



2019 Global Product Catalog



www.kyocera-sgstool.com



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 PrecisionTools 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®.



Table of Contents

KYOCERA SGS Precision Tools	2
KYOCERA SGS Precision Tools Europe Ltd. . .	4
Global Innovation Center	5
Tooling Services.....	6
Tech Hub	7
Medical Division	8
Tool Wizard®	9

OVERVIEW

Common Legend.....	10
End Mill Legend.....	12
Drill Legend.....	13
Router Legend	14

COATINGS	15

MILLING

High Performance End Mills.....	16
End Mill Matrix.....	22
High Performance Aluminum End Mills . . .	118
General Purpose End Mills.....	170

HOLE MAKING

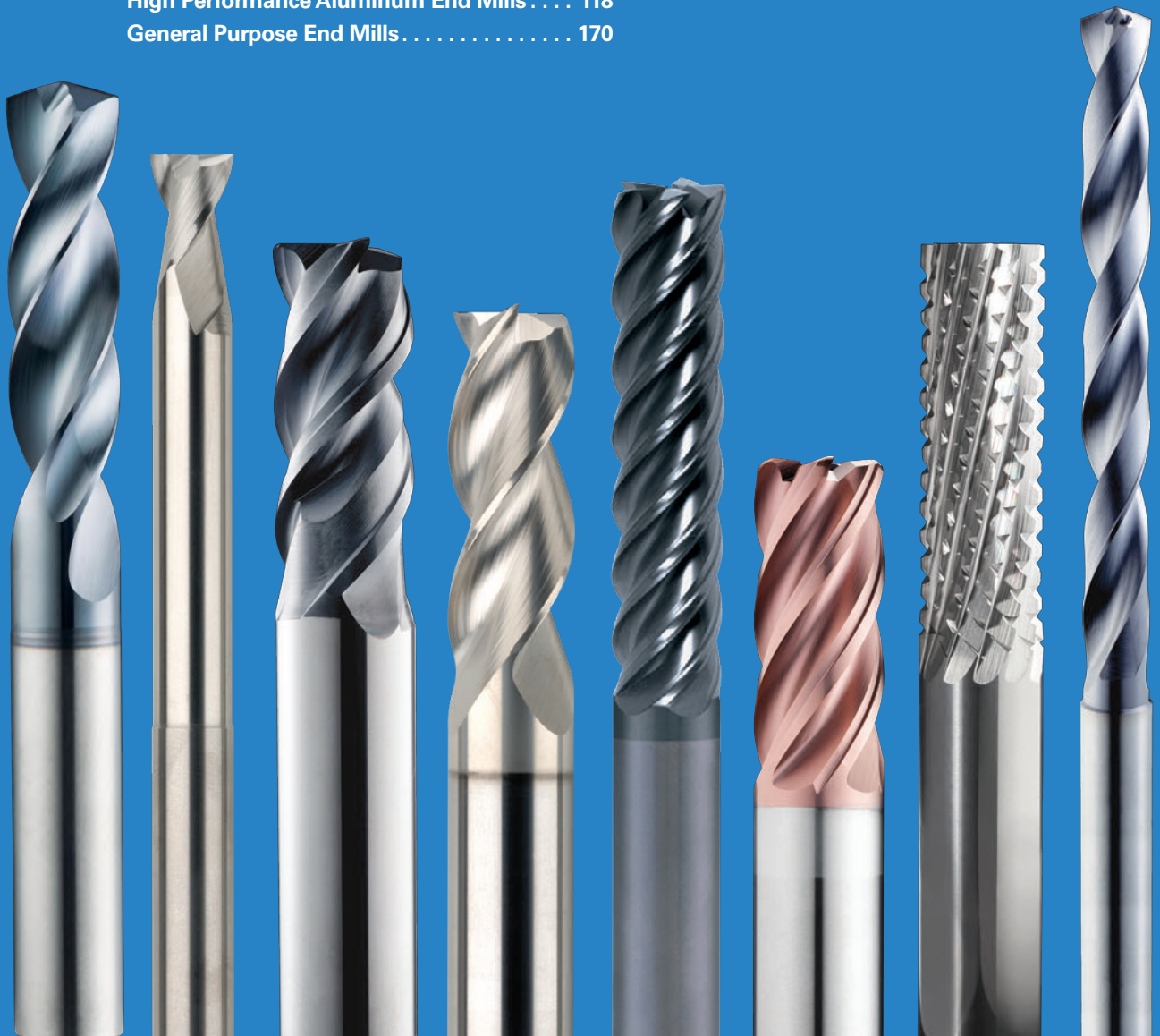
High Performance Drills	238
General Purpose Drills	298
General Purpose Countersinks	324
General Purpose Reamers	340

ROUTING

High Performance Routers.....	352
General Purpose Routers	370

TECHNICAL INFORMATION

EDP Index	376
KSPT Reference Information	393
Decimal Equivalent Chart	394
Hardness Conversion Chart	395





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 SGSTool 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
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KSPT

1021 N. Shephard Street
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Wokingham, Berkshire
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e-mail: SalesEU@kyocera-sgstool.com

KYOCERA SGS Precision Tools Tech Hub

149 Slayton Avenue
Danville, VA 24540
US and Canada: (434) 791-2020
Fax US & Canada: (434) 791-2044
web: www.kyocera-techhub.com



BEFORE



AFTER

TECH HUB

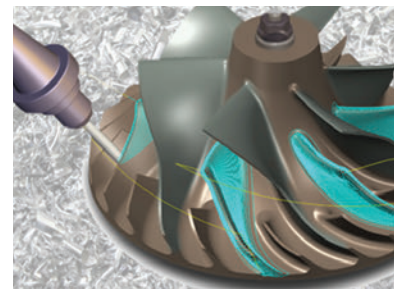
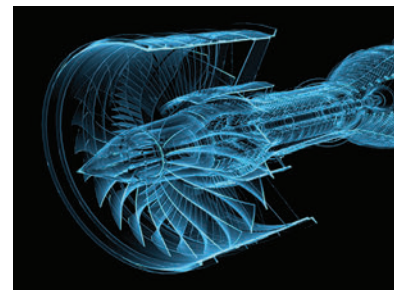
The KYOCERA SGSTech Hub (KSTH) is an independent subsidiary of the Kyocera SGS PrecisionTools (KSPT) group created to focus on custom cutting tool solutions and explore new technologies. This facility has resources designed to provide MORE than a cutting tool, but a complete scope of services to include managing the entire cutting tool application from conception to application and beyond.

CUSTOMIZED ENGINEERING SOLUTIONS

At KSTH we approach each opportunity as a project and manage it as such. We pride ourselves on engineering each project to the specific needs of our customers. Providing quotes often within 24 hours and following through with detailed drawings, solid models, process plans, and program simulations if needed. Our goal is to work hand in hand with the end user and maintain constant communication to customize our support to their needs.

RELEVANT TESTED SOLUTIONS

KSTH R&D has been created with a dual purpose. First and foremost is to create dedicated resources for testing and evaluating application solutions tailored to each customer project. The second is to focus on evaluating technologies within industry as a whole so that we can provide complete and relevant solutions to our customers. The KSTH R&D space is a collaborative think tank that allows KSTH to work for each customer individually with industry partners, new technology, and Universities to provide thorough next level solutions.



KYOCERA SGS
Precision Tools Tech Hub
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US and Canada: (434) 791-2020
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MEDICAL DIVISION

WHO WE ARE

With over 20 years of industry experience, KSPT Medical produces unique, customer designed orthopedic devices using highly trained engineers dedicated to new technology. KSPT Medical is a division of KYOCERA SGS Precision tools—an ISO-certified leader, who proudly pioneered some of the world's most advanced metal cutting technology and sells to more than 60 countries. With over 20 years of industry experience, KSPT Medical Division maintains their ISO13485 certification and is FDA Registered in the production of medical devices in the orthopedic marketplace.

ENGINEERING

We approach each opportunity as a project and manage it as such. We pride ourselves on engineering each project to the specific needs of our customers. Providing quotes often within 24 hours and following through with detailed drawings, solid models, process plans, and program simulations if needed. Our goal is to work hand in hand with the end user and maintain constant communication to customize our support to their needs.

MACHINING CAPABILITIES

- GRINDING
- MILLING
- TURNING
- PROFILING
- BENDING
- CUSTOMIZED ASSEMBLY
- Services Offered; Welding, Various Coatings, Anodizing, Passivation, Electropolishing, Laser Etching and Heat Treating



KYOCERA SGS

Precision Tools Medical Division

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To Request a Quote:
rfq@kyocera-sgstool.com

Customer Service and Orders:
salesmd@kyocera-sgstool.com



ISO 13485 CERTIFIED



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.kyocera-sgstool.com
2. Sign up for an account
3. Start calculating
4. Start saving



 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 SÉCURITÉ DOIVENT ÊTRE IMPÉRATIVEMENT PORTÉES LORS D'UTILISATION D'OUTILS À GRANDE VITESSE

BEI SCHNELL LAUFENDEN SPANABHEBENDEN MASCHINEN MÜSSEN IMMER DIE VORGESCHRIEBENEN SICHERHEITSBRILLEN GETRAGEN WERDEN



WARNING: This product can expose you to chemicals including Cobalt, which is known to the State of California to cause cancer. For more information go to www.p65warnings.ca.gov



ADVERTENCIA: Este producto puede exponerlo a químicos como el Cobalto, que se conoce al estado de California como causante de Cancer. Para mas informacion vaya a esta pagina web: www.p65warnings.ca.gov



ATTENTION: Ce produit vous expose aux produits chimiques incluant le Cobalt, qui est reconnu par l'Etat de Californie a etre une cause de cancer. Pour plus d'information veuillez regarder sur: www.p65warnings.ca.gov



WARNUNG: Dieses Produkt kann Sie Chemikalien wie Kobalt aussetzen, das dem Staat Kalifornien als krebserregend bekannt ist. Für weitere Informationen, besuchen Sie: www.p65warnings.ca.gov

INTELLECTUAL PROPERTY
PROPIEDAD INTELECTUAL
PROPRIÉTÉ INTELLECTUELLE
GEISTIGES EIGENTUM

KYOCERA SGS Precision Tools holds more than 12 patents globally. Please visit our website at www.kyocera-sgstool.com to learn more.

KYOCERA SGS Precision Tools posee más de 12 patentes a nivel mundial. Para más información, visita nuestra página web www.kyocera-sgstool.com.

KYOCERA SGS Precision Tools possède plus de 12 brevets mondialement reconnus. Pour plus d'information, veuillez consulter notre site web www.kyocera-sgstool.com.

KYOCERA SGS Precision Tools besitzt mehr als 12 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 GOIJURES 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**



Ball
Esférica
Boule
Kugelkopf



Corner
Plana con
borde romo
Coin
Ecke



Square
Plana
Carrée
Ohne Eckenradius

SHANK TYPE **TIPO DE VÁSTAGO** **TYPE DE TIGE** **SCHAFTART**



Common
Normal
Commune
Standard



Straight
Recto
Droite
Gerade



Weldon Flat
Weldon plano
Méplat Weldon
Spannfläche

HELIX ANGLES **ÁNGULOS HELICOIDALES** **SPANWINKEL** **ANGLES DE L'HÉLICE**



Right Spiral
Espiral sentido
derecho
Spirale droite
Rechtsläufig



Left Spiral
Espiral sentido
izquierdo
Spirale gauche
Linksläufig



Variable Right Spiral
Espiral sentido derecha
con ángulo variable
Spirale droite variable
Rechtsläufig, variabel

COOLANT OPTIONS **OPCIONES DE REFRIGERACIÓN** **OPTIONS DE REFOIDISSEMENT** **KÜHLSCHMIERMITTEL-OPTIONEN**



Internal Coolant
Refrigerante interno
Refrondissement interne
Innenkühlung



JetStream Coolant Slots
Ranuras del refrigerante
JetStream
Fentes de refroidissement
JetStream
Kühlmittelschlitz

RAKE ANGLE **ÁNGULO DE ATAQUE** **ANGLE DE PENTE** **SPANWINKEL**



Positive
Positivo
Positif
Positiv



Neutral
Neutro
Neutre
Neutral



Negative
Negativo
Négatif
Negativ



Variable
Variable
Variable
Variabel

ADDITIONAL GEOMETRY **CARACTERÍSTICAS GEOMÉTRICAS ADICIONALES** **GÉOMÉTRIE SUPPLÉMENTAIRE** **WEITERE BAUFORMEN**



Flute Spacing Unequal
Espaciado filos desigual
Espacement inégal
entre les goujures
Nutenabstand Ungleich



Chip Breaker
Rompevirutas
Brise-copeaux
Spanteiler

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 REFROIDISSEMENT KÜHLSCHMIERMITTEL-OPTIONEN



Internal Coolant
Refrigerante externo
Refroidissement interne
Innenkühlung



External Coolant
Refrigerante interno
Refroidissement externe
Außenkühlung

Router Legend Leyenda ranuradores Légende détourage Oberfräsen-Legende

SHANK TYPE TIPO DE VÁSTAGO TYPE DE TIGE SCHAFTART



Straight
 Recto
 Droite
 Gerade

RAKE ANGLE ÁNGULO DE ATAQUE ANGLE DE PENTE SPANWINKEL



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 (TiB2)	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	Z5	5 Flute Rougher Square End Fractional	28
	Z5CR	5 Flute Rougher Corner Radius Fractional	29
	Z5MCR	5 Flute Rougher Corner Radius Metric	33
Z-Carb-AP	Z1PCR	4 Flute Variable Rake Corner Radius Fractional	36
	Z1MPCR	4 Flute Variable Rake Corner Radius Metric	42
	Z1PLC	4 Flute Variable Rake Long Reach Corner Radius Fractional	38
	Z1MPIC	4 Flute Variable Rake Intermediate Reach Corner Radius Metric	43
	Z1MPLC	4 Flute Variable Rake Long Reach Corner Radius Metric	44
	Z1PLB	4 Flute Variable Rake Ball End Long Reach Fractional	39
Z-Carb	Z1	4 Flute Variable Geometry Square End Fractional	47
	Z1M	4 Flute Variable Geometry Square End Metric	52
	Z1B	4 Flute Variable Geometry Ball End Fractional	49
	Z1MB	4 Flute Variable Geometry Ball End Metric	53
	Z16CR	4 Flute Variable Geometry Corner Radius Fractional	48
Z-Carb-HTA	ZH1CR	4 Flute Variable Geometry High Temp Alloys Corner Radius Fractional	56
	ZH1MCR	4 Flute Variable Geometry High Temp Alloys Corner Radius Metric	58
	ZH1MCRS	4 Flute Variable Geometry High Temp Alloys Stub Corner Radius Metric	58
Z-Carb-MD	ZD1CR	4 Flute Variable Geometry Hard Materials Long Reach Corner Radius Fractional	60
	ZD1MCR	4 Flute Variable Geometry Hard Materials Long Reach Corner Radius Metric	61
Series 7	7	4 Flute Variable Geometry Long Length Square End Fractional	100
	7M	4 Flute Variable Geometry Long Length Square End Metric	103
	7B	4 Flute Variable Geometry Long Length Ball End Fractional	101
	7MB	4 Flute Variable Geometry Long Length Ball End Metric	104
V-Carb	55	5 Flute Finisher & Semi-Finisher Square End Fractional	63
	55CR	5 Flute Finisher & Semi-Finisher Corner Radius Fractional	64
	55B	5 Flute Finisher & Semi-Finisher Ball End Fractional	65
	55M	5 Flute Finisher & Semi-Finisher Square End Metric	68
	55MCR	5 Flute Finisher & Semi-Finisher Corner Radius Metric	69
	55MB	5 Flute Finisher & Semi-Finisher Ball End Metric	71

Speed & Feed Recommendations listed after each series

HIGH PERFORMANCE END MILLS	SERIES	DESCRIPTION	PAGE
T-Carb®	51	6 Flute High Speed Machining Square End Fractional	75
	51M	6 Flute High Speed Machining Square End Metric	80
	51L	6 Flute High Speed Machining Square End Long Reach Fractional	76
	51ML	6 Flute High Speed Machining Square End Long Reach Metric	82
	51CR	6 Flute High Speed Machining Corner Radius Fractional	75
	51MCR	6 Flute High Speed Machining Corner Radius Metric	81
	51LC	6 Flute High Speed Machining Long Reach Corner Radius Fractional	77
	51MLC	6 Flute High Speed Machining Long Reach Corner Radius Metric	83
Multi-Carb	66	Multi-Flute Finisher Square End Fractional	86
	66M	Multi-Flute Finisher Square End Metric	89
	66CR	Multi-Flute Finisher Corner Radius Fractional	86
	66MCR	Multi-Flute Finisher Corner Radius Metric	90
Turbo-Carb	56B	2 Flute Contouring Long Reach Ball End Fractional	106
	56MB	2 Flute Contouring Long Reach Ball End Metric	108
Power-Carb	57	6 Flute Finisher Square End Fractional	110
	57M	6 Flute Finisher Square End Metric	112
Series 33	33CR	3 Flute Difficult to Machine Materials Corner Radius Fractional	94
	33MCR	3 Flute Difficult to Machine Materials Corner Radius Metric	97
CFRP Slow Helix	27	4 Flute Slow Helix Square End Fractional	114
	27M	4 Flute Slow Helix Square End Metric	116

Speed & Feed Recommendations listed after each series

FRESAS DE ALTO RENDIMIENTO	SERIE	DESCRIPCIÓN	PÁGINA
Z-Carb-HPR	Z5	5 filos, desbastador, punta cuadrada, fraccional	28
	Z5CR	5 filos, desbastador, radio angulado, fraccional	29
	Z5MCR	5 filos, desbastador, radio angulado, métrico	33
Z-Carb-AP	Z1PCR	4 filos, inclinación variable, radio angulado, fraccional	36
	Z1MPCR	4 filos, inclinación variable, radio angulado, métrico	42
	Z1PLC	4 filos, inclinación variable, largo alcance, radio angulado, fraccional	38
	Z1MPIC	4 filos, inclinación variable, medio alcance, radio angulado, métrico	43
	Z1MPLC	4 filos, inclinación variable, largo alcance, radio angulado, métrico	44
	Z1PLB	4 filos, inclinación variable, punta esférica, largo alcance, fraccional	39
Z-Carb	Z1	4 filos, geometría variable, punta cuadrada, fraccional	47
	Z1M	4 filos, geometría variable, punta cuadrada, métrico	52
	Z1B	4 filos, geometría variable, punta esférica, fraccional	49
	Z1MB	4 filos, geometría variable, punta esférica, métrico	53
	Z16CR	4 filos, geometría variable, radio angulado, fraccional	48
Z-Carb-HTA	ZH1CR	4 filos, geometría variable, aleaciones a altas temperaturas, radio angulado, fraccional	56
	ZH1MCR	4 filos, geometría variable, aleaciones a altas temperaturas, radio angulado, métrico	58
	ZH1MCRS	4 filos, geometría variable, aleaciones a altas temperaturas, versión corta, radio angulado, métrico	58
Z-Carb-MD	ZD1CR	4 filos, geometría variable, materiales duros, largo alcance, radio angulado, fraccional	60
	ZD1MCR	4 filos, geometría variable, materiales duros, largo alcance, radio angulado, métrico	61
Serie 7	7	4 filos, geometría variable, longitud larga, punta cuadrada, fraccional	100
	7M	4 filos, geometría variable, longitud larga, punta cuadrada, métrico	103
	7B	4 filos, geometría variable, longitud larga, punta esférica, fraccional	101
	7MB	4 filos, geometría variable, longitud larga, punta esférica, métrico	104
V-Carb	55	5 filos, acabador y semiacabador, punta cuadrada, fraccional	63
	55CR	5 filos, acabador y semiacabador, radio angulado, fraccional	64
	55B	5 filos, acabador y semiacabador, punta esférica, fraccional	65
	55M	5 filos, acabador y semiacabador, punta cuadrada, métrico	68
	55MCR	5 filos, acabador y semiacabador, radio angulado, métrico	69
	55MB	5 filos, acabador y semiacabador, punta esférica, métrico	71
T-Carb®	51	6 filos, mecanizado de alta velocidad, punta cuadrada, fraccional	75
	51M	6 filos, mecanizado de alta velocidad, punta cuadrada, métrico	80
	51L	6 filos, mecanizado de alta velocidad, punta cuadrada, largo alcance, fraccional	76
	51ML	6 filos, mecanizado de alta velocidad, punta cuadrada, largo alcance, métrico	82
	51CR	6 filos mecanizado de alta velocidad, radio angulado, fraccional	75
	51MCR	6 filos mecanizado de alta velocidad, radio angulado, métrico	81
	51LC	6 filos mecanizado de alta velocidad, largo alcance, radio angulado, fraccional	77
	51MLC	6 filos mecanizado de alta velocidad, largo alcance, radio angulado, métrico	83
Multi-Carb	66	Filo múltiple, acabador, punta cuadrada, fraccional	86
	66M	Filo múltiple, acabador, punta cuadrada, métrico	89
	66CR	Filo múltiple, acabador, radio angulado, fraccional	86
	66MCR	Filo múltiple, acabador, radio angulado, métrico	90
Turbo-Carb	56B	2 filos, contorneado, largo alcance, punta esférica, fraccional	106
	56MB	2 filos, contorneado, largo alcance, punta esférica, métrico	108
Power-Carb	57	6 filos, acabador, punta cuadrada, fraccional	110
	57M	6 filos, acabador, punta cuadrada, métrico	112
Serie 33	33CR	3 filos, materiales difíciles de mecanizar, radio angulado, fraccional	94
	33MCR	3 filos, materiales difíciles de mecanizar, radio angulado, métrico	97
Helicoidal de avance lento CFRP	27	4 filos, helicoidal de avance lento, punta cuadrada, fraccional	114
	27M	4 filos, helicoidal de avance lento, punta cuadrada, métrico	116

Recomendaciones de velocidades y avances mostradas tras cada serie

FRAISES A DETOURER UNIVERSELLES	SÉRIES	DESCRIPTION	PAGE
Z-Carb-HPR	Z5	5 dents à bout plat d'ébauche (fractionnel)	28
	Z5CR	5 dents rayon en coin d'ébauche (fractionnel)	29
	Z5MCR	5 dents rayon en coin d'ébauche (métrique)	33
Z-Carb-AP	Z1PCR	4 dents à vague de coupe variable rayon en coin (fractionnel)	36
	Z1MPCR	4 dents à vague de coupe variable rayon en coin (métrique)	42
	Z1PLC	4 dents à vague de coupe variable longue portée rayon en coin (fractionnel)	38
	Z1MPIC	4 dents à vague de coupe variable portée intermédiaire rayon en coin (métrique)	43
	Z1MPLC	4 dents à vague de coupe variable longue portée rayon en coin (métrique)	44
	Z1PLB	4 dents à vague de coupe variable longue portée à bout hémisphérique (fractionnel)	39
Z-Carb	Z1	4 dents géométrie variable à bout plat (fractionnel)	47
	Z1M	4 dents géométrie variable à bout plat (métrique)	52
	Z1B	4 dents géométrie variable à bout hémisphérique (fractionnel)	49
	Z1MB	4 dents géométrie variable à bout hémisphérique (métrique)	53
	Z16CR	4 dents géométrie variable rayon en coin (fractionnel)	48
Z-Carb-HTA	ZH1CR	4 dents géométrie variable alliages haute température rayon en coin (fractionnel)	56
	ZH1MCR	4 dents géométrie variable alliages haute température rayon en coin (métrique)	58
	ZH1MCRS	4 dents géométrie variable, alliages haute température, longueur de l'outil court, rayon en coin (métrique)	58
Z-Carb-MD	ZD1CR	4 dents géométrie variable matériaux durs longue portée rayon en coin (fractionnel)	60
	ZD1MCR	4 dents géométrie variable matériaux durs longue portée rayon en coin (métrique)	61
Série 7	7	4 dents géométrie variable à queue longue à bout plat (fractionnel)	100
	7M	4 dents géométrie variable à queue longue à bout plat (métrique)	103
	7B	4 dents géométrie variable à queue longue à bout hémisphérique (fractionnel)	101
	7MB	4 dents géométrie variable à queue longue à bout hémisphérique (métrique)	104
V-Carb	55	5 dents en bout de finition et semi-finition plat (fractionnel)	63
	55CR	5 dents en bout finition et semi-finition rayon en coin (fractionnel)	64
	55B	5 dents en bout de finition et semi-finition hémisphérique (fractionnel)	65
	55M	5 dents en bout de finition et semi-finition plat (métrique)	68
	55MCR	5 dents en bout finition et semi-finition rayon en coin (métrique)	69
	55MB	5 dents en bout de finition et semi-finition hémisphérique (métrique)	71
T-Carb®	51	6 dents pour usinage grande vitesse à bout plat (fractionnel)	75
	51M	6 dents pour usinage grande vitesse à bout plat (métrique)	80
	51L	6 dents pour usinage grande vitesse à bout plat longue portée (fractionnel)	76
	51ML	6 dents pour usinage grande vitesse à bout plat longue portée (métrique)	82
	51CR	6 dents pour usinage grande vitesse rayon en coin (fractionnel)	75
	51MCR	6 dents pour usinage grande vitesse rayon en coin (métrique)	81
	51LC	6 dents pour usinage grande vitesse longue portée rayon en coin (fractionnel)	77
	51MLC	6 dents pour usinage grande vitesse longue portée rayon en coin (métrique)	83
Multi-Carb	66	Multi-dents en bout de finition plat (fractionnel)	86
	66M	Multi-dents en bout de finition plat (métrique)	89
	66CR	Multi-dents en bout de finition rayon en coin (fractionnel)	86
	66MCR	Multi-dents en bout de finition rayon en coin (métrique)	90
Turbo-Carb	56B	2 dents contournage longue portée à bout hémisphérique (fractionnel)	106
	56MB	2 dents contournage longue portée à bout hémisphérique (métrique)	108
Power-Carb	57	6 dents en bout de finition plat (fractionnel)	110
	57M	6 dents en bout de finition plat (métrique)	112
Série 33	33CR	3 dents usinage des matériaux difficiles rayon en coin (fractionnel)	94
	33MCR	3 dents usinage des matériaux difficiles rayon en coin (métrique)	97
CFRP hélice lente	27	4 dents hélice lente à bout plat (fractionnel)	114
	27M	4 dents hélice lente à bout plat (métrique)	116

Recommandatavons de vitesse et avance indiquées après chaque série

HOCHLEISTUNGS-SCHAFTFRÄSER	SERIE	BESCHREIBUNG	SEITE
Z-Carb-HPR	Z5	Zölliger Schruppfräser mit 5 Schneidekanten ohne Eckenradien	28
	Z5CR	Zölliger Schruppfräser mit 5 Schneidekanten und Eckenradien	29
	Z5MCR	Metrischer Schruppfräser mit 5 Schneidekanten und Eckenradien	33
Z-Carb-AP	Z1PCR	Zölliger Fräser mit 4 variablen Schneidekanten und Eckenradien	36
	Z1MPCR	Metrischer Fräser mit 4 Schneidekanten und variablen Spanwinkel	42
	Z1PLC	Zölliger Tiefbohr-fräser mit 4 variablen Schneidekanten und Eckenradien	38
	Z1MPIC	Metrischer Fräser mittlerer Länge mit 4 variablen Schneidekanten und Eckenradien	43
	Z1MPLC	Metrischer Tiefbohr-fräser mit 4 variablen Schneidekanten und Eckenradien	44
	Z1PLB	Zölliger Radiuschaftfräser mit 4 Schneidekanten und variablem Spanwinkel	39
	Z1	Zölliger Schaftfräser mit 4 Schneidekanten ohne Eckenradien und variabler Form	47
Z-Carb	Z1M	Metrischer Schaftfräser mit 4 Schneidekanten ohne Eckenradien und variabler Form	52
	Z1B	Zölliger Radiuschaftfräser mit 4 Schneidekanten und variabler Form	49
	Z1MB	Metrischer Radiuschaftfräser mit 4 Schneidekanten und variabler Form	53
	Z16CR	Zölliger Fräser mit 4 variablen Schneidekanten und Eckenradien	48
	ZH1CR	Hochwarmfester zölliger Fräser mit 4 variablen Schneidekanten und Eckenradien	56
Z-Carb-HTA	ZH1MCR	Hochwarmfester metrischer Fräser mit 4 variablen Schneidekanten und Eckenradien	58
	ZH1MCRS	Hochwarmfester metrischer Fräser mit 4 variablen Schneidekanten und Eckenradien	58
Z-Carb-MD	ZD1CR	Zölliger Tiefbohr-fräser mit 4 variablen Schneidekanten, Eckenradien und Form aus Hartmetall	60
	ZD1MCR	Metrischer Tiefbohr-fräser mit 4 variablen Schneidekanten, Eckenradien und Form aus Hartmetall	61
Serie 7	7	Zölliger Langloch-Schaftfräser mit 4 Schneidekanten ohne Eckenradien und variabler Form	100
	7M	Metrischer Langloch-Schaftfräser mit 4 Schneidekanten ohne Eckenradien und variabler Form	103
	7B	Zölliger Langloch-Radiuschaftfräser mit 4 Schneidekanten und variabler Form	101
	7MB	Metrischer Langloch-Radiuschaftfräser mit 4 Schneidekanten und variabler Form	104
V-Carb	55	Zölliger Schlicht- und Halbschlichtfräser mit 5 Schneidekanten ohne Eckenradien und variabler Form	63
	55CR	Zölliger Schlicht- und Halbschlichtfräser mit 5 Schneidekanten ohne Eckenradien	64
	55B	Metrischer Schlicht- und Halbschlicht-Radiuschaftfräser mit 5 Schneidekanten ohne Eckenradien	65
	55M	Metrischer Schlicht- und Halbschlichtfräser mit 5 Schneidekanten ohne Eckenradien und variabler Form	68
	55MCR	Metrischer Schlicht- und Halbschlichtfräser mit 5 Schneidekanten und Eckenradien	69
	55MB	Metrischer Schlicht- und Halbschlicht-Radiuschaftfräser mit 5 Schneidekanten und variabler Form	71
T-Carb®	51	Zölliger Schaftfräser aus Schnellstahl mit 6 Schneidekanten ohne Eckenradien	75
	51M	Metrischer Schaftfräser aus Schnellstahl mit 6 Schneidekanten ohne Eckenradien	80
	51L	Zölliger Langloch-Schaftfräser aus Schnellstahl mit 6 Schneidekanten ohne Eckenradien	76
	51ML	Metrischer Langloch-Schaftfräser aus Schnellstahl mit 6 Schneidekanten ohne Eckenradien	82
	51CR	Zölliger Fräser aus Schnellstahl mit 6 Schneidekanten und Eckenradien	75
	51MCR	Metrischer Fräser aus Schnellstahl mit 6 Schneidekanten und Eckenradien aus Schnellstahl	81
	51LC	Zölliger Tiefbohr-fräser aus Schnellstahl mit 6 Schneidekanten und Eckenradien	77
	51MLC	Metrischer Tiefbohr-fräser aus Schnellstahl mit 6 Schneidekanten und Eckenradien	83
Multi-Carb	66	Zölliger mehrschneidiger Schlichtfräser ohne Eckenradien	86
	66M	Metrischer mehrschneidiger Schlichtfräser ohne Eckenradien	89
	66CR	Zölliger mehrschneidiger Schlichtfräser mit Eckenradien	86
	66MCR	Metrischer mehrschneidiger Schlichtfräser mit Eckenradien	90
Turbo-Carb	56B	Zölliger Langloch-Profil-Radiuschaftfräser mit 2 Schneidekanten	106
	56MB	Metrischer Langloch-Profil-Radiuschaftfräser mit 2 Schneidekanten	108
Power-Carb	57	Zölliger Schlichtfräser mit 6 Schneidekanten ohne Eckenradien	110
	57M	Metrischer Schlichtfräser mit 6 Schneidekanten ohne Eckenradien	112
Serie 33	33CR	Zölliger Fräser aus Schnellstahl mit 3 Schneidekanten und Eckenradien für schwerspanbare Werkstoffe	94
	33MCR	Metrischer Fräser aus Schnellstahl mit 3 Schneidekanten und Eckenradien für schwerspanbare Werkstoffe	97
CFRP Slow Helix	27	Zölliger Schaftfräser mit 4 steilen Schneidekanten ohne Eckenradien	114
	27M	Metrischer Schaftfräser mit 4 steilen Schneidekanten ohne Eckenradien	116

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	28	★	★	★	★	★			☆	5	37	≠	+	E	N
Z-Carb	Z1 / Z16 / Z1B	47	★	★	★	☆	★			☆	4	35 / 38	≠	+	E	Y
Z-Carb-AP	Z1P	36	★	★	★	☆	★			☆	4	35 / 38	≠	+	E	Y
Z-Carb-HTA	ZH1	56	★	☆	★	★	☆			☆	4	38 / 41	≠	+	E	Y
Z-Carb-MD	ZD1	60	★							★	4	42 / 45	≠	—	E	Y
Series 33	33	94	★	★	★	☆	★			☆	3	32 / 48	≠	+	E	Y
T-Carb®	51	75	★	★	★	★	★			☆	6	41	≠	+	E	Y
Series 7	7	100	★	★	★	★	★			☆	4	38	≠	+	P-S	Y
V-Carb	55	63	★	★	★	★	★			☆	5	45	≠	+	P-S	Y
Multi-Carb	66	86	★	★	★	☆	★			☆	7, 9, 11	35	=	+	E	N
Turbo-Carb	56B	106	★							★	2	30	=	+	E	Y
Power-Carb	57	110								★	6	45	=	—	E	Y
Ski-Carb	44, 45	164						★	☆		2	45	=	+	P-S	Y
S-Carb® 3 Flute	43	134						★	☆		3	38	=	+	E	Y
S-Carb® Chipbreaker	43CB	144						★	☆		3	38	=	+	E	Y
S-Carb® 2 Flute	47	157						★	☆		2	35	=	+	E	Y
S-Carb APR®	43APR	123						★			3	38	=	+	E	Y
S-Carb APR-3®	APR3	129						★			3	38	≠	+	E	Y
S-Carb APR-4®	APR4	130						★			4	38 / 41	≠	+	E	Y
S-Carb APF®	43APF	125						★			4	38 / 41	≠	+	E	Y
Slow Helix	27	114							★		4	10 / 12	≠	+	P-S	Y
CCR *	20-CCR	356							★		8, 10, 12	15	=	+	C	EM or DR
CCR *	31-CCR	362							★		5, 7, 10	15	=	+	C	EM or DR
PCR *	29-PCR	352							★		8, 9, 12	15	=	0	E	EM or DR
Compression Router	25	366							★		4, 6, 8	30	=	+	P-S	Y
Up Cut Router	21	370						★	★		2	35	=	+	P-S	Y
Down Cut Router	22	371						★	★		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

Relief Key

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

Center Cutting Key

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

End Mill Matrix

Coating		Finishing					HSM				Profiling						Slotting						Ramping			Plunging		
	Ae %	2	2	5	5	5	5	5	10	10	25	50	25	50	25	50	100	100	100	100	100	100				Ap 50%	Ap 100%	
	Ap %	100	200	100	200	300	100	200	100	200	100	100	150	150	200	200	25	50	75	100	150	200	1°	3°	6°			
TM / TA		☆	☆	☆	☆		★	★	★	★	★	★	★	★	★	☆	★	★	★	★	★	☆	★	★	★			
TA / TX		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	★	☆	★	★	★	★	☆		★	★	☆			
TX		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	★	☆	★	★	★	★	★	☆	★	★	★	☆		
TA		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	★	☆	★	★	★	★	☆		★	★	☆			
TX		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	★	☆	★	★	★	★			★	★	☆			
TA		☆	☆	☆	☆		☆	☆	☆	☆	★	★	★	★	★	☆	★	★	★	★	★	★	★	★	★	★	☆	
TX		☆	☆	☆	☆		★	★	★	★	☆		☆										★	☆				
TX		★	★	★	★	★																	★					
TA		★	★	★	★		☆	☆			☆		☆				☆	☆					★	☆				
TX		★	★	★	★																		★					
TX		★	★	★	★		★	★	☆		☆	☆					☆						★	☆				
TX		★	★	★	★		★	★	★		★	☆	☆				★	☆					★					
TB		★	★	★	★		★	★	★	☆	★	★	★	★	☆		★	★	★	★	☆	☆	★	★	★	★	★	☆
TB		★	★	★	★		★	★	★	☆	★	★	★	★	☆		★	★	★	★	☆	☆	★	★	★	★	★	★
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	• 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	• 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	• Secure clamping of the workpiece will reduce chatter and deflection
Machine	• 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	• Avoid re-milling chips through use of air blast or liquid coolant as necessary • Maintain clean coolant with appropriate concentration • General recommendations: —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	• 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:

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

ENTRY METHODS

Pre-Drilled Hole

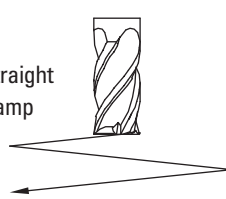


Pre-drilling is the preferred entry method for most applications.

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	• 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	• 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	• La buena sujeción de la pieza a maquinar reducirá la vibración y la desviación de la herramienta
Máquina	• 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	• 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: –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	• 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

Barreno previo



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

Rampa helicoidal



Rampa recta



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.

Agujero o Barrenado



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	• 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	• 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	• Le système de fixation et de bridage de la pièce devra permettre de réduire les vibrations et la déformation
Machine	• 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	• 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 – –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	• 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 A_e et A_p 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	• Wählen Sie möglichst immer den Schaftfräser mit dem größten Durchmesser, der kürzesten Schneidekante und Gesamtlänge, um eine hohe Steifigkeit zu erhalten • Langlochschaftfräser sind nicht zum Taschen-, Schlitz- oder Profilfräsen bestimmt – die Dehnung auf Ae 0,2 der Streckgrenze begrenzen • Hochleistungswerkzeuge minimieren die Zykluszeit und verlängern die Werkzeugstandzeit
Werkzeughalter	• 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	• Sicheres Werkzeugspannen verringert Vibrationen und das Auswandern aus der Ziellinie
Werkzeugmaschine	• 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	• Das Überfräsen der Späne durch Luftstrahl oder flüssige Kühlmittel möglichst verhindern • Kühlmittel in geeigneter Konzentration vorhalten • Allgemeine Empfehlungen: – Wasser-Öl-Emulsionen oder Luftstrahl: Werkzeugstähle, Form- und Schneidstähle, unlegierte oder legierte Stähle – Wasser-Öl-Emulsion: Nichtrostender Stahl, Titan, Warmfeste Legierungen, Nichteisenlegierungen
Verfahren	• Vorzugsweise Gleichlaufräsen anwenden • Das Beachten der Fräseparameter, Werkzeughalter, TIR, Auswuchten, Einspannen, usw. verbessert die Schnittleistung und verlängert die Standzeit

RICHTWERTE ZUM FRÄSEN

D_1 = Fräsdurchmesser L_2 = Schnittleänge

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 Ae und Ap 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



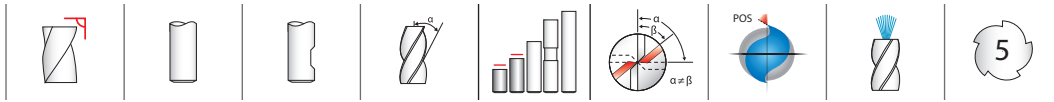
Alternative Verfahren sind Zirkulareintauchen und Schrägeintauchen. Starke Tauchwinkel erfordern verringerte Vorschubgeschwindigkeiten. Geringe Tauchwinkel ermöglichen höhere Vorschubgeschwindigkeiten und verlängern die Standzeit. Verwenden Sie die Drehzahlen und Vorschübe zum Schlitzfräsen für Tauchwinkel 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



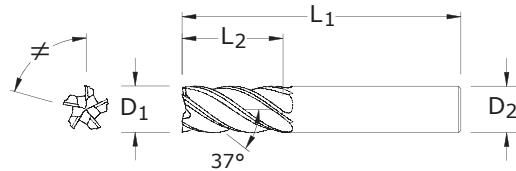
Stechen Sie in Nichteisenmetalle und kurzspanende Werkstoffe nur mit Schlitzfräsdrehzahl und 25 % der Schlitzvorschubgeschwindigkeit ein.

FRACTIONAL Z-Carb-HPR



Z5 FRACTIONAL 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
- Excels at roughing, ramping, high speed machining and finishing in a variety of materials
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



inch				EDP NO.					
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	TI-NAMITE-A (TA)	TI-NAMITE-A (TA) W/FLAT	TI-NAMITE-A (TA) W/INTERNAL COOLANT	TI-NAMITE-M (TM)	TI-NAMITE-M (TM) W/FLAT	TI-NAMITE-M (TM) W/INTERNAL COOLANT
1/8	1/4	1-1/2	1/8	—	—	—	37000	—	—
1/8	3/8	1-1/2	1/8	37180	—	—	37002	—	—
3/16	5/16	2	3/16	—	—	—	37004	—	—
3/16	1/2	2	3/16	37182	—	—	37006	—	—
1/4	3/8	2-1/2	1/4	38502	—	—	37008	—	—
1/4	1/2	2-1/2	1/4	37184	—	—	37011	—	—
5/16	7/16	2-1/2	5/16	—	—	—	37014	—	—
5/16	5/8	2-1/2	5/16	38504	—	—	37016	—	—
3/8	1/2	2-1/2	3/8	—	—	—	37018	—	—
3/8	3/4	2-1/2	3/8	37187	—	—	37021	—	—
7/16	5/8	2-1/2	7/16	37168	—	—	37159	—	—
7/16	7/8	2-3/4	7/16	37170	—	—	37169	—	—
1/2	5/8	3	1/2	38506	38512	37320	37024	37030	37321
1/2	1	3	1/2	38507	38513	37322	37036	37042	37323
1/2	1-1/4	3-1/4	1/2	37190	37194	37324	37048	37054	37325
5/8	3/4	3-1/2	5/8	38508	38514	—	37060	37067	37260
5/8	1-1/4	3-1/2	5/8	37198	37202	—	37074	37081	37267
3/4	7/8	4	3/4	—	38515	—	37088	37095	37274
3/4	1-1/2	4	3/4	37206	37210	—	37102	37109	37281
1	1-1/8	4	1	—	—	—	37116	37123	37288
1	1-1/2	4	1	37214	37218	—	37130	37137	37295
1	2	4-1/2	1	—	38517	—	37144	37151	37302

TOLERANCES (inch)

1/8–1/4 DIAMETER

D₁ = +0.0000/–0.0012

D₂ = h₆

>1/4–3/8 DIAMETER

D₁ = +0.0000/–0.0016

D₂ = h₆

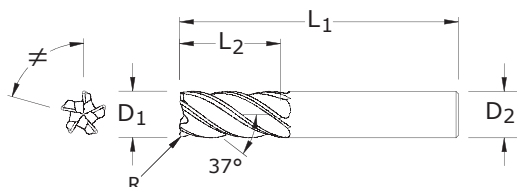
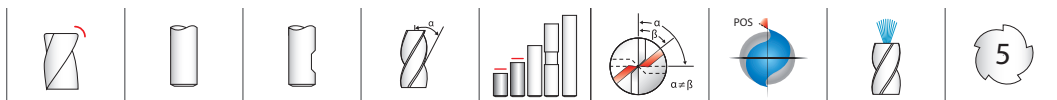
>3/8–1 DIAMETER

D₁ = +0.0000/–0.0020

D₂ = h₆

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent
information visit
www.ksptpatents.com



TOLERANCES (inch)

1/8–1/4 DIAMETER

$D_1 = +0.0000/-0.0012$

$D_2 = h_6$

$R = +0.0000/-0.0020$

>1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.0016$

$D_2 = h_6$

$R = +0.0000/-0.0020$

>3/8–1 DIAMETER

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

$R = +0.0000/-0.0020$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

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inch					EDP NO.					
CUTTING DIAMETER 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) W/INTERNAL COOLANT	TI-NAMITE-M (TM)	MTI-NAMITE-M (TM) W/ FLAT	TI-NAMITE-M (TM) W/INTERNAL COOLANT
1/8	1/4	1-1/2	1/8	.015	38525	—	—	37001	—	—
1/8	3/8	1-1/2	1/8	.015	37181	—	—	37003	—	—
3/16	5/16	2	3/16	.015	—	—	—	37005	—	—
3/16	1/2	2	3/16	.015	37183	—	—	37007	—	—
1/4	3/8	2-1/2	1/4	.015	—	—	—	37009	—	—
1/4	3/8	2-1/2	1/4	.030	38528	—	—	37010	—	—
1/4	1/2	2-1/2	1/4	.015	37185	—	—	37012	—	—
1/4	1/2	2-1/2	1/4	.030	37186	—	—	37013	—	—
5/16	7/16	2-1/2	5/16	.015	38529	—	—	37015	—	—
5/16	5/8	2-1/2	5/16	.015	38530	—	—	37017	—	—
3/8	1/2	2-1/2	3/8	.015	—	—	—	37019	—	—
3/8	1/2	2-1/2	3/8	.030	38532	—	—	37020	—	—
3/8	3/4	2-1/2	3/8	.015	37188	—	—	37022	—	—
3/8	3/4	2-1/2	3/8	.030	37189	—	—	37023	37175	—
7/16	5/8	2-1/2	7/16	.015	37164	—	—	37160	—	—
7/16	5/8	2-1/2	7/16	.030	37165	—	—	37161	—	—
7/16	7/8	2-3/4	7/16	.015	37166	—	—	37162	—	—
7/16	7/8	2-3/4	7/16	.030	37167	—	—	37163	—	—
1/2	5/8	3	1/2	.015	—	38578	37330	37025	37031	37331
1/2	5/8	3	1/2	.030	—	38579	37332	37026	37032	37333
1/2	5/8	3	1/2	.060	—	38580	37334	37027	37033	37335
1/2	5/8	3	1/2	.090	—	38581	37337	37028	37034	37338
1/2	5/8	3	1/2	.120	—	—	37339	37029	37035	37340
1/2	1	3	1/2	.015	—	38583	37341	37037	37043	37342
1/2	1	3	1/2	.030	38539	38584	37343	37038	37044	37344
1/2	1	3	1/2	.060	—	38585	37345	37039	37045	37346
1/2	1	3	1/2	.090	—	—	37348	37040	37046	37349
1/2	1	3	1/2	.120	—	—	37350	37041	37047	37351
1/2	1-1/4	3-1/4	1/2	.015	37191	37195	37352	37049	37055	37353
1/2	1-1/4	3-1/4	1/2	.030	37192	37196	37354	37050	37056	37355
1/2	1-1/4	3-1/4	1/2	.060	37193	37197	37356	37051	37057	37357
1/2	1-1/4	3-1/4	1/2	.090	—	—	37359	37052	37058	37360
1/2	1-1/4	3-1/4	1/2	.120	—	—	37361	37053	37059	37362
5/8	3/4	3-1/2	5/8	.015	—	—	—	37061	37068	37261
5/8	3/4	3-1/2	5/8	.030	—	38591	—	37062	37069	37262
5/8	3/4	3-1/2	5/8	.060	—	—	—	37063	37070	37263
5/8	3/4	3-1/2	5/8	.090	—	—	—	37064	37071	37264
5/8	3/4	3-1/2	5/8	.120	38549	—	—	37065	37072	37265

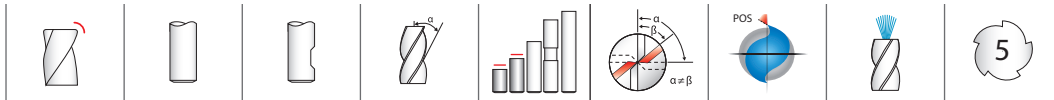
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Z5CR

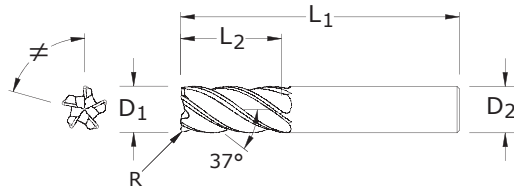
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- An ideal balance of helix, indexing, flute depth, rake and relief
- Variable indexing for chatter suppression and proprietary edge geometry for shearing and strength
- Chatter-free geometry allows deep cutting and high speed machining
- Central coolant 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)

FRACTIONAL Z-Carb-HPR



Z5CR FRACTIONAL SERIES



CONTINUED

inch					EDP NO.					
CUTTING DIAMETER 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) W/INTERNAL COOLANT	TI-NAMITE-M (TM)	TI-NAMITE-M (TM) W/FLAT	TI-NAMITE-M (TM) W/INTERNAL COOLANT
5/8	3/4	3-1/2	5/8	.190	—	—	—	37066	37073	37266
5/8	1-1/4	3-1/2	5/8	.015	37199	37203	—	37075	37082	37268
5/8	1-1/4	3-1/2	5/8	.030	37200	37204	—	37076	37083	37269
5/8	1-1/4	3-1/2	5/8	.060	37201	37205	—	37077	37084	37270
5/8	1-1/4	3-1/2	5/8	.090	—	—	—	37078	37085	37271
5/8	1-1/4	3-1/2	5/8	.120	—	—	—	37079	37086	37272
5/8	1-1/4	3-1/2	5/8	.190	—	—	—	37080	37087	37273
3/4	7/8	4	3/4	.030	—	38599	—	37089	37096	37275
3/4	7/8	4	3/4	.060	—	—	—	37090	37097	37276
3/4	7/8	4	3/4	.090	—	—	—	37091	37098	37277
3/4	7/8	4	3/4	.120	—	—	—	37092	37099	37278
3/4	7/8	4	3/4	.190	—	—	—	37093	37100	37279
3/4	7/8	4	3/4	.250	—	—	—	37094	37101	37280
3/4	1-1/2	4	3/4	.030	37207	37211	—	37103	37110	37282
3/4	1-1/2	4	3/4	.060	37208	37212	—	37104	37111	37283
3/4	1-1/2	4	3/4	.090	—	—	—	37105	37112	37284
3/4	1-1/2	4	3/4	.120	37209	37213	—	37106	37113	37285
3/4	1-1/2	4	3/4	.190	—	—	—	37107	37114	37286
3/4	1-1/2	4	3/4	.250	—	—	—	37108	37115	37287
1	1-1/8	4	1	.030	—	38608	—	37117	37124	37289
1	1-1/8	4	1	.060	—	—	—	37118	37125	37290
1	1-1/8	4	1	.090	—	—	—	37119	37126	37291
1	1-1/8	4	1	.120	—	—	—	37120	37127	37292
1	1-1/8	4	1	.190	—	—	—	37121	37128	37293
1	1-1/8	4	1	.250	—	—	—	37122	37129	37294
1	1-1/2	4	1	.030	37215	37219	—	37131	37138	37296
1	1-1/2	4	1	.060	37216	37220	—	37132	37139	37297
1	1-1/2	4	1	.090	—	—	—	37133	37140	37298
1	1-1/2	4	1	.120	37217	37221	—	37134	37141	37299
1	1-1/2	4	1	.190	—	—	—	37135	37142	37300
1	1-1/2	4	1	.250	—	—	—	37136	37143	37301
1	2	4-1/2	1	.030	—	38617	—	37145	37152	37303
1	2	4-1/2	1	.060	—	—	—	37146	37153	37304
1	2	4-1/2	1	.090	—	—	—	37147	37154	37305
1	2	4-1/2	1	.120	—	—	—	37148	37155	37306
1	2	4-1/2	1	.190	—	—	—	37149	37156	37307
1	2	4-1/2	1	.250	—	—	—	37150	37157	37308

TOLERANCES (inch)

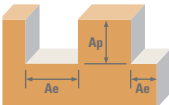
1/8–1/4 DIAMETER
D₁ = +0.0000/–0.0012
D₂ = h₆
R = +0.0000/–0.0020

>1/4–3/8 DIAMETER
D₁ = +0.0000/–0.0016
D₂ = h₆
R = +0.0000/–0.0020

>3/8–1 DIAMETER
D₁ = +0.0000/–0.0020
D₂ = h₆
R = +0.0000/–0.0020

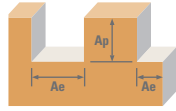
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent
information visit
www.ksptpatents.com

Series Z5, Z5CR Fractional		Hardness			Vc (sfm)	Diameter (D ₁) (inch)							
			Ae x D ₁	Ap x D ₁		1/8	1/4	3/8	1/2	5/8	3/4	1	
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	 ≤ 275 Bhn or ≤ 28 HRc	 ≤ 0.5 ≤ 1.5	555	RPM	16961	8480	5654	4240	3392	2827	2120	
				(444-666)	Fz	0.00046	0.0012	0.0023	0.0031	0.0034	0.0037	0.0043	
					Feed (ipm)	39.0	50.9	65.0	65.7	57.7	52.3	45.6	
		 1 ≤ 1	440	RPM	13446	6723	4482	3362	2689	2241	1681		
			(352-528)	Fz	0.00046	0.0012	0.0023	0.0031	0.0034	0.0037	0.0043		
				Feed (ipm)	30.9	40.3	51.5	52.1	45.7	41.5	36.1		
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	 ≤ 375 Bhn or ≤ 40 HRc	 ≤ 0.5 ≤ 1.5	315	RPM	9626	4813	3209	2407	1925	1604	1203	
				(252-378)	Fz	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032	
					Feed (ipm)	16.4	21.7	27.3	27.7	25.0	22.5	19.3	
		 1 ≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955		
			(200-300)	Fz	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032		
				Feed (ipm)	13.0	17.2	21.6	22.0	19.9	17.8	15.3		
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	 ≤ 375 Bhn or ≤ 40 HRc	 ≤ 0.5 ≤ 1.5	185	RPM	5654	2827	1885	1413	1131	942	707	
				(148-222)	Fz	0.00028	0.0007	0.0014	0.0018	0.0020	0.0022	0.0026	
					Feed (ipm)	7.9	9.9	13.2	12.7	11.3	10.4	9.2	
		 1 ≤ 1	145	RPM	4431	2216	1477	1108	886	739	554		
			(116-174)	Fz	0.00028	0.0007	0.0014	0.0018	0.0020	0.0022	0.0026		
				Feed (ipm)	6.2	7.8	10.3	10.0	8.9	8.1	7.2		
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	 ≤ 220 Bhn or ≤ 19 HRc	 ≤ 0.5 ≤ 1.5	445	RPM	13599	6800	4533	3400	2720	2267	1700	
				(356-534)	Fz	0.00042	0.0011	0.0021	0.0028	0.0031	0.0034	0.0039	
					Feed (ipm)	28.6	37.4	47.6	47.6	42.2	38.5	33.1	
		 1 ≤ 1	355	RPM	10849	5424	3616	2712	2170	1808	1356		
			(284-426)	Fz	0.00042	0.0011	0.0021	0.0028	0.0031	0.0034	0.0039		
				Feed (ipm)	22.8	29.8	38.0	38.0	33.6	30.7	26.4		
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	 ≤ 260 Bhn or ≤ 26 HRc	 ≤ 0.5 ≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299	
				(272-408)	Fz	0.00031	0.0008	0.0016	0.0021	0.0023	0.0025	0.0029	
					Feed (ipm)	16.1	21.8	27.7	27.3	23.9	21.6	18.8	
		 1 ≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031		
			(216-324)	Fz	0.00031	0.0008	0.0016	0.0021	0.0023	0.0025	0.0029		
				Feed (ipm)	12.8	17.3	22.0	21.7	19.0	17.2	15.0		
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	 ≤ 275 Bhn or ≤ 28 HRc	 ≤ 0.5 ≤ 1.5	490	RPM	14974	7487	4991	3744	2995	2496	1872	
				(392-588)	Fz	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032	
					Feed (ipm)	25.5	33.7	42.4	43.1	38.9	34.9	29.9	
		 1 ≤ 1	390	RPM	11918	5959	3973	2980	2384	1986	1490		
			(312-468)	Fz	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032		
				Feed (ipm)	20.3	26.8	33.8	34.3	31.0	27.8	23.8		
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	 ≤ 275 Bhn or ≤ 28 HRc	 ≤ 0.5 ≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299	
				(272-408)	Fz	0.00027	0.0007	0.0014	0.0018	0.0020	0.0022	0.0025	
					Feed (ipm)	14.0	18.2	24.2	23.4	20.8	19.0	16.2	
		 1 ≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031		
			(216-324)	Fz	0.00027	0.0007	0.0014	0.0018	0.0020	0.0022	0.0025		
				Feed (ipm)	11.1	14.4	19.3	18.6	16.5	15.1	12.9		

continued on next page

FRACTIONAL Z-Carb-HPR



Series Z5, Z5CR Fractional	Hardness		Ae x D ₁	Ap x D ₁	Vc (sfm)	Diameter (D ₁) (inch)							
						1/8	1/4	3/8	1/2	5/8	3/4	1	
M	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	 Profile	≤ 0.5	≤ 1.5	310	RPM	9474	4737	3158	2368	1895	1579	1184
					(248-372)	Fz	0.00027	0.0007	0.0014	0.0018	0.0020	0.0022	0.0025
					Feed (ipm)	12.8	16.6	22.1	21.3	18.9	17.4	14.8	
		 Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
					(200-300)	Fz	0.00027	0.0007	0.0014	0.0018	0.0020	0.0022	0.0025
					Feed (ipm)	10.3	13.4	17.8	17.2	15.3	14.0	11.9	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	 Profile	≤ 0.5	≤ 1.5	80	RPM	2445	1222	815	611	489	407	306
					(64-96)	Fz	0.00025	0.00068	0.00128	0.00170	0.00187	0.00204	0.00238
					Feed (ipm)	3.1	4.2	5.2	5.2	4.6	4.2	3.6	
		 Slot	1	≤ 1	65	RPM	1986	993	662	497	397	331	248
					(52-78)	Fz	0.00025	0.00068	0.00128	0.00170	0.00187	0.00204	0.00238
					Feed (ipm)	2.5	3.4	4.2	4.2	3.7	3.4	3.0	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	 Profile	≤ 0.5	≤ 1.5	62	RPM	1895	947	632	474	379	316	237
					(50-74)	Fz	0.00018	0.00048	0.00090	0.00120	0.00130	0.00140	0.00170
					Feed (ipm)	1.7	2.3	2.8	2.8	2.5	2.2	2.0	
		 Slot	1	≤ 1	50	RPM	1528	764	509	382	306	255	191
					(40-60)	Fz	0.00018	0.00048	0.00090	0.00120	0.00130	0.00140	0.00170
					Feed (ipm)	1.4	1.8	2.3	2.3	2.0	1.8	1.6	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	 Profile	≤ 0.5	≤ 1.5	215	RPM	6570	3285	2190	1643	1314	1095	821
					(172-258)	Fz	0.0003	0.0008	0.0015	0.0020	0.0022	0.0024	0.0028
					Feed (ipm)	9.9	13.1	16.4	16.4	14.5	13.1	11.5	
		 Slot	1	≤ 1	170	RPM	5195	2598	1732	1299	1039	866	649
					(136-204)	Fz	0.0003	0.0008	0.0015	0.0020	0.0022	0.0024	0.0028
					Feed (ipm)	7.8	10.4	13.0	13.0	11.4	10.4	9.1	
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	 Profile	≤ 0.5	≤ 1.5	75	RPM	2292	1146	764	573	458	382	287
					(60-90)	Fz	0.0003	0.0008	0.0015	0.0020	0.0022	0.0024	0.0028
					Feed (ipm)	3.4	4.6	5.7	5.7	5.0	4.6	4.0	
		 Slot	1	≤ 1	60	RPM	1834	917	611	458	367	306	229
					(48-72)	Fz	0.0003	0.0008	0.0015	0.0020	0.0022	0.0024	0.0028
					Feed (ipm)	2.8	3.7	4.6	4.6	4.0	3.7	3.2	

Bhn (Brinell) HRc (Rockwell C)

rpm = $V_c \times 3.82 / D_1$

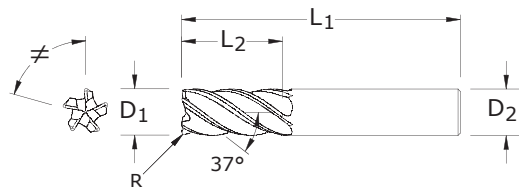
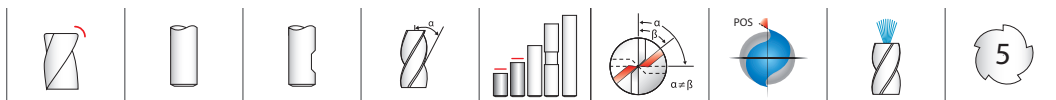
ipm = $F_z \times 5 \times \text{rpm}$

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)

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

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information visit
www.ksptpatents.com

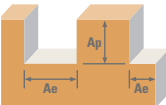
Z5MCR

METRIC SERIES

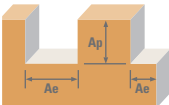
mm					EDP NO.					
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	TI-NAMITE-A (TA)	TI-NAMITE-A (TA) W/FLAT	TI-NAMITE-A (TA) EDP NO. W/INTERNAL COOLANT	TI-NAMITE-M (TM) EDP NO.	TI-NAMITE-M (TM) EDP NO. W/FLAT	TI-NAMITE-M (TM) EDP NO. W/INTERNAL COOLANT
6,0	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	48002	—	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

- 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)

Z-Carb-HPR

Series Z5MCR Metric		Hardness			Vc (m/min)	Diameter (D ₁) (mm)								
			Ae x D ₁	Ap x D ₁		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
			Slot 	1	≤ 1	(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	
		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
		Slot 	1	≤ 1		(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	
					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
		Slot 	1	≤ 1		(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	
					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
		Slot 	1	≤ 1		(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	
					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
		Slot 	1	≤ 1		(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	
					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
		Slot 	1	≤ 1		(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	
					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
		Slot 	1	≤ 1		(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	
					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

Series Z5MCR Metric	Hardness			Vc (m/min)	Diameter (D ₁) (mm)								
		Ae x D ₁	Ap x D ₁		6	8	10	12	16	20	25		
M	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	 ≤ 325 Bhn or ≤ 35 HRc	 ≤ 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
		 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	 ≤ 300 Bhn or ≤ 32 HRc	 ≤ 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
		 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	 ≤ 400 Bhn or ≤ 43 HRc	 ≤ 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
		 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	 ≤ 350 Bhn or ≤ 38 HRc	 ≤ 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
		 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	 ≤ 440 Bhn or ≤ 47 HRc	 ≤ 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
		 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

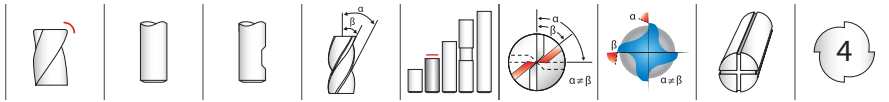
ramp up to 5 degrees using slotting speed and feed rates. Do not plunge.

reduce speed and feed for materials harder than listed

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

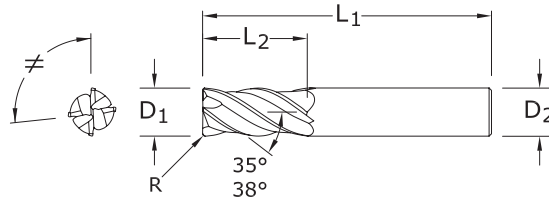
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

FRACTIONAL Z-Carb-AP



Z1PCR FRACTIONAL 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
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



CUTTING DIAMETER D_1	LENGTH OF CUT L_2	inch			EDP NO.		
		OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT	JetStream
1/64	1/32	1-1/2	1/8	.002	36874	—	—
1/32	5/64	1-1/2	1/8	.005	36875	—	—
3/64	7/64	1-1/2	1/8	.005	36876	—	—
1/16	3/16	1-1/2	1/8	.005	36872	—	—
5/64	3/16	1-1/2	1/8	.005	36877	—	—
3/32	9/32	1-1/2	1/8	.010	36873	—	—
7/64	3/8	1-1/2	1/8	.010	36878	—	—
1/8	3/8	1-1/2	1/8	.010	36370	—	—
1/8	3/8	1-1/2	1/8	.015	36851	—	—
3/16	7/16	2	3/16	.010	36371	—	—
3/16	7/16	2	3/16	.015	36852	—	—
3/16	7/16	2	3/16	.030	36722	—	—
1/4	1/2	2-1/2	1/4	.010	36372	—	—
1/4	1/2	2-1/2	1/4	.015	36723	—	—
1/4	1/2	2-1/2	1/4	.020	36853	—	—
1/4	1/2	2-1/2	1/4	.030	36373	—	—
1/4	3/4	2-1/2	1/4	.010	36599	—	—
1/4	3/4	2-1/2	1/4	.015	36600	—	—
1/4	3/4	2-1/2	1/4	.020	36854	—	—
1/4	3/4	2-1/2	1/4	.030	36601	—	—
5/16	13/16	2-1/2	5/16	.015	36724	—	—
5/16	13/16	2-1/2	5/16	.020	36855	—	—
5/16	13/16	2-1/2	5/16	.030	36374	—	—
3/8	7/8	2-1/2	3/8	.010	36375	36701	—
3/8	7/8	2-1/2	3/8	.015	36725	36736	—
3/8	7/8	2-1/2	3/8	.020	36856	36864	—
3/8	7/8	2-1/2	3/8	.030	36376	36702	—
3/8	7/8	2-1/2	3/8	.060	36727	36738	—

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TOLERANCES (inch)

<1/8 DIAMETER

$D_1 = +0.0005/-0.0005$

$D_2 = h_6$

$R = +0.000/-0.0010$

1/8-1/4 DIAMETER

$D_1 = +0.000/-0.0012$

$D_2 = h_6$

$R = +0.000/-0.0020$

>1/4-3/8 DIAMETER

$D_1 = +0.000/-0.0016$

$D_2 = h_6$

$R = +0.000/-0.0020$

>3/8-1 DIAMETER

$D_1 = +0.000/-0.0020$

$D_2 = h_6$

$R = +0.000/-0.0020$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

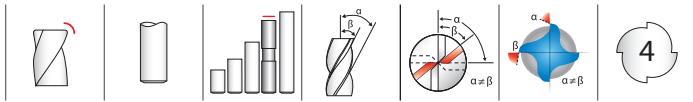
For patent
information visit
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Z1PCR
FRACTIONAL SERIES

CONTINUED

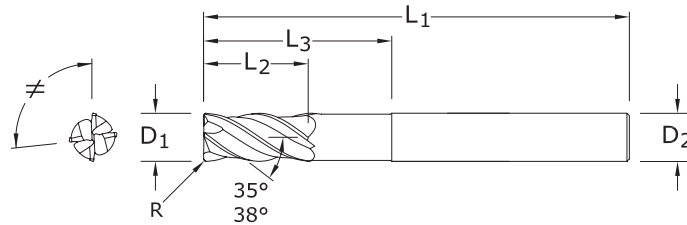
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	inch			EDP NO.		
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT	JetStream
7/16	1	2-3/4	7/16	.020	36857	36865	—
1/2	1	3	1/2	.010	36378	36704	36804
1/2	1	3	1/2	.015	36729	36740	36810
1/2	1	3	1/2	.030	36858	36866	36805
1/2	1	3	1/2	.060	36380	36706	36811
1/2	1	3	1/2	.090	36381	36707	36812
1/2	1	3	1/2	.125	36731	36742	36813
1/2	1-1/4	3-1/4	1/2	.010	36602	36603	—
1/2	1-1/4	3-1/4	1/2	.015	36604	36605	—
1/2	1-1/4	3-1/4	1/2	.030	36859	36867	—
1/2	1-1/4	3-1/4	1/2	.060	36610	36611	—
1/2	1-1/4	3-1/4	1/2	.090	36612	36613	—
1/2	1-1/4	3-1/4	1/2	.125	36614	36615	—
9/16	1-1/8	3-1/2	9/16	.030	36860	36868	36806
5/8	1-1/4	3-1/2	5/8	.030	36383	36709	36814
5/8	1-1/4	3-1/2	5/8	.040	36861	36869	36807
5/8	1-1/4	3-1/2	5/8	.060	36384	36710	36815
5/8	1-1/4	3-1/2	5/8	.090	36385	36711	36816
5/8	1-1/4	3-1/2	5/8	.125	36733	36744	36817
3/4	1-1/2	4	3/4	.030	36386	36712	36818
3/4	1-1/2	4	3/4	.040	36862	36870	36808
3/4	1-1/2	4	3/4	.060	36387	36713	36819
3/4	1-1/2	4	3/4	.090	36388	36714	36820
3/4	1-1/2	4	3/4	.125	36389	36715	36821
1	1-1/2	4	1	.030	36390	36716	36822
1	1-1/2	4	1	.040	36863	36871	36809
1	1-1/2	4	1	.060	36391	36717	36823
1	1-1/2	4	1	.090	36392	36718	36824
1	1-1/2	4	1	.125	36393	36719	36825

FRACTIONAL Z-Carb-AP



Z1PLC FRACTIONAL 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)



inch						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
1/4	1/2	2-1/2	1/4	1-1/8	.020	36447
1/4	1/2	3-1/2	1/4	1-5/8	.020	36448
1/4	1/2	4	1/4	1-1/4	.020	36450
1/4	1/2	4	1/4	2-1/8	.020	36449
5/16	13/16	3	5/16	1-3/8	.020	36453
5/16	13/16	4	5/16	2	.020	36454
5/16	13/16	4	5/16	1-5/8	.020	36452
3/8	7/8	3	3/8	1-5/8	.020	36457
3/8	7/8	5	3/8	1-7/8	.020	36456
3/8	7/8	4	3/8	2-3/8	.020	36458
7/16	1	6	7/16	2	.020	36460
1/2	1	4	1/2	2	.030	36463
1/2	1	5	1/2	3	.030	36464
1/2	1	6	1/2	2-1/4	.030	36462
9/16	1-1/8	6	9/16	2-1/2	.030	36466
5/8	1-1/4	5	5/8	2-1/2	.040	36468
5/8	1-1/4	6	5/8	3-3/4	.040	36469
5/8	1-1/4	6	5/8	3	.040	36470
3/4	1-1/2	6	3/4	3-1/2	.040	36472
1	1-1/2	6	1	3	.040	36475
1	1-1/2	6	1	4	.040	36474

TOLERANCES (inch)

1/4 DIAMETER

$D_1 = +0.0000/-0.0012$

$D_2 = h_6$

$R = +0.0000/-0.0020$

>1/4-3/8 DIAMETER

$D_1 = +0.0000/-0.0016$

$D_2 = h_6$

$R = +0.0000/-0.0020$

>3/8-1 DIAMETER

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

$R = +0.0000/-0.0020$

STEELS

STAINLESS STEELS

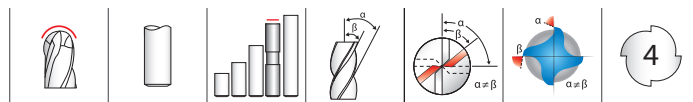
CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

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TOLERANCES (inch)

1/4 DIAMETER

$D_1 = +0.0000/-0.0012$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0006$

>1/4-3/8 DIAMETER

$D_1 = +0.0000/-0.0016$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0008$

>3/8-1 DIAMETER

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0010$

STEELS

STAINLESS STEELS

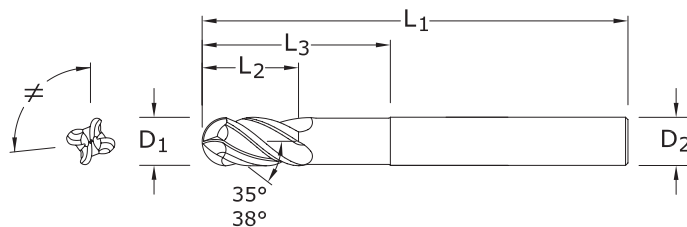
CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

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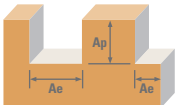


Z1PLB
FRACTIONAL SERIES

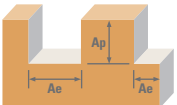
inch					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	Ti-NAMITE-X
1/4	1/2	4	1/4	1-1/4	36480
5/16	13/16	4	5/16	1-5/8	36482
3/8	7/8	5	3/8	1-7/8	36486
7/16	1	6	7/16	2	38490
1/2	1	6	1/2	2-1/4	38492
9/16	1-1/8	6	9/16	2-1/2	38496
5/8	1-1/4	6	5/8	3	36500
3/4	1-1/2	6	3/4	3-1/2	36502
1	1-1/2	6	1	4	36504

- 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
- Long reach design allows for deeper and faster cuts
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

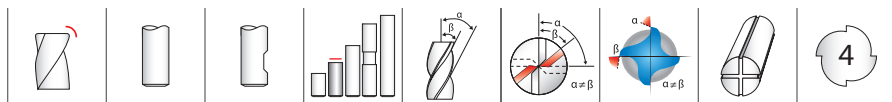
FRACTIONAL Z-Carb-AP

Series Z1PCR, Z1PLC, Z1PLB					Vc (sfm)	Diameter (D ₁) (inch)								
Fractional	Hardness	Ae x D ₁	Ap x D ₁	1/64		1/8	1/4	3/8	1/2	5/8	3/4	1		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	 Profile ≤ 0.5	≤ 1.5	555	RPM	135904	16961	8480	5654	4240	3392	2827	2120
					(444-666)	Fz	0.00005	0.00046	0.0012	0.0023	0.0031	0.0034	0.0037	0.0043
						Feed (ipm)	27.2	31.2	40.7	52.0	52.6	46.1	41.8	36.5
		 Slot 1	≤ 1	440	RPM	107744	13446	6723	4482	3362	2689	2241	1681	
				(352-528)	Fz	0.00005	0.00046	0.0012	0.0023	0.0031	0.0034	0.0037	0.0043	
					Feed (ipm)	21.5	24.7	32.3	41.2	41.7	36.6	33.2	28.9	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	 Profile ≤ 0.5	≤ 1.5	315	RPM	77135	9626	4813	3209	2407	1925	1604	1203
					(252-378)	Fz	0.00004	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032
						Feed (ipm)	12.3	13.1	17.3	21.8	22.1	20.0	18.0	15.4
		 Slot 1	≤ 1	250	RPM	61218	7640	3820	2547	1910	1528	1273	955	
				(200-300)	Fz	0.00004	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032	
					Feed (ipm)	9.8	10.4	13.8	17.3	17.6	15.9	14.3	12.2	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	 Profile ≤ 0.5	≤ 1.5	185	RPM	45301	5654	2827	1885	1413	1131	942	707
					(148-222)	Fz	0.00003	0.00028	0.0007	0.0014	0.0018	0.0020	0.0022	0.0026
						Feed (ipm)	5.4	6.3	7.9	10.6	10.2	9.0	8.3	7.3
		 Slot 1	≤ 1	145	RPM	35506	4431	2216	1477	1108	886	739	554	
				(116-174)	Fz	0.00003	0.00028	0.0007	0.0014	0.0018	0.0020	0.0022	0.0026	
					Feed (ipm)	4.3	5.0	6.2	8.3	8.0	7.1	6.5	5.8	
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	 Profile ≤ 0.5	≤ 1.5	445	RPM	108968	13599	6800	4533	3400	2720	2267	1700
					(356-534)	Fz	0.00005	0.00042	0.0011	0.0021	0.0028	0.0031	0.0034	0.0039
						Feed (ipm)	21.8	22.8	29.9	38.1	38.1	33.7	30.8	26.5
		 Slot 1	≤ 1	355	RPM	86929	10849	5424	3616	2712	2170	1808	1356	
				(284-426)	Fz	0.00005	0.00042	0.0011	0.0021	0.0028	0.0031	0.0034	0.0039	
					Feed (ipm)	17.4	18.2	23.9	30.4	30.4	26.9	24.6	21.2	
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	 Profile ≤ 0.5	≤ 1.5	340	RPM	83256	10390	5195	3463	2598	2078	1732	1299
					(272-408)	Fz	0.00004	0.00031	0.0008	0.0016	0.0021	0.0023	0.0025	0.0029
						Feed (ipm)	13.3	12.9	17.5	22.2	21.8	19.1	17.3	15.1
		 Slot 1	≤ 1	270	RPM	66115	8251	4126	2750	2063	1650	1375	1031	
				(216-324)	Fz	0.00004	0.00031	0.0008	0.0016	0.0021	0.0023	0.0025	0.0029	
					Feed (ipm)	10.6	10.2	13.9	17.6	17.3	15.2	13.8	12.0	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	 Profile ≤ 0.5	≤ 1.5	490	RPM	119987	14974	7487	4991	3744	2995	2496	1872
					(392-588)	Fz	0.00004	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032
						Feed (ipm)	19.2	20.4	27.0	33.9	34.4	31.1	28.0	24.0
		 Slot 1	≤ 1	390	RPM	95500	11918	5959	3973	2980	2384	1986	1490	
				(312-468)	Fz	0.00004	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032	
					Feed (ipm)	15.3	16.2	21.5	27.0	27.4	24.8	22.2	19.1	

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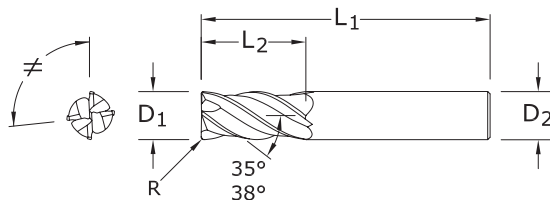
Series Z1PCR, Z1PLC, Z1PLB Fractional		Hardness			Vc (sfm)	Diameter (D ₁) (inch)									
			Ae x D ₁	Ap x D ₁		1/64	1/8	1/4	3/8	1/2	5/8	3/4	1		
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc		≤ 0.5	≤ 1.5	340	RPM	83256	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.00003	0.00027	0.0007	0.0014	0.0018	0.0020	0.0022	0.0025
							Feed (ipm)	10.0	11.2	14.5	19.4	18.7	16.6	15.2	13.0
				1	≤ 1	270	RPM	66115	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.00003	0.00027	0.0007	0.0014	0.0018	0.0020	0.0022	0.0025
							Feed (ipm)	7.9	8.9	11.6	15.4	14.9	13.2	12.1	10.3
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc		≤ 0.5	≤ 1.5	310	RPM	75910	9474	4737	3158	2368	1895	1579	1184
						(248-372)	Fz	0.00003	0.00027	0.0007	0.0014	0.0018	0.0020	0.0022	0.0025
							Feed (ipm)	9.1	10.2	13.3	17.7	17.1	15.2	13.9	11.8
				1	≤ 1	250	RPM	61218	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.00003	0.00027	0.0007	0.0014	0.0018	0.0020	0.0022	0.0025
							Feed (ipm)	7.3	8.3	10.7	14.3	13.8	12.2	11.2	9.6
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc		≤ 0.5	≤ 1.5	80	RPM	19590	2445	1222	815	611	489	407	306
						(64-96)	Fz	0.00003	0.00025	0.0007	0.0013	0.0017	0.0019	0.0020	0.0024
							Feed (ipm)	2.4	2.4	3.3	4.2	4.2	3.7	3.3	2.9
				1	≤ 1	65	RPM	15917	1986	993	662	497	397	331	248
						(52-78)	Fz	0.00003	0.00025	0.0007	0.0013	0.0017	0.0019	0.0020	0.0024
							Feed (ipm)	1.9	2.0	2.7	3.4	3.4	3.0	2.7	2.4
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc		≤ 0.5	≤ 1.5	62	RPM	15182	1895	947	632	474	379	316	237
						(50-74)	Fz	0.00002	0.00018	0.0005	0.0009	0.0012	0.0013	0.0014	0.0017
							Feed (ipm)	1.2	1.4	1.8	2.3	2.3	2.0	1.8	1.6
				1	≤ 1	50	RPM	12244	1528	764	509	382	306	255	191
						(40-60)	Fz	0.00002	0.00018	0.0005	0.0009	0.0012	0.0013	0.0014	0.0017
							Feed (ipm)	1.0	1.1	1.5	1.8	1.8	1.6	1.4	1.3
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc		≤ 0.5	≤ 1.5	215	RPM	52647	6570	3285	2190	1643	1314	1095	821
						(172-258)	Fz	0.00003	0.0003	0.0008	0.0015	0.0020	0.0022	0.0024	0.0028
							Feed (ipm)	6.3	7.9	10.5	13.1	13.1	11.6	10.5	9.2
				1	≤ 1	170	RPM	41628	5195	2598	1732	1299	1039	866	649
						(136-204)	Fz	0.00003	0.0003	0.0008	0.0015	0.0020	0.0022	0.0024	0.0028
							Feed (ipm)	5.0	6.2	8.3	10.4	10.4	9.1	8.3	7.3
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc		≤ 0.5	≤ 1.5	75	RPM	18365	2292	1146	764	573	458	382	287
						(60-90)	Fz	0.00003	0.0003	0.0008	0.0015	0.0020	0.0022	0.0024	0.0028
							Feed (ipm)	2.2	2.8	3.7	4.6	4.6	4.0	3.7	3.2
				1	≤ 1	60	RPM	14692	1834	917	611	458	367	306	229
						(48-72)	Fz	0.00003	0.0003	0.0008	0.0015	0.0020	0.0022	0.0024	0.0028
							Feed (ipm)	1.8	2.2	2.9	3.7	3.7	3.2	2.9	2.6

Bhn (Brinell) HRC (Rockwell C)
 $\text{rpm} = \text{Vc} \times 3.82 / D_1$
 $\text{ipm} = \text{Fz} \times 4 \times \text{rpm}$
 maximum Slotting Ap for Z1PCR <1/8 diameter and all Z1PLC / Z1PLB is .25 x D₁
 maximum Profile Ae for Z1PCR <1/8 diameter and all Z1PLC / Z1PLB 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)



Z1MPCR

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
- 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			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

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

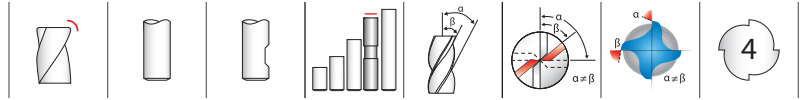
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 $R = +0,000/-0,050$

>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

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TOLERANCES (mm)

>12-20 DIAMETER

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

$D_2 = h_6$

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

STEELS

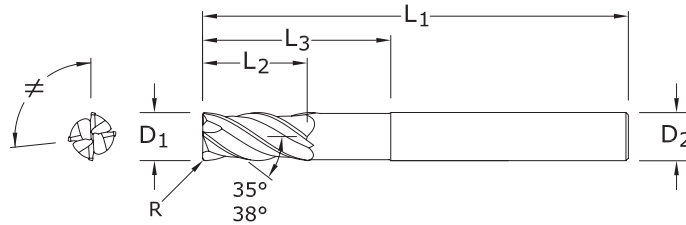
STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

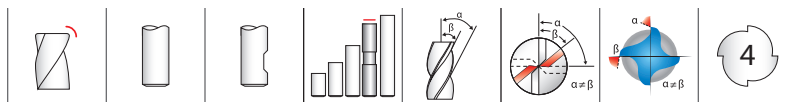
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information visit
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Z1MPIC METRIC SERIES

mm						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	Ti-NAMITE-X W/FLAT
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

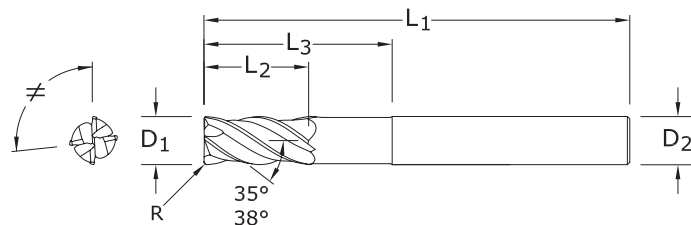
- Variable rake geometry alters and controls the cutting dynamic taking chatter suppression to an unprecedented level
- Unequal helix design changes the cutting angle to improve harmonics
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging 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)



Z1MPLC

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	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	mm		EDP NO.	
				REACH L ₃	CORNER RADIUS R	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

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

>10-20 DIAMETER

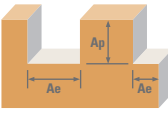
D₁ = +0,000/-0,050

D₂ = h₆

R = +0,000/-0,050

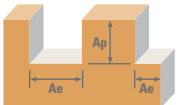
STEELS
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Series Z1MPCR, Z1MPIC, Z1MPLC Metric					Diameter (D ₁) (mm)										
Hardness				Vc (m/min)	1	3	6	8	10	12	16	20	25		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	 ≤ 275 Bhn or ≤ 28 HRc	Profile ≤ 0.5	≤ 1.5	169	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	
		 1	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	
		 1	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	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	 ≤ 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	
		 1	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	
		 1	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	
		 1	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	
		 1	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

Z-Carb-AP

Series Z1MPCR, Z1MPIC, Z1MPLC Metric				Vc (m/min)	Diameter (D ₁) (mm)										
Hardness	Ae x D ₁	Ap x D ₁	1		3	6	8	10	12	16	20	25			
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L ≤ 275 Bhn or ≤ 28 HRc		≤ 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
					(83-124)	Feed (mm/min)	237	281	374	494	488	472	420	389	332
			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
					(66-99)	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		≤ 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
					(76-113)	Feed (mm/min)	216	256	341	451	445	431	383	355	303
			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
					(61-91)	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		≤ 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
					(20-29)	Feed (mm/min)	56	63	83	105	105	106	93	82	74
			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
					(16-24)	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		≤ 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
					(15-23)	Feed (mm/min)	31	34	44	57	58	56	50	44	40
			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
					(12-18)	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		≤ 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
					(52-79)	Feed (mm/min)	167	197	264	333	333	333	292	267	233
			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
					(41-62)	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		≤ 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
					(18-27)	Feed (mm/min)	58	69	92	116	116	116	102	93	81
			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
					(15-22)	Feed (mm/min)	47	55	74	93	93	93	81	74	65

Bhn (Brinell) HRC (Rockwell C)

rpm = (Vc x 1000) / (D₁ x 3.14)

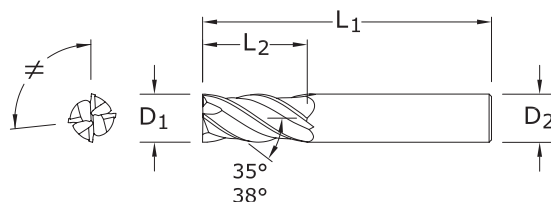
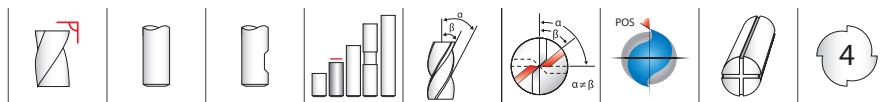
ipm = Fz x 4 x rpm

maximum Slotting Ap for Z1PCR <3mm diameter and all Z1MPLC / Z1MPLB is .25 x D₁maximum 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)



TOLERANCES (inch)

1/8–1/4 DIAMETER

$D_1 = +0.0000/-0.0012$

$D_2 = h_6$

>1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.0016$

$D_2 = h_6$

>3/8–1 DIAMETER

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

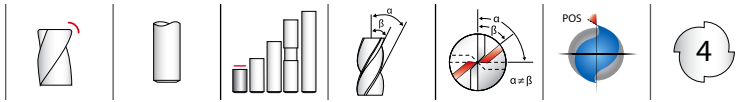
HARDENED STEELS

For patent
information visit
www.ksptpatents.com

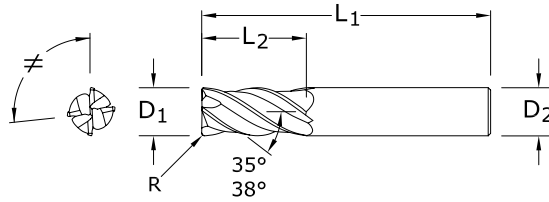
Z1 FRACTIONAL SERIES

inch				EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	JetStream
1/8	3/8	1-1/2	1/8	36404	—	—
5/32	7/16	2	3/16	36406	—	—
3/16	7/16	2	3/16	36408	—	—
7/32	7/16	2-1/2	1/4	36410	—	—
1/4	1/2	2-1/2	1/4	36416	—	—
1/4	3/4	2-1/2	1/4	36596	—	—
9/32	5/8	2-1/2	5/16	36418	—	—
5/16	13/16	2-1/2	5/16	36420	—	—
11/32	13/16	2-1/2	3/8	36422	—	—
3/8	7/8	2-1/2	3/8	36424	36530	—
13/32	15/16	2-3/4	7/16	36426	36531	—
7/16	1	2-3/4	7/16	36428	36532	—
15/32	1	3	1/2	36430	36533	—
1/2	1	3	1/2	36432	36534	36826
1/2	1-1/4	3-1/4	1/2	36597	36598	—
9/16	1-1/8	3-1/2	9/16	36436	36535	36827
5/8	1-1/4	3-1/2	5/8	36440	36536	36828
3/4	1-1/2	4	3/4	36442	36537	36829
1	1-1/2	4	1	36444	36538	36830

- 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)



Z16CR FRACTIONAL 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
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	inch		CORNER RADIUS R	EDP NO. TI-NAMITE-X
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂		
1/8	1/4	1-1/2	1/8	.015	36505
5/32	5/16	2	3/16	.015	36506
3/16	3/8	2	3/16	.015	36507
7/32	3/8	2	1/4	.020	36508
1/4	7/16	2	1/4	.020	36509
5/16	1/2	2	5/16	.020	36511
3/8	5/8	2	3/8	.020	36513
7/16	5/8	2-1/2	7/16	.020	36515
1/2	5/8	2-1/2	1/2	.030	36517
5/8	3/4	3	5/8	.040	36519
3/4	1	3	3/4	.040	36520

TOLERANCES (inch)

1/8-1/4 DIAMETER

D₁ = +0.0000/-0.0012

D₂ = h₆

R = +0.0000/-0.005

>1/4-3/8 DIAMETER

D₁ = +0.0000/-0.0016

D₂ = h₆

R = +0.0000/-0.005

>3/8-3/4 DIAMETER

D₁ = +0.0000/-0.0020

D₂ = h₆

R = +0.0000/-0.005

STEELS

STAINLESS STEELS

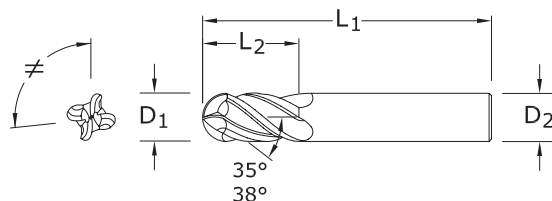
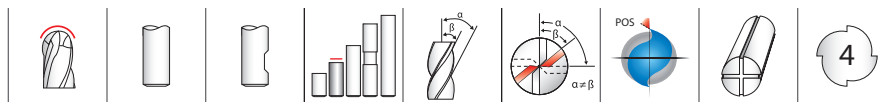
CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

For patent
information visit
www.ksptpatents.com



TOLERANCES (inch)

1/8–1/4 DIAMETER

$D_1 = +0.0000/-0.0012$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0006$

>1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.0016$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0008$

>3/8–1 DIAMETER

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0010$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

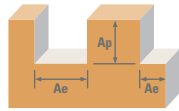
HARDENED STEELS

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information visit
www.ksptpatents.com

Z1B FRACTIONAL SERIES

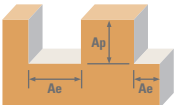
inch				EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-X (TX)	Ti-NAMITE-X (TX) W/FLAT	JetStream
1/8	3/8	1-1/2	1/8	36358	—	—
5/32	7/16	2	3/16	36357	—	—
3/16	7/16	2	3/16	36359	—	—
7/32	7/16	2-1/2	1/4	36361	—	—
1/4	1/2	2-1/2	1/4	36344	—	—
1/4	3/4	2-1/2	1/4	36590	—	—
9/32	5/8	2-1/2	5/16	36353	—	—
5/16	13/16	2-1/2	5/16	36345	—	—
11/32	13/16	2-1/2	3/8	36354	—	—
3/8	7/8	2-1/2	3/8	36346	36539	—
13/32	15/16	2-3/4	7/16	36355	36540	—
7/16	1	2-3/4	7/16	36347	36541	—
15/32	1	3	1/2	36356	36542	—
1/2	1	3	1/2	36348	36543	36846
1/2	1-1/4	3-1/4	1/2	36591	36592	—
9/16	1-1/8	3-1/2	9/16	36349	36544	36847
5/8	1-1/4	3-1/2	5/8	36350	36545	36848
3/4	1-1/2	4	3/4	36351	36546	36849
1	1-1/2	4	1	36352	36547	36850

- 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)



Series Z1, Z1B, Z16CR Fractional		Hardness			Vc (sfm)	Diameter (D ₁) (inch)								
			Ae x D ₁	Ap x D ₁		1/8	1/4	3/8	1/2	5/8	3/4	1		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	555	RPM	16961	8480	5654	4240	3392	2827	2120
						(444-666)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (ipm)	25.8	33.9	43.0	42.4	42.1	36.5	29.7
		≤ 375 Bhn or ≤ 40 HRc	Slot 	1	≤ 1	440	RPM	13446	6723	4482	3362	2689	2241	1681
						(352-528)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (ipm)	20.4	26.9	34.1	33.6	33.3	29.0	23.5
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.5	≤ 1.5	315	RPM	9626	4813	3209	2407	1925	1604	1203
						(252-378)	Fz	0.0003	0.0008	0.0014	0.0019	0.0024	0.0025	0.0027
							Feed (ipm)	10.8	15.4	18.0	18.3	18.5	16.0	13.0
		≤ 375 Bhn or ≤ 40 HRc	Slot 	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0003	0.0008	0.0014	0.0019	0.0024	0.0025	0.0027
							Feed (ipm)	8.6	12.2	14.3	14.5	14.7	12.7	10.3
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.5	≤ 1.5	185	RPM	5654	2827	1885	1413	1131	942	707
						(148-222)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (ipm)	4.5	5.7	7.5	7.3	7.2	6.4	5.1
		≤ 375 Bhn or ≤ 40 HRc	Slot 	1	≤ 1	145	RPM	4431	2216	1477	1108	886	739	554
						(116-174)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (ipm)	3.5	4.4	5.9	5.8	5.7	5.0	4.0
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ 0.5	≤ 1.5	445	RPM	13599	6800	4533	3400	2720	2267	1700
						(356-534)	Fz	0.0004	0.0010	0.0018	0.0024	0.0030	0.0031	0.0034
							Feed (ipm)	19.0	27.2	32.6	32.6	32.6	28.1	23.1
		≤ 220 Bhn or ≤ 19 HRc	Slot 	1	≤ 1	355	RPM	10849	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0004	0.0010	0.0018	0.0024	0.0030	0.0031	0.0034
							Feed (ipm)	15.2	21.7	26.0	26.0	26.0	22.4	18.4
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile 	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (ipm)	12.5	14.5	19.4	18.7	19.1	16.6	13.0
		≤ 260 Bhn or ≤ 26 HRc	Slot 	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (ipm)	9.9	11.6	15.4	14.9	15.2	13.2	10.3
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	490	RPM	14974	7487	4991	3744	2995	2496	1872
						(392-588)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (ipm)	18.0	21.0	28.0	27.0	27.6	24.0	18.7
		≤ 275 Bhn or ≤ 28 HRc	Slot 	1	≤ 1	390	RPM	11918	5959	3973	2980	2384	1986	1490
						(312-468)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (ipm)	14.3	16.7	22.2	21.5	21.9	19.1	14.9

continued on next page

Series Z1, Z1B, Z16CR Fractional	Hardness			Vc (sfm)	Diameter (D ₁) (inch)								
		Ae x D ₁	Ap x D ₁		1/8	1/4	3/8	1/2	5/8	3/4	1		
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L ≤ 275 Bhn or ≤ 28 HRc		≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
					(272-408)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
						Feed (ipm)	8.3	12.5	15.2	14.5	15.0	13.2	10.4
			1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
					(216-324)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
						Feed (ipm)	6.6	9.9	12.1	11.6	11.9	10.5	8.3
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450 ≤ 325 Bhn or ≤ 35 HRc		≤ 0.5	≤ 1.5	310	RPM	9474	4737	3158	2368	1895	1579	1184
					(248-372)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
						Feed (ipm)	7.6	11.4	13.9	13.3	13.6	12.0	9.5
			1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
					(200-300)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
						Feed (ipm)	6.1	9.2	11.2	10.7	11.0	9.7	7.6
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400 ≤ 300 Bhn or ≤ 32 HRc		≤ 0.5	≤ 1.5	80	RPM	2445	1222	815	611	489	407	306
					(64-96)	Fz	0.0002	0.0004	0.0008	0.0010	0.0013	0.0014	0.0015
						Feed (ipm)	2.2	2.0	2.6	2.4	2.5	2.3	1.8
			1	≤ 1	65	RPM	1986	993	662	497	397	331	248
					(52-78)	Fz	0.0002	0.0004	0.0008	0.0010	0.0013	0.0014	0.0015
						Feed (ipm)	1.6	1.6	2.1	2.0	2.1	1.9	1.5
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750-X, Incoloy, Waspaloy, Hastelloy, Rene ≤ 400 Bhn or ≤ 43 HRc		≤ 0.5	≤ 1.5	62	RPM	1895	947	632	474	379	316	237
					(50-74)	Fz	0.0001	0.0003	0.0005	0.0007	0.0008	0.0009	0.0010
						Feed (ipm)	0.8	1.1	1.3	1.3	1.2	1.1	0.9
			1	≤ 1	49	RPM	1497	749	499	374	299	250	187
					(39-59)	Fz	0.0001	0.0003	0.0005	0.0007	0.0008	0.0009	0.0010
						Feed (ipm)	0.6	0.9	1.0	1.0	1.0	0.9	0.7
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si ≤ 350 Bhn or ≤ 38 HRc		≤ 0.5	≤ 1.5	215	RPM	6570	3285	2190	1643	1314	1095	821
					(172-258)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
						Feed (ipm)	5.3	6.6	8.8	8.5	8.4	7.4	5.9
			1	≤ 1	170	RPM	5195	2598	1732	1299	1039	866	649
					(136-204)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
						Feed (ipm)	4.2	5.2	6.9	6.8	6.6	5.9	4.7
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al ≤ 440 Bhn or ≤ 47 HRc		≤ 0.5	≤ 1.5	75	RPM	2292	1146	764	573	458	382	287
					(60-90)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
						Feed (ipm)	1.8	2.3	3.1	3.0	2.9	2.6	2.1
			1	≤ 1	60	RPM	1834	917	611	458	367	306	229
					(48-72)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
						Feed (ipm)	1.5	1.8	2.4	2.4	2.3	2.1	1.7

Bhn (Brinell) HRC (Rockwell C)

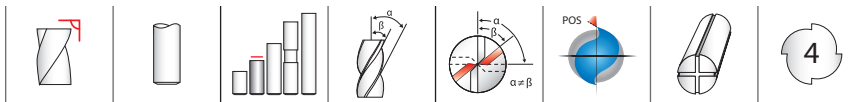
rpm = Vc x 3.82 / D₁

ipm = Fz x 4 x rpm

reduce speed and feed for materials harder than listed

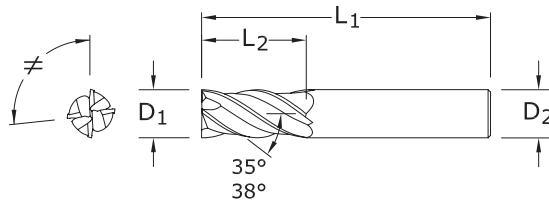
reduce feed and Ae when finish milling (.02 x D₁ maximum)

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



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	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	EDP NO.	
				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

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

$D_2 = h_6$

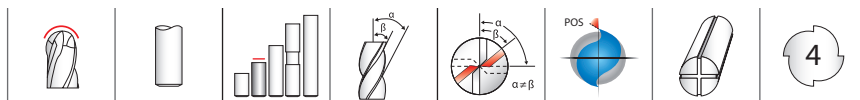
>10–25 DIAMETER

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

$D_2 = h_6$

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent information visit
www.ksptpatents.com



TOLERANCES (mm)

3–6 DIAMETER

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

$D_2 = h_6$

BALL RADIUS

$+0,000/-0,015$

>6–10 DIAMETER

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

$D_2 = h_6$

BALL RADIUS

$+0,000/-0,020$

>10–25 DIAMETER

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

$D_2 = h_6$

BALL RADIUS

$+0,000/-0,025$

STEELS

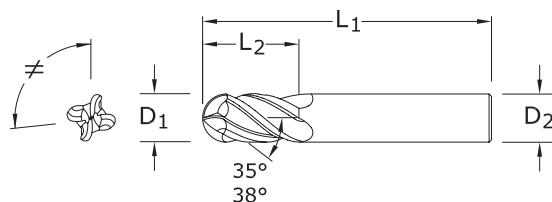
STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

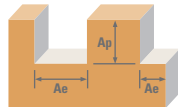


Z1MB
METRIC SERIES

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

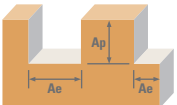
- Unequal helix design aids in damping harmonics by changing the angle at which each cutting edge enters and exits the material
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging harmonics
- Optimal material removal rates through increased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

For patent information visit
www.ksptpatents.com



Series Z1M, Z1MB Metric		Hardness			Vc (m/min)	Diameter (D1) (mm)									
			Ae x D1	Ap x D1		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	
		≤ 275 Bhn or ≤ 28 HRc	 Slot	1	≤ 1	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	
	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	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	
		≤ 375 Bhn or ≤ 40 HRc	 Slot	1	≤ 1	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	
		≤ 375 Bhn or ≤ 40 HRc	 Slot	1	≤ 1	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	
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	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	
		≤ 220 Bhn or ≤ 19 HRc	 Slot	1	≤ 1	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	
	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	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	
		≤ 260 Bhn or ≤ 26 HRc	 Slot	1	≤ 1	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	
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	
		≤ 275 Bhn or ≤ 28 HRc	 Slot	1	≤ 1	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			Vc (m/min)	Diameter (D ₁) (mm)									
			Ae x D ₁	Ap x D 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	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 x 1000) / (D₁ x 3.14)

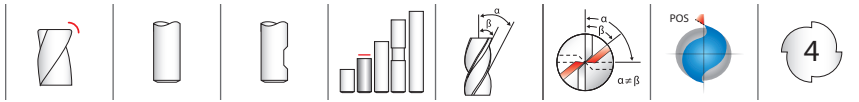
ipm = Fz x 4 x rpm

reduce speed and feed for materials harder than listed

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

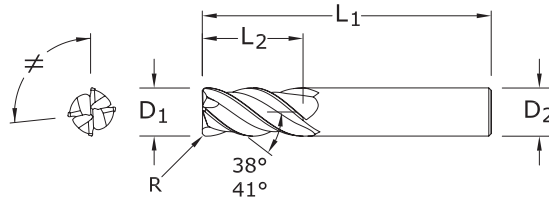
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

FRACTIONAL Z-Carb-HTA



ZH1CR FRACTIONAL 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 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 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	inch		SHANK DIAMETER D_2	CORNER RADIUS R	EDP NO.	
		OVERALL LENGTH L_1				Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
1/4	1/2	2-1/2		1/4	.020	36570	—
1/4	3/4	2-1/2		1/4	.020	36616	—
5/16	13/16	2-1/2		5/16	.020	36571	—
3/8	7/8	2-1/2		3/8	.020	36572	36555
7/16	1	2-3/4		7/16	.020	36573	36556
1/2	1	3		1/2	.030	36574	36557
1/2	1-1/4	3-1/4		1/2	.030	36618	36617
9/16	1-1/8	3-1/2		9/16	.030	36575	36558
5/8	1-1/4	3-1/2		5/8	.040	36576	36559
3/4	1-1/2	4		3/4	.040	36577	36560
1	1-1/2	4		1	.040	36578	36561

TOLERANCES (inch)

1/4 DIAMETER

$D_1 = +0.0000/-0.0012$

$D_2 = h_6$

$R = +0.0000/-0.0020$

>1/4-3/8 DIAMETER

$D_1 = +0.0000/-0.0016$

$D_2 = h_6$

$R = +0.0000/-0.0020$

>3/8-1 DIAMETER

$D_1 = +0.0000/-0.0020$

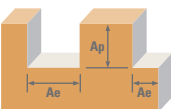
$D_2 = h_6$

$R = +0.0000/-0.0020$

HIGH TEMP ALLOYS

TITANIUM

For patent
information visit
www.ksptpatents.com



Series ZH1CR Fractional	Hardness		Ae x D ₁	Ap x D ₁	Vc (sfm)	Diameter (D ₁) (inch)						
						1/4	3/8	1/2	3/4	1		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.5	≤ 1.5	85	RPM	1299	866	649	433	325	
					(68-102)	Fz	0.0007	0.0012	0.0017	0.0020	0.0023	
		Slot	1	≤ 1	70	RPM	1070	713	535	357	267	
					(56-84)	Fz	0.0007	0.0012	0.0017	0.0020	0.0023	
						Feed (ipm)	3.0	3.4	3.6	2.9	2.5	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ 0.5	≤ 1.5	70	RPM	1070	713	535	357	267
						(56-84)	Fz	0.0005	0.0009	0.0012	0.0014	0.0016
			Slot	1	≤ 1	55	RPM	840	560	420	280	210
						(44-66)	Fz	0.0005	0.0009	0.0012	0.0014	0.0016
							Feed (ipm)	1.7	2.0	2.0	1.6	1.3
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ 0.5	≤ 1.5	215	RPM	3285	2190	1643	1095	821	
					(172-258)	Fz	0.0008	0.0015	0.0020	0.0024	0.0028	
		Slot	1	≤ 1	170	RPM	2598	1732	1299	866	649	
					(136-204)	Fz	0.0008	0.0015	0.0020	0.0024	0.0028	
						Feed (ipm)	8.3	10.4	10.4	8.3	7.3	
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ 0.5	≤ 1.5	75	RPM	1146	764	573	382	287	
					(60-90)	Fz	0.0008	0.0015	0.0020	0.0024	0.0028	
		Slot	1	≤ 1	60	RPM	917	611	458	306	229	
					(48-72)	Fz	0.0008	0.0015	0.0020	0.0024	0.0028	
						Feed (ipm)	2.9	3.7	3.7	2.9	2.6	

Bhn (Brinell) HRc (Rockwell C)

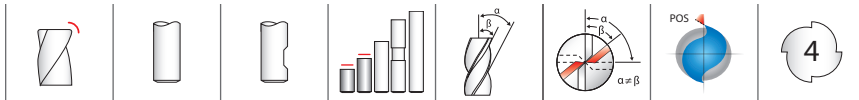
rpm = Vc x 3.82 / D₁

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)

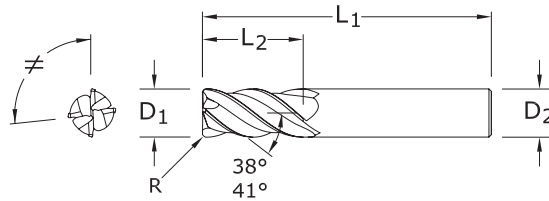
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



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 (AlTiN)
		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

D₁ = +0,000/-0,030D₂ = h₆

R = +0,000/-0,050

>6-10 DIAMETER

D₁ = +0,000/-0,040D₂ = h₆

R = +0,000/-0,050

>10-20 DIAMETER

D₁ = +0,000/-0,050D₂ = h₆

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 (AlTiN)	Ti-NAMITE-A (AlTiN) 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

D₁ = +0,000/-0,030D₂ = h₆

R = +0,000/-0,050

>6-10 DIAMETER

D₁ = +0,000/-0,040D₂ = h₆

R = +0,000/-0,050

>10-20 DIAMETER

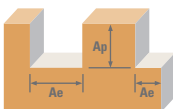
D₁ = +0,000/-0,050D₂ = h₆

R = +0,000/-0,050

HIGH TEMP ALLOYS

TITANIUM

For patent
information visit
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Series ZH1MCRS, ZH1MCR Metric		Hardness			Vc (m/min)	Diameter (D ₁) (mm)								
			Ae x D ₁	Ap x D ₁		6	10	12	20					
S	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
		≤ 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	
	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
		≤ 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
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al						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)

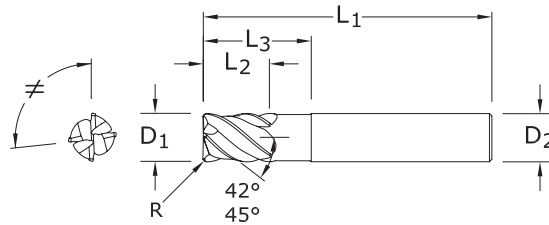
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

FRACTIONAL Z-Carb-MD



ZD1CR FRACTIONAL 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)



CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	inch				EDP NO.
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	REACH L ₃	CORNER RADIUS R	Ti-NAMITE-X
1/8	5/32	2-1/2	1/4	1/2	.010	36780
3/16	7/32	2-1/2	1/4	3/4	.020	36781
1/4	9/32	2-1/2	1/4	3/4	.020	36782
5/16	13/32	2-1/2	5/16	1	.040	36783
3/8	15/32	2-1/2	3/8	1	.040	36784
7/16	9/16	2-3/4	7/16	1	.040	36785
1/2	5/8	3	1/2	1-1/4	.040	36786
1/2	5/8	4-1/2	1/2	2-1/4	.040	36787
5/8	3/4	3-1/2	5/8	1-1/2	.040	36788
5/8	3/4	4-1/2	5/8	2-1/4	.040	36789
5/8	3/4	5-1/2	5/8	3-1/4	.040	36790
3/4	15/16	4	3/4	1-3/4	.060	36791
3/4	15/16	4-1/2	3/4	2-1/4	.060	36792
3/4	15/16	5-1/2	3/4	3-1/4	.060	36793

TOLERANCES (inch)

1/8-1/4 DIAMETER

D₁ = +0.0000/-0.0012

D₂ = h₆

R = +0.0000/-0.0020

>1/4-3/8 DIAMETER

D₁ = +0.0000/-0.0016

D₂ = h₆

R = +0.0000/-0.0020

>3/8-3/4 DIAMETER

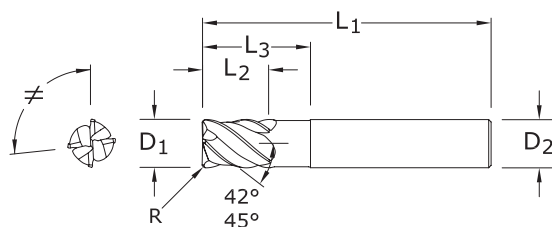
D₁ = +0.0000/-0.0020

D₂ = h₆

R = +0.0000/-0.0020

HARDENED STEELS

For patent
information visit
www.ksptpatents.com



ZD1MCR

METRIC SERIES

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

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

$D_2 = h_6$

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

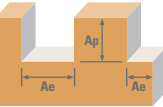
HARDENED STEELS

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	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

- 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)

Z-Carb-MD

Series ZD1CR Fractional	Hardness			Vc (sfm)	Diameter (D ₁) (inch)							
		Ae x D ₁	Ap x D ₁		1/8	1/4	3/8	1/2	5/8	3/4		
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRC	 Profile	≤ 0.4	≤ 1	405	RPM	12377	6188	4126	3094	2475	2063
					(324-486)	Fz	0.0005	0.0012	0.0023	0.0030	0.0039	0.0042
					Feed (ipm)	24.8	29.7	38.0	37.1	38.6	34.7	
		 Slot	1	≤ 0.4	320	RPM	9779	4890	3260	2445	1956	1630
					(256-384)	Fz	0.0005	0.0012	0.0023	0.0030	0.0039	0.0042
					Feed (ipm)	19.6	23.5	30.0	29.3	30.5	27.4	
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRC	 Profile	≤ 0.4	≤ 1	210	RPM	6418	3209	2139	1604	1284	1070
					(168-252)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0035
					Feed (ipm)	10.3	12.8	16.3	16.0	16.4	15.0	
		 Slot	1	≤ 0.4	170	RPM	5195	2598	1732	1299	1039	866
					(136-204)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0035
					Feed (ipm)	8.3	10.4	13.2	13.0	13.3	12.1	
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 655 Bhn or ≤ 60 HRC	 Profile	≤ 0.4	≤ 1	90	RPM	2750	1375	917	688	550	458
					(72-108)	Fz	0.0002	0.0005	0.0010	0.0013	0.0017	0.0018
					Feed (ipm)	2.2	2.8	3.7	3.6	3.7	3.3	
		 Slot	1	≤ 0.4	70	RPM	2139	1070	713	535	428	357
					(56-84)	Fz	0.0002	0.0005	0.0010	0.0013	0.0017	0.0018
					Feed (ipm)	1.7	2.1	2.9	2.8	2.9	2.6	

Bhn (Brinell) HRc (Rockwell C)

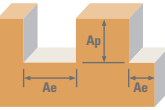
rpm = Vc x 3.82 / D₁

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)

Series ZD1MCR Metric	Hardness			Vc (m/min)	Diameter (D1) (mm)								
		Ae x D1	Ap x D1		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	
H 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)

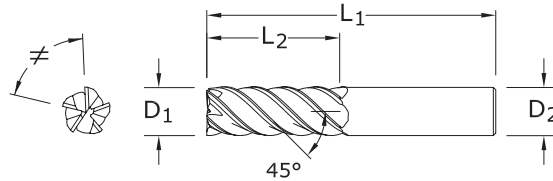
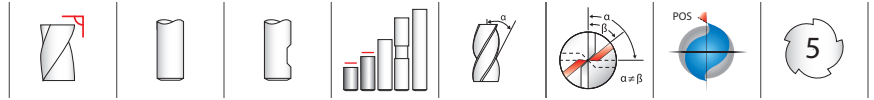
rpm = (Vc x 1000) / (D₁ x 3.14)

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)



TOLERANCES (inch)

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

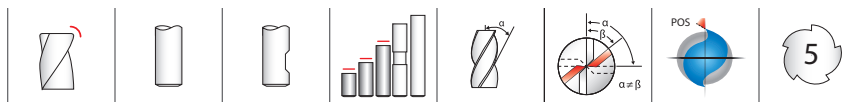
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent
information visit
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inch				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
1/8	1/4	1-1/2	1/8	32672	—
1/8	1/2	1-1/2	1/8	32655	—
5/32	9/16	2	3/16	32656	—
3/16	5/16	2	3/16	32673	—
3/16	5/8	2	3/16	32657	—
7/32	3/4	2-1/2	1/4	32658	—
1/4	3/8	2	1/4	32674	—
1/4	3/4	2-1/2	1/4	32659	—
5/16	7/16	2	5/16	32675	—
5/16	13/16	2-1/2	5/16	32660	—
3/8	1/2	2	3/8	32676	32677
3/8	1	2-1/2	3/8	32661	32662
7/16	1	2-3/4	7/16	32663	—
1/2	5/8	2-1/2	1/2	32678	32679
1/2	1-1/4	3	1/2	32664	32665
5/8	3/4	3	5/8	32680	32681
5/8	1-5/8	3-1/2	5/8	32666	32667
3/4	1	3	3/4	32682	32683
3/4	1-5/8	4	3/4	32668	32669
1	1-1/2	4	1	32670	32671

**55
FRACTIONAL SERIES**

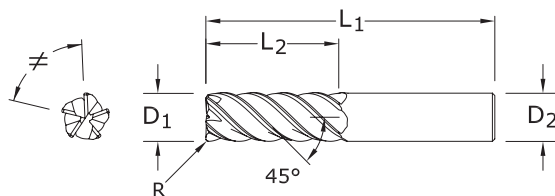
- Unequal indexing, high helix and an ideal rake and relief combination for unmatched finishing capability
- The choice when peak finish quality is the requirement
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)



55CR

FRACTIONAL 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
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



inch					EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	Ti-NAMITE-A (AITiN)	Ti-NAMITE-A (AITiN) W/FLAT
1/8	1/4	1-1/2	1/8	.010	32606	—
1/8	1/2	1-1/2	1/8	.010	32607	—
5/32	5/16	2	3/16	.010	32608	—
5/32	9/16	2	3/16	.010	32609	—
3/16	5/16	2	3/16	.010	32610	—
3/16	5/8	2	3/16	.010	32611	—
7/32	3/8	2	1/4	.015	32612	—
7/32	3/4	2-1/2	1/4	.015	32613	—
1/4	3/8	2	1/4	.015	32614	—
1/4	3/4	2-1/2	1/4	.015	32615	—
1/4	1-1/4	4	1/4	.015	32616	—
5/16	7/16	2	5/16	.015	32619	—
5/16	13/16	2-1/2	5/16	.015	32620	—
5/16	1-1/4	4	5/16	.015	32621	—
3/8	1/2	2	3/8	.015	32625	32591
3/8	1/2	2	3/8	.030	32592	32593
3/8	1	2-1/2	3/8	.015	32626	32628
3/8	1	2-1/2	3/8	.030	32573	32574
3/8	1-1/2	4	3/8	.015	32627	—
3/8	1-1/2	4	3/8	.030	32569	—
7/16	1	2-3/4	7/16	.015	32632	—
7/16	2	4	7/16	.015	32633	—
1/2	5/8	2-1/2	1/2	.030	32594	32595
1/2	5/8	2-1/2	1/2	.060	32596	32597
1/2	1-1/4	3	1/2	.030	32575	32576
1/2	1-1/4	3	1/2	.060	32577	32578
1/2	2	4	1/2	.030	32685	—
1/2	2	4	1/2	.060	32686	—
5/8	3/4	3	5/8	.030	32598	32599
5/8	3/4	3	5/8	.060	32600	32601
5/8	1-5/8	3-1/2	5/8	.030	32579	32580
5/8	1-5/8	3-1/2	5/8	.060	32581	32582
5/8	2-1/2	5	5/8	.030	32570	—
5/8	2-1/2	5	5/8	.060	32687	—
3/4	1	3	3/4	.030	32602	32603
3/4	1	3	3/4	.060	32604	32605
3/4	1-5/8	4	3/4	.030	32583	32584
3/4	1-5/8	4	3/4	.060	32585	32586
3/4	3-1/4	6	3/4	.030	32571	—
3/4	3-1/4	6	3/4	.060	32688	—
1	1-1/2	4	1	.030	32587	32588
1	1-1/2	4	1	.060	32589	32590
1	2-5/8	6	1	.030	32572	—
1	2-5/8	6	1	.060	32689	—

TOLERANCES (inch)

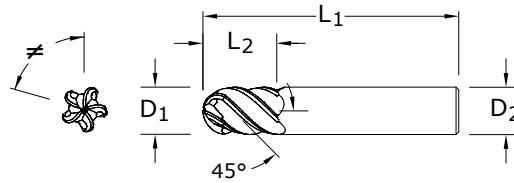
D₁ = +0.0000/-0.0020

D₂ = h₆

R = +0.0000/-0.0020

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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TOLERANCES (inch)

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0010$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

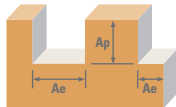
HARDENED STEELS

**55B
FRACTIONAL SERIES**

inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AITiN)
1/4	3/4	2-1/2	1/4	32500
5/16	13/16	2-1/2	5/16	32501
3/8	1	2-1/2	3/8	32502
1/2	1-1/4	3	1/2	32503
5/8	1-5/8	3-1/2	5/8	32504
3/4	1-5/8	4	3/4	32505
1	1-1/2	4	1	32506

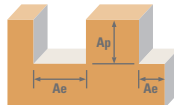
- Unequal indexing, high helix and an ideal rake and relief combination for unmatched finishing capability
- The choice when peak finish quality is the requirement
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)

For patent
information visit
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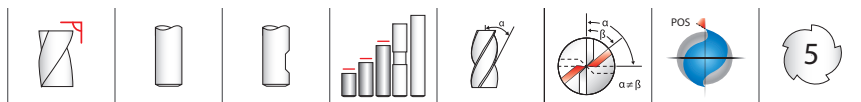


Series 55, 55CR, 55B Fractional		Hardness			Vc (sfm)	Diameter (D1) (inch)								
			Ae x D1	Ap x D1		1/8	1/4	3/8	1/2	5/8	3/4	1		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.25	≤ 1.5	385	RPM	11766	5883	3922	2941	2353	1961	1471
						(308-462)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0028	0.0032
							Feed (ipm)	20.6	26.5	33.3	33.8	34.1	27.5	23.5
		≤ 275 Bhn or ≤ 28 HRc	HSM 	≤ 0.05	≤ 2	630	RPM	19253	9626	6418	4813	3851	3209	2407
						(504-756)	Fz	0.0007	0.0018	0.0034	0.0046	0.0057	0.0055	0.0064
							Feed (ipm)	67.4	86.6	109.1	110.7	109.7	88.2	77.0
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.25	≤ 1.5	325	RPM	9932	4966	3311	2483	1986	1655	1242
						(260-390)	Fz	0.0003	0.0007	0.0013	0.0017	0.0022	0.0021	0.0024
							Feed (ipm)	12.9	17.4	21.5	21.1	21.9	17.4	14.9
		≤ 375 Bhn or ≤ 40 HRc	HSM 	≤ 0.05	≤ 2	530	RPM	16197	8098	5399	4049	3239	2699	2025
						(424-636)	Fz	0.0005	0.0014	0.0026	0.0034	0.0043	0.0041	0.0048
							Feed (ipm)	42.1	56.7	70.2	68.8	69.6	55.3	48.6
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.25	≤ 1.5	175	RPM	5348	2674	1783	1337	1070	891	669
						(140-210)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (ipm)	5.3	6.7	8.9	8.7	8.6	7.6	6.0
		≤ 375 Bhn or ≤ 40 HRc	HSM 	≤ 0.05	≤ 2	290	RPM	8862	4431	2954	2216	1772	1477	1108
						(232-348)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0033	0.0035
							Feed (ipm)	17.7	22.2	28.1	27.7	28.4	24.4	19.4
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ 0.25	≤ 1.5	470	RPM	14363	7182	4788	3591	2873	2394	1795
						(376-564)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (ipm)	25.1	32.3	40.7	41.3	41.7	35.9	28.7
		≤ 220 Bhn or ≤ 19 HRc	HSM 	≤ 0.05	≤ 2	705	RPM	21545	10772	7182	5386	4309	3591	2693
						(564-846)	Fz	0.0007	0.0018	0.0034	0.0046	0.0057	0.0059	0.0064
							Feed (ipm)	75.4	97.0	122.1	123.9	122.8	105.9	86.2
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile 	≤ 0.25	≤ 1.5	360	RPM	11002	5501	3667	2750	2200	1834	1375
						(288-432)	Fz	0.0003	0.0007	0.0013	0.0017	0.0022	0.0023	0.0024
							Feed (ipm)	14.3	19.3	23.8	23.4	24.2	21.1	16.5
		≤ 260 Bhn or ≤ 26 HRc	HSM 	≤ 0.05	≤ 2	540	RPM	16502	8251	5501	4126	3300	2750	2063
						(432-648)	Fz	0.0005	0.0014	0.0026	0.0034	0.0043	0.0044	0.0048
							Feed (ipm)	42.9	57.8	71.5	70.1	71.0	60.5	49.5
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.25	≤ 1.5	370	RPM	11307	5654	3769	2827	2261	1885	1413
						(296-444)	Fz	0.0003	0.0007	0.0013	0.0017	0.0022	0.0023	0.0024
							Feed (ipm)	14.7	19.8	24.5	24.0	24.9	21.7	17.0
		≤ 275 Bhn or ≤ 28 HRc	HSM 	≤ 0.05	≤ 2	560	RPM	17114	8557	5705	4278	3423	2852	2139
						(448-672)	Fz	0.0005	0.0014	0.0026	0.0034	0.0043	0.0044	0.0048
							Feed (ipm)	44.5	59.9	74.2	72.7	73.6	62.7	51.3

continued on next page

Series 55, 55CR, 55B Fractional	Hardness			Vc (sfm)	Diameter (D ₁) (inch)								
		Ae x D ₁	Ap x D ₁		1/8	1/4	3/8	1/2	5/8	3/4	1		
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L		≤ 0.25	≤ 1.5	255	RPM	7793	3896	2598	1948	1559	1299	974
					(204-306)	Fz	0.0002	0.0006	0.0012	0.0016	0.0020	0.0021	0.0023
						Feed (ipm)	9.4	11.7	15.6	15.6	15.6	13.6	11.2
			≤ 0.05	≤ 2	385	RPM	11766	5883	3922	2941	2353	1961	1471
					(308-462)	Fz	0.0005	0.0013	0.0024	0.0032	0.0040	0.0041	0.0045
						Feed (ipm)	28.2	38.2	47.1	47.1	47.1	40.2	33.1
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450		≤ 0.25	≤ 1.5	235	RPM	7182	3591	2394	1795	1436	1197	898
					(188-282)	Fz	0.0002	0.0006	0.0010	0.0014	0.0017	0.0018	0.0019
						Feed (ipm)	7.5	10.8	12.0	12.6	12.2	10.8	8.5
			≤ 0.05	≤ 2	355	RPM	10849	5424	3616	2712	2170	1808	1356
					(284-426)	Fz	0.0004	0.0011	0.0021	0.0028	0.0034	0.0036	0.0039
						Feed (ipm)	22.2	29.8	38.0	38.0	36.9	32.5	26.4
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400		≤ 0.25	≤ 1.5	70	RPM	2139	1070	713	535	428	357	267
					(56-84)	Fz	0.0002	0.0006	0.0010	0.0014	0.0017	0.0018	0.0019
						Feed (ipm)	2.2	3.2	3.6	3.7	3.6	3.2	2.5
			≤ 0.05	≤ 2	107	RPM	3270	1635	1090	817	654	545	409
					(86-128)	Fz	0.0004	0.0011	0.0021	0.0028	0.0034	0.0036	0.0039
						Feed (ipm)	6.7	9.0	11.4	11.4	11.1	9.8	8.0
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene		≤ 0.25	≤ 1.5	55	RPM	1681	840	560	420	336	280	210
					(44-66)	Fz	0.0002	0.0004	0.0008	0.0010	0.0013	0.0014	0.0015
						Feed (ipm)	1.3	1.7	2.2	2.1	2.2	2.0	1.6
			≤ 0.05	≤ 2	85	RPM	2598	1299	866	649	520	433	325
					(68-102)	Fz	0.0003	0.0008	0.0015	0.0021	0.0026	0.0027	0.0029
						Feed (ipm)	4.0	5.2	6.5	6.8	6.8	5.8	4.7
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si		≤ 0.25	≤ 1.5	235	RPM	7182	3591	2394	1795	1436	1197	898
					(188-282)	Fz	0.0002	0.0006	0.0012	0.0016	0.0020	0.0021	0.0023
						Feed (ipm)	7.2	10.8	14.4	14.4	14.4	12.6	10.3
			≤ 0.05	≤ 2	390	RPM	11918	5959	3973	2980	2384	1986	1490
					(312-468)	Fz	0.0005	0.0013	0.0024	0.0032	0.0040	0.0041	0.0045
						Feed (ipm)	29.8	38.7	47.7	47.7	47.7	40.7	33.5
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al		≤ 0.25	≤ 1.5	85	RPM	2598	1299	866	649	520	433	325
					(68-102)	Fz	0.0002	0.0006	0.0012	0.0016	0.0020	0.0021	0.0023
						Feed (ipm)	2.6	3.9	5.2	5.2	5.2	4.5	3.7
			≤ 0.05	≤ 2	140	RPM	4278	2139	1426	1070	856	713	535
					(112-168)	Fz	0.0005	0.0013	0.0024	0.0032	0.0040	0.0042	0.0045
						Feed (ipm)	10.7	13.9	17.1	17.1	17.1	15.0	12.0

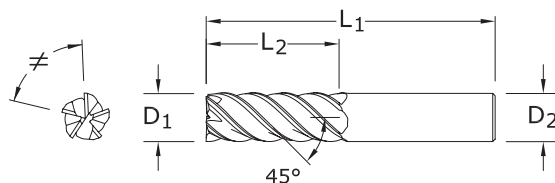
Bhn (Brinell) HRC (Rockwell C) HSM (High Speed Machining)
 $\text{rpm} = \text{Vc} \times 3.82 / D_1$
 $\text{ipm} = \text{Fz} \times 5 \times \text{rpm}$
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x D1 maximum)
 reduce Ap to 1 x D1 (maximum) when profile milling with long or extra long flute length tools
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-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)



mm				EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	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	—

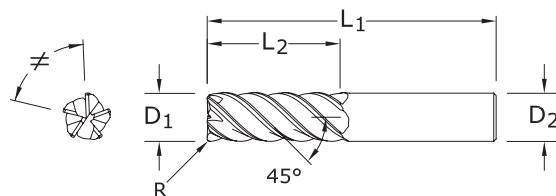
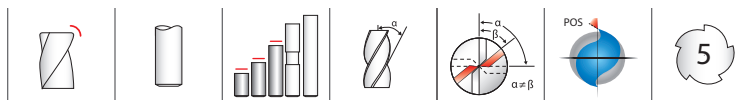
TOLERANCES (mm)

D₁ = +0,000/−0,050

D₂ = h₆

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent
information visit
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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
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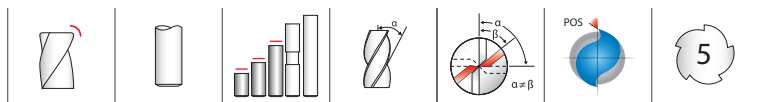
55MCR

METRIC SERIES

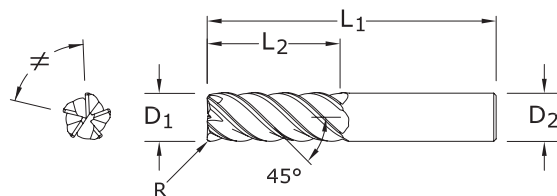
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	EDP NO. Ti-NAMITE-A (AlTiN)
6,0	12,0	50,0	6,0	0,5	42660
6,0	19,0	63,0	6,0	0,25	42661
6,0	19,0	63,0	6,0	0,5	42662
6,0	19,0	63,0	6,0	1,0	42663
6,0	19,0	63,0	6,0	1,5	42664
6,0	25,0	75,0	6,0	0,5	42665
8,0	12,0	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

	mm				EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	Ti-NAMITE-A (AlTiN)
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

R = +0,000/-0,050

STEELS

STAINLESS STEELS

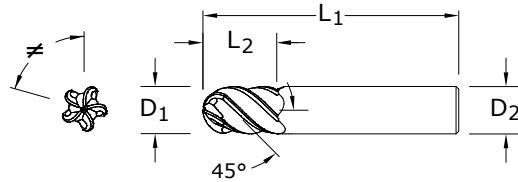
CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

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information visit
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TOLERANCES (mm)

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

$D_2 = h_6$

BALL RADIUS

$+0,000/-0,025$

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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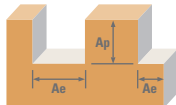
55MB
METRIC SERIES

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)
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

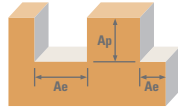
- Unequal indexing, high helix and an ideal rake and relief combination for unmatched finishing capability
- The choice when peak finish quality is the requirement
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)

Series 55M, 55MCR, 55MB					Diameter (D1) (mm)							
Metric	Hardness		Ae x D1	Ap x D1	Vc (m/min)	6	8	10	12	16	20	
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	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	
		HSM	≤ 0.05	≤ 2	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	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	Profile	≤ 0.25	≤ 1.5	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	
		HSM	≤ 0.05	≤ 2	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	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	
		HSM	≤ 0.05	≤ 2	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	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	
		HSM	≤ 0.05	≤ 2	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	
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	Profile	≤ 0.25	≤ 1.5	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	
		HSM	≤ 0.05	≤ 2	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	

continued on next page

Series 55M, 55MCR, 55MB Metric					Diameter (D ₁) (mm)								
Hardness			Ae x D ₁	Ap x D ₁	Vc (m/min)	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	
	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	
	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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Series 55M, 55MCR, 55MB					Vc (m/min)	Diameter (D1) (mm)							
Metric	Hardness	Ae x D1	Ap x D1	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	
		≤ 38 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	
		≤ 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)

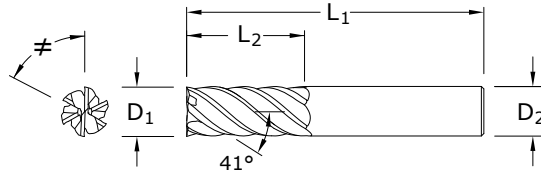
rpm = (Vc x 1000) / (D₁ x 3.14)

mm/min = Fz x 5 x 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-sgstool.com)


TOLERANCES (inch)
 $D_1 = +0.0000/-0.0020$
 $D_2 = h6$

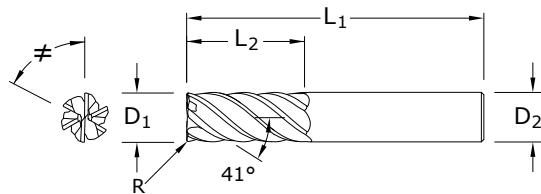
STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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51
FRACTIONAL SERIES

inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	TI-NAMITE-X (TX)
1/4	3/4	2-1/2	1/4	35100
3/8	1	2-1/2	3/8	35101
1/2	1-1/4	3	1/2	35102
5/8	1-5/8	3-1/2	5/8	35103
3/4	1-5/8	4	3/4	35104
1	2-5/8	6	1	35105

- 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)


TOLERANCES (inch)
 $D_1 = +0.0000/-0.0020$
 $D_2 = h6$
 $R = +0.0000/-0.0020$

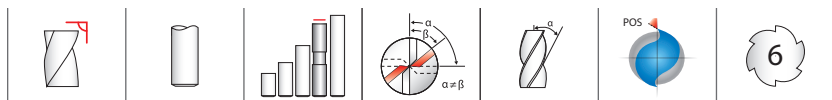
STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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51CR
FRACTIONAL SERIES

inch					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	TI-NAMITE-X (TX)
1/4	3/4	2-1/2	1/4	.015	35112
1/4	3/4	2-1/2	1/4	.030	35150
3/8	1	2-1/2	3/8	.015	35113
3/8	1	2-1/2	3/8	.030	35114
1/2	1-1/4	3	1/2	.015	35151
1/2	1-1/4	3	1/2	.030	35115
1/2	1-1/4	3	1/2	.060	35152
1/2	1-1/4	3	1/2	.090	35116
1/2	1-1/4	3	1/2	.120	35117
5/8	1-5/8	3-1/2	5/8	.015	35153
5/8	1-5/8	3-1/2	5/8	.030	35118
5/8	1-5/8	3-1/2	5/8	.060	35154
5/8	1-5/8	3-1/2	5/8	.090	35119
5/8	1-5/8	3-1/2	5/8	.120	35120
5/8	1-5/8	3-1/2	5/8	.190	35155
3/4	1-5/8	4	3/4	.030	35121
3/4	1-5/8	4	3/4	.060	35156
3/4	1-5/8	4	3/4	.090	35122
3/4	1-5/8	4	3/4	.120	35123
3/4	1-5/8	4	3/4	.190	35157
3/4	1-5/8	4	3/4	.250	35158
1	2-5/8	6	1	.030	35124
1	2-5/8	6	1	.060	35159
1	2-5/8	6	1	.090	35125
1	2-5/8	6	1	.120	35126
1	2-5/8	6	1	.190	35160
1	2-5/8	6	1	.250	35161

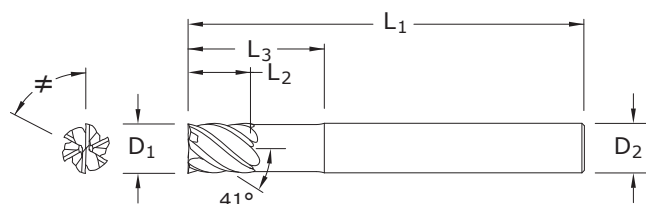
- Engineered for High Speed Milling using Trochoidal and Peel Milling techniques
- Eccentric relief provides superior strength and smoother surface finish
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



51L

FRACTIONAL 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
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	inch		SHANK DIAMETER D ₂	REACH L ₃	EDP NO. TI-NAMITE-X (TX)
		OVERALL LENGTH L ₁				
1/4	3/8	4		1/4	1-1/8	35106
3/8	1/2	4		3/8	2-1/8	35107
1/2	5/8	4		1/2	2-1/4	35108
5/8	3/4	5		5/8	2-1/2	35109
3/4	1	6		3/4	3-3/8	35110
1	1-1/4	6		1	3-3/8	35111

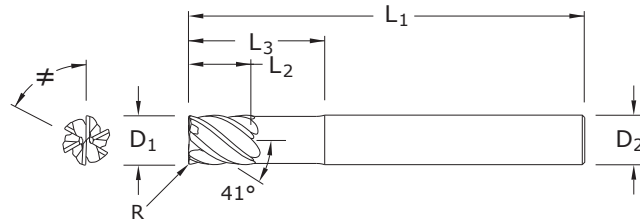
TOLERANCES (inch)

D₁ = +0.0000/-0.0020

D₂ = h6

STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

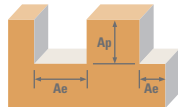
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TOLERANCES (inch)
 $D_1 = +0.0000/-0.0020$
 $D_2 = h6$
 $R = +0.0000/-0.0020$
STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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51LC
FRACTIONAL SERIES

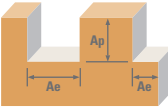
inch						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	TI-NAMITE-X (TX)
1/4	3/8	4	1/4	1-1/8	.015	35127
1/4	3/8	4	1/4	1-1/8	.030	35180
3/8	1/2	4	3/8	2-1/8	.015	35128
3/8	1/2	4	3/8	2-1/8	.030	35129
1/2	5/8	4	1/2	2-1/4	.015	35181
1/2	5/8	4	1/2	2-1/4	.030	35130
1/2	5/8	4	1/2	2-1/4	.060	35182
1/2	5/8	4	1/2	2-1/4	.090	35131
1/2	5/8	4	1/2	2-1/4	.120	35132
5/8	3/4	5	5/8	2-1/2	.015	35183
5/8	3/4	5	5/8	2-1/2	.030	35133
5/8	3/4	5	5/8	2-1/2	.060	35184
5/8	3/4	5	5/8	2-1/2	.090	35134
5/8	3/4	5	5/8	2-1/2	.120	35135
5/8	3/4	5	5/8	2-1/2	.190	35185
3/4	1	6	3/4	3-3/8	.030	35136
3/4	1	6	3/4	3-3/8	.060	35186
3/4	1	6	3/4	3-3/8	.090	35137
3/4	1	6	3/4	3-3/8	.120	35138
3/4	1	6	3/4	3-3/8	.190	35187
3/4	1	6	3/4	3-3/8	.250	35188
1	1-1/4	6	1	3-3/8	.030	35139
1	1-1/4	6	1	3-3/8	.060	35189
1	1-1/4	6	1	3-3/8	.090	35140
1	1-1/4	6	1	3-3/8	.120	35141
1	1-1/4	6	1	3-3/8	.190	35190
1	1-1/4	6	1	3-3/8	.250	35191

- 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)



Series 51, 51CR, 51L, 51LC Fractional		Hardness			Vc (sfm)	Diameter (D1) (inch)							
			Ae x D1	Ap x D1		1/4	3/8	1/2	5/8	3/4	1		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRC	 Profile	≤ 0.1	≤ 1	720	RPM	11002	7334	5501	4401	3667	2750
						(576-864)	Fz	0.0020	0.0035	0.0050	0.0055	0.0061	0.0071
						Feed (ipm)	132	154	165	145	134	117	
			 HSM	≤ 0.05	≤ 2	915	RPM	13981	9321	6991	5592	4660	3495
						(732-1098)	Fz	0.0028	0.0053	0.0070	0.0077	0.0085	0.0100
						Feed (ipm)	235	296	294	258	238	210	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRC	 Profile	≤ 0.1	≤ 1	490	RPM	7487	4991	3744	2995	2496	1872
						(392-588)	Fz	0.0015	0.0029	0.0038	0.0042	0.0046	0.0054
						Feed (ipm)	67	87	85	75	69	61	
			 HSM	≤ 0.05	≤ 2	620	RPM	9474	6316	4737	3789	3158	2368
						(496-744)	Fz	0.0021	0.0039	0.0052	0.0057	0.0062	0.0073
						Feed (ipm)	119	148	148	130	117	104	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRC	 Profile	≤ 0.1	≤ 1	240	RPM	3667	2445	1834	1467	1222	917
						(192-288)	Fz	0.0012	0.0023	0.0030	0.0034	0.0037	0.0043
						Feed (ipm)	26	34	33	30	27	24	
			 HSM	≤ 0.05	≤ 2	305	RPM	4660	3107	2330	1864	1553	1165
						(244-366)	Fz	0.0017	0.0032	0.0042	0.0046	0.0050	0.0059
						Feed (ipm)	48	60	59	51	47	41	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRC	 Profile	≤ 0.1	≤ 1	510	RPM	7793	5195	3896	3117	2598	1948
						(459-561)	Fz	0.0015	0.0028	0.0038	0.0041	0.0045	0.0053
						Feed (ipm)	70	87	89	77	70	62	
			 HSM	≤ 0.05	≤ 2	650	RPM	9932	6621	4966	3973	3311	2483
						(585-715)	Fz	0.0021	0.0038	0.0051	0.0056	0.0061	0.0072
						Feed (ipm)	125	151	152	133	121	107	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRC	 Profile	≤ 0.1	≤ 1	350	RPM	5348	3565	2674	2139	1783	1337
						(315-385)	Fz	0.0012	0.0023	0.0030	0.0033	0.0036	0.0042
						Feed (ipm)	39	49	48	42	39	34	
			 HSM	≤ 0.05	≤ 2	450	RPM	6876	4584	3438	2750	2292	1719
						(405-495)	Fz	0.0017	0.0032	0.0042	0.0046	0.0050	0.0059
						Feed (ipm)	70	88	87	76	69	61	
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRC	 Profile	≤ 0.1	≤ 1	325	RPM	4966	3311	2483	1986	1655	1242
						(293-358)	Fz	0.0012	0.0023	0.0030	0.0033	0.0036	0.0042
						Feed (ipm)	36	46	45	39	36	31	
			 HSM	≤ 0.05	≤ 2	410	RPM	6265	4177	3132	2506	2088	1566
						(369-451)	Fz	0.0017	0.0032	0.0042	0.0046	0.0050	0.0059
						Feed (ipm)	64	80	79	69	63	55	

continued on next page

Series 51, 51CR, 51L, 51LC Fractional	Hardness			Vc (sfm)	Diameter (D ₁) (inch)								
		Ae x D ₁	Ap x D ₁		1/4	3/8	1/2	5/8	3/4	1			
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	 Profile	≤ 0.1	≤ 1	105	RPM	1604	1070	802	642	535	401	
					(84-126)	Fz	0.0014	0.0027	0.0036	0.0039	0.0043	0.0050	
						Feed (ipm)	13	17	17	15	14	12	
		 HSM	≤ 0.05	≤ 2	130	RPM	1986	1324	993	795	662	497	
					(104-156)	Fz	0.0016	0.0036	0.0048	0.0053	0.0058	0.0067	
						Feed (ipm)	19	29	29	25	23	20	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	 Profile	≤ 0.1	≤ 1	80	RPM	1222	815	611	489	407	306
						(64-96)	Fz	0.0010	0.0018	0.0025	0.0027	0.0029	0.0034
							Feed (ipm)	7	9	9	8	7	6
			 HSM	≤ 0.05	≤ 2	100	RPM	1528	1019	764	611	509	382
						(80-120)	Fz	0.0013	0.0025	0.0034	0.0037	0.0041	0.0047
							Feed (ipm)	12	15	16	14	13	11
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si		≤ 350 Bhn or ≤ 38 HRc	 Profile	≤ 0.1	≤ 1	280	RPM	4278	2852	2139	1711	1426	1070
						(224-336)	Fz	0.0010	0.0018	0.0025	0.0027	0.0029	0.0034
							Feed (ipm)	26	31	32	28	25	22
			 HSM	≤ 0.05	≤ 2	355	RPM	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0013	0.0025	0.0034	0.0037	0.0041	0.0047
							Feed (ipm)	42	54	55	48	44	38
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	 Profile	≤ 0.1	≤ 1	155	RPM	2368	1579	1184	947	789	592
						(124-186)	Fz	0.0010	0.0018	0.0025	0.0027	0.0029	0.0034
							Feed (ipm)	14	17	18	15	14	12
			 HSM	≤ 0.05	≤ 2	200	RPM	3056	2037	1528	1222	1019	764
						(160-240)	Fz	0.0013	0.0025	0.0034	0.0037	0.0041	0.0047
							Feed (ipm)	24	31	31	27	25	22

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)

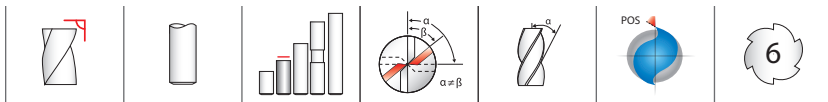
rpm = Vc x 3.82 / D₁

ipm = Fz x 6 x rpm

reduce speed and feed for materials harder than listed

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

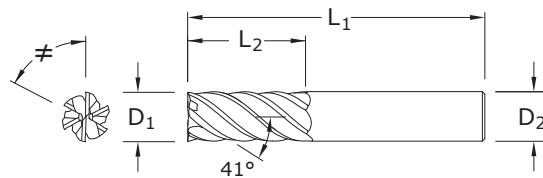
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



51M

METRIC SERIES

- 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)



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

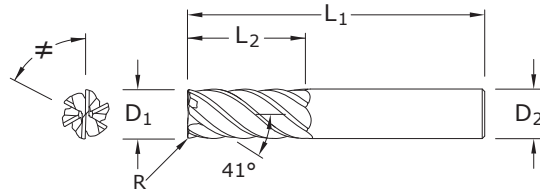
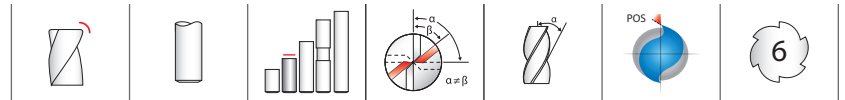
TOLERANCES (mm)

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

$D_2 = h6$

STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent
information visit
www.ksptpatents.com



TOLERANCES (mm)

D₁ = +0,000/-0,050

D₂ = h6

R = +0,000/-0,050

STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

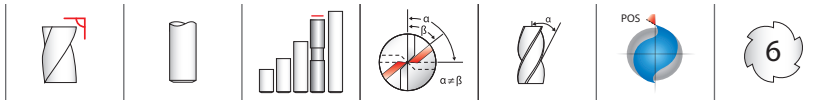
For patent
information visit
www.ksptpatents.com

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	mm OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	EDP NO. TI-NAMITE-X (TX)
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
20,0	38,0	104,0	20,0	4,0	45185
20,0	38,0	104,0	20,0	5,0	45186

51MCR

METRIC SERIES

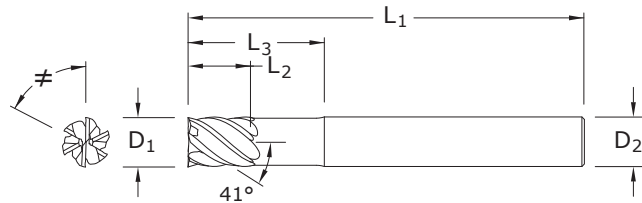
- Engineered for High Speed Milling using Trochoidal and Peel Milling techniques
- Eccentric relief provides superior strength and smoother surface finish
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



51ML

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
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	mm			EDP NO. TI-NAMITE-X (TX)
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	REACH L ₃	
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

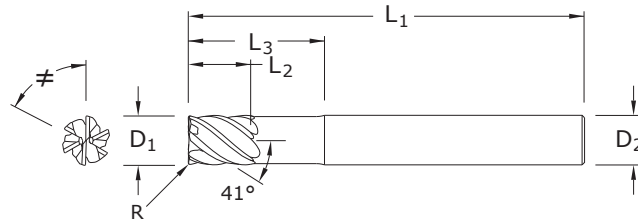
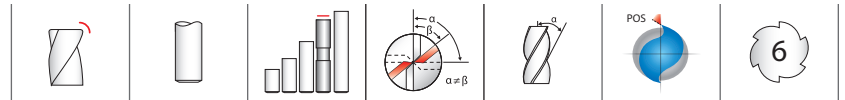
TOLERANCES (mm)

D₁ = +0,000/-0,050

D₂ = h6

STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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TOLERANCES (mm)

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

$D_2 = h6$

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

STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

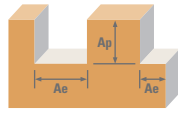
For patent
information visit
www.ksptpatents.com

mm						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	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

51MLC

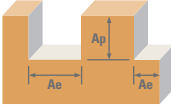
METRIC SERIES

- 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)



Series 51M, 51MCR, 51ML, 51MLC Metric		Hardness			Vc (m/min)	Diameter (D1) (mm)							
			Ae x D1	Ap x D1		6	8	10	12	16	20		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc		≤ 0.1	≤ 1	219	RPM	11633	8725	6980	5816	4362	3490
						(176-263)	Fz	0.048	0.081	0.101	0.121	0.142	0.158
						Feed (mm/min)	3350	4240	4230	4223	3717	3308	
		≤ 275 Bhn or ≤ 28 HRc		≤ 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	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc		≤ 0.1	≤ 1	149	RPM	7917	5938	4750	3958	2969	2375
						(119-179)	Fz	0.036	0.061	0.077	0.092	0.107	0.119
						Feed (mm/min)	1710	2173	2195	2185	1906	1696	
		≤ 375 Bhn or ≤ 40 HRc		≤ 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	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc		≤ 0.1	≤ 1	73	RPM	3878	2908	2327	1939	1454	1163
						(59-88)	Fz	0.029	0.049	0.061	0.073	0.086	0.096
						Feed (mm/min)	675	855	852	849	750	670	
		≤ 375 Bhn or ≤ 40 HRc		≤ 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	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc		≤ 0.1	≤ 1	155	RPM	8240	6180	4944	4120	3090	2472
						(140-171)	Fz	0.035	0.060	0.075	0.090	0.105	0.117
						Feed (mm/min)	1730	2225	2225	2225	1947	1735	
		≤ 275 Bhn or ≤ 28 HRc		≤ 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	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc		≤ 0.1	≤ 1	107	RPM	5655	4241	3393	2827	2121	1696
						(96-117)	Fz	0.029	0.049	0.061	0.073	0.086	0.096
						Feed (mm/min)	984	1247	1242	1238	1094	977	
		≤ 275 Bhn or ≤ 28 HRc		≤ 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	
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc		≤ 0.1	≤ 1	99	RPM	5251	3938	3151	2626	1969	1575
						(89-109)	Fz	0.029	0.049	0.061	0.073	0.086	0.096
						Feed (mm/min)	914	1158	1153	1150	1016	907	
		≤ 325 Bhn or ≤ 35 HRc		≤ 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	

continued on next page

Series 51M, 51MCR, 51ML, 51MLC Metric	Hardness			Vc (m/min)	Diameter (D ₁) (mm)							
		Ae x D ₁	Ap x D ₁		6	8	10	12	16	20		
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	 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	 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	 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	 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)

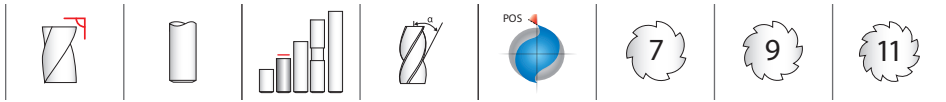
rpm = (Vc x 1000) / (D₁ x 3.14)

mm/min = Fz x 6 x rpm

reduce speed and feed for materials harder than listed

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

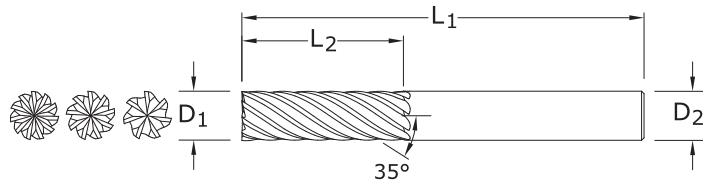
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



66

FRACTIONAL 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)



inch					EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	NO. OF FLUTES	TI-NAMITE-X
3/16	5/8	2	3/16	7	36620
1/4	3/4	2-1/2	1/4	7	36621
3/8	1	3	3/8	7	36622
1/2	1-1/4	3	1/2	9	36623
5/8	1-5/8	3-1/2	5/8	9	36624
3/4	1-5/8	4	3/4	11	36625
1	2	6	1	11	36626

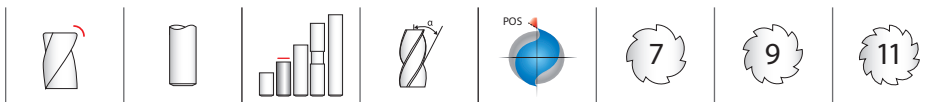
Neck Option Available

TOLERANCES (inch)

D₁ = +0.0000/-0.0020
D₂ = h₆

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

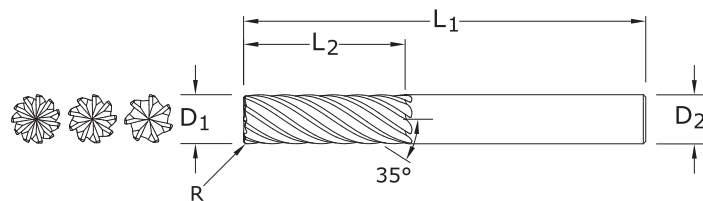
For patent information visit
www.ksptpatents.com



66CR

FRACTIONAL 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)



inch						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
3/16	5/8	2	3/16	.010	7	36627
1/4	3/4	2-1/2	1/4	.015	7	36628
3/8	1	3	3/8	.015	7	36629
1/2	1-1/4	3	1/2	.030	9	36630
1/2	1-1/4	3	1/2	.090	9	36631
1/2	1-1/4	3	1/2	.120	9	36632
5/8	1-5/8	3-1/2	5/8	.030	9	36633
5/8	1-5/8	3-1/2	5/8	.090	9	36634
5/8	1-5/8	3-1/2	5/8	.120	9	36635
3/4	1-5/8	4	3/4	.030	11	36636
3/4	1-5/8	4	3/4	.090	11	36637
3/4	1-5/8	4	3/4	.120	11	36638
1	2	6	1	.030	11	36639
1	2	6	1	.090	11	36640
1	2	6	1	.120	11	36641

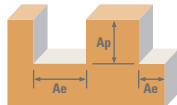
Neck Option Available

TOLERANCES (inch)

D₁ = +0.0000/-0.0020
D₂ = h₆
R = +0.0000/-0.0020

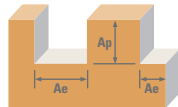
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent information visit
www.ksptpatents.com

Series 66, 66CR Fractional		Hardness			Vc (sfm)	Diameter (D ₁) (inch)								
			Ae x D ₁	Ap x D ₁		3/16	1/4	3/8	1/2	5/8	3/4	1		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.05	≤ 1	635	RPM	12937	9703	6469	4851	3881	3234	2426
						(508-762)	Fz	0.0008	0.0012	0.0022	0.0030	0.0037	0.0038	0.0042
							Feed (ipm)	72.4	81.5	99.6	131.0	129.2	135.2	112.1
		Finish 	≤ 0.02	≤ 2	762	RPM	15524	11643	7762	5822	4657	3881	2911	
					(610-914)	Fz	0.0006	0.0010	0.0018	0.0024	0.0030	0.0030	0.0034	
						Feed (ipm)	69.5	78.2	95.6	125.7	124.1	129.8	107.6	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.05	≤ 1	360	RPM	7334	5501	3667	2750	2200	1834	1375
						(288-432)	Fz	0.0006	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (ipm)	30.8	34.7	43.6	56.9	57.4	60.5	48.4
		Finish 	≤ 0.02	≤ 2	432	RPM	8801	6601	4401	3300	2640	2200	1650	
					(346-518)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026	
						Feed (ipm)	29.6	33.3	41.9	54.7	55.1	58.1	46.5	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ 0.05	≤ 1	290	RPM	5908	4431	2954	2216	1772	1477	1108
						(232-348)	Fz	0.0004	0.0006	0.0012	0.0016	0.0020	0.0021	0.0022
							Feed (ipm)	16.5	18.6	24.8	31.9	31.9	34.1	26.8
		Finish 	≤ 0.02	≤ 2	348	RPM	7090	5317	3545	2659	2127	1772	1329	
					(278-418)	Fz	0.0003	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018	
						Feed (ipm)	15.9	17.9	23.8	30.6	30.6	32.8	25.7	
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ 0.05	≤ 1	705	RPM	14363	10772	7182	5386	4309	3591	2693
						(564-846)	Fz	0.0008	0.0012	0.0022	0.0030	0.0037	0.0038	0.0042
							Feed (ipm)	80.4	90.5	110.6	145.4	143.5	150.1	124.4
		Finish 	≤ 0.02	≤ 2	846	RPM	17236	12927	8618	6463	5171	4309	3232	
					(677-1015)	Fz	0.0006	0.0010	0.0018	0.0024	0.0030	0.0030	0.0034	
						Feed (ipm)	77.2	86.9	106.2	139.6	137.7	144.1	119.4	
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile 	≤ 0.05	≤ 1	540	RPM	11002	8251	5501	4126	3300	2750	2063
						(432-648)	Fz	0.0006	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (ipm)	46.2	52.0	65.5	85.4	86.1	90.8	72.6
		Finish 	≤ 0.02	≤ 2	648	RPM	13202	9901	6601	4951	3961	3300	2475	
					(518-778)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026	
						Feed (ipm)	44.4	49.9	62.8	82.0	82.7	87.1	69.7	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.05	≤ 1	560	RPM	11409	8557	5705	4278	3423	2852	2139
						(448-672)	Fz	0.0006	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (ipm)	47.9	53.9	67.9	88.6	89.3	94.1	75.3
		Finish 	≤ 0.02	≤ 2	448	RPM	9127	6845	4564	3423	2738	2282	1711	
					(358-538)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026	
						Feed (ipm)	30.7	34.5	43.4	56.7	57.2	60.2	48.2	

continued on next page

Multi-Carb



Series 66, 66CR Fractional	Hardness			Vc (sfm)	Diameter (D ₁) (inch)								
		Ae x D ₁	Ap x D ₁		3/16	1/4	3/8	1/2	5/8	3/4	1		
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L ≤ 275 Bhn or ≤ 28 HRc	 Profile	≤ 0.05	≤ 1	385	RPM	7844	5883	3922	2941	2353	1961	1471
					(308-462)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
						Feed (ipm)	27.5	28.8	38.4	47.7	48.7	51.8	42.1
		 Finish	≤ 0.02	≤ 2	462	RPM	9412	7059	4706	3530	2824	2353	1765
					(370-554)	Fz	0.0004	0.0006	0.0011	0.0014	0.0018	0.0019	0.0021
						Feed (ipm)	26.4	27.7	36.9	45.7	46.8	49.7	40.4
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450 ≤ 325 Bhn or ≤ 35 HRc	 Profile	≤ 0.05	≤ 1	355	RPM	7233	5424	3616	2712	2170	1808	1356
					(284-426)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
						Feed (ipm)	25.3	26.6	35.4	43.9	44.9	47.7	38.8
		 Finish	≤ 0.02	≤ 2	426	RPM	8679	6509	4340	3255	2604	2170	1627
					(341-511)	Fz	0.0004	0.0006	0.0011	0.0014	0.0018	0.0019	0.0021
						Feed (ipm)	24.3	25.5	34.0	42.2	43.1	45.8	37.2
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400 ≤ 300 Bhn or ≤ 32 HRc	 Profile	≤ 0.05	≤ 1	105	RPM	2139	1604	1070	802	642	535	401
					(84-126)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
						Feed (ipm)	7.5	7.9	10.5	13.0	13.3	14.1	11.5
		 Finish	≤ 0.02	≤ 2	126	RPM	2567	1925	1284	963	770	642	481
					(101-151)	Fz	0.0004	0.0006	0.0011	0.0014	0.0018	0.0019	0.0021
						Feed (ipm)	7.2	7.5	10.1	12.5	12.8	13.6	11.0
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene ≤ 400 Bhn or ≤ 43 HRc	 Profile	≤ 0.05	≤ 1	85	RPM	1732	1299	866	649	520	433	325
					(68-102)	Fz	0.0003	0.0005	0.0009	0.0011	0.0014	0.0015	0.0016
						Feed (ipm)	3.6	4.5	5.5	6.4	6.5	7.1	5.7
		 Finish	≤ 0.02	≤ 2	102	RPM	2078	1559	1039	779	623	520	390
					(82-122)	Fz	0.0002	0.0004	0.0007	0.0009	0.0011	0.0012	0.0013
						Feed (ipm)	3.5	4.4	5.2	6.2	6.3	6.9	5.5
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si ≤ 350 Bhn or ≤ 38 HRc	 Profile	≤ 0.05	≤ 1	390	RPM	7946	5959	3973	2980	2384	1986	1490
					(312-468)	Fz	0.0005	0.0008	0.0015	0.0021	0.0026	0.0027	0.0029
						Feed (ipm)	27.8	33.4	41.7	56.3	55.8	59.0	47.5
		 Finish	≤ 0.02	≤ 2	468	RPM	9535	7151	4767	3576	2860	2384	1788
					(374-562)	Fz	0.0004	0.0006	0.0012	0.0017	0.0021	0.0022	0.0023
						Feed (ipm)	26.7	32.0	40.0	54.1	53.5	56.6	45.6
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al ≤ 440 Bhn or ≤ 47 HRc	 Profile	≤ 0.05	≤ 1	140	RPM	2852	2139	1426	1070	856	713	535
					(112-168)	Fz	0.0005	0.0008	0.0015	0.0021	0.0026	0.0027	0.0029
						Feed (ipm)	10.0	12.0	15.0	20.2	20.0	21.2	17.1
		 Finish	≤ 0.02	≤ 2	168	RPM	3423	2567	1711	1284	1027	856	642
					(134-202)	Fz	0.0004	0.0006	0.0012	0.0017	0.0021	0.0022	0.0023
						Feed (ipm)	9.6	11.5	14.4	19.4	19.2	20.3	16.4

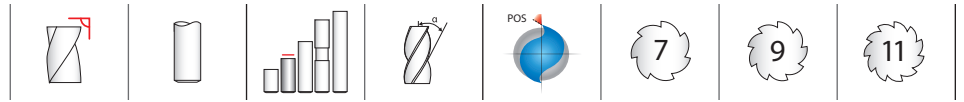
Bhn (Brinell) HRc (Rockwell C)

rpm = Vc x 3.82 / D₁

ipm = 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)



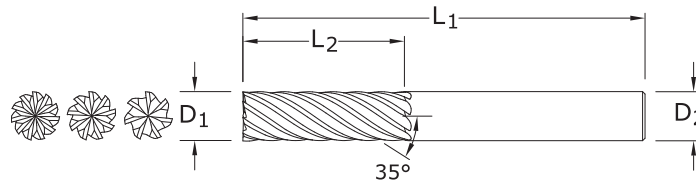
TOLERANCES (mm)

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

$D_2 = h_6$

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HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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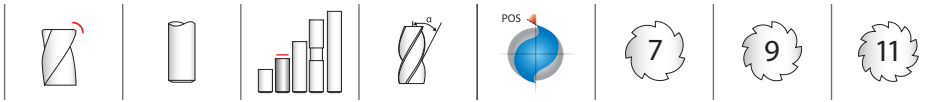


66M
METRIC SERIES

mm					EDP NO. TI-NAMITE-X
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	
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

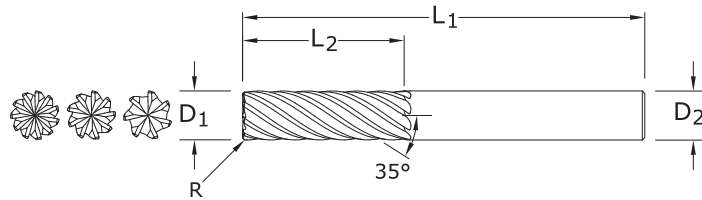
- Heavy core and rigid design allow for straight walls
- High flute count design results in smoother cutting performance and enhanced tool life in precise finishing applications
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



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)



CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	mm		CORNER RADIUS R	NO. OF FLUTES	EDP NO.
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂			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

continued on next page

Neck Option Available

TOLERANCES (mm)

D₁ = +0,000/-0,050

D₂ = h₆

R = +0,000/-0,050

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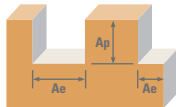
66MCR
METRIC SERIES

CONTINUED

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

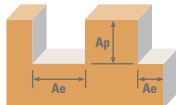
Neck Option Available

Multi-Carb



Series 66M, 66MCR Metric		Hardness			Vc (m/min)	Diameter (D ₁) (mm)								
			Ae x D ₁	Ap x D ₁		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	
		≤ 275 Bhn or ≤ 28 HRC	 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	
	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	
		≤ 375 Bhn or ≤ 40 HRC	 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	
H	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	
		≤ 375 Bhn or ≤ 40 HRC	 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	
K	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	
		≤ 220 Bhn or ≤ 19 HRC	 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	
	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	
		≤ 260 Bhn or ≤ 26 HRC	 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	
		≤ 275 Bhn or ≤ 28 HRC	 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			Vc (m/min)	Diameter (D ₁) (mm)								
		Ae x D ₁	Ap x D ₁		6	8	10	12	16	20	25		
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L ≤ 275 Bhn or ≤ 28 HRc		≤ 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	
			≤ 0.02	≤ 2	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	
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450 ≤ 325 Bhn or ≤ 35 HRc		≤ 0.05	≤ 1	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	
			≤ 0.02	≤ 2	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		≤ 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	
			≤ 0.02	≤ 2	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	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene ≤ 400 Bhn or ≤ 43 HRc		≤ 0.05	≤ 1	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	
			≤ 0.02	≤ 2	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		≤ 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	
			≤ 0.02	≤ 2	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	
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al ≤ 440 Bhn or ≤ 47 HRc		≤ 0.05	≤ 1	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	
			≤ 0.02	≤ 2	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 x 1000) / (D₁ x 3.14)

mm/min = Fz x number of flutes x rpm

reduce speed and feed for materials harder than listed

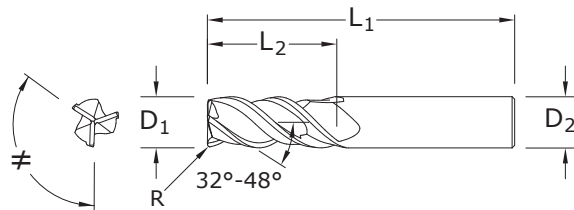
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

FRACTIONAL Series 33



33CR FRACTIONAL 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)



	inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	TI-NAMITE-A (AITiN)
1/8	3/8	2-1/2	1/4	.015	33345
3/16	9/16	2-1/2	1/4	.015	33346
1/4	3/4	2-1/2	1/4	.020	33347
5/16	13/16	2-1/2	5/16	.020	33348
3/8	1	2-1/2	3/8	.020	33349
7/16	1-1/8	2-3/4	7/16	.020	33350
1/2	1-1/4	3-1/4	1/2	.030	33351
5/8	1-1/2	3-1/2	5/8	.040	33352
3/4	1-3/4	4	3/4	.040	33353
1	2-1/4	5	1	.040	33354

TOLERANCES (inch)

1/8-1/4 DIAMETER

$D_1 = +0.0000/-0.0012$

$D_2 = h6$

$R = +0.0000/-0.0020$

>1/4-3/8 DIAMETER

$D_1 = +0.0000/-0.0016$

$D_2 = h6$

$R = +0.0000/-0.0020$

>3/8-1 DIAMETER

$D_1 = +0.0000/-0.0020$

$D_2 = h6$

$R = +0.0000/-0.0020$

STEELS

STAINLESS STEELS

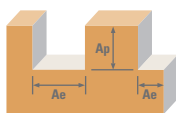
CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

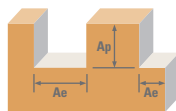
For patent
information visit
www.ksptpatents.com



Series 33CR Fractional	Hardness		Ae x D ₁	Ap x D ₁	Vc (sfm)	Diameter (D ₁) (inch)							
						1/8	1/4	3/8	1/2	5/8	3/4	1	
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	 Profile	≤ 0.5	≤ 1.5	550	RPM	16808	8404	5603	4202	3362	2801	2101
					(440-660)	Fz	0.0005	0.0012	0.0023	0.0031	0.0039	0.0040	0.0043
						Feed (ipm)	25.2	30.3	38.7	39.1	39.3	33.6	27.1
		 Slot	1	≤ 1	440	RPM	13446	6723	4482	3362	2689	2241	1681
					(352-528)	Fz	0.0005	0.0012	0.0023	0.0031	0.0039	0.0040	0.0043
						Feed (ipm)	20.2	24.2	30.9	31.3	31.5	26.9	21.7
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	 Profile	≤ 0.5	≤ 1.5	315	RPM	9626	4813	3209	2407	1925	1604	1203
					(252-378)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
						Feed (ipm)	11.6	13.0	16.4	16.6	16.7	14.4	11.6
		 Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
					(200-300)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
						Feed (ipm)	9.2	10.3	13.0	13.2	13.3	11.5	9.2
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	 Profile	≤ 0.5	≤ 1.5	185	RPM	5654	2827	1885	1413	1131	942	707
					(148-222)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
						Feed (ipm)	5.1	5.9	7.9	7.6	7.8	6.8	5.3
		 Slot	1	≤ 1	145	RPM	4431	2216	1477	1108	886	739	554
					(116-174)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
						Feed (ipm)	4.0	4.7	6.2	6.0	6.1	5.3	4.2
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	 Profile	≤ 0.5	≤ 1.5	445	RPM	13599	6800	4533	3400	2720	2267	1700
					(356-534)	Fz	0.0004	0.0011	0.0021	0.0028	0.0035	0.0036	0.0039
						Feed (ipm)	14.3	22.4	28.6	28.6	28.6	24.5	19.9
		 Slot	1	≤ 1	355	RPM	10849	5424	3616	2712	2170	1808	1356
					(284-426)	Fz	0.0004	0.0011	0.0021	0.0028	0.0035	0.0036	0.0039
						Feed (ipm)	11.4	17.9	22.8	22.8	22.8	19.5	15.9
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	 Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
					(272-408)	Fz	0.0003	0.0008	0.0016	0.0021	0.0026	0.0027	0.0029
						Feed (ipm)	9.4	12.5	16.6	16.4	16.2	14.0	11.3
		 Slot	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
					(216-324)	Fz	0.0003	0.0008	0.0016	0.0021	0.0026	0.0027	0.0029
						Feed (ipm)	7.4	9.9	13.2	13.0	12.9	11.1	9.0
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	 Profile	≤ 0.5	≤ 1.5	490	RPM	14974	7487	4991	3744	2995	2496	1872
					(392-588)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
						Feed (ipm)	17.1	22.5	28.5	28.1	27.9	24.0	19.7
		 Slot	1	≤ 1	390	RPM	11918	5959	3973	2980	2384	1986	1490
					(312-468)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
						Feed (ipm)	13.6	17.9	22.6	22.3	22.2	19.1	15.6

continued on next page

Series 33



Series 33CR Fractional	Hardness		Vc (sfm)	Diameter (D ₁) (inch)									
				1/8	1/4	3/8	1/2	5/8	3/4	1			
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	 Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
					(272-408)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
						Feed (ipm)	9.4	12.5	15.6	15.6	15.6	13.5	10.9
		 Slot	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
					(216-324)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
						Feed (ipm)	7.4	9.9	12.4	12.4	12.4	10.7	8.7
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	 Profile	≤ 0.5	≤ 1.5	310	RPM	9474	4737	3158	2368	1895	1579	1184
					(248-372)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
						Feed (ipm)	8.5	11.4	14.2	14.2	14.2	12.3	9.9
		 Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
					(200-300)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
						Feed (ipm)	6.9	9.2	11.5	11.5	11.5	9.9	8.0
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	 Profile	≤ 0.5	≤ 1.5	80	RPM	2445	1222	815	611	489	407	306
					(64-96)	Fz	0.0003	0.0007	0.0013	0.0017	0.0021	0.0022	0.0024
						Feed (ipm)	1.9	2.6	3.2	3.1	3.1	2.7	2.2
		 Slot	1	≤ 1	65	RPM	1986	993	662	497	397	331	248
					(52-78)	Fz	0.0003	0.0007	0.0013	0.0017	0.0021	0.0022	0.0024
						Feed (ipm)	1.5	2.1	2.6	2.5	2.5	2.2	1.8
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	 Profile	≤ 0.5	≤ 1.5	62	RPM	1895	947	632	474	379	316	237
					(50-74)	Fz	0.0002	0.0005	0.0009	0.0012	0.0015	0.0016	0.0017
						Feed (ipm)	1.1	1.4	1.7	1.7	1.7	1.5	1.2
		 Slot	1	≤ 1	49	RPM	1497	749	499	374	299	250	187
					(39-59)	Fz	0.0002	0.0005	0.0009	0.0012	0.0015	0.0016	0.0017
						Feed (ipm)	0.9	1.1	1.3	1.3	1.3	1.2	1.0
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	 Profile	≤ 0.5	≤ 1.5	215	RPM	6570	3285	2190	1643	1314	1095	821
					(172-258)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
						Feed (ipm)	5.9	7.9	9.9	9.9	9.9	8.5	6.9
		 Slot	1	≤ 1	170	RPM	5195	2598	1732	1299	1039	866	649
					(136-204)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
						Feed (ipm)	4.7	6.2	7.8	7.8	7.8	6.8	5.5
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	 Profile	≤ 0.5	≤ 1.5	75	RPM	2292	1146	764	573	458	382	287
					(60-90)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
						Feed (ipm)	2.1	2.8	3.4	3.4	3.4	3.0	2.4
		 Slot	1	≤ 1	60	RPM	1834	917	611	458	367	306	229
					(48-72)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
						Feed (ipm)	1.7	2.2	2.8	2.8	2.8	2.4	1.9

Bhn (Brinell) HRc (Rockwell C)

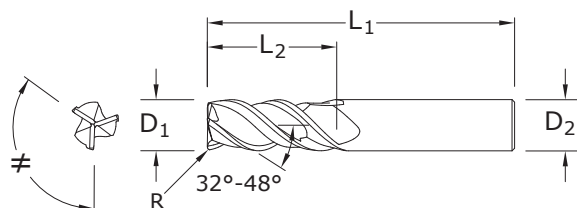
rpm = Vc x 3.82 / D₁

ipm = Fz x 3 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)


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
 $D_1 = +0,000/-0,050$
 $D_2 = h_6$
 $R = +0,000/-0,050$
33MCR
METRIC SERIES

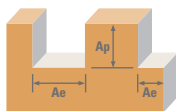
	mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	TI-NAMITE-A (AlTiN)
3,0	9,0	57,0	6,0	0,3	43445
3,0	9,0	57,0	6,0	0,5	43470
4,0	12,0	57,0	6,0	0,3	43446
4,0	12,0	57,0	6,0	0,5	43471
5,0	15,0	57,0	6,0	0,3	43447
5,0	15,0	57,0	6,0	0,5	43472
6,0	18,0	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

- 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)

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

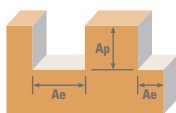
For patent information visit
www.ksptpatents.com

Series 33



Series 33MCR Metric		Hardness			Vc (m/min)	Diameter (D1) (mm)								
			Ae x D1	Ap x D1		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		

continued on next page



Series 33MCR Metric	Hardness			Vc (m/min)	Diameter (D1) (mm)									
		Ae x D1	Ap x D1		3	6	8	10	12	16	20			
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc		≤ 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	
		≤ 28 HRc		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	≤ 325 Bhn or ≤ 35 HRc		≤ 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	
		≤ 35 HRc		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	≤ 300 Bhn or ≤ 32 HRc		≤ 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	
		≤ 32 HRc		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	≤ 400 Bhn or ≤ 43 HRc		≤ 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	
		≤ 43 HRc		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	≤ 350 Bhn or ≤ 38 HRc		≤ 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	
		≤ 38 HRc		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	≤ 440 Bhn or ≤ 47 HRc		≤ 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		
	≤ 47 HRc		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)

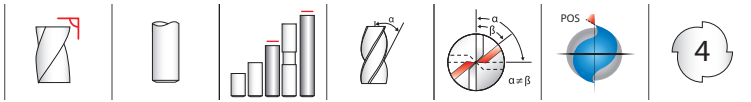
rpm = (Vc x 1000) / (D₁ x 3.14)

mm/min = Fz x 3 x rpm

reduce speed and feed for materials harder than listed

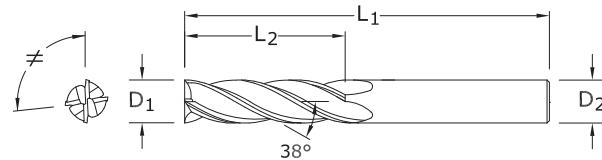
reduce feed and Ae when finish milling (.02 x D₁ maximum)

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



7 FRACTIONAL 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
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



	inch			EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-X
1/8	3/4	2-1/4	1/8	70470
1/8	1	3	1/8	70471
3/16	3/4	2-1/2	3/16	70472
3/16	1-1/8	3	3/16	70473
1/4	1-1/8	3	1/4	70474
1/4	1-1/2	4	1/4	70475
5/16	1-1/8	3	5/16	70476
5/16	1-5/8	4	5/16	70477
3/8	1-1/8	3	3/8	70478
3/8	1-3/4	4	3/8	70479
7/16	2	4-1/2	7/16	70480
7/16	3	6	7/16	70481
1/2	2	4-1/2	1/2	70482
1/2	3	6	1/2	70483
5/8	2-1/4	5	5/8	70484
5/8	3	6	5/8	70485
3/4	2-1/4	5	3/4	70486
3/4	3	6	3/4	70487
1	2-1/4	5	1	70488
1	3	6	1	70489

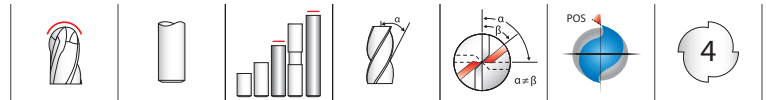
TOLERANCES (inch)

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent
information visit
www.ksptpatents.com



TOLERANCES (inch)

$D_1 = +0.0000/-0.0020$

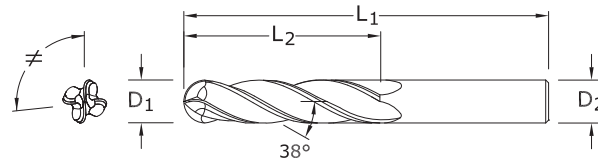
$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0010$

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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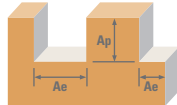


inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-X
1/8	3/4	2-1/4	1/8	70441
1/8	1	3	1/8	70442
3/16	3/4	2-1/2	3/16	70444
3/16	1-1/8	3	3/16	70445
1/4	1-1/8	3	1/4	70447
1/4	1-1/2	4	1/4	70448
5/16	1-1/8	3	5/16	70450
5/16	1-5/8	4	5/16	70451
3/8	1-1/8	3	3/8	70453
3/8	1-3/4	4	3/8	70454
7/16	2	4-1/2	7/16	70456
7/16	3	6	7/16	70457
1/2	2	4-1/2	1/2	70459
1/2	3	6	1/2	70460
5/8	2-1/4	5	5/8	70462
5/8	3	6	5/8	70463
3/4	2-1/4	5	3/4	70465
3/4	3	6	3/4	70466
1	2-1/4	5	1	70468
1	3	6	1	70469

7B
FRACTIONAL 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)

FRACTIONAL Series 7



Series 7, 7B Fractional		Hardness			Vc (sfm)	Diameter (D ₁) (inch)								
			1/8	1/4		3/8	1/2	5/8	3/4	1				
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Finish 	≤ 0.02	≤ 2	480	RPM	14669	7334	4890	3667	2934	2445	1834
						(384-576)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0033	0.0035
						Feed (ipm)	23.5	29.3	37.2	36.7	37.6	32.3	25.7	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Finish 	≤ 0.02	≤ 2	275	RPM	8404	4202	2801	2101	1681	1401	1051
						(220-330)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
						Feed (ipm)	10.1	11.8	15.7	15.1	15.5	13.4	10.9	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Finish 	≤ 0.02	≤ 2	230	RPM	7029	3514	2343	1757	1406	1171	879
						(184-276)	Fz	0.0002	0.0006	0.0012	0.0016	0.0020	0.0021	0.0022
						Feed (ipm)	5.6	8.4	11.2	11.2	11.2	9.8	7.7	
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Finish 	≤ 0.02	≤ 2	605	RPM	18489	9244	6163	4622	3698	3081	2311
						(484-726)	Fz	0.0006	0.0015	0.0028	0.0037	0.0046	0.0047	0.0051
						Feed (ipm)	44.4	55.5	69.0	68.4	68.0	57.9	47.1	
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Finish 	≤ 0.02	≤ 2	465	RPM	14210	7105	4737	3553	2842	2368	1776
						(372-558)	Fz	0.0004	0.0011	0.0021	0.0028	0.0034	0.0036	0.0039
						Feed (ipm)	22.7	31.3	39.8	39.8	38.7	34.1	27.7	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Finish 	≤ 0.02	≤ 2	420	RPM	12835	6418	4278	3209	2567	2139	1604
						(336-504)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0033	0.0035
						Feed (ipm)	20.5	25.7	32.5	32.1	32.9	28.2	22.5	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Finish 	≤ 0.02	≤ 2	290	RPM	8862	4431	2954	2216	1772	1477	1108
						(232-348)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
						Feed (ipm)	10.6	12.4	16.5	16.0	16.3	14.2	11.5	
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Finish 	≤ 0.02	≤ 2	265	RPM	8098	4049	2699	2025	1620	1350	1012
						(212-318)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
						Feed (ipm)	9.7	11.3	15.1	14.6	14.9	13.0	10.5	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Finish 	≤ 0.02	≤ 2	80	RPM	2445	1222	815	611	489	407	306
						(64-96)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
						Feed (ipm)	2.9	3.4	4.6	4.4	4.5	3.9	3.2	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Finish 	≤ 0.02	≤ 2	65	RPM	1986	993	662	497	397	331	248
						(52-78)	Fz	0.0002	0.0006	0.0010	0.0014	0.0017	0.0018	0.0019
						Feed (ipm)	1.6	2.4	2.6	2.8	2.7	2.4	1.9	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Finish 	≤ 0.02	≤ 2	300	RPM	9168	4584	3056	2292	1834	1528	1146
						(240-360)	Fz	0.0004	0.0011	0.0021	0.0028	0.0034	0.0036	0.0039
						Feed (ipm)	14.7	20.2	25.7	25.7	24.9	22.0	17.9	
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Finish 	≤ 0.02	≤ 2	105	RPM	3209	1604	1070	802	642	535	401	
					(84-126)	Fz	0.0004	0.0011	0.0021	0.0028	0.0034	0.0036	0.0039	
					Feed (ipm)	5.1	7.1	9.0	9.0	8.7	7.7	6.3		

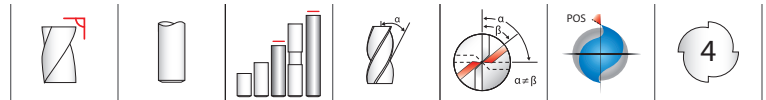
Bhn (Brinell) HRC (Rockwell C)

rpm = $V_c \times 3.82 / D_1$

ipm = $F_z \times 4 \times \text{rpm}$

reduce speed and feed for materials harder than listed

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



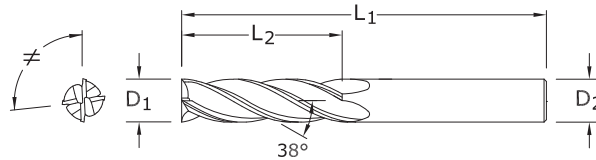
TOLERANCES (mm)

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

$D_2 = h_6$

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

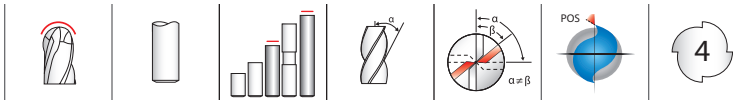
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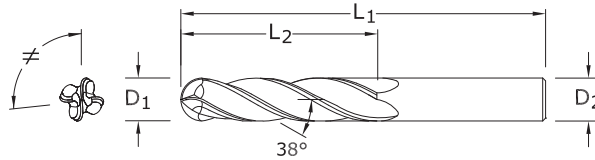
7M
METRIC SERIES

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)



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)

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

$D_2 = h_6$

BALL RADIUS

$+0,000/-0,025$

STEELS

STAINLESS STEELS

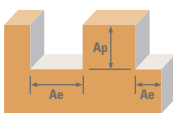
CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

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Series 7M, 7MB 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	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	
	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	
	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	
	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	
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	
	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	
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		
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		

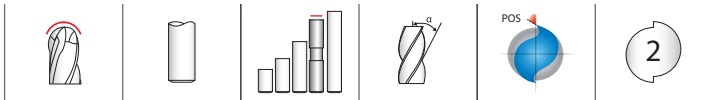
Bhn (Brinell) HRc (Rockwell C)

rpm = (Vc x 1000) / (D₁ x 3.14)

mm/min = Fz x 4 x rpm

reduce speed and feed for materials harder than listed

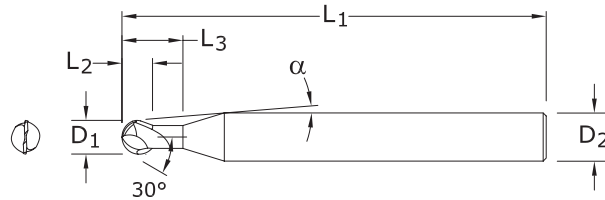
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



56B

FRACTIONAL 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)



CUTTING DIAMETER D_1	LENGTH OF CUT L_2	inch			α	REACH L_3	EDP NO. Ti-NAMITE-X
		OVERALL LENGTH L_1	SHANK DIAMETER D_2				
1/32	1/32	3	1/4		8°20'	1/16	93272
1/16	1/16	3	1/4		7°40'	1/8	93273
3/32	3/32	3	1/4		6°50'	3/16	93274
1/8	1/8	3	1/4		6°	1/4	93275
3/16	3/16	3	1/4		3°35'	3/8	93276
1/4	1/4	3-1/2	1/4		—	1/2	93277
5/16	5/16	4	5/16		—	5/8	93278
3/8	3/8	4	3/8		—	3/4	93279
1/2	1/2	4-1/2	1/2		—	1	93280
5/8	5/8	5-1/2	5/8		—	1-1/4	93281
3/4	3/4	6-1/2	3/4		—	1-1/2	93282

Neck Option Available

TOLERANCES (inch)

1/32–3/32 DIAMETER

$D_1 = +0.0000/-0.0010$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0005$

>3/32–1/4 DIAMETER

$D_1 = +0.0000/-0.0012$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0006$

>1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.0016$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0008$

>3/8–3/4 DIAMETER

$D_1 = +0.0000/-0.0020$

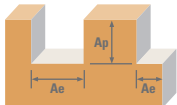
$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0010$

HARDENED STEELS

For patent
information visit
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Series 56B	Fractional	Hardness	Ae x D ₁	Ap x D ₁	Vc (sfm)	Diameter (D ₁) (inch)									
						1/32	1/16	1/8	3/16	1/4	3/8	1/2	3/4		
H	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	625	RPM	76400	38200	19100	12733	9550	6367	4775	3183
						(500-750)	Fz	0.0006	0.0015	0.0030	0.0040	0.0050	0.0080	0.0100	0.0120
							Feed (ipm)	92	115	115	102	96	102	96	76
		≤ 475 Bhn or ≤ 50 HRc	HSM 	≤ 0.4	≤ 0.03	950	RPM	116128	58064	29032	19355	14516	9677	7258	4839
						(760-1140)	Fz	0.0007	0.0017	0.0033	0.0044	0.0060	0.0088	0.0110	0.0130
							Feed (ipm)	163	197	192	170	174	170	160	126
	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	750	RPM	91680	45840	22920	15280	11460	7640	5730	3820
						(600-900)	Fz	0.0005	0.0011	0.0023	0.0030	0.0038	0.0060	0.0075	0.0085
							Feed (ipm)	92	101	105	92	87	92	86	65
		≤ 655 Bhn or ≤ 60 HRc	HSM 	≤ 0.4	≤ 0.02	1150	RPM	140576	70288	35144	23429	17572	11715	8786	5857
						(920-1380)	Fz	0.0006	0.0012	0.0025	0.0033	0.0042	0.0066	0.0082	0.0100
							Feed (ipm)	169	169	176	155	148	155	144	117
	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	500	RPM	61120	30560	15280	10187	7640	5093	3820	2547
						(400-600)	Fz	0.0004	0.0008	0.0017	0.0023	0.0029	0.0045	0.0057	0.0063
							Feed (ipm)	49	49	52	47	44	46	44	32
		≤ 655 Bhn or ≤ 60 HRc	HSM 	≤ 0.4	≤ 0.01	1000	RPM	122240	61120	30560	20373	15280	10187	7640	5093
						(800-1200)	Fz	0.0005	0.0009	0.0019	0.0025	0.0032	0.0050	0.0063	0.0071
							Feed (ipm)	122	110	116	102	98	102	96	72

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)

rpm = Vc x 3.82 / D₁

ipm = Fz x 2 x rpm

reduce speed and feed for materials harder than listed

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

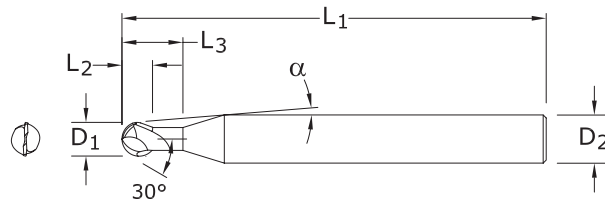
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



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

BALL RADIUS

+0.0000/–0.0013

>2,5–6 DIAMETER

D₁ = +0,000/–0,030

D₂ = h₆

BALL RADIUS

+0.0000/–0.0015

>6–10 DIAMETER

D₁ = +0,000/–0,040

D₂ = h₆

BALL RADIUS

+0.0000/–0.0020

>10–20 DIAMETER

D₁ = +0,000/–0,050

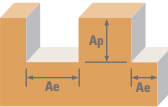
D₂ = h₆

BALL RADIUS

+0.0000/–0.0025

HARDENED STEELS

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information visit
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Series 56MB Metric	Hardness			Vc (m/min)	Diameter (D ₁) (mm)									
		Ae x D ₁	Ap x D ₁		1	1.5	3	5	6	10	12	20		
H	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)

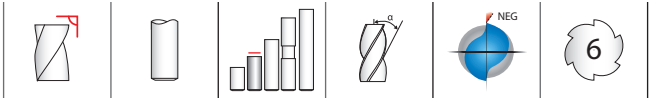
rpm = (Vc x 1000) / (D₁ x 3.14)

mm/min = Fz x 2 x rpm

reduce speed and feed for materials harder than listed

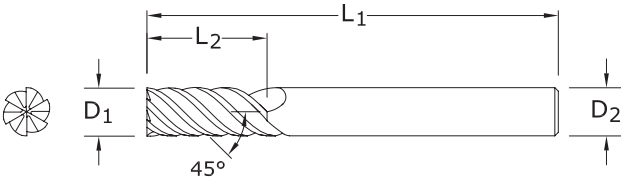
reduce feed and Ae when finish milling (.02 x D₁ maximum)

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



57
FRACTIONAL 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)



inch				EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	Ti-NAMITE-X
1/4	17/32	3-1/2	1/4	36140
5/16	11/16	4	5/16	36141
3/8	13/16	4	3/8	36142
1/2	1-3/32	4-1/2	1/2	36143

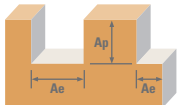
Neck Option Available

TOLERANCES (inch)

- 1/4 DIAMETER**
D₁ = +0.0000/-0.0012
D₂ = h₆
- 5/16 DIAMETER**
D₁ = +0.0000/-0.0016
D₂ = h₆
- 3/8 DIAMETER**
D₁ = +0.0000/-0.0016
D₂ = h₆
- 1/2 DIAMETER**
D₁ = +0.0000/-0.0020
D₂ = h₆

HARDENED STEELS

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information visit
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Series 57 Fractional	Hardness			Vc (sfm)	Diameter (D ₁) (inch)					
		Ae x D ₁	Ap x D ₁		1/4	5/16	3/8	1/2		
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		1	≤ 0.3	215	RPM	3285	2628	2190	1643
					(172-258)	Fz	0.0013	0.0019	0.0025	0.0031
						Feed (ipm)	26	30	33	31
			≤ 0.1	≤ 1.5	265	RPM	4049	3239	2699	2025
					(212-318)	Fz	0.0018	0.0026	0.0035	0.0044
						Feed (ipm)	44	51	57	53
		≤ 0.04	≤ 1.5	560	RPM	8557	6845	5705	4278	
				(448-672)	Fz	0.0022	0.0033	0.0044	0.0055	
					Feed (ipm)	113	136	151	141	
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		1	≤ 0.3	120	RPM	1834	1467	1222	917
					(96-144)	Fz	0.0010	0.0015	0.0020	0.0025
						Feed (ipm)	11	13	15	14
			≤ 0.1	≤ 1.5	150	RPM	2292	1834	1528	1146
					(120-180)	Fz	0.0014	0.0021	0.0028	0.0035
						Feed (ipm)	19	23	26	24
		≤ 0.04	≤ 1.5	490	RPM	7487	5990	4991	3744	
				(392-588)	Fz	0.0018	0.0026	0.0035	0.0044	
					Feed (ipm)	81	93	105	99	
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		1	≤ 0.3	65	RPM	993	795	662	497
					(52-78)	Fz	0.0008	0.0011	0.0015	0.0019
						Feed (ipm)	5	5	6	6
			≤ 0.1	≤ 1.5	80	RPM	1222	978	815	611
					(64-96)	Fz	0.0011	0.0016	0.0021	0.0026
						Feed (ipm)	8	9	10	10
		≤ 0.04	≤ 1.5	250	RPM	3820	3056	2547	1910	
				(200-300)	Fz	0.0013	0.0019	0.0025	0.0031	
					Feed (ipm)	30	35	38	36	

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)

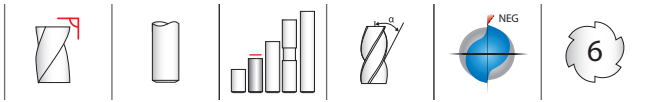
rpm = Vc x 3.82 / D₁

ipm = Fz x 6 x rpm

reduce speed and feed for materials harder than listed

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

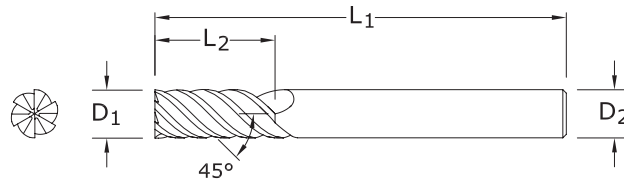
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57M

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

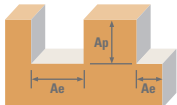
12-20 DIAMETER

D₁ = +0,000/-0,050

D₂ = h₆

HARDENED STEELS

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information visit
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Series 57M Metric	Hardness			Vc (m/min)	Diameter (D ₁) (mm)							
		Ae x D ₁	Ap x D ₁		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		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
			≤ 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
			≤ 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		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
			≤ 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
			≤ 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		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
			≤ 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
			≤ 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 x 1000) / (D₁ x 3.14)

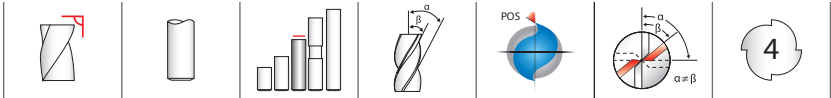
mm/min = Fz x 6 x rpm

reduce speed and feed for materials harder than listed

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

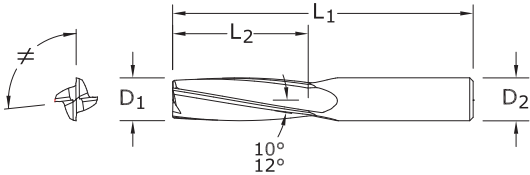
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

FRACTIONAL
Series 27



27
 FRACTIONAL 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

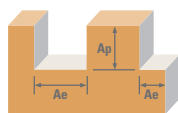


inch				EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	UNCOATED	Di-NAMITE® (Diamond)
1/4	1	2-1/2	1/4	72978	72979
3/8	1-1/8	2-1/2	3/8	72980	72981
1/2	1-1/2	3-1/2	1/2	72982	72983
3/4	1-3/8	4	3/4	72984	72985

TOLERANCES (inch)
 D₁ = +0.0000/−0.0030
 D₂ = h₆

PLASTICS/COMPOSITES

For patent
 information visit
www.ksptpatents.com



Series 27 Fractional				Vc (sfm)	Diameter (D ₁) (inch)				
		Ae x D ₁	Ap x D ₁		1/4	3/8	1/2	3/4	
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)		1	≤ 1	400	RPM	6112	4075	3056	2037
				(320-480)	Fz	0.0016	0.0030	0.0040	0.0048
					Feed (ipm)	39	49	49	39
		≤ 0.5	≤ 1.5	500	RPM	7640	5093	3820	2547
				(400-600)	Fz	0.0016	0.0030	0.0040	0.0048
					Feed (ipm)	49	61	61	49
		≤ 0.5	≤ 2	825	RPM	12606	8404	6303	4202
				(660-990)	Fz	0.0037	0.0069	0.0092	0.0110
					Feed (ipm)	187	232	232	185
GFRP (FIBERGLASS)		1	≤ 1	320	RPM	4890	3260	2445	1630
				(256-384)	Fz	0.0016	0.0030	0.0040	0.0048
					Feed (ipm)	31	39	39	31
		≤ 0.5	≤ 1.5	400	RPM	6112	4075	3056	2037
				(320-480)	Fz	0.0016	0.0030	0.0040	0.0048
					Feed (ipm)	39	49	49	39
		≤ 0.5	≤ 2	660	RPM	10085	6723	5042	3362
				(528-792)	Fz	0.0037	0.0069	0.0092	0.0110
					Feed (ipm)	149	186	186	148
N CARBON, GRAPHITE		1	≤ 1	480	RPM	7334	4890	3667	2445
				(384-576)	Fz	0.0020	0.0038	0.0050	0.0060
					Feed (ipm)	59	74	73	59
		≤ 0.5	≤ 1.5	600	RPM	9168	6112	4584	3056
				(480-720)	Fz	0.0020	0.0038	0.0050	0.0060
					Feed (ipm)	73	93	92	73
		≤ 0.5	≤ 2	990	RPM	15127	10085	7564	5042
				(792-1188)	Fz	0.0046	0.0086	0.0115	0.0138
					Feed (ipm)	278	347	348	278
PLASTICS		1	≤ 1	800	RPM	12224	8149	6112	4075
				(640-690)	Fz	0.0020	0.0038	0.0050	0.0060
					Feed (ipm)	98	124	122	98
		≤ 0.5	≤ 1.5	1000	RPM	15280	10187	7640	5093
				(800-1200)	Fz	0.0020	0.0038	0.0050	0.0060
					Feed (ipm)	122	155	153	122
		≤ 0.5	≤ 2	1650	RPM	25212	16808	12606	8404
				(1320-1980)	Fz	0.0046	0.0086	0.0115	0.0138
					Feed (ipm)	464	578	580	464
MACHINABLE CERAMICS MACHINABLE GLASS		1	≤ 1	40	RPM	611	407	306	204
				(32-48)	Fz	0.0008	0.0015	0.0020	0.0024
					Feed (ipm)	2.0	2.4	2.4	2.0
		≤ 0.5	≤ 1.5	50	RPM	764	509	382	255
				(40-60)	Fz	0.0008	0.0015	0.0020	0.0024
					Feed (ipm)	2.4	3.1	3.1	2.4
		≤ 0.5	≤ 2	85	RPM	1299	866	649	433
				(68-102)	Fz	0.0018	0.0034	0.0046	0.0055
					Feed (ipm)	9.4	11.8	11.9	9.5

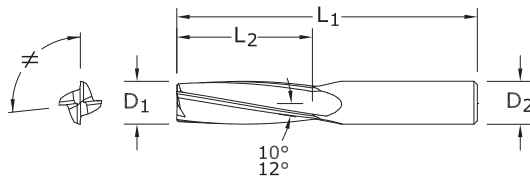
HSM (High Speed Machining)
 $rpm = Vc \times 3.82 / D_1$
 $ipm = Fz \times 4 \times rpm$
 adjust parameters based on resin type and fiber structure
 reduce speed when overheating causes melting or damage to resin
 reduce feed if delamination or fraying occur
 finish cuts typically required reduced feed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



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

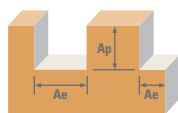
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm		EDP NO.	
		OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Di-NAMITE® (Diamond)
6,0	25,0	63,0	6,0	83056	83057
8,0	25,0	63,0	8,0	83058	83059
10,0	28,0	63,0	10,0	83060	83061
12,0	38,0	89,0	12,0	83062	83063
16,0	48,0	115,0	16,0	83064	83065

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 D ₁	Ap x D ₁	Vc (m/min)		Diameter (D ₁) (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)
 $\text{rpm} = \text{Vc} \times 3.82 / D_1$
 $\text{ipm} = \text{Fz} \times 4 \times \text{rpm}$
 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
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High Performance Aluminum End Mills



Milling

HIGH PERFORMANCE ALUMINUM END MILLS	SERIES	DESCRIPTION	PAGE
S-Carb APR® & APF®	43APR	3 Flute Advanced Productivity Rougher Fractional	123
	43APR-3	3 Flute Advanced Productivity Rougher Fractional	129
	43APR-4	4 Flute Advanced Productivity Rougher Fractional	130
	43MAPR	3 Flute Advanced Productivity Rougher Metric	127
	43APF	4 Flute Advanced Productivity Finisher Fractional	125
	43MAPF	4 Flute Advanced Productivity Finisher Metric	132
S-Carb® (3 Flute)	43	3 Flute Non-Ferrous Square End Fractional	134
	43M	3 Flute Non-Ferrous Square End Metric (Unpolished Flutes)	147
	43M	3 Flute Non-Ferrous Square End Metric (Polished Flutes)	147
	43CR	3 Flute Non-Ferrous Corner Radius Fractional	135
	43MCR	3 Flute Non-Ferrous Corner Radius Metric (Unpolished Flutes)	148
	43MCR	3 Flute Non-Ferrous Corner Radius Metric (Polished Flutes)	149
	43MCR	3 Flute Non-Ferrous Corner Radius 4xD Metric (Polished Flutes)	150
	43LC	3 Flute Non-Ferrous Long Reach Corner Radius Fractional	139
	43MLC	3 Flute Non-Ferrous Long Reach Corner Radius Metric (Unpolished Flutes)	152
	43MLC	3 Flute Non-Ferrous Long Reach Corner Radius Metric (Polished Flutes)	153
	43L	3 Flute Non-Ferrous Square End Long Reach Fractional	138
	43ML	3 Flute Non-Ferrous Square End Long Reach Metric	151
	43EC	3 Flute Non-Ferrous Square End Extra Long Reach Fractional	141
	43B	3 Flute Non-Ferrous Ball End Fractional	142
	43MB	3 Flute Non-Ferrous Ball End Metric (Polished Flutes)	154
	43LB	3 Flute Non-Ferrous Ball End Long Reach Fractional	143
	43EB	3 Flute Non-Ferrous Ball End Extra Long Reach Fractional	143
S-Carb® Rougher (3 Flute)	43CB	3 Flute Rougher Non-Ferrous Chip Breaker Fractional	144
	43MCB	3 Flute Rougher Non-Ferrous Chip Breaker Metric	155
	43LCB	3 Flute Rougher Non-Ferrous Chip Breaker Long Reach Fractional	145
S-Carb® (2 Flute)	47	2 Flute Non-Ferrous Square End Fractional	157
	47M	2 Flute Non-Ferrous Square End Metric	160
	47B	2 Flute Non-Ferrous Ball End Fractional	158
	47MB	2 Flute Non-Ferrous Ball End Metric	162
	47L	2 Flute Non-Ferrous Square End Long Reach Fractional	157
	47ML	2 Flute Non-Ferrous Square End Long Reach Metric	161
	47LB	2 Flute Non-Ferrous Ball End Long Reach Fractional	158
	47MLB	2 Flute Non-Ferrous Ball End Long Reach Metric	162
Ski-Carb	44	2 Flute Non-Ferrous Materials Square End Fractional	164
	44M	2 Flute Non-Ferrous Materials Square End Metric	166
	45	2 Flute Non-Ferrous Materials Long Reach Corner Radius Fractional	168

Speed & Feed Recommendations listed after each series

FRESAS DE ALTO RENDIMIENTO PARA ALUMINIO	SERIE	DESCRIPCIÓN	PÁGINA
S-Carb APR® y APF®	43APR	3 filos, productividad avanzada, desbastador, fraccional	123
	43APR-3	3 filos, productividad avanzada, desbastador, fraccional	129
	43APR-4	4 filos, productividad avanzada, desbastador, fraccional	130
	43MAPR	3 filos, productividad avanzada, desbastador, métrico	127
	43APF	4 filos, productividad avanzada, acabador, fraccional	125
	43MAPF	4 filos, productividad avanzada, acabador, métrico	132
S-Carb® (3 filos)	43	3 filos, no férrico, punta cuadrada, fraccional	134
	43M	3 filos, no férrico, punta cuadrada, métrico (filos no pulidos)	147
	43M	3 filos, no férrico, punta cuadrada, métrico (filos pulidos)	147
	43CR	3 filos, no férrico, radio angulado, fraccional	135
	43MCR	3 filos, no férrico, radio angulado, métrico (filos no pulidos)	148
	43MCR	3 filos, no férrico, radio angulado, métrico (filos pulidos)	149
	43MCR	3 filos, no férrico, radio angulado 4xD, métrico (filos pulidos)	150
	43LC	3 filos, no férricos, largo alcance, radio angulado, fraccional	139
	43MLC	3 filos, no férrico, largo alcance, radio angulado, métrico (filos no pulidos)	152
	43MLC	3 filos, no férrico, largo alcance, radio angulado, métrico (filos pulidos)	153
	43L	3 filos, no férrico, punta cuadrada, largo alcance, fraccional	138
	43ML	3 filos, no férrico, punta cuadrada, largo alcance, métrico	151
	43EC	3 filos, no férrico, punta cuadrada, alcance extralargo, fraccional	141
	43B	3 filos, no férrico, punta esférica, fraccional	142
	43MB	3 filos, no férrico, punta esférica, métrico (filos pulidos)	154
	43LB	3 filos, no férrico, punta esférica, largo alcance, fraccional	143
	43EB	3 filos, no férrico, punta esférica, alcance extralargo, fraccional	143
Desbastador S-Carb® (3 filos)	43CB	3 filos, desbastador, no férrico, rompevirutas, fraccional	144
	43MCB	3 filos, desbastador, no férrico, rompevirutas, métrico	155
	43LCB	3 filos, desbastador, no férrico, rompevirutas, largo alcance, fraccional	145
S-Carb® (2 filos)	47	2 filos, no férrico, punta cuadrada, fraccional	157
	47M	2 filos, no férrico, punta cuadrada, métrico	160
	47B	2 filos, no férrico, punta esférica, fraccional	158
	47MB	2 filos, no férrico, punta esférica, métrico	162
	47L	2 filos, no férrico, punta cuadrada, largo alcance, fraccional	157
	47ML	2 filos, no férrico, punta cuadrada, largo alcance, métrico	161
	47LB	2 filos, no férrico, punta esférica, largo alcance, fraccional	158
	47MLB	2 filos, no férrico, punta esférica, largo alcance, métrico	162
Ski-Carb	44	2 filos, materiales no férricos, punta cuadrada, fraccional	164
	44M	2 filos, materiales no férricos, punta cuadrada, métrico	166
	45	2 filos, materiales no férricos, largo alcance, radio angulado, fraccional	168

Recomendaciones de velocidades y avances mostradas tras cada serie

FRAISE HAUTE PERFORMANCE POUR ALUMINIUM	SÉRIES	DESCRIPTION	PAGE
S-Carb APR®/APF®	43APR	3 dents productivité avancée d'ébauche (fractionnel)	123
	43APR-3	3 dents productivité avancée d'ébauche (fractionnel)	129
	43APR-4	4 dents productivité avancée d'ébauche (fractionnel)	130
	43MAPR	3 dents productivité avancée d'ébauche (métrique)	127
	43APF	4 dents productivité avancée de finition (fractionnel)	125
	43MAPF	4 dents productivité avancée de finition (métrique)	132
S-Carb® (3 dents)	43	3 dents non-ferreux à bout plat (fractionnel)	134
	43M	3 dents non-ferreux à bout plat (métrique) (goujures non polies)	147
	43M	3 dents non-ferreux à bout plat (métrique) (goujures polies)	147
	43CR	3 dents non-ferreux rayon en coin (fractionnel)	135
	43MCR	3 dents matériaux non-ferreux rayon en coin (métrique) (goujures non polies)	148
	43MCR	3 dents matériaux non-ferreux rayon en coin (métrique) (goujures polies)	149
	43MCR	3 dents matériaux non-ferreux rayon en coin 4xD (métrique) (goujures polies)	150
	43LC	3 dents non-ferreux longue portée rayon en coin (fractionnel)	139
	43MLC	3 dents non-ferreux longue portée rayon en coin (métrique) (goujures non polies)	152
	43MLC	3 dents non-ferreux longue portée rayon en coin (métrique) (goujures polies)	153
	43L	3 dents non-ferreux à bout plat longue portée (fractionnel)	138
	43ML	3 dents non-ferreux à bout plat longue portée (métrique)	151
	43EC	3 dents non-ferreux à bout plat portée extra-longue (fractionnel)	141
	43B	3 dents non-ferreux à bout hémisphérique (fractionnel)	142
	43MB	3 dents non-ferreux à bout hémisphérique (métrique) (goujures polies)	154
	43LB	3 dents non-ferreux à bout hémisphérique longue portée (fractionnel)	143
	43EB	3 dents non-ferreux à bout hémisphérique portée extra-longue (fractionnel)	143
S-Carb® d'ébauche (3 dents)	43CB	3 dents d'ébauche non-ferreux brise-copeaux (fractionnel)	144
	43MCB	3 dents d'ébauche non-ferreux brise-copeaux (métrique)	155
	43LCB	3 dents d'ébauche non-ferreux brise-copeaux longue portée (fractionnel)	145
S-Carb® (2 dents)	47	2 dents non-ferreux à bout plat (fractionnel)	157
	47M	2 dents non-ferreux à bout plat (métrique)	160
	47B	2 dents non-ferreux à bout hémisphérique (fractionnel)	158
	47MB	2 dents non-ferreux à bout hémisphérique (métrique)	162
	47L	2 dents non-ferreux à bout plat longue portée (fractionnel)	157
	47ML	2 dents non-ferreux à bout plat longue portée (métrique)	161
	47LB	2 dents non-ferreux à bout hémisphérique longue portée (fractionnel)	158
	47MLB	2 dents non-ferreux à bout hémisphérique longue portée (métrique)	162
Ski-Carb	44	2 dents matériaux non-ferreux à bout plat (fractionnel)	164
	44M	2 dents matériaux non-ferreux à bout plat (métrique)	166
	45	2 dents matériaux non-ferreux longue portée rayon en coin (fractionnel)	168

Recommandations de vitesse et avance indiquées après chaque série

HOCHLEISTUNGS-SCHAFTFRÄSER	SERIE	BESCHREIBUNG	SEITE
S-Carb APR® & APF®	43APR	Zölliger Hochleistungs-Stirnschrupfräser mit 3 Schneidekanten	123
	43APR-3	Zölliger Hochleistungs-Stirnschrupfräser mit 3 Schneidekanten	129
	43APR-4	Zölliger Hochleistungs-Stirnschrupfräser mit 4 Schneidekanten	130
	43MAPR	Metrischer Hochleistungs-Stirnschrupfräser mit 3 Schneidekanten	127
	43APF	Zölliger Hochleistungs-Schlichtfräser mit 4 Schneidekanten	125
	43MAPF	Metrischer Hochleistungs-Schlichtfräser mit 4 Schneidekanten	132
S-Carb® (3 Schneidekanten)	43	Zölliger Nichteisenmetall-Schaftfräser mit 3 Schneidekanten ohne Eckenradien	134
	43M	Metrischer Nichteisenmetall-Schaftfräser mit 3 unpolierten Schneidekanten ohne Eckenradien	147
	43M	Metrischer Nichteisenmetall-Schaftfräser mit 3 polierten Schneidekanten ohne Eckenradien	147
	43CR	Zölliger Nichteisenmetall-Fräser mit 3 Schneidekanten und Eckenradien	135
	43MCR	Metrischer Nichteisenmetall-Fräser mit 3 unpolierten Schneidekanten und Eckenradien	148
	43MCR	Metrischer Nichteisenmetall-Fräser mit 3 polierten Schneidekanten und Eckenradien	149
	43MCR	Metrischer Nichteisenmetall-Fräser mit 3 polierten Schneidekanten und 4xD-Eckenradien	150
	43LC	Zölliger Tiefbohr-fräser mit 3 Schneidekanten und Eckenradien	139
	43MLC	Metrischer Nichteisenmetall-Tiefbohr-fräser mit 3 unpolierten Schneidekanten und Eckenradien	152
	43MLC	Metrischer Nichteisenmetall-Tiefbohr-fräser mit 3 polierten Schneidekanten und Eckenradien	153
	43L	Zölliger Nichteisenmetall-Langloch-Schaftfräser mit 3 Schneidekanten ohne Eckenradien	138
	43ML	Metrischer Nichteisenmetall-Langloch-Schaftfräser mit 3 Schneidekanten ohne Eckenradien	151
	43EC	Zölliger Nichteisenmetall-Superlangloch-Schaftfräser mit 3 Schneidekanten ohne Eckenradien	141
	43B	Zölliger Nichteisenmetall-Radiusschaftfräser mit 3 Schneidekanten	142
	43MB	Metrischer Nichteisenmetall-Radiusschaftfräser mit 3 polierten Schneidekanten	154
	43LB	Zölliger Nichteisenmetall-Langloch-Radiusschaftfräser mit 3 Schneidekanten	143
S-Carb® Schruppfräser (3 Schneidekanten)	43EB	Zölliger Nichteisenmetall-Superlangloch-Radiusschaftfräser mit 3 Schneidekanten	143
	43CB	Zölliger Nichteisenmetall-Schrupfräser mit 3 Spanteilernuten	144
	43MCB	Metrischer Nichteisenmetall-Schrupfräser mit 3 Spanteilernuten	155
S-Carb® (2 Schneidekanten)	43LCB	Zölliger Nichteisenmetall-Langloch-Schrupfräser mit 3 Spanteilernuten	145
	47	Zölliger Nichteisenmetall-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	157
	47M	Metrischer Nichteisenmetall-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	160
	47B	Zölliger Nichteisenmetall-Radiusschaftfräser mit 2 Schneidekanten	158
	47MB	Metrischer Nichteisenmetall-Radiusschaftfräser mit 2 Schneidekanten	162
	47L	Zölliger Nichteisenmetall-Langloch-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	157
	47ML	Metrischer Nichteisenmetall-Langloch-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	161
	47LB	Zölliger Nichteisenmetall-Langloch-Radiusschaftfräser mit 2 Schneidekanten	158
	47MLB	Metrischer Nichteisenmetall-Langloch-Radiusschaftfräser mit 2 Schneidekanten	162
Ski-Carb	44	Zölliger Schaftfräser mit 2 Schneidekanten ohne Eckenradien für Nichteisenmetalle	164
	44M	Metrischer Schaftfräser mit 2 Schneidekanten ohne Eckenradien für Nichteisenmetalle	166
	45	Zölliger Tiefbohr-fräser mit 2 Schneidekanten und Eckenradien für Nichteisenmetalle	168

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie



TOLERANCES (inch)

3/4–1 DIAMETER

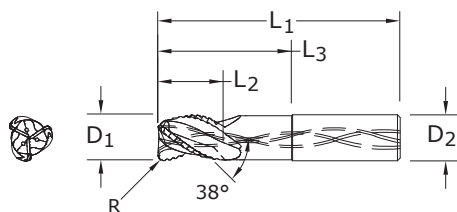
$D_1 = +0.00040/-0.0020$

$D_2 = h_6$

$R = +0.0000/-0.0012$

NON-FERROUS

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information visit
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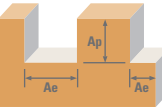
43APR
FRACTIONAL SERIES

inch						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)
3/4	1-3/8	4-1/4	3/4	2-3/8	.030	34000
3/4	1-3/8	4-1/4	3/4	2-3/8	.060	34001
3/4	1-3/8	4-1/4	3/4	2-3/8	.090	34002
3/4	1-3/8	4-1/4	3/4	2-3/8	.120	34003
3/4	1-1/4	4-7/8	3/4	3	.030	34004
3/4	1-1/4	4-7/8	3/4	3	.060	34005
3/4	1-1/4	4-7/8	3/4	3	.090	34006
3/4	1-1/4	4-7/8	3/4	3	.120	34007
1	1-3/4	4-1/2	1	2-1/2	.030	34008
1	1-3/4	4-1/2	1	2-1/2	.060	34009
1	1-3/4	4-1/2	1	2-1/2	.090	34010
1	1-3/4	4-1/2	1	2-1/2	.120	34011
1	1-1/2	5-1/4	1	3-1/4	.030	34012
1	1-1/2	5-1/4	1	3-1/4	.060	34013
1	1-1/2	5-1/4	1	3-1/4	.090	34014
1	1-1/2	5-1/4	1	3-1/4	.120	34015

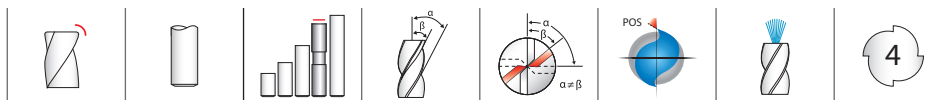
Available on request: • JetStream Technology • Side exit coolant holes

- 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)

FRACTIONAL S-Carb APR®

Series 43APR Fractional		Hardness			Vc (sfm)	Diameter (D ₁) (inch)		
			Ae x D ₁	Ap x D ₁		3/4	1	
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075		1	≤ 1	4920	RPM	25059	18794
					(3936-5904)	Fz	0.0060	0.0070
						Feed (in/min)	451	395
			≤ 0.5	≤ 1.5	6560	RPM	33412	25059
					(5248-7872)	Fz	0.0060	0.0070
						Feed (in/min)	601	526
	ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090		1	≤ 1	3940	RPM	20068	15051
					(3152-4728)	Fz	0.0045	0.0053
						Feed (in/min)	271	239
			≤ 0.5	≤ 1.5	4920	RPM	25059	18794
					(3936-5904)	Fz	0.0045	0.0053
						Feed (in/min)	338	299

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
 $rpm = Vc \times 3.82 / D_1$
 $ipm = Fz \times 3 \times rpm$
 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)



TOLERANCES (inch)

1/2–3/4 DIAMETER

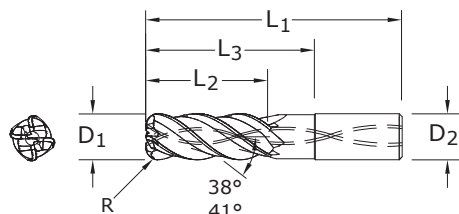
$D_1 = +0.00040/-0.0020$

$D_2 = h_6$

$R = +0.0000/-0.0012$

NON-FERROUS

For patent
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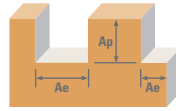
43APF
FRACTIONAL SERIES

inch						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)
1/2	1-1/4	3-1/4	1/2	1-5/8	.030	34016
1/2	1-1/4	3-1/4	1/2	1-5/8	.060	34017
1/2	1-1/4	3-1/4	1/2	1-5/8	.090	34018
1/2	1-1/4	3-1/4	1/2	1-5/8	.120	34019
1/2	2	4	1/2	2-3/8	.030	34020
1/2	2	4	1/2	2-3/8	.060	34021
1/2	2	4	1/2	2-3/8	.090	34022
1/2	2	4	1/2	2-3/8	.120	34023
3/4	1-7/8	4-1/4	3/4	2-3/8	.030	34024
3/4	1-7/8	4-1/4	3/4	2-3/8	.060	34025
3/4	1-7/8	4-1/4	3/4	2-3/8	.090	34026
3/4	1-7/8	4-1/4	3/4	2-3/8	.120	34027
3/4	3	5-3/8	3/4	3-1/2	.030	34028
3/4	3	5-3/8	3/4	3-1/2	.060	34029
3/4	3	5-3/8	3/4	3-1/2	.090	34030
3/4	3	5-3/8	3/4	3-1/2	.120	34031

Available on request: • JetStream Technology

- 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)

FRACTIONAL S-Carb APF®



Series 43APF Fractional		Hardness			Vc (sfm)	Diameter (D ₁) (inch)			
			Ae x D ₁	Ap x D ₁		1/2	3/4		
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	≤ 150 Bhn or ≤ 7 HRc		≤ 0.1	≤ 2.5	2625	RPM	20055	13370
						(2100-3150)	Fz	0.0030	0.0050
							Feed (in/min)		241
			≤ 0.1	≤ 4	2625	RPM	20055	13370	
					(2100-3150)	Fz	0.0020	0.0040	
						Feed (in/min)		160	214
	ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	≤ 150 Bhn or ≤ 7 HRc		≤ 0.1	≤ 2.5	1970	RPM	15051	10034
						(1576-2364)	Fz	0.0030	0.0050
							Feed (in/min)		181
			≤ 0.1	≤ 4	1970	RPM	15051	10034	
					(1576-2364)	Fz	0.0020	0.0040	
						Feed (in/min)		120	161

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
 $rpm = Vc \times 3.82 / D_1$
 $ipm = Fz \times 4 \times rpm$
 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)



TOLERANCES (mm)

12–25 DIAMETER

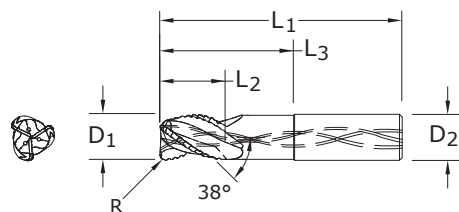
$D_1 = +0,010/-0,050$

$D_2 = h_6$

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

NON-FERROUS

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information visit
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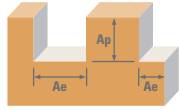


43MAPR METRIC SERIES

mm						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	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

- Ultra high-productivity rougher for Aluminum alloys, specifically for aircraft components
- Designed for machine tools with capability of 9.83 l³ 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)

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

Series 43MAPR Metric		Hardness			Vc (m/min)	Diameter (D ₁) (mm)				
			Ae x D ₁	Ap x D ₁		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
						Feed (mm/min)	11459	5944	6302	6417
		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 x 1000) / (D₁ x 3.14)

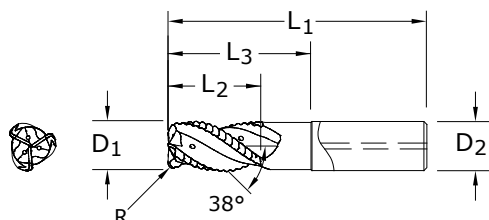
mm/min = Fz x 3 x rpm

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)



TOLERANCES (mm)

20–25 DIAMETER

$D_1 = -0,01/-0,10$

$D_2 = h_6$

$R = +/-0,05$

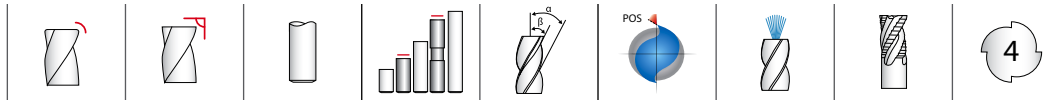
NON-FERROUS

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43APR-3
METRIC SERIES

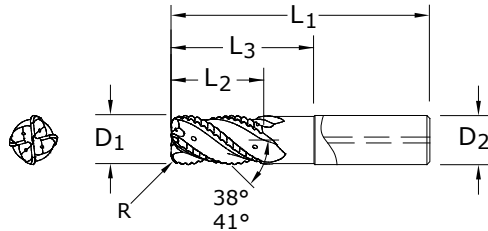
inch						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	Ti-NAMITE-B (TiB ₂)
20,0	35,0	86,0	20,0	—	—	44990
20,0	35,0	86,0	20,0	45,0	3,0	44991
20,0	35,0	86,0	20,0	45,0	4,0	44992
20,0	35,0	106,0	20,0	—	—	44993
20,0	35,0	106,0	20,0	65,0	2,0	44994
20,0	35,0	106,0	20,0	65,0	3,0	44995
20,0	35,0	106,0	20,0	65,0	4,0	44996
20,0	35,0	106,0	20,0	65,0	5,0	44997
25,0	43,0	108,0	25,0	—	—	44998
25,0	43,0	108,0	25,0	60,0	2,0	44999
25,0	43,0	108,0	25,0	60,0	3,0	45000
25,0	43,0	108,0	25,0	60,0	4,0	45001
25,0	35,0	140,0	25,0	—	—	45002
25,0	35,0	140,0	25,0	80,0	3,0	45003
25,0	35,0	140,0	25,0	90,0	3,0	45004

- Ultra high-productivity rougher for Aluminum alloys, specifically for aircraft components
- Designed for machine tools with capability of 12 IP per minute material removal rates
- New 3 flute variable geometry with side exit coolant holes
- Open fluting for deep slotting and profiling
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



43APR-4

METRIC SERIES



- Ultra high-productivity rougher for Aluminum alloys, specifically for aircraft components
- Designed for machine tools with capability of 12 l³ per minute material removal rates
- New 4 flute variable geometry with side exit coolant holes
- Open fluting for deep slotting and profiling
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

inch						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)
20,0	35,0	86,0	20,0	—	—	45005
20,0	35,0	86,0	20,0	45,0	3,0	45006
20,0	35,0	86,0	20,0	45,0	4,0	45007
20,0	35,0	106,0	20,0	—	—	45008
20,0	35,0	106,0	20,0	65,0	2,0	45009
20,0	35,0	106,0	20,0	65,0	3,0	45010
20,0	35,0	106,0	20,0	65,0	4,0	45011
20,0	35,0	106,0	20,0	65,0	5,0	45012
25,0	43,0	108,0	25,0	—	—	45013
25,0	43,0	108,0	25,0	60,0	2,0	45014
25,0	43,0	108,0	25,0	60,0	3,0	45015
25,0	43,0	108,0	25,0	60,0	4,0	45016
25,0	35,0	140,0	25,0	—	—	45017
25,0	35,0	140,0	25,0	80,0	3,0	45018
25,0	35,0	140,0	25,0	90,0	3,0	45019

TOLERANCES (mm)

20–25 DIAMETER

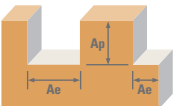
D₁ = -0,01/-0,10

D₂ = h₆

R = +/-0,05

NON-FERROUS

For patent information visit
www.ksptpatents.com

Series 43APR-3 43APR-4 Metric				Vc (m/min)	Diameter (D ₁) (mm)					
		Ae x D ₁	Ap x D ₁		APR-3		APR-4			
					20	25	20	25		
N	ALUMINIUM ALLOYS 6068, 7075		1	≤ 1	1600	RPM	25461	20369	25461	20369
					(300-2100)	Fz	0.12	0.12	0.12	0.12
					Feed (mm/min)	9166	7333	12222	9777	
			≤ 0.5	≤ 1.5	1800	RPM	28644	22915	28644	22915
					(300-2100)	Fz	0.15	0.15	0.15	0.15
					Feed (mm/min)	12890	10312	17187	13749	
			≤ 0.1	≤ 2	2100	RPM	33418	26735	33418	26735
					(300-2100)	Fz	0.18	0.18	0.18	0.18
					Feed (mm/min)	18046	14437	24061	19249	

For best results use the peak power of the specific machine torque chart.

Typically 10kw is required to remove 1 litre of material (MMR).

Eg. >> $(A_e \times A_p \times \text{Feed}) / 1000000 \gg$ Therefore Full slotting Ø25: $25 \times 25 \times 7333 = 4.58$ Litres so it needs a min of 46Kw.

Larger cuts and chip load consume more power.

Review the power chart of each machine to determine MAX power for ultimate performance.

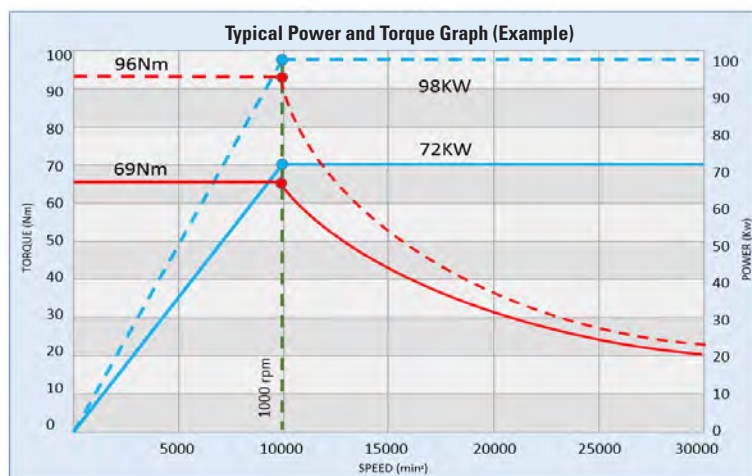
Example below shows peak power @ 10,000 rpm.

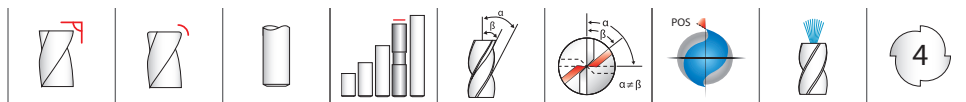
The APR-4 design is for ultimate metal removal but typically requires more power, and is also better suited to horizontal machines.

The new coolant supply is designed for MQL as well as normal emulsion coolant on the same data.

Ensure max MQL flow prior to cutting.

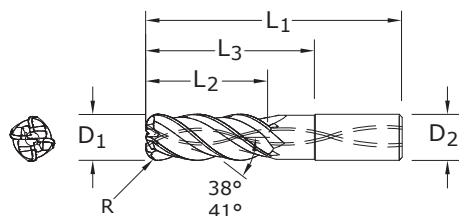
Refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com).





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

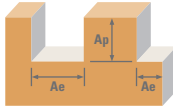
D₁ = +0,010/–0,050

D₂ = h₆

R = +0,000/–0,030

NON-FERROUS

For patent information visit
www.ksptpatents.com

Series 43MAPF Metric	Hardness				Vc (m/min)	Diameter (D ₁) (mm)							
			Ae x D ₁	Ap x D ₁		6	8	10	12	16	20	25	
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075		≤ 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
			≤ 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		≤ 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
			≤ 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

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

$\text{mm/min} = \text{Fz} \times 4 \times \text{rpm}$

maximum recommended depths shown

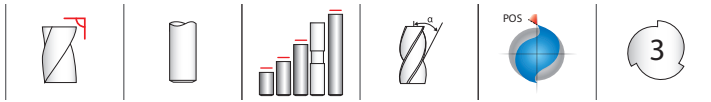
reduce speed and feed for materials harder than listed

finish cuts typically require reduced feed and cutting depths of 0.02 X D₁ maximum

ramp angle = 6° (feed rate = 50%)

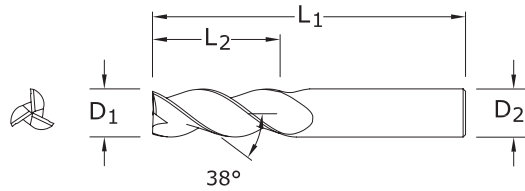
plunging not recommended

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



43

FRACTIONAL 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	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	EDP NO.	
				UNCOATED	Ti-NAMITE-B (TiB ₂)
1/8	3/8	1-1/2	1/8	34701	34728
3/16	5/16	2-1/2	3/16	34822	34857
3/16	9/16	2	3/16	34702	34729
3/16	3/4	2-1/2	3/16	34823	34858
1/4	3/8	2	1/4	34703	34730
1/4	1/2	2-1/2	1/4	34824	34859
1/4	3/4	2-1/2	1/4	34704	34731
1/4	1	3	1/4	34825	34860
1/4	1-1/4	3-1/2	1/4	34705	34732
1/4	1-3/4	4	1/4	34826	34861
5/16	7/16	2	5/16	34706	34733
5/16	5/8	2-1/2	5/16	34707	34734
5/16	1-1/4	4	5/16	34708	34735
3/8	1/2	2	3/8	34709	34736
3/8	1	2-1/2	3/8	34710	34737
3/8	1-1/4	3-1/2	3/8	34827	34862
3/8	1-1/2	3-1/2	3/8	34711	34738
3/8	2	4	3/8	34828	34863
1/2	5/8	2-1/2	1/2	34712	34739
1/2	1	3	1/2	34830	34865
1/2	1-1/4	3-1/4	1/2	34713	34740
1/2	1-5/8	4	1/2	34831	34866
1/2	2-1/2	5	1/2	34832	34867
1/2	2	4	1/2	34714	34741
1/2	3-1/8	6	1/2	34715	34742
5/8	3/4	3	5/8	34716	34743
5/8	1-5/8	3-3/4	5/8	34717	34744
5/8	2-1/8	4	5/8	34833	34868
5/8	2-1/2	5	5/8	34718	34745
5/8	3-1/4	6	5/8	34834	34869
5/8	3-3/4	6	5/8	34719	34746
3/4	1	3	3/4	34720	34747
3/4	1-5/8	4	3/4	34721	34748
3/4	2-1/4	5	3/4	34722	34749
3/4	3-1/4	6	3/4	34723	34750
1	1-1/4	4	1	34724	34751
1	2	4-1/2	1	34725	34752
1	2-5/8	6	1	34726	34753
1	3-1/4	6	1	34727	34754
1	4-1/8	7	1	34835	34870

TOLERANCES (inch)

1/8–3/16 DIAMETER

D₁ = +0.0000/–0.00032

D₂ = h₆

1/4–3/8 DIAMETER

D₁ = +0.0000/–0.00035

D₂ = h₆

1/2–5/8 DIAMETER

D₁ = +0.0000/–0.00043

D₂ = h₆

3/4–1 DIAMETER

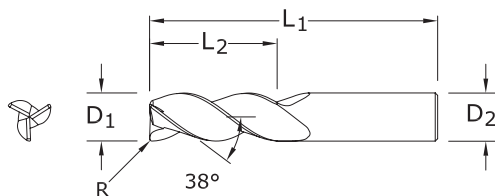
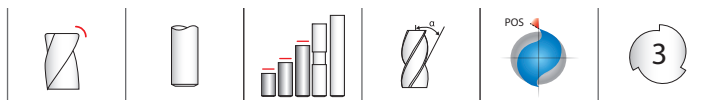
D₁ = +0.0000/–0.00051

D₂ = h₆

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com



TOLERANCES (inch)

1/8–3/16 DIAMETER

$D_1 = +0.0000/-0.00032$

$D_2 = h_6$

$R = +0.0000/-0.0020$

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

$R = +0.0000/-0.0020$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

$R = +0.0000/-0.0020$

3/4–1 DIAMETER

$D_1 = +0.0000/-0.00051$

$D_2 = h_6$

$R = +0.0000/-0.0020$

NON-FERROUS

PLASTICS/COMPOSITES

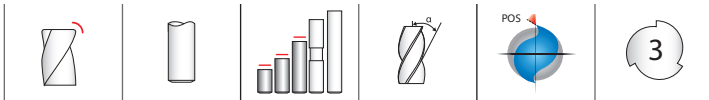
For patent
information visit
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43CR
FRACTIONAL SERIES

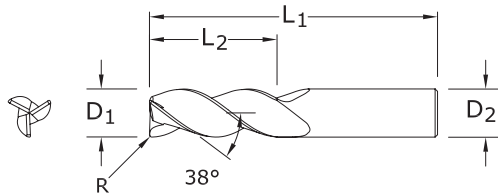
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	inch			EDP NO.	
		OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	UNCOATED	TI-NAMITE-B (TiB ₂)
1/8	3/8	1-1/2	1/8	.010	34771	34793
3/16	9/16	2	3/16	.010	34772	34794
1/4	3/8	2-1/2	1/4	.010	35575	35665
1/4	3/8	2-1/2	1/4	.015	35576	35666
1/4	3/8	2-1/2	1/4	.030	35577	35667
1/4	3/8	2-1/2	1/4	.060	35578	35668
1/4	3/4	2-1/2	1/4	.010	34773	34795
1/4	3/4	2-1/2	1/4	.015	35579	35669
1/4	3/4	2-1/2	1/4	.030	34774	34796
1/4	3/4	2-1/2	1/4	.060	35580	35670
1/4	1	3	1/4	.010	35581	35671
1/4	1	3	1/4	.015	35582	35672
1/4	1	3	1/4	.030	35583	35673
1/4	1	3	1/4	.060	35584	35674
5/16	5/8	2-1/2	5/16	.030	34775	34797
3/8	1/2	3	3/8	.010	35585	35675
3/8	1/2	3	3/8	.015	35586	35676
3/8	1/2	3	3/8	.030	35587	35677
3/8	1/2	3	3/8	.060	35588	35678
3/8	1/2	3	3/8	.090	35589	35679
3/8	1	2-1/2	3/8	.010	34776	34798
3/8	1	2-1/2	3/8	.030	34777	34799
3/8	1	2-1/2	3/8	.060	32761	32825
3/8	1	3	3/8	.015	35590	35680
3/8	1	3	3/8	.090	35591	35681
3/8	1-1/2	4	3/8	.010	35592	35682
3/8	1-1/2	4	3/8	.015	35593	35683
3/8	1-1/2	4	3/8	.030	35594	35684
3/8	1-1/2	4	3/8	.060	35595	35685
3/8	1-1/2	4	3/8	.090	35596	35686
1/2	5/8	3	1/2	.010	35597	35687
1/2	5/8	3	1/2	.015	35598	35688
1/2	5/8	3	1/2	.030	35599	35689
1/2	5/8	3	1/2	.060	35600	35690
1/2	5/8	3	1/2	.090	35601	35691
1/2	5/8	3	1/2	.120	35602	35692

- 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)

continued on next page



43CR
FRACTIONAL SERIES



CONTINUED

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	inch			EDP NO.	
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/2	1	3	1/2	.010	35603	35693
1/2	1	3	1/2	.015	35604	35694
1/2	1	3	1/2	.030	35605	35695
1/2	1	3	1/2	.060	35606	35696
1/2	1	3	1/2	.090	35607	35697
1/2	1	3	1/2	.120	35608	35698
1/2	1-1/4	3	1/2	.015	35609	35699
1/2	1-1/4	3-1/4	1/2	.010	34778	34800
1/2	1-1/4	3-1/4	1/2	.030	34779	34801
1/2	1-1/4	3-1/4	1/2	.060	34780	34802
1/2	1-1/4	3-1/4	1/2	.090	34781	34803
1/2	1-1/4	3-1/4	1/2	.120	32766	32830
1/2	1-5/8	4	1/2	.010	35610	35700
1/2	1-5/8	4	1/2	.015	35611	35701
1/2	1-5/8	4	1/2	.030	35612	35702
1/2	1-5/8	4	1/2	.060	35613	35703
1/2	1-5/8	4	1/2	.090	35614	35704
1/2	1-5/8	4	1/2	.120	35615	35705
1/2	2	4	1/2	.010	35616	35706
1/2	2	4	1/2	.015	35617	35707
1/2	2	4	1/2	.030	35618	35708
1/2	2	4	1/2	.060	35619	35709
1/2	2	4	1/2	.090	35620	35710
1/2	2	4	1/2	.120	35621	35711
5/8	3/4	3-1/2	5/8	.030	35622	35712
5/8	3/4	3-1/2	5/8	.060	35623	35713
5/8	3/4	3-1/2	5/8	.090	35624	35714
5/8	3/4	3-1/2	5/8	.120	35625	35715
5/8	1-5/8	3-3/4	5/8	.030	34782	34804
5/8	1-5/8	3-3/4	5/8	.060	34783	34805
5/8	1-5/8	3-3/4	5/8	.090	34784	34806
5/8	1-5/8	3-3/4	5/8	.120	35626	35716
3/4	1	4	3/4	.030	35627	35717
3/4	1	4	3/4	.060	35628	35718
3/4	1	4	3/4	.090	35629	35719
3/4	1	4	3/4	.120	35630	35720

continued on next page

TOLERANCES (inch)

1/8–3/16 DIAMETER

D₁ = +0.0000/–0.00032

D₂ = h₆

R = +0.0000/–0.0020

1/4–3/8 DIAMETER

D₁ = +0.0000/–0.00035

D₂ = h₆

R = +0.0000/–0.0020

1/2–5/8 DIAMETER

D₁ = +0.0000/–0.00043

D₂ = h₆

R = +0.0000/–0.0020

3/4–1 DIAMETER

D₁ = +0.0000/–0.00051

D₂ = h₆

R = +0.0000/–0.0020

NON-FERROUS

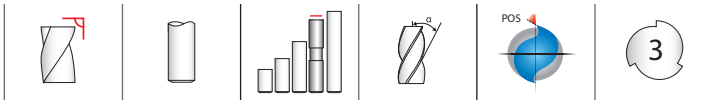
PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

43CR
FRACTIONAL SERIES

CONTINUED

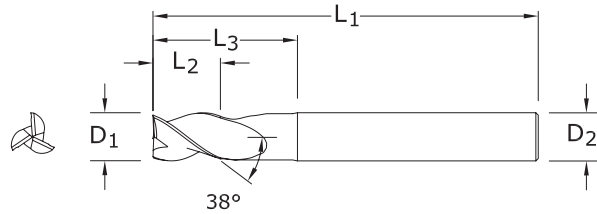
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	inch			EDP NO.	
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB ₂)
3/4	1	4	3/4	.190	35631	35721
3/4	1	4	3/4	.250	35632	35722
3/4	1-5/8	4	3/4	.030	34785	34807
3/4	1-5/8	4	3/4	.060	34786	34808
3/4	1-5/8	4	3/4	.090	34787	34809
3/4	1-5/8	4	3/4	.120	34815	34817
3/4	1-5/8	4	3/4	.190	35633	35723
3/4	1-5/8	4	3/4	.250	35634	35724
3/4	2-1/4	5	3/4	.030	35635	35725
3/4	2-1/4	5	3/4	.060	35636	35726
3/4	2-1/4	5	3/4	.090	35637	35727
3/4	2-1/4	5	3/4	.120	35638	35728
3/4	2-1/4	5	3/4	.190	35639	35729
3/4	2-1/4	5	3/4	.250	35640	35730
1	1-1/4	5	1	.030	35641	35731
1	1-1/4	5	1	.060	35642	35732
1	1-1/4	5	1	.090	35643	35733
1	1-1/4	5	1	.120	35644	35734
1	1-1/4	5	1	.190	35645	35735
1	1-1/4	5	1	.250	35646	35736
1	2	5	1	.190	35647	35737
1	2	5	1	.250	35648	35738
1	2	4-1/2	1	.030	34789	34811
1	2	4-1/2	1	.060	34790	34812
1	2	4-1/2	1	.090	34791	34813
1	2	4-1/2	1	.120	34816	34818
1	3-1/4	6	1	.030	35649	35739
1	3-1/4	6	1	.060	35650	35740
1	3-1/4	6	1	.090	35651	35741
1	3-1/4	6	1	.120	35652	35742
1	3-1/4	6	1	.190	35653	35743
1	3-1/4	6	1	.250	35654	35744



43L

FRACTIONAL 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
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	inch			EDP NO.	
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	REACH L ₃	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/8	5/32	3	1/8	1/2	32700	32725
1/8	5/32	3	1/8	3/4	32691	34888
3/16	7/32	3	3/16	1/2	32701	32726
3/16	7/32	3	3/16	3/4	32692	34889
1/4	3/8	4	1/4	3/4	32702	32727
1/4	3/8	4	1/4	1-1/2	32703	32728
1/4	3/8	4	1/4	2-1/8	32704	32729
5/16	7/16	4	5/16	1-1/8	32705	32730
5/16	7/16	4	5/16	2-1/8	32706	32731
3/8	1/2	4	3/8	1-1/8	32707	32732
3/8	1/2	4	3/8	2-1/8	32708	32733
1/2	5/8	4	1/2	1-3/8	32709	32734
1/2	5/8	6	1/2	2-1/8	32710	32735
1/2	5/8	6	1/2	3-3/8	32711	32736
1/2	5/8	6	1/2	4-1/4	32697	34894
5/8	3/4	4	5/8	1-3/4	32712	32737
5/8	3/4	4	5/8	2-3/8	32713	32738
5/8	3/4	6	5/8	3-3/8	32714	32739
5/8	3/4	6	5/8	4-3/8	32698	34895
3/4	1	4	3/4	1-3/4	32715	32740
3/4	1	6	3/4	2-3/8	32716	32741
3/4	1	6	3/4	3-3/8	32717	32742
3/4	1	6	3/4	4-3/8	32699	34896
1	1-1/4	6	1	2-3/8	32718	32743
1	1-1/4	6	1	3-3/8	32719	32744
1	1-1/4	7	1	4-3/8	32720	32745

TOLERANCES (inch)

1/8–3/16 DIAMETER

D₁ = +0.0000/–0.00032

D₂ = h₆

1/4–3/8 DIAMETER

D₁ = +0.0000/–0.00035

D₂ = h₆

1/2–5/8 DIAMETER

D₁ = +0.0000/–0.00043

D₂ = h₆

3/4–1 DIAMETER

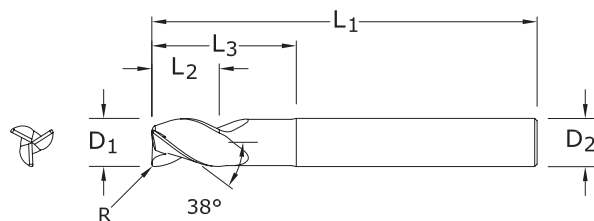
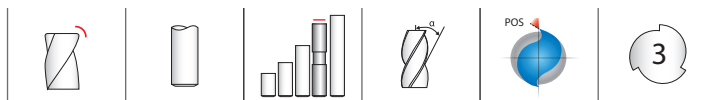
D₁ = +0.0000/–0.00051

D₂ = h₆

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com



TOLERANCES (inch)

1/8–3/16 DIAMETER

D₁ = +0.0000/–0.00032

D₂ = h₆

R = +0.0000/–0.0020

1/4–3/8 DIAMETER

D₁ = +0.0000/–0.00035

D₂ = h₆

R = +0.0000/–0.0020

1/2–5/8 DIAMETER

D₁ = +0.0000/–0.00043

D₂ = h₆

R = +0.0000/–0.0020

3/4–1 DIAMETER

D₁ = +0.0000/–0.00051

D₂ = h₆

R = +0.0000/–0.0020

NON-FERROUS

PLASTICS/COMPOSITES

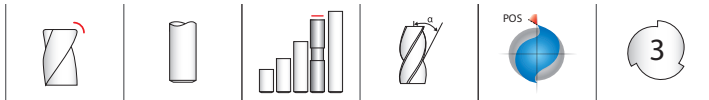
For patent
information visit
www.ksptpatents.com

43LC
FRACTIONAL SERIES

inch						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	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/8	5/32	3	1/8	1/2	.010	32751	32815
3/16	7/32	3	3/16	1/2	.010	32752	32816
1/4	3/8	2-1/2	1/4	3/4	.015	35787	36235
1/4	3/8	2-1/2	1/4	3/4	.060	35788	36236
1/4	3/8	4	1/4	3/4	.010	32753	32817
1/4	3/8	4	1/4	3/4	.030	32754	32818
1/4	3/8	4	1/4	1-1/2	.010	32755	32819
1/4	3/8	4	1/4	1-1/2	.030	32756	32820
1/4	3/8	4	1/4	2-1/8	.010	32757	32821
1/4	3/8	4	1/4	2-1/8	.030	32758	32822
5/16	7/16	4	5/16	1-1/8	.030	32759	32823
5/16	7/16	4	5/16	2-1/8	.030	32760	32824
3/8	1/2	3	3/8	1-1/8	.015	35791	36239
3/8	1/2	3	3/8	1-1/8	.090	35792	36240
3/8	1/2	4	3/8	1-1/8	.030	32762	32826
3/8	1/2	4	3/8	1-1/8	.060	32763	32827
3/8	1/2	4	3/8	2-1/8	.030	32764	32828
3/8	1/2	4	3/8	2-1/8	.060	32765	32829
1/2	5/8	3	1/2	1-3/8	.015	35795	36243
1/2	5/8	4	1/2	1-3/8	.030	32767	32831
1/2	5/8	4	1/2	1-3/8	.060	32768	32832
1/2	5/8	4	1/2	1-3/8	.090	32769	32833
1/2	5/8	4	1/2	1-3/8	.120	32770	32834
1/2	5/8	4	1/2	2-1/4	.015	35796	36244
1/2	5/8	6	1/2	2-1/8	.030	32771	32835
1/2	5/8	6	1/2	2-1/8	.060	32772	32836
1/2	5/8	6	1/2	2-1/8	.090	32773	32837
1/2	5/8	6	1/2	2-1/8	.120	32774	32838
1/2	5/8	6	1/2	3-3/8	.030	32775	32839
1/2	5/8	6	1/2	3-3/8	.060	32776	32840
1/2	5/8	6	1/2	3-3/8	.090	32777	32841
1/2	5/8	6	1/2	3-3/8	.120	32778	32842
5/8	3/4	4	5/8	1-3/4	.030	32779	32843
5/8	3/4	4	5/8	1-3/4	.060	32780	32844
5/8	3/4	4	5/8	1-3/4	.090	32781	32845
5/8	3/4	4	5/8	1-3/4	.120	32782	32846
5/8	3/4	4	5/8	2-3/8	.030	32783	32847
5/8	3/4	4	5/8	2-3/8	.060	32784	32848

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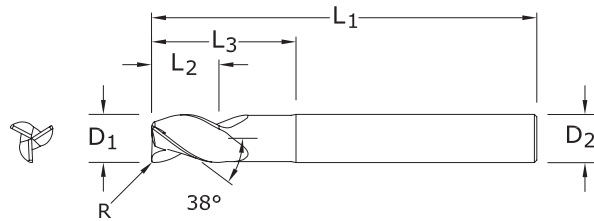
- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Necked design with blended diameter transitions provide clearance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



43LC

FRACTIONAL SERIES

CONTINUED



CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	inch			EDP NO.	
			SHANK DIAMETER D ₂	REACH L ₃	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB ₂)
5/8	3/4	4	5/8	2-3/8	.090	32785	32849
5/8	3/4	4	5/8	2-3/8	.120	32786	32850
5/8	3/4	6	5/8	3-3/8	.030	32787	32851
5/8	3/4	6	5/8	3-3/8	.060	32788	32852
5/8	3/4	6	5/8	3-3/8	.090	32789	32853
5/8	3/4	6	5/8	3-3/8	.120	32790	32854
3/4	1	4	3/4	1-3/4	.030	32791	32855
3/4	1	4	3/4	1-3/4	.060	32792	32856
3/4	1	4	3/4	1-3/4	.090	32793	32857
3/4	1	4	3/4	1-3/4	.120	32794	32858
3/4	1	4	3/4	2	.190	35803	36251
3/4	1	4	3/4	2	.250	35804	36252
3/4	1	6	3/4	2-3/8	.030	32795	32859
3/4	1	6	3/4	2-3/8	.060	32796	32860
3/4	1	6	3/4	2-3/8	.090	32797	32861
3/4	1	6	3/4	2-3/8	.120	32798	32862
3/4	1	6	3/4	3-3/8	.030	32799	32863
3/4	1	6	3/4	3-3/8	.060	32800	32864
3/4	1	6	3/4	3-3/8	.090	32801	32865
3/4	1	6	3/4	3-3/8	.120	32802	32866
1	1-1/4	5	1	2-5/8	.190	35809	36257
1	1-1/4	5	1	2-5/8	.250	35810	36258
1	1-1/4	6	1	2-3/8	.030	32803	32867
1	1-1/4	6	1	2-3/8	.060	32804	32868
1	1-1/4	6	1	2-3/8	.090	32805	32869
1	1-1/4	6	1	2-3/8	.120	32806	32870
1	1-1/4	6	1	3-3/8	.030	32807	32871
1	1-1/4	6	1	3-3/8	.060	32808	32872
1	1-1/4	6	1	3-3/8	.090	32809	32873
1	1-1/4	6	1	3-3/8	.120	32810	32874
1	1-1/4	6	1	3-3/8	.190	35811	36259
1	1-1/4	6	1	3-3/8	.250	35812	36260

TOLERANCES (inch)

1/8–3/16 DIAMETER

D₁ = +0.0000/–0.00032

D₂ = h₆

R = +0.0000/–0.0020

1/4–3/8 DIAMETER

D₁ = +0.0000/–0.00035

D₂ = h₆

R = +0.0000/–0.0020

1/2–5/8 DIAMETER

D₁ = +0.0000/–0.00043

D₂ = h₆

R = +0.0000/–0.0020

3/4–1 DIAMETER

D₁ = +0.0000/–0.00051

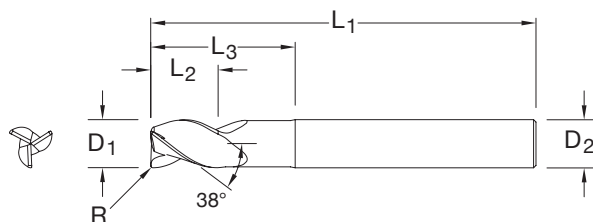
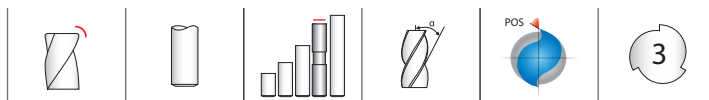
D₂ = h₆

R = +0.0000/–0.0020

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com



TOLERANCES (inch)

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

$R = +0.0000/-0.0020$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

$R = +0.0000/-0.0020$

3/4–1 DIAMETER

$D_1 = +0.0000/-0.00051$

$D_2 = h_6$

$R = +0.0000/-0.0020$

NON-FERROUS

PLASTICS/COMPOSITES

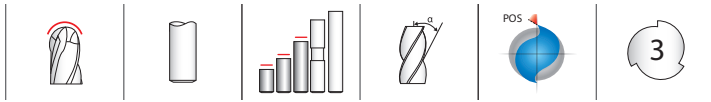
For patent
information visit
www.ksptpatents.com

43EC

FRACTIONAL SERIES

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	inch			EDP NO.	
			SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	3	1/4	1-1/8	.015	35789	36237
1/4	3/8	3	1/4	1-1/8	.060	35790	36238
3/8	1/2	4	3/8	2-1/8	.015	35793	36241
3/8	1/2	4	3/8	2-1/8	.090	35794	36242
1/2	5/8	5	1/2	3-3/8	.015	35797	36245
1/2	5/8	6	1/2	4-1/4	.015	35798	36246
1/2	5/8	6	1/2	4-1/4	.030	35799	36247
1/2	5/8	6	1/2	4-1/4	.060	35800	36248
1/2	5/8	6	1/2	4-1/4	.090	35801	36249
1/2	5/8	6	1/2	4-1/4	.120	35802	36250
3/4	1	6	3/4	3-3/8	.190	35805	36253
3/4	1	6	3/4	3-3/8	.250	35806	36254
1	1-1/4	7	1	4-3/8	.030	35813	36261
1	1-1/4	7	1	4-3/8	.060	35814	36262
1	1-1/4	7	1	4-3/8	.090	35815	36263
1	1-1/4	7	1	4-3/8	.120	35816	36264
1	1-1/4	7	1	4-3/8	.190	35817	36265
1	1-1/4	7	1	4-3/8	.250	35818	36266

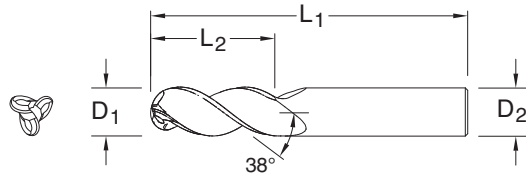
- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Necked design with blended diameter transitions provide clearance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



43B

FRACTIONAL SERIES

- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Open fluting for deep slotting and profiling
- 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	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	EDP NO.	
				UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	2	1/4	34916	34972
1/4	3/4	2-1/2	1/4	34917	34973
1/4	1	3	1/4	34918	34974
3/8	1/2	2	3/8	34919	34975
3/8	1	2-1/2	3/8	34920	34976
3/8	1-1/2	3-1/2	3/8	34921	34977
1/2	5/8	2-1/2	1/2	34922	34978
1/2	1	3	1/2	34923	34979
1/2	1-1/4	3	1/2	34924	34980
1/2	1-5/8	4	1/2	34925	34981
1/2	2	4	1/2	34926	34982
5/8	3/4	3	5/8	34927	34983
5/8	1-5/8	4	5/8	34928	34984
3/4	1	3	3/4	34929	34985
3/4	1-5/8	4	3/4	34930	34986
3/4	2-1/4	5	3/4	34931	34987
1	1-1/4	4	1	34932	34988
1	2	5	1	34933	34989
1	3-1/4	6	1	34934	34990

TOLERANCES (inch)

1/4–3/8 DIAMETER

D₁ = +0.0000/–0.00035

D₂ = h₆

BALL RADIUS

+0.0005/–0.0005

1/2–5/8 DIAMETER

D₁ = +0.0000/–0.00043

D₂ = h₆

BALL RADIUS

+0.0005/–0.0005

3/4–1 DIAMETER

D₁ = +0.0000/–0.00051

D₂ = h₆

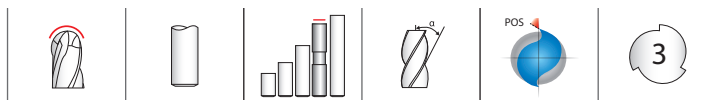
BALL RADIUS

+0.0005/–0.0005

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com



TOLERANCES (inch)

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0005$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0005$

3/4–1 DIAMETER

$D_1 = +0.0000/-0.00051$

$D_2 = h_6$

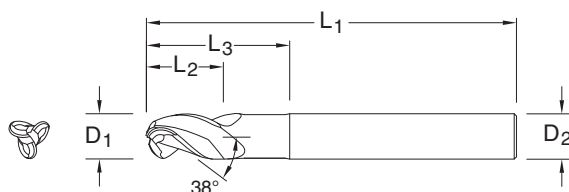
BALL RADIUS

$+0.0005/-0.0005$

NON-FERROUS

PLASTICS/COMPOSITES

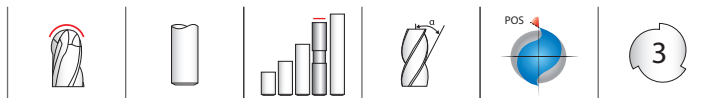
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inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	TI-NAMITE-B (TiB ₂)
1/4	3/8	2-1/2	1/4	3/4	34941	35005
3/8	1/2	3	3/8	1-1/8	34943	35007
1/2	5/8	3	1/2	1-3/8	34945	35009
1/2	5/8	4	1/2	2-1/4	34946	35010
5/8	3/4	4	5/8	1-5/8	34949	35013
3/4	1	4	3/4	2	34951	35015
1	1-1/4	5	1	2-5/8	34954	35018
1	1-1/4	6	1	3-3/8	34955	35019

43LB
FRACTIONAL SERIES

- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Open fluting for deep slotting and profiling
- 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)



TOLERANCES (inch)

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0005$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0005$

3/4–1 DIAMETER

$D_1 = +0.0000/-0.00051$

$D_2 = h_6$

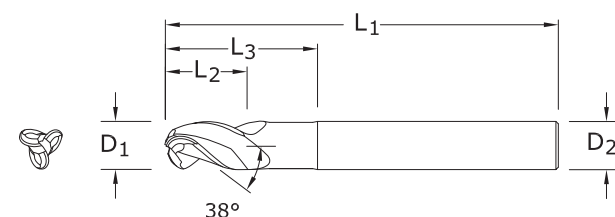
BALL RADIUS

$+0.0005/-0.0005$

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
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inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	TI-NAMITE-B (TiB ₂)
1/4	3/8	3	1/4	1-1/8	34942	35006
3/8	1/2	4	3/8	2-1/8	34944	35008
1/2	5/8	5	1/2	3-3/8	34947	35011
1/2	5/8	6	1/2	4-1/4	34948	35012
5/8	3/4	6	5/8	3-3/8	34950	35014
3/4	1	6	3/4	3-3/8	34952	35016
1	1-1/4	7	1	4-3/8	34956	35020

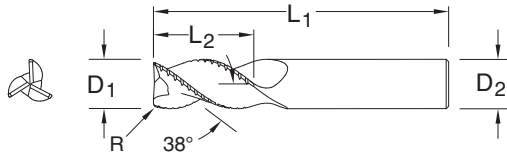
43EB
FRACTIONAL SERIES

- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Open fluting for deep slotting and profiling
- 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)



43CB

FRACTIONAL 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
- 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)

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	inch			EDP NO.	
		OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	2-1/2	1/4	.020	33390	33450
1/4	1/2	2-1/2	1/4	.020	33391	33451
1/4	3/4	2-1/2	1/4	.020	33392	33452
1/4	1	3	1/4	.020	33393	33453
1/4	1-1/4	3-1/2	1/4	.020	33394	33454
1/4	1-3/4	4	1/4	.020	33395	33455
5/16	7/16	2-1/2	5/16	.020	33396	33456
5/16	11/16	2-1/2	5/16	.020	33397	33457
5/16	1	3	5/16	.020	33398	33458
5/16	2-1/8	4	5/16	.020	33400	33460
3/8	1/2	3	3/8	.020	33401	33461
3/8	1	2-1/2	3/8	.020	33402	33462
3/8	1-1/4	3-1/2	3/8	.020	33403	33463
3/8	1-1/2	4	3/8	.020	33404	33464
3/8	2	4	3/8	.020	33406	33466
1/2	5/8	3	1/2	.030	33407	33467
1/2	1	3	1/2	.030	33408	33468
1/2	1-1/4	3-1/4	1/2	.030	33409	33469
1/2	1-5/8	4	1/2	.030	33410	33470
1/2	2	4	1/2	.030	33411	33471
1/2	2-1/2	5	1/2	.030	33412	33472
1/2	3-1/8	6	1/2	.030	33413	33473
5/8	3/4	3-1/2	5/8	.030	33415	33475
5/8	1-5/8	3-3/4	5/8	.030	33416	33476
5/8	2-1/8	4	5/8	.030	33417	33477
5/8	3-1/4	6	5/8	.030	33418	33478
5/8	3-3/4	6	5/8	.030	33419	33479
3/4	1	4	3/4	.030	33420	33480
3/4	1-5/8	4	3/4	.030	33421	33481
3/4	2-1/4	4	3/4	.030	33422	33482
3/4	3-1/4	6	3/4	.030	33423	33483
3/4	4	6	3/4	.030	33424	33484
1	1-1/4	5	1	.030	33425	33485
1	2	4-1/2	1	.030	33426	33486
1	2-5/8	6	1	.030	33427	33487
1	3-1/4	6	1	.030	33428	33488
1	4-1/8	7	1	.030	33429	33489

TOLERANCES (inch)

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

$R = +0.0000/-0.0020$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

$R = +0.0000/-0.0020$

3/4–1 DIAMETER

$D_1 = +0.0000/-0.00051$

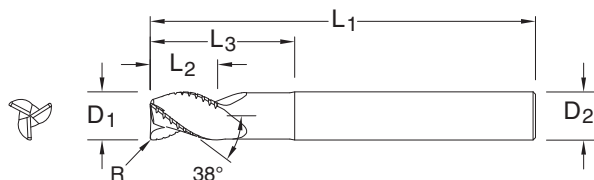
$D_2 = h_6$

$R = +0.0000/-0.0020$

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com



TOLERANCES (inch)

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

$R = +0.0000/-0.0020$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

$R = +0.0000/-0.0020$

3/4–1 DIAMETER

$D_1 = +0.0000/-0.00051$

$D_2 = h_6$

$R = +0.0000/-0.0020$

NON-FERROUS

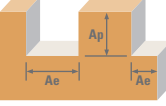
PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

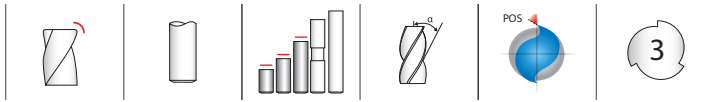
43LCB
FRACTIONAL SERIES

inch						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	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	4	1/4	3/4	.020	33500	33540
1/4	3/8	4	1/4	1-1/8	.020	33501	33541
1/4	3/8	4	1/4	2-1/8	.020	33502	33542
5/16	7/16	4	5/16	1-1/8	.020	33503	33543
5/16	7/16	4	5/16	2-1/8	.020	33504	33544
3/8	1/2	4	3/8	1-1/8	.020	33507	33547
3/8	1/2	4	3/8	2-1/8	.020	33508	33548
1/2	5/8	4	1/2	1-3/8	.030	33511	33551
1/2	5/8	4	1/2	2-1/4	.030	33512	33552
1/2	5/8	6	1/2	3-3/8	.030	33513	33553
1/2	5/8	6	1/2	4-1/4	.030	33514	33554
5/8	3/4	4	5/8	1-5/8	.030	33515	33555
5/8	3/4	6	5/8	2-3/8	.030	33516	33556
5/8	3/4	6	5/8	3-3/8	.030	33517	33557
5/8	3/4	6	5/8	4-3/8	.030	33518	33558
3/4	1	4	3/4	2	.030	33519	33559
3/4	1	6	3/4	2-1/2	.030	33520	33560
3/4	1	6	3/4	3-3/8	.030	33521	33561
3/4	1	6	3/4	4-3/8	.030	33522	33562
1	1-1/4	6	1	2-5/8	.030	33523	33563
1	1-1/4	6	1	3-3/8	.030	33524	33564
1	1-1/4	7	1	4-3/8	.030	33525	33565

- 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
- Necked design with blended diameter transitions provide clearance to reach
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

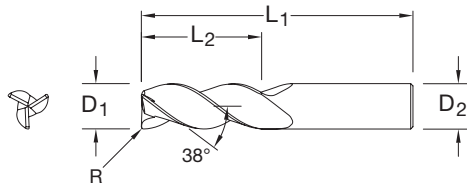
Series 43CR, 43CB, 43LC, 43, 43L, 43LCB, 43B, 43LB, 43ELB, 43EC Fractional		Hardness				Vc (sfm)	Diameter (D ₁) (inch)						
		Ae x D ₁		Ap x D ₁			1/8	1/4	3/8	1/2	5/8	3/4	1
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075		1	≤ 1	1600	RPM	48896	24448	16299	12224	9779	8149	6112
					(1280-1920)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	132	183	220	220	191	171	156
			≤ 0.5	≤ 1.5	2000	RPM	61120	30560	20373	15280	12224	10187	7640
					(1600-2400)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	165	229	275	275	238	214	195
			≤ 0.05	≤ 2	3300	RPM	100848	50424	33616	25212	20170	16808	12606
					(2640-3960)	Fz	0.0021	0.0055	0.0105	0.0140	0.0150	0.0165	0.0195
						Feed (ipm)	635	832	1059	1059	908	832	737
	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B-390		1	≤ 1	600	RPM	18336	9168	6112	4584	3667	3056	2292
					(480-720)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	50	69	83	83	72	64	58
			≤ 0.5	≤ 1.5	750	RPM	22920	11460	7640	5730	4584	3820	2865
					(600-900)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	62	86	103	103	89	80	73
			≤ 0.05	≤ 2	1240	RPM	37894	18947	12631	9474	7579	6316	4737
					(992-1488)	Fz	0.0021	0.0055	0.0105	0.0140	0.0150	0.0165	0.0195
						Feed (ipm)	239	313	398	398	341	313	277
	COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass		1	≤ 1	865	RPM	26434	13217	8811	6609	5287	4406	3304
					(692-1038)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	63	79	106	99	87	79	69
			≤ 0.5	≤ 1.5	1080	RPM	33005	16502	11002	8251	6601	5501	4126
					(864-1296)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	79	99	132	124	109	99	87
			≤ 0.05	≤ 2	1780	RPM	54397	27198	18132	13599	10879	9066	6800
					(1424-2136)	Fz	0.0017	0.0045	0.0085	0.0115	0.0125	0.0140	0.0160
						Feed (ipm)	277	367	462	469	408	381	326
COPPER ALLOYS Beryllium Copper C110, Malleable Bronze, Tin Bronze		1	≤ 1	345	RPM	10543	5272	3514	2636	2109	1757	1318	
				(276-414)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070	
					Feed (ipm)	25	32	42	40	35	32	28	
		≤ 0.5	≤ 1.5	430	RPM	13141	6570	4380	3285	2628	2190	1643	
				(344-516)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070	
					Feed (ipm)	32	39	53	49	43	39	34	
		≤ 0.05	≤ 2	710	RPM	21698	10849	7233	5424	4340	3616	2712	
				(568-852)	Fz	0.0017	0.0045	0.0085	0.0115	0.0125	0.0140	0.0160	
					Feed (ipm)	111	146	184	187	163	152	130	
PLASTICS ABS, Polycarbonate, PVC, Polypropylene		1	≤ 1	1600	RPM	48896	24448	16299	12224	9779	8149	6112	
				(1280-1920)	Fz	0.0015	0.0040	0.0075	0.0100	0.0110	0.0120	0.0140	
					Feed (ipm)	220	293	367	367	323	293	257	
		≤ 0.5	≤ 1.5	2000	RPM	61120	30560	20373	15280	12224	10187	7640	
				(1600-2400)	Fz	0.0015	0.0040	0.0075	0.0100	0.0110	0.0120	0.0140	
					Feed (ipm)	275	367	458	458	403	367	321	
		≤ 0.05	≤ 2	3300	RPM	100848	50424	33616	25212	20170	16808	12606	
				(2640-3960)	Fz	0.0034	0.0090	0.0170	0.0230	0.0250	0.0275	0.0320	
					Feed (ipm)	1029	1361	1714	1740	1513	1387	1210	

Bhn (Brinell) HRC (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
 $rpm = Vc \times 3.82 / D_1$
 $ipm = Fz \times 3 \times rpm$
 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)



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

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

$D_2 = h_6$

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

>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

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

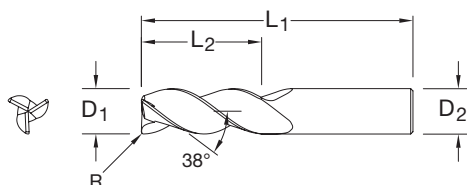
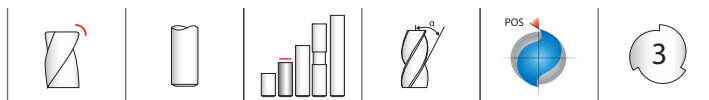
$D_2 = h_6$

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

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
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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

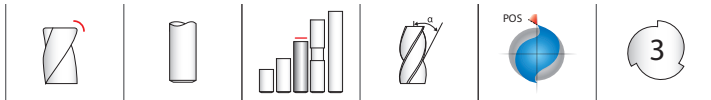
For patent
information visit
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43MCR

METRIC SERIES

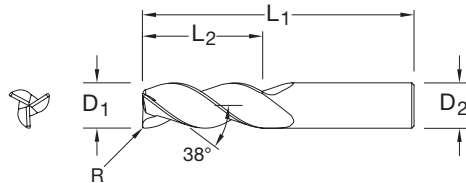
mm						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	POLISHED FLUTE	Ti-NAMITE-B (TiB ₂)
6,0	13,0	57,0	6,0	0,5	•	44902
6,0	13,0	57,0	6,0	1,0	•	44894
6,0	13,0	72,0	6,0	0,8	•	44842
6,0	13,0	72,0	6,0	1,2	•	44843
8,0	19,0	63,0	8,0	0,3	•	44846
8,0	19,0	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)

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	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

D₁ = +0,000/-0,008

D₂ = h₆

R = +0,00/-0,05

>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

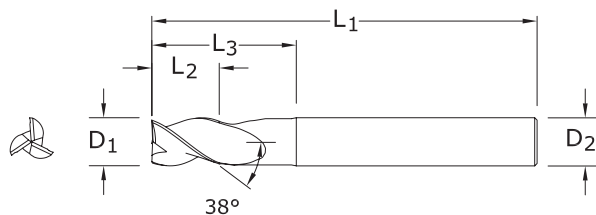
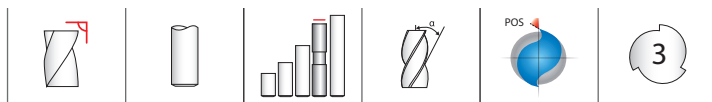
D₂ = h₆

R = +0,00/-0,05

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
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43ML
METRIC SERIES

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

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

$D_2 = h_6$

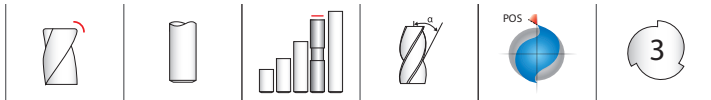
NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

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

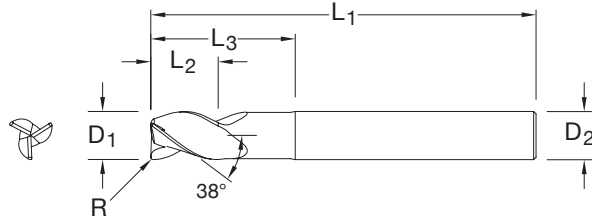
- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Necked design with blended diameter transitions provide clearance 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)



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	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

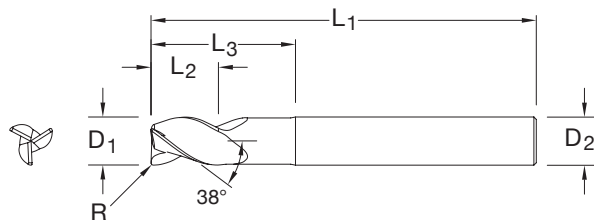
D₂ = h₆

R = +0,00/–0,05

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com



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

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

$D_2 = h_6$

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

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

$D_2 = h_6$

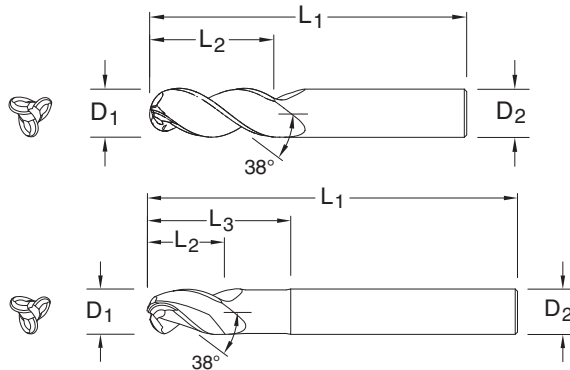
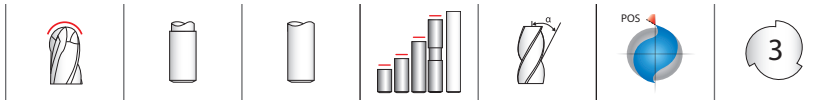
NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	mm				CORNER RADIUS R	POLISHED FLUTE	EDP NO. Ti-NAMITE-B (TiB ₂)
			SHANK DIAMETER D_2	REACH L_3					
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

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

$D_2 = h_6$

BALL RADIUS

$+0,0127/-0,0127$

>3–6 DIAMETER

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

$D_2 = h_6$

BALL RADIUS

$+0,0127/-0,0127$

>6–10 DIAMETER

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

$D_2 = h_6$

BALL RADIUS

$+0,0127/-0,0127$

>10–18 DIAMETER

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

$D_2 = h_6$

BALL RADIUS

$+0,0127/-0,0127$

>18–25 DIAMETER

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

$D_2 = h_6$

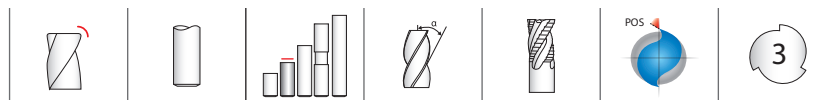
BALL RADIUS

$+0,0127/-0,0127$

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
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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

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

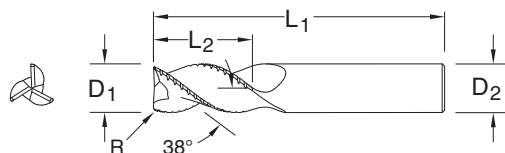
$D_2 = h_6$

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

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com



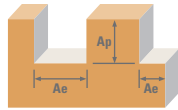
43MCB

METRIC SERIES

mm					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	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



43M, 43MB, 43MCR, 43ML, 43MLC, 43MCB					Diameter (D ₁) (mm)												
Metric	Hardness			Vc (m/min)													
		Ae x D ₁	Ap x D ₁		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 x 1000) / (D₁ x 3.14)

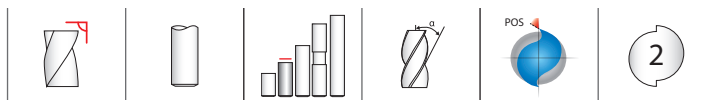
mm/min = Fz x 3 x rpm

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)



TOLERANCES (inch)

1/8–3/16 DIAMETER

$D_1 = +0.0000/-0.00032$

$D_2 = h_6$

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

3/4–1 DIAMETER

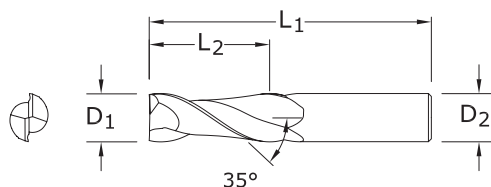
$D_1 = +0.0000/-0.00051$

$D_2 = h_6$

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com



inch				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)
1/8	3/8	1-1/2	1/8	34620	34660
3/16	9/16	2	3/16	34621	34661
1/4	3/4	2-1/2	1/4	34622	34662
5/16	13/16	2-1/2	5/16	34623	34663
3/8	1	2-1/2	3/8	34624	34664
1/2	1-1/4	3-1/4	1/2	34625	34665
5/8	1-5/8	3-3/4	5/8	34626	34666
3/4	1-5/8	4	3/4	34627	34667
1	2	4-1/2	1	34628	34668

47

FRACTIONAL 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
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)

TOLERANCES (inch)

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

3/4–1 DIAMETER

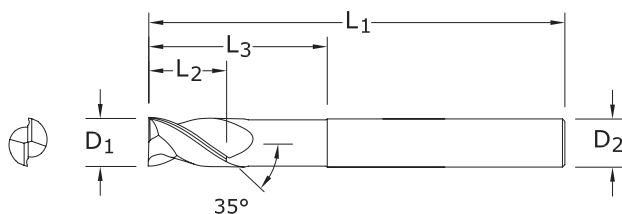
$D_1 = +0.0000/-0.00051$

$D_2 = h_6$

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

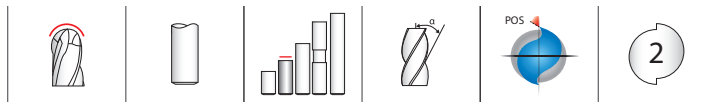


inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	4	1/4	2-1/8	34640	34678
3/8	1/2	4	3/8	2-1/8	34641	34679
1/2	5/8	6	1/2	2-1/8	34642	34680
1/2	5/8	6	1/2	3-3/8	34643	34681
5/8	3/4	6	5/8	2-3/8	34644	34682
5/8	3/4	6	5/8	3-3/8	34645	34683
3/4	1	6	3/4	2-1/2	34646	34684
3/4	1	6	3/4	3-3/8	34647	34685

47L

FRACTIONAL SERIES

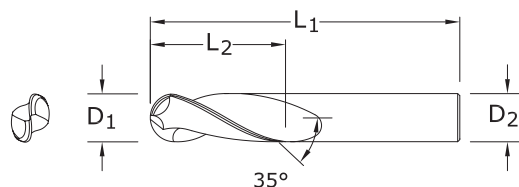
- Circular land reduces edge aggressiveness for varied speed and feed rates
- 2 Flutes effectively manage the large size and volume of chips produced during the aggressive machining process
- Excellent balance at high speeds and aggressive plunging capability
- Necked design with blended diameter transitions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



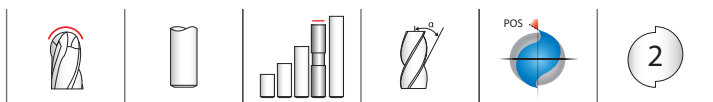
47B

FRACTIONAL 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
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



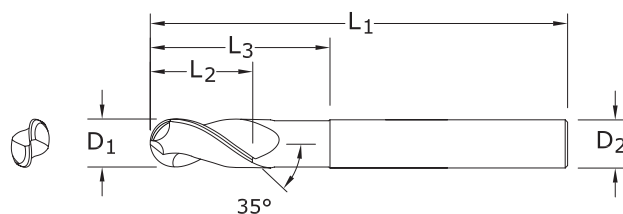
inch				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/8	3/8	1-1/2	1/8	34630	34669
3/16	9/16	2	3/16	34631	34670
1/4	3/4	2-1/2	1/4	34632	34671
5/16	13/16	2-1/2	5/16	34633	34672
3/8	1	2-1/2	3/8	34634	34673
1/2	1-1/4	3-1/4	1/2	34635	34674
5/8	1-5/8	3-3/4	5/8	34636	34675
3/4	1-5/8	4	3/4	34637	34676
1	2	4-1/2	1	34638	34677



47LB

FRACTIONAL 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)



mm					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	4	1/4	2-1/8	34650	34686
3/8	1/2	4	3/8	2-1/8	34651	34687
1/2	5/8	6	1/2	2-1/8	34652	34688
1/2	5/8	6	1/2	3-3/8	34653	34689
5/8	3/4	6	5/8	2-3/8	34655	34691
5/8	3/4	6	5/8	3-3/8	34654	34690
3/4	1	6	3/4	2-1/2	34656	34693
3/4	1	6	3/4	3-3/8	34657	34692

TOLERANCES (inch)

1/8–3/16 DIAMETER

$D_1 = +0.0000/-0.00032$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0005$

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0005$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0005$

3/4–1 DIAMETER

$D_1 = +0.0000/-0.00051$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0005$

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
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TOLERANCES (inch)

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0005$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

BALL RADIUS

$+0.0005/-0.0005$

3/4–1 DIAMETER

$D_1 = +0.0000/-0.00051$

$D_2 = h_6$

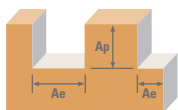
BALL RADIUS

$+0.0005/-0.0005$

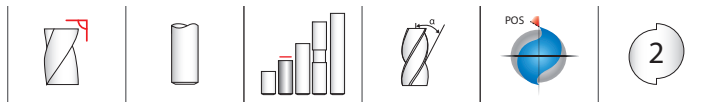
NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

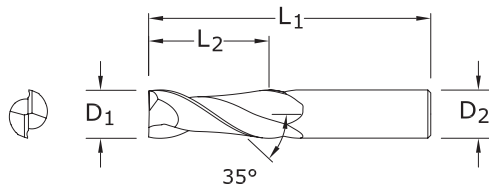
Series 47, 47B, 47L, 47LB Fractional	Hardness			Vc (sfm)	Diameter (D ₁) (inch)									
		Ae x D ₁	Ap x D ₁		1/8	1/4	3/8	1/2	5/8	3/4	1			
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc		1	≤ 1	1600	RPM	48896	24448	16299	12224	9779	8149	6112	
					(1280-1920)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085	
					Feed (ipm)	88	122	147	147	127	114	104		
			≤ 0.5	≤ 1.5	2000	RPM	61120	30560	20373	15280	12224	10187	7640	
					(1600-2400)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085	
					Feed (ipm)	110	153	183	183	159	143	130		
		≤ 0.05	≤ 2	3300	RPM	100848	50424	33616	25212	20170	16808	12606		
				(2640-3960)	Fz	0.0021	0.0055	0.0105	0.0140	0.0150	0.0165	0.0195		
				Feed (ipm)	424	555	706	706	605	555	492			
	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B- 390	≤ 125 Bhn or ≤ 77 HRb		1	≤ 1	600	RPM	18336	9168	6112	4584	3667	3056	2292
						(480-720)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	33	46	55	55	48	43	39	
			≤ 0.5	≤ 1.5	750	RPM	22920	11460	7640	5730	4584	3820	2865	
					(600-900)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085	
					Feed (ipm)	41	57	69	69	60	53	49		
		≤ 0.05	≤ 2	1240	RPM	37894	18947	12631	9474	7579	6316	4737		
				(992-1488)	Fz	0.0021	0.0055	0.0105	0.0140	0.0150	0.0165	0.0195		
				Feed (ipm)	159	208	265	265	227	208	185			
COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass		≤ 140 Bhn or ≤ 3 HRc		1	≤ 1	865	RPM	26434	13217	8811	6609	5287	4406	3304
						(692-1038)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	42	53	70	66	58	53	46	
			≤ 0.5	≤ 1.5	1080	RPM	33005	16502	11002	8251	6601	5501	4126	
					(864-1296)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070	
					Feed (ipm)	53	66	88	83	73	66	58		
		≤ 0.05	≤ 2	1780	RPM	54397	27198	18132	13599	10879	9066	6800		
				(1424-2136)	Fz	0.0017	0.0045	0.0085	0.0115	0.0125	0.0140	0.0160		
				Feed (ipm)	185	245	308	313	272	254	218			
	COPPER ALLOYS Beryllium Copper C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc		1	≤ 1	345	RPM	10543	5272	3514	2636	2109	1757	1318
						(276-414)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	17	21	28	26	23	21	18	
			≤ 0.5	≤ 1.5	430	RPM	13141	6570	4380	3285	2628	2190	1643	
					(344-516)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070	
					Feed (ipm)	21	26	35	33	29	26	23		
		≤ 0.05	≤ 2	710	RPM	21698	10849	7233	5424	4340	3616	2712		
				(568-852)	Fz	0.0017	0.0045	0.0085	0.0115	0.0125	0.0140	0.0160		
				Feed (ipm)	74	98	123	125	108	101	87			
PLASTICS ABS, Polycarbonate, PVC, Polypropylene				1	≤ 1	1600	RPM	48896	24448	16299	12224	9779	8149	6112
						(1280-1920)	Fz	0.0015	0.0040	0.0075	0.0100	0.0110	0.0120	0.0140
						Feed (ipm)	147	196	244	244	215	196	171	
			≤ 0.5	≤ 1.5	2000	RPM	61120	30560	20373	15280	12224	10187	7640	
					(1600-2400)	Fz	0.0015	0.0040	0.0075	0.0100	0.0110	0.0120	0.0140	
					Feed (ipm)	183	244	306	306	269	244	214		
		≤ 0.05	≤ 2	3300	RPM	100848	50424	33616	25212	20170	16808	12606		
				(2640-3960)	Fz	0.0034	0.0090	0.0170	0.0230	0.0250	0.0275	0.0320		
				Feed (ipm)	686	908	1143	1160	1008	924	807			

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
 rpm = Vc x 3.82 / D1
 ipm = 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)



47M

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
- 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	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

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

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

$D_2 = h_6$

>18-25 DIAMETER

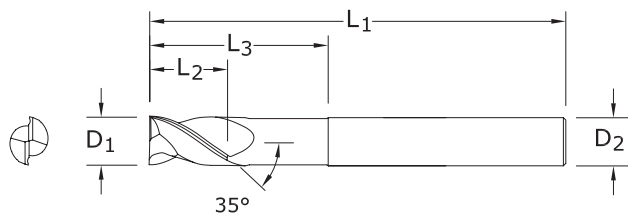
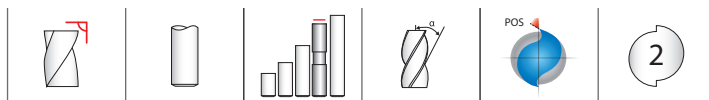
$D_1 = +0,000/-0,013$

$D_2 = h_6$

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
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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

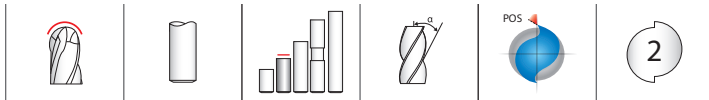
For patent
information visit
www.ksptpatents.com

47ML

METRIC SERIES

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

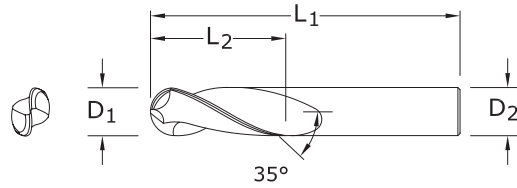
- Circular land reduces edge aggressiveness for varied speed and feed rates
- 2 Flutes effectively manage the large size and volume of chips produced during the aggressive machining process
- Excellent balance at high speeds and aggressive plunging capability
- Necked design with blended diameter transitions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



47MB

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
- 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	UNCOATED	TI-NAMITE-B (TiB 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

TOLERANCES (mm)

3 DIAMETER

D₁ = +0,000/-0,006

D₂ = h₆

BALL RADIUS

+0,0127/-0,0127

>3-6 DIAMETER

D₁ = +0,000/-0,008

D₂ = h₆

BALL RADIUS

+0,0127/-0,0127

>6-10 DIAMETER

D₁ = +0,000/-0,009

D₂ = h₆

BALL RADIUS

+0,0127/-0,0127

>10-18 DIAMETER

D₁ = +0,000/-0,012

D₂ = h₆

BALL RADIUS

+0,0127/-0,0127

>18-25 DIAMETER

D₁ = +0,000/-0,013

D₂ = h₆

BALL RADIUS

+0,0127/-0,0127

NON-FERROUS

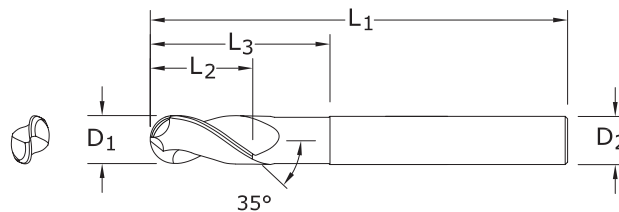
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

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)



mm					EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	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

D₁ = +0,000/-0,008

D₂ = h₆

BALL RADIUS

+0,0127/-0,0127

>6-10 DIAMETER

D₁ = +0,000/-0,009

D₂ = h₆

BALL RADIUS

+0,0127/-0,0127

>10-18 DIAMETER

D₁ = +0,000/-0,011

D₂ = h₆

BALL RADIUS

+0,0127/-0,0127

>18-20 DIAMETER

D₁ = +0,000/-0,013

D₂ = h₆

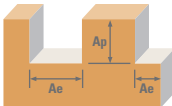
BALL RADIUS

+0,0127/-0,0127

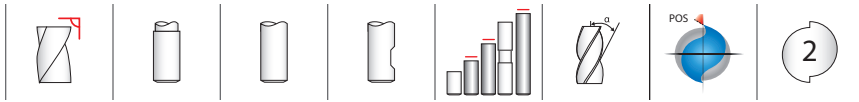
NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

Series 47M, 47MB, 47ML, 47MLB Metric	Hardness			Vc (m/min)	Diameter (D ₁) (mm)								
		Ae x D ₁	Ap x D ₁		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

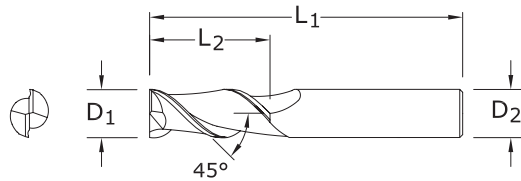
Bhn (Brinell) HRC (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
 $\text{rpm} = (\text{Vc} \times 1000) / (D_1 \times 3.14)$
 $\text{mm/min} = \text{Fz} \times 2 \times \text{rpm}$
 reduce speed and feed for materials harder than listed
 reduce cut depth and feed by 50% for long flute and long 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)



44

FRACTIONAL 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)



inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED W/FLAT	Ti-NAMITE-B (TiB ₂) W/FLAT	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/4	2-7/16	3/8	34501	34502	32033	32053
1/4	1-1/4	3-1/16	3/8	34503	34504	32034	32054
1/4	1-3/4	3-9/16	3/8	34505	34506	32035	32055
5/16	1-3/8	3-1/8	3/8	34507	34508	32036	32056
3/8	3/4	2-1/2	3/8	34509	34510	32037	32057
3/8	1-1/2	3-1/4	3/8	34511	34512	32038	32058
3/8	2-1/2	4-1/4	3/8	34513	34514	32039	32059
1/2	1-1/4	3-1/4	1/2	34515	34516	32040	32060
1/2	2	4	1/2	34517	34518	32041	32061
1/2	3	5	1/2	34519	34520	32042	32062
5/8	1-5/8	3-3/4	5/8	34521	34522	32043	32063
5/8	2-1/2	4-5/8	5/8	34523	34524	32044	32064
3/4	1-5/8	3-7/8	3/4	34525	34526	32045	32065
3/4	3	5-1/4	3/4	34527	34528	32046	32066
3/4	4	6-1/4	3/4	34529	34530	32047	32067
1	2	4-1/2	1	34531	34532	32048	32068
1	4	6-1/2	1	34533	34534	32049	32069

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

TOLERANCES (inch)

1/4–3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

1/2–5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

3/4–1 DIAMETER

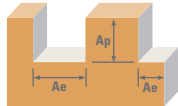
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$D_2 = h_6$

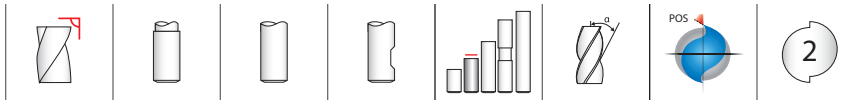
NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

Series 44 Fractional	Hardness			Vc (sfm)	Diameter (D1) (inch)								
		Ae x D1	Ap x D1		1/8	1/4	3/8	1/2	5/8	3/4	1		
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc		1	≤ 1	1600	RPM	48896	24448	16299	12224	9779	8149	6112
					(1280-1920)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	88	122	147	147	127	114	104
			≤ 0.5	≤ 1.5	2000	RPM	61120	30560	20373	15280	12224	10187	7640
					(1600-2400)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	110	153	183	183	159	143	130
			≤ 0.05	≤ 2	3300	RPM	100848	50424	33616	25212	20170	16808	12606
					(2640-3960)	Fz	0.0021	0.0055	0.0105	0.0140	0.0150	0.0165	0.0195
						Feed (ipm)	424	555	706	706	605	555	492
ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B- 390	≤ 125 Bhn or ≤ 77 HRb		1	≤ 1	600	RPM	18336	9168	6112	4584	3667	3056	2292
					(480-720)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	33	46	55	55	48	43	39
			≤ 0.5	≤ 1.5	750	RPM	22920	11460	7640	5730	4584	3820	2865
					(600-900)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	41	57	69	69	60	53	49
			≤ 0.05	≤ 2	1240	RPM	37894	18947	12631	9474	7579	6316	4737
					(992-1488)	Fz	0.0021	0.0055	0.0105	0.0140	0.0150	0.0165	0.0195
						Feed (ipm)	159	208	265	265	227	208	185
COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass	≤ 140 Bhn or ≤ 3 HRc		1	≤ 1	865	RPM	26434	13217	8811	6609	5287	4406	3304
					(692-1038)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	42	53	70	66	58	53	46
			≤ 0.5	≤ 1.5	1080	RPM	33005	16502	11002	8251	6601	5501	4126
					(864-1296)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	53	66	88	83	73	66	58
			≤ 0.05	≤ 2	1780	RPM	54397	27198	18132	13599	10879	9066	6800
					(1424-2136)	Fz	0.0017	0.0045	0.0085	0.0115	0.0125	0.0140	0.0160
						Feed (ipm)	185	245	308	313	272	254	218
COPPER ALLOYS Beryllium Copper C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc		1	≤ 1	345	RPM	10543	5272	3514	2636	2109	1757	1318
					(276-414)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	17	21	28	26	23	21	18
			≤ 0.5	≤ 1.5	430	RPM	13141	6570	4380	3285	2628	2190	1643
					(344-516)	Fz	0.0008	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	21	26	35	33	29	26	23
			≤ 0.05	≤ 2	710	RPM	21698	10849	7233	5424	4340	3616	2712
					(568-852)	Fz	0.0017	0.0045	0.0085	0.0115	0.0125	0.0140	0.0160
						Feed (ipm)	74	98	123	125	108	101	87
PLASTICS ABS, Polycarbonate, PVC, Polypropylene			1	≤ 1	1600	RPM	48896	24448	16299	12224	9779	8149	6112
					(1280-1920)	Fz	0.0015	0.0040	0.0075	0.0100	0.0110	0.0120	0.0140
						Feed (ipm)	147	196	244	244	215	196	171
			≤ 0.5	≤ 1.5	2000	RPM	61120	30560	20373	15280	12224	10187	7640
					(1600-2400)	Fz	0.0015	0.0040	0.0075	0.0100	0.0110	0.0120	0.0140
						Feed (ipm)	183	244	306	306	269	244	214
			≤ 0.05	≤ 2	3300	RPM	100848	50424	33616	25212	20170	16808	12606
					(2640-3960)	Fz	0.0034	0.0090	0.0170	0.0230	0.0250	0.0275	0.0320
						Feed (ipm)	686	908	1143	1160	1008	924	807

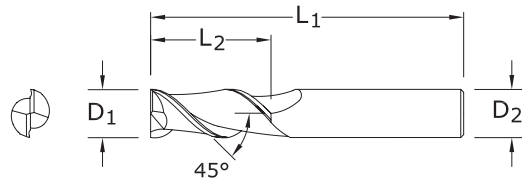
Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
 rpm = Vc x 3.82 / D1
 ipm = Fz x 2 x rpm
 reduce speed and feed for materials harder than listed
 reduce cut depth and feed by 50% for long flute and long reach tools
 reduce feed and Ae when finish milling (.02 x D1 maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



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)



mm				EDP NO.			
CUTTING DIAMETER D ₁	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

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

>18-20 DIAMETER

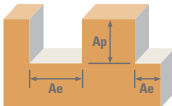
D₁ = +0,000/-0,013

D₂ = h₆

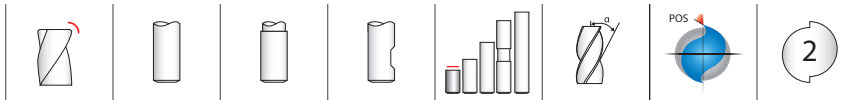
NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

Series 44M Metric	Hardness			Vc (m/min)	Diameter (D ₁) (mm)								
		Ae x D ₁	Ap x D ₁		3	6	10	12	16	20	25		
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7HRc		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	
			≤ 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	
			≤ 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		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	
			≤ 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	
			≤ 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		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	
			≤ 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	
			≤ 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		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	
			≤ 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	
			≤ 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			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	
			≤ 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	
			≤ 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	

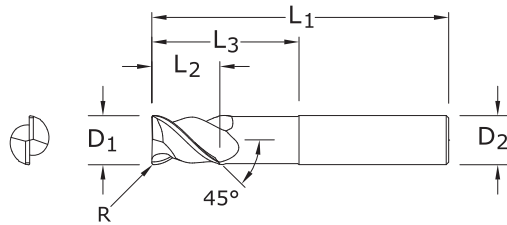
Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
 rpm = (Vc x 1000) / (D₁ x 3.14)
 mm/min = Fz x 2 x rpm
 reduce speed and feed for materials harder than listed
 reduce cut depth and feed by 50% for long flute and long reach tools
 reduce feed and Ae when finish milling (.02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



45

FRACTIONAL 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)



inch						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	UNCOATED W/FLAT	UNCOATED	Ti-NAMITE-B (TiB ₂) W/FLAT	Ti-NAMITE-B (TiB ₂)
1/4	3/8	2-1/2	3/8	1	.010	91257	91250	91242	91235
5/16	7/16	2-1/2	3/8	1-1/8	.012	91258	91251	91243	91236
3/8	9/16	2-1/2	3/8	1-1/8	.015	91259	91252	91244	91237
1/2	3/4	3	1/2	1-1/2	.020	91260	91253	91245	91238
5/8	7/8	3-1/2	5/8	1-3/4	.025	91261	91254	91246	91239
3/4	1	4	3/4	2	.030	91262	91255	91247	91240
1	1-1/4	4	1	2-1/8	.040	91263	91256	91248	91241

*Reach (Optional)

TOLERANCES (inch)

1/4-3/8 DIAMETER

$D_1 = +0.0000/-0.00035$

$D_2 = h_6$

$R = +0.0000/-0.0020$

1/2-5/8 DIAMETER

$D_1 = +0.0000/-0.00043$

$D_2 = h_6$

$R = +0.0000/-0.0020$

3/4-1 DIAMETER

$D_1 = +0.0000/-0.00051$

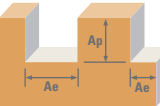
$D_2 = h_6$

$R = +0.0000/-0.0020$

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

Series 45 Fractional	Hardness			Vc (sfm)	Diameter (D ₁) (inch)							
		Ae x D ₁	Ap x D ₁		1/4	3/8	1/2	5/8	3/4	1		
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc		1	≤ 1	1600	RPM	24448	16299	12224	9779	8149	6112
					(1280-1920)	Fz	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	122	147	147	127	114	104
			≤ 0.5	≤ 1.5	2000	RPM	30560	20373	15280	12224	10187	7640
					(1600-2400)	Fz	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	153	183	183	159	143	130
			≤ 0.05	≤ 2	3300	RPM	50424	33616	25212	20170	16808	12606
					(2640-3960)	Fz	0.0055	0.0105	0.0140	0.0150	0.0165	0.0195
						Feed (ipm)	555	706	706	605	555	492
ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B- 390	≤ 125 Bhn or ≤ 77 HRb		1	≤ 1	600	RPM	9168	6112	4584	3667	3056	2292
					(480-720)	Fz	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	46	55	55	48	43	39
			≤ 0.5	≤ 1.5	750	RPM	11460	7640	5730	4584	3820	2865
					(600-900)	Fz	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
						Feed (ipm)	57	69	69	60	53	49
			≤ 0.05	≤ 2	1240	RPM	18947	12631	9474	7579	6316	4737
					(992-1488)	Fz	0.0055	0.0105	0.0140	0.0150	0.0165	0.0195
						Feed (ipm)	208	265	265	227	208	185
COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass	≤ 140 Bhn or ≤ 3 HRc		1	≤ 1	865	RPM	13217	8811	6609	5287	4406	3304
					(692-1038)	Fz	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	53	70	66	58	53	46
			≤ 0.5	≤ 1.5	1080	RPM	16502	11002	8251	6601	5501	4126
					(864-1296)	Fz	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	66	88	83	73	66	58
			≤ 0.05	≤ 2	1780	RPM	27198	18132	13599	10879	9066	6800
					(1424-2136)	Fz	0.0045	0.0085	0.0115	0.0125	0.0140	0.0160
						Feed (ipm)	245	308	313	272	254	218
COPPER ALLOYS Beryllium Copper C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc		1	≤ 1	345	RPM	5272	3514	2636	2109	1757	1318
					(276-414)	Fz	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	21	28	26	23	21	18
			≤ 0.5	≤ 1.5	430	RPM	6570	4380	3285	2628	2190	1643
					(344-516)	Fz	0.0020	0.0040	0.0050	0.0055	0.0060	0.0070
						Feed (ipm)	26	35	33	29	26	23
			≤ 0.05	≤ 2	710	RPM	10849	7233	5424	4340	3616	2712
					(568-852)	Fz	0.0045	0.0085	0.0115	0.0125	0.0140	0.0160
						Feed (ipm)	98	123	125	108	101	87
PLASTICS ABS, Polycarbonate, PVC, Polypropylene			1	≤ 1	1600	RPM	24448	16299	12224	9779	8149	6112
					(1280-1920)	Fz	0.0040	0.0075	0.0100	0.0110	0.0120	0.0140
						Feed (ipm)	196	244	244	215	196	171
			≤ 0.5	≤ 1.5	2000	RPM	30560	20373	15280	12224	10187	7640
					(1600-2400)	Fz	0.0040	0.0075	0.0100	0.0110	0.0120	0.0140
						Feed (ipm)	244	306	306	269	244	214
			≤ 0.05	≤ 2	3300	RPM	50424	33616	25212	20170	16808	12606
					(2640-3960)	Fz	0.0090	0.0170	0.0230	0.0250	0.0275	0.0320
						Feed (ipm)	908	1143	1160	1008	924	807

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
 $\text{rpm} = \text{Vc} \times 3.82 / D_1$
 $\text{ipm} = \text{Fz} \times 2 \times \text{rpm}$
 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
16	4 Flute Square End Stub Fractional	192
16M	4 Flute Square End Stub Metric	222
1	4 Flute Square End Standard Length Fractional	193
1L	4 Flute Square End Long Reach Fractional	193
1EL	4 Flute Square End Extended Length Fractional	193
1M	4 Flute Square End Standard Length Metric	223
1XLM	4 Flute Square End Extra Long Reach Metric	223
14	4 Flute Double End Square Stub Fractional	197
14M	4 Flute Double End Square Stub Metric	225
1B	4 Flute Ball End Standard Length Fractional	198
1LB	4 Flute Ball End Long Reach Fractional	198
1ELB	4 Flute Ball End Extended Length Fractional	198
1MB	4 Flute Ball End Standard Length Metric	226
1XLMB	4 Flute Ball End Extra Long Reach Metric	226
14B	4 Flute Double End Ball Stub Fractional	200
14MB	4 Flute Double End Ball Stub Metric	227
1CR	4 Flute Corner Radius Standard Length Fractional	195
1MCR	4 Flute Corner Radius Standard Length Metric	224
54	4 Flute High Shear Square End Standard Length Fractional	209
54M	4 Flute High Shear Square End Standard Length Metric	235
17	2 Flute Square End Stub Fractional	178
17M	2 Flute Square End Stub Metric	213
3	2 Flute Square End Standard Length Fractional	179
3L	2 Flute Square End Long Reach Fractional	179
3EL	2 Flute Square End Extended Length Fractional	179
3M	2 Flute Square End Standard Length Metric	214
3XLM	2 Flute Square End Extra Long Reach Metric	214
59	2 Flute Square End Long Reach Fractional	181
59M	2 Flute Square End Long Reach Metric	215
15	2 Flute Double End Square Stub Fractional	183
15M	2 Flute Double End Square Stub Metric	216
3B	2 Flute Ball End Standard Length Fractional	184
3LB	2 Flute Ball End Long Reach Fractional	184
3ELB	2 Flute Ball End Extended Length Fractional	184
3MB	2 Flute Ball End Standard Length Metric	217
3XLMB	2 Flute Ball End Extra Long Reach Metric	217
59B	2 Flute Ball End Long Reach Fractional	186
59MB	2 Flute Ball End Long Reach Metric	218

Speed & Feed Recommendations listed after each series

SERIES	GENERAL PURPOSE END MILLS DESCRIPTION	PAGE
15B	2 Flute Double End Ball Stub Fractional	187
15MB	2 Flute Double End Ball Stub Metric	219
3CR	2 Flute Corner Radius Standard Length Fractional	182
52	2 Flute High Shear Square End Standard Length Fractional	208
52M	2 Flute High Shear Square End Standard Length Metric	234
5	3 Flute Square End Standard Length Fractional	188
5M	3 Flute Square End Standard Length Metric	220
5XLM	3 Flute Square End Extra Long Reach Metric	220
5B	3 Flute Ball End Standard Length Fractional	189
5MB	3 Flute Ball End Standard Length Metric	221
5XLMB	3 Flute Ball End Extra Long Reach Metric	221
61	Multi-Flute Coarse Pitch Rougher Fractional	206
61M	Multi-Flute Coarse Pitch Rougher Metric	232
62	Multi-Flute Fine Pitch Rougher Fractional	204
62M	Multi-Flute Fine Pitch Rougher Metric	230
23	3 Flute Tapered Square End Standard Length Fractional	190
24	3 Flute Tapered Corner Radius Standard Length Fractional	191
End Mill Sets	2, 3, & 4 Flute Square End Series 1, 3, 5, 14, 15	211
	2, 3, & 4 Flute Ball End Series 1B, 3B, 5B, 14B, 15B	212

Speed & Feed Recommendations listed after each series

Fresado

SERIE	DESCRIPCIÓN DE FRESAS DE USO GENERAL	PÁGINA
16	4 filos, pieza de punta cuadrada, fraccional	192
16M	4 filos, pieza de punta cuadrada, métrico	222
1	4 filos, punta cuadrada, longitud estándar, fraccional	193
1L	4 filos, punta cuadrada, largo alcance, fraccional	193
1EL	4 filos, punta cuadrada, longitud extendida, fraccional	193
1M	4 filos, punta cuadrada, longitud estándar, métrico	223
1XLM	4 filos, punta cuadrada, alcance extralargo, métrico	223
14	4 filos, pieza doble de punta cuadrada, fraccional	197
14M	4 filos, pieza doble de punta cuadrada, métrico	225
1B	4 filos, punta esférica, longitud estándar, fraccional	198
1LB	4 filos, punta esférica, largo alcance, fraccional	198
1ELB	4 filos, punta esférica, longitud extendida, fraccional	198
1MB	4 filos, punta esférica, longitud estándar, métrico	226
1XLMB	4 filos, punta esférica, alcance extralargo, métrico	226
14B	4 filos, pieza doble de punta esférica, fraccional	200
14MB	4 filos, pieza doble de punta esférica, métrico	227

SERIE	DESCRIPCIÓN DE FRESAS DE USO GENERAL	PÁGINA
1CR	4 filos, radio angulado, longitud estándar, fraccional	195
1MCR	4 filos, radio angulado, longitud estándar, métrico	224
54	4 filos, alto rendimiento, punta cuadrada, longitud estándar, fraccional	209
54M	4 filos, alto rendimiento, punta cuadrada, longitud estándar, métrico	235
17	2 filos, pieza de punta cuadrada, fraccional	178
17M	2 filos, pieza de punta cuadrada, métrico	213
3	2 filos, punta cuadrada, longitud estándar, fraccional	179
3L	2 filos, punta cuadrada, largo alcance, fraccional	179
3EL	2 filos, punta cuadrada, longitud extendida, fraccional	179
3M	2 filos, punta cuadrada, longitud estándar, métrico	214
3XLM	2 filos, punta cuadrada, alcance extralargo, métrico	214
59	2 filos, punta cuadrada, largo alcance, fraccional	181
59M	2 filos, punta cuadrada, largo alcance, métrico	215
15	2 filos, pieza doble de punta cuadrada, fraccional	183
15M	2 filos, pieza doble de punta cuadrada, métrico	216
3B	2 filos, punta esférica, longitud estándar, fraccional	184
3LB	2 filos, punta esférica, largo alcance, fraccional	184
3ELB	2 filos, punta esférica, longitud extendida, fraccional	184
3MB	2 filos, punta esférica, longitud estándar, métrico	217
3XLMB	2 filos, punta esférica, alcance extralargo, métrico	217
59B	2 filos, punta esférica, largo alcance, fraccional	186
59MB	2 filos, punta esférica, largo alcance, métrico	218
15B	2 filos, pieza doble de punta esférica, fraccional	187
15MB	2 filos, pieza doble de punta esférica, métrico	219
3CR	2 filos, radio angulado, longitud estándar, fraccional	182
52	2 filos, alto rendimiento, punta cuadrada, longitud estándar, fraccional	208
52M	2 filos, alto rendimiento, punta cuadrada, longitud estándar, métrico	234
5	3 filos, punta cuadrada, longitud estándar, fraccional	188
5M	3 filos, punta cuadrada, longitud estándar, métrico	220
5XLM	3 filos, punta cuadrada, alcance extralargo, métrico	220
5B	3 filos, punta esférica, longitud estándar, fraccional	189
5MB	3 filos, punta esférica, longitud estándar, métrico	221
5XLMB	3 filos, punta esférica, alcance extralargo, métrico	221
61	Filo múltiple, paso grueso, desbastador, fraccional	206
61M	Filo múltiple, paso grueso, desbastador, métrico	232
62	Filo múltiple, paso fino, desbastador, fraccional	204
62M	Filo múltiple, paso fino, desbastador, métrico	230
23	3 filos, cónico, punta cuadrada, longitud estándar, fraccional	190
24	3 filos, cónico, radio angulado, longitud estándar, fraccional	191
Juegos de fresas	2, 3 y 4 filos, punta cuadrada, series 1, 3, 5, 14, 15	211
	2, 3 y 4 filos, punta esférica, series 1B, 3B, 5B, 14B, 15B	212

Recomendaciones de velocidades y avances mostradas tras cada serie

SERIES	DESCRIPTION DE FRAISES À USAGE GÉNÉRAL	PAGE
16	4 dents à bout plat court (fractionnel)	192
16M	4 dents à bout plat court (métrique)	222
1	4 dents à bout plat longueur standard (fractionnel)	193
1L	4 dents à bout plat longue portée (fractionnel)	193
1EL	4 dents à bout plat extra-long (fractionnel)	193
1M	4 dents à bout plat longueur standard (métrique)	223
1XLM	4 dents à bout plat portée extra-longue (métrique)	223
14	4 dents à double bouts plats court (fractionnel)	197
14M	4 dents à double bouts plats court (métrique)	225
1B	4 dents à bout hémisphérique longueur standard (fractionnel)	198
1LB	4 dents à bout hémisphérique longue portée (fractionnel)	198
1ELB	4 dents à bout hémisphérique extra-long (fractionnel)	198
1MB	4 dents à bout hémisphérique longueur standard (métrique)	226
1XLMB	4 dents à bout hémisphérique portée extra-longue (métrique)	226
14B	4 dents à double bouts hémisphériques court (fractionnel)	200
14MB	4 dents à double bouts hémisphériques court (métrique)	227
1CR	4 dents rayon en coin longueur standard (fractionnel)	195
1MCR	4 dents rayon en coin longueur standard (métrique)	224
54	4 dents cisaillement élevé à bout plat longueur standard (fractionnel)	209
54M	4 dents cisaillement élevé à bout plat longueur standard (métrique)	235
17	2 dents à bout plat court (fractionnel)	178
17M	2 dents à bout plat court (métrique)	213
3	2 dents à bout plat longueur standard (fractionnel)	179
3L	2 dents à bout plat longue portée (fractionnel)	179
3EL	2 dents à bout plat extra-long (fractionnel)	179
3M	2 dents à bout plat longueur standard (métrique)	214
3XLM	2 dents à bout plat portée extra-longue (métrique)	214
59	2 dents à bout plat longue portée (fractionnel)	181
59M	2 dents à bout plat longue portée (métrique)	215
15	2 dents à double bouts plats court (fractionnel)	183
15M	2 dents à double bouts plats court (métrique)	216
3B	2 dents à bout hémisphérique longueur standard (fractionnel)	184
3LB	2 dents à bout hémisphérique longue portée (fractionnel)	184
3ELB	2 dents à bout hémisphérique extra-long (fractionnel)	184
3MB	2 dents à bout hémisphérique longueur standard (métrique)	217
3XLMB	2 dents à bout hémisphérique portée extra-longue (métrique)	217
59B	2 dents à bout hémisphérique longue portée (fractionnel)	186
59MB	2 dents à bout hémisphérique longue portée (métrique)	218
15B	2 dents à double bouts hémisphériques court (fractionnel)	187
15MB	2 dents à double bouts hémisphériques court (métrique)	219

SERIES	DESCRIPTION DE FRAISES À USAGE GÉNÉRAL	PAGE
3CR	2 dents rayon en coin longueur standard (fractionnel)	182
52	2 dents cisaillement élevé à bout plat longueur standard (fractionnel)	208
52M	2 dents cisaillement élevé à bout plat longueur standard (métrique)	234
5	3 dents à bout plat longueur standard (fractionnel)	188
5M	3 dents à bout plat longueur standard (métrique)	220
5XLM	3 dents à bout plat portée extra-longue (métrique)	220
5B	3 dents à bout hémisphérique longueur standard (fractionnel)	189
5MB	3 dents à bout hémisphérique longueur standard (métrique)	221
5XLMB	3 dents à bout hémisphérique portée extra-longue (métrique)	221
61	Multi-dents à pas gros d'ébauche (fractionnel)	206
61M	Multi-dents à pas gros d'ébauche (métrique)	232
62	Multi-dents à pas fin d'ébauche (fractionnel)	204
62M	Multi-dents à pas fin d'ébauche (métrique)	230
23	3 dents conique à bout plat longueur standard (fractionnel)	190
24	3 dents conique rayon en coin longueur standard (fractionnel)	191
Jeux de fraises	2, 3, & 4 Série goujure à bout plat 1,3,5,14,15	211
	2, 3, & 4 Série goujure à bout hémisphérique 15B, 15MB, 15B, 15MB, 15B, 15MB	212

Recommandations de vitesse et avance indiquées après chaque série

SERIE	BESCHREIBUNG DER ALLZWECK-SCHAFTFRÄSER	SEITE
16	Zölliger Schaftfräser mit 4 Schneidekanten ohne Eckenradien, kurze Ausführung	192
16M	Metrischer Schaftfräser mit 4 Schneidekanten ohne Eckenradien, kurze Ausführung	222
1	Zölliger Schaftfräser mit 4 Schneidekanten ohne Eckenradien, Standardlänge	193
1L	Zölliger Langloch-Schaftfräser mit 4 Schneidekanten ohne Eckenradien	193
1EL	Zölliger Schaftfräser mit 4 Schneidekanten ohne Eckenradien, extra lang	193
1M	Metrischer Schaftfräser mit 4 Schneidekanten ohne Eckenradien, Standardlänge	223
1XLM	Metrischer Superlangloch-Schaftfräser mit 4 Schneidekanten ohne Eckenradien	223
14	Zölliger Schaftfräser mit 4 Schneidekanten, kurze Ausführung	197
14M	Metrischer Schaftfräser mit 4 Schneidekanten, kurze Ausführung	225
1B	Zölliger Schaftfräser mit 4 Schneidekanten, Standardlänge	198
1LB	Zölliger Langloch-Radiusschaftfräser mit 4 Schneidekanten	198
1ELB	Zölliger Schaftfräser mit 4 Schneidekanten, Extra lang	198
1MB	Metrischer Schaftfräser mit 4 Schneidekanten, Standardlänge	226
1XLMB	Metrischer Superlangloch-Radiusschaftfräser mit 4 Schneidekanten	226
14B	Zölliger Doppelend-Radiusschaftfräser mit 4 Schneidekanten, kurze Ausführung	200
14MB	Metrischer Doppelend-Radiusschaftfräser mit 4 Schneidekanten, kurze Ausführung	227
1CR	Zölliger Schaftfräser mit 4 Schneidekanten mit Eckenradien, Standardlänge	195
1MCR	Metrischer Schaftfräser mit 4 Schneidekanten mit Eckenradien, Standardlänge	224
54	Zölliger Schaftfräser hoher Scherfestigkeit mit 4 Schneidekanten ohne Eckenradien, Standardlänge	209
54M	Metrischer Schaftfräser hoher Scherfestigkeit mit 4 Schneidekanten ohne Eckenradien, Standardlänge	235
17	Zölliger Schaftfräser mit 2 Schneidekanten ohne Eckenradien, kurze Ausführung	178
17M	Metrischer Schaftfräser mit 2 Schneidekanten ohne Eckenradien, kurze Ausführung	213
3	Zölliger Schaftfräser mit 2 Schneidekanten ohne Eckenradien, Standardlänge	179
3L	Zölliger Langloch-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	179
3EL	Zölliger Schaftfräser mit 2 Schneidekanten ohne Eckenradien, extra lang	179
3M	Metrischer Schaftfräser mit 2 Schneidekanten ohne Eckenradien, Standardlänge	214
3XLM	Metrischer Superlangloch-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	214
59	Zölliger Langloch-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	181
59M	Metrischer Langloch-Schaftfräser mit 2 Schneidekanten ohne Eckenradien	215
15	Zölliger Schaftfräser mit 2 Schneidekanten, kurze Ausführung	183
15M	Metrischer Schaftfräser mit 2 Schneidekanten, kurze Ausführung	216
3B	Zölliger Radiusschaftfräser mit 2 Schneidekanten, Standardlänge	184
3LB	Zölliger Langloch-Radiusschaftfräser mit 2 Schneidekanten	184
3ELB	Zölliger Schaftfräser mit 2 Schneidekanten, Extra lang	184
3MB	Metrischer Schaftfräser mit 2 Schneidekanten, Standardlänge	217
3XLMB	Metrischer Superlangloch-Schaftfräser mit 2 Schneidekanten	217
59B	Zölliger Langloch-Radiusschaftfräser mit 2 Schneidekanten	186
59MB	Metrischer Langloch-Radiusschaftfräser mit 2 Schneidekanten	218
15B	Zölliger Doppelend-Radiusschaftfräser mit 2 Schneidekanten, kurze Ausführung	187
15MB	Metrischer Doppelend-Radiusschaftfräser mit 2 Schneidekanten, kurze Ausführung	219

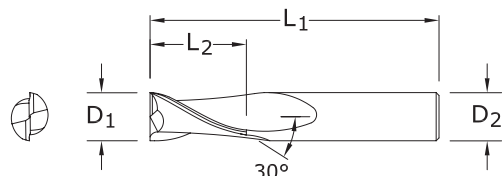
SERIE	BESCHREIBUNG DER ALLZWECK-SCHAFTFRÄSER	SEITE
3CR	Zölliger Schaftfräser mit 2 Schneidekanten mit Eckenradien, Standardlänge	182
52	Zölliger Schaftfräser hoher Scherfestigkeit mit 2 Schneidekanten ohne Eckenradien, Standardlänge	208
52M	Metrischer Schaftfräser hoher Scherfestigkeit mit 2 Schneidekanten ohne Eckenradien, Standardlänge	234
5	Zölliger Schaftfräser mit 3 Schneidekanten ohne Eckenradien, Standardlänge	188
5M	Metrischer Schaftfräser mit 3 Schneidekanten ohne Eckenradien, Standardlänge	220
5XLM	Metrischer Superlangloch-Schaftfräser mit 3 Schneidekanten ohne Eckenradien	220
5B	Zölliger Schaftfräser mit 3 Schneidekanten, Standardlänge	189
5MB	Metrischer Schaftfräser mit 3 Schneidekanten, Standardlänge	221
5XLMB	Metrischer Superlangloch-Schaftfräser mit 3 Schneidekanten	221
61	Zölliger mehrschneidiger fein verzahnter Schrufffräser	206
61M	Metrischer mehrschneidiger fein verzahnter Schrufffräser	232
62	Zölliger mehrschneidiger fein verzahnter Schrufffräser	204
62M	Metrischer mehrschneidiger fein verzahnter Schrufffräser	230
23	Zölliger Schaftfräser mit 3 Schneidekanten ohne Eckenradien, Standardlänge	190
24	Zölliger Schaftfräser mit 3 Schneidekanten mit Eckenradien, Standardlänge	191
Richtwerte zum Fräsen	Schaftfräser mit 2, 3 und 4 Schneidekanten ohne Eckenradien, Serien 1, 3, 5, 14, 15	211
	Radiuschaftfräser mit 2, 3 und 4 Schneidekanten, Serien 1B, 3B, 5B, 14B ,15B	212
<i>Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie</i>		

2 Flute Square End Stub



17

FRACTIONAL SERIES



TOLERANCES (inch)

D₁ = +0.0000/-0.0020D₂ = h₆

inch

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)
1/16	1/8	1-1/2	1/8	31701	31750	31303	31358
3/32	3/16	1-1/2	1/8	31703	31751	31304	31359
1/8	1/4	1-1/2	1/8	31705	31752	31305	31360
5/32	5/16	2	3/16	31707	31753	31306	31361
3/16	3/8	2	3/16	31709	31754	31307	31362
7/32	7/16	2	1/4	31711	31755	31308	31363
1/4	1/2	2	1/4	31713	31756	31309	31364
5/16	1/2	2	5/16	31715	31757	31310	31365
3/8	5/8	2	3/8	31717	31758	31311	31366
7/16	5/8	2-1/2	7/16	31719	31759	31312	31367
1/2	5/8	2-1/2	1/2	31721	31760	31313	31368
5/8	3/4	3	5/8	31723	31761	31314	31369
3/4	1	3	3/4	31725	31762	31315	31370

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

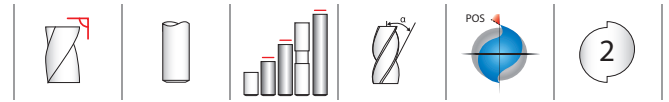
HARDENED STEELS

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

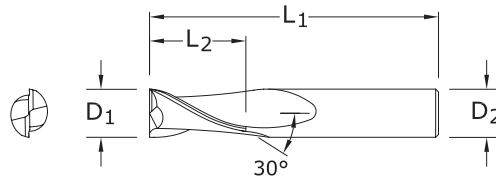
FRACTIONAL 2 Flute Square End



TOLERANCES (inch)

D₁ = +0.0000/-0.0020

D₂ = h₆



3•3L•3EL
FRACTIONAL SERIES

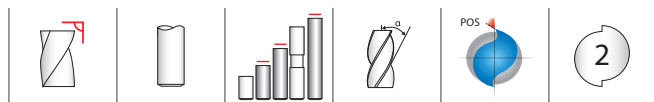
inch				EDP NO.					SERIES
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Di-NAMITE® (Diamond)	
1/64	1/32	1-1/2	1/8	30301	39301	39501	30397	—	3
1/32	5/64	1-1/2	1/8	30303	39303	39503	30398	—	3
3/64	7/64	1-1/2	1/8	30305	39305	39505	30399	—	3
1/16	3/16	1-1/2	1/8	30307	39307	39507	30400	91266	3
5/64	3/16	1-1/2	1/8	30309	39309	39509	30435	—	3
3/32	9/32	1-1/2	1/8	30311	39311	39511	30436	—	3
7/64	3/8	1-1/2	1/8	30313	39313	39513	30437	—	3
1/8	3/8	1-1/2	1/8	30377	39377	39577	30469	—	3
*1/8	1/2	1-1/2	1/8	30315	39315	39515	30438	91270	3
1/8	3/4	2-1/4	1/8	33341	31800	31810	31850	—	3L
1/8	1	3	1/8	33343	31938	31948	31958	—	3EL
9/64	1/2	2	3/16	30317	39317	39517	30439	—	3
5/32	1/2	2	3/16	30319	39319	39519	30440	—	3
11/64	5/8	2	3/16	30321	39321	39521	30441	—	3
*3/16	5/8	2	3/16	30323	39323	39523	30442	91274	3
3/16	3/4	2-1/2	3/16	33301	31820	31825	31851	—	3L
3/16	1-1/8	3	3/16	33321	31939	31949	31959	—	3EL
13/64	5/8	2-1/2	1/4	30325	39325	39525	30443	—	3
7/32	5/8	2-1/2	1/4	30327	39327	39527	30444	—	3
15/64	3/4	2-1/2	1/4	30329	39329	39529	30445	—	3
*1/4	3/4	2-1/2	1/4	30331	39331	39531	30446	91278	3
1/4	1-1/8	3	1/4	33303	31802	31812	31852	—	3L
1/4	1-1/2	4	1/4	33323	31940	31950	31960	—	3EL
17/64	3/4	2-1/2	5/16	30333	39333	39533	30447	—	3
9/32	3/4	2-1/2	5/16	30335	39335	39535	30448	—	3
19/64	13/16	2-1/2	5/16	30337	39337	39537	30449	—	3
*5/16	13/16	2-1/2	5/16	30339	39339	39539	30450	91282	3
5/16	1-1/8	3	5/16	33305	31821	31826	31853	—	3L
5/16	1-5/8	4	5/16	33325	31941	31951	31961	—	3EL
21/64	1	2-1/2	3/8	30341	39341	39541	30451	—	3
11/32	1	2-1/2	3/8	30343	39343	39543	30452	—	3
23/64	1	2-1/2	3/8	30345	39345	39545	30453	—	3
*3/8	1	2-1/2	3/8	30347	39347	39547	30454	91286	3
3/8	1-1/8	3	3/8	33307	31804	31814	31854	—	3L

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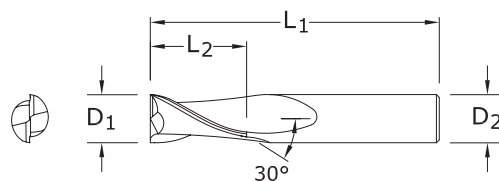
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

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2 Flute Square End



3•3L•3EL
FRACTIONAL SERIES



TOLERANCES (inch)

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

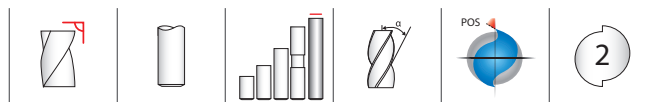
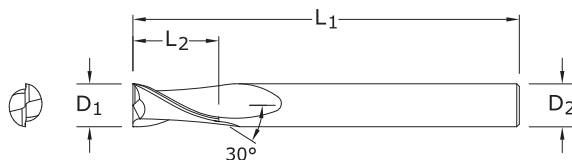
CONTINUED

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

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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)	Di-NAMITE® (Diamond)	
3/8	1-3/4	4	3/8	33327	31942	31952	31962	—	3EL
25/64	1	2-3/4	7/16	30349	39349	39549	30455	—	3
13/32	1	2-3/4	7/16	30351	39351	39551	30456	—	3
27/64	1	2-3/4	7/16	30353	39353	39553	30457	—	3
7/16	1	2-3/4	7/16	30355	39355	39555	30458	—	3
7/16	2	4-1/2	7/16	33309	31822	31827	31855	—	3L
7/16	3	6	7/16	33329	31943	31953	31963	—	3EL
29/64	1	3	1/2	30357	39357	39557	30459	—	3
15/32	1	3	1/2	30359	39359	39559	30460	—	3
31/64	1	3	1/2	30361	39361	39561	30461	—	3
*1/2	1	3	1/2	30363	39363	39563	30462	91290	3
1/2	2	4-1/2	1/2	33311	31806	31816	31856	—	3L
1/2	3	6	1/2	33331	31944	31954	31964	—	3EL
9/16	1-1/8	3-1/2	9/16	30365	39365	39565	30463	—	3
5/8	1-1/4	3-1/2	5/8	30367	39367	39567	30464	—	3
5/8	2-1/4	5	5/8	33313	31823	31817	31857	—	3L
5/8	3	6	5/8	33333	31945	31955	31965	—	3EL
11/16	1-3/8	4	3/4	30369	39369	39569	30465	—	3
3/4	1-1/2	4	3/4	30371	39371	39571	30466	—	3
3/4	2-1/4	5	3/4	33315	31808	31818	31858	—	3L
3/4	3	6	3/4	33335	31946	31956	31966	—	3EL
7/8	1-1/2	4	7/8	30373	39373	39573	30467	—	3
1	1-1/2	4	1	30375	39375	39575	30468	—	3
1	2-1/4	5	1	33317	31824	31819	31859	—	3L
1	3	6	1	33337	31947	31957	31967	—	3EL
*Series 3 Set				30389	39389	39589	30470	—	3

2 Flute Square End Long Reach


TOLERANCES (inch)
 $D_1 = +0.0000/-0.0020$
 $D_2 = h_6$

59
FRACTIONAL SERIES

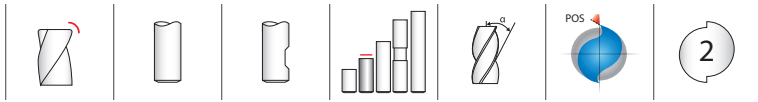
inch				EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/8	3/8	2-1/2	1/4	32280	32260	32270
3/16	9/16	3	1/4	32281	32261	32271
1/4	5/8	3-1/2	1/4	32282	32262	32272
5/16	11/16	4	5/16	32283	32263	32273
3/8	7/8	4	3/8	32284	32264	32274
1/2	1	4-1/2	1/2	32285	32265	32275
5/8	1-1/8	5	5/8	32286	32266	32276
3/4	1-3/8	5-1/4	3/4	32287	32267	32277

Neck Option Available

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

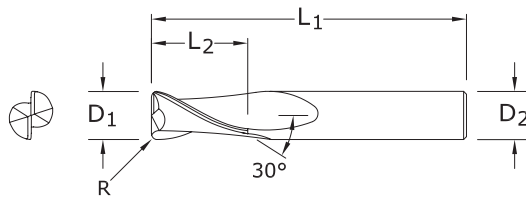
 For patent
 information visit
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2 Flute Corner Radius



3CR

FRACTIONAL SERIES



TOLERANCES (inch)

D₁ = -0.0010/-0.0020D₂ = h₆

R = +0.0000/-0.0020

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

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CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	EDP NO.			
					UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/8*	1/2	1-1/2	1/8	.015	38201	38202	38315	38357
1/8*	1/2	1-1/2	1/8	.020	38203	38204	38316	38358
3/16*	5/8	2	3/16	.015	38209	38210	38317	38359
3/16*	5/8	2	3/16	.020	38211	38212	38318	38360
3/16*	5/8	2	3/16	.030	38213	38214	38319	38361
1/4*	3/4	2-1/2	1/4	.015	38219	38220	38320	38362
1/4*	3/4	2-1/2	1/4	.020	38221	38222	38321	38363
1/4*	3/4	2-1/2	1/4	.030	38223	38224	38322	38364
1/4*	3/4	2-1/2	1/4	.045	38225	38226	38323	38365
5/16*	13/16	2-1/2	5/16	.015	38231	38232	38324	38366
5/16*	13/16	2-1/2	5/16	.020	38233	38234	38325	38367
5/16*	13/16	2-1/2	5/16	.030	38235	38236	38326	38368
5/16*	13/16	2-1/2	5/16	.045	38237	38238	38327	38369
3/8	1	2-1/2	3/8	.015	38245	38246	38328	38370
3/8	1	2-1/2	3/8	.020	38247	38248	38329	38371
3/8	1	2-1/2	3/8	.030	38249	38250	38330	38372
3/8	1	2-1/2	3/8	.045	38251	38252	38331	38373
1/2	1	3	1/2	.015	38259	38260	38332	38374
1/2	1	3	1/2	.020	38261	38262	38333	38375
1/2	1	3	1/2	.030	38263	38264	38334	38376
1/2	1	3	1/2	.045	38265	38266	38335	38377
1/2	1	3	1/2	.060	38267	38268	38336	38378
5/8	1-1/4	3-1/2	5/8	.015	38273	38274	38337	38379
5/8	1-1/4	3-1/2	5/8	.020	38275	38276	38338	38380
5/8	1-1/4	3-1/2	5/8	.030	38277	38278	38339	38381
5/8	1-1/4	3-1/2	5/8	.045	38279	38280	38340	38382
5/8	1-1/4	3-1/2	5/8	.060	38281	38282	38341	38383
5/8	1-1/4	3-1/2	5/8	.090	38283	38284	38342	38384
3/4	1-1/2	4	3/4	.015	38287	38288	38343	38385
3/4	1-1/2	4	3/4	.020	38289	38290	38344	38386
3/4	1-1/2	4	3/4	.030	38291	38292	38345	38387
3/4	1-1/2	4	3/4	.045	38293	38294	38346	38388
3/4	1-1/2	4	3/4	.060	38295	38296	38347	38389
3/4	1-1/2	4	3/4	.090	38297	38298	38348	38390
3/4	1-1/2	4	3/4	.125	38299	38300	38349	38391
1	1-1/2	4	1	.015	38301	38302	38350	38392
1	1-1/2	4	1	.020	38303	38304	38351	38393
1	1-1/2	4	1	.030	38305	38306	38352	38394
1	1-1/2	4	1	.045	38307	38308	38353	38395
1	1-1/2	4	1	.060	38309	38310	38354	38396
1	1-1/2	4	1	.090	38311	38312	38355	38397
1	1-1/2	4	1	.125	38313	38314	38356	38398

*Without Flat

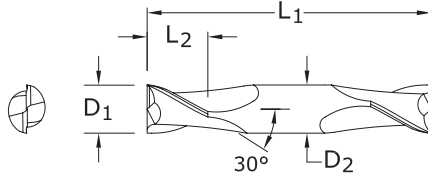
FRACTIONAL 2 Flute Double End Mills



TOLERANCES (inch)

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$



15

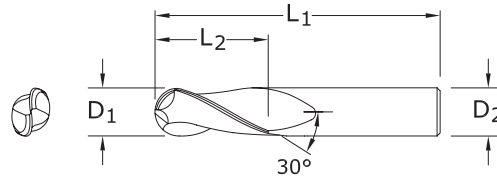
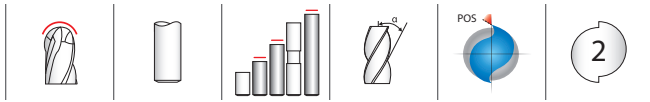
FRACTIONAL SERIES

inch				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)
1/32	1/16	1-1/2	1/8	31501	31541	39651	31316
3/64	3/32	1-1/2	1/8	31503	31543	39653	31317
1/16	1/8	1-1/2	1/8	31505	31545	39655	31318
5/64	1/8	1-1/2	1/8	31507	31547	39657	31319
3/32	3/16	1-1/2	1/8	31509	31549	39659	31320
7/64	3/16	1-1/2	1/8	31511	31551	39661	31321
*1/8	1/4	1-1/2	1/8	31513	31553	39663	31322
9/64	5/16	2	3/16	31515	31555	39665	31323
5/32	5/16	2	3/16	31517	31557	39667	31324
11/64	5/16	2	3/16	31519	31559	39669	31325
*3/16	3/8	2	3/16	31521	31561	39671	31326
13/64	1/2	2-1/2	1/4	31523	31563	39673	31327
7/32	1/2	2-1/2	1/4	31525	31565	39675	31328
15/64	1/2	2-1/2	1/4	31527	31567	39677	31329
*1/4	1/2	2-1/2	1/4	31529	31569	39679	31330
9/32	1/2	2-1/2	5/16	31531	31571	39681	31331
*5/16	1/2	2-1/2	5/16	31533	31573	39683	31332
*3/8	9/16	2-1/2	3/8	31535	31575	39685	31333
7/16	9/16	2-3/4	7/16	31537	31577	39687	31334
*1/2	5/8	3	1/2	31539	31579	39689	31335
*Series 15 Set				31589	31581	39691	31336

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

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2 Flute Ball End


3B•3LB•3ELB
 FRACTIONAL SERIES
TOLERANCES (inch) $D_1 = +0.0000/-0.0020$ $D_2 = h_6$ **BALL RADIUS** $+0.0000/-0.0010$

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

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inch				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)	
1/64	1/32	1-1/2	1/8	30302	39302	39502	30471	3B
1/32	5/64	1-1/2	1/8	30304	39304	39504	30472	3B
3/64	7/64	1-1/2	1/8	30306	39306	39506	30473	3B
1/16	3/16	1-1/2	1/8	30308	39308	39508	30474	3B
5/64	3/16	1-1/2	1/8	30310	39310	39510	30475	3B
3/32	9/32	1-1/2	1/8	30312	39312	39512	30476	3B
7/64	3/8	1-1/2	1/8	30314	39314	39514	30477	3B
1/8	3/8	1-1/2	1/8	30378	39378	39578	30599	3B
*1/8	1/2	1-1/2	1/8	30316	39316	39516	30478	3B
1/8	3/4	2-1/4	1/8	33342	31830	31840	31890	3LB
1/8	1	3	1/8	33344	31968	31978	31988	3ELB
9/64	1/2	2	3/16	30318	39318	39518	30479	3B
5/32	1/2	2	3/16	30320	39320	39520	30480	3B
11/64	5/8	2	3/16	30322	39322	39522	30481	3B
*3/16	5/8	2	3/16	30324	39324	39524	30482	3B
3/16	3/4	2-1/2	3/16	33302	31831	31841	31891	3LB
3/16	1-1/8	3	3/16	33322	31969	31979	31989	3ELB
13/64	5/8	2-1/2	1/4	30326	39326	39526	30483	3B
7/32	5/8	2-1/2	1/4	30328	39328	39528	30484	3B
15/64	3/4	2-1/2	1/4	30330	39330	39530	30485	3B
*1/4	3/4	2-1/2	1/4	30332	39332	39532	30486	3B
1/4	1-1/8	3	1/4	33304	31832	31842	31892	3LB
1/4	1-1/2	4	1/4	33324	31970	31980	31990	3ELB
17/64	3/4	2-1/2	5/16	30334	39334	39534	30487	3B
9/32	3/4	2-1/2	5/16	30336	39336	39536	30488	3B
19/64	13/16	2-1/2	5/16	30338	39338	39538	30489	3B
*5/16	13/16	2-1/2	5/16	30340	39340	39540	30490	3B
5/16	1-1/8	3	5/16	33306	31833	31843	31893	3LB
5/16	1-5/8	4	5/16	33326	31971	31981	31991	3ELB
21/64	1	2-1/2	3/8	30342	39342	39542	30491	3B

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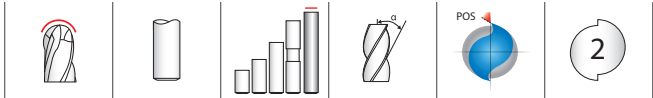
FRACTIONAL
2 Flute Ball End

3B•3LB•3ELB
FRACTIONAL SERIES

inch				EDP NO.				SERIES	CONTINUED
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)		
11/32	1	2-1/2	3/8	30344	39344	39544	30492	3B	
23/64	1	2-1/2	3/8	30346	39346	39546	30493	3B	
*3/8	1	2-1/2	3/8	30348	39348	39548	30494	3B	
3/8	1-1/8	3	3/8	33308	31834	31844	31894	3LB	
3/8	1-3/4	4	3/8	33328	31972	31982	31992	3ELB	
25/64	1	2-3/4	7/16	30350	39350	39550	30495	3B	
13/32	1	2-3/4	7/16	30352	39352	39552	30496	3B	
27/64	1	2-3/4	7/16	30354	39354	39554	30497	3B	
7/16	1	2-3/4	7/16	30356	39356	39556	30498	3B	
7/16	2	4-1/2	7/16	33310	31835	31845	31895	3LB	
7/16	3	6	7/16	33330	31973	31983	31993	3ELB	
29/64	1	3	1/2	30358	39358	39558	30499	3B	
15/32	1	3	1/2	30360	39360	39560	30500	3B	
31/64	1	3	1/2	30362	39362	39562	30591	3B	
*1/2	1	3	1/2	30364	39364	39564	30592	3B	
1/2	2	4-1/2	1/2	33312	31836	31846	31896	3LB	
1/2	3	6	1/2	33332	31974	31984	31994	3ELB	
9/16	1-1/8	3-1/2	9/16	30366	39366	39566	30593	3B	
5/8	1-1/4	3-1/2	5/8	30368	39368	39568	30594	3B	
5/8	2-1/4	5	5/8	33314	31837	31847	31897	3LB	
5/8	3	6	5/8	33334	31975	31985	31995	3ELB	
11/16	1-3/8	4	3/4	30370	39370	39570	30595	3B	
3/4	1-1/2	4	3/4	30372	39372	39572	30596	3B	
3/4	2-1/4	5	3/4	33316	31838	31848	31898	3LB	
3/4	3	6	3/4	33336	31976	31986	31996	3ELB	
7/8	1-1/2	4	7/8	30374	39374	39574	30597	3B	
1	1-1/2	4	1	30376	39376	39576	30598	3B	
1	2-1/4	5	1	33318	31839	31849	31899	3LB	
1	3	6	1	33338	31977	31987	31997	3ELB	
*Series 3B Set				30390	39390	39590	30600	3B	

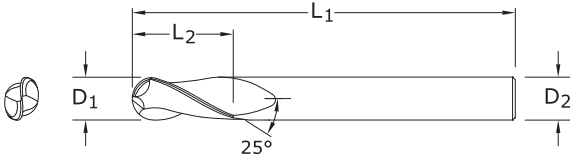
FRACTIONAL

2 Flute Ball End Long Reach



59B

FRACTIONAL SERIES



TOLERANCES (inch)

D₁ = +0.0000/-0.0020

D₂ = h₆

BALL RADIUS

+0.0000/-0.0010

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

inch				EDP NO.		
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/8	3/8	2-1/2	1/4	32210	32290	32200
3/16	9/16	3	1/4	32211	32291	32201
1/4	5/8	3-1/2	1/4	32212	32292	32202
5/16	11/16	4	5/16	32213	32293	32203
3/8	7/8	4	3/8	32214	32294	32204
1/2	1	4-1/2	1/2	32215	32295	32205
5/8	1-1/8	5	5/8	32216	32296	32206
3/4	1-3/8	5-1/4	3/4	32217	32297	32207

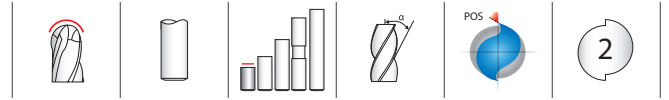
Neck Option Available

For patent

information visit

www.ksptpatents.com

FRACTIONAL 2 Flute Double End Ball End



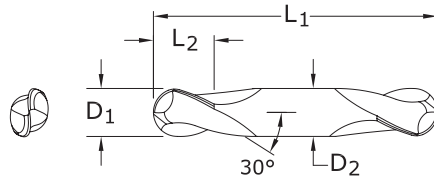
TOLERANCES (inch)

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0010$



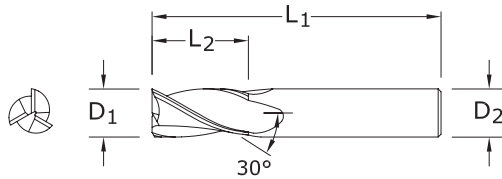
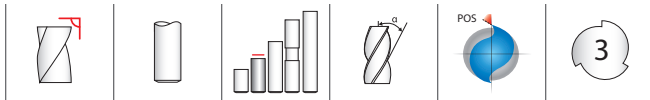
15B
FRACTIONAL SERIES

inch				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)
1/32	1/16	1-1/2	1/8	31502	31542	39652	31337
3/64	3/32	1-1/2	1/8	31504	31544	39654	31338
1/16	1/8	1-1/2	1/8	31506	31546	39656	31339
5/64	1/8	1-1/2	1/8	31508	31548	39658	31340
3/32	3/16	1-1/2	1/8	31510	31550	39660	31341
7/64	3/16	1-1/2	1/8	31512	31552	39662	31342
*1/8	1/4	1-1/2	1/8	31514	31554	39664	31343
9/64	5/16	2	3/16	31516	31556	39666	31344
5/32	5/16	2	3/16	31518	31558	39668	31345
11/64	5/16	2	3/16	31520	31560	39670	31346
*3/16	3/8	2	3/16	31522	31562	39672	31347
13/64	1/2	2-1/2	1/4	31524	31564	39674	31348
7/32	1/2	2-1/2	1/4	31526	31566	39676	31349
15/64	1/2	2-1/2	1/4	31528	31568	39678	31350
*1/4	1/2	2-1/2	1/4	31530	31570	39680	31351
9/32	1/2	2-1/2	5/16	31532	31572	39682	31352
*5/16	1/2	2-1/2	5/16	31534	31574	39684	31353
*3/8	9/16	2-1/2	3/8	31536	31576	39686	31354
7/16	9/16	2-3/4	7/16	31538	31578	39688	31355
*1/2	5/8	3	1/2	31540	31580	39690	31356
*Series 15B Set				31590	31582	39692	31357

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

For patent
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3 Flute Square End



5

FRACTIONAL SERIES

TOLERANCES (inch)

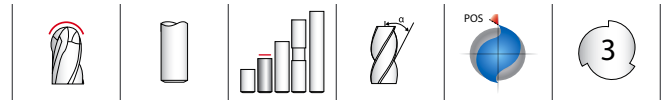
 $D_1 = +0.0000/-0.0020$ $D_2 = h_6$

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

For patent
information visit
www.ksptpatents.com

inch				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)
1/64	1/32	1-1/2	1/8	30501	39701	30771	30811
1/32	5/64	1-1/2	1/8	30503	39703	30772	30812
3/64	7/64	1-1/2	1/8	30505	39705	30773	30813
1/16	3/16	1-1/2	1/8	30507	39707	30774	30814
5/64	3/16	1-1/2	1/8	30509	39709	30775	30815
3/32	9/32	1-1/2	1/8	30511	39711	30776	30816
7/64	3/8	1-1/2	1/8	30513	39713	30777	30817
1/8	3/8	1-1/2	1/8	30577	39777	30809	30849
1/8	1/2	1-1/2	1/8	30515	39715	30778	30818
9/64	1/2	2	3/16	30517	39717	30779	30819
5/32	1/2	2	3/16	30519	39719	30780	30820
11/64	5/8	2	3/16	30521	39721	30781	30821
3/16	5/8	2	3/16	30523	39723	30782	30822
13/64	5/8	2-1/2	1/4	30525	39725	30783	30823
7/32	5/8	2-1/2	1/4	30527	39727	30784	30824
15/64	3/4	2-1/2	1/4	30529	39729	30785	30825
1/4	3/4	2-1/2	1/4	30531	39731	30786	30826
17/64	3/4	2-1/2	5/16	30533	39733	30787	30827
9/32	3/4	2-1/2	5/16	30535	39735	30788	30828
19/64	13/16	2-1/2	5/16	30537	39737	30789	30829
5/16	13/16	2-1/2	5/16	30539	39739	30790	30830
21/64	1	2-1/2	3/8	30541	39741	30791	30831
11/32	1	2-1/2	3/8	30543	39743	30792	30832
23/64	1	2-1/2	3/8	30545	39745	30793	30833
3/8	1	2-1/2	3/8	30547	39747	30794	30834
25/64	1	2-3/4	7/16	30549	39749	30795	30835
13/32	1	2-3/4	7/16	30551	39751	30796	30836
27/64	1	2-3/4	7/16	30553	39753	30797	30837
7/16	1	2-3/4	7/16	30555	39755	30798	30838
29/64	1	3	1/2	30557	39757	30799	30839
15/32	1	3	1/2	30559	39759	30800	30840
31/64	1	3	1/2	30561	39761	30801	30841
1/2	1	3	1/2	30563	39763	30802	30842
9/16	1-1/8	3-1/2	9/16	30565	39765	30803	30843
5/8	1-1/4	3-1/2	5/8	30567	39767	30804	30844
11/16	1-3/8	4	3/4	30569	39769	30805	30845
3/4	1-1/2	4	3/4	30571	39771	30806	30846
7/8	1-1/2	4	7/8	30573	39773	30807	30847
1	1-1/2	4	1	30575	39775	30808	30848

FRACTIONAL 3 Flute Ball End



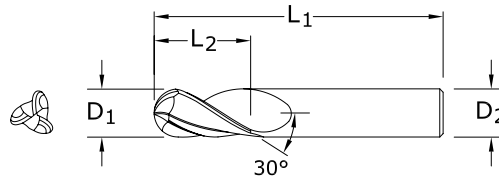
TOLERANCES (inch)

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$

BALL RADIUS

$+0.0000/-0.0010$



5B

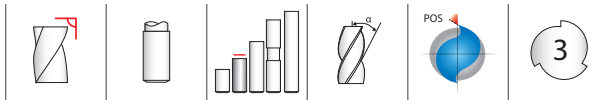
FRACTIONAL SERIES

inch				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)
1/64	1/32	1-1/2	1/8	30502	30851	30602	31130
1/32	5/64	1-1/2	1/8	30504	30852	30604	31131
3/64	7/64	1-1/2	1/8	30506	30853	30606	31132
1/16	3/16	1-1/2	1/8	30508	30854	30608	31133
5/64	3/16	1-1/2	1/8	30510	30855	30610	31134
3/32	9/32	1-1/2	1/8	30512	30856	30612	31135
7/64	3/8	1-1/2	1/8	30514	30857	30902	31136
1/8	3/8	1-1/2	1/8	30578	30889	30943	31168
*1/8	1/2	1-1/2	1/8	30516	30858	30904	31137
9/64	1/2	2	3/16	30518	30859	30906	31138
5/32	1/2	2	3/16	30520	30860	30908	31139
11/64	5/8	2	3/16	30522	30861	30910	31140
*3/16	5/8	2	3/16	30524	30862	30912	31141
13/64	5/8	2-1/2	1/4	30526	30863	30914	31142
7/32	5/8	2-1/2	1/4	30528	30864	30916	31143
15/64	3/4	2-1/2	1/4	30530	30865	30918	31144
1/4	3/4	2-1/2	1/4	30532	30866	30920	31145
17/64	3/4	2-1/2	5/16	30534	30867	30921	31146
9/32	3/4	2-1/2	5/16	30536	30868	30922	31147
19/64	13/16	2-1/2	5/16	30538	30869	30923	31148
*5/16	13/16	2-1/2	5/16	30540	30870	30924	31149
21/64	1	2-1/2	3/8	30542	30871	30925	31150
11/32	1	2-1/2	3/8	30544	30872	30926	31151
23/64	1	2-1/2	3/8	30546	30873	30927	31152
*3/8	1	2-1/2	3/8	30548	30874	30928	31153
25/64	1	2-3/4	7/16	30550	30875	30929	31154
13/32	1	2-3/4	7/16	30552	30876	30930	31155
27/64	1	2-3/4	7/16	30554	30877	30931	31156
7/16	1	2-3/4	7/16	30556	30878	30932	31157
29/64	1	3	1/2	30558	30879	30933	31158
15/32	1	3	1/2	30560	30880	30934	31159
31/64	1	3	1/2	30562	30881	30935	31160
*1/2	1	3	1/2	30564	30882	30936	31161
9/16	1-1/8	3-1/2	9/16	30566	30883	30937	31162
5/8	1-1/4	3-1/2	5/8	30568	30884	30938	31163
11/16	1-3/8	4	3/4	30570	30885	30939	31164
3/4	1-1/2	4	3/4	30572	30886	30940	31165
7/8	1-1/2	4	7/8	30574	30887	30941	31166
1	1-1/2	4	1	30576	30888	30942	31167
*Series 5B Set				30590	30900	30944	31169

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

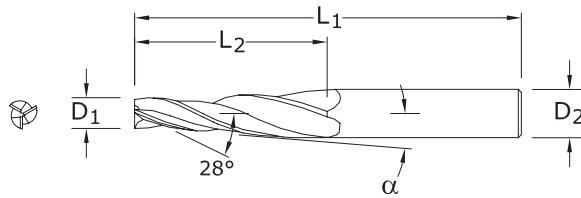
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Tapered Square End



23

FRACTIONAL SERIES



TOLERANCES (inch)

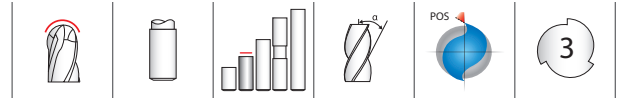
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STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

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information visit
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inch					EDP NO.			
SHANK DIAMETER D_2	CENTER LINE ANGLE α	SMALL DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/4	1°	1/8	1-1/2	3	32301	32370	32302	32345
1/4	1°30'	1/8	1-1/2	3	32303	32371	32304	32346
1/4	2°	1/8	1-1/4	3	32305	32372	32306	32347
1/4	3°	1/8	1	3	32307	32373	32308	32348
1/4	5°	1/8	3/4	3	32309	32374	32310	32349
1/4	7°	1/8	1/2	3	32311	32375	32312	32350
1/4	10°	3/32	1/2	3	32313	32376	32314	32351
3/8	1°	3/16	1-3/4	3-1/2	32315	32377	32316	32352
3/8	1°30'	3/16	1-3/4	3-1/2	32317	32378	32318	32353
3/8	2°	3/16	1-3/4	3-1/2	32319	32379	32320	32354
3/8	3°	5/32	1-3/4	3-1/2	32321	32380	32322	32355
3/8	5°	1/8	1-1/2	3-1/2	32323	32381	32324	32356
3/8	7°	1/8	1	3-1/2	32325	32382	32326	32357
3/8	10°	1/8	3/4	3-1/2	32327	32383	32328	32358
1/2	1°	1/4	2	4	32329	32384	32330	32359
1/2	2°	1/4	2	4	32333	32385	32334	32360
1/2	3°	1/4	2	4	32335	32386	32336	32361
1/2	5°	1/4	1-1/4	4	32337	32387	32338	32362
1/2	7°	3/16	1-1/4	4	32339	32388	32340	32363
1/2	10°	1/8	1	4	32341	32389	32342	32364

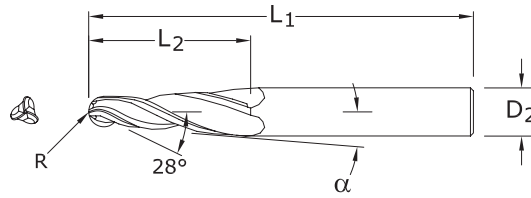
FRACTIONAL Tapered Radius End



TOLERANCES (inch)

$D_2 = h_6$

$R = +0.0005/-0.0010$



24

FRACTIONAL SERIES

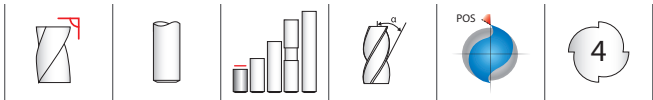
SHANK DIAMETER D_2	CENTER LINE ANGLE α	inch			EDP NO.			
		RADIUS R	LENGTH OF CUT L_2	OVERALL LENGTH L_1	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/4	1°	0.062	1-1/2	3	32402	32403	32445	32470
1/4	1°30'	0.062	1-1/2	3	32404	32405	32446	32471
1/4	2°	0.062	1-1/4	3	32406	32407	32447	32472
1/4	3°	0.062	1	3	32408	32409	32448	32473
1/4	5°	0.062	3/4	3	32410	32411	32449	32474
1/4	7°	0.062	1/2	3	32412	32413	32450	32475
1/4	10°	0.047	1/2	3	32414	32415	32451	32476
3/8	1°	0.093	1-3/4	3-1/2	32416	32417	32452	32477
3/8	1°30'	0.093	1-3/4	3-1/2	32418	32419	32453	32478
3/8	2°	0.093	1-3/4	3-1/2	32420	32421	32454	32479
3/8	3°	0.078	1-3/4	3-1/2	32422	32423	32455	32480
3/8	5°	0.062	1-1/2	3-1/2	32424	32425	32456	32481
3/8	7°	0.062	1	3-1/2	32426	32427	32457	32482
3/8	10°	0.062	3/4	3-1/2	32428	32429	32458	32483
1/2	1°	0.125	2	4	32430	32431	32459	32484
1/2	2°	0.125	2	4	32434	32435	32460	32485
1/2	3°	0.125	2	4	32436	32437	32461	32486
1/2	5°	0.125	1-1/4	4	32438	32439	32462	32487
1/2	7°	0.093	1-1/4	4	32440	32441	32463	32488
1/2	10°	0.062	1	4	32442	32443	32464	32489

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

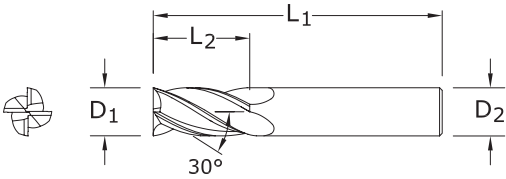
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FRACTIONAL

4 Flute Square End Stub



16
FRACTIONAL SERIES



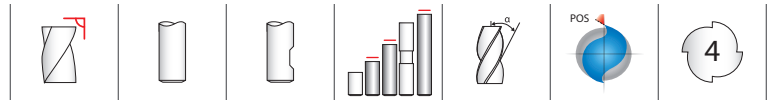
TOLERANCES (inch)
 $D_1 = +0.0000/-0.0020$
 $D_2 = h_6$

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

inch				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)
1/16	1/8	1-1/2	1/8	31601	31650	31238	31251
3/32	3/16	1-1/2	1/8	31603	31651	31239	31252
1/8	1/4	1-1/2	1/8	31605	31652	31240	31253
5/32	5/16	2	3/16	31607	31653	31241	31254
3/16	3/8	2	3/16	31609	31654	31242	31255
7/32	7/16	2	1/4	31611	31655	31243	31256
1/4	1/2	2	1/4	31613	31656	31244	31257
5/16	1/2	2	5/16	31615	31657	31245	31258
3/8	5/8	2	3/8	31617	31658	31246	31259
7/16	5/8	2-1/2	7/16	31619	31659	31247	31260
1/2	5/8	2-1/2	1/2	31621	31660	31248	31261
5/8	3/4	3	5/8	31623	31661	31249	31262
3/4	1	3	3/4	31625	31662	31250	31263

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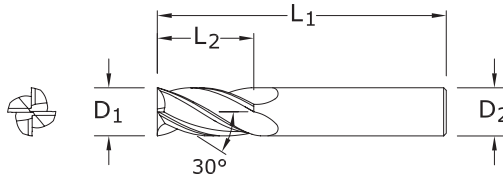
FRACTIONAL 4 Flute End Mills



TOLERANCES (inch)

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$



1•1L•1EL
FRACTIONAL SERIES

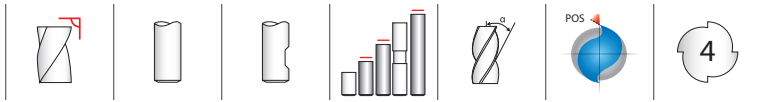
inch				EDP NO.							SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	UNCOATED W/ FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE® (Diamond)	
1/64	1/32	1-1/2	1/8	30101	—	39101	39001	30191	—	—	1
1/32	5/64	1-1/2	1/8	30103	—	39103	39003	30192	—	—	1
3/64	7/64	1-1/2	1/8	30105	—	39105	39005	30193	—	—	1
1/16	3/16	1-1/2	1/8	30107	—	39107	39007	30194	—	91268	1
5/64	3/16	1-1/2	1/8	30109	—	39109	39009	30195	—	—	1
3/32	9/32	1-1/2	1/8	30111	—	39111	39011	30196	—	—	1
7/64	3/8	1-1/2	1/8	30113	—	39113	39013	30197	—	—	1
1/8	3/8	1-1/2	1/8	30177	—	39177	39077	30029	—	—	1
*1/8	1/2	1-1/2	1/8	30115	—	39115	39015	30198	—	91272	1
1/8	3/4	2-1/4	1/8	33141	—	31727	31737	31747	—	—	1L
1/8	1	3	1/8	33143	—	31860	31870	31880	—	—	1EL
9/64	1/2	2	3/16	30117	—	39117	39017	30199	—	—	1
5/32	1/2	2	3/16	30119	—	39119	39019	30000	—	—	1
11/64	5/8	2	3/16	30121	—	39121	39021	30001	—	—	1
*3/16	5/8	2	3/16	30123	—	39123	39023	30002	—	91276	1
3/16	3/4	2-1/2	3/16	33101	—	31728	31738	31748	—	—	1L
3/16	1-1/8	3	3/16	33121	—	31861	31871	31881	—	—	1EL
13/64	5/8	2-1/2	1/4	30125	—	39125	39025	30003	—	—	1
7/32	5/8	2-1/2	1/4	30127	—	39127	39027	30004	—	—	1
15/64	3/4	2-1/2	1/4	30129	—	39129	39029	30005	—	—	1
*1/4	3/4	2-1/2	1/4	30131	30300	39131	39031	30006	—	91280	1
1/4	1-1/8	3	1/4	33103	—	31729	31739	31749	—	—	1L
1/4	1-1/2	4	1/4	33123	—	31862	31872	31882	—	—	1EL
17/64	3/4	2-1/2	5/16	30133	—	39133	39033	30007	—	—	1
9/32	3/4	2-1/2	5/16	30135	—	39135	39035	30008	—	—	1
19/64	13/16	2-1/2	5/16	30137	—	39137	39037	30009	—	—	1
*5/16	13/16	2-1/2	5/16	30139	—	39139	39039	30010	—	91284	1
5/16	1-1/8	3	5/16	33105	—	31730	31740	31763	—	—	1L
5/16	1-5/8	4	5/16	33125	—	31863	31873	31883	—	—	1EL
21/64	1	2-1/2	3/8	30141	—	39141	39041	30011	—	—	1

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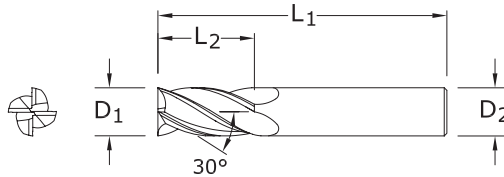
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

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4 Flute End Mills



1·1L·1EL
FRACTIONAL SERIES



TOLERANCES (inch)

D₁ = +0.0000/-0.0020D₂ = h₆

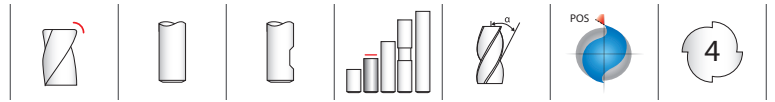
CONTINUED

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

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inch				EDP NO.							SERIES
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	UNCOATED	UNCOATED W/ FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE® (Diamond)	
11/32	1	2-1/2	3/8	30143	—	39143	39043	30012	—	—	1
23/64	1	2-1/2	3/8	30145	—	39145	39045	30013	—	—	1
*3/8	1	2-1/2	3/8	30147	30179	39147	39047	30014	30379	91288	1
3/8	1-1/8	3	3/8	33107	—	31731	31741	31764	—	—	1L
3/8	1-3/4	4	3/8	33127	—	31864	31874	31884	—	—	1EL
25/64	1	2-3/4	7/16	30149	—	39149	39049	30015	—	—	1
13/32	1	2-3/4	7/16	30151	—	39151	39051	30016	—	—	1
27/64	1	2-3/4	7/16	30153	—	39153	39053	30017	—	—	1
7/16	1	2-3/4	7/16	30155	—	39155	39055	30018	—	—	1
7/16	2	4-1/2	7/16	33109	—	31732	31742	31765	—	—	1L
7/16	3	6	7/16	33129	—	31865	31875	31885	—	—	1EL
29/64	1	3	1/2	30157	—	39157	39057	30019	—	—	1
15/32	1	3	1/2	30159	—	39159	39059	30020	—	—	1
31/64	1	3	1/2	30161	—	39161	39061	30021	—	—	1
*1/2	1	3	1/2	30163	30180	39163	39063	30022	30380	91292	1
1/2	2	4-1/2	1/2	33111	—	31733	31743	31766	—	—	1L
1/2	3	6	1/2	33131	—	31866	31876	31886	—	—	1EL
9/16	1-1/8	3-1/2	9/16	30165	—	39165	39065	30023	—	—	1
5/8	1-1/4	3-1/2	5/8	30167	30181	39167	39067	30024	30381	—	1
5/8	2-1/4	5	5/8	33113	—	31734	31744	31767	—	—	1L
5/8	3	6	5/8	33133	—	31867	31877	31887	—	—	1EL
11/16	1-3/8	4	3/4	30169	—	39169	39069	30025	—	—	1
3/4	1-1/2	4	3/4	30171	30182	39171	39071	30026	30382	—	1
3/4	2-1/4	5	3/4	33115	—	31735	31745	31768	—	—	1L
3/4	3	6	3/4	33135	—	31868	31878	31888	—	—	1EL
7/8	1-1/2	4	7/8	30173	—	39173	39073	30027	—	—	1
1	1-1/2	4	1	30175	30183	39175	39075	30028	30383	—	1
1	2-1/4	5	1	33117	—	31736	31746	31769	—	—	1L
1	3	6	1	33137	—	31869	31879	31889	—	—	1EL
*Series 1 Set				30189	—	39189	39089	30030	—	—	1

FRACTIONAL 4 Flute Corner Radius

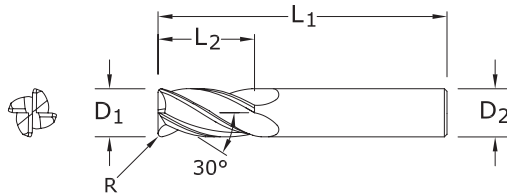


TOLERANCES (inch)

$D_1 = -0.0010/-0.0020$

$D_2 = h_6$

$R = +0.0000/-0.0020$



1CR
FRACTIONAL SERIES

inch					EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/8*	1/2	1-1/2	1/8	.015	38001	38002	38115	38157
1/8*	1/2	1-1/2	1/8	.020	38003	38004	38116	38158
3/16*	5/8	2	3/16	.015	38009	38010	38117	38159
3/16*	5/8	2	3/16	.020	38011	38012	38118	38160
3/16*	5/8	2	3/16	.030	38013	38014	38119	38161
1/4*	3/4	2-1/2	1/4	.015	38019	38020	38120	38162
1/4*	3/4	2-1/2	1/4	.020	38021	38022	38121	38163
1/4*	3/4	2-1/2	1/4	.030	38023	38024	38122	38164
1/4*	3/4	2-1/2	1/4	.045	38025	38026	38123	38165
5/16*	13/16	2-1/2	5/16	.015	38031	38032	38124	38166
5/16*	13/16	2-1/2	5/16	.020	38033	38034	38125	38167
5/16*	13/16	2-1/2	5/16	.030	38035	38036	38126	38168
5/16*	13/16	2-1/2	5/16	.045	38037	38038	38127	38169
3/8	1	2-1/2	3/8	.015	38045	38046	38128	38170
3/8	1	2-1/2	3/8	.020	38047	38048	38129	38171
3/8	1	2-1/2	3/8	.030	38049	38050	38130	38172
3/8	1	2-1/2	3/8	.045	38051	38052	38131	38173
1/2	1	3	1/2	.015	38059	38060	38132	38174
1/2	1	3	1/2	.020	38061	38062	38133	38175
1/2	1	3	1/2	.030	38063	38064	38134	38176
1/2	1	3	1/2	.045	38065	38066	38135	38177
1/2	1	3	1/2	.060	38067	38068	38136	38178
5/8	1-1/4	3-1/2	5/8	.015	38073	38074	38137	38179
5/8	1-1/4	3-1/2	5/8	.020	38075	38076	38138	38180
5/8	1-1/4	3-1/2	5/8	.030	38077	38078	38139	38181
5/8	1-1/4	3-1/2	5/8	.045	38079	38080	38140	38182
5/8	1-1/4	3-1/2	5/8	.060	38081	38082	38141	38183
5/8	1-1/4	3-1/2	5/8	.090	38083	38084	38142	38184
3/4	1-1/2	4	3/4	.015	38087	38088	38143	38185
3/4	1-1/2	4	3/4	.020	38089	38090	38144	38186

*Without Flat

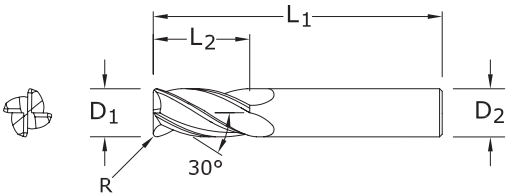
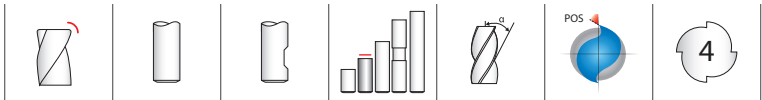
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STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

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FRACTIONAL

4 Flute Corner Radius



1CR

FRACTIONAL SERIES

TOLERANCES (inch)

D₁ = -0.0010/-0.0020

D₂ = h₆

R = +0.0000/-0.0020

CONTINUED

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

CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	inch			EDP NO.			
		OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
3/4	1-1/2	4	3/4	.030	38091	38092	38145	38187
3/4	1-1/2	4	3/4	.045	38093	38094	38146	38188
3/4	1-1/2	4	3/4	.060	38095	38096	38147	38189
3/4	1-1/2	4	3/4	.090	38097	38098	38148	38190
3/4	1-1/2	4	3/4	.125	38099	38100	38149	38191
1	1-1/2	4	1	.015	38101	38102	38150	38192
1	1-1/2	4	1	.020	38103	38104	38151	38193
1	1-1/2	4	1	.030	38105	38106	38152	38194
1	1-1/2	4	1	.045	38107	38108	38153	38195
1	1-1/2	4	1	.060	38109	38110	38154	38196
1	1-1/2	4	1	.090	38111	38112	38155	38197
1	1-1/2	4	1	.125	38113	38114	38156	38198

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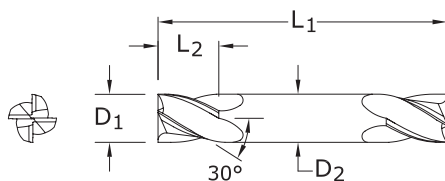
FRACTIONAL 4 Flute Double End Mills



TOLERANCES (inch)

$D_1 = +0.0000/-0.0020$

$D_2 = h_6$



14

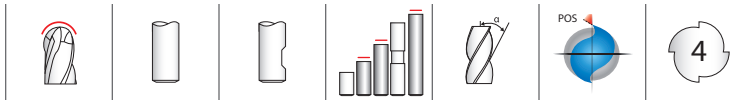
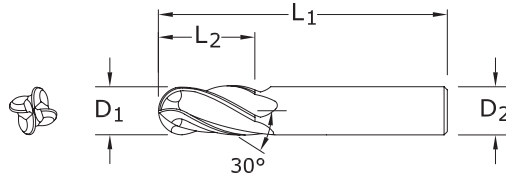
FRACTIONAL SERIES

inch				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)
1/32	1/16	1-1/2	1/8	31401	31441	39601	31170
3/64	3/32	1-1/2	1/8	31403	31443	39603	31171
1/16	1/8	1-1/2	1/8	31405	31445	39605	31172
5/64	1/8	1-1/2	1/8	31407	31447	39607	31173
3/32	3/16	1-1/2	1/8	31409	31449	39609	31174
7/64	3/16	1-1/2	1/8	31411	31451	39611	31175
*1/8	1/4	1-1/2	1/8	31413	31453	39613	31176
9/64	5/16	2	3/16	31415	31455	39615	31177
5/32	5/16	2	3/16	31417	31457	39617	31178
11/64	5/16	2	3/16	31419	31459	39619	31179
*3/16	3/8	2	3/16	31421	31461	39621	31180
13/64	1/2	2-1/2	1/4	31423	31463	39623	31181
7/32	1/2	2-1/2	1/4	31425	31465	39625	31182
15/64	1/2	2-1/2	1/4	31427	31467	39627	31183
*1/4	1/2	2-1/2	1/4	31429	31469	39629	31184
9/32	1/2	2-1/2	5/16	31431	31471	39631	31185
*5/16	1/2	2-1/2	5/16	31433	31473	39633	31186
*3/8	9/16	2-1/2	3/8	31435	31475	39635	31187
7/16	9/16	2-3/4	7/16	31437	31477	39637	31188
*1/2	5/8	3	1/2	31439	31479	39639	31189
*Series 14 Set				31489	31481	39641	31190

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

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4 Flute Ball End


1B•1LB•1ELB
 FRACTIONAL SERIES
**TOLERANCES (inch)** $D_1 = +0.0000/-0.0020$ $D_2 = h_6$ **BALL RADIUS**
 $+0.0000/-0.0010$

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

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inch				EDP NO.							SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	UNCOATED W/FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE® (Diamond)	
1/64	1/32	1-1/2	1/8	30102	—	39102	39002	30031	—	—	1B
1/32	5/64	1-1/2	1/8	30104	—	39104	39004	30032	—	—	1B
3/64	7/64	1-1/2	1/8	30106	—	39106	39006	30033	—	—	1B
1/16	3/16	1-1/2	1/8	30108	—	39108	39008	30034	—	91269	1B
5/64	3/16	1-1/2	1/8	30110	—	39110	39010	30035	—	—	1B
3/32	9/32	1-1/2	1/8	30112	—	39112	39012	30036	—	—	1B
7/64	3/8	1-1/2	1/8	30114	—	39114	39014	30037	—	—	1B
*1/8	3/8	1-1/2	1/8	30178	—	39178	39078	30069	—	—	1B
1/8	1/2	1-1/2	1/8	30116	—	39116	39016	30038	—	91273	1B
1/8	3/4	2-1/4	1/8	33142	—	31770	31780	31790	—	—	1LB
1/8	1	3	1/8	33144	—	31900	31918	31928	—	—	1ELB
9/64	1/2	2	3/16	30118	—	39118	39018	30039	—	—	1B
5/32	1/2	2	3/16	30120	—	39120	39020	30040	—	—	1B
11/64	5/8	2	3/16	30122	—	39122	39022	30041	—	—	1B
*3/16	5/8	2	3/16	30124	—	39124	39024	30042	—	—	1B
3/16	3/4	2-1/2	3/16	33102	—	31771	31781	31791	—	91277	1LB
3/16	1-1/8	3	3/16	33122	—	31902	31919	31929	—	—	1ELB
13/64	5/8	2-1/2	1/4	30126	—	39126	39026	30043	—	—	1B
7/32	5/8	2-1/2	1/4	30128	—	39128	39028	30044	—	—	1B
15/64	3/4	2-1/2	1/4	30130	—	39130	39030	30045	—	—	1B
*1/4	3/4	2-1/2	1/4	30132	—	39132	39032	30046	—	91281	1B
1/4	1-1/8	3	1/4	33104	—	31772	31782	31792	—	—	1LB
1/4	1-1/2	4	1/4	33124	—	31904	31920	31930	—	—	1ELB
17/64	3/4	2-1/2	5/16	30134	—	39134	39034	30047	—	—	1B
9/32	3/4	2-1/2	5/16	30136	—	39136	39036	30048	—	—	1B
19/64	13/16	2-1/2	5/16	30138	—	39138	39038	30049	—	—	1B
*5/16	13/16	2-1/2	5/16	30140	—	39140	39040	30050	—	91285	1B
5/16	1-1/8	3	5/16	33106	—	31773	31783	31793	—	—	1LB
5/16	1-5/8	4	5/16	33126	—	31906	31921	31931	—	—	1ELB
21/64	1	2-1/2	3/8	30142	—	39142	39042	30051	—	—	1B

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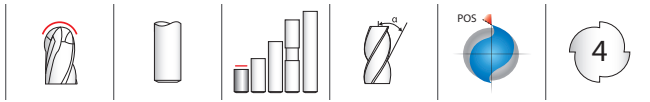
FRACTIONAL
4 Flute Ball End

1B•1LB•1ELB
FRACTIONAL SERIES

inch				EDP NO.							SERIES
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	UNCOATED	UNCOATED W/FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE® (Diamond)	
11/32	1	2-1/2	3/8	30144	—	39144	39044	30052	—	—	1B
23/64	1	2-1/2	3/8	30146	—	39146	39046	30053	—	—	1B
*3/8	1	2-1/2	3/8	30148	30184	39148	39048	30054	30384	91289	1B
3/8	1-1/8	3	3/8	33108	—	31774	31784	31794	—	—	1LB
3/8	1-3/4	4	3/8	33128	—	31908	31922	31932	—	—	1ELB
25/64	1	2-3/4	7/16	30150	—	39150	39050	30055	—	—	1B
13/32	1	2-3/4	7/16	30152	—	39152	39052	30056	—	—	1B
27/64	1	2-3/4	7/16	30154	—	39154	39054	30057	—	—	1B
7/16	1	2-3/4	7/16	30156	—	39156	39056	30058	—	—	1B
7/16	2	4-1/2	7/16	33110	—	31775	31785	31795	—	—	1LB
7/16	3	6	7/16	33130	—	31910	31923	31933	—	—	1ELB
29/64	1	3	1/2	30158	—	39158	39058	30059	—	—	1B
15/32	1	3	1/2	30160	—	39160	39060	30060	—	—	1B
31/64	1	3	1/2	30162	—	39162	39062	30061	—	—	1B
*1/2	1	3	1/2	30164	30185	39164	39064	30062	30385	91293	1B
1/2	2	4-1/2	1/2	33112	—	31776	31786	31796	—	—	1LB
1/2	3	6	1/2	33132	—	31912	31924	31934	—	—	1ELB
9/16	1-1/8	3-1/2	9/16	30166	—	39166	39066	30063	—	—	1B
5/8	1-1/4	3-1/2	5/8	30168	30186	39168	39068	30064	30386	—	1B
5/8	2-1/4	5	5/8	33114	—	31777	31787	31797	—	—	1LB
5/8	3	6	5/8	33134	—	31914	31925	31935	—	—	1ELB
11/16	1-3/8	4	3/4	30170	—	39170	39070	30065	—	—	1B
3/4	1-1/2	4	3/4	30172	30187	39172	39072	30066	30387	—	1B
3/4	2-1/4	5	3/4	33116	—	31778	31788	31798	—	—	1LB
3/4	3	6	3/4	33136	—	31916	31926	31936	—	—	1ELB
7/8	1-1/2	4	7/8	30174	—	39174	39074	30067	—	—	1B
1	1-1/2	4	1	30176	30188	39176	39076	30068	30388	—	1B
1	2-1/4	5	1	33118	—	31779	31789	31799	—	—	1LB
1	3	6	1	33138	—	31917	31927	31937	—	—	1ELB
*Series 1B Set				30190	—	39190	39090	30070	—	—	1B

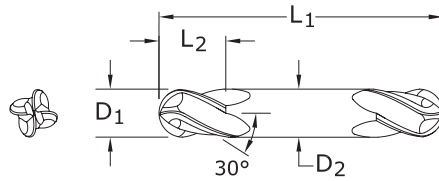
CONTINUED

4 Flute Double End Ball End



14B

FRACTIONAL SERIES

**TOLERANCES (inch)** $D_1 = +0.0000/-0.0020$ $D_2 = h_6$ **BALL RADIUS** $+0.0000/-0.0010$

inch

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)
1/32	1/16	1-1/2	1/8	31402	31442	39602	31218
3/64	3/32	1-1/2	1/8	31404	31444	39604	31219
1/16	1/8	1-1/2	1/8	31406	31446	39606	31220
5/64	1/8	1-1/2	1/8	31408	31448	39608	31221
3/32	3/16	1-1/2	1/8	31410	31450	39610	31222
7/64	3/16	1-1/2	1/8	31412	31452	39612	31223
*1/8	1/4	1-1/2	1/8	31414	31454	39614	31224
9/64	5/16	2	3/16	31416	31456	39616	31225
5/32	5/16	2	3/16	31418	31458	39618	31226
11/64	5/16	2	3/16	31420	31460	39620	31227
*3/16	3/8	2	3/16	31422	31462	39622	31228
13/64	1/2	2-1/2	1/4	31424	31464	39624	31229
7/32	1/2	2-1/2	1/4	31426	31466	39626	31230
15/64	1/2	2-1/2	1/4	31428	31468	39628	31231
*1/4	1/2	2-1/2	1/4	31430	31470	39630	31232
9/32	1/2	2-1/2	5/16	31432	31472	39632	31233
*5/16	1/2	2-1/2	5/16	31434	31474	39634	31234
*3/8	9/16	2-1/2	3/8	31436	31476	39636	31235
7/16	9/16	2-3/4	7/16	31438	31478	39638	31236
*1/2	5/8	3	1/2	31440	31480	39640	31237
*Series 14B Set				31490	31482	39642	31217

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

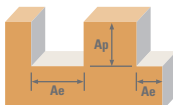
NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

2 Flute: Square & Ball End

4 Flute: Square & Ball End

Diamond 1, 1B, 3, 3B Fractional			Vc (sfm)		Diameter (D ₁) (inch)					
	Ae x D ₁	Ap x D ₁			1/8	1/4	5/16	3/8	1/2	
GRAPHITE Ultrafine, Superfine	 Profile ≤ 0.25 ≤ 1.5	(576-864)	720	RPM	22003	11002	8801	7334	5501	
			Fz	0.0009	0.0023	0.0036	0.0043	0.0058		
			Feed 2 flutes (ipm)	38.3	50.6	63.4	63.1	63.8		
			Feed 3 flutes (ipm)	76.6	101.2	126.7	126.2	127.6		
	 Slot ≤ 1 ≤ 1	(464-696)	580	RPM	17725	8862	7090	5908	4431	
			Fz	0.0075	0.0020	0.0031	0.0038	0.0050		
			Feed 2 flutes (ipm)	265.9	35.4	44.0	44.9	44.3		
			Feed 3 flutes (ipm)	531.7	70.9	87.9	89.8	88.6		
	COMPOSITES FRP, CFRP, GRP	 Profile ≤ 0.25 ≤ 1.5	(308-462)	385	RPM	11766	5883	4706	3922	2941
				Fz	0.0005	0.0014	0.0022	0.0026	0.0035	
Feed 2 flutes (ipm)				12.2	16.5	20.7	20.4	20.6		
Feed 3 flutes (ipm)				24.5	32.9	41.4	40.8	41.2		
 Slot ≤ 1 ≤ 1		(280-420)	350	RPM	10696	5348	4278	3565	2674	
			Fz	0.0005	0.0012	0.0019	0.0023	0.0030		
			Feed 2 flutes (ipm)	9.6	12.8	16.3	16.4	16.0		
			Feed 3 flutes (ipm)	19.3	25.7	32.5	32.8	32.1		
PLASTICS Polycarbonate, PVC, Polypropylene	 Profile ≤ 0.25 ≤ 1.5	(960-1440)	1200	RPM	36672	18336	14669	12224	9168	
			Fz	0.0009	0.0023	0.0036	0.0043	0.0058		
			Feed 2 flutes (ipm)	63.8	84.3	105.6	105.1	106.3		
			Feed 3 flutes (ipm)	127.6	168.7	211.2	210.3	212.7		
	 Slot ≤ 1 ≤ 1	(768-1152)	960	RPM	29338	14669	11735	9779	7334	
			Fz	0.0008	0.0020	0.0031	0.0038	0.0050		
			Feed 2 flutes (ipm)	44.0	58.7	72.8	74.3	73.3		
			Feed 3 flutes (ipm)	88.0	117.4	145.5	148.6	146.7		

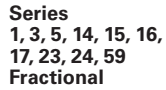
$$\text{rpm} = (\text{Vc} \times 3.82) / D_1$$

$$\text{ipm} = \text{Fz} \times \text{number of flutes} \times \text{rpm}$$

finish cuts typically require reduced feed and cut depths (.02 x D maximum)

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

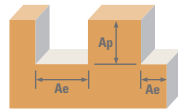
2 Flute: Square, Double, Stub, Long, Ball, Corner Radius
3 Flute: Square, Ball, Tapered
4 Flute: Square, Double, Stub, Ball, Corner Radius
Tapered: Square, Radius



continued on next page

FRACTIONAL

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



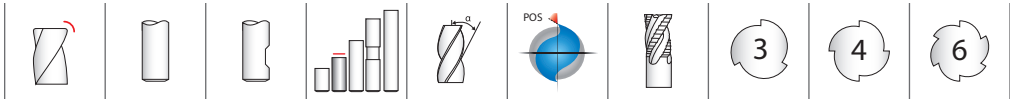
Series 1, 3, 5, 14, 15, 16, 17, 23, 24, 59 Fractional								Diameter (D ₁) (inch)										
Hardness	Flutes	Ae x D ₁	Ap x D ₁	Vc (sfm)		1/64	1/32	1/16	1/8	1/4	3/8	1/2	3/4	1				
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, 718, Incoloy 800, Monel 400, Rene, Waspalloy TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	≤ 300 Bhn or ≤ 32 HRc		Profile		65	RPM	15891	7946	3973	1986	993	662	497	331	248			
					(52-78)	Feed (ipm)	Fz	0.00002	0.00003	0.00006	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014		
			2	≤ 0.50			≤ 1.5	0.6	0.5	0.5	0.7	0.7	1.1	1.0	0.8	0.7		
			3	≤ 0.25			≤ 1.5	1.0	0.7	0.7	1.1	1.0	1.6	1.5	1.2	1.0		
			4	≤ 0.25			≤ 1.5	1.3	1.0	1.0	1.4	1.4	2.1	2.0	1.6	1.4		
								45	RPM	11002	5501	2750	1375	688	458	344	229	172
			Slot		(36-54)	Feed (ipm)	Fz	0.00002	0.00003	0.00006	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014		
			2	1			≤ 1	0.4	0.3	0.3	0.5	0.5	0.7	0.7	0.6	0.5		
			3	1			≤ 0.5	0.7	0.5	0.5	0.7	0.7	1.1	1.0	0.8	0.7		
			4	1			≤ 0.4	0.9	0.7	0.7	1.0	1.0	1.5	1.4	1.1	1.0		
								180	RPM	44006	22003	11002	5501	2750	1375	688	458	344
			≤ 350 Bhn or ≤ 38 HRc		Profile		(144-216)	Feed (ipm)	Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0010	0.0014	0.0017	
	2	≤ 0.50			≤ 1.5	1.8			1.8	1.8	2.2	2.8	3.3	3.3	2.6	2.3		
	3	≤ 0.25			≤ 1.5	2.6			2.6	2.6	3.3	4.1	5.0	5.0	3.9	3.5		
	4	≤ 0.25			≤ 1.5	3.5			3.5	3.5	4.4	5.5	6.6	6.6	5.1	4.7		
						130			RPM	31782	15891	7946	3973	1986	993	662	497	331
		Slot			(104-156)	Feed (ipm)	Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0010	0.0014	0.0017			
		2		1			≤ 1	1.3	1.3	1.3	1.6	2.0	2.4	2.4	1.9	1.7		
3		1		≤ 0.5			1.9	1.9	1.9	2.4	3.0	3.6	3.6	2.8	2.5			
4		1		≤ 0.4			2.5	2.5	2.5	3.2	4.0	4.8	4.8	3.7	3.4			
							880	RPM	215142	107571	53786	26893	13446	8964	6723	4482	3362	
N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075 COPPER ALLOYS Alum Bronze, C110, Muntz Brass PLASTICS Polycarbonate, PVC, Polypropylene GRAPHITE		≤ 150 Bhn or ≤ 7 HRc			Profile		(704-1056)	Feed (ipm)	Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
	2				≤ 0.50	≤ 1.5			25.8	28.0	26.9	32.3	43.0	53.8	53.8	43.0	37.6	
	3		≤ 0.25		≤ 1.5	38.7			42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5		
	4		≤ 0.25		≤ 1.5	156467			78234	39117	19558	9779	6519	4890	3260	2445		
						0.00006			0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056		
			Slot		(512-768)	Feed (ipm)	Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056		
			2	1			≤ 1	18.8	20.3	19.6	23.5	31.3	39.1	39.1	31.3	27.4		
			3	1			≤ 0.5	28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1		
			4	1			≤ 0.5	485	RPM	118573	59286	29643	14822	7411	4941	3705	2470	1853
								Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028	
			≤ 140 Bhn or ≤ 3 HRc		Profile		(388-582)	Feed (ipm)	Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
	2				≤ 0.50	≤ 1.5			7.1	7.1	7.7	8.9	11.9	14.8	14.8	11.9	10.4	
	3	≤ 0.25			≤ 1.5	10.7			10.7	11.6	13.3	17.8	22.2	22.2	17.8	15.6		
	4	≤ 0.25			≤ 1.5	14.2			14.2	15.4	17.8	23.7	29.6	29.6	23.7	20.8		
						350			RPM	85568	42784	21392	10696	5348	3565	2674	1783	1337
		Slot			(280-420)	Feed (ipm)	Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028		
		2		1			≤ 1	5.1	5.1	5.6	6.4	8.6	10.7	10.7	8.6	7.5		
		3		1			≤ 0.5	7.7	7.7	8.3	9.6	12.8	16.0	16.0	12.8	11.2		
4		1		≤ 0.4			10.3	10.3	11.1	12.8	17.1	21.4	21.4	17.1	15.0			
							880	RPM	215142	107571	53786	26893	13446	8964	6723	4482	3362	
≤ 140 Bhn or ≤ 3 HRc				Profile		(704-1056)	Feed (ipm)	Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056	
	2			≤ 0.50	≤ 1.5			25.8	28.0	26.9	32.3	43.0	53.8	53.8	43.0	37.6		
	3		≤ 0.25	≤ 1.5	38.7			42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5			
	4		≤ 0.25	≤ 1.5	51.6			55.9	53.8	64.5	86.1	107.6	107.6	86.1	75.3			
					640			RPM	156467	78234	39117	19558	9779	6519	4890	3260	2445	
			Slot		(512-768)	Feed (ipm)	Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056		
		2	1	≤ 1			18.8	20.3	19.6	23.5	31.3	39.1	39.1	31.3	27.4			
		3	1	≤ 0.5			28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1			
		4	1	≤ 0.4			37.6	40.7	39.1	46.9	62.6	78.2	78.2	62.6	54.8			
							660	RPM	161357	80678	40339	20170	10085	6723	5042	3362	2521	
		≤ 140 Bhn or ≤ 3 HRc		Profile		(528-792)	Feed (ipm)	Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056	
	2			≤ 0.50	≤ 1.5			19.4	21.0	20.2	24.2	32.3	40.3	40.3	32.3	28.2		
3	≤ 0.25			≤ 1.5	29.0			31.5	30.3	36.3	48.4	60.5	60.5	48.4	42.4			
4	≤ 0.25			≤ 1.5	38.7			42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5			
					480			RPM	117350	58675	29338	14669	7334	4890	3667	2445	1834	
	Slot			(384-576)	Feed (ipm)	Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056			
	2		1			≤ 1	14.1	15.3	14.7	17.6	23.5	29.3	29.3	23.5	20.5			
	3		1			≤ 0.5	21.1	22.9	22.0	26.4	35.2	44.0	44.0	35.2	30.8			
	4		1			≤ 0.4	28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1			

Bhn (Brinell) HRc (Rockwell C)
 rpm = (Vc x 3.82) / D₁
 ipm = Fz x number of flutes x rpm
 reduce speed and feed for materials harder than listed
 for tapered end mills, base the speed on the largest diameter contacting
 the workpiece and the feed on the smallest diameter

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)

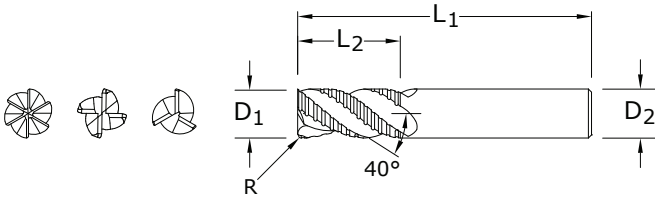
FRACTIONAL

Single End Roughers (Fine Pitch)



62

FRACTIONAL SERIES



TOLERANCES (inch)

D₁ = +0.0000/–0.0040

D₂ = h₆

R = +0.0050/–0.0050

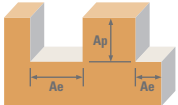
inch						EDP NO.		
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	NO. OF FLUTES	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/4*	3/4	2-1/2	1/4	.045	3	36207	36206	36210
5/16*	3/4	2-1/2	5/16	.045	3	36209	36208	36211
3/8	7/8	2-1/2	3/8	.060	3	36213	36212	36214
1/2	1	3	1/2	.060	4	36217	36216	36218
5/8	1-1/4	3-1/2	5/8	.060	4	36221	36220	36222
3/4	1-5/8	4	3/4	.060	4	36225	36224	36226
1	1-3/4	4	1	.060	6	36229	36228	36230

*Without Flat

- STAINLESS STEELS
- HIGH TEMP ALLOYS
- TITANIUM

For patent
information visit
www.ksptpatents.com

Single End Roughers (Fine Pitch)

Series 62 Fractional	Hardness			Vc (sfm)		Diameter (D ₁) (inch)				
		Ae x D ₁	Ap x D ₁			1/4	3/8	1/2	3/4	1
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	 Profile ≤ 0.5 ≤ 1.5		405	RPM	6188	4126	3094	2063	1547
				(324-486)	Fz	0.0006	0.0011	0.0015	0.0019	0.0021
					Feed (ipm)	11.1	13.6	18.6	15.7	19.5
		 Slot 1 ≤ 1		325	RPM	4966	3311	2483	1655	1242
				(260-390)	Fz	0.0006	0.0011	0.0015	0.0019	0.0021
					Feed (ipm)	8.9	10.9	14.9	12.6	15.6
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4PH, 15-5PH, 13-4PH, Custom 450	 Profile ≤ 0.5 ≤ 1.5		280	RPM	4278	2852	2139	1426	1070
				(224-336)	Fz	0.0005	0.0009	0.0012	0.0015	0.0017
					Feed (ipm)	6.4	7.7	10.3	8.6	10.9
		 Slot 1 ≤ 1		225	RPM	3438	2292	1719	1146	860
				(180-270)	Fz	0.0005	0.0009	0.0012	0.0015	0.0017
					Feed (ipm)	5.2	6.2	8.3	6.9	8.8
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspalloy	 Profile ≤ 0.5 ≤ 1.5		70	RPM	1070	713	535	357	267
				(56-84)	Fz	0.0004	0.0008	0.0010	0.0013	0.0014
					Feed (ipm)	1.3	1.7	2.1	1.9	2.2
		 Slot 1 ≤ 1		56	RPM	856	570	428	285	214
				(45-67)	Fz	0.0004	0.0008	0.0010	0.0013	0.0014
					Feed (ipm)	1.0	1.4	1.7	1.5	1.8
	TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	 Profile ≤ 0.5 ≤ 1.5		155	RPM	2368	1579	1184	789	592
				(124-186)	Fz	0.0005	0.0009	0.0012	0.0015	0.0017
					Feed (ipm)	3.6	4.3	5.7	4.7	6.0
		 Slot 1 ≤ 1		195	RPM	2980	1986	1490	993	745
				(156-234)	Fz	0.0005	0.0009	0.0012	0.0015	0.0017
					Feed (ipm)	4.5	5.4	7.2	6.0	7.6

Bhn (Brinell) HRc (Rockwell C)

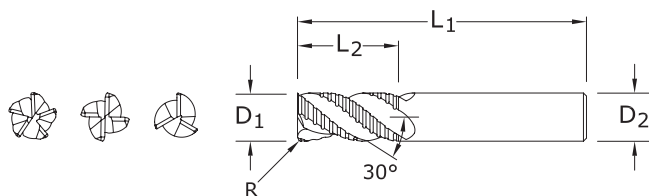
rpm = (Vc x 3.82) / D₁

ipm = 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)

Single End Roughers (Coarse Pitch)



TOLERANCES (inch)

$D_1 = +0.0000/-0.0040$
 $D_2 = h_6$
 $R = +0.0050/-0.0050$

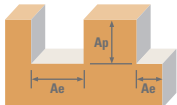
inch						EDP NO.		
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	CORNER RADIUS R	NO. OF FLUTES	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/4*	3/4	2-1/2	1/4	.045	3	36107	36106	36110
5/16*	3/4	2-1/2	5/16	.045	3	36109	36108	36111
3/8	7/8	2-1/2	3/8	.060	3	36113	36112	36114
1/2	1	3	1/2	.060	4	36117	36116	36118
5/8	1-1/4	3-1/2	5/8	.060	4	36121	36120	36122
3/4	1-5/8	4	3/4	.060	4	36125	36124	36126
1	1-3/4	4	1	.060	5	36129	36128	36130

*Without Flat

- STEELS
- CAST IRON
- HARDENED STEELS

For patent
information visit
www.ksptpatents.com

Single End Roughers (Coarse Pitch)



Series 61	Fractional	Hardness	 Ae x D ₁	 Ap x D ₁	Vc (sfm)	Diameter (D ₁) (inch)						
						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	 Profile	≤ 0.5	≤ 1.5	500	RPM	7640	5093	3820	2547	1910
						(400-600)	Fz	0.0006	0.0011	0.0014	0.0017	0.0020
							Feed (ipm)	13.8	16.8	21.4	17.3	19.1
			 Slot	1	≤ 1	400	RPM	6112	4075	3056	2037	1528
						(320-480)	Fz	0.0006	0.0011	0.0014	0.0017	0.0020
							Feed (ipm)	11.0	13.4	17.1	13.9	15.3
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HR	 Profile	≤ 0.5	≤ 1.5	365	RPM	5577	3718	2789	1859	1394
						(292-438)	Fz	0.0004	0.0008	0.0011	0.0013	0.0015
							Feed (ipm)	6.7	8.9	12.3	9.7	10.5
			 Slot	1	≤ 1	295	RPM	4508	3005	2254	1503	1127
						(236-354)	Fz	0.0004	0.0008	0.0011	0.0013	0.0015
							Feed (ipm)	5.4	7.2	9.9	7.8	8.5
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	 Profile	≤ 0.5	≤ 1.5	345	RPM	5272	3514	2636	1757	1318
						(276-414)	Fz	0.0006	0.0009	0.0015	0.0018	0.0021
							Feed (ipm)	9.5	9.5	15.8	12.7	13.8
			 Slot	1	≤ 1	275	RPM	4202	2801	2101	1401	1051
						(220-330)	Fz	0.0006	0.0009	0.0015	0.0018	0.0021
							Feed (ipm)	7.6	7.6	12.6	10.1	11.0
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	 Profile	≤ 0.5	≤ 1.5	365	RPM	5577	3718	2789	1859	1394
						(292-438)	Fz	0.0008	0.0015	0.0020	0.0024	0.0028
							Feed (ipm)	13.4	16.7	22.3	17.8	19.5
			 Slot	1	≤ 1	295	RPM	4508	3005	2254	1503	1127
						(236-354)	Fz	0.0008	0.0015	0.0020	0.0024	0.0028
							Feed (ipm)	10.8	13.5	18.0	14.4	15.8

Bhn (Brinell) HRc (Rockwell C)

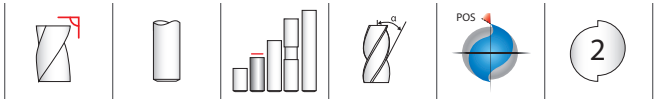
rpm = (Vc x 3.82) / D₁

ipm = Fz x number of flutes x rpm

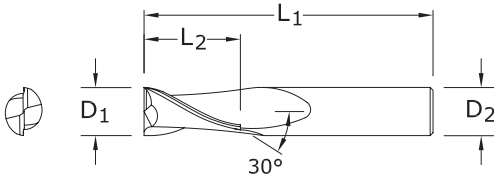
reduce speed and feed for materials harder than listed

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

2 Flute High Shear End Mills



52
FRACTIONAL SERIES



TOLERANCES (inch)
D₁ = +0.0000/-0.0020
D₂ = h₆

- NON-FERROUS
- PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

inch				EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	UNCOATED	Ti-NAMITE-C (TiCN)
1/16	3/16	1-1/2	1/8	35273	35300
3/32	3/8	1-1/2	1/8	35275	35301
1/8	7/16	1-1/2	1/8	35277	35302
5/32	9/16	2	3/16	35278	35303
3/16	9/16	2	3/16	35279	35304
7/32	5/8	2-1/2	1/4	35280	35305
1/4	3/4	2-1/2	1/4	35281	35306
9/32	3/4	2-1/2	5/16	35282	35307
5/16	13/16	2-1/2	5/16	35283	35308
3/8	7/8	2-1/2	3/8	35285	35309
7/16	1	2-3/4	7/16	35287	35310
1/2	1	3	1/2	35289	35311
9/16	1-1/8	3-1/2	9/16	35291	35312
5/8	1-1/4	3-1/2	5/8	35293	35313
3/4	1-1/2	4	3/4	35295	35314
1	1-1/2	4	1	35297	35315

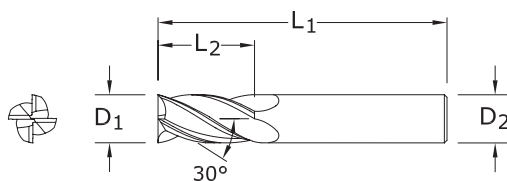
4 Flute High Shear End Mills



TOLERANCES (inch)

D1 = +0.0000/-0.0020

D2 = h_6



54
FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	UNCOATED	Ti-NAMITE-C (TiCN)
1/16	3/16	1-1/2	1/8	35473	35500
3/32	3/8	1-1/2	1/8	35475	35501
1/8	7/16	1-1/2	1/8	35477	35502
5/32	9/16	2	3/16	35478	35503
3/16	9/16	2	3/16	35479	35504
7/32	5/8	2-1/2	1/4	35480	35505
1/4	3/4	2-1/2	1/4	35481	35506
9/32	3/4	2-1/2	5/16	35482	35507
5/16	13/16	2-1/2	5/16	35483	35508
3/8	7/8	2-1/2	3/8	35485	35509
7/16	1	2-3/4	7/16	35487	35510
1/2	1	3	1/2	35489	35511
9/16	1-1/8	3-1/2	9/16	35491	35512
5/8	1-1/4	3-1/2	5/8	35493	35513
3/4	1-1/2	4	3/4	35495	35514
1	1-1/2	4	1	35497	35515

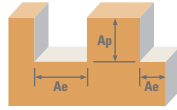
NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
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2 Flute: High Shear End Mills

4 Flute: High Shear End Mills



Series 52, 54 Fractional	Hardness	Flutes			Vc (sfm)	Diameter (D1) (inch)						
			Ae x D1	Ap x D1		1/8	1/4	3/8	1/2	3/4	1	
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	≤ 150 Bhn or ≤ 7 HRc		Profile		1360	RPM	41562	20781	13854	10390	6927	5195
					(1088-1632)	Fz	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
						Feed (ipm)	57.4	74.8	94.2	95.6	76.2	66.5
			2	≤ 0.3			≤ 1.5	114.7	149.6	188.4	191.2	152.4
				(872-1308)	Fz	0.00063	0.0017	0.0032	0.0042	0.0050	0.0059	
			Slot		Feed (ipm)	42.0	56.6	71.1	70.0	55.5	49.1	
			2			1	≤ 1	83.9	113.3	142.1	139.9	111.0
				4	1	≤ 0.25	1090	RPM	33310	16655	11103	8328
ALUMINUM DIE CAST ALLOYS (HIGH SILICON) A-390, A-392, B-390	≤ 125 Bhn or ≤ 77 HRb		Profile		510	RPM	15586	7793	5195	3896	2598	1948
					(408-612)	Fz	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
						Feed (ipm)	21.5	28.1	35.3	35.8	28.6	24.9
			2	≤ 0.3			≤ 1.5	43.0	56.1	70.7	71.7	57.1
				(328-492)	Fz	0.00063	0.0017	0.0032	0.0042	0.0050	0.0059	
			Slot		Feed (ipm)	15.8	21.3	26.7	26.3	20.9	18.5	
			2			1	≤ 1	31.6	42.6	53.5	52.6	41.8
				4	1	≤ 0.25	410	RPM	12530	6265	4177	3132
COPPER ALLOYS Aluminum Bronze, Muntz Brass, Naval, Brass, Red Brass	≤ 140 Bhn or ≤ 3 HRc		Profile		590	RPM	18030	9015	6010	4508	3005	2254
					(472-708)	Fz	0.00039	0.0010	0.0020	0.0026	0.0031	0.0037
						Feed (ipm)	14.1	18.0	24.0	23.4	18.6	16.7
			2	≤ 0.3			≤ 1.5	28.1	36.1	48.1	46.9	37.3
				(380-570)	Fz	0.00036	0.0010	0.0018	0.0024	0.0029	0.0034	
			Slot		Feed (ipm)	10.5	14.5	17.4	17.4	14.0	12.3	
			2			1	≤ 1	20.9	29.0	34.8	34.8	28.1
				4	1	≤ 0.25	475	RPM	14516	7258	4839	3629
COPPER ALLOYS Beryllium Copper, C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc		Profile		235	RPM	7182	3591	2394	1795	1197	898
					(188-282)	Fz	0.00039	0.0010	0.0020	0.0026	0.0031	0.0037
						Feed (ipm)	5.6	7.2	9.6	9.3	7.4	6.6
			2	≤ 0.3			≤ 1.5	11.2	14.4	19.2	18.7	14.8
				(152-228)	Fz	0.00036	0.0010	0.0018	0.0024	0.0029	0.0034	
			Slot		Feed (ipm)	4.2	5.8	7.0	7.0	5.6	4.9	
			2			1	≤ 1	8.4	11.6	13.9	13.9	11.2
				4	1	≤ 0.25	1600	RPM	48896	24448	16299	12224
PLASTICS ABS, Polycarbonate, PVC, Polypropylene			Profile		1600	RPM	48896	24448	16299	12224	8149	6112
					(1280-1920)	Fz	0.00110	0.0030	0.0056	0.0074	0.0089	0.0100
						Feed (ipm)	107.6	146.7	182.5	180.9	145.1	122.2
			2	≤ 0.3			≤ 1.5	215.1	293.4	365.1	361.8	290.1
				(1024-1536)	Fz	0.00100	0.0027	0.0051	0.0068	0.0082	0.0095	
			Slot		Feed (ipm)	78.2	105.6	133.0	133.0	106.9	92.9	
			2			1	≤ 1	156.5	211.2	266.0	266.0	213.8
				4	1	≤ 0.25	1280	RPM	39117	19558	13039	9779
PLASTICS Fiberglass, Glass Filled			Profile		720	RPM	22003	11002	7334	5501	3667	2750
					(576-864)	Fz	0.00082	0.0022	0.0041	0.0055	0.0065	0.0076
						Feed (ipm)	36.1	48.4	60.1	60.5	47.7	41.8
			2	≤ 0.3			≤ 1.5	72.2	96.8	120.3	121.0	95.3
				(460-690)	Fz	0.00075	0.0020	0.0037	0.0050	0.0060	0.0070	
			Slot		Feed (ipm)	26.4	35.1	43.3	43.9	35.1	30.8	
			2			1	≤ 1	52.7	70.3	86.7	87.9	70.3
				4	1	≤ 0.25	575	RPM	17572	8786	5857	4393

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

rpm = (Vc x 3.82) / D₁

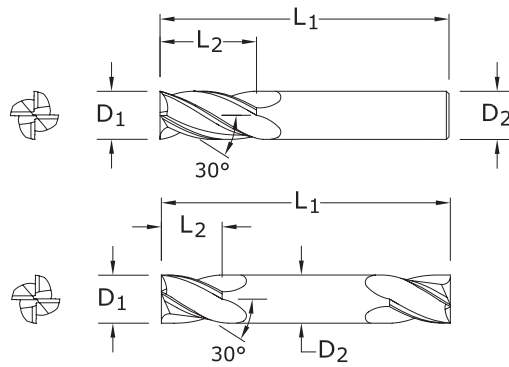
ipm = Fz x number of flutes x rpm

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)

FRACTIONAL End Mills Sets



Pictured:
Series 1 4 Flute
Single End Square
Endmill Set

CUTTING DIAMETER D_1	SINGLE END LENGTH OF CUT L_2	DOUBLE END LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2
1/8	1/2	1/4	1-1/2	1/8
3/16	5/8	3/8	2	3/16
1/4	3/4	1/2	2-1/2	1/4
5/16	13/16	1/2	2-1/2	5/16
3/8	1	9/16	2-1/2	3/8
1/2	1	5/8	3	1/2

Square End FRACTIONAL SERIES

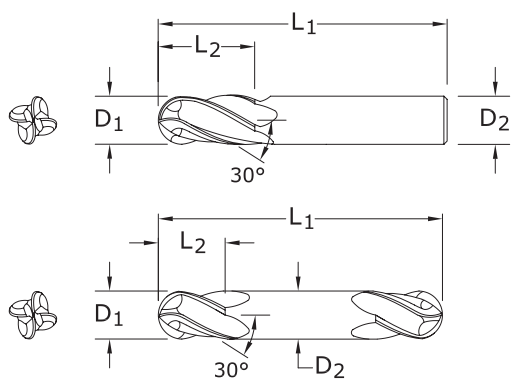
DESCRIPTION	EDP NO.			
	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
Series 1 – 4 Flute, Single End	30189	39189	39089	30030
Series 3 – 2 Flute, Single End	30389	39389	39589	30470
Series 5 – 3 Flute, Single End	30589	39789	30810	30850
Series 14 – 4 Flute, Double End	31489	31481	39641	31190
Series 15 – 2 Flute, Double End	31589	31581	39691	31336



For patent
information visit
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FRACTIONAL

End Mills Sets



Pictured:
Series 1 4 Flute Single
End Ball Endmill Set

CUTTING DIAMETER D ₁	SINGLE END LENGTH OF CUT L ₂	DOUBLE END LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂
1/8	1/2	1/4	1-1/2	1/8
3/16	5/8	3/8	2	3/16
1/4	3/4	1/2	2-1/2	1/4
5/16	13/16	1/2	2-1/2	5/16
3/8	1	9/16	2-1/2	3/8
1/2	1	5/8	3	1/2

Ball End

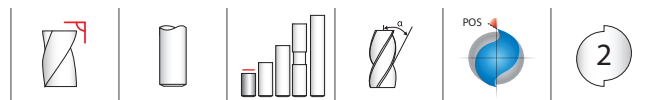
FRACTIONAL SERIES



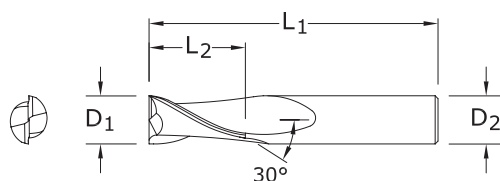
For patent
information visit
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DESCRIPTION	EDP NO.			
	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
Series 1B – 4 Flute, Single End	30190	39109	39090	30070
Series 3B – 2 Flute, Single End	30390	39390	39590	30600
Series 5B – 3 Flute, Single End	30590	30900	30944	31169
Series 14B – 4 Flute, Double End	31490	31482	39642	31217
Series 15B – 2 Flute, Double End	31590	31582	39692	31357

2 Flute Square End Stub



TOLERANCES (mm)

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


17M

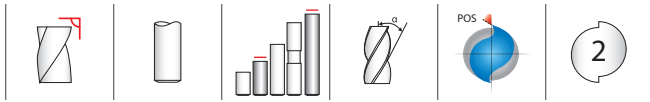
METRIC SERIES

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	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

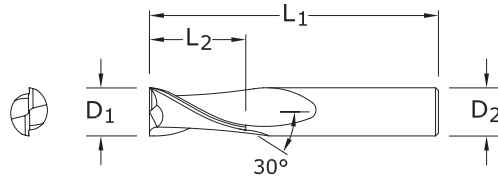
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

For patent
information visit
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2 Flute Square End



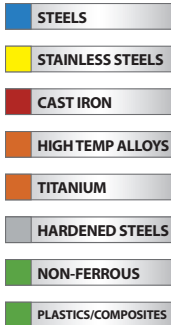
3M•3XLM
METRIC SERIES



TOLERANCES (mm)

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

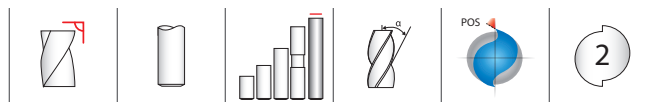
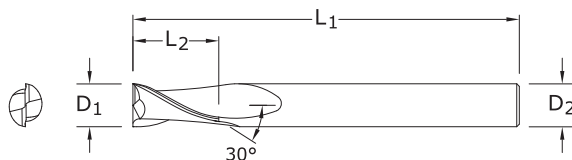
$D_2 = h_6$



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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	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

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)
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

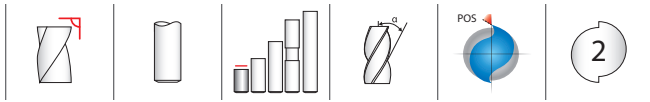
Neck Option Available

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

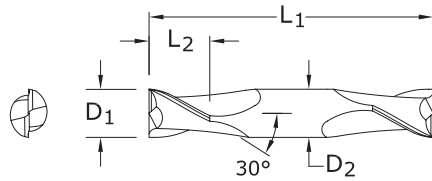
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METRIC

2 Flute Double End Mills



15M
METRIC SERIES



TOLERANCES (mm)

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

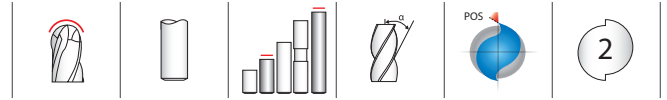
$D_2 = h_6$

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

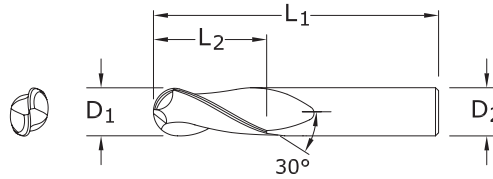
For patent
information visit
www.ksptpatents.com

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	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)

 $D_1 = +0,000/-0,050$
 $D_2 = h_6$
BALL RADIUS
 $+0,000/-0,025$


3MB•3XLMB

METRIC SERIES

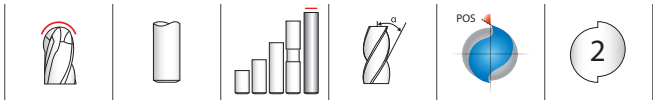
mm				EDP NO.				SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40306	48692	48714	48735	3MB
1,5	4,5	38,0	3,0	40310	48693	48715	48736	3MB
2,0	6,3	38,0	3,0	40314	48694	48716	48737	3MB
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

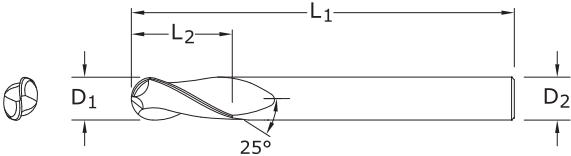
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METRIC

2 Flute Ball End Long Reach



59MB
METRIC SERIES



TOLERANCES (mm)

D₁ = +0,000/-0,050
D₂ = h₆
BALL RADIUS
+0,000/-0,025

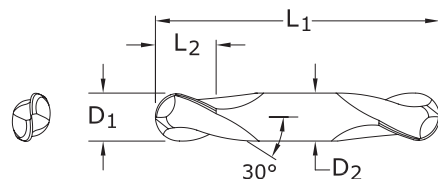
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

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)
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
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2 Flute Double End Ball End

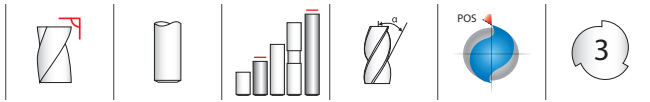

TOLERANCES (mm)
 $D_1 = +0,000/-0,050$
 $D_2 = h_6$
BALL RADIUS
 $+0,000/-0,025$

15MB
 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	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

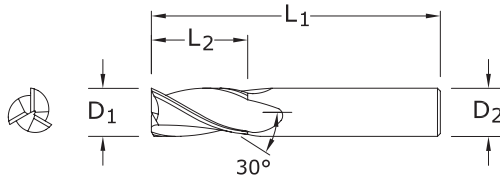
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

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3 Flute Square End



5M•5XLM
METRIC SERIES



TOLERANCES (mm)

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

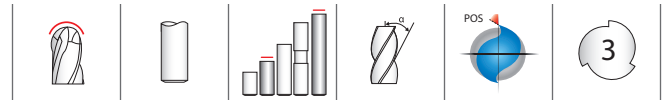
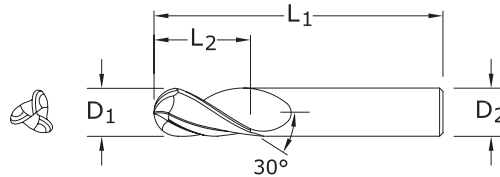
$D_2 = h_6$

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

For patent
information visit
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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	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)
 $D_1 = +0,000/-0,050$
 $D_2 = h_6$
BALL RADIUS
 $+0,000/-0,025$


5MB•5XLMB

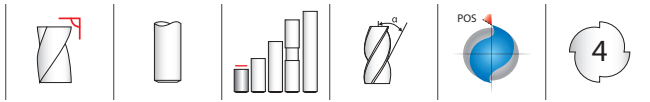
METRIC SERIES

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

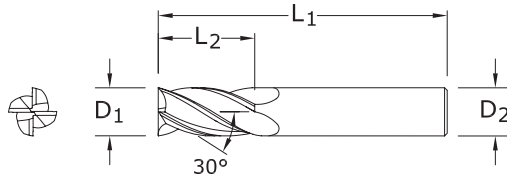
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

For patent
information visit
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4 Flute Square End Stub



16M
METRIC SERIES



TOLERANCES (mm)

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

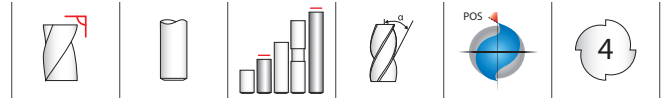
$D_2 = h_6$

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

For patent
information visit
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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	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

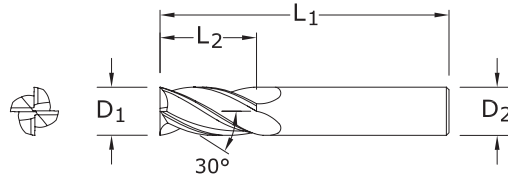
METRIC 4 Flute End Mills



TOLERANCES (mm)

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

$D_2 = h_6$



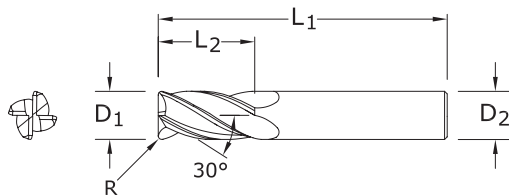
1M•1XLM
METRIC SERIES

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

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4 Flute Corner Radius



1MCR
METRIC SERIES

TOLERANCES (mm)

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

$D_2 = h_6$

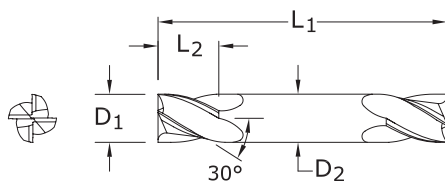
$R = +0,000/-0,050$

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

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information visit
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CUTTING DIAMETER D_1	LENGTH OF CUT L_2	mm			EDP NO.
		OVERALL LENGTH L_1	CORNER RADIUS R	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)
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

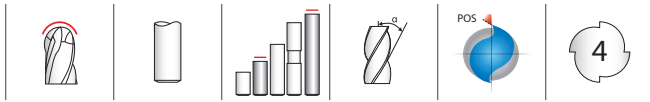

TOLERANCES (mm)
 $D_1 = +0,000/-0,050$
 $D_2 = h_6$

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

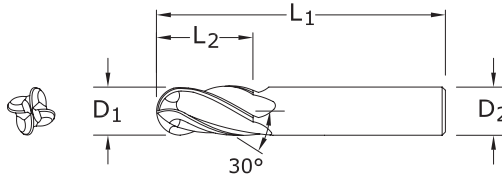
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4 Flute Ball End



1MB•1XLMB

METRIC SERIES

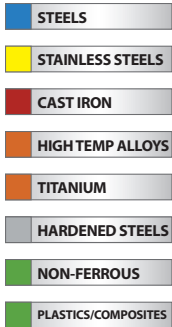


TOLERANCES (mm)

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

$D_2 = h_6$

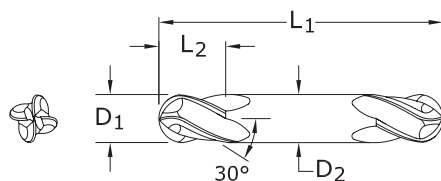
BALL RADIUS
+0,000/-0,025



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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)
 $D_1 = +0,000/-0,050$
 $D_2 = h_6$
BALL RADIUS
 $+0,000/-0,025$

14MB
 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	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

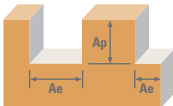
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METRIC

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

3 Flute: Square, Long Reach, Ball

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

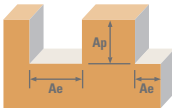
Series 1M, 3M, 5M, 14M, 15M, 16M, 17M, 59M Metric								Diameter (D ₁) (mm)									
Hardness	Flutes	Ae x D ₁	Ap x D ₁	Vc (m/min)		0.4	0.75	1.5	3	6	10	12	20	25			
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc		Profile	140	RPM	111483	59458	29729	14864	7432	4459	3716	2230	1784		
						(112-168)	Feed (mm/min)	Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
								178	178	184	208	282	357	357	285	250	
			268	268	276			312	424	535	535	428	375				
			357	357	369	416	565	713	713	571	499						
			(82-123)	Feed (mm/min)	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				
		130			130	134	152	206	260	260	208	182					
		195	195	201	227	309	390	390	312	273							
		260	260	268	303	411	520	520	416	364							
		H	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc		Profile	102	RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299
								(82-123)	Feed (mm/min)	Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036
81	104									95	130	152	188	195	156	135	
122	156				143	195	227			283	292	234	203				
162	208				191	260	303	377	390	312	270						
(60-90)	Feed (mm/min)				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				
				59	76	70	95	111	138	143	114	99					
119	152			139	190	222	276	285	228	198							
119	152			139	190	222	276	285	228	198							
K	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2			≤ 250 Bhn or ≤ 24 HRc		Profile	96	RPM	76342	40715	20358	10179	5089	3054	2545	1527	1221
								(77-115)	Feed (mm/min)	Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036
		76	98							90	122	143	177	183	147	127	
		115	147		134	183	214			266	275	220	191				
		153	195		179	244	285	354	366	293	254						
		(56-84)	Feed (mm/min)		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				
				56	71	65	89	104	129	134	107	93					
		84	107	98	134	156	194	201	161	139							
		111	143	131	178	208	259	268	214	186							
		M	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc		Profile	102	RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299
								(82-123)	Feed (mm/min)	Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048
130	130									134	152	206	260	260	208	182	
195	195				201	227	309			390	390	312	273				
260	260				268	303	411	520	520	416	364						
(60-90)	Feed (mm/min)				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				
				95	95	98	111	150	190	190	152	133					
143	143			147	166	226	285	285	228	200							
190	190			196	222	301	380	380	304	266							
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F			≤ 275 Bhn or ≤ 28 HRc		Profile	113	RPM	89671	47825	23912	11956	5978	3587	2989	1793	1435
								(90-135)	Feed (mm/min)	Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036
		90	115							105	143	167	208	215	172	149	
		135	172		158	215	251			312	323	258	224				
		179	230		210	287	335	416	430	344	298						
		(66-99)	Feed (mm/min)		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				
				65	84	77	105	122	152	157	126	109					
		98	126	115	157	183	228	236	188	163							
		131	168	154	209	244	304	314	251	218							
		M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4 PH, 15-5, 13-4, Custom 450	≤ 275 Bhn or ≤ 28 HRc		Profile	78	RPM	61800	32960	16480	8240	4120	2472	2060	1236	989
								(62-93)	Feed (mm/min)	Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029
62	66									63	66	99	119	119	91	83	
93	99				94	99	148			178	179	137	125				
124	132				125	132	198	237	239	183	166						
(45-68)	Feed (mm/min)				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				
				45	48	45	48	72	86	87	66	60					
67	72			68	72	108	129	130	100	90							
90	96			91	96	143	172	173	133	121							

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							Diameter (D ₁) (mm)											
Metric	Hardness	Flutes	Ae x D ₁	Ap x D ₁	Vc (m/min)		0.4	0.75	1.5	3	6	10	12	20	25			
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, 718, Incoloy 800, Monel 400,Rene, Waspalloy	Profile 	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	≤ 300 Bhn or ≤ 32 HRc	20	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		
								24	18	18	25	32	40	38	30	26		
		Slot 	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	≤ 300 Bhn or ≤ 32 HRc	14	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		
								16	12	12	17	22	27	26	21	18		
		Slot 	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	≤ 300 Bhn or ≤ 32 HRc	14	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		
								16	12	12	17	22	27	26	21	18		
TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	≤ 350 Bhn or ≤ 38 HRc	Profile 	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	≤ 350 Bhn or ≤ 38 HRc	55	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		
								65	70	66	70	105	126	127	97	88		
		Slot 	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	≤ 350 Bhn or ≤ 38 HRc	40	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		
								47	50	48	50	76	91	91	70	64		
		Slot 	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	≤ 350 Bhn or ≤ 38 HRc	40	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		
								47	50	48	50	76	91	91	70	64		
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile 	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5	≤ 150 Bhn or ≤ 7 HRc	268	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		
								960	1092	1024	1194	1621	2047	2047	1638	1433		
		Slot 	2 1 ≤ 1 3 1 ≤ 0.5	≤ 150 Bhn or ≤ 7 HRc	195	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		
								698	794	745	869	1179	1489	1489	1191	1042		
		COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile 	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	≤ 140 Bhn or ≤ 3 HRc	148	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
										282	282	292	329	447	564	564	451	395
Slot 	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4			≤ 140 Bhn or ≤ 3 HRc	148	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		
								204	204	210	238	322	407	407	326	285		
PLASTICS Polycarbonate, PVC, Polypropylene	≤ 140 Bhn or ≤ 3 HRc			Profile 	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	≤ 140 Bhn or ≤ 3 HRc	268	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
										960	1092	1024	1194	1621	2047	2047	1638	1433
		Slot 	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4	≤ 140 Bhn or ≤ 3 HRc	195	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		
								698	794	745	869	1179	1489	1489	1191	1042		
		GRAPHITE	≤ 140 Bhn or ≤ 3 HRc	Profile 	2 ≤ 0.50 ≤ 1.5 3 ≤ 0.25 ≤ 1.5 4 ≤ 0.25 ≤ 1.5	≤ 140 Bhn or ≤ 3 HRc	201	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
										720	819	768	896	1216	1536	1536	1228	1075
Slot 	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4			≤ 140 Bhn or ≤ 3 HRc	146	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		
								523	596	558	651	884	1117	1117	893	782		
Slot 	2 1 ≤ 1 3 1 ≤ 0.5 4 1 ≤ 0.4			≤ 140 Bhn or ≤ 3 HRc	146	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		
								523	596	558	651	884	1117	1117	893	782		

Bhn (Brinell) HRc (Rockwell C)
 $\text{rpm} = (\text{Vc} \times 1000) / (D_1 \times 3.14)$
 $\text{mm/min} = \text{Fz} \times \text{number of flutes} \times \text{rpm}$
 reduce speed and feed for materials harder than listed

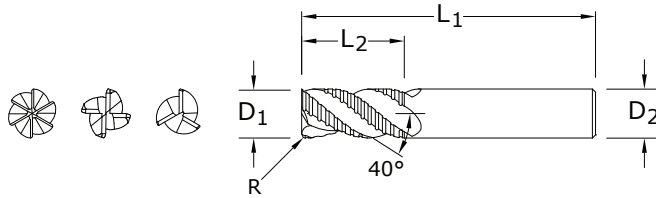
limit cut depths of long and extra long flute mills to .05 x D₁ when slotting or profiling
 reduce feed and Ae when finish milling (.02 x D₁ maximum)
 refer to the KYOCERA SGS Tool Wizard® for complete technical information
 (www.kyocera-sgstool.com)

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

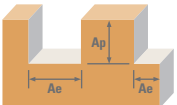
STAINLESS STEELS

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

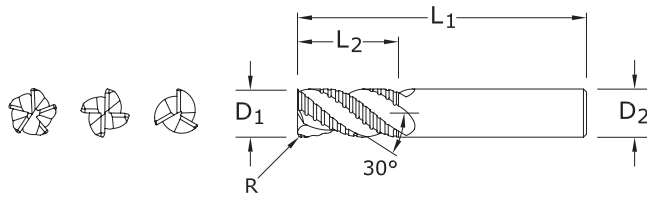
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC

Single End Roughers (Coarse Pitch)



61M
METRIC SERIES



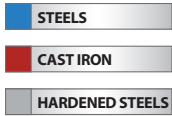
TOLERANCES h10 (mm)

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

$D_2 = h_6$

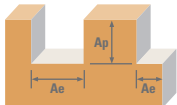
$R = +0,127 / -0,127$

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	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



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information visit
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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	 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	 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	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	 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	CAST IRONS Gray, Malleable, Ductile	 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)

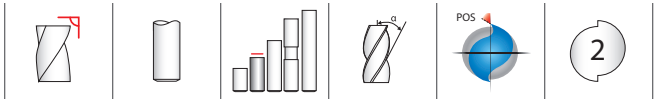
mm/min = Fz x number of flutes x rpm

reduce speed and feed for materials harder than listed

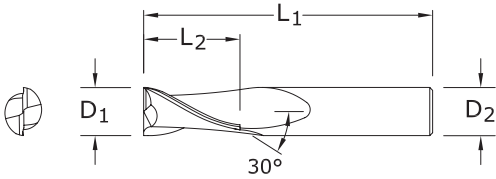
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC

2 Flute High Shear End Mills



52M
METRIC SERIES



TOLERANCES (mm)

D₁ = +0,000/-0,050

D₂ = h₆

NON-FERROUS

PLASTICS/COMPOSITES

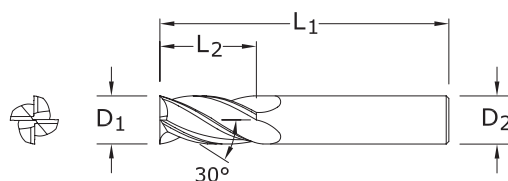
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mm				EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	UNCOATED	Ti-NAMITE-C (TiCN)
3,0	7,0	38,0	3,0	45277	49829
3,5	7,0	57,0	6,0	45279	49830
4,0	8,0	57,0	6,0	45281	49831
4,5	8,0	57,0	6,0	45283	49832
5,0	10,0	57,0	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

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	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

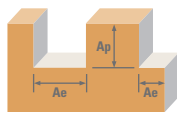
NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

2 Flute: High Shear End Mills

4 Flute: High Shear End Mills

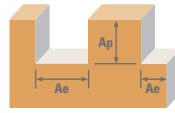


Series 52M, 54M Metric		Hardness	Flutes			Vc (m/min)	Diameter (D ₁) (mm)							
				3	6		10	12	20	25				
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	≤ 150 Bhn or ≤ 7 HRc		Profile			415	RPM	43947	21973	13184	10987	6592	5274	
							Fz	0.0166	0.043	0.091	0.110	0.147	0.160	
			2	≤ 0.3	≤ 1.5	(332-497)	Feed (mm/min)	1459	1890	2399	2417	1938	1688	
		4	≤ 0.3	≤ 1.5			2918	3779	4799	4834	3876	3375		
			Slot			332	RPM	35222	17611	10567	8806	5283	4227	
							Fz	0.0151	0.041	0.085	0.101	0.133	0.148	
	2		1	≤ 1	(266-399)	Feed (mm/min)	1064	1444	1796	1779	1405	1251		
		4	1	≤ 0.25			2127	2888	3593	3557	2811	2502		
	ALUMINUM DIE CAST ALLOYS (HIGH SILICON) A-390, A-392, B-390	≤ 125 Bhn or ≤ 77 HRb		Profile			155	RPM	16480	8240	4944	4120	2472	1978
								Fz	0.0166	0.043	0.091	0.110	0.147	0.160
				2	≤ 0.3	≤ 1.5	(124-187)	Feed (mm/min)	547	709	900	906	727	633
			4	≤ 0.3	≤ 1.5			1094	1417	1800	1813	1454	1266	
			Slot			125	RPM	13249	6624	3975	3312	1987	1590	
							Fz	0.0151	0.041	0.085	0.101	0.133	0.148	
		2	1	≤ 1	(100-150)	Feed (mm/min)	400	543	676	669	529	471		
		4	1	≤ 0.25			800	1086	1351	1338	1057	941		
COPPER ALLOYS Aluminum Bronze, Muntz Brass, Naval, Brass, Red Brass		≤ 140 Bhn or ≤ 3 HRc		Profile			180	RPM	19065	9533	5720	4766	2860	2288
								Fz	0.0094	0.024	0.053	0.062	0.083	0.093
				2	≤ 0.3	≤ 1.5	(144-216)	Feed (mm/min)	358	458	606	591	475	426
			4	≤ 0.3	≤ 1.5			717	915	1213	1182	949	851	
			Slot			145	RPM	15349	7675	4605	3837	2302	1842	
							Fz	0.0086	0.024	0.048	0.058	0.077	0.085	
		2	1	≤ 1	(116-174)	Feed (mm/min)	264	368	442	445	355	313		
		4	1	≤ 0.25			528	737	884	890	709	626		
	COPPER ALLOYS Beryllium Copper, C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc		Profile			72	RPM	7594	3797	2278	1898	1139	911
								Fz	0.0094	0.024	0.053	0.062	0.083	0.093
				2	≤ 0.3	≤ 1.5	(57-86)	Feed (mm/min)	143	182	241	235	189	169
			4	≤ 0.3	≤ 1.5			286	365	483	471	378	339	
			Slot			58	RPM	6140	3070	1842	1535	921	737	
							Fz	0.0086	0.024	0.048	0.058	0.077	0.085	
		2	1	≤ 1	(46-69)	Feed (mm/min)	106	147	177	178	142	125		
		4	1	≤ 0.25			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			Vc (m/min)	Diameter (D ₁) (mm)							
			Ae x D ₁	Ap x D ₁		3	6	10	12	20	25		
N	PLASTICS ABS, Polycarbonate, PVC, Polypropylene				488	RPM	51702	25851	15511	12926	7755	6204	
					(390-585)	Fz	0.0264	0.072	0.149	0.178	0.237	0.250	
			2	≤ 0.3		≤ 1.5	Feed (mm/min)	2730	3723	4622	4601	3676	3102
			4	≤ 0.3		≤ 1.5		5460	7445	9244	9203	7352	6204
					390	RPM	41362	20681	12409	10340	6204	4963	
					(312-468)	Fz	0.0240	0.065	0.136	0.163	0.210	0.238	
			2	1		≤ 1	Feed (mm/min)	1985	2689	3375	3371	2606	2363
			4	1		≤ 0.25		3971	5377	6750	6742	5212	4725
	PLASTICS Fiberglass, Glass Filled				219	RPM	23266	11633	6980	5816	3490	2792	
					(176-263)	Fz	0.0197	0.053	0.109	0.132	0.173	0.190	
			2	≤ 0.3		≤ 1.5	Feed (mm/min)	917	1233	1522	1536	1208	1061
			4	≤ 0.3		≤ 1.5		1833	2466	3043	3071	2415	2122
					175	RPM	18580	9290	5574	4645	2787	2230	
					(140-210)	Fz	0.0180	0.048	0.101	0.120	0.160	0.175	
			2	1		≤ 1	Feed (mm/min)	669	892	1126	1115	892	780
			4	1		≤ 0.25		1338	1784	2252	2230	1784	1561

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	245
	135 (5xD)	2 Flute External Coolant Double Margin 5xD	254
	131N (3xD)	3 Flute External Coolant Triple Margin 3xD	264
	131N (5xD)	3 Flute External Coolant Triple Margin 5xD	268
	141K (5xD)	3 Flute Internal Coolant Triple Margin 5xD	274
Ice-Carb®	140 (5xD)	2 Flute Internal Coolant 5xD	280
	140 (8xD)	2 Flute Internal Coolant 8xD	288
CFRP 8 Facet	120	2 Flute External Coolant Double Margin CFRP	296

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	245
	135 (5xD)	2 filos, refrigerante externo, doble margen, 5xD	254
	131N (3xD)	3 filos, refrigerante externo, triple margen, 3xD	264
	131N (5xD)	3 filos, refrigerante externo, triple margen, 5xD	268
	141K (5xD)	3 filos, refrigerante interno, triple margen, 5xD	274
Ice-Carb®	140 (5xD)	2 filos, refrigerante interno, 5xD	280
	140 (8xD)	2 filos, refrigerante interno, 8xD	288
De 8 caras CFRP	120	2 filos, refrigerante externo, doble margen, CFRP	296

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	245
	135 (5xD)	2 dents refroidissement externe à double listel 5xD	254
	131N (3xD)	3 dents refroidissement externe à triple listel 3xD	264
	131N (5xD)	3 dents refroidissement externe à triple listel 5xD	268
	141K (5xD)	3 dents refroidissement interne à triple listel 5xD	274
Ice-Carb®	140 (5xD)	2 dents refroidissement interne 5xD	280
	140 (8xD)	2 dents refroidissement interne 8xD	288
CFRP à 8 facettes	120	2 dents refroidissement externe à double listel CFRP	296

Recommandations de vitesse et avance indiquées après chaque série

Bohren

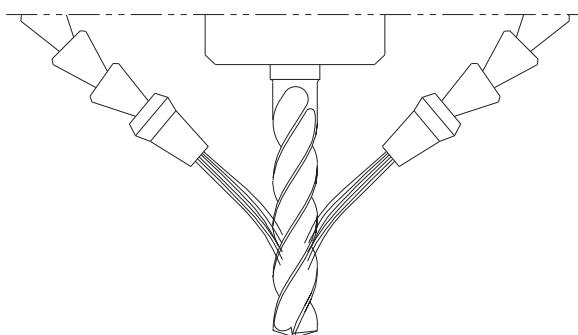
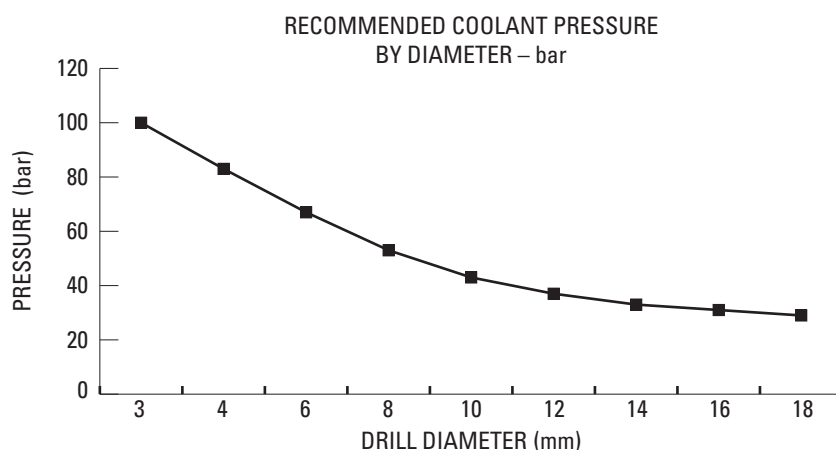
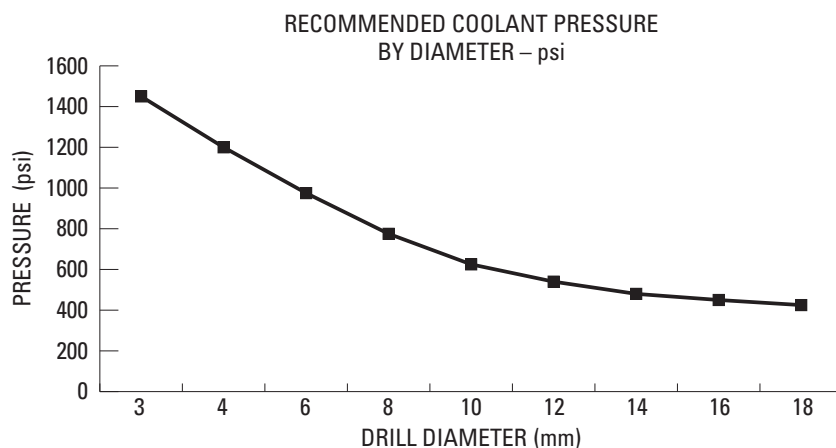
HOCHLEISTUNGS-BOHRER	SERIE	BESCHREIBUNG	SEITE
Hi-PerCarb	135 (3xD)	Doppelfasenbohrer 3xD mit 2 Schneidekanten und Außenkühlung	245
	135 (5xD)	Doppelfasenbohrer 5xD mit 2 Schneidekanten und Außenkühlung	254
	131N (3xD)	Dreifasenbohrer 3xD mit 3 Schneidekanten und Außenkühlung	264
	131N (5xD)	Dreifasenbohrer 5xD mit 3 Schneidekanten und Außenkühlung	268
	141K (5xD)	Dreifasenbohrer 5xD mit 3 Schneidekanten und Innenkühlung	274
Ice-Carb®	140 (5xD)	Bohrer 5xD mit 2 Schneidekanten und Innenkühlung	280
	140 (8xD)	Bohrer 8xD mit 2 Schneidekanten und Innenkühlung	288
CFRP 8 Facet	120	Doppelfasenbohrer CFRP mit 2 Schneidekanten und Außenkühlung	296

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

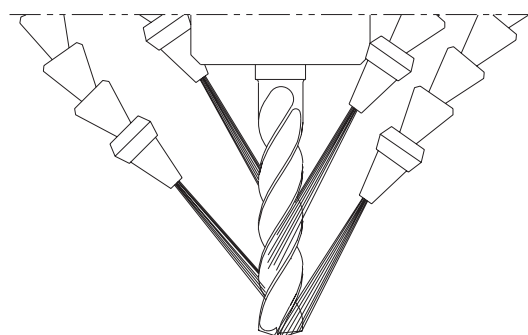
Drilling Operations

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



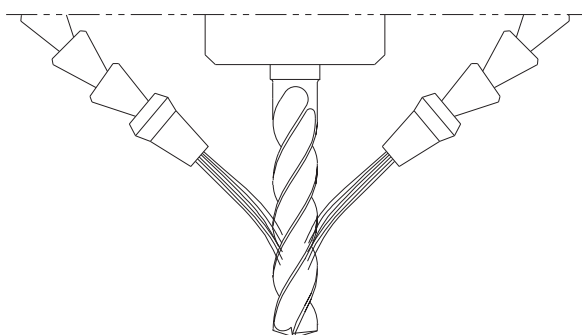
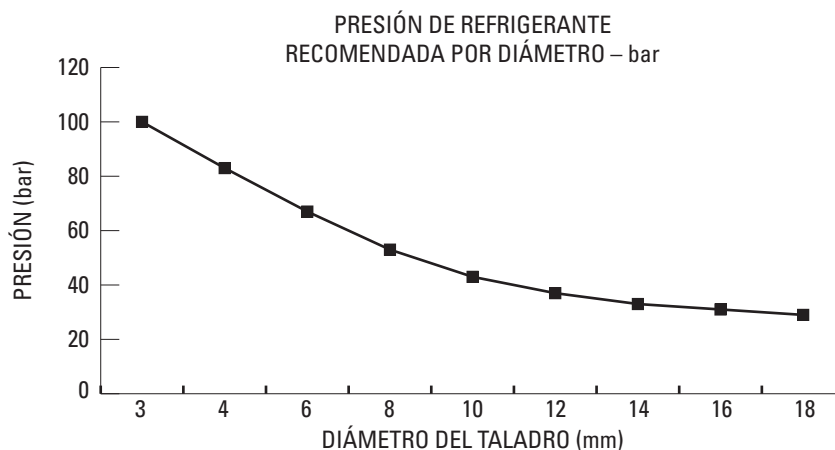
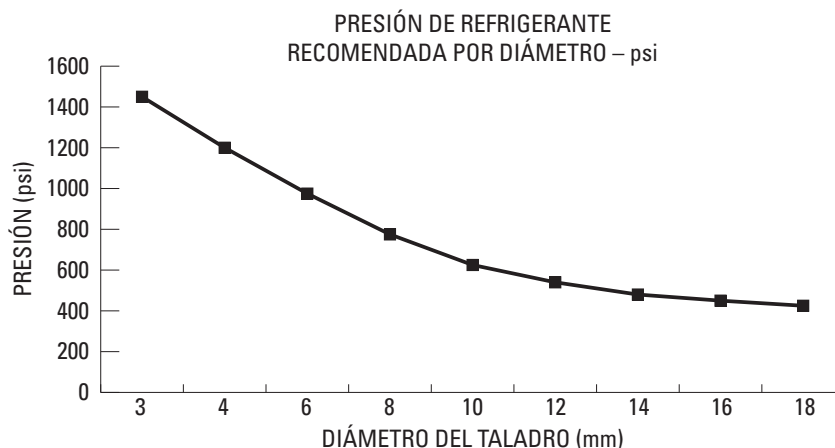
SMALL TIP – HIGH VELOCITY
COMPLETE COVERAGE

- 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.

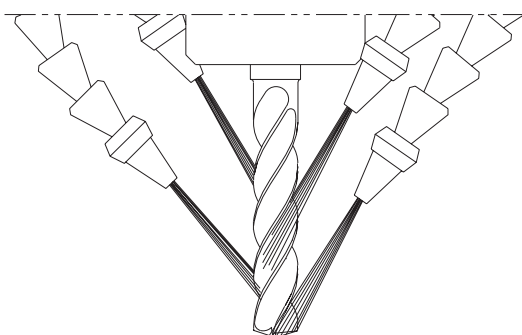
Operaciones de taladrado

Refrigerantes recomendados

- El líquido refrigerante actúa movilizand 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



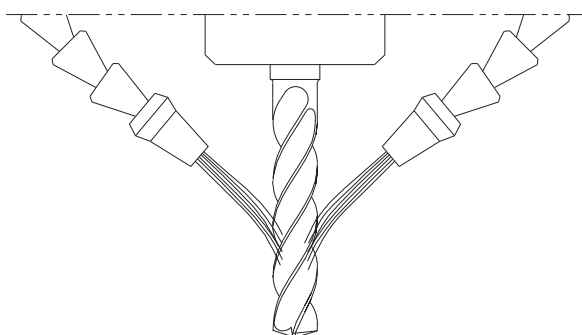
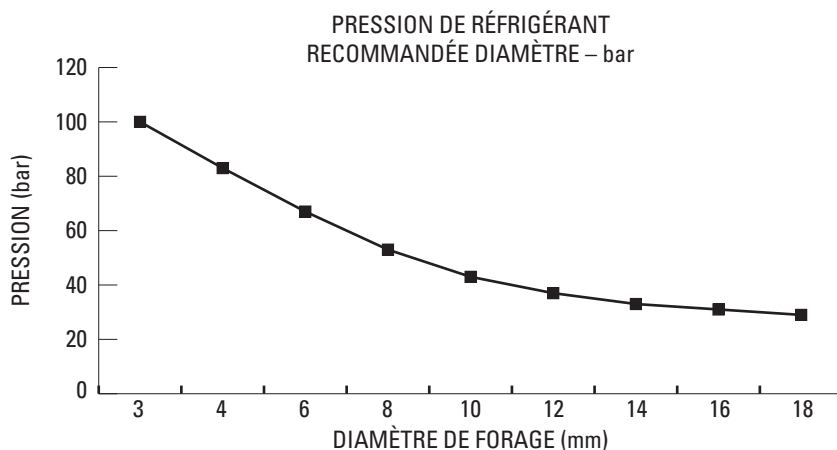
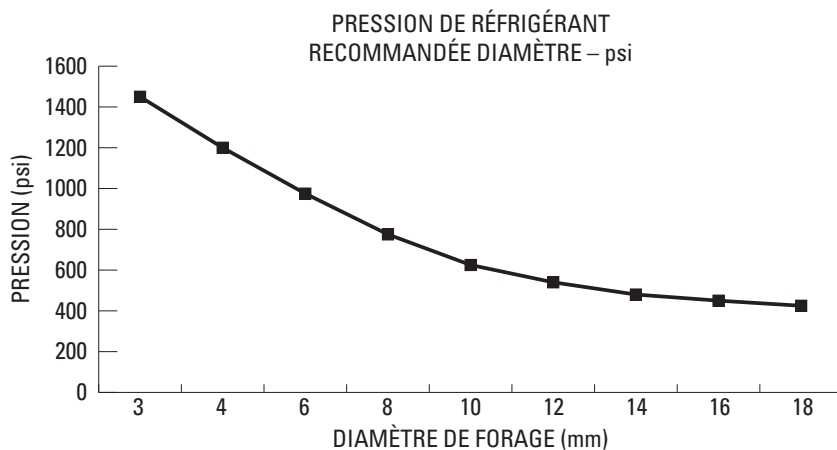
PUNTA PEQUEÑA – ALTA VELOCIDAD
COMPLETO ALCANCE

- 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.

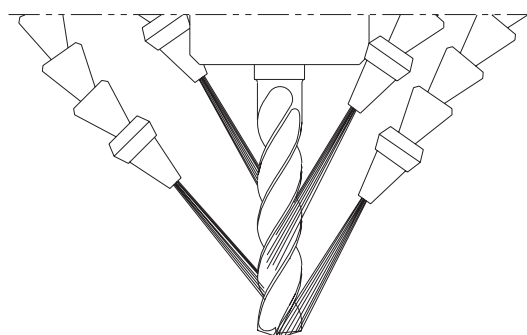
Opérations de forage

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

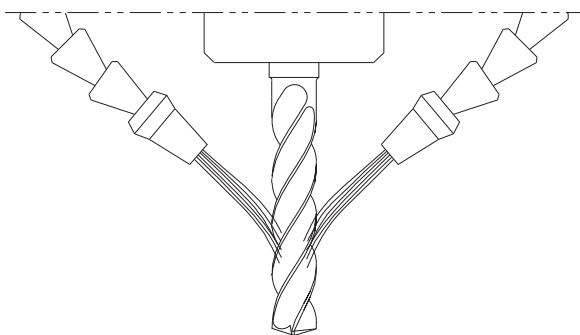
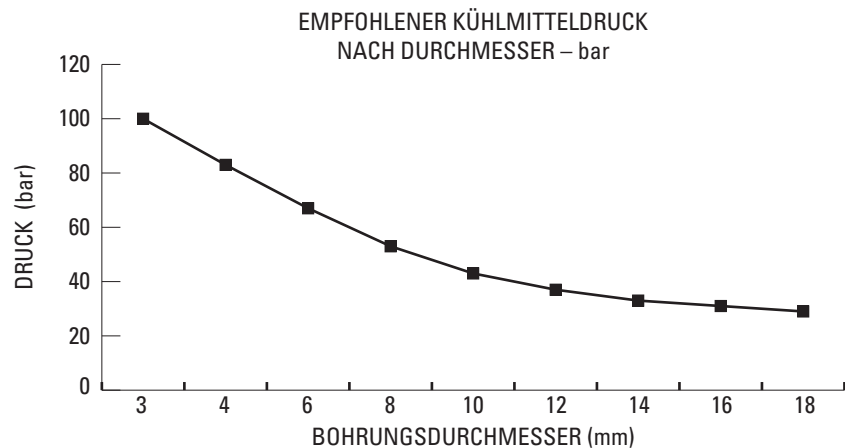
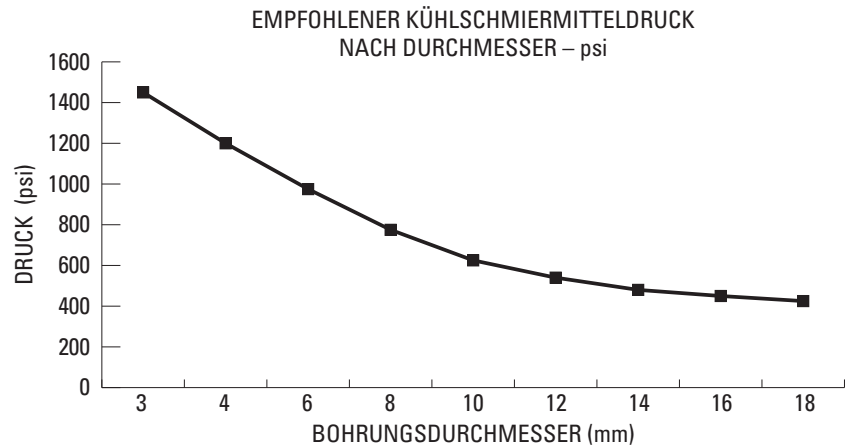


POINTE FINE – GRANDE VITESSE
COUVERTURE COMPLÈTE

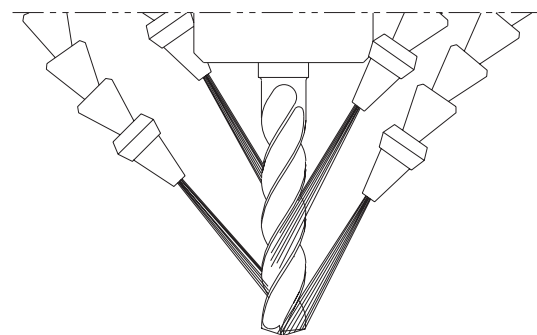
- La réduction de la taille de l'embout permet de maximiser les bienfaits du refroidissement du concept à double listel original de la perceuse Hi-PerCarb en augmentant la vitesse. Pour les meilleurs résultats, orientez les embouts dans l'axe de la goujure secondaire située entre les deux listels, de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

Bohrarbeiten Kühlmittlempfehlungen

- Kühlmittel dienen dazu, die Späne aus dem Schneidenbereich 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.



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



SCHMALE QUERSCHNEIDE – HOHE DREHZAHL
VOLLSTÄNDIGE BENETZUNG

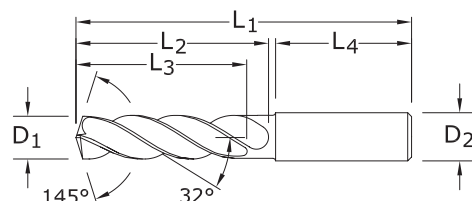
- Durch Verringern der Düsengröße können die vorteilhaften Eigenschaften der Doppelfase genutzt werden, um die Drehzahl des Hi-PerCarb-Bohrers zu steigern. Richten Sie die Düsen auf die Nebennut zwischen beiden Fasen sowie auf die Schneidekante aus, um beste Ergebnisse zu erzielen.



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

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

NON-FERROUS

HARDENED STEELS

For patent
information visit
www.ksptpatents.com

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.
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
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- Recommended for materials ≤ 56 HRC (≤ 577 Bhn)



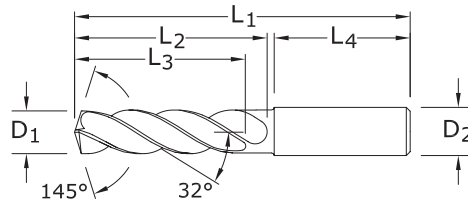
3xD



135 3xD

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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

TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.00114D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025D₂ = h₆

>18-30 DIAMETER

D₁ = +0,008/+0,029D₂ = h₆

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

NON-FERROUS

HARDENED STEELS

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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.
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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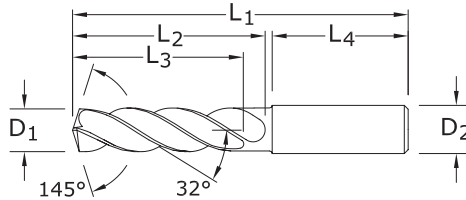
3xD



135 3xD

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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/+0.00047D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.0114D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025D₂ = h₆

>18-30 DIAMETER

D₁ = +0,008/+0,029D₂ = h₆

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

NON-FERROUS

HARDENED STEELS

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continued on next page

CUTTING DIAMETER	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AITIN)	CONTINUED
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.	
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	

FRACTIONAL Hi-PerCarb

Series 135 3D Fractional					Diameter (D ₁) (inch)						
	Hardness	Vc (sfm)									
			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	RPM	47062	11766	5883	3922	2941	2353	1681
			(308-462)	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	RPM	42784	10696	5348	3565	2674	2139	1528
			(280-420)	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	RPM	24448	6112	3056	2037	1528	1222	873
			(160-240)	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
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	300	RPM	36672	9168	4584	3056	2292	1834	1310
			(240-360)	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	RPM	22614	5654	2827	1885	1413	1131	808
			(148-222)	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	RPM	15891	3973	1986	1324	993	795	568
			(104-156)	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
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	130	RPM	15891	3973	1986	1324	993	795	568
			(104-156)	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	RPM	11002	2750	1375	917	688	550	393
			(72-108)	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	RPM	9168	2292	1146	764	573	458	327
			(60-90)	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
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	320	RPM	39117	9779	4890	3260	2445	1956	1397
			(256-384)	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	RPM	34838	8710	4355	2903	2177	1742	1244
			(228-342)	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	RPM	33616	8404	4202	2801	2101	1681	1201
			(220-330)	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	RPM	20781	5195	2598	1732	1299	1039	742
			(136-204)	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
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	90	RPM	11002	2750	1375	917	688	550	393
			(72-108)	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	RPM	7946	1986	993	662	497	397	284
			(52-78)	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

continued on next page

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		
S	SUPER ALLOYS (NICKEL , COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	55	RPM	6723	1681	840	560	420	336	240
		(44-66)	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	RPM	3667	917	458	306	229	183	131
		(24-36)	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	RPM	16502	4126	2063	1375	1031	825	589
		(108-162)	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	RPM	12224	3056	1528	1019	764	611	437
		(80-120)	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	RPM	6723	1681	840	560	420	336	240
		(44-66)	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	
		N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	700	RPM	85568	21392	10696	7131	5348
(560-840)	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			RPM	73344	18336	9168	6112	4584	3667	2619
(480-720)	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	
COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc		500	RPM	61120	15280	7640	5093	3820	3056	2183
	(400-600)		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	RPM	48896	12224	6112	4075	3056	2445	1746
	(320-480)		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 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)

Series 135 3D Metric				Diameter (D ₁) (inch)								
				Hardness	Vc (m/min)	1.5	3	6	8	10	12	16
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
	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	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
H	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	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
K	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	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
M	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	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	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	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	85

continued on next page

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		
COPPER ALLOYS Alum Bronze, C110, Muntz Brass		≤ 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		

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)



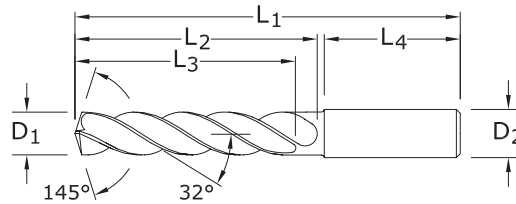
5xD



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 (AITIN)
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/+0.00047D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.0114D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025D₂ = h₆

>18-30 DIAMETER

D₁ = +0,008/+0,029D₂ = h₆

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

NON-FERROUS

HARDENED STEELS

For patent
information visit
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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	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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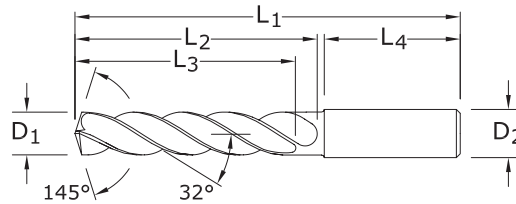
5xD



135 5xD

FRACTIONAL & METRIC SERIES

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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
5,9 mm	0.2323			6,0	82,0	44,0	35,0	36,0	64130
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/+0.00047D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.0114D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025D₂ = h₆

>18-30 DIAMETER

D₁ = +0,008/+0,029D₂ = h₆

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

NON-FERROUS

HARDENED STEELS

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continued on next page

135 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-A (AITiN)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
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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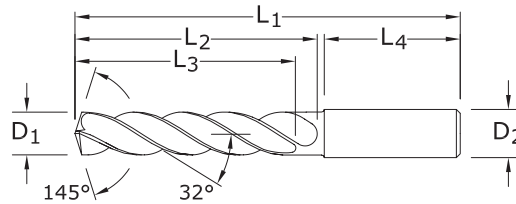
5xD



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 (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)

 $\leq .1181$ DIAMETER

$D_1 = +.00008/+0.00047$

$D_2 = h_6$

 $>.1181-.2362$ DIAMETER

$D_1 = +.00016/+0.00063$

$D_2 = h_6$

 $>.2362-.3937$ DIAMETER

$D_1 = +.00024/+0.00083$

$D_2 = h_6$

 $>.3937-.7087$ DIAMETER

$D_1 = +.00028/+0.00098$

$D_2 = h_6$

 $>.7087-1.1811$ DIAMETER

$D_1 = +.00031/+0.0114$

$D_2 = h_6$

TOLERANCES (mm)

 ≤ 3 DIAMETER

$D_1 = +0,002/+0,012$

$D_2 = h_6$

 $>3-6$ DIAMETER

$D_1 = +0,004/+0,016$

$D_2 = h_6$

 $>6-10$ DIAMETER

$D_1 = +0,006/+0,021$

$D_2 = h_6$

 $>10-18$ DIAMETER

$D_1 = +0,007/+0,025$

$D_2 = h_6$

 $>18-30$ DIAMETER

$D_1 = +0,008/+0,029$

$D_2 = h_6$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

NON-FERROUS

HARDENED STEELS

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continued on next page

135 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-A (AITIN)	CONTINUED
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.	
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	

FRACTIONAL Hi-PerCarb

Series 135 5D Fractional				Diameter (D ₁) (inch)							
				Hardness	Vc (sfm)	1/32	1/8	1/4	3/8	1/2	5/8
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	345	RPM	42173	10543	5272	3514	2636	2109	1506
			(276-414)	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	RPM	37894	9474	4737	3158	2368	1895	1353
			(248-372)	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	RPM	22003	5501	2750	1834	1375	1100	786
			(144-216)	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
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	270	RPM	33005	8251	4126	2750	2063	1650	1179
			(216-324)	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	RPM	20170	5042	2521	1681	1261	1008	720
			(132-198)	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	RPM	14058	3514	1757	1171	879	703	502
			(92-138)	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
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	120	RPM	14669	3667	1834	1222	917	733	524
			(96-144)	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	RPM	9779	2445	1222	815	611	489	349
			(64-96)	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	RPM	8557	2139	1070	713	535	428	306
			(56-84)	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
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	300	RPM	36672	9168	4584	3056	2292	1834	1310
			(240-360)	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	RPM	32394	8098	4049	2699	2025	1620	1157
			(212-318)	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	RPM	30560	7640	3820	2547	1910	1528	1091
			(200-300)	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	RPM	18336	4584	2292	1528	1146	917	655
			(120-180)	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
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	80	RPM	9779	2445	1222	815	611	489	349
			(64-96)	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	RPM	6723	1681	840	560	420	336	240
			(44-66)	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

continued on next page

Series 135 5D Fractional				Diameter (D ₁) (inch)									
				Hardness	Vc (sfm)	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	RPM	4890	1222	611	407	306	244	175		
			(32-48)	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	RPM	2445	611	306	204	153	122	87		
			(16-24)	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	RPM	12835	3209	1604	1070	802	642	458		
			(84-126)	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	RPM	9779	2445	1222	815	611	489	349		
			(64-96)	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	RPM	5134	1284	642	428	321	257	183		
			(34-50)	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	RPM	77622	19406	9703	6469	4851	3881	2772
					(508-762)	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			RPM	66010	16502	8251	5501	4126	3300	2357		
	(432-648)			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		
COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc		450	RPM	55008	13752	6876	4584	3438	2750	1965		
			(360-540)	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	RPM	44006	11002	5501	3667	2750	2200	1572		
			(288-432)	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		

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 135M 5D Metric				Diameter (D ₁) (mm)									
				Hardness	Vc (m/min)	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	
		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			
H	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	
K	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	
	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	

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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	
				Fr	0.007	0.014	0.028	0.037	0.046	0.056	0.074	0.093	
			(5-7)	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
			(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	
				Fr	0.019	0.039	0.077	0.103	0.129	0.155	0.206	0.258	
			(20-29)	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
			Fr		0.015	0.029	0.059	0.079	0.098	0.118	0.157	0.196	
			(10-15)	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
			(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
					Fr	0.059	0.118	0.237	0.316	0.394	0.473	0.631	0.789
				(132-198)	Feed (mm/min)	2065	2065	2065	2065	2065	2065	2065	2065
Copper Alloys Alum Bronze, C110, Muntz Brass		≤ 140 Bhn or ≤ 3 HRc	137	RPM	29082	14541	7271	5453	4362	3635	2726	2181	
				Fr	0.027	0.053	0.107	0.142	0.178	0.213	0.284	0.355	
			(110-165)	Feed (mm/min)	775	775	775	775	775	775	775	775	
		≤ 200 Bhn or ≤ 23 HRc	110	RPM	23266	11633	5816	4362	3490	2908	2181	1745	
				Fr	0.027	0.054	0.108	0.144	0.181	0.217	0.289	0.361	
			(88-132)	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)



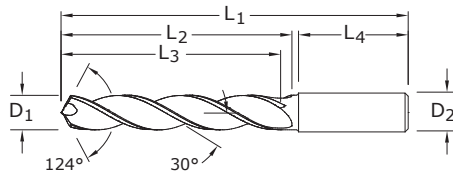
3xD



131N 3xD

FRACTIONAL & METRIC SERIES

- Triple margin design improves hole stability and size control while providing superior finish, roundness and 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 DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	UNCOATED	Ti-NAMITE-B (TiB ₂)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.	EDP NO.
3,0 mm	0.1181			6,0	62,0	20,0	14,0	36,0	64600	67600
3,1 mm	0.1220			6,0	62,0	20,0	14,0	36,0	64601	67601
1/8	0.1250	3.18		6,0	62,0	20,0	14,0	36,0	54600	54700
3,2 mm	0.1260		M3,5 X 0,35	6,0	62,0	20,0	14,0	36,0	64602	67602
3,3 mm	0.1299		M4 X 0,7	6,0	62,0	20,0	14,0	36,0	64603	67603
3,4 mm	0.1339			6,0	62,0	20,0	14,0	36,0	64604	67604
#29	0.1360	3.45	8-32,8-36	6,0	62,0	20,0	14,0	36,0	54601	54701
3,5 mm	0.1378		M4 X 0,5	6,0	62,0	20,0	14,0	36,0	64605	67605
9/64	0.1406	3.57		6,0	62,0	20,0	14,0	36,0	54602	54702
3,6 mm	0.1417		M4 X 0,35	6,0	62,0	20,0	14,0	36,0	64606	67606
3,7 mm	0.1457		M4,5 X 0,75	6,0	62,0	20,0	14,0	36,0	64607	67607
3,8 mm	0.1496		10-24	6,0	66,0	24,0	17,0	36,0	64608	67608
3,9 mm	0.1535			6,0	66,0	24,0	17,0	36,0	64609	67609
5/32	0.1562	3.97		6,0	66,0	24,0	17,0	36,0	54603	54703
4,0 mm	0.1575		M4,5 X 0,5	6,0	66,0	24,0	17,0	36,0	64610	67610
#21	0.1590	4.04	10-32	6,0	66,0	24,0	17,0	36,0	54604	54704
4,1 mm	0.1614			6,0	66,0	24,0	17,0	36,0	64611	67611
4,2 mm	0.1654		M5 / M5 x 0,75	6,0	66,0	24,0	17,0	36,0	64612	67612
4,3 mm	0.1693			6,0	66,0	24,0	17,0	36,0	64613	67613
11/64	0.1719	4.37		6,0	66,0	24,0	17,0	36,0	54605	54705
4,4 mm	0.1732		12-24	6,0	66,0	24,0	17,0	36,0	64614	67614
4,5 mm	0.1772		M5 X 0,5	6,0	66,0	24,0	17,0	36,0	64615	67615
4,6 mm	0.1811		12-28	6,0	66,0	24,0	17,0	36,0	64616	67616
4,7 mm	0.1850		12-32	6,0	66,0	24,0	17,0	36,0	64617	67617
3/16	0.1875	4.76		6,0	66,0	28,0	20,0	36,0	54606	54706
4,8 mm	0.1890		7/32-32	6,0	66,0	28,0	20,0	36,0	64618	67618
4,9 mm	0.1929			6,0	66,0	28,0	20,0	36,0	64619	67619
5,0 mm	0.1969		M6 X 1	6,0	66,0	28,0	20,0	36,0	64620	67620
5,1 mm	0.2008		1/4-20	6,0	66,0	28,0	20,0	36,0	64621	67621
13/64	0.2031	5.16		6,0	66,0	28,0	20,0	36,0	54607	54707
5,2 mm	0.2047		M6 X 0,75	6,0	66,0	28,0	20,0	36,0	64622	67622
5,3 mm	0.2087			6,0	66,0	28,0	20,0	36,0	64623	67623
5,4 mm	0.2126			6,0	66,0	28,0	20,0	36,0	64624	67624
5,5 mm	0.2165		M6 X 0,5	6,0	66,0	28,0	20,0	36,0	64625	67625
7/32	0.2188	5.56	1/4-32	6,0	66,0	28,0	20,0	36,0	54608	54708
5,6 mm	0.2205			6,0	66,0	28,0	20,0	36,0	64626	67626

continued on next page

TOLERANCES (inch)

 $\leq .1181$ DIAMETER $D_1 = +.00008/+0.00047$ $D_2 = h_6$ $>.1181-.2362$ DIAMETER $D_1 = +.00016/+0.00063$ $D_2 = h_6$ $>.2362-.3937$ DIAMETER $D_1 = +.00024/+0.00083$ $D_2 = h_6$ $>.3937-.7087$ DIAMETER $D_1 = +.00028/+0.00098$ $D_2 = h_6$ $>.7087-1.1811$ DIAMETER $D_1 = +.00031/+0.0114$ $D_2 = h_6$

TOLERANCES (mm)

 ≤ 3 DIAMETER $D_1 = +0,002/+0,012$ $D_2 = h_6$ $>3-6$ DIAMETER $D_1 = +0,004/+0,016$ $D_2 = h_6$ $>6-10$ DIAMETER $D_1 = +0,006/+0,021$ $D_2 = h_6$ $>10-18$ DIAMETER $D_1 = +0,007/+0,025$ $D_2 = h_6$

NON-FERROUS

PLASTICS/COMPOSITES

For patent
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131N 3xD

FRACTIONAL & METRIC SERIES

CUTTING DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	UNCOATED	Ti-NAMITE-B (TiB ₂)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.	EDP NO.
5,7 mm	0.2244			6,0	66,0	28,0	20,0	36,0	64627	67627
5,8 mm	0.2283			6,0	66,0	28,0	20,0	36,0	64628	67628
5,9 mm	0.2323			6,0	66,0	28,0	20,0	36,0	64629	67629
15/64	0.2344	5.95		6,0	66,0	28,0	20,0	36,0	54609	54709
6,0 mm	0.2362		M7 X 1	6,0	66,0	28,0	20,0	36,0	64630	67630
6,1 mm	0.2402			8,0	79,0	34,0	24,0	36,0	64631	67631
6,2 mm	0.2441		M7 X 0,75	8,0	79,0	34,0	24,0	36,0	64632	67632
6,3 mm	0.2480			8,0	79,0	34,0	24,0	36,0	64633	67633
1/4	0.2500	6.35		8,0	79,0	34,0	24,0	36,0	54610	54710
6,4 mm	0.2520			8,0	79,0	34,0	24,0	36,0	64634	67634
6,5 mm	0.2559			8,0	79,0	34,0	24,0	36,0	64635	67635
F	0.2570	6.53	5/16-18	8,0	79,0	34,0	24,0	36,0	54611	54711
6,6 mm	0.2598			8,0	79,0	34,0	24,0	36,0	64636	67636
6,7 mm	0.2638			8,0	79,0	34,0	24,0	36,0	64637	67637
17/64	0.2656	6.75	5/16-20	8,0	79,0	34,0	24,0	36,0	54612	54712
6,8 mm	0.2677		M8 X 1,25	8,0	79,0	34,0	24,0	36,0	64638	67638
6,9 mm	0.2717		5/16-24	8,0	79,0	34,0	24,0	36,0	64639	67639
7,0 mm	0.2756		M8 X 1	8,0	79,0	34,0	24,0	36,0	64640	67640
7,1 mm	0.2795			8,0	79,0	41,0	29,0	36,0	64641	67641
9/32	0.2812	7.14	5/16-32	8,0	79,0	41,0	29,0	36,0	54613	54713
7,2 mm	0.2835		M8 X 0,75	8,0	79,0	41,0	29,0	36,0	64642	67642
7,3 mm	0.2874			8,0	79,0	41,0	29,0	36,0	64643	67643
7,4 mm	0.2913			8,0	79,0	41,0	29,0	36,0	64644	67644
7,5 mm	0.2953		M8 X 0,5	8,0	79,0	41,0	29,0	36,0	64645	67645
19/64	0.2969	7.54		8,0	79,0	41,0	29,0	36,0	54614	54714
7,6 mm	0.2992			8,0	79,0	41,0	29,0	36,0	64646	67646
7,7 mm	0.3031			8,0	79,0	41,0	29,0	36,0	64647	67647
7,8 mm	0.3071		M9 X 1,25	8,0	79,0	41,0	29,0	36,0	64648	67648
7,9 mm	0.3110			8,0	79,0	41,0	29,0	36,0	64649	67649
5/16	0.3125	7.94	3/8-16	8,0	79,0	41,0	29,0	36,0	54615	54715
8,0 mm	0.3150		M9 X 1	8,0	79,0	41,0	29,0	36,0	64650	67650
8,1 mm	0.3189			10,0	89,0	47,0	35,0	40,0	64651	67651
8,2 mm	0.3228			10,0	89,0	47,0	35,0	40,0	64652	67652
8,3 mm	0.3268			10,0	89,0	47,0	35,0	40,0	64653	67653
21/64	0.3281	8.33	3/8-20	10,0	89,0	47,0	35,0	40,0	54616	54716
8,4 mm	0.3307			10,0	89,0	47,0	35,0	40,0	64654	67654
Q	0.3320	8.43	3/8-24	10,0	89,0	47,0	35,0	40,0	54617	54717
8,5 mm	0.3346		M10 X 1,5	10,0	89,0	47,0	35,0	40,0	64655	67655
8,6 mm	0.3386			10,0	89,0	47,0	35,0	40,0	64656	67656
8,7 mm	0.3425			10,0	89,0	47,0	35,0	40,0	64657	67657
11/32	0.3438	8.73	3/8-32	10,0	89,0	47,0	35,0	40,0	54618	54718
8,8 mm	0.3465		M10 X 1,25	10,0	89,0	47,0	35,0	40,0	64658	67658
8,9 mm	0.3504			10,0	89,0	47,0	35,0	40,0	64659	67659
9,0 mm	0.3543		M10 X 1	10,0	89,0	47,0	35,0	40,0	64660	67660
9,1 mm	0.3583			10,0	89,0	47,0	35,0	40,0	64661	67661
23/64	0.3594	9.13		10,0	89,0	47,0	35,0	40,0	54619	54719

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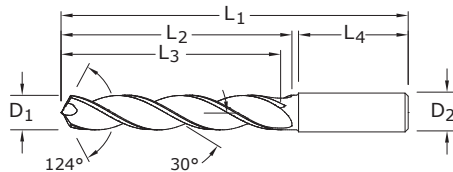
3xD



131N 3xD

FRACTIONAL & METRIC SERIES

- Triple margin design improves hole stability and size control while providing superior finish, roundness and 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 DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	UNCOATED	Ti-NAMITE-B (TiB ₂)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.	EDP NO.
9,2 mm	0.3622		M10 X 0,75	10,0	89,0	47,0	35,0	40,0	64662	67662
9,3 mm	0.3661			10,0	89,0	47,0	35,0	40,0	64663	67663
U	0.3680	9.35	7/16-14	10,0	89,0	47,0	35,0	40,0	54620	54720
9,4 mm	0.3701			10,0	89,0	47,0	35,0	40,0	64664	67664
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	89,0	47,0	35,0	40,0	64665	67665
3/8	0.3750	9.53		10,0	89,0	47,0	35,0	40,0	54621	54721
9,6 mm	0.3780			10,0	89,0	47,0	35,0	40,0	64666	67666
9,7 mm	0.3819			10,0	89,0	47,0	35,0	40,0	64667	67667
9,8 mm	0.3858			10,0	89,0	47,0	35,0	40,0	64668	67668
9,9 mm	0.3898			10,0	89,0	47,0	35,0	40,0	64669	67669
25/64	0.3906	9.92	7/16-20	10,0	89,0	47,0	35,0	40,0	54622	54722
10,0 mm	0.3937			10,0	89,0	47,0	35,0	40,0	64670	67670
10,1 mm	0.3976			12,0	102,0	55,0	40,0	45,0	64671	67671
10,2 mm	0.4016		M12 X 1,75	12,0	102,0	55,0	40,0	45,0	64672	67672
10,3 mm	0.4055			12,0	102,0	55,0	40,0	45,0	64673	67673
13/32	0.4062	10.32		12,0	102,0	55,0	40,0	45,0	54623	54723
10,4 mm	0.4094			12,0	102,0	55,0	40,0	45,0	64674	67674
10,5 mm	0.4134		M12 X 1,5	12,0	102,0	55,0	40,0	45,0	64675	67675
10,6 mm	0.4173			12,0	102,0	55,0	40,0	45,0	64676	67676
10,7 mm	0.4213			12,0	102,0	55,0	40,0	45,0	64677	67677
27/64	0.4219	10.72	1/2-13	12,0	102,0	55,0	40,0	45,0	54624	54724
10,8 mm	0.4252		M12 X 1,25	12,0	102,0	55,0	40,0	45,0	64678	67678
10,9 mm	0.4291			12,0	102,0	55,0	40,0	45,0	64679	67679
11,0 mm	0.4331		M12 X 1	12,0	102,0	55,0	40,0	45,0	64680	67680
11,1 mm	0.4370			12,0	102,0	55,0	40,0	45,0	64681	67681
7/16	0.4375	11.11	1/4-18NPT	12,0	102,0	55,0	40,0	45,0	54625	54725
11,2 mm	0.4409			12,0	102,0	55,0	40,0	45,0	64682	67682
11,3 mm	0.4449			12,0	102,0	55,0	40,0	45,0	64683	67683
11,4 mm	0.4488			12,0	102,0	55,0	40,0	45,0	64684	67684
11,5 mm	0.4528		M12 X 0,5	12,0	102,0	55,0	40,0	45,0	64685	67685
11,6 mm	0.4567			12,0	102,0	55,0	40,0	45,0	64686	67686
11,7 mm	0.4606			12,0	102,0	55,0	40,0	45,0	64687	67687
11,8 mm	0.4646			12,0	102,0	55,0	40,0	45,0	64688	67688
11,9 mm	0.4685			12,0	102,0	55,0	40,0	45,0	64689	67689
15/32	0.4688	11.91	1/2-28	12,0	102,0	55,0	40,0	45,0	54626	54726
12,0 mm	0.4724		M14 X 2	12,0	102,0	55,0	40,0	45,0	64690	67690

TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.0114D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025D₂ = h₆

NON-FERROUS

PLASTICS/COMPOSITES

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continued on next page

131N 3xD

FRACTIONAL & METRIC SERIES

CUTTING DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	UNCOATED	Ti-NAMITE-B (TiB ₂)	CONTINUED
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.	EDP NO.	
31/64	0.4844	12.30	9/16-12	14,0	107,0	60,0	43,0	45,0	54627	54727	
12,5 mm	0.4921		M14 X 1,5	14,0	107,0	60,0	43,0	45,0	64691	67691	
1/2	0.5000	12.70		14,0	107,0	60,0	43,0	45,0	54628	54728	
12,8 mm	0.5039		M14 X 1,25	14,0	107,0	60,0	43,0	45,0	64692	67692	
13,0 mm	0.5118		M14 X 1	14,0	107,0	60,0	43,0	45,0	64693	67693	
33/64	0.5156	13.10	9/16-18	14,0	107,0	60,0	43,0	45,0	54629	54729	
13,5 mm	0.5315		5/8-11	14,0	107,0	60,0	43,0	45,0	64694	67694	
13,8 mm	0.5433			14,0	107,0	60,0	43,0	45,0	64695	67695	
14,0 mm	0.5512		M16 X 2	14,0	107,0	60,0	43,0	45,0	64696	67696	
9/16	0.5625	14.29		16,0	115,0	65,0	45,0	48,0	54630	54730	
14,5 mm	0.5709		M16 X 1,5	16,0	115,0	65,0	45,0	48,0	64697	67697	
37/64	0.5781	14.68	5/8-18	16,0	115,0	65,0	45,0	48,0	54631	54731	
14,8 mm	0.5827			16,0	115,0	65,0	45,0	48,0	64698	67698	
15,0 mm	0.5906		M16 X 1	16,0	115,0	65,0	45,0	48,0	64699	67699	
15,5 mm	0.6102		M18 X 2,5	16,0	115,0	65,0	45,0	48,0	64700	67700	
15,8 mm	0.6220			16,0	115,0	65,0	45,0	48,0	64701	67701	
5/8	0.6250	15.88	11/16-16	16,0	115,0	65,0	45,0	48,0	54632	54732	
16,0 mm	0.6299			16,0	115,0	65,0	45,0	48,0	64702	67702	
21/32	0.6562	16.67	3/4-10	18,0	123,0	73,0	51,0	48,0	54633	54733	
11/16	0.6875	17.46	3/4-16	18,0	123,0	73,0	51,0	48,0	54634	54734	
3/4	0.7500	19.05	13/16-16	20,0	131,0	79,0	55,0	50,0	54635	54735	



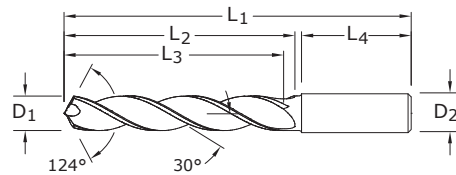
5xD



131N 5xD

FRACTIONAL & METRIC SERIES

- Triple margin design improves hole stability and size control while providing superior finish, roundness and 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 DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	UNCOATED	Ti-NAMITE-B (TiB ₂)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.	EDP NO.
3,0 mm	0.1181			6,0	66,0	28,0	23,0	36,0	65000	64800
3,1 mm	0.1220			6,0	66,0	28,0	23,0	36,0	65001	64801
1/8	0.1250	3.18		6,0	66,0	28,0	23,0	36,0	55000	54800
3,2 mm	0.1260		M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	65002	64802
3,3 mm	0.1299		M4 X 0,7	6,0	66,0	28,0	23,0	36,0	65003	64803
3,4 mm	0.1339			6,0	66,0	28,0	23,0	36,0	65004	64804
#29	0.1360	3.45	8-32,8-36	6,0	66,0	28,0	23,0	36,0	55001	54801
3,5 mm	0.1378		M4 X 0,5	6,0	66,0	28,0	23,0	36,0	65005	64805
9/64	0.1406	3.57		6,0	66,0	28,0	23,0	36,0	55002	54802
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	65006	64806
3,7 mm	0.1457		M4,5 X 0,75	6,0	66,0	28,0	23,0	36,0	65007	64807
3,8 mm	0.1496		10-24	6,0	74,0	36,0	29,0	36,0	65008	64808
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	65009	64809
5/32	0.1562	3.97		6,0	74,0	36,0	29,0	36,0	55003	54803
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	65010	64810
#21	0.1590	4.04	10-32	6,0	74,0	36,0	29,0	36,0	55004	54804
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	65011	64811
4,2 mm	0.1654		M5 / M5 x 0,75	6,0	74,0	36,0	29,0	36,0	65012	64812
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	65013	64813
11/64	0.1719	4.37		6,0	74,0	36,0	29,0	36,0	55005	54805
4,4 mm	0.1732		12-24	6,0	74,0	36,0	29,0	36,0	65014	64814
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	65015	64815
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	65016	64816
4,7 mm	0.1850		12-32	6,0	74,0	36,0	29,0	36,0	65017	64817
3/16	0.1875	4.76		6,0	82,0	44,0	35,0	36,0	55006	54806
4,8 mm	0.1890		7/32-32	6,0	82,0	44,0	35,0	36,0	65018	64818
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	65019	64819
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	65020	64820
5,1 mm	0.2008		1/4-20	6,0	82,0	44,0	35,0	36,0	65021	64821
13/64	0.2031	5.16		6,0	82,0	44,0	35,0	36,0	55007	54807
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	65022	64822
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	65023	64823
5,4 mm	0.2126			6,0	82,0	44,0	35,0	36,0	65024	64824
5,5 mm	0.2165		M6 X 0,5	6,0	82,0	44,0	35,0	36,0	65025	64825
7/32	0.2188	5.56	1/4-32	6,0	82,0	44,0	35,0	36,0	55008	54808
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	65026	64826

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TOLERANCES (inch)

 $\leq .1181$ DIAMETER $D_1 = +.00008/+0.00047$ $D_2 = h_6$ $>.1181-.2362$ DIAMETER $D_1 = +.00016/+0.00063$ $D_2 = h_6$ $>.2362-.3937$ DIAMETER $D_1 = +.00024/+0.00083$ $D_2 = h_6$ $>.3937-.7087$ DIAMETER $D_1 = +.00028/+0.00098$ $D_2 = h_6$ $>.7087-1.1811$ DIAMETER $D_1 = +.00031/+0.0114$ $D_2 = h_6$

TOLERANCES (mm)

 ≤ 3 DIAMETER $D_1 = +0,002/+0,012$ $D_2 = h_6$ $>3-6$ DIAMETER $D_1 = +0,004/+0,016$ $D_2 = h_6$ $>6-10$ DIAMETER $D_1 = +0,006/+0,021$ $D_2 = h_6$ $>10-18$ DIAMETER $D_1 = +0,007/+0,025$ $D_2 = h_6$

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131N 5xD

FRACTIONAL & METRIC SERIES

CUTTING DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	UNCOATED	Ti-NAMITE-B (TiB ₂)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.	EDP NO.
5,7 mm	0.2244			6,0	82,0	44,0	35,0	36,0	65027	64827
5,8 mm	0.2283			6,0	82,0	44,0	35,0	36,0	65028	64828
5,9 mm	0.2323			6,0	82,0	44,0	35,0	36,0	65029	64829
15/64	0.2344	5.95		6,0	82,0	44,0	35,0	36,0	55009	54809
6,0 mm	0.2362		M7 X 1	6,0	82,0	44,0	35,0	36,0	65030	64830
6,1 mm	0.2402			8,0	91,0	53,0	43,0	36,0	65031	64831
6,2 mm	0.2441		M7 X 0,75	8,0	91,0	53,0	43,0	36,0	65032	64832
6,3 mm	0.2480			8,0	91,0	53,0	43,0	36,0	65033	64833
1/4	0.2500	6.35		8,0	91,0	53,0	43,0	36,0	55010	54810
6,4 mm	0.2520			8,0	91,0	53,0	43,0	36,0	65034	64834
6,5 mm	0.2559			8,0	91,0	53,0	43,0	36,0	65035	64835
F	0.2570	6.53	5/16-18	8,0	91,0	53,0	43,0	36,0	55011	54811
6,6 mm	0.2598			8,0	91,0	53,0	43,0	36,0	65036	64836
6,7 mm	0.2638			8,0	91,0	53,0	43,0	36,0	65037	64837
17/64	0.2656	6.75	5/16-20	8,0	91,0	53,0	43,0	36,0	55012	54812
6,8 mm	0.2677		M8 X 1,25	8,0	91,0	53,0	43,0	36,0	65038	64838
6,9 mm	0.2717		5/16-24	8,0	91,0	53,0	43,0	36,0	65039	64839
7,0 mm	0.2756		M8 X 1	8,0	91,0	53,0	43,0	36,0	65040	64840
7,1 mm	0.2795			8,0	91,0	53,0	43,0	36,0	65041	64841
9/32	0.2812	7.14	5/16-32	8,0	91,0	53,0	43,0	36,0	55013	54813
7,2 mm	0.2835		M8 X 0,75	8,0	91,0	53,0	43,0	36,0	65042	64842
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0	65043	64843
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0	65044	64844
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0	65045	64845
19/64	0.2969	7.54		8,0	91,0	53,0	43,0	36,0	55014	54814
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0	65046	64846
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0	65047	64847
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0	65048	64848
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0	65049	64849
5/16	0.3125	7.94	3/8-16	8,0	91,0	53,0	43,0	36,0	55015	54815
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0	65050	64850
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0	65051	64851
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0	65052	64852
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0	65053	64853
21/64	0.3281	8.33	3/8-20	10,0	103,0	61,0	49,0	40,0	55016	54816
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0	65054	64854
Q	0.3320	8.43	3/8-24	10,0	103,0	61,0	49,0	40,0	55017	54817
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0	65055	64855
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0	65056	64856
8,7 mm	0.3425			10,0	103,0	61,0	49,0	40,0	65057	64857
11/32	0.3438	8.73	3/8-32	10,0	103,0	61,0	49,0	40,0	55018	54818
8,8 mm	0.3465		M10 X 1,25	10,0	103,0	61,0	49,0	40,0	65058	64858
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0	65059	64859
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0	65060	64860
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0	65061	64861
23/64	0.3594	9.13		10,0	103,0	61,0	49,0	40,0	55019	54819

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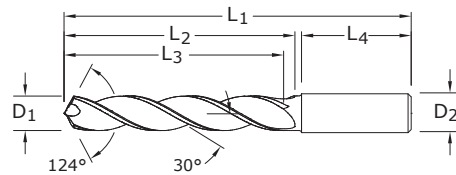
5xD



131N 5xD

FRACTIONAL & METRIC SERIES

- Triple margin design improves hole stability and size control while providing superior finish, roundness and 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 DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	UNCOATED	Ti-NAMITE-B (TiB ₂)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.	EDP NO.
9,2 mm	0.3622		M10 X 0,75	10,0	103,0	61,0	49,0	40,0	65062	64862
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0	65063	64863
U	0.3680	9.35	7/16-14	10,0	103,0	61,0	49,0	40,0	55020	54820
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0	65064	64864
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	103,0	61,0	49,0	40,0	65065	64865
3/8	0.3750	9.53		10,0	103,0	61,0	49,0	40,0	55021	54821
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0	65066	64866
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0	65067	64867
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0	65068	64868
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0	65069	64869
25/64	0.3906	9.92	7/16-20	10,0	103,0	61,0	49,0	40,0	55022	54822
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	65070	64870
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	65071	64871
10,2 mm	0.4016		M12 X 1,75	12,0	118,0	71,0	56,0	45,0	65072	64872
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	65073	64873
13/32	0.4062	10.32		12,0	118,0	71,0	56,0	45,0	55023	54823
10,4 mm	0.4094			12,0	118,0	71,0	56,0	45,0	65074	64874
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	65075	64875
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	65076	64876
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	65077	64877
27/64	0.4219	10.72	1/2-13	12,0	118,0	71,0	56,0	45,0	55024	54824
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	65078	64878
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	65079	64879
11,0 mm	0.4331		M12 X 1	12,0	118,0	71,0	56,0	45,0	65080	64880
11,1 mm	0.4370			12,0	118,0	71,0	56,0	45,0	65081	64881
7/16	0.4375	11.11	1/4-18NPT	12,0	118,0	71,0	56,0	45,0	55025	54825
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	65082	64882
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	65083	64883
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	65084	64884
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	65085	64885
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	65086	64886
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	65087	64887
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	65088	64888
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	65089	64889

TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.0114D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025D₂ = h₆

NON-FERROUS

PLASTICS/COMPOSITES

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continued on next page

131N 5xD

FRACTIONAL & METRIC SERIES

CUTTING DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	UNCOATED	Ti-NAMITE-B (TiB ₂)	CONTINUED
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.	EDP NO.	
15/32	0.4688	11.91	1/2-28	12,0	118,0	71,0	56,0	45,0	55026	54826	
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	65090	64890	
31/64	0.4844	12.30	9/16-12	14,0	124,0	77,0	60,0	45,0	55027	54827	
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	65091	64891	
1/2	0.5000	12.70		14,0	124,0	77,0	60,0	45,0	55028	54828	
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	65092	64892	
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	65093	64893	
33/64	0.5156	13.10	9/16-18	14,0	124,0	77,0	60,0	45,0	55029	54829	
13,5 mm	0.5315		5/8-11	14,0	124,0	77,0	60,0	45,0	65094	64894	
13,8 mm	0.5433			14,0	124,0	77,0	60,0	45,0	65095	64895	
14,0 mm	0.5512		M16 X 2	14,0	124,0	77,0	60,0	45,0	65096	64896	
9/16	0.5625	14.29		16,0	133,0	83,0	63,0	48,0	55030	54830	
14,5 mm	0.5709		M16 X 1,5	16,0	133,0	83,0	63,0	48,0	65097	64897	
37/64	0.5781	14.68	5/8-18	16,0	133,0	83,0	63,0	48,0	55031	54831	
14,8 mm	0.5827			16,0	133,0	83,0	63,0	48,0	65098	64898	
15,0 mm	0.5906		M16 X 1	16,0	133,0	83,0	63,0	48,0	65099	64899	
15,5 mm	0.6102		M18 X 2,5	16,0	133,0	83,0	63,0	48,0	65100	64900	
15,8 mm	0.6220			16,0	133,0	83,0	63,0	48,0	65101	64901	
5/8	0.6250	15.88	11/16-16	16,0	133,0	83,0	63,0	48,0	55032	54832	
16,0 mm	0.6299			16,0	133,0	83,0	63,0	48,0	65102	64902	
21/32	0.6562	16.67	3/4-10	18,0	143,0	93,0	71,0	48,0	55033	54833	
11/16	0.6875	17.46	3/4-16	18,0	143,0	93,0	71,0	48,0	55034	54834	
3/4	0.7500	19.05	13/16-16	20,0	153,0	101,0	77,0	50,0	55035	54835	

FRACTIONAL Hi-PerCarb

Series 131N 3D & 5D Fractional				Diameter (D ₁) (inch)							
Hardness		Vc (sfm)		1/8	3/16	1/4	3/8	1/2	5/8	3/4	
N	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, Naval 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	(360-540)	450	RPM	13752	9168	6876	4584	3438	2750	2292
			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 3D & 5D Metric				Diameter (D ₁) (mm)							
	Hardness	Vc (m/min)		3	6	8	10	12	14	16	
N	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, Navel 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 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)



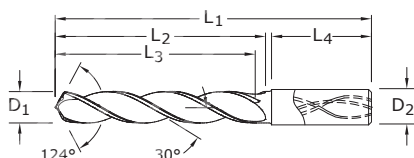
5xD



141K 5xD

FRACTIONAL & METRIC SERIES

- Triple margin design improves hole stability and size control while providing superior finish, roundness and 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 ≤ 400 Bhn (≤ 43 HRc)



CUTTING DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-M (TM)
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	65160
3,1 mm	0.1220			6,0	66,0	28,0	23,0	36,0	65161
1/8	0.1250	3.18		6,0	66,0	28,0	23,0	36,0	55160
3,2 mm	0.1260		M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	65162
3,3 mm	0.1299		M4 X 0,7	6,0	66,0	28,0	23,0	36,0	65163
3,4 mm	0.1339			6,0	66,0	28,0	23,0	36,0	65164
#29	0.1360	3.45	8-32,8-36	6,0	66,0	28,0	23,0	36,0	55161
3,5 mm	0.1378		M4 X 0,5	6,0	66,0	28,0	23,0	36,0	65165
9/64	0.1406	3.57		6,0	66,0	28,0	23,0	36,0	55162
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	65166
3,7 mm	0.1457		M4,5 X 0,75	6,0	66,0	28,0	23,0	36,0	65167
3,8 mm	0.1496		10-24	6,0	74,0	36,0	29,0	36,0	65168
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	65169
5/32	0.1562	3.97		6,0	74,0	36,0	29,0	36,0	55163
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	65170
#21	0.1590	4.04	10-32	6,0	74,0	36,0	29,0	36,0	55164
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	65171
4,2 mm	0.1654		M5 / M5 x 0,75	6,0	74,0	36,0	29,0	36,0	65172
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	65173
11/64	0.1719	4.37		6,0	74,0	36,0	29,0	36,0	55165
4,4 mm	0.1732		12-24	6,0	74,0	36,0	29,0	36,0	65174
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	65175
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	65176
4,7 mm	0.1850		12-32	6,0	74,0	36,0	29,0	36,0	65177
3/16	0.1875	4.76		6,0	82,0	44,0	35,0	36,0	55166
4,8 mm	0.1890		7/32-32	6,0	82,0	44,0	35,0	36,0	65178
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	65179
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	65180
5,1 mm	0.2008		1/4-20	6,0	82,0	44,0	35,0	36,0	65181
13/64	0.2031	5.16		6,0	82,0	44,0	35,0	36,0	55167
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	65182
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	65183
5,4 mm	0.2126			6,0	82,0	44,0	35,0	36,0	65184
5,5 mm	0.2165		M6 X 0,5	6,0	82,0	44,0	35,0	36,0	65185
7/32	0.2188	5.56	1/4-32	6,0	82,0	44,0	35,0	36,0	55168
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	65186

TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.0114D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025D₂ = h₆

CAST IRON

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continued on next page

141K 5xD

FRACTIONAL & METRIC SERIES

CUTTING DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	TI-NAMITE-M (TM)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
5,7 mm	0.2244			6,0	82,0	44,0	35,0	36,0	65187
5,8 mm	0.2283			6,0	82,0	44,0	35,0	36,0	65188
5,9 mm	0.2323			6,0	82,0	44,0	35,0	36,0	65189
15/64	0.2344	5.95		6,0	82,0	44,0	35,0	36,0	55169
6,0 mm	0.2362		M7 X 1	6,0	82,0	44,0	35,0	36,0	65190
6,1 mm	0.2402			8,0	91,0	53,0	43,0	36,0	65191
6,2 mm	0.2441		M7 X 0,75	8,0	91,0	53,0	43,0	36,0	65192
6,3 mm	0.2480			8,0	91,0	53,0	43,0	36,0	65193
1/4	0.2500	6.35		8,0	91,0	53,0	43,0	36,0	55170
6,4 mm	0.2520			8,0	91,0	53,0	43,0	36,0	65194
6,5 mm	0.2559			8,0	91,0	53,0	43,0	36,0	65195
F	0.2570	6.53	5/16-18	8,0	91,0	53,0	43,0	36,0	55171
6,6 mm	0.2598			8,0	91,0	53,0	43,0	36,0	65196
6,7 mm	0.2638			8,0	91,0	53,0	43,0	36,0	65197
17/64	0.2656	6.75	5/16-20	8,0	91,0	53,0	43,0	36,0	55172
6,8 mm	0.2677		M8 X 1,25	8,0	91,0	53,0	43,0	36,0	65198
6,9 mm	0.2717		5/16-24	8,0	91,0	53,0	43,0	36,0	65199
7,0 mm	0.2756		M8 X 1	8,0	91,0	53,0	43,0	36,0	65200
7,1 mm	0.2795			8,0	91,0	53,0	43,0	36,0	65201
9/32	0.2812	7.14	5/16-32	8,0	91,0	53,0	43,0	36,0	55173
7,2 mm	0.2835		M8 X 0,75	8,0	91,0	53,0	43,0	36,0	65202
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0	65203
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0	65204
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0	65205
19/64	0.2969	7.54		8,0	91,0	53,0	43,0	36,0	55174
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0	65206
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0	65207
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0	65208
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0	65209
5/16	0.3125	7.94	3/8-16	8,0	91,0	53,0	43,0	36,0	55175
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0	65210
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0	65211
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0	65212
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0	65213
21/64	0.3281	8.33	3/8-20	10,0	103,0	61,0	49,0	40,0	55176
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0	65214
Q	0.3320	8.43	3/8-24	10,0	103,0	61,0	49,0	40,0	55177
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0	65215
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0	65216
8,7 mm	0.3425			10,0	103,0	61,0	49,0	40,0	65217
11/32	0.3438	8.73	3/8-32	10,0	103,0	61,0	49,0	40,0	55178
8,8 mm	0.3465		M10 X 1,25	10,0	103,0	61,0	49,0	40,0	65218
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0	65219
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0	65220
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0	65221
23/64	0.3594	9.13		10,0	103,0	61,0	49,0	40,0	55179

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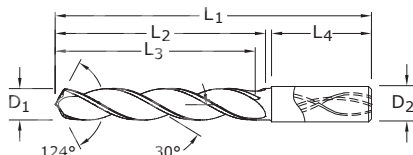
5xD



141K 5xD

FRACTIONAL & METRIC SERIES

- Triple margin design improves hole stability and size control while providing superior finish, roundness and 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 ≤ 400 Bhn (≤ 43 HRC)



CUTTING DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-M (TM)
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	65222
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0	65223
U	0.3680	9.35	7/16-14	10,0	103,0	61,0	49,0	40,0	55180
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0	65224
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	103,0	61,0	49,0	40,0	65225
3/8	0.3750	9.53		10,0	103,0	61,0	49,0	40,0	55181
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0	65226
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0	65227
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0	65228
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0	65229
25/64	0.3906	9.92	7/16-20	10,0	103,0	61,0	49,0	40,0	55182
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	65230
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	65231
10,2 mm	0.4016		M12 X 1,75	12,0	118,0	71,0	56,0	45,0	65232
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	65233
13/32	0.4062	10.32		12,0	118,0	71,0	56,0	45,0	55183
10,4 mm	0.4094			12,0	118,0	71,0	56,0	45,0	65234
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	65235
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	65236
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	65237
27/64	0.4219	10.72	1/2-13	12,0	118,0	71,0	56,0	45,0	55184
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	65238
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	65239
11,0 mm	0.4331		M12 X 1	12,0	118,0	71,0	56,0	45,0	65240
11,1 mm	0.4370			12,0	118,0	71,0	56,0	45,0	65241
7/16	0.4375	11.11	1/4-18NPT	12,0	118,0	71,0	56,0	45,0	55185
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	65242
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	65243
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	65244
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	65245
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	65246
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	65247
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	65248
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	65249
15/32	0.4688	11.91	1/2-28	12,0	118,0	71,0	56,0	45,0	55186
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	65250

TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.0114D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025D₂ = h₆

CAST IRON

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continued on next page

141K 5xD

FRACTIONAL & METRIC SERIES

CUTTING DIA.	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIA.	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	TI-NAMITE-M (TM)
D ₁				D ₂	L ₁	L ₂	L ₃	L ₄	EDP NO.
31/64	0.4844	12.30	9/16-12	14,0	124,0	77,0	60,0	45,0	55187
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	65251
1/2	0.5000	12.70		14,0	124,0	77,0	60,0	45,0	55188
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	65252
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	65253
33/64	0.5156	13.10	9/16-18	14,0	124,0	77,0	60,0	45,0	55189
13,5 mm	0.5315		5/8-11	14,0	124,0	77,0	60,0	45,0	65254
13,8 mm	0.5433			14,0	124,0	77,0	60,0	45,0	65255
14,0 mm	0.5512		M16 X 2	14,0	124,0	77,0	60,0	45,0	65256
9/16	0.5625	14.29		16,0	133,0	83,0	63,0	48,0	55190
14,5 mm	0.5709		M16 X 1,5	16,0	133,0	83,0	63,0	48,0	65257
37/64	0.5781	14.68	5/8-18	16,0	133,0	83,0	63,0	48,0	55191
14,8 mm	0.5827			16,0	133,0	83,0	63,0	48,0	65258
15,0 mm	0.5906		M16 X 1	16,0	133,0	83,0	63,0	48,0	65259
15,5 mm	0.6102		M18 X 2,5	16,0	133,0	83,0	63,0	48,0	65260
15,8 mm	0.6220			16,0	133,0	83,0	63,0	48,0	65261
5/8	0.6250	15.88	11/16-16	16,0	133,0	83,0	63,0	48,0	55192
16,0 mm	0.6299			16,0	133,0	83,0	63,0	48,0	65262
21/32	0.6562	16.67	3/4-10	18,0	143,0	93,0	71,0	48,0	55193
11/16	0.6875	17.46	3/4-16	18,0	143,0	93,0	71,0	48,0	55194
3/4	0.7500	19.05	13/16-16	20,0	153,0	101,0	77,0	50,0	55195

CONTINUED

FRACTIONAL Hi-PerCarb

Series 141K 5D Fractional	Hardness	Vc (sfm)		Diameter (D ₁) (inch)							
				1/8	3/16	1/4	3/8	1/2	5/8	3/4	
K	GRAY CAST IRON FERRITIC ASTM A48: CLASS 20 SAE J431C: GRADE 1800	≤ 150 Bhn	450	RPM	13752	9168	6876	4584	3438	2750	2292
		or	(360-540)	Fr	0.0049	0.0074	0.0099	0.0148	0.0198	0.0247	0.0297
		≤ 80 HRb		Feed (ipm)	68	68	68	68	68	68	68
	GRAY CAST IRON PEARLITIC ASTM A48: CLASS 30, 35, 40 SAE J431C: GRADE 3000	≤ 220 Bhn	375	RPM	11460	7640	5730	3820	2865	2292	1910
		or	(300-450)	Fr	0.0039	0.0059	0.0079	0.0118	0.0157	0.0196	0.0236
		≤ 19 HRc		Feed (ipm)	45	45	45	45	45	45	45
	COMPACTED GRAPHITE IRON	≤ 250 Bhn	325	RPM	9932	6621	4966	3311	2483	1986	1655
		or	(260-390)	Fr	0.0039	0.0059	0.0079	0.0118	0.0157	0.0196	0.0236
		≤ 25 HRc		Feed (ipm)	39	39	39	39	39	39	39
	MALLEABLE CAST IRON FERRITIC ASTM A220: GRADE 40010 SAE J158: GRADE M4504	≤ 160 Bhn	450	RPM	13752	9168	6876	4584	3438	2750	2292
		or	(360-540)	Fr	0.0049	0.0074	0.0099	0.0148	0.0198	0.0247	0.0297
		≤ 3 HRc		Feed (ipm)	68	68	68	68	68	68	68
	MALLEABLE CAST IRON MARTENSITE ASTM A220: GRADE 90001 SAE J158: GRADE M8501	≤ 320 Bhn	250	RPM	7640	5093	3820	2547	1910	1528	1273
		or	(200-300)	Fr	0.0031	0.0047	0.0063	0.0094	0.0126	0.0157	0.0188
		≤ 34 HRc		Feed (mm/min)	24	24	24	24	24	24	24

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

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

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

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 141K 5D Metric	Hardness	Vc (m/min)		Diameter (D ₁) (mm)							
				3	6	8	10	12	14	16	
K	GRAY CAST IRON FERRITIC ASTM A48: CLASS 20 SAE J431C: GRADE 1800	≤ 150 Bhn	137	RPM	14541	7271	5453	4362	3635	3116	2726
		or	(110-165)	Fr	0.119	0.237	0.316	0.395	0.475	0.554	0.633
		≤ 80 HRb		Feed (mm/min)	1725	1725	1725	1725	1725	1725	1725
	GRAY CAST IRON PEARLITIC ASTM A48: CLASS 30, 35, 40 SAE J431C: GRADE 3000	≤ 220 Bhn	114	RPM	12118	6059	4544	3635	3029	2597	2272
		or	(91-137)	Fr	0.094	0.189	0.252	0.315	0.378	0.441	0.504
		≤ 19 HRc		Feed (mm/min)	1145	1145	1145	1145	1145	1145	1145
	COMPACTED GRAPHITE IRON	≤ 250 Bhn	99	RPM	10502	5251	3938	3151	2626	2250	1969
		or	(79-119)	Fr	0.094	0.189	0.251	0.314	0.377	0.440	0.503
		≤ 25 HRc		Feed (mm/min)	990	990	990	990	990	990	990
	MALLEABLE CAST IRON FERRITIC ASTM A220: GRADE 40010 SAE J158: GRADE M4504	≤ 160 Bhn	137	RPM	14541	7271	5453	4362	3635	3116	2726
		or	(110-165)	Fr	0.119	0.237	0.316	0.395	0.475	0.554	0.633
		≤ 3 HRc		Feed (mm/min)	1725	1725	1725	1725	1725	1725	1725
	MALLEABLE CAST IRON MARTENSITE ASTM A220: GRADE 90001 SAE J158: GRADE M8501	≤ 320 Bhn	76	RPM	8078	4039	3029	2424	2020	1731	1515
		or	(61-91)	Fr	0.076	0.151	0.201	0.252	0.302	0.352	0.403
		≤ 34 HRc		Feed (mm/min)	610	610	610	610	610	610	610

(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

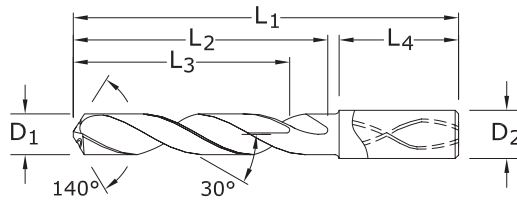
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



5xD



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.
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

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TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.00114D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025D₂ = h₆

STEELS
STAINLESS STEELS
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TITANIUM
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HARDENED STEELS

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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.
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

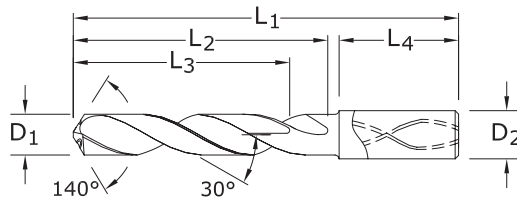
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5xD



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	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.
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

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TOLERANCES (inch)

≤.1181 DIAMETER

D₁ = +.00008/+0.00047D₂ = h₆

>.1181-.2362 DIAMETER

D₁ = +.00016/+0.00063D₂ = h₆

>.2362-.3937 DIAMETER

D₁ = +.00024/+0.00083D₂ = h₆

>.3937-.7087 DIAMETER

D₁ = +.00028/+0.00098D₂ = h₆

>.7087-1.1811 DIAMETER

D₁ = +.00031/+0.00114D₂ = h₆

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,002/+0,012D₂ = h₆

>3-6 DIAMETER

D₁ = +0,004/+0,016D₂ = h₆

>6-10 DIAMETER

D₁ = +0,006/+0,021D₂ = h₆

>10-18 DIAMETER

D₁ = +0,007/+0,025D₂ = h₆

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

NON-FERROUS

HARDENED STEELS

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140 5xD

FRACTIONAL & METRIC SERIES

CONTINUED

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.
11,4 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

Series 140 5D Fractional				Diameter (D1) (inch)									
	Hardness	Vc (sfm)		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	RPM	12988	8659	6494	4329	3247	2598	2165		
			(340-510)	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	RPM	11613	7742	5806	3871	2903	2323	1935		
			(304-456)	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	RPM	6723	4482	3362	2241	1681	1345	1121		
			(176-264)	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		
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	330	RPM	10085	6723	5042	3362	2521	2017	1681		
			(264-396)	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	RPM	6112	4075	3056	2037	1528	1222	1019		
			(160-240)	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	RPM	4278	2852	2139	1426	1070	856	713		
			(112-168)	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		
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	145	RPM	4431	2954	2216	1477	1108	886	739		
			(116-174)	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	RPM	2903	1935	1452	968	726	581	484		
			(76-114)	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	RPM	2598	1732	1299	866	649	520	433		
			(68-102)	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		
		K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	360	RPM	11002	7334	5501	3667	2750	2200	1834
					(288-432)	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			RPM	10238	6825	5119	3413	2559	2048	1706		
	(268-402)			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	RPM	9321	6214	4660	3107	2330	1864	1553		
			(244-366)	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	RPM	5959	3973	2980	1986	1490	1192	993		
			(156-234)	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		
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	150	RPM	4584	3056	2292	1528	1146	917	764		
			(120-180)	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	RPM	3362	2241	1681	1121	840	672	560		
			(88-132)	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	RPM	2903	1935	1452	968	726	581	484
		(76-114)	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	RPM	1528	1019	764	509	382	306	255
		(40-60)	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	RPM	6570	4380	3285	2190	1643	1314	1095
		(172-258)	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	RPM	4890	3260	2445	1630	1222	978	815
		(128-192)	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	
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 440 Bhn or ≤ 47 HRc	85	RPM	2598	1732	1299	866	649	520	433
		(68-102)	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	
		≤ 80 Bhn or ≤ 47 HRb	770	RPM	23531	15687	11766	7844	5883	4706	3922
		(616-924)	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	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 150 Bhn or ≤ 7 HRc	660	RPM	20170	13446	10085	6723	5042	4034	3362
		(528-792)	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	RPM	16808	11205	8404	5603	4202	3362	2801
		(440-660)	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	RPM	13446	8964	6723	4482	3362	2689	2241	
	(352-528)	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	27.0		

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

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

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

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				Diameter (D ₁) (mm)							
				Hardness	Vc (m/min)	3	6	8	10	12	14
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	130	RPM	13733	6867	5150	4120	3433	2943	2575
			(104-155)	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	RPM	12279	6140	4605	3684	3070	2631	2302
			(93-139)	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	RPM	7109	3555	2666	2133	1777	1523	1333
			(54-80)	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
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	101	RPM	10664	5332	3999	3199	2666	2285	1999
			(80-121)	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	RPM	6463	3231	2424	1939	1616	1385	1212
			(49-73)	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	RPM	4524	2262	1696	1357	1131	969	848
			(34-51)	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
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	44	RPM	4686	2343	1757	1406	1171	1004	879
			(35-53)	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	RPM	3070	1535	1151	921	767	658	576
			(23-35)	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	RPM	2747	1373	1030	824	687	589	515
			(21-31)	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
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	110	RPM	11633	5816	4362	3490	2908	2493	2181
			(88-132)	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	RPM	10825	5413	4059	3248	2706	2320	2030
			(82-123)	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	RPM	9856	4928	3696	2957	2464	2112	1848
			(74-112)	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	RPM	6301	3151	2363	1890	1575	1350	1181
			(48-71)	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
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	46	RPM	4847	2424	1818	1454	1212	1039	909
			(37-55)	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	RPM	3555	1777	1333	1066	889	762	666
			(27-40)	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

continued on next page

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
	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
	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)

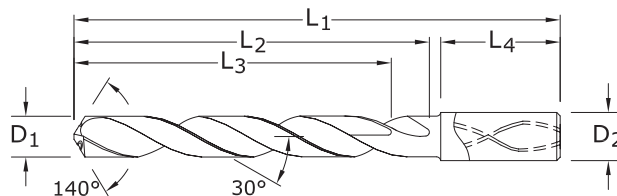


8xD



140 8xD

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 D ₁	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	mm					Ti-NAMITE-A (AlTiN) EDP NO.
				SHANK DIAMETER D ₂	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	SHANK LENGTH 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

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TOLERANCES (inch)

 $\leq .1181$ DIAMETERD₁ = +.00008/+0.00047D₂ = h₆ $>.1181-.2362$ DIAMETERD₁ = +.00016/+0.00063D₂ = h₆ $>.2362-.3937$ DIAMETERD₁ = +.00024/+0.00083D₂ = h₆ $>.3937-.7087$ DIAMETERD₁ = +.00028/+0.00098D₂ = h₆ $>.7087-1.1811$ DIAMETERD₁ = +.00031/+0.00114D₂ = h₆

TOLERANCES (mm)

 ≤ 3 DIAMETERD₁ = +0,002/+0,012D₂ = h₆ $>3-6$ DIAMETERD₁ = +0,004/+0,016D₂ = h₆ $>6-10$ DIAMETERD₁ = +0,006/+0,021D₂ = h₆ $>10-18$ DIAMETERD₁ = +0,007/+0,025D₂ = h₆

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

For patent
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140 8xD

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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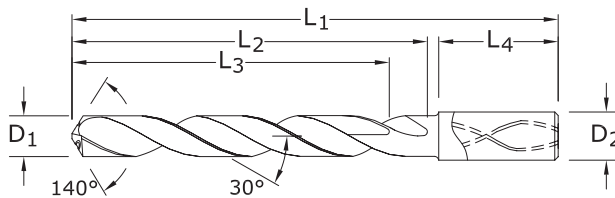
8xD



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140 8xD

FRACTIONAL & METRIC SERIES



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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.
11/32	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

continued on next page

TOLERANCES (inch)

 $\leq .1181$ DIAMETER $D_1 = +.00008/+0.00047$ $D_2 = h_6$ $>.1181-.2362$ DIAMETER $D_1 = +.00016/+0.00063$ $D_2 = h_6$ $>.2362-.3937$ DIAMETER $D_1 = +.00024/+0.00083$ $D_2 = h_6$ $>.3937-.7087$ DIAMETER $D_1 = +.00028/+0.00098$ $D_2 = h_6$ $>.7087-1.1811$ DIAMETER $D_1 = +.00031/+0.00114$ $D_2 = h_6$

TOLERANCES (mm)

 ≤ 3 DIAMETER $D_1 = +0,002/+0,012$ $D_2 = h_6$ $>3-6$ DIAMETER $D_1 = +0,004/+0,016$ $D_2 = h_6$ $>6-10$ DIAMETER $D_1 = +0,006/+0,021$ $D_2 = h_6$ $>10-18$ DIAMETER $D_1 = +0,007/+0,025$ $D_2 = h_6$

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140 8xD

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.
11,2 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

	Series 140 8D Fractional	Hardness	Vc (sfm)	Diameter (D1) (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	RPM	12377	8251	6188	4126	3094	2475	2063	
			(324-486)	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	RPM	11307	7538	5654	3769	2827	2261	1885	
			(296-444)	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	RPM	6418	4278	3209	2139	1604	1284	1070	
			(168-252)	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	
		ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	320	RPM	9779	6519	4890	3260	2445	1956	1630
				(256-384)	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		RPM	5806	3871	2903	1935	1452	1161	968		
	(152-228)		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	RPM	4126	2750	2063	1375	1031	825	688			
	(108-162)	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			
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	140	RPM	4278	2852	2139	1426	1070	856	713	
			(112-168)	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	RPM	2750	1834	1375	917	688	550	458	
			(72-108)	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	RPM	2445	1630	1222	815	611	489	407	
			(64-96)	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	
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	350	RPM	10696	7131	5348	3565	2674	2139	1783	
			(280-420)	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	RPM	9474	6316	4737	3158	2368	1895	1579	
			(248-372)	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	RPM	8862	5908	4431	2954	2216	1772	1477	
			(232-348)	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	RPM	5501	3667	2750	1834	1375	1100	917	
			(144-216)	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	
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	130	RPM	3973	2649	1986	1324	993	795	662	
			(104-156)	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	RPM	2903	1935	1452	968	726	581	484	
			(76-114)	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	RPM	1986	1324	993	662	497	397	331
			(52-78)	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	RPM	1070	713	535	357	267	214	178
			(28-42)	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	RPM	5654	3769	2827	1885	1413	1131	942
			(148-222)	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	RPM	4278	2852	2139	1426	1070	856	713
			(112-168)	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
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	730	RPM	22309	14873	11154	7436	5577	4462	3718
			(584-876)	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	RPM	19406	12937	9703	6469	4851	3881	3234
			(508-762)	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	RPM	7793	5195	3896	2598	1948	1559	1299
			(204-306)	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	RPM	7182	4788	3591	2394	1795	1436	1197
			(188-282)	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)

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

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

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				Diameter (D ₁) (mm)									
Hardness		Vc (m/min)		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		
	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		
H	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		
		K	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		
	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				Diameter (D ₁) (mm)							
Hardness	Vc (m/min)										
		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	RPM	2100	1050	788	630	525	450	394
			(16-24)	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	RPM	1131	565	424	339	283	242	212
			(9-13)	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	RPM	5978	2989	2242	1793	1495	1281	1121
			(45-68)	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	RPM	4524	2262	1696	1357	1131	969	848
			(34-51)	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	RPM	2424	1212	909	727	606	519	454
			(18-27)	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	RPM	23589	11795	8846	7077	5897	5055	4423
			(178-267)	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	RPM	20519	10260	7695	6156	5130	4397	3847
			(155-232)	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	RPM	8240	4120	3090	2472	2060	1766	1545
			(62-93)	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	RPM	7594	3797	2848	2278	1898	1627	1424
			(57-86)	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



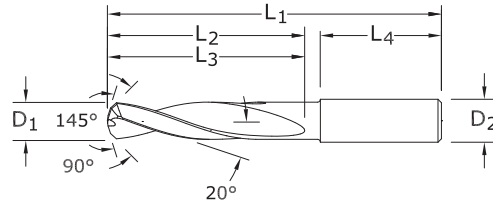
3xD



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/-0.0005D₂ = h₆

TOLERANCES (mm)

D₁ = +0,000/-0,013D₂ = h₆

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

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	RPM	9779	6519	4890	3912	3260	2794	2445
		(256-384)	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	RPM	7334	4890	3667	2934	2445	2096	1834
		(192-288)	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	RPM	12224	8149	6112	4890	4075	3493	3056
		(320-480)	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	RPM	12722	10602	7951	5301	3976	3181	2650
		(80-120)	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	RPM	9542	7951	5963	3976	2982	2385	1988
		(65-90)	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	RPM	15266	12722	9542	6361	4771	3817	3181
		(96-144)	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	302
Short Length Self Centering (DIN6539)	108M Plus	2 Flute Short Length DIN 6539	307
Straight Flute	106	Straight Flute 140 Point Geometry	314
3 Flute with 150 Point Geometry	103	3 Flute 150 Point Geometry	318
GENERAL PURPOSE COUNTERSINKS	SERIES	DESCRIPTION	PAGE
Combined Drill & Countersink	301	2 Flute Straight Flute Combined Drill and Countersink Fractional	324
	301M	2 Flute Straight Flute Combined Drill and Countersink Metric	325
Single Flute Countersink	601	Single Flute Fractional	330
3 Flute Countersink	603	3 Flute Fractional	333
6 Flute Countersink	606	6 Flute Fractional	336
GENERAL PURPOSE REAMERS	SERIES	DESCRIPTION	PAGE
Straight Flute Accu-Reamer	200	Accu-Reamer	340
Straight Flute Reamer	201M	Metric Reamer	344

Speed & Feed Recommendations listed after each series

Taladrado

TALADROS DE USO GENERAL	SERIE	DESCRIPCIÓN	PÁGINA
2 filos	101	2 filos, espiral de avance lento	302
Autocentrante de longitud corta (DIN6539)	108M Plus	2 filos, longitud corta, DIN 6539	307
Filo recto	106	Filo recto, geometría de 140 puntos	314
3 filos con geometría de 150 puntos	103	3 filos, geometría de 150 puntos	318
TALADROS DE USO AVELLANADORES	SERIE	DESCRIPCIÓN	PÁGINA
Taladro y avellanador combinados	301	2 filos, filo recto, taladro y avellanador combinados, fraccional	324
	301M	2 filos, filo recto, taladro y avellanador combinados, métrico	325
Avellanador de filo único	601	Filo único, fraccional	330
Avellanador de 3 filos	603	3 filos, fraccional	333
Avellanador de 6 filos	606	6 filos, fraccional	336
TALADROS DE USO ESCARIADORES	SERIE	DESCRIPCIÓN	PÁGINA
Escariador Accu de filo recto	200	Escariador Accu	340
Escariador de filo recto	201M	Escariador métrico	344

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	302
Court autocentrant (DIN 6539)	108M Plus	2 dents court DIN 6539	307
Denture droite	106	Denture droite à angle de pointe 140°	314
3 dents à angle de pointe 150°	103	3 dents à angle de pointe 150°	318
FORETS À FRAISER	SERIES	DESCRIPTION	PAGE
Foret et foret à fraiser combinés	301	2 dents denture droite foret et foret à fraiser combinés (fractionnel)	324
	301M	2 dents denture droite foret et foret à fraiser combinés (métrique)	325
Foret à fraiser à dent simple	601	Foret à dent simple (fractionnel)	330
Foret à fraiser 3 dents	603	3 dents (fractionnel)	333
foret à fraiser 6 dents	606	6 dents (fractionnel)	336
FORETS À ALÉSOIRS	SERIES	DESCRIPTION	PAGE
Alésoir denture droite Accu-Reamer	200	Alésoir Accu-Reamer	340
Alésoir denture droite	201M	Alésoir (métrique)	344

Recommandations de vitesse et avance indiquées après chaque série

ALLZWECK-BOHRER	SERIE	BESCHREIBUNG	SEITE
2 Schneidekanten	101	2 Schneidekanten mit kleinem Spanwinkel	302
Kurze Bauform Selbstzentrierung (DIN 6539)	108M Plus	2 Schneidekanten Kurze Bauform DIN 6539	307
Gerade Schneidekante	106	Gerade Schneidekante Spitzengeometrie 140	314
3 Schneidekanten mit Spitzengeometrie 150	103	3 Schneidekanten Spitzengeometrie 150	318

ALLZWECK-BOHRER	SERIE	BESCHREIBUNG	SEITE
Senkbohrer	301	Zölliger Senkbohrer mit 2 geraden Schneidekanten	324
	301M	Metrischer Senkbohrer mit 2 geraden Schneidekanten	325
Senker mit 1 Schneidekante	601	Zölliger Bohrer mit 1 Schneidekante	330
Senkbohrer mit 1 Schneidekante	603	Zölliger Bohrer mit 3 Schneidekanten	333
Senkbohrer mit 6 Schneidekanten	606	Zölliger Bohrer mit 6 Schneidekanten	336

ALLZWECK-BOHRER	SERIE	BESCHREIBUNG	SEITE
Reibahlen mit gerader Schneidekante	200	Accu-Reamer	340
Reibahle mit gerader Schneidekante	201M	Metrische Reibahle	344

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

2 Flute Drills • Metric: DIN 338



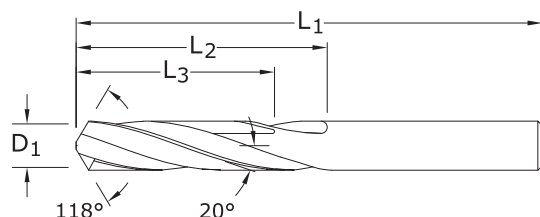
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2

101

FRACTIONAL & METRIC SERIES

Pictured:
Series 101 Drill Set

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)
#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

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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

2 Flute Drills • Metric: DIN 338

101

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 (AITiN)
#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



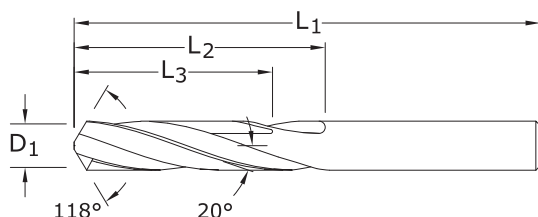
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2

101

FRACTIONAL & METRIC SERIES

Pictured:
Series 101 Drill Set

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)
#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

continued on next page

TOLERANCES (inch)

D₁ = +.0000/- .0005

TOLERANCES (mm)

D₁ = +0,0000/-0,0127

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
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2 Flute Drills • Metric: DIN 338

101

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 (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	57176
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

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2 Flute Drills • Metric: DIN 338



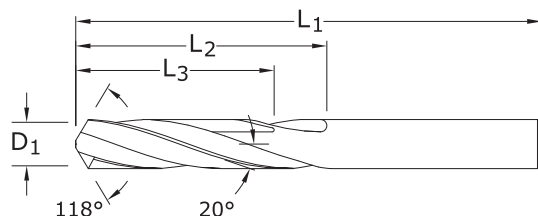
5xD



2

101

FRACTIONAL & METRIC SERIES

Pictured:
Series 101 Drill Set

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 = +.0000/- .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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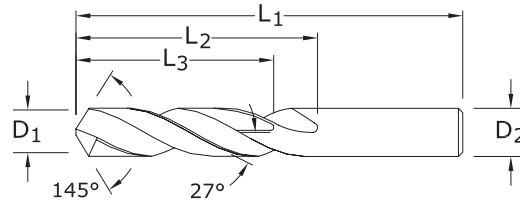
Short Length Self Centering Drills • DIN 6539



3xD



2



TOLERANCES (mm)

≤3 DIAMETER

 $D_1 = +0,000/-0,010$
 $D_2 = h_6$

>3–6 DIAMETER

 $D_1 = +0,000/-0,012$
 $D_2 = h_6$

>6–10 DIAMETER

 $D_1 = +0,000/-0,015$
 $D_2 = h_6$

>10–18 DIAMETER

 $D_1 = +0,000/-0,018$
 $D_2 = h_6$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

NON-FERROUS

PLASTICS/COMPOSITES

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108M Plus

METRIC SERIES

mm				EDP NO.	
CUTTING DIAMETER D_1/D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	UNCOATED	Ti-NAMITE-A (AlTiN)
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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Short Length Self Centering Drills • DIN 6539



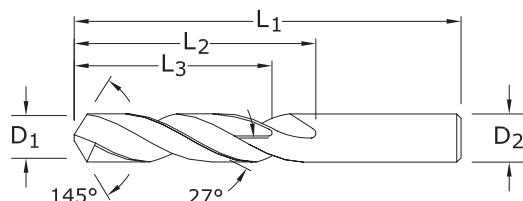
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2

108M Plus

METRIC SERIES



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)
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

continued on next page

TOLERANCES (mm)

≤3 DIAMETER

D₁ = +0,000/−0,010D₂ = h₆

>3–6 DIAMETER

D₁ = +0,000/−0,012D₂ = h₆

>6–10 DIAMETER

D₁ = +0,000/−0,015D₂ = h₆

>10–16 DIAMETER

D₁ = +0,000/−0,018D₂ = h₆

STEELS
STAINLESS STEELS
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108M Plus

METRIC SERIES

CONTINUED

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)
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 101 Fractional	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 (212-318)	265	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 (100-150)	125	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 (68-102)	85	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
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc (184-276)	230	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 (116-174)	145	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 (48-72)	60	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
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc (68-102)	85	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 (44-66)	55	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 (32-48)	40	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
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc (224-336)	280	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 (200-300)	250	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 (168-252)	210	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 (88-132)	110	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
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc (52-78)	65	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 (44-66)	55	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

continued on next page

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 (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 (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 (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
	TITANIUM ALLOYS (DIFFICULT) Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc (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
		≤ 350 Bhn or ≤ 38 HRc (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 (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 (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 (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 (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 (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 (400-600)	RPM	122240	61120	30560	15280	7640	5093	3820
			Fr	0.00031	0.0006	0.0012	0.0025	0.0050	0.0075	0.0099
			Feed (ipm)	38.0	38.0	38.0	38.0	38.0	38.0	38.0

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)

2 Flute Drills

Short Length Self Centering Drills • DIN 6539

Series 101M, 108M Metric			Diameter (D ₁) (mm)										
	Hardness	Vc (m/min)		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			
	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			
H	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			
		K	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			
	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 101M, 108M Metric	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
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 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 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)

Straight Flute Drills • Metric: DIN 6539

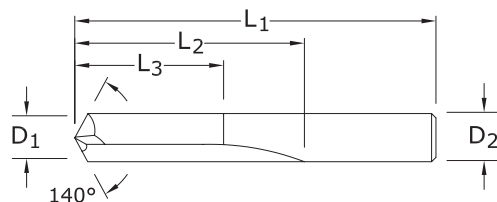


3xD



106

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 (AITiN)
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

continued on next page

TOLERANCES (inch)

D₁ = +.0000/- .0005D₂ = h6

TOLERANCES (mm)

D₁ = +0,0000/-0,0127D₂ = h6

STEELS

CAST IRON

HARDENED STEELS

For patent
information visit
www.ksptpatents.com

Straight Flute Drills • Metric: DIN 6539

106

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 (AlTiN)
#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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Straight Flute Drills • Metric: DIN 6539

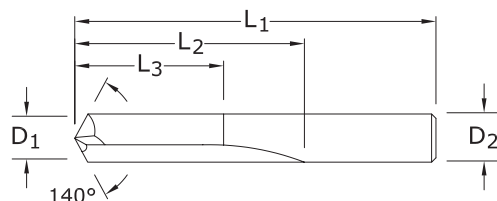


3xD



106

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		89,0	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	47,0	33,0	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	47,0	33,0	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/- .0005D₂ = h6

TOLERANCES (mm)

D₁ = +0,0000/-0,0127D₂ = h6

STEELS

CAST IRON

HARDENED STEELS

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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	RPM	3667	1834	1222	917	611	458
			(48-72)	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	RPM	3056	1528	1019	764	509	382
			(40-60)	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	RPM	3667	1834	1222	917	611	458
			(48-72)	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	RPM	3056	1528	1019	764	509	382
			(40-60)	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	RPM	15280	7640	5093	3820	2547	1910
			(200-300)	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	RPM	11918	5959	3973	2980	1986	1490
			(156-234)	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	RPM	5816	1939	969	727	582	485
			(15-22)	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	RPM	4847	1616	808	606	485	404
			(12-18)	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	RPM	5816	1939	969	727	582	485
			(15-22)	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	RPM	4847	1616	808	606	485	404
			(12-18)	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	RPM	24235	8078	4039	3029	2424	2020
			(61-91)	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	RPM	18904	6301	3151	2363	1890	1575
			(48-71)	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)

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

$mm/min = Fr \times rpm$

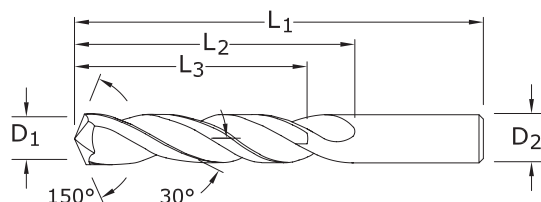
reduce speed and feed 30 percent when using uncoated drills

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)

3



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)
#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

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TOLERANCES (inch)

D₁ = +.0000/-0.0005D₂ = h6

TOLERANCES (mm)

D₁ = +0,0000/-0,0127D₂ = h6

STEELS

CAST IRON

HARDENED STEELS

NON-FERROUS

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FRACTIONAL & METRIC

3 Flute Drills • Metric: DIN 6539

103

FRACTIONAL & METRIC SERIES

CONTINUED

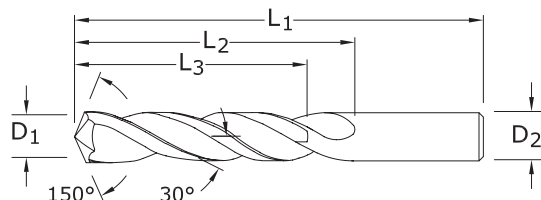
CUTTING DIAMETER D ₁ /D ₂	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH L ₁	FLUTE LENGTH L ₂	CLEARED LENGTH L ₃	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AITiN)
#16	0.1770	4.50	2-3/4	1-5/8	1-19/64	53016	58036
4,5 mm	0.1772		58,0	24,0	18,0	63006	68980
#15	0.1800	4.57	2-3/4	1-5/18	1-19/64	53015	58037
4,6 mm	0.1811		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

continued on next page

3 Flute Drills • Metric: DIN 6539

3xD
(mm)5xD
(inch)

3



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 (AITiN)
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/- .0005D₂ = h6

TOLERANCES (mm)

D₁ = +0,0000/-0,0127D₂ = h6

STEELS

CAST IRON

HARDENED STEELS

NON-FERROUS

For patent
information visit
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3 Flute Drills • Metric: DIN 6539

103

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	0.4724		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	RPM	9015	4508	3005	2254	1803	1503
			(236-354)	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	RPM	7946	3973	2649	1986	1589	1324
			(208-312)	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
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 425 Bhn or ≤ 45 HRc	150	RPM	4584	2292	1528	1146	917	764
			(120-180)	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
		≤ 275 Bhn or ≤ 28 HRc	230	RPM	7029	3514	2343	1757	1406	1171
			(184-276)	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
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	145	RPM	4431	2216	1477	1108	886	739
			(116-174)	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	RPM	3514	1757	1171	879	703	586
			(92-138)	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
	CAST IRONS Gray, Malleable, Ductile	≤ 250 Bhn or ≤ 24 HRc	85	RPM	2598	1299	866	649	520	433
			(68-102)	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	RPM	1986	993	662	497	397	331
			(52-78)	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
K	CAST IRONS Gray, Malleable, Ductile	≤ 475 Bhn or ≤ 50 HRc	50	RPM	1528	764	509	382	306	255
			(40-60)	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
		≤ 220 Bhn or ≤ 19 HRc	250	RPM	7640	3820	2547	1910	1528	1273
			(200-300)	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
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 330 Bhn or ≤ 36 HRc	195	RPM	5959	2980	1986	1490	1192	993
			(156-234)	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
		≤ 80 Bhn or ≤ 47 HRb	540	RPM	16502	8251	5501	4126	3300	2750
			(432-648)	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
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 150 Bhn or ≤ 7 HRc	455	RPM	13905	6952	4635	3476	2781	2317
			(364-546)	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
		≤ 140 Bhn or ≤ 3 HRc	305	RPM	9321	4660	3107	2330	1864	1553
			(244-366)	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	RPM	4890	2445	1630	1222	978	815		
	(128-192)	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	RPM	9533	4766	2860	2383	1787	1430
		(72-108)	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	RPM	8402	4201	2520	2100	1575	1260
		(63-95)	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	RPM	4847	2424	1454	1212	909	727
		(37-55)	Fr	0.032	0.064	0.107	0.128	0.171	0.213	
			Feed (mm/min)	155	155	155	155	155	155	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	70	RPM	7432	3716	2230	1858	1394	1115
		(56-84)	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	RPM	4686	2343	1406	1171	879	703
		(35-53)	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	RPM	3716	1858	1115	929	697	557
		(28-42)	Fr	0.012	0.024	0.040	0.048	0.065	0.081	
			Feed (mm/min)	45	45	45	45	45	45	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	26	RPM	2747	1373	824	687	515	412
		(21-31)	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	RPM	2100	1050	630	525	394	315
		(16-24)	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	RPM	1616	808	485	404	303	242
		(12-18)	Fr	0.015	0.031	0.052	0.062	0.083	0.103	
			Feed (mm/min)	25	25	25	25	25	25	
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	76	RPM	8078	4039	2424	2020	1515	1212
		(61-91)	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	RPM	6301	3151	1890	1575	1181	945
		(48-71)	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	RPM	17449	8725	5235	4362	3272	2617
		(132-198)	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	RPM	14703	7351	4411	3676	2757	2205
		(111-166)	Fr	0.078	0.156	0.261	0.313	0.417	0.521	
			Feed (mm/min)	1150	1150	1150	1150	1150	1150	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	93	RPM	9856	4928	2957	2464	1848	1478
		(74-112)	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	RPM	5170	2585	1551	1293	969	776
		(39-59)	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)

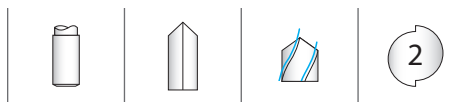
mm/min = Fr x rpm

reduce speed and feed 30 percent when using uncoated drills

reduce speed and feed for materials harder than listed

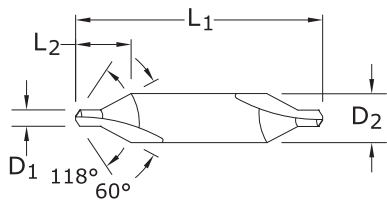
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Combined Drill & Countersink



301

FRACTIONAL SERIES



Pictured:
Series 301 Set

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/-.000D₂ = -.0001/-.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)

 $D_1 = +0,076/-0,000$
 $D_2 = -0,0025/-0,0127$

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

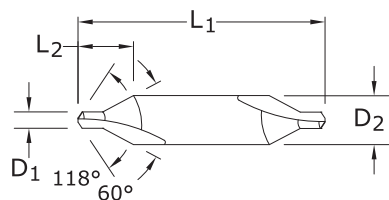
TITANIUM

HARDENED STEELS

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
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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	RPM	8098	5399	3239	2314	2025		
		(212-318)	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	RPM	3820	2547	1528	1091	955		
		(100-150)	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	RPM	2598	1732	1039	742	649		
		(68-102)	Fr	0.00038	0.0006	0.0010	0.0013	0.0015			
			Feed (ipm)	1.0	1.0	1.0	1.0	1.0			
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	230	RPM	7029	4686	2812	2008	1757		
		(184-276)	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	RPM	4431	2954	1772	1266	1108		
		(116-174)	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	RPM	1834	1222	733	524	458		
		(48-72)	Fr	0.00027	0.0004	0.0007	0.0010	0.0011			
			Feed (ipm)	0.5	0.5	0.5	0.5	0.5			
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	85	RPM	2598	1732	1039	742	649		
		(68-102)	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	RPM	1681	1121	672	480	420		
		(44-66)	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	RPM	1222	815	489	349	306		
		(32-48)	Fr	0.00016	0.0002	0.0004	0.0006	0.0007			
			Feed (ipm)	0.2	0.2	0.2	0.2	0.2			
		K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	280	RPM	8557	5705	3423	2445	2139
				(224-336)	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			RPM	7640	5093	3056	2183	1910		
(200-300)	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	RPM	6418	4278	2567	1834	1604		
		(168-252)	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	RPM	3362	2241	1345	960	840		
		(88-132)	Fr	0.00028	0.0004	0.0007	0.0010	0.0011			
			Feed (ipm)	0.9	0.9	0.9	0.9	0.9			
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	65	RPM	1986	1324	795	568	497		
		(52-78)	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	RPM	1681	1121	672	480	420		
		(44-66)	Fr	0.00032	0.0005	0.0008	0.0011	0.0013			
			Feed (ipm)	0.5	0.5	0.5	0.5	0.5			

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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	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
		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
		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
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	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
		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
		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	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
		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
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	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
		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
	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 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)

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	RPM	8155	6422	4078	2569	2055
			(65-97)	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	RPM	3847	3029	1923	1212	969
			(30-46)	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	RPM	2616	2060	1308	824	659
			(21-31)	Fr	0.010	0.013	0.020	0.032	0.039
				Feed (mm/min)	26	26	26	26	26
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	70	RPM	7078	5574	3539	2230	1784
			(56-84)	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	RPM	4462	3514	2231	1406	1125
			(35-53)	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	RPM	1847	1454	923	582	465
			(15-22)	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	RPM	2616	2060	1308	824	659
			(21-31)	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	RPM	1693	1333	846	533	427
			(13-20)	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	RPM	1231	969	616	388	310
			(10-15)	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	RPM	8617	6786	4309	2714	2171
			(68-102)	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	RPM	7694	6059	3847	2424	1939
			(61-91)	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	RPM	6463	5089	3231	2036	1629
			(51-77)	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	RPM	3385	2666	1693	1066	853
			(27-40)	Fr	0.007	0.009	0.014	0.023	0.028
				Feed (mm/min)	24	24	24	24	24
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	20	RPM	2000	1575	1000	630	504
			(16-24)	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	RPM	1693	1333	846	533	427
			(13-20)	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		
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	12	RPM	1231	969	616	388	310
			(10-15)	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	RPM	769	606	385	242	194
			(6-9)	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	RPM	616	485	308	194	155
			(5-7)	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	RPM	2616	2060	1308	824	659
			(21-31)	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	RPM	2000	1575	1000	630	504
			(16-24)	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	RPM	1693	1333	846	533	427
			(13-20)	Fr	0.008	0.011	0.017	0.026	0.033
				Feed (mm/min)	14	14	14	14	14
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	165	RPM	16619	13087	8309	5235	4188
			(132-198)	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	RPM	14003	11027	7001	4411	3529
			(111-166)	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	RPM	5847	4605	2924	1842	1474
			(46-69)	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	RPM	5386	4241	2693	1696	1357
			(43-64)	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)

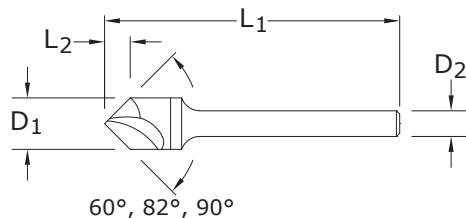
mm/min = Fr x rpm

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

inch				EDP NO.		
CUTTING DIAMETER D ₁	SHANK DIAMETER D ₂	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 601 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	0.0005	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	RPM	1834	1222	917	611	458	306	229
			(48-72)	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	RPM	1375	917	688	458	344	229	172
			(36-54)	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	RPM	2903	1935	1452	968	726	484	363
			(76-114)	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	RPM	1834	1222	917	611	458	306	229
			(48-72)	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	RPM	1070	713	535	357	267	178	134
			(28-42)	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
H	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	0.0003	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	RPM	764	509	382	255	191	127	96
			(20-30)	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	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
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	105	RPM	3209	2139	1604	1070	802	535	401
			(84-126)	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	RPM	2292	1528	1146	764	573	382	287
			(60-90)	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
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	0.0003	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	RPM	1406	937	703	469	351	234	176
			(37-55)	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	RPM	856	570	428	285	214	143	107
			(22-34)	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	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

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	RPM	550	367	275	183	138	92	69
			(14-22)	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	RPM	428	285	214	143	107	71	53
			(11-17)	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	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	138
			(29-43)	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	RPM	856	570	428	285	214	143	107
			(22-34)	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	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
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	225	RPM	6876	4584	3438	2292	1719	1146	860
			(180-270)	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	RPM	5806	3871	2903	1935	1452	968	726
			(152-228)	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
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	95	RPM	2903	1935	1452	968	726	484	363
			(76-114)	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	RPM	2445	1630	1222	815	611	407	306
			(64-96)	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)

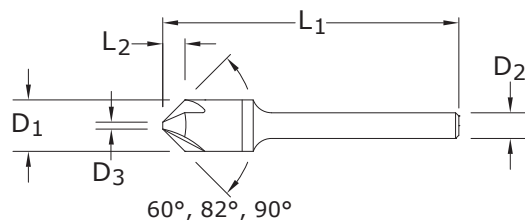
rpm = Vc x 3.82 / D₁

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**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

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	
				Fr	0.0007	0.0011	0.0014	0.0021	0.0028	0.0043	0.0057	
			(48-72)	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	
				Fr	0.0004	0.0007	0.0009	0.0013	0.0017	0.0026	0.0035	
			(36-54)	Feed (ipm)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	95	RPM	2903	1935	1452	968	726	484	363	
				Fr	0.0007	0.0010	0.0014	0.0021	0.0028	0.0041	0.0055	
			(76-114)	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		
			Fr	0.0007	0.0010	0.0013	0.0020	0.0026	0.0039	0.0052		
		(48-72)	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		
			Fr	0.0004	0.0006	0.0007	0.0011	0.0015	0.0022	0.0030		
		(28-42)	Feed (ipm)	0.4	0.4	0.4	0.4	0.4	0.4	0.4		
H	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	
				Fr	0.0004	0.0006	0.0007	0.0011	0.0015	0.0022	0.0030	
			(28-42)	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	
				Fr	0.0003	0.0004	0.0005	0.0008	0.0010	0.0016	0.0021	
			(20-30)	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	
				Fr	0.0002	0.0002	0.0003	0.0005	0.0007	0.0010	0.0013	
			(16-24)	Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	105	RPM	3209	2139	1604	1070	802	535	401
					Fr	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
				(84-126)	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		
			Fr	0.0009	0.0014	0.0018	0.0027	0.0037	0.0055	0.0073		
	(60-90)		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	
				Fr	0.0004	0.0006	0.0009	0.0013	0.0017	0.0026	0.0035	
			(42-64)	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	
				Fr	0.0004	0.0005	0.0007	0.0011	0.0014	0.0021	0.0028	
			(37-55)	Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
		STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	28	RPM	856	570	428	285	214	143	107	
				Fr	0.0005	0.0007	0.0009	0.0014	0.0019	0.0028	0.0037	
			(22-34)	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		
			Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012		
		(17-25)	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		
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	69
			(14-22)	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	RPM	428	285	214	143	107	71	53
			(11-17)	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	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	138
			(29-43)	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	RPM	856	570	428	285	214	143	107
			(22-34)	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	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
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	225	RPM	6876	4584	3438	2292	1719	1146	860
			(180-270)	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	RPM	5806	3871	2903	1935	1452	968	726
			(152-228)	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	RPM	2903	1935	1452	968	726	484	363
			(76-114)	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	RPM	2445	1630	1222	815	611	407	306
			(64-96)	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)

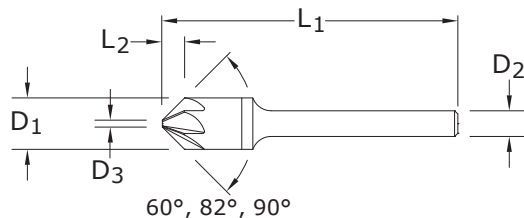
rpm = Vc x 3.82 / D₁

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)

6 Flute Countersink



606

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	.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

FRACTIONAL 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	
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
	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
H	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	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	
		≤ 330 Bhn or ≤ 36 HRc	46	RPM	1406	937	703	469	351	234	176
		(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	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	
		≤ 375 Bhn or ≤ 40 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	
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	69
		(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	53
		(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	138
		(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	

continued on next page

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		
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	225	RPM	6876	4584	3438	2292	1719	1146	860
			(180-270)	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
		≤ 150 Bhn or ≤ 7 HRc	190	RPM	5806	3871	2903	1935	1452	968	726
			(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	RPM	2903	1935	1452	968	726	484	363
			(76-114)	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
		≤ 200 Bhn or ≤ 23 HRc	80	RPM	2445	1630	1222	815	611	407	306
			(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 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)

Straight Flute Accu-Reamer

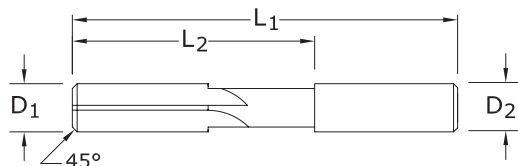


5xD



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

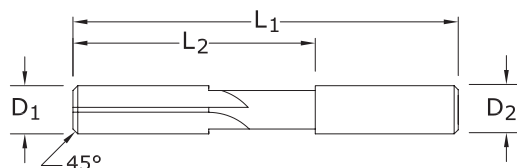
TOLERANCES (inch)

D₁ = +.0002/-0.0000D₂ = +.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)
 $D_1 = +.0002/-0.0000$
 $D_2 = +.0002/-0.0000$

200
FRACTIONAL SERIES

inch				NO. OF FLUTES
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	MAXIMUM REAM LENGTH L_2	OVERALL LENGTH L_1	
.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 – .1562	5/32	1-1/2	2-1/2	4
.1563 – .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 – .2812	9/32	2-1/4	3-1/4	6
.2813 – .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 – .4062	13/32	2-7/8	4	6
.4063 – .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 D_1 . 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. $\div 25.4$)
- The above sample would be a 1.25mm size ($1.25 \div 25.4 = 0.0492$)

All other dimensions are fractional as per table including the Shank

Straight Flute Accu-Reamer

Series 200 Fractional					Diameter (D ₁) (inch)						
					Hardness	Vc (sfm)	1/16	1/8	3/16	1/4	5/16
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	150	RPM	9168	4584	3056	2292	1834	1528	1146
			(120-180)	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	RPM	4584	2292	1528	1146	917	764	573
			(60-90)	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	RPM	3362	1681	1121	840	672	560	420
			(44-66)	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
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	115	RPM	7029	3514	2343	1757	1406	1171	879
			(92-138)	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	RPM	4278	2139	1426	1070	856	713	535
			(56-84)	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	RPM	2750	1375	917	688	550	458	344
			(36-54)	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
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	40	RPM	2445	1222	815	611	489	407	306
			(32-48)	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	RPM	1528	764	509	382	306	255	191
			(20-30)	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	RPM	1222	611	407	306	244	204	153
			(16-24)	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	RPM	856	428	285	214	171	143	107
			(11-17)	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
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	125	RPM	7640	3820	2547	1910	1528	1273	955
			(100-150)	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	RPM	5806	2903	1935	1452	1161	968	726
			(76-114)	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	RPM	4584	2292	1528	1146	917	764	573
			(60-90)	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	RPM	3362	1681	1121	840	672	560	420
			(44-66)	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
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	35	RPM	2139	1070	713	535	428	357	267
			(28-42)	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	RPM	1528	764	509	382	306	255	191
			(20-30)	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		
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	20	RPM	1222	611	407	306	244	204	153
			(16-24)	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	RPM	917	458	306	229	183	153	115
			(12-18)	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	RPM	611	306	204	153	122	102	76
			(8-12)	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	RPM	2750	1375	917	688	550	458	344
			(36-54)	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	RPM	2139	1070	713	535	428	357	267
			(28-42)	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	RPM	1528	764	509	382	306	255	191
			(20-30)	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
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	270	RPM	16502	8251	5501	4126	3300	2750	2063
			(216-324)	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	RPM	14058	7029	4686	3514	2812	2343	1757
			(184-276)	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	RPM	7029	3514	2343	1757	1406	1171	879
			(92-138)	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	RPM	5806	2903	1935	1452	1161	968	726
			(76-114)	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 x 3.82 / D₁

ipm = Fr x rpm

increase speed and feed 30 percent when using coated reamers

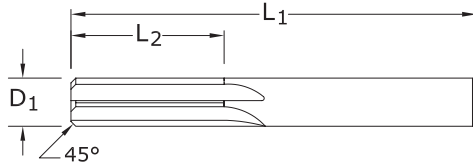
reduce speed and feed for materials harder than listed

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

Straight Flute Reamer



3xD


201M
METRIC SERIES


CUTTING DIAMETER D ₁	mm		NO. OF FLUTES	EDP NO.
	MAXIMUM REAM LENGTH L ₂	OVERALL LENGTH L ₁		UNCOATED
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
	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
H	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

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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	

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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	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	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	188

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

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

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	29	Multi-Flute Plastic Composite Fractional	352
	29M	Multi-Flute Plastic Composite Metric	354
Carbon Composite	20-CCR	Multi-Flute Carbon Composite Fractional	356
	20M-CCR	Multi-Flute Carbon Composite Metric	359
Coarse Cut Carbon Composite	31-CCR	Multi-Flute Coarse Composite Fractional	362
	31M-CCR	Multi-Flute Coarse Composite Metric	364
Compression	25	Multi-Flute Compression Fractional	366
	25M	Multi-Flute Compression Metric	368
GENERAL PURPOSE ROUTERS	SERIES	DESCRIPTION	PAGE
Up Cut	21	2 Flute Up Cut Fractional	370
	21M	2 Flute Up Cut Metric	373
Down Cut	22	2 Flute Down Cut Fractional	371
	22M	2 Flute Down Cut Metric	374

Speed & Feed Recommendations listed after each series

Ranurado

RANURADORES DE ALTO RENDIMIENTO	SERIE	DESCRIPCIÓN	PÁGINA
Compuesto de plástico	29	Filo múltiple, compuesto plástico, fraccional	352
	29M	Filo múltiple, compuesto plástico, métrico	354
Compuesto de carbono	20-CCR	Filo múltiple, compuesto de carbono, fraccional	356
	20M-CCR	Filo múltiple, compuesto de carbono, métrico	359
Compuesto de carbono de corte áspero	31-CCR	Filo múltiple, compuesto áspero, fraccional	362
	31M-CCR	Filo múltiple, compuesto áspero, métrico	364
Compresión	25	Filo múltiple, compresión, fraccional	366
	25M	Filo múltiple, compresión, métrico	368

RANURADORES DE USO GENERAL	SERIE	DESCRIPCIÓN	PÁGINA
Corte ascendente	21	2 filos, corte ascendente, fraccional	370
	21M	2 filos, corte ascendente, métrico	373
Corte descendente	22	2 filos, corte descendente, fraccional	371
	22M	2 filos, corte descendente, métrico	374

Recomendaciones de velocidades y avances mostradas tras cada serie

Détourage

FRAISES A DETOURER HAUTE PERFORMANCE	SERIES	DESCRIPTION	PAGE
Composites plastique	29	Multi-dents pour composites plastique (fractionnel)	352
	29M	Multi-dents pour composites plastique (métrique)	354
Composites carbone	20-CCR	Multi-dents pour composites carbone (fractionnel)	356
	20M-CCR	Multi-dents pour composites carbone (métrique)	359
Pour composites carbone coupe grossière	31-CCR	Multi-dents pour composites grossiers (fractionnel)	362
	31M-CCR	Multi-dents pour composites grossiers (métrique)	364
Compression	25	Multi-dents de compression (fractionnel)	366
	25M	Multi-dents de compression (métrique)	368

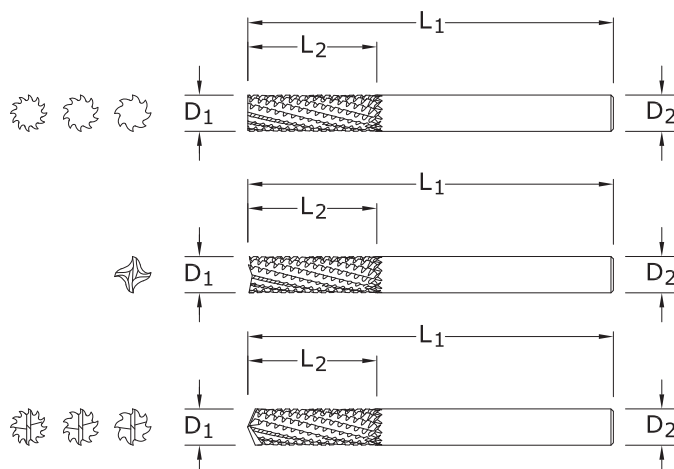
FRAISES À DÉTOURER UNIVERSELLES	SERIES	DESCRIPTION	PAGE
Coupe ascendante	21	2 dents coupe ascendante (fractionnel)	370
	21M	2 dents coupe ascendante (métrique)	373
Coupe descendante	22	2 dents coupe descendante (fractionnel)	371
	22M	2 dents coupe descendante (métrique)	374

Recommandations de vitesse et avance indiquées après chaque série

HOCHLEISTUNGS-OBERFRÄSE	SERIE	BESCHREIBUNG	SEITE
Verbundkunststoff	29	Zöllige Oberfräse mit mehrschneidigen Schneidekanten für Verbundkunststoff	352
	29M	Zöllige Oberfräse mit mehrschneidigen Schneidekanten für Verbundkunststoff	354
Kohlefaserverbundwerkstoff	20-CCR	Zöllige Oberfräse mit mehrschneidigen Schneidekanten für Kohlefaserverbundwerkstoff	356
	20M-CCR	Metrische Oberfräse mit mehrschneidigen Schneidekanten für Kohlefaserverbundwerkstoff	359
Grobschnitt Kohlefaserverbundwerkstoff	31-CCR	Zöllige Oberfräse mit mehrschneidigen Schneidekanten für Verbundkunststoff-Grobschnitt	362
	31M-CCR	Metrische Oberfräse mit mehrschneidigen Schneidekanten für Verbundkunststoff	364
Gegenläufiger Drall	25	Zöllige gegenläufige mehrschneidige Oberfräse	366
	25M	Metrische gegenläufige mehrschneidige Oberfräse	368

ALLZWECK-OBERFRÄSEN	SERIE	BESCHREIBUNG	SEITE
Gegenlauf	21	Zöllige gegenläufige Oberfräse mit 2 Schneidekanten	370
	21M	Zöllige gegenläufige Oberfräse mit 2 Schneidekanten	373
Gleichlauf	22	Zöllige gleichläufige Oberfräse mit 2 Schneidekanten	371
	22M	Zöllige gleichläufige Oberfräse mit 2 Schneidekanten	374

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie



29

FRACTIONAL 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

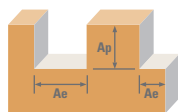
inch						EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	NO. OF FLUTES	END STYLE	UNCOATED	Di-NAMITE® (Diamond)
1/8	1/2	1-1/2	1/8	8	No End Cut	74280	75080
1/8	1/2	1-1/2	1/8	8	End Mill	74281	75081
1/8	1/2	1-1/2	1/8	8	Drill	74282	75082
1/4	1	2-1/2	1/4	10	No End Cut	74283	75083
1/4	1	2-1/2	1/4	10	End Mill	74284	75084
1/4	1	2-1/2	1/4	10	Drill	74285	75085
5/16	1	2-1/2	5/16	12	No End Cut	74286	75086
5/16	1	2-1/2	5/16	12	End Mill	74287	75087
5/16	1	2-1/2	5/16	12	Drill	74288	75088
3/8	1-1/8	2-1/2	3/8	12	No End Cut	74289	75089
3/8	1-1/8	2-1/2	3/8	12	End Mill	74290	75090
3/8	1-1/8	2-1/2	3/8	12	Drill	74291	75091

TOLERANCES (inch)

D₁ = +.000/-.005D₂ = h₆

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

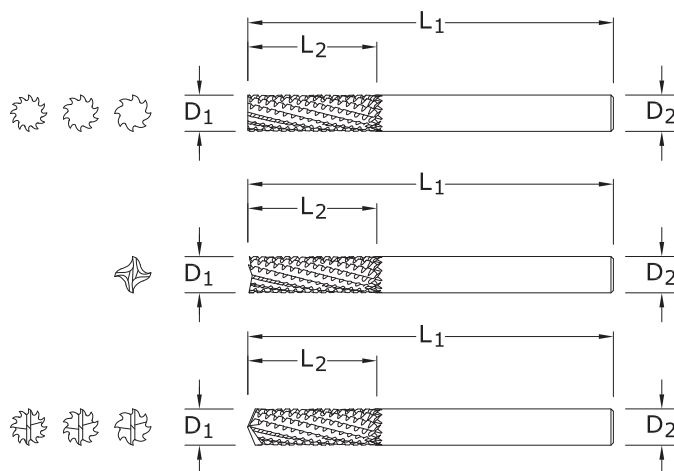


Series 29 Fractional				Vc (sfm)	Diameter (D ₁) (inch)					
	Ae x D ₁	Ap x D ₁	1/8		1/4	5/16	3/8			
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)		1	≤ 1	400	RPM	12224	6112	4890	4075
					(320-480)	Fr	0.0024	0.0048	0.0060	0.0072
						Feed (ipm)	29	29	29	29
			≤ 0.5	≤ 1.5	500	RPM	15280	7640	6112	5093
					(400-600)	Fr	0.0024	0.0048	0.0060	0.0072
						Feed (ipm)	37	37	37	37
			≤ 0.05	≤ 2	825	RPM	25212	12606	10085	8404
					(660-990)	Fr	0.0055	0.0110	0.0138	0.0165
						Feed (ipm)	139	139	139	139
	GFRP (FIBERGLASS)		1	≤ 1	320	RPM	9779	4890	3912	3260
					(256-384)	Fr	0.0024	0.0048	0.0060	0.0072
						Feed (ipm)	23	23	23	23
			≤ 0.5	≤ 1.5	400	RPM	12224	6112	4890	4075
					(320-480)	Fr	0.0024	0.0048	0.0060	0.0072
						Feed (ipm)	29	29	29	29
			≤ 0.05	≤ 2	660	RPM	20170	10085	8068	6723
					(528-792)	Fr	0.0055	0.0110	0.0138	0.0165
						Feed (ipm)	111	111	111	111
	CARBON, GRAPHITE		1	≤ 1	480	RPM	14669	7334	5868	4890
					(384-576)	Fr	0.0037	0.0075	0.0094	0.0112
						Feed (ipm)	55	55	55	55
			≤ 0.5	≤ 1.5	600	RPM	18336	9168	7334	6112
					(480-720)	Fr	0.0037	0.0075	0.0094	0.0112
						Feed (ipm)	69	69	69	69
			≤ 0.05	≤ 2	990	RPM	30254	15127	12102	10085
					(792-1188)	Fr	0.0086	0.0172	0.0215	0.0258
						Feed (ipm)	260	260	260	260
	PLASTICS		1	≤ 1	800	RPM	24448	12224	9779	8149
					(640-690)	Fr	0.0038	0.0075	0.0094	0.0113
						Feed (ipm)	92	92	92	92
			≤ 0.5	≤ 1.5	1000	RPM	30560	15280	12224	10187
					(800-1200)	Fr	0.0038	0.0075	0.0094	0.0113
						Feed (ipm)	115	115	115	115
			≤ 0.05	≤ 2	1650	RPM	50424	25212	20170	16808
					(1320-1980)	Fr	0.0035	0.0069	0.0086	0.0104
						Feed (ipm)	174	174	174	174

HSM (high speed machining)
 $\text{rpm} = \text{Vc} \times 3.82 / D_1$
 $\text{ipm} = \text{Fr} \times \text{rpm}$
 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)

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)

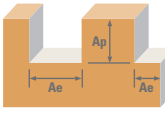
$D_1 = +0,00/-0,13$

$D_2 = h_6$

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

Plastic Composite

Series 29M Metric				Vc (m/min)	Diameter (D ₁) (mm)					
	Ae x D ₁	Ap x D ₁			3	6	8	10		
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)		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
			≤ 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
			≤ 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)		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
			≤ 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
			≤ 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		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
			≤ 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
			≤ 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		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	
		≤ 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	
		≤ 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)
 $\text{rpm} = (\text{Vc} \times 1000) / (\text{D}_1 \times 3.14)$
 $\text{mm/min} = \text{Fr} \times \text{rpm}$
 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
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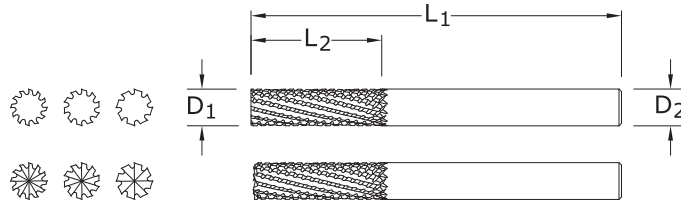
Carbon Composite



20-CCR

FRACTIONAL 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



inch						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)
1/4	1	2-1/2	1/4	8	No End Cutting	72930	73013
1/4	1	2-1/2	1/4	8	End Cutting	72947	73012
5/16	1	2-1/2	5/16	10	No End Cutting	72948	73026
5/16	1	2-1/2	5/16	10	End Cutting	72949	73014
3/8	1-1/8	2-1/2	3/8	12	No End Cutting	72950	73028
3/8	1-1/8	2-1/2	3/8	12	End Cutting	72951	73027
1/2	1-1/2	3-1/2	1/2	12	No End Cutting	72952	73041
1/2	1-1/2	3-1/2	1/2	12	End Cutting	72953	73029

TOLERANCES (inch)

D₁ = +.000/-.005

D₂ = h₆

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com



FRACTIONAL Carbon Composite



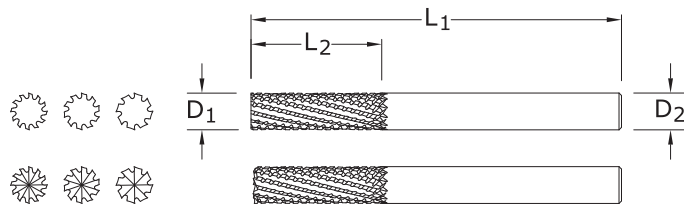
TOLERANCES (inch)

$D_1 = +.000/-0.005$

$D_2 = h_6$

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

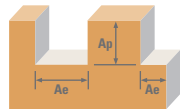


20-CCR-LHC FRACTIONAL SERIES

inch						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)
1/4	1	2-1/2	1/4	8	No End Cutting	73070	73078
1/4	1	2-1/2	1/4	8	End Cutting	73071	73079
5/16	1	2-1/2	5/16	10	No End Cutting	73072	73080
5/16	1	2-1/2	5/16	10	End Cutting	73073	73081
3/8	1-1/8	2-1/2	3/8	12	No End Cutting	73074	73082
3/8	1-1/8	2-1/2	3/8	12	End Cutting	73075	73083

- Multi-flute design and positive geometry to shear with minimal pressure and delamination
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- Excels at trimming and profiling difficult and abrasive fiber filled plastics

Carbon Composite



Series 20 Fractional				Vc (sfm)		Diameter (D ₁) (inch)				
	Ae x D ₁	Ap x D ₁	1/4			5/16	3/8	1/2		
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)		1	≤ 1	400	RPM	6112	4890	4075	3056
					(320-480)	Fr	0.0049	0.0094	0.0135	0.0180
						Feed (ipm)	30	46	55	55
			≤ 0.5	≤ 1.5	500	RPM	7640	6112	5093	3820
					(400-600)	Fr	0.0049	0.0094	0.0135	0.0180
						Feed (ipm)	38	58	69	69
			≤ 0.05	≤ 2	825	RPM	12606	10085	8404	6303
					(660-990)	Fr	0.0111	0.0215	0.0309	0.0413
						Feed (ipm)	140	217	260	260
	GFRP (FIBERGLASS)		1	≤ 1	320	RPM	4890	3912	3260	2445
					(256-384)	Fr	0.0049	0.0095	0.0135	0.0180
						Feed (ipm)	24	37	44	44
			≤ 0.5	≤ 1.5	400	RPM	6112	4890	4075	3056
					(320-480)	Fr	0.0049	0.0095	0.0135	0.0180
						Feed (ipm)	30	46	55	55
			≤ 0.05	≤ 2	660	RPM	10085	8068	6723	5042
					(528-792)	Fr	0.0110	0.0214	0.0311	0.0414
						Feed (ipm)	111	173	209	209
	CARBON, GRAPHITE		1	≤ 1	480	RPM	7334	5868	4890	3667
					(384-576)	Fr	0.0064	0.0124	0.0180	0.0240
						Feed (ipm)	47	73	88	88
			≤ 0.5	≤ 1.5	600	RPM	9168	7334	6112	4584
					(480-720)	Fr	0.0064	0.0124	0.0180	0.0240
						Feed (ipm)	59	91	110	110
		≤ 0.05	≤ 2	990	RPM	15127	12102	10085	7564	
				(792-1188)	Fr	0.0147	0.0287	0.0412	0.0549	
					Feed (ipm)	223	347	415	415	
PLASTICS		1	≤ 1	800	RPM	12224	9779	8149	6112	
				(640-690)	Fr	0.0064	0.0125	0.0180	0.0241	
					Feed (ipm)	78	122	147	147	
		≤ 0.5	≤ 1.5	1000	RPM	15280	12224	10187	7640	
				(800-1200)	Fr	0.0064	0.0125	0.0180	0.0241	
					Feed (ipm)	98	153	184	184	
		≤ 0.05	≤ 2	1650	RPM	25212	20170	16808	12606	
				(1320-1980)	Fr	0.0147	0.0287	0.0413	0.0551	
					Feed (ipm)	370	579	694	694	

HSM (high speed machining)

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

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

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

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Carbon Composite

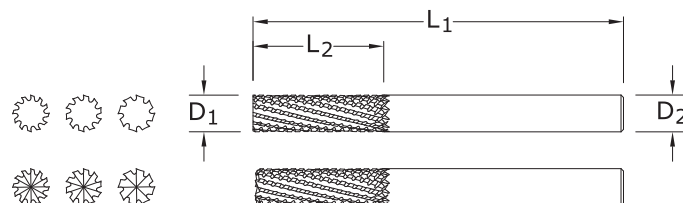


TOLERANCES (mm)

 $D_1 = +0,00/-0,13$
 $D_2 = h_6$

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com



20M-CCR METRIC SERIES

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

- 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

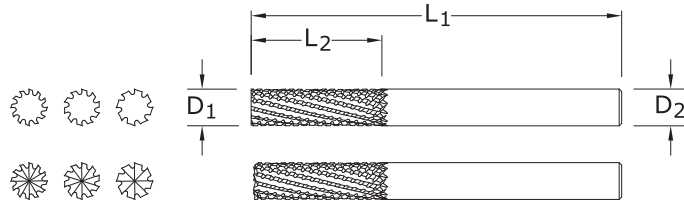
Carbon Composite



20M-CCR-LHC

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	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

TOLERANCES (mm)

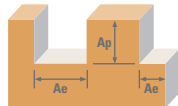
D₁ = +0,00/-0,13

D₂ = h₆

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

Carbon Composite



Series 20M Metric

Ae x D₁

Ap x D₁

Vc (m/min)

3

6

8

10

12

Diameter (D₁) (mm)

CFRP, AFRP (CARBON FIBER, ARAMID FIBER)

Slot

1

≤ 1

120

(96-164)

RPM

Fr

Feed (mm/min)

12722

0.055

700

6361

0.113

720

4771

0.243

1160

3817

0.366

1395

3181

0.439

1395

Profile

≤ 0.5

≤ 1.5

150

(120-180)

RPM

Fr

Feed (mm/min)

15903

0.055

875

7951

0.113

900

5963

0.243

1450

4771

0.366

1744

3976

0.439

1744

HSM

≤ 0.05

≤ 2

250

(200-300)

RPM

Fr

Feed (mm/min)

26504

0.126

3350

13252

0.260

3450

9939

0.556

5527

7951

0.833

6625

6626

1.000

6625

GFRP (FIBERGLASS)

Slot

1

≤ 1

100

(80-120)

RPM

Fr

Feed (mm/min)

10602

0.054

570

5301

0.111

587

3976

0.236

940

3181

0.357

1135

2650

0.428

1135

Profile

≤ 0.5

≤ 1.5

120

(96-164)

RPM

Fr

Feed (mm/min)

12722

0.054

684

6361

0.111

704

4771

0.236

1128

3817

0.357

1362

3181

0.428

1362

HSM

≤ 0.05

≤ 2

200

(160-240)

RPM

Fr

Feed (mm/min)

21203

0.124

2629

10602

0.261

2765

7951

0.557

4430

6361

1.011

6430

5301

1.213

6430

CARBON, GRAPHITE

Slot

1

≤ 1

145

(116-174)

RPM

Fr

Feed (mm/min)

15372

0.069

1061

7686

0.152

1165

5765

0.323

1860

4612

0.482

2224

3843

0.579

2224

Profile

≤ 0.5

≤ 1.5

185

(148-222)

RPM

Fr

Feed (mm/min)

19613

0.069

1353

9807

0.152

1486

7355

0.323

2373

5884

0.482

2838

4903

0.579

2838

HSM

≤ 0.05

≤ 2

300

(240-360)

RPM

Fr

Feed (mm/min)

31805

0.159

5057

15903

0.348

5535

11927

0.740

8820

9542

1.109

10580

7951

1.331

10580

PLASTICS

Slot

1

≤ 1

245

(196-294)

RPM

Fr

Feed (mm/min)

25974

0.069

1792

12987

0.150

1945

9740

0.319

3107

7792

0.477

3717

6494

0.572

3717

Profile

≤ 0.5

≤ 1.5

305

(244-366)

RPM

Fr

Feed (mm/min)

32335

0.069

2231

16168

0.150

2421

12126

0.319

3868

9701

0.477

4627

8084

0.572

4627

HSM

≤ 0.05

≤ 2

505

(404-606)

RPM

Fr

Feed (mm/min)

53538

0.159

8513

26769

0.344

9220

20077

0.732

14690

16062

1.097

17617

13385

1.316

17617

HSM (high speed machining)
 $\text{rpm} = (\text{Vc} \times 1000) / (D_1 \times 3.14)$
 $\text{mm/min} = \text{Fr} \times \text{rpm}$
 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

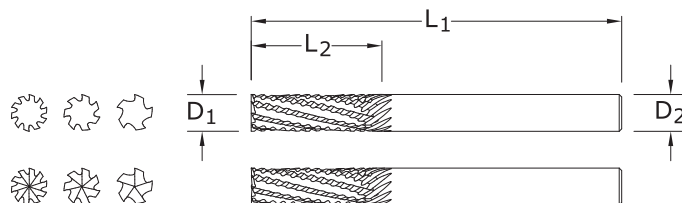
finish cuts typically required reduced feed and cutting depths
 rates shown are for use without coolant; rates may be increased with coolant
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Coarse Cut Carbon Composite



31-CCR FRACTIONAL SERIES

- 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
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inch						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)
1/4	1	2-1/2	1/4	5	End Cutting	72954	72955
1/4	1	2-1/2	1/4	5	No End Cutting	72956	72957
5/16	1	2-1/2	5/16	7	End Cutting	72958	72959
5/16	1	2-1/2	5/16	7	No End Cutting	72960	72961
3/8	1-1/8	2-1/2	3/8	8	End Cutting	72962	72963
3/8	1-1/8	2-1/2	3/8	8	No End Cutting	72964	72965
1/2	1-1/2	3-1/2	1/2	10	End Cutting	72966	72967
1/2	1-1/2	3-1/2	1/2	10	No End Cutting	72968	72969

TOLERANCES (inch)

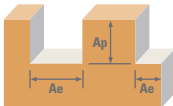
D₁ = +.000/-.005

D₂ = h₆

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

Coarse Cut Carbon Composite

Series 31 Fractional				Vc (sfm)		Diameter (D ₁) (inch)				
		Ae x D ₁	Ap x D ₁			1/4	5/16	3/8	1/2	
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)		1	≤ 1	400	RPM	6112	4890	4075	3056
					(320-480)	Fr	0.0029	0.0065	0.0088	0.0147
						Feed (ipm)	18	32	36	45
			≤ 0.5	≤ 1.5	500	RPM	7640	6112	5093	3820
					(400-600)	Fr	0.0029	0.0065	0.0088	0.0147
						Feed (ipm)	23	40	45	56
			≤ 0.05	≤ 2	825	RPM	12606	10085	8404	6303
					(660-990)	Fr	0.0069	0.0151	0.0206	0.0344
						Feed (ipm)	87	152	173	217
	GFRP (FIBERGLASS)		1	≤ 1	320	RPM	4890	3912	3260	2445
					(256-384)	Fr	0.0031	0.0066	0.0089	0.0147
						Feed (ipm)	15	26	29	36
			≤ 0.5	≤ 1.5	400	RPM	6112	4890	4075	3056
					(320-480)	Fr	0.0031	0.0066	0.0089	0.0147
						Feed (ipm)	19	33	36	45
			≤ 0.05	≤ 2	660	RPM	10085	8068	6723	5042
					(528-792)	Fr	0.0069	0.0150	0.0205	0.0343
						Feed (ipm)	70	121	138	173
	CARBON, GRAPHITE		1	≤ 1	480	RPM	7334	5868	4890	3667
					(384-576)	Fr	0.0040	0.0087	0.0119	0.0199
						Feed (ipm)	29	51	58	73
			≤ 0.5	≤ 1.5	600	RPM	9168	7334	6112	4584
					(480-720)	Fr	0.0040	0.0087	0.0119	0.0199
						Feed (ipm)	36	64	73	91
			≤ 0.05	≤ 2	990	RPM	15127	12102	10085	7564
					(792-1188)	Fr	0.0092	0.0201	0.0275	0.0459
						Feed (ipm)	139	243	277	347
PLASTICS		1	≤ 1	800	RPM	12224	9779	8149	6112	
				(640-690)	Fr	0.0040	0.0087	0.0119	0.0200	
					Feed (ipm)	49	85	97	122	
		≤ 0.5	≤ 1.5	1000	RPM	15280	12224	10187	7640	
				(800-1200)	Fr	0.0040	0.0087	0.0119	0.0200	
					Feed (ipm)	61	106	121	153	
		≤ 0.05	≤ 2	1650	RPM	25212	20170	16808	12606	
				(1320-1980)	Fr	0.0092	0.0201	0.0275	0.0459	
					Feed (ipm)	232	405	462	578	

HSM (high speed machining)

rpm = Vc x 3.82 / D₁

ipm = 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

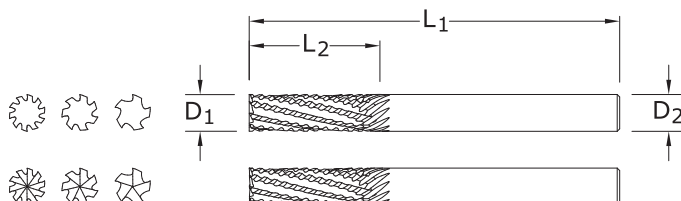
(www.kyocera-sgstool.com)

Coarse Cut Carbon Composite



31M-CCR

METRIC SERIES



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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)
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

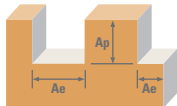
TOLERANCES (mm)

D₁ = +0,00/-0,13D₂ = h₆

PLASTICS/COMPOSITES

For patent
information visit
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Coarse Cut Carbon Composite

Series 31M Metric				Vc (m/min)	Diameter (D ₁) (mm)					
	Ae x D ₁	Ap x D ₁			6	8	10	12		
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)		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
			≤ 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
			≤ 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)		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
			≤ 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
			≤ 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		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
			≤ 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
			≤ 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		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
			≤ 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
			≤ 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)
 $\text{rpm} = (\text{Vc} \times 1000) / (D_1 \times 3.14)$
 $\text{mm/min} = \text{Fr} \times \text{rpm}$
 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)

FRACTIONAL

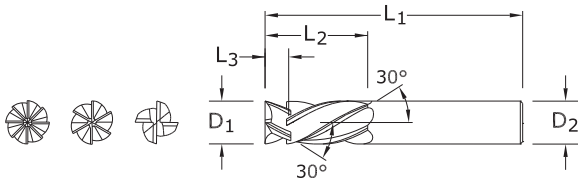
Compression



25

FRACTIONAL SERIES

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



inch						EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	INTERSECT LENGTH L ₃	NO. OF FLUTES	UNCOATED	Di-NAMITE® (Diamond)
1/4	1	2-1/2	1/4	11/64	4	72970	72971
5/16	1	2-1/2	5/16	7/32	4	72972	72973
3/8	1-1/8	2-1/2	3/8	17/64	6	72974	72975
1/2	1-1/2	3-1/2	1/2	23/64	8	72976	72977

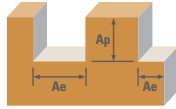
TOLERANCES (inch)

D₁ = +.000/–.003

D₂ = h₆

PLASTICS/COMPOSITES

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Series 25 Fractional				Vc (sfm)	Diameter (D1) (inch)				
	Ae x D1	Ap x D1			1/4	5/16	3/8	1/2	
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	 Profile	≤ 0.5	≤ 1.5	500	RPM	7640	6112	5093	3820
				(400-600)	Fz	0.0016	0.0030	0.0040	0.0048
					Feed (ipm)	49	73	122	147
	 HSM	≤ 0.05	≤ 2	825	RPM	12606	10085	8404	6303
				(660-990)	Fz	0.0037	0.0069	0.0092	0.0110
					Feed (ipm)	187	278	464	555
GFRP (FIBERGLASS)	 Profile	≤ 0.5	≤ 1.5	400	RPM	6112	4890	4075	3056
				(320-480)	Fz	0.0016	0.0030	0.0040	0.0048
					Feed (ipm)	39	59	98	117
	 HSM	≤ 0.05	≤ 2	660	RPM	10085	8068	6723	5042
				(528-792)	Fz	0.0037	0.0069	0.0092	0.0110
					Feed (ipm)	149	223	371	444
N CARBON, GRAPHITE	 Profile	≤ 0.5	≤ 1.5	600	RPM	9168	7334	6112	4584
				(480-720)	Fz	0.0020	0.0038	0.0050	0.0060
					Feed (ipm)	73	111	183	220
	 HSM	≤ 0.05	≤ 2	990	RPM	15127	12102	10085	7564
				(792-1188)	Fz	0.0046	0.0086	0.0115	0.0138
					Feed (ipm)	278	416	696	835
PLASTICS	 Profile	≤ 0.5	≤ 1.5	1000	RPM	15280	12224	10187	7640
				(800-1200)	Fz	0.0020	0.0038	0.0050	0.0060
					Feed (ipm)	122	186	306	367
	 HSM	≤ 0.05	≤ 2	1650	RPM	25212	20170	16808	12606
				(1320-1980)	Fz	0.0046	0.0086	0.0115	0.0138
					Feed (ipm)	464	694	1160	1392
MACHINABLE CERAMICS MACHINABLE GLASS	 Profile	≤ 0.5	≤ 1.5	50	RPM	764	611	509	382
				(40-60)	Fz	0.0008	0.0015	0.0020	0.0024
					Feed (ipm)	2.4	3.7	6.1	7.3
	 HSM	≤ 0.05	≤ 2	85	RPM	1299	1039	866	649
				(68-102)	Fz	0.0018	0.0034	0.0046	0.0055
					Feed (ipm)	9.4	14.1	23.9	28.6

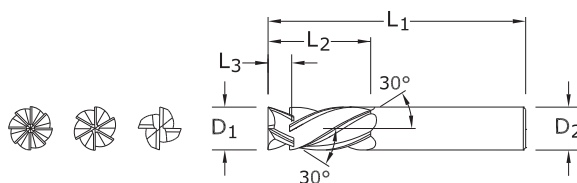
HSM (high speed machining)
 $\text{rpm} = \text{Vc} \times 3.82 / D_1$
 $\text{ipm} = \text{Fz} \times \text{number of flutes} \times \text{rpm}$
 adjust parameters based on resin type and fiber structure
 reduce speed when overheating causes melting or damage to resin
 reduce feed if delamination or 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)

Compression



25M METRIC SERIES



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

mm						EDP NO.	
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	INTERSECT LENGTH L ₃	NO. OF FLUTES	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

TOLERANCES (mm)

D₁ = +0,00/-0,08

D₂ = h₆

PLASTICS/COMPOSITES

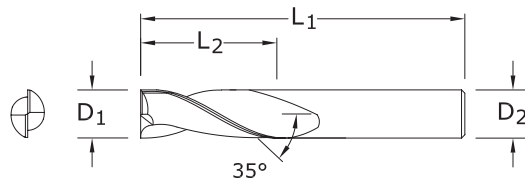
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FRACTIONAL Up Cut



21

FRACTIONAL SERIES



TOLERANCES (inch)

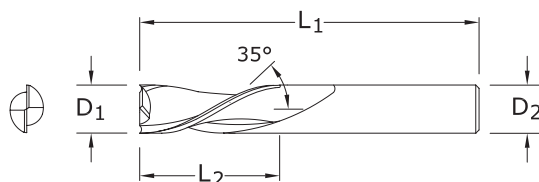
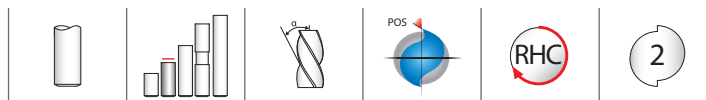
$D_1 = +.000/-0.003$

$D_2 = h_6$

PLASTICS/COMPOSITES

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	inch			EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED
1/8	1/2	2	1/4	90001
5/32	5/8	2-1/2	1/4	90005
3/16	3/4	2-1/2	1/4	90009
1/4	3/4	2-1/2	1/4	90013
1/4	1	2-1/2	1/4	90017
5/16	1	2-1/2	5/16	90021
5/16	1	3	1/2	90025
3/8	1	2-1/2	3/8	90029
3/8	1-1/4	3	1/2	90033
1/2	1-1/4	3	1/2	90037
1/2	1-1/2	3-1/2	1/2	90041
1/2	2	4	1/2	90045
5/8	2	4-1/2	5/8	90049
3/4	2	4-1/2	3/4	90053



TOLERANCES (inch)

$D_1 = +.000/-0.003$

$D_2 = h_6$

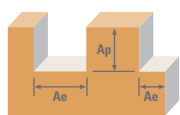
PLASTICS/COMPOSITES

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22
FRACTIONAL SERIES

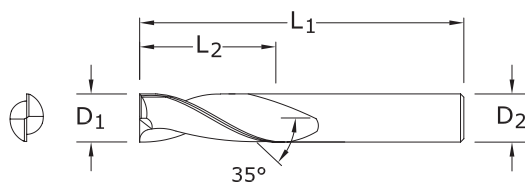
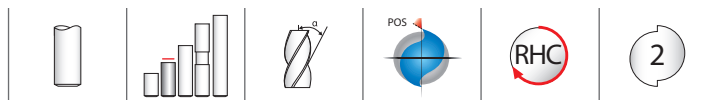
	inch			EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED
1/8	1/2	2	1/4	91001
5/32	5/8	2-1/2	1/4	91005
3/16	3/4	2-1/2	1/4	91009
1/4	3/4	2-1/2	1/4	91013
1/4	1	2-1/2	1/4	91017
5/16	1	2-1/2	5/16	91021
5/16	1	3	1/2	91025
3/8	1	2-1/2	3/8	91029
3/8	1-1/4	3	1/2	91033
1/2	1-1/4	3	1/2	91037
1/2	1-1/2	3-1/2	1/2	91041
1/2	2	4	1/2	91045
5/8	2	4-1/2	5/8	91049
3/4	2	4-1/2	3/4	91053

Up Cut Down Cut



Series 21, 22 Fractional		Ae x D ₁ Ap x D ₁		Vc (sfm)		Diameter (D ₁) (inch)				
						1/8	1/4	3/8	1/2	3/4
HARDWOODS	Slot 	1	≤ 1	1550	RPM	47368	23684	15789	11842	7895
				(1240-1860)	Fz	0.0008	0.0015	0.0025	0.0030	0.0045
					Feed (ipm)	76	71	79	71	71
	Profile 	≤ 0.5	≤ 1.5	1550	RPM	47368	23684	15789	11842	7895
				(1240-1860)	Fz	0.0008	0.0015	0.0025	0.0030	0.0045
					Feed (ipm)	76	71	79	71	71
	Slot 	1	≤ 1	1950	RPM	59592	29796	19864	14898	9932
				(1560-2340)	Fz	0.0010	0.0020	0.0030	0.0035	0.0055
					Feed (ipm)	119	119	119	104	109
	Profile 	≤ 0.5	≤ 1.5	1950	RPM	59592	29796	19864	14898	9932
				(1560-2340)	Fz	0.0010	0.0020	0.0030	0.0035	0.0055
					Feed (ipm)	119	119	119	104	109
PLYWOODS	Slot 	1	≤ 1	1950	RPM	59592	29796	19864	14898	9932
				(1560-2340)	Fz	0.0013	0.0025	0.0040	0.0050	0.0075
					Feed (ipm)	155	149	159	149	149
	Profile 	≤ 0.5	≤ 1.5	1950	RPM	59592	29796	19864	14898	9932
				(1560-2340)	Fz	0.0013	0.0025	0.0040	0.0050	0.0075
					Feed (ipm)	155	149	159	149	149
N PLASTICS	Slot 	1	≤ 1	1950	RPM	59592	29796	19864	14898	9932
				(1560-2340)	Fz	0.0008	0.0017	0.0025	0.0035	0.0050
					Feed (ipm)	95	101	99	104	99
	Profile 	≤ 0.5	≤ 1.5	1950	RPM	59592	29796	19864	14898	9932
				(1560-2340)	Fz	0.0008	0.0017	0.0025	0.0035	0.0050
					Feed (ipm)	95	101	99	104	99

rpm = Vc x 3.82 / D₁
ipm = Fz x 2 x rpm



TOLERANCES (mm)

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

$D_2 = h_6$

PLASTICS/COMPOSITES

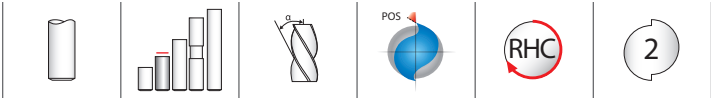
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21M
METRIC SERIES

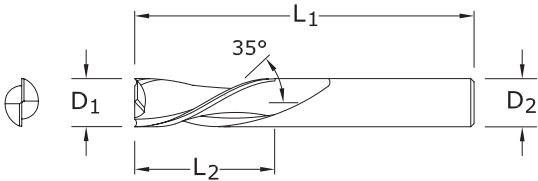
mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED
3,0	13,0	50,0	6,0	90101
4,0	16,0	63,0	6,0	90107
5,0	19,0	63,0	6,0	90109
6,0	25,0	63,0	6,0	90113
8,0	25,0	63,0	8,0	90121
10,0	31,0	75,0	10,0	90129
12,0	31,0	75,0	12,0	90137

METRIC

Down Cut



22M
METRIC SERIES



mm				EDP NO.
CUTTING DIAMETER D ₁	LENGTH OF CUT L ₂	OVERALL LENGTH L ₁	SHANK DIAMETER D ₂	UNCOATED
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

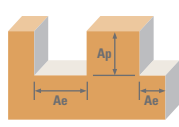
D₂ = h₆

PLASTICS/COMPOSITES

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METRIC

Up Cut Down Cut

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

rpm = (V_c x 1000) / (D₁ x 3.14)
mm/min = Fz x 2 x rpm

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
30000.....	193	30111.....	193	30192.....	193	30375.....	180	30495.....	185	30578.....	189	30833.....	188
30001.....	193	30112.....	198	30193.....	193	30376.....	185	30496.....	185	30589.....	211	30834.....	188
30002.....	193	30113.....	193	30194.....	193	30377.....	179	30497.....	185	30590.....	189	30835.....	188
30003.....	193	30114.....	198	30195.....	193	30378.....	184	30498.....	185	30590.....	212	30836.....	188
30004.....	193	30115.....	193	30196.....	193	30379.....	194	30499.....	185	30591.....	185	30837.....	188
30005.....	193	30116.....	198	30197.....	193	30380.....	194	30500.....	185	30592.....	185	30838.....	188
30006.....	193	30117.....	193	30198.....	193	30381.....	194	30501.....	188	30593.....	185	30839.....	188
30007.....	193	30118.....	198	30199.....	193	30382.....	194	30502.....	189	30594.....	185	30840.....	188
30008.....	193	30119.....	193	30300.....	193	30383.....	194	30503.....	188	30595.....	185	30841.....	188
30009.....	193	30120.....	198	30301.....	179	30384.....	199	30504.....	189	30596.....	185	30842.....	188
30010.....	193	30121.....	193	30302.....	184	30385.....	199	30505.....	188	30597.....	185	30843.....	188
30011.....	193	30122.....	198	30303.....	179	30386.....	199	30506.....	189	30598.....	185	30844.....	188
30012.....	194	30123.....	193	30304.....	184	30387.....	199	30507.....	188	30599.....	184	30845.....	188
30013.....	194	30124.....	198	30305.....	179	30388.....	199	30508.....	189	30600.....	185	30846.....	188
30014.....	194	30125.....	193	30306.....	184	30389.....	180	30509.....	188	30600.....	212	30847.....	188
30015.....	194	30126.....	198	30307.....	179	30389.....	211	30510.....	189	30602.....	189	30848.....	188
30016.....	194	30127.....	193	30308.....	184	30390.....	185	30511.....	188	30604.....	189	30849.....	188
30017.....	194	30128.....	198	30309.....	179	30390.....	212	30512.....	189	30606.....	189	30850.....	211
30018.....	194	30129.....	193	30310.....	184	30397.....	179	30513.....	188	30608.....	189	30851.....	189
30019.....	194	30130.....	198	30311.....	179	30398.....	179	30514.....	189	30610.....	189	30852.....	189
30020.....	194	30131.....	193	30312.....	184	30399.....	179	30515.....	188	30612.....	189	30853.....	189
30021.....	194	30132.....	198	30313.....	179	30400.....	179	30516.....	189	30771.....	188	30854.....	189
30022.....	194	30133.....	193	30314.....	184	30435.....	179	30517.....	188	30772.....	188	30855.....	189
30023.....	194	30134.....	198	30315.....	179	30436.....	179	30518.....	189	30773.....	188	30856.....	189
30024.....	194	30135.....	193	30316.....	184	30437.....	179	30519.....	188	30774.....	188	30857.....	189
30025.....	194	30136.....	198	30317.....	179	30438.....	179	30520.....	189	30775.....	188	30858.....	189
30026.....	194	30137.....	193	30318.....	184	30439.....	179	30521.....	188	30776.....	188	30859.....	189
30027.....	194	30138.....	198	30319.....	179	30440.....	179	30522.....	189	30777.....	188	30860.....	189
30028.....	194	30139.....	193	30320.....	184	30441.....	179	30523.....	188	30778.....	188	30861.....	189
30029.....	193	30140.....	198	30321.....	179	30442.....	179	30524.....	189	30779.....	188	30862.....	189
30030.....	194	30141.....	193	30322.....	184	30443.....	179	30525.....	188	30780.....	188	30863.....	189
30030.....	211	30142.....	198	30323.....	179	30444.....	179	30526.....	189	30781.....	188	30864.....	189
30031.....	198	30143.....	194	30324.....	184	30445.....	179	30527.....	188	30782.....	188	30865.....	189
30032.....	198	30144.....	199	30325.....	179	30446.....	179	30528.....	189	30783.....	188	30866.....	189
30033.....	198	30145.....	194	30326.....	184	30447.....	179	30529.....	188	30784.....	188	30867.....	189
30034.....	198	30146.....	199	30327.....	179	30448.....	179	30530.....	189	30785.....	188	30868.....	189
30035.....	198	30147.....	194	30328.....	184	30449.....	179	30531.....	188	30786.....	188	30869.....	189
30036.....	198	30148.....	199	30329.....	179	30450.....	179	30532.....	189	30787.....	188	30870.....	189
30037.....	198	30149.....	194	30330.....	184	30451.....	179	30533.....	188	30788.....	188	30871.....	189
30038.....	198	30150.....	199	30331.....	179	30452.....	179	30534.....	189	30789.....	188	30872.....	189
30039.....	198	30151.....	194	30332.....	184	30453.....	179	30535.....	188	30790.....	188	30873.....	189
30040.....	198	30152.....	199	30333.....	179	30454.....	179	30536.....	189	30791.....	188	30874.....	189
30041.....	198	30153.....	194	30334.....	184	30455.....	180	30537.....	188	30792.....	188	30875.....	189
30042.....	198	30154.....	199	30335.....	179	30456.....	180	30538.....	189	30793.....	188	30876.....	189
30043.....	198	30155.....	194	30336.....	184	30457.....	180	30539.....	188	30794.....	188	30877.....	189
30044.....	198	30156.....	199	30337.....	179	30458.....	180	30540.....	189	30795.....	188	30878.....	189
30045.....	198	30157.....	194	30338.....	184	30459.....	180	30541.....	188	30796.....	188	30879.....	189
30046.....	198	30158.....	199	30339.....	179	30460.....	180	30542.....	189	30797.....	188	30880.....	189
30047.....	198	30159.....	194	30340.....	184	30461.....	180	30543.....	188	30798.....	188	30881.....	189
30048.....	198	30160.....	199	30341.....	179	30462.....	180	30544.....	189	30799.....	188	30882.....	189
30049.....	198	30161.....	194	30342.....	184	30463.....	180	30545.....	188	30800.....	188	30883.....	189
30050.....	198	30162.....	199	30343.....	179	30464.....	180	30546.....	189	30801.....	188	30884.....	189
30051.....	198	30163.....	194	30344.....	185	30465.....	180	30547.....	188	30802.....	188	30885.....	189
30052.....	199	30164.....	199	30345.....	179	30466.....	180	30548.....	189	30803.....	188	30886.....	189
30053.....	199	30165.....	194	30346.....	185	30467.....	180	30549.....	188	30804.....	188	30887.....	189
30054.....	199	30166.....	199	30347.....	179	30468.....	180	30550.....	189	30805.....	188	30888.....	189
30055.....	199	30167.....	194	30348.....	185	30469.....	179	30551.....	188	30806.....	188	30889.....	189
30056.....	199	30168.....	199	30349.....	180	30470.....	180	30552.....	189	30807.....	188	30900.....	189
30057.....	199	30169.....	194	30350.....	185	30470.....	211	30553.....	188	30808.....	188	30900.....	212
30058.....	199	30170.....	199	30351.....	180	30471.....	184	30554.....	189	30809.....	188	30902.....	189
30059.....	199	30171.....	194	30352.....	185	30472.....	184	30555.....	188	30810.....	211	30904.....	189
30060.....	199	30172.....	199	30353.....	180	30473.....	184	30556.....	189	30811.....	188	30906.....	189
30061.....	199	30173.....	194	30354.....	185	30474.....	184	30557.....	188	30812.....	188	30908.....	189
30062.....	199	30174.....	199	30355.....	180	30475.....	184	30558.....	189	30813.....	188	30910.....	189
30063.....	199	30175.....	194	30356.....	185	30476.....	184	30559.....	188	30814.....	188	30912.....	189
30064.....	199	30176.....	199	30357.....	180	30477.....	184	30560.....	189	30815.....	188	30914.....	189
30065.....	199	30177.....	193	30358.....	185	30478.....	184	30561.....	188	30816.....	188	30916.....	189
30066.....	199	30178.....	198	30359.....	180	30479.....	184	30562.....	189	30817.....	188	30918.....	189
30067.....	199	30179.....	194	30360.....	185	30480.....	184	30563.....	188	30818.....	188	30920.....	189
30068.....	199	30180.....	194	30361.....	180	30481.....	184	30564.....	189	30819.....	188	30921.....	189
30069.....	198	30181.....	194	30362.....	185	30482.....	184	30565.....	188	30820.....	188	30922.....	189
30070.....	199	30182.....	194	30363.....	180	30483.....	184	30566.....	189	30821.....	188	30923.....	189
30070.....	212	30183.....	194	30364.....	185	30484.....	184	30567.....	188	30822.....	188	30924.....	189
30101.....	193	30184.....	199	30365.....	180	30485.....	184	30568.....	189	30823.....	188	30925.....	189
30102.....	198	30185.....	199	30366.....	185	30486.....	184	30569.....	188	30824.....	188	30926.....	189
30103.....	193	30186.....	199	30367.....	180	30487.....	184	30570.....	189	30825.....	188	30927.....	189
30104.....	198	30187.....	199	30368.....	185	30488.....	184	30571.....	188	30826.....	188	30928.....	189
30105.....	193	30188.....	199	30369.....	180	30489.....	184	30572.....	189	30827.....	188	30929.....	189
30106.....	198	30189.....	194	30370.....	185	30490.....	184	30573.....	188	30828.....	188	30930.....	189
30107.....	193	30189.....	211	30371.....	180	30491.....	184	30574.....	189	30829.....	188	30931.....	189
30108.....	198	30190.....	199	30372.....	185	30492.....	185	30575.....	188	30830.....	188	30932.....	189
30109.....	193	30190.....	212	30373.....	180	30493.....	185	30576.....	189	30831.....	188	30933.....	189
30110.....	198	30191.....	193	30374.....	185	30494.....	185	30577.....	188	30832.....	188	30934.....	189

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
30935.....	189	31225.....	200	31346.....	187	31458.....	200	31553.....	183	31735.....	194	31826.....	179
30936.....	189	31226.....	200	31347.....	187	31459.....	197	31554.....	187	31736.....	194	31827.....	180
30937.....	189	31227.....	200	31348.....	187	31460.....	200	31555.....	183	31737.....	193	31830.....	184
30938.....	189	31228.....	200	31349.....	187	31461.....	197	31556.....	187	31738.....	193	31831.....	184
30939.....	189	31229.....	200	31350.....	187	31462.....	200	31557.....	183	31739.....	193	31832.....	184
30940.....	189	31230.....	200	31351.....	187	31463.....	197	31558.....	187	31740.....	193	31833.....	184
30941.....	189	31231.....	200	31352.....	187	31464.....	200	31559.....	183	31741.....	194	31834.....	185
30942.....	189	31232.....	200	31353.....	187	31465.....	197	31560.....	187	31742.....	194	31835.....	185
30943.....	189	31233.....	200	31354.....	187	31466.....	200	31561.....	183	31743.....	194	31836.....	185
30944.....	189	31234.....	200	31355.....	187	31467.....	197	31562.....	187	31744.....	194	31837.....	185
30944.....	212	31235.....	200	31356.....	187	31468.....	200	31563.....	183	31745.....	194	31838.....	185
31130.....	189	31236.....	200	31357.....	187	31469.....	197	31564.....	187	31746.....	194	31839.....	185
31131.....	189	31237.....	200	31357.....	212	31470.....	200	31565.....	183	31747.....	193	31840.....	194
31132.....	189	31238.....	192	31358.....	178	31471.....	197	31566.....	187	31748.....	193	31841.....	184
31133.....	189	31239.....	192	31359.....	178	31472.....	200	31567.....	183	31749.....	193	31842.....	184
31134.....	189	31240.....	192	31360.....	178	31473.....	197	31568.....	187	31750.....	178	31843.....	184
31135.....	189	31241.....	192	31361.....	178	31474.....	200	31569.....	183	31751.....	178	31844.....	185
31136.....	189	31242.....	192	31362.....	178	31475.....	197	31570.....	187	31752.....	178	31845.....	185
31137.....	189	31243.....	192	31363.....	178	31476.....	200	31571.....	183	31753.....	178	31846.....	185
31138.....	189	31244.....	192	31364.....	178	31477.....	197	31572.....	187	31754.....	178	31847.....	185
31139.....	189	31245.....	192	31365.....	178	31478.....	200	31573.....	183	31755.....	178	31848.....	185
31140.....	189	31246.....	192	31366.....	178	31479.....	197	31574.....	187	31756.....	178	31849.....	185
31141.....	189	31247.....	192	31367.....	178	31480.....	200	31575.....	183	31757.....	178	31850.....	179
31142.....	189	31248.....	192	31368.....	178	31481.....	197	31576.....	187	31758.....	178	31851.....	179
31143.....	189	31249.....	192	31369.....	178	31481.....	211	31577.....	183	31759.....	178	31852.....	179
31144.....	189	31250.....	192	31370.....	178	31482.....	200	31578.....	187	31760.....	178	31853.....	179
31145.....	189	31251.....	192	31401.....	197	31482.....	212	31579.....	183	31761.....	178	31854.....	179
31146.....	189	31252.....	192	31402.....	197	31483.....	197	31580.....	187	31762.....	178	31855.....	180
31147.....	189	31253.....	192	31403.....	200	31489.....	211	31581.....	183	31763.....	193	31856.....	180
31148.....	189	31254.....	192	31404.....	200	31490.....	200	31581.....	211	31764.....	194	31857.....	180
31149.....	189	31255.....	192	31405.....	197	31490.....	212	31582.....	187	31765.....	194	31858.....	180
31150.....	189	31256.....	192	31406.....	200	31501.....	183	31582.....	212	31766.....	194	31859.....	180
31151.....	189	31257.....	192	31407.....	197	31502.....	187	31589.....	183	31767.....	194	31860.....	193
31152.....	189	31258.....	192	31408.....	200	31503.....	183	31589.....	211	31768.....	194	31861.....	193
31153.....	189	31259.....	192	31409.....	197	31504.....	187	31590.....	187	31769.....	194	31862.....	193
31154.....	189	31260.....	192	31410.....	200	31505.....	183	31590.....	212	31770.....	198	31863.....	193
31155.....	189	31261.....	192	31411.....	197	31506.....	187	31601.....	192	31771.....	198	31864.....	194
31156.....	189	31262.....	192	31412.....	200	31507.....	183	31603.....	192	31772.....	198	31865.....	194
31157.....	189	31263.....	192	31413.....	197	31508.....	187	31605.....	192	31773.....	198	31866.....	194
31158.....	189	31303.....	178	31414.....	200	31509.....	183	31607.....	192	31774.....	199	31867.....	194
31159.....	189	31304.....	178	31415.....	197	31510.....	187	31609.....	192	31775.....	199	31868.....	194
31160.....	189	31305.....	178	31416.....	200	31511.....	183	31611.....	192	31776.....	199	31869.....	194
31161.....	189	31306.....	178	31417.....	197	31512.....	187	31613.....	192	31777.....	199	31870.....	193
31162.....	189	31307.....	178	31418.....	200	31513.....	183	31615.....	192	31778.....	199	31871.....	193
31163.....	189	31308.....	178	31419.....	197	31514.....	187	31617.....	192	31779.....	199	31872.....	193
31164.....	189	31309.....	178	31420.....	200	31515.....	183	31619.....	192	31780.....	198	31873.....	193
31165.....	189	31310.....	178	31421.....	197	31516.....	187	31621.....	192	31781.....	198	31874.....	194
31166.....	189	31311.....	178	31422.....	200	31517.....	183	31623.....	192	31782.....	198	31875.....	194
31167.....	189	31312.....	178	31423.....	197	31518.....	187	31625.....	192	31783.....	198	31876.....	194
31168.....	189	31313.....	178	31424.....	200	31519.....	183	31650.....	192	31784.....	199	31877.....	194
31169.....	189	31314.....	178	31425.....	197	31520.....	187	31651.....	192	31785.....	199	31878.....	194
31169.....	212	31315.....	178	31426.....	200	31521.....	183	31652.....	192	31786.....	199	31879.....	194
31170.....	197	31316.....	183	31427.....	197	31522.....	187	31653.....	192	31787.....	199	31880.....	193
31171.....	197	31317.....	183	31428.....	200	31523.....	183	31654.....	192	31788.....	199	31881.....	193
31172.....	197	31318.....	183	31429.....	197	31524.....	187	31655.....	192	31789.....	199	31882.....	193
31173.....	197	31319.....	183	31430.....	200	31525.....	183	31656.....	192	31790.....	198	31883.....	193
31174.....	197	31320.....	183	31431.....	197	31526.....	187	31657.....	192	31791.....	198	31884.....	194
31175.....	197	31321.....	183	31432.....	200	31527.....	183	31658.....	192	31792.....	198	31885.....	194
31176.....	197	31322.....	183	31433.....	197	31528.....	187	31659.....	192	31793.....	198	31886.....	194
31177.....	197	31323.....	183	31434.....	200	31529.....	183	31660.....	192	31794.....	199	31887.....	194
31178.....	197	31324.....	183	31435.....	197	31530.....	187	31661.....	192	31795.....	199	31888.....	194
31179.....	197	31325.....	183	31436.....	200	31531.....	183	31662.....	192	31796.....	199	31889.....	194
31180.....	197	31326.....	183	31437.....	197	31532.....	187	31701.....	178	31797.....	199	31890.....	184
31181.....	197	31327.....	183	31438.....	200	31533.....	183	31703.....	178	31798.....	199	31891.....	184
31182.....	197	31328.....	183	31439.....	197	31534.....	187	31705.....	178	31799.....	199	31892.....	184
31183.....	197	31329.....	183	31440.....	200	31535.....	183	31707.....	178	31800.....	179	31893.....	184
31184.....	197	31330.....	183	31441.....	197	31536.....	187	31709.....	178	31802.....	179	31894.....	185
31185.....	197	31331.....	183	31442.....	200	31537.....	183	31711.....	178	31804.....	179	31895.....	185
31186.....	197	31332.....	183	31443.....	197	31538.....	187	31713.....	178	31806.....	180	31896.....	185
31187.....	197	31333.....	183	31444.....	200	31539.....	183	31715.....	178	31808.....	180	31897.....	185
31188.....	197	31334.....	183	31445.....	197	31540.....	187	31717.....	178	31810.....	179	31898.....	185
31189.....	197	31335.....	183	31446.....	200	31541.....	183	31719.....	178	31812.....	179	31899.....	185
31190.....	197	31336.....	183	31447.....	197	31542.....	187	31721.....	178	31814.....	179	31900.....	198
31190.....	211	31336.....	211	31448.....	200	31543.....	183	31723.....	178	31816.....	180	31902.....	198
31217.....	200	31337.....	187	31449.....	197	31544.....	187	31725.....	178	31817.....	180	31904.....	198
31217.....	212	31338.....	187	31450.....	200	31545.....	183	31727.....	193	31818.....	180	31906.....	198
31218.....	200	31339.....	187	31451.....	197	31546.....	187	31728.....	193	31819.....	180	31908.....	199
31219.....	200	31340.....	187	31452.....	200	31547.....	183	31729.....	193	31820.....	179	31910.....	199
31220.....	200	31341.....	187	31453.....	197	31548.....	187	31730.....	193	31821.....	179	31912.....	199
31221.....	200	31342.....	187	31454.....	200	31549.....	183	31731.....	194	31822.....	180	31914.....	199
31222.....	200	31343.....	187	31455.....	197	31550.....	187	31732.....	194	31823.....	180	31916.....	199
31223.....	200	31344.....	187	31456.....	200	31551.....	183	31733.....	194	31824.....	180	31917.....	199
31224.....	200	31345.....	187	31457.....	197	31552.....	187	31734.....	194	31825.....	179	31918.....	198

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
31919	198	32037	164	32306	190	32410	191	32573	64	32686	64	32783	139
31920	198	32038	164	32307	190	32411	191	32574	64	32687	64	32784	139
31921	198	32039	164	32308	190	32412	191	32575	64	32688	64	32785	140
31922	199	32040	164	32309	190	32413	191	32576	64	32689	64	32786	140
31923	199	32041	164	32310	190	32414	191	32577	64	32691	138	32787	140
31924	199	32042	164	32311	190	32415	191	32578	64	32692	138	32788	140
31925	199	32043	164	32312	190	32416	191	32579	64	32697	138	32789	140
31926	199	32044	164	32313	190	32417	191	32580	64	32698	138	32790	140
31927	199	32045	164	32314	190	32418	191	32581	64	32699	138	32791	140
31928	198	32046	164	32315	190	32419	191	32582	64	32700	138	32792	140
31929	198	32047	164	32316	190	32420	191	32583	64	32701	138	32793	140
31930	198	32048	164	32317	190	32421	191	32584	64	32702	138	32794	140
31931	198	32049	164	32318	190	32422	191	32585	64	32703	138	32795	140
31932	199	32053	164	32319	190	32423	191	32586	64	32704	138	32796	140
31933	199	32054	164	32320	190	32424	191	32587	64	32705	138	32797	140
31934	199	32055	164	32321	190	32425	191	32588	64	32706	138	32798	140
31935	199	32056	164	32322	190	32426	191	32589	64	32707	138	32799	140
31936	199	32057	164	32323	190	32427	191	32590	64	32708	138	32800	140
31937	199	32058	164	32324	190	32428	191	32591	64	32709	138	32801	140
31938	179	32059	164	32325	190	32429	191	32592	64	32710	138	32802	140
31939	179	32060	164	32326	190	32430	191	32593	64	32711	138	32803	140
31940	179	32061	164	32327	190	32431	191	32594	64	32712	138	32804	140
31941	179	32062	164	32328	190	32434	191	32595	64	32713	138	32805	140
31942	180	32063	164	32329	190	32435	191	32596	64	32714	138	32806	140
31943	180	32064	164	32330	190	32436	191	32597	64	32715	138	32807	140
31944	180	32065	164	32333	190	32437	191	32598	64	32716	138	32808	140
31945	180	32066	164	32334	190	32438	191	32599	64	32717	138	32809	140
31946	180	32067	164	32335	190	32439	191	32600	64	32718	138	32810	140
31947	180	32068	164	32336	190	32440	191	32601	64	32719	138	32815	139
31948	179	32069	164	32337	190	32441	191	32602	64	32720	138	32816	139
31949	179	32200	186	32338	190	32442	191	32603	64	32725	138	32817	139
31950	179	32201	186	32339	190	32443	191	32604	64	32726	138	32818	139
31951	179	32202	186	32340	190	32445	191	32605	64	32727	138	32819	139
31952	180	32203	186	32341	190	32446	191	32606	64	32728	138	32820	139
31953	180	32204	186	32342	190	32447	191	32607	64	32729	138	32821	139
31954	180	32205	186	32345	190	32448	191	32608	64	32730	138	32822	139
31955	180	32206	186	32346	190	32449	191	32609	64	32731	138	32823	139
31956	180	32207	186	32347	190	32450	191	32610	64	32732	138	32824	139
31957	180	32210	186	32348	190	32451	191	32611	64	32733	138	32825	135
31958	179	32211	186	32349	190	32452	191	32612	64	32734	138	32826	139
31959	179	32212	186	32350	190	32453	191	32613	64	32735	138	32827	139
31960	179	32213	186	32351	190	32454	191	32614	64	32736	138	32828	139
31961	179	32214	186	32352	190	32455	191	32615	64	32737	138	32829	139
31962	180	32215	186	32353	190	32456	191	32616	64	32738	138	32830	136
31963	180	32216	186	32354	190	32457	191	32619	64	32739	138	32831	139
31964	180	32217	186	32355	190	32458	191	32620	64	32740	138	32832	139
31965	180	32260	181	32356	190	32459	191	32621	64	32741	138	32833	139
31966	180	32261	181	32357	190	32460	191	32625	64	32742	138	32834	139
31967	180	32262	181	32358	190	32461	191	32626	64	32743	138	32835	139
31968	184	32263	181	32359	190	32462	191	32627	64	32744	138	32836	139
31969	184	32264	181	32360	190	32463	191	32628	64	32745	138	32837	139
31970	184	32265	181	32361	190	32464	191	32632	64	32751	139	32838	139
31971	184	32266	181	32362	190	32470	191	32633	64	32752	139	32839	139
31972	185	32267	181	32363	190	32471	191	32655	63	32753	139	32840	139
31973	185	32270	181	32364	190	32472	191	32656	63	32754	139	32841	139
31974	185	32271	181	32370	190	32473	191	32657	63	32755	139	32842	139
31975	185	32272	181	32371	190	32474	191	32658	63	32756	139	32843	139
31976	185	32273	181	32372	190	32475	191	32659	63	32757	139	32844	139
31977	185	32274	181	32373	190	32476	191	32660	63	32758	139	32845	139
31978	184	32275	181	32374	190	32477	191	32661	63	32759	139	32846	139
31979	184	32276	181	32375	190	32478	191	32662	63	32760	139	32847	139
31980	184	32277	181	32376	190	32479	191	32663	63	32761	135	32848	139
31981	184	32280	181	32377	190	32480	191	32664	63	32762	139	32849	140
31982	185	32281	181	32378	190	32481	191	32665	63	32763	139	32850	140
31983	185	32282	181	32379	190	32482	191	32666	63	32764	139	32851	140
31984	185	32283	181	32380	190	32483	191	32667	63	32765	139	32852	140
31985	185	32284	181	32381	190	32484	191	32668	63	32766	136	32853	140
31986	185	32285	181	32382	190	32485	191	32669	63	32767	139	32854	140
31987	185	32286	181	32383	190	32486	191	32670	63	32768	139	32855	140
31988	184	32287	181	32384	190	32487	191	32671	63	32769	139	32856	140
31989	184	32290	186	32385	190	32488	191	32672	63	32770	139	32857	140
31990	184	32291	186	32386	190	32489	191	32673	63	32771	139	32858	140
31991	184	32292	186	32387	190	32500	65	32674	63	32772	139	32859	140
31992	185	32293	186	32388	190	32501	65	32675	63	32773	139	32860	140
31993	185	32294	186	32389	190	32502	65	32676	63	32774	139	32861	140
31994	185	32295	186	32402	191	32503	65	32677	63	32775	139	32862	140
31995	185	32296	186	32403	191	32504	65	32678	63	32776	139	32863	140
31996	185	32297	186	32404	191	32505	65	32679	63	32777	139	32864	140
31997	185	32301	190	32405	191	32506	65	32680	63	32778	139	32865	140
32033	164	32302	190	32406	191	32569	64	32681	63	32779	139	32866	140
32034	164	32303	190	32407	191	32570	64	32682	63	32780	139	32867	140
32035	164	32304	190	32408	191	32571	64	32683	63	32781	139	32868	140
32036	164	32305	190	32409	191	32572	64	32685	64	32782	139	32869	140

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
32870.....	140	33343.....	179	33511.....	145	34505.....	164	34679.....	157	34785.....	137	34944.....	143
32871.....	140	33344.....	184	33512.....	145	34506.....	164	34680.....	157	34786.....	137	34945.....	143
32872.....	140	33345.....	94	33513.....	145	34507.....	164	34681.....	157	34787.....	137	34946.....	143
32873.....	140	33346.....	94	33514.....	145	34508.....	164	34682.....	157	34789.....	137	34947.....	143
32874.....	140	33347.....	94	33515.....	145	34509.....	164	34683.....	157	34790.....	137	34948.....	143
33101.....	193	33348.....	94	33516.....	145	34510.....	164	34684.....	157	34791.....	137	34949.....	143
33102.....	198	33349.....	94	33517.....	145	34511.....	164	34685.....	157	34793.....	135	34950.....	143
33103.....	193	33350.....	94	33518.....	145	34512.....	164	34686.....	158	34794.....	135	34951.....	143
33104.....	198	33351.....	94	33519.....	145	34513.....	164	34687.....	158	34795.....	135	34952.....	143
33105.....	193	33352.....	94	33520.....	145	34514.....	164	34688.....	158	34796.....	135	34954.....	143
33106.....	198	33353.....	94	33521.....	145	34515.....	164	34689.....	158	34797.....	135	34955.....	143
33107.....	194	33354.....	94	33522.....	145	34516.....	164	34690.....	158	34798.....	135	34956.....	143
33108.....	199	33390.....	144	33523.....	145	34517.....	164	34691.....	158	34799.....	135	34972.....	142
33109.....	194	33391.....	144	33524.....	145	34518.....	164	34692.....	158	34800.....	136	34973.....	142
33110.....	199	33392.....	144	33525.....	145	34519.....	164	34693.....	158	34801.....	136	34974.....	142
33111.....	194	33393.....	144	33540.....	145	34520.....	164	34701.....	134	34802.....	136	34975.....	142
33112.....	199	33394.....	144	33541.....	145	34521.....	164	34702.....	134	34803.....	136	34976.....	142
33113.....	194	33395.....	144	33542.....	145	34522.....	164	34703.....	134	34804.....	136	34977.....	142
33114.....	199	33396.....	144	33543.....	145	34523.....	164	34704.....	134	34805.....	136	34978.....	142
33115.....	194	33397.....	144	33544.....	145	34524.....	164	34705.....	134	34806.....	136	34979.....	142
33116.....	199	33398.....	144	33547.....	145	34525.....	164	34706.....	134	34807.....	137	34980.....	142
33117.....	194	33400.....	144	33548.....	145	34526.....	164	34707.....	134	34808.....	137	34981.....	142
33118.....	199	33401.....	144	33551.....	145	34527.....	164	34708.....	134	34809.....	137	34982.....	142
33121.....	193	33402.....	144	33552.....	145	34528.....	164	34709.....	134	34811.....	137	34983.....	142
33122.....	198	33403.....	144	33553.....	145	34529.....	164	34710.....	134	34812.....	137	34984.....	142
33123.....	193	33404.....	144	33554.....	145	34530.....	164	34711.....	134	34813.....	137	34985.....	142
33124.....	198	33406.....	144	33555.....	145	34531.....	164	34712.....	134	34815.....	137	34986.....	142
33125.....	193	33407.....	144	33556.....	145	34532.....	164	34713.....	134	34816.....	137	34987.....	142
33126.....	198	33408.....	144	33557.....	145	34533.....	164	34714.....	134	34817.....	137	34988.....	142
33127.....	194	33409.....	144	33558.....	145	34534.....	164	34715.....	134	34818.....	137	34989.....	142
33128.....	199	33410.....	144	33559.....	145	34620.....	157	34716.....	134	34822.....	134	34990.....	142
33129.....	194	33411.....	144	33560.....	145	34621.....	157	34717.....	134	34823.....	134	35005.....	143
33130.....	199	33412.....	144	33561.....	145	34622.....	157	34718.....	134	34824.....	134	35006.....	143
33131.....	194	33413.....	144	33562.....	145	34623.....	157	34719.....	134	34825.....	134	35007.....	143
33132.....	199	33415.....	144	33563.....	145	34624.....	157	34720.....	134	34826.....	134	35008.....	143
33133.....	194	33416.....	144	33564.....	145	34625.....	157	34721.....	134	34827.....	134	35009.....	143
33134.....	199	33417.....	144	33565.....	145	34626.....	157	34722.....	134	34828.....	134	35010.....	143
33135.....	194	33418.....	144	34000.....	123	34627.....	157	34723.....	134	34830.....	134	35011.....	143
33136.....	199	33419.....	144	34001.....	123	34628.....	157	34724.....	134	34831.....	134	35012.....	143
33137.....	194	33420.....	144	34002.....	123	34630.....	158	34725.....	134	34832.....	134	35013.....	143
33138.....	199	33421.....	144	34003.....	123	34631.....	158	34726.....	134	34833.....	134	35014.....	143
33141.....	193	33422.....	144	34004.....	123	34632.....	158	34727.....	134	34834.....	134	35015.....	143
33142.....	198	33423.....	144	34005.....	123	34633.....	158	34728.....	134	34835.....	134	35016.....	143
33143.....	193	33424.....	144	34006.....	123	34634.....	158	34729.....	134	34857.....	134	35018.....	143
33144.....	198	33450.....	144	34007.....	123	34635.....	158	34730.....	134	34858.....	134	35019.....	143
33301.....	179	33451.....	144	34008.....	123	34636.....	158	34731.....	134	34859.....	134	35020.....	143
33302.....	184	33452.....	144	34009.....	123	34637.....	158	34732.....	134	34860.....	134	35100.....	75
33303.....	179	33453.....	144	34010.....	123	34638.....	158	34733.....	134	34861.....	134	35101.....	75
33304.....	184	33454.....	144	34011.....	123	34640.....	157	34734.....	134	34862.....	134	35102.....	75
33305.....	179	33455.....	144	34012.....	123	34641.....	157	34735.....	134	34863.....	134	35103.....	75
33306.....	184	33456.....	144	34013.....	123	34642.....	157	34736.....	134	34865.....	134	35104.....	75
33307.....	179	33457.....	144	34014.....	123	34643.....	157	34737.....	134	34866.....	134	35105.....	75
33308.....	185	33458.....	144	34015.....	123	34644.....	157	34738.....	134	34867.....	134	35106.....	76
33309.....	180	33460.....	144	34016.....	125	34645.....	157	34739.....	134	34868.....	134	35107.....	76
33310.....	185	33461.....	144	34017.....	125	34646.....	157	34740.....	134	34869.....	134	35108.....	76
33311.....	180	33462.....	144	34018.....	125	34647.....	157	34741.....	134	34870.....	134	35109.....	76
33312.....	185	33463.....	144	34019.....	125	34650.....	158	34742.....	134	34888.....	138	35110.....	76
33313.....	180	33464.....	144	34020.....	125	34651.....	158	34743.....	134	34889.....	138	35111.....	76
33314.....	185	33466.....	144	34021.....	125	34652.....	158	34744.....	134	34894.....	138	35112.....	75
33315.....	180	33467.....	144	34022.....	125	34653.....	158	34745.....	134	34895.....	138	35113.....	75
33316.....	185	33468.....	144	34023.....	125	34654.....	158	34746.....	134	34896.....	138	35114.....	75
33317.....	180	33469.....	144	34024.....	125	34655.....	158	34747.....	134	34916.....	142	35115.....	75
33318.....	185	33470.....	144	34025.....	125	34656.....	158	34748.....	134	34917.....	142	35116.....	75
33321.....	179	33471.....	144	34026.....	125	34657.....	158	34749.....	134	34918.....	142	35117.....	75
33322.....	184	33472.....	144	34027.....	125	34660.....	157	34750.....	134	34919.....	142	35118.....	75
33323.....	179	33473.....	144	34028.....	125	34661.....	157	34751.....	134	34920.....	142	35119.....	75
33324.....	184	33475.....	144	34029.....	125	34662.....	157	34752.....	134	34921.....	142	35120.....	75
33325.....	179	33476.....	144	34030.....	125	34663.....	157	34753.....	134	34922.....	142	35121.....	75
33326.....	184	33477.....	144	34031.....	125	34664.....	157	34754.....	134	34923.....	142	35122.....	75
33327.....	180	33478.....	144	34300.....	144	34665.....	157	34771.....	135	34924.....	142	35123.....	75
33328.....	185	33479.....	144	34301.....	144	34666.....	157	34772.....	135	34925.....	142	35124.....	75
33329.....	180	33480.....	144	34302.....	144	34667.....	157	34773.....	135	34926.....	142	35125.....	75
33330.....	185	33481.....	144	34303.....	144	34668.....	157	34774.....	135	34927.....	142	35126.....	75
33331.....	180	33482.....	144	34304.....	144	34669.....	158	34775.....	135	34928.....	142	35127.....	77
33332.....	185	33483.....	144	34305.....	144	34670.....	158	34776.....	135	34929.....	142	35128.....	77
33333.....	180	33484.....	144	34306.....	144	34671.....	158	34777.....	135	34930.....	142	35129.....	77
33334.....	185	33500.....	145	34307.....	144	34672.....	158	34778.....	136	34931.....	142	35130.....	77
33335.....	180	33501.....	145	34308.....	144	34673.....	158	34779.....	136	34932.....	142	35131.....	77
33336.....	185	33502.....	145	34309.....	144	34674.....	158	34780.....	136	34933.....	142	35132.....	77
33337.....	180	33503.....	145	34501.....	164	34675.....	158	34781.....	136	34934.....	142	35133.....	77
33338.....	185	33504.....	145	34502.....	164	34676.....	158	34782.....	136	34941.....	143	35134.....	77
33341.....	179	33507.....	145	34503.....	164	34677.....	158	34783.....	136	34942.....	143	35135.....	77
33342.....	184	33508.....	145	34504.....	164	34678.....	157	34784.....	136	34943.....	143	35136.....	77

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
35137.....	77	35506.....	209	35648.....	137	35741.....	137	36238.....	141	36448.....	38	36605.....	37
35138.....	77	35507.....	209	35649.....	137	35742.....	137	36239.....	139	36449.....	38	36610.....	37
35139.....	77	35508.....	209	35650.....	137	35743.....	137	36240.....	139	36450.....	38	36611.....	37
35140.....	77	35509.....	209	35651.....	137	35744.....	137	36241.....	141	36452.....	38	36612.....	37
35141.....	77	35510.....	209	35652.....	137	35787.....	139	36242.....	141	36453.....	38	36613.....	37
35150.....	75	35511.....	209	35653.....	137	35788.....	139	36243.....	139	36454.....	38	36614.....	37
35151.....	75	35512.....	209	35654.....	137	35789.....	141	36244.....	139	36456.....	38	36615.....	37
35152.....	75	35513.....	209	35665.....	135	35790.....	141	36245.....	141	36457.....	38	36616.....	56
35153.....	75	35514.....	209	35666.....	135	35791.....	139	36246.....	141	36458.....	38	36617.....	56
35154.....	75	35515.....	209	35667.....	135	35792.....	139	36247.....	141	36460.....	38	36618.....	56
35155.....	75	35575.....	135	35668.....	135	35793.....	141	36248.....	141	36462.....	38	36620.....	86
35156.....	75	35576.....	135	35669.....	135	35794.....	141	36249.....	141	36463.....	38	36621.....	86
35157.....	75	35577.....	135	35670.....	135	35795.....	139	36250.....	141	36464.....	38	36622.....	86
35158.....	75	35578.....	135	35671.....	135	35796.....	139	36251.....	140	36466.....	38	36623.....	86
35159.....	75	35579.....	135	35672.....	135	35797.....	141	36252.....	140	36468.....	38	36624.....	86
35160.....	75	35580.....	135	35673.....	135	35798.....	141	36253.....	141	36469.....	38	36625.....	86
35161.....	75	35581.....	135	35674.....	135	35799.....	141	36254.....	141	36470.....	38	36626.....	86
35180.....	77	35582.....	135	35675.....	135	35800.....	141	36257.....	140	36472.....	38	36627.....	86
35181.....	77	35583.....	135	35676.....	135	35801.....	141	36258.....	140	36474.....	38	36628.....	86
35182.....	77	35584.....	135	35677.....	135	35802.....	141	36259.....	140	36475.....	38	36629.....	86
35183.....	77	35585.....	135	35678.....	135	35803.....	140	36260.....	140	36480.....	39	36630.....	86
35184.....	77	35586.....	135	35679.....	135	35804.....	140	36261.....	141	36482.....	39	36631.....	86
35185.....	77	35587.....	135	35680.....	135	35805.....	141	36262.....	141	36486.....	39	36632.....	86
35186.....	77	35588.....	135	35681.....	135	35806.....	141	36263.....	141	36500.....	39	36633.....	86
35187.....	77	35589.....	135	35682.....	135	35809.....	140	36264.....	141	36502.....	39	36634.....	86
35188.....	77	35590.....	135	35683.....	135	35810.....	140	36265.....	141	36504.....	39	36635.....	86
35189.....	77	35591.....	135	35684.....	135	35811.....	140	36266.....	141	36505.....	48	36636.....	86
35190.....	77	35592.....	135	35685.....	135	35812.....	140	36344.....	49	36506.....	48	36637.....	86
35191.....	77	35593.....	135	35686.....	135	35813.....	141	36345.....	49	36507.....	48	36638.....	86
35273.....	208	35594.....	135	35687.....	135	35814.....	141	36346.....	49	36508.....	48	36639.....	86
35275.....	208	35595.....	135	35688.....	135	35815.....	141	36347.....	49	36509.....	48	36640.....	86
35277.....	208	35596.....	135	35689.....	135	35816.....	141	36348.....	49	36511.....	48	36641.....	86
35278.....	208	35597.....	135	35690.....	135	35817.....	141	36349.....	49	36513.....	48	36701.....	36
35279.....	208	35598.....	135	35691.....	135	35818.....	141	36350.....	49	36515.....	48	36702.....	36
35280.....	208	35599.....	135	35692.....	135	36106.....	206	36351.....	49	36517.....	48	36704.....	37
35281.....	208	35600.....	135	35693.....	136	36107.....	206	36352.....	49	36519.....	48	36706.....	37
35282.....	208	35601.....	135	35694.....	136	36108.....	206	36353.....	49	36520.....	48	36707.....	37
35283.....	208	35602.....	135	35695.....	136	36109.....	206	36354.....	49	36530.....	47	36709.....	37
35285.....	208	35603.....	136	35696.....	136	36110.....	206	36355.....	49	36531.....	47	36710.....	37
35287.....	208	35604.....	136	35697.....	136	36111.....	206	36356.....	49	36532.....	47	36711.....	37
35289.....	208	35605.....	136	35698.....	136	36112.....	206	36357.....	49	36533.....	47	36712.....	37
35291.....	208	35606.....	136	35699.....	136	36113.....	206	36358.....	49	36534.....	47	36713.....	37
35293.....	208	35607.....	136	35700.....	136	36114.....	206	36359.....	49	36535.....	47	36714.....	37
35295.....	208	35608.....	136	35701.....	136	36116.....	206	36361.....	49	36536.....	47	36715.....	37
35297.....	208	35609.....	136	35702.....	136	36117.....	206	36370.....	36	36537.....	47	36716.....	37
35300.....	208	35610.....	136	35703.....	136	36118.....	206	36371.....	36	36538.....	47	36717.....	37
35301.....	208	35611.....	136	35704.....	136	36120.....	206	36372.....	36	36539.....	49	36718.....	37
35302.....	208	35612.....	136	35705.....	136	36121.....	206	36373.....	36	36540.....	49	36719.....	37
35303.....	208	35613.....	136	35706.....	136	36122.....	206	36374.....	36	36541.....	49	36722.....	36
35304.....	208	35614.....	136	35707.....	136	36124.....	206	36375.....	36	36542.....	49	36723.....	36
35305.....	208	35615.....	136	35708.....	136	36125.....	206	36376.....	36	36543.....	49	36724.....	36
35306.....	208	35616.....	136	35709.....	136	36126.....	206	36378.....	37	36544.....	49	36725.....	36
35307.....	208	35617.....	136	35710.....	136	36128.....	206	36380.....	37	36545.....	49	36727.....	36
35308.....	208	35618.....	136	35711.....	136	36129.....	206	36381.....	37	36546.....	49	36729.....	37
35309.....	208	35619.....	136	35712.....	136	36130.....	206	36383.....	37	36547.....	49	36731.....	37
35310.....	208	35620.....	136	35713.....	136	36140.....	110	36384.....	37	36555.....	56	36733.....	37
35311.....	208	35621.....	136	35714.....	136	36141.....	110	36385.....	37	36556.....	56	36736.....	36
35312.....	208	35622.....	136	35715.....	136	36142.....	110	36386.....	37	36557.....	56	36738.....	36
35313.....	208	35623.....	136	35716.....	136	36143.....	110	36387.....	37	36558.....	56	36740.....	37
35314.....	208	35624.....	136	35717.....	136	36206.....	204	36388.....	37	36559.....	56	36742.....	37
35315.....	208	35625.....	136	35718.....	136	36207.....	204	36389.....	37	36560.....	56	36744.....	37
35473.....	209	35626.....	136	35719.....	136	36208.....	204	36390.....	37	36561.....	56	36780.....	60
35475.....	209	35627.....	136	35720.....	136	36209.....	204	36391.....	37	36570.....	56	36781.....	60
35477.....	209	35628.....	136	35721.....	137	36210.....	204	36392.....	37	36571.....	56	36782.....	60
35478.....	209	35629.....	136	35722.....	137	36211.....	204	36393.....	37	36572.....	56	36783.....	60
35479.....	209	35630.....	136	35723.....	137	36212.....	204	36404.....	47	36573.....	56	36784.....	60
35480.....	209	35631.....	137	35724.....	137	36213.....	204	36406.....	47	36574.....	56	36785.....	60
35481.....	209	35632.....	137	35725.....	137	36214.....	204	36408.....	47	36575.....	56	36786.....	60
35482.....	209	35633.....	137	35726.....	137	36216.....	204	36410.....	47	36576.....	56	36787.....	60
35483.....	209	35634.....	137	35727.....	137	36217.....	204	36416.....	47	36577.....	56	36788.....	60
35485.....	209	35635.....	137	35728.....	137	36218.....	204	36418.....	47	36578.....	56	36789.....	60
35487.....	209	35636.....	137	35729.....	137	36220.....	204	36420.....	47	36590.....	49	36790.....	60
35489.....	209	35637.....	137	35730.....	137	36221.....	204	36422.....	47	36591.....	49	36791.....	60
35491.....	209	35638.....	137	35731.....	137	36222.....	204	36424.....	47	36592.....	49	36792.....	60
35493.....	209	35639.....	137	35732.....	137	36224.....	204	36426.....	47	36596.....	47	36793.....	60
35495.....	209	35640.....	137	35733.....	137	36225.....	204	36428.....	47	36597.....	47	36804.....	37
35497.....	209	35641.....	137	35734.....	137	36226.....	204	36430.....	47	36598.....	47	36805.....	37
35500.....	209	35642.....	137	35735.....	137	36228.....	204	36432.....	47	36599.....	36	36806.....	37
35501.....	209	35643.....	137	35736.....	137	36229.....	204	36436.....	47	36600.....	36	36807.....	37
35502.....	209	35644.....	137	35737.....	137	36230.....	204	36440.....	47	36601.....	36	36808.....	37
35503.....	209	35645.....	137	35738.....	137	36235.....	139	36442.....	47	36602.....	37	36809.....	37
35504.....	209	35646.....	137	35739.....	137	36236.....	139	36444.....	47	36603.....	37	36810.....	37
35505.....	209	35647.....	137	35740.....	137	36237.....	141	36447.....	38	36604.....	37	36811.....	37

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
36812.....	37	37031.....	29	37114.....	30	37206.....	28	37343.....	29	38096.....	196	38179.....	195
36813.....	37	37032.....	29	37115.....	30	37207.....	30	37344.....	29	38097.....	196	38180.....	195
36814.....	37	37033.....	29	37116.....	28	37208.....	30	37345.....	29	38098.....	196	38181.....	195
36815.....	37	37034.....	29	37117.....	30	37209.....	30	37346.....	29	38099.....	196	38182.....	195
36816.....	37	37035.....	29	37118.....	30	37210.....	28	37348.....	29	38100.....	196	38183.....	195
36817.....	37	37036.....	28	37119.....	30	37211.....	30	37349.....	29	38101.....	196	38184.....	195
36818.....	37	37037.....	29	37120.....	30	37212.....	30	37350.....	29	38102.....	196	38185.....	195
36819.....	37	37038.....	29	37121.....	30	37213.....	30	37351.....	29	38103.....	196	38186.....	195
36820.....	37	37039.....	29	37122.....	30	37214.....	28	37352.....	29	38104.....	196	38187.....	196
36821.....	37	37040.....	29	37123.....	28	37215.....	30	37353.....	29	38105.....	196	38188.....	196
36822.....	37	37041.....	29	37124.....	30	37216.....	30	37354.....	29	38106.....	196	38189.....	196
36823.....	37	37042.....	28	37125.....	30	37217.....	30	37355.....	29	38107.....	196	38190.....	196
36824.....	37	37043.....	29	37126.....	30	37218.....	28	37356.....	29	38108.....	196	38191.....	196
36825.....	37	37044.....	29	37127.....	30	37219.....	30	37357.....	29	38109.....	196	38192.....	196
36826.....	47	37045.....	29	37128.....	30	37220.....	30	37359.....	29	38110.....	196	38193.....	196
36827.....	47	37046.....	29	37129.....	30	37221.....	30	37360.....	29	38111.....	196	38194.....	196
36828.....	47	37047.....	29	37130.....	28	37260.....	28	37361.....	29	38112.....	196	38195.....	196
36829.....	47	37048.....	28	37131.....	30	37261.....	29	37362.....	29	38113.....	196	38196.....	196
36830.....	47	37049.....	29	37132.....	30	37262.....	29	38001.....	195	38114.....	196	38197.....	196
36846.....	49	37050.....	29	37133.....	30	37263.....	29	38002.....	195	38115.....	195	38198.....	196
36847.....	49	37051.....	29	37134.....	30	37264.....	29	38003.....	195	38116.....	195	38201.....	182
36848.....	49	37052.....	29	37135.....	30	37265.....	29	38004.....	195	38117.....	195	38202.....	182
36849.....	49	37053.....	29	37136.....	30	37266.....	30	38009.....	195	38118.....	195	38203.....	182
36850.....	49	37054.....	28	37137.....	28	37267.....	28	38010.....	195	38119.....	195	38204.....	182
36851.....	36	37055.....	29	37138.....	30	37268.....	30	38011.....	195	38120.....	195	38209.....	182
36852.....	36	37056.....	29	37139.....	30	37269.....	30	38012.....	195	38121.....	195	38210.....	182
36853.....	36	37057.....	29	37140.....	30	37270.....	30	38013.....	195	38122.....	195	38211.....	182
36854.....	36	37058.....	29	37141.....	30	37271.....	30	38014.....	195	38123.....	195	38212.....	182
36855.....	36	37059.....	29	37142.....	30	37272.....	30	38019.....	195	38124.....	195	38213.....	182
36856.....	36	37060.....	28	37143.....	30	37273.....	30	38020.....	195	38125.....	195	38214.....	182
36857.....	37	37061.....	29	37144.....	28	37274.....	28	38021.....	195	38126.....	195	38219.....	182
36858.....	37	37062.....	29	37145.....	30	37275.....	30	38022.....	195	38127.....	195	38220.....	182
36859.....	37	37063.....	29	37146.....	30	37276.....	30	38023.....	195	38128.....	195	38221.....	182
36860.....	37	37064.....	29	37147.....	30	37277.....	30	38024.....	195	38129.....	195	38222.....	182
36861.....	37	37065.....	29	37148.....	30	37278.....	30	38025.....	195	38130.....	195	38223.....	182
36862.....	37	37066.....	30	37149.....	30	37279.....	30	38026.....	195	38131.....	195	38224.....	182
36863.....	37	37067.....	28	37150.....	30	37280.....	30	38031.....	195	38132.....	195	38225.....	182
36864.....	36	37068.....	29	37151.....	28	37281.....	28	38032.....	195	38133.....	195	38226.....	182
36865.....	37	37069.....	29	37152.....	30	37282.....	30	38033.....	195	38134.....	195	38231.....	182
36866.....	37	37070.....	29	37153.....	30	37283.....	30	38034.....	195	38135.....	195	38232.....	182
36867.....	37	37071.....	29	37154.....	30	37284.....	30	38035.....	195	38136.....	195	38233.....	182
36868.....	37	37072.....	29	37155.....	30	37285.....	30	38036.....	195	38137.....	195	38234.....	182
36869.....	37	37073.....	30	37156.....	30	37286.....	30	38037.....	195	38138.....	195	38235.....	182
36870.....	37	37074.....	28	37157.....	30	37287.....	30	38038.....	195	38139.....	195	38236.....	182
36871.....	37	37075.....	30	37159.....	28	37288.....	28	38045.....	195	38140.....	195	38237.....	182
36872.....	36	37076.....	30	37160.....	29	37289.....	30	38046.....	195	38141.....	195	38238.....	182
36873.....	36	37077.....	30	37161.....	29	37290.....	30	38047.....	195	38142.....	195	38245.....	182
36874.....	36	37078.....	30	37162.....	29	37291.....	30	38048.....	195	38143.....	195	38246.....	182
36875.....	36	37079.....	30	37163.....	29	37292.....	30	38049.....	195	38144.....	195	38247.....	182
36876.....	36	37080.....	30	37164.....	29	37293.....	30	38050.....	195	38145.....	196	38248.....	182
36877.....	36	37081.....	28	37165.....	29	37294.....	30	38051.....	195	38146.....	196	38249.....	182
36878.....	36	37082.....	30	37166.....	29	37295.....	28	38052.....	195	38147.....	196	38250.....	182
37000.....	28	37083.....	30	37167.....	29	37296.....	30	38059.....	195	38148.....	196	38251.....	182
37001.....	29	37084.....	30	37168.....	28	37297.....	30	38060.....	195	38149.....	196	38252.....	182
37002.....	28	37085.....	30	37169.....	28	37298.....	30	38061.....	195	38150.....	196	38259.....	182
37003.....	29	37086.....	30	37170.....	28	37299.....	30	38062.....	195	38151.....	196	38260.....	182
37004.....	28	37087.....	30	37175.....	29	37300.....	30	38063.....	195	38152.....	196	38261.....	182
37005.....	29	37088.....	28	37180.....	28	37301.....	30	38064.....	195	38153.....	196	38262.....	182
37006.....	28	37089.....	30	37181.....	29	37302.....	28	38065.....	195	38154.....	196	38263.....	182
37007.....	29	37090.....	30	37182.....	28	37303.....	30	38066.....	195	38155.....	196	38264.....	182
37008.....	28	37091.....	30	37183.....	29	37304.....	30	38067.....	195	38156.....	196	38265.....	182
37009.....	29	37092.....	30	37184.....	28	37305.....	30	38068.....	195	38157.....	195	38266.....	182
37010.....	29	37093.....	30	37185.....	29	37306.....	30	38073.....	195	38158.....	195	38267.....	182
37011.....	28	37094.....	30	37186.....	29	37307.....	30	38074.....	195	38159.....	195	38268.....	182
37012.....	29	37095.....	28	37187.....	28	37308.....	30	38075.....	195	38160.....	195	38273.....	182
37013.....	29	37096.....	30	37188.....	29	37320.....	28	38076.....	195	38161.....	195	38274.....	182
37014.....	28	37097.....	30	37189.....	29	37321.....	28	38077.....	195	38162.....	195	38275.....	182
37015.....	29	37098.....	30	37190.....	28	37322.....	28	38078.....	195	38163.....	195	38276.....	182
37016.....	28	37099.....	30	37191.....	29	37323.....	28	38079.....	195	38164.....	195	38277.....	182
37017.....	29	37100.....	30	37192.....	29	37324.....	28	38080.....	195	38165.....	195	38278.....	182
37018.....	28	37101.....	30	37193.....	29	37325.....	29	38081.....	195	38166.....	195	38279.....	182
37019.....	29	37102.....	28	37194.....	28	37330.....	29	38082.....	195	38167.....	195	38280.....	182
37020.....	29	37103.....	30	37195.....	29	37331.....	29	38083.....	195	38168.....	195	38281.....	182
37021.....	28	37104.....	30	37196.....	29	37332.....	29	38084.....	195	38169.....	195	38282.....	182
37022.....	29	37105.....	30	37197.....	29	37333.....	29	38087.....	195	38170.....	195	38283.....	182
37023.....	29	37106.....	30	37198.....	28	37334.....	29	38088.....	195	38171.....	195	38284.....	182
37024.....	28	37107.....	30	37199.....	30	37335.....	29	38089.....	195	38172.....	195	38287.....	182
37025.....	29	37108.....	30	37200.....	30	37337.....	29	38090.....	195	38173.....	195	38288.....	182
37026.....	29	37109.....	28	37201.....	30	37338.....	29	38091.....	196	38174.....	195	38289.....	182
37027.....	29	37110.....	30	37202.....	28	37339.....	29	38092.....	196	38175.....	195	38290.....	182
37028.....	29	37111.....	30	37203.....	30	37340.....	29	38093.....	196	38176.....	195	38291.....	182
37029.....	29	37112.....	30	37204.....	30	37341.....	29	38094.....	196	38177.....	195	38292.....	182
37030.....	28	37113.....	30	37205.....	30	37342.....	29	38095.....	196	38178.....	195	38293.....	182

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
38294.....	182	38377.....	182	39031.....	193	39131.....	193	39333.....	179	39534.....	184	39635.....	197
38295.....	182	38378.....	182	39032.....	198	39132.....	198	39334.....	184	39535.....	179	39636.....	200
38296.....	182	38379.....	182	39033.....	193	39133.....	193	39335.....	179	39536.....	184	39637.....	197
38297.....	182	38380.....	182	39034.....	198	39134.....	198	39336.....	184	39537.....	179	39638.....	200
38298.....	182	38381.....	182	39035.....	193	39135.....	193	39337.....	179	39538.....	184	39639.....	197
38299.....	182	38382.....	182	39036.....	198	39136.....	198	39338.....	184	39539.....	179	39640.....	200
38300.....	182	38383.....	182	39037.....	193	39137.....	193	39339.....	179	39540.....	184	39641.....	197
38301.....	182	38384.....	182	39038.....	198	39138.....	198	39340.....	184	39541.....	179	39641.....	211
38302.....	182	38385.....	182	39039.....	193	39139.....	193	39341.....	179	39542.....	184	39642.....	200
38303.....	182	38386.....	182	39040.....	198	39140.....	198	39342.....	184	39543.....	179	39642.....	212
38304.....	182	38387.....	182	39041.....	193	39141.....	193	39343.....	179	39544.....	185	39651.....	183
38305.....	182	38388.....	182	39042.....	198	39142.....	198	39344.....	185	39545.....	179	39652.....	187
38306.....	182	38389.....	182	39043.....	194	39143.....	194	39345.....	179	39546.....	185	39653.....	183
38307.....	182	38390.....	182	39044.....	199	39144.....	199	39346.....	185	39547.....	179	39654.....	187
38308.....	182	38391.....	182	39045.....	194	39145.....	194	39347.....	179	39548.....	185	39655.....	183
38309.....	182	38392.....	182	39046.....	199	39146.....	199	39348.....	185	39549.....	180	39656.....	187
38310.....	182	38393.....	182	39047.....	194	39147.....	194	39349.....	180	39550.....	185	39657.....	183
38311.....	182	38394.....	182	39048.....	199	39148.....	199	39350.....	185	39551.....	180	39658.....	187
38312.....	182	38395.....	182	39049.....	194	39149.....	194	39351.....	180	39552.....	185	39659.....	183
38313.....	182	38396.....	182	39050.....	199	39150.....	199	39352.....	185	39553.....	180	39660.....	187
38314.....	182	38397.....	182	39051.....	194	39151.....	194	39353.....	180	39554.....	185	39661.....	183
38315.....	182	38398.....	182	39052.....	199	39152.....	199	39354.....	185	39555.....	180	39662.....	187
38316.....	182	38490.....	39	39053.....	194	39153.....	194	39355.....	180	39556.....	185	39663.....	183
38317.....	182	38492.....	39	39054.....	199	39154.....	199	39356.....	185	39557.....	180	39664.....	187
38318.....	182	38496.....	39	39055.....	194	39155.....	194	39357.....	180	39558.....	185	39665.....	183
38319.....	182	38502.....	28	39056.....	199	39156.....	199	39358.....	185	39559.....	180	39666.....	187
38320.....	182	38504.....	28	39057.....	194	39157.....	194	39359.....	180	39560.....	185	39667.....	183
38321.....	182	38506.....	28	39058.....	199	39158.....	199	39360.....	185	39561.....	180	39668.....	187
38322.....	182	38507.....	28	39059.....	194	39159.....	194	39361.....	180	39562.....	185	39669.....	183
38323.....	182	38508.....	28	39060.....	199	39160.....	199	39362.....	185	39563.....	180	39670.....	187
38324.....	182	38512.....	28	39061.....	194	39161.....	194	39363.....	180	39564.....	185	39671.....	183
38325.....	182	38513.....	28	39062.....	199	39162.....	199	39364.....	185	39565.....	180	39672.....	187
38326.....	182	38514.....	28	39063.....	194	39163.....	194	39365.....	180	39566.....	185	39673.....	183
38327.....	182	38515.....	28	39064.....	199	39164.....	199	39366.....	185	39567.....	180	39674.....	187
38328.....	182	38517.....	28	39065.....	194	39165.....	194	39367.....	180	39568.....	185	39675.....	183
38329.....	182	38525.....	29	39066.....	199	39166.....	199	39368.....	185	39569.....	180	39676.....	187
38330.....	182	38528.....	29	39067.....	194	39167.....	194	39369.....	180	39570.....	185	39677.....	183
38331.....	182	38529.....	29	39068.....	199	39168.....	199	39370.....	185	39571.....	180	39678.....	187
38332.....	182	38530.....	29	39069.....	194	39169.....	194	39371.....	180	39572.....	185	39679.....	183
38333.....	182	38532.....	29	39070.....	199	39170.....	199	39372.....	185	39573.....	180	39680.....	187
38334.....	182	38539.....	29	39071.....	194	39171.....	194	39373.....	180	39574.....	185	39681.....	183
38335.....	182	38549.....	29	39072.....	199	39172.....	199	39374.....	185	39575.....	180	39682.....	187
38336.....	182	38578.....	29	39073.....	194	39173.....	194	39375.....	180	39576.....	185	39683.....	183
38337.....	182	38579.....	29	39074.....	199	39174.....	199	39376.....	185	39577.....	179	39684.....	187
38338.....	182	38580.....	29	39075.....	194	39175.....	194	39377.....	179	39578.....	184	39685.....	183
38339.....	182	38581.....	29	39076.....	199	39176.....	199	39378.....	184	39589.....	180	39686.....	187
38340.....	182	38583.....	29	39077.....	193	39177.....	193	39389.....	180	39589.....	211	39687.....	183
38341.....	182	38584.....	29	39078.....	198	39178.....	198	39389.....	211	39590.....	185	39688.....	187
38342.....	182	38585.....	29	39089.....	194	39189.....	194	39390.....	185	39590.....	212	39689.....	183
38343.....	182	38591.....	29	39089.....	211	39189.....	211	39390.....	212	39601.....	197	39690.....	187
38344.....	182	38599.....	30	39090.....	199	39190.....	199	39501.....	179	39602.....	200	39691.....	183
38345.....	182	38608.....	30	39090.....	212	39301.....	179	39502.....	184	39603.....	197	39691.....	211
38346.....	182	38617.....	30	39101.....	193	39302.....	184	39503.....	179	39604.....	200	39692.....	187
38347.....	182	39001.....	193	39102.....	198	39303.....	179	39504.....	184	39605.....	197	39692.....	212
38348.....	182	39002.....	198	39103.....	193	39304.....	184	39505.....	179	39606.....	200	39701.....	188
38349.....	182	39003.....	193	39104.....	198	39305.....	179	39506.....	184	39607.....	197	39703.....	188
38350.....	182	39004.....	198	39105.....	193	39306.....	184	39507.....	179	39608.....	200	39705.....	188
38351.....	182	39005.....	193	39106.....	198	39307.....	179	39508.....	184	39609.....	197	39707.....	188
38352.....	182	39006.....	198	39107.....	193	39308.....	184	39509.....	179	39610.....	200	39709.....	188
38353.....	182	39007.....	193	39108.....	198	39309.....	179	39510.....	184	39611.....	197	39711.....	188
38354.....	182	39008.....	198	39109.....	193	39310.....	184	39511.....	179	39612.....	200	39713.....	188
38355.....	182	39009.....	193	39109.....	212	39311.....	179	39512.....	184	39613.....	197	39715.....	188
38356.....	182	39010.....	198	39110.....	198	39312.....	184	39513.....	179	39614.....	200	39717.....	188
38357.....	182	39011.....	193	39111.....	193	39313.....	179	39514.....	184	39615.....	197	39719.....	188
38358.....	182	39012.....	198	39112.....	198	39314.....	184	39515.....	179	39616.....	200	39721.....	188
38359.....	182	39013.....	193	39113.....	193	39315.....	179	39516.....	184	39617.....	197	39723.....	188
38360.....	182	39014.....	198	39114.....	198	39316.....	184	39517.....	179	39618.....	200	39725.....	188
38361.....	182	39015.....	193	39115.....	193	39317.....	179	39518.....	184	39619.....	197	39727.....	188
38362.....	182	39016.....	198	39116.....	198	39318.....	184	39519.....	179	39620.....	200	39729.....	188
38363.....	182	39017.....	193	39117.....	193	39319.....	179	39520.....	184	39621.....	197	39731.....	188
38364.....	182	39018.....	198	39118.....	198	39320.....	184	39521.....	179	39622.....	200	39733.....	188
38365.....	182	39019.....	193	39119.....	193	39321.....	179	39522.....	184	39623.....	197	39735.....	188
38366.....	182	39020.....	198	39120.....	198	39322.....	184	39523.....	179	39624.....	200	39737.....	188
38367.....	182	39021.....	193	39121.....	193	39323.....	179	39524.....	184	39625.....	197	39739.....	188
38368.....	182	39022.....	198	39122.....	198	39324.....	184	39525.....	179	39626.....	200	39741.....	188
38369.....	182	39023.....	193	39123.....	193	39325.....	179	39526.....	184	39627.....	197	39743.....	188
38370.....	182	39024.....	198	39124.....	198	39326.....	184	39527.....	179	39628.....	200	39745.....	188
38371.....	182	39025.....	193	39125.....	193	39327.....	179	39528.....	184	39629.....	197	39747.....	188
38372.....	182	39026.....	198	39126.....	198	39328.....	184	39529.....	179	39630.....	200	39749.....	188
38373.....	182	39027.....	193	39127.....	193	39329.....	179	39530.....	184	39631.....	197	39751.....	188
38374.....	182	39028.....	198	39128.....	198	39330.....	184	39531.....	179	39632.....	200	39753.....	188
38375.....	182	39029.....	193	39129.....	193	39331.....	179	39532.....	184	39633.....	197	39755.....	188
38376.....	182	39030.....	198	39130.....	198	39332.....	184	39533.....	179	39634.....	200	39757.....	188

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
39759.....	188	40310.....	217	41409.....	225	41725.....	213	42693.....	70	43335.....	214	43906.....	218
39761.....	188	40313.....	214	41410.....	227	41729.....	213	42694.....	70	43336.....	217	43907.....	218
39763.....	188	40314.....	217	41413.....	225	41733.....	213	42695.....	70	43345.....	214	43908.....	218
39765.....	188	40317.....	214	41414.....	227	41737.....	213	42696.....	70	43346.....	217	43909.....	218
39767.....	188	40318.....	217	41417.....	225	41741.....	213	42697.....	70	43355.....	214	43910.....	215
39769.....	188	40321.....	214	41418.....	227	41745.....	213	42698.....	70	43356.....	217	43911.....	215
39771.....	188	40322.....	217	41421.....	225	41749.....	213	42699.....	70	43365.....	214	43912.....	215
39773.....	188	40325.....	214	41422.....	227	41753.....	213	42700.....	70	43366.....	217	43913.....	215
39775.....	188	40326.....	217	41425.....	225	41757.....	213	42701.....	70	43375.....	214	43914.....	215
39777.....	188	40329.....	214	41426.....	227	41761.....	213	42702.....	70	43376.....	217	43915.....	215
39789.....	211	40330.....	217	41429.....	225	41765.....	213	42703.....	70	43385.....	214	43916.....	215
40000.....	224	40333.....	214	41430.....	227	42606.....	68	42704.....	70	43386.....	217	43917.....	215
40001.....	224	40334.....	217	41433.....	225	42607.....	68	42705.....	70	43395.....	214	43918.....	215
40003.....	224	40337.....	214	41434.....	227	42608.....	68	42706.....	151	43396.....	217	43919.....	215
40004.....	224	40338.....	217	41437.....	225	42609.....	68	42707.....	151	43445.....	97	43920.....	215
40005.....	224	40341.....	214	41438.....	227	42610.....	68	42708.....	151	43446.....	97	43921.....	215
40007.....	224	40342.....	217	41441.....	225	42611.....	68	42709.....	151	43447.....	97	43922.....	215
40009.....	224	40345.....	214	41442.....	227	42612.....	68	42710.....	151	43448.....	97	43923.....	215
40010.....	224	40346.....	217	41445.....	225	42613.....	68	42711.....	151	43449.....	97	43924.....	215
40011.....	224	40349.....	214	41446.....	227	42614.....	68	42712.....	58	43450.....	97	43925.....	215
40012.....	224	40350.....	217	41449.....	225	42615.....	68	42713.....	58	43451.....	97	43926.....	215
40015.....	224	40353.....	214	41450.....	227	42616.....	68	42714.....	58	43452.....	97	43927.....	215
40016.....	224	40354.....	217	41453.....	225	42617.....	68	42715.....	58	43453.....	97	43928.....	215
40017.....	224	40357.....	214	41454.....	227	42618.....	68	42716.....	58	43470.....	97	43929.....	215
40019.....	224	40358.....	217	41457.....	225	42619.....	68	42717.....	58	43471.....	97	43930.....	215
40020.....	224	40361.....	214	41458.....	227	42620.....	68	42718.....	42	43472.....	97	43931.....	215
40021.....	224	40362.....	217	41461.....	225	42621.....	68	42719.....	42	43473.....	97	43932.....	215
40023.....	224	40365.....	214	41462.....	227	42622.....	68	42721.....	42	43474.....	97	43933.....	215
40024.....	224	40366.....	217	41465.....	225	42623.....	68	42722.....	42	43475.....	97	43934.....	215
40025.....	224	40369.....	214	41466.....	227	42624.....	68	42723.....	42	43476.....	97	43935.....	215
40028.....	224	40370.....	217	41505.....	216	42625.....	68	42731.....	43	43477.....	97	43936.....	215
40030.....	224	40373.....	214	41506.....	219	42626.....	68	42732.....	43	43478.....	97	43937.....	215
40031.....	224	40374.....	217	41509.....	216	42627.....	68	42733.....	43	43479.....	97	43938.....	215
40032.....	224	40377.....	214	41510.....	219	42628.....	70	42734.....	43	43480.....	97	43939.....	215
40035.....	224	40378.....	217	41513.....	216	42630.....	69	42735.....	43	43481.....	97	43950.....	215
40037.....	224	40381.....	214	41514.....	219	42631.....	69	42736.....	43	43482.....	97	43951.....	215
40038.....	224	40382.....	217	41517.....	216	42632.....	70	42737.....	43	43483.....	97	43952.....	215
40039.....	224	40385.....	214	41518.....	219	42633.....	70	42738.....	43	43484.....	97	43953.....	215
40105.....	223	40386.....	217	41521.....	216	42648.....	70	42739.....	43	43485.....	97	43954.....	215
40106.....	226	40505.....	220	41522.....	219	42649.....	70	42750.....	71	43486.....	97	43955.....	215
40109.....	223	40506.....	221	41525.....	216	42650.....	70	42751.....	71	43487.....	97	43956.....	215
40110.....	226	40509.....	220	41526.....	219	42651.....	70	42752.....	71	43488.....	97	43957.....	215
40113.....	223	40510.....	221	41529.....	216	42652.....	70	42753.....	71	43489.....	97	43958.....	215
40114.....	226	40513.....	220	41530.....	219	42653.....	70	42754.....	71	43490.....	97	43959.....	215
40117.....	223	40514.....	221	41533.....	216	42654.....	70	42755.....	71	43491.....	97	44299.....	155
40118.....	226	40517.....	220	41534.....	219	42655.....	70	43101.....	223	43492.....	97	44300.....	155
40121.....	223	40518.....	221	41537.....	216	42656.....	70	43102.....	226	43493.....	97	44301.....	155
40122.....	226	40521.....	220	41538.....	219	42657.....	70	43103.....	223	43494.....	97	44302.....	155
40125.....	223	40522.....	221	41541.....	216	42658.....	70	43104.....	226	43495.....	97	44303.....	155
40126.....	226	40525.....	220	41542.....	219	42659.....	70	43105.....	223	43496.....	97	44304.....	155
40129.....	223	40526.....	221	41545.....	216	42660.....	69	43106.....	226	43497.....	97	44305.....	155
40130.....	226	40529.....	220	41546.....	219	42661.....	69	43107.....	223	43501.....	220	44306.....	155
40133.....	223	40530.....	221	41549.....	216	42662.....	69	43108.....	226	43502.....	221	44307.....	155
40134.....	226	40533.....	220	41550.....	219	42663.....	69	43115.....	223	43503.....	220	44308.....	155
40137.....	223	40534.....	221	41553.....	216	42664.....	69	43116.....	226	43504.....	221	44309.....	155
40138.....	226	40537.....	220	41554.....	219	42665.....	69	43125.....	223	43505.....	220	44505.....	166
40141.....	223	40538.....	221	41557.....	216	42666.....	69	43126.....	226	43506.....	221	44506.....	166
40142.....	226	40541.....	220	41558.....	219	42667.....	69	43135.....	223	43507.....	220	44509.....	166
40145.....	223	40542.....	221	41561.....	216	42668.....	69	43136.....	226	43508.....	221	44510.....	166
40146.....	226	40545.....	220	41562.....	219	42669.....	69	43145.....	223	43515.....	220	44513.....	166
40149.....	223	40546.....	221	41565.....	216	42670.....	69	43146.....	226	43516.....	221	44514.....	166
40150.....	226	40549.....	220	41566.....	219	42671.....	69	43155.....	223	43525.....	220	44517.....	166
40153.....	223	40550.....	221	41605.....	222	42672.....	69	43156.....	226	43526.....	221	44518.....	166
40154.....	226	40553.....	220	41609.....	222	42673.....	69	43165.....	223	43535.....	220	44521.....	166
40157.....	223	40554.....	221	41613.....	222	42674.....	69	43166.....	226	43536.....	221	44522.....	166
40158.....	226	40557.....	220	41617.....	222	42675.....	69	43175.....	223	43545.....	220	44525.....	166
40161.....	223	40558.....	221	41621.....	222	42676.....	69	43176.....	226	43546.....	221	44526.....	166
40162.....	226	40561.....	220	41625.....	222	42677.....	69	43185.....	223	43555.....	220	44529.....	166
40165.....	222	40562.....	221	41629.....	222	42678.....	69	43186.....	226	43556.....	221	44530.....	166
40166.....	226	40565.....	220	41633.....	222	42679.....	69	43195.....	223	43565.....	220	44533.....	166
40169.....	223	40566.....	221	41637.....	222	42680.....	69	43196.....	226	43566.....	221	44534.....	166
40170.....	226	40569.....	220	41641.....	222	42681.....	69	43301.....	214	43575.....	220	44537.....	166
40173.....	223	40570.....	221	41645.....	222	42682.....	69	43302.....	217	43576.....	221	44538.....	166
40174.....	226	40573.....	220	41649.....	222	42683.....	69	43303.....	214	43585.....	220	44541.....	166
40177.....	223	40574.....	221	41653.....	222	42684.....	69	43304.....	217	43586.....	221	44542.....	166
40178.....	226	40577.....	220	41657.....	222	42685.....	69	43305.....	214	43595.....	220	44545.....	166
40181.....	223	40578.....	221	41661.....	222	42686.....	69	43306.....	217	43596.....	221	44546.....	166
40182.....	226	40581.....	220	41665.....	223	42687.....	69	43307.....	214	43900.....	218	44550.....	160
40185.....	223	40582.....	221	41705.....	213	42688.....	69	43308.....	217	43901.....	218	44551.....	160
40186.....	226	40585.....	220	41709.....	213	42689.....	69	43315.....	214	43902.....	218	44552.....	160
40305.....	214	40586.....	221	41713.....	213	42690.....	70	43316.....	217	43903.....	218	44553.....	160
40306.....	217	41405.....	225	41717.....	213	42691.....	70	43325.....	214	43904.....	218	44554.....	160
40309.....	214	41406.....	227	41721.....	213	42692.....	70	43326.....	217	43905.....	218	44555.....	160

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
44556.....	160	44653.....	127	44789.....	152	44875.....	150	44993.....	129	45183.....	81	46147.....	112
44557.....	160	44654.....	127	44790.....	152	44876.....	150	44994.....	129	45184.....	81	46206.....	230
44558.....	160	44685.....	127	44791.....	152	44877.....	150	44995.....	129	45185.....	81	46207.....	230
44559.....	160	44686.....	127	44792.....	152	44878.....	150	44996.....	129	45186.....	81	46208.....	230
44560.....	160	44687.....	127	44793.....	152	44879.....	149	44997.....	129	45187.....	83	46209.....	230
44561.....	161	44688.....	127	44794.....	152	44880.....	150	44998.....	129	45188.....	83	46210.....	230
44562.....	161	44689.....	127	44795.....	152	44881.....	150	44999.....	129	45189.....	83	46211.....	230
44563.....	161	44690.....	127	44796.....	152	44882.....	150	45000.....	129	45190.....	83	46212.....	230
44564.....	161	44691.....	127	44797.....	152	44883.....	150	45001.....	129	45191.....	83	46213.....	230
44565.....	161	44692.....	127	44798.....	152	44884.....	150	45002.....	129	45192.....	83	46214.....	230
44566.....	161	44693.....	127	44799.....	152	44885.....	150	45003.....	129	45193.....	83	46216.....	230
44570.....	162	44694.....	127	44800.....	152	44886.....	150	45004.....	129	45194.....	83	46217.....	230
44571.....	162	44695.....	127	44801.....	152	44890.....	147	45005.....	130	45195.....	83	46218.....	230
44572.....	162	44696.....	127	44802.....	152	44891.....	147	45006.....	130	45196.....	83	46220.....	230
44573.....	162	44701.....	147	44803.....	152	44892.....	147	45007.....	130	45197.....	83	46221.....	230
44574.....	162	44702.....	147	44804.....	152	44893.....	147	45008.....	130	45198.....	83	46222.....	230
44575.....	162	44703.....	147	44805.....	152	44894.....	149	45009.....	130	45199.....	83	46228.....	230
44576.....	162	44705.....	147	44806.....	152	44895.....	147	45010.....	130	45200.....	83	46229.....	230
44577.....	162	44708.....	147	44807.....	152	44896.....	147	45011.....	130	45201.....	83	46230.....	230
44578.....	162	44711.....	147	44808.....	152	44897.....	147	45012.....	130	45202.....	83	46231.....	230
44579.....	162	44714.....	147	44809.....	127	44898.....	147	45013.....	130	45203.....	83	46232.....	230
44580.....	162	44715.....	147	44810.....	127	44899.....	147	45014.....	130	45277.....	234	46233.....	230
44581.....	162	44716.....	147	44811.....	127	44900.....	147	45015.....	130	45279.....	234	46343.....	53
44582.....	162	44717.....	147	44814.....	148	44901.....	147	45016.....	130	45281.....	234	46344.....	53
44583.....	162	44719.....	147	44815.....	148	44902.....	149	45017.....	130	45283.....	234	46345.....	53
44584.....	162	44722.....	147	44816.....	148	44916.....	154	45018.....	130	45285.....	234	46346.....	53
44585.....	162	44725.....	147	44817.....	148	44917.....	154	45019.....	130	45287.....	234	46347.....	53
44586.....	162	44728.....	147	44818.....	148	44918.....	154	45100.....	80	45289.....	234	46348.....	53
44587.....	160	44731.....	147	44819.....	148	44919.....	154	45101.....	80	45291.....	234	46349.....	53
44588.....	160	44732.....	148	44820.....	148	44920.....	154	45102.....	80	45293.....	234	46350.....	53
44589.....	160	44733.....	148	44821.....	148	44921.....	154	45103.....	80	45295.....	234	46351.....	53
44590.....	160	44734.....	148	44822.....	148	44922.....	154	45104.....	80	45297.....	234	46354.....	53
44591.....	160	44735.....	148	44823.....	148	44923.....	154	45105.....	80	45299.....	234	46355.....	53
44592.....	160	44736.....	148	44824.....	148	44924.....	154	45106.....	82	45477.....	235	46356.....	53
44593.....	160	44737.....	148	44826.....	148	44925.....	154	45107.....	82	45478.....	235	46357.....	52
44594.....	160	44738.....	152	44827.....	148	44926.....	154	45108.....	82	45479.....	235	46358.....	52
44595.....	160	44739.....	152	44828.....	148	44927.....	154	45109.....	82	45480.....	235	46359.....	52
44596.....	160	44740.....	152	44829.....	148	44928.....	154	45110.....	82	45481.....	235	46360.....	52
44597.....	160	44741.....	152	44830.....	148	44929.....	154	45111.....	82	45482.....	235	46362.....	52
44598.....	162	44745.....	132	44831.....	148	44930.....	154	45112.....	81	45483.....	235	46364.....	52
44599.....	162	44746.....	132	44832.....	152	44931.....	154	45113.....	81	45484.....	235	46366.....	52
44600.....	162	44747.....	132	44833.....	152	44932.....	154	45114.....	81	45485.....	235	46368.....	52
44601.....	162	44748.....	132	44834.....	152	44933.....	154	45115.....	81	45486.....	235	46370.....	52
44602.....	162	44749.....	132	44835.....	152	44934.....	154	45116.....	81	45487.....	235	46372.....	52
44603.....	162	44750.....	132	44836.....	152	44935.....	154	45117.....	81	45488.....	235	46374.....	52
44604.....	162	44751.....	132	44837.....	152	44936.....	154	45118.....	81	45489.....	235	46376.....	52
44605.....	162	44752.....	132	44838.....	152	44937.....	154	45119.....	81	45490.....	235	46450.....	58
44606.....	162	44753.....	132	44839.....	152	44938.....	154	45120.....	81	45491.....	235	46451.....	58
44607.....	162	44754.....	132	44840.....	152	44939.....	154	45121.....	81	45492.....	235	46452.....	58
44608.....	162	44755.....	132	44841.....	152	44940.....	154	45122.....	81	45493.....	235	46453.....	58
44609.....	161	44756.....	132	44842.....	149	44941.....	154	45123.....	81	45494.....	235	46454.....	58
44610.....	161	44757.....	132	44843.....	149	44942.....	154	45124.....	81	45495.....	235	46455.....	58
44611.....	161	44758.....	132	44844.....	150	44943.....	154	45125.....	81	45496.....	235	46456.....	58
44612.....	161	44759.....	132	44845.....	150	44944.....	154	45126.....	81	45497.....	235	46457.....	58
44613.....	161	44760.....	132	44846.....	149	44945.....	154	45127.....	83	45498.....	235	46458.....	58
44614.....	161	44761.....	132	44847.....	149	44950.....	153	45128.....	83	45499.....	235	46459.....	58
44615.....	162	44762.....	132	44848.....	149	44951.....	153	45129.....	83	45500.....	235	46460.....	58
44616.....	162	44763.....	132	44849.....	149	44952.....	153	45130.....	83	46106.....	232	46461.....	58
44617.....	162	44764.....	132	44850.....	150	44953.....	153	45131.....	83	46107.....	232	46462.....	58
44618.....	162	44765.....	132	44851.....	150	44954.....	153	45132.....	83	46108.....	232	46463.....	58
44619.....	162	44766.....	132	44852.....	150	44955.....	153	45133.....	83	46109.....	232	46464.....	58
44620.....	162	44767.....	132	44853.....	150	44956.....	153	45134.....	83	46110.....	232	46465.....	58
44627.....	132	44768.....	132	44854.....	149	44957.....	153	45135.....	83	46111.....	232	46466.....	58
44628.....	132	44769.....	152	44855.....	149	44958.....	153	45136.....	83	46112.....	232	46467.....	58
44629.....	132	44770.....	152	44856.....	149	44959.....	153	45137.....	83	46113.....	232	46468.....	58
44630.....	132	44771.....	152	44857.....	149	44960.....	153	45138.....	83	46114.....	232	46469.....	58
44631.....	132	44772.....	152	44858.....	150	44961.....	153	45139.....	83	46116.....	232	46470.....	58
44634.....	132	44773.....	152	44859.....	150	44962.....	153	45140.....	83	46117.....	232	46471.....	58
44635.....	132	44774.....	152	44860.....	150	44963.....	153	45141.....	83	46118.....	232	46472.....	58
44636.....	132	44775.....	152	44861.....	150	44964.....	153	45150.....	81	46120.....	232	46473.....	58
44637.....	132	44776.....	152	44862.....	150	44965.....	153	45170.....	81	46121.....	232	46474.....	58
44638.....	132	44777.....	152	44863.....	150	44966.....	153	45171.....	81	46122.....	232	46475.....	58
44639.....	132	44778.....	152	44864.....	150	44967.....	153	45172.....	81	46128.....	232	46476.....	58
44641.....	132	44779.....	152	44865.....	150	44968.....	153	45173.....	81	46129.....	232	46477.....	58
44642.....	132	44780.....	152	44866.....	150	44969.....	153	45174.....	81	46130.....	232	46478.....	58
44643.....	132	44781.....	152	44867.....	150	44970.....	153	45175.....	81	46131.....	232	46479.....	58
44645.....	127	44782.....	152	44868.....	149	44971.....	153	45176.....	81	46132.....	232	46480.....	58
44646.....	127	44783.....	152	44869.....	149	44972.....	153	45177.....	81	46133.....	232	46481.....	58
44647.....	127	44784.....	152	44870.....	149	44973.....	153	45178.....	81	46140.....	112	46482.....	58
44648.....	127	44785.....	152	44871.....	149	44974.....	153	45179.....	81	46141.....	112	46483.....	58
44649.....	127	44786.....	152	44872.....	150	44990.....	129	45180.....	81	46142.....	112	46493.....	42
44650.....	127	44787.....	152	44873.....	150	44991.....	129	45181.....	81	46143.....	112	46494.....	42
44652.....	127	44788.....	152	44874.....	150	44992.....	129	45182.....	81	46145.....	112	46495.....	42

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
46497.....	42	46849.....	42	47003.....	33	47086.....	33	48524.....	223	48608.....	226	48692.....	217
46498.....	42	46850.....	42	47004.....	33	47087.....	33	48525.....	223	48609.....	226	48693.....	217
46506.....	52	46851.....	42	47005.....	33	47088.....	33	48526.....	223	48610.....	226	48694.....	217
46507.....	52	46852.....	42	47006.....	33	47089.....	33	48527.....	223	48611.....	226	48695.....	217
46508.....	52	46853.....	42	47007.....	33	47090.....	33	48528.....	223	48612.....	226	48696.....	217
46509.....	52	46854.....	42	47008.....	33	47091.....	33	48529.....	223	48613.....	226	48697.....	217
46510.....	52	46855.....	42	47009.....	33	47092.....	33	48530.....	223	48614.....	226	48698.....	217
46518.....	53	46856.....	42	47010.....	33	47093.....	33	48531.....	223	48615.....	226	48699.....	217
46519.....	53	46857.....	42	47011.....	33	47094.....	33	48532.....	223	48616.....	226	48700.....	217
46520.....	53	46858.....	42	47012.....	33	47095.....	33	48533.....	223	48617.....	226	48701.....	217
46521.....	53	46859.....	42	47013.....	33	47096.....	33	48534.....	223	48618.....	226	48702.....	217
46522.....	53	46860.....	42	47014.....	33	47097.....	33	48535.....	223	48619.....	226	48703.....	217
46560.....	61	46861.....	42	47015.....	33	47120.....	33	48536.....	223	48620.....	226	48704.....	217
46561.....	61	46862.....	42	47016.....	33	47121.....	33	48537.....	223	48621.....	226	48705.....	217
46562.....	61	46863.....	42	47017.....	33	47122.....	33	48538.....	223	48622.....	226	48706.....	217
46563.....	61	46864.....	42	47018.....	33	47123.....	33	48539.....	223	48623.....	226	48707.....	217
46564.....	61	46865.....	42	47019.....	33	47124.....	33	48540.....	223	48624.....	226	48708.....	217
46565.....	61	46866.....	42	47020.....	33	47125.....	33	48541.....	223	48625.....	226	48709.....	217
46566.....	61	46867.....	42	47021.....	33	47126.....	33	48542.....	223	48626.....	226	48710.....	217
46567.....	61	46868.....	42	47022.....	33	47127.....	33	48543.....	223	48627.....	226	48711.....	217
46568.....	61	46869.....	42	47023.....	33	47128.....	33	48544.....	223	48628.....	214	48712.....	217
46620.....	89	46873.....	42	47024.....	33	47129.....	33	48545.....	223	48629.....	214	48714.....	217
46621.....	89	46874.....	42	47025.....	33	47130.....	33	48546.....	223	48630.....	214	48715.....	217
46622.....	89	46880.....	42	47026.....	33	47131.....	33	48547.....	223	48631.....	214	48716.....	217
46623.....	89	46881.....	42	47027.....	33	47132.....	33	48548.....	223	48632.....	214	48717.....	217
46624.....	89	46882.....	42	47028.....	33	47133.....	33	48549.....	223	48633.....	214	48718.....	217
46625.....	89	46884.....	42	47029.....	33	47134.....	33	48550.....	223	48634.....	214	48719.....	217
46626.....	89	46886.....	42	47030.....	33	47135.....	33	48551.....	223	48635.....	214	48720.....	217
46627.....	90	46887.....	42	47031.....	33	47136.....	33	48552.....	223	48636.....	214	48721.....	217
46628.....	90	46889.....	42	47032.....	33	47137.....	33	48553.....	223	48637.....	214	48722.....	217
46629.....	90	46890.....	42	47033.....	33	47138.....	33	48554.....	223	48638.....	214	48723.....	217
46630.....	90	46891.....	42	47034.....	33	47139.....	33	48555.....	223	48639.....	214	48724.....	217
46631.....	90	46893.....	42	47035.....	33	47140.....	33	48556.....	223	48640.....	214	48725.....	217
46632.....	90	46894.....	42	47036.....	33	47141.....	33	48557.....	223	48641.....	214	48726.....	217
46633.....	90	46895.....	42	47037.....	33	47142.....	33	48558.....	223	48642.....	214	48727.....	217
46634.....	90	46896.....	42	47038.....	33	47143.....	33	48559.....	223	48643.....	214	48728.....	217
46635.....	90	46898.....	42	47039.....	33	47144.....	33	48560.....	223	48644.....	214	48729.....	217
46636.....	90	46899.....	42	47040.....	33	47145.....	33	48561.....	223	48645.....	214	48730.....	217
46637.....	90	46900.....	42	47041.....	33	47146.....	33	48562.....	223	48646.....	214	48731.....	217
46638.....	90	46903.....	42	47042.....	33	47147.....	33	48563.....	223	48647.....	214	48732.....	217
46639.....	90	46904.....	42	47043.....	33	47148.....	33	48564.....	226	48648.....	214	48733.....	217
46640.....	90	46905.....	42	47044.....	33	47160.....	33	48565.....	226	48650.....	214	48734.....	217
46641.....	90	46909.....	42	47045.....	33	47161.....	33	48566.....	226	48651.....	214	48735.....	217
46642.....	90	46910.....	42	47046.....	33	47162.....	33	48567.....	226	48652.....	214	48736.....	217
46643.....	90	46911.....	42	47047.....	33	47163.....	33	48568.....	226	48653.....	214	48737.....	217
46644.....	90	46912.....	42	47048.....	33	47164.....	33	48569.....	226	48654.....	214	48738.....	217
46645.....	90	46913.....	42	47049.....	33	47165.....	33	48570.....	226	48655.....	214	48739.....	217
46646.....	90	46914.....	42	47050.....	33	47166.....	33	48571.....	226	48656.....	214	48740.....	217
46647.....	91	46915.....	42	47051.....	33	47167.....	33	48572.....	226	48657.....	214	48741.....	217
46648.....	91	46916.....	42	47052.....	33	47168.....	33	48573.....	226	48658.....	214	48742.....	217
46649.....	91	46917.....	42	47053.....	33	47169.....	33	48574.....	226	48659.....	214	48743.....	217
46650.....	91	46918.....	42	47054.....	33	47170.....	33	48575.....	226	48660.....	214	48744.....	217
46651.....	91	46919.....	42	47055.....	33	47171.....	33	48576.....	226	48661.....	214	48745.....	217
46652.....	91	46920.....	42	47056.....	33	47172.....	33	48577.....	226	48662.....	214	48746.....	217
46653.....	91	46921.....	42	47057.....	33	47173.....	33	48578.....	226	48663.....	214	48747.....	217
46654.....	91	46922.....	42	47058.....	33	48002.....	33	48579.....	226	48664.....	214	48748.....	217
46655.....	91	46923.....	42	47059.....	33	48003.....	33	48580.....	226	48665.....	214	48749.....	217
46656.....	91	46924.....	42	47060.....	33	48012.....	33	48581.....	226	48666.....	214	48750.....	217
46657.....	91	46925.....	42	47061.....	33	48020.....	33	48582.....	226	48667.....	214	48751.....	217
46658.....	91	46926.....	42	47062.....	33	48070.....	33	48583.....	226	48668.....	214	48752.....	217
46659.....	91	46927.....	42	47063.....	33	48500.....	223	48584.....	226	48669.....	214	48753.....	217
46660.....	91	46928.....	44	47064.....	33	48501.....	223	48586.....	226	48670.....	214	48754.....	217
46821.....	44	46929.....	44	47065.....	33	48502.....	223	48587.....	226	48671.....	214	48755.....	217
46822.....	44	46930.....	44	47066.....	33	48503.....	223	48588.....	226	48672.....	214	48756.....	220
46823.....	44	46931.....	44	47067.....	33	48504.....	223	48589.....	226	48673.....	214	48757.....	220
46824.....	44	46932.....	44	47068.....	33	48505.....	223	48590.....	226	48674.....	214	48758.....	220
46825.....	44	46933.....	44	47069.....	33	48506.....	223	48591.....	226	48675.....	214	48759.....	220
46826.....	44	46934.....	44	47070.....	33	48507.....	223	48592.....	226	48676.....	214	48760.....	220
46827.....	44	46935.....	44	47071.....	33	48508.....	223	48593.....	226	48677.....	214	48761.....	220
46828.....	44	46936.....	44	47072.....	33	48509.....	223	48594.....	226	48678.....	214	48762.....	220
46829.....	44	46937.....	44	47073.....	33	48510.....	223	48595.....	226	48679.....	214	48763.....	220
46830.....	44	46938.....	44	47074.....	33	48511.....	223	48596.....	226	48680.....	214	48764.....	220
46831.....	44	46939.....	44	47075.....	33	48512.....	223	48597.....	226	48681.....	214	48765.....	220
46832.....	44	46940.....	44	47076.....	33	48513.....	223	48598.....	226	48682.....	214	48766.....	220
46833.....	44	46941.....	44	47077.....	33	48514.....	223	48599.....	226	48683.....	214	48767.....	220
46834.....	44	46942.....	44	47078.....	33	48515.....	223	48600.....	226	48684.....	214	48768.....	220
46835.....	44	46943.....	44	47079.....	33	48516.....	223	48601.....	226	48685.....	214	48769.....	220
46836.....	44	46944.....	42	47080.....	33	48517.....	223	48602.....	226	48686.....	214	48770.....	220
46837.....	44	46945.....	42	47081.....	33	48518.....	223	48603.....	226	48687.....	214	48771.....	220
46838.....	44	46946.....	42	47082.....	33	48519.....	223	48604.....	226	48688.....	214	48772.....	220
46839.....	44	47000.....	33	47083.....	33	48520.....	223	48605.....	226	48689.....	214	48773.....	220
46840.....	44	47001.....	33	47084.....	33	48522.....	223	48606.....	226	48690.....	214	48774.....	220
46841.....	44	47002.....	33	47085.....	33	48523.....	223	48607.....	226	48691.....	214	48775.....	220

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
48776.....	220	48861.....	221	48959.....	227	49067.....	216	49180.....	222	49409.....	223
48778.....	220	48862.....	221	48960.....	227	49073.....	219	49181.....	222	49410.....	223
48779.....	220	48863.....	221	48961.....	227	49074.....	219	49182.....	222	49411.....	223
48780.....	220	48864.....	221	48962.....	227	49075.....	219	49183.....	222	49412.....	223
48781.....	220	48865.....	221	48968.....	227	49076.....	219	49184.....	222	49413.....	223
48782.....	220	48866.....	221	48969.....	227	49077.....	219	49185.....	222	49414.....	223
48783.....	220	48867.....	221	48970.....	227	49078.....	219	49186.....	222	49415.....	223
48784.....	220	48868.....	221	48971.....	227	49079.....	219	49187.....	222	49416.....	223
48785.....	220	48869.....	221	48972.....	227	49080.....	219	49188.....	222	49417.....	223
48786.....	220	48870.....	221	48973.....	227	49081.....	219	49189.....	222	49418.....	223
48787.....	220	48871.....	221	48974.....	227	49082.....	219	49190.....	222	49419.....	223
48788.....	220	48872.....	221	48975.....	227	49083.....	219	49191.....	222	49420.....	223
48789.....	220	48873.....	221	48976.....	227	49084.....	219	49192.....	222	49421.....	223
48790.....	220	48874.....	221	48977.....	227	49085.....	219	49193.....	222	49422.....	223
48791.....	220	48875.....	221	48978.....	227	49086.....	219	49262.....	213	49423.....	223
48792.....	220	48876.....	221	48979.....	227	49087.....	219	49263.....	213	49424.....	223
48793.....	220	48877.....	221	48980.....	227	49088.....	219	49264.....	213	49425.....	223
48794.....	220	48878.....	221	48981.....	227	49094.....	219	49265.....	213	49426.....	223
48795.....	220	48879.....	221	48982.....	227	49095.....	219	49266.....	213	49427.....	214
48796.....	220	48880.....	221	48983.....	227	49096.....	219	49267.....	213	49428.....	214
48797.....	220	48881.....	221	48989.....	227	49097.....	219	49268.....	213	49429.....	214
48798.....	220	48882.....	221	48990.....	227	49098.....	219	49269.....	213	49430.....	214
48799.....	220	48883.....	221	48991.....	227	49099.....	219	49270.....	213	49431.....	214
48800.....	220	48884.....	225	48992.....	227	49100.....	219	49271.....	213	49432.....	214
48801.....	220	48885.....	225	48993.....	227	49101.....	219	49272.....	213	49433.....	214
48802.....	220	48886.....	225	48994.....	227	49102.....	219	49273.....	213	49434.....	214
48803.....	220	48887.....	225	48995.....	227	49103.....	219	49274.....	213	49435.....	214
48804.....	220	48888.....	225	48996.....	227	49104.....	219	49275.....	213	49436.....	214
48805.....	220	48889.....	225	48997.....	227	49105.....	219	49276.....	213	49437.....	214
48806.....	220	48890.....	225	48998.....	227	49106.....	219	49277.....	213	49438.....	214
48807.....	220	48891.....	225	48999.....	227	49107.....	219	49283.....	213	49439.....	214
48808.....	220	48892.....	225	49000.....	227	49108.....	219	49284.....	213	49440.....	214
48809.....	220	48893.....	225	49001.....	227	49109.....	219	49285.....	213	49441.....	214
48810.....	220	48894.....	225	49002.....	227	49115.....	219	49286.....	213	49442.....	21

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
49575.....	217	49669.....	166	51024.....	303	51127.....	306	51371.....	249	51622.....	248
49576.....	217	49670.....	166	51025.....	303	51128.....	306	51372.....	249	51752.....	245
49577.....	217	49671.....	166	51026.....	303	51129.....	306	51373.....	249	51753.....	245
49578.....	217	49672.....	166	51027.....	303	51130.....	306	51374.....	249	51754.....	245
49579.....	217	49673.....	166	51028.....	303	51131.....	306	51375.....	249	51755.....	245
49580.....	217	49674.....	166	51029.....	303	51132.....	306	51506.....	255	51756.....	245
49581.....	217	49675.....	166	51030.....	303	51201.....	305	51507.....	255	51757.....	245
49582.....	217	49676.....	166	51031.....	303	51202.....	305	51508.....	255	51758.....	245
49583.....	221	49677.....	166	51032.....	303	51203.....	305	51509.....	256	51759.....	245
49584.....	221	49678.....	166	51033.....	303	51204.....	305	51510.....	256	51760.....	245
49585.....	221	49679.....	166	51034.....	303	51206.....	305	51511.....	256	51761.....	245
49586.....	221	49680.....	166	51035.....	303	51207.....	305	51512.....	256	51762.....	245
49587.....	221	49681.....	166	51036.....	303	51208.....	305	51513.....	256	51763.....	246
49588.....	221	49682.....	166	51037.....	303	51209.....	305	51514.....	256	51764.....	246
49589.....	221	49683.....	166	51038.....	303	51210.....	305	51515.....	256	51765.....	246
49590.....	221	49684.....	166	51039.....	303	51211.....	305	51516.....	257	51766.....	246
49591.....	221	49829.....	234	51040.....	303	51212.....	305	51517.....	257	51767.....	246
49592.....	221	49830.....	234	51041.....	303	51213.....	305	51518.....	257	51768.....	246
49593.....	221	49831.....	234	51042.....	303	51214.....	305	51519.....	257	51769.....	246
49594.....	221	49832.....	234	51043.....	303	51215.....	305	51520.....	257	51770.....	246
49595.....	221	49833.....	234	51044.....	303	51216.....	305	51521.....	257	51771.....	246
49596.....	221	49834.....	234	51045.....	303	51217.....	305	51522.....	257	51772.....	246
49597.....	221	49835.....	234	51046.....	303	51218.....	306	51523.....	257	51773.....	246
49598.....	221	49836.....	234	51047.....	303	51219.....	306	51524.....	257	51774.....	246
49599.....	221	49837.....	234	51048.....	303	51220.....	306	51525.....	257	51775.....	246
49600.....	221	49838.....	234	51049.....	303	51221.....	306	51526.....	257	51776.....	246
49601.....	221	49839.....	234	51050.....	303	51222.....	306	51527.....	257	51777.....	246
49602.....	221	49840.....	234	51051.....	302	51223.....	306	51528.....	258	51778.....	246
49603.....	221	50000.....	296	51052.....	302	51224.....	306	51529.....	258	51779.....	246
49604.....	221	50001.....	296	51053.....	302	51225.....	306	51530.....	258	51780.....	246
49605.....	221	50002.....	296	51054.....	302	51226.....	306	51531.....	258	51781.....	247
49606.....	221	50003.....	296	51055.....	302	51269.....	245	51532.....	258	51782.....	247
49607.....	221	50004.....	296	51056.....	302	51270.....	245	51533.....	258	51783.....	249
49608.....	221	50005.....	296	51057.....	302	51271.....	245	51534.....	258	51784.....	24

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
52352.	258	53209.	320	54729.	267	55164.	274	56052.	314	56224.	315	57096.	302
52353.	258	53210.	320	54730.	267	55165.	274	56053.	314	56225.	315	57097.	302
52354.	258	53211.	320	54731.	267	55166.	274	56054.	314	56226.	315	57098.	302
52355.	259	53212.	320	54732.	267	55167.	274	56055.	314	56227.	315	57099.	302
52356.	259	53213.	320	54733.	267	55168.	274	56056.	314	56228.	315	57100.	302
52357.	259	53214.	320	54734.	267	55169.	275	56057.	314	56229.	315	57101.	302
52358.	259	53215.	320	54735.	267	55170.	275	56058.	314	56230.	315	57102.	302
52359.	259	53216.	320	54800.	268	55171.	275	56059.	314	56231.	315	57103.	302
52360.	259	53217.	320	54801.	268	55172.	275	56060.	314	56232.	315	57104.	302
53001.	319	53218.	320	54802.	268	55173.	275	56103.	314	56233.	315	57105.	302
53002.	319	53219.	320	54803.	268	55174.	275	56104.	314	56234.	315	57106.	302
53003.	319	53220.	320	54804.	268	55175.	275	56105.	314	56235.	315	57107.	302
53004.	319	53221.	321	54805.	268	55176.	275	56106.	314	56236.	315	57108.	302
53005.	319	53222.	321	54806.	268	55177.	275	56107.	314	56237.	315	57109.	302
53006.	319	53223.	321	54807.	268	55178.	275	56108.	315	56238.	315	57110.	303
53007.	319	53224.	321	54808.	268	55179.	275	56109.	315	56239.	315	57111.	303
53008.	319	53225.	321	54809.	269	55180.	276	56110.	315	56240.	315	57112.	303
53009.	319	53226.	321	54810.	269	55181.	276	56111.	315	56241.	315	57113.	303
53010.	319	54600.	264	54811.	269	55182.	276	56112.	315	56242.	315	57114.	303
53011.	319	54601.	264	54812.	269	55183.	276	56113.	315	56243.	314	57115.	303
53012.	319	54602.	264	54813.	269	55184.	276	56114.	315	56244.	314	57116.	303
53013.	319	54603.	264	54814.	269	55185.	276	56115.	316	56245.	314	57117.	303
53014.	319	54604.	264	54815.	269	55186.	276	56116.	316	56246.	314	57118.	303
53015.	319	54605.	264	54816.	269	55187.	277	56117.	316	56247.	314	57119.	303
53016.	319	54606.	264	54817.	269	55188.	277	56118.	316	56248.	314	57120.	303
53017.	318	54607.	264	54818.	269	55189.	277	56119.	316	56249.	314	57121.	303
53018.	318	54608.	264	54819.	269	55190.	277	56120.	316	56250.	314	57122.	303
53019.	318	54609.	265	54820.	270	55191.	277	56121.	316	56251.	314	57123.	303
53020.	318	54610.	265	54821.	270	55192.	277	56122.	316	56252.	314	57124.	303
53021.	318	54611.	265	54822.	270	55193.	277	56123.	316	56253.	314	57125.	303
53022.	318	54612.	265	54823.	270	55194.	277	56124.	316	56254.	314	57126.	303
53023.	318	54613.	265	54824.	270	55195.	277	56125.	316	56255.	314	57127.	303
53024.	318	54614.	265	54825.	270	56001.	315	56126.	316	56256.	314	57128.	303
53025.	318	54615.	265	54826.	271	56002.	315	56127.	316	56257.	314	57129.	303
53026.	318	54616.	265	54827.	271	56003.	315	56128.	316	56258.	314	57130.	303
53027.	318	54617.	265	54828.	271	56004.	315	56129.	316	56259.	314	57131.	303
53028.	318	54618.	265	54829.	271	56005.	315	56130.	316	56260.	314	57132.	303
53029.	318	54619.	265	54830.	271	56006.	315	56131.	316	56261.	314	57133.	303
53030.	318	54620.	266	54831.	271	56007.	315	56132.	316	56262.	314	57134.	303
53031.	318	54621.	266	54832.	271	56008.	315	56135.	314	56263.	314	57135.	303
53032.	318	54622.	266	54833.	271	56009.	315	56136.	314	56264.	314	57136.	303
53033.	318	54623.	266	54834.	271	56010.	315	56137.	314	56265.	314	57137.	303
53034.	318	54624.	266	54835.	271	56011.	315	56138.	314	56266.	314	57138.	303
53035.	318	54625.	266	55000.	268	56012.	315	56139.	314	56267.	314	57139.	303
53036.	318	54626.	266	55001.	268	56013.	315	56140.	315	56268.	314	57140.	303
53107.	318	54627.	267	55002.	268	56014.	315	56141.	315	56269.	314	57141.	303
53108.	318	54628.	267	55003.	268	56015.	315	56142.	315	57005.	324	57142.	304
53109.	318	54629.	267	55004.	268	56016.	315	56143.	315	57006.	324	57143.	304
53110.	318	54630.	267	55005.	268	56017.	315	56144.	315	57007.	324	57144.	304
53111.	318	54631.	267	55006.	268	56018.	315	56145.	315	57008.	324	57145.	304
53112.	319	54632.	267	55007.	268	56019.	315	56146.	315	57009.	324	57146.	304
53113.	319	54633.	267	55008.	268	56020.	315	56147.	316	57010.	324	57147.	304
53114.	319	54634.	267	55009.	269	56021.	315	56148.	316	57011.	324	57148.	304
53115.	319	54635.	267	55010.	269	56022.	315	56149.	316	57012.	324	57149.	304
53116.	319	54700.	264	55011.	269	56023.	315	56150.	316	57015.	324	57150.	304
53117.	320	54701.	264	55012.	269	56024.	315	56151.	316	57016.	324	57151.	304
53118.	320	54702.	264	55013.	269	56025.	315	56152.	316	57017.	324	57152.	304
53119.	320	54703.	264	55014.	269	56026.	315	56153.	316	57018.	324	57153.	304
53120.	320	54704.	264	55015.	269	56027.	315	56154.	316	57019.	324	57154.	304
53121.	320	54705.	264	55016.	269	56028.	315	56155.	316	57020.	324	57155.	304
53122.	320	54706.	264	55017.	269	56029.	315	56156.	316	57021.	324	57156.	304
53123.	321	54707.	264	55018.	269	56030.	315	56157.	316	57022.	324	57157.	304
53124.	321	54708.	264	55019.	269	56031.	315	56158.	316	57075.	324	57158.	304
53125.	321	54709.	265	55020.	270	56032.	315	56159.	316	57076.	302	57159.	304
53126.	321	54710.	265	55021.	270	56033.	315	56160.	316	57077.	302	57160.	304
53127.	321	54711.	265	55022.	270	56034.	314	56161.	316	57078.	302	57161.	304
53128.	321	54712.	265	55023.	270	56035.	314	56162.	316	57079.	302	57162.	304
53129.	321	54713.	265	55024.	270	56036.	314	56163.	316	57080.	302	57163.	304
53130.	321	54714.	265	55025.	270	56037.	314	56164.	316	57081.	302	57164.	304
53131.	321	54715.	265	55026.	271	56038.	314	56210.	315	57082.	302	57165.	304
53132.	321	54716.	265	55027.	271	56039.	314	56211.	315	57083.	302	57166.	304
53133.	321	54717.	265	55028.	271	56040.	314	56212.	315	57084.	302	57167.	304
53134.	321	54718.	265	55029.	271	56041.	314	56213.	315	57085.	302	57168.	304
53135.	321	54719.	265	55030.	271	56042.	314	56214.	315	57086.	302	57169.	305
53136.	321	54720.	266	55031.	271	56043.	314	56215.	315	57087.	302	57170.	305
53137.	321	54721.	266	55032.	271	56044.	314	56216.	315	57088.	302	57171.	305
53201.	319	54722.	266	55033.	271	56045.	314	56217.	315	57089.	302	57172.	305
53202.	319	54723.	266	55034.	271	56046.	314	56218.	315	57090.	302	57173.	305
53203.	319	54724.	266	55035.	271	56047.	314	56219.	315	57091.	302	57174.	305
53204.	319	54725.	266	55160.	274	56048.	314	56220.	315	57092.	302	57176.	305
53206.	319	54726.	266	55161.	274	56049.	314	56221.	315	57093.	302	57177.	305
53207.	319	54727.	267	55162.	274	56050.	314	56222.	315	57094.	302	57178.	305
53208.	320	54728.	267	55163.	274	56051.	314	56223.	315	57095.	302	57179.	305

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
57180.....	305	58059.....	319	61065.....	303	62045.....	307	63009.....	319	63155.....	245
57181.....	305	58061.....	319	61066.....	303	62047.....	307	63010.....	319	63156.....	245
57182.....	305	58062.....	319	61067.....	303	62049.....	307	63011.....	319	63157.....	245
57183.....	305	58063.....	319	61068.....	303	62051.....	307	63012.....	319	63158.....	245
57184.....	305	58064.....	320	61069.....	303	62053.....	307	63013.....	320	63159.....	245
57185.....	305	58065.....	320	61070.....	303	62055.....	307	63014.....	320	63160.....	245
57186.....	305	58066.....	320	61071.....	303	62057.....	307	63015.....	320	63161.....	245
57187.....	305	58067.....	320	61072.....	303	62059.....	307	63016.....	320	63162.....	246
57188.....	305	58068.....	320	61073.....	303	62061.....	307	63017.....	320	63163.....	246
57189.....	305	58069.....	320	61074.....	303	62063.....	307	63018.....	320	63164.....	246
57190.....	305	58070.....	320	61075.....	303	62065.....	307	63019.....	320	63165.....	246
57191.....	305	58071.....	320	61076.....	304	62066.....	309	63020.....	320	63166.....	246
57192.....	305	58072.....	320	61077.....	304	62067.....	307	63021.....	320	63167.....	246
57193.....	305	58073.....	320	61078.....	304	62069.....	308	63022.....	320	63168.....	246
57194.....	306	58074.....	320	61079.....	304	62071.....	308	63023.....	320	63169.....	246
57195.....	306	58075.....	320	61080.....	304	62073.....	308	63024.....	321	63170.....	246
57196.....	306	58076.....	320	61081.....	304	62075.....	308	63025.....	321	63171.....	246
57197.....	306	58077.....	320	61082.....	304	62077.....	308	63026.....	321	63172.....	247
57198.....	306	58078.....	320	61083.....	304	62079.....	308	63027.....	321	63173.....	247
57199.....	306	58079.....	320	61084.....	304	62081.....	308	63028.....	321	63174.....	247
57200.....	306	58080.....	320	61085.....	304	62083.....	308	63029.....	321	63175.....	247
57201.....	306	58081.....	320	61086.....	304	62084.....	309	63030.....	321	63176.....	247
57202.....	306	58082.....	320	61087.....	304	62085.....	308	63031.....	321	63177.....	247
57203.....	306	58083.....	321	61088.....	304	62087.....	308	63032.....	321	63178.....	247
57204.....	306	58084.....	321	61089.....	305	62089.....	308	63033.....	321	63179.....	247
57205.....	306	58085.....	321	61090.....	305	62091.....	308	63034.....	321	63180.....	247
57206.....	306	58086.....	321	61091.....	305	62093.....	308	63035.....	321	63181.....	247
57207.....	306	58087.....	321	61092.....	305	62095.....	308	63036.....	321	63182.....	247
57208.....	306	58088.....	321	61093.....	305	62097.....	308	63037.....	321	63183.....	247
57209.....	306	58089.....	321	61094.....	305	62099.....	308	63038.....	321	63184.....	248
57210.....	306	58090.....	321	61095.....	305	62101.....	308	63039.....	321	63185.....	248
57211.....	306	58091.....	321	61096.....	305	62102.....	309	63040.....	321	63186.....	248
57212.....	306	58092.....	321	61097.....	305	62103.....	308	63041.....	321	63187.....	248
57213.....	306	58093.....	321	61098.....	305	62105.....	308	63042.....	321	63188.....	24

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
63745.....	246	63933.....	281	64114.....	255	64197.....	258	64635.....	265	64815.....	268
63746.....	246	63934.....	281	64115.....	255	64198.....	258	64636.....	265	64816.....	268
63747.....	246	63935.....	281	64116.....	255	64199.....	258	64637.....	265	64817.....	268
63748.....	246	63936.....	281	64117.....	255	64200.....	259	64638.....	265	64818.....	268
63749.....	246	63937.....	281	64118.....	255	64201.....	259	64639.....	265	64819.....	268
63750.....	246	63938.....	281	64119.....	255	64202.....	259	64640.....	265	64820.....	268
63751.....	247	63939.....	281	64120.....	255	64203.....	259	64641.....	265	64821.....	268
63752.....	247	63940.....	281	64121.....	255	64204.....	259	64642.....	265	64822.....	268
63753.....	247	63941.....	281	64122.....	255	64205.....	259	64643.....	265	64823.....	268
63754.....	247	63942.....	281	64123.....	255	64206.....	259	64644.....	265	64824.....	268
63755.....	247	63943.....	281	64124.....	255	64207.....	259	64645.....	265	64825.....	268
63756.....	247	63944.....	281	64125.....	256	64208.....	259	64646.....	265	64826.....	268
63757.....	247	63945.....	281	64126.....	256	64209.....	259	64647.....	265	64827.....	269
63758.....	247	63946.....	281	64127.....	256	64210.....	259	64648.....	265	64828.....	269
63759.....	247	63947.....	281	64128.....	256	64211.....	259	64649.....	265	64829.....	269
63760.....	247	63948.....	281	64129.....	256	64212.....	259	64650.....	265	64830.....	269
63761.....	247	63949.....	281	64130.....	256	64500.....	245	64651.....	265	64831.....	269
63762.....	247	63950.....	281	64131.....	256	64501.....	245	64652.....	265	64832.....	269
63763.....	247	63951.....	281	64132.....	256	64502.....	245	64653.....	265	64833.....	269
63764.....	247	63952.....	281	64133.....	256	64503.....	245	64654.....	265	64834.....	269
63765.....	247	63953.....	281	64134.....	256	64504.....	245	64655.....	265	64835.....	269
63766.....	247	63954.....	281	64135.....	256	64505.....	245	64656.....	265	64836.....	269
63767.....	247	63955.....	282	64136.....	256	64506.....	245	64657.....	265	64837.....	269
63768.....	247	63956.....	282	64137.....	256	64507.....	245	64658.....	265	64838.....	269
63769.....	247	63957.....	282	64138.....	256	64508.....	245	64659.....	265	64839.....	269
63770.....	248	63958.....	282	64139.....	256	64509.....	245	64660.....	265	64840.....	269
63771.....	248	63959.....	282	64140.....	256	64510.....	245	64661.....	265	64841.....	269
63772.....	248	63960.....	282	64141.....	256	64511.....	245	64662.....	266	64842.....	269
63773.....	248	63961.....	282	64142.....	256	64512.....	245	64663.....	266	64843.....	269
63774.....	248	63962.....	282	64143.....	256	64513.....	249	64664.....	266	64844.....	269
63775.....	248	63963.....	282	64144.....	256	64514.....	249	64665.....	266	64845.....	269
63776.....	248	63964.....	282	64145.....	257	64515.....	249	64666.....	266	64846.....	269
63777.....	248	63965.....	282	64146.....	257	64520.....	254	64667.....	266	64847.....	269
63778.....	248	63966.....	282	64147.....	257	64521.....	254	64668.....	266	64848.....	26

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
65078.....	270	65218.....	275	66039.....	316	67655.....	265	68303.....	303	68651.....	307
65079.....	270	65219.....	275	66040.....	316	67656.....	265	68304.....	303	68652.....	307
65080.....	270	65220.....	275	66041.....	316	67657.....	265	68305.....	303	68653.....	307
65081.....	270	65221.....	275	66042.....	316	67658.....	265	68306.....	303	68654.....	307
65082.....	270	65222.....	276	66043.....	316	67659.....	265	68307.....	303	68655.....	307
65083.....	270	65223.....	276	66044.....	316	67660.....	265	68308.....	303	68656.....	307
65084.....	270	65224.....	276	66045.....	316	67661.....	265	68309.....	303	68657.....	307
65085.....	270	65225.....	276	66046.....	316	67662.....	266	68310.....	303	68658.....	307
65086.....	270	65226.....	276	67005.....	325	67663.....	266	68311.....	303	68659.....	307
65087.....	270	65227.....	276	67007.....	325	67664.....	266	68312.....	303	68660.....	307
65088.....	270	65228.....	276	67009.....	325	67665.....	266	68313.....	303	68661.....	307
65089.....	270	65229.....	276	67011.....	325	67666.....	266	68314.....	303	68662.....	307
65090.....	271	65230.....	276	67013.....	325	67667.....	266	68315.....	303	68663.....	307
65091.....	271	65231.....	276	67015.....	325	67668.....	266	68316.....	303	68664.....	307
65092.....	271	65232.....	276	67017.....	325	67669.....	266	68317.....	303	68665.....	307
65093.....	271	65233.....	276	67019.....	325	67670.....	266	68318.....	304	68666.....	307
65094.....	271	65234.....	276	67021.....	325	67671.....	266	68319.....	304	68667.....	307
65095.....	271	65235.....	276	67023.....	325	67672.....	266	68320.....	304	68668.....	307
65096.....	271	65236.....	276	67035.....	325	67673.....	266	68321.....	304	68669.....	307
65097.....	271	65237.....	276	67037.....	325	67674.....	266	68322.....	304	68670.....	307
65098.....	271	65238.....	276	67039.....	325	67675.....	266	68323.....	304	68671.....	307
65099.....	271	65239.....	276	67041.....	325	67676.....	266	68324.....	304	68672.....	307
65100.....	271	65240.....	276	67043.....	325	67677.....	266	68325.....	304	68673.....	307
65101.....	271	65241.....	276	67045.....	325	67678.....	266	68326.....	304	68674.....	307
65102.....	271	65242.....	276	67047.....	325	67679.....	266	68327.....	304	68675.....	307
65160.....	274	65243.....	276	67049.....	325	67680.....	266	68328.....	304	68676.....	307
65161.....	274	65244.....	276	67051.....	325	67681.....	266	68329.....	304	68677.....	308
65162.....	274	65245.....	276	67053.....	325	67682.....	266	68330.....	304	68678.....	308
65163.....	274	65246.....	276	67600.....	264	67683.....	266	68331.....	305	68679.....	308
65164.....	274	65247.....	276	67601.....	264	67684.....	266	68332.....	305	68680.....	308
65165.....	274	65248.....	276	67602.....	264	67685.....	266	68333.....	305	68681.....	308
65166.....	274	65249.....	276	67603.....	264	67686.....	266	68334.....	305	68682.....	308
65167.....	274	65250.....	276	67604.....	264	67687.....	266	68335.....	305	68683.....	308
65168.....	274	65251.....	277	67605.....	264	67688.....	266	68336.....	305	68684.....	30

EDP Number Index

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
69054.....	321	70489.....	100	73028.....	356	74228.....	333	82980.....	364	84280.....	354	91241.....	168
69055.....	321	70527.....	104	73029.....	356	74231.....	333	82981.....	364	84281.....	354	91242.....	168
69056.....	321	70529.....	104	73041.....	356	74234.....	333	82982.....	364	84282.....	354	91243.....	168
70003.....	340	70531.....	104	73070.....	357	74237.....	333	82983.....	364	84283.....	354	91244.....	168
70004.....	340	70533.....	104	73071.....	357	74240.....	333	82984.....	364	84284.....	354	91245.....	168
70005.....	340	70535.....	104	73072.....	357	74243.....	333	82985.....	364	84285.....	354	91246.....	168
70006.....	340	70537.....	104	73073.....	357	74246.....	333	82986.....	364	84286.....	354	91247.....	168
70007.....	340	70539.....	104	73074.....	357	74249.....	336	82987.....	364	84287.....	354	91248.....	168
70008.....	340	70540.....	104	73075.....	357	74252.....	336	82988.....	364	84288.....	354	91250.....	168
70009.....	340	70542.....	104	73078.....	357	74255.....	336	82989.....	364	84289.....	354	91251.....	168
70010.....	340	70544.....	104	73079.....	357	74258.....	336	82990.....	368	84290.....	354	91252.....	168
70011.....	340	70546.....	104	73080.....	357	74261.....	336	82991.....	368	84291.....	354	91253.....	168
70012.....	340	70548.....	104	73081.....	357	74264.....	336	82992.....	368	85080.....	354	91254.....	168
70013.....	340	70550.....	104	73082.....	357	74267.....	336	82993.....	368	85081.....	354	91255.....	168
70014.....	340	70551.....	103	73083.....	357	74270.....	336	82994.....	368	85082.....	354	91256.....	168
70015.....	340	70552.....	103	74001.....	330	74280.....	352	82995.....	368	85083.....	354	91257.....	168
70016.....	340	70553.....	103	74004.....	330	74281.....	352	82996.....	368	85084.....	354	91258.....	168
70017.....	340	70554.....	103	74007.....	330	74282.....	352	82997.....	368	85085.....	354	91259.....	168
70018.....	340	70555.....	103	74010.....	330	74283.....	352	83026.....	359	85086.....	354	91260.....	168
70019.....	340	70556.....	103	74013.....	330	74284.....	352	83027.....	359	85087.....	354	91261.....	168
70020.....	340	70557.....	103	74016.....	330	74285.....	352	83028.....	359	85088.....	354	91262.....	168
70021.....	340	70558.....	103	74019.....	330	74286.....	352	83029.....	359	85089.....	354	91263.....	168
70022.....	340	70559.....	103	74022.....	330	74287.....	352	83041.....	359	85090.....	354	91266.....	179
70023.....	340	70560.....	103	74025.....	333	74288.....	352	83042.....	359	85091.....	354	91268.....	193
70024.....	340	70561.....	103	74028.....	333	74289.....	352	83043.....	359	90001.....	370	91269.....	198
70025.....	340	70562.....	103	74031.....	333	74290.....	352	83044.....	359	90005.....	370	91270.....	179
70026.....	340	70563.....	103	74034.....	333	74291.....	352	83056.....	116	90009.....	370	91272.....	193
70027.....	340	72930.....	356	74037.....	333	75080.....	352	83057.....	116	90013.....	370	91273.....	198
70028.....	340	72947.....	356	74040.....	333	75081.....	352	83058.....	116	90017.....	370	91274.....	179
70029.....	340	72948.....	356	74043.....	333	75082.....	352	83059.....	116	90021.....	370	91276.....	193
70030.....	340	72949.....	356	74046.....	333	75083.....	352	83060.....	116	90025.....	370	91277.....	198
70031.....	340	72950.....	356	74049.....	336	75084.....	352	83061.....	116	90029.....	370	91278.....	179
70032.....	340	72951.....	356	74052.....	336	75085.....	352	83062.....	116	90033.....	370	91280.....	193
70441.....	101	72952.....	356	74055.....	336	75086.....	352	83063.....	116	90037.....	370	91281.....	198
70442.....	101	72953.....	356	74058.....	336	75087.....	352	83064.....	116	90041.....	370	91282.....	179
70444.....	101	72954.....	362	74061.....	336	75088.....	352	83065.....	116	90045.....	370	91284.....	193
70445.....	101	72955.....	362	74064.....	336	75089.....	352	83070.....	359	90049.....	370	91285.....	179
70447.....	101	72956.....	362	74067.....	336	75090.....	352	83071.....	359	90053.....	370	91286.....	193
70448.....	101	72957.....	362	74070.....	336	75091.....	352	83072.....	359	90101.....	373	91288.....	194
70450.....	101	72958.....	362	74101.....	330	81001.....	344	83073.....	359	90107.....	373	91289.....	199
70451.....	101	72959.....	362	74104.....	330	81003.....	344	83100.....	359	90109.....	373	91290.....	180
70453.....	101	72960.....	362	74107.....	330	81005.....	344	83101.....	359	90113.....	373	91292.....	194
70454.....	101	72961.....	362	74110.....	330	81007.....	344	83102.....	359	90121.....	373	91293.....	199
70456.....	101	72962.....	362	74113.....	330	81009.....	344	83103.....	359	90129.....	373	91349.....	108
70457.....	101	72963.....	362	74116.....	330	81011.....	344	83104.....	359	90137.....	373	91350.....	108
70459.....	101	72964.....	362	74119.....	330	81013.....	344	83105.....	359	91001.....	371	91351.....	108
70460.....	101	72965.....	362	74122.....	330	81015.....	344	83106.....	359	91005.....	371	91352.....	108
70462.....	101	72966.....	362	74125.....	333	81017.....	344	83107.....	359	91009.....	371	91353.....	108
70463.....	101	72967.....	362	74128.....	333	81019.....	344	83108.....	359	91013.....	371	91354.....	108
70465.....	101	72968.....	362	74131.....	333	81021.....	344	83109.....	359	91017.....	371	91355.....	108
70466.....	101	72969.....	362	74134.....	333	81023.....	344	83110.....	359	91021.....	371	91356.....	108
70468.....	101	72970.....	366	74137.....	333	81025.....	344	83111.....	359	91025.....	371	91357.....	108
70469.....	101	72971.....	366	74140.....	333	81027.....	344	83200.....	364	91029.....	371	91358.....	108
70470.....	100	72972.....	366	74143.....	333	81029.....	344	83201.....	364	91033.....	371	91359.....	108
70471.....	100	72973.....	366	74146.....	333	82930.....	359	83202.....	364	91037.....	371	91360.....	108
70472.....	100	72974.....	366	74149.....	336	82931.....	359	83203.....	364	91041.....	371	91361.....	108
70473.....	100	72975.....	366	74152.....	336	82932.....	359	83204.....	364	91045.....	371	93272.....	106
70474.....	100	72976.....	366	74155.....	336	82933.....	359	83205.....	364	91049.....	371	93273.....	106
70475.....	100	72977.....	366	74158.....	336	82966.....	359	83206.....	364	91053.....	371	93274.....	106
70476.....	100	72978.....	114	74161.....	336	82967.....	359	83207.....	364	91101.....	374	93275.....	106
70477.....	100	72979.....	114	74164.....	336	82968.....	359	83220.....	360	91107.....	374	93276.....	106
70478.....	100	72980.....	114	74167.....	336	82969.....	359	83221.....	360	91109.....	374	93277.....	106
70479.....	100	72981.....	114	74170.....	336	82970.....	359	83222.....	360	91113.....	374	93278.....	106
70480.....	100	72982.....	114	74201.....	330	82971.....	359	83223.....	360	91121.....	374	93279.....	106
70481.....	100	72983.....	114	74204.....	330	82972.....	359	83224.....	360	91129.....	374	93280.....	106
70482.....	100	72984.....	114	74207.....	330	82973.....	359	83225.....	360	91137.....	374	93281.....	106
70483.....	100	72985.....	114	74210.....	330	82974.....	364	83230.....	360	91235.....	168	93282.....	106
70484.....	100	73012.....	356	74213.....	330	82975.....	364	83231.....	360	91236.....	168		
70485.....	100	73013.....	356	74216.....	330	82976.....	364	83232.....	360	91237.....	168		
70486.....	100	73014.....	356	74219.....	330	82977.....	364	83233.....	360	91238.....	168		
70487.....	100	73026.....	356	74222.....	330	82978.....	364	83234.....	360	91239.....	168		
70488.....	100	73027.....	356	74225.....	333	82979.....	364	83235.....	360	91240.....	168		

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) - $\sqrt{(\text{tool diameter}^2 - \text{pitch}^2) / 4}$	cuspl height* = (tool diameter / 2) - $\sqrt{(\text{tool diameter}^2 - \text{pitch}^2) / 4}$
pitch = $\sqrt{4 \times (\text{cuspl height} \times \text{tool diameter}) - 4 \times (\text{cuspl height}^2)}$	pitch = $\sqrt{4 \times (\text{cuspl height} \times \text{tool diameter}) - 4 \times (\text{cuspl height}^2)}$
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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