032	0.0065	0.0097	0.0129	0.0162	0.0194	
			Feed (ipm)	45.0	45.0	45.0	45.0	45.0	45.0	
COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	305 (244-366)	RPM	9321	4660	3107	2330	1864	1553	
			Fr	0.0019	0.0039	0.0058	0.0077	0.0097	0.0116	
			Feed (ipm)	18.0	18.0	18.0	18.0	18.0	18.0	
≤ 200 Bhn or ≤ 23 HRc	160 (128-192)	RPM	4890	2445	1630	1222	978	815		
		Fr	0.0016	0.0033	0.0049	0.0065	0.0082	0.0098		
		Feed (ipm)	8.0	8.0	8.0	8.0	8.0	8.0		

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 rpm = Vc x 3.82 / D₁
 ipm = Fr x rpm
 reduce speed and feed 30 percent when using uncoated drills
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

3 Flute Drills

Series 103M Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)							
			3	6	10	12	16	20		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	90 (72-108)	RPM	9533	4766	2860	2383	1787	1430	
			Fr	0.062	0.124	0.206	0.248	0.330	0.413	
			Feed (mm/min)	590	590	590	590	590	590	
	≤ 300 Bhn or ≤ 32 HRc	79 (63-95)	RPM	8402	4201	2520	2100	1575	1260	
			Fr	0.055	0.110	0.183	0.219	0.292	0.365	
			Feed (mm/min)	460	460	460	460	460	460	
	≤ 425 Bhn or ≤ 45 HRc	46 (37-55)	RPM	4847	2424	1454	1212	909	727	
			Fr	0.032	0.064	0.107	0.128	0.171	0.213	
			Feed (mm/min)	155	155	155	155	155	155	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	70 (56-84)	RPM	7432	3716	2230	1858	1394	1115
				Fr	0.046	0.093	0.155	0.186	0.248	0.309
				Feed (mm/min)	345	345	345	345	345	345
≤ 375 Bhn or ≤ 40 HRc		44 (35-53)	RPM	4686	2343	1406	1171	879	703	
			Fr	0.046	0.092	0.153	0.184	0.245	0.306	
			Feed (mm/min)	215	215	215	215	215	215	
≤ 450 Bhn or ≤ 48 HRc		35 (28-42)	RPM	3716	1858	1115	929	697	557	
			Fr	0.012	0.024	0.040	0.048	0.065	0.081	
			Feed (mm/min)	45	45	45	45	45	45	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRc	26 (21-31)	RPM	2747	1373	824	687	515	412
				Fr	0.031	0.062	0.103	0.124	0.165	0.206
				Feed (mm/min)	85	85	85	85	85	85
	≤ 375 Bhn or ≤ 40 HRc	20 (16-24)	RPM	2100	1050	630	525	394	315	
			Fr	0.017	0.033	0.056	0.067	0.089	0.111	
			Feed (mm/min)	35	35	35	35	35	35	
≤ 475 Bhn or ≤ 50 HRc	15 (12-18)	RPM	1616	808	485	404	303	242		
		Fr	0.015	0.031	0.052	0.062	0.083	0.103		
		Feed (mm/min)	25	25	25	25	25	25		
N CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	76 (61-91)	RPM	8078	4039	2424	2020	1515	1212	
			Fr	0.063	0.126	0.210	0.253	0.337	0.421	
			Feed (mm/min)	510	510	510	510	510	510	
	≤ 330 Bhn or ≤ 36 HRc	59 (48-71)	RPM	6301	3151	1890	1575	1181	945	
			Fr	0.052	0.105	0.175	0.209	0.279	0.349	
			Feed (mm/min)	330	330	330	330	330	330	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	165 (132-198)	RPM	17449	8725	5235	4362	3272	2617	
			Fr	0.078	0.156	0.260	0.312	0.416	0.520	
			Feed (mm/min)	1360	1360	1360	1360	1360	1360	
	≤ 150 Bhn or ≤ 7 HRc	139 (111-166)	RPM	14703	7351	4411	3676	2757	2205	
			Fr	0.078	0.156	0.261	0.313	0.417	0.521	
			Feed (mm/min)	1150	1150	1150	1150	1150	1150	
N COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	93 (74-112)	RPM	9856	4928	2957	2464	1848	1478	
			Fr	0.047	0.094	0.157	0.189	0.252	0.315	
			Feed (mm/min)	465	465	465	465	465	465	
	≤ 200 Bhn or ≤ 23 HRc	49 (39-59)	RPM	5170	2585	1551	1293	969	776	
			Fr	0.039	0.077	0.129	0.155	0.206	0.258	
			Feed (mm/min)	200	200	200	200	200	200	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

rpm = (Vc x 1000) / (D₁ x 3.14)

mm/min = Fr x rpm

reduce speed and feed 30 percent when using uncoated drills

reduce speed and feed for materials harder than listed

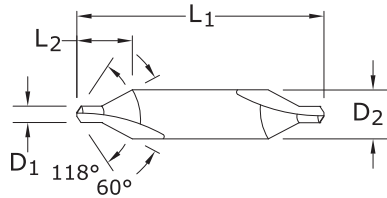
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

FRACTIONAL

Combined Drill & Countersink



301 FRACTIONAL SERIES



SIZE	inch				EDP NO.	
	DRILL DIAMETER D ₁	BODY DIAMETER D ₂	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	UNCOATED	Ti-NAMITE-A (AlTiN)
00*	.025	1/8	1-1/2	.125	57005	57015
0*	1/32	1/8	1-1/2	.130	57006	57016
1*	3/64	1/8	1-1/2	.135	57007	57017
2*	5/64	3/16	1-7/8	.200	57008	57018
3*	7/64	1/4	2	.280	57009	57019
4*	1/8	5/16	2-1/8	.340	57010	57020
5*	3/16	7/16	2-3/4	.475	57011	57021
6*	7/32	1/2	3	.540	57012	57022
*Series 301 Set	—	—	—	—	57075	—

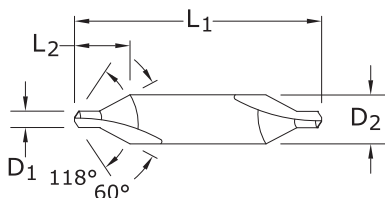
TOLERANCES (inch)

D₁ = +.003/-0.000
D₂ = -.0001/-0.0005

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

Combined Drill & Countersink



TOLERANCES (mm)

$D_1 = +0,076/-0,000$

$D_1 = -0,0025/-0,0127$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

301M
METRIC SERIES

mm				EDP NO.	
DRILL DIAMETER D_1	BODY DIAMETER D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	UNCOATED	Ti-NAMITE-A (AlTiN)
0,5	3,15	20,0	3,0	67005	67035
0,8	3,15	20,0	3,5	67007	67037
1	3,15	31,5	3,5	67009	67039
1,25	3,15	31,5	4,0	67011	67041
1,6	4,0	35,5	5,0	67013	67043
2	5,0	40,0	6,0	67015	67045
2,5	6,3	45,0	7,0	67017	67047
3,15	8,0	50,0	9,0	67019	67049
4	10,0	56,0	11,0	67021	67051
5	12,5	63,0	14,0	67023	67053

Combined Drill & Countersink

Series 301 Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)						
			1/32	5/64	1/8	3/16	7/32		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	265 (212-318)	RPM	8098	5399	3239	2314	2025	
			Fr	0.00068	0.0010	0.0017	0.0024	0.0027	
			Feed (ipm)	5.5	5.5	5.5	5.5	5.5	
	≤ 300 Bhn or ≤ 32 HRc	125 (100-150)	RPM	3820	2547	1528	1091	955	
			Fr	0.00065	0.0010	0.0016	0.0023	0.0026	
			Feed (ipm)	2.5	2.5	2.5	2.5	2.5	
	≤ 425 Bhn or ≤ 45 HRc	85 (68-102)	RPM	2598	1732	1039	742	649	
			Fr	0.00038	0.0006	0.0010	0.0013	0.0015	
			Feed (ipm)	1.0	1.0	1.0	1.0	1.0	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	230 (184-276)	RPM	7029	4686	2812	2008	1757
				Fr	0.00064	0.0010	0.0016	0.0022	0.0026
				Feed (ipm)	4.5	4.5	4.5	4.5	4.5
≤ 375 Bhn or ≤ 40 HRc		145 (116-174)	RPM	4431	2954	1772	1266	1108	
			Fr	0.00059	0.0009	0.0015	0.0021	0.0023	
			Feed (ipm)	2.6	2.6	2.6	2.6	2.6	
≤ 450 Bhn or ≤ 48 HRc		60 (48-72)	RPM	1834	1222	733	524	458	
			Fr	0.00027	0.0004	0.0007	0.0010	0.0011	
			Feed (ipm)	0.5	0.5	0.5	0.5	0.5	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRc	85 (68-102)	RPM	2598	1732	1039	742	649
				Fr	0.00035	0.0005	0.0009	0.0012	0.0014
				Feed (ipm)	0.9	0.9	0.9	0.9	0.9
	≤ 375 Bhn or ≤ 40 HRc	55 (44-66)	RPM	1681	1121	672	480	420	
			Fr	0.00016	0.0002	0.0004	0.0006	0.0006	
			Feed (ipm)	0.3	0.3	0.3	0.3	0.3	
	≤ 475 Bhn or ≤ 50 HRc	40 (32-48)	RPM	1222	815	489	349	306	
			Fr	0.00016	0.0002	0.0004	0.0006	0.0007	
			Feed (ipm)	0.2	0.2	0.2	0.2	0.2	
	M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	280 (224-336)	RPM	8557	5705	3423	2445	2139
				Fr	0.00084	0.0013	0.0021	0.0029	0.0034
				Feed (ipm)	7.2	7.2	7.2	7.2	7.2
≤ 330 Bhn or ≤ 36 HRc		250 (200-300)	RPM	7640	5093	3056	2183	1910	
			Fr	0.00084	0.0013	0.0021	0.0029	0.0034	
			Feed (ipm)	6.4	6.4	6.4	6.4	6.4	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250 Bhn or ≤ 24 HRc0	210 (168-252)	RPM	6418	4278	2567	1834	1604	
			Fr	0.00048	0.0007	0.0012	0.0017	0.0019	
			Feed (ipm)	3.1	3.1	3.1	3.1	3.1	
	≤ 330 Bhn or ≤ 36 HRc	110 (88-132)	RPM	3362	2241	1345	960	840	
			Fr	0.00028	0.0004	0.0007	0.0010	0.0011	
			Feed (ipm)	0.9	0.9	0.9	0.9	0.9	
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	65 (52-78)	RPM	1986	1324	795	568	497
				Fr	0.00036	0.0005	0.0009	0.0013	0.0014
				Feed (ipm)	0.7	0.7	0.7	0.7	0.7
		≤ 375 Bhn or ≤ 40 HRc	55 (44-66)	RPM	1681	1121	672	480	420
				Fr	0.00032	0.0005	0.0008	0.0011	0.0013
				Feed (ipm)	0.5	0.5	0.5	0.5	0.5

continued on next page

Combined Drill & Countersink

Series	301 Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)							
				1/32	5/64	1/8	3/16	7/32			
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	40 (32-48)	RPM	1222	815	489	349	306		
				Fr	0.00036	0.0005	0.0009	0.0013	0.0014		
				Feed (ipm)	0.4	0.4	0.4	0.4	0.4		
		≤ 320 Bhn or ≤ 34 HRc	25 (20-30)	RPM	764	509	306	218	191		
				Fr	0.00033	0.0005	0.0008	0.0011	0.0013		
				Feed (ipm)	0.3	0.3	0.3	0.3	0.3		
		≤ 425 Bhn or ≤ 45 HRc	20 (16-24)	RPM	611	407	244	175	153		
				Fr	0.00016	0.0002	0.0004	0.0006	0.0007		
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1		
		S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	85 (68-102)	RPM	2598	1732	1039	742	649
						Fr	0.00064	0.0010	0.0016	0.0022	0.0026
						Feed (ipm)	1.7	1.7	1.7	1.7	1.7
≤ 350 Bhn or ≤ 38 HRc	65 (52-78)			RPM	1986	1324	795	568	497		
				Fr	0.00036	0.0005	0.0009	0.0013	0.0014		
				Feed (ipm)	0.7	0.7	0.7	0.7	0.7		
≤ 440 Bhn or ≤ 47 HRc	55 (44-66)			RPM	1681	1121	672	480	420		
				Fr	0.00032	0.0005	0.0008	0.0011	0.0013		
				Feed (ipm)	0.5	0.5	0.5	0.5	0.5		
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075			≤ 80 Bhn or ≤ 47 HRb	540 (432-648)	RPM	16502	11002	6601	4715	4126
						Fr	0.00100	0.0015	0.0025	0.0035	0.0040
						Feed (ipm)	16.5	16.5	16.5	16.5	16.5
		≤ 150 Bhn or ≤ 7 HRc	455 (364-546)	RPM	13905	9270	5562	3973	3476		
				Fr	0.00100	0.0015	0.0025	0.0035	0.0040		
				Feed (ipm)	13.9	13.9	13.9	13.9	13.9		
		N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	190 (152-228)	RPM	5806	3871	2323	1659	1452
						Fr	0.00048	0.0007	0.0012	0.0017	0.0019
						Feed (ipm)	2.8	2.8	2.8	2.8	2.8
				≤ 200 Bhn or ≤ 23 HRc	175 (140-210)	RPM	5348	3565	2139	1528	1337
						Fr	0.00048	0.0007	0.0012	0.0017	0.0019
						Feed (ipm)	2.6	2.6	2.6	2.6	2.6
N	PLASTICS Polycarbonate, PVC	500 (400-600)	RPM	15280	10187	6112	4366	3820			
			Fr	0.00100	0.0015	0.0025	0.0035	0.0040			
				Feed (ipm)	15.3	15.3	15.3	15.3	15.3		

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 $rpm = Vc \times 3.82 / D_1$
 $ipm = Fr \times rpm$
 reduce speed and feed 30 percent when using uncoated drills
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Combined Drill & Countersink

Series 301M Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)						
			1	1.6	2.5	4	5		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	81 (65-97)	RPM	8155	6422	4078	2569	2055	
			Fr	0.017	0.022	0.034	0.054	0.068	
			Feed (mm/min)	139	139	139	139	139	
	≤ 300 Bhn or ≤ 32 HRc	38 (30-46)	RPM	3847	3029	1923	1212	969	
			Fr	0.016	0.020	0.032	0.051	0.064	
			Feed (mm/min)	62	62	62	62	62	
	≤ 425 Bhn or ≤ 45 HRc	26 (21-31)	RPM	2616	2060	1308	824	659	
			Fr	0.010	0.013	0.020	0.032	0.039	
			Feed (mm/min)	26	26	26	26	26	
	P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	70 (56-84)	RPM	7078	5574	3539	2230	1784
				Fr	0.016	0.020	0.032	0.051	0.063
				Feed (mm/min)	113	113	113	113	113
≤ 375 Bhn or ≤ 40 HRc		44 (35-53)	RPM	4462	3514	2231	1406	1125	
			Fr	0.015	0.019	0.030	0.048	0.060	
			Feed (mm/min)	67	67	67	67	67	
≤ 450 Bhn or ≤ 48 HRc		18 (15-22)	RPM	1847	1454	923	582	465	
			Fr	0.007	0.009	0.014	0.022	0.028	
			Feed (mm/min)	13	13	13	13	13	
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRc	26 (21-31)	RPM	2616	2060	1308	824	659
				Fr	0.009	0.012	0.018	0.029	0.036
				Feed (mm/min)	24	24	24	24	24
	≤ 375 Bhn or ≤ 40 HRc	17 (13-20)	RPM	1693	1333	846	533	427	
			Fr	0.004	0.005	0.008	0.013	0.016	
			Feed (mm/min)	7	7	7	7	7	
	≤ 475 Bhn or ≤ 50 HRc	12 (10-15)	RPM	1231	969	616	388	310	
			Fr	0.004	0.005	0.008	0.013	0.016	
			Feed (mm/min)	5	5	5	5	5	
	K CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	85 (68-102)	RPM	8617	6786	4309	2714	2171
				Fr	0.021	0.027	0.042	0.067	0.083
				Feed (mm/min)	181	181	181	181	181
≤ 330 Bhn or ≤ 36 HRc		76 (61-91)	RPM	7694	6059	3847	2424	1939	
			Fr	0.021	0.027	0.042	0.067	0.084	
			Feed (mm/min)	162	162	162	162	162	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250 Bhn or ≤ 24 HRc	64 (51-77)	RPM	6463	5089	3231	2036	1629	
			Fr	0.012	0.015	0.024	0.038	0.048	
			Feed (mm/min)	78	78	78	78	78	
	≤ 330 Bhn or ≤ 36 HRc	34 (27-40)	RPM	3385	2666	1693	1066	853	
			Fr	0.007	0.009	0.014	0.023	0.028	
			Feed (mm/min)	24	24	24	24	24	
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	20 (16-24)	RPM	2000	1575	1000	630	504
				Fr	0.009	0.011	0.018	0.029	0.036
				Feed (mm/min)	18	18	18	18	18
		≤ 375 Bhn or ≤ 40 HRc	17 (13-20)	RPM	1693	1333	846	533	427
				Fr	0.008	0.011	0.017	0.026	0.033
				Feed (mm/min)	14	14	14	14	14

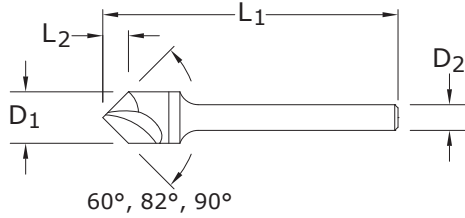
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Combined Drill & Countersink

Series 301M Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)						
			1	1.6	2.5	4	5		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	12 (10-15)	RPM	1231	969	616	388	310	
			Fr	0.009	0.011	0.018	0.028	0.035	
			Feed (mm/min)	11	11	11	11	11	
	≤ 320 Bhn or ≤ 34 HRc	8 (6-9)	RPM	769	606	385	242	194	
			Fr	0.008	0.010	0.016	0.025	0.031	
			Feed (mm/min)	6	6	6	6	6	
	≤ 425 Bhn or ≤ 45 HRc	6 (5-7)	RPM	616	485	308	194	155	
			Fr	0.003	0.004	0.006	0.010	0.013	
			Feed (mm/min)	2	2	2	2	2	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	26 (21-31)	RPM	2616	2060	1308	824	659
				Fr	0.016	0.020	0.032	0.051	0.064
				Feed (mm/min)	42	42	42	42	42
≤ 350 Bhn or ≤ 38 HRc		20 (16-24)	RPM	2000	1575	1000	630	504	
			Fr	0.009	0.011	0.018	0.029	0.036	
			Feed (mm/min)	18	18	18	18	18	
≤ 440 Bhn or ≤ 47 HRc		17 (13-20)	RPM	1693	1333	846	533	427	
			Fr	0.008	0.011	0.017	0.026	0.033	
			Feed (mm/min)	14	14	14	14	14	
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	165 (132-198)	RPM	16619	13087	8309	5235	4188
				Fr	0.025	0.032	0.050	0.079	0.099
				Feed (mm/min)	415	415	415	415	415
	≤ 150 Bhn or ≤ 7 HRc	139 (111-166)	RPM	14003	11027	7001	4411	3529	
			Fr	0.025	0.032	0.050	0.079	0.099	
			Feed (mm/min)	350	350	350	350	350	
COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	58 (46-69)	RPM	5847	4605	2924	1842	1474	
			Fr	0.012	0.015	0.024	0.038	0.048	
			Feed (mm/min)	70	70	70	70	70	
	≤ 200 Bhn or ≤ 23 HRc	53 (43-64)	RPM	5386	4241	2693	1696	1357	
			Fr	0.012	0.015	0.024	0.038	0.048	
			Feed (mm/min)	65	65	65	65	65	
PLASTICS Polycarbonate, PVC	152 (122-183)	RPM	15388	12118	7694	4847	3878		
		Fr	0.025	0.032	0.050	0.079	0.099		
			Feed (mm/min)	385	385	385	385	385	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 rpm = (Vc x 1000) / (D₁ x 3.14)
 mm/min = Fr x rpm
 reduce speed and feed 30 percent when using uncoated drills
 reduce speed and feed for materials harder than listed
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Single Flute Countersink



601

FRACTIONAL SERIES

CUTTING DIAMETER D ₁	SHANK DIAMETER D ₂	inch		EDP NO.		
		OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	UNCOATED 60°	UNCOATED 82°	UNCOATED 90°
1/8	1/8	1-1/2	.062	–	–	74201
1/8	1/8	1-1/2	.072	–	74101	–
1/8	1/8	1-1/2	.108	74001	–	–
3/16	3/16	2	.094	–	–	74204
3/16	3/16	2	.108	–	74104	–
3/16	3/16	2	.163	74004	–	–
1/4	1/4	2	.125	–	–	74207
1/4	1/4	2	.144	–	74107	–
1/4	1/4	2	.217	74007	–	–
3/8*	1/4	2-13/16	.188	–	–	74210
3/8*	1/4	2-13/16	.216	–	74110	–
3/8*	1/4	2-13/16	.325	74010	–	–
1/2*	1/4	2-7/8	.250	–	–	74213
1/2*	1/4	2-7/8	.288	–	74113	–
1/2*	1/4	2-7/8	.433	74013	–	–
5/8*	3/8	3	.313	–	–	74216
5/8*	3/8	3	.360	–	74116	–
5/8*	3/8	3	.541	74016	–	–
3/4*	1/2	3	.375	–	–	74219
3/4*	1/2	3	.431	–	74119	–
3/4*	1/2	3	.650	74019	–	–
1*	1/2	3-1/4	.500	–	–	74222
1*	1/2	3-1/4	.575	–	74122	–
1*	1/2	3-1/4	.866	74022	–	–

*Steel Shank / Con mango de acero / Avec queue en acier / Mit Stahlschaft

TOLERANCES (inch)

1/8–1/4 DIAMETER

D₁ = +.0000/–.0005

3/8–1 DIAMETER

D₁ = +.003/–.000

Included Angle

+1°/–1°

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

NON-FERROUS

For patent information visit www.ksptpatents.com

Single Flute Countersink

Series	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/8	3/16	1/4	3/8	1/2	3/4	1		
601 Fractional CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	125 (100-150)	RPM	3820	2547	1910	1273	955	637	478	
			Fr	0.0005	0.0008	0.0010	0.0016	0.0021	0.0031	0.0042	
			Feed (ipm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
	≤ 300 Bhn or ≤ 32 HRc	60 (48-72)	RPM	1834	1222	917	611	458	306	229	
			Fr	0.0005	0.0007	0.0010	0.0015	0.0020	0.0029	0.0039	
			Feed (ipm)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	
	≤ 425 Bhn or ≤ 45 HRc	45 (36-54)	RPM	1375	917	688	458	344	229	172	
			Fr	0.0003	0.0004	0.0006	0.0009	0.0012	0.0017	0.0023	
			Feed (ipm)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	95 (76-114)	RPM	2903	1935	1452	968	726	484	363
				Fr	0.0004	0.0007	0.0009	0.0013	0.0018	0.0027	0.0036
				Feed (ipm)	1.3	1.3	1.3	1.3	1.3	1.3	1.3
≤ 375 Bhn or ≤ 40 HRc		60 (48-72)	RPM	1834	1222	917	611	458	306	229	
			Fr	0.0004	0.0007	0.0009	0.0013	0.0017	0.0026	0.0035	
			Feed (ipm)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
≤ 450 Bhn or ≤ 48 HRc		35 (28-42)	RPM	1070	713	535	357	267	178	134	
			Fr	0.0003	0.0004	0.0006	0.0008	0.0011	0.0017	0.0022	
			Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRc	35 (28-42)	RPM	1070	713	535	357	267	178	134
				Fr	0.0003	0.0004	0.0006	0.0008	0.0011	0.0017	0.0022
				Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	≤ 375 Bhn or ≤ 40 HRc	25 (20-30)	RPM	764	509	382	255	191	127	96	
			Fr	0.0001	0.0002	0.0003	0.0004	0.0005	0.0008	0.0010	
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	≤ 475 Bhn or ≤ 50 HRc	20 (16-24)	RPM	611	407	306	204	153	102	76	
			Fr	0.0002	0.0002	0.0003	0.0005	0.0007	0.0010	0.0013	
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	105 (84-126)	RPM	3209	2139	1604	1070	802	535	401
				Fr	0.0006	0.0009	0.0012	0.0018	0.0024	0.0036	0.0047
				Feed (ipm)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
≤ 330 Bhn or ≤ 36 HRc		75 (60-90)	RPM	2292	1528	1146	764	573	382	287	
			Fr	0.0006	0.0009	0.0012	0.0018	0.0024	0.0037	0.0049	
			Feed (ipm)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	
STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250 Bhn or ≤ 24 HRc	53 (42-64)	RPM	1620	1080	810	540	405	270	202	
			Fr	0.0003	0.0005	0.0006	0.0009	0.0012	0.0019	0.0025	
			Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	≤ 330 Bhn or ≤ 36 HRc	46 (37-55)	RPM	1406	937	703	469	351	234	176	
			Fr	0.0002	0.0003	0.0004	0.0006	0.0009	0.0013	0.0017	
			Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	28 (22-34)	RPM	856	570	428	285	214	143	107
				Fr	0.0004	0.0005	0.0007	0.0011	0.0014	0.0021	0.0028
				Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		≤ 375 Bhn or ≤ 40 HRc	21 (17-25)	RPM	642	428	321	214	160	107	80
				Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1

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Single Flute Countersink

Series 601 Fractional	Hardness	Vc (sfm)		Diameter (D ₁) (inch)							
				1/8	3/16	1/4	3/8	1/2	3/4	1	
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	18 (14-22)	RPM	550	367	275	183	138	92	69	
			Fr	0.0002	0.0003	0.0004	0.0005	0.0007	0.0011	0.0015	
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	≤ 320 Bhn or ≤ 34 HRc	14 (11-17)	RPM	428	285	214	143	107	71	53	
			Fr	0.0002	0.0004	0.0005	0.0007	0.0009	0.0014	0.0019	
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	≤ 425 Bhn or ≤ 45 HRc	12 (10-14)	RPM	367	244	183	122	92	61	46	
			Fr	0.0003	0.0004	0.0005	0.0008	0.0011	0.0016	0.0022	
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	36 (29-43)	RPM	1100	733	550	367	275	183	138
				Fr	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
				Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
≤ 350 Bhn or ≤ 38 HRc		28 (22-34)	RPM	856	570	428	285	214	143	107	
			Fr	0.0004	0.0005	0.0007	0.0011	0.0014	0.0021	0.0028	
			Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
≤ 440 Bhn or ≤ 47 HRc		21 (17-25)	RPM	642	428	321	214	160	107	80	
			Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012	
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	225 (180-270)	RPM	6876	4584	3438	2292	1719	1146	860
				Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0061
				Feed (ipm)	5.2	5.2	5.2	5.2	5.2	5.2	5.2
	≤ 150 Bhn or ≤ 7 HRc	190 (152-228)	RPM	5806	3871	2903	1935	1452	968	726	
			Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0061	
			Feed (ipm)	4.4	4.4	4.4	4.4	4.4	4.4	4.4	
	≤ 140 Bhn or ≤ 3 HRc	95 (76-114)	RPM	2903	1935	1452	968	726	484	363	
			Fr	0.0004	0.0006	0.0008	0.0011	0.0015	0.0023	0.0030	
			Feed (ipm)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
	≤ 200 Bhn or ≤ 23 HRc	80 (64-96)	RPM	2445	1630	1222	815	611	407	306	
			Fr	0.0004	0.0006	0.0008	0.0012	0.0016	0.0025	0.0033	
			Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

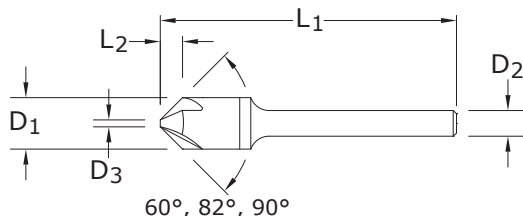
rpm = Vc x 3.82 / D₁

ipm = Fr x rpm

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

3 Flute Countersink



TOLERANCES (inch)

1/8–1/4 DIAMETER

$D_1 = +.0000/-0.0005$

3/8–1 DIAMETER

$D_1 = +.003/-0.000$

Included Angle

$+1^\circ/-1^\circ$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS

For patent information visit www.ksptpatents.com

603
FRACTIONAL SERIES

inch				EDP NO.		
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	OVERALL LENGTH L_1	TIP DIAMETER D_3	UNCOATED 60°	UNCOATED 82°	UNCOATED 90°
1/8	1/8	1-1/2	.040	–	–	74225
1/8	1/8	1-1/2	.040	–	74125	–
1/8	1/8	1-1/2	.035	74025	–	–
3/16	3/16	2	.060	–	–	74228
3/16	3/16	2	.060	–	74128	–
3/16	3/16	2	.045	74028	–	–
1/4	1/4	2	.100	–	–	74231
1/4	1/4	2	.100	–	74131	–
1/4	1/4	2	.070	74031	–	–
3/8*	1/4	2-13/16	.108	–	–	74234
3/8*	1/4	2-13/16	.108	–	74134	–
3/8*	1/4	2-13/16	.100	74034	–	–
1/2*	1/4	2-7/8	.122	–	–	74237
1/2*	1/4	2-7/8	.122	–	74137	–
1/2*	1/4	2-7/8	.113	74037	–	–
5/8*	3/8	3	.138	–	–	74240
5/8*	3/8	3	.138	–	74140	–
5/8*	3/8	3	.128	74040	–	–
3/4*	1/2	3	.153	–	–	74243
3/4*	1/2	3	.153	–	74143	–
3/4*	1/2	3	.143	74043	–	–
1*	1/2	3-1/4	.168	–	–	74246
1*	1/2	3-1/4	.168	–	74146	–
1*	1/2	3-1/4	.158	74046	–	–

*Steel Shank / Con mango de acero / Avec queue en acier / Mit Stahlschaft
NOTE: D3 dimension varies based on angle. Contact your KSPT representative or consult KYOCERA SGS Tool Wizard® for dimension information.

3 Flute Countersink

Series 603 Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/8	3/16	1/4	3/8	1/2	3/4	1		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	125	RPM	3820	2547	1910	1273	955	637	478	
		(100-150)	Fr	0.0008	0.0012	0.0016	0.0024	0.0031	0.0047	0.0063	
			Feed (ipm)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
	≤ 300 Bhn or ≤ 32 HRc	60	RPM	1834	1222	917	611	458	306	229	
		(48-72)	Fr	0.0007	0.0011	0.0014	0.0021	0.0028	0.0043	0.0057	
			Feed (ipm)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
	≤ 425 Bhn or ≤ 45 HRc	45	RPM	1375	917	688	458	344	229	172	
		(36-54)	Fr	0.0004	0.0007	0.0009	0.0013	0.0017	0.0026	0.0035	
			Feed (ipm)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	95	RPM	2903	1935	1452	968	726	484	363
			(76-114)	Fr	0.0007	0.0010	0.0014	0.0021	0.0028	0.0041	0.0055
				Feed (ipm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
≤ 375 Bhn or ≤ 40 HRc		60	RPM	1834	1222	917	611	458	306	229	
		(48-72)	Fr	0.0007	0.0010	0.0013	0.0020	0.0026	0.0039	0.0052	
			Feed (ipm)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
≤ 450 Bhn or ≤ 48 HRc		35	RPM	1070	713	535	357	267	178	134	
		(28-42)	Fr	0.0004	0.0006	0.0007	0.0011	0.0015	0.0022	0.0030	
			Feed (ipm)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRc	35	RPM	1070	713	535	357	267	178	134
			(28-42)	Fr	0.0004	0.0006	0.0007	0.0011	0.0015	0.0022	0.0030
				Feed (ipm)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	≤ 375 Bhn or ≤ 40 HRc	25	RPM	764	509	382	255	191	127	96	
		(20-30)	Fr	0.0003	0.0004	0.0005	0.0008	0.0010	0.0016	0.0021	
			Feed (ipm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
≤ 475 Bhn or ≤ 50 HRc	20	RPM	611	407	306	204	153	102	76		
	(16-24)	Fr	0.0002	0.0002	0.0003	0.0005	0.0007	0.0010	0.0013		
		Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	105	RPM	3209	2139	1604	1070	802	535	401	
		(84-126)	Fr	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072	
			Feed (ipm)	2.9	2.9	2.9	2.9	2.9	2.9	2.9	
	≤ 330 Bhn or ≤ 36 HRc	75	RPM	2292	1528	1146	764	573	382	287	
		(60-90)	Fr	0.0009	0.0014	0.0018	0.0027	0.0037	0.0055	0.0073	
			Feed (ipm)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250 Bhn or ≤ 24 HRc	53	RPM	1620	1080	810	540	405	270	202	
		(42-64)	Fr	0.0004	0.0006	0.0009	0.0013	0.0017	0.0026	0.0035	
			Feed (ipm)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
	≤ 330 Bhn or ≤ 36 HRc	46	RPM	1406	937	703	469	351	234	176	
		(37-55)	Fr	0.0004	0.0005	0.0007	0.0011	0.0014	0.0021	0.0028	
			Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	28	RPM	856	570	428	285	214	143	107
			(22-34)	Fr	0.0005	0.0007	0.0009	0.0014	0.0019	0.0028	0.0037
				Feed (ipm)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		≤ 375 Bhn or ≤ 40 HRc	21	RPM	642	428	321	214	160	107	80
			(17-25)	Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1

continued on next page

3 Flute Countersink

Series 603 Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/8	3/16	1/4	3/8	1/2	3/4	1		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	18 (14-22)	RPM	550	367	275	183	138	92	69	
			Fr	0.0004	0.0005	0.0007	0.0011	0.0015	0.0022	0.0029	
			Feed (ipm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
	≤ 320 Bhn or ≤ 34 HRc	14 (11-17)	RPM	428	285	214	143	107	71	53	
			Fr	0.0002	0.0004	0.0005	0.0007	0.0009	0.0014	0.0019	
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	≤ 425 Bhn or ≤ 45 HRc	12 (10-14)	RPM	367	244	183	122	92	61	46	
			Fr	0.0003	0.0004	0.0005	0.0008	0.0011	0.0016	0.0022	
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	36 (29-43)	RPM	1100	733	550	367	275	183	138
				Fr	0.0007	0.0011	0.0015	0.0022	0.0029	0.0044	0.0058
				Feed (ipm)	0.8	0.8	0.8	0.8	0.8	0.8	0.8
≤ 350 Bhn or ≤ 38 HRc		28 (22-34)	RPM	856	570	428	285	214	143	107	
			Fr	0.0006	0.0009	0.0012	0.0018	0.0023	0.0035	0.0047	
			Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
≤ 440 Bhn or ≤ 47 HRc		21 (17-25)	RPM	642	428	321	214	160	107	80	
			Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012	
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	225 (180-270)	RPM	6876	4584	3438	2292	1719	1146	860
				Fr	0.0011	0.0017	0.0023	0.0034	0.0045	0.0068	0.0091
				Feed (ipm)	7.8	7.8	7.8	7.8	7.8	7.8	7.8
	≤ 150 Bhn or ≤ 7 HRc	190 (152-228)	RPM	5806	3871	2903	1935	1452	968	726	
			Fr	0.0011	0.0017	0.0022	0.0034	0.0045	0.0067	0.0090	
			Feed (ipm)	6.5	6.5	6.5	6.5	6.5	6.5	6.5	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	95 (76-114)	RPM	2903	1935	1452	968	726	484	363
				Fr	0.0006	0.0009	0.0012	0.0018	0.0023	0.0035	0.0047
				Feed (ipm)	1.7	1.7	1.7	1.7	1.7	1.7	1.7
		≤ 200 Bhn or ≤ 23 HRc	80 (64-96)	RPM	2445	1630	1222	815	611	407	306
				Fr	0.0006	0.0009	0.0011	0.0017	0.0023	0.0034	0.0046
				Feed (ipm)	1.4	1.4	1.4	1.4	1.4	1.4	1.4

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

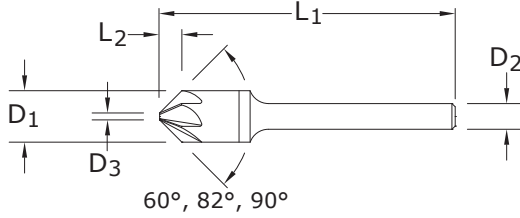
$rpm = Vc \times 3.82 / D_1$

$ipm = Fr \times rpm$

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

6 Flute Countersink



606

FRACTIONAL SERIES

CUTTING DIAMETER D ₁	SHANK DIAMETER D ₂	OVERALL LENGTH L ₁	TIP DIAMETER D ₃	EDP NO.		
				UNCOATED 60°	UNCOATED 82°	UNCOATED 90°
1/8	1/8	1-1/2	.035	—	—	74249
1/8	1/8	1-1/2	.035	—	74149	—
1/8	1/8	1-1/2	.035	74049	—	—
3/16	3/16	2	.045	—	—	74252
3/16	3/16	2	.045	—	74152	—
3/16	3/16	2	.045	74052	—	—
1/4	1/4	2	.070	—	—	74255
1/4	1/4	2	.070	—	74155	—
1/4	1/4	2	.070	74055	—	—
3/8*	1/4	2-13/16	.100	—	—	74258
3/8*	1/4	2-13/16	.100	—	74158	—
3/8*	1/4	2-13/16	.100	74058	—	—
1/2*	1/4	2-7/8	.160	—	—	74261
1/2*	1/4	2-7/8	.160	—	74161	—
1/2*	1/4	2-7/8	.160	74061	—	—
5/8*	3/8	3	.190	—	—	74264
5/8*	3/8	3	.190	—	74164	—
5/8*	3/8	3	.190	74064	—	—
3/4*	1/2	3	.220	—	—	74267
3/4*	1/2	3	.220	—	74167	—
3/4*	1/2	3	.220	74067	—	—
1*	1/2	3-1/4	.260	—	—	74270
1*	1/2	3-1/4	.260	—	74170	—
1*	1/2	3-1/4	.260	74070	—	—

*Steel Shank / Con mango de acero / Avec queue en acier / Mit Stahlschaft
 NOTE: D₃ dimension varies based on angle. Contact your KSPT representative or consult KYOCERA SGS Tool Wizard® for dimension information.

TOLERANCES (inch)

1/8–1/4 DIAMETER

D₁ = +.0000/–.0005

3/8–1 DIAMETER

D₁ = +.003/–.000

Included Angle

+1°/–1°

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

NON-FERROUS

HARDENED STEELS

For patent information visit www.ksptpatents.com

6 Flute Countersink

Series	Hardness	Vc (sfm)		Diameter (D ₁) (inch)								
				1/8	3/16	1/4	3/8	1/2	3/4	1		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	125	RPM	3820	2547	1910	1273	955	637	478	
			(100-150)	Fr	0.0010	0.0016	0.0021	0.0031	0.0042	0.0063	0.0084	
				Feed (ipm)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
		≤ 300 Bhn or ≤ 32 HRc	60	RPM	1834	1222	917	611	458	306	229	
			(48-72)	Fr	0.0010	0.0015	0.0020	0.0029	0.0039	0.0059	0.0079	
				Feed (ipm)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
	≤ 425 Bhn or ≤ 45 HRc	45	RPM	1375	917	688	458	344	229	172		
		(36-54)	Fr	0.0006	0.0009	0.0012	0.0017	0.0023	0.0035	0.0047		
			Feed (ipm)	0.8	0.8	0.8	0.8	0.8	0.8	0.8		
	H	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	95	RPM	2903	1935	1452	968	726	484	363
				(76-114)	Fr	0.0009	0.0013	0.0018	0.0027	0.0036	0.0054	0.0072
					Feed (ipm)	2.6	2.6	2.6	2.6	2.6	2.6	2.6
≤ 375 Bhn or ≤ 40 HRc			60	RPM	1834	1222	917	611	458	306	229	
			(48-72)	Fr	0.0009	0.0014	0.0019	0.0028	0.0037	0.0056	0.0074	
				Feed (ipm)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
≤ 450 Bhn or ≤ 48 HRc	35	RPM	1070	713	535	357	267	178	134			
	(28-42)	Fr	0.0006	0.0008	0.0011	0.0017	0.0022	0.0034	0.0045			
		Feed (ipm)	0.6	0.6	0.6	0.6	0.6	0.6	0.6			
K	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	35	RPM	1070	713	535	357	267	178	134	
			(28-42)	Fr	0.0006	0.0008	0.0011	0.0017	0.0022	0.0034	0.0045	
				Feed (ipm)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
		≤ 375 Bhn or ≤ 40 HRc	25	RPM	764	509	382	255	191	127	96	
			(20-30)	Fr	0.0003	0.0004	0.0005	0.0008	0.0010	0.0016	0.0021	
				Feed (ipm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
≤ 475 Bhn or ≤ 50 HRc	20	RPM	611	407	306	204	153	102	76			
	(16-24)	Fr	0.0003	0.0005	0.0007	0.0010	0.0013	0.0020	0.0026			
		Feed (ipm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2			
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	105	RPM	3209	2139	1604	1070	802	535	401	
			(84-126)	Fr	0.0012	0.0018	0.0024	0.0036	0.0049	0.0073	0.0097	
				Feed (ipm)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	
		≤ 330 Bhn or ≤ 36 HRc	75	RPM	2292	1528	1146	764	573	382	287	
(60-90)	Fr		0.0012	0.0018	0.0024	0.0037	0.0049	0.0073	0.0098			
				Feed (ipm)	2.8	2.8	2.8	2.8	2.8	2.8		

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6 Flute Countersink

Series 606 Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/8	3/16	1/4	3/8	1/2	3/4	1		
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250 Bhn or ≤ 24 HRc	53	RPM	1620	1080	810	540	405	270	202
		(42-64)	Fr	0.0006	0.0009	0.0012	0.0019	0.0025	0.0037	0.0049	
			Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
			46	RPM	1406	937	703	469	351	234	176
		≤ 330 Bhn or ≤ 36 HRc	(37-55)	Fr	0.0005	0.0007	0.0010	0.0015	0.0020	0.0030	0.0040
		Feed (ipm)		0.7	0.7	0.7	0.7	0.7	0.7	0.7	
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc		28	RPM	856	570	428	285	214	143
		(22-34)	Fr	0.0007	0.0011	0.0014	0.0021	0.0028	0.0042	0.0056	
			Feed (IPM)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
			≤ 375 Bhn or ≤ 40 HRc	21	RPM	642	428	321	214	160	107
		(17-25)	Fr	0.0003	0.0005	0.0006	0.0009	0.0012	0.0019	0.0025	
			Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy		≤ 220 Bhn or ≤ 19 HRc	18	RPM	550	367	275	183	138	92
		(14-22)	Fr	0.0005	0.0008	0.0011	0.0016	0.0022	0.0033	0.0044	
			Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
			≤ 320 Bhn or ≤ 34 HRc	14	RPM	428	285	214	143	107	71
		(11-17)	Fr	0.0005	0.0007	0.0009	0.0014	0.0019	0.0028	0.0037	
			Feed (ipm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
	≤ 425 Bhn or ≤ 45 HRc		12	RPM	367	244	183	122	92	61	46
	(10-14)	Fr	0.0003	0.0004	0.0005	0.0008	0.0011	0.0016	0.0022		
		Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
		TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	36	RPM	1100	733	550	367	275	183
	(29-43)		Fr	0.0009	0.0014	0.0018	0.0027	0.0036	0.0055	0.0073	
			Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
≤ 350 Bhn or ≤ 38 HRc			28	RPM	856	570	428	285	214	143	107
(22-34)	Fr		0.0007	0.0011	0.0014	0.0021	0.0028	0.0042	0.0056		
	Feed (ipm)		0.6	0.6	0.6	0.6	0.6	0.6	0.6		
	≤ 440 Bhn or ≤ 47 HRc	21	RPM	642	428	321	214	160	107	80	
(17-25)	Fr	0.0003	0.0005	0.0006	0.0009	0.0012	0.0019	0.0025			
	Feed (ipm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2			

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6 Flute Countersink

Series 606 Fractional	Hardness	Vc (sfm)		Diameter (D ₁) (inch)							
				1/8	3/16	1/4	3/8	1/2	3/4	1	
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	225 (180-270)	RPM	6876	4584	3438	2292	1719	1146	860	
			Fr	0.0015	0.0022	0.0030	0.0045	0.0060	0.0090	0.0120	
				Feed (ipm)	10.3	10.3	10.3	10.3	10.3	10.3	10.3
				RPM	5806	3871	2903	1935	1452	968	726
	≤ 150 Bhn or ≤ 7 HRc	190 (152-228)	Fr	0.0015	0.0022	0.0030	0.0045	0.0060	0.0090	0.0120	
			Feed (ipm)	8.7	8.7	8.7	8.7	8.7	8.7	8.7	
COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	95 (76-114)	RPM	2903	1935	1452	968	726	484	363	
			Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0061	
				Feed (ipm)	2.2	2.2	2.2	2.2	2.2	2.2	2.2
				RPM	2445	1630	1222	815	611	407	306
	≤ 200 Bhn or ≤ 23 HRc	80 (64-96)	Fr	0.0008	0.0012	0.0016	0.0023	0.0031	0.0047	0.0062	
			Feed (ipm)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

$rpm = Vc \times 3.82 / D_1$

$ipm = Fr \times rpm$

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

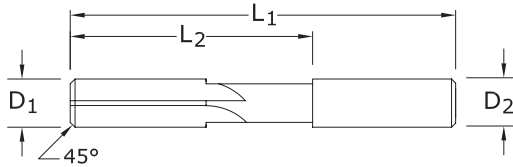
Straight Flute Accu-Reamer



5xD



200
FRACTIONAL SERIES



inch					EDP NO.
CUTTING DIAMETER D ₁	SHANK DIAMETER D ₂	MAXIMUM REAM LENGTH L ₂	OVERALL LENGTH L ₁	NO. OF FLUTES	UNCOATED
3/64	3/64	3/4	1-1/2	4	70003
1/16	1/16	3/4	1-1/2	4	70004
5/64	5/64	1	2	4	70005
3/32	3/32	1-1/4	2-1/4	4	70006
7/64	7/64	1-1/4	2-1/4	4	70007
1/8	1/8	1-1/4	2-1/4	4	70008
9/64	9/64	1-1/2	2-1/2	4	70009
5/32	5/32	1-1/2	2-1/2	4	70010
11/64	11/64	1-3/4	2-3/4	4	70011
3/16	3/16	1-3/4	2-3/4	4	70012
13/64	13/64	2	3	4	70013
7/32	7/32	2	3	4	70014
15/64	15/64	2	3	4	70015
1/4	1/4	2	3	4	70016
17/64	17/64	2-1/4	3-1/4	6	70017
9/32	9/32	2-1/4	3-1/4	6	70018
19/64	19/64	2-1/4	3-1/4	6	70019
5/16	5/16	2-1/4	3-1/4	6	70020
21/64	21/64	2-3/8	3-1/2	6	70021
11/32	11/32	2-3/8	3-1/2	6	70022
23/64	23/64	2-3/8	3-1/2	6	70023
3/8	3/8	2-3/8	3-1/2	6	70024
25/64	25/64	2-7/8	4	6	70025
13/32	13/32	2-7/8	4	6	70026
27/64	27/64	2-7/8	4	6	70027
7/16	7/16	2-7/8	4	6	70028
29/64	29/64	2-7/8	4	6	70029
15/32	15/32	2-7/8	4	6	70030
31/64	31/64	2-7/8	4	6	70031
1/2	1/2	2-7/8	4	6	70032

TOLERANCES (inch)

D₁ = +.0002/-0.0000

D₂ = +.0002/-0.0000

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- HARDENED STEELS

For patent information visit www.ksptpatents.com

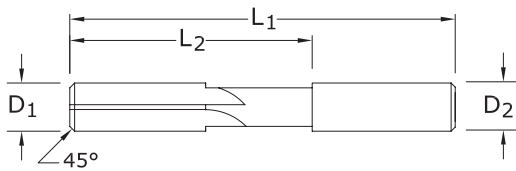
Straight Flute Accu-Reamer



TOLERANCES (inch)

D₁ = +.0002/-0.0000

D₂ = +.0002/-0.0000



200
FRACTIONAL SERIES

inch				
CUTTING DIAMETER D ₁	SHANK DIAMETER D ₂	MAXIMUM REAM LENGTH L ₂	OVERALL LENGTH L ₁	NO. OF FLUTES
.0470 – .0625	1/16	3/4	1-1/2	4
.0626 – .0781	5/64	1	2	4
.0782 – .0938	3/32	1-1/4	2-1/4	4
.0939 – .1094	7/64	1-1/4	2-1/4	4
.1095 – .1250	1/8	1-1/4	2-1/4	4
.1251 – .1406	9/64	1-1/2	2-1/2	4
.1407 – .1563	5/32	1-1/2	2-1/2	4
.1564 – .1719	11/64	1-3/4	2-3/4	4
.1720 – .1875	3/16	1-3/4	2-3/4	4
.1876 – .2031	13/64	2	3	4
.2032 – .2188	7/32	2	3	4
.2189 – .2344	15/64	2	3	4
.2345 – .2500	1/4	2	3	4
.2501 – .2656	17/64	2-1/4	3-1/4	6
.2657 – .2813	9/32	2-1/4	3-1/4	6
.2814 – .2969	19/64	2-1/4	3-1/4	6
.2970 – .3125	5/16	2-1/4	3-1/4	6
.3126 – .3281	21/64	2-3/8	3-1/2	6
.3282 – .3438	11/32	2-3/8	3-1/2	6
.3439 – .3594	23/64	2-3/8	3-1/2	6
.3595 – .3750	3/8	2-3/8	3-1/2	6
.3751 – .3906	25/64	2-7/8	4	6
.3907 – .4063	13/32	2-7/8	4	6
.4064 – .4219	27/64	2-7/8	4	6
.4220 – .4375	7/16	2-7/8	4	6
.4376 – .4531	29/64	2-7/8	4	6
.4532 – .4688	15/32	2-7/8	4	6
.4689 – .4844	31/64	2-7/8	4	6
.4845 – .5000	1/2	2-7/8	4	6

SER 200 Fractional reamers can be ordered to specific diameters according to the size range of Cutting Diameter D₁. Please order as:

- 200. Then the size of the cut diameter in fractional format.
 - i.e. 200.0492
 - Description: Series 200 size 0.0492
 - For Metric sizes convert to fractional inches (i.e. ÷ 25.4)
 - The above sample would be a 1.25mm size (1.25 ÷ 25.4 = 0.0492")
- All other dimensions are fractional as per table including the Shank

Straight Flute Accu-Reamer

Series 200 Fractional	Hardness	Vc (sfm)	Diameter (D ₁) (inch)								
			1/16	1/8	3/16	1/4	5/16	3/8	1/2		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	150 (120-180)	RPM	9168	4584	3056	2292	1834	1528	1146	
			Fr	0.0018	0.0035	0.0053	0.0071	0.0088	0.0106	0.0141	
			Feed (ipm)	16.5	16.0	16.2	16.3	16.1	16.2	16.2	
	≤ 300 Bhn or ≤ 32 HRc	75 (60-90)	RPM	4584	2292	1528	1146	917	764	573	
			Fr	0.0016	0.0031	0.0047	0.0062	0.0078	0.0093	0.0124	
			Feed (ipm)	7.3	7.1	7.2	7.1	7.2	7.1	7.1	
	≤ 425 Bhn or ≤ 45 HRc	55 (44-66)	RPM	3362	1681	1121	840	672	560	420	
			Fr	0.0009	0.0019	0.0028	0.0037	0.0046	0.0056	0.0074	
			Feed (ipm)	3.0	3.2	3.1	3.1	3.1	3.1	3.1	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	115 (92-138)	RPM	7029	3514	2343	1757	1406	1171	879
				Fr	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
				Feed (ipm)	10.5	10.5	10.5	10.5	10.5	10.5	10.5
≤ 375 Bhn or ≤ 40 HRc		70 (56-84)	RPM	4278	2139	1426	1070	856	713	535	
			Fr	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120	
			Feed (ipm)	6.4	6.4	6.4	6.4	6.4	6.4	6.4	
≤ 450 Bhn or ≤ 48 HRc		45 (36-54)	RPM	2750	1375	917	688	550	458	344	
			Fr	0.0009	0.0019	0.0028	0.0037	0.0046	0.0056	0.0074	
			Feed (ipm)	2.5	2.6	2.6	2.5	2.5	2.6	2.5	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRc	40 (32-48)	RPM	2445	1222	815	611	489	407	306
				Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078
				Feed (ipm)	2.4	2.4	2.4	2.4	2.4	2.4	2.4
	≤ 375 Bhn or ≤ 40 HRc	25 (20-30)	RPM	1528	764	509	382	306	255	191	
			Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
			Feed (ipm)	0.9	1.0	1.0	1.0	0.9	1.0	1.0	
	≤ 475 Bhn or ≤ 50 HRc	20 (16-24)	RPM	1222	611	407	306	244	204	153	
			Fr	0.0004	0.0008	0.0012	0.0016	0.0019	0.0023	0.0031	
			Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	≤ 655 Bhn or ≤ 60 HRc	14 (11-17)	RPM	856	428	285	214	171	143	107	
			Fr	0.0003	0.0007	0.0011	0.0014	0.0018	0.0021	0.0028	
			Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
M CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	125 (100-150)	RPM	7640	3820	2547	1910	1528	1273	955	
			Fr	0.0020	0.0040	0.0060	0.0081	0.0101	0.0121	0.0161	
			Feed (ipm)	15.3	15.3	15.3	15.5	15.4	15.4	15.4	
	≤ 330 Bhn or ≤ 36 HRc	95 (76-114)	RPM	5806	2903	1935	1452	1161	968	726	
			Fr	0.0020	0.0040	0.0060	0.0081	0.0101	0.0121	0.0161	
			Feed (ipm)	11.6	11.6	11.6	11.8	11.7	11.7	11.7	
M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250 Bhn or ≤ 24 HRc	75 (60-90)	RPM	4584	2292	1528	1146	917	764	573	
			Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078	
			Feed (ipm)	4.6	4.6	4.4	4.5	4.5	4.5	4.5	
	≤ 330 Bhn or ≤ 36 HRc	55 (44-66)	RPM	3362	1681	1121	840	672	560	420	
			Fr	0.0008	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	
			Feed (ipm)	2.7	2.5	2.6	2.5	2.6	2.5	2.5	
M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	35 (28-42)	RPM	2139	1070	713	535	428	357	267	
			Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078	
			Feed (ipm)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
	≤ 375 Bhn or ≤ 40 HRc	25 (20-30)	RPM	1528	764	509	382	306	255	191	
			Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
			Feed (ipm)	0.9	1.0	1.0	1.0	0.9	1.0	1.0	

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Straight Flute Accu-Reamer

Series 200 Fractional	Hardness	Vc (sfm)		Diameter (D ₁) (inch)							
				1/16	1/8	3/16	1/4	5/16	3/8	1/2	
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	20 (16-24)	RPM	1222	611	407	306	244	204	153	
			Fr	0.0008	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060	
			Feed (ipm)	1.0	0.9	0.9	0.9	0.9	0.9	0.9	
	≤ 320 Bhn or ≤ 34 HRc	15 (12-18)	RPM	917	458	306	229	183	153	115	
			Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
			Feed (ipm)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
	≤ 425 Bhn or ≤ 45 HRc	10 (8-12)	RPM	611	306	204	153	122	102	76	
			Fr	0.0004	0.0007	0.0011	0.0015	0.0018	0.0022	0.0029	
			Feed (ipm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	45 (36-54)	RPM	2750	1375	917	688	550	458	344
				Fr	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
				Feed (ipm)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
≤ 350 Bhn or ≤ 38 HRc		35 (28-42)	RPM	2139	1070	713	535	428	357	267	
			Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078	
			Feed (ipm)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
≤ 440 Bhn or ≤ 47 HRc		25 (20-30)	RPM	1528	764	509	382	306	255	191	
			Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050	
			Feed (ipm)	0.9	1.0	1.0	1.0	0.9	1.0	1.0	
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 80 Bhn or ≤ 47 HRb	270 (216-324)	RPM	16502	8251	5501	4126	3300	2750	2063
				Fr	0.0025	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200
				Feed (ipm)	41.3	41.3	41.3	41.3	41.3	41.3	41.3
	≤ 150 Bhn or ≤ 7 HRc	230 (184-276)	RPM	14058	7029	4686	3514	2812	2343	1757	
			Fr	0.0025	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200	
			Feed (ipm)	35.1	35.1	35.1	35.1	35.1	35.1	35.1	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	115 (92-138)	RPM	7029	3514	2343	1757	1406	1171	879
				Fr	0.0013	0.0026	0.0038	0.0051	0.0064	0.0077	0.0102
				Feed (ipm)	9.1	9.1	8.9	9.0	9.0	9.0	9.0
		≤ 200 Bhn or ≤ 23 HRc	95 (76-114)	RPM	5806	2903	1935	1452	1161	968	726
				Fr	0.0013	0.0026	0.0038	0.0051	0.0064	0.0077	0.0102
				Feed (ipm)	7.5	7.5	7.4	7.4	7.4	7.5	7.4

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

$rpm = Vc \times 3.82 / D_1$

$ipm = Fr \times rpm$

increase speed and feed 30 percent when using coated reamers

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstoool.com)

METRIC

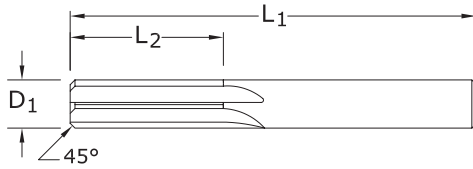
Straight Flute Reamer



3xD



201M
METRIC SERIES



CUTTING DIAMETER D_1	mm		NO. OF FLUTES	EDP NO. UNCOATED
	MAXIMUM REAM LENGTH L_2	OVERALL LENGTH L_1		
1,0	6,0	32,0	4	81001
1,5	9,5	38,0	4	81003
2,0	12,7	44,0	4	81005
2,5	12,7	50,0	4	81007
3,0	16,0	57,0	4	81009
3,5	19,0	63,0	4	81011
4,0	19,0	63,0	4	81013
4,5	22,0	70,0	4	81015
5,0	25,0	75,0	4	81017
5,5	25,0	75,0	4	81019
6,0	25,0	75,0	4	81021
7,0	28,0	82,0	6	81023
8,0	28,0	82,0	6	81025
9,0	31,0	89,0	6	81027
10,0	31,0	89,0	6	81029

TOLERANCES (mm)

1-6 DIAMETER

$D_1 = +0,008/-0,000$

>6-10 DIAMETER

$D_1 = +0,011/-0,000$

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- HARDENED STEELS

For patent information visit www.ksptpatents.com

Straight Flute Reamer

Series 201M Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			1	2	3	4	6	8	10		
P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	46	RPM	14541	7271	4847	3635	2424	1818	1454	
		(37-55)	Fr	0.028	0.056	0.085	0.113	0.169	0.226	0.282	
			Feed (mm/min)	410	410	410	410	410	410	410	
	≤ 300 Bhn or ≤ 32 HRc	23	RPM	7271	3635	2424	1818	1212	909	727	
		(18-27)	Fr	0.025	0.050	0.074	0.099	0.149	0.198	0.248	
			Feed (mm/min)	180	180	180	180	180	180	180	
	≤ 425 Bhn or ≤ 45 HRc	17	RPM	5332	2666	1777	1333	889	666	533	
		(13-20)	Fr	0.015	0.030	0.044	0.059	0.089	0.119	0.148	
			Feed (mm/min)	79	79	79	79	79	79	79	
	H ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	35	RPM	11148	5574	3716	2787	1858	1394	1115
			(28-42)	Fr	0.024	0.048	0.072	0.096	0.144	0.192	0.240
				Feed (mm/min)	268	268	268	268	268	268	268
≤ 375 Bhn or ≤ 40 HRc		21	RPM	6786	3393	2262	1696	1131	848	679	
		(17-26)	Fr	0.024	0.048	0.072	0.096	0.144	0.192	0.240	
			Feed (mm/min)	163	163	163	163	163	163	163	
≤ 450 Bhn or ≤ 48 HRc		14	RPM	4362	2181	1454	1091	727	545	436	
		(11-16)	Fr	0.015	0.030	0.045	0.060	0.089	0.119	0.149	
			Feed (mm/min)	65	65	65	65	65	65	65	
K TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 250 Bhn or ≤ 24 HRc	12	RPM	3878	1939	1293	969	646	485	388
			(10-15)	Fr	0.015	0.031	0.046	0.062	0.093	0.124	0.155
				Feed (mm/min)	60	60	60	60	60	60	60
	≤ 375 Bhn or ≤ 40 HRc	8	RPM	2424	1212	808	606	404	303	242	
		(6-9)	Fr	0.010	0.020	0.030	0.040	0.059	0.079	0.099	
			Feed (mm/min)	24	24	24	24	24	24	24	
	≤ 475 Bhn or ≤ 50 HRc	6	RPM	1939	969	646	485	323	242	194	
		(5-7)	Fr	0.006	0.012	0.019	0.025	0.037	0.050	0.062	
			Feed (mm/min)	12	12	12	12	12	12	12	
	≤ 655 Bhn or ≤ 60 HRc	4	RPM	1272	636	424	318	212	159	127	
		(3-5)	Fr	0.006	0.013	0.019	0.025	0.038	0.050	0.063	
			Feed (mm/min)	8	8	8	8	8	8	8	
K CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	38	RPM	12118	6059	4039	3029	2020	1515	1212	
		(30-46)	Fr	0.032	0.064	0.097	0.129	0.193	0.257	0.322	
			Feed (mm/min)	390	390	390	390	390	390	390	
	≤ 330 Bhn or ≤ 36 HRc	29	RPM	9209	4605	3070	2302	1535	1151	921	
		(23-35)	Fr	0.032	0.064	0.096	0.128	0.192	0.256	0.320	
			Feed (mm/min)	295	295	295	295	295	295	295	

continued on next page

Straight Flute Reamer

Series 201M Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			1	2	3	4	6	8	10		
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250 Bhn or ≤ 24 HRc	23	RPM	7271	3635	2424	1818	1212	909	727
			(18-27)	Fr	0.015	0.030	0.045	0.059	0.089	0.119	0.149
				Feed (mm/min)	108	108	108	108	108	108	108
		≤ 330 Bhn or ≤ 36 HRc	17	RPM	5332	2666	1777	1333	889	666	533
			(13-20)	Fr	0.012	0.024	0.036	0.048	0.072	0.096	0.120
				Feed (mm/min)	64	64	64	64	64	64	64
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	11	RPM	3393	1696	1131	848	565	424	339
			(9-13)	Fr	0.015	0.029	0.044	0.059	0.088	0.118	0.147
				Feed (mm/min)	50	50	50	50	50	50	50
		≤ 375 Bhn or ≤ 40 HRc	8	RPM	2424	1212	808	606	404	303	242
			(6-9)	Fr	0.010	0.020	0.030	0.040	0.059	0.079	0.099
				Feed (mm/min)	24	24	24	24	24	24	24
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	6	RPM	1939	969	646	485	323	242	194
			(5-7)	Fr	0.012	0.024	0.036	0.047	0.071	0.095	0.119
				Feed (mm/min)	23	23	23	23	23	23	23
		≤ 320 Bhn or ≤ 34 HRc	5	RPM	1454	727	485	364	242	182	145
			(4-5)	Fr	0.010	0.021	0.031	0.041	0.062	0.083	0.103
				Feed (mm/min)	15	15	15	15	15	15	15
	≤ 425 Bhn or ≤ 45 HRc	3	RPM	969	485	323	242	162	121	97	
		(2-4)	Fr	0.006	0.012	0.019	0.025	0.037	0.050	0.062	
			Feed (mm/min)	6	6	6	6	6	6	6	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	14	RPM	4362	2181	1454	1091	727	545	436
			(11-16)	Fr	0.024	0.048	0.072	0.096	0.144	0.193	0.241
				Feed (mm/min)	105	105	105	105	105	105	105
≤ 350 Bhn or ≤ 38 HRc		11	RPM	3393	1696	1131	848	565	424	339	
		(9-13)	Fr	0.015	0.029	0.044	0.059	0.088	0.118	0.147	
			Feed (mm/min)	50	50	50	50	50	50	50	
≤ 440 Bhn or ≤ 47 HRc	8	RPM	2424	1212	808	606	404	303	242		
	(6-9)	Fr	0.010	0.020	0.030	0.040	0.059	0.079	0.099		
		Feed (mm/min)	24	24	24	24	24	24	24		

continued on next page

Straight Flute Reamer

Series 201M Metric	Hardness	Vc (m/min)	Diameter (D ₁) (mm)								
			1	2	3	4	6	8	10		
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	82	RPM	26174	13087	8725	6544	4362	3272	2617	
		(66-99)	Fr	0.040	0.080	0.120	0.160	0.240	0.320	0.400	
			Feed (mm/min)	1047	1047	1047	1047	1047	1047	1047	
	≤ 150 Bhn or ≤ 7 HRc	70	RPM	22297	11148	7432	5574	3716	2787	2230	
		(56-84)	Fr	0.040	0.080	0.120	0.160	0.240	0.320	0.400	
			Feed (mm/min)	892	892	892	892	892	892	892	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	35	RPM	11148	5574	3716	2787	1858	1394	1115
			(28-42)	Fr	0.020	0.041	0.061	0.081	0.122	0.163	0.204
				Feed (mm/min)	227	227	227	227	227	227	227
≤ 200 Bhn or ≤ 23 HRc		29	RPM	9209	4605	3070	2302	1535	1151	921	
		(23-35)	Fr	0.020	0.041	0.061	0.082	0.122	0.163	0.204	
			Feed (mm/min)	188	188	188	188	188	188	188	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)

rpm = (Vc x 1000) / (D₁ x 3.14)

mm/min = Fr x rpm

increase speed and feed 30 percent when using coated reamers

reduce speed and feed for materials harder than listed

refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Routers



Routing

HIGH PERFORMANCE ROUTERS	SERIES	DESCRIPTION	PAGE
Plastic Composite	29M	Multi-Flute Plastic Composite Metric	230
Carbon Composite	20M-CCR	Multi-Flute Carbon Composite Metric	232
Coarse Cut Carbon Composite	31M-CCR	Multi-Flute Coarse Composite Metric	235
Compression	25M	Multi-Flute Compression Metric	237
GENERAL PURPOSE ROUTERS	SERIES	DESCRIPTION	PAGE
Up Cut	21M	2 Flute Up Cut Metric	239
Down Cut	22M	2 Flute Down Cut Metric	240

Speed & Feed Recommendations listed after each series

Ranurado

RANURADORES DE ALTO RENDIMIENTO	SERIE	DESCRIPCIÓN	PÁGINA
Compuesto de plástico	29M	Filo múltiple, compuesto plástico, métrico	230
Compuesto de carbono	20M-CCR	Filo múltiple, compuesto de carbono, métrico	232
Compuesto de carbono de corte áspero	31M-CCR	Filo múltiple, compuesto áspero, métrico	235
Compresión	25M	Filo múltiple, compresión, métrico	237

RANURADORES DE USO GENERAL	SERIE	DESCRIPCIÓN	PÁGINA
Corte ascendente	21M	2 filos, corte ascendente, métrico	239
Corte descendente	22M	2 filos, corte descendente, métrico	240

Recomendaciones de velocidades y avances mostradas tras cada serie

Détourage

FRAISES A DETOURER HAUTE PERFORMANCE	SERIES	DESCRIPTION	PAGE
Composites plastique	29M	Multi-dents pour composites plastique (métrique)	230
Composites carbone	20M-CCR	Multi-dents pour composites carbone (métrique)	232
Pour composites carbone coupe grossière	31M-CCR	Multi-dents pour composites grossiers (métrique)	235
Compression	25M	Multi-dents de compression (métrique)	237

FRAISES À DÉTOURER UNIVERSELLES	SERIES	DESCRIPTION	PAGE
Coupe ascendante	21M	2 dents coupe ascendante (métrique)	239
Coupe descendante	22M	2 dents coupe descendante (métrique)	240

Recommandations de vitesse et avance indiquées après chaque série

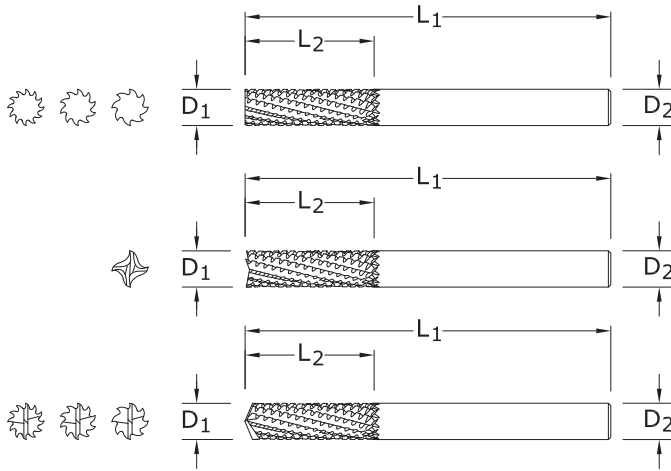
HOCHLEISTUNGS-OBERFRÄSE	SERIE	BESCHREIBUNG	SEITE
Verbundkunststoff	29M	Zöllige Oberfräse mit mehrschneidigen Schneidekanten für Verbundkunststoff	230
Kohlefaserverbundwerkstoff	20M-CCR	Metrische Oberfräse mit mehrschneidigen Schneidekanten für Kohlefaserverbundwerkstoff	232
Grobschnitt Kohlefaserverbundwerkstoff	31M-CCR	Metrische Oberfräse mit mehrschneidigen Schneidekanten für Verbundkunststoff	235
Gegenläufiger Drall	25M	Metrische gegenläufige mehrschneidige Oberfräse	237

ALLZWECK-OBERFRÄSEN	SERIE	BESCHREIBUNG	SEITE
Gegenlauf	21M	Zöllige gegenläufige Oberfräse mit 2 Schneidekanten	239
Gleichlauf	22M	Zöllige gleichläufige Oberfräse mit 2 Schneidekanten	240

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

METRIC

Plastic Composite



29M METRIC SERIES

- Radial chisel edge design provides smoother cuts and enhanced tool life
- Eccentric relief and neutral rake for strength
- Excels at trimming and profiling non-filled plastics as well as glass-filled plastics

mm						EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	NO. OF FLUTES	END STYLE	UNCOATED	Di-NAMITE® (Diamond)
3,0	12,0	38,0	3,0	8	No End Cut	84280	85080
3,0	12,0	38,0	3,0	8	End Mill	84281	85081
3,0	12,0	38,0	3,0	8	Drill	84282	85082
6,0	25,0	63,0	6,0	10	No End Cut	84283	85083
6,0	25,0	63,0	6,0	10	End Mill	84284	85084
6,0	25,0	63,0	6,0	10	Drill	84285	85085
8,0	25,0	63,0	8,0	12	No End Cut	84286	85086
8,0	25,0	63,0	8,0	12	End Mill	84287	85087
8,0	25,0	63,0	8,0	12	Drill	84288	85088
10,0	25,0	63,0	10,0	12	No End Cut	84289	85089
10,0	25,0	63,0	10,0	12	End Mill	84290	85090
10,0	25,0	63,0	10,0	12	Drill	84291	85091

TOLERANCES (mm)

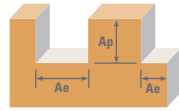
D₁ = +0,00/-0,13

D₂ = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

Plastic Composite



Series 29M Metric		Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)				
					3	6	8	10	
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot 	1	≤ 1	120	RPM	12722	6361	4771	3817
				(96-164)	Fr	0.061	0.122	0.163	0.203
					Feed (mm/min)	776	776	776	776
	Profile 	≤ 0.5	≤ 1.5	150	RPM	15903	7951	5963	4771
				(120-180)	Fr	0.061	0.122	0.163	0.203
					Feed (mm/min)	970	970	970	970
	HSM 	≤ 0.05	≤ 2	250	RPM	26504	13252	9939	7951
				(200-300)	Fr	0.140	0.280	0.373	0.467
					Feed (mm/min)	3710	3710	3710	3710
GFRP (FIBERGLASS)	Slot 	1	≤ 1	100	RPM	10602	5301	3976	3181
				(80-120)	Fr	0.061	0.122	0.162	0.203
					Feed (mm/min)	646	646	646	646
	Profile 	≤ 0.5	≤ 1.5	120	RPM	12722	6361	4771	3817
				(96-164)	Fr	0.061	0.122	0.163	0.203
					Feed (mm/min)	776	776	776	776
	HSM 	≤ 0.05	≤ 2	200	RPM	21203	10602	7951	6361
				(160-240)	Fr	0.140	0.280	0.374	0.467
					Feed (mm/min)	2970	2970	2970	2970
CARBON, GRAPHITE	Slot 	1	≤ 1	145	RPM	15372	7686	5765	4612
				(116-174)	Fr	0.095	0.190	0.253	0.317
					Feed (mm/min)	1460	1460	1460	1460
	Profile 	≤ 0.5	≤ 1.5	185	RPM	19613	9807	7355	5884
				(148-222)	Fr	0.095	0.190	0.253	0.317
					Feed (mm/min)	1863	1863	1863	1863
	HSM 	≤ 0.05	≤ 2	300	RPM	31805	15903	11927	9542
				(240-360)	Fr	0.219	0.437	0.583	0.729
					Feed (mm/min)	6957	6957	6957	6957
PLASTICS	Slot 	1	≤ 1	245	RPM	25974	12987	9740	7792
				(196-294)	Fr	0.037	0.075	0.100	0.125
					Feed (mm/min)	974	974	974	974
	Profile 	≤ 0.5	≤ 1.5	305	RPM	32335	16168	12126	9701
				(244-366)	Fr	0.038	0.075	0.100	0.125
					Feed (mm/min)	1213	1213	1213	1213
	HSM 	≤ 0.05	≤ 2	505	RPM	53538	26769	20077	16062
				(404-606)	Fr	0.088	0.175	0.233	0.292
					Feed (mm/min)	4685	4685	4685	4685

HSM (high speed machining)
 rpm = (Vc x 1000) / (D₁ x 3.14)
 mm/min = Fr x rpm
 adjust parameters based on resin type and fiber structure
 reduce speed when overheating causes melting or damage to resin
 reduce feed if delamination or fraying occur

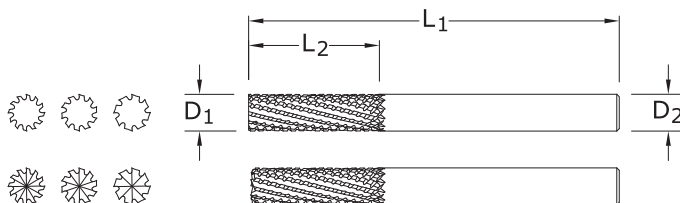
finish cuts typically required reduced feed and cutting depths
 rates shown are for use without coolant; rates may be increased with coolant
 dust collection is vital when machining dry
 diamond coating will increase tool life in graphite and composite materials
 refer to the KYOCERA SGS Tool Wizard® for complete technical information
 (www.kyocera-sgstool.com)

METRIC

Carbon Composite



20M-CCR METRIC SERIES



- Multi-flute design and positive geometry to shear with minimal pressure and delamination
- Unique clearance grind minimizes contact between tool diameter and workpiece eliminating friction
- Left hand flutes engineered to control the fibers within CFRP, preventing excessive fiber breakout
- Excels at trimming and profiling difficult and abrasive fiber filled plastics

mm						EDP NO.		
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	NO. OF FLUTES	END STYLE	UNCOATED	Ti-NAMITE-B (TiB ₂)	Di-NAMITE® (Diamond)
2,0	6,0	38,0	3,0	5	End Cutting	82930	83100	83070
3,0	10,0	38,0	3,0	5	End Cutting	82931	83101	83071
4,0	12,0	50,0	4,0	5	End Cutting	82932	83102	83072
5,0	15,0	50,0	6,0	5	End Cutting	82933	83103	83073
6,0	25,0	63,0	6,0	8	No End Cutting	82966	83104	83027
6,0	25,0	63,0	6,0	8	End Cutting	82967	83105	83026
8,0	25,0	63,0	8,0	10	No End Cutting	82968	83106	83029
8,0	25,0	63,0	8,0	10	End Cutting	82969	83107	83028
10,0	28,0	63,0	10,0	12	No End Cutting	82970	83108	83042
10,0	28,0	63,0	10,0	12	End Cutting	82971	83109	83041
12,0	38,0	89,0	12,0	12	No End Cutting	82972	83110	83044
12,0	38,0	89,0	12,0	12	End Cutting	82973	83111	83043

TOLERANCES (mm)

D₁ = +0,00/-0,13

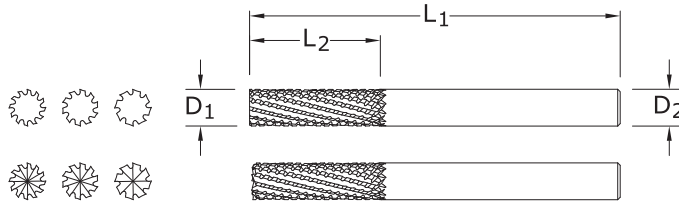
D₂ = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



Carbon Composite



20M-CCR-LHC

METRIC SERIES

TOLERANCES (mm)

$D_1 = +0,00/-0,13$

$D_2 = h_6$

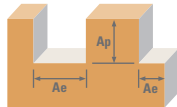
PLASTICS/COMPOSITES













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CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	END STYLE	EDP NO.	
						UNCOATED	Di-NAMITE® (Diamond)
6,0	25,0	63,0	6,0	8	No End Cutting	83220	83230
6,0	25,0	63,0	6,0	8	End Cutting	83221	83231
8,0	25,0	63,0	8,0	10	No End Cutting	83222	83232
8,0	25,0	63,0	8,0	10	End Cutting	83223	83233
10,0	28,0	63,0	10,0	12	No End Cutting	83224	83234
10,0	28,0	63,0	10,0	12	End Cutting	83225	83235

- Multi-flute design and positive geometry to shear with minimal pressure and delamination
- Unique clearance grind minimizes contact between tool diameter and workpiece eliminating friction
- Left hand flutes engineered to control the fibers within CFRP, preventing excessive fiber breakout
- Excels at trimming and profiling difficult and abrasive fiber filled plastics

Carbon Composite



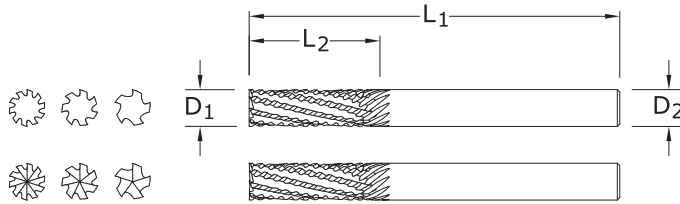
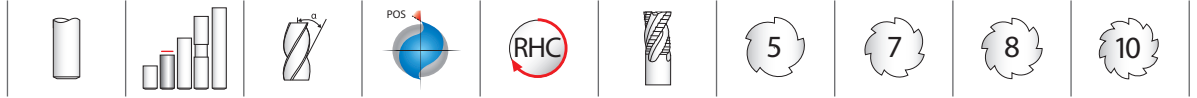
Series 20M Metric	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)						
				3	6	8	10	12		
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot 	1	≤ 1	120	RPM	12722	6361	4771	3817	3181
				(96-164)	Fr	0.055	0.113	0.243	0.366	0.439
					Feed (mm/min)	700	720	1160	1395	1395
	Profile 	≤ 0.5	≤ 1.5	150	RPM	15903	7951	5963	4771	3976
				(120-180)	Fr	0.055	0.113	0.243	0.366	0.439
					Feed (mm/min)	875	900	1450	1744	1744
	HSM 	≤ 0.05	≤ 2	250	RPM	26504	13252	9939	7951	6626
				(200-300)	Fr	0.126	0.260	0.556	0.833	1.000
					Feed (mm/min)	3350	3450	5527	6625	6625
GFRP (FIBERGLASS)	Slot 	1	≤ 1	100	RPM	10602	5301	3976	3181	2650
				(80-120)	Fr	0.054	0.111	0.236	0.357	0.428
					Feed (mm/min)	570	587	940	1135	1135
	Profile 	≤ 0.5	≤ 1.5	120	RPM	12722	6361	4771	3817	3181
				(96-164)	Fr	0.054	0.111	0.236	0.357	0.428
					Feed (mm/min)	684	704	1128	1362	1362
	HSM 	≤ 0.05	≤ 2	200	RPM	21203	10602	7951	6361	5301
				(160-240)	Fr	0.124	0.261	0.557	1.011	1.213
					Feed (mm/min)	2629	2765	4430	6430	6430
CARBON, GRAPHITE	Slot 	1	≤ 1	145	RPM	15372	7686	5765	4612	3843
				(116-174)	Fr	0.069	0.152	0.323	0.482	0.579
					Feed (mm/min)	1061	1165	1860	2224	2224
	Profile 	≤ 0.5	≤ 1.5	185	RPM	19613	9807	7355	5884	4903
				(148-222)	Fr	0.069	0.152	0.323	0.482	0.579
					Feed (mm/min)	1353	1486	2373	2838	2838
	HSM 	≤ 0.05	≤ 2	300	RPM	31805	15903	11927	9542	7951
				(240-360)	Fr	0.159	0.348	0.740	1.109	1.331
					Feed (mm/min)	5057	5535	8820	10580	10580
PLASTICS	Slot 	1	≤ 1	245	RPM	25974	12987	9740	7792	6494
				(196-294)	Fr	0.069	0.150	0.319	0.477	0.572
					Feed (mm/min)	1792	1945	3107	3717	3717
	Profile 	≤ 0.5	≤ 1.5	305	RPM	32335	16168	12126	9701	8084
				(244-366)	Fr	0.069	0.150	0.319	0.477	0.572
					Feed (mm/min)	2231	2421	3868	4627	4627
	HSM 	≤ 0.05	≤ 2	505	RPM	53538	26769	20077	16062	13385
				(404-606)	Fr	0.159	0.344	0.732	1.097	1.316
					Feed (mm/min)	8513	9220	14690	17617	17617

HSM (high speed machining)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fr \times rpm$
 adjust parameters based on resin type and fiber structure
 reduce speed when overheating causes melting or damage to resin
 reduce feed if delamination or fraying occur

finish cuts typically required reduced feed and cutting depths
 rates shown are for use without coolant; rates may be increased with coolant
 dust collection is vital when machining dry
 diamond coating will increase tool life in graphite and composite materials
 refer to the KYOCERA SGS Tool Wizard® for complete technical information
 (www.kyocera-sgstool.com)



Coarse Cut Carbon Composite



31M-CCR METRIC SERIES

TOLERANCES (mm)

$D_1 = +0,00/-0,13$

$D_2 = h_6$

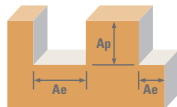
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	END STYLE	EDP NO.		
						UNCOATED	Ti-NAMITE-B (TiB ₂)	Di-NAMITE® (Diamond)
6,0	25,0	63,0	6,0	5	End Cutting	82974	83200	82982
6,0	25,0	63,0	6,0	5	No End Cutting	82975	83201	82983
8,0	25,0	63,0	8,0	7	End Cutting	82976	83202	82984
8,0	25,0	63,0	8,0	7	No End Cutting	82977	83203	82985
10,0	28,0	63,0	10,0	8	End Cutting	82978	83204	82986
10,0	28,0	63,0	10,0	8	No End Cutting	82979	83205	82987
12,0	38,0	89,0	12,0	10	End Cutting	82980	83206	82988
12,0	38,0	89,0	12,0	10	No End Cutting	82981	83207	82989

- Fewer, deeper flutes to prevent clogging in heavy routing
- Unique clearance grind minimizes contact between tool diameter and workpiece eliminating friction
- Left hand flutes engineered to control the fibers within CFRP, preventing excessive fiber breakout
- Excels at trimming and profiling difficult and abrasive fiber filled plastics

Coarse Cut Carbon Composite



Series 31M Metric	Ae x D1	Ap x D1	Vc (m/min)	Diameter (D1) (mm)					
				6	8	10	12		
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot 	1	≤ 1	120	RPM	6361	4771	3817	3181
				(96-164)	Fr	0.071	0.170	0.244	0.366
					Feed (mm/min)	450	810	930	1165
	Profile 	≤ 0.5	≤ 1.5	150	RPM	7951	5963	4771	3976
				(120-180)	Fr	0.071	0.170	0.244	0.366
					Feed (mm/min)	563	1013	1163	1456
	HSM 	≤ 0.05	≤ 2	250	RPM	13252	9939	7951	6626
				(200-300)	Fr	0.162	0.388	0.555	0.832
					Feed (mm/min)	2150	3860	4415	5515
GFRP (FIBERGLASS)	Slot 	1	≤ 1	100	RPM	5301	3976	3181	2650
				(80-120)	Fr	0.069	0.165	0.237	0.357
					Feed (mm/min)	365	655	755	945
	Profile 	≤ 0.5	≤ 1.5	120	RPM	6361	4771	3817	3181
				(96-164)	Fr	0.069	0.165	0.237	0.357
					Feed (mm/min)	438	786	906	1134
	HSM 	≤ 0.05	≤ 2	200	RPM	10602	7951	6361	5301
				(160-240)	Fr	0.163	0.390	0.557	0.834
					Feed (mm/min)	1725	3100	3540	4420
CARBON, GRAPHITE	Slot 	1	≤ 1	145	RPM	7686	5765	4612	3843
				(116-174)	Fr	0.095	0.226	0.321	0.483
					Feed (mm/min)	728	1300	1480	1855
	Profile 	≤ 0.5	≤ 1.5	185	RPM	9807	7355	5884	4903
				(148-222)	Fr	0.095	0.226	0.321	0.483
					Feed (mm/min)	929	1659	1888	2367
	HSM 	≤ 0.05	≤ 2	300	RPM	15903	11927	9542	7951
				(240-360)	Fr	0.217	0.517	0.739	1.111
					Feed (mm/min)	3450	6170	7050	8830
PLASTICS	Slot 	1	≤ 1	245	RPM	12987	9740	7792	6494
				(196-294)	Fr	0.094	0.223	0.318	0.477
					Feed (mm/min)	1215	2175	2475	3100
	Profile 	≤ 0.5	≤ 1.5	305	RPM	16168	12126	9701	8084
				(244-366)	Fr	0.094	0.223	0.318	0.477
					Feed (mm/min)	1513	2708	3081	3859
	HSM 	≤ 0.05	≤ 2	505	RPM	26769	20077	16062	13385
				(404-606)	Fr	0.215	0.512	0.731	1.098
					Feed (mm/min)	5760	10280	11745	14700

HSM (high speed machining)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fr \times rpm$
 adjust parameters based on resin type and fiber structure
 reduce speed when overheating causes melting or damage to resin
 reduce feed if delamination or fraying occur

finish cuts typically required reduced feed and cutting depths
 rates shown are for use without coolant; rates may be increased with coolant
 dust collection is vital when machining dry
 diamond coating will increase tool life in graphite and composite materials
 refer to the KYOCERA SGS Tool Wizard® for complete technical information
 (www.kyocera-sgstool.com)



METRIC

Compression



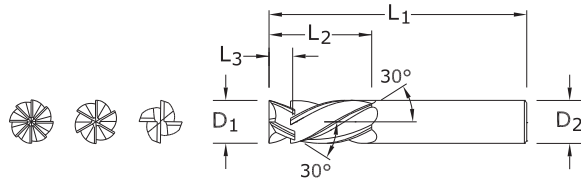
TOLERANCES (mm)

$D_1 = +0,00/-0,08$

$D_2 = h_6$

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

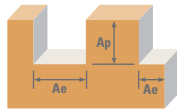


25M METRIC SERIES

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	INTERSECT LENGTH L_3	NO. OF FLUTES	EDP NO.	
						UNCOATED	Di-NAMITE® (Diamond)
6,0	25,0	63,0	6,0	4,10	4	82990	82991
8,0	25,0	63,0	8,0	5,58	4	82992	82993
10,0	28,0	63,0	10,0	7,05	6	82994	82995
12,0	38,0	89,0	12,0	8,60	8	82996	82997

- Compression-style helixes direct cutting forces inward, eliminating fiber breakout and delamination
- Primary/secondary relief grind for reduced friction and pressure
- Rigid, heavy core

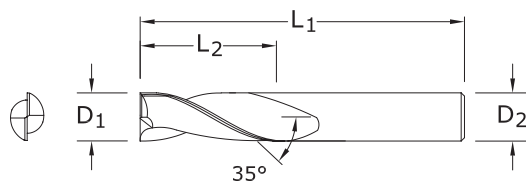
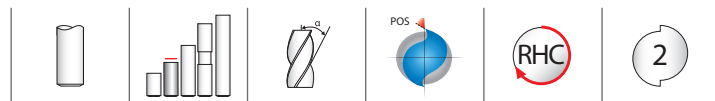
Compression



Series 25M Metric	Profile	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)				
					6	8	10	12	
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Profile	≤ 0.5	≤ 1.5	150	RPM	7951	5963	4771	3976
				(96-164)	Fr	0.040	0.065	0.075	0.100
					Feed (mm/min)	1272	1550	2147	3181
	HSM	≤ 0.05	≤ 2	250	RPM	13252	9939	7951	6626
				(200-300)	Fr	0.095	0.145	0.175	0.235
					Feed (mm/min)	5036	5765	8349	12457
GFRP (FIBERGLASS)	Profile	≤ 0.5	≤ 1.5	120	RPM	6361	4771	3817	3181
				(96-164)	Fr	0.040	0.065	0.075	0.100
					Feed (mm/min)	1018	1240	1717	2544
	HSM	≤ 0.05	≤ 2	200	RPM	10602	7951	6361	5301
				(160-240)	Fr	0.095	0.145	0.175	0.235
					Feed (mm/min)	4029	4612	6679	9966
N CARBON, GRAPHITE	Profile	≤ 0.5	≤ 1.5	185	RPM	9807	7355	5884	4903
				(148-222)	Fr	0.050	0.080	0.095	0.125
					Feed (mm/min)	1961	2354	3354	4903
	HSM	≤ 0.05	≤ 2	300	RPM	15903	11927	9542	7951
				(240-360)	Fr	0.115	0.185	0.220	0.290
					Feed (mm/min)	7315	8826	12595	18447
PLASTICS	Profile	≤ 0.5	≤ 1.5	305	RPM	16168	12126	9701	8084
				(244-366)	Fr	0.050	0.080	0.095	0.125
					Feed (mm/min)	3234	3880	5529	8084
	HSM	≤ 0.05	≤ 2	505	RPM	26769	20077	16062	13385
				(404-606)	Fr	0.115	0.185	0.220	0.290
					Feed (mm/min)	12314	14857	21201	31052
MACHINABLE CERAMICS MACHINABLE GLASS	Profile	≤ 0.5	≤ 1.5	15	RPM	795	596	477	398
				(12-18)	Fr	0.020	0.035	0.045	0.050
					Feed (mm/min)	64	83	129	159
	HSM	≤ 0.05	≤ 2	25	RPM	1325	994	795	663
				(20-30)	Fr	0.045	0.075	0.085	0.115
					Feed (mm/min)	239	298	406	610

HSM (high speed machining)
 $rpm = (Vc \times 1000) / (D_1 \times 3.14)$
 $mm/min = Fz \times \text{number of flutes} \times rpm$
 adjust parameters based on resin type and fiber structure
 reduce speed when overheating causes melting or damage to resin
 reduce feed if delamination or fraying occur

finish cuts typically required reduced feed and cutting depths
 rates shown are for use without coolant; rates may be increased with coolant
 dust collection is vital when machining dry
 diamond coating will increase tool life in graphite and composite materials
 refer to the KYOCERA SGS Tool Wizard® for complete technical information
 (www.kyocera-sgstool.com)



TOLERANCES (mm)

$D_1 = +0,00/-0,08$

$D_2 = h_6$

PLASTICS/COMPOSITES

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information visit
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21M
METRIC SERIES

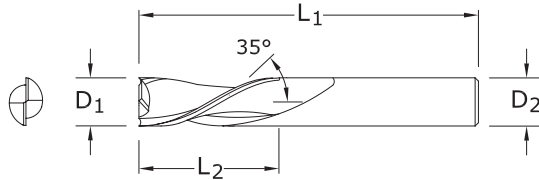
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	EDP NO.
				UNCOATED
3,0	13,0	50,0	6,0	90101
4,0	16,0	63,0	6,0	90107
5,0	19,0	63,0	6,0	90109
6,0	25,0	63,0	6,0	90113
8,0	25,0	63,0	8,0	90121
10,0	31,0	75,0	10,0	90129
12,0	31,0	75,0	12,0	90137

METRIC

Down Cut



22M
METRIC SERIES



CUTTING DIAMETER D ₁	mm			EDP NO. UNCOATED
	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	
3,0	13,0	50,0	6,0	91101
4,0	16,0	63,0	6,0	91107
5,0	19,0	63,0	6,0	91109
6,0	25,0	63,0	6,0	91113
8,0	25,0	63,0	8,0	91121
10,0	31,0	75,0	10,0	91129
12,0	31,0	75,0	12,0	91137

TOLERANCES (mm)

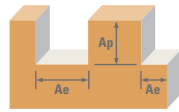
D₁ = +0,00/-0,08









D₂ = h₆

PLASTICS/COMPOSITES

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information visit
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METRIC Up Cut Down Cut



Series 21M, 22M Metric	Ae x D ₁	Ap x D ₁	Vc (m/min)	Diameter (D ₁) (mm)						
				3	6	10	12	20		
HARDWOODS	Slot 	1	≤ 1	470	RPM	49828	24914	14948	12457	7474
				(376-564)	Fr	0.020	0.040	0.065	0.075	0.115
					Feed (mm/min)	1993	1993	1943	1869	1719
	Profile 	≤ 0.5	≤ 1.5	470	RPM	49828	24914	8155	4241	1509
				(376-564)	Fr	0.020	0.040	0.065	0.075	0.115
					Feed (mm/min)	1993	1993	1060	636	347
SOFTWOODS	Slot 	1	≤ 1	600	RPM	63610	31805	19083	15903	9542
				(480-720)	Fr	0.025	0.050	0.075	0.090	0.140
					Feed (mm/min)	3181	3181	2862	2862	2672
	Profile 	≤ 0.5	≤ 1.5	600	RPM	63610	31805	19083	15903	303467
				(480-720)	Fr	0.025	0.050	0.075	0.090	0.140
					Feed (mm/min)	3181	3181	2862	2862	84971
PLYWOODS	Slot 	1	≤ 1	600	RPM	63610	31805	19083	15903	9542
				(480-720)	Fr	0.030	0.065	0.100	0.125	0.190
					Feed (mm/min)	3817	4135	3817	3976	3626
	Profile 	≤ 0.5	≤ 1.5	600	RPM	63610	31805	19083	15903	303467
				(480-720)	Fr	0.030	0.065	0.100	0.125	0.190
					Feed (mm/min)	3817	4135	3817	3976	115318
N PLASTICS	Slot 	1	≤ 1	600	RPM	63610	31805	19083	15903	9542
				(480-720)	Fr	0.020	0.040	0.065	0.090	0.125
					Feed (mm/min)	2544	2544	2481	2862	2385
	Profile 	≤ 0.5	≤ 1.5	600	RPM	63610	31805	19083	15903	9542
				(480-720)	Fr	0.020	0.040	0.065	0.090	0.125
					Feed (mm/min)	2544	2544	2481	2862	2385

$$\text{rpm} = (\text{Vc} \times 1000) / (\text{D}_1 \times 3.14)$$

$$\text{mm/min} = \text{Fz} \times 2 \times \text{rpm}$$

refer to the KYOCERA SGS Tool Wizard® for complete technical information
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KSPT Reference Information

ISO H6 SPECIFICATIONS					
DIAMETER			DIAMETER		
	+	-		+	-
≥ 1/8 - 3/16	0.00000	-0.00032	≤ 3	0,000	0,006
> 3/16 - 7/16	0.00000	-0.00035	> 3 - 6	0,000	0,008
> 7/16 - 5/8	0.00000	-0.00043	> 6 - 10	0,000	0,009
> 5/8 - 1	0.00000	-0.00051	> 10 - 18	0,000	0,011
> 1 - 1-1/4	0.00000	-0.00063	> 18 - 25	0,000	0,013

MACHINING FORMULAS	
INCH FORMULAS	METRIC FORMULAS
sfm = rpm x .262 x cutting diameter	m/min = (3.14 x cutting diameter x rpm) / 1000
rpm = sfm x 3.82 / cutting diameter	rpm = (1000 x m / min) / (3.14 x cutting diameter)
feed (inches per tooth) = ipm / (number of teeth x rpm)	feed (mm per tooth) = millimeters per minute / (number of teeth x rpm)
feed (inches / minute) = inches per tooth x number of teeth x rpm	feed (mm/minute) = feed per tooth x number of teeth x rpm
feed (inches / minute) = ipr x rpm	feed (mm/minute) = mmr x rpm
feed (inches / revolution) = ipm / rpm	feed (mm per revolution) = mmr / rpm
cuspl height* = (tool diameter / 2) - √(tool diameter ² - pitch ²) / 4	cuspl height* = (tool diameter / 2) - √(tool diameter ² - pitch ²) / 4
pitch = √4 x (cuspl height x tool diameter) - 4 x (cuspl height ²)	pitch = √4 x (cuspl height x tool diameter) - 4 x (cuspl height ²)
mrr - milling - (in ³ /min) = width of cut x depth of cut x ipm	mrr - milling - (cm ³ /min) = (width of cut x depth of cut x mm/min) / 1000
cutting time - drilling - (minutes) = length / ipm	cutting time - drilling - (minutes) = length / mm/min

sfm	surface feet per minute
rpm	revolutions per minute
ipm	feed rate in inches per minutes
ipr	inches per revolution
mmr	millimeters per revolution
mm/min	feed rate in millimeters per minute
mrr	material removal rate
*	on flat surface

GENERAL FORMULAS	
coolant pressure: 1 Bar = 14.5 Pounds per Square Inch (PSI)	
calculation of coolant pressure: Pounds Per Square Inch (PSI) = (Horsepower of Pump x 1.460) / Gallons per Minute (GPM)	
1 Liter = 0.254 Gallons	
inch = millimeters / 25.4	millimeters = inch x 25.4
inch tap drill sizes = major diameter - ((1.299 x % of thread) / threads per inch)	
metric tap drill sizes = major diameter - (1.082 x pitch x % of thread)	
inch thread forming drill size: maximum diameter = basic major diameter - (3/8 x number of threads per inch)	
inch thread forming drill size: minimum diameter = basic major diameter - (1/2 x number of threads per inch)	
metric thread forming drill size: maximum diameter = basic major diameter - (.375 x pitch)	
metric thread forming drill size: minimum diameter = basic major diameter - (.500 x pitch)	

Decimal Equivalents

Fraction • Number • Letter • Metric Sizes

INCH	METRIC	DECIMAL EQUIVALENT	INCH	METRIC	DECIMAL EQUIVALENT	INCH	METRIC	DECIMAL EQUIVALENT	INCH	METRIC	DECIMAL EQUIVALENT	INCH	METRIC	DECIMAL EQUIVALENT	INCH	METRIC	DECIMAL EQUIVALENT
–	0,10	0.0039	–	1,60	0.0630	9/64	3,57	0.1406	#1	5,79	0.2280	R	8,61	0.3390	–	13,00	0.5118
–	0,20	0.0079	#52	1,61	0.0635	–	3,60	0.1417	–	5,80	0.2283	–	8,70	0.3425	33/64	13,10	0.5156
–	0,25	0.0098	–	1,65	0.0650	#27	3,66	0.1440	–	5,90	0.2323	11/32	8,73	0.3438	17/32	13,49	0.5312
–	0,30	0.0118	#51	1,70	0.0669	–	3,70	0.1457	A	5,94	0.2340	–	8,75	0.3445	–	13,50	0.5315
#80	0,34	0.0135	–	1,75	0.0689	#26	3,73	0.1470	15/64	5,95	0.2344	–	8,80	0.3465	35/64	13,89	0.5469
–	0,35	0.0138	#50	1,78	0.0700	–	3,75	0.1476	–	6,00	0.2362	S	8,84	0.3480	–	14,00	0.5512
#79	0,37	0.0145	–	1,80	0.0709	#25	3,80	0.1495	B	6,05	0.2380	–	8,90	0.3504	9/16	14,29	0.5625
1/64	0,40	0.0156	#49	1,85	0.0728	–	3,80	0.1496	–	6,10	0.2402	–	9,00	0.3543	–	14,50	0.5709
#78	0,41	0.0160	–	1,90	0.0748	#24	3,86	0.1520	C	6,15	0.2420	T	9,09	0.3580	37/64	14,68	0.5781
–	0,45	0.0177	#48	1,93	0.0760	–	3,90	0.1535	–	6,20	0.2441	–	9,10	0.3583	–	15,00	0.5906
#77	0,46	0.0180	–	1,95	0.0768	#23	3,91	0.1540	D	6,25	0.2461	23/64	9,13	0.3594	19/32	15,08	0.5938
–	0,50	0.0197	5/64	1,98	0.0781	5/32	3,97	0.1562	–	6,30	0.2480	–	9,20	0.3622	39/64	15,48	0.6094
#76	0,51	0.0200	#47	1,99	0.0785	#22	3,99	0.1570	E	6,35	0.2500	–	9,25	0.3642	–	15,50	0.6102
#75	0,53	0.0210	–	2,00	0.0787	–	4,00	0.1575	1/4	6,35	0.2500	–	9,30	0.3661	5/8	15,88	0.6250
–	0,55	0.0217	–	2,05	0.0807	#21	4,04	0.1590	–	6,40	0.2520	U	9,35	0.3680	–	16,00	0.6299
#74	0,57	0.0225	#46	2,06	0.0810	#20	4,09	0.1610	–	6,50	0.2559	–	9,40	0.3701	41/64	16,27	0.6406
–	0,60	0.0236	#45	2,08	0.0820	–	4,10	0.1614	F	6,53	0.2570	–	9,50	0.3740	–	16,50	0.6496
#73	0,61	0.0240	–	2,10	0.0827	–	4,20	0.1654	–	6,60	0.2598	3/8	9,53	0.3750	21/32	16,67	0.6562
#72	0,64	0.0250	–	2,15	0.0846	#19	4,22	0.1660	G	6,63	0.2610	V	9,56	0.3770	–	17,00	0.6693
–	0,65	0.0256	#44	2,18	0.0860	–	4,25	0.1673	–	6,70	0.2638	–	9,60	0.3780	43/64	17,07	0.6719
#71	0,66	0.0260	–	2,20	0.0866	–	4,30	0.1693	17/64	6,75	0.2656	–	9,70	0.3819	11/16	17,46	0.6875
–	0,70	0.0276	–	2,25	0.0886	#18	4,31	0.1695	H	6,76	0.2660	–	9,75	0.3839	–	17,50	0.6890
#70	0,71	0.0280	#43	2,26	0.0890	11/64	4,37	0.1719	–	6,80	0.2677	W	9,80	0.3858	45/64	17,86	0.7031
#69	0,74	0.0292	–	2,30	0.0906	#17	4,39	0.1730	–	6,90	0.2717	–	9,90	0.3898	–	18,00	0.7087
–	0,75	0.0295	–	2,35	0.0925	–	4,40	0.1732	I	6,91	0.2720	25/64	9,92	0.3906	23/32	18,26	0.7188
#68	0,79	0.0310	#42	2,37	0.0935	#16	4,50	0.1770	–	7,00	0.2756	–	10,00	0.3937	–	18,50	0.7283
1/32	0,79	0.0313	3/32	2,38	0.0938	–	4,50	0.1772	J	7,04	0.2770	X	10,08	0.3970	47/64	18,65	0.7344
–	0,80	0.0315	–	2,40	0.0945	#15	4,57	0.1800	–	7,10	0.2795	–	10,10	0.3976	–	19,00	0.7480
#67	0,81	0.0320	#41	2,44	0.0960	–	4,60	0.1811	K	7,14	0.2810	–	10,20	0.4016	3/4	19,05	0.7500
#66	0,84	0.0330	–	2,45	0.0965	#14	4,62	0.1820	9/32	7,14	0.2812	Y	10,26	0.4040	49/64	19,45	0.7656
–	0,85	0.0335	#40	2,50	0.0984	#13	4,70	0.1850	–	7,20	0.2835	–	10,30	0.4055	–	19,50	0.7677
#65	0,89	0.0350	#39	2,53	0.0995	–	4,75	0.1870	–	7,25	0.2854	13/32	10,32	0.4062	25/32	19,84	0.7812
–	0,90	0.0354	#38	2,58	0.1015	3/16	4,76	0.1875	–	7,30	0.2874	–	10,40	0.4094	–	20,00	0.7874
#64	0,91	0.0360	–	2,60	0.1024	#12	4,80	0.1890	L	7,37	0.2900	Z	10,49	0.4130	51/64	20,24	0.7969
#63	0,94	0.0370	#37	2,64	0.1040	#11	4,85	0.1910	–	7,40	0.2913	–	10,50	0.4134	–	20,50	0.8071
–	0,95	0.0374	–	2,70	0.1063	–	4,90	0.1929	M	7,49	0.2950	–	10,60	0.4173	13/16	20,64	0.8125
#62	0,97	0.0380	#36	2,71	0.1065	#10	4,91	0.1935	–	7,50	0.2953	–	10,70	0.4213	–	21,00	0.8268
#61	0,99	0.0390	–	2,75	0.1083	#9	4,98	0.1960	19/64	7,54	0.2969	27/64	10,72	0.4219	53/64	21,03	0.8281
–	1,00	0.0394	7/64	2,78	0.1094	–	5,00	0.1969	–	7,60	0.2992	–	10,80	0.4252	27/32	21,43	0.8438
#60	1,02	0.0400	#35	2,79	0.1100	#8	5,05	0.1990	N	7,67	0.3020	–	10,90	0.4291	–	21,50	0.8465
#59	1,04	0.0410	–	2,80	0.1102	–	5,10	0.2008	–	7,70	0.3031	–	11,00	0.4331	55/64	21,84	0.8594
–	1,05	0.0413	#34	2,82	0.1110	#7	5,11	0.2010	–	7,75	0.3051	–	11,10	0.4370	–	22,00	0.8661
#58	1,07	0.0420	#33	2,87	0.1130	13/64	5,16	0.2031	–	7,80	0.3071	7/16	11,11	0.4375	7/8	22,23	0.8750
#57	1,09	0.0430	–	2,90	0.1142	#6	5,18	0.2040	–	7,90	0.3110	–	11,20	0.4409	–	22,50	0.8858
–	1,10	0.0433	#32	2,95	0.1160	–	5,20	0.2047	5/16	7,94	0.3125	–	11,30	0.4449	57/64	22,62	0.8906
–	1,15	0.0453	–	3,00	0.1181	#5	5,22	0.2055	–	8,00	0.3150	–	11,40	0.4488	–	23,00	0.9055
#56	1,18	0.0465	#31	3,05	0.1200	–	5,25	0.2067	O	8,03	0.3160	–	11,50	0.4528	29/32	23,02	0.9062
3/64	1,19	0.0469	–	3,10	0.1220	–	5,3	0.2087	–	8,10	0.3189	29/64	11,51	0.4531	59/64	23,42	0.9219
–	1,20	0.0472	1/8	3,18	0.1250	#4	5,31	0.2090	–	8,20	0.3228	–	11,60	0.4567	–	23,50	0.9252
–	1,25	0.0492	–	3,20	0.1260	–	5,40	0.2126	P	8,20	0.3230	–	11,70	0.4606	15/16	23,81	0.9375
–	1,30	0.0512	–	3,25	0.1280	#3	5,41	0.2130	–	8,25	0.3248	–	11,80	0.4646	–	24,00	0.9449
#55	1,32	0.0520	#30	3,26	0.1285	–	5,50	0.2165	–	8,30	0.3268	–	11,90	0.4685	61/64	24,21	0.9531
–	1,35	0.0531	–	3,30	0.1299	7/32	5,56	0.2188	21/64	8,33	0.3281	15/32	11,91	0.4688	–	24,50	0.9646
#54	1,40	0.0550	–	3,40	0.1339	–	5,60	0.2205	–	8,40	0.3307	–	12,00	0.4724	31/32	24,61	0.9688
#53	1,51	0.0595	#29	3,45	0.1360	#2	5,61	0.2210	Q	8,43	0.3320	31/64	12,30	0.4844	–	25,00	0.9843
–	1,55	0.0610	–	3,50	0.1378	–	5,70	0.2244	–	8,50	0.3346	–	12,50	0.4921	63/64	25,00	0.9844
1/16	1,59	0.0625	#28	3,57	0.1405	–	5,75	0.2264	–	8,60	0.3386	1/2	12,70	0.5000	1	25,40	1.0000

Hardness Conversion Chart

ROCKWELL HARDNESS (HRb)	ROCKWELL HARDNESS (HRC)	BRINELL HARDNESS (HB)	VICKERS HARDNESS (HV)	TENSILE STRENGTH (N/mm2)	PSI (1000lb/in2)
67	—	121	122	401	58
70	—	126	127	432	63
73	—	132	132	448	65
75	—	136	137	455	66
77	—	140	143	463	67
80	—	147	150	479	69
82	—	153	156	494	72
84	—	159	163	525	76
86	—	165	171	540	78
89	—	177	178	556	81
91	—	186	188	602	88
93	—	197	196	632	92
96	—	216	212	664	97
97	—	223	218	695	101
98	21	230	234	756	110
—	22	236	241	772	112
—	23	242	247	787	114
—	24	248	255	818	118
—	25	254	261	849	123
—	27	266	269	865	125
—	28	272	275	895	130
—	29	278	284	911	132
—	30	284	292	942	136
—	31	293	300	973	141
—	32	302	308	988	143
—	33	310	318	1019	147
—	34	319	327	1050	152
—	35	328	337	1096	159
—	37	345	349	1127	163
—	38	353	359	1158	168
—	39	362	370	1189	172
—	40	370	381	1235	179
—	41	381	395	1266	183
—	42	391	408	1312	190
—	44	411	422	1359	197
—	45	422	437	1420	206
—	46	433	452	1467	212
—	48	455	470	1513	219
—	50	479	497	1559	226
—	51	485	517	1621	235
—	52	497	532	1668	241
—	54	—	573	1729	250
—	56	—	609	1807	262
—	57	—	630	1884	273
—	59	—	670	1961	284
—	60	—	698	2039	295
—	61	—	725	—	—
—	62	—	740	—	—
—	63	—	780	—	—
—	64	—	812	—	—
—	65	—	847	—	—
—	66	—	885	—	—
—	67	—	926	—	—
—	68	—	971	—	—

Conversions from each scale are approximate

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