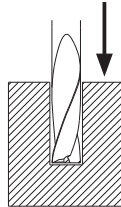
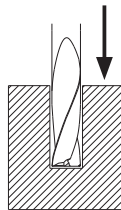


Recommended Cutting Conditions (Plunge milling)

2ZDK

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø1	ø2	ø3	ø4	ø5	ø6	ø8
 Plunge milling	Structural Steel Carbon Steel	Plunge milling	Spindle Revolution (min ⁻¹)	19,500	11,200	8,300	6,200	5,000	4,200	3,200
			Feed Rate (mm/min)	300	380	520	520	520	520	520
	Alloy Steel		Spindle Revolution (min ⁻¹)	19,000	10,000	7,200	5,400	4,400	3,600	2,700
			Feed Rate (mm/min)	300	320	450	450	450	450	450
	Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min ⁻¹)	16,000	8,000	3,900	2,900	2,300	1,900	1,500
			Feed Rate (mm/min)	210	210	210	210	210	210	210
	Nodular Cast Iron		Spindle Revolution (min ⁻¹)	16,000	10,000	7,200	5,400	4,400	3,600	2,700
			Feed Rate (mm/min)	200	300	390	390	390	390	390
	Aluminum Alloys		Spindle Revolution (min ⁻¹)	20,000	20,000	17,800	13,100	10,500	8,900	6,700
			Feed Rate (mm/min)	500	850	1,270	1,270	1,270	1,270	1,270
	Aluminum Alloy Casting		Spindle Revolution (min ⁻¹)	20,000	20,000	13,100	10,000	8,000	6,700	5,000
			Feed Rate (mm/min)	450	750	820	820	820	820	820

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø10	ø12	ø14	ø16	ø18	ø20
 Plunge milling	Structural Steel Carbon Steel	Plunge milling	Spindle Revolution (min ⁻¹)	2,500	2,100	1,800	1,600	1,400	1,300
			Feed Rate (mm/min)	450	450	450	450	450	450
	Alloy Steel		Spindle Revolution (min ⁻¹)	2,200	1,800	1,500	1,350	1,200	1,100
			Feed Rate (mm/min)	400	400	400	400	400	400
	Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min ⁻¹)	1,200	1,000	850	750	650	600
			Feed Rate (mm/min)	190	190	190	190	190	190
	Nodular Cast Iron		Spindle Revolution (min ⁻¹)	2,200	1,800	1,550	1,350	1,200	1,100
			Feed Rate (mm/min)	340	340	340	340	340	340
	Aluminum Alloys		Spindle Revolution (min ⁻¹)	5,400	4,500	3,800	3,400	3,000	2,700
			Feed Rate (mm/min)	1,270	1,270	1,270	1,270	1,270	1,270
	Aluminum Alloy Casting		Spindle Revolution (min ⁻¹)	4,000	3,400	2,900	2,500	2,200	2,000
			Feed Rate (mm/min)	820	820	820	820	820	820

NOT recommended for slotting

*This tool is specially designed for plunge milling and NOT recommended for slotting.

- Coolant is recommended.
 - Adjust cutting conditions to suit machine rigidity.
 - Use chuck and machine with as high rigidity as possible.
 - Stainless steel machining is NOT recommended.
 - Cutting conditions adjustment is required when machining a slant surface, depending on the slant angle. (fig.1)
- When workpiece slant angle is 30° or less, reduce the feed rate by 50%.
When workpiece slant angle is more than 30°, reduce the revolution by 70% and the feed rate by 30%.

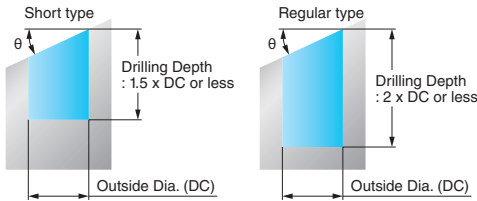


Fig. 1



VALUE AT THE SPINDLE®

2021 Global Product Catalog



www.kyocera-sgstool.com

ISO 9001:2015 Certified



VALUE AT THE SPINDLE®

KYOCERA SGS Precision Tools (KSPT) is an ISO 9001:2015 Certified manufacturer of industry leading round solid carbide cutting tools. State of the art manufacturing and warehouse facilities have the capacity and processes to meet the quality and delivery demands of customers in all markets around the world. Complete inspections performed within its metallurgical lab and manufacturing quality departments ensure the use of high quality carbide and reliable manufacturing consistency regardless of when a cutting tool is produced.

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

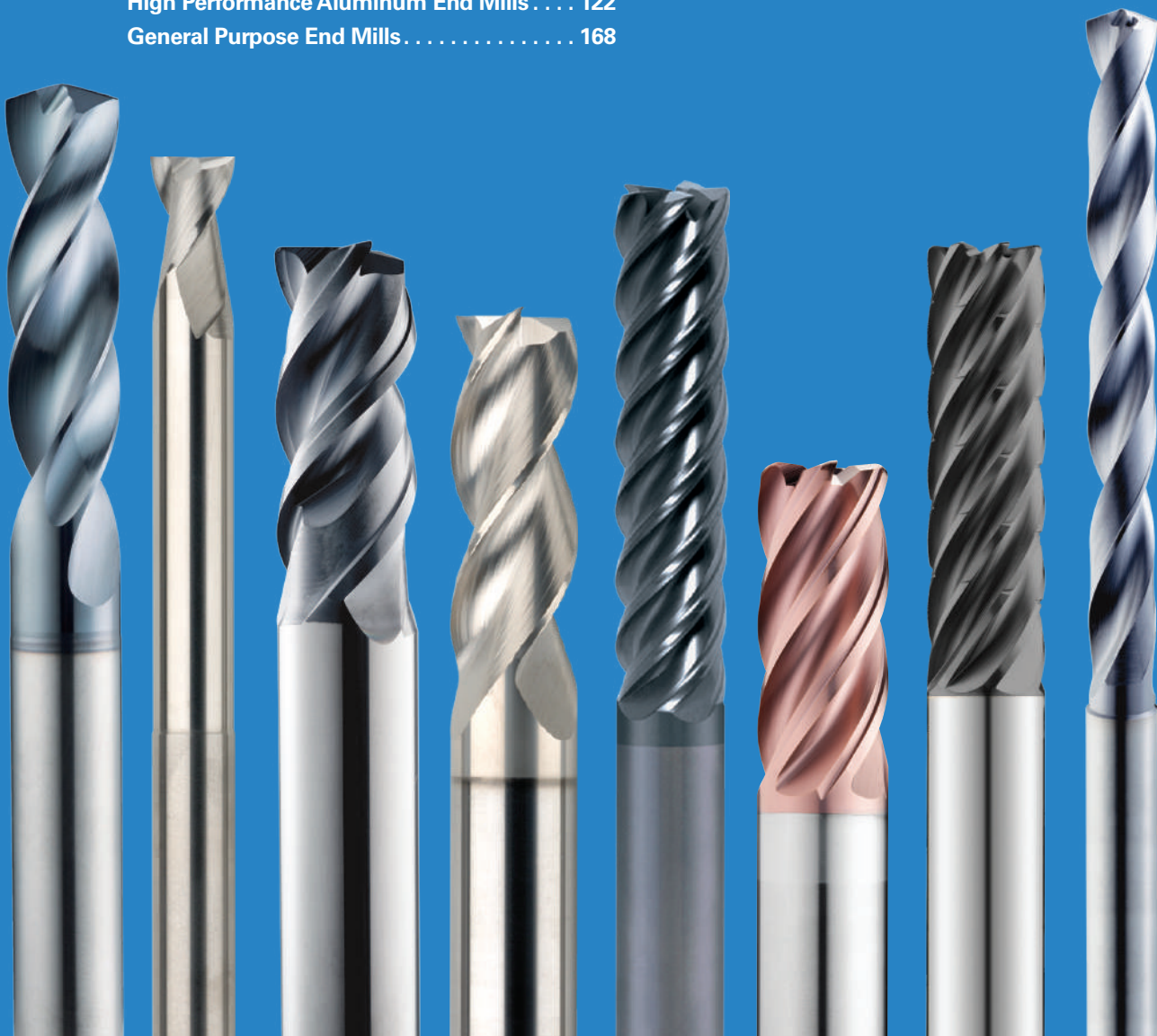
SGS has become an important part of the KYOCERA Precision Tools family, and while the name has changed, one thing has not. Its dedicated people and their relentless commitment to the customer. KSPT Technical Sales Engineers, Application Specialists, and Distribution Partners blanket the globe, delivering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



Table of Contents

Please put "S" at the beginning of all page numbers below.

KYOCERA SGS Precision Tools	2	HOLE MAKING	
KYOCERA SGS Precision Tools Europe Ltd. . .	4	High Performance Drills	224
Global Innovation Center	5	General Purpose Drills	284
Tooling Services.....	6	General Purpose Countersinks	310
Tech Hub	7	General Purpose Reamers	326
Medical Divison	8		
Tool Wizard®	9	ROUTING	
		High Performance Routers.....	334
OVERVIEW		General Purpose Routers	348
Common Legend.....	11		
End Mill Legend.....	12	TECHNICAL INFORMATION	
Drill Legend.....	13	EDP Index	352
Router Legend	14	KSPT Reference Information	369
		Decimal Equivalent Chart	370
COATINGS	15	Hardness Conversion Chart.....	371
MILLING			
High Performance End Mills.....	16		
End Mill Matrix.....	22		
High Performance Aluminum End Mills . . .	122		
General Purpose End Mills.....	168		





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 FastTrack 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

150 Marc Drive
Cuyahoga Falls, Ohio 44223 U.S.A.
customer service -
US and Canada: (330) 686-5700
fax - US & Canada: (800) 447-4017
international fax: (330) 686-2146

KYOCERA SGS Precision Tools West Coast Service Center

1814 W. Collins Ave.
Orange, California 92867
phone: (714) 363-3701
fax: (714) 363-3711
email: sgswest@kyocera-sgstool.com

EUROPE KSPT

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

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

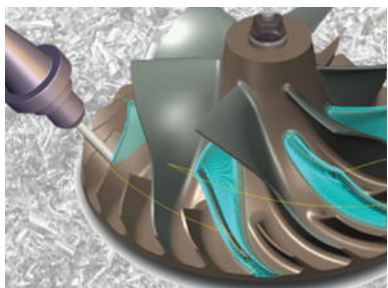
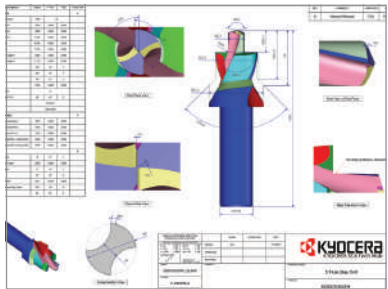
KYOCERA SGS Tech Hub LLC

The KYOCERA SGS Tech Hub (KSTH) is an independent subsidiary of KYOCERA SGS Precision Tools Inc. created to focus on custom high-performance cutting tool solutions, while exploring emerging technologies. The state-of-the-art custom facility is designed with the purpose and resources to provide MORE than a cutting tool. KSTH provides a complete scope of services and works with customers to tailor solutions from conception to application and beyond.

SPECIAL CUTTING TOOL SOLUTIONS

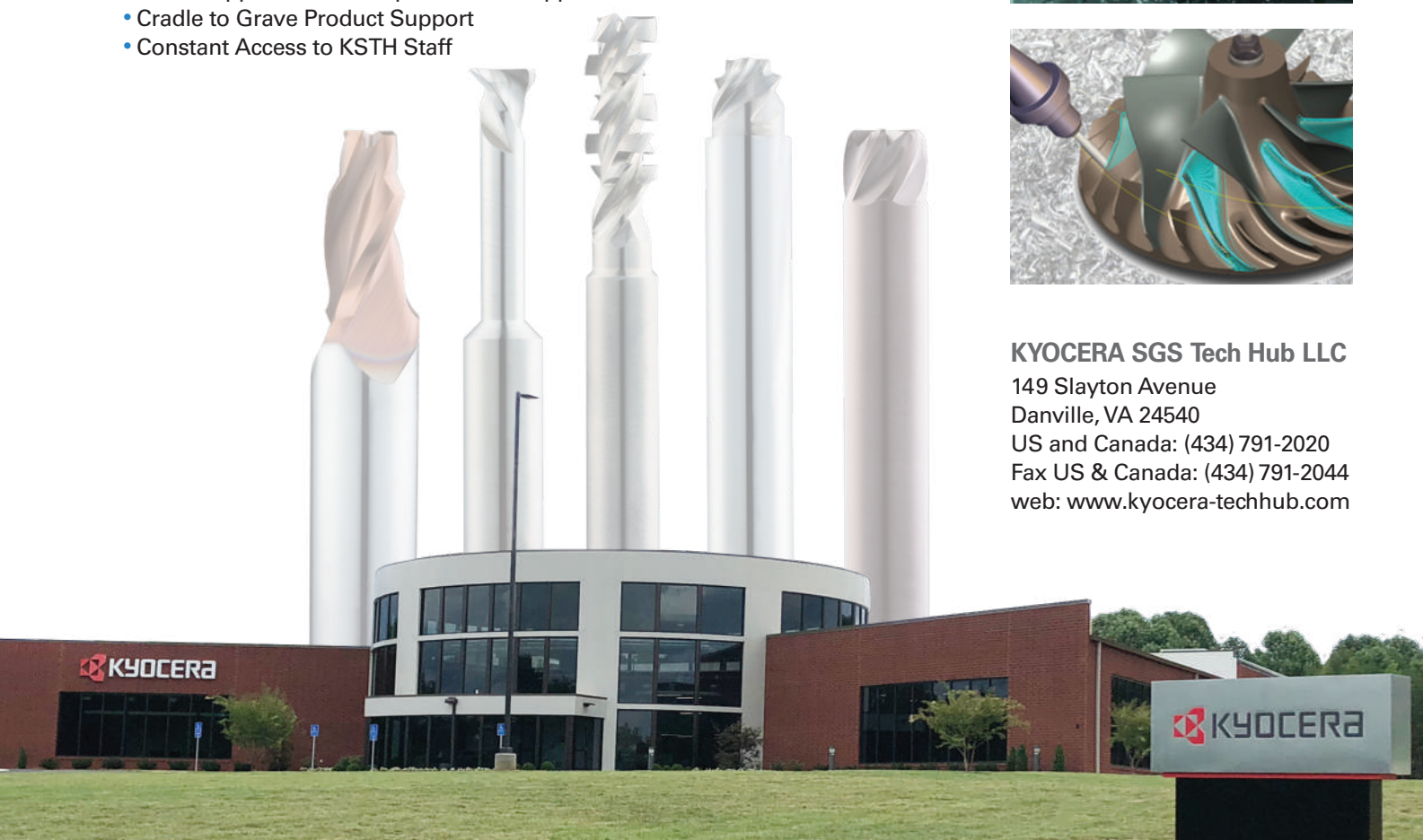
KSTH considers each opportunity as a priority project and understands the challenges special tailored tooling present to our end users. Our sole focus is supporting a culture required for applying custom solutions yielding a return on investment with our technical expertise, close collaboration and effective communication. Besides KSTH providing quotation requests within a 24-hour period, we also offer:

- Aggressive Deliveries
- Improved Value Proposition
- Global Resources and Technology
- Full Project Proposal and Management
- Detailed Drawings
- Solid Models
- Process Plans
- Cutting Strategies and Simulations
- Quality Assurance Documentation (ISO 9001:2015 Certified)
- Testing and Validation
- Onsite Application and Optimization Support
- Cradle to Grave Product Support
- Constant Access to KSTH Staff



KYOCERA SGS Tech Hub LLC

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





KYOCERA **SGS** Precision Tools
Medical Division



VALUE AT THE SPINDLE®

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, 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 is ISO 13485:2016 Certified 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
- Services Offered; Welding, Various Coatings, Anodizing, Passivation, Electropolishing, Laser Etching and Heat Treating

KYOCERA SGS Precision Tools Medical Division

724 East Swihart Street
Columbia City, Indiana 46725
phone: (260) 244-7677
fax: (260) 244-7466

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

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



REGISTERED ISO 13485:2016 Certified



An interactive and dynamic platform to help select the correct SGS tool for the operation and provide optimal machining parameters.

- A quick and reliable 3 step process:
 1. Choose the material
 2. Enter the application
 3. From the list of recommended results, choose the tool that best fits your machining needs
- Speed & Feed rates will be generated based on application parameters combined with the selected tool's capabilities in the desired material.

TO SIGN UP FOR THE TOOLWIZARD®:

1. Visit Toolwizard.kyocera-sgstool.com
2. Register 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 Atención al Cliente.
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 Kundendienstmitarbeiter für RMA-Nummer.

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

DEBEN USARSE GAFAS PROTECTORAS CUANDO SE UTILICEN EQUIPOS DE ALTA VELOCIDAD

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

BEI SCHNELLLAUFENDEN SPANABHEBENDEN MASCHINEN MÜSSEN IMMER DIE VORGESCHRIEBENEN SICHERHEITSBRILLEN GETRAGEN WERDEN



- 

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, reconocido como cancerígeno en el estado de California. Para mas informacion visite 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 mit 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 20 patents globally. Please visit our website at www.kyocera-sgstool.com to learn more.

KYOCERA SGS Precision Tools posee más de 20 patentes a nivel mundial. Para más información, visite nuestra página web www.kyocera-sgstool.com.

KYOCERA SGS Precision Tools possède plus de 20 brevets mondialement reconnus. Pour plus d'information, veuillez consulter notre site web www.kyocera-sgstool.com.

KYOCERA SGS Precision Tools besitzt mehr als 20 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 Aciers inoxydables Nichtrostende Stähle	 Cast Iron Acero de Fundición Fonte Grauguss	 High Temp Alloys Aleaciones Termorresistentes Alliages hautes températures Warmfeste Legierungen	
 Titanium Titanio Titane Titan	 Non-Ferrous No Férricos Non Ferreux Nichteisenmetalle	 Plastics/Composites Plásticos/Resinas Plastiques/Composites Kunststoffe/Verbundkunststoffe	 Hardened Steels Aceros Endurecidos Aciers Trempés Gehärteter Stahl	

TOOL LENGTH LONGITUDES DE HERRAMIENTAS LONGUEUR DE L'OUTIL WERKZEUGLÄNGE				
 Stub Corta Court Kurze Bauform	 Regular Media Moyen Standard	 Long Larga Long Lang	 Long Reach Neck Larga con cuello Détalonnage longue portée Freischliff	 Extra Long Extra-larga Extra-long Extra-Lang

FLUTES FILOS DENTS SCHNEIDEN					
 2 Flutes 2 Filos 2 Dents 2 Schneiden	 3 Flutes 3 Filos 3 Dents 3 Schneiden	 4 Flutes 4 Filos 4 Dents 4 Schneiden	 5 Flutes 5 Filos 5 Dents 5 Schneiden	 6 Flutes 6 Filos 6 Dents 6 Schneiden	 7 Flutes 7 Filos 7 Dents 7 Schneiden
 8 Flutes 8 Filos 8 Dents 8 Schneiden	 9 Flutes 9 Filos 9 Dents 9 Schneiden	 10 Flutes 10 Filos 10 Dents 10 Schneiden	 11 Flutes 11 Filos 11 Dents 11 Schneiden	 12 Flutes 12 Filos 12 Dents 12 Schneiden	

S10

S11

End Mill Legend

Leyenda fresas

Légende fraise

Fräser-Legende

END CONFIGURATIONS

CONFIGURACIONES DE LA PUNTA

FORME DE L'OUTIL EN BOUT

ENDENAUSFÜHRUNG

		
Ball Esférica Boule Kugelkopf	Corner Plana con borde romo Rayon mit Eckenradius	Square Plana Non rayonné Scharfkantig

SHANK TYPE

TIPO DE VÁSTAGO

TYPE DE TIGE

SCHAFTART

		
Common Normal Dégagée Standard	Straight Recto Cylindrique Gerade	Weldon Flat Weldon plano Méplat Weldon Spannfläche

HELIX ANGLES

ANGULOS DE LAS HELICES

SPANWINKEL

ANGLES DE L'HÉLICE

		
Right Spiral Hélice con corte a la derecha Hélice droite Rechtsspirale	Left Spiral Hélice con corte a la izquierda Hélice gauche Linksspirale	Variable Right Spiral Hélice con corte a la derecha y ángulo variable Hélice droite variable Rechtsspirale, variabel

RAKE ANGLE

ANGULO DE DESPRENDIMIENTO

ANGLE DE COUPE

SPANWINKEL

			
Positive Positivo Positif Positiv	Neutral Neutro Neutre Neutral	Negative Negativo Négatif Negativ	Variable Variable Variable Variabel

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 sind rechtsschneidend, soweit nicht anders angegeben

COOLANT OPTIONS

OPCIONES DE REFRIGERACIÓN

OPTIONS DE REROIDISSEMENT

KÜHLSCHMIERMITTEL-OPTIONEN

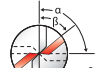
	
Internal Coolant Refrigeración interna Refroidissement interne Innenkühlung	JetStream Coolant Slots Ranuras de refrigeración JetStream Fentes de refroidissement JetStream JetStream- Kühlmittelschlitze

ADDITIONAL GEOMETRY

GEOMETRÍAS ADICIONALES

GÉOMÉTRIE SUPPLÉMENTAIRE

WEITERE BAUFORMEN

	
Flute Spacing Unequal Espaciado desigual de los filos Denture décalée Nutenabstand Ungleich	Chip Breaker Rompevirutas Brise-copeaux Spanteiler

Drill Legend

Leyenda brocas

Légende perçage

Bohrer-Legende

SHANK TYPE

TIPO DE VÁSTAGO

TYPE DE TIGE

SCHAFTART

Common Normal Dégagée Standard	Straight Recto Cylindrique Gerade

HELIX ANGLES

ANGULOS DE LAS HELICES

ANGLES DE L'HÉLICE

SPANWINKEL

Right Spiral Hélice con corte a la derecha Hélice à droite Rechtsspirale	None Ninguno Aucun gerade genutet

POINT ANGLE

ANGULO DE PUNTA

POINT D'ANGLE

SPITZENWINKEL

Drill Point Angulo de la Punta Point de perçage Bohrspitze

CHAMFER ANGLE

ÁNGULO DE CHAFLÁN

ANGLE DE CHANFREIN

FASENWINKEL

Chamfer Angle Ángulo de chaflán Angle de chanfrein Fasenwinkel

REACH

ALCANCE

LONGUEUR

NUTZLÄNGE

>3xD Reach Alcance >3xD >Longueur 3xD >3xD Nutzlänge	5xD Reach Alcance 5xD Longueur 5xD 5xD Nutzlänge	8xD Reach Alcance 8xD Longueur 8xD 8xD Nutzlänge

COOLANT OPTIONS

OPCIONES DE REFRIGERACIÓN

OPTIONS DE REROIDISSEMENT

KÜHLSCHMIERMITTEL-OPTIONEN

Internal Coolant Refrigeración interna Refroidissement interne Innenkühlung	External Coolant Refrigeración externa Refroidissement externe Auskühlung

S12

S13

 Router Legend

 Leyenda ranuradores

 Légende détourage

 Konturenfräser-Legende

SHANK TYPE
TIPO DE VÁSTAGO
TYPE DE TIGE
SCHAFTART



Straight
Recto
Cylindrique
Gerade

RAKE ANGLE
ANGULO DE DESPRENDIMIENTO
ANGLE DE PENTE
SPANWINKEL



Positive
Positivo
Positif
Positiv



Neutral
Neutro
Neutre
Neutral



Negative
Negativo
Négatif
Negativ



Variable
Variable
Variable
Variabel

HELIX ANGLES
ANGULOS DE LAS HELICES
ANGLES DE L'HELICE
SPANWINKEL



Right Spiral
Hélice con corte
a la derecha
Hélice à droite
Rechtsspirale



Left Spiral
Hélice con corte
a la izquierda
Hélice à gauche
Linksspirale

ADDITIONAL GEOMETRY
GEOMETRÍAS 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
Spanbrecher



Drill Point
Angulo de la Punta
Point de perçage
Bohrspitze

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	1–5 microns	2200	0.40–0.65	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	1–5 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	0.10–0.20	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	1–5 microns	3000	0.30–0.45	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	1–5 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	0.15–0.20	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	1–5 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.

Other coatings available upon request.

S14

S15

High Performance End Mills



 Milling

Please put "S" at the beginning of all page numbers below.

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	28
	Z5MCR	5 Flute Rougher Corner Radius Metric	35
Z-Carb-AP	Z1PCR	4 Flute Variable Rake Corner Radius Fractional	39
	Z1PLC	4 Flute Variable Rake Long Reach Corner Radius Fractional	41
	Z1PLB	4 Flute Variable Rake Ball End Long Reach Fractional	42
	Z1MPCR	4 Flute Variable Rake Corner Radius Metric	45
	Z1MPIC	4 Flute Variable Rake Intermediate Reach Corner Radius Metric	46
	Z1MPLC	4 Flute Variable Rake Long Reach Corner Radius Metric	46
Z-Carb	Z1	4 Flute Variable Geometry Square End Fractional	49
	Z16CR	4 Flute Variable Geometry Corner Radius Fractional	49
	Z1B	4 Flute Variable Geometry Ball End Fractional	50
	Z1M	4 Flute Variable Geometry Square End Metric	53
	Z1MB	4 Flute Variable Geometry Ball End Metric	54
Z-Carb-HTA	ZH1CR	4 Flute Variable Geometry High Temp Alloys Corner Radius Fractional	57
	ZH1MCR	4 Flute Variable Geometry High Temp Alloys Corner Radius Metric	59
	ZH1MCRS	4 Flute Variable Geometry High Temp Alloys Stub Corner Radius Metric	59
Z-Carb-MD	ZD1CR	4 Flute Variable Geometry Hard Materials Long Reach Corner Radius Fractional	61
	ZD1MCR	4 Flute Variable Geometry Hard Materials Long Reach Corner Radius Metric	61
V-Carb	55	5 Flute Finisher & Semi-Finisher Square End Fractional	63
	55CR	5 Flute Finisher & Semi-Finisher Corner Radius Fractional	63
	55M	5 Flute Finisher & Semi-Finisher Square End Metric	65
	55MCR	5 Flute Finisher & Semi-Finisher Corner Radius Metric	65
	55B	5 Flute Finisher & Semi-Finisher Ball End Fractional	68
	55MB	5 Flute Finisher & Semi-Finisher Ball End Metric	68
T-Carb [®]	51	6 Flute High Speed Machining Square End Fractional	74
	51CR	6 Flute High Speed Machining Corner Radius Fractional	74
	51L	6 Flute High Speed Machining Square End Long Reach Fractional	75
	51LC	6 Flute High Speed Machining Long Reach Corner Radius Fractional	75
	51M	6 Flute High Speed Machining Square End Metric	78
	51MCR	6 Flute High Speed Machining Corner Radius Metric	78
	51ML	6 Flute High Speed Machining Square End Long Reach Metric	79
	51MLC	6 Flute High Speed Machining Long Reach Corner Radius Metric	79

Speed & Feed Recommendations listed after each series

Please put "S" at the beginning of all page numbers below.

HIGH PERFORMANCE END MILLS	SERIES	DESCRIPTION	PAGE
H-Carb	77	7 Flute High Efficiency Square End Fractional	82
	77CR	7 Flute High Efficiency Corner Radius Fractional	82
	77M	7 Flute High Efficiency Square End Metric	84
	77MCR	7 Flute High Efficiency Corner Radius Metric	84
Multi-Carb	66	Multi-Flute Finisher Square End Fractional	90
	66CR	Multi-Flute Finisher Corner Radius Fractional	90
	66M	Multi-Flute Finisher Square End Metric	93
	66MCR	Multi-Flute Finisher Corner Radius Metric	93
Series 33	33CR	3 Flute Difficult to Machine Materials Corner Radius Fractional	97
	33MCR	3 Flute Difficult to Machine Materials Corner Radius Metric	100
Series 7	7	4 Flute Variable Geometry Long Length Square End Fractional	103
	7M	4 Flute Variable Geometry Long Length Square End Metric	103
	7B	4 Flute Variable Geometry Long Length Ball End Fractional	104
	7MB	4 Flute Variable Geometry Long Length Ball End Metric	104
Turbo-Carb	56B	2 Flute Contouring Long Reach Ball End Fractional	107
	56MB	2 Flute Contouring Long Reach Ball End Metric	107
Power-Carb®	57	6 Flute Finisher Square End Fractional	110
	57M	6 Flute Finisher Square End Metric	110
CFRP Slow Helix	27	4 Flute Slow Helix Square End Fractional	113
	27M	4 Flute Slow Helix Square End Metric	113
Picatinny Rail Tools		3 Flute Non-Ferrous Recoil Groove Tool Groove Fractional	116
		5 Flute Non-Ferrous Dovetail Form Tool Fractional	116
		3 Flute Ferrous Recoil Groove Tool Fractional	117
		5 Flute Ferrous Dovetail Form Tool Fractional	117
Speed & Feed Recommendations listed after each series			

Please put "S" at the beginning of all page numbers below.

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	28
	Z5MCR	5 filos, desbastador, radio angulado, métrico	35
Z-Carb-AP	Z1PCR	4 filos, inclinación variable, radio angulado, fraccional	39
	Z1PLC	4 filos, inclinación variable, largo alcance, radio angulado, fraccional	41
	Z1PLB	4 filos, inclinación variable, punta esférica, largo alcance, fraccional	42
	Z1MPCR	4 filos, inclinación variable, radio angulado, métrico	45
	Z1MPIC	4 filos, inclinación variable, medio alcance, radio angulado, métrico	46
Z-Carb	Z1MPLC	4 filos, inclinación variable, largo alcance, radio angulado, métrico	46
	Z1	4 filos, geometría variable, punta cuadrada, fraccional	49
	Z16CR	4 filos, geometría variable, radio angulado, fraccional	49
	Z1B	4 filos, geometría variable, punta esférica, fraccional	50
	Z1M	4 filos, geometría variable, punta cuadrada, métrico	53
Z-Carb-HTA	Z1MB	4 filos, geometría variable, punta esférica, métrico	54
	ZH1CR	4 filos, geometría variable, aleaciones termorresistentes, radio angulado, fraccional	57
	ZH1MCR	4 filos, geometría variable, aleaciones termorresistentes, radio angulado, métrico	59
	ZH1MCRS	4 filos, geometría variable, aleaciones termorresistentes, versión corta, radio angulado, métrico	59
Z-Carb-MD	ZD1CR	4 filos, geometría variable, materiales duros, largo alcance, radio angulado, fraccional	61
	ZD1MCR	4 filos, geometría variable, materiales duros, largo alcance, radio angulado, métrico	61
V-Carb	55	5 filos, acabador y semiacabador, punta cuadrada, fraccional	63
	55CR	5 filos, acabador y semiacabador, radio angulado, fraccional	63
	55M	5 filos, acabador y semiacabador, punta cuadrada, métrico	65
	55MCR	5 filos, acabador y semiacabador, radio angulado, métrico	65
	55B	5 filos, acabador y semiacabador, punta esférica, fraccional	68
T-Carb®	55MB	5 filos, acabador y semiacabador, punta esférica, métrico	68
	51	6 filos, mecanizado de alta velocidad, punta cuadrada, fraccional	74
	51CR	6 filos mecanizado de alta velocidad, radio angulado, fraccional	74
	51L	6 filos, mecanizado de alta velocidad, punta cuadrada, largo alcance, fraccional	75
	51LC	6 filos mecanizado de alta velocidad, largo alcance, radio angulado, fraccional	75
	51M	6 filos, mecanizado de alta velocidad, punta cuadrada, métrico	78
	51MCR	6 filos mecanizado de alta velocidad, radio angulado, métrico	78
	51ML	6 filos, mecanizado de alta velocidad, punta cuadrada, largo alcance, métrico	79
H-Carb	51MLC	6 filos mecanizado de alta velocidad, largo alcance, radio angulado, métrico	79
	77	7 filos de alta eficiencia, punta cuadrada, fraccional	82
	77CR	7 filos de alta eficiencia, radio angulado, fraccional	82
	77M	7 filos métrica de alta eficiencia, punta cuadrada, métrico	84
	77MCR	7 filos métrica de alta eficiencia, radio angulado, métrico	84
Multi-Carb	66	Filo múltiple, acabador, punta cuadrada, fraccional	90
	66CR	Filo múltiple, acabador, radio angulado, fraccional	90
	66M	Filo múltiple, acabador, punta cuadrada, métrico	93
	66MCR	Filo múltiple, acabador, radio angulado, métrico	93
Serie 33	33CR	3 filos, materiales difíciles de mecanizar, radio angulado, fraccional	97
	33MCR	3 filos, materiales difíciles de mecanizar, radio angulado, métrico	100
Serie 7	7	4 filos, geometría variable, longitud larga, punta cuadrada, fraccional	103
	7M	4 filos, geometría variable, longitud larga, punta cuadrada, métrico	103
	7B	4 filos, geometría variable, longitud larga, punta esférica, fraccional	104
	7MB	4 filos, geometría variable, longitud larga, punta esférica, métrico	104
Turbo-Carb	56B	2 filos, contorneado, largo alcance, punta esférica, fraccional	107
	56MB	2 filos, contorneado, largo alcance, punta esférica, métrico	107
Power-Carb®	57	6 filos, acabador, punta cuadrada, fraccional	110
	57M	6 filos, acabador, punta cuadrada, métrico	110
Helicoidal de avance lento CFRP	27	4 filos, helicoidal de avance lento, punta cuadrada, fraccional	113
	27M	4 filos, helicoidal de avance lento, punta cuadrada, métrico	113
Herramientas de riel Picatinny		Herramienta de ranura de retroceso no ferrosa de 3 filos fraccional	116
		Herramienta de forma de cola de milano no ferrosa de 5 filos fraccional	116
		Herramienta de ranura de retroceso ferroso de 3 filos fraccional	117
		Herramienta de cola de milano ferrosa de 5 filos fraccional	117
Recomendaciones de velocidades y avances mostradas tras cada serie			

FRAISES A DETOURER UNIVERSELLES	SÉRIES	DESCRIPTION	PAGE
Z-Carb-HPR	Z5	5 dents non rayonné pour l'ébauche (fractionnel)	28
	Z5CR	5 dents rayonnée pour l'ébauche (fractionnel)	28
	Z5MCR	5 dents rayonnée pour l'ébauche (métrique)	35
Z-Carb-AP	Z1PCR	4 dents pas décalé et hélice variable rayonnés (fractionnel)	39
	Z1PLC	4 dents pas décalé et hélice variable rayonnés (fractionnel)	41
	Z1PLB	4 dents à vague de coupe variable longue portée à bout hémisphérique (fractionnel)	42
	Z1MPCR	4 dents pas décalé et hélice variable rayonnés (métrique)	45
	Z1MPIC	4 dents pas décalé, hélice variable, détalonné, rayonnés (métrique)	46
Z-Carb	Z1MPLC	4 dents pas décalé et hélice variable rayonnés (métrique)	46
	Z1	4 dents géométrie variable non rayonné (fractionnel)	49
	Z16CR	4 dents géométrie variable rayonné (fractionnel)	49
	Z1B	4 dents géométrie variable à bout hémisphérique (fractionnel)	50
	Z1M	4 dents géométrie variable non rayonné (métrique)	53
Z-Carb-HTA	Z1MB	4 dents géométrie variable à bout hémisphérique (métrique)	54
	ZH1CR	4 dents géométrie variable alliages haute température rayonné (fractionnel)	57
	ZH1MCR	4 dents géométrie variable alliages haute température rayonné (métrique)	59
	ZH1MCRS	4 dents géométrie variable, alliages haute température, longueur de l'outil court, rayonné (métrique)	59
Z-Carb-MD	ZD1CR	4 dents géométrie variable matériaux durs longue portée rayonné (fractionnel)	61
	ZD1MCR	4 dents géométrie variable matériaux durs longue portée rayonné (métrique)	61
V-Carb	55	5 dents en bout de finition et semi-finition plat (fractionnel)	63
	55CR	5 dents en bout finition et semi-finition rayonné (fractionnel)	63
	55M	5 dents en bout de finition et semi-finition plat (métrique)	65
	55MCR	5 dents en bout finition et semi-finition rayonné (métrique)	65
	55B	5 dents en bout de finition et semi-finition hémisphérique (fractionnel)	68
	55MB	5 dents en bout de finition et semi-finition hémisphérique (métrique)	68
T-Carb®	51	6 dents pour usinage grande vitesse non rayonné (fractionnel)	74
	51CR	6 dents pour usinage grande vitesse rayonné (fractionnel)	74
	51L	6 dents pour usinage grande vitesse non rayonné extra longue (fractionnel)	75
	51LC	6 dents pour usinage grande vitesse extra longue rayonné (fractionnel)	75
	51M	6 dents pour usinage grande vitesse non rayonné (métrique)	78
	51MCR	6 dents pour usinage grande vitesse rayonné (métrique)	78
	51ML	6 dents pour usinage grande vitesse non rayonné extra longue (métrique)	79
	51MLC	6 dents pour usinage grande vitesse extra longue rayonné (métrique)	79
H-Carb	77	7 dents hautes performances droite côtes (fractionnel)	82
	77CR	7 dents hautes performances torique côtes (fractionnel)	82
	77M	7 dents hautes performances droite côtes (métrique)	84
	77MCR	7 dents hautes performances torique côtes (métrique)	84
Multi-Carb	66	Multi-dents non rayonné pour finition (fractionnel)	90
	66CR	Multi-dents rayonné pour finition (fractionnel)	90
	66M	Multi-dents non rayonné pour finition (métrique)	93
	66MCR	Multi-dents rayonné pour finition (métrique)	93
Série 33	33CR	3 dents rayonné pour l'ébauche dans tous les matériaux sauf non-ferreux (fractionnel)	97
	33MCR	3 dents rayonné pour l'ébauche dans tous les matériaux sauf non-ferreux (métrique)	100
Série 7	7	4 dents géométrie variable à queue longue non rayonné (fractionnel)	103
	7M	4 dents géométrie variable à queue longue non rayonné (métrique)	103
	7B	4 dents géométrie variable à queue longue à bout hémisphérique (fractionnel)	104
	7MB	4 dents géométrie variable à queue longue à bout hémisphérique (métrique)	104
Turbo-Carb	56B	2 dents contournage longue portée à bout hémisphérique (fractionnel)	107
	56MB	2 dents contournage longue portée à bout hémisphérique (métrique)	107
Power-Carb®	57	6 dents en bout de finition plat (fractionnel)	110
	57M	6 dents en bout de finition plat (métrique)	110
CFRP hélice lente	27	4 dents hélice lente non rayonné (fractionnel)	113
	27M	4 dents hélice lente non rayonné (métrique)	113
Outils de rail Picatinny		Outil de rainure de recul non ferreux à 3 dents (fractionnel)	116
		Outil de forme en queue d'aronde non ferreux à 5 dents (fractionnel)	116
		Outil de rainure de recul ferreux à 3 dents (fractionnel)	117
		Outil en queue d'aronde ferreux à 5 dents (fractionnel)	117

Recommandativons de vitesse et avance indiquées après chaque série

HOCHLEISTUNGS- SCHAFTFRÄSER	SERIE	BESCHREIBUNG	SEITE
Z-Carb-HPR	Z5	Zölliger Schruppfräser mit 5 Schneiden ohne Eckenradien	28
	Z5CR	Zölliger Schruppfräser mit 5 Schneiden und Eckenradien	28
	Z5MCR	Schruppfräser mit 5 Schneiden und Eckenradien	35
Z-Carb-AP	Z1PCR	Zölliger Fräser mit 4 variablen Schneiden und Eckenradien	39
	Z1PLC	Zölliger Langlochfräser mit 4 variablen Schneiden und Eckenradien	41
	Z1PLB	Zölliger Radiussschaftfräser mit 4 Schneiden und variablem Spanwinkel	42
	Z1MPCR	Fräser mit 4 Schneiden und variablen Spanwinkel	45
	Z1MPIC	Fräser mittlerer Länge mit 4 variablen Schneiden und Eckenradien	46
Z-Carb	Z1MPLC	Langlochfräser mit 4 variablen Schneiden und Eckenradien	46
	Z1	Zölliger Schaftfräser mit 4 Schneiden ohne Eckenradien und variabler Form	49
	Z16CR	Zölliger Fräser mit 4 variablen Schneiden und Eckenradien	49
	Z1B	Zölliger Radiussschaftfräser mit 4 Schneiden und variabler Form	50
	Z1M	Schaftfräser mit 4 Schneiden ohne Eckenradien und variabler Form	53
Z-Carb-HTA	Z1MB	Radiussschaftfräser mit 4 Schneiden und variabler Form	54
	ZH1CR	Hochwarmfester zölliger Fräser mit 4 variablen Schneiden und Eckenradien	57
	ZH1MCR	Hochwarmfester Fräser mit 4 variablen Schneiden und Eckenradien	59
Z-Carb-MD	ZH1MCRS	Hochwarmfester Fräser mit 4 variablen Schneiden und Eckenradien	59
	ZD1CR	Zölliger Langlochfräser mit 4 variablen Schneiden, Eckenradien und Form aus Hartmetall	61
V-Carb	ZD1MCR	Langlochfräser mit 4 variablen Schneiden, Eckenradien und Form aus Hartmetall	61
	55	Zölliger Schlicht- und Halbschlichtfräser mit 5 Schneiden ohne Eckenradien und variabler Form	63
T-Carb®	55CR	Zölliger Schlicht- und Halbschlichtfräser mit 5 Schneiden ohne Eckenradien	63
	55M	Schlicht- und Halbschlichtfräser mit 5 Schneiden ohne Eckenradien und variabler Form	65
	55MCR	Schlicht- und Halbschlichtfräser mit 5 Schneiden und Eckenradien	65
	55B	Schlicht- und Halbschlicht-Radiussschaftfräser mit 5 Schneiden ohne Eckenradien	68
	55MB	Schlicht- und Halbschlicht-Radiussschaftfräser mit 5 Schneiden und variabler Form	68
	51	Zölliger Schaftfräser für die Hochgeschwindigkeitsbearbeitung mit 6 Schneiden ohne Eckenradien	74
H-Carb	51CR	Zölliger Fräser für die Hochgeschwindigkeitsbearbeitung mit 6 Schneiden und Eckenradien	74
	51L	Zölliger Langloch-Schaftfräser aus Schnellstahl mit 6 Schneiden ohne Eckenradien	75
	51ML	Langloch-Schaftfräser aus Schnellstahl mit 6 Schneiden ohne Eckenradien	75
	51M	Schaftfräser für die Hochgeschwindigkeitsbearbeitung mit 6 Schneiden ohne Eckenradien	78
	51MCR	Fräser für die Hochgeschwindigkeitsbearbeitung mit 6 Schneiden und Eckenradien aus Schnellstahl	78
	51LC	Zölliger Langlochfräser für die Hochgeschwindigkeitsbearbeitung mit 6 Schneiden und Eckenradien	79
	51MLC	Langlochfräser für die Hochgeschwindigkeitsbearbeitung mit 6 Schneiden und Eckenradien	79
	77	Zölliger Hocheffizienter mit 7 Schneiden ohne Eckenradien	82
Multi-Carb	77CR	Zölliger Hocheffizienter mit 7 Schneiden und Eckenradien	82
	77M	Hocheffizienter mit 7 Schneiden ohne Eckenradien	84
	77MCR	Hocheffizienter mit 7 Schneiden und Eckenradien	84
	66	Zölliger mehrschneidiger Schlichtfräser ohne Eckenradien	90
Serie 33	66CR	Zölliger mehrschneidiger Schlichtfräser mit Eckenradien	90
	66M	mehrschneidiger Schlichtfräser ohne Eckenradien	93
	66MCR	mehrschneidiger Schlichtfräser mit Eckenradien	93
	33CR	Zölliger Fräser mit 3 Schneiden und Eckenradien für schwerspanbare Werkstoffe	97
Serie 7	33MCR	Fräser mit 3 Schneiden und Eckenradien für schwerspanbare Werkstoffe	100
	7	Zölliger Langloch-Schaftfräser mit 4 Schneiden ohne Eckenradien und variabler Form	103
	7M	Langloch-Schaftfräser mit 4 Schneiden ohne Eckenradien und variabler Form	103
	7B	Zölliger Langloch-Radiussschaftfräser mit 4 Schneiden und variabler Form	104
Turbo-Carb	7MB	Langloch-Radiussschaftfräser mit 4 Schneiden und variabler Form	104
	56B	Zölliger Langloch-Profil-Radiussschaftfräser mit 2 Schneiden	107
	56MB	Langloch-Profil-Radiussschaftfräser mit 2 Schneiden	107
Power-Carb®	57	Zölliger Schlichtfräser mit 6 Schneiden ohne Eckenradien	110
	57M	Schlichtfräser mit 6 Schneiden ohne Eckenradien	110
	27	Zölliger Schaftfräser mit 4 steilen Schneiden ohne Eckenradien	113
CFRP Slow Helix	27M	Schaftfräser mit 4 steilen Schneiden ohne Eckenradien	113
Picatinny Schienenwerkzeuge		3 Flöte Nichteisen-Rückstoßnut Nut Grove Bruchteil	116
		5 Flöte Nichteisen-Schwalbenschwanzform-Werkzeug Bruchteil	116
		3 Rillen-Eisenrückstoß-Nutwerkzeug fraktioniert	117
		5 Flöte Eisen Schwalbenschwanz Werkzeug gebrochen	117

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

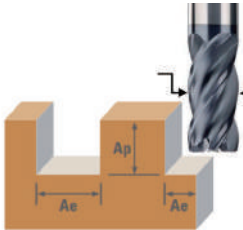
End Mill Matrix

Please put "S" at the beginning of all page numbers below.

End Mill Matrix

SGS End Mill Matrix							Preferred Cut Type for Series					Toolpath Preference* 1st 2nd	Flute Count	
Name	Series	Page	Material					• Good	•• Better	••• Best	Not Recommended			
			Aluminum	Steel	Inconel	Titanium	Cast Iron	Stainless Steel	Heavy	Moderate	Light	Fine	Finish	
Series 33	33	97	✓	✓	✓	✓	✓	•••	•••	••	••	•	Standard HEM	3
Z-Carb	Z1	49	✓	✓	✓	✓	✓	•••	•••	••	••	•	Standard HEM	4
Z-Carb-AP	Z1P	39	✓	✓	✓	✓	✓	•••	•••	••	••	•	Standard HEM	4
Z-Carb-HTA	ZH1	57	✓	✓	✓	✓	✓	•••	•••	••	••	•	Standard HEM	4
Series 7	7	103	✓	✓	✓	✓	✓	•	•	•	•••	•••	HEM Standard	4
Z-Carb HPR	Z5	28	✓	✓	✓	✓	✓	••	•••	•••	••	•	HEM Standard	5
V-Carb	55	63	✓	✓	✓	✓	✓	•	••	•••	•••	•••	HEM Standard	5
T-Carb®	51	74	✓	✓	✓	✓	✓	•	•	••	•••	•••	HEM Standard	6
H-Carb	77	82	✓	✓	✓	✓	✓	•	•	•	•••	•••	HEM Standard	7
Multi Carb	66	90	✓	✓	✓	✓	✓	•	•	•	••	•••	HEM Standard	7, 9, 11
Turbo Carb	56B	107	✓	✓	✓	✓	✓	•	•	••	•••	•••	HEM Standard	2
Z-Carb-MD	ZD1	61	✓	✓	✓	✓	✓	•••	•••	••	••	••	Standard HEM	4
Power-Carb®	57	110	✓	✓	✓	✓	✓	•	•	••	•••	•••	HEM Standard	6
Ski-Carb	44	163	✓	✓	✓	✓	✓	••	••	••	•••	•••	Standard HEM	2
S-Carb® 2 Flute	47	157	✓	✓	✓	✓	✓	•••	•••	••	••	•	Standard HEM	2
S-Carb® 3 Flute	43	136	✓	✓	✓	✓	✓	•••	•••	••	••	•	Standard HEM	3
S-Carb® Chipbreaker	43CB	146	✓	✓	✓	✓	✓	•••	•••	••	••	NR	Standard HEM	3
S-Carb® APR-3®	43APR-3	127	✓	✓	✓	✓	✓	•••	•••	••	••	NR	Standard HEM	3
S-Carb APR-4®	43APR-4	130	✓	✓	✓	✓	✓	•••	•••	••	••	NR	Standard HEM	4
S-Carb APF®	43APF	132	✓	✓	✓	✓	✓	•	•	••	•••	•••	Standard HEM	4
Slow Helix	27	113	✓	✓	✓	✓	✓	•	•	••	•••	•••	Standard HEM	4
CCR	20-CCR	338	✓	✓	✓	✓	✓	•••	•••	••	••	NR	Standard HEM	5, 8, 10, 12
CCR	31-CCR	342	✓	✓	✓	✓	✓	•••	•••	••	••	NR	Standard HEM	5, 7, 8, 10
Compression Router	25	345	✓	✓	✓	✓	✓	•	•	••	••	•••	Standard HEM	4, 6, 8
Up Cut Router	21	348	✓	✓	✓	✓	✓	•••	•••	••	••	•	Standard HEM	2
Down Cut Router	22	349	✓	✓	✓	✓	✓	•	•	••	••	•••	Standard HEM	2

Preferred materials for each Series are highlighted above
Cut depths (Ae & Ap) are based on a percentage of the cutter diameter (DC)

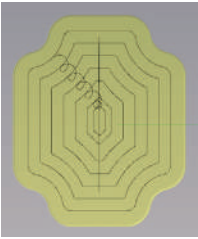


Steel P0 to P6	Stainless Steel M1 to M3	Cast Iron K1 to K3	High Temp Alloy S1 to S3	Titanium Alloy S4	Hardened Steel H1 to H4	Non Ferrous N1 to N4	Non Ferrous N5 to N7	Heavy 100%~40% Ae ≤ 100% Ap	Moderate 100%~40% Ae ≤ 150% Ap	Light 25%~10% Ae ≤ 250% Ap	Fine 10%~2% Ae ≤ 450% Ap	Finish 2%~0% Ae any Ap
⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕

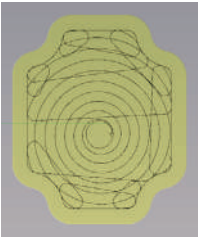
⊕ Coolant required in these materials
⊖ Plunging not recommended in these materials

Material hardness and machinability affect speed, feed, and cut depths
Long flute or long reach tools require reduced rates and cut depth
Unless marked "NR", a high quality finish can be achieved with any Series tool with adjustments to speed and feed

Cut Diameter Range inch mm	Cut Length Availability (x DC)**	Reach Option (x DC)**	End Styles Square Radius Ball	Chipbreaker Option	Shank Option Solid Round, Weldon Flat, Jet Stream, Coolant Hole	Center Cutting	Maximum Recommended Ramp Angle ***	Helix Angle	Flute Index	Coating
0.125 to 1 3 to 20	2.25 to 3	—	R	By Request	SR, WF	Yes	90	32 / 48	Unequal	Ti-Namite-A
0.125 to 1 3 to 25	1.25 to 3	—	R, B	By Request	SR, WF, JS	Yes	90	35 / 38	Unequal	Ti-Namite-A
0.0156 to 1 1 to 25	1 to 3.25	2.5 to 8.5	S, R, B	By Request	SR, WF, JS	Yes	90	35 / 38	Unequal	Ti-Namite-X
0.250 to 1 6 to 20	1.25 to 3	—	R	By Request	SR, WF	Yes	20	38 / 41	Unequal	Ti-Namite-A
0.125 to 1 3 to 25	2.25 to 8.25	—	S, B	By Request	SR	Yes	1	38	Unequal	Ti-Namite-A
0.125 - 1 6 - 25	1 to 3	—	S, R	By Request	SR, WF, CH	No	7	37	Unequal	Ti-Namite-M Ti-Namite-A
0.125 - 1 6 - 20	1.25 to 5	—	S, R, B	By Request	SR, WF	Yes	5	45	Unequal	Ti-Namite-A
0.250 to 1 6 to 20	1.25 to 3	3.25 to 5.5	S, R	By Request	SR	Yes	3	41	Unequal	Ti-Namite-X
0.250 to 1 6 to 25	2.5 to 4	—	S, R	In Stock Avail- able	SR	No	1	37	Unequal	Ti-Namite-M Ti-Namite-A
0.188 to 1 6 to 25	1.5 to 3.25	—	S, R	By Request	SR	No	1	35	Equal	Ti-Namite-A
0.031 to 0.750 1 to 20	1	2 to 2.25	B	By Request	SR	Yes	25	30	Equal	Ti-Namite-A
0.118 to 0.750 5 to 20	1 to 1.25	2.25 to 5	R	By Request	SR	Yes	2	42 / 45	Unequal	Ti-Namite-A
0.250 to 0.500 6 to 20	2 to 2.25	—	S	By Request	SR	Yes	1	45	Equal	Ti-Namite-A
0.250 to 1 3 to 20	1.25 to 7	—	S, R	By Request	SR, WF	Yes	90	45	Equal	Ti-Namite-B
0.125 to 1 3 to 25	1 to 3	3 to 9	S, B	By Request	SR	Yes	90	35	Equal	Ti-Namite-B
0.125 to 1 3 to 25	1 to 7	2.25 to 8.5	S, R, B	By Request	SR	Yes	90	38	Equal	Ti-Namite-B
0.250 to 1 6 to 20	1 to 7	2.5 to 8.5	R	Standard	SR	Yes	90	38	Equal	Ti-Namite-B
0.750 to 1 12 to 26	1.25 to 1.75	3 to 4	S, R	Standard	CH	Yes	90	38	Unequal	Ti-Namite-B
20 to 25	1.25 to 1.75	2.25 to 3.5	S, R	Standard	CH	Yes	90	38 / 41	Unequal	Ti-Namite-B
0.500 to 0.750 6 to 25	2.5 to 4	3 to 5	S, R	By Request	CH	Yes	25	38 / 41	Unequal	Ti-Namite-B
0.250 to 0.750 6 to 16	1.75 to 4	—	S	By Request	SR	Yes	5	10, 12	Unequal	Di-Namite (optional)
0.250 to 0.500 2 to 12	2.75 to 4	—	S	Standard	SR	Based upon end style	5 (for end cut styles)	15	Equal	Di-Namite (optional)
0.250 to 0.500 6 to 12	2.75 to 4	—	S	Standard	SR	Based upon end style	5 (for end cut styles)	15	Equal	Di-Namite (optional)
0.250 to 0.500 6 to 12	2.75 to 4	—	S	By Request	SR	Yes	5	30	Equal	Di-Namite (optional)
0.125 to 0.750 3 to 12	2.5 to 4.25	—	S	By Request	SR	Yes	90	35	Equal	various optional
0.125 to 0.750 3 to 12	2.5 to 4.25	—	S	By Request	SR	Yes	—	35	Equal	various optional



Standard Toolpath



HEM Toolpath

* HEM toolpaths are usually preferred in most situations. However, standard paths may be more efficient with moderate to heavy cut types
** some variations of Cut Length and Reach are based upon Cut Diameter
*** shown is general recommendation for most materials, lower ramp angles are required for materials with lower machinability

For complete application recommendations refer to the SGS Tool Wizard®



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

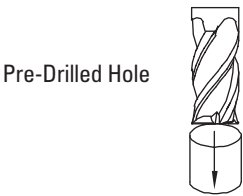
DC = cutting diameter APMX = flute length

Speeds and Feeds for Cut Types are based on Radial Width (Ae) and Axial Depth (Ap)

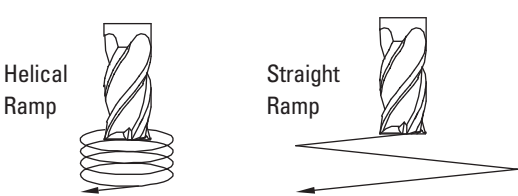
Reductions to Speeds and Feeds may be necessary when:

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

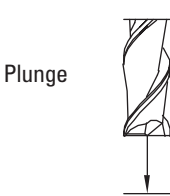
ENTRY METHODS



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



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

Herramientas	- Siempre que sea posible, seleccione la herramienta de mayor diámetro y menor longitud total y de filo para obtener una mayor 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 amarre para la sujeción de la herramienta y una concentricidad máxima indicada (TIR) - Se recomienda usar portaherramientas de amarre directo cortos, o de boquilla con longitud cero para lograr un máximo arranque de viruta - Cuando se utilicen portaherramientas de amarre 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 husillo 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
Refrigeración	- Evite el re-maquinado de virutas usando aire a presión o líquido refrigeración según sea necesario - Mantener limpio la refrigeración con su concentración adecuada - Recomendaciones generales: —Para el maquinado de aceros de 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 Termorresistentes, 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

DC = diámetro de corte APMX = largo de filo

Las velocidades y avances para cortes están basados en la profundidad radial (Ae) y profundidad axial (Ap)

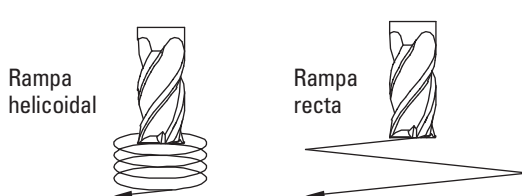
Reduccionen en velocidades y avances serán necesarias cuando:

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

MÉTODOS DE ENTRADA



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



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



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

Conseils relatifs à l’application

Outil	- 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, aciersau 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

DC = diamètre de coupe APMX = longueur de coupe

Vitesses & avances pour ces cas d'usinage sont basées sur l’engagement radial (Ae) et axial (Ap)

- La réduction de la vitesse et de l'avance doit être nécessaire quand:
- Les engagements Ae et Ap sont importants
 - Des dentures longues ou des séries longues sont utilisées
 - Des attachement longs sont utilisés
 - Lors d'usinage de matériaux durs

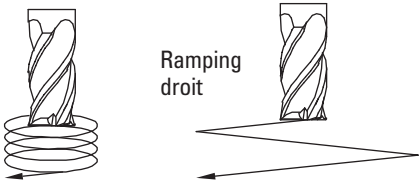
TYPES D'ENTREE MATIERE

Preperçage



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

Ramping hélicoïdal Ramping droit



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

Plongée



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

Anwendungstipps

Werkzeug	- Wählen Sie möglichst immer den Schaftfräser mit dem größten Durchmesser, der kürzesten Schneide 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 nicht überschreiten - Hochleistungswerkzeuge minimieren die Bearbeitungszeit und verlängern die Werkzeugstandzeit
Werkzeughalter	- Es werden Spannzangen mit genauem Rundlauf 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 Spannvorrichtung
Werkzeugmaschine	- Die Spindel muss in optimalem Zustand sein, um einen genauen Rundlauf 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 Stauen der Späne durch Luftstrahl oder flüssige Kühlmittel möglichst verhindern - Kühlmittel in geeigneter Konzentration verwenden - 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 Fräsparemeter, Werkzeughalter, Rundlauf, Auswuchten, Einspannen, usw. verbessert die Schnittleistung und verlängert die Standzeit

RICHTWERTE ZUM FRÄSEN

DC = Fräsdurchmesser APMX = Schnittlänge

Drehzahl und Vorschub für Fräsarbeiten hängen von Radialbreite (Ae) und Frästiefe (Ap) ab

- Drehzahl und Vorschub müssen ggfs. verringert werden wenn:
- die empfohlenen Werte für Ae und Ap überschritten werden
 - lange Schneiden oder Langschaftfräser verwendet werden
 - lange Werkzeughalter verwendet werden
 - die Werkstoffe härter als vorgesehen sind

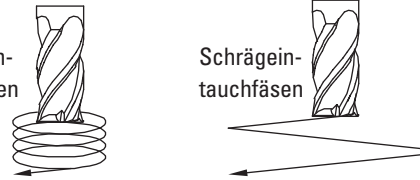
VORBEREITUNGEN

Vorbohrung



Vorbohren ist in den meisten Fällen ratsam.

Zirkuläreintauchfräsen Schrägeintauchfräsen



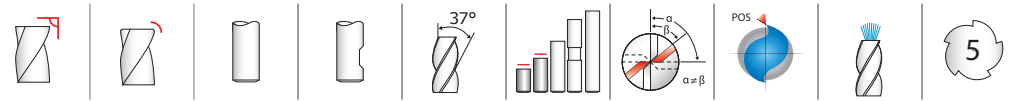
Alternative Verfahren sind Zirkuläreintauchen und Schrägeintauchen. Starke Tauchwinkel erfordern verringerte Vorschubgeschwindigkeiten. Geringe Tauchwinkel ermöglichen höhere Vorschubgeschwindigkeiten und verlängern die Standzeit. Verwenden Sie die Drehzahlen und Vorschübe zum Schlitzfräsen für Tauchwinkel von 1° bis 2°. Den Vorschub auf 25 % verringern, wenn der Tauchwinkel 6° erreicht. Standardwerkzeuge 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 •
Z5CR
FRACTIONAL SERIES

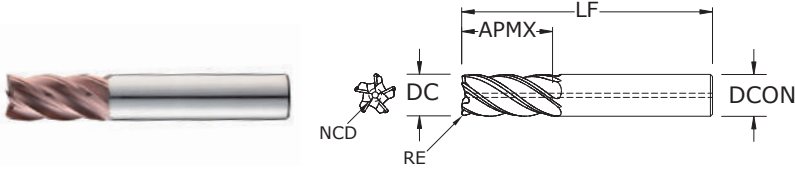
- An ideal balance of helix, indexing, flute depth, rake and relief
- Variable indexing for chatter suppression and patented edge geometry for shearing and strength
- Chatter-free geometry allows deep cutting and high speed machining
- Central coolant hole delivers coolant effectively to the cutting zone enhancing chip removal when pocketing or slotting
- Excels at roughing, ramping, high speed machining and finishing in a variety of materials
- 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



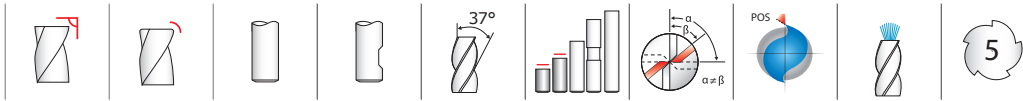
TOLERANCES (inch)
1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h₆
RE = +0.0000/–0.0020
>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h₆
RE = +0.0000/–0.0020
>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h₆
RE = +0.0000/–0.0020



inch						EDP NO.					
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	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	–	0.0440	38500	–	–	37000	–	–
1/8	1/4	1-1/2	1/8	0.010	0.0440	38771	–	–	38770	–	–
1/8	1/4	1-1/2	1/8	0.015	0.0440	38525	–	–	37001	–	–
1/8	1/4	1-1/2	1/8	0.030	0.0440	38773	–	–	38772	–	–
1/8	3/8	1-1/2	1/8	–	0.0440	37180	–	–	37002	–	–
1/8	3/8	1-1/2	1/8	0.010	0.0440	38775	–	–	38774	–	–
1/8	3/8	1-1/2	1/8	0.015	0.0290	37181	–	–	37003	–	–
1/8	3/8	1-1/2	1/8	0.030	0.0290	38777	–	–	38776	–	–
3/16	5/16	2	3/16	–	0.0660	38501	–	–	37004	–	–
3/16	5/16	2	3/16	0.010	0.0660	38779	–	–	38778	–	–
3/16	5/16	2	3/16	0.015	0.0660	38526	–	–	37005	–	–
3/16	5/16	2	3/16	0.030	0.0660	38781	–	–	38780	–	–
3/16	1/2	2	3/16	–	0.0660	37182	–	–	37006	–	–
3/16	1/2	2	3/16	0.010	0.0660	38783	–	–	38782	–	–
3/16	1/2	2	3/16	0.015	0.0660	37183	–	–	37007	–	–
3/16	1/2	2	3/16	0.030	0.0660	38785	–	–	38784	–	–
1/4	3/8	2-1/2	1/4	–	0.0880	38502	–	–	37008	–	–
1/4	3/8	2-1/2	1/4	0.010	0.0880	38787	–	–	38786	–	–
1/4	3/8	2-1/2	1/4	0.015	0.0880	38527	–	–	37009	–	–
1/4	3/8	2-1/2	1/4	0.030	0.0880	38528	–	–	37010	–	–
1/4	3/8	2-1/2	1/4	0.060	0.0750	38789	–	–	38788	–	–
1/4	3/8	2-1/2	1/4	0.090	0.0880	38791	–	–	38790	–	–
1/4	1/2	2-1/2	1/4	–	0.0880	37184	–	–	37011	–	–
1/4	1/2	2-1/2	1/4	0.010	0.0880	38793	–	–	38792	–	–
1/4	1/2	2-1/2	1/4	0.015	0.0880	37185	–	–	37012	–	–
1/4	1/2	2-1/2	1/4	0.030	0.0880	37186	–	–	37013	–	–
1/4	1/2	2-1/2	1/4	0.060	0.0750	38795	–	–	38794	–	–
1/4	1/2	2-1/2	1/4	0.090	0.0880	38797	–	–	38796	–	–

continued on next page

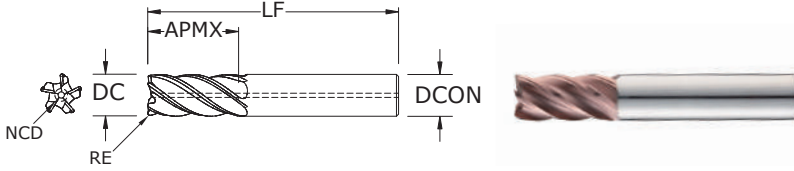
FRACTIONAL
Z-Carb-HPR



Z5 •
Z5CR
FRACTIONAL SERIES



TOLERANCES (inch)
1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h₆
RE = +0.0000/–0.0020
>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h₆
RE = +0.0000/–0.0020
>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h₆
RE = +0.0000/–0.0020

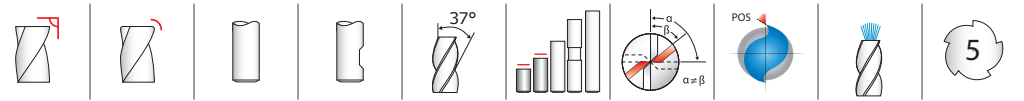


inch						EDP NO.					
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	TI-NAMITE-A (TA)	TI-NAMITE-A (TA) W/FLAT	TI-NAMITE-A (TA) W/INTERNAL COOLANT	TI-NAMITE-M (TM)	TI-NAMITE-M (TM) W/FLAT	TI-NAMITE-M (TM) W/INTERNAL COOLANT
5/16	7/16	2-1/2	5/16	–	0.1090	38503	–	–	37014	–	–
5/16	7/16	2-1/2	5/16	0.010	0.1090	38799	–	–	38798	–	–
5/16	7/16	2-1/2	5/16	0.015	0.1090	38529	–	–	37015	–	–
5/16	7/16	2-1/2	5/16	0.030	0.1090	38801	–	–	38800	–	–
5/16	7/16	2-1/2	5/16	0.060	0.1090	38803	–	–	38802	–	–
5/16	7/16	2-1/2	5/16	0.090	0.0640	38805	–	–	38804	–	–
5/16	5/8	2-1/2	5/16	–	0.1090	38504	–	–	37016	–	–
5/16	5/8	2-1/2	5/16	0.010	0.0640	38807	–	–	38806	–	–
5/16	5/8	2-1/2	5/16	0.015	0.1090	38530	–	–	37017	–	–
5/16	5/8	2-1/2	5/16	0.030	0.1090	38809	–	–	38808	–	–
5/16	5/8	2-1/2	5/16	0.060	0.1090	38811	–	–	38810	–	–
5/16	5/8	2-1/2	5/16	0.090	0.0640	38813	–	–	38812	–	–
3/8	1/2	2-1/2	3/8	–	0.1310	38505	–	–	37018	–	–
3/8	1/2	2-1/2	3/8	0.010	0.1310	38815	–	–	38814	–	–
3/8	1/2	2-1/2	3/8	0.015	0.1310	38531	–	–	37019	–	–
3/8	1/2	2-1/2	3/8	0.030	0.1310	38532	–	–	37020	–	–
3/8	1/2	2-1/2	3/8	0.060	0.1310	38817	–	–	38816	–	–
3/8	1/2	2-1/2	3/8	0.090	0.0830	38819	–	–	38818	–	–
3/8	3/4	2-1/2	3/8	–	0.1310	37187	–	–	37021	–	–
3/8	3/4	2-1/2	3/8	0.010	0.1310	38821	–	–	38820	–	–
3/8	3/4	2-1/2	3/8	0.015	0.1310	37188	–	–	37022	–	–
3/8	3/4	2-1/2	3/8	0.030	0.1310	37189	37174	–	37023	–	–
3/8	3/4	2-1/2	3/8	0.060	0.1310	38823	–	–	38822	–	–
3/8	3/4	2-1/2	3/8	0.090	0.0830	38825	–	–	38824	–	–
7/16	5/8	2-1/2	7/16	0.015	0.1530	37164	–	–	37160	–	–
7/16	5/8	2-1/2	7/16	0.030	0.1530	37165	–	–	37161	–	–
7/16	7/8	2-3/4	7/16	0.015	0.1530	37166	–	–	37162	–	–
7/16	7/8	2-3/4	7/16	0.030	0.1530	37167	–	–	37163	–	–

continued on next page

CONTINUED

FRACTIONAL
Z-Carb-HPR



Z5 •
Z5CR
FRACTIONAL SERIES

CONTINUED

- An ideal balance of helix, indexing, flute depth, rake and relief
- Variable indexing for chatter suppression and patented 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
- 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

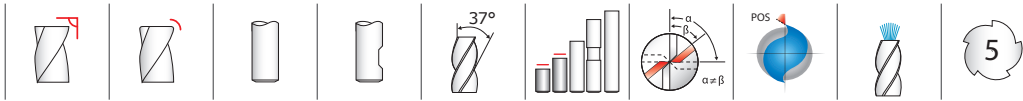
inch						EDP NO.					
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	TI-NAMITE-A (TA)	TI-NAMITE-A (TA) W/FLAT	TI-NAMITE-A (TA) W/INTERNAL COOLANT	TI-NAMITE-M (TM)	TI-NAMITE-M (TM) W/FLAT	TI-NAMITE-M (TM) W/INTERNAL COOLANT
1/2	5/8	3	1/2	—	0.1750	38506	38512	37320	37024	37030	37321
1/2	5/8	3	1/2	0.010	0.1750	38827	38829	38831	38826	38828	38830
1/2	5/8	3	1/2	0.015	0.1750	38533	38578	37330	37025	37031	37331
1/2	5/8	3	1/2	0.030	0.1750	38534	38579	37332	37026	37032	37333
1/2	5/8	3	1/2	0.060	0.1750	38535	38580	37334	37027	37033	37335
1/2	5/8	3	1/2	0.090	0.1750	38536	38581	37337	37028	37034	37338
1/2	5/8	3	1/2	0.120	0.1750	38537	38582	37339	37029	37035	37340
1/2	1	3	1/2	—	0.1750	38507	38513	37322	37036	37042	37323
1/2	1	3	1/2	0.010	0.1750	38833	38835	38837	38832	38834	38836
1/2	1	3	1/2	0.015	0.1750	38538	38583	37341	37037	37043	37342
1/2	1	3	1/2	0.030	0.1750	38539	38584	37343	37038	37044	37344
1/2	1	3	1/2	0.060	0.1750	38540	38585	37345	37039	37045	37346
1/2	1	3	1/2	0.090	0.1750	38541	38586	37348	37040	37046	37349
1/2	1	3	1/2	0.120	0.1750	38542	38587	37350	37041	37047	37351
1/2	1-1/4	3-1/4	1/2	—	0.1750	37190	37194	37325	37048	37054	37324
1/2	1-1/4	3-1/4	1/2	0.010	0.1750	38839	38841	38843	38838	38840	38842
1/2	1-1/4	3-1/4	1/2	0.015	0.1750	37191	37195	37352	37049	37055	37353
1/2	1-1/4	3-1/4	1/2	0.030	0.1750	37192	37196	37354	37050	37056	37355
1/2	1-1/4	3-1/4	1/2	0.060	0.1750	37193	37197	37356	37051	37057	37357
1/2	1-1/4	3-1/4	1/2	0.090	0.1750	38543	38588	37359	37052	37058	37360
1/2	1-1/4	3-1/4	1/2	0.120	0.1750	38544	38589	37361	37053	37059	37362
5/8	3/4	3-1/2	5/8	—	0.2630	38508	38514	38518	37060	37067	37260
5/8	3/4	3-1/2	5/8	0.010	0.2190	38845	38847	38849	38844	38846	38848
5/8	3/4	3-1/2	5/8	0.015	0.2190	38545	38590	38623	37061	37068	37261
5/8	3/4	3-1/2	5/8	0.030	0.2190	38546	38591	38624	37062	37069	37262
5/8	3/4	3-1/2	5/8	0.060	0.2190	38547	38592	38625	37063	37070	37263
5/8	3/4	3-1/2	5/8	0.090	0.2190	38548	38593	38626	37064	37071	37264
5/8	3/4	3-1/2	5/8	0.120	0.2190	38549	38594	38627	37065	37072	37265
5/8	3/4	3-1/2	5/8	0.190	0.2190	38550	38595	38628	37066	37073	37266
5/8	1-1/4	3-1/2	5/8	—	0.2190	37198	37202	38519	37074	37081	37267

continued on next page



TOLERANCES (inch)
1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h₆
RE = +0.0000/–0.0020
>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h₆
RE = +0.0000/–0.0020
>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h₆
RE = +0.0000/–0.0020

FRACTIONAL
Z-Carb-HPR



Z5 •
Z5CR
FRACTIONAL SERIES

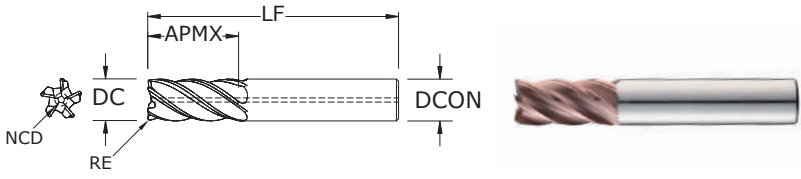
CONTINUED

inch						EDP NO.					
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	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	1-1/4	3-1/2	5/8	0.010	0.2190	38851	38853	38855	38850	38852	38854
5/8	1-1/4	3-1/2	5/8	0.015	0.2190	37199	37203	38629	37075	37082	37268
5/8	1-1/4	3-1/2	5/8	0.030	0.2190	37200	37204	38630	37076	37083	37269
5/8	1-1/4	3-1/2	5/8	0.060	0.2190	37201	37205	38631	37077	37084	37270
5/8	1-1/4	3-1/2	5/8	0.090	0.2190	38551	38596	38632	37078	37085	37271
5/8	1-1/4	3-1/2	5/8	0.120	0.2190	38552	38597	38633	37079	37086	37272
5/8	1-1/4	3-1/2	5/8	0.190	0.2190	38553	38598	38634	37080	37087	37273
3/4	7/8	4	3/4	—	0.2630	38509	38515	38520	37088	37095	37274
3/4	7/8	4	3/4	0.010	0.2630	38857	38859	38861	38856	38858	38860
3/4	7/8	4	3/4	0.030	0.2630	38554	38599	38635	37089	37096	37275
3/4	7/8	4	3/4	0.060	0.2630	38555	38600	38636	37090	37097	37276
3/4	7/8	4	3/4	0.090	0.2630	38556	38601	38637	37091	37098	37277
3/4	7/8	4	3/4	0.120	0.2630	38557	38602	38638	37092	37099	37278
3/4	7/8	4	3/4	0.190	0.2630	38558	38603	38639	37093	37100	37279
3/4	7/8	4	3/4	0.250	0.2630	38559	38604	38640	37094	37101	37280
3/4	1-1/2	4	3/4	—	0.2630	37206	37210	38521	37102	37109	37281
3/4	1-1/2	4	3/4	0.010	0.2630	38863	38865	38867	38862	38864	38866
3/4	1-1/2	4	3/4	0.030	0.2630	37207	37211	38641	37103	37110	37282
3/4	1-1/2	4	3/4	0.060	0.2630	37208	37212	38642	37104	37111	37283
3/4	1-1/2	4	3/4	0.090	0.2630	38560	38605	38643	37105	37112	37284
3/4	1-1/2	4	3/4	0.120	0.2630	37209	37213	38644	37106	37113	37285
3/4	1-1/2	4	3/4	0.190	0.2630	38561	38606	38645	37107	37114	37286
3/4	1-1/2	4	3/4	0.250	0.2630	38562	38607	38646	37108	37115	37287
3/4	1-5/8	4	3/4	0.030	0.2630	37222	—	—	37223	—	—
3/4	1-5/8	4	3/4	0.060	0.2630	37224	—	—	37225	—	—
3/4	1-5/8	4	3/4	0.090	0.2630	37226	—	—	37227	—	—
3/4	1-5/8	4	3/4	0.120	0.2630	37228	—	—	37229	—	—
3/4	2	4-1/2	3/4	0.030	0.2630	37230	—	—	37231	—	—
3/4	2	4-1/2	3/4	0.060	0.2630	37232	—	—	37233	—	—
3/4	2	4-1/2	3/4	0.090	0.2630	37234	—	—	37235	—	—

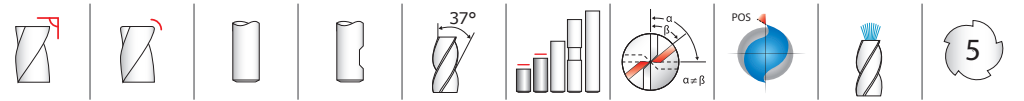
continued on next page



TOLERANCES (inch)
1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h₆
RE = +0.0000/–0.0020
>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h₆
RE = +0.0000/–0.0020
>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h₆
RE = +0.0000/–0.0020



FRACTIONAL
Z-Carb-HPR



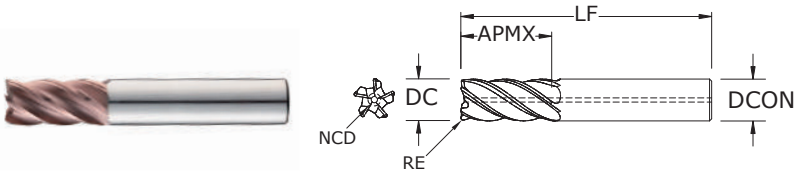
Z5 •
Z5CR
FRACTIONAL SERIES

CONTINUED

- An ideal balance of helix, indexing, flute depth, rake and relief
- Variable indexing for chatter suppression and patented 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
- 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



inch						EDP NO.					
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	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
3/4	2	4-1/2	3/4	0.120	0.2630	37236	—	—	37237	—	—
1	1-1/8	4	1	—	0.3500	38510	38516	38522	37116	37123	37288
1	1-1/8	4	1	0.010	0.3500	38869	38871	38873	38868	38870	38872
1	1-1/8	4	1	0.030	0.3500	38563	38608	38647	37117	37124	37289
1	1-1/8	4	1	0.060	0.3500	38564	38609	38648	37118	37125	37290
1	1-1/8	4	1	0.090	0.3500	38565	38610	38649	37119	37126	37291
1	1-1/8	4	1	0.120	0.3500	38566	38611	38650	37120	37127	37292
1	1-1/8	4	1	0.190	0.3500	38567	38612	38651	37121	37128	37293
1	1-1/8	4	1	0.250	0.3500	38568	38613	38652	37122	37129	37294
1	1-1/2	4	1	—	0.3500	37214	37218	38523	37130	37137	37295
1	1-1/2	4	1	0.010	0.3500	38875	38877	38879	38874	38876	38878
1	1-1/2	4	1	0.030	0.3500	37215	37219	38653	37131	37138	37296
1	1-1/2	4	1	0.060	0.3500	37216	37220	38654	37132	37139	37297
1	1-1/2	4	1	0.090	0.3500	38569	38614	38655	37133	37140	37298
1	1-1/2	4	1	0.120	0.3500	37217	37221	38656	37134	37141	37299
1	1-1/2	4	1	0.190	0.3500	38570	38615	38657	37135	37142	37300
1	1-1/2	4	1	0.250	0.3500	38571	38616	38658	37136	37143	37301
1	2	4-1/2	1	—	0.3500	38511	38517	38524	37144	37151	37302
1	2	4-1/2	1	0.010	0.3500	38881	38883	38885	38880	38882	38884
1	2	4-1/2	1	0.030	0.3500	38572	38617	38659	37145	37152	37303
1	2	4-1/2	1	0.060	0.3500	38573	38618	38660	37146	37153	37304
1	2	4-1/2	1	0.090	0.3500	38574	38619	38661	37147	37154	37305
1	2	4-1/2	1	0.120	0.3500	38575	38620	38662	37148	37155	37306
1	2	4-1/2	1	0.190	0.3500	38576	38621	38663	37149	37156	37307
1	2	4-1/2	1	0.250	0.3500	38577	38622	38664	37150	37157	37308



TOLERANCES (inch)

1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h₆
RE = +0.0000/–0.0020

>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h₆
RE = +0.0000/–0.0020

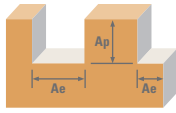
>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h₆
RE = +0.0000/–0.0020

FRACTIONAL
Z-Carb-HPR

Series Z5, Z5CR Fractional		Hardness			Vc (sfm)	DC • in								
			Ae x DC	Ap x DC		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 (444-666)	RPM	16961	8480	5654	4240	3392	2827	2120
						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	
		Slot	1	≤ 1	440 (352-528)	RPM	13446	6723	4482	3362	2689	2241	1681	
						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	Profile	≤ 0.5	≤ 1.5	315 (252-378)	RPM	9626	4813	3209	2407	1925	1604	1203
						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	
		Slot	1	≤ 1	250 (200-300)	RPM	7640	3820	2547	1910	1528	1273	955	
						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	
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRC	Profile	≤ 0.5	≤ 1.5	445 (356-534)	RPM	13599	6800	4533	3400	2720	2267	1700
						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	
		Slot	1	≤ 1	355 (284-426)	RPM	10849	5424	3616	2712	2170	1808	1356	
						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	Profile	≤ 0.5	≤ 1.5	340 (272-408)	RPM	10390	5195	3463	2598	2078	1732	1299
						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	
		Slot	1	≤ 1	270 (216-324)	RPM	8251	4126	2750	2063	1650	1375	1031	
						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	Profile	≤ 0.5	≤ 1.5	490 (392-588)	RPM	14974	7487	4991	3744	2995	2496	1872
						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	
		Slot	1	≤ 1	390 (312-468)	RPM	11918	5959	3973	2980	2384	1986	1490	
						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	Profile	≤ 0.5	≤ 1.5	340 (272-408)	RPM	10390	5195	3463	2598	2078	1732	1299
						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	
		Slot	1	≤ 1	270 (216-324)	RPM	8251	4126	2750	2063	1650	1375	1031	
						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	
STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRC	Profile	≤ 0.5	≤ 1.5	310 (248-372)	RPM	9474	4737	3158	2368	1895	1579	1184	
					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 (200-300)	RPM	7640	3820	2547	1910	1528	1273	955		
					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		

continued on next page

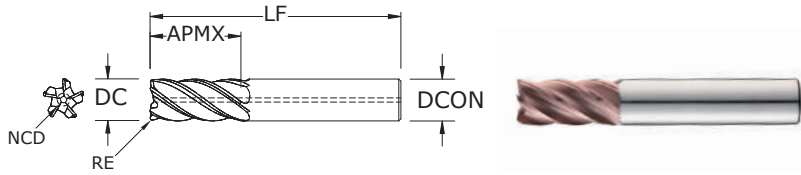
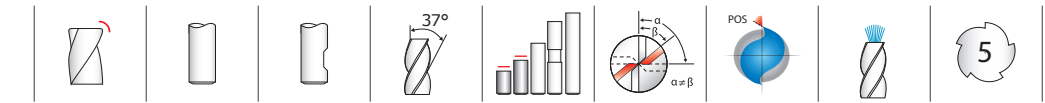
FRACTIONAL
Z-Carb-HPR

Series Z5, Z5CR Fractional	Hardness			Vc (sfm)	DC • in								
		Ae x DC	Ap x DC		1/8	1/4	3/8	1/2	5/8	3/4	1		
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRC		≤ 0.5	≤ 1.5	80 (64-96)	RPM	2445	1222	815	611	489	407	306
						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
			1	≤ 1	65 (52-78)	RPM	1986	993	662	497	397	331	248
						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
	≤ 400 Bhn or ≤ 43 HRc		≤ 0.5	≤ 1.5	62 (50-74)	RPM	1895	947	632	474	379	316	237
						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
			1	≤ 1	50 (40-60)	RPM	1528	764	509	382	306	255	191
						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
	≤ 350 Bhn or ≤ 38 HRC		≤ 0.5	≤ 1.5	215 (172-258)	RPM	6570	3285	2190	1643	1314	1095	821
						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
			1	≤ 1	170 (136-204)	RPM	5195	2598	1732	1299	1039	866	649
						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
	≤ 440 Bhn or ≤ 47 HRC		≤ 0.5	≤ 1.5	75 (60-90)	RPM	2292	1146	764	573	458	382	287
						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
			1	≤ 1	60 (48-72)	RPM	1834	917	611	458	367	306	229
						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
≤ 375 Bhn or ≤ 40 HRC		≤ 0.5	≤ 1.5	185 (148-222)	RPM	5654	2827	1885	1413	1131	942	707	
					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 (116-174)	RPM	4431	2216	1477	1108	886	739	554	
					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	

Bhn (Brinell) HRc (Rockwell C)
rpm = Vc x 3.82 / DC
ipm = 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 DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



TOLERANCES (mm)
6 DIAMETER
DC = +0,000/-0,030
DCON = h₆
RE = +0,000/-0,050
>6-10 DIAMETER
DC = +0,000/-0,040
DCON = h₆
RE = +0,000/-0,050
>10-25 DIAMETER
DC = +0,000/-0,050
DCON = h₆
RE = +0,000/-0,050



mm						EDP NO.					
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON- CUTTING CENTER DIAMETER NCD	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
6,0	9,0	54,0	6,0	0,5	2,11	48000	—	—	47000	—	—
6,0	13,0	57,0	6,0	0,3	2,11	48001	—	—	47001	—	—
6,0	13,0	57,0	6,0	0,5	2,11	47120	—	—	47002	—	—
6,0	13,0	57,0	6,0	1,0	2,11	48002	—	—	47003	—	—
6,0	13,0	57,0	6,0	1,5	2,11	48003	—	—	47004	—	—
8,0	11,0	58,0	8,0	0,5	2,79	48004	—	—	47005	—	—
8,0	18,0	63,0	8,0	0,5	2,79	47121	—	—	47006	—	—
8,0	18,0	63,0	8,0	1,0	2,79	47122	—	—	47007	—	—
8,0	18,0	63,0	8,0	1,5	2,79	48005	—	—	47008	—	—
8,0	18,0	63,0	8,0	2,0	2,79	48006	—	—	47009	—	—
10,0	13,0	66,0	10,0	1,0	2,79	48007	—	—	47010	—	—
10,0	22,0	72,0	10,0	0,5	3,51	47123	—	—	47011	—	—
10,0	22,0	72,0	10,0	1,0	3,51	47124	—	—	47012	—	—
10,0	22,0	72,0	10,0	1,5	3,51	48008	—	—	47013	—	—
10,0	22,0	72,0	10,0	2,0	3,51	48009	—	—	47014	—	—
10,0	22,0	72,0	10,0	2,5	3,51	48010	—	—	47015	—	—
12,0	15,0	73,0	12,0	1,0	4,19	48011	48029	—	47016	47024	—
12,0	26,0	83,0	12,0	0,5	4,19	47125	47128	47160	47017	47025	47161
12,0	26,0	83,0	12,0	0,76	4,19	47126	47129	47162	47018	47026	47163
12,0	26,0	83,0	12,0	1,0	4,19	47127	47130	47164	47019	47027	47165
12,0	26,0	83,0	12,0	1,5	4,19	48012	48030	47166	47020	47028	47167
12,0	26,0	83,0	12,0	2,0	4,19	48013	48031	47168	47021	47029	47169
12,0	26,0	83,0	12,0	2,5	4,19	48014	48032	47170	47022	47030	47171
12,0	26,0	83,0	12,0	3,0	4,19	48015	48033	47172	47023	47031	47173
16,0	19,0	82,0	16,0	1,0	5,59	48016	48034	48056	47032	47039	47046
16,0	19,0	82,0	16,0	1,5	5,59	48070	—	—	48071	—	—
16,0	35,0	92,0	16,0	1,0	5,59	47131	48035	47134	47033	47040	47047
16,0	35,0	92,0	16,0	1,5	5,59	48017	48036	48057	47034	47041	47048

continued on next page

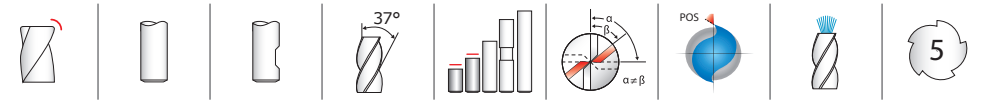
- An ideal balance of helix, indexing, flute depth, rake and relief
- Variable indexing for chatter suppression and patented edge geometry for shearing and strength
- Chatter-free geometry allows deep cutting and high speed machining
- Central coolant hole delivers coolant effectively to the cutting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

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

For patent information visit www.ksptpatents.com

METRIC

Z-Carb-HPR



TOLERANCES (mm)
6 DIAMETER
DC = +0,000/-0,030
DCON = h₆
RE = +0,000/-0,050
>6-10 DIAMETER
DC = +0,000/-0,040
DCON = h₆
RE = +0,000/-0,050
>10-25 DIAMETER
DC = +0,000/-0,050
DCON = h₆
RE = +0,000/-0,050

Z5MCR

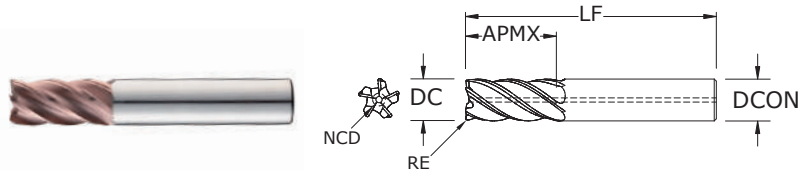
METRIC SERIES

CONTINUED

- An ideal balance of helix, indexing, flute depth, rake and relief
- Variable indexing for chatter supression and patented 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)

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

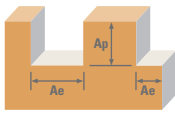
For patent information visit www.ksptpatents.com



mm						EDP NO.					
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	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
16,0	35,0	92,0	16,0	2,0	5,59	47132	48037	47135	47035	47042	47049
16,0	35,0	92,0	16,0	2,5	5,59	48018	48038	48058	47036	47043	47050
16,0	35,0	92,0	16,0	3,0	5,59	47133	48039	47136	47037	47044	47051
16,0	35,0	92,0	16,0	4,0	5,59	48019	48040	48059	47038	47045	47052
20,0	23,0	92,0	20,0	1,0	7,01	48020	48041	48060	47053	47061	47069
20,0	43,0	104,0	20,0	1,0	7,01	47137	48042	47140	47054	47062	47070
20,0	43,0	104,0	20,0	1,5	7,01	48021	48043	48061	47055	47063	47071
20,0	43,0	104,0	20,0	2,0	7,01	47138	48044	47141	47056	47064	47072
20,0	43,0	104,0	20,0	2,5	7,01	48022	48045	48062	47057	47065	47073
20,0	43,0	104,0	20,0	3,0	7,01	47139	48046	47142	47058	47066	47074
20,0	43,0	104,0	20,0	4,0	7,01	48023	48047	48063	47059	47067	47075
20,0	43,0	104,0	20,0	5,0	7,01	48024	48048	48064	47060	47068	47076
25,0	28,0	100,0	25,0	1,0	8,76	48025	48049	48065	47077	47084	47091
25,0	53,0	121,0	25,0	1,0	8,76	47143	48050	47146	47078	47085	47092
25,0	53,0	121,0	25,0	2,0	8,76	47144	48051	47147	47079	47086	47093
25,0	53,0	121,0	25,0	2,5	8,76	48026	48052	48066	47080	47087	47094
25,0	53,0	121,0	25,0	3,0	8,76	47145	48053	47148	47081	47088	47095
25,0	53,0	121,0	25,0	4,0	8,76	48027	48054	48067	47082	47089	47096
25,0	53,0	121,0	25,0	5,0	8,76	48028	48055	48068	47083	47090	47097

METRIC

Z-Carb-HPR

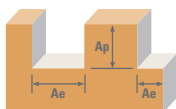


Series Z5MCR Metric	Hardness			Vc (m/min)	DC • mm									
		Ae x DC	Ap x DC		6	8	10	12	16	20	25			
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	169 (135-203)	RPM	8967	6725	5380	4484	3363	2690	2152
						Fz	0.029	0.049	0.061	0.074	0.087	0.099	0.108	
						Feed (mm/min)	1291	1650	1650	1668	1463	1327	1157	
		Slot 	1	≤ 1	134 (107-161)	RPM	7109	5332	4265	3555	2666	2133	1706	
						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 (77-115)	RPM	5089	3817	3054	2545	1909	1527	1221
						Fz	0.022	0.036	0.045	0.055	0.067	0.075	0.080	
						Feed (mm/min)	550	692	692	702	635	570	489	
		Slot 	1	≤ 1	76 (61-91)	RPM	4039	3029	2424	2020	1515	1212	969	
						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	
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ 0.5	≤ 1.5	136 (109-163)	RPM	7190	5392	4314	3595	2696	2157	1726
						Fz	0.026	0.045	0.056	0.067	0.079	0.091	0.098	
						Feed (mm/min)	949	1208	1208	1208	1070	978	841	
		Slot 	1	≤ 1	108 (87-130)	RPM	5736	4302	3441	2868	2151	1721	1377	
						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 (83-124)	RPM	5493	4120	3296	2747	2060	1648	1318
						Fz	0.020	0.034	0.043	0.050	0.059	0.067	0.073	
						Feed (mm/min)	554	703	703	692	606	549	478	
		Slot 	1	≤ 1	82 (66-99)	RPM	4362	3272	2617	2181	1636	1309	1047	
						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 (119-179)	RPM	7917	5938	4750	3958	2969	2375	1900
						Fz	0.022	0.036	0.045	0.055	0.067	0.075	0.080	
						Feed (mm/min)	855	1077	1077	1092	988	887	760	
		Slot 	1	≤ 1	119 (95-143)	RPM	6301	4726	3781	3151	2363	1890	1512	
						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 (83-124)	RPM	5493	4120	3296	2747	2060	1648	1318
						Fz	0.017	0.030	0.037	0.043	0.051	0.059	0.063	
						Feed (mm/min)	461	615	615	593	527	483	412	
		Slot 	1	≤ 1	82 (66-99)	RPM	4362	3272	2617	2181	1636	1309	1047	
						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	
	STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile 	≤ 0.5	≤ 1.5	94 (76-113)	RPM	5009	3756	3005	2504	1878	1503	1202
						Fz	0.017	0.030	0.037	0.043	0.051	0.059	0.063	
						Feed (mm/min)	421	561	561	541	481	441	376	
		Slot 	1	≤ 1	76 (61-91)	RPM	4039	3029	2424	2020	1515	1212	969	
						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	

continued on next page

METRIC

Z-Carb-HPR

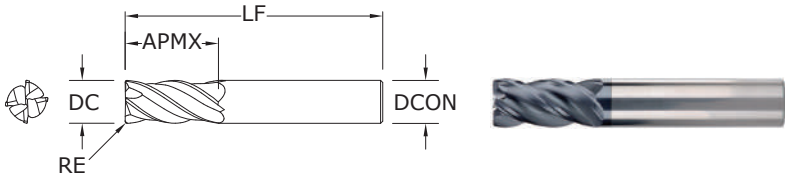
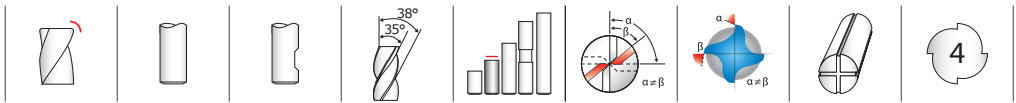
Series Z5MCR Metric	Hardness			Vc (m/min)	DC • mm								
		Ae x DC	Ap x DC		6	8	10	12	16	20	25		
S	SUPER ALLOYS (NICKEL , COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	 Profile	≤ 0.5	≤ 1.5	24 (20-29)	RPM	1293	969	776	646	485	388	310
						Fz	0.0160	0.0272	0.0340	0.0409	0.0478	0.0531	0.0599
						Feed (mm/min)	103	132	132	132	116	103	93
		 Slot	1	≤ 1	20 (16-24)	RPM	1050	788	630	525	394	315	252
						Fz	0.0160	0.0272	0.0340	0.0409	0.0478	0.0531	0.0599
						Feed (mm/min)	84	107	107	107	94	84	75
	SUPER ALLOYS (NICKEL , COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	 Profile	≤ 0.5	≤ 1.5	19 (15-23)	RPM	1002	751	601	501	376	301	240
						Fz	0.0112	0.0192	0.0239	0.0284	0.0333	0.0371	0.0420
						Feed (mm/min)	56	72	72	71	63	56	50
		 Slot	1	≤ 1	15 (12-18)	RPM	808	606	485	404	303	242	194
						Fz	0.0112	0.0192	0.0239	0.0284	0.0333	0.0371	0.0420
						Feed (mm/min)	45	58	58	57	50	45	41
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	 Profile	≤ 0.5	≤ 1.5	66 (52-79)	RPM	3474	2605	2084	1737	1303	1042	834
						Fz	0.019	0.032	0.040	0.048	0.056	0.064	0.070
						Feed (mm/min)	333	417	417	417	367	333	292
		 Slot	1	≤ 1	52 (41-62)	RPM	2747	2060	1648	1373	1030	824	659
						Fz	0.019	0.032	0.040	0.048	0.056	0.064	0.070
						Feed (mm/min)	264	330	330	330	290	264	231
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	 Profile	≤ 0.5	≤ 1.5	23 (18-27)	RPM	1212	909	727	606	454	364	291
						Fz	0.019	0.032	0.040	0.048	0.056	0.064	0.071
						Feed (mm/min)	116	145	145	145	128	116	103
		 Slot	1	≤ 1	18 (15-22)	RPM	969	727	582	485	364	291	233
						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
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	 Profile	≤ 0.5	≤ 1.5	56 (45-68)	RPM	2989	2242	1793	1495	1121	897	717
						Fz	0.017	0.030	0.037	0.043	0.051	0.059	0.065
						Feed (mm/min)	251	335	335	323	287	263	233
		 Slot	1	≤ 1	44 (35-53)	RPM	2343	1757	1406	1171	879	703	562
						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

Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 1000) / (DC 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 DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



FRACTIONAL

Z-Carb-AP



Z1PCR

FRACTIONAL SERIES

TOLERANCES (inch)

<1/8 DIAMETER

DC = +0.0005/-0.0005

DCON = h₆

RE = +0.000/-0.0010

1/8-1/4 DIAMETER

DC = +0.000/-0.0012

DCON = h₆

RE = +0.000/-0.0020

>1/4-3/8 DIAMETER

DC = +0.000/-0.0016

DCON = h₆

RE = +0.000/-0.0020

>3/8-1 DIAMETER

DC = +0.000/-0.0020

DCON = h₆

RE = +0.000/-0.0020

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent
information visit
www.ksptpatents.com

CUTTING DIAMETER DC	LENGTH OF CUT APMX	inch			EDP NO.		
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	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	—
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

*Variable flute spacing. Helix and rake do not vary.

continued on next page

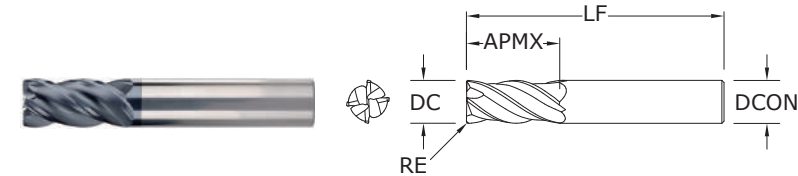
FRACTIONAL
Z-Carb-AP



FRACTIONAL
Z-Carb-AP

Z1PCR
FRACTIONAL SERIES

CONTINUED



inch						EDP NO.		
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT	JetStream	
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	

TOLERANCES (inch)

<1/8 DIAMETER
DC = +0.0005/−0.0005
DCON = h₆
RE = +0.000/−0.0010

1/8–1/4 DIAMETER
DC = +0.000/−0.0012
DCON = h₆
RE = +0.000/−0.0020

>1/4–3/8 DIAMETER
DC = +0.000/−0.0016
DCON = h₆
RE = +0.000/−0.0020

>3/8–1 DIAMETER
DC = +0.000/−0.0020
DCON = h₆
RE = +0.000/−0.0020

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGHTEMP ALLOYS
- TITANIUM
- HARDENED STEELS

For patent information visit
www.ksptpatents.com

TOLERANCES (inch)

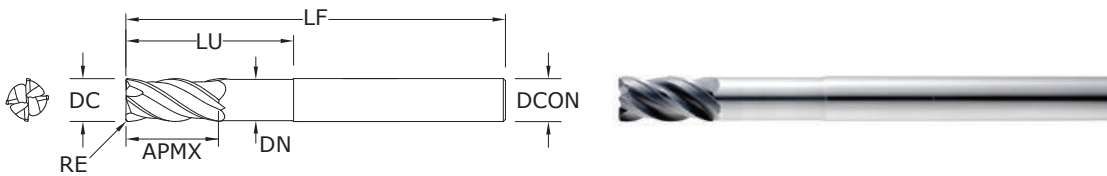
1/4 DIAMETER
DC = +0.0000/−0.0012
DCON = h₆
RE = +0.000/−0.005

>1/4–3/8 DIAMETER
DC = +0.0000/−0.0016
DCON = h₆
RE = +0.000/−0.005

>3/8–1 DIAMETER
DC = +0.0000/−0.0020
DCON = h₆
RE = +0.000/−0.005

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGHTEMP ALLOYS
- TITANIUM
- HARDENED STEELS

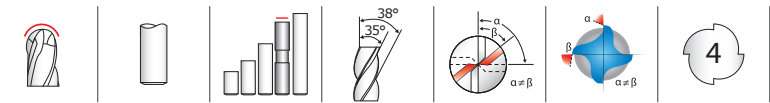
For patent information visit
www.ksptpatents.com



Z1PLC
FRACTIONAL SERIES

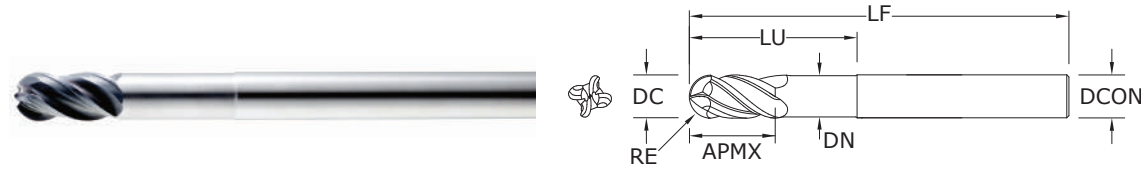
inch							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	Ti-NAMITE-X
1/4	1/2	2-1/2	1/4	1-1/8	.230	.020	36447
1/4	1/2	3-1/2	1/4	1-5/8	.230	.020	36448
1/4	1/2	4	1/4	1-1/4	.230	.020	36450
1/4	1/2	4	1/4	2-1/8	.230	.020	36449
5/16	13/16	3	5/16	1-3/8	.293	.020	36453
5/16	13/16	4	5/16	2	.293	.020	36454
5/16	13/16	4	5/16	1-5/8	.293	.020	36452
3/8	7/8	3	3/8	1-5/8	.355	.020	36457
3/8	7/8	5	3/8	1-7/8	.355	.020	36456
3/8	7/8	4	3/8	2-3/8	.355	.020	36458
7/16	1	6	7/16	2	.418	.020	36460
1/2	1	4	1/2	2	.480	.030	36463
1/2	1	5	1/2	3	.480	.030	36464
1/2	1	6	1/2	2-1/4	.480	.030	36462
9/16	1-1/8	6	9/16	2-1/2	.543	.030	36466
5/8	1-1/4	5	5/8	2-1/2	.605	.040	36468
5/8	1-1/4	6	5/8	3-3/4	.605	.040	36469
5/8	1-1/4	6	5/8	3	.605	.040	36470
3/4	1-1/2	6	3/4	3-1/2	.730	.040	36472
1	1-1/2	6	1	3	.980	.040	36475
1	1-1/2	6	1	4	.980	.040	36474

- Variable rake geometry alters and controls the cutting dynamic taking chatter suppression to an unprecedented level
- Unequal flute spacing 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)



Z1PLB
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
- 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)



inch						EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	Ti-NAMITE-X
1/4	1/2	4	1/4	1-1/4	.230	36480
5/16	13/16	4	5/16	1-5/8	.293	36482
3/8	7/8	5	3/8	1-7/8	.355	36486
7/16	1	6	7/16	2	.418	38490
1/2	1	6	1/2	2-1/4	.480	38492
9/16	1-1/8	6	9/16	2-1/2	.543	38496
5/8	1-1/4	6	5/8	3	.605	36500
3/4	1-1/2	6	3/4	3-1/2	.730	36502
1	1-1/2	6	1	4	.980	36504

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (inch)

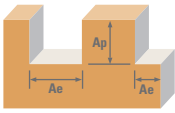
1/4 DIAMETER
DC = +0.0000/-0.0012
DCON = h_6
RE = +0.0000/-0.0006

>1/4-3/8 DIAMETER
DC = +0.0000/-0.0016
DCON = h_6
RE = +0.0000/-0.0008

>3/8-1 DIAMETER
DC = +0.0000/-0.0020
DCON = h_6
RE = +0.0000/-0.0010

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

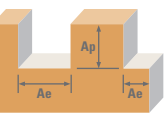
For patent information visit www.ksptpatents.com



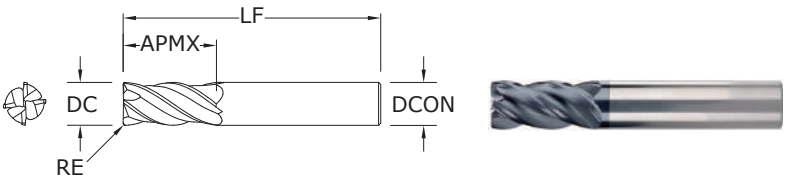
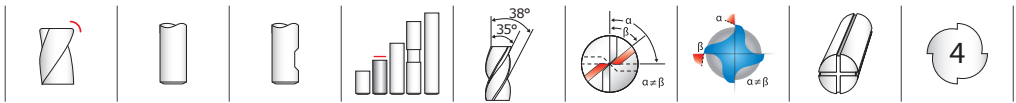
Series Z1, Z16CR, Z1PCR, Z1PLC, Z1PLB Fractional							DC • in								
Hardness		Ae x DC	Ap x DC	Vc (sfm)		1/64	1/8	1/4	3/8	1/2	5/8	3/4	1		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 0.5	≤ 1.5	555	RPM	135904	16961	8480	5654	4240	3392	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	
		≤ 28 HRc	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	
		≤ 40 HRc	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	
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	
		≤ 28 HRc	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	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ 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	
		≤ 28 HRc	Slot 	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	Profile 	≤ 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		
	≤ 35 HRc	Slot 	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		
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	
		≤ 19 HRc	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	

continued on next page

FRACTIONAL
Z-Carb-AP

Series Z1, Z16CR, Z1PCR, Z1PLC, Z1PLB Fractional	Hardness			Vc (sfm)	DC • in									
		Ae x DC	Ap x DC		1/64	1/8	1/4	3/8	1/2	5/8	3/4	1		
K 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	
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400 SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 300 Bhn or ≤ 32 HRC ≤ 400 Bhn or ≤ 43 HRC ≤ 350 Bhn or ≤ 38 HRC	 Profile	≤ 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	
		 Slot	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	
		 Profile	≤ 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	
		 Slot	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	
		 Profile	≤ 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	
		 Slot	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	
 Profile	≤ 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			
 Slot	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			
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	

Bhn (Brinell) HRc (Rockwell C)
rpm = Vc x 3.82 / DC
ipm = Fz x 4 x rpm
maximum Slotting Ap for Z1PCR <1/8 diameter and all Z1PLC / Z1PLB is .25 x DC
maximum Profile Ae for Z1PCR <1/8 diameter and all Z1PLC / Z1PLB is .20 x DC
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



Z1MPCR
METRIC SERIES

TOLERANCES (mm)

<3 DIAMETER
DC = +0,012/-0,012
DCON = hg
RE = +0,000/-0,025

3-6 DIAMETER
DC = +0,000/-0,030
DCON = hg
RE = +0,000/-0,050

>6-10 DIAMETER
DC = +0,000/-0,040
DCON = hg
RE = +0,000/-0,050

>10-25 DIAMETER
DC = +0,000/-0,050
DCON = hg
RE = +0,000/-0,050

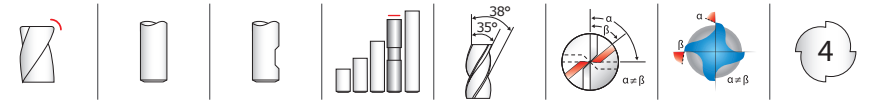
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

For patent
information visit
www.ksptpatents.com

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

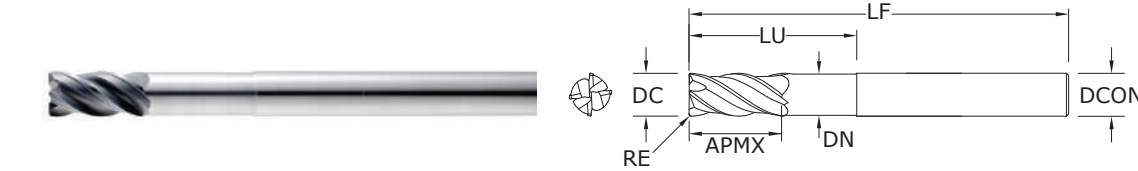
*Variable flute spacing. Helix and rake do not vary.

METRIC
Z-Carb-AP



Z1MPIC •
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)



mm							EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT
6,0	8,0	75,0	6,0	24,0	5,49	0,5	46821	—
8,0	10,0	75,0	8,0	32,0	7,49	1,0	46822	—
8,0	10,0	75,0	8,0	32,0	7,49	2,0	46823	—
10,0	12,0	100,0	10,0	40,0	9,50	1,0	46824	—
10,0	12,0	100,0	10,0	40,0	9,50	2,0	46825	—
12,0	15,0	100,0	12,0	48,0	11,48	1,0	46826	46928
12,0	15,0	100,0	12,0	48,0	11,48	1,5	46827	46929
12,0	15,0	100,0	12,0	48,0	11,48	2,0	46828	46930
12,0	15,0	100,0	12,0	48,0	11,48	3,0	46829	46931
12,0	26,0	83,0	12,0	36,0	11,48	2,5	—	42731
12,0	26,0	83,0	12,0	36,0	11,48	3,0	—	42732
12,0	26,0	83,0	12,0	36,0	11,48	4,0	—	42733
16,0	32,0	92,0	16,0	42,0	15,49	2,5	—	42734
16,0	32,0	92,0	16,0	42,0	15,49	4,0	—	42735
16,0	32,0	92,0	16,0	42,0	15,49	6,0	—	42736
16,0	20,0	115,0	16,0	65,0	15,49	1,0	46830	46932
16,0	20,0	115,0	16,0	65,0	15,49	1,5	46831	46933
16,0	20,0	115,0	16,0	65,0	15,49	2,0	46832	46934
16,0	20,0	115,0	16,0	65,0	15,49	3,0	46833	46935
16,0	20,0	115,0	16,0	65,0	15,49	4,0	46834	46936
16,0	20,0	115,0	16,0	65,0	15,49	5,0	46835	46937
20,0	24,0	140,0	20,0	80,0	19,48	1,0	46836	46938
20,0	24,0	140,0	20,0	80,0	19,48	1,5	46837	46939
20,0	24,0	140,0	20,0	80,0	19,48	2,0	46838	46940
20,0	24,0	140,0	20,0	80,0	19,48	3,0	46839	46941
20,0	24,0	140,0	20,0	80,0	19,48	4,0	46840	46942
20,0	24,0	140,0	20,0	80,0	19,48	5,0	46841	46943
20,0	38,0	104,0	20,0	52,0	19,48	2,5	—	42737
20,0	38,0	104,0	20,0	52,0	19,48	4,0	—	42738
20,0	38,0	104,0	20,0	52,0	19,48	6,0	—	42739

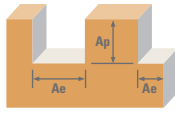
TOLERANCES (mm)

- 6 DIAMETER**
DC = +0,000/−0,030
DCON = h₆
RE = +0,000/−0,050
- >6–10 DIAMETER**
DC = +0,000/−0,040
DCON = h₆
RE = +0,000/−0,050
- >10–20 DIAMETER**
DC = +0,000/−0,050
DCON = h₆
RE = +0,000/−0,050

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

For patent information visit www.ksptpatents.com

METRIC
Z-Carb-AP

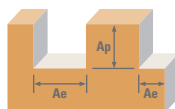


Series Z1M, Z1MPCR, Z1MPIC, Z1MPLC Metric							DC • mm									
Hardness		Ae x DC	Ap x DC	Vc (m/min)		1	3	6	8	10	12	16	20	25		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	Profile 	≤ 0.5	≤ 1.5	169	RPM	53803	17934	8967	6725	5380	4484	3363	2690	2152	
					(135-203)	Fz	0.0030	0.0109	0.029	0.049	0.061	0.074	0.087	0.099	0.108	
					Feed (mm/min)	646	782	1040	1318	1313	1327	1170	1065	930		
		Slot 	1	≤ 1	134	RPM	42654	14218	7109	5332	4265	3555	2666	2133	1706	
					(107-161)	Fz	0.0030	0.0109	0.029	0.049	0.061	0.074	0.087	0.099	0.108	
					Feed (mm/min)	512	620	825	1045	1041	1052	928	845	737		
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	Profile 	≤ 375 Bhn or ≤ 40 HRC	≤ 0.5	≤ 1.5	96	RPM	30537	10179	5089	3817	3054	2545	1909	1527	1221
						(77-115)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	281	330	448	550	550	560	511	458	391	
		Slot 	1	≤ 1	76	RPM	24235	8078	4039	3029	2424	2020	1515	1212	969	
(61-91)					Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080		
Feed (mm/min)					223	262	355	436	436	444	406	364	310			
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	Profile 	≤ 0.5	≤ 1.5	149	RPM	47501	15834	7917	5938	4750	3958	2969	2375	1900	
					(119-179)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080	
					Feed (mm/min)	437	513	697	855	855	871	796	713	608		
		Slot 	1	≤ 1	119	RPM	37807	12602	6301	4726	3781	3151	2363	1890	1512	
					(95-143)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080	
					Feed (mm/min)	348	408	555	681	681	693	633	567	484		
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	Profile 	≤ 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
						Feed (mm/min)	237	281	374	494	488	472	420	389	332	
		Slot 	1	≤ 1	82	RPM	26174	8725	4362	3272	2617	2181	1636	1309	1047	
(66-99)					Fz	0.0018	0.0064	0.017	0.030	0.037	0.043	0.051	0.059	0.063		
Feed (mm/min)					188	223	297	393	387	375	334	309	264			
STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	Profile 	≤ 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	
					Feed (mm/min)	216	256	341	451	445	431	383	355	303		
	Slot 	1	≤ 1	76	RPM	24235	8078	4039	3029	2424	2020	1515	1212	969		
				(61-91)	Fz	0.0018	0.0064	0.017	0.030	0.037	0.043	0.051	0.059	0.063		
				Feed (mm/min)	174	207	275	364	359	347	309	286	244			
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	Profile 	≤ 0.5	≤ 1.5	136	RPM	43139	14380	7190	5392	4314	3595	2696	2157	1726	
					(109-163)	Fz	0.0028	0.0099	0.026	0.045	0.056	0.067	0.079	0.091	0.098	
					Feed (mm/min)	483	569	748	971	966	963	852	785	676		
		Slot 	1	≤ 1	108	RPM	34414	11471	5736	4302	3441	2868	2151	1721	1377	
					(87-130)	Fz	0.0028	0.0099	0.026	0.045	0.056	0.067	0.079	0.091	0.098	
					Feed (mm/min)	385	454	597	774	771	769	680	626	540		

continued on next page

METRIC

Z-Carb-AP

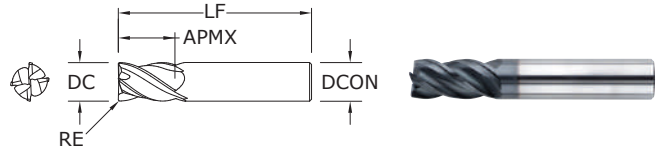
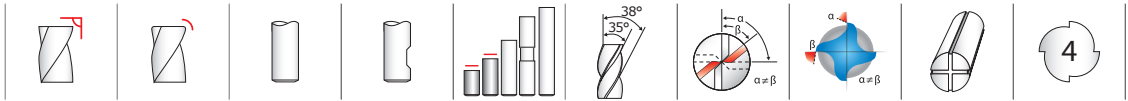
Series Z1M, Z1MPCR, Z1MPC, Z1MPLC Metric		Hardness			Vc (m/min)	DC • mm										
			Ae x DC	Ap x DC		1	3	6	8	10	12	16	20	25		
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc		≤ 0.5	≤ 1.5	104	RPM	32960	10987	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.0020	0.0074	0.020	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	≤ 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	
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
						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
						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
						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
						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	
					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	
					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	
					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	
					Feed (mm/min)	47	55	74	93	93	93	81	74	65		
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc		≤ 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	≤ 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	

Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fz x 4 x rpm
maximum Slotting Ap for Z1PCR <3mm diameter and all Z1MPLC / Z1MPLB is .25 x DC
maximum Profile Ae for Z1PCR <3mm diameter and all Z1MPLC / Z1MPLB is .20 x DC
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



FRACTIONAL

Z-Carb



Z1-Z16CR

FRACTIONAL SERIES

TOLERANCES (inch)

1/8-1/4 DIAMETER
DC = +0.0000/-0.0012
DCON = h₆
RE = +0.000/-0.002

>1/4-3/8 DIAMETER
DC = +0.0000/-0.0016
DCON = h₆
RE = +0.000/-0.002

>3/8-3/4 DIAMETER
DC = +0.0000/-0.0020
DCON = h₆
RE = +0.000/-0.002

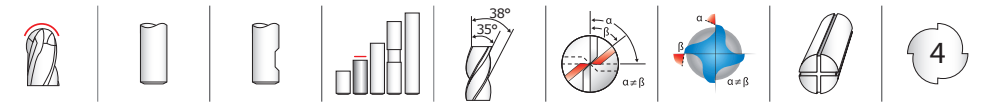
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

For patent information visit
www.ksptpatents.com

inch					EDP NO.		
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT	JetStream
1/8	1/4	1-1/2	1/8	.015	36505	—	—
1/8	3/8	1-1/2	1/8	—	36404	—	—
5/32	5/16	2	3/16	.015	36506	—	—
5/32	7/16	2	3/16	—	36406	—	—
3/16	3/8	2	3/16	.015	36507	—	—
3/16	7/16	2	3/16	—	36408	—	—
7/32	3/8	2	1/4	.020	36508	—	—
1/4	1/2	2-1/2	1/4	—	36416	—	—
1/4	7/16	2	1/4	.020	36509	—	—
1/4	3/4	2-1/2	1/4	—	36596	—	—
9/32	5/8	2-1/2	5/16	—	36418	—	—
5/16	1/2	2	5/16	.020	36511	—	—
5/16	13/16	2-1/2	5/16	—	36420	—	—
11/32	13/16	2-1/2	3/8	—	36422	—	—
3/8	5/8	2	3/8	.020	36513	—	—
3/8	7/8	2-1/2	3/8	—	36424	36530	—
13/32	15/16	2-3/4	7/16	—	36426	36531	—
7/16	5/8	2-1/2	7/16	.020	36515	—	—
7/16	1	2-3/4	7/16	—	36428	36532	—
15/32	1	3	1/2	—	36430	36533	—
1/2	5/8	2-1/2	1/2	.030	36517	—	—
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	3/4	3	5/8	.040	36519	—	—
5/8	1-1/4	3-1/2	5/8	—	36440	36536	36828
3/4	1	3	3/4	.040	36520	—	—
3/4	1-1/2	4	3/4	—	36442	36537	36829
1	1-1/2	4	1	—	36444	36538	36830

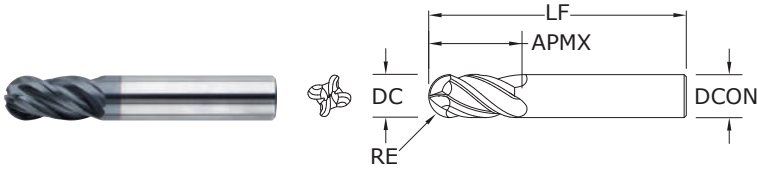
Refer to page 43 for speed & feed recommendations

- Variable rake geometry alters and controls the cutting dynamic taking chatter suppression to an unprecedented level
- Unequal helix design reduces 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
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



Z1B
FRACTIONAL SERIES

- Unequal helix design reduces 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
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



inch				EDP NO.		
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

RE = 1/2 Cutting Diameter (DC)



TOLERANCES (inch)

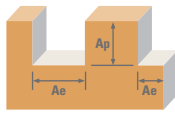
1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h₆
RE = +0.0000/–0.0006

>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h₆
RE = +0.0000/–0.0008

>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h₆
RE = +0.0000/–0.0010

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

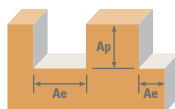
For patent information visit www.ksptpatents.com



Series Z1B Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in						
							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	555 (444-666)	RPM	16961	8480	5654	4240	3392	2827	2120
						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
		 Slot	1	≤ 1	440 (352-528)	RPM	13446	6723	4482	3362	2689	2241	1681
						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	 Profile	≤ 0.5	≤ 1.5	315 (252-378)	RPM	9626	4813	3209	2407	1925	1604	1203
						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
		 Slot	1	≤ 1	250 (200-300)	RPM	7640	3820	2547	1910	1528	1273	955
						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
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	 Profile	≤ 0.5	≤ 1.5	490 (392-588)	RPM	14974	7487	4991	3744	2995	2496	1872
						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
		 Slot	1	≤ 1	390 (312-468)	RPM	11918	5959	3973	2980	2384	1986	1490
						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
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	 Profile	≤ 0.5	≤ 1.5	340 (272-408)	RPM	10390	5195	3463	2598	2078	1732	1299
						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
		 Slot	1	≤ 1	270 (216-324)	RPM	8251	4126	2750	2063	1650	1375	1031
						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	 Profile	≤ 0.5	≤ 1.5	310 (248-372)	RPM	9474	4737	3158	2368	1895	1579	1184	
					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	
	 Slot	1	≤ 1	250 (200-300)	RPM	7640	3820	2547	1910	1528	1273	955	
					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	
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	 Profile	≤ 0.5	≤ 1.5	445 (356-534)	RPM	13599	6800	4533	3400	2720	2267	1700
						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
		 Slot	1	≤ 1	355 (284-426)	RPM	10849	5424	3616	2712	2170	1808	1356
						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

continued on next page

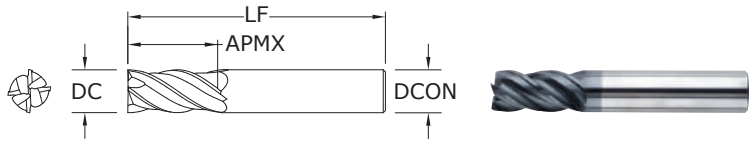
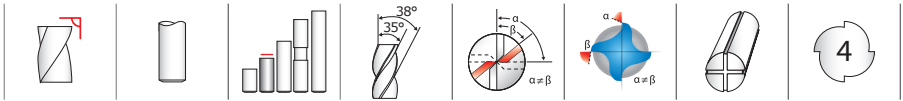
FRACTIONAL
Z-Carb

Series Z1B	Fractional	Hardness			Vc (sfm)	DC • in								
			Ae x DC	Ap x DC		1/8	1/4	3/8	1/2	5/8	3/4	1		
K	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	
			 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	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRC	 Profile	≤ 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	
			 Slot	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, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRC	 Profile	≤ 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	
			 Slot	1	≤ 1	50	RPM	1497	749	499	374	299	250	187
						(40-60)	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	 Profile	≤ 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		
		 Slot	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	 Profile	≤ 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		
		 Slot	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		
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	
			 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	

Bhn (Brinell) HRc (Rockwell C)
rpm = Vc x 3.82 / DC
ipm = Fz x 4 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



METRIC
Z-Carb



Z1M
METRIC SERIES

mm				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	Ti-NAMITE-X (TX)	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

Refer to page 47 for speed & feed recommendations

- Variable rake geometry alters and controls the cutting dynamic taking chatter suppression to an unprecedented level
- Unequal helix design reduces 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
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

TOLERANCES (mm)

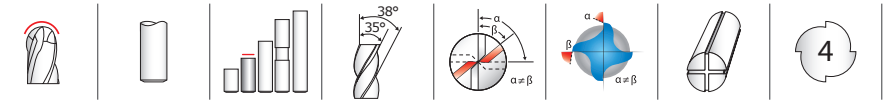
3–6 DIAMETER
DC = +0,000/–0,030
DCON = h₆

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h₆

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h₆

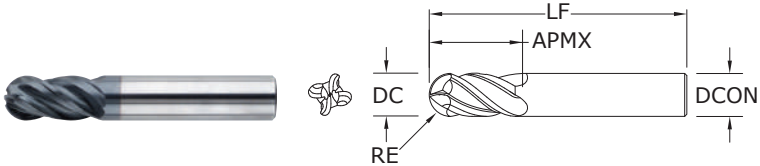
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGHTEMP ALLOYS
- TITANIUM
- HARDENED STEELS

For patent
information visit
www.ksptpatents.com



Z1MB
METRIC SERIES

- Unequal helix design reduces 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
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



mm				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

RE = 1/2 Cutting Diameter (DC)



TOLERANCES (mm)

3–6 DIAMETER
DC = +0,000/–0,030
DCON = h₆

RE = +0,000/–0,015

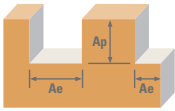
>6–10 DIAMETER
DC = +0,000/–0,040

DCON = h₆
RE = +0,000/–0,020

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h₆
RE = +0,000/–0,025

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

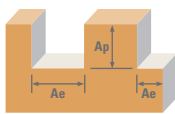
For patent information visit www.ksptpatents.com



Series Z1MB Metric	Hardness			Vc (m/min)	DC • mm										
		Ae x DC	Ap x DC		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		≤ 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	
			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		≤ 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	
			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		
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRC		≤ 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	
			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		
	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	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	
			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		≤ 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		
		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			
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRC		≤ 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	
			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		

continued on next page

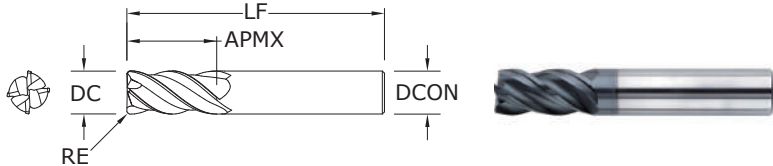
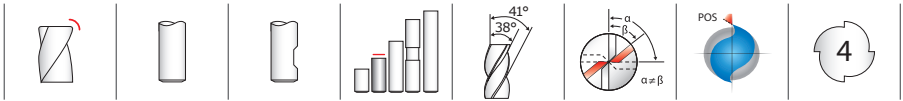
METRIC
Z-Carb

Series Z1MB Metric	Hardness			Vc (m/min)	DC • mm										
		Ae x DC	Ap x DC		3	6	8	10	12	16	20	25			
K 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	
		 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	
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	
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	
		 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	

Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fz x 4 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



FRACTIONAL
Z-Carb-HTA



ZH1CR
FRACTIONAL SERIES

TOLERANCES (inch)

1/4 DIAMETER
DC = +0.0000/-0.0012
DCON = h₆
RE = +0.0000/-0.0020

>1/4-3/8 DIAMETER
DC = +0.0000/-0.0016
DCON = h₆
RE = +0.0000/-0.0020

>3/8-1 DIAMETER
DC = +0.0000/-0.0020
DCON = h₆
RE = +0.0000/-0.0020

HIGH TEMP ALLOYS

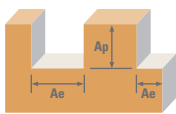
TITANIUM

For patent
information visit
www.ksptpatents.com

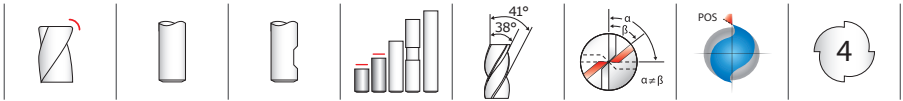
CUTTING DIAMETER DC	LENGTH OF CUT APMX	inch			EDP NO.	
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	Ti-NAMITE-A (AITiN)	Ti-NAMITE-A (AITiN) W/FLAT
1/4	1/2	2-1/2	1/4	.020	36570	—
1/4	3/4	2-1/2	1/4	.020	36616	—
5/16	13/16	2-1/2	5/16	.020	36571	—
3/8	7/8	2-1/2	3/8	.020	36572	36555
7/16	1	2-3/4	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

- The original Z-Carb design with an enhanced core and higher helix suited for the demands of high temperature alloys
- 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)

FRACTIONAL
Z-Carb-HTA

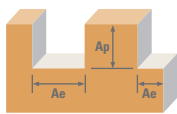
Series ZH1CR Fractional	Hardness			Vc (sfm)	Diameter (DC) (inch)						
		Ae x DC	Ap x DC		1/4	3/8	1/2	3/4	1		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	 Profile	≤ 0.5	≤ 1.5	85	RPM	1299	866	649	433	325
					(68-102)	Fz	0.0007	0.0012	0.0017	0.0020	0.0023
						Feed (ipm)	3.6	4.2	4.4	3.5	3.0
		 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
						Feed (ipm)	2.1	2.6	2.6	2.0	1.7
		 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
						Feed (ipm)	10.5	13.1	13.1	10.5	9.2
		 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
						Feed (ipm)	3.7	4.6	4.6	3.7	3.2
		 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 / DC
ipm = Fz x 4 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



METRIC

Z-Carb-HTA

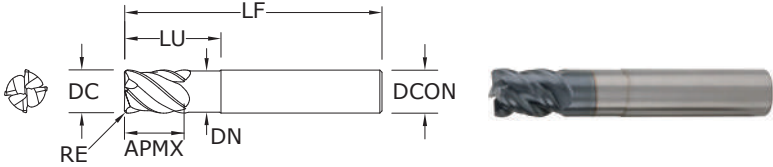
Series ZH1MCRS, ZH1MCR Metric	Hardness			Vc (m/min)	DC • mm					
		Ae x DC	Ap x DC		6	10	12	20		
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	 Profile	≤ 0.5	≤ 1.5	26	RPM	1373	824	687	412
					(21-31)	Fz	0.017	0.032	0.041	0.053
					Feed (mm/min)	93	105	113	87	
		 Slot	1	≤ 1	21	RPM	1131	679	565	339
					(17-26)	Fz	0.017	0.032	0.041	0.053
					Feed (mm/min)	77	87	93	72	
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	 Profile	≤ 0.5	≤ 1.5	21	RPM	1131	679	565	339
					(17-26)	Fz	0.012	0.024	0.029	0.037
					Feed (mm/min)	54	65	66	50	
		 Slot	1	≤ 1	17	RPM	889	533	444	267
					(13-20)	Fz	0.012	0.024	0.029	0.037
					Feed (mm/min)	43	51	52	39	
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
					Feed (mm/min)	264	342	340	238	
		 Slot	1	≤ 1	52	RPM	2747	1648	1373	824
					(41-62)	Fz	0.019	0.041	0.049	0.057
					Feed (mm/min)	209	270	269	188	
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	 Profile	≤ 0.5	≤ 1.5	23	RPM	1212	727	606	364
					(18-27)	Fz	0.019	0.041	0.049	0.057
					Feed (mm/min)	92	119	119	83	
		 Slot	1	≤ 1	18	RPM	969	582	485	291
					(15-22)	Fz	0.019	0.041	0.049	0.057
					Feed (mm/min)	74	95	95	66	

Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 1000) / (DC 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 DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



FRACTIONAL & METRIC

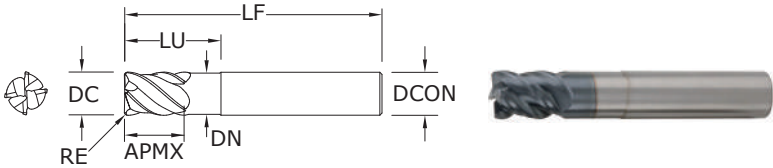
Z-Carb-MD



ZD1CR

FRACTIONAL SERIES

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	inch			CORNER RADIUS RE	EDP NO.
			SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN		
1/8	5/32	2-1/2	1/4	1/2	.110	.010	36780
3/16	7/32	2-1/2	1/4	3/4	.172	.020	36781
1/4	9/32	2-1/2	1/4	3/4	.235	.020	36782
5/16	13/32	2-1/2	5/16	1	.297	.040	36783
3/8	15/32	2-1/2	3/8	1	.360	.040	36784
7/16	9/16	2-3/4	7/16	1	.422	.040	36785
1/2	5/8	3	1/2	1-1/4	.485	.040	36786
1/2	5/8	4-1/2	1/2	2-1/4	.485	.040	36787
5/8	3/4	3-1/2	5/8	1-1/2	.610	.040	36788
5/8	3/4	4-1/2	5/8	2-1/4	.610	.040	36789
5/8	3/4	5-1/2	5/8	3-1/4	.610	.040	36790
3/4	15/16	4	3/4	1-3/4	.735	.060	36791
3/4	15/16	4-1/2	3/4	2-1/4	.735	.060	36792
3/4	15/16	5-1/2	3/4	3-1/4	.735	.060	36793



ZD1MCR

METRIC SERIES

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	mm			CORNER RADIUS RE	EDP NO.
			SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN		
3,0	4,0	57,0	6,0	15,0	2,62	0,2	46560
4,0	5,0	57,0	6,0	15,0	3,61	0,3	46561
5,0	6,0	57,0	6,0	15,0	4,60	0,5	46562
6,0	7,0	57,0	6,0	15,0	5,61	1,0	46563
8,0	10,0	63,0	8,0	25,0	7,62	1,0	46564
10,0	12,0	72,0	10,0	30,0	9,60	1,0	46565
12,0	15,0	83,0	12,0	35,0	11,61	1,0	46566
16,0	20,0	92,0	16,0	45,0	15,60	1,5	46567
20,0	24,0	104,0	20,0	55,0	19,61	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 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)

TOLERANCES (inch)

1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h₆
RE = +0.0000/–0.0020

>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h₆
RE = +0.0000/–0.0020

>3/8–3/4 DIAMETER
DC = +0.0000/–0.0020
DCON = h₆
RE = +0.0000/–0.0020

HARDENED STEELS

For patent
information visit
www.ksptpatents.com

TOLERANCES (mm)

3–6 DIAMETER
DC = +0,000/–0,030
DCON = h₆
RE = +0,000/–0,050

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h₆
RE = +0,000/–0,050

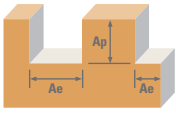
>10–20 DIAMETER
DC = +0,000/–0,050
DCON = h₆
RE = +0,000/–0,050

HARDENED STEELS

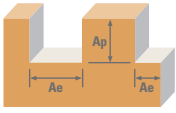
For patent
information visit
www.ksptpatents.com

FRACTIONAL & METRIC

Z-Carb-MD

Series ZD1CR Fractional	Hardness				Vc (sfm)	Diameter (DC) (inch)							
		Ae x DC	Ap x DC			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 / DC
ipm = Fz x 4 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

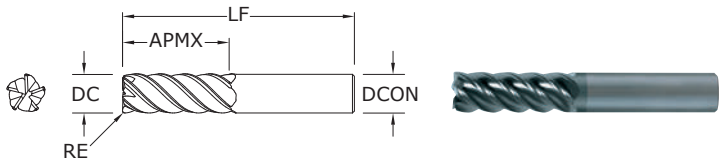
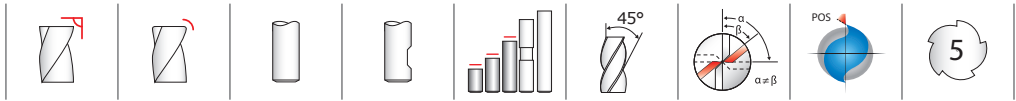
Series ZD1MCR Metric	Hardness			Vc (m/min)	Diameter (DC) (mm)								
		Ae x DC	Ap x DC		3	6	8	10	12	16	20		
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRC	Profile	≤ 0.4	≤ 1	123	RPM	13087	6544	4908	3926	3272	2454	1963
					(99-148)	Fz	0.012	0.029	0.049	0.061	0.072	0.083	0.112
					Feed (mm/min)	628	754	963	963	942	817	879	
					98	RPM	10340	5170	3878	3102	2585	1939	1551
						(78-117)	Fz	0.012	0.029	0.049	0.061	0.072	0.083
		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	
					52	RPM	5493	2747	2060	1648	1373	1030	824
						(41-62)	Fz	0.010	0.024	0.041	0.051	0.060	0.068
		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	
					21	RPM	2262	1131	848	679	565	424	339
						(17-26)	Fz	0.005	0.012	0.021	0.027	0.031	0.036
		Feed (mm/min)				43	54	72	72	71	62	65	

Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 1000) / (DC 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 DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



FRACTIONAL

V-Carb



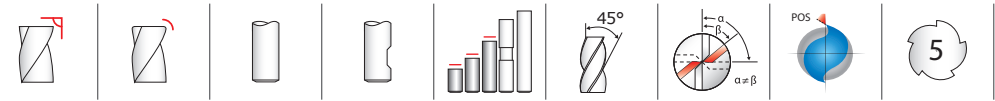
55 •
55CR
FRACTIONAL SERIES

CUTTING DIAMETER DC	LENGTH OF CUT APMX	inch			EDP NO.	
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	Ti-NAMITE-A (AITiN)	Ti-NAMITE-A (AITiN) W/FLAT
1/8	1/4	1-1/2	1/8	—	32672	—
1/8	1/4	1-1/2	1/8	.010	32606	—
1/8	1/2	1-1/2	1/8	—	32655	—
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	—	32656	—
5/32	9/16	2	3/16	.010	32609	—
3/16	5/16	2	3/16	—	32673	—
3/16	5/16	2	3/16	.010	32610	—
3/16	5/8	2	3/16	—	32657	—
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	—
7/32	3/4	2-1/2	1/4	—	32658	—
1/4	3/8	2	1/4	.015	32614	—
1/4	3/8	2	1/4	—	32674	—
1/4	3/4	2-1/2	1/4	—	32659	—
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	—	32675	—
5/16	7/16	2	5/16	.015	32619	—
5/16	13/16	2-1/2	5/16	—	32660	—
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	—	32676	32677
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	—	32661	32662
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	—

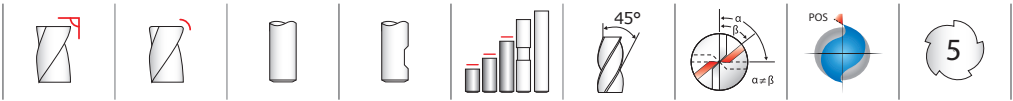
continued on next page

- 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)

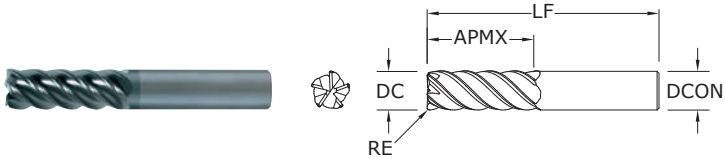
FRACTIONAL
V-Carb



METRIC
V-Carb



55 •
55CR
FRACTIONAL SERIES



CONTINUED

CUTTING DIAMETER DC	LENGTH OF CUT APMX	inch			EDP NO.	
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
7/16	1	2-3/4	7/16	—	32663	—
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	—	32678	32679
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	—	32664	32665
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	—	32680	32681
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	—	32666	32667
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	—	32668	32669
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	—	32670	32671
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)

DC = +0.0000/−0.0020
DCON = h₆
RE = +0.0000/−0.0020

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

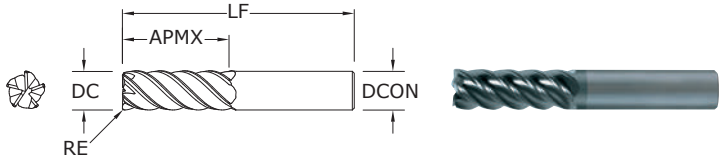
For patent information visit
www.ksptpatents.com

TOLERANCES (mm)

DC = +0,000/−0,050
DCON = h₆
RE = +0,000/−0,050

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

For patent information visit
www.ksptpatents.com

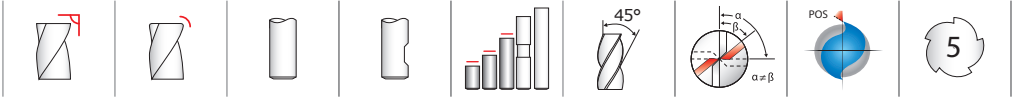
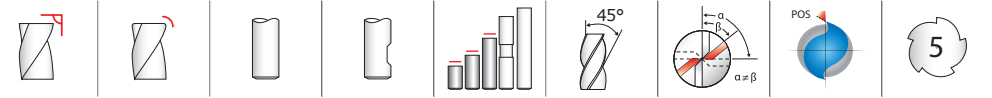


55M •
55MCR
METRIC SERIES

CUTTING DIAMETER DC	LENGTH OF CUT APMX	mm			EDP NO.	
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
6,0	12,0	50,0	6,0	—	42606	—
6,0	12,0	50,0	6,0	0,5	42660	—
6,0	19,0	63,0	6,0	—	42607	—
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	—	42608	—
6,0	25,0	75,0	6,0	0,5	42665	—
8,0	12,0	50,0	8,0	—	42609	—
8,0	12,0	50,0	8,0	0,5	42666	—
8,0	20,0	63,0	8,0	—	42610	—
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	—	42611	—
8,0	25,0	75,0	8,0	0,5	42671	—
10,0	16,0	50,0	10,0	—	42612	—
10,0	16,0	50,0	10,0	0,5	42672	—
10,0	22,0	75,0	10,0	—	42622	42613
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	—	42614	—
10,0	38,0	100,0	10,0	0,5	42678	—
12,0	19,0	63,0	12,0	—	42615	—
12,0	19,0	63,0	12,0	0,5	42679	—
12,0	25,0	75,0	12,0	—	42616	42623
12,0	25,0	75,0	12,0	0,5	42680	—

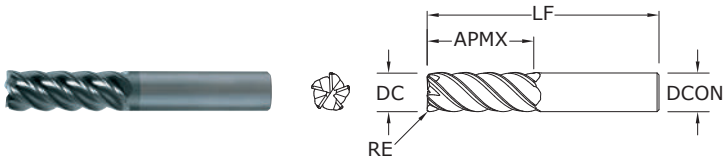
- Unequal indexing, high helix and an ideal rake and relief combination for unmatched finishing capability
- The choice when peak finish quality is the requirement
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

continued on next page



55M •
55MCR
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
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)

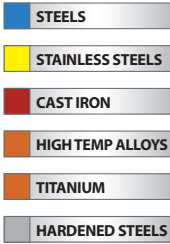


mm					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	Ti-NAMITE-A (AITiN)	Ti-NAMITE-A (AITiN) W/FLAT
12,0	25,0	75,0	12,0	1,0	42681	—
12,0	25,0	75,0	12,0	1,5	42682	—
12,0	25,0	75,0	12,0	2,0	42683	—
12,0	25,0	75,0	12,0	2,5	42684	—
12,0	25,0	75,0	12,0	3,0	42685	—
12,0	50,0	100,0	12,0	—	42617	—
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	—	42618	42624
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	—
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	—	42626	—
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	—	42619	—
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	—	42620	42625
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	—

continued on next page

TOLERANCES (mm)

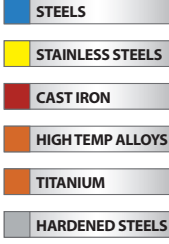
DC = +0,000/−0,050
DCON = h₆
RE = +0,000/−0,050



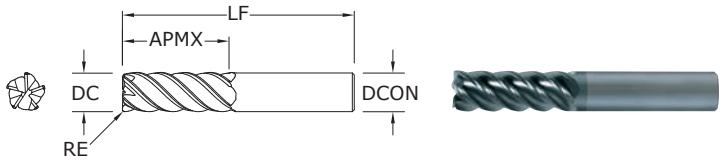
For patent information visit
www.ksptpatents.com

TOLERANCES (mm)

DC = +0,000/−0,050
DCON = h₆
RE = +0,000/−0,050



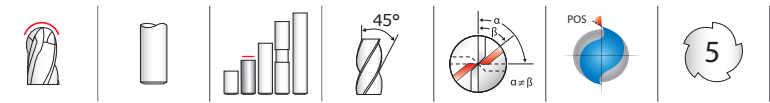
For patent information visit
www.ksptpatents.com



55M •
55MCR
METRIC SERIES

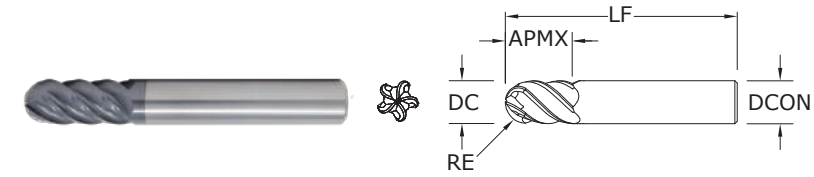
CONTINUED

mm					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	Ti-NAMITE-A (AITiN)	Ti-NAMITE-A (AITiN) W/FLAT
20,0	38,0	100,0	20,0	6,0	42648	—
20,0	50,0	100,0	20,0	—	42627	—
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	—	42621	—
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	—



55B
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
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



inch				EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (inch)

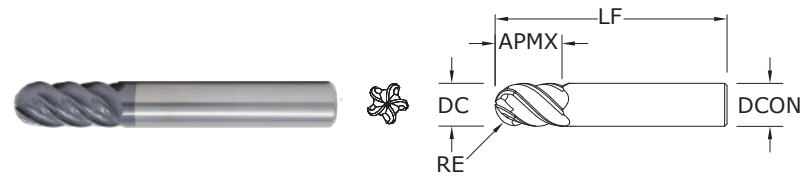
DC = +0.0000/-0.0020
DCON = h₆
RE = +0.0005/-0.0010

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

For patent information visit www.ksptpatents.com

55MB
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
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



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

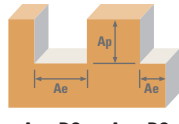
RE = 1/2 Cutting Diameter (DC)

TOLERANCES (mm)

DC = +0,000/-0,050
DCON = h₆
RE = +0,000/-0,025

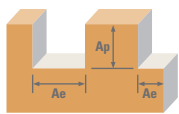
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

For patent information visit www.ksptpatents.com

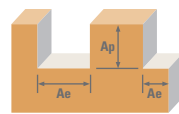


Series 55, 55CR, 55B Fractional							DC • in							
Hardness					Ae x DC Ap x DC		Vc (sfm)	1/8	1/4	3/8	1/2	5/8	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc		≤ 0.25	≤ 1.5	385	RPM	11766	5883	3922	2941	2353	1961	1471
						(308-462)	Fz	0.0004	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	
		≤ 28 HRc		≤ 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		≤ 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	
		≤ 40 HRc		≤ 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	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc		≤ 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	
		≤ 28 HRc		≤ 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	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc		≤ 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	
		≤ 28 HRc		≤ 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	≤ 325 Bhn or ≤ 35 HRc		≤ 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		
	≤ 35 HRc		≤ 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		
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc		≤ 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	
		≤ 19 HRc		≤ 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	

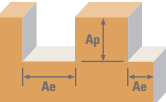
continued on next page

Series 55, 55CR, 55B Fractional		Hardness			Vc (sfm)	DC • in								
			Ae x DC	Ap x DC		1/8	1/4	3/8	1/2	5/8	3/4	1		
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRC		≤ 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
				≤ 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
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRC		≤ 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	≤ 400 Bhn or ≤ 43 HRC		≤ 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	≤ 350 Bhn or ≤ 38 HRC		≤ 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	≤ 440 Bhn or ≤ 47 HRC		≤ 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	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRC		≤ 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
				≤ 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

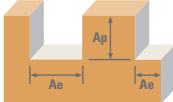
Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
rpm = Vc x 3.82 / DC
ipm = Fz x 5 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
reduce Ap to 1 x DC (maximum) when profile milling with long or extra long flute length tools
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Series 55M, 55MCR, 55MB Metric		Hardness			Vc (m/min)	DC • mm							
			Ae x DC	Ap x DC		6	8	10	12	16	20		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc		≤ 0.25	≤ 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	
		≤ 375 Bhn or ≤ 40 HRc		≤ 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	≤ 375 Bhn or ≤ 40 HRc		≤ 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	
		≤ 40 HRc		≤ 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	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc		≤ 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	
		≤ 375 Bhn or ≤ 40 HRc		≤ 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	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc		≤ 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	
		≤ 375 Bhn or ≤ 35 HRc		≤ 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		≤ 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	304	425	387	328	289	
		≤ 35 HRc		≤ 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	964	1285	1170	991	895	

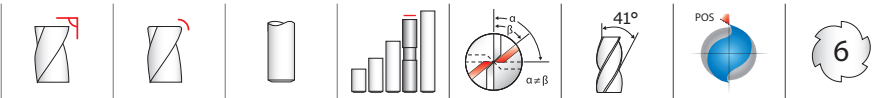
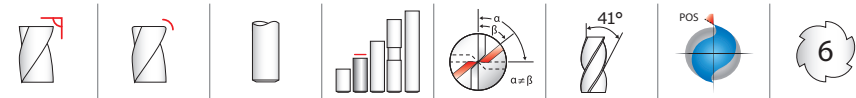
continued on next page

Series 55M, 55MCR, 55MB Metric		Hardness			Vc (m/min)	DC • mm							
			Ae x DC	Ap x DC		6	8	10	12	16	20		
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc		≤ 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	
		≤ 260 Bhn or ≤ 26 HRc		≤ 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	≤ 260 Bhn or ≤ 26 HRc		≤ 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	
		≤ 300 Bhn or ≤ 32 HRc		≤ 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	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc		≤ 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	90	127	115	98	86	
		≤ 400 Bhn or ≤ 43 HRc		≤ 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		≤ 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	
		≤ 400 Bhn or ≤ 43 HRc		≤ 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	

continued on next page

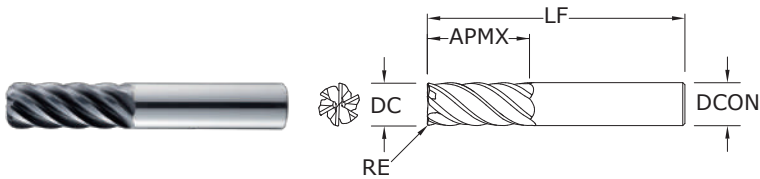
Series 55M, 55MCR, 55MB Metric					Vc (m/min)	DC • mm							
			Hardness	Ae x DC		Ap x DC	6	8	10	12	16	20	
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRC		≤ 0.25	≤ 1.5	72	RPM	3797	2848	2278	1898	1424	1139
						(57-86)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
						Feed (mm/min)	273	365	486	456	383	349	
		≤ 440 Bhn or ≤ 47 HRC		≤ 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	≤ 375 Bhn or ≤ 40 HRC		≤ 0.25	≤ 1.5	26	RPM	1373	1030	824	687	515	412
						(21-31)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
						Feed (mm/min)	99	132	176	165	138	126	
		≤ 440 Bhn or ≤ 47 HRC		≤ 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	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRC		≤ 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	
		≤ 440 Bhn or ≤ 47 HRC		≤ 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	

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
rpm = (Vc x 1000) / (DC 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 DC maximum)
reduce Ap to 1 x DC (maximum) when profile milling with long or extra long flute length tools
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



51 •
51CR
FRACTIONAL 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)



inch						EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	TI-NAMITE-X (TX)	
1/4	3/4	2-1/2	1/4	—		35100
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	—		35101
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	—		35102
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	—		35103
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	—		35104
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	—		35105
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

TOLERANCES (inch)
DC = +0.0000/−0.0020
DCON = h₆
RE = +0.0000/−0.0020

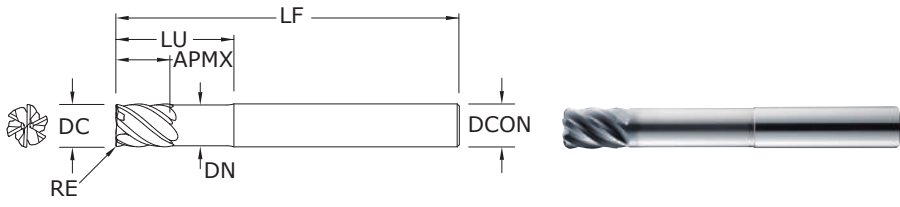
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- HARDENED STEELS

For patent information visit www.ksptpatents.com

TOLERANCES (inch)
DC = +0.0000/−0.0020
DCON = h₆
RE = +0.0000/−0.0020

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

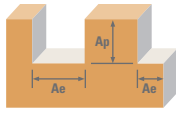
For patent information visit www.ksptpatents.com



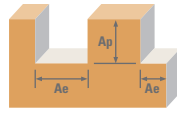
inch							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	TI-NAMITE-X (TX)
1/4	3/8	4	1/4	1-1/8	.237	—	35106
1/4	3/8	4	1/4	1-1/8	.237	.015	35127
1/4	3/8	4	1/4	1-1/8	.237	.030	35180
3/8	1/2	4	3/8	2-1/8	.356	—	35107
3/8	1/2	4	3/8	2-1/8	.356	.015	35128
3/8	1/2	4	3/8	2-1/8	.356	.030	35129
1/2	5/8	4	1/2	2-1/4	.475	—	35108
1/2	5/8	4	1/2	2-1/4	.475	.015	35181
1/2	5/8	4	1/2	2-1/4	.475	.030	35130
1/2	5/8	4	1/2	2-1/4	.475	.060	35182
1/2	5/8	4	1/2	2-1/4	.475	.090	35131
1/2	5/8	4	1/2	2-1/4	.475	.120	35132
5/8	3/4	5	5/8	2-1/2	.594	—	35109
5/8	3/4	5	5/8	2-1/2	.594	.015	35183
5/8	3/4	5	5/8	2-1/2	.594	.030	35133
5/8	3/4	5	5/8	2-1/2	.594	.060	35184
5/8	3/4	5	5/8	2-1/2	.594	.090	35134
5/8	3/4	5	5/8	2-1/2	.594	.120	35135
5/8	3/4	5	5/8	2-1/2	.594	.190	35185
3/4	1	6	3/4	3-3/8	.712	—	35110
3/4	1	6	3/4	3-3/8	.712	.030	35136
3/4	1	6	3/4	3-3/8	.712	.060	35186
3/4	1	6	3/4	3-3/8	.712	.090	35137
3/4	1	6	3/4	3-3/8	.712	.120	35138
3/4	1	6	3/4	3-3/8	.712	.190	35187
3/4	1	6	3/4	3-3/8	.712	.250	35188
1	1-1/4	6	1	3-3/8	.950	—	35111
1	1-1/4	6	1	3-3/8	.950	.030	35139
1	1-1/4	6	1	3-3/8	.950	.060	35189
1	1-1/4	6	1	3-3/8	.950	.090	35140
1	1-1/4	6	1	3-3/8	.950	.120	35141
1	1-1/4	6	1	3-3/8	.950	.190	35190
1	1-1/4	6	1	3-3/8	.950	.250	35191

51L •
51LC
FRACTIONAL SERIES

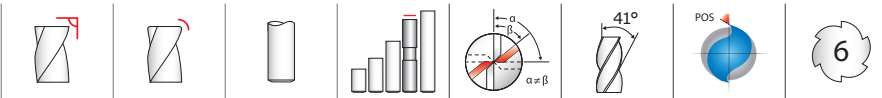
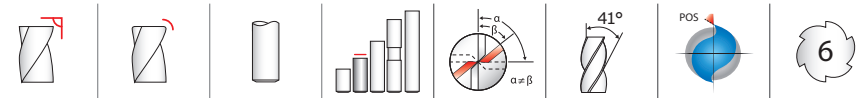
- Engineered for High Speed Milling using Trochoidal and Peel Milling techniques
- Eccentric relief provides superior strength and smoother surface finish
- Necked design with blended diameter transitions provide clearance to reach
- Enhanced corner geometry with tight tolerance corner radii
- Recommended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

Series 51, 51CR, 51L, 51LC Fractional		Hardness			Vc (sfm)	DC • in							
			Ae x DC	Ap x DC		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		≤ 0.1	≤ 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	
		≤ 375 Bhn or ≤ 40 HRc		≤ 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		≤ 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	
		≤ 410 Bhn or ≤ 45 HRc		≤ 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	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc		≤ 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	
		≤ 375 Bhn or ≤ 40 HRc		≤ 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		≤ 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	
		≤ 375 Bhn or ≤ 40 HRc		≤ 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		≤ 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	
		≤ 410 Bhn or ≤ 45 HRc		≤ 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

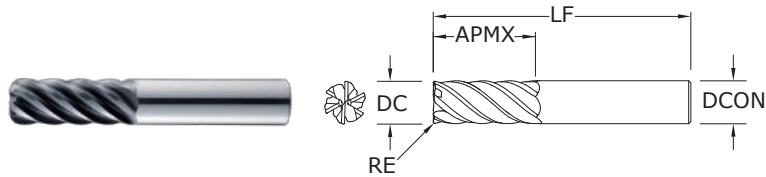
Series 51, 51CR, 51L, 51LC Fractional	Hardness			Vc (sfm)	DC • in							
		Ae x DC	Ap x DC		1/4	3/8	1/2	5/8	3/4	1		
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	 Profile	≤ 0.1	≤ 1	105	RPM	1604	1070	802	642	535	401
					(84-126)	Fz	0.0014	0.0027	0.0036	0.0039	0.0043	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	 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	 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	 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		
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	 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	

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
rpm = Vc x 3.82 / DC
ipm = Fz x 6 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



51M •
51MCR
METRIC SERIES

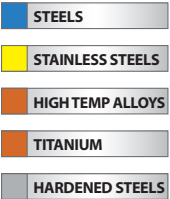
- Engineered for High Speed Milling using Trochoidal and Peel Milling techniques
- Eccentric relief provides superior strength and smoother surface finish
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)



mm						EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	TI-NAMITE-X (TX)	
6,0	19,0	63,0	6,0	—		45100
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	—		45101
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	—		45102
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	—		45103
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	—		45104
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	—		45105
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

TOLERANCES (mm)

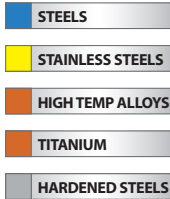
DC = +0,000/–0,050
DCON = h₆
RE = +0,000/–0,050



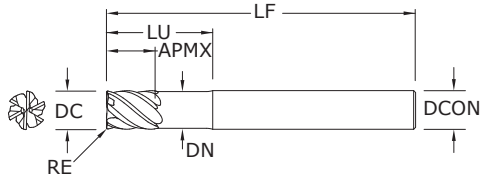
For patent information visit
www.ksptpatents.com

TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h₆
RE = +0,000/–0,050



For patent information visit
www.ksptpatents.com



mm							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	TI-NAMITE-X (TX)
6,0	8,0	75,0	6,0	32,0	5,69	—	45106
6,0	8,0	75,0	6,0	32,0	5,69	0,5	45127
6,0	8,0	75,0	6,0	32,0	5,69	1,0	45187
6,0	8,0	75,0	6,0	32,0	5,69	1,5	45188
8,0	10,0	75,0	8,0	32,0	7,59	—	45107
8,0	10,0	75,0	8,0	32,0	7,59	0,5	45128
8,0	10,0	75,0	8,0	32,0	7,59	1,0	45129
8,0	10,0	75,0	8,0	32,0	7,59	1,5	45189
8,0	10,0	75,0	8,0	32,0	7,59	2,0	45190
10,0	12,0	100,0	10,0	40,0	9,50	—	45108
10,0	12,0	100,0	10,0	40,0	9,50	0,5	45191
10,0	12,0	100,0	10,0	40,0	9,50	1,0	45130
10,0	12,0	100,0	10,0	40,0	9,50	1,5	45131
10,0	12,0	100,0	10,0	40,0	9,50	2,0	45132
10,0	12,0	100,0	10,0	40,0	9,50	2,5	45192
12,0	15,0	100,0	12,0	48,0	11,38	—	45109
12,0	15,0	100,0	12,0	48,0	11,38	0,5	45193
12,0	15,0	100,0	12,0	48,0	11,38	0,76	45194
12,0	15,0	100,0	12,0	48,0	11,38	1,0	45133
12,0	15,0	100,0	12,0	48,0	11,38	1,5	45134
12,0	15,0	100,0	12,0	48,0	11,38	2,0	45135
12,0	15,0	100,0	12,0	48,0	11,38	2,5	45195
12,0	15,0	100,0	12,0	48,0	11,38	3,0	45196
16,0	20,0	115,0	16,0	65,0	15,19	—	45110
16,0	20,0	115,0	16,0	65,0	15,19	1,0	45136
16,0	20,0	115,0	16,0	65,0	15,19	1,5	45137
16,0	20,0	115,0	16,0	65,0	15,19	2,0	45138
16,0	20,0	115,0	16,0	65,0	15,19	2,5	45197
16,0	20,0	115,0	16,0	65,0	15,19	3,0	45198
16,0	20,0	115,0	16,0	65,0	15,19	4,0	45199
20,0	24,0	150,0	20,0	80,0	19,00	—	45111
20,0	24,0	150,0	20,0	80,0	19,00	1,0	45139
20,0	24,0	150,0	20,0	80,0	19,00	1,5	45140
20,0	24,0	150,0	20,0	80,0	19,00	2,0	45141
20,0	24,0	150,0	20,0	80,0	19,00	2,5	45200
20,0	24,0	150,0	20,0	80,0	19,00	3,0	45201
20,0	24,0	150,0	20,0	80,0	19,00	4,0	45202
20,0	24,0	150,0	20,0	80,0	19,00	5,0	45203

51ML •
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)		DC • mm					
		Ae x DC	Ap x DC			6	8	10	12	16	20
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 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
		≤ 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	≤ 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
		≤ 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
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 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
		≤ 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	≤ 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
		≤ 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	≤ 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
		≤ 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

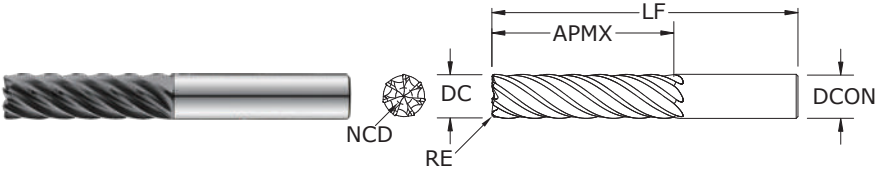
Series 51M, 51MCR, 51ML, 51MLC Metric	Hardness			Vc (m/min)		DC • mm					
		Ae x DC	Ap x DC			6	8	10	12	16	20
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 0.1	≤ 1	32	RPM	1696	1272	1018	848	636	509
				(26-38)	Fz	0.034	0.057	0.071	0.085	0.100	0.110
					Feed (mm/min)	346	435	434	433	382	336
		≤ 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	≤ 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
		≤ 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
H	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 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
		≤ 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	≤ 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
		≤ 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
	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 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
		≤ 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

Bhn (Brinell) HRC (Rockwell C) HSM (High Speed Machining)
rpm = (Vc x 1000) / (DC 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 DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



77 •
77CR
FRACTIONAL SERIES

- Specializes in deep axial trochoidal and high-speed milling applications
- Optimized core improves rigidity, chip flow and reduces deflection
- Chip Breaker design breaks up chips from the long flute length allowing for better chip flow and evacuation in deep pocketing operations
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)



inch						EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	TI-NAMITE-A (TA) EDP NO.	TI-NAMITE-A (TA) EDP NO. CHIP BREAKER	TI-NAMITE-M (TM) EDP NO.	TI-NAMITE-M (TM) EDP NO. CHIP BREAKER
1/4	5/8	2-1/2	1/4	—	0.0845	77100	77102	77101	77103
1/4	5/8	2-1/2	1/4	.015	0.0845	77104	77106	77105	77107
1/4	5/8	2-1/2	1/4	.030	0.0845	77108	77110	77109	77111
1/4	3/4	2-1/2	1/4	—	0.0845	77112	77114	77113	77115
1/4	3/4	2-1/2	1/4	.015	0.0845	77116	77118	77117	77119
1/4	3/4	2-1/2	1/4	.030	0.0845	77120	77122	77121	77123
1/4	1	3	1/4	—	0.0845	77124	77126	77125	77127
1/4	1	3	1/4	.015	0.0845	77128	77130	77129	77131
1/4	1	3	1/4	.030	0.0845	77132	77134	77133	77135
3/8	15/16	3	3/8	—	0.1268	77136	77138	77137	77139
3/8	15/16	3	3/8	.015	0.1268	77140	77142	77141	77143
3/8	15/16	3	3/8	.030	0.1268	77144	77146	77145	77147
3/8	1-1/8	3-1/4	3/8	—	0.1268	77148	77150	77149	77151
3/8	1-1/8	3-1/4	3/8	.015	0.1268	77152	77154	77153	77155
3/8	1-1/8	3-1/4	3/8	.030	0.1268	77156	77158	77157	77159
3/8	1-1/2	3-1/2	3/8	—	0.1268	77160	77162	77161	77163
3/8	1-1/2	3-1/2	3/8	.015	0.1268	77164	77166	77165	77167
3/8	1-1/2	3-1/2	3/8	.030	0.1268	77168	77170	77169	77171
1/2	1-1/4	3-1/4	1/2	—	0.1690	77172	77174	77173	77175
1/2	1-1/4	3-1/4	1/2	.030	0.1690	77176	77178	77177	77179
1/2	1-1/4	3-1/4	1/2	.060	0.1690	77180	77182	77181	77183
1/2	1-1/2	3-1/2	1/2	—	0.1690	77184	77186	77185	77187
1/2	1-1/2	3-1/2	1/2	.030	0.1690	77188	77190	77189	77191
1/2	1-1/2	3-1/2	1/2	.060	0.1690	77192	77194	77193	77195
1/2	2	4	1/2	—	0.1690	77196	77198	77197	77199
1/2	2	4	1/2	.030	0.1690	77200	77202	77201	77203
1/2	2	4	1/2	.060	0.1690	77204	77206	77205	77207
5/8	1-9/16	3-3/4	5/8	—	0.2113	77208	77210	77209	77211
5/8	1-9/16	3-3/4	5/8	.030	0.2113	77212	77214	77213	77215
5/8	1-9/16	3-3/4	5/8	.060	0.2113	77216	77218	77217	77219

continued on next page



TOLERANCES (inch)

1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h₆
RE = +0.000 / -0.002
>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h₆
RE = +0.000 / -0.002
>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h₆
RE = +0.000 / -0.002

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

For patent information visit www.ksptpatents.com

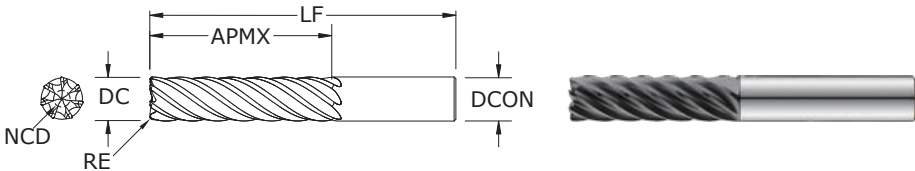


TOLERANCES (inch)

1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h₆
RE = +0.000 / -0.002
>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h₆
RE = +0.000 / -0.002
>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h₆
RE = +0.000 / -0.002

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

For patent information visit www.ksptpatents.com



77 •
77CR
FRACTIONAL SERIES

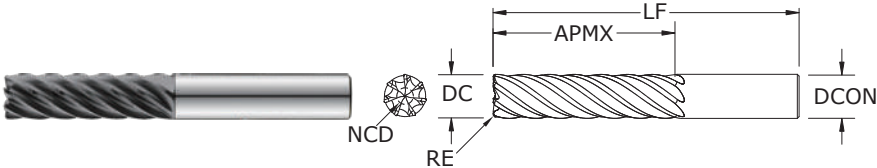
CONTINUED

inch						EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	TI-NAMITE-A (TA) EDP NO.	TI-NAMITE-A (TA) EDP NO. CHIP BREAKER	TI-NAMITE-M (TM) EDP NO.	TI-NAMITE-M (TM) EDP NO. CHIP BREAKER
5/8	1-7/8	4	5/8	—	0.2113	77220	77222	77221	77223
5/8	1-7/8	4	5/8	.030	0.2113	77224	77226	77225	77227
5/8	1-7/8	4	5/8	.060	0.2113	77228	77230	77229	77231
5/8	2-1/2	4-1/2	5/8	—	0.2113	77232	77234	77233	77235
5/8	2-1/2	4-1/2	5/8	.030	0.2113	77236	77238	77237	77239
5/8	2-1/2	4-1/2	5/8	.060	0.2113	77240	77242	77241	77243
3/4	1-7/8	4	3/4	—	0.2535	77244	77246	77245	77247
3/4	1-7/8	4	3/4	.030	0.2113	77248	77250	77249	77251
3/4	1-7/8	4	3/4	.060	0.2113	77252	77254	77253	77255
3/4	1-7/8	4	3/4	.120	0.2113	77256	77258	77257	77259
3/4	2-1/4	4-1/2	3/4	—	0.2535	77260	77262	77261	77263
3/4	2-1/4	4-1/2	3/4	.030	0.2535	77264	77266	77265	77267
3/4	2-1/4	4-1/2	3/4	.060	0.2535	77268	77270	77269	77271
3/4	2-1/4	4-1/2	3/4	.120	0.2535	77272	77274	77273	77275
3/4	3	5-1/4	3/4	—	0.2535	77276	77278	77277	77279
3/4	3	5-1/4	3/4	.030	0.2535	77280	77282	77281	77283
3/4	3	5-1/4	3/4	.060	0.2535	77284	77286	77285	77287
3/4	3	5-1/4	3/4	.120	0.2535	77288	77290	77289	77291
1	2-1/2	5-1/2	1	—	0.3380	77292	77294	77293	77295
1	2-1/2	5-1/2	1	.030	0.3380	77296	77298	77297	77299
1	2-1/2	5-1/2	1	.060	0.3380	77300	77302	77301	77303
1	2-1/2	5-1/2	1	.120	0.3380	77304	77306	77305	77307
1	3	6	1	—	0.3380	77308	77310	77309	77311
1	3	6	1	.030	0.3380	77312	77314	77313	77315
1	3	6	1	.060	0.3380	77316	77318	77317	77319
1	3	6	1	.120	0.3380	77320	77322	77321	77323
1	4	7	1	—	0.3380	77324	77326	77325	77327
1	4	7	1	.030	0.3380	77328	77330	77329	77331
1	4	7	1	.060	0.3380	77332	77334	77333	77335
1	4	7	1	.120	0.3380	77336	77338	77337	77339

FRACTIONAL
H-Carb



77M •
77MCR
METRIC SERIES



- Specializes in deep axial trochoidal and high-speed milling applications
- Optimized core improves rigidity, chip flow and reduces deflection
- Chip Breaker design breaks up chips from the long flute length allowing for better chip flow and evacuation in deep pocketing operations
- Recommended for materials ≤ 45 HRC (≤ 420 Bhn)

mm						EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING DIAMETER NCD	TI-NAMITE-A (TA) EDP NO.	TI-NAMITE-A (TA) EDP NO. CHIP BREAKER	TI-NAMITE-M (TM) EDP NO.	TI-NAMITE-M (TM) EDP NO. CHIP BREAKER
6,0	15,0	63,0	6,0	–	2,03	74300	74302	74301	74303
6,0	15,0	63,0	6,0	0,3	2,03	74304	74306	74305	74307
6,0	15,0	63,0	6,0	0,5	2,03	74308	74310	74309	74311
6,0	18,0	63,0	6,0	–	2,03	74316	74318	74317	74319
6,0	18,0	63,0	6,0	0,3	2,03	74320	74322	74321	74323
6,0	18,0	63,0	6,0	0,5	2,03	74324	74326	74325	74327
6,0	24,0	75,0	6,0	–	2,03	74332	74334	74333	74335
6,0	24,0	75,0	6,0	0,3	2,03	74336	74338	74337	74339
6,0	24,0	75,0	6,0	0,5	2,03	74340	74342	74341	74343
8,0	20,0	75,0	8,0	–	2,71	74348	74350	74349	74351
8,0	20,0	75,0	8,0	0,5	2,71	74352	74354	74353	74355
8,0	20,0	75,0	8,0	1,0	2,71	74356	74358	74357	74359
8,0	20,0	75,0	8,0	2,0	2,71	74360	74362	74361	74363
8,0	24,0	75,0	8,0	–	2,71	74364	74366	74365	74367
8,0	24,0	75,0	8,0	0,5	2,71	74368	74370	74369	74371
8,0	24,0	75,0	8,0	1,0	2,71	74372	74374	74373	74375
8,0	24,0	75,0	8,0	2,0	2,71	74376	74378	74377	74379
8,0	32,0	85,0	8,0	–	2,71	74380	74382	74381	74383
8,0	32,0	85,0	8,0	0,5	2,71	74384	74386	74385	74387
8,0	32,0	85,0	8,0	1,0	2,71	74388	74390	74389	74391
8,0	32,0	85,0	8,0	2,0	2,71	74392	74394	74393	74395
10,0	25,0	75,0	10,0	–	3,38	74396	74398	74397	74399
10,0	25,0	75,0	10,0	0,5	3,38	74400	74402	74401	74403
10,0	25,0	75,0	10,0	1,0	3,38	74404	74406	74405	74407
10,0	30,0	80,0	10,0	–	3,38	74408	74410	74409	74411
10,0	30,0	80,0	10,0	0,5	3,38	74412	74414	74413	74415
10,0	30,0	80,0	10,0	1,0	3,38	74416	74418	74417	74419
10,0	40,0	100,0	10,0	–	3,38	74420	74422	74421	74423
10,0	40,0	100,0	10,0	0,5	3,38	74424	74426	74425	74427
10,0	40,0	100,0	10,0	1,0	3,38	74428	74430	74429	74431
12,0	30,0	83,0	12,0	–	4,06	74432	74434	74433	74435
12,0	30,0	83,0	12,0	0,5	4,06	74436	74438	74437	74439
12,0	30,0	83,0	12,0	1,0	4,06	74440	74442	74441	74443
12,0	36,0	83,0	12,0	–	4,06	74444	74446	74445	74447
12,0	36,0	83,0	12,0	0,5	4,06	74448	74450	74449	74451
12,0	36,0	83,0	12,0	1,0	4,06	74452	74454	74453	74455

continued on next page



TOLERANCES (mm)

6 DIAMETER
DC = +0,000/–0,030
DCON = h₆
RE = +0,000 / -0,050

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h₆
RE = +0,000 / -0,050

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h₆
RE = +0,000 / -0,050

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

For patent information visit www.ksptpatents.com



TOLERANCES (mm)

6 DIAMETER
DC = +0,000/–0,030
DCON = h₆
RE = +0,000 / -0,050

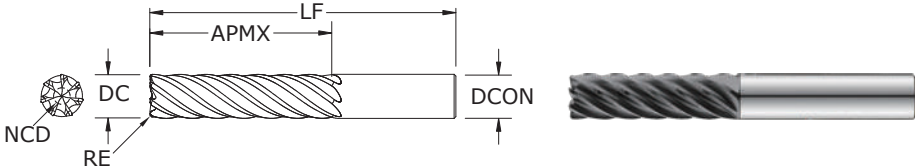
>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h₆
RE = +0,000 / -0,050

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h₆
RE = +0,000 / -0,050

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

For patent information visit www.ksptpatents.com

FRACTIONAL
H-Carb



77M •
77MCR
METRIC SERIES

mm						EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING DIAMETER NCD	TI-NAMITE-A (TA) EDP NO.	TI-NAMITE-A (TA) EDP NO. CHIP BREAKER	TI-NAMITE-M (TM) EDP NO.	TI-NAMITE-M (TM) EDP NO. CHIP BREAKER
12,0	48,0	100,0	12,0	–	4,06	74456	74458	74457	74459
12,0	48,0	100,0	12,0	0,5	4,06	74460	74462	74461	74463
12,0	48,0	100,0	12,0	1,0	4,06	74464	74466	74465	74467
16,0	40,0	92,0	16,0	–	5,41	74468	74470	74469	74471
16,0	40,0	92,0	16,0	0,5	5,41	74472	74474	74473	74475
16,0	40,0	92,0	16,0	1,0	5,41	74476	74478	74477	74479
16,0	48,0	100,0	16,0	–	5,41	74480	74482	74481	74483
16,0	48,0	100,0	16,0	0,5	5,41	74484	74486	74485	74487
16,0	48,0	100,0	16,0	1,0	5,41	74488	74490	74489	74491
16,0	64,0	115,0	16,0	–	5,41	74492	74494	74493	74495
16,0	64,0	115,0	16,0	0,5	5,41	74496	74498	74497	74499
16,0	64,0	115,0	16,0	1,0	5,41	74500	74502	74501	74503
20,0	50,0	100,0	20,0	–	6,76	74504	74506	74505	74507
20,0	50,0	100,0	20,0	0,5	6,76	74508	74510	74509	74511
20,0	50,0	100,0	20,0	1,0	6,76	74512	74514	74513	74515
20,0	50,0	100,0	20,0	2,0	6,76	74516	74518	74517	74519
20,0	60,0	115,0	20,0	–	6,76	74520	74522	74521	74523
20,0	60,0	115,0	20,0	0,5	6,76	74524	74526	74525	74527
20,0	60,0	115,0	20,0	1,0	6,76	74528	74530	74529	74531
20,0	60,0	115,0	20,0	2,0	6,76	74532	74534	74533	74535
20,0	80,0	140,0	20,0	–	6,76	74536	74538	74537	74539
20,0	80,0	140,0	20,0	0,5	6,76	74540	74542	74541	74543
20,0	80,0	140,0	20,0	1,0	6,76	74544	74546	74545	74547
20,0	80,0	140,0	20,0	2,0	6,76	74548	74550	74549	74551
25,0	63,0	135,0	25,0	–	8,45	74552	74554	74553	74555
25,0	63,0	135,0	25,0	1,0	8,45	74556	74558	74557	74559
25,0	63,0	135,0	25,0	2,0	8,45	74560	74562	74561	74563
25,0	63,0	135,0	25,0	3,0	8,45	74564	74566	74565	74567
25,0	75,0	150,0	25,0	–	8,45	74568	74570	74569	74571
25,0	75,0	150,0	25,0	1,0	8,45	74572	74574	74573	74575
25,0	75,0	150,0	25,0	2,0	8,45	74576	74578	74577	74579
25,0	75,0	150,0	25,0	3,0	8,45	74580	74582	74581	74583
25,0	100,0	170,0	25,0	–	8,45	74584	74586	74585	74587
25,0	100,0	170,0	25,0	1,0	8,45	74588	74590	74589	74591
25,0	100,0	170,0	25,0	2,0	8,45	74592	74594	74593	74595
25,0	100,0	170,0	25,0	3,0	8,45	74596	74598	74597	74599

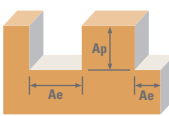
CONTINUED

KYOCERA Solid Tools

SGS Solid Tools

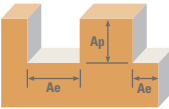
SGS Micro Tools



Series 77, 77CR Fractional		Hardness			Vc (sfm)	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				RPM	11552	7701	5776	4621	3851	2888
			HSM	2.5xD	816	Fz	0.0015	0.0024	0.0031	0.0035	0.0038	0.0042
				≤ 0.2 ≤ APMX	(653-979)	Feed (ipm)	121	129	125	113	102	85
			HSM	3xD	845	Fz	0.0017	0.0027	0.0035	0.0040	0.0043	0.0047
			≤ 0.15 ≤ APMX	(676-1014)	Feed (ipm)	136	146	140	129	116	95	
		HSM	4xD	756	Fz	0.0018	0.0028	0.0036	0.0041	0.0044	0.0049	
			≤ 0.1 ≤ APMX	(605-907)	Feed (ipm)	146	151	146	133	119	99	
		ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc				RPM	8419	5613	4210	3368	2806
	HSM			2.5xD	595	Fz	0.0009	0.0019	0.0026	0.0028	0.0031	0.0035
				≤ 0.2 ≤ APMX	(476-714)	Feed (ipm)	53	75	77	66	61	52
	HSM			3xD	616	Fz	0.0010	0.0021	0.0030	0.0033	0.0035	0.0039
		≤ 0.15 ≤ APMX	(493-739)	Feed (ipm)	59	83	88	78	69	57		
HSM	4xD	551	Fz	0.0011	0.0022	0.0031	0.0034	0.0036	0.0041			
	≤ 0.1 ≤ APMX	(441-661)	Feed (ipm)	65	86	91	80	71	60			
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc				RPM	9137	6092	4569	3655	3046	2284
			HSM	2.5xD	646	Fz	0.0009	0.0017	0.0023	0.0025	0.0028	0.0032
				≤ 0.2 ≤ APMX	(517-775)	Feed (ipm)	58	72	74	64	60	51
			HSM	3xD	669	Fz	0.0010	0.0019	0.0026	0.0029	0.0031	0.0036
			≤ 0.15 ≤ APMX	(535-803)	Feed (ipm)	64	81	83	74	66	58	
		HSM	4xD	598	Fz	0.0011	0.0020	0.0027	0.0030	0.0033	0.0037	
			≤ 0.1 ≤ APMX	(478-718)	Feed (ipm)	70	85	86	77	70	59	
		STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc				RPM	6020	4014	3010	2408	2007
	HSM			2.5xD	425	Fz	0.0007	0.0014	0.0019	0.0023	0.0026	0.0030
				≤ 0.2 ≤ APMX	(340-510)	Feed (ipm)	29	39	40	39	37	32
	HSM			3xD	440	Fz	0.0008	0.0016	0.0021	0.0025	0.0029	0.0034
		≤ 0.15 ≤ APMX	(352-528)	Feed (ipm)	34	45	44	42	41	36		
HSM	4xD	394	Fz	0.0008	0.0016	0.0022	0.0026	0.0030	0.0035			
	≤ 0.1 ≤ APMX	(315-473)	Feed (ipm)	34	45	46	44	42	37			
STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc				RPM	5776	3851	2888	2310	1925	1444	
		HSM	2.5xD	408	Fz	0.0007	0.0014	0.0019	0.0023	0.0026	0.0030	
			≤ 0.2 ≤ APMX	(326-490)	Feed (ipm)	28	38	38	37	35	30	
		HSM	3xD	422	Fz	0.0008	0.0016	0.0021	0.0025	0.0029	0.0034	
			≤ 0.15 ≤ APMX	(338-506)	Feed (ipm)	32	43	42	40	39	34	
		HSM	4xD	378	Fz	0.0008	0.0016	0.0022	0.0026	0.0030	0.0035	
			≤ 0.1 ≤ APMX	(302-454)	Feed (ipm)	32	43	44	42	40	35	
		P	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc				RPM	10100	6733	5050	4040
HSM	2.5xD				714	Fz	0.0010	0.0018	0.0024	0.0028	0.0033	0.0037
	≤ 0.2 ≤ APMX				(571-857)	Feed (ipm)	71	85	85	79	78	65
HSM	3xD				739	Fz	0.0011	0.0020	0.0027	0.0033	0.0037	0.0042
	≤ 0.15 ≤ APMX			(591-887)	Feed (ipm)	78	94	95	93	87	73	
HSM	4xD			661	Fz	0.0012	0.0021	0.0028	0.0034	0.0039	0.0043	
	≤ 0.1 ≤ APMX			(529-793)	Feed (ipm)	85	99	99	96	92	76	
CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc						RPM	6020	4014	3010	2408	2007
			HSM	2.5xD	425	Fz	0.0007	0.0014	0.0019	0.0023	0.0026	0.0030
				≤ 0.2 ≤ APMX	(340-510)	Feed (ipm)	29	39	40	39	37	32
			HSM	3xD	440	Fz	0.0008	0.0016	0.0021	0.0025	0.0029	0.0037
	≤ 0.15 ≤ APMX		(352-528)	Feed (ipm)	34	45	44	42	41	39		
HSM	4xD	394	Fz	0.0008	0.0016	0.0022	0.0026	0.0030	0.0035			
	≤ 0.1 ≤ APMX	(315-473)	Feed (ipm)	34	45	46	44	42	37			

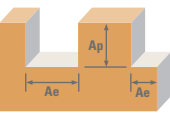
continued on next page



Series 77, 77CR Fractional		Hardness			Vc (sfm)	D ₁ • inch							
			Ae x D ₁	Ap x D ₁		1/4	3/8	1/2	5/8	3/4	1		
N	Not Recommended for this Material Group												
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc		HSM		RPM	1925	1284	963	770	642	481	
				2.5xD		136	Fz	0.0006	0.0011	0.0016	0.0018	0.0021	0.0025
				3xD		141	Fz	0.0007	0.0012	0.0018	0.0021	0.0024	0.0028
				≤ 0.15 ≤ APMX		(113-169)	Feed (ipm)	9	11	12	11	11	9
			4xD		126	Fz	0.0007	0.0013	0.0018	0.0022	0.0025	0.0029	
			≤ 0.1 ≤ APMX		(101-151)	Feed (ipm)	9	12	12	12	11	10	
		SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc		HSM		RPM	1207	805	604	483	402	302
					2.5xD		85	Fz	0.0005	0.0009	0.0013	0.0015	0.0018
				3xD		88	Fz	0.0005	0.0010	0.0015	0.0018	0.0020	0.0025
				≤ 0.15 ≤ APMX		(70-106)	Feed (ipm)	4	6	6	6	6	5
	S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc		HSM		RPM	4095	2730	2048	1638	1365	1024
2.5xD					289	Fz	0.0008	0.0015	0.0021	0.0024	0.0028	0.0032	
				3xD		299	Fz	0.0009	0.0017	0.0023	0.0025	0.0028	0.0036
				≤ 0.15 ≤ APMX		(239-359)	Feed (ipm)	23	29	30	28	27	23
			4xD		268	Fz	0.0009	0.0018	0.0024	0.0029	0.0033	0.0037	
			≤ 0.1 ≤ APMX		(214-322)	Feed (ipm)	26	32	33	29	27	26	
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al			≤ 440 Bhn or ≤ 47 HRc		HSM		RPM	2399	1599	1199	960	800	600
					2.5xD		170	Fz	0.0008	0.0015	0.0021	0.0024	0.0028
				3xD		176	Fz	0.0009	0.0017	0.0023	0.0025	0.0028	0.0036
				≤ 0.15 ≤ APMX		(141-211)	Feed (ipm)	13	17	18	16	16	13
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2		≤ 375 Bhn or ≤ 40 HRc		HSM		RPM	3851	2567	1925	1540	1284	963	
				2.5xD		272	Fz	0.0006	0.0011	0.0014	0.0017	0.0020	0.0024
			3xD		282	Fz	0.0007	0.0012	0.0016	0.0019	0.0022	0.0027	
			≤ 0.15 ≤ APMX		(226-338)	Feed (ipm)	16	20	19	18	18	16	
TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 40 HRc		HSM		RPM	3851	2567	1925	1540	1284	963		
			4xD		252	Fz	0.0007	0.0013	0.0017	0.0020	0.0023	0.0028	
			≤ 0.1 ≤ APMX		(202-302)	Feed (ipm)	19	22	22	20	20	18	
			≤ 0.1 ≤ APMX		(202-302)	Feed (ipm)	19	23	23	22	21	19	

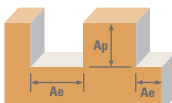
Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
rpm = Vc x 3.82 / DC
mm/min = Fz x 7 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



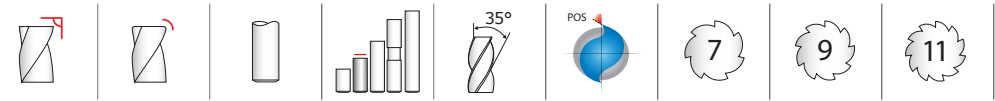
Series 77M, 77MCR Metric		Hardness			Vc (m/min)	D ₁ • mm								
			Ae x D ₁	Ap x D ₁		6	8	10	12	16	20	25		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	RPM					12208	9156	7325	6104	4578	3662	2930
				2.5xD	284 (227-341)	Fz	0.0413	0.0411	0.0640	0.0711	0.0889	0.1013	0.1050	
				≤ 0.2 ≤ APMX		Feed (ipm)	3529	2634	3282	3038	2849	2597	2154	
				3xD	257 (206-308)	Fz	0.0347	0.0461	0.0717	0.0797	0.0996	0.1135	0.1176	
				≤ 0.15 ≤ APMX		Feed (ipm)	2965	2955	3676	3405	3192	2910	2412	
				4xD	230 (184-276)	Fz	0.0362	0.0480	0.0747	0.0830	0.1037	0.1182	0.0919	
	≤ 0.1 ≤ APMX	Feed (ipm)		3094		3076	3830	3546	3323	3030	1885			
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	RPM					8068	6051	4841	4034	3025	2420	1936
				2.5xD	132 (106-159)	Fz	0.0213	0.0285	0.0512	0.0610	0.0711	0.0827	0.0875	
				≤ 0.2 ≤ APMX		Feed (ipm)	1203	1207	1735	1723	1506	1401	1186	
				3xD	138 (111-166)	Fz	0.0239	0.0319	0.0574	0.0683	0.0797	0.0926	0.0980	
				≤ 0.15 ≤ APMX		Feed (ipm)	1350	1351	1945	1929	1688	1569	1328	
			4xD	152 (122-182)	Fz	0.0249	0.0332	0.0597	0.0711	0.0830	0.0964	0.1021		
	≤ 0.1 ≤ APMX	Feed (ipm)	1406		1406	2023	2008	1758	1633	1384				
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	RPM					9660	7245	5796	4830	3623	2898	2318
				2.5xD	197 (158-236)	Fz	0.0216	0.0285	0.0448	0.0533	0.0635	0.0747	0.0800	
				≤ 0.2 ≤ APMX		Feed (ipm)	1461	1445	1818	1803	1610	1515	1298	
				3xD	204 (163-245)	Fz	0.0242	0.0319	0.0502	0.0598	0.0711	0.0837	0.0896	
				≤ 0.15 ≤ APMX		Feed (ipm)	1636	1618	2037	2022	1803	1698	1454	
				4xD	182 (146-218)	Fz	0.0252	0.0332	0.0523	0.0622	0.0741	0.0871	0.0933	
	≤ 0.1 ≤ APMX	Feed (ipm)		1704		1684	2122	2104	1879	1767	1514			
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	RPM					6369	4777	3822	3185	2389	1911	1529
				2.5xD	130 (104-156)	Fz	0.0168	0.0221	0.0371	0.0432	0.0584	0.0693	0.0750	
				≤ 0.2 ≤ APMX		Feed (ipm)	749	739	993	963	976	927	803	
				3xD	134 (107-161)	Fz	0.0188	0.0248	0.0416	0.0484	0.0655	0.0777	0.0840	
				≤ 0.15 ≤ APMX		Feed (ipm)	838	829	1113	1079	1095	1039	899	
			4xD	120 (96-144)	Fz	0.0196	0.0258	0.0433	0.0504	0.0682	0.0809	0.0875		
	≤ 0.1 ≤ APMX	Feed (ipm)	874		863	1158	1124	1140	1082	936				
STAINLESS STEELS (PH) 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	RPM					6104	4578	3662	3052	2289	1831	1465	
			2.5xD	124 (99-149)	Fz	0.0168	0.0221	0.0371	0.0432	0.0584	0.0693	0.0750		
			≤ 0.2 ≤ APMX		Feed (ipm)	718	708	952	923	936	888	769		
			3xD	129 (103-155)	Fz	0.0188	0.0248	0.0416	0.0484	0.0655	0.0777	0.0840		
			≤ 0.15 ≤ APMX		Feed (ipm)	803	795	1066	1034	1050	996	861		
			4xD	115 (92-138)	Fz	0.0196	0.0258	0.0433	0.0504	0.0682	0.0809	0.0875		
≤ 0.1 ≤ APMX	Feed (ipm)		837		827	1110	1077	1093	1037	897				
P	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	RPM					10722	8041	6433	5361	4021	3217	2573
				2.5xD	218 (174-262)	Fz	0.0239	0.0315	0.0474	0.0559	0.0762	0.0880	0.0925	
				≤ 0.2 ≤ APMX		Feed (ipm)	1794	1773	2135	2098	2145	1981	1666	
				3xD	225 (180-270)	Fz	0.0268	0.0353	0.0531	0.0626	0.0854	0.0986	0.1036	
				≤ 0.15 ≤ APMX		Feed (ipm)	2011	1987	2391	2349	2404	2220	1866	
				4xD	202 (162-242)	Fz	0.0279	0.0368	0.0553	0.0652	0.0889	0.1027	0.1079	
	≤ 0.1 ≤ APMX	Feed (ipm)		2094		2071	2490	2447	2502	2312	1944			
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	RPM					6369	4777	3822	3185	2389	1911	1529
				2.5xD	130 (104-156)	Fz	0.0168	0.0221	0.0371	0.0432	0.0584	0.0693	0.0750	
				≤ 0.2 ≤ APMX		Feed (ipm)	749	739	993	963	976	927	803	
				3xD	134 (107-161)	Fz	0.0188	0.0248	0.0416	0.0484	0.0655	0.0777	0.0840	
				≤ 0.15 ≤ APMX		Feed (ipm)	838	829	1113	1079	1095	1039	899	
			4xD	120 (96-144)	Fz	0.0196	0.0258	0.0433	0.0504	0.0682	0.0809	0.0875		
	≤ 0.1 ≤ APMX	Feed (ipm)	874		863	1158	1124	1140	1082	936				
N	NON-FERROUS MATERIALS	Not Recommended for this Material Group												

continued on next page



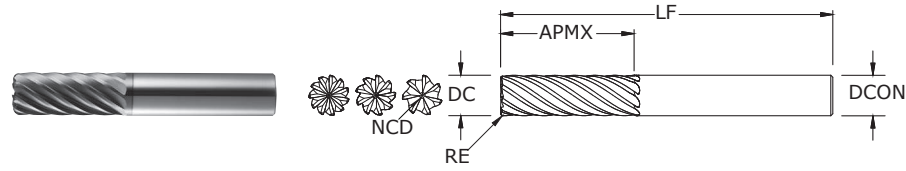
Series 77M, 77MCR				Vc (m/min)	D ₁ • mm									
Metric	Hardness	Ae x D ₁	Ap x D ₁		6	8	10	12	16	20	25			
S	SUPER ALLOYS (NICKEL , COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRC			RPM	2017	1513	1210	1008	756	605	484		
			HSM	2.5xD	41	Fz	0.0140	0.0183	0.0294	0.0356	0.0457	0.0560	0.0625	
				≤ 0.2	≤ APMX	(33-49)	Feed (ipm)	198	194	249	251	242	237	212
			HSM	3xD	43	Fz	0.0157	0.0205	0.0330	0.0398	0.0512	0.0627	0.0700	
				≤ 0.15	≤ APMX	(34-52)	Feed (ipm)	222	217	280	281	271	266	237
			HSM	4xD	38	Fz	0.0163	0.0213	0.0344	0.0415	0.0533	0.0653	0.0729	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRC			RPM	1274	955	764	637	478	382	306		
			HSM	2.5xD	26	Fz	0.0114	0.0152	0.0243	0.0305	0.0381	0.0480	0.0550	
				≤ 0.2	≤ APMX	(21-31)	Feed (ipm)	102	102	130	136	127	128	118
			HSM	3xD	27	Fz	0.0128	0.0171	0.0273	0.0342	0.0427	0.0538	0.0616	
				≤ 0.15	≤ APMX	(22-32)	Feed (ipm)	114	114	146	152	143	144	132
			HSM	4xD	24	Fz	0.0133	0.0178	0.0284	0.0356	0.0445	0.0560	0.0642	
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRC			RPM	4352	3264	2611	2176	1632	1306	1045			
		HSM	2.5xD	88	Fz	0.0191	0.0254	0.0397	0.0483	0.0635	0.0747	0.0800		
			≤ 0.2	≤ APMX	(70-106)	Feed (ipm)	582	580	726	736	725	683	585	
		HSM	3xD	91	Fz	0.0213	0.0285	0.0445	0.0541	0.0711	0.0837	0.0896		
			≤ 0.15	≤ APMX	(73-109)	Feed (ipm)	649	651	813	824	812	765	655	
		HSM	4xD	82	Fz	0.0222	0.0296	0.0463	0.0563	0.0741	0.0871	0.0933		
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRC			RPM	2548	1911	1529	1274	955	764	611		
			HSM	2.5xD	52	Fz	0.0163	0.0254	0.0397	0.0483	0.0635	0.0747	0.0800	
				≤ 0.2	≤ APMX	(42-62)	Feed (ipm)	291	340	425	431	425	400	342
			HSM	3xD	54	Fz	0.0182	0.0285	0.0445	0.0541	0.0711	0.0837	0.0896	
				≤ 0.15	≤ APMX	(43-65)	Feed (ipm)	325	381	476	482	476	448	384
			HSM	4xD	48	Fz	0.0190	0.0296	0.0463	0.0563	0.0741	0.0871	0.0933	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRC			RPM	4087	3065	2452	2044	1533	1226	981		
			HSM	2.5xD	83	Fz	0.0140	0.0183	0.0294	0.0356	0.0457	0.0560	0.0625	
				≤ 0.2	≤ APMX	(66-100)	Feed (ipm)	401	393	505	509	490	481	429
			HSM	3xD	86	Fz	0.0157	0.0205	0.0330	0.0398	0.0512	0.0627	0.0700	
				≤ 0.15	≤ APMX	(69-103)	Feed (ipm)	449	440	566	569	549	538	481
			HSM	4xD	77	Fz	0.0163	0.0213	0.0344	0.0415	0.0533	0.0653	0.0729	

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fz x 7 x rpm
reduce speed and feed for materials harder than listed
reduce feed and



66 •
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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	NO. OF FLUTES	TI-NAMITE-X
3/16	5/8	2	3/16	—	0.0550	7	36620
3/16	5/8	2	3/16	.010	0.0550	7	36627
1/4	3/4	2-1/2	1/4	—	0.0650	7	36621
1/4	3/4	2-1/2	1/4	.015	0.0650	7	36628
3/8	1	3	3/8	—	0.0810	7	36622
3/8	1	3	3/8	.015	0.0810	7	36629
1/2	1-1/4	3	1/2	—	0.1340	9	36623
1/2	1-1/4	3	1/2	.030	0.1340	9	36630
1/2	1-1/4	3	1/2	.090	0.1340	9	36631
1/2	1-1/4	3	1/2	.120	0.1340	9	36632
5/8	1-5/8	3-1/2	5/8	—	0.1150	9	36624
5/8	1-5/8	3-1/2	5/8	.030	0.1150	9	36633
5/8	1-5/8	3-1/2	5/8	.090	0.1150	9	36634
5/8	1-5/8	3-1/2	5/8	.120	0.1150	9	36635
3/4	1-5/8	4	3/4	—	0.1750	11	36625
3/4	1-5/8	4	3/4	.030	0.1750	11	36636
3/4	1-5/8	4	3/4	.090	0.1750	11	36637
3/4	1-5/8	4	3/4	.120	0.1750	11	36638
1	2	6	1	—	0.3000	11	36626
1	2	6	1	.030	0.3000	11	36639
1	2	6	1	.090	0.3000	11	36640
1	2	6	1	.120	0.3000	11	36641

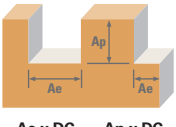
Neck Option Available

TOLERANCES (inch)

DC = +0.0000/−0.0020
DCON = h₆
RE = +0.0000/−0.0020

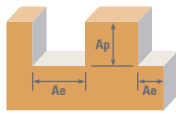
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

For patent information visit
www.ksptpatents.com



Series 66, 66CR Fractional	Hardness		Vc (sfm)	DC • in								
				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
		 ≤ 28 HRC	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
		 ≤ 40 HRC	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
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
		 ≤ 28 HRC	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
	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
		 ≤ 28 HRC	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	
	 ≤ 35 HRC	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	
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
		 ≤ 19 HRC	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

continued on next page

Series 66, 66CR Fractional		Hardness			Vc (sfm)	DC • in								
			Ae x DC	Ap x DC		3/16	1/4	3/8	1/2	5/8	3/4	1		
K	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
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
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

Bhn (Brinell) HRc (Rockwell C)
rpm = Vc x 3.82 / DC
ipm = Fz x number of flutes x rpm
reduce speed and feed for materials harder than listed
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



66M •
66MCR
METRIC SERIES

TOLERANCES (mm)

DC = +0,000/−0,050

DCON = h₆

RE = +0,000/−0,050

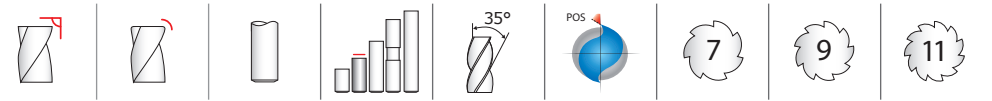
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

For patent
information visit
www.ksptpatents.com

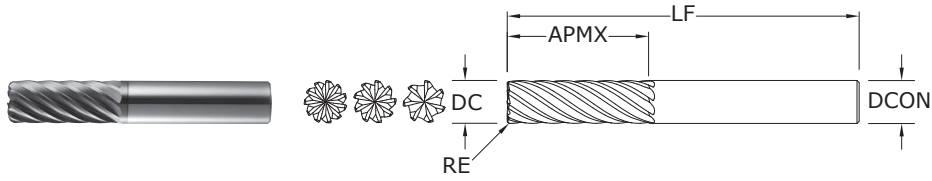
mm							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON- CUTTING CENTER DIAMETER NCD	NO. OF FLUTES	TI-NAMITE-X
6,0	19,0	63,0	6,0	—	1,63	7	46620
8,0	20,0	63,0	8,0	0,5	1,63	7	46627
6,0	19,0	63,0	6,0	1,0	1,63	7	46628
8,0	20,0	63,0	8,0	—	1,78	7	46621
8,0	20,0	63,0	8,0	0,5	1,78	7	46629
8,0	20,0	63,0	8,0	1,0	1,78	7	46630
8,0	20,0	63,0	8,0	1,5	1,78	7	46631
10,0	22,0	75,0	10,0	—	2,03	7	46622
10,0	22,0	75,0	10,0	0,5	2,03	7	46632
10,0	22,0	75,0	10,0	1,0	2,03	7	46633
10,0	22,0	75,0	10,0	1,5	2,03	7	46634
10,0	22,0	75,0	10,0	2,0	2,03	7	46635
12,0	26,0	83,0	12,0	—	3,45	9	46623
12,0	26,0	83,0	12,0	1,0	3,45	9	46636
12,0	26,0	83,0	12,0	1,5	3,45	9	46637
12,0	26,0	83,0	12,0	2,0	3,45	9	46638
12,0	26,0	83,0	12,0	2,5	3,45	9	46639
12,0	26,0	83,0	12,0	3,0	3,45	9	46640
16,0	32,0	92,0	16,0	—	2,92	9	46624
16,0	32,0	92,0	16,0	1,0	2,92	9	46641
16,0	32,0	92,0	16,0	1,5	2,92	9	46642
16,0	32,0	92,0	16,0	2,0	2,92	9	46643
16,0	32,0	92,0	16,0	2,5	2,92	9	46644
16,0	32,0	92,0	16,0	3,0	2,92	9	46645
16,0	32,0	92,0	16,0	4,0	2,92	9	46646
20,0	38,0	104,0	20,0	—	4,57	11	46625
20,0	38,0	104,0	20,0	1,0	4,57	11	46647
20,0	38,0	104,0	20,0	1,5	4,57	11	46648
20,0	38,0	104,0	20,0	2,0	4,57	11	46649
20,0	38,0	104,0	20,0	2,5	4,57	11	46650
20,0	38,0	104,0	20,0	3,0	4,57	11	46651
20,0	38,0	104,0	20,0	4,0	4,57	11	46652

continued on next page

Neck Option Available



66M •
66MCR
METRIC SERIES



CONTINUED

mm							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	NO. OF FLUTES	TI-NAMITE-X
20,0	38,0	104,0	20,0	5,0	4,57	11	46653
25,0	38,0	104,0	25,0	—	7,49	11	46626
25,0	38,0	104,0	25,0	1,0	7,49	11	46654
25,0	38,0	104,0	25,0	1,5	7,49	11	46655
25,0	38,0	104,0	25,0	2,0	7,49	11	46656
25,0	38,0	104,0	25,0	2,5	7,49	11	46657
25,0	38,0	104,0	25,0	3,0	7,49	11	46658
25,0	38,0	104,0	25,0	4,0	7,49	11	46659
25,0	38,0	104,0	25,0	5,0	7,49	11	46660

Neck Option Available

TOLERANCES (mm)

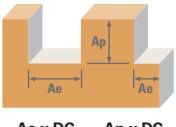
DC = +0,000/−0,050

DCON = h₆

RE = +0,000/−0,050

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

For patent information visit www.ksptpatents.com

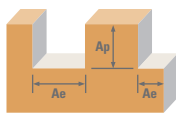


Series 66M, 66MCR Metric		Hardness			Vc (m/min)	DC • mm								
			Ae x DC	Ap x DC		6	8	10	12	16	20	25		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRC		≤ 0.05	≤ 1	194	RPM	10260	7695	6156	5130	3847	3078	2462
						(155-232)	Fz	0.029	0.047	0.059	0.072	0.095	0.101	0.105
						Feed (mm/min)	2068	2528	2528	3324	3280	3431	2844	
			≤ 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		≤ 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	
			≤ 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		
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRC		≤ 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	
			≤ 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		
	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			
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRC		≤ 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	
			≤ 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		

continued on next page

METRIC

Multi-Carb

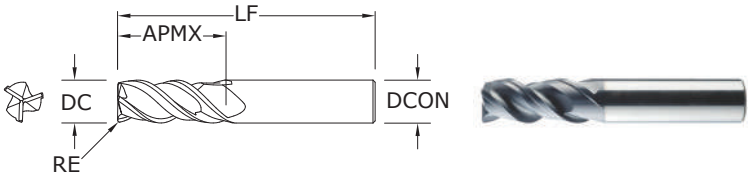
Series 66M, 66MCR Metric	Hardness			Vc (m/min)	DC • mm								
		Ae x DC	Ap x DC		6	8	10	12	16	20	25		
K CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRC	 Profile	≤ 0.05	≤ 1	165	RPM	8725	6544	5235	4362	3272	2617	2094
					(132-198)	Fz	0.022	0.036	0.045	0.055	0.074	0.080	0.080
					Feed (mm/min)	1319	1661	1661	2167	2186	2303	1843	
		 Finish	≤ 0.02	≤ 2	198	RPM	10470	7852	6282	5235	3926	3141	2513
					(158-237)	Fz	0.017	0.029	0.036	0.044	0.059	0.064	0.064
					Feed (mm/min)	1266	1595	1595	2080	2099	2211	1769	
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRC	 Profile	≤ 0.05	≤ 1	32	RPM	1696	1272	1018	848	636	509	407
					(26-38)	Fz	0.017	0.030	0.037	0.043	0.059	0.064	0.065
					Feed (mm/min)	199	266	213	330	337	358	291	
		 Finish	≤ 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	
S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRC	 Profile	≤ 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	
		 Finish	≤ 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	
S TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRC	 Profile	≤ 0.05	≤ 1	119	RPM	6301	4726	3781	3151	2363	1890	1512
					(95-143)	Fz	0.019	0.032	0.040	0.050	0.067	0.072	0.073
					Feed (mm/min)	847	1059	1059	1429	1415	1497	1206	
		 Finish	≤ 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	
S TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRC	 Profile	≤ 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	
		 Finish	≤ 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	
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	
		 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	

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



FRACTIONAL

Series 33



33CR

FRACTIONAL SERIES

TOLERANCES (inch)

1/8–1/4 DIAMETER

DC = +0.0000/–0.0012

DCON = h₆

RE = +0.0000/–0.0020

>1/4–3/8 DIAMETER

DC = +0.0000/–0.0016

DCON = h₆

RE = +0.0000/–0.0020

>3/8–1 DIAMETER

DC = +0.0000/–0.0020

DCON = h₆

RE = +0.0000/–0.0020

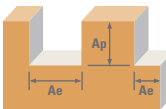
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent
information visit
www.ksptpatents.com

CUTTING DIAMETER DC	LENGTH OF CUT APMX	inch			EDP NO.
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	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

- 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)

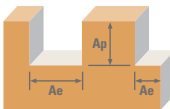
FRACTIONAL Series 33

Series	33CR	Fractional	Hardness			Vc (sfm)	DC • in							
				Ae x DC	Ap x DC		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	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	
				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	≤ 375 Bhn or ≤ 40 HRc		≤ 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	
				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	
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	0.0004	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	
				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	
	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	0.0003	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	
				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	≤ 325 Bhn or ≤ 35 HRc		≤ 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	
				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	
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	0.0004	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	
				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	

continued on next page

Bhn (Brinell) HRc (Rockwell C)
 rpm = $Vc \times 3.82 / DC$
 ipm = $Fz \times 3 \times rpm$
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x DC maximum)
 feed rates listed have chip thinning adjustments included where applicable
 refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

FRACTIONAL
Series 33

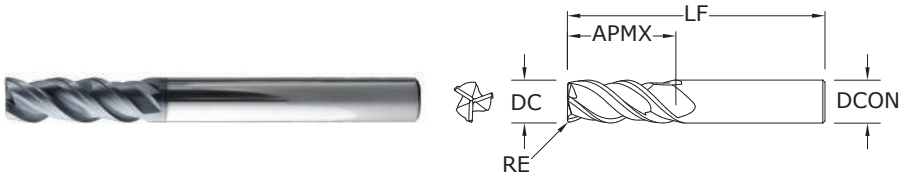
Series 33CR Fractional		Hardness			Vc (sfm)	DC • in								
			1/8	1/4		3/8	1/2	5/8	3/4	1				
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	 Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0003	0.0008	0.0016	0.0021	0.0026	0.0027	0.0029
						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	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	 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	≤ 400 Bhn or ≤ 43 HRc	 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	≤ 350 Bhn or ≤ 38 HRc	 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	≤ 440 Bhn or ≤ 47 HRc	 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		
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	0.0003	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	

Bhn (Brinell) HRc (Rockwell C)
 rpm = $Vc \times 3.82 / DC$
 ipm = $Fz \times 3 \times rpm$
 reduce speed and feed for materials harder than listed
 reduce feed and Ae when finish milling (.02 x DC maximum)
 feed rates listed have chip thinning adjustments included where applicable
 refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



33MCR
METRIC SERIES

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



mm					EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	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

TOLERANCES (mm)

3–6 DIAMETER

DC = +0,000/–0,030

DCON = h₆

RE = +0,000/–0,050

>6–10 DIAMETER

DC = +0,000/–0,040

DCON = h₆

RE = +0,000/–0,050

>10–20 DIAMETER

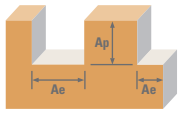
DC = +0,000/–0,050

DCON = h₆

RE = +0,000/–0,050

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

For patent information visit
www.ksptpatents.com

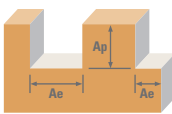


Series 33MCR Metric	Hardness			Vc (m/min)	DC • mm								
		Ae x DC	Ap x DC		3	6	8	10	12	16	20		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	 Profile	≤ 0.5	≤ 1.5	168	RPM	17773	8886	6665	5332	4443	3332	2666
					(134-201)	Fz	0.012	0.029	0.049	0.061	0.074	0.100	0.107
					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	 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	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	 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	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	 Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648
					(83-124)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069
					Feed (mm/min)	237	316	396	396	395	396	343	
		 Slot	1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309
					(66-99)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069
					Feed (mm/min)	188	251	314	314	314	314	272	
STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	 Profile	≤ 0.5	≤ 1.5	94	RPM	10017	5009	3756	3005	2504	1878	1503	
				(76-113)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	
				Feed (mm/min)	216	288	361	361	361	361	313		
	 Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212	
				(61-91)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	
				Feed (mm/min)	174	233	291	291	291	291	252		
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	 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	

continued on next page

METRIC

Series 33

Series 33MCR Metric	Hardness			Vc (m/min)	DC • mm									
		Ae x DC	Ap x DC		3	6	8	10	12	16	20			
K	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	
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
						(20-29)	Fz	0.006	0.017	0.028	0.035	0.041	0.054	0.059
						Feed (mm/min)	48	65	81	65	79	78	68	
			 Slot	1	≤ 1	20	RPM	2100	1050	788	630	525	394	315
						(16-24)	Fz	0.006	0.017	0.028	0.035	0.041	0.054	0.059
						Feed (mm/min)	39	53	66	66	64	64	55	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRC	 Profile	≤ 0.5	≤ 1.5	19	RPM	2003	1002	751	601	501	376	301
						(15-23)	Fz	0.005	0.012	0.019	0.024	0.029	0.038	0.043
						Feed (mm/min)	29	36	43	43	43	43	38	
			 Slot	1	≤ 1	15	RPM	1583	792	594	475	396	297	238
						(12-18)	Fz	0.005	0.012	0.019	0.024	0.029	0.038	0.043
						Feed (mm/min)	23	28	34	34	34	34	30	
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRC	 Profile	≤ 0.5	≤ 1.5	66	RPM	6947	3474	2605	2084	1737	1303	1042	
					(52-79)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	
					Feed (mm/min)	150	200	250	250	250	250	217		
		 Slot	1	≤ 1	52	RPM	5493	2747	2060	1648	1373	1030	824	
					(41-62)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	
					Feed (mm/min)	119	158	198	198	198	198	171		
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRC	 Profile	≤ 0.5	≤ 1.5	23	RPM	2424	1212	909	727	606	454	364	
					(18-27)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	
					Feed (mm/min)	52	70	87	87	87	87	76		
		 Slot	1	≤ 1	18	RPM	1939	969	727	582	485	364	291	
					(15-22)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	
					Feed (mm/min)	42	56	70	70	70	70	60		
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	

Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 1000) / (DC 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 DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



FRACTIONAL & METRIC

Series 7



TOLERANCES (inch)
DC = +0.0000/-0.0020
DCON = h₆

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

For patent information visit
www.ksptpatents.com

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	EDP NO. 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 (mm)
DC = +0,000/+0,050
DCON = h₆

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

For patent information visit
www.ksptpatents.com

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	EDP NO. 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

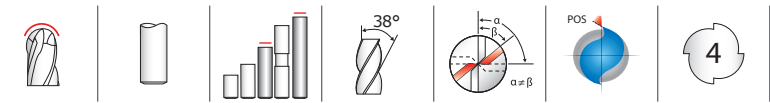
- Variable pitch allows for improved chatter suppression along with improved surface finish and enhanced tool life
- Raised land and increased core diameter designed to enhance tool life and decrease tool deflection
- Recommended for materials ≤ 45 HRc (≤ 420 Bhn)

- 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)

FRACTIONAL & METRIC
Series 7



FRACTIONAL
Series 7



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)



inch				EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

RE = 1/2 Cutting Diameter (DC)

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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (inch)

DC = +0.0000/-0.0020

DCON = h₆

RE = +0.0000/-0.0010

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

For patent information visit
www.ksptpatents.com

TOLERANCES (mm)

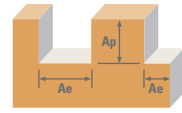
DC = +0,000/+0,050

DCON = h₆

RE = +0,000/-0,025

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

For patent information visit
www.ksptpatents.com

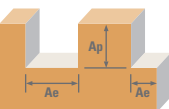


Series 7, 7B Fractional						Vc (sfm)		DC • in						
				Ae x DC	Ap x DC			1/8	1/4	3/8	1/2	5/8	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Finish 	≤ 0.02	≤ 2	480	RPM	14669	7334	4890	3667	2934	2445	1834
						(384-576)	Fz	0.0004	0.0010	0.0019	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	
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	
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	
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		
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	

Bhn (Brinell) HRc (Rockwell C)
rpm = Vc x 3.82 / DC
ipm = Fz x 4 x rpm
reduce speed and feed for materials harder than listed
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC

Series 7

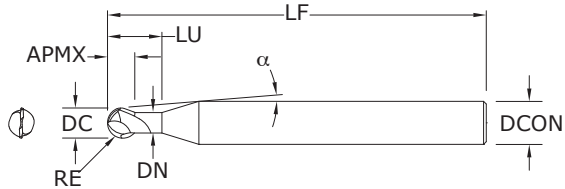
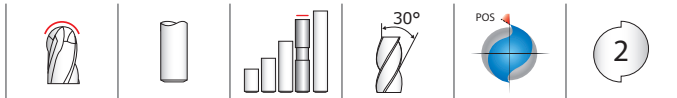
Series 7M, 7MB Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm									
						3	6	8	10	12	16	20	25		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Finish 	≤ 0.02	≤ 2	146	RPM	15511	7755	5816	4653	3878	2908	2327	1861
						(117-176)	Fz	0.0166	0.043	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	
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		
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	
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	0.040	0.050	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		
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	

Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fz x 4 x rpm
reduce speed and feed for materials harder than listed
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



FRACTIONAL & METRIC

Turbo-Carb



TOLERANCES (inch)

1/32–3/32 DIAMETER

DC = +0.0000/–0.0010

DCON = h₆

RE = +0.0000/–0.0005

>3/32–1/4 DIAMETER

DC = +0.0000/–0.0012

DCON = h₆

RE = +0.0000/–0.0006

>1/4–3/8 DIAMETER

DC = +0.0000/–0.0016

DCON = h₆

RE = +0.0000/–0.0008

>3/8–3/4 DIAMETER

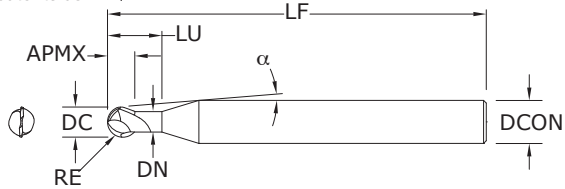
DC = +0.0000/–0.0020

DCON = h₆

RE = +0.0000/–0.0010

HARDENED STEELS

For patent
information visit
www.ksptpatents.com



TOLERANCES (mm)

1–2.5 DIAMETER

DC = +0,000/–0,025

DCON = h₆

RE = +0,000/–0,0013

>2,5–6 DIAMETER

DC = +0,000/–0,030

DCON = h₆

RE = +0,000/–0,0013

>6–10 DIAMETER

DC = +0,000/–0,040

DCON = h₆

RE = +0,000/–0,0020

>10–20 DIAMETER

DC = +0,000/–0,050

DCON = h₆

RE = +0,000/–0,0025

HARDENED STEELS

For patent
information visit
www.ksptpatents.com



56B

FRACTIONAL SERIES

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	inch SHANK DIAMETER DCON	CENTER LINE ANGLE α	REACH LU	NECK DIAMETER DN	EDP NO. Ti-NAMITE-X
1/32	1/32	3	1/4	8°20'	1/16	.025	93272
1/16	1/16	3	1/4	7°40'	1/8	.055	93273
3/32	3/32	3	1/4	6°50'	3/16	.085	93274
1/8	1/8	3	1/4	6°	1/4	.114	93275
3/16	3/16	3	1/4	3°35'	3/8	.171	93276
1/4	1/4	3-1/2	1/4	–	1/2	.230	93277
5/16	5/16	4	5/16	–	5/8	.292	93278
3/8	3/8	4	3/8	–	3/4	.355	93279
1/2	1/2	4-1/2	1/2	–	1	.480	93280
5/8	5/8	5-1/2	5/8	–	1-1/4	.610	93281
3/4	3/4	6-1/2	3/4	–	1-1/2	.735	93282

Neck Option Available
RE = 1/2 Cutting Diameter (DC)



56MB

METRIC SERIES

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	mm SHANK DIAMETER DCON	CENTER LINE ANGLE α	REACH LU	NECK DIAMETER DN	EDP NO. Ti-NAMITE-X
1,0	1,0	76,0	6,0	8°10'	2,0	0,91	91349
1,5	1,5	76,0	6,0	7°45'	3,0	1,37	91350
2,0	2,0	76,0	6,0	7°10'	4,0	1,83	91351
2,5	2,5	76,0	6,0	6°35'	5,0	2,29	91352
3,0	3,0	76,0	6,0	6°	6,0	2,72	91353
4,0	4,0	76,0	6,0	4°30'	8,0	3,63	91354
5,0	5,0	89,0	6,0	2°30'	10,0	4,55	91355
6,0	6,0	89,0	6,0	–	12,0	5,49	91356
8,0	8,0	102,0	8,0	–	16,0	7,49	91357
10,0	10,0	102,0	10,0	–	20,0	9,47	91358
12,0	12,0	114,0	12,0	–	24,0	11,48	91359
16,0	16,0	140,0	16,0	–	32,0	15,62	91360
20,0	20,0	165,0	20,0	–	40,0	19,61	91361

Neck Option Available
RE = 1/2 Cutting Diameter (DC)

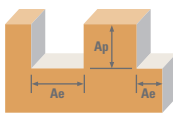
- Short flute length and rigid design to reduce deflection
- S-Gash Ball geometry minimizes load and heat produced during the cutting process, ultimately enhancing tool life
- Ideal for machining complex contoured shapes in hardened steels
- Recommended for materials 35 to 60 HRc (327 to 654 Bhn)

KYOCERA Solid Tools

SGS Solid Tools

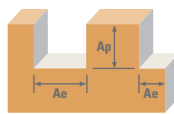
SGS Micro Tools

FRACTIONAL
Turbo-Carb

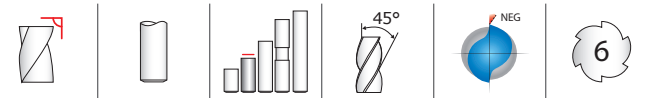
Series 56B Fractional		Hardness			Vc (sfm)	DC • in									
			Ae x DC	Ap x DC		1/32	1/16	1/8	3/16	1/4	3/8	1/2	3/4		
H	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	 Rough	≤ 0.4	≤ 0.1	625	RPM	76400	38200	19100	12733	9550	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 / DC
ipm = Fz x 2 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC
Turbo-Carb

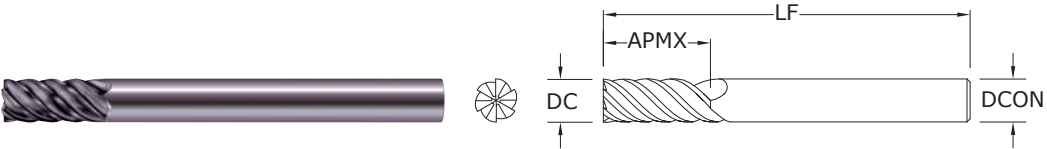
Series 56MB Metric				Vc (m/min)	DC • mm									
		Hardness	Ae x DC		Ap x DC	1	1.5	3	5	6	10	12	20	
H	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	 Rough	≤ 0.4	≤ 0.1	191	RPM	60748	40498	20249	12150	10125	6075	5062	3037
					(153-229)	Fz	0.015	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	 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	 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) / (DC 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 DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the 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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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
DC = +0.0000/-0.0012
DCON = h₆

5/16 DIAMETER
DC = +0.0000/-0.0016
DCON = h₆

3/8 DIAMETER
DC = +0.0000/-0.0016
DCON = h₆

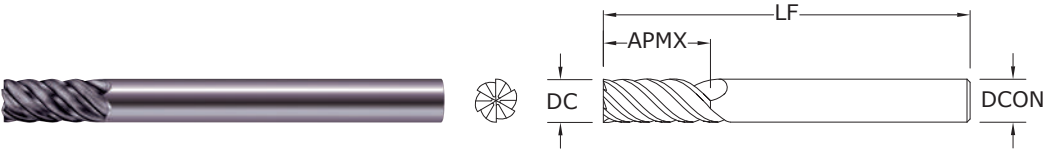
1/2 DIAMETER
DC = +0.0000/-0.0020
DCON = h₆

HARDENED STEELS

For patent information visit www.ksptpatents.com

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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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
DC = +0,000/-0,030
DCON = h₆

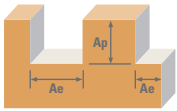
8 DIAMETER
DC = +0,000/-0,040
DCON = h₆

10 DIAMETER
DC = +0,000/-0,040
DCON = h₆

12-20 DIAMETER
DC = +0,000/-0,050
DCON = h₆

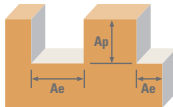
HARDENED STEELS

For patent information visit www.ksptpatents.com

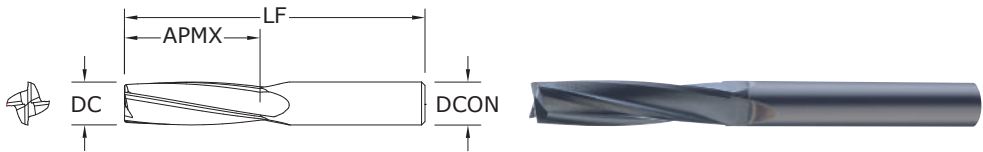


Series 57	Fractional	Hardness			Vc (sfm)	DC • in				
						1/4	5/16	3/8	1/2	
TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 420 Bhn or ≤ 45 HRc		1	≤ 0.3	215	RPM	3285	2628	2190	1643
					(172-258)	Fz	0.0013	0.0019	0.0025	0.0031
						Feed (ipm)	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 / DC
ipm = Fz x 6 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Series 57M Metric	Hardness			Vc (m/min)	DC • mm							
		Ae x DC	Ap x DC		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) / (DC 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 DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



TOLERANCES (inch)

DC = +0.0000/-0.0030
DCON = h₆

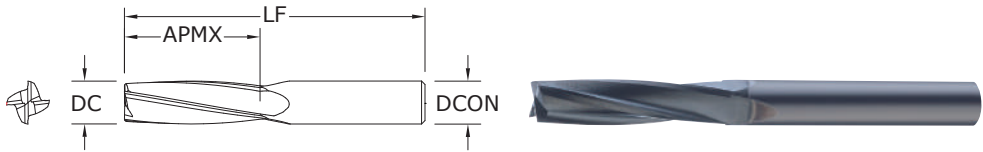
PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

inch				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

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



TOLERANCES (mm)

DC = +0,000/-0,080
DCON = h₆

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

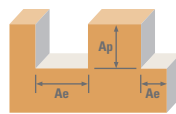
mm				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Di-NAMITE® (Diamond)
6,0	25,0	63,0	6,0	83056	83057
8,0	25,0	63,0	8,0	83058	83059
10,0	28,0	63,0	10,0	83060	83061
12,0	38,0	89,0	12,0	83062	83063
16,0	48,0	115,0	16,0	83064	83065

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

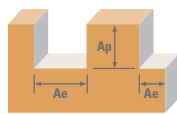
FRACTIONAL
Series 27

METRIC
Series 27

Series 27 Fractional			Vc (sfm)		DC • in				
	Ae x DC	Ap x DC			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 x 3.82 / DC
ipm = Fz x 4 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 depthsv

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
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information
(www.kyocera-sgstool.com)

Series 27M Metric			Vc (m/min)		DC • mm					
	Ae x DC	Ap x DC			6	8	10	12	16	
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)		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
		≤ 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
		≤ 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)		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
		≤ 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
		≤ 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		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
		≤ 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
		≤ 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		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
		≤ 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
		≤ 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		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
		≤ 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
		≤ 0.5	≤ 2	25	RPM	1325	994	795	663	497
				(20-30)	Fz	0.045	0.075	0.085	0.115	0.140
					Feed (mm/min)	239	298	270	305	278

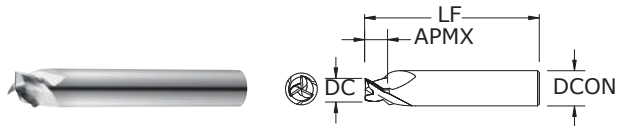
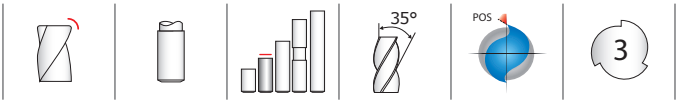
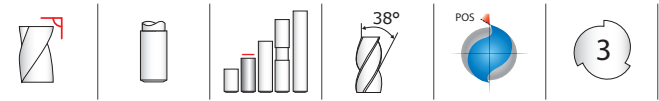
HSM (High Speed Machining)
rpm = Vc x 3.82 / DC
mm/min = Fz x 4 x rpm
adjust parameters based on resin type and fiber structure
reduce speed when overheating causes melting or damage to resin
reduce feed if delamination or fraying occur
finish cuts typically required reduced feed and cutting depths

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
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete technical information
(www.kyocera-sgstool.com)

FRACTIONAL
Picatinny Rail Tools



FRACTIONAL
Picatinny Rail Tools



Non-Ferrous Recoil Groove Tool

FRACTIONAL SERIES

- Open Flute design improves chip removal at high feed rates.
- Circular land improves surface finish and chatter suppression.
- Symmetrical end gashing improves balance in high speed operations.
- 45 degree chamfer enables slot and deburr in one operation.
- Meets MIL-STD 1913.

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	Ti-NAMITE-B (TiB ₂)
0.2100	1/4	0.118	1-3/4	34760	34761

TOLERANCES (inch)
DC = +0.0080/-0.0000
APMX= +0.0060/-0.0000
DCON= h₆

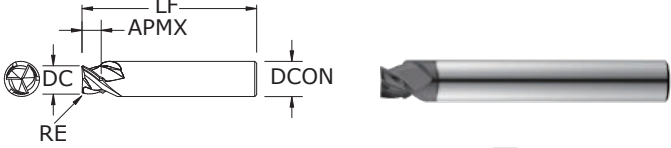
NON-FERROUS

For patent information visit
www.ksptpatents.com

TOLERANCES (inch)
DC = +0.0080/-0.0000
APMX= +0.0060/-0.0000
DCON= h₆
RE = +0.0000/-0.0005

- STEELS
- STAINLESS STEELS
- TITANIUM
- HARDENED STEELS

For patent information visit
www.ksptpatents.com

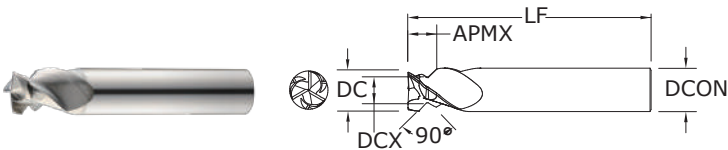
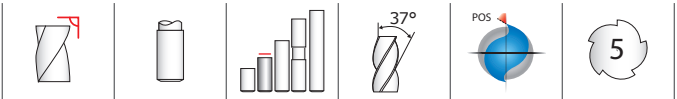
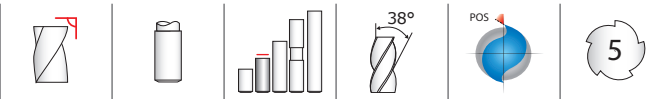


Ferrous Recoil Groove Tool

FRACTIONAL SERIES

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	Ti-NAMITE-A (TA)	Ti-NAMITE-M (TM)
0.2100	1/4	0.118	1-3/4	.010	33360	33361

- Heavy core design adds rigidity for cutting difficult to machine materials.
- Tight corner radius tangency tolerance for quality recoil grooves.
- Specially engineered flute design adds strength and improves chip flow.
- Meets MIL-STD 1913.



Non-Ferrous Dovetail Form Tool

FRACTIONAL SERIES

- Open Flute design improves chip removal at high feed rates.
- Specially engineered flute shape for improved chip control.
- Circular land improves surface finish and chatter suppression.
- Symmetrical end gashing improves balance in high speed operations.
- Meets MIL-STD 1913.

inch					EDP NO.	
CUTTING DIAMETER DC	INNER CUTTING DIAMETER DCX	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	Ti-NAMITE-B (TiB ₂)
0.6050	0.384	5/8	0.410	3-1/2	34762	34763

TOLERANCES (inch)
DC = +0.0010/-0.0010
DCON= h₆

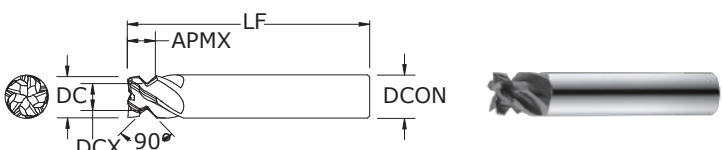
NON-FERROUS

For patent information visit
www.ksptpatents.com

TOLERANCES (inch)
DC = +0.0010/-0.0010
DCON= h₆

- STEELS
- STAINLESS STEELS
- TITANIUM
- HARDENED STEELS

For patent information visit
www.ksptpatents.com



Ferrous Dovetail Form Tool

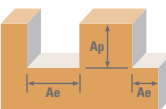
FRACTIONAL SERIES

inch					EDP NO.	
CUTTING DIAMETER DC	INNER CUTTING DIAMETER DCX	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	Ti-NAMITE-A (TA)	Ti-NAMITE-M (TM)
0.6050	0.384	5/8	0.410	3-1/2	37391	37390

- Five-flute design allows for higher machining parameters.
- Open end work design allows for increased chip space.
- Square end configuration with enhanced corner strength to improve corner durability.
- Meets MIL-STD 1913.

FRACTIONAL

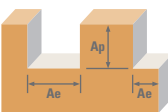
Picatinny Rail Ferrous Recoil Groove Tool

Picatinny Rail Ferrous Recoil Groove Tool 3 Flute Made to MIL-STD-1913						Vc (sfm)		DC • in	
Hardness				Ae x DC	Ap x DC			0.2100	
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Slot 	0.210	0.118	440 (352-528)	RPM	8004	
							Fz	0.0009	
							Feed (ipm)	22.99	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Slot 	0.210	0.118	250 (200-300)	RPM	4548	
							Fz	0.0006	
							Feed (ipm)	9.79	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Slot 	0.210	0.118	390 (312-468)	RPM	7094	
							Fz	0.0007	
							Feed (ipm)	17.01	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Slot 	0.210	0.118	270 (216-324)	RPM	4911	
							Fz	0.0006	
							Feed (ipm)	9.41	
STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Slot 	0.210	0.118	250 (200-300)	RPM	4548		
						Fz	0.0006		
						Feed (ipm)	8.74		
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Slot 	0.210	0.118	270 (216-324)	RPM	4911	
							Fz	0.0006	
							Feed (ipm)	9.41	
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075			Tool not recommended for this material group					
	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B-390			Tool not recommended for this material group					
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass			Tool not recommended for this material group					
	PLASTICS Polycarbonate, PVC, Polypropylene			Tool not recommended for this material group					
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Slot 	0.210	0.118	65 (52-78)	RPM	1182	
							Fz	0.0005	
							Feed (ipm)	2.00	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Slot 	0.210	0.118	49 (39-59)	RPM	891	
							Fz	0.0004	
							Feed (ipm)	1.05	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Slot 	0.210	0.118	170 (136-204)	RPM	3092	
							Fz	0.0006	
							Feed (ipm)	5.89	
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Slot 	0.210	0.118	60 (48-72)	RPM	1091	
							Fz	0.0006	
							Feed (ipm)	2.09	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Slot 	0.210	0.118	145 (116-174)	RPM	2638	
							Fz	0.0005	
							Feed (ipm)	4.47	

Bhn (Brinell) HRc (Rockwell C)
when recommended speed exceeds your capability, use maximum available and recalculate ipm
rpm = Vc x 3.82 / DC
ipm = Fz x 3 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

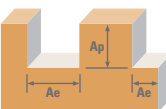
FRACTIONAL

Picatinny Rail Non-Ferrous Recoil Groove Tool

Picatinny Rail Non-Ferrous Recoil Groove Tool 3 Flute Made to MIL-STD-1913						Vc (sfm)	DC • in	
Hardness				Ae x DC	Ap x DC		0.2100	
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536			Tool not recommended for this material group				
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100			Tool not recommended for this material group				
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F			Tool not recommended for this material group				
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L			Tool not recommended for this material group				
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450			Tool not recommended for this material group				
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile			Tool not recommended for this material group				
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Slot 	0.210	0.118	1600 (1280-1920)	RPM	29105
							Fz	0.0026
							Feed (ipm)	227.89
	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B-390	≤ 125 Bhn or ≤ 77 HRb	Slot 	0.210	0.118	600 (480-720)	RPM	10914
							Fz	0.0026
							Feed (ipm)	85.46
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Slot 	0.210	0.118	345 (276-414)	RPM	6276
							Fz	0.0022
							Feed (ipm)	40.79
	PLASTICS Polycarbonate, PVC, Polypropylene		Slot 	0.210	0.118	1600 (1280-1920)	RPM	29105
Fz							0.0044	
Feed (ipm)							380.58	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400			Tool not recommended for this material group				
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene			Tool not recommended for this material group				
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si			Tool not recommended for this material group				
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al			Tool not recommended for this material group				
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2			Tool not recommended for this material group				

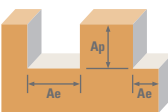
Bhn (Brinell) HRc (Rockwell C)
when recommended speed exceeds your capability, use maximum available and recalculate ipm
rpm = Vc x 3.82 / DC
ipm = Fz x 3 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Picatinny Rail Ferrous Dovetail Form Tool

Picatinny Rail Ferrous Dovetail Form Tool 5 Flute Made to MIL-STD-1913						Vc (sfm)		DC • in	
Hardness				Ae x DC	Ap x DC			0.6050	
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ .50	APMX	450 (360-540)	RPM	2841	
							Fz	0.0032	
							Feed (ipm)	46.03	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ .50	APMX	260 (208-312)	RPM	1642	
							Fz	0.0024	
							Feed (ipm)	19.68	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ .50	APMX	400 (320-480)	RPM	2526	
							Fz	0.0024	
							Feed (ipm)	30.28	
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile 	≤ .50	APMX	280 (224-336)	RPM	1768	
							Fz	0.0019	
							Feed (ipm)	16.61	
STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Profile 	≤ .50	APMX	260 (208-312)	RPM	1642		
						Fz	0.0019		
						Feed (ipm)	15.42		
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile 	≤ .50	APMX	280 (224-336)	RPM	1768	
							Fz	0.0029	
							Feed (ipm)	25.78	
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075			Tool not recommended for this material group					
	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B-390			Tool not recommended for this material group					
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass			Tool not recommended for this material group					
	PLASTICS Polycarbonate, PVC, Polypropylene			Tool not recommended for this material group					
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile 	≤ .50	APMX	75 (60-90)	RPM	474	
							Fz	0.0018	
							Feed (ipm)	4.22	
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile 	≤ .50	APMX	60 (48-72)	RPM	379	
							Fz	0.0013	
							Feed (ipm)	2.39	
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile 	≤ .50	APMX	180 (144-216)	RPM	1137	
							Fz	0.0021	
							Feed (ipm)	11.97	
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile 	≤ .50	APMX	70 (56-84)	RPM	442	
Fz							0.0021		
Feed (ipm)							4.65		
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile 	≤ .50	APMX	145 (116-174)	RPM	916	
							Fz	0.0019	
							Feed (ipm)	8.60	

Bhn (Brinell) HRc (Rockwell C)
when recommended speed exceeds your capability, use maximum available and recalculate ipm
rpm = Vc x 3.82 / DC
ipm = Fz x 5 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Picatinny Rail Non-Ferrous Dovetail Form Tool

Picatinny Rail Non-Ferrous Dovetail Form Tool 3 Flute Made to MIL-STD-1913						Vc (sfm)	DC • in	
Hardness				Ae x DC	Ap x DC		0.6050	
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536			Tool not recommended for this material group				
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100			Tool not recommended for this material group				
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F			Tool not recommended for this material group				
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L			Tool not recommended for this material group				
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450			Tool not recommended for this material group				
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile			Tool not recommended for this material group				
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile 	≤ .50	APMX	2000 (1600-2400)	RPM	12628
							Fz	0.0056
							Feed (ipm)	211.39
	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B-390	≤ 125 Bhn or ≤ 77 HRb	Profile 	≤ .50	APMX	750 (600-900)	RPM	4736
							Fz	0.0056
							Feed (ipm)	79.27
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile 	≤ .50	APMX	430 (344-516)	RPM	2715
							Fz	0.0046
							Feed (ipm)	37.72
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile 	≤ .50	APMX	2000 (1600-2400)	RPM	12628
							Fz	0.0093
							Feed (ipm)	353.03
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400			Tool not recommended for this material group				
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene			Tool not recommended for this material group				
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si			Tool not recommended for this material group				
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al			Tool not recommended for this material group				
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2			Tool not recommended for this material group				

Bhn (Brinell) HRc (Rockwell C)
when recommended speed exceeds your capability, use maximum available and recalculate ipm
rpm = Vc x 3.82 / DC
ipm = Fz x 3 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

High Performance Aluminum End Mills



 Milling

Please put "S" at the beginning of all page numbers below.

HIGH PERFORMANCE ALUMINUM END MILLS	SERIES	DESCRIPTION	PAGE
S-Carb APR [®] & APF [®]	43APR-3	3 Flute Advanced Productivity Rougher Fractional	127
	43APR-3	3 Flute Advanced Productivity Rougher Metric	129
	43APR-4	4 Flute Advanced Productivity Rougher Metric	130
	43APF	4 Flute Advanced Productivity Finisher Fractional	132
	43MAPF	4 Flute Advanced Productivity Finisher Metric	134
S-Carb [®] (3 Flute)	43	3 Flute Non-Ferrous Square End Fractional	136
	43CR	3 Flute Non-Ferrous Corner Radius Fractional	136
	43L	3 Flute Non-Ferrous Square End Long Reach Fractional	140
	43LC	3 Flute Non-Ferrous Corner Radius End Long Reach Fractional	140
	43EC	3 Flute Non-Ferrous Square End Extra Long Reach Fractional	143
	43B	3 Flute Non-Ferrous Ball End Fractional	144
	43LB	3 Flute Non-Ferrous Ball End Long Reach Fractional	145
	43EB	3 Flute Non-Ferrous Ball End Extra Long Reach Fractional	145
	43M	3 Flute Non-Ferrous Square End Metric (Unpolished Flutes)	149
	43M	3 Flute Non-Ferrous Square End Metric (Polished Flutes)	149
	43MCR	3 Flute Non-Ferrous Corner Radius Metric (Unpolished Flutes)	149
	43MCR	3 Flute Non-Ferrous Corner Radius Metric (Polished Flutes)	149
	43MCR	3 Flute Non-Ferrous Corner Radius 4xD Metric (Polished Flutes)	149
	43ML	3 Flute Non-Ferrous Square End Long Reach Metric	152
	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)	152
	43MB	3 Flute Non-Ferrous Ball End Metric (Polished Flutes)	154
S-Carb [®] Rougher (3 Flute)	43CB	3 Flute Rougher Non-Ferrous Chip Breaker Fractional	146
	43LCB	3 Flute Rougher Non-Ferrous Chip Breaker Long Reach Fractional	147
	43MCB	3 Flute Rougher Non-Ferrous Chip Breaker Metric	155
S-Carb [®] (2 Flute)	47	2 Flute Non-Ferrous Square End Fractional	157
	47L	2 Flute Non-Ferrous Square End Long Reach Fractional	157
	47B	2 Flute Non-Ferrous Ball End Fractional	158
	47LB	2 Flute Non-Ferrous Ball End Long Reach Fractional	158
	47M	2 Flute Non-Ferrous Square End Metric	160
	47ML	2 Flute Non-Ferrous Square End Long Reach Metric	160
	47MB	2 Flute Non-Ferrous Ball End Metric	161
	47MLB	2 Flute Non-Ferrous Ball End Long Reach Metric	161
Ski-Carb	44	2 Flute Non-Ferrous Materials Square End Fractional	163
	44M	2 Flute Non-Ferrous Materials Square End Metric	163
	45	2 Flute Non-Ferrous Materials Long Reach Corner Radius Fractional	166

Speed & Feed Recommendations listed after each series

Please put "S" at the beginning of all page numbers below.

FRESAS DE ALTO RENDIMIENTO PARA ALUMINIO	SERIE	DESCRIPCIÓN	PÁGINA
S-Carb APR® y APF®	43APR-3	3 filos, productividad avanzada, desbastador, fraccional	127
	43APR-3	3 filos, productividad avanzada, desbastador, métrico	129
	43APR-4	4 filos, productividad avanzada, desbastador, métrico	130
	43APF	4 filos, productividad avanzada, acabador, fraccional	132
	43MAPF	4 filos, productividad avanzada, acabador, métrico	134
S-Carb® (3 filos)	43	3 filos, no férrico, punta cuadrada, fraccional	136
	43CR	3 filos, no férrico, radio angulado, fraccional	136
	43L	3 filos, no férrico, punta cuadrada, largo alcance, fraccional	140
	43LC	3 filos, no férricos, largo alcance, radio angulado, fraccional	140
	43EC	3 filos, no férrico, punta cuadrada, alcance extralargo, fraccional	143
	43B	3 filos, no férrico, punta esférica, fraccional	144
	43LB	3 filos, no férrico, punta esférica, largo alcance, fraccional	145
	43EB	3 filos, no férrico, punta esférica, alcance extralargo, fraccional	145
	43M	3 filos, no férrico, punta cuadrada, métrico (filos no pulidos)	149
	43M	3 filos, no férrico, punta cuadrada, métrico (filos pulidos)	149
	43MCR	3 filos, no férrico, radio angulado, métrico (filos no pulidos)	149
	43MCR	3 filos, no férrico, radio angulado, métrico (filos pulidos)	149
	43MCR	3 filos, no férrico, radio angulado 4xD, métrico (filos pulidos)	149
	43ML	3 filos, no férrico, punta cuadrada, largo alcance, métrico	152
	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)	152
	43MB	3 filos, no férrico, punta esférica, métrico (filos pulidos)	154
Desbastador S-Carb® (3 filos)	43CB	3 filos, desbastador, no férrico, rompevirutas, fraccional	146
	43LCB	3 filos, desbastador, no férrico, rompevirutas, largo alcance, fraccional	147
	43MCB	3 filos, desbastador, no férrico, rompevirutas, métrico	155
S-Carb® (2 filos)	47	2 filos, no férrico, punta cuadrada, fraccional	157
	47L	2 filos, no férrico, punta cuadrada, largo alcance, fraccional	157
	47B	2 filos, no férrico, punta esférica, fraccional	158
	47LB	2 filos, no férrico, punta esférica, largo alcance, fraccional	158
	47M	2 filos, no férrico, punta cuadrada, métrico	160
	47ML	2 filos, no férrico, punta cuadrada, largo alcance, métrico	160
	47MB	2 filos, no férrico, punta esférica, métrico	161
Ski-Carb	47MLB	2 filos, no férrico, punta esférica, largo alcance, métrico	161
	44	2 filos, materiales no férricos, punta cuadrada, fraccional	163
	44M	2 filos, materiales no férricos, punta cuadrada, métrico	163
	45	2 filos, materiales no férricos, largo alcance, radio angulado, fraccional	166

Recomendaciones de velocidades y avances mostradas tras cada serie

Please put "S" at the beginning of all page numbers below.

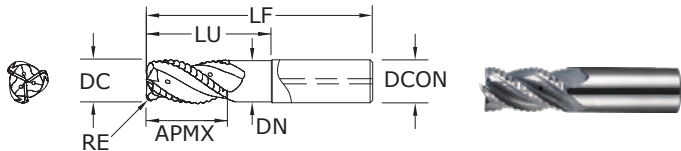
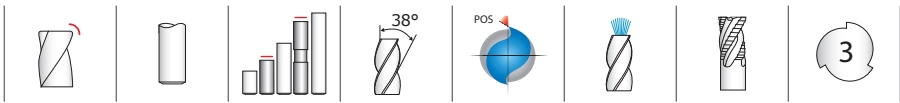
FRAISE HAUTE PERFORMANCE POUR ALUMINIUM	SÉRIES	DESCRIPTION	PAGE
S-Carb APR®/APF®	43APR-3	3 dents productivité avancée d'ébauche (fractionnel)	127
	43APR-3	3 dents productivité avancée d'ébauche (métrique)	129
	43APR-4	4 dents productivité avancée d'ébauche (métrique)	130
	43APF	4 dents productivité avancée de finition (fractionnel)	132
	43MAPF	4 dents productivité avancée de finition (métrique)	134
S-Carb® (3 dents)	43	3 dents non-ferreux non rayonné (fractionnel)	136
	43CR	3 dents non-ferreux rayonné (fractionnel)	136
	43L	3 dents non-ferreux non rayonné longue portée (fractionnel)	140
	43LC	3 dents non-ferreux longue portée rayonné (fractionnel)	140
	43EC	3 dents non-ferreux non rayonné portée extra-longue (fractionnel)	143
	43B	3 dents non-ferreux à bout hémisphérique (fractionnel)	144
	43LB	3 dents non-ferreux à bout hémisphérique longue portée (fractionnel)	145
	43EB	3 dents non-ferreux à bout hémisphérique portée extra-longue (fractionnel)	145
	43M	3 dents non-ferreux non rayonné (métrique) (goujures non polies)	149
	43M	3 dents non-ferreux non rayonné (métrique) (goujures polies)	149
	43MCR	3 dents matériaux non-ferreux rayonné (métrique) (goujures non polies)	149
	43MCR	3 dents matériaux non-ferreux rayonné (métrique) (goujures polies)	149
	43MCR	3 dents matériaux non-ferreux rayonné 4xD (métrique) (goujures polies)	149
	43MLC	3 dents non-ferreux longue portée rayonné (métrique) (goujures non polies)	152
	43MLC	3 dents non-ferreux longue portée rayonné (métrique) (goujures polies)	152
	43ML	3 dents non-ferreux non rayonné longue portée (métrique)	152
	43MB	3 dents non-ferreux à bout hémisphérique (métrique) (goujures polies)	154
S-Carb® d'ébauche (3 dents)	43CB	3 dents d'ébauche non-ferreux brise-copeaux (fractionnel)	146
	43LCB	3 dents d'ébauche non-ferreux brise-copeaux longue portée (fractionnel)	147
	43MCB	3 dents d'ébauche non-ferreux brise-copeaux (métrique)	155
S-Carb® (2 dents)	47	2 dents non-ferreux non rayonné (fractionnel)	157
	47L	2 dents non-ferreux non rayonné longue portée (fractionnel)	157
	47B	2 dents non-ferreux à bout hémisphérique (fractionnel)	158
	47LB	2 dents non-ferreux à bout hémisphérique longue portée (fractionnel)	158
	47M	2 dents non-ferreux non rayonné (métrique)	160
	47ML	2 dents non-ferreux non rayonné longue portée (métrique)	160
	47MB	2 dents non-ferreux à bout hémisphérique (métrique)	161
Ski-Carb	47MLB	2 dents non-ferreux à bout hémisphérique longue portée (métrique)	161
	44	2 dents matériaux non-ferreux non rayonné (fractionnel)	163
	44M	2 dents matériaux non-ferreux non rayonné (métrique)	163
	45	2 dents matériaux non-ferreux longue portée rayonné (fractionnel)	166

Recommandations de vitesse et avance indiquées après chaque série



HOCHLEISTUNGSSCHAFTFRÄSER FÜR ALUMINIUM	SERIE	BESCHREIBUNG	SEITE
S-Carb APR® & APF®	43APR-3	Hochleistungs-Schruppfräser mit 3 Schneiden	127
	43APR-3	Hochleistungs-Schruppfräser mit 3 Schneiden (Erweiterung)	129
	43APR-4	Hochleistungs-Schruppfräser mit 4 Schneiden	130
	43APF	Zölliger Hochleistungs-Schlichtfräser mit 4 Schneiden	132
	43MAPF	Hochleistungs-Schlichtfräser mit 4 Schneiden	134
S-Carb® (3 Schneiden)	43	Zölliger NE-Schaftfräser mit 3 Schneiden ohne Eckenradien	136
	43CR	Zölliger NE-Fräser mit 3 Schneiden und Eckenradien	136
	43L	Zölliger NE-Langloch-Schaftfräser mit 3 Schneiden ohne Eckenradien	140
	43LC	Zölliger Langlochfräser mit 3 Schneiden und Eckenradien	140
	43EC	Zölliger NE-Superlangloch-Schaftfräser mit 3 Schneiden ohne Eckenradien	143
	43B	Zölliger NE-Radiusschaftfräser mit 3 Schneiden	144
	43LB	Zölliger NE-Langloch-Radiusschaftfräser mit 3 Schneiden	145
	43EB	Zölliger NE-Superlangloch-Radiusschaftfräser mit 3 Schneiden	145
	43M	NE-Schaftfräser mit 3 unpolierten Schneiden ohne Eckenradien	149
	43M	NE-Schaftfräser mit 3 polierten Schneiden ohne Eckenradien	149
S-Carb® Schruppfräser (3 Schneiden)	43MCR	NE-Fräser mit 3 unpolierten Schneiden und Eckenradien	149
	43MCR	NE-Fräser mit 3 polierten Schneiden und Eckenradien	149
	43MCR	NE-Fräser 4xD mit 3 polierten Schneiden und Eckenradien	149
	43ML	NE-Langloch-Schaftfräser mit 3 Schneiden ohne Eckenradien	152
	43MLC	NE-Langlochfräser mit 3 unpolierten Schneiden und Eckenradien	152
	43MLC	NE-Langlochfräser mit 3 polierten Schneiden und Eckenradien	152
	43MB	NE-Radiusschaftfräser mit 3 polierten Schneiden	154
	43CB	Zölliger NE-Schruppfräser mit 3 Schneiden und Spanbrechern	146
	43LCB	Zölliger NE-Langloch-Schruppfräser mit 3 Spanteilernuten	147
	43MCB	NE-Schruppfräser mit 3 Schneiden und Spanbrechern	155
S-Carb® (2 Schneiden)	47	Zölliger NE-Schaftfräser mit 2 Schneiden ohne Eckenradien	157
	47L	Zölliger NE-Langloch-Schaftfräser mit 2 Schneiden ohne Eckenradien	157
	47B	Zölliger NE-Radiusschaftfräser mit 2 Schneiden	158
	47LB	Zölliger NE-Langloch-Radiusschaftfräser mit 2 Schneiden	158
	47M	NE-Schaftfräser mit 2 Schneiden ohne Eckenradien	160
	47ML	NE-Langloch-Schaftfräser mit 2 Schneiden ohne Eckenradien	160
Ski-Carb	47MB	NE-Radiusschaftfräser mit 2 Schneiden	161
	47MLB	NE-Langloch-Radiusschaftfräser mit 2 Schneiden	161
	44	Zölliger NE-Schaftfräser mit 2 Schneiden ohne Eckenradien	163
	44M	NE-Schaftfräser mit 2 Schneiden ohne Eckenradien	163
	45	Zölliger Langlochfräser mit 2 Schneidenn und Eckenradien für Nichteisenmetalle	166

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie



43APR-3
FRACTIONAL SERIES

TOLERANCES (inch)

1/2–1 DIAMETER
DC = -0.0004/-0.004
DCON = h₆
RE = +/-0.002

NON-FERROUS

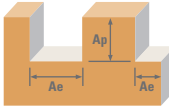
For patent
information visit
www.ksptpatents.com

mm							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	Ti-NAMITE-B (TiB ₂)
1/2	1	3-1/4	1/2	1-1/2	.474	.030	34100
1/2	1	3-1/4	1/2	1-1/2	.474	.060	34101
1/2	1	3-1/4	1/2	1-1/2	.474	.090	34102
1/2	1	3-1/4	1/2	1-1/2	.474	.120	34103
5/8	1-3/8	3-5/8	5/8	2	.594	.030	34104*
5/8	1-3/8	3-5/8	5/8	2	.594	.060	34105*
5/8	1-3/8	3-5/8	5/8	2	.594	.090	34106*
5/8	1-3/8	3-5/8	5/8	2	.594	.120	34107*
5/8	1-3/8	4-1/4	5/8	2-5/8	.594	.030	34108*
5/8	1-3/8	4-1/4	5/8	2-5/8	.594	.060	34109*
5/8	1-3/8	4-1/4	5/8	2-5/8	.594	.090	34110*
5/8	1-3/8	4-1/4	5/8	2-5/8	.594	.120	34111*
3/4	1-3/8	3-5/8	3/4	1-3/4	.713	.030	34112
3/4	1-3/8	3-5/8	3/4	1-3/4	.713	.060	34113
3/4	1-3/8	3-5/8	3/4	1-3/4	.713	.090	34114
3/4	1-3/8	3-5/8	3/4	1-3/4	.713	.120	34115
3/4	1-3/8	4-3/8	3/4	2-1/2	.713	.030	34116*
3/4	1-3/8	4-3/8	3/4	2-1/2	.713	.060	34117*
3/4	1-3/8	4-3/8	3/4	2-1/2	.713	.090	34118*
3/4	1-3/8	4-3/8	3/4	2-1/2	.713	.120	34119*
3/4	1-3/8	5-1/4	3/4	3-1/4	.713	.030	34120*
3/4	1-3/8	5-1/4	3/4	3-1/4	.713	.060	34121*
3/4	1-3/8	5-1/4	3/4	3-1/4	.713	.090	34122*
3/4	1-3/8	5-1/4	3/4	3-1/4	.713	.120	34123*
1	1-3/4	4-1/2	1	2-1/2	.949	.030	34124
1	1-3/4	4-1/2	1	2-1/2	.949	.060	34125
1	1-3/4	4-1/2	1	2-1/2	.949	.090	34126
1	1-3/4	4-1/2	1	2-1/2	.949	.120	34127
1	1-3/4	5-1/4	1	3-1/4	.949	.030	34128*
1	1-3/4	5-1/4	1	3-1/4	.949	.060	34129*
1	1-3/4	5-1/4	1	3-1/4	.949	.090	34130*
1	1-3/4	5-1/4	1	3-1/4	.949	.120	34131*
1	1-3/4	6-1/4	1	4-1/4	.949	.030	34132*
1	1-3/4	6-1/4	1	4-1/4	.949	.060	34133*
1	1-3/4	6-1/4	1	4-1/4	.949	.090	34134*
1	1-3/4	6-1/4	1	4-1/4	.949	.120	34135*

*Variable Helix

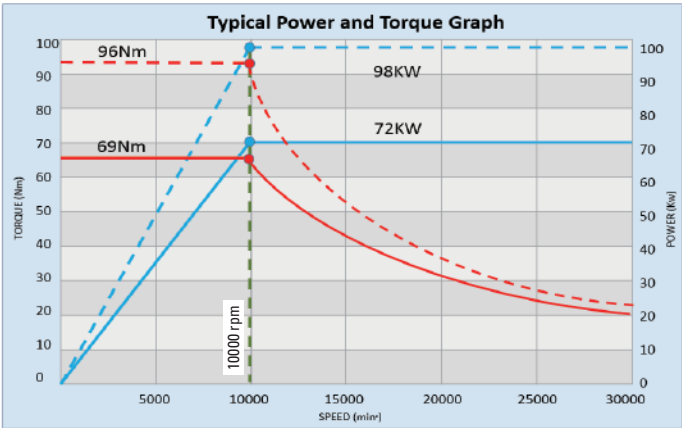
- Ultra high-productivity rougher for Aluminum alloys, specifically for aircraft components
- Designed for machine tools with capability of 12 f³ per minute material removal rates
- New 3 flute variable geometry with side exit coolant holes
- Open fluting for deep slotting and profiling
- Recommended for materials ≤ 150 Bhn (≤ 7 HRc)

FRACTIONAL
S-Carb APR®

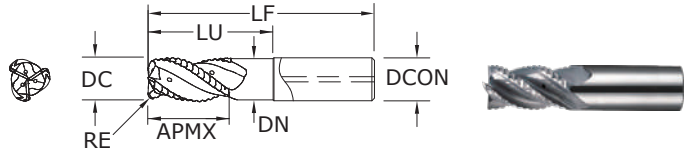
Series 43APR-3 Fractional				DC • inch			
				APR-3			
				0.75		1	
N		1	≤ 1	5250	RPM	26740	20055
				(980-6900)	Fz	0.0055	0.0059
					Feed (ipm)	441	355
		≤ 0.5	≤ 1.5	5900	RPM	30051	22538
				(980-6900)	Fz	0.0063	0.0067
					Feed (ipm)	568	453
		≤ 0.1	≤ 2	6900	RPM	35144	26358
				(980-6900)	Fz	0.0075	0.0079
					Feed (ipm)	791	625

Series 43APR-3L Fractional		Ae x DC		Ap x DC	Vc (sfm)	DC • inch				
						APR-3 LONG				
						0.5	0.625	0.75	1	
N	ALUMINIUM ALLOYS 6068, 7075		1	≤ 1	3280	RPM	25059	20047	16706	12530
					(980-6900)	Fz	0.0039	0.0043	0.0047	0.0051
						Feed (ipm)	293	259	236	192
			≤ 0.5	≤ 1.5	3950	RPM	30178	24142	20119	15089
					(980-6900)	Fz	0.0047	0.0051	0.0055	0.0059
						Feed (ipm)	426	369	332	267
			≤ 0.1	≤ 2	4600	RPM	35144	28115	23429	17572
					(980-6900)	Fz	0.0055	0.0059	0.0063	0.0067
						Feed (ipm)	580	498	443	353

RPM stated may be outside of most machine tools in the smaller sizes, adjust the surface speed but maintain the Fz
For best results use the peak power of the specific machine torque chart.
Typically 10hp is required to remove 45 cubic inches of material (MRR).
Eg. >> (Ae x Ap x Feed) >> Therefore Full slotting 1" dia: 1 x 1 x 355 = 355 cubic inches, so it needs a min of 78hp.
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 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 SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com).



METRIC
S-Carb APR®



43APR-3
METRIC SERIES

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	mm				EDP NO.
			SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	Ti-NAMITE-B (TiB ₂)
12,0	26,0	83,0	12,0	39,0	11,4	1,0	44976*
12,0	26,0	83,0	12,0	39,0	11,4	2,0	44977*
12,0	26,0	83,0	12,0	39,0	11,4	3,0	44978*
12,0	26,0	83,0	12,0	39,0	11,4	4,0	44979*
12,0	26,0	95,0	12,0	—	—	—	44975*
16,0	35,0	92,0	16,0	—	—	—	44980
16,0	35,0	92,0	16,0	51,0	15,2	2,0	44981*
16,0	35,0	92,0	16,0	51,0	15,2	3,0	44982*
16,0	35,0	92,0	16,0	51,0	15,2	4,0	44983*
16,0	35,0	108,0	16,0	67,0	15,2	2,0	44985*
16,0	35,0	108,0	16,0	67,0	15,2	3,0	44986*
16,0	35,0	108,0	16,0	67,0	15,2	4,0	44987*
16,0	35,0	124,0	16,0	—	—	—	44984
20,0	35,0	86,0	20,0	—	—	—	44990
20,0	35,0	86,0	20,0	45,0	19,4	3,0	44991
20,0	35,0	86,0	20,0	45,0	19,4	4,0	44992
20,0	35,0	106,0	20,0	—	—	—	44993
20,0	35,0	106,0	20,0	65,0	19,4	2,0	44994*
20,0	35,0	106,0	20,0	65,0	19,4	3,0	44995*
20,0	35,0	106,0	20,0	65,0	19,4	4,0	44996*
20,0	35,0	106,0	20,0	65,0	19,4	5,0	44997*
20,0	35,0	125,0	20,0	84,0	19,0	2,0	45021*
20,0	35,0	125,0	20,0	84,0	19,0	3,0	45022*
20,0	35,0	125,0	20,0	84,0	19,0	4,0	45023*
20,0	35,0	145,0	20,0	—	—	—	45020
25,0	43,0	108,0	25,0	—	—	—	44998
25,0	43,0	108,0	25,0	60,0	24,4	2,0	44999
25,0	43,0	108,0	25,0	60,0	24,4	3,0	45000
25,0	43,0	108,0	25,0	60,0	24,4	4,0	45001
25,0	35,0	140,0	25,0	—	—	—	45002
25,0	35,0	140,0	25,0	80,0	24,4	3,0	45003*
25,0	35,0	140,0	25,0	90,0	24,4	3,0	45004*
25,0	35,0	151,0	25,0	—	—	—	45024
25,0	35,0	151,0	25,0	105,0	23,7	3,0	45025*

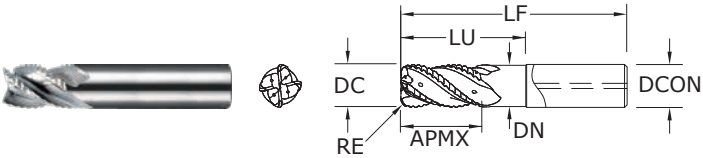
*Variable Helix

- 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 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
- 4 flute variable geometry with side exit coolant holes
- Open fluting for deep slotting and profiling
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



mm							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	Ti-NAMITE-B (TiB ₂)
20,0	35,0	86,0	20,0	—	18,97	—	45005
20,0	35,0	86,0	20,0	45,0	19,00	3,0	45006
20,0	35,0	86,0	20,0	45,0	19,00	4,0	45007
20,0	35,0	106,0	20,0	—	19,00	—	45008
20,0	35,0	106,0	20,0	65,0	19,00	2,0	45009
20,0	35,0	106,0	20,0	65,0	19,00	3,0	45010
20,0	35,0	106,0	20,0	65,0	19,00	4,0	45011
20,0	35,0	106,0	20,0	65,0	19,00	5,0	45012
25,0	43,0	108,0	25,0	—	23,75	—	45013
25,0	43,0	108,0	25,0	60,0	23,75	2,0	45014
25,0	43,0	108,0	25,0	60,0	23,75	3,0	45015
25,0	43,0	108,0	25,0	60,0	23,75	4,0	45016
25,0	35,0	140,0	25,0	—	23,75	—	45017
25,0	35,0	140,0	25,0	80,0	23,75	3,0	45018
25,0	35,0	140,0	25,0	90,0	23,75	3,0	45019

TOLERANCES (mm)

20–25 DIAMETER

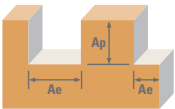
DC = −0,010/−0,100

DCON = h₆

RE = ±0,050

NON-FERROUS

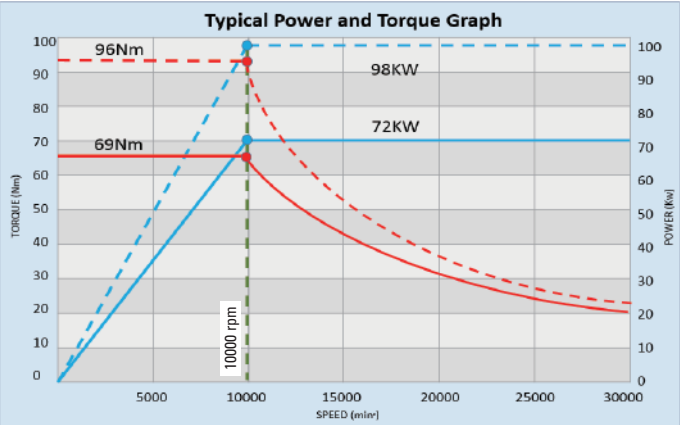
For patent information visit www.ksptpatents.com



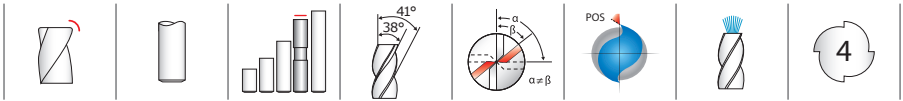
Series 43APR-3 43APR-4 Metric		Ae x DC		Ap x DC		Vc (m/min)		DC • mm			
								APR-3		APR-4	
								20	25	20	25
N	ALUMINIUM ALLOYS 6068, 7075		1	≤ 1	1600	RPM	25461	20369	25461	20369	
					(300-2100)	Fz	0.14	0.15	0.12	0.13	
					Feed (mm/min)	10694	9166	12222	10592		
			≤ 0.5	≤ 1.5	1800	RPM	28644	22915	28644	22915	
					(300-2100)	Fz	0.16	0.17	0.14	0.15	
					Feed (mm/min)	13749	11687	16041	13749		
		≤ 0.1	≤ 2	2100	RPM	33418	26735	33418	26735		
				(300-2100)	Fz	0.19	0.20	0.16	0.17		
				Feed (mm/min)	19048	16041	21388	18180			

Series 43APR-3 43APR-4 Metric					DC • mm					
					APR-3 LONG					
					12	16	20	25		
N	ALUMINIUM ALLOYS 6068, 7075		1	≤ 1	1600	RPM	26522	19892	15913	12731
					(300-2100)	Fz	0.10	0.11	0.12	0.13
						Feed (mm/min)	7957	6564	5729	4965
			≤ 0.5	≤ 1.5	1800	RPM	31827	23870	19096	15277
					(300-2100)	Fz	0.12	0.13	0.14	0.15
						Feed (mm/min)	11458	9309	8020	6875
			≤ 0.1	≤ 2	2100	RPM	37131	27849	22279	17823
					(300-2100)	Fz	0.14	0.15	0.16	0.17
						Feed (mm/min)	15595	12532	10694	9090

RPM stated may be outside of most machine tools in the smaller sizes, adjust the surface speed but maintain the Fz
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. >> (Ae x Ap x Feed) / 1000000 >> Therefore Full slotting Ø25: 25 x 25 x 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 SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com).

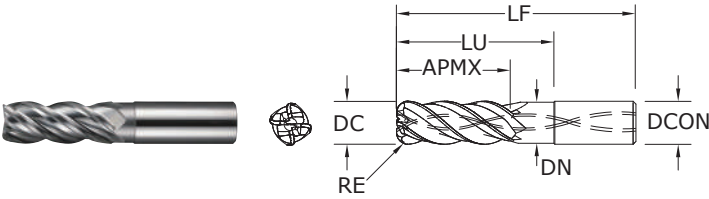


FRACTIONAL
S-Carb APF®



43APF
FRACTIONAL 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)



inch							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	Ti-NAMITE-B (TiB ₂)
1/2	1-1/4	3-1/4	1/2	1-5/8	.478	.030	34016
1/2	1-1/4	3-1/4	1/2	1-5/8	.478	.060	34017
1/2	1-1/4	3-1/4	1/2	1-5/8	.478	.090	34018
1/2	1-1/4	3-1/4	1/2	1-5/8	.478	.120	34019
1/2	2	4	1/2	2-3/8	.478	.030	34020
1/2	2	4	1/2	2-3/8	.478	.060	34021
1/2	2	4	1/2	2-3/8	.478	.090	34022
1/2	2	4	1/2	2-3/8	.478	.120	34023
3/4	1-7/8	4-1/4	3/4	2-3/8	.728	.030	34024
3/4	1-7/8	4-1/4	3/4	2-3/8	.728	.060	34025
3/4	1-7/8	4-1/4	3/4	2-3/8	.728	.090	34026
3/4	1-7/8	4-1/4	3/4	2-3/8	.728	.120	34027
3/4	3	5-3/8	3/4	3-1/2	.728	.030	34028
3/4	3	5-3/8	3/4	3-1/2	.728	.060	34029
3/4	3	5-3/8	3/4	3-1/2	.728	.090	34030
3/4	3	5-3/8	3/4	3-1/2	.728	.120	34031

Available on request: • JetStream Technology



TOLERANCES (inch)

1/2–3/4 DIAMETER

DC = -0.0004/-0.0020

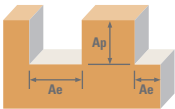
DCON = h₆

RE = +0.0000/-0.0012

NON-FERROUS

For patent information visit www.ksptpatents.com

FRACTIONAL
S-Carb APF®

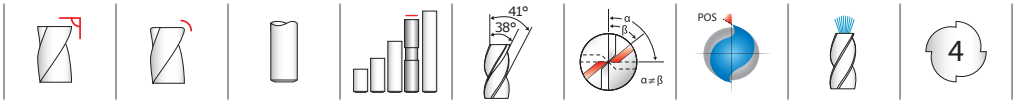


Series 43APF Fractional	Hardness	Ae x DC	Ap x DC	Vc (sfm)	DC • in	
					1/2	3/4
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	Profile	≤ 0.1	2625 (2100-3150)	RPM	20055
					Fz	0.0030
		Profile	≤ 2.5	2625 (2100-3150)	Feed (in/min)	241
						267
	ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	Profile	≤ 0.1	2625 (2100-3150)	RPM	20055
					Fz	0.0020
		Profile	≤ 4	2625 (2100-3150)	Feed (in/min)	160
						214
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	Profile	≤ 0.1	1970 (1576-2364)	RPM	15051
					Fz	0.0030
		Profile	≤ 2.5	1970 (1576-2364)	Feed (in/min)	181
						201
	ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	Profile	≤ 0.1	1970 (1576-2364)	RPM	15051
					Fz	0.0020
		Profile	≤ 4	1970 (1576-2364)	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 x 3.82 / DC
ipm = Fz x 4 x 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 DC maximum
ramp angle = 6° (feed rate = 50%)
plunging not recommended
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgtool.com)

METRIC

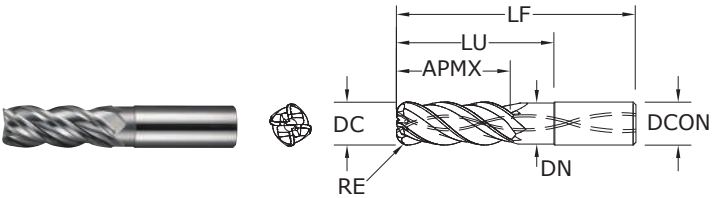
S-Carb APF®



43MAPF

METRIC SERIES

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



mm							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	Ti-NAMITE-B (TiB ₂)
6,0	24,0	58,0	6,0	30,0	5,66	—	44627
8,0	32,0	64,0	8,0	40,0	7,57	—	44628
10,0	40,0	80,0	10,0	50,0	9,47	—	44629
12,0	30,0	83,0	12,0	40,0	11,38	—	44630
12,0	30,0	83,0	12,0	40,0	11,38	2,0	44745
12,0	30,0	83,0	12,0	40,0	11,38	3,0	44746
12,0	30,0	83,0	12,0	40,0	11,38	4,0	44747
12,0	30,0	83,0	12,0	50,0	11,38	0,5	44641
12,0	30,0	83,0	12,0	50,0	11,38	5,0	44642
12,0	48,0	100,0	12,0	62,0	11,38	—	44631
12,0	48,0	100,0	12,0	62,0	11,38	2,0	44748
12,0	48,0	100,0	12,0	62,0	11,38	3,0	44749
12,0	48,0	100,0	12,0	62,0	11,38	4,0	44750
16,0	40,0	92,0	16,0	51,0	15,16	—	44634
16,0	40,0	92,0	16,0	51,0	15,16	2,0	44751
16,0	40,0	92,0	16,0	51,0	15,16	3,0	44752
16,0	40,0	92,0	16,0	51,0	15,16	4,0	44753
16,0	42,0	93,0	16,0	51,0	15,16	5,0	44643
16,0	64,0	125,0	16,0	82,0	15,16	—	44635
16,0	64,0	125,0	16,0	82,0	15,16	2,0	44754
16,0	64,0	125,0	16,0	82,0	15,16	3,0	44755
16,0	64,0	125,0	16,0	82,0	15,16	4,0	44756
20,0	50,0	108,0	20,0	63,0	18,97	—	44636
20,0	50,0	108,0	20,0	63,0	18,97	3,0	44757
20,0	50,0	108,0	20,0	63,0	18,97	4,0	44758
20,0	50,0	108,0	20,0	63,0	18,97	5,0	44759
20,0	80,0	150,0	20,0	102,0	18,97	—	44637
20,0	80,0	150,0	20,0	102,0	18,97	3,0	44760
20,0	80,0	150,0	20,0	102,0	18,97	4,0	44761
20,0	80,0	150,0	20,0	102,0	18,97	5,0	44762
25,0	63,0	130,0	25,0	79,0	23,75	—	44638
25,0	63,0	130,0	25,0	79,0	23,75	3,0	44763
25,0	63,0	130,0	25,0	79,0	23,75	4,0	44764
25,0	63,0	130,0	25,0	79,0	23,75	5,0	44765
25,0	100,0	175,0	25,0	120,0	23,75	—	44639
25,0	100,0	175,0	25,0	120,0	23,75	3,0	44766
25,0	100,0	175,0	25,0	120,0	23,75	4,0	44767
25,0	100,0	175,0	25,0	120,0	23,75	5,0	44768

Available on request: • JetStream Technology



TOLERANCES (mm)

6–25 DIAMETER

DC = −0,010/−0,050

DCON = h₆

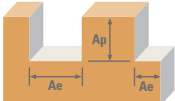
RE = +0,000/−0,030

NON-FERROUS

For patent information visit www.ksptpatents.com

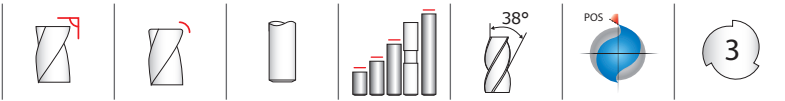
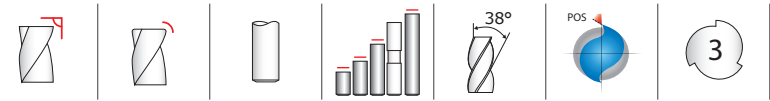
METRIC

S-Carb APF®



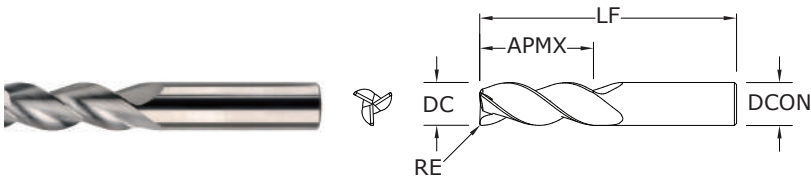
Series 43MAPF Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm								
						6	8	10	12	16	20	25		
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile 	≤ 0.1	≤ 2.5	800	RPM	42440	31830	25464	21220	15915	12732	10186
						(640-960)	Fz	0.050	0.055	0.060	0.070	0.100	0.140	0.170
							Feed (mm/min)	8488	7003	6111	5942	6366	7130	6926
		≤ 150 Bhn or ≤ 7 HRc	Profile 	≤ 0.1	≤ 4	800	RPM	42440	31830	25464	21220	15915	12732	10186
						(640-960)	Fz	0.040	0.045	0.050	0.050	0.070	0.100	0.120
							Feed (mm/min)	6790	5729	5093	4244	4456	5093	4889
	ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	≤ 150 Bhn or ≤ 7 HRc	Profile 	≤ 0.1	≤ 2.5	600	RPM	31830	23873	19098	15915	11936	9549	7639
						(480-720)	Fz	0.050	0.055	0.060	0.070	0.100	0.140	0.170
			Profile 	≤ 0.1	≤ 4	600	RPM	31830	23873	19098	15915	11936	9549	7639
						(480-720)	Fz	0.040	0.045	0.050	0.050	0.070	0.100	0.120

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



43 •
43CR
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
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



CUTTING DIAMETER DC	LENGTH OF CUT APMX	inch			EDP NO.	
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/8	3/8	1-1/2	1/8	—	34701	34728
1/8	3/8	1-1/2	1/8	.010	34771	34793
3/16	5/16	2-1/2	3/16	—	34822	34857
3/16	9/16	2	3/16	—	34702	34729
3/16	9/16	2	3/16	.010	34772	34794
3/16	3/4	2-1/2	3/16	—	34823	34858
1/4	3/8	2	1/4	—	34703	34730
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	1/2	2-1/2	1/4	—	34824	34859
1/4	3/4	2-1/2	1/4	—	34704	34731
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	—	34825	34860
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
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	5/8	2-1/2	5/16	.030	34775	34797
5/16	1-1/4	4	5/16	—	34708	34735
3/8	1/2	2	3/8	—	34709	34736
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	—	34710	34737
3/8	1	2-1/2	3/8	.010	34776	34798

continued on next page

TOLERANCES (inch)

1/8–3/16 DIAMETER

DC = +0.0000/–0.00032

DCON = h₆

RE = +0.0000/–0.0020

1/4–3/8 DIAMETER

DC = +0.0000/–0.00035

DCON = h₆

RE = +0.0000/–0.0020

1/2–5/8 DIAMETER

DC = +0.0000/–0.00043

DCON = h₆

RE = +0.0000/–0.0020

3/4–1 DIAMETER

DC = +0.0000/–0.00051

DCON = h₆

RE = +0.0000/–0.0020

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

TOLERANCES (inch)

1/8–3/16 DIAMETER

DC = +0.0000/–0.00032

DCON = h₆

RE = +0.0000/–0.0020

1/4–3/8 DIAMETER

DC = +0.0000/–0.00035

DCON = h₆

RE = +0.0000/–0.0020

1/2–5/8 DIAMETER

DC = +0.0000/–0.00043

DCON = h₆

RE = +0.0000/–0.0020

3/4–1 DIAMETER

DC = +0.0000/–0.00051

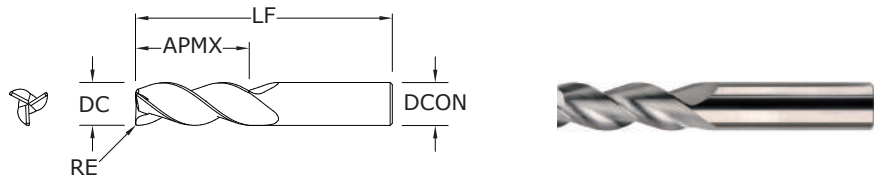
DCON = h₆

RE = +0.0000/–0.0020

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

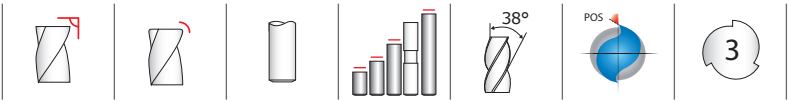
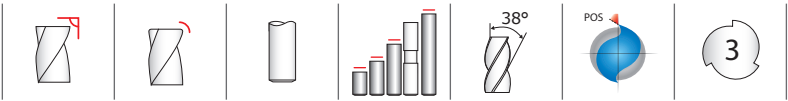


CUTTING DIAMETER DC	LENGTH OF CUT APMX	inch			EDP NO.	
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB ₂)
3/8	1	2-1/2	3/8	.030	34777	34799
3/8	1	2-1/2	3/8	.060	32761	32825
3/8	1	3	3/8	.015	35590	35680
3/8	1	3	3/8	.090	35591	35681
3/8	1-1/4	3-1/2	3/8	—	34827	34862
3/8	1-1/2	3-1/2	3/8	—	34711	34738
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
3/8	2	4	3/8	—	34828	34863
1/2	5/8	2-1/2	1/2	—	34712	34739
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
1/2	1	3	1/2	—	34830	34865
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	—	34713	34740
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	—	34831	34866
1/2	1-5/8	4	1/2	.010	35610	35700
1/2	1-5/8	4	1/2	.015	35611	35701

continued on next page

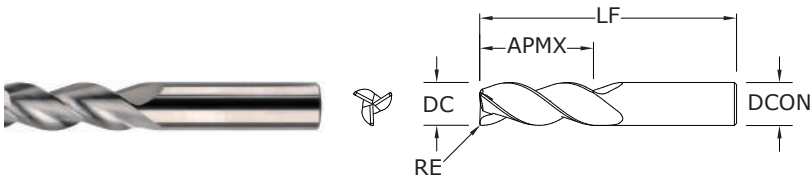
43 •
43CR
FRACTIONAL SERIES

CONTINUED



43 •
43CR
FRACTIONAL SERIES

CONTINUED



CUTTING DIAMETER DC	LENGTH OF CUT APMX	inch			EDP NO.	
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB ₂)
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
1/2	2	4	1/2	—	34714	34741
1/2	2-1/2	5	1/2	—	34832	34867
1/2	3-1/8	6	1/2	—	34715	34742
5/8	3/4	3	5/8	—	34716	34743
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	—	34717	34744
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
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	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
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	—	34721	34748
3/4	1-5/8	4	3/4	.030	34785	34807

continued on next page

TOLERANCES (inch)

1/8–3/16 DIAMETER

DC = +0.0000/–0.00032

DCON = h₆

RE = +0.0000/–0.0020

1/4–3/8 DIAMETER

DC = +0.0000/–0.00035

DCON = h₆

RE = +0.0000/–0.0020

1/2–5/8 DIAMETER

DC = +0.0000/–0.00043

DCON = h₆

RE = +0.0000/–0.0020

3/4–1 DIAMETER

DC = +0.0000/–0.00051

DCON = h₆

RE = +0.0000/–0.0020

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

TOLERANCES (inch)

1/8–3/16 DIAMETER

DC = +0.0000/–0.00032

DCON = h₆

RE = +0.0000/–0.0020

1/4–3/8 DIAMETER

DC = +0.0000/–0.00035

DCON = h₆

RE = +0.0000/–0.0020

1/2–5/8 DIAMETER

DC = +0.0000/–0.00043

DCON = h₆

RE = +0.0000/–0.0020

3/4–1 DIAMETER

DC = +0.0000/–0.00051

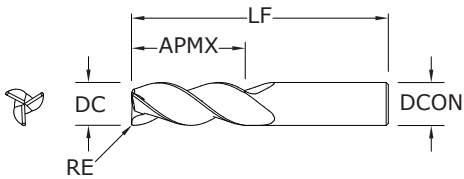
DCON = h₆

RE = +0.0000/–0.0020

NON-FERROUS

PLASTICS/COMPOSITES

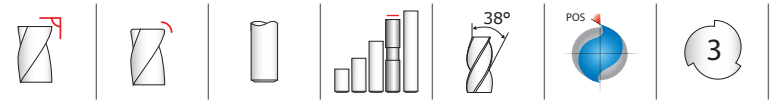
For patent
information visit
www.ksptpatents.com



CUTTING DIAMETER DC	LENGTH OF CUT APMX	inch			EDP NO.	
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB ₂)
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	—	34722	34749
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
3/4	2-1/2	5	3/4	—	34758	34765
3/4	3-1/4	6	3/4	—	34723	34750
1	1-1/4	4	1	—	34724	34751
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	4-1/2	1	—	34725	34752
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	2	5	1	.190	35647	35737
1	2	5	1	.250	35648	35738
1	2-5/8	6	1	—	34726	34753
1	3-1/4	6	1	—	34727	34754
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
1	4-1/8	7	1	—	34835	34870

43 •
43CR
FRACTIONAL SERIES

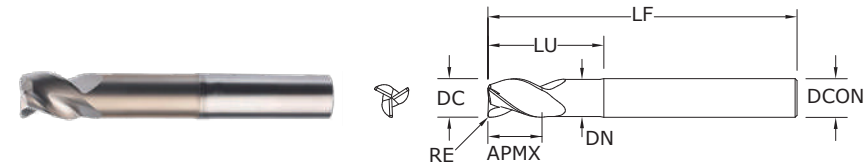
CONTINUED



43L •
43LC

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
- Enhanced corner geometry with tight tolerance corner radii
- Recommended for materials ≤ 150 Bhn (≤ 7 HRC)



CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	inch				EDP NO.	
			SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/8	5/32	3	1/8	1/2	.105	—	32700	32725
1/8	5/32	3	1/8	1/2	.105	.010	32751	32815
1/8	5/32	3	1/8	3/4	.105	—	32691	34888
3/16	7/32	3	3/16	1/2	.105	—	32701	32726
3/16	7/32	3	3/16	1/2	.167	.010	32752	32816
3/16	7/32	3	3/16	3/4	.167	—	32692	34889
1/4	3/8	2-1/2	1/4	3/4	.230	.015	35787	36235
1/4	3/8	2-1/2	1/4	3/4	.230	.060	35788	36236
1/4	3/8	4	1/4	3/4	.230	—	32702	32727
1/4	3/8	4	1/4	3/4	.230	.010	32753	32817
1/4	3/8	4	1/4	3/4	.230	.030	32754	32818
1/4	3/8	4	1/4	1-1/2	.230	—	32703	32728
1/4	3/8	4	1/4	1-1/2	.230	.010	32755	32819
1/4	3/8	4	1/4	1-1/2	.230	.030	32756	32820
1/4	3/8	4	1/4	2-1/8	.230	—	32704	32729
1/4	3/8	4	1/4	2-1/8	.230	.010	32757	32821
1/4	3/8	4	1/4	2-1/8	.230	.030	32758	32822
5/16	7/16	4	5/16	1-1/8	.292	—	32705	32730
5/16	7/16	4	5/16	1-1/8	.292	.030	32759	32823
5/16	7/16	4	5/16	2-1/8	.292	—	32706	32731
5/16	7/16	4	5/16	2-1/8	.292	.030	32760	32824
3/8	1/2	3	3/8	1-1/8	.355	.015	35791	36239
3/8	1/2	3	3/8	1-1/8	.355	.090	35792	36240
3/8	1/2	4	3/8	1-1/8	.355	—	32707	32732
3/8	1/2	4	3/8	1-1/8	.355	.030	32762	32826
3/8	1/2	4	3/8	1-1/8	.355	.060	32763	32827
3/8	1/2	4	3/8	2-1/8	.355	—	32708	32733
3/8	1/2	4	3/8	2-1/8	.355	.030	32764	32828
3/8	1/2	4	3/8	2-1/8	.355	.060	32765	32829
1/2	5/8	3	1/2	1-3/8	.480	.015	35795	36243
1/2	5/8	4	1/2	1-3/8	.480	—	32709	32734
1/2	5/8	4	1/2	1-3/8	.480	.030	32767	32831
1/2	5/8	4	1/2	1-3/8	.480	.060	32768	32832
1/2	5/8	4	1/2	1-3/8	.480	.090	32769	32833
1/2	5/8	4	1/2	1-3/8	.480	.120	32770	32834
1/2	5/8	4	1/2	2-1/4	.480	.015	35796	36244

continued on next page



TOLERANCES (inch)

1/8–3/16 DIAMETER

DC = +0.0000/–0.00032

DCON = h₆

RE = +0.0000/–0.0020

1/4–3/8 DIAMETER

DC = +0.0000/–0.00035

DCON = h₆

RE = +0.0000/–0.0020

1/2–5/8 DIAMETER

DC = +0.0000/–0.00043

DCON = h₆

RE = +0.0000/–0.0020

3/4–1 DIAMETER

DC = +0.0000/–0.00051

DCON = h₆

RE = +0.0000/–0.0020

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

TOLERANCES (inch)

1/8–3/16 DIAMETER

DC = +0.0000/–0.00032

DCON = h₆

RE = +0.0000/–0.0020

1/4–3/8 DIAMETER

DC = +0.0000/–0.00035

DCON = h₆

RE = +0.0000/–0.0020

1/2–5/8 DIAMETER

DC = +0.0000/–0.00043

DCON = h₆

RE = +0.0000/–0.0020

3/4–1 DIAMETER

DC = +0.0000/–0.00051

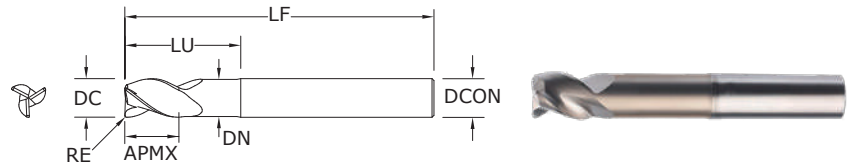
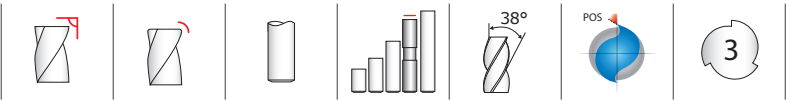
DCON = h₆

RE = +0.0000/–0.0020

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com



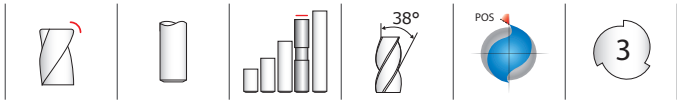
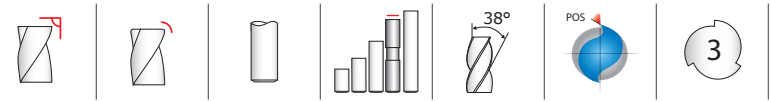
43L •
43LC

FRACTIONAL SERIES

CONTINUED

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	inch				EDP NO.	
			SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/2	5/8	6	1/2	2-1/8	.480	—	32710	32735
1/2	5/8	6	1/2	2-1/8	.480	.030	32771	32835
1/2	5/8	6	1/2	2-1/8	.480	.060	32772	32836
1/2	5/8	6	1/2	2-1/8	.480	.090	32773	32837
1/2	5/8	6	1/2	2-1/8	.480	.120	32774	32838
1/2	5/8	6	1/2	3-3/8	.480	—	32711	32736
1/2	5/8	6	1/2	3-3/8	.480	.030	32775	32839
1/2	5/8	6	1/2	3-3/8	.480	.060	32776	32840
1/2	5/8	6	1/2	3-3/8	.480	.090	32777	32841
1/2	5/8	6	1/2	3-3/8	.480	.120	32778	32842
1/2	5/8	6	1/2	4-1/4	.480	—	32697	34894
5/8	3/4	4	5/8	1-3/4	.605	—	32712	32737
5/8	3/4	4	5/8	1-3/4	.605	.030	32779	32843
5/8	3/4	4	5/8	1-3/4	.605	.060	32780	32844
5/8	3/4	4	5/8	1-3/4	.605	.090	32781	32845
5/8	3/4	4	5/8	1-3/4	.605	.120	32782	32846
5/8	3/4	4	5/8	2-3/8	.605	—	32713	32738
5/8	3/4	4	5/8	2-3/8	.605	.030	32783	32847
5/8	3/4	4	5/8	2-3/8	.605	.060	32784	32848
5/8	3/4	4	5/8	2-3/8	.605	.090	32785	32849
5/8	3/4	4	5/8	2-3/8	.605	.120	32786	32850
5/8	3/4	6	5/8	3-3/8	.605	—	32714	32739
5/8	3/4	6	5/8	3-3/8	.605	.030	32787	32851
5/8	3/4	6	5/8	3-3/8	.605	.060	32788	32852
5/8	3/4	6	5/8	3-3/8	.605	.090	32789	32853
5/8	3/4	6	5/8	3-3/8	.605	.120	32790	32854
5/8	3/4	6	5/8	4-3/8	.605	—	32698	34895
3/4	1	4	3/4	1-3/4	.730	—	32715	32740
3/4	1	4	3/4	1-3/4	.730	.030	32791	32855
3/4	1	4	3/4	1-3/4	.730	.060	32792	32856
3/4	1	4	3/4	1-3/4	.730	.090	32793	32857
3/4	1	4	3/4	1-3/4	.730	.120	32794	32858
3/4	1	4	3/4	2	.730	.190	35803	36251
3/4	1	4	3/4	2	.730	.250	35804	36252
3/4	1	6	3/4	2-3/8	.730	—	32716	32741
3/4	1	6	3/4	2-3/8	.730	.030	32795	32859

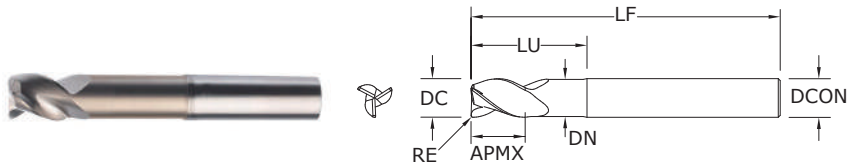
continued on next page



43L •
43LC

FRACTIONAL SERIES

CONTINUED



inch							EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB ₂)
3/4	1	6	3/4	2-3/8	.730	.060	32796	32860
3/4	1	6	3/4	2-3/8	.730	.090	32797	32861
3/4	1	6	3/4	2-3/8	.730	.120	32798	32862
3/4	1	6	3/4	3-3/8	.730	—	32717	32742
3/4	1	6	3/4	3-3/8	.730	.030	32799	32863
3/4	1	6	3/4	3-3/8	.730	.060	32800	32864
3/4	1	6	3/4	3-3/8	.730	.090	32801	32865
3/4	1	6	3/4	3-3/8	.730	.120	32802	32866
3/4	1	6	3/4	4-3/8	.730	—	32699	34896
1	1-1/4	5	1	2-5/8	.980	.190	35809	36257
1	1-1/4	5	1	2-5/8	.980	.250	35810	36258
1	1-1/4	6	1	2-3/8	.980	—	32718	32743
1	1-1/4	6	1	2-3/8	.980	.030	32803	32867
1	1-1/4	6	1	2-3/8	.980	.060	32804	32868
1	1-1/4	6	1	2-3/8	.980	.090	32805	32869
1	1-1/4	6	1	2-3/8	.980	.120	32806	32870
1	1-1/4	6	1	3-3/8	.980	—	32719	32744
1	1-1/4	6	1	3-3/8	.980	.030	32807	32871
1	1-1/4	6	1	3-3/8	.980	.060	32808	32872
1	1-1/4	6	1	3-3/8	.980	.090	32809	32873
1	1-1/4	6	1	3-3/8	.980	.120	32810	32874
1	1-1/4	6	1	3-3/8	.980	.190	35811	36259
1	1-1/4	6	1	3-3/8	.980	.250	35812	36260
1	1-1/4	7	1	4-3/8	.980	—	32720	32745

TOLERANCES (inch)

1/8–3/16 DIAMETER
DC = +0.0000/–0.00032
DCON = h₆
RE = +0.0000/–0.0020

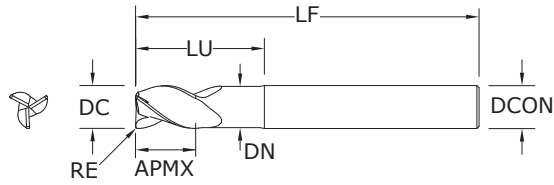
1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h₆
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h₆
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h₆
RE = +0.0000/–0.0020

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com



TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h₆
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h₆
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h₆
RE = +0.0000/–0.0020

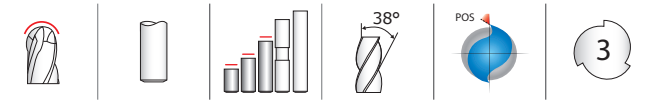
NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

inch							EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	3	1/4	1-1/8	.230	.015	35789	36237
1/4	3/8	3	1/4	1-1/8	.230	.060	35790	36238
3/8	1/2	4	3/8	2-1/8	.355	.015	35793	36241
3/8	1/2	4	3/8	2-1/8	.355	.090	35794	36242
1/2	5/8	5	1/2	3-3/8	.480	.015	35797	36245
1/2	5/8	6	1/2	4-1/4	.480	.015	35798	36246
1/2	5/8	6	1/2	4-1/4	.480	.030	35799	36247
1/2	5/8	6	1/2	4-1/4	.480	.060	35800	36248
1/2	5/8	6	1/2	4-1/4	.480	.090	35801	36249
1/2	5/8	6	1/2	4-1/4	.480	.120	35802	36250
3/4	1	6	3/4	3-3/8	.730	.190	35805	36253
3/4	1	6	3/4	3-3/8	.730	.250	35806	36254
1	1-1/4	7	1	4-3/8	.980	.030	35813	36261
1	1-1/4	7	1	4-3/8	.980	.060	35814	36262
1	1-1/4	7	1	4-3/8	.980	.090	35815	36263
1	1-1/4	7	1	4-3/8	.980	.120	35816	36264
1	1-1/4	7	1	4-3/8	.980	.190	35817	36265
1	1-1/4	7	1	4-3/8	.980	.250	35818	36266

43EC
FRACTIONAL SERIES

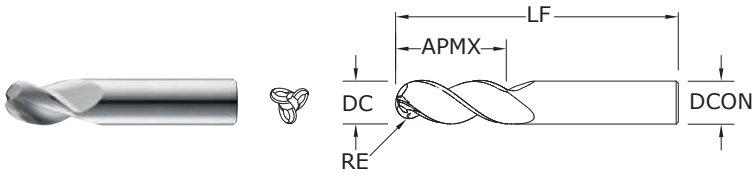
- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Symmetrical end gashing for excellent balance at high speeds and aggressive plunging capability
- Open fluting for deep slotting and profiling
- Necked design with blended diameter transitions provide clearance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



43B

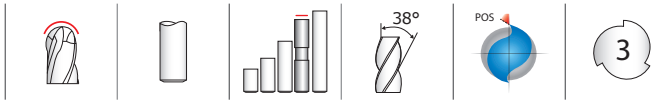
FRACTIONAL SERIES

- 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)



inch				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

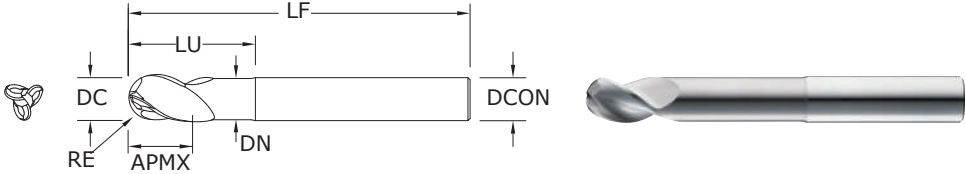
RE = 1/2 Cutting Diameter (DC)



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
DC = +0.0000/–0.00035
DCON = h₆
RE = +0.0005/–0.0005

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h₆
RE = +0.0005/–0.0005

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h₆
RE = +0.0005/–0.0005

TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h₆
RE = +0.0005/–0.0005

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h₆
RE = +0.0005/–0.0005

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h₆
RE = +0.0005/–0.0005

NON-FERROUS
PLASTICS/COMPOSITES

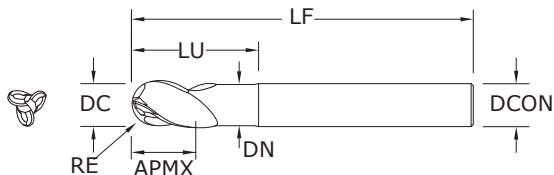
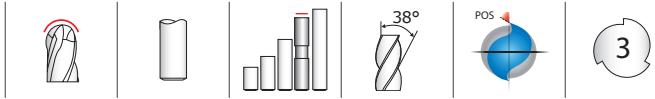
For patent information visit
www.ksptpatents.com

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

inch						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	2-1/2	1/4	3/4	.230	34941	35005
3/8	1/2	3	3/8	1-1/8	.355	34943	35007
1/2	5/8	3	1/2	1-3/8	.480	34945	35009
1/2	5/8	4	1/2	2-1/4	.480	34946	35010
5/8	3/4	4	5/8	1-5/8	.605	34949	35013
3/4	1	4	3/4	2	.730	34951	35015
1	1-1/4	5	1	2-5/8	.980	34954	35018
1	1-1/4	6	1	3-3/8	.980	34955	35019

RE = 1/2 Cutting Diameter (DC)



TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h₆
RE = +0.0005/–0.0005

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h₆
RE = +0.0005/–0.0005

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h₆
RE = +0.0005/–0.0005

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

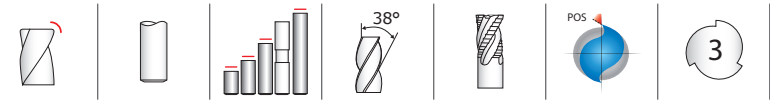
inch						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	3	1/4	1-1/8	.230	34942	35006
3/8	1/2	4	3/8	2-1/8	.355	34944	35008
1/2	5/8	5	1/2	3-3/8	.480	34947	35011
1/2	5/8	6	1/2	4-1/4	.480	34948	35012
5/8	3/4	6	5/8	3-3/8	.605	34950	35014
3/4	1	6	3/4	3-3/8	.730	34952	35016
1	1-1/4	7	1	4-3/8	.980	34956	35020

RE = 1/2 Cutting Diameter (DC)

43EB

FRACTIONAL SERIES

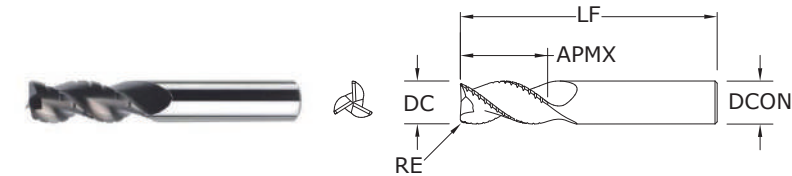
- Circular land allows for increased control at various speed and feed rates and reduces chatter
- Open fluting for deep slotting and profiling
- Necked design with blended diameter transitions provide clearance to reach
- Ball nose design ideal for finishing operations in complex workpieces
- Recommended 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 DC	LENGTH OF CUT APMX	inch			EDP NO.	
		OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	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	34300	34305
3/8	1-1/4	3-1/2	3/8	.020	33402	33462
3/8	1-1/2	4	3/8	.020	33403	33463
3/8	2	4	3/8	.020	33404	33464
1/2	5/8	3	1/2	.030	33406	33466
1/2	1	3	1/2	.030	33407	33467
1/2	1-1/4	3-1/4	1/2	.030	34301	34306
1/2	1-5/8	4	1/2	.030	33408	33468
1/2	2	4	1/2	.030	33409	33469
1/2	2-1/2	5	1/2	.030	33410	33470
1/2	3-1/8	6	1/2	.030	33411	33471
5/8	3/4	3-1/2	5/8	.030	33412	33472
5/8	1-5/8	3-3/4	5/8	.030	34302	34307
5/8	2-1/8	4	5/8	.030	33413	33473
5/8	3-1/4	6	5/8	.030	33415	33475
5/8	3-3/4	6	5/8	.030	33416	33476
3/4	1	4	3/4	.030	33417	33477
3/4	1-5/8	4	3/4	.030	34303	34308
3/4	2-1/4	4	3/4	.030	33418	33478
3/4	3-1/4	6	3/4	.030	33419	33479
3/4	4	6	3/4	.030	33420	33480
1	1-1/4	5	1	.030	33421	33481
1	2	4-1/2	1	.030	34304	34309
1	2-5/8	6	1	.030	33422	33482
1	3-1/4	6	1	.030	33423	33483
1	4-1/8	7	1	.030	33424	33484

TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h₆
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h₆
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h₆
RE = +0.0000/–0.0020

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

TOLERANCES (inch)

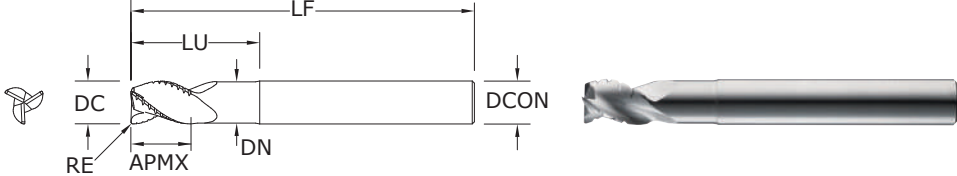
1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h₆
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h₆
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h₆
RE = +0.0000/–0.0020

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

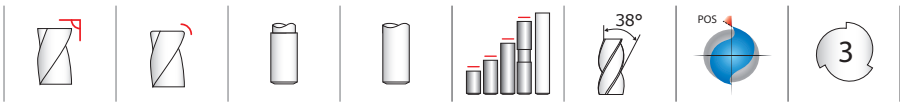


CUTTING DIAMETER DC	LENGTH OF CUT APMX	inch					EDP NO.	
		OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	4	1/4	3/4	.230	.020	33500	33540
1/4	3/8	4	1/4	1-1/8	.230	.020	33501	33541
1/4	3/8	4	1/4	2-1/8	.230	.020	33502	33542
5/16	7/16	4	5/16	1-1/8	.292	.020	33503	33543
5/16	7/16	4	5/16	2-1/8	.292	.020	33504	33544
3/8	1/2	4	3/8	1-1/8	.355	.020	33507	33547
3/8	1/2	4	3/8	2-1/8	.355	.020	33508	33548
1/2	5/8	4	1/2	1-3/8	.480	.030	33511	33551
1/2	5/8	4	1/2	2-1/4	.480	.030	—	33552
1/2	5/8	6	1/2	3-3/8	.480	.030	33513	33553
1/2	5/8	6	1/2	4-1/4	.480	.030	33514	33554
5/8	3/4	4	5/8	1-5/8	.605	.030	33515	33555
5/8	3/4	6	5/8	2-3/8	.605	.030	33516	33556
5/8	3/4	6	5/8	3-3/8	.605	.030	33517	33557
5/8	3/4	6	5/8	4-3/8	.605	.030	33518	33558
3/4	1	4	3/4	2	.730	.030	33519	33559
3/4	1	6	3/4	2-1/2	.730	.030	33520	33560
3/4	1	6	3/4	3-3/8	.730	.030	33521	33561
3/4	1	6	3/4	4-3/8	.730	.030	33522	33562
1	1-1/4	6	1	2-5/8	.980	.030	33523	33563
1	1-1/4	6	1	3-3/8	.980	.030	33524	33564
1	1-1/4	7	1	4-3/8	.980	.030	33525	33565

43LCB

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
- 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)	DC • in							
			Ae x DC	Ap x DC		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		
N	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 x 3.82 / DC
ipm = 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 DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

TOLERANCES (mm)

6 DIAMETER

DC = +0,000/-0,008

DCON = h₆

RE = +0,000/-0,050

>6-10 DIAMETER

DC = +0,000/-0,009

DCON = h₆

RE = +0,000/-0,050

>10-18 DIAMETER

DC = +0,000/-0,011

DCON = h₆

RE = +0,000/-0,050

>18-20 DIAMETER

DC = +0,000/-0,013

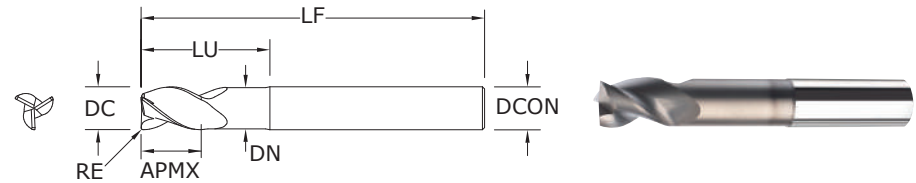
DCON = h₆

RE = +0,000/-0,050

NON-FERROUS

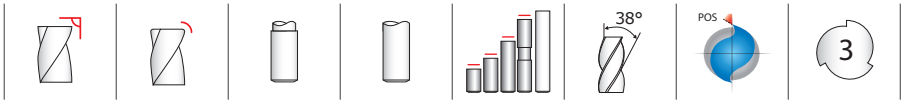
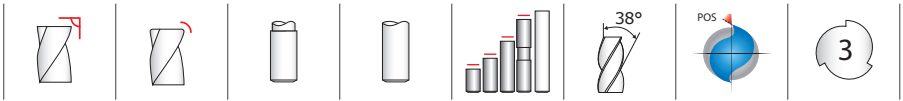
PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

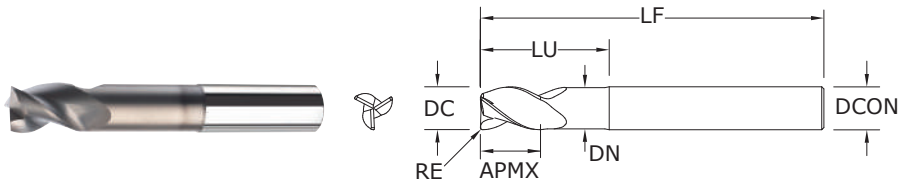


mm									EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	REACH LU	NECK DIAMETER DN	POLISHED FLUTE	UNCOATED Ti-NAMITE-B (TiB ₂)		
3,0	8,0	52,0	6,0	—	—	—	•	—	44890	
4,0	11,0	55,0	6,0	—	—	—	•	—	44891	
5,0	13,0	57,0	6,0	—	—	—	•	—	44892	
6,0	13,0	57,0	6,0	—	—	—		44701	44715	
6,0	13,0	57,0	6,0	1,5	—	—		—	44732	
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	—	—	—		44702	44716	
6,0	13,0	72,0	6,0	0,8	—	—	•	—	44842	
6,0	13,0	72,0	6,0	1,2	—	—	•	—	44843	
6,0	24,0	75,0	6,0	—	—	—	•	—	44893	
6,0	24,0	75,0	6,0	0,5	—	—	•	—	44844	
6,0	24,0	75,0	6,0	1,0	—	—	•	—	44845	
8,0	19,0	63,0	8,0	—	—	—		44703	44717	
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	
8,0	32,0	75,0	8,0	—	—	—	•	—	44895	
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	22,0	72,0	10,0	—	—	—		44705	44719	
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	
10,0	40,0	100,0	10,0	—	—	—	•	—	44896	
10,0	40,0	100,0	10,0	0,5	—	—	•	—	44858	

continued on next page



43M •
43MCR
METRIC SERIES



CONTINUED

mm									EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	REACH LU	NECK DIAMETER DN	POLISHED FLUTE	UNCOATED Ti-NAMITE-B (TiB ₂)		
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	26,0	83,0	12,0	—	—	—		44708	44722	
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	
12,0	48,0	100,0	12,0	—	—	—	•	—	44897	
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	
14,0	30,0	89,0	14,0	—	—	—	•	—	44898	
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	
14,0	18,0	125,0	14,0	—	45,0	13,49	•	—	44899	
16,0	32,0	92,0	16,0	—	—	—		44711	44725	
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	
16,0	32,0	92,0	16,0	4,0	—	—	•	—	44871	
16,0	64,0	125,0	16,0	—	—	—	•	—	44900	
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	

continued on next page

TOLERANCES (mm)

6 DIAMETER

DC = +0,000/–0,008

DCON = h₆

RE = +0,000/–0,050

>6–10 DIAMETER

DC = +0,000/–0,009

DCON = h₆

RE = +0,000/–0,050

>10–18 DIAMETER

DC = +0,000/–0,011

DCON = h₆

RE = +0,000/–0,050

>18–20 DIAMETER

DC = +0,000/–0,013

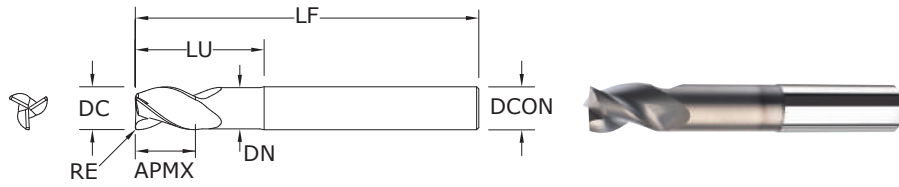
DCON = h₆

RE = +0,000/–0,050

NON-FERROUS

PLASTICS/COMPOSITES

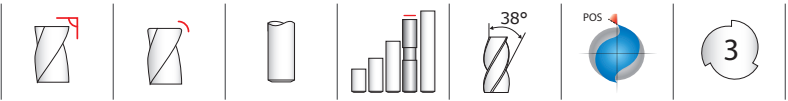
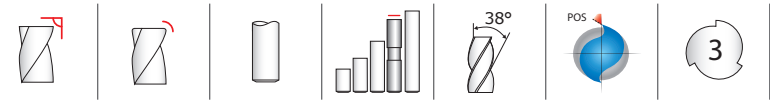
For patent
information visit
www.ksptpatents.com



43M •
43MCR
METRIC SERIES

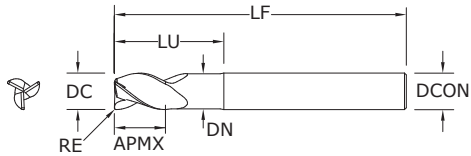
CONTINUED

mm									EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	REACH LU	NECK DIAMETER DN	POLISHED FLUTE	UNCOATED Ti-NAMITE-B (TiB ₂)		
16,0	64,0	125,0	16,0	3,0	—	—	•	—	44877	
16,0	64,0	125,0	16,0	4,0	—	—	•	—	44878	
20,0	38,0	104,0	20,0	—	—	—		44714	44728	
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	
20,0	38,0	104,0	20,0	4,0	—	—	•	—	44879	
20,0	80,0	150,0	20,0	—	—	—	•	—	44901	
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	
25,0	50,0	125,0	25,0	—	—	—		—	44731	



43ML •
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
- 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)



mm								EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	POLISHED FLUTE	UNCOATED	Ti-NAMITE-B (TiB ₂)
6,0	10,0	63,0	6,0	20,0	5,49	0,5		44769	44789
6,0	10,0	63,0	6,0	20,0	5,49	1,0		44770	44790
6,0	10,0	75,0	6,0	20,0	5,49	—		—	42706
6,0	13,0	72,0	6,0	30,0	5,49	0,5		44771	44791
6,0	13,0	72,0	6,0	30,0	5,49	1,0		44772	44792
8,0	12,0	75,0	8,0	25,0	7,49	—		—	44792
8,0	12,0	75,0	8,0	25,0	7,49	—		—	42707
8,0	12,0	75,0	8,0	25,0	7,49	0,3		44773	44793
8,0	12,0	75,0	8,0	25,0	7,49	0,5		44774	44794
8,0	12,0	75,0	8,0	25,0	7,49	0,8	•	—	44950
8,0	12,0	75,0	8,0	25,0	7,49	1,0		44775	44795
8,0	12,0	75,0	8,0	25,0	7,49	1,2	•	—	44951
8,0	12,0	75,0	8,0	25,0	7,49	1,5		44776	44796
8,0	12,0	75,0	8,0	25,0	7,49	1,6	•	—	44952
10,0	14,0	100,0	10,0	35,0	9,48	—		—	42708
10,0	14,0	100,0	10,0	35,0	9,48	0,3		44777	44797
10,0	14,0	100,0	10,0	35,0	9,48	0,5		44778	44798
10,0	14,0	100,0	10,0	35,0	9,48	1,0		44779	44799
10,0	14,0	100,0	10,0	35,0	9,48	1,5		44780	44800
10,0	14,0	100,0	10,0	35,0	9,50	0,8	•	—	44953
10,0	14,0	100,0	10,0	35,0	9,50	1,2	•	—	44954
10,0	14,0	100,0	10,0	35,0	9,50	1,6	•	—	44955
10,0	14,0	100,0	10,0	35,0	9,50	2,4	•	—	44956
12,0	16,0	100,0	12,0	40,0	11,48	—		—	42709
12,0	16,0	100,0	12,0	40,0	11,48	0,5		44781	44801
12,0	16,0	100,0	12,0	40,0	11,48	0,8	•	—	44957
12,0	16,0	100,0	12,0	40,0	11,48	1,0		44782	44802
12,0	16,0	100,0	12,0	40,0	11,48	1,2	•	—	44958
12,0	16,0	100,0	12,0	40,0	11,48	1,5		44783	44803
12,0	16,0	100,0	12,0	40,0	11,48	1,6	•	—	44959
12,0	16,0	100,0	12,0	40,0	11,48	2,0		44784	44804
12,0	16,0	100,0	12,0	40,0	11,48	2,4	•	—	44960
12,0	16,0	100,0	12,0	40,0	11,48	2,5		44832	44839
12,0	16,0	100,0	12,0	40,0	11,48	3,0		44833	44738

continued on next page

TOLERANCES (mm)

6 DIAMETER
DC = +0,000/–0,008
DCON = h₆

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h₆
RE = +0,000/–0,050

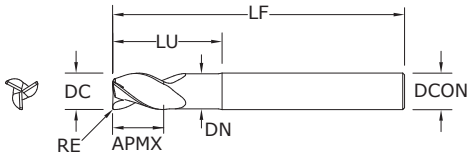
>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h₆
RE = +0,000/–0,050

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h₆
RE = +0,000/–0,050

NON-FERROUS

PLASTICS/COMPOSITES

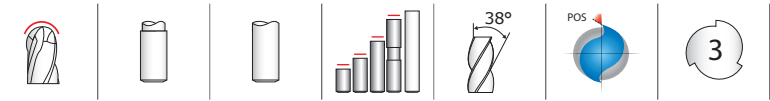
For patent information visit
www.ksptpatents.com



43ML •
43MLC
METRIC SERIES

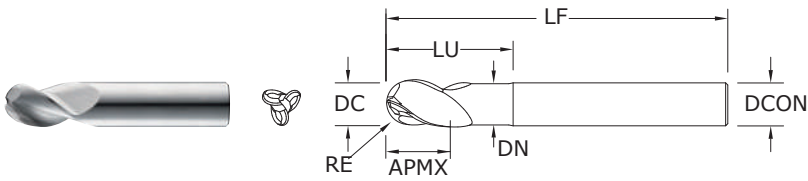
CONTINUED

mm								EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	POLISHED FLUTE	UNCOATED	Ti-NAMITE-B (TiB ₂)
12,0	16,0	100,0	12,0	40,0	11,48	4,0		44834	44741
14,0	18,0	125,0	14,0	45,0	13,49	1,0	•	—	44961
14,0	18,0	125,0	14,0	45,0	13,49	2,0	•	—	44962
14,0	18,0	125,0	14,0	45,0	13,49	3,0	•	—	44963
14,0	18,0	125,0	14,0	45,0	13,49	4,0	•	—	44964
16,0	20,0	125,0	16,0	50,0	15,47	—		—	42710
16,0	20,0	125,0	16,0	50,0	15,47	2,0		44785	44805
16,0	20,0	125,0	16,0	50,0	15,47	2,5		44835	44840
16,0	20,0	125,0	16,0	50,0	15,47	3,0		44836	44739
16,0	20,0	125,0	16,0	50,0	15,47	4,0		44786	44806
16,0	20,0	125,0	16,0	50,0	15,49	0,8	•	—	44965
16,0	20,0	125,0	16,0	50,0	15,49	1,2	•	—	44966
16,0	20,0	125,0	16,0	50,0	15,49	1,6	•	—	44967
16,0	20,0	125,0	16,0	50,0	15,49	2,4	•	—	44968
16,0	20,0	125,0	16,0	50,0	15,49	3,2	•	—	44969
20,0	25,0	150,0	20,0	65,0	19,46	—		—	42711
20,0	25,0	150,0	20,0	65,0	19,46	2,0		44787	44807
20,0	25,0	150,0	20,0	65,0	19,46	2,4	•	—	44973
20,0	25,0	150,0	20,0	65,0	19,46	2,5		44837	44841
20,0	25,0	150,0	20,0	65,0	19,46	3,0		44838	44740
20,0	25,0	150,0	20,0	65,0	19,46	4,0		44788	44808
20,0	25,0	150,0	20,0	65,0	19,48	0,8	•	—	44970
20,0	25,0	150,0	20,0	65,0	19,48	1,2	•	—	44971
20,0	25,0	150,0	20,0	65,0	19,48	1,6	•	—	44972
20,0	25,0	150,0	20,0	65,0	19,48	3,2	•	—	44974



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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	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	2,74	•	44917
3,0	9,0	57,0	6,0	16,0	2,74	•	44918
4,0	6,0	57,0	6,0	—	—	•	44919
4,0	8,0	57,0	6,0	13,0	3,73	•	44920
4,0	12,0	57,0	6,0	21,0	3,73	•	44921
5,0	7,5	57,0	6,0	—	—	•	44922
5,0	10,0	63,0	6,0	16,0	4,50	•	44923
5,0	15,0	63,0	6,0	26,0	4,50	•	44924
6,0	9,0	57,0	6,0	—	—	•	44925
6,0	12,0	63,0	6,0	19,0	5,49	•	44926
6,0	18,0	75,0	6,0	31,0	5,49	•	44927
8,0	12,0	63,0	8,0	—	—	•	44928
8,0	16,0	75,0	8,0	25,0	7,49	•	44929
8,0	24,0	83,0	8,0	41,0	7,49	•	44930
10,0	15,0	75,0	10,0	—	—	•	44931
10,0	20,0	83,0	10,0	31,0	9,50	•	44932
10,0	30,0	100,0	10,0	51,0	9,50	•	44933
12,0	18,0	83,0	12,0	—	—	•	44934
12,0	24,0	100,0	12,0	37,0	11,48	•	44935
12,0	36,0	130,0	12,0	61,0	11,48	•	44936
16,0	24,0	100,0	16,0	—	—	•	44937
16,0	32,0	130,0	16,0	49,0	15,49	•	44938
16,0	48,0	150,0	16,0	81,0	15,49	•	44939
20,0	30,0	108,0	20,0	—	—	•	44940
20,0	40,0	130,0	20,0	61,0	19,48	•	44941
20,0	60,0	150,0	20,0	101,0	19,48	•	44942
25,0	37,5	127,0	25,0	—	—	•	44943
25,0	50,0	152,0	25,0	76,0	24,49	•	44944
25,0	75,0	170,0	25,0	126,0	24,49	•	44945

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (mm)

3 DIAMETER
DC = +0,000/–0,006
DCON = h₆
RE = +0,0127/–0,0127

>3–6 DIAMETER
DC = +0,000/–0,008
DCON = h₆
RE = +0,0127/–0,0127

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h₆
RE = +0,0127/–0,0127

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h₆
RE = +0,0127/–0,0127

>18–25 DIAMETER
DC = +0,000/–0,013
DCON = h₆
RE = +0,0127/–0,0127

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

TOLERANCES (mm)

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h₆
RE = +0,000/–0,050

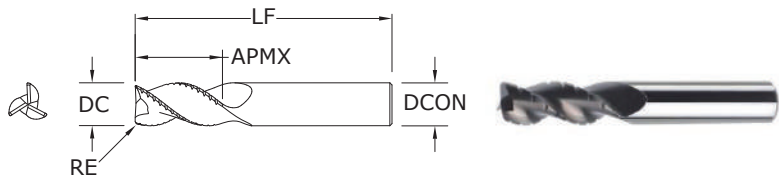
>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h₆
RE = +0,000/–0,050

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h₆
RE = +0,000/–0,050

NON-FERROUS

PLASTICS/COMPOSITES

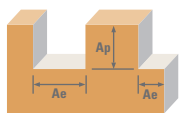
For patent information visit
www.ksptpatents.com



43MCB
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
- 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)

mm					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB ₂)
6,0	19,0	63,0	6,0	0,5	44298	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

Series 43M, 43MB, 43MCR, 43ML, 43MLC, 43MCB Metric	Hardness			Vc (m/min)	DC • mm							
		Ae x DC	Ap x DC									
					3	6	10	12	16	20	25	
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc		1	≤ 1	490	RPM						
					(392-588)	Fz	0.022	0.060	0.120	0.144	0.166	0.187
						Feed (mm/min)	3371	4682	5618	5618	4869	4370
			≤ 0.5	≤ 1.5	610	RPM						
					(488-732)	Fz	0.022	0.060	0.120	0.144	0.166	0.187
						Feed (mm/min)	4196	5828	6994	6994	6061	5440
	≤ 125 Bhn or ≤ 77 HRb		≤ 0.05	≤ 2	1005	RPM						
					(804-1206)	Fz	0.050	0.132	0.280	0.336	0.384	0.440
						Feed (mm/min)	16131	21124	26888	26885	23046	21126
ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B- 390	≤ 125 Bhn or ≤ 77 HRb		1	≤ 1	185	RPM						
					(148-222)	Fz	0.022	0.060	0.120	0.144	0.166	0.187
						Feed (mm/min)	1273	1768	2121	2121	1838	1650
			≤ 0.5	≤ 1.5	230	RPM						
					(184-276)	Fz	0.022	0.060	0.120	0.144	0.166	0.187
						Feed (mm/min)	1582	2197	2637	2637	2285	2051
	≤ 140 Bhn or ≤ 3 HRc		≤ 0.05	≤ 2	380	RPM						
					(304-456)	Fz	0.050	0.132	0.280	0.336	0.384	0.440
						Feed (mm/min)	6099	7987	10166	10166	8714	7988
COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass	≤ 140 Bhn or ≤ 3 HRc		1	≤ 1	265	RPM						
					(212-318)	Fz	0.019	0.048	0.107	0.120	0.141	0.160
						Feed (mm/min)	1620	2025	2701	2532	2228	2026
			≤ 0.5	≤ 1.5	330	RPM						
					(264-396)	Fz	0.019	0.048	0.107	0.120	0.141	0.160
						Feed (mm/min)	2018	2522	3363	3153	2775	2523
	≤ 200 Bhn or ≤ 23 HRc		≤ 0.05	≤ 2	545	RPM						
					(436-654)	Fz	0.041	0.108	0.227	0.276	0.320	0.373
						Feed (mm/min)	7082	9373	11804	11976	10415	9721
COPPER ALLOYS Beryllium Copper C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc		1	≤ 1	105	RPM						
					(84-126)	Fz	0.019	0.048	0.107	0.120	0.141	0.160
						Feed (mm/min)	642	803	1070	1003	883	803
			≤ 0.5	≤ 1.5	130	RPM						
					(104-156)	Fz	0.019	0.048	0.107	0.120	0.141	0.160
						Feed (mm/min)	795	994	1325	1242	1093	994
	≤ 200 Bhn or ≤ 23 HRc		≤ 0.05	≤ 2	215	RPM						
					(172-258)	Fz	0.041	0.108	0.227	0.276	0.320	0.373
						Feed (mm/min)	2794	3697	4656	4725	4109	3835
PLASTICS ABS, Polycarbonate, PVC, Polypropylene	≤ 200 Bhn or ≤ 23 HRc		1	≤ 1	490	RPM						
					(392-588)	Fz	0.036	0.096	0.200	0.240	0.282	0.320
						Feed (mm/min)	5618	7490	9364	9363	8240	7491
			≤ 0.5	≤ 1.5	610	RPM						
					(488-732)	Fz	0.036	0.096	0.200	0.240	0.282	0.320
						Feed (mm/min)	6994	9325	11657	11656	10258	9326
	≤ 200 Bhn or ≤ 23 HRc		≤ 0.05	≤ 2	1005	RPM						
					(804-1206)	Fz	0.082	0.216	0.453	0.552	0.640	0.733
						Feed (mm/min)	26117	34567	43532	44169	38410	35210

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
rpm = (Vc x 1000) / (DC 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 DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



TOLERANCES (inch)

1/8–3/16 DIAMETER
DC = +0.0000/–0.00032
DCON = h₆

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h₆

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h₆

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h₆

NON-FERROUS

PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com



TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h₆

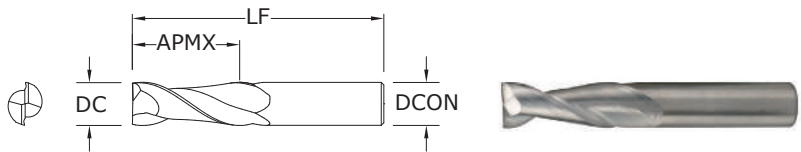
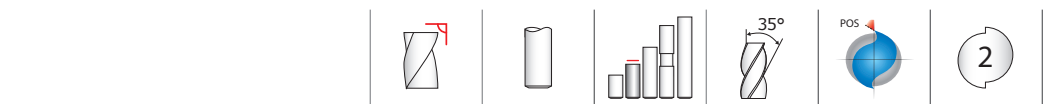
1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h₆

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h₆

NON-FERROUS

PLASTICS/COMPOSITES

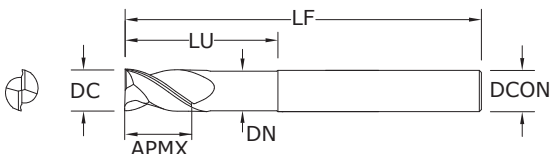
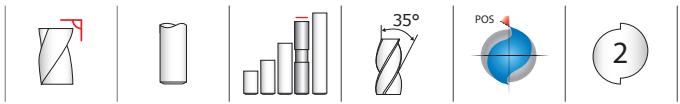
For patent
information visit
www.ksptpatents.com



inch				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

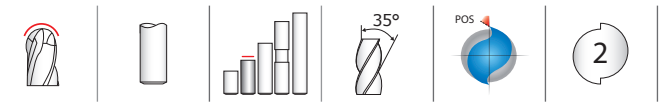
- Circular land reduces edge aggressiveness for varied speed and feed rates
- 2 Flutes effectively manage the large size and volume of chips produced during the aggressive machining process
- Excellent balance at high speeds and aggressive plunging capability
- Recommended for materials ≤ 150 Bhn (≤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



inch						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	UNCOATED	TI-NAMITE-B (TiB ₂)
1/4	3/8	4	1/4	2-1/8	.235	34640	34678
3/8	1/2	4	3/8	2-1/8	.360	34641	34679
1/2	5/8	6	1/2	2-1/8	.485	34642	34680
1/2	5/8	6	1/2	3-3/8	.485	34643	34681
5/8	3/4	6	5/8	2-3/8	.610	34644	34682
5/8	3/4	6	5/8	3-3/8	.610	34645	34683
3/4	1	6	3/4	2-1/2	.735	34646	34684
3/4	1	6	3/4	3-3/8	.735	34647	34685

47L
FRACTIONAL SERIES

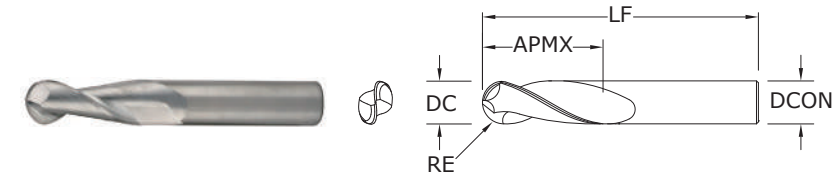
- Circular land reduces edge aggressiveness for varied speed and feed rates
- 2 Flutes effectively manage the large size and volume of chips produced during the aggressive machining process
- Excellent balance at high speeds and aggressive plunging capability
- Necked design with blended diameter transitions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



47B

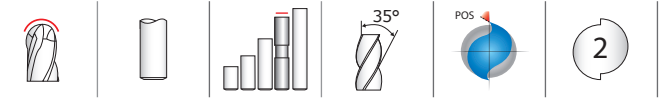
FRACTIONAL SERIES

- 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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

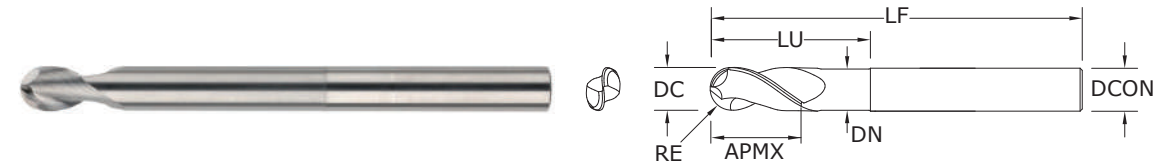
RE = 1/2 Cutting Diameter (DC)



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)



inch						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	UNCOATED	Ti-NAMITE-B (TiB ₂)
1/4	3/8	4	1/4	2-1/8	.235	34650	34686
3/8	1/2	4	3/8	2-1/8	.360	34651	34687
1/2	5/8	6	1/2	2-1/8	.485	34652	34688
1/2	5/8	6	1/2	3-3/8	.485	34653	34689
5/8	3/4	6	5/8	2-3/8	.610	34655	34691
5/8	3/4	6	5/8	3-3/8	.610	34654	34690
3/4	1	6	3/4	2-1/2	.735	34656	34693
3/4	1	6	3/4	3-3/8	.735	34657	34692

RE = 1/2 Cutting Diameter (DC)



TOLERANCES (inch)

1/8–3/16 DIAMETER

DC = +0.0000/–0.00032

DCON = h₆

RE = +.0005/–.0005

1/4–3/8 DIAMETER

DC = +0.0000/–0.00035

DCON = h₆

RE = +.0005/–.0005

1/2–5/8 DIAMETER

DC = +0.0000/–0.00043

DCON = h₆

RE = +.0005/–.0005

3/4–1 DIAMETER

DC = +0.0000/–0.00051

DCON = h₆

RE = +.0005/–.0005

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

TOLERANCES (inch)

1/4–3/8 DIAMETER

DC = +0.0000/–0.00035

DCON = h₆

RE = +.0005/–.0005

1/2–5/8 DIAMETER

DC = +0.0000/–0.00043

DCON = h₆

RE = +.0005/–.0005

3/4–1 DIAMETER

DC = +0.0000/–0.00051

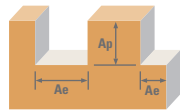
DCON = h₆

RE = +.0005/–.0005

NON-FERROUS

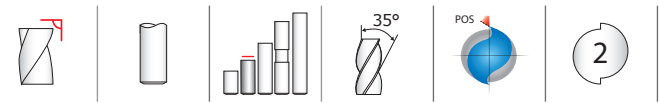
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com



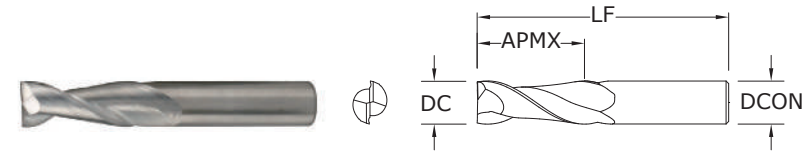
Series 47, 47B, 47L, 47LB Fractional				Vc (sfm)	DC • in									
Hardness	Ae x DC	Ap x DC	1/8		1/4	3/8	1/2	5/8	3/4	1				
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc	 Slot	1	≤ 1	1600	RPM	48896	24448	16299	12224	9779	8149	6112	
					(1280-1920)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085	
					Feed (ipm)	88	122	147	147	127	114	104		
		 Profile	≤ 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		
	≤ 125 Bhn or ≤ 77 HRc	 HSM	≤ 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	 Slot	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	
 Profile	≤ 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			
 HSM	≤ 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	 Slot	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			
	 Profile	≤ 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			
	 HSM	≤ 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	 Slot	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		
		 Profile	≤ 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		
	≤ 150 Bhn or ≤ 7 HRc	 HSM	≤ 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	 Slot	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	
 Profile	≤ 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			
≤ 125 Bhn or ≤ 77 HRc	 HSM	≤ 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 / DC
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 DC maximum)
refer to the 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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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	38,0	104,0	25,0	44560	44597



TOLERANCES (mm)

3 DIAMETER
DC = +0,000/–0,006
DCON = h₆

>3–6 DIAMETER
DC = +0,000/–0,008
DCON = h₆

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h₆

>10–18 DIAMETER
DC = +0,000/–0,012
DCON = h₆

>18–25 DIAMETER
DC = +0,000/–0,013
DCON = h₆

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com



TOLERANCES (mm)

3 DIAMETER
DC = +0,000/–0,006
DCON = h₆
RE = +0,0127/–0,0127

>3–6 DIAMETER
DC = +0,000/–0,008
DCON = h₆
RE = +0,0127/–0,0127

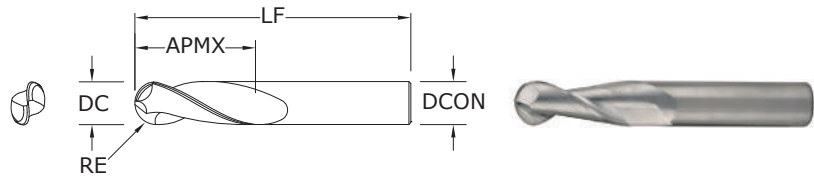
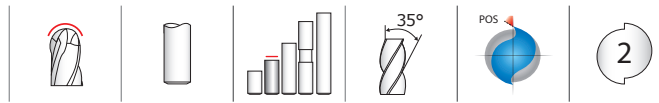
>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h₆
RE = +0,0127/–0,0127

>10–18 DIAMETER
DC = +0,000/–0,012
DCON = h₆
RE = +0,0127/–0,0127

>18–25 DIAMETER
DC = +0,000/–0,013
DCON = h₆
RE = +0,0127/–0,0127

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

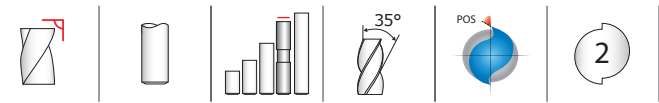


47MB
METRIC SERIES

- 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)

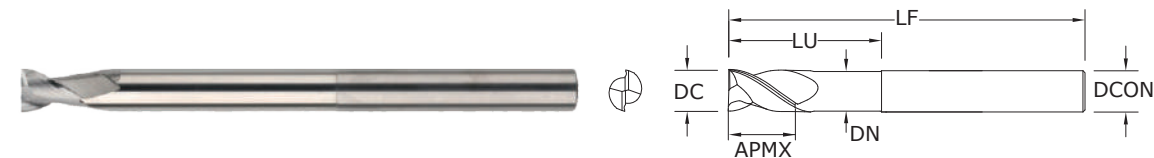
mm				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE-B (TiB ₂)
3,0	8,0	38,0	3,0	44570	44598
4,0	11,0	50,0	4,0	44571	44599
5,0	13,0	50,0	5,0	44572	44600
6,0	13,0	57,0	6,0	44573	44601
8,0	19,0	63,0	8,0	44574	44602
10,0	22,0	72,0	10,0	44575	44603
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

RE = 1/2 Cutting Diameter (DC)



47ML
METRIC SERIES

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



mm						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	UNCOATED	Ti-NAMITE-B (TiB ₂)
6,0	10,0	100,0	6,0	54,0	5,62	44561	44609
8,0	12,0	100,0	8,0	54,0	7,62	44562	44610
10,0	12,0	100,0	10,0	54,0	9,62	44563	44611
12,0	16,0	150,0	12,0	80,0	11,62	44564	44612
16,0	20,0	150,0	16,0	80,0	15,62	44565	44613
20,0	25,0	150,0	20,0	80,0	19,62	44566	44614

TOLERANCES (mm)

6 DIAMETER
DC = +0,000/–0,008
DCON = h₆

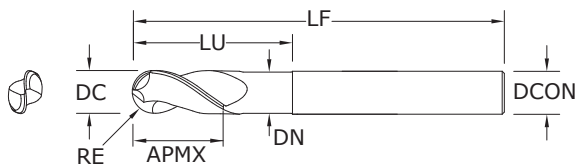
>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h₆

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h₆

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h₆

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com



TOLERANCES (mm)

6 DIAMETER
DC = +0,000/–0,008
DCON = h₆
RE = +0,0127/–0,0127

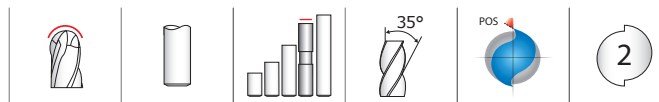
>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h₆
RE = +0,0127/–0,0127

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h₆
RE = +0,0127/–0,0127

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h₆
RE = +0,0127/–0,0127

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

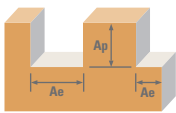


47MLB
METRIC SERIES

- 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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	UNCOATED	Ti-NAMITE-B (TiB ₂)
6,0	10,0	100,0	6,0	54,0	5,62	44581	44615
8,0	12,0	100,0	8,0	54,0	7,62	44582	44616
10,0	12,0	100,0	10,0	54,0	9,62	44583	44617
12,0	16,0	150,0	12,0	80,0	11,62	44584	44618
16,0	20,0	150,0	16,0	80,0	15,62	44585	44619
20,0	25,0	150,0	20,0	80,0	19,62	44586	44620

RE = 1/2 Cutting Diameter (DC)

Series 47M, 47MB, 47ML, 47MLB Metric	Hardness			Vc (m/min)	DC • mm								
		Ae x DC	Ap x DC		3	6	10	12	16	20	25		
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc		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) / (DC 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 DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

TOLERANCES (inch)
1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h₆
1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h₆
3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h₆

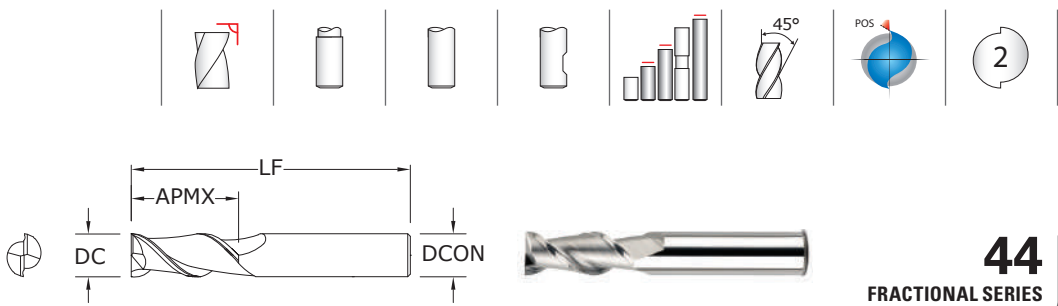
NON-FERROUS
PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com

TOLERANCES (mm)
≤3 DIAMETER
DC = +0,000/–0,006
DCON = h₆
>3–6 DIAMETER
DC = +0,000/–0,008
DCON = h₆
>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h₆
>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h₆
>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h₆

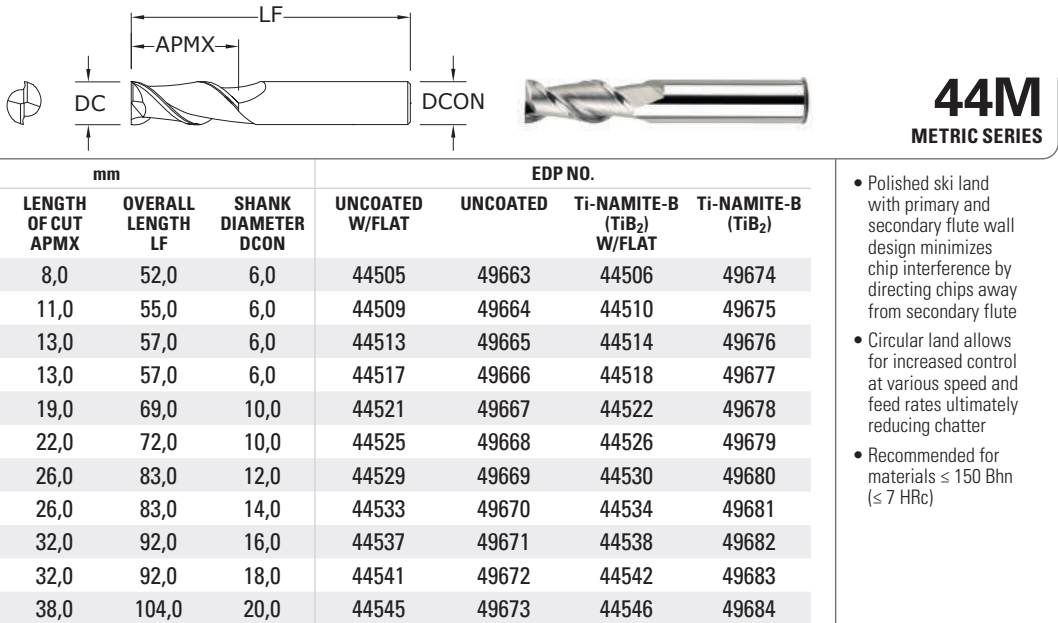
NON-FERROUS
PLASTICS/COMPOSITES

For patent
information visit
www.ksptpatents.com



inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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.



mm				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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.

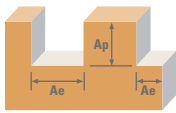
44
FRACTIONAL SERIES

- 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)

44M
METRIC SERIES

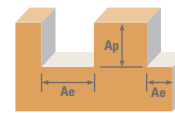
- Polished ski land with primary and secondary flute wall design minimizes chip interference by directing chips away from secondary flute
- Circular land allows for increased control at various speed and feed rates ultimately reducing chatter
- Recommended for materials ≤ 150 Bhn (≤ 7 HRc)

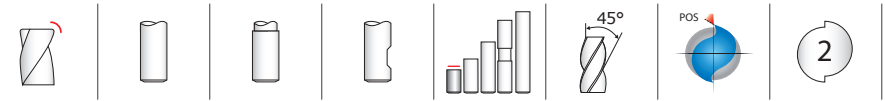
FRACTIONAL
Ski-Carb

Series 44	Fractional	Hardness			Vc (sfm)	DC • in							
			Ae x DC	Ap x DC									
						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 (1280-1920)	RPM	48896	24448	16299	12224	9779	8149	6112
						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 (1600-2400)	RPM	61120	30560	20373	15280	12224	10187	7640
						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 (2640-3960)	RPM	100848	50424	33616	25212	20170	16808	12606
						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 (480-720)	RPM	18336	9168	6112	4584	3667	3056	2292
						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 (600-900)	RPM	22920	11460	7640	5730	4584	3820	2865
						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 (992-1488)	RPM	37894	18947	12631	9474	7579	6316	4737
						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 (692-1038)	RPM	26434	13217	8811	6609	5287	4406	3304
						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 (864-1296)	RPM	33005	16502	11002	8251	6601	5501	4126
						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 (1424-2136)	RPM	54397	27198	18132	13599	10879	9066	6800
						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 (276-414)	RPM	10543	5272	3514	2636	2109	1757	1318
						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 (344-516)	RPM	13141	6570	4380	3285	2628	2190	1643
						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 (568-852)	RPM	21698	10849	7233	5424	4340	3616	2712
						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 (1280-1920)	RPM	48896	24448	16299	12224	9779	8149	6112
						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 (1600-2400)	RPM	61120	30560	20373	15280	12224	10187	7640
						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 (2640-3960)	RPM	100848	50424	33616	25212	20170	16808	12606
						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 / DC
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 DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC
Ski-Carb

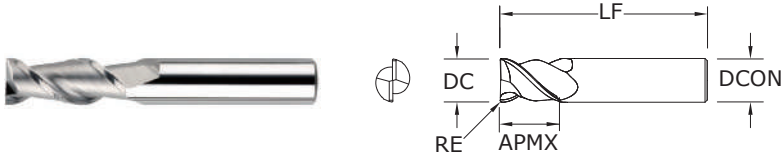
Series 44M Metric	Hardness			Vc (m/min)	DC • mm								
		Ae x DC	Ap x DC										
					3	6	10	12	16	20	25		
ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7HRc		1	≤ 1	490 (392-588)	RPM	52022	26011	15607	13005	9754	7803	6243
						Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
						Feed (mm/min)	2247	3121	3746	3745	3246	2913	2653
			≤ 0.5	≤ 1.5	610 (488-732)	RPM	64762	32381	19429	16190	12143	9714	7771
						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 (804-1206)	RPM	106698	53349	32009	26674	20006	16005	12804
						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 (148-222)	RPM	19641	9820	5892	4910	3683	2946	2357
						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 (184-276)	RPM	24418	12209	7326	6105	4578	3663	2930
						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 (304-456)	RPM	40343	20172	12103	10086	7564	6052	4841
						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 (212-318)	RPM	28134	14067	8440	7034	5275	4220	3376
						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 (264-396)	RPM	35035	17518	10511	8759	6569	5255	4204
						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 (436-654)	RPM	57861	28930	17358	14465	10849	8679	6943
						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 (84-126)	RPM	11148	5574	3344	2787	2090	1672	1338
						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 (104-156)	RPM	13802	6901	4141	3450	2588	2070	1656
						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 (172-258)	RPM	22826	11413	6848	5706	4280	3424	2739
						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 (392-588)	RPM	52022	26011	15607	13005	9754	7803	6243
						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 (488-732)	RPM	64762	32381	19429	16190	12143	9714	7771
						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 (804-1206)	RPM	106698	53349	32009	26674	20006	16005	12804
						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



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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	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	.010	91257	91250	91242	91235
5/16	7/16	2-1/2	3/8	.012	91258	91251	91243	91236
3/8	9/16	2-1/2	3/8	.015	91259	91252	91244	91237
1/2	3/4	3	1/2	.020	91260	91253	91245	91238
5/8	7/8	3-1/2	5/8	.025	91261	91254	91246	91239
3/4	1	4	3/4	.030	91262	91255	91247	91240
1	1-1/4	4	1	.040	91263	91256	91248	91241

Contact your KSPT representative for reach options.

TOLERANCES (inch)

1/4–3/8 DIAMETER

DC = +0.0000/–0.00035

DCON = h₆

RE = +0.0000/–0.0020

1/2–5/8 DIAMETER

DC = +0.0000/–0.00043

DCON = h₆

RE = +0.0000/–0.0020

3/4–1 DIAMETER

DC = +0.0000/–0.00051

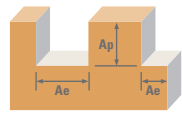
DCON = h₆

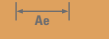
RE = +0.0000/–0.0020

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



Series 45 Fractional	Hardness			Vc (sfm)	DC • in							
		Ae x DC	Ap x DC		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)
rpm = Vc x 3.82 / DC
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 DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

General Purpose End Mills



 Milling

Please put "S" at the beginning of all page numbers below.

SERIES	GENERAL PURPOSE END MILLS DESCRIPTION	PAGE
3	2 Flute Square End Standard Length Fractional	176
3L	2 Flute Square End Long Reach Fractional	176
3EL	2 Flute Square End Extended Length Fractional	176
3CR	2 Flute Corner Radius Standard Length Fractional	176
3M	2 Flute Square End Standard Length Metric	179
3XLM	2 Flute Square End Extra Long Reach Metric	179
3B	2 Flute Ball End Standard Length Fractional	180
3LB	2 Flute Ball End Long Reach Fractional	180
3ELB	2 Flute Ball End Extended Length Fractional	180
3MB	2 Flute Ball End Standard Length Metric	182
3XLMB	2 Flute Ball End Extra Long Reach Metric	182
15	2 Flute Double End Square Stub Fractional	183
15M	2 Flute Double End Square Stub Metric	183
15B	2 Flute Double End Ball Stub Fractional	184
15MB	2 Flute Double End Ball Stub Metric	184
17	2 Flute Square End Stub Fractional	185
17M	2 Flute Square End Stub Metric	185
52	2 Flute High Shear Square End Standard Length Fractional	186
52M	2 Flute High Shear Square End Standard Length Metric	186
59	2 Flute Square End Long Reach Fractional	187
59M	2 Flute Square End Long Reach Metric	187
59B	2 Flute Ball End Long Reach Fractional	188
59MB	2 Flute Ball End Long Reach Metric	188
5	3 Flute Square End Standard Length Fractional	189
5M	3 Flute Square End Standard Length Metric	190
5XLM	3 Flute Square End Extra Long Reach Metric	190
5B	3 Flute Ball End Standard Length Fractional	191
5MB	3 Flute Ball End Standard Length Metric	192
5XLMB	3 Flute Ball End Extra Long Reach Metric	192
23	3 Flute Tapered Square End Standard Length Fractional	193
24	3 Flute Tapered Corner Radius Standard Length Fractional	194
1	4 Flute Square End Standard Length Fractional	195
1L	4 Flute Square End Long Reach Fractional	195
1EL	4 Flute Square End Extended Length Fractional	195
1CR	4 Flute Corner Radius Standard Length Fractional	195
1M	4 Flute Square End Standard Length Metric	199
1XLM	4 Flute Square End Extra Long Reach Metric	199
1MCR	4 Flute Corner Radius Standard Length Metric	199

Speed & Feed Recommendations listed at the end of this section

Please put "S" at the beginning of all page numbers below.

SERIES	GENERAL PURPOSE END MILLS DESCRIPTION	PAGE
1B	4 Flute Ball End Standard Length Fractional	201
1LB	4 Flute Ball End Long Reach Fractional	201
1ELB	4 Flute Ball End Extended Length Fractional	201
1MB	4 Flute Ball End Standard Length Metric	202
1XLMB	4 Flute Ball End Extra Long Reach Metric	202
14	4 Flute Double End Square Stub Fractional	203
14M	4 Flute Double End Square Stub Metric	203
14B	4 Flute Double End Ball Stub Fractional	204
14MB	4 Flute Double End Ball Stub Metric	204
16	4 Flute Square End Stub Fractional	205
16M	4 Flute Square End Stub Metric	205
54	4 Flute High Shear Square End Standard Length Fractional	206
54M	4 Flute High Shear Square End Standard Length Metric	206
61	Multi-Flute Coarse Pitch Rougher Fractional	207
61M	Multi-Flute Coarse Pitch Rougher Metric	207
62	Multi-Flute Fine Pitch Rougher Fractional	208
62M	Multi-Flute Fine Pitch Rougher Metric	209
End Mill Sets	2, 3, & 4 Flute Square End Series 1, 3, 5, 14, 15	210
	2, 3, & 4 Flute Ball End Series 1B, 3B, 5B, 14B ,15B	211
Speed & Feed Recommendations listed at the end of this section		

 Fresado

Please put "S" at the beginning of all page numbers below.

SERIE	DESCRIPCIÓN DE FRESAS DE USO GENERAL	PÁGINA
3	2 filos, punta cuadrada, longitud estándar, fraccional	176
3L	2 filos, punta cuadrada, largo alcance, fraccional	176
3EL	2 filos, punta cuadrada, longitud extendida, fraccional	176
3CR	2 filos, radio angulado, longitud estándar, fraccional	176
3M	2 filos, punta cuadrada, longitud estándar, métrico	179
3XLM	2 filos, punta cuadrada, alcance extralargo, métrico	179
3B	2 filos, punta esférica, longitud estándar, fraccional	180
3LB	2 filos, punta esférica, largo alcance, fraccional	180
3ELB	2 filos, punta esférica, longitud extendida, fraccional	180
3MB	2 filos, punta esférica, longitud estándar, métrico	182
3XLMB	2 filos, punta esférica, alcance extralargo, métrico	182
15	2 filos, pieza doble de punta cuadrada, fraccional	183
15M	2 filos, pieza doble de punta cuadrada, métrico	183
15B	2 filos, pieza doble de punta esférica, fraccional	184
15MB	2 filos, pieza doble de punta esférica, métrico	184
17	2 filos, pieza de punta cuadrada, fraccional	185

Please put "S" at the beginning of all page numbers below.

SERIE	DESCRIPCIÓN DE FRESAS DE USO GENERAL	PÁGINA
17M	2 filos, pieza de punta cuadrada, métrico	185
52	2 filos, alto rendimiento, punta cuadrada, longitud estándar, fraccional	186
52M	2 filos, alto rendimiento, punta cuadrada, longitud estándar, métrico	186
59	2 filos, punta cuadrada, largo alcance, fraccional	187
59M	2 filos, punta cuadrada, largo alcance, métrico	187
59B	2 filos, punta esférica, largo alcance, fraccional	188
59MB	2 filos, punta esférica, largo alcance, métrico	188
5	3 filos, punta cuadrada, longitud estándar, fraccional	189
5M	3 filos, punta cuadrada, longitud estándar, métrico	190
5XLM	3 filos, punta cuadrada, alcance extralargo, métrico	190
5B	3 filos, punta esférica, longitud estándar, fraccional	191
5MB	3 filos, punta esférica, longitud estándar, métrico	192
5XLMB	3 filos, punta esférica, alcance extralargo, métrico	192
23	3 filos, cónico, punta cuadrada, longitud estándar, fraccional	193
24	3 filos, cónico, radio angulado, longitud estándar, fraccional	194
1	4 filos, punta cuadrada, longitud estándar, fraccional	195
1L	4 filos, punta cuadrada, largo alcance, fraccional	195
1EL	4 filos, punta cuadrada, longitud extendida, fraccional	195
1CR	4 filos, radio angulado, longitud estándar, fraccional	195
1M	4 filos, punta cuadrada, longitud estándar, métrico	199
1XLM	4 filos, punta cuadrada, alcance extralargo, métrico	199
1MCR	4 filos, radio angulado, longitud estándar, métrico	199
1B	4 filos, punta esférica, longitud estándar, fraccional	201
1LB	4 filos, punta esférica, largo alcance, fraccional	201
1ELB	4 filos, punta esférica, longitud extendida, fraccional	201
1MB	4 filos, punta esférica, longitud estándar, métrico	202
1XLMB	4 filos, punta esférica, alcance extralargo, métrico	202
14	4 filos, pieza doble de punta cuadrada, fraccional	203
14M	4 filos, pieza doble de punta cuadrada, métrico	203
14B	4 filos, pieza doble de punta esférica, fraccional	204
14MB	4 filos, pieza doble de punta esférica, métrico	204
16	4 filos, pieza de punta cuadrada, fraccional	205
16M	4 filos, pieza de punta cuadrada, métrico	205
54	4 filos, alto rendimiento, punta cuadrada, longitud estándar, fraccional	206
54M	4 filos, alto rendimiento, punta cuadrada, longitud estándar, métrico	206
61	Filo múltiple, paso grueso, desbastador, fraccional	207
61M	Filo múltiple, paso grueso, desbastador, métrico	207
62	Filo múltiple, paso fino, desbastador, fraccional	208
62M	Filo múltiple, paso fino, desbastador, métrico	209
Juegos de fresas	2, 3 y 4 filos, punta cuadrada, series 1, 3, 5, 14, 15	210
	2, 3 y 4 filos, punta esférica, series 1B, 3B, 5B, 14B ,15B	211

Recomendaciones de Velocidad y Avance mostrados al final de esta sección.

SÉRIES	DESCRIPTION DE FRAISES À USAGE GÉNÉRAL	PAGE
3	2 dents non rayonné longueur standard (fractionnel)	176
3L	2 dents non rayonné longue portée (fractionnel)	176
3EL	2 dents non rayonné extra-long (fractionnel)	176
3CR	2 dents rayonné longueur standard (fractionnel)	176
3M	2 dents non rayonné longueur standard (métrique)	179
3XLM	2 dents non rayonné portée extra-longue (métrique)	179
3B	2 dents à bout hémisphérique longueur standard (fractionnel)	180
3LB	2 dents à bout hémisphérique longue portée (fractionnel)	180
3ELB	2 dents à bout hémisphérique extra-long (fractionnel)	180
3MB	2 dents à bout hémisphérique longueur standard (métrique)	182
3XLMB	2 dents à bout hémisphérique portée extra-longue (métrique)	182
15	2 dents à double bouts plats court (fractionnel)	183
15M	2 dents à double bouts plats court (métrique)	183
15B	2 dents à double bouts hémisphériques court (fractionnel)	184
15MB	2 dents à double bouts hémisphériques court (métrique)	184
17	2 dents non rayonné court (fractionnel)	185
17M	2 dents non rayonné court (métrique)	185
52	2 dents cisaillement élevé non rayonné longueur standard (fractionnel)	186
52M	2 dents cisaillement élevé non rayonné longueur standard (métrique)	186
59	2 dents non rayonné longue portée (fractionnel)	187
59M	2 dents non rayonné longue portée (métrique)	187
59B	2 dents à bout hémisphérique longue portée (fractionnel)	188
59MB	2 dents à bout hémisphérique longue portée (métrique)	188
5	3 dents non rayonné longueur standard (fractionnel)	189
5M	3 dents non rayonné longueur standard (métrique)	190
5XLM	3 dents non rayonné portée extra-longue (métrique)	190
5B	3 dents à bout hémisphérique longueur standard (fractionnel)	191
5MB	3 dents à bout hémisphérique longueur standard (métrique)	192
5XLMB	3 dents à bout hémisphérique portée extra-longue (métrique)	192
23	3 dents conique non rayonné longueur standard (fractionnel)	193
24	3 dents conique rayonné longueur standard (fractionnel)	194
1	4 dents non rayonné longueur standard (fractionnel)	195
1L	4 dents non rayonné longue portée (fractionnel)	195
1EL	4 dents non rayonné extra-long (fractionnel)	195
1CR	4 dents rayonné longueur standard (fractionnel)	195
1M	4 dents non rayonné longueur standard (métrique)	199
1XLM	4 dents non rayonné portée extra-longue (métrique)	199
1MCR	4 dents rayonné longueur standard (métrique)	199
1B	4 dents à bout hémisphérique longueur standard (fractionnel)	201
1LB	4 dents à bout hémisphérique longue portée (fractionnel)	201

SÉRIES	DESCRIPTION DE FRAISES À USAGE GÉNÉRAL	PAGE
1ELB	4 dents à bout hémisphérique extra-long (fractionnel)	201
1MB	4 dents à bout hémisphérique longueur standard (métrique)	202
1XLMB	4 dents à bout hémisphérique portée extra-longue (métrique)	202
14	4 dents à double bouts plats court (fractionnel)	203
14M	4 dents à double bouts plats court (métrique)	203
14B	4 dents à double bouts hémisphériques court (fractionnel)	204
14MB	4 dents à double bouts hémisphériques court (métrique)	204
16	4 dents non rayonné court (fractionnel)	205
16M	4 dents non rayonné court (métrique)	205
54	4 dents cisaillement élevé non rayonné longueur standard (fractionnel)	206
54M	4 dents cisaillement élevé non rayonné longueur standard (métrique)	206
61	Multi-dents à pas gros d'ébauche (fractionnel)	207
61M	Multi-dents à pas gros d'ébauche (métrique)	207
62	Multi-dents à pas fin d'ébauche (fractionnel)	208
62M	Multi-dents à pas fin d'ébauche (métrique)	209
Jeux de fraises	2, 3, & 4 Série goujure non rayonné 1,3,5,14,15	210
	2, 3, & 4 Série goujure à bout hémisphérique 15B, 15MB, 15B, 15MB ,15B, 15MB	211

Les avances et les vitesses recommandées se trouvent à la fin du chapitre.

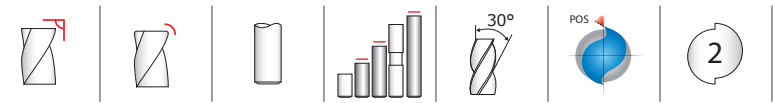
SERIE	BESCHREIBUNG DER STANDARD-SCHAFTFRÄSER	SEITE
3	Zölliger Schaftfräser mit 2 Schneiden ohne Eckenradien, Standardlänge	176
3L	Zölliger Langloch-Schaftfräser mit 2 Schneiden ohne Eckenradien	176
3EL	Zölliger Schaftfräser mit 2 Schneiden ohne Eckenradien, extra lang	176
3CR	Zölliger Schaftfräser mit 2 Schneiden mit Eckenradien, Standardlänge	176
3M	Schaftfräser mit 2 Schneiden ohne Eckenradien, Standardlänge	179
3XLM	Langloch-Schaftfräser mit 2 Schneiden ohne Eckenradien	179
3B	Zölliger Radiusshaftfräser mit 2 Schneiden, Standardlänge	180
3LB	Zölliger Langloch-Radiusshaftfräser mit 2 Schneiden	180
3ELB	Zölliger Schaftfräser mit 2 Schneiden, Extra lang	180
3MB	Schaftfräser mit 2 Schneiden, Standardlänge	182
3XLMB	Superlangloch-Schaftfräser mit 2 Schneiden	182
15	Zölliger Schaftfräser mit 2 Schneiden, kurze Ausführung	183
15M	Schaftfräser mit 2 Schneiden, kurze Ausführung	183
15B	Zölliger Doppelend-Radiusshaftfräser mit 2 Schneiden, kurze Ausführung	184
15MB	Doppelend-Radiusshaftfräser mit 2 Schneiden, kurze Ausführung	184
17	Zölliger Schaftfräser mit 2 Schneiden ohne Eckenradien, kurze Ausführung	185
17M	Schaftfräser mit 2 Schneiden ohne Eckenradien, kurze Ausführung	185
52	Zölliger Schaftfräser hoher Scherfestigkeit mit 2 Schneiden ohne Eckenradien, Standardlänge	186
52M	Schaftfräser hoher Scherfestigkeit mit 2 Schneiden ohne Eckenradien, Standardlänge	186
59	Zölliger Langloch-Schaftfräser mit 2 Schneiden ohne Eckenradien	187
59M	Langloch-Schaftfräser mit 2 Schneiden ohne Eckenradien	187
59B	Zölliger Langloch-Radiusshaftfräser mit 2 Schneiden	188
59MB	Langloch-Radiusshaftfräser mit 2 Schneiden	188
5	Zölliger Schaftfräser mit 3 Schneiden ohne Eckenradien, Standardlänge	189
5M	Schaftfräser mit 3 Schneiden ohne Eckenradien, Standardlänge	190
5XLM	Langloch-Schaftfräser mit 3 Schneiden ohne Eckenradien	190
5B	Zölliger Schaftfräser mit 3 Schneiden, Standardlänge	191
5MB	Schaftfräser mit 3 Schneiden, Standardlänge	192
5XLMB	Langloch-Schaftfräser mit 3 Schneiden	192
23	Zölliger Schaftfräser mit 3 Schneiden ohne Eckenradien, Standardlänge	193
24	Zölliger Schaftfräser mit 3 Schneiden mit Eckenradien, Standardlänge	194
1	Zölliger Schaftfräser mit 4 Schneiden ohne Eckenradien, Standardlänge	195
1L	Zölliger Langloch-Schaftfräser mit 4 Schneiden ohne Eckenradien	195
1EL	Zölliger Schaftfräser mit 4 Schneiden ohne Eckenradien, extra lang	195
1CR	Zölliger Schaftfräser mit 4 Schneiden mit Eckenradien, Standardlänge	195
1M	Schaftfräser mit 4 Schneiden ohne Eckenradien, Standardlänge	199
1XLM	Superlangloch-Schaftfräser mit 4 Schneiden ohne Eckenradien	199
1MCR	Schaftfräser mit 4 Schneiden mit Eckenradien, Standardlänge	199
1B	Zölliger Schaftfräser mit 4 Schneiden, Standardlänge	201
1LB	Zölliger Langloch-Radiusshaftfräser mit 4 Schneiden	201

SERIE	BESCHREIBUNG DER STANDARD-SCHAFTFRÄSER	SEITE
1ELB	Zölliger Schaftfräser mit 4 Schneiden, Extra lang	201
1MB	Schaftfräser mit 4 Schneiden, Standardlänge	202
1XLMB	Langloch-Radiusshaftfräser mit 4 Schneiden	202
14	Zölliger Schaftfräser mit 4 Schneiden, kurze Ausführung	203
14M	Schaftfräser mit 4 Schneiden, kurze Ausführung	203
14B	Zölliger Doppelend-Radiusshaftfräser mit 4 Schneiden, kurze Ausführung	204
14MB	Doppelend-Radiusshaftfräser mit 4 Schneiden, kurze Ausführung	204
16	Zölliger Schaftfräser mit 4 Schneiden ohne Eckenradien, kurze Ausführung	205
16M	Schaftfräser mit 4 Schneiden ohne Eckenradien, kurze Ausführung	205
54	Zölliger Schaftfräser hoher Scherfestigkeit mit 4 Schneiden ohne Eckenradien, Standardlänge	206
54M	Schaftfräser hoher Scherfestigkeit mit 4 Schneiden ohne Eckenradien, Standardlänge	206
61	Zölliger mehrschneidiger fein verzahnter Schruppfräser	207
61M	Mehrschneidiger fein verzahnter Schruppfräser	207
62	Zölliger mehrschneidiger fein verzahnter Schruppfräser	208
62M	Mehrschneidiger fein verzahnter Schruppfräser	209
Richtwerte zum Fräsen	Schaftfräser mit 2, 3 und 4 Schneiden ohne Eckenradien, Serien 1, 3, 5, 14, 15	210
	Radiusshaftfräser mit 2, 3 und 4 Schneiden, Serien 1B, 3B, 5B, 14B ,15B	211

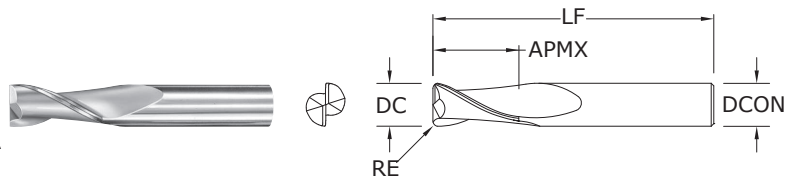
Schnittwertempfehlungen finden Sie am Ende dieses Abschnitts

FRACTIONAL

2 Flute Square End • 2 Flute Corner Radius



**3•3L•
3EL•3CR**
FRACTIONAL SERIES



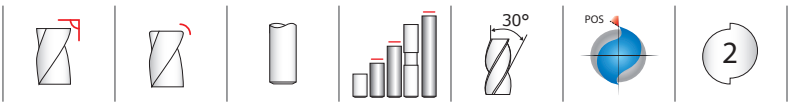
TOLERANCES (inch)
DC = -0.001/-0.002
DCON = h₆
RE = +0.0000/-0.0020

inch					EDP NO.					SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	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	1/2	1-1/2	1/8	.015	38201	38202	38315	38357	—	3CR
**1/8	1/2	1-1/2	1/8	.020	38203	38204	38316	38358	—	3CR
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	5/8	2	3/16	.015	38209	38210	38317	38359	—	3CR
**3/16	5/8	2	3/16	.020	38211	38212	38318	38360	—	3CR
**3/16	5/8	2	3/16	.030	38213	38214	38319	38361	—	3CR
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	3/4	2-1/2	1/4	.015	38219	38220	38320	38362	—	3CR
**1/4	3/4	2-1/2	1/4	.020	38221	38222	38321	38363	—	3CR
**1/4	3/4	2-1/2	1/4	.030	38223	38224	38322	38364	—	3CR
**1/4	3/4	2-1/2	1/4	.045	38225	38226	38323	38365	—	3CR
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

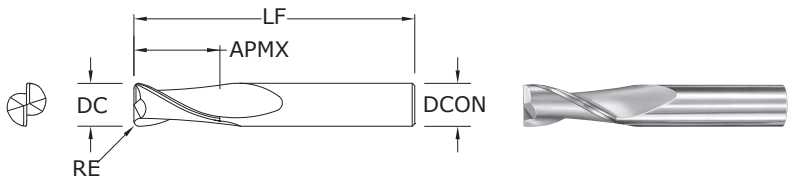
continued on next page

FRACTIONAL

2 Flute Square End • 2 Flute Corner Radius



TOLERANCES (inch)
DC = -0.001/-0.002
DCON = h₆
RE = +0.0000/-0.0020



**3•3L•
3EL•3CR**
FRACTIONAL SERIES

inch					EDP NO.					SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Di-NAMITE* (Diamond)	
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	13/16	2-1/2	5/16	.015	38231	38232	38324	38366	—	3CR
**5/16	13/16	2-1/2	5/16	.020	38233	38234	38325	38367	—	3CR
**5/16	13/16	2-1/2	5/16	.030	38235	38236	38326	38368	—	3CR
**5/16	13/16	2-1/2	5/16	.045	38237	38238	38327	38369	—	3CR
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	2-1/2	3/8	.015	38245	38246	38328	38370	—	3CR
3/8	1	2-1/2	3/8	.020	38247	38248	38329	38371	—	3CR
3/8	1	2-1/2	3/8	.030	38249	38250	38330	38372	—	3CR
3/8	1	2-1/2	3/8	.045	38251	38252	38331	38373	—	3CR
3/8	1-1/8	3	3/8	—	33307	31804	31814	31854	—	3L
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	1	3	1/2	.015	38259	38260	38332	38374	—	3CR
1/2	1	3	1/2	.020	38261	38262	38333	38375	—	3CR
1/2	1	3	1/2	.030	38263	38264	38334	38376	—	3CR
1/2	1	3	1/2	.045	38265	38266	38335	38377	—	3CR
1/2	1	3	1/2	.060	38267	38268	38336	38378	—	3CR
1/2	2	4-1/2	1/2	—	33311	31806	31816	31856	—	3L

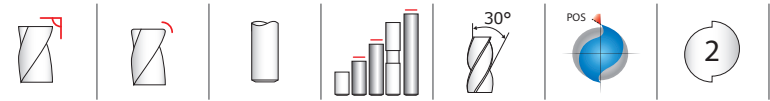
continued on next page

For patent information visit
www.ksptpatents.com

For patent information visit
www.ksptpatents.com

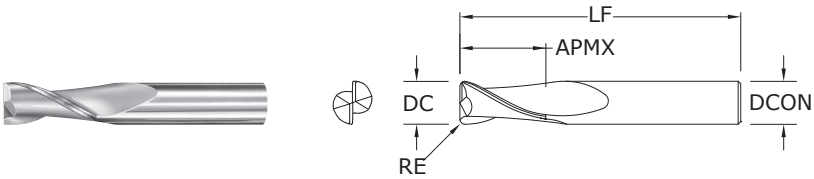
FRACTIONAL

2 Flute Square End • 2 Flute Corner Radius



3•3L• 3EL•3CR

FRACTIONAL SERIES



TOLERANCES (inch)
DC = -0.001/-0.002
DCON = h₆
RE = +0.0000/-0.0020

CONTINUED

inch						EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Di-NAMITE* (Diamond)	
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	1-1/4	3-1/2	5/8	.015	38273	38274	38337	38379	—	3CR
5/8	1-1/4	3-1/2	5/8	.020	38275	38276	38338	38380	—	3CR
5/8	1-1/4	3-1/2	5/8	.030	38277	38278	38339	38381	—	3CR
5/8	1-1/4	3-1/2	5/8	.045	38279	38280	38340	38382	—	3CR
5/8	1-1/4	3-1/2	5/8	.060	38281	38282	38341	38383	—	3CR
5/8	1-1/4	3-1/2	5/8	.090	38283	38284	38342	38384	—	3CR
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	1-1/2	4	3/4	.015	38287	38288	38343	38385	—	3CR
3/4	1-1/2	4	3/4	.020	38289	38290	38344	38386	—	3CR
3/4	1-1/2	4	3/4	.030	38291	38292	38345	38387	—	3CR
3/4	1-1/2	4	3/4	.045	38293	38294	38346	38388	—	3CR
3/4	1-1/2	4	3/4	.060	38295	38296	38347	38389	—	3CR
3/4	1-1/2	4	3/4	.090	38297	38298	38348	38390	—	3CR
3/4	1-1/2	4	3/4	.125	38299	38300	38349	38391	—	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	1-1/2	4	1	.015	38301	38302	38350	38392	—	3CR
1	1-1/2	4	1	.020	38303	38304	38351	38393	—	3CR
1	1-1/2	4	1	.030	38305	38306	38352	38394	—	3CR
1	1-1/2	4	1	.045	38307	38308	38353	38395	—	3CR
1	1-1/2	4	1	.060	38309	38310	38354	38396	—	3CR
1	1-1/2	4	1	.090	38311	38312	38355	38397	—	3CR
1	1-1/2	4	1	.125	38313	38314	38356	38398	—	
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

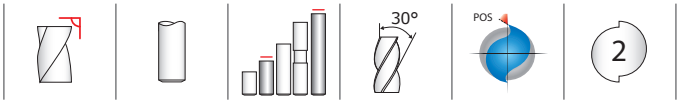
**Without Flat

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

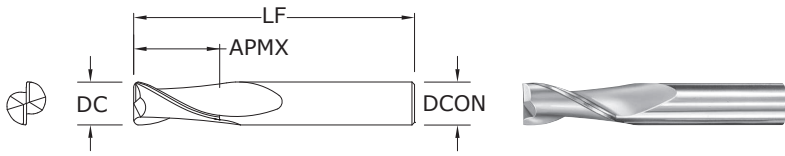
For patent information visit www.ksptpatents.com

METRIC

2 Flute Square End



TOLERANCES (mm)
DC = +0,000/-0,050
DCON = h₆



3M• 3XLM

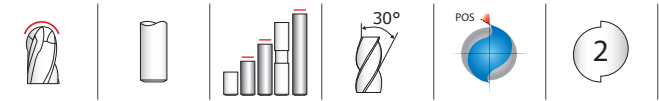
METRIC SERIES

mm				EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

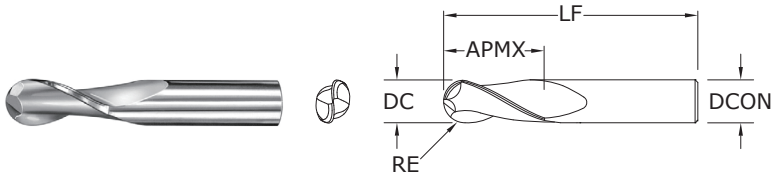
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

FRACTIONAL
2 Flute Ball End



3B•3LB•
3ELB
FRACTIONAL SERIES

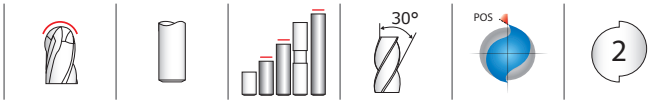


TOLERANCES (inch)	
DC	= -0.0000/-0.0020
DCON	= h ₆
RE	= +0.0000/-0.0010

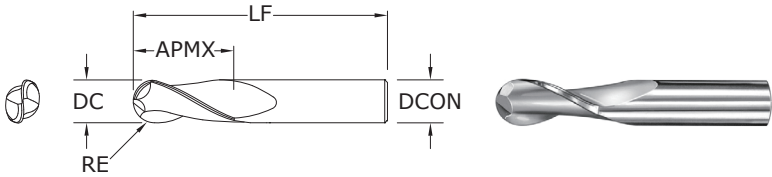
inch				EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1/64	1/32	1-1/2	1/8	30302	39302	39502	30471	3B
1/32	5/64	1-1/2	1/8	30304	39304	39504	30472	3B
3/64	7/64	1-1/2	1/8	30306	39306	39506	30473	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

continued on next page

FRACTIONAL
2 Flute Ball End



3B•3LB•
3ELB
FRACTIONAL SERIES



TOLERANCES (inch)	
DC	= -0.0000/-0.0020
DCON	= h ₆
RE	= +0.0000/-0.0010

inch				EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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
				30390	39390	39590	30600	3B

*Series 3B Set
RE = 1/2 Cutting Diameter (DC)

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

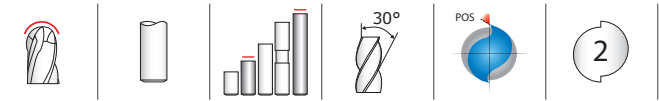
For patent information visit
www.ksptpatents.com

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

For patent information visit
www.ksptpatents.com

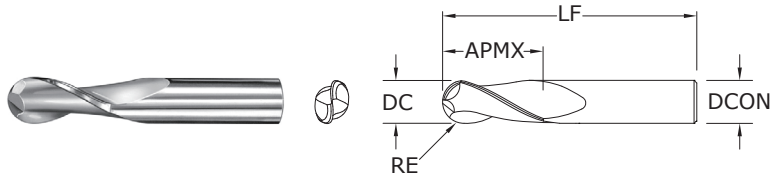
METRIC

2 Flute Ball End



3MB• 3XLMB

METRIC SERIES



TOLERANCES (mm)

DC	= +0,000/–0,050
DCON	= h ₆
RE	= +0,000/–0,025

mm				EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

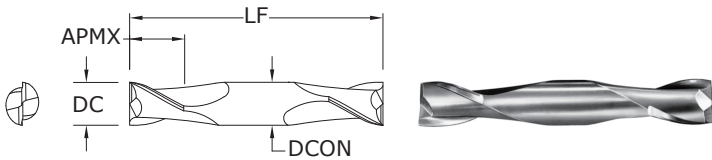
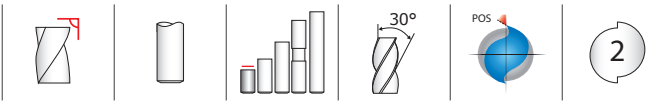
RE = 1/2 Cutting Diameter (DC)

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

For patent information visit www.ksptpatents.com

FRACTIONAL & METRIC

2 Flute Double End



TOLERANCES (inch)

DC	= +0.0000/–0.0020
DCON	= h ₆

inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

TOLERANCES (mm)

DC	= +0,000/–0,050
DCON	= h ₆

mm				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

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

For patent information visit www.ksptpatents.com

15

FRACTIONAL SERIES

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

For patent information visit www.ksptpatents.com

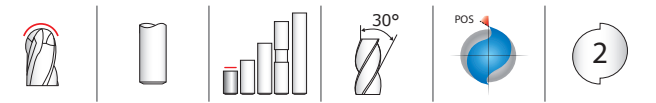
15M

METRIC SERIES

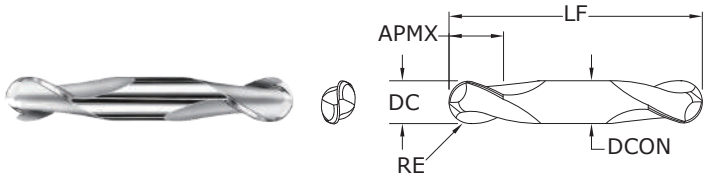
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

2 Flute Double End Ball End



15B
FRACTIONAL SERIES



TOLERANCES (inch)	
DC	= -0.0000/-0.0020
DCON	= h ₆
RE	= +0.0000/-0.0010

inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (mm)	
DC	= +0,000/-0,050
DCON	= h ₆
RE	= +0,000/0,025

15MB
METRIC SERIES

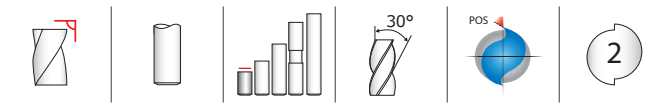
mm				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41506	49073	49094	49115
1,5	3,0	38,0	3,0	41510	49074	49095	49116
2,0	4,0	38,0	3,0	41514	49075	49096	49117
2,5	5,0	38,0	3,0	41518	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

RE = 1/2 Cutting Diameter (DC)

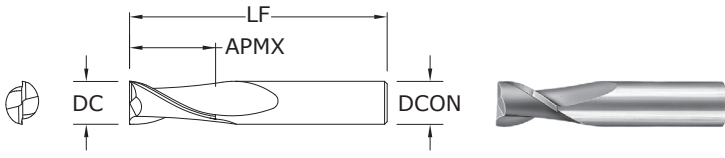
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

2 Flute Square End Stub



17
FRACTIONAL SERIES

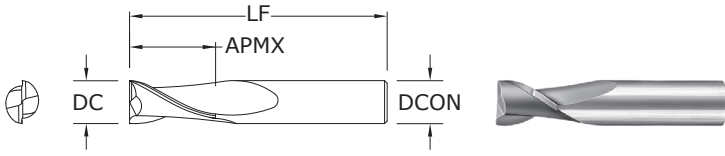


TOLERANCES (inch)	
DC	= +0.0000/-0.0020
DCON	= h ₆

inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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



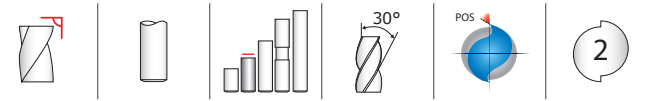
TOLERANCES (mm)	
DC	= +0,000/-0,050
DCON	= h ₆

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

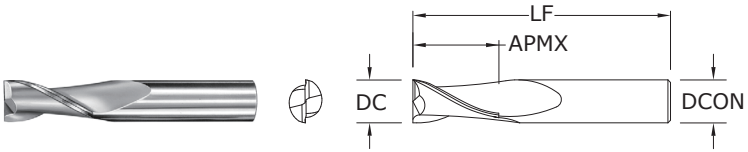
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

2 Flute High Shear



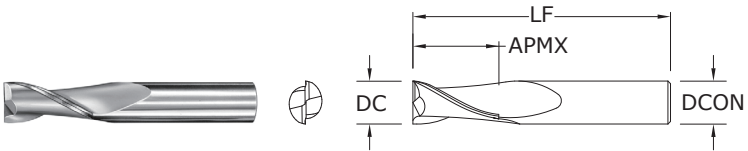
52
FRACTIONAL SERIES



TOLERANCES (inch)
DC = +0.0000/-0.0020
DCON = h₆

inch				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

52M
METRIC SERIES



TOLERANCES (mm)
DC = +0.000/-0.050
DCON = h₆

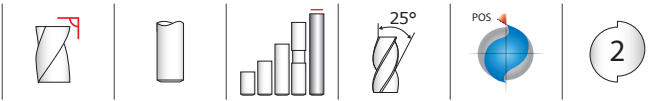
mm				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE-C (TiCN)
3,0	7,0	38,0	3,0	45277	49829
3,5	7,0	57,0	6,0	45279	49830
4,0	8,0	57,0	6,0	45281	49831
4,5	8,0	57,0	6,0	45283	49832
5,0	10,0	57,0	6,0	45285	49833
6,0	10,0	57,0	6,0	45287	49834
8,0	16,0	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

NON-FERROUS

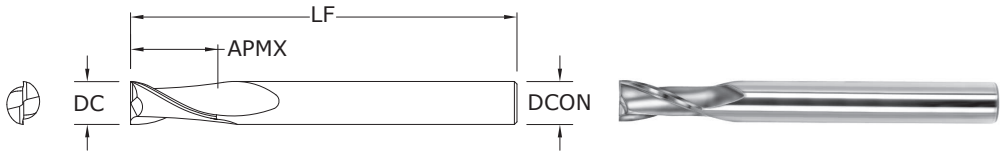
PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

2 Flute Square End Long Reach



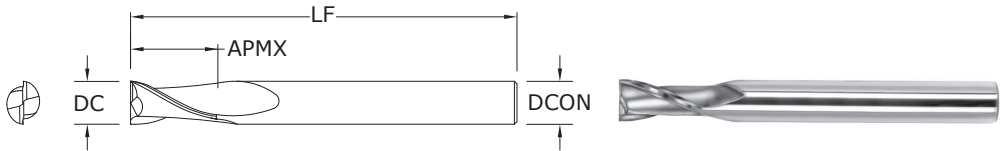
59
FRACTIONAL SERIES



TOLERANCES (mm)
DC = +0.000/-0.050
DCON = h₆

inch				EDP NO.		
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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



TOLERANCES (mm)
DC = +0.000/-0.050
DCON = h₆

mm				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

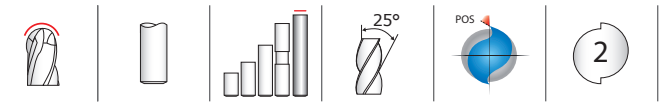
59M
METRIC SERIES

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

For patent information visit
www.ksptpatents.com

FRACTIONAL & METRIC

2 Flute Ball End Long Reach



59B

FRACTIONAL SERIES

- 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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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
RE = 1/2 Cutting Diameter (DC)

mm				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

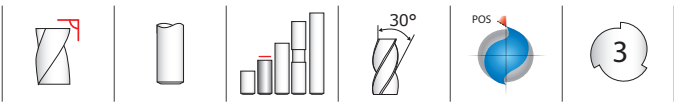
Neck Option Available
RE = 1/2 Cutting Diameter (DC)

For patent information visit www.ksptpatents.com

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

FRACTIONAL

3 Flute Square End



5

FRACTIONAL SERIES

inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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
*Series 5 Set				30589	39789	30810	30850

5

FRACTIONAL SERIES

inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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
*Series 5 Set				30589	39789	30810	30850

For patent information visit www.ksptpatents.com

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

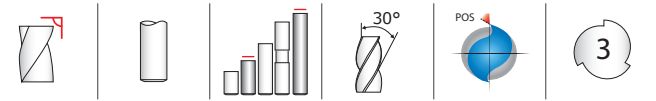
KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

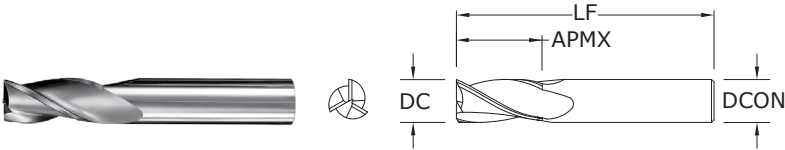
METRIC

3 Flute Square End



5M• 5XLM

METRIC SERIES



TOLERANCES (mm)

DC = +0,000/-0,050
DCON = h₆

mm				EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

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

For patent information visit
www.ksptpatents.com

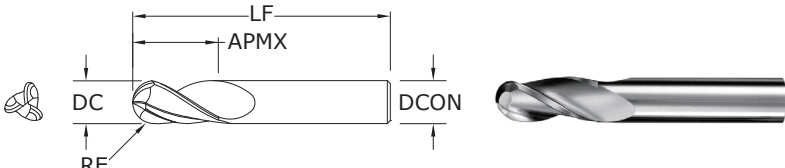
FRACTIONAL

3 Flute Ball End



5B

FRACTIONAL SERIES



TOLERANCES (inch)

DC = -0.0000/-0.0020
DCON = h₆
RE = +0.0000/-0.0010

inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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
				30590	30900	30944	31169

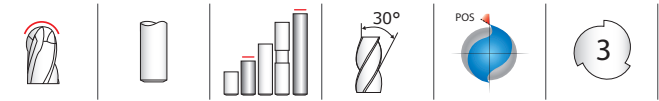
*Series 5B Set
RE = 1/2 Cutting Diameter (DC)

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

For patent information visit
www.ksptpatents.com

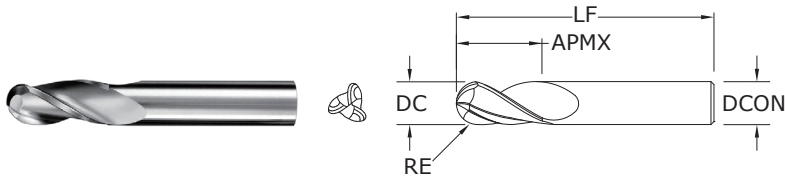
METRIC

3 Flute Ball End



5MB• 5XLMB

METRIC SERIES



TOLERANCES (mm)	
DC	= +0,000/-0,050
DCON	= h ₆
RE	= +0,000/-0,025

mm				EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

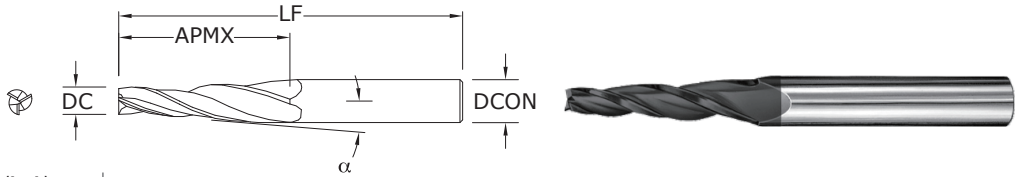
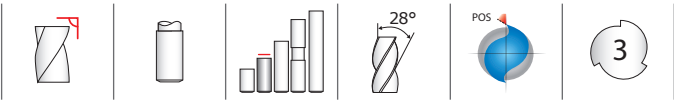
RE = 1/2 Cutting Diameter (DC)

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

For patent information visit www.ksptpatents.com

FRACTIONAL

Tapered Square End



TOLERANCES (inch)	
DC	= -0.0000/-0.0020
DCON	= h ₆

inch					EDP NO.			
SHANK DIAMETER DCON	CENTER LINE ANGLE α	SMALL DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	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

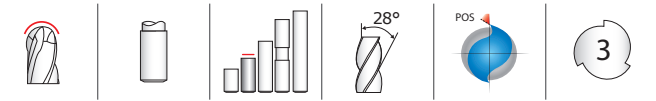
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

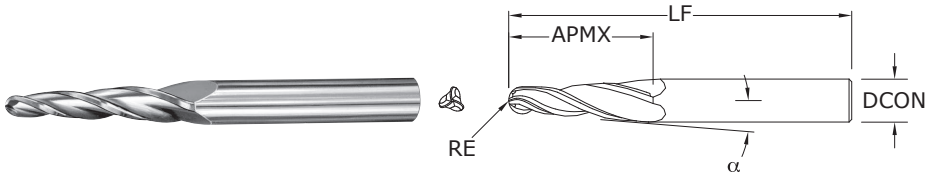
23

FRACTIONAL SERIES

FRACTIONAL
Tapered Ball End



24
FRACTIONAL SERIES



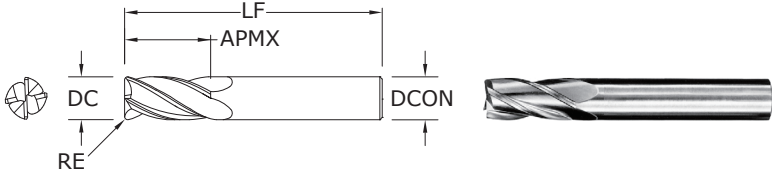
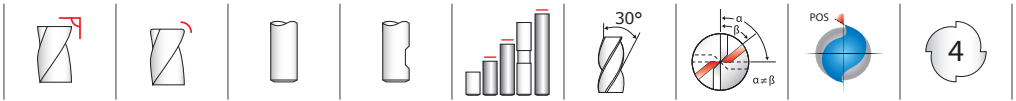
TOLERANCES (inch)
DCON = h₆
RE = +0.0000/-0.0010

inch					EDP NO.			
SHANK DIAMETER DCON	CENTER LINE ANGLE α	RADIUS RE	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE (TiN)	TI-NAMITE-C (TiCN)	TI-NAMITE-A (AlTiN)
1/4	1°	.062	1-1/2	3	32402	32403	32445	32470
1/4	1°30'	.062	1-1/2	3	32404	32405	32446	32471
1/4	2°	.062	1-1/4	3	32406	32407	32447	32472
1/4	3°	.062	1	3	32408	32409	32448	32473
1/4	5°	.062	3/4	3	32410	32411	32449	32474
1/4	7°	.062	1/2	3	32412	32413	32450	32475
1/4	10°	.047	1/2	3	32414	32415	32451	32476
3/8	1°	.093	1-3/4	3-1/2	32416	32417	32452	32477
3/8	1°30'	.093	1-3/4	3-1/2	32418	32419	32453	32478
3/8	2°	.093	1-3/4	3-1/2	32420	32421	32454	32479
3/8	3°	.078	1-3/4	3-1/2	32422	32423	32455	32480
3/8	5°	.062	1-1/2	3-1/2	32424	32425	32456	32481
3/8	7°	.062	1	3-1/2	32426	32427	32457	32482
3/8	10°	.062	3/4	3-1/2	32428	32429	32458	32483
1/2	1°	.125	2	4	32430	32431	32459	32484
1/2	2°	.125	2	4	32434	32435	32460	32485
1/2	3°	.125	2	4	32436	32437	32461	32486
1/2	5°	.125	1-1/4	4	32438	32439	32462	32487
1/2	7°	.093	1-1/4	4	32440	32441	32463	32488
1/2	10°	.062	1	4	32442	32443	32464	32489

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

For patent information visit www.ksptpatents.com

FRACTIONAL
4 Flute Square End • 4 Flute Corner Radius



TOLERANCES (inch)
DC = +0.0000/-0.0020
1CR DC = -0.0010/-0.0020
DCON = h₆
RE = +0.000/-0.002

1•1L•
1EL•1CR
FRACTIONAL SERIES

inch					EDP NO.							SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	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	1/2	1-1/2	1/8	.015	38001	38002	38115	38157	—	—	—	1CR
**1/8	1/2	1-1/2	1/8	.020	38003	38004	38116	38158	—	—	—	1CR
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	5/8	2	3/16	.015	38009	38010	38117	38159	—	—	—	1CR
**3/16	5/8	2	3/16	.020	38011	38012	38118	38160	—	—	—	1CR
**3/16	5/8	2	3/16	.030	38013	38014	38119	38161	—	—	—	1CR
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	3/4	2-1/2	1/4	.015	38019	38020	38120	38162	—	—	—	1CR
**1/4	3/4	2-1/2	1/4	.020	38021	38022	38121	38163	—	—	—	1CR
**1/4	3/4	2-1/2	1/4	.030	38023	38024	38122	38164	—	—	—	1CR
**1/4	3/4	2-1/2	1/4	.045	38025	38026	38123	38165	—	—	—	1CR

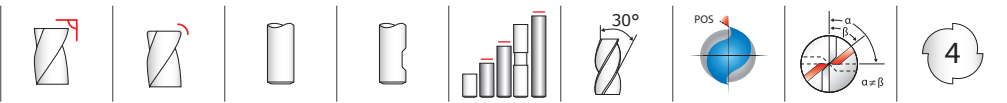
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

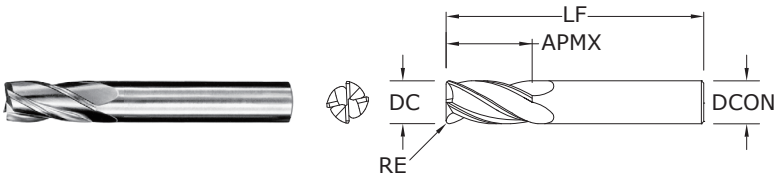
continued on next page

FRACTIONAL

4 Flute Square End • 4 Flute Corner Radius



1•1L•
1EL•1CR
FRACTIONAL SERIES



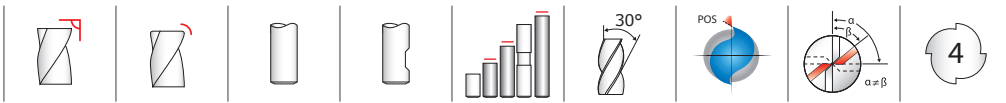
TOLERANCES (inch)
DC = +0.0000/-0.0020
1CR DC = -0.0010/-0.0020
DCON = h₆
RE = +0.000/-0.002

inch						EDP NO.						SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	UNCOATED	UNCOATED W/ FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE* (Diamond)	
1/4	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	13/16	2-1/2	5/16	.015	38031	38032	38124	38166	—	—	—	1CR
**5/16	13/16	2-1/2	5/16	.020	38033	38034	38125	38167	—	—	—	1CR
**5/16	13/16	2-1/2	5/16	.030	38035	38036	38126	38168	—	—	—	1CR
**5/16	13/16	2-1/2	5/16	.045	38037	38038	38127	38169	—	—	—	1CR
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
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	2-1/2	3/8	.015	38045	38046	38128	38170	—	—	—	1CR
3/8	1	2-1/2	3/8	.020	38047	38048	38129	38171	—	—	—	1CR
3/8	1	2-1/2	3/8	.030	38049	38050	38130	38172	—	—	—	1CR
3/8	1	2-1/2	3/8	.045	38051	38052	38131	38173	—	—	—	1CR
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

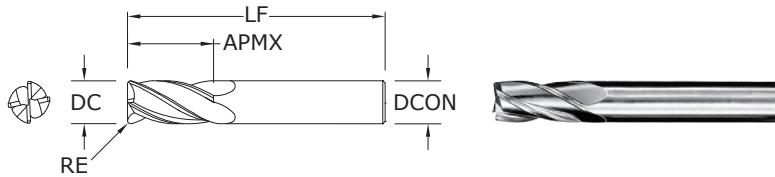
continued on next page

FRACTIONAL

4 Flute Square End • 4 Flute Corner Radius



TOLERANCES (inch)
DC = +0.0000/-0.0020
1CR DC = -0.0010/-0.0020
DCON = h₆
RE = +0.000/-0.002



1•1L•
1EL•1CR
FRACTIONAL SERIES

inch						EDP NO.						SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	UNCOATED	UNCOATED W/ FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE* (Diamond)	
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	1	3	1/2	.015	38059	38060	38132	38174	—	—	—	1CR
1/2	1	3	1/2	.020	38061	38062	38133	38175	—	—	—	1CR
1/2	1	3	1/2	.030	38063	38064	38134	38176	—	—	—	1CR
1/2	1	3	1/2	.045	38065	38066	38135	38177	—	—	—	1CR
1/2	1	3	1/2	.060	38067	38068	38136	38178	—	—	—	1CR
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	1-1/4	3-1/2	5/8	.015	38073	38074	38137	38179	—	—	—	1CR
5/8	1-1/4	3-1/2	5/8	.020	38075	38076	38138	38180	—	—	—	1CR
5/8	1-1/4	3-1/2	5/8	.030	38077	38078	38139	38181	—	—	—	1CR
5/8	1-1/4	3-1/2	5/8	.045	38079	38080	38140	38182	—	—	—	1CR
5/8	1-1/4	3-1/2	5/8	.060	38081	38082	38141	38183	—	—	—	1CR
5/8	1-1/4	3-1/2	5/8	.090	38083	38084	38142	38184	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	1-1/2	4	3/4	.015	38087	38088	38143	38185	—	—	—	1CR
3/4	1-1/2	4	3/4	.020	38089	38090	38144	38186	—	—	—	1CR
3/4	1-1/2	4	3/4	.030	38091	38092	38145	38187	—	—	—	1CR
3/4	1-1/2	4	3/4	.045	38093	38094	38146	38188	—	—	—	1CR
3/4	1-1/2	4	3/4	.060	38095	38096	38147	38189	—	—	—	1CR
3/4	1-1/2	4	3/4	.090	38097	38098	38148	38190	—	—	—	1CR
3/4	1-1/2	4	3/4	.125	38099	38100	38149	38191	—	—	—	1CR
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

continued on next page

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

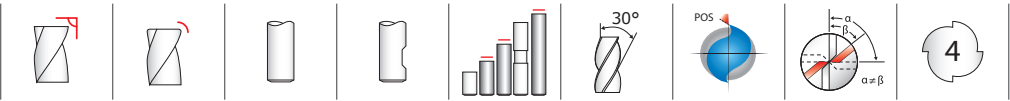
For patent information visit www.ksptpatents.com

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

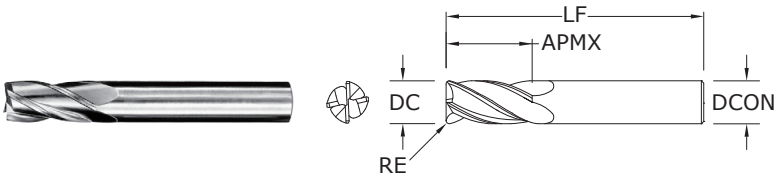
For patent information visit www.ksptpatents.com

FRACTIONAL

4 Flute Square End • 4 Flute Corner Radius



1•1L•
1EL•1CR
FRACTIONAL SERIES



TOLERANCES (inch)
DC = +0.0000/-0.0020
1CR DC = -0.0010/-0.0020
DCON = h₆
RE = +0.000/-0.002

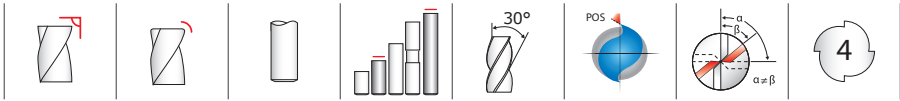
inch						EDP NO.							SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE		UNCOATED	UNCOATED W/ FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE* (Diamond)	
1	1-1/2	4	1	—		30175	30183	39175	39075	30028	30383	—	1
1	1-1/2	4	1	.015		38101	38102	38150	38192	—	—	—	1CR
1	1-1/2	4	1	.020		38103	38104	38151	38193	—	—	—	1CR
1	1-1/2	4	1	.030		38105	38106	38152	38194	—	—	—	1CR
1	1-1/2	4	1	.045		38107	38108	38153	38195	—	—	—	1CR
1	1-1/2	4	1	.060		38109	38110	38154	38196	—	—	—	1CR
1	1-1/2	4	1	.090		38111	38112	38155	38197	—	—	—	1CR
1	1-1/2	4	1	.125		38113	38114	38156	38198	—	—	—	1CR
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
**Without Flat													

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

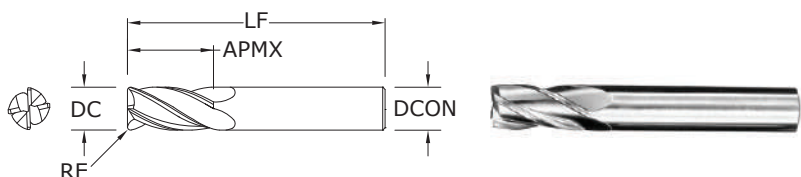
For patent information visit www.ksptpatents.com

METRIC

4 Flute Square End • 4 Flute Corner Radius



TOLERANCES (mm)
DC = +0,000/-0,050
DCON = h₆
RE = +0,000/-0,050



1M•1XLM•
1MCR
METRIC SERIES

mm					EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	SHANK DIAMETER DCON	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
4,0	14,0	50,0	0,25	4,0	—	—	—	40000	1MCR
4,0	14,0	50,0	0,50	4,0	—	—	—	40001	1MCR
4,0	14,0	50,0	1,00	4,0	—	—	—	40003	1MCR
4,5	16,0	50,0	—	6,0	40133	48507	48529	48550	1M
5,0	16,0	50,0	0,25	6,0	—	—	—	40004	1MCR
5,0	16,0	50,0	0,50	6,0	—	—	—	40005	1MCR
5,0	16,0	50,0	1,00	6,0	—	—	—	40007	1MCR
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
6,0	19,0	50,0	0,25	6,0	—	—	—	40009	1MCR
6,0	19,0	50,0	0,50	6,0	—	—	—	40010	1MCR
6,0	19,0	50,0	0,75	6,0	—	—	—	40011	1MCR
6,0	19,0	50,0	1,00	6,0	—	—	—	40012	1MCR
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
8,0	20,0	63,0	0,50	8,0	—	—	—	40015	1MCR
8,0	20,0	63,0	0,75	8,0	—	—	—	40016	1MCR
8,0	20,0	63,0	1,00	8,0	—	—	—	40017	1MCR
8,0	20,0	63,0	1,50	8,0	—	—	—	40019	1MCR
8,0	20,0	63,0	2,00	8,0	—	—	—	40020	1MCR
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

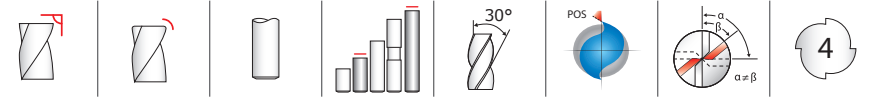
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

continued on next page

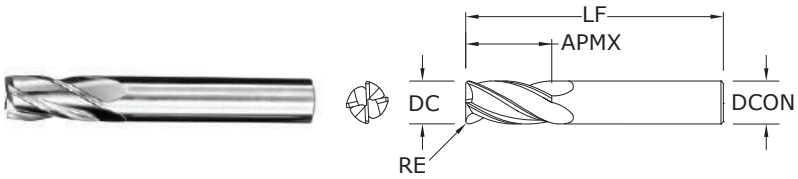
METRIC

4 Flute Square End • 4 Flute Corner Radius



1M•1XLM•1MCR

METRIC SERIES



TOLERANCES (mm)

DC = +0,000/-0,050
DCON = h₆
RE = +0,000/-0,050

CONTINUED

CONTINUED		mm				EDP NO.				SERIES
		CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	
	10,0	38,0	100,0	—	10,0	43125	49393	49406	49419	1XLM
	10,0	22,0	75,0	0,50	10,0	—	—	—	40021	1MCR
	10,0	22,0	75,0	1,00	10,0	—	—	—	40023	1MCR
	10,0	22,0	75,0	1,50	10,0	—	—	—	40024	1MCR
	10,0	22,0	75,0	2,00	10,0	—	—	—	40025	1MCR
	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
	12,0	25,0	75,0	0,50	12,0	—	—	—	40028	1MCR
	12,0	25,0	75,0	1,00	12,0	—	—	—	40030	1MCR
	12,0	25,0	75,0	1,50	12,0	—	—	—	40031	1MCR
	12,0	25,0	75,0	2,00	12,0	—	—	—	40032	1MCR
	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
	16,0	32,0	89,0	0,50	16,0	—	—	—	40035	1MCR
	16,0	32,0	89,0	1,00	16,0	—	—	—	40037	1MCR
	16,0	32,0	89,0	1,50	16,0	—	—	—	40038	1MCR
	16,0	32,0	89,0	2,00	16,0	—	—	—	40039	1MCR
	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

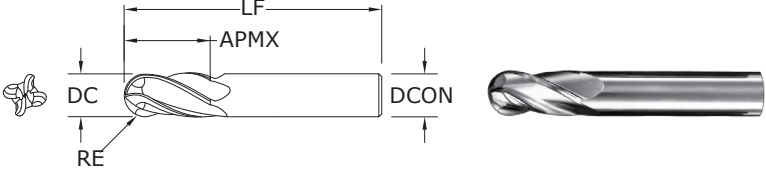
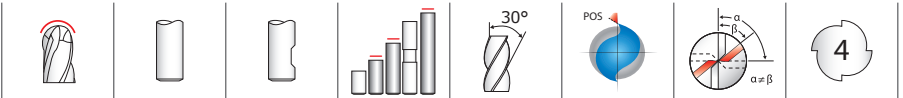
For patent information visit www.ksptpatents.com

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

For patent information visit www.ksptpatents.com

FRACTIONAL

4 Flute Ball End



1B•1LB•1ELB

FRACTIONAL SERIES

TOLERANCES (inch)

DC = +0.0000/-0.0020
DCON = h₆
RE = +0.0000/-0.0010

inch				EDP NO.							SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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	—	91277	1B
3/16	3/4	2-1/2	3/16	33102	—	31771	31781	31791	—	—	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

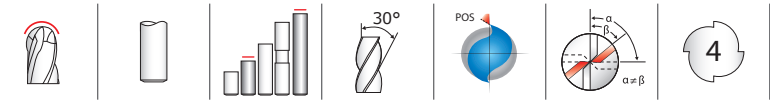
RE = 1/2 Cutting Diameter (DC)

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

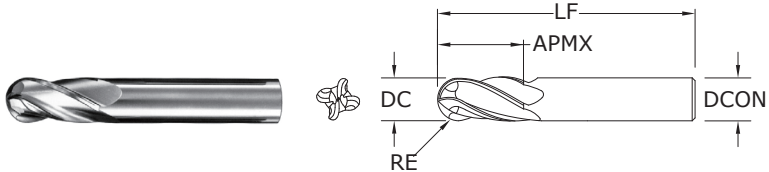
For patent information visit www.ksptpatents.com

METRIC

4 Flute Ball End



**1MB•
1XLMB**
METRIC SERIES



TOLERANCES (mm)
DC = +0,000/−0,050
DCON = h₆
RE = +0,000/−0,025

mm				EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

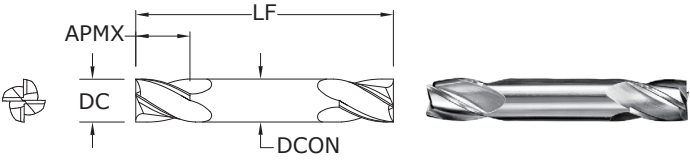
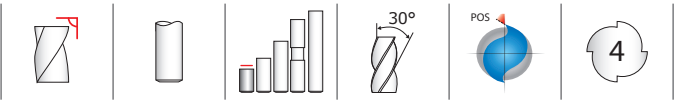
RE = 1/2 Cutting Diameter (DC)

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

For patent information visit www.ksptpatents.com

FRACTIONAL & METRIC

4 Flute Double End



TOLERANCES (inch)
DC = +0.0000/−0.0020
DCON = h₆

inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

TOLERANCES (mm)
DC = +0,000/−0,050
DCON = h₆

mm				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

14
FRACTIONAL SERIES

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

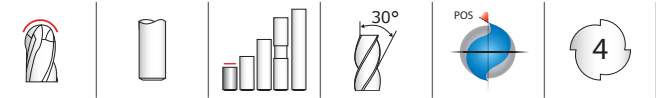
For patent information visit www.ksptpatents.com

14M
METRIC SERIES

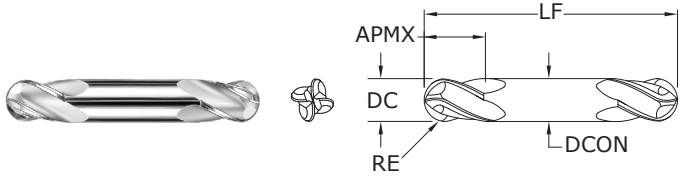
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

4 Flute Double End Ball End



14B
FRACTIONAL SERIES



TOLERANCES (inch)	
DC	= +0.0000/-0.0020
DCON	= h ₆
RE	= +0.0000/-0.0010

inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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
				31490	31482	39642	31217

*Series 14B Set
RE = 1/2 Cutting Diameter (DC)

For patent information visit
www.ksptpatents.com

14MB
METRIC SERIES

mm				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

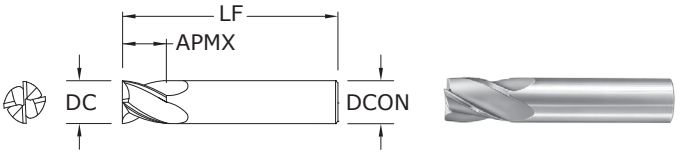
RE = 1/2 Cutting Diameter (DC)

For patent information visit
www.ksptpatents.com

4 Flute Square End Stub



TOLERANCES (inch)	
DC	= -0.0000/-0.0020
DCON	= h ₆



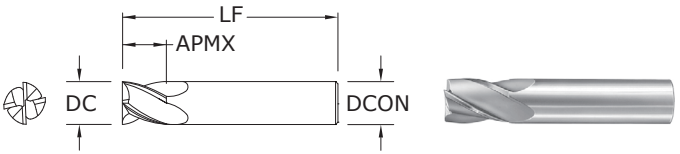
inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/16	1/8	1-1/2	1/8	31601	31650	31238	31251
3/32	3/16	1-1/2	1/8	31603	31651	31239	31252
1/8	1/4	1-1/2	1/8	31605	31652	31240	31253
5/32	5/16	2	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

16
FRACTIONAL SERIES

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

For patent information visit
www.ksptpatents.com

TOLERANCES (mm)	
DC	= +0,000/-0,050
DCON	= h ₆



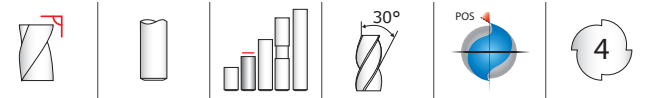
mm				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41605	49136	49157	49178
1,5	3,0	38,0	3,0	41609	49137	49158	49179
2,0	4,0	38,0	3,0	41613	49138	49159	49180
2,5	5,0	38,0	3,0	41617	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

16M
METRIC SERIES

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

For patent information visit
www.ksptpatents.com

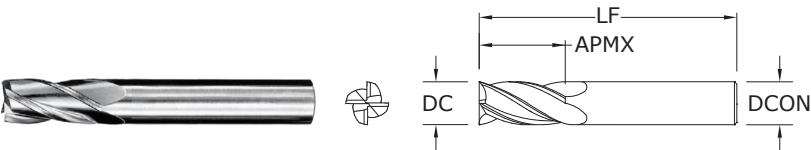
4 Flute High Shear



54
FRACTIONAL SERIES

- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



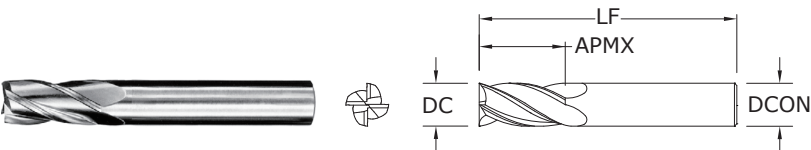
TOLERANCES (inch)
DC = +0.0000/-0.0020
DCON = h₆

inch				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

54M
METRIC SERIES

- NON-FERROUS
- PLASTICS/COMPOSITES

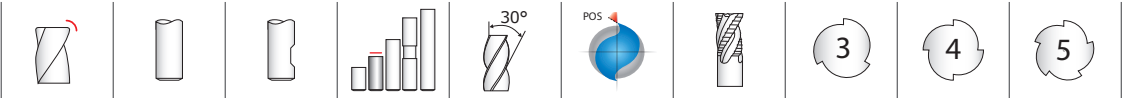
For patent information visit www.ksptpatents.com



TOLERANCES (mm)
DC = +0,000/-0,050
DCON = h₆
RE = +0,000/-0,025

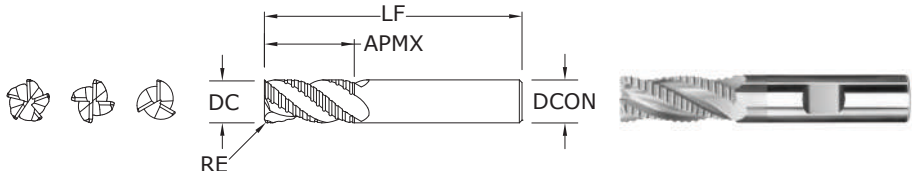
mm				EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE-C (TiCN)
3,0	8,0	38,0	3,0	45477	45478
3,5	10,0	57,0	6,0	45479	45480
4,0	11,0	57,0	6,0	45481	45482
4,5	11,0	57,0	6,0	45483	45484
5,0	13,0	57,0	6,0	45485	45486
6,0	13,0	57,0	6,0	45487	45488
8,0	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

Single End Roughers (Coarse Pitch)



61
FRACTIONAL SERIES

TOLERANCES (inch)
DC = +0.0000/-0.0040
DCON = h₆
RE = +0.0050/-0.0050



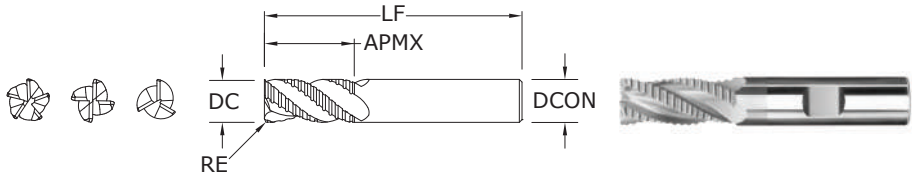
inch						EDP NO.		
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NO. OF FLUTES	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
*1/4	3/4	2-1/2	1/4	.045	3	36107	36106	36110
*5/16	3/4	2-1/2	5/16	.045	3	36109	36108	36111
3/8	7/8	2-1/2	3/8	.060	3	36113	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

TOLERANCES h10 (mm)
DC = +0,000/-0,100
DCON = h₆
RE = +0,127/-0,127



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

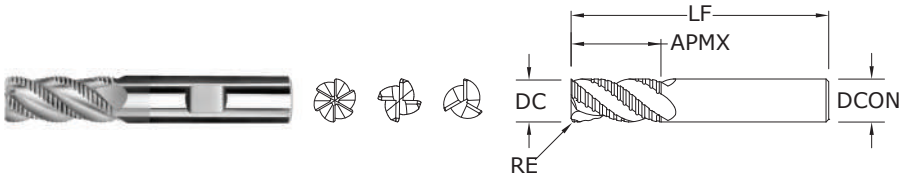
- STEELS
- CAST IRON
- HARDENED STEELS

For patent information visit www.ksptpatents.com

61M
METRIC SERIES

FRACTIONAL

Single End Roughers (Fine Pitch)



TOLERANCES (inch)
DC = +0.0000/-0.0040
DCON = h₆
RE = +0.0050/-0.0050

62

FRACTIONAL SERIES

- STAINLESS STEELS
- HIGH TEMP ALLOYS
- TITANIUM

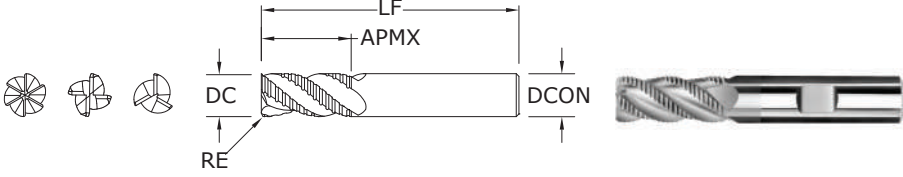
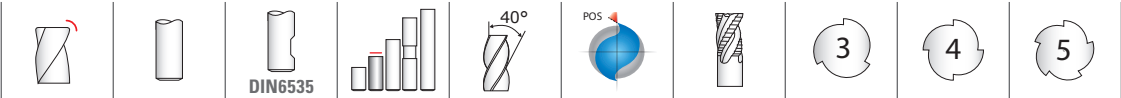
For patent information visit www.ksptpatents.com

inch						EDP NO.		
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	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

METRIC

Single End Roughers (Fine Pitch)



TOLERANCES h10 (mm)
DC = +0,000/-0,100
DCON = h₆
RE = +0,127/-0,127

62M

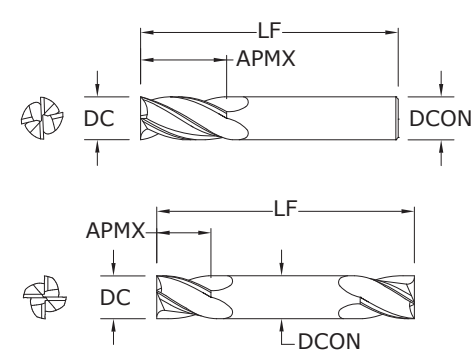
METRIC SERIES

- STAINLESS STEELS
- HIGH TEMP ALLOYS
- TITANIUM

For patent information visit www.ksptpatents.com

mm						EDP NO.		
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	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	5	46231	46230	46233

FRACTIONAL
End Mill Sets



Pictured:
Series 1 4 Flute
Single End Square
Endmill Set

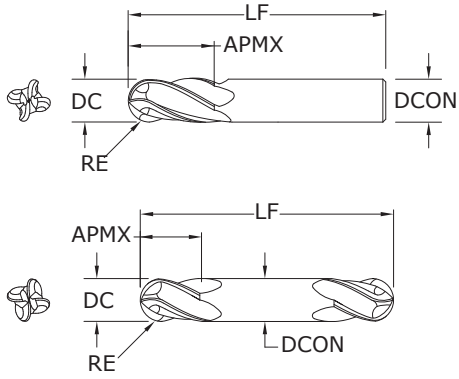
CUTTING DIAMETER DC	SINGLE END LENGTH OF CUT APMX	DOUBLE END LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON
1/8	1/2	1/4	1-1/2	1/8
3/16	5/8	3/8	2	3/16
1/4	3/4	1/2	2-1/2	1/4
5/16	13/16	1/2	2-1/2	5/16
3/8	1	9/16	2-1/2	3/8
1/2	1	5/8	3	1/2

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
www.ksptpatents.com

FRACTIONAL
End Mill Sets



Pictured:
Series 1 4 Flute Single
End Ball Endmill Set

CUTTING DIAMETER DC	SINGLE END LENGTH OF CUT APMX	DOUBLE END LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON
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

RE = 1/2 Cutting Diameter (DC)

Ball End
FRACTIONAL SERIES

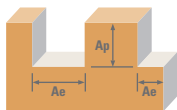
DESCRIPTION	EDP NO.			
	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
Series 1B – 4 Flute, Single End	30190	39190	39090	30070
Series 3B – 2 Flute, Single End	30390	39390	39590	30600
Series 5B – 3 Flute, Single End	30590	30900	30944	31169
Series 14B – 4 Flute, Double End	31490	31482	39642	31217
Series 15B – 2 Flute, Double End	31590	31582	39692	31357



For patent information visit
www.ksptpatents.com

FRACTIONAL

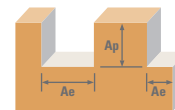
2 Flute: Square & Ball End
4 Flute: Square & Ball End

Diamond 1, 1B, 3, 3B Fractional			Vc (sfm)		DC • in					
	Ae x DC	Ap x DC			1/8	1/4	5/16	3/8	1/2	
GRAPHITE Ultrafine, Superfine		≤ 0.25	≤ 1.5	720	RPM	22003	11002	8801	7334	5501
				(576-864)	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 4 flutes (ipm)	76.6	101.2	126.7	126.2	127.6
					580	RPM	17725	8862	7090	5908
				(464-696)	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 4 flutes (ipm)	531.7	70.9		87.9	89.8	88.6			
		≤ 1	≤ 1		385	RPM	11766	5883	4706	3922
				(308-462)	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 4 flutes (ipm)	24.5	32.9	41.4	40.8	41.2
350					RPM	10696	5348	4278	3565	2674
(280-420)				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				
	COMPOSITES FRP, CFRP, GRP		≤ 0.25	≤ 1.5	1200	RPM	36672	18336	14669	12224
(960-1440)					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 4 flutes (ipm)	127.6	168.7	211.2	210.3	212.7
					960	RPM	29338	14669	11735	9779
(768-1152)					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			
			≤ 1	≤ 1						

rpm = (Vc x 3.82) / DC
ipm = Fz x number of flutes x rpm
finish cuts typically require reduced feed and cut depths (.02 x D maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

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		Hardness	Flutes			Vc (sfm)	DC • in													
				Ae x DC	Ap x DC		1/64	1/32	1/16	1/8	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		2	≤ 0.50	≤ 1.5	460	RPM	112461	56230	28115	14058	7029	4686	3514	2343	1757			
								Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028			
								Feed	6.7	6.7	7.3	8.4	11.2	14.1	14.1	11.2	9.8			
								(ipm)	10.1	10.1	11.0	12.7	16.9	21.1	21.1	16.9	14.8			
				2	1	≤ 1	335	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280			
								Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028			
								Feed	4.9	4.9	5.3	6.1	8.2	10.2	10.2	8.2	7.2			
								(ipm)	7.4	7.4	8.0	9.2	12.3	15.4	15.4	12.3	10.7			
				2	≤ 0.50	≤ 1.5	(268-402)	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280			
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021			
								Feed	3.3	4.1	3.7	4.1	6.1	7.5	7.7	6.1	5.4			
								(ipm)	4.9	6.1	5.5	6.1	9.2	11.3	11.5	9.2	8.1			
M	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRC		2	≤ 0.50	≤ 1.5	245	RPM	59898	29949	14974	7487	3744	2496	1872	1248	936			
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021			
								Feed	2.4	3.0	2.7	3.0	4.5	5.5	5.6	4.5	3.9			
								(ipm)	3.6	4.5	4.0	4.5	6.7	8.2	8.4	6.7	5.9			
				2	1	≤ 1	(196-294)	RPM	90458	45229	22614	11307	5654	3769	2827	1885	1413			
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021			
								Feed	4.8	6.0	5.4	6.0	9.0	11.0	11.2	9.0	7.9			
								(ipm)	7.2	9.0	8.1	9.0	13.6	16.6	17.0	13.6	11.9			
				2	≤ 0.50	≤ 1.5	(296-444)	RPM	90458	45229	22614	11307	5654	3769	2827	1885	1413			
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021			
								Feed	3.6	4.5	4.1	4.5	6.8	8.3	8.5	6.8	5.9			
								(ipm)	5.4	6.8	6.1	6.8	10.2	12.4	12.7	10.2	8.9			
K	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275 Bhn or ≤ 28 HRC		2	≤ 0.50	≤ 1.5	270	RPM	66010	33005	16502	8251	4126	2750	2063	1375	1031			
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021			
								Feed	2.6	3.3	3.0	3.3	5.0	6.1	6.2	5.0	4.3			
								(ipm)	4.0	5.0	4.5	5.0	7.4	9.1	9.3	7.4	6.5			
				2	1	≤ 1	(216-324)	RPM	62342	31171	15586	7793	3896	2598	1948	1299	974			
								Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017			
								Feed	2.5	2.5	2.5	2.6	3.9	4.7	4.7	3.6	3.3			
								(ipm)	3.7	3.7	3.7	4.0	5.8	7.0	7.0	5.5	5.0			
				2	≤ 0.50	≤ 1.5	(204-306)	RPM	45229	22614	11307	5654	2827	1885	1413	942	707			
								Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017			
								Feed	1.8	1.8	1.8	1.9	2.8	3.4	3.4	2.6	2.4			
								(ipm)	2.7	2.7	2.7	2.9	4.2	5.1	5.1	4.0	3.6			
N	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4 PH, 15-5, 13-4, Custom 450	≤ 275 Bhn or ≤ 28 HRC		2	≤ 0.50	≤ 1.5	185	RPM	45229	22614	11307	5654	2827	1885	1413	942	707			
								Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017			
								Feed	1.8	1.8	1.8	1.9	2.8	3.4	3.4	2.6	2.4			
								(ipm)	2.7	2.7	2.7	2.9	4.2	5.1	5.1	4.0	3.6			
				2	1	≤ 1	(148-222)	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280			
								Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028			
								Feed	4.9	4.9	5.3	6.1	8.2	10.2	10.2	8.2	7.2			
								(ipm)	7.4	7.4	8.0	9.2	12.3	15.4	15.4	12.3	10.7			
			K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRC		2	≤ 0.50	≤ 1.5	245	RPM	59898	29949	14974	7487	3744	2496	1872	1248	936
											Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
											Feed	3.6	3.6	3.9	4.5	6.0	7.5	7.5	6.0	5.2
											(ipm)	5.4	5.4	5.8	6.7	9.0	11.2	11.2	9.0	7.9
	2	1				≤ 1	(196-294)	RPM	90458	45229	22614	11307	5654	3769	2827	1885	1413			
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021			
								Feed	4.8	6.0	5.4	6.0	9.0	11.0	11.2	9.0	7.9			
								(ipm)	7.2	9.0	8.1	9.0	13.6	16.6	17.0	13.6	11.9			
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRC					2	≤ 0.50	≤ 1.5	880	RPM	215142	107571	53786	26893	13446	8964	6723	4482	3362
											Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
											Feed	25.8	28.0	26.9	32.3	43.0	53.8	53.8	43.0	37.6
											(ipm)	38.7	42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5
				2	1	≤ 1	640	RPM	156467	78234	39117	19558	9779	6519	4890	3260	2445			
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056			
								Feed	18.8	20.3	19.6	23.5	31.3	39.1	39.1	31.3	27.4			
								(ipm)	28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1			
				2	≤ 0.50	≤ 1.5	(512-768)	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			
								Feed	7.1	7.1	7.7	8.9	11.9	14.8	14.8	11.9	10.4			
								(ipm)	10.7	10.7	11.6	13.3	17.8	22.2	22.2	17.8	15.6			
	2	1	≤ 1	(388-582)	RPM	85568	42784	21392	10696	5348	3565	2674	1783	1337						
					Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028						
					Feed	5.1	5.1	5.6	6.4	8.6	10.7	10.7	8.6	7.5						
					(ipm)	7.7	7.7	8.3	9.6	12.8	16.0	16.0	12.8	11.2						
	2	≤ 0.50	≤ 1.5	(280-420)	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						
					Feed	5.1	5.1	5.6	6.4	8.6	10.7	10.7	8.6	7.5						
					(ipm)	7.7	7.7	8.3	9.6	12.8	16.0	16.0	12.8	11.2						
	2	1	≤ 1	(350)	RPM	85568	42784	21392	10696	5348	3565	2674	1783	1337						
					Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028						
					Feed	5.1	5.1	5.6	6.4	8.6	10.7	10.7	8.6	7.5						
					(ipm)	7.7	7.7	8.3	9.6	12.8	16.0	16.0	12.8	11.2						
	2	≤ 0.50	≤ 1.5	(350)	RPM	85568	42784	21392	10696	5348	3565	2674	1783	1337						
					Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028						
					Feed	5.1	5.1	5.6	6.4	8.6	10.7	10.7	8.6	7.5						
					(ipm)	7.7	7.7	8.3	9.6	12.8	16.0	16.0	12.8	11.2						

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

2 Flute: High Shear
4 Flute: High Shear

Bhn (Brinell) HRC (Rockwell C)
 rpm = $(Vc \times 3.82) / DC$
 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 DC when slotting
 or profiling
 reduce feed and Ae when finish milling (.02 x DC maximum)
 refer to the SGS Tool Wizard® for complete technical information
 (www.kvcocera-sgstool.com)

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
 rpm = $(Vc \times 3.82) / DC$
 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 DC maximum)
 refer to the SGS Tool Wizard® for complete technical information (www.kycocera-sqstool.com)

FRACTIONAL

Single End Roughers (Coarse Pitch)

Series 61 Fractional		Hardness			Vc (sfm)	DC • in						
			Ae x DC	Ap x DC		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	
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	
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	

Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 3.82) / DC
ipm = Fz x number of flutes x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

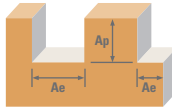
FRACTIONAL

Single End Roughers (Fine Pitch)

Series 62						DC • in						
		Fractional	Hardness	Ae x DC	Ap x DC	Vc (sfm)	1/4	3/8	1/2	3/4	1	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	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	≤ 275 Bhn or ≤ 28 HRc	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	≤ 300 Bhn or ≤ 32 HRc	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	≤ 350 Bhn or ≤ 38 HRc	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	

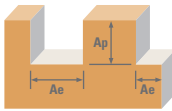
Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 3.82) / DC
ipm = Fz x number of flutes x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

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								DC • mm											
Hardness		Flutes	Ae x DC	Ap x DC	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	2	≤ 0.50	≤ 1.5	(112-168)	140	RPM	111483	59458	29729	14864	7432	4459	3716	2230	1784
									Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070	
									Feed (mm/min)	178	178	184	208	282	357	357	285	250	
			Slot		2	1	≤ 1	(82-123)	Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070	
									Feed (mm/min)	130	130	134	152	206	260	260	208	182	
									195	195	201	227	309	390	390	312	273		
		≤ 275 Bhn or ≤ 28 HRC	Profile	2	≤ 0.50	≤ 1.5	(82-123)	102	RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299	
								Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070		
								Feed (mm/min)	260	260	268	303	411	520	520	416	364		
			Slot		2	1	≤ 1	(60-90)	Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052	
									Feed (mm/min)	81	104	95	130	152	188	195	156	135	
									122	156	143	195	227	283	292	234	203		
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRC	Profile	2	≤ 0.50	≤ 1.5	(82-123)	75	RPM	59377	31668	15834	7917	3958	2375	1979	1188	950	
								Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052		
								Feed (mm/min)	59	76	70	95	111	138	143	114	99		
			Slot		2	1	≤ 0.5	(60-90)	Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052	
									Feed (mm/min)	119	152	139	190	222	276	285	228	198	
									119	152	139	190	222	276	285	228	198		
		STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275 Bhn or ≤ 28 HRC	Profile	2	≤ 0.50	≤ 1.5	(90-135)	113	RPM	89671	47825	23912	11956	5978	3587	2989	1793	1435
									Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052	
Feed (mm/min)									90	115	105	143	167	208	215	172	149		
Slot					2	1	≤ 0.5	(66-99)	Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052	
									Feed (mm/min)	135	172	158	215	251	312	323	258	224	
									179	230	210	287	335	416	430	344	298		
STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4 PH, 15-5, 13-4, Custom 450			≤ 275 Bhn or ≤ 28 HRC	Profile	2	≤ 0.50	≤ 1.5	(62-93)	82	RPM	65436	34899	17449	8725	4362	2617	2181	1309	1047
									Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052	
									Feed (mm/min)	65	84	77	105	122	152	157	126	109	
				Slot		2	1	≤ 0.5	(45-68)	Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
										Feed (mm/min)	84	105	94	122	148	178	179	137	125
										124	132	125	132	198	237	239	183	166	
	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRC	Profile	2	≤ 0.50	≤ 1.5	(82-123)	102	RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299	
								Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070		
								Feed (mm/min)	130	130	134	152	206	260	260	208	182		
			Slot		2	1	≤ 0.5	(60-90)	Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070	
									Feed (mm/min)	95	95	98	111	150	190	190	152	133	
									143	143	147	166	226	285	285	228	200		
ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075		≤ 150 Bhn or ≤ 7 HRC	Profile	2	≤ 0.50	≤ 1.5	(215-322)	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		
			Slot		2	1	≤ 0.5	(156-234)	Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140	
									Feed (mm/min)	960	1092	1024	1194	1621	2047	2047	1638	1433	
									155107	82724	41362	20681	10340	6204	5170	3102	2482		

continued on next page

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

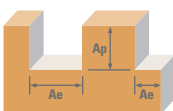
Series 1M, 3M, 5M, 14M, 15M, 16M, 17M, 59M Metric				Vc (m/min)	DC • mm														
					Hardness	Flutes	Ae x DC	Ap x DC											
									0.4	0.75	1.5	3	6	10	12	20	25		
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc		Profile	(118-177)	148	RPM	117542	62689	31344	15672	7836	4702	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				
			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							
			Slot	(118-177)	136	136	140	158	215	271	271	217	190						
					204	204	210	238	322	407	407	326	285						
					271	271	280	317	430	543	543	434	380						
					Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070					
		PLASTICS Polycarbonate, PVC, Polypropylene				Profile	(215-322)	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			
	RPM							1280	1456	1365	1592	2161	2730	2730	2184	1911			
	Fz							0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140			
	GRAPHITE				Profile	(156-234)	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				
RPM							931	1059	993	1158	1572	1985	1985	1588	1390				
Fz							0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140				
							Slot	(117-176)	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	
RPM							960	1092	1024	1194	1621	2047	2047	1638	1433				
Fz							0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140				
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, 718, Incoloy 800, Monel 400, Rene, Waspalloy	≤ 300 Bhn or ≤ 32 HRc		Profile	(16-24)	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				
			RPM	32	24	24	34	42	53	50	40	35							
			Fz	0.0005	0.0007	0.0014	0.004	0.010	0.021	0.024	0.032	0.035							
				Slot	(11-16)	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				
			RPM	22	16	16	23	29	37	35	28	24							
			Fz	0.0005	0.0007	0.0014	0.004	0.010	0.021	0.024	0.032	0.035							
	TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al3Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	≤ 350 Bhn or ≤ 38 HRc		Profile	(44-66)	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				
			RPM	87	93	88	93	140	168	169	129	117							
			Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042							
	Slot	(32-48)	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							
RPM	63	67	64	67	101	121	122	93	85										
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc		Profile	(77-115)	96	RPM	76342	40715	20358	10179	5089	3054	2545	1527	1221			
						Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052				
						Feed (mm/min)	76	98	90	122	143	177	183	147	127				
							115	147	134	183	214	266	275	220	191				
			RPM	153	195	179	244	285	354	366	293	254							
			Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052							
				Slot	(56-84)	70	RPM	55741	29729	14864	7432	3716	2230	1858	1115	892			
						Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052				
						Feed (mm/min)	56	71	65	89	104	129	134	107	93				
							84	107	98	134	156	194	201	161	139				
			RPM	111	143	131	178	208	259	268	214	186							

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

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

METRIC

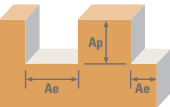
2 Flute: High Shear
4 Flute: High Shear

Series 52M, 54M Metric		Hardness	Flutes			Vc (m/min)	DC • mm								
				Ae x DC	Ap x DC		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			
					(332-497)	Fz	0.0166	0.043	0.091	0.110	0.147	0.160			
			2	≤ 0.3		≤ 1.5	Feed (mm/min)	1459	1890	2399	2417	1938	1688		
							2918	3779	4799	4834	3876	3375			
			4	≤ 0.3		≤ 1.5	332	RPM	35222	17611	10567	8806	5283	4227	
							Fz	0.0151	0.041	0.085	0.101	0.133	0.148		
		 Slot			(266-399)	Feed (mm/min)	1064	1444	1796	1779	1405	1251			
			2	1		≤ 1	2127	2888	3593	3557	2811	2502			
							4	1	≤ 0.25						
						155				RPM	16480	8240	4944	4120	2472
			ALUMINUM DIE CAST ALLOYS (HIGH SILICON) A-390, A-392, B-390	≤ 125 Bhn or ≤ 77 HRb		 Profile			(124-187)	Fz	0.0166	0.043	0.091	0.110	0.147
					2		≤ 0.3	≤ 1.5		Feed (mm/min)	547	709	900	906	727
1094	1417	1800								1813	1454	1266			
4	≤ 0.3	≤ 1.5			125		RPM	13249		6624	3975	3312	1987	1590	
					Fz		0.0151	0.041		0.085	0.101	0.133	0.148		
 Slot					(100-150)		Feed (mm/min)	400	543	676	669	529	471		
	2	1				≤ 1	800	1086	1351	1338	1057	941			
							4	1	≤ 0.25						
						180				RPM	19065	9533	5720	4766	2860
	COPPER ALLOYS Aluminum Bronze, Muntz Brass, Naval, Brass, Red Brass	≤ 140 Bhn or ≤ 3 HRc				 Profile			(144-216)	Fz	0.0094	0.024	0.053	0.062	0.083
					2		≤ 0.3	≤ 1.5		Feed (mm/min)	358	458	606	591	475
717										915	1213	1182	949	851	
4			≤ 0.3	≤ 1.5	145		RPM	15349		7675	4605	3837	2302	1842	
					Fz		0.0086	0.024		0.048	0.058	0.077	0.085		
 Slot					(116-174)		Feed (mm/min)	264	368	442	445	355	313		
			2	1		≤ 1	528	737	884	890	709	626			
							4	1	≤ 0.25						
						72				RPM	7594	3797	2278	1898	1139
			COPPER ALLOYS Beryllium Copper, C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc		 Profile			(57-86)	Fz	0.0094	0.024	0.053	0.062	0.083
					2		≤ 0.3	≤ 1.5		Feed (mm/min)	143	182	241	235	189
286										365	483	471	378	339	
4	≤ 0.3	≤ 1.5			58		RPM	6140		3070	1842	1535	921	737	
					Fz		0.0086	0.024		0.048	0.058	0.077	0.085		
 Slot					(46-69)		Feed (mm/min)	106	147	177	178	142	125		
	2	1				≤ 1	211	295	354	356	284	250			
							4	1	≤ 0.25						

continued on next page

METRIC

2 Flute: High Shear
4 Flute: High Shear

Series 52M, 54M Metric		Hardness	Flutes			Vc (m/min)	DC • mm								
				Ae x DC	Ap x DC		3	6	10	12	20	25			
PLASTICS ABS, Polycarbonate, PVC, Polypropylene	N		2	≤ 0.3	≤ 1.5	488	RPM	51702	25851	15511	12926	7755	6204		
						(390-585)	Fz	0.0264	0.072	0.149	0.178	0.237	0.250		
							Feed (mm/min)	2730	3723	4622	4601	3676	3102		
			4	≤ 0.3	≤ 1.5			390	RPM	41362	20681	12409	10340	6204	4963
		Slot 	2	1	≤ 1	(312-468)	Fz	0.0240	0.065	0.136	0.163	0.210	0.238		
						(312-468)	Feed (mm/min)	1985	2689	3375	3371	2606	2363		
							3971	5377	6750	6742	5212	4725			
			PLASTICS Fiberglass, Glass Filled	2	≤ 0.3	≤ 1.5	219	RPM	23266	11633	6980	5816	3490	2792	
							(176-263)	Fz	0.0197	0.053	0.109	0.132	0.173	0.190	
								Feed (mm/min)	917	1233	1522	1536	1208	1061	
4	≤ 0.3	≤ 1.5		175	RPM	18580			9290	5574	4645	2787	2230		
Slot 	2	1	≤ 1	(140-210)	Fz	0.0180	0.048	0.101	0.120	0.160	0.175				
				(140-210)	Feed (mm/min)	669	892	1126	1115	892	780				
					1338	1784	2252	2230	1784	1561					

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = (Vc x 1000) / (DC 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 DC maximum)
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

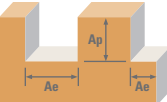
KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

METRIC

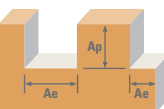
Single End Roughers (Coarse Pitch)

Series 61M Metric	Hardness			Vc (m/min)	DC • mm						
		Ae x DC	Ap x DC		6	10	12	20	25		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	 ≤ 175 Bhn or ≤ 7 HRc	Profile ≤ 0.5	≤ 1.5	152	RPM	8078	4847	4039	2424	1939
					(122-183)	Fz	0.014	0.029	0.034	0.045	0.050
					Feed (mm/min)	339	422	549	436	485	
		 1	Slot 1	≤ 1	122	RPM	6463	3878	3231	1939	1551
					(98-146)	Fz	0.014	0.029	0.034	0.045	0.050
					Feed (mm/min)	271	337	439	349	388	
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	 ≤ 275 Bhn or ≤ 28 HR	Profile ≤ 0.5	≤ 1.5	111	RPM	5897	3538	2949	1769	1415
					(89-134)	Fz	0.010	0.021	0.026	0.035	0.038
					Feed (mm/min)	177	223	307	248	269	
		 1	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	
K	CAST IRONS Gray, Malleable, Ductile	 ≤ 220 Bhn or ≤ 19 HRc	Profile ≤ 0.5	≤ 1.5	111	RPM	5897	3538	2949	1769	1415
					(89-134)	Fz	0.019	0.040	0.048	0.064	0.070
					Feed (mm/min)	336	425	566	453	495	
		 1	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	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	 ≤ 250 Bhn or ≤ 24 HRc	Profile ≤ 0.5	≤ 1.5	105	RPM	5574	3344	2787	1672	1338
					(84-126)	Fz	0.014	0.024	0.036	0.048	0.053
					Feed (mm/min)	234	241	401	321	355	
		 1	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	

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

METRIC

Single End Roughers (Fine Pitch)

Series 62M Metric	Hardness			Vc (m/min)	DC • mm						
		Ae x DC	Ap x DC		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	
		 ≤ 275 Bhn or ≤ 28 HRc	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	
		 ≤ 275 Bhn or ≤ 28 HRc	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	
		 ≤ 300 Bhn or ≤ 32 HRc	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	
		 ≤ 350 Bhn or ≤ 38 HRc	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) / (DC x 3.14)
mm/min = Fz x number of flutes x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

High Performance Drills



 Hole Making

Please put "S" at the beginning of all page numbers below.

HIGH PERFORMANCE DRILLS	SERIES	DESCRIPTION	APPLICATION						PAGE
			● PREFERRED ○ ALTERNATE						
Hi-PerCarb®	135 (3xD)	2 Flute External Coolant Double Margin 3xD	●	●	○	●	●	○	231
	135 (5xD)	2 Flute External Coolant Double Margin 5xD	●	●	○	●	●	○	240
	131N (3xD)	3 Flute External Coolant Triple Margin 3xD						●	250
	131N (5xD)	3 Flute External Coolant Triple Margin 5xD						●	254
	141K (5xD)	3 Flute Internal Coolant Triple Margin 5xD				●			260
Ice-Carb®	140 (5xD)	2 Flute Internal Coolant 5xD	●	●	○	●	●	○	266
	140 (8xD)	2 Flute Internal Coolant 8xD	●	●	○	●	●	○	274
CFRP 8 Facet	120	2 Flute External Coolant Double Margin CFRP						●	282

Speed & Feed Recommendations listed after each series

 Taladrado

Please put "S" at the beginning of all page numbers below.

BROCAS DE ALTO RENDIMIENTO	SERIE	DESCRIPCIÓN	APPLICATION						PÁGINA
			● PREFERRED ○ ALTERNATE						
Hi-PerCarb®	135 (3xD)	2 filos, refrigeración externa, doble margen, 3xD	●	●	○	●	●	○	231
	135 (5xD)	2 filos, refrigeración externa, doble margen, 5xD	●	●	○	●	●	○	240
	131N (3xD)	3 filos, refrigeración externa, triple margen, 3xD						●	250
	131N (5xD)	3 filos, refrigeración externa, triple margen, 5xD						●	254
	141K (5xD)	3 filos, refrigeración interna, triple margen, 5xD			●				260
Ice-Carb®	140 (5xD)	2 filos, refrigeración interna, 5xD	●	●	○	●	●	○	266
	140 (8xD)	2 filos, refrigeración interna, 8xD	●	●	○	●	●	○	274
De 8 caras CFRP	120	2 filos, refrigeración externa, doble margen, CFRP						●	282

Recomendaciones de velocidades y avances mostradas tras cada serie

Outils de perçage

Please put "S" at the beginning of all page numbers below.

FORETS HAUTE PERFORMANCE	SÉRIES	DESCRIPTION	APPLICATION		PAGE
			● PREFERRED	○ ALTERNATE	
Hi-PerCarb®	135 (3xD)	2 dents refroidissement externe à double listel 3xD	●	○	231
	135 (5xD)	2 dents refroidissement externe à double listel 5xD	●	○	240
	131N (3xD)	3 dents refroidissement externe à triple listel 3xD		●	250
	131N (5xD)	3 dents refroidissement externe à triple listel 5xD		●	254
	141K (5xD)	3 dents refroidissement interne à triple listel 5xD	●		260
Ice-Carb®	140 (5xD)	2 dents refroidissement interne 5xD	●	○	266
	140 (8xD)	2 dents refroidissement interne 8xD	●	○	274
CFRP à 8 facettes	120	2 dents refroidissement externe à double listel CFRP		●	282

Recommandations de vitesse et avance indiquées après chaque série

Bohren

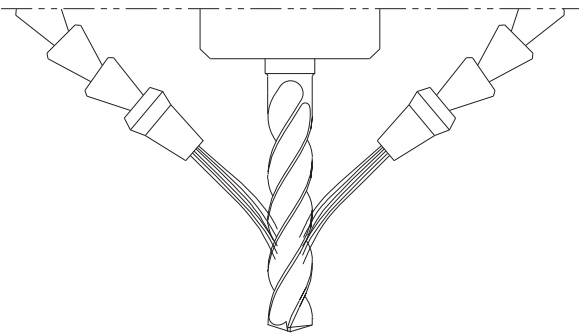
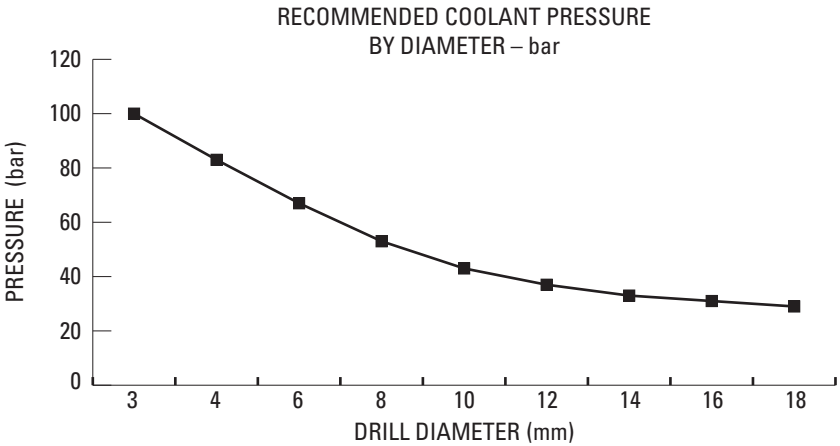
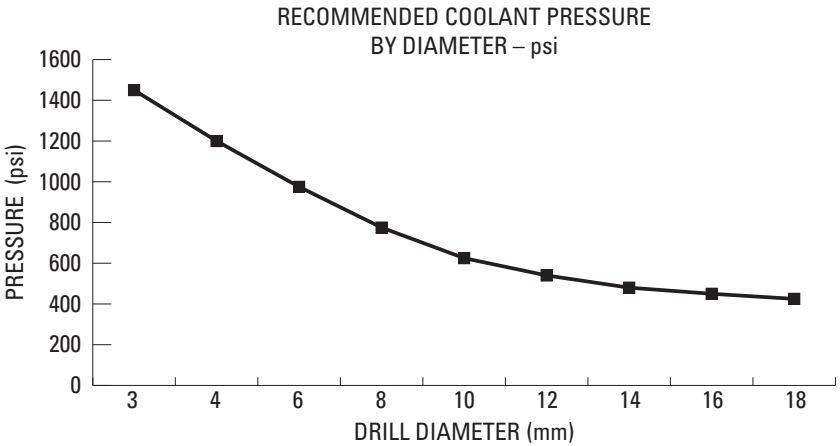
Please put "S" at the beginning of all page numbers below.

HOCHLEISTUNGS-BOHRER	SERIE	BESCHREIBUNG	APPLICATION		SEITE
			● PREFERRED	○ ALTERNATE	
Hi-PerCarb®	135 (3xD)	Doppelfasenbohrer 3xD mit 2 Schneiden und Außenkühlung	●	○	231
	135 (5xD)	Doppelfasenbohrer 5xD mit 2 Schneiden und Außenkühlung	●	○	240
	131N (3xD)	Dreifasenbohrer 3xD mit 3 Schneiden und Außenkühlung		●	250
	131N (5xD)	Dreifasenbohrer 5xD mit 3 Schneiden und Außenkühlung		●	254
	141K (5xD)	Dreifasenbohrer 5xD mit 3 Schneiden und Innenkühlung	●		260
Ice-Carb®	140 (5xD)	Bohrer 5xD mit 2 Schneiden und Innenkühlung	●	○	266
	140 (8xD)	Bohrer 8xD mit 2 Schneiden und Innenkühlung	●	○	274
CFRP 8 Facet	120	Doppelfasenbohrer CFRP mit 2 Schneiden und Außenkühlung		●	282

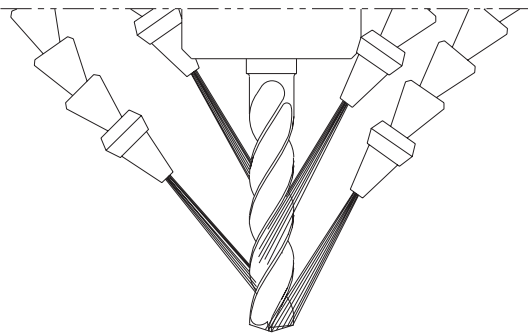
Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

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

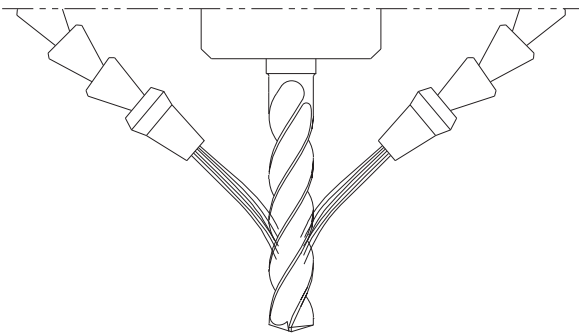
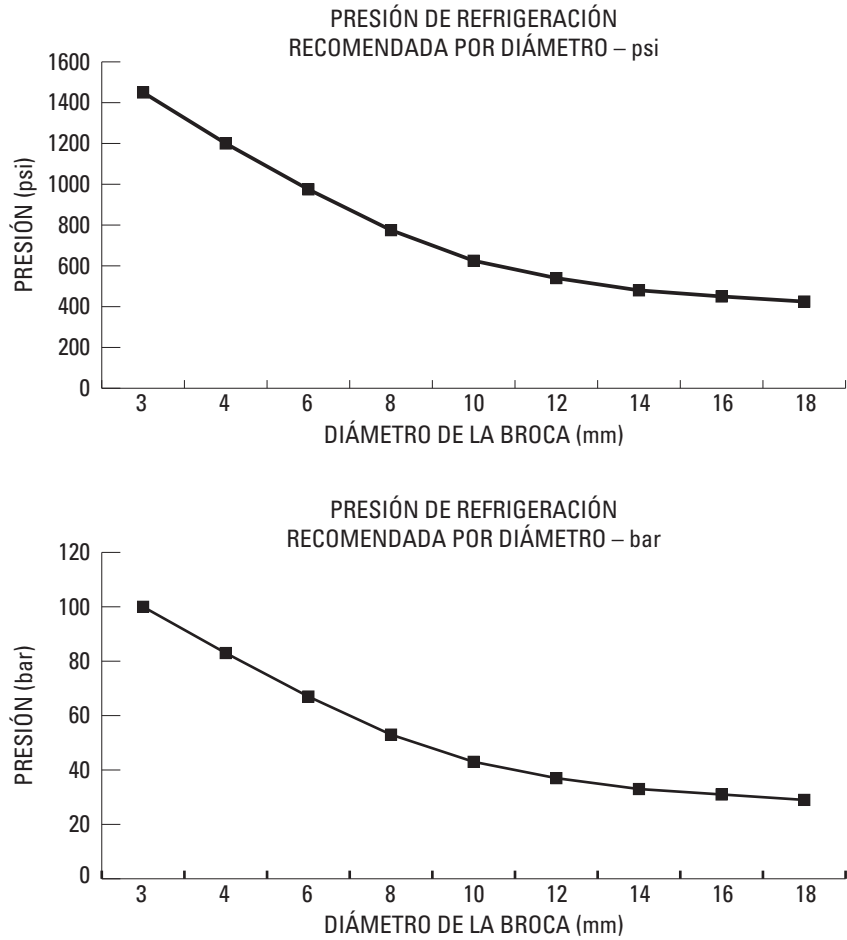


SMALL TIP – HIGH VELOCITY
COMPLETE COVERAGE

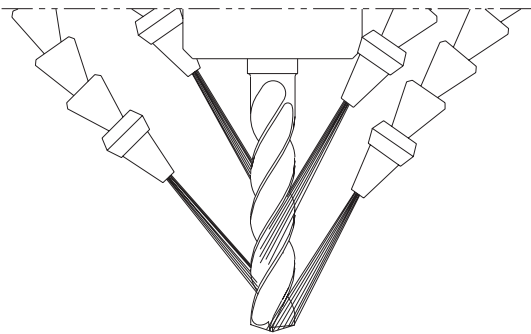
- Reducing the nozzle size helps maximize the cooling benefits of the unique double margin design on the Hi-PerCarb drill by increasing velocity. Aim the nozzles in line with the secondary flute located between the two margins as well as the flute for best results.

Recomendaciones en operacion de taladrado

- El líquido de refrigeración actúa movilizandolas 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 de la refrigeración y la posición para poder obtener todos los beneficios más refrigerante durante el proceso de corte.
- Una aplicación apropiada de la refrigeración 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 del refrigerante es importante, pero lo es más el flujo continuo aplicado a la herramienta; una refrigeración intermitente en el carburo puede ocasionar un estrés térmico en el material y la formación de "micro-fisuras".
- Una limpieza y filtración adecuadas son importantes para que el refrigerante mantenga sus propiedades y beneficios; por otra parte, se evita la reducción de la presión o la posibilidad de obstruir los canales de refrigeración de la broca.



PUNTA GRANDE – BAJA VELOCIDAD SIN ALCANCE A PROFUNDIDAD MÁXIMA

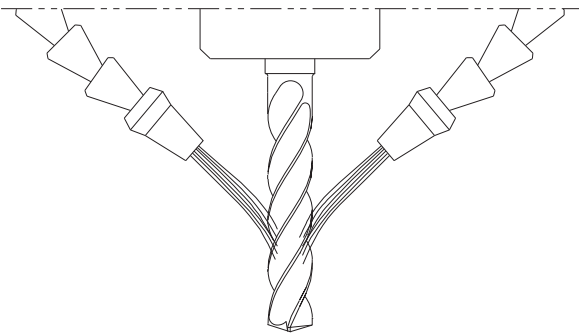
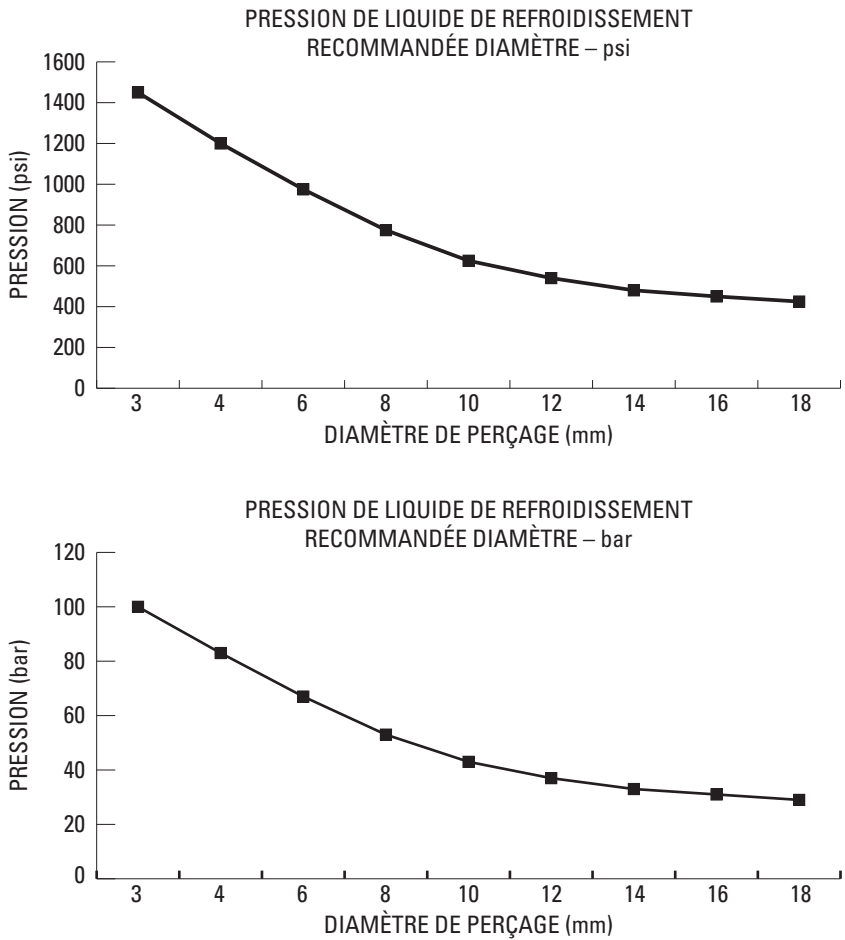


PUNTA PEQUEÑA – ALTA VELOCIDAD COMPLETO ALCANCE

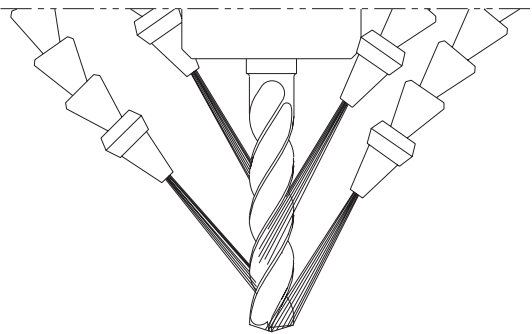
- Reducir el tamaño de la boquilla ayuda a maximizar los beneficios de refrigeración del exclusivo diseño de doble margen de la broca. Hi-PerCarb aumentando la velocidad. Coloque las boquillas en línea con el segundo filo que se encuentra entre los dos márgenes y también el filo para obtener mejores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

Opérations de perçage
Recommandations en matière de refroidissement

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



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

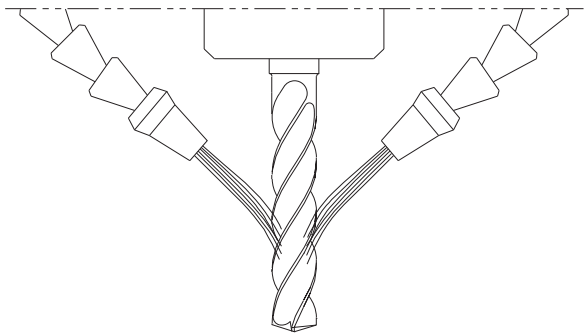
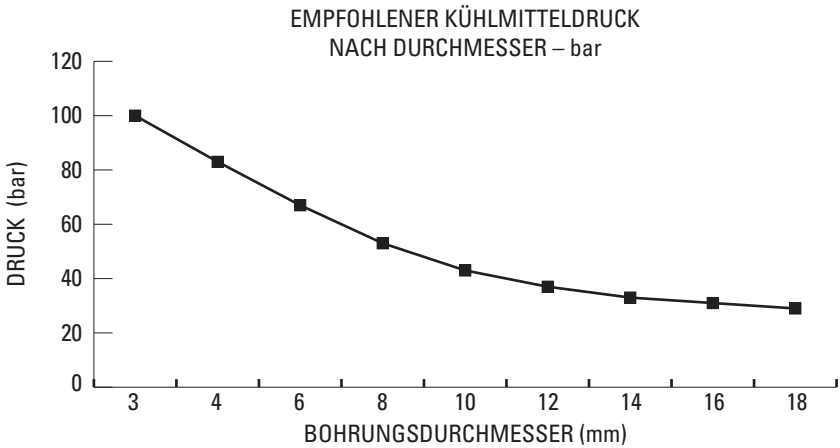
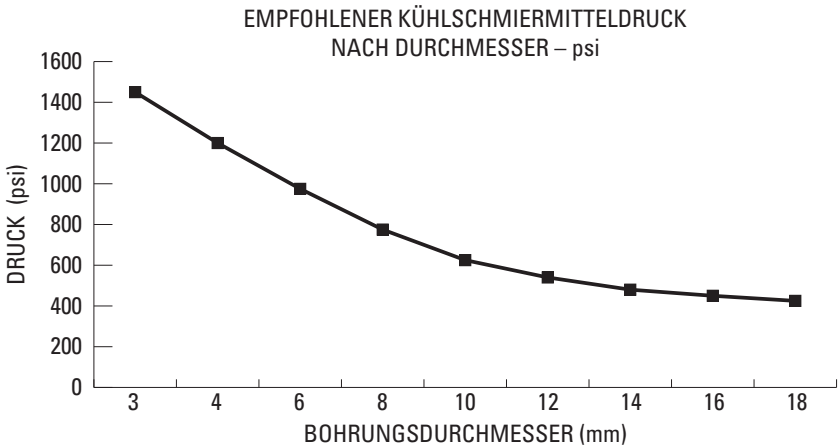


POINTE FINE – GRANDE VITESSE COUVERTURE COMPLÈTE

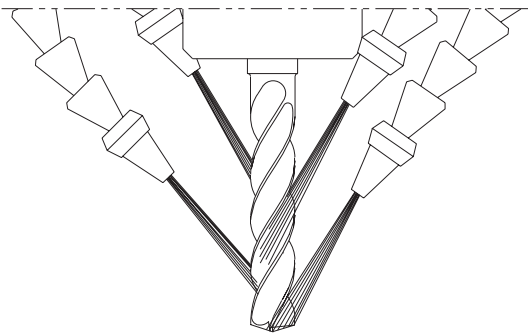
- La réduction de la taille de l'embout permet de maximiser les bienfaits du refroidissement du concept à double listel original de la perceuse Hi-PerCarb en augmentant la vitesse. Pour les meilleurs résultats, orientez les embouts dans l'axe de la goujure secondaire située entre les deux listels, de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

Bohrarbeiten
Kühlmittelempfehlungen

- Kühlmittel dienen dazu, die Späne aus dem 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, bessere Oberflächengüte, vorhersehbare Standzeiten und geringere Leistungsaufnahme und Laufzeiten.
- 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".
- Kühlmitte 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

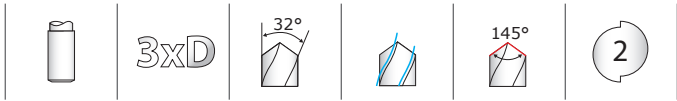


SCHMALE QUERSCHNEIDE – HOHE DREHZAHL
VOLLSTÄNDIGE BENETZUNG

- 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 Schneiden aus, um beste Ergebnisse zu erzielen.



FRACTIONAL & METRIC
Hi-PerCarb®



TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+0.00047
DCON = h6

>.1181-.2362 DIAMETER
DC = +.00016/+0.00063
DCON = h6

>.2362-.3937 DIAMETER
DC = +.00024/+0.00083
DCON = h6

>.3937-.7087 DIAMETER
DC = +.00028/+0.00098
DCON = h6

>.7087-1.1811 DIAMETER
DC = +.00031/+0.00114
DCON = h6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h6

>3-6 DIAMETER
DC = +0,004/+0,016
DCON = h6

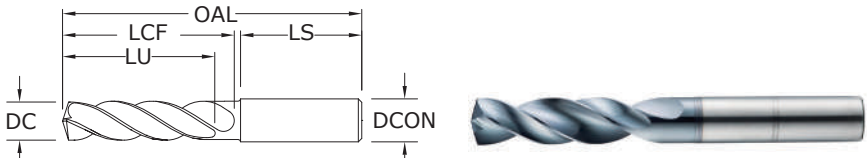
>6-10 DIAMETER
DC = +0,006/+0,021
DCON = h6

>10-18 DIAMETER
DC = +0,007/+0,025
DCON = h6

>18-30 DIAMETER
DC = +0,008/+0,029
DCON = h6

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

For patent information visit
www.ksptpatents.com



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

*Single Margin

continued on next page

135 3xD
FRACTIONAL & METRIC SERIES

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



135 3xD
FRACTIONAL & METRIC SERIES

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

CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	inch & mm						EDP NO. Ti-NAMITE-A (AITiN)
			TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	
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

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+0.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+0.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+0.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+0.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+0.0114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

>18–30 DIAMETER
DC = +0,008/+0,029
DCON = h₆

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

For patent information visit
www.ksptpatents.com

CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	inch & mm				EDP NO. Ti-NAMITE-A (AITiN)
				SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	
5,6 mm	0.2205			6,0	66,0	28,0	24,0	63751
#2	0.2210	5.61		1/4	2-5/8	1	53/64	51781
5,7 mm	0.2244			6,0	66,0	28,0	24,0	63752
#1	0.2280	5.79		1/4	2-5/8	1	53/64	51782
5,8 mm	0.2283			6,0	66,0	28,0	24,0	63172
5,9 mm	0.2323			6,0	66,0	28,0	24,0	63753
A	0.2340	5.94		1/4	2-5/8	1	53/64	51601
15/64	0.2344	5.95		1/4	2-5/8	1	53/64	51342
6,0 mm	0.2362	6.00	M7 X 1	6,0	66,0	28,0	24,0	63173
B	0.2380	6.05		1/4	3-1/8	1-5/16	1-3/64	51602
6,1 mm	0.2402			8,0	79,0	34,0	28,0	63754
C	0.2420	6.15		1/4	3-1/8	1-5/16	1-3/64	51603
6,2 mm	0.2441			8,0	79,0	34,0	28,0	63755
D	0.2460	6.25		1/4	3-1/8	1-5/16	1-3/64	51604
6,25 mm	0.2461		M7 X 0,75	8,0	79,0	34,0	28,0	63174
6,3 mm	0.2480			8,0	79,0	34,0	28,0	63756
1/4	0.2500	6.35		1/4	3-1/8	1-5/16	1-3/64	51343
6,4 mm	0.2520			8,0	79,0	34,0	28,0	63175
6,5 mm	0.2559			8,0	79,0	34,0	28,0	63213
F	0.2570	6.53	5/16-18	5/16	3-1/8	1-5/16	1-3/64	51344
6,6 mm	0.2598			8,0	79,0	34,0	28,0	63757
G	0.2610	6.63		5/16	3-1/8	1-5/16	1-3/64	51606
6,7 mm	0.2638			8,0	79,0	34,0	28,0	63758
17/64	0.2656	6.75	5/16-20	5/16	3-1/8	1-5/16	1-3/64	51345
H	0.2660	6.76		5/16	3-1/8	1-5/16	1-3/64	51607
6,8 mm	0.2677		M8 X 1,25	8,0	79,0	34,0	28,0	63176
6,9 mm	0.2717			8,0	79,0	34,0	28,0	63759
I	0.2720	6.91	5/16-24	5/16	3-1/8	1-5/16	1-3/64	51346
7,0 mm	0.2756		M8 X 1	8,0	79,0	34,0	28,0	63177
J	0.2770	7.04		5/16	3-1/8	1-5/16	1-3/64	51608
7,1 mm	0.2795			8,0	79,0	41,0	34,0	63760
K	0.2810	7.14		5/16	3-1/8	1-9/16	1-3/16	51609
9/32	0.2812	7.14	5/16-32	5/16	3-1/8	1-9/16	1-3/16	51347
7,2 mm	0.2835			8,0	79,0	41,0	34,0	63761
7,25 mm	0.2854		M8 X 0,75	8,0	79,0	41,0	34,0	63178
7,3 mm	0.2874			8,0	79,0	41,0	34,0	63762
L	0.2900	7.37		5/16	3-1/8	1-9/16	1-3/16	51610
7,4 mm	0.2913			8,0	79,0	41,0	34,0	63763
M	0.2950	7.49		5/16	3-1/8	1-9/16	1-3/16	51611
7,5 mm	0.2953		M8 X 0,5	8,0	79,0	41,0	34,0	63179
19/64	0.2969	7.54		5/16	3-1/8	1-9/16	1-3/16	51348
7,6 mm	0.2992			8,0	79,0	41,0	34,0	63764
N	0.3020	7.67		5/16	3-1/8	1-9/16	1-3/16	51612
7,7 mm	0.3031			8,0	79,0	41,0	34,0	63765
7,8 mm	0.3071		M9 X 1,25	8,0	79,0	41,0	34,0	63180
7,9 mm	0.3110			8,0	79,0	41,0	34,0	63766
5/16	0.3125	7.94	3/8-16	5/16	3-1/8	1-9/16	1-3/16	51349
8,0 mm	0.3150		M9 x 1	8,0	79,0	41,0	34,0	63181
O	0.3160	8.03		3/8	3-1/2	1-27/32	1-37/64	51613
8,1 mm	0.3189			10,0	89,0	47,0	40,0	63767
8,2 mm	0.3228			10,0	89,0	47,0	40,0	63768
P	0.3230	8.20		3/8	3-1/2	1-27/32	1-37/64	51614
8,3 mm	0.3268			10,0	89,0	47,0	40,0	63769
21/64	0.3281	8.33	3/8-20	3/8	3-1/2	1-27/32	1-37/64	51350
8,4 mm	0.3307			10,0	89,0	47,0	40,0	63182
Q	0.3320	8.43	3/8-24	3/8	3-1/2	1-27/32	1-37/64	51351
8,5 mm	0.3346		M10 X 1,5	10,0	89,0	47,0	40,0	63183
8,6 mm	0.3386			10,0	89,0	47,0	40,0	63770

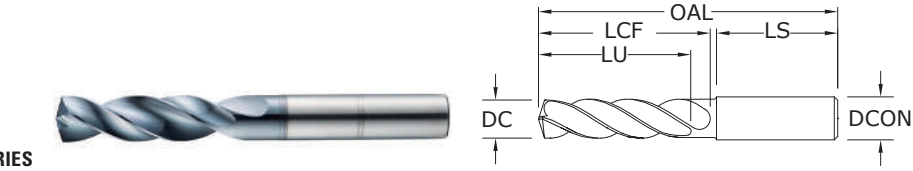
continued on next page



135 3xD

FRACTIONAL & METRIC SERIES

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



inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS		Ti-NAMITE-A (AITiN)
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

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER

DC = +.00008/+-.00047

DCON = h₆

>.1181-.2362 DIAMETER

DC = +.00016/+-.00063

DCON = h₆

>.2362-.3937 DIAMETER

DC = +.00024/+-.00083

DCON = h₆

>.3937-.7087 DIAMETER

DC = +.00028/+-.00098

DCON = h₆

>.7087-1.1811 DIAMETER

DC = +.00031/+-.00114

DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER

DC = +.0,002/+0,012

DCON = h₆

>3-6 DIAMETER

DC = +.0,004/+0,016

DCON = h₆

>6-10 DIAMETER

DC = +.0,006/+0,021

DCON = h₆

>10-18 DIAMETER

DC = +.0,007/+0,025

DCON = h₆

>18-30 DIAMETER

DC = +.0,008/+0,029

DCON = h₆

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

For patent information visit
www.ksptpatents.com

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS		Ti-NAMITE-A (AITiN)
11,4 mm	0.4488			12,0	102,0	55,0	45,0	45,0		63790
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		

Series 135 3D Fractional	Hardness	Vc (sfm)	DC • in									
			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		
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		
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	

continued on next page

Series 135 3D Fractional				DC • in							
Hardness		Vc (sfm)		1/32	1/8	1/4	3/8	1/2	5/8	7/8	
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	700	RPM	85568	21392	10696	7131	5348	4278	3056
			(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
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	
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

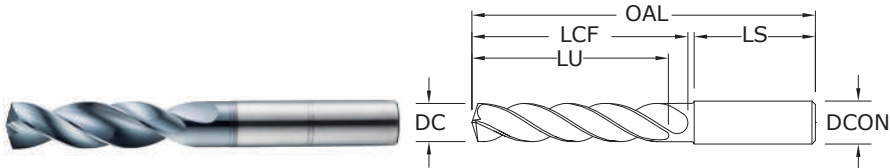
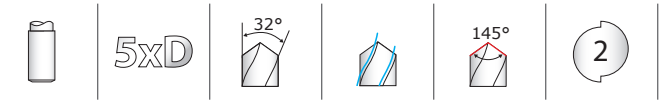
Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = Vc x 3.82 / DC
ipm = Fr x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Series 135 3D Metric	Hardness	Vc (m/min)	DC • mm									
			1.5	3	6	8	10	12	16	20		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	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
		≤ 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
		≤ 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
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	91	RPM	19388	9694	4847	3635	2908	2424	1818	1454
			(73-110)	Fr	0.036	0.071	0.142	0.190	0.237	0.285	0.380	0.475
				Feed (mm/min)	690	690	690	690	690	690	690	690
		≤ 375 Bhn or ≤ 40 HRc	56	RPM	11956	5978	2989	2242	1793	1495	1121	897
			(45-68)	Fr	0.031	0.061	0.122	0.163	0.204	0.244	0.326	0.407
				Feed (mm/min)	365	365	365	365	365	365	365	365
		≤ 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
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
		≤ 275 Bhn or ≤ 28 HRc	52	RPM	10987	5493	2747	2060	1648	1373	1030	824
			(41-62)	Fr	0.024	0.047	0.095	0.126	0.158	0.189	0.252	0.316
				Feed (mm/min)	260	260	260	260	260	260	260	260
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	27	RPM	5816	2908	1454	1091	872	727	545	436
			(22-33)	Fr	0.023	0.046	0.093	0.124	0.155	0.186	0.248	0.309
				Feed (mm/min)	135	135	135	135	135	135	135	135
		≤ 375 Bhn or ≤ 40 HRc	20	RPM	4201	2100	1050	788	630	525	394	315
			(16-24)	Fr	0.020	0.040	0.081	0.108	0.135	0.162	0.216	0.270
				Feed (mm/min)	85	85	85	85	85	85	85	85
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
		≤ 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

continued on next page

Series 135 3D Metric				DC • mm								
Hardness		Vc (m/min)		1.5	3	6	8	10	12	16	20	
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
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
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
		≤ 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
		≤ 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

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



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)

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS		Ti-NAMITE-A (AITiN)
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
DC = +.00008/+0.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+0.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+0.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+0.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+0.0114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

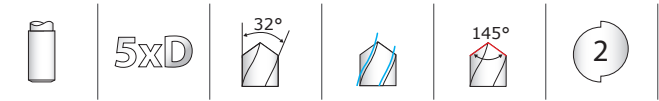
>18–30 DIAMETER
DC = +0,008/+0,029
DCON = h₆

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

For patent information visit
www.ksptpatents.com

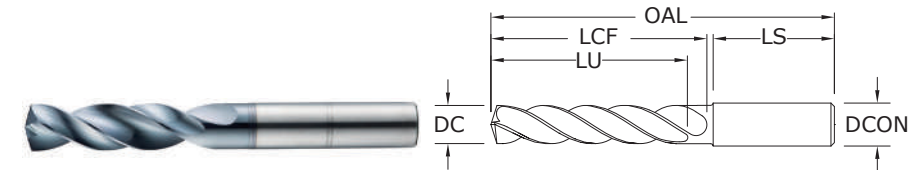
inch & mm									EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)
3,5 mm	0.1378			6,0	66,0	28,0	23,0	36,0	64105
#28	0.1405	3.57	8-40	1/4	3	1	53/64	1- 7/16	52317
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

continued on next page



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)



inch & mm									EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)
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

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+0.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+0.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+0.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+0.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+0.0114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

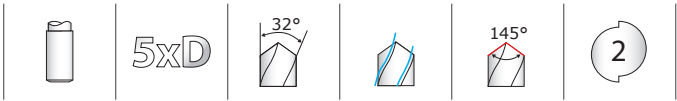
>18–30 DIAMETER
DC = +0,008/+0,029
DCON = h₆

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

For patent information visit
www.ksptpatents.com

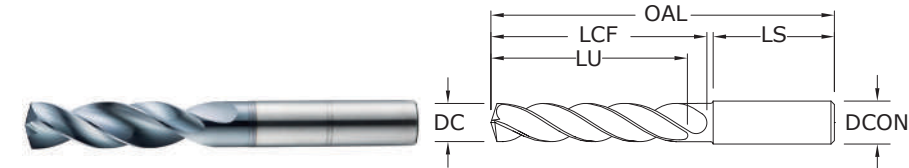
inch & mm									EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)
7,25 mm	0.2854		M8 X 0,75	8,0	91,0	53,0	43,0	36,0	64145
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0	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

continued on next page



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)



inch & mm									EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)
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			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

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+-.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+-.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+-.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+-.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+-.00114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

>18–30 DIAMETER
DC = +0,008/+0,029
DCON = h₆

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

For patent information visit
www.ksptpatents.com

inch & mm									EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)
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

CONTINUED

Series 135 5D Fractional	Hardness	Vc (sfm)	DC • in								
			1/32	1/8	1/4	3/8	1/2	5/8	7/8		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	345	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	
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	
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	

continued on next page

Series 135 5D Fractional				DC • in							
Hardness		Vc (sfm)		1/32	1/8	1/4	3/8	1/2	5/8	7/8	
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
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	
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

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

Series 135M 5D Metric	Hardness	Vc (m/min)	DC • mm									
			1.5	3	6	8	10	12	16	20		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	105	RPM	22297	11148	5574	4181	3344	2787	2090	1672
			(84-126)	Fr	0.048	0.095	0.190	0.254	0.317	0.380	0.507	0.634
				Feed (mm/min)	1060	1060	1060	1060	1060	1060	1060	1060
		≤ 275 Bhn or ≤ 28 HRc	94	RPM	20035	10017	5009	3756	3005	2504	1878	1503
			(76-113)	Fr	0.043	0.085	0.171	0.228	0.285	0.341	0.455	0.569
				Feed (mm/min)	855	855	855	855	855	855	855	855
		≤ 425 Bhn or ≤ 45 HRc	55	RPM	11633	5816	2908	2181	1745	1454	1091	872
			(44-66)	Fr	0.036	0.071	0.143	0.190	0.238	0.285	0.381	0.476
				Feed (mm/min)	415	415	415	415	415	415	415	415
	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
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
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

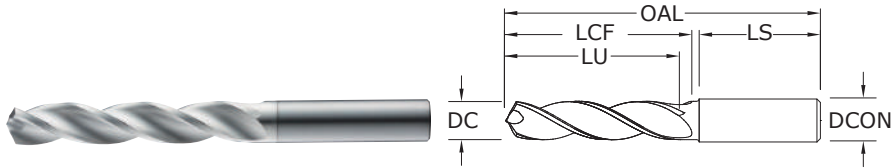
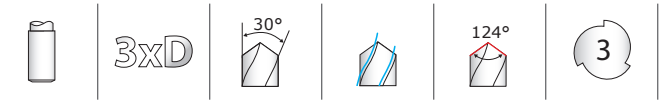
continued on next page

Series 135M 5D Metric	Hardness	Vc (m/min)	DC • mm								
			1.5	3	6	8	10	12	16	20	
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb (155-232)	RPM	41039	20519	10260	7695	6156	5130	3847	3078
			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 (132-198)	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
			Feed (mm/min)	2065	2065	2065	2065	2065	2065	2065	2065
	Copper Alloys Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc (110-165)	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
			Feed (mm/min)	775	775	775	775	775	775	775	775
		≤ 200 Bhn or ≤ 23 HRc (88-132)	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
			Feed (mm/min)	630	630	630	630	630	630	630	630
S	SUPER ALLOYS (Nickel , Cobalt, Iron Base) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc (10-15)	RPM	2585	1293	646	485	388	323	242	194
			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 (5-7)	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
			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 (26-38)	RPM	6786	3393	1696	1272	1018	848	636	509
			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 (20-29)	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
			Feed (mm/min)	100	100	100	100	100	100	100	100
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 440 Bhn or ≤ 47 HRc (10-15)	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
			Feed (mm/min)	40	40	40	40	40	40	40	40
		≤ 200 Bhn or ≤ 13 HRc (29-44)	RPM	7755	3878	1939	1454	1163	969	727	582
			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 (20-29)	RPM	5170	2585	1293	969	776	646	485	388
			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 (17-26)	RPM	4524	2262	1131	848	679	565	424	339
			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

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



131N 3xD
FRACTIONAL & METRIC SERIES



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)

inch & mm										EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	UNCOATED	Ti-NAMITE-B (TiB ₂)	
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)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

inch & mm										EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	UNCOATED	Ti-NAMITE-B (TiB ₂)	
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	

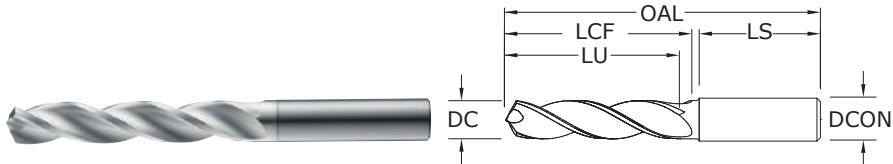
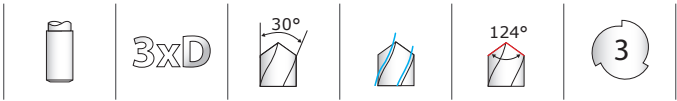
continued on next page

CONTINUED

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools



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)

inch & mm										EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS		UNCOATED	Ti-NAMITE-B (TiB ₂)
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

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

NON-FERROUS

PLASTICS/COMPOSITES

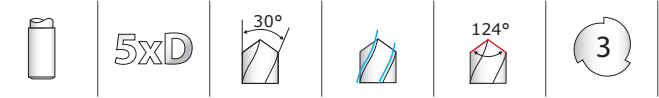
For patent information visit
www.ksptpatents.com

inch & mm									EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	UNCOATED	Ti-NAMITE-B (TiB ₂)
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

CONTINUED



131N 5xD
FRACTIONAL & METRIC SERIES



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)

inch & mm										EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	UNCOATED	Ti-NAMITE-B (TiB ₂)	
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	

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

inch & mm										EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	UNCOATED	Ti-NAMITE-B (TiB ₂)	
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	65026	64826	
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	

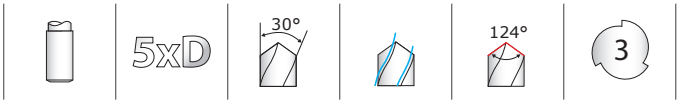
continued on next page

CONTINUED

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools



131N 5xD
FRACTIONAL & METRIC SERIES

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)

inch & mm										EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS		UNCOATED	Ti-NAMITE-B (TiB ₂)
23/64	0.3594	9.13		10,0	103,0	61,0	49,0	40,0		55019	54819
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

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

inch & mm										EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS		UNCOATED	Ti-NAMITE-B (TiB ₂)
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0		65089	64889
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

CONTINUED

Series 131N 3D & 5D Fractional				DC • in							
		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, Navel Brass	≤ 175 Bhn or ≤ 16 HRc	550	RPM	16808	11205	8404	5603	4202	3362	2801
			(440-660)	Fr	0.0020	0.0030	0.0040	0.0061	0.0081	0.0101	0.0121
				Feed (ipm)	34	34	34	34	34	34	34
	PLASTICS Acrylic, PVC, Polypropylene		450	RPM	13752	9168	6876	4584	3438	2750	2292
			(360-540)	Fr	0.0025	0.0037	0.0049	0.0074	0.0099	0.0124	0.0148
				Feed (ipm)	34	34	34	34	34	34	34

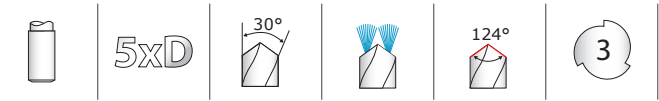
Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = Vc x 3.82 / DC
ipm = Fr x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Series 131N 3D & 5D Metric				DC • 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) / (DC x 3.14)
mm/min = Fr x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)



141K 5xD
FRACTIONAL & METRIC SERIES



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)

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-M (TM)	
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	

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+0.00047
DCON= h₆

>.1181--.2362 DIAMETER
DC = +.00016/+0.00063
DCON= h₆

>.2362--.3937 DIAMETER
DC = +.00024/+0.00083
DCON= h₆

>.3937--.7087 DIAMETER
DC = +.00028/+0.00098
DCON= h₆

>.7087--1.1811 DIAMETER
DC = +0.0031/+0.0114
DCON= h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON= h₆

>3--6 DIAMETER
DC = +0,004/+0,016
DCON= h₆

>6--10 DIAMETER
DC = +0,006/+0,021
DCON= h₆

>10--18 DIAMETER
DC = +0,007/+0,025
DCON= h₆

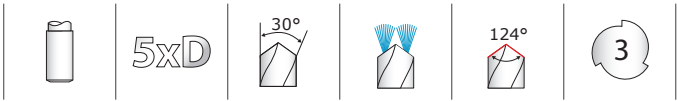
CAST IRON

For patent information visit
www.ksptpatents.com

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-M (TM)	
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	

continued on next page

CONTINUED



141K 5xD
FRACTIONAL & METRIC SERIES

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)

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-M (TM)	
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	

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+0.00047
DCON= h₆

>.1181--.2362 DIAMETER
DC = +.00016/+0.00063
DCON= h₆

>.2362--.3937 DIAMETER
DC = +.00024/+0.00083
DCON= h₆

>.3937--.7087 DIAMETER
DC = +.00028/+0.00098
DCON= h₆

>.7087-1.1811 DIAMETER
DC = +.00031/+0.00114
DCON= h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON= h₆

>3-6 DIAMETER
DC = +0,004/+0,016
DCON= h₆

>6-10 DIAMETER
DC = +0,006/+0,021
DCON= h₆

>10-18 DIAMETER
DC = +0,007/+0,025
DCON= h₆



For patent
information visit
www.ksptpatents.com

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-M (TM)	
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	

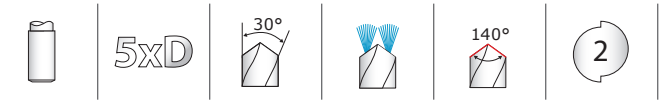
CONTINUED

Series 141K 5D Fractional	Hardness	Vc (sfm)		DC • in							
				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 or ≤ 80 HRb	450	RPM	13752	9168	6876	4584	3438	2750	2292
			(360-540)	Fr	0.0049	0.0074	0.0099	0.0148	0.0198	0.0247	0.0297
			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 or ≤ 19 HRc	375	RPM	11460	7640	5730	3820	2865	2292	1910
			(300-450)	Fr	0.0039	0.0059	0.0079	0.0118	0.0157	0.0196	0.0236
			Feed (ipm)	45	45	45	45	45	45	45	
	COMPACTED GRAPHITE IRON	≤ 250 Bhn or ≤ 25 HRc	325	RPM	9932	6621	4966	3311	2483	1986	1655
			(260-390)	Fr	0.0039	0.0059	0.0079	0.0118	0.0157	0.0196	0.0236
			Feed (ipm)	39	39	39	39	39	39	39	
	MALLEABLE CAST IRON FERRITIC ASTM A220: GRADE 40010 SAE J158: GRADE M4504	≤ 160 Bhn or ≤ 3 HRc	450	RPM	13752	9168	6876	4584	3438	2750	2292
			(360-540)	Fr	0.0049	0.0074	0.0099	0.0148	0.0198	0.0247	0.0297
			Feed (ipm)	68	68	68	68	68	68	68	
	MALLEABLE CAST IRON MARTENSITE ASTM A220: GRADE 90001 SAE J158: GRADE M8501	≤ 320 Bhn or ≤ 34 HRc	250	RPM	7640	5093	3820	2547	1910	1528	1273
			(200-300)	Fr	0.0031	0.0047	0.0063	0.0094	0.0126	0.0157	0.0188
			Feed (ipm)	24	24	24	24	24	24	24	

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

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

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



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)

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)	
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	

continued on next page



140 5xD
FRACTIONAL & METRIC SERIES

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)	
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	

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+0.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+0.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+0.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+0.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+0.0114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

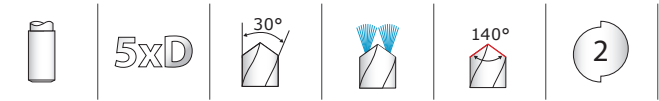
>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

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

For patent information visit
www.ksptpatents.com

CONTINUED



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)

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)	
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	

continued on next page



140 5xD
FRACTIONAL & METRIC SERIES

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)	
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	

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+-.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+-.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+-.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+-.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+-.00114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

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

For patent information visit
www.ksptpatents.com

CONTINUED

Series 140 5D Fractional	Hardness	Vc (sfm)	DC • in									
			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 (340-510)	425	RPM	12988	8659	6494	4329	3247	2598	2165	
			Fr	0.0039	0.0059	0.0079	0.0118	0.0157	0.0196	0.0236		
			Feed (ipm)	51.0	51.0	51.0	51.0	51.0	51.0	51.0		
		≤ 275 Bhn or ≤ 28 HRc (304-456)	380	RPM	11613	7742	5806	3871	2903	2323	1935	
			Fr	0.0035	0.0053	0.0071	0.0106	0.0141	0.0177	0.0212		
			Feed (ipm)	41.0	41.0	41.0	41.0	41.0	41.0	41.0		
		≤ 425 Bhn or ≤ 45 HRc (176-264)	220	RPM	6723	4482	3362	2241	1681	1345	1121	
			Fr	0.0030	0.0045	0.0059	0.0089	0.0119	0.0149	0.0178		
			Feed (ipm)	20.0	20.0	20.0	20.0	20.0	20.0	20.0		
		ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc (264-396)	330	RPM	10085	6723	5042	3362	2521	2017	1681
				Fr	0.0030	0.0045	0.0059	0.0089	0.0119	0.0149	0.0178	
				Feed (ipm)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
≤ 375 Bhn or ≤ 40 HRc (160-240)	200		RPM	6112	4075	3056	2037	1528	1222	1019		
	Fr		0.0025	0.0038	0.0051	0.0076	0.0101	0.0127	0.0152			
	Feed (ipm)		15.5	15.5	15.5	15.5	15.5	15.5	15.5			
≤ 450 Bhn or ≤ 48 HRc (112-168)	140		RPM	4278	2852	2139	1426	1070	856	713		
	Fr		0.0018	0.0027	0.0036	0.0054	0.0072	0.0090	0.0108			
	Feed (ipm)		7.7	7.7	7.7	7.7	7.7	7.7	7.7			
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc (244-366)	305	RPM	9321	6214	4660	3107	2330	1864	1553	
			Fr	0.0026	0.0039	0.0051	0.0077	0.0103	0.0129	0.0154		
			Feed (ipm)	24.0	24.0	24.0	24.0	24.0	24.0	24.0		
		≤ 275 Bhn or ≤ 28 HRc (156-234)	195	RPM	5959	3973	2980	1986	1490	1192	993	
			Fr	0.0020	0.0030	0.0040	0.0060	0.0081	0.0101	0.0121		
			Feed (ipm)	12.0	12.0	12.0	12.0	12.0	12.0	12.0		
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc (120-180)	150	RPM	4584	3056	2292	1528	1146	917	764	
			Fr	0.0020	0.0030	0.0040	0.0060	0.0079	0.0099	0.0119		
			Feed (ipm)	9.1	9.1	9.1	9.1	9.1	9.1	9.1		
		≤ 375 Bhn or ≤ 40 HRc (88-132)	110	RPM	3362	2241	1681	1121	840	672	560	
			Fr	0.0018	0.0027	0.0036	0.0054	0.0071	0.0089	0.0107		
			Feed (ipm)	6.0	6.0	6.0	6.0	6.0	6.0	6.0		
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc (288-432)	360	RPM	11002	7334	5501	3667	2750	2200	1834	
			Fr	0.0045	0.0068	0.0091	0.0136	0.0182	0.0227	0.0273		
			Feed (ipm)	50.0	50.0	50.0	50.0	50.0	50.0	50.0		
		≤ 260 Bhn or ≤ 26 HRc (268-402)	335	RPM	10238	6825	5119	3413	2559	2048	1706	
			Fr	0.0045	0.0068	0.0091	0.0136	0.0182	0.0227	0.0273		
			Feed (ipm)	46.5	46.5	46.5	46.5	46.5	46.5	46.5		

continued on next page

Series 140 5D Fractional		Hardness	Vc (sfm)	DC • in							
				1/8	3/16	1/4	3/8	1/2	5/8	3/4	
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	770 (616-924)	RPM	23531	15687	11766	7844	5883	4706	3922
				Fr	0.0049	0.0073	0.0098	0.0147	0.0195	0.0244	0.0293
				Feed (ipm)	115.0	115.0	115.0	115.0	115.0	115.0	115.0
		≤ 150 Bhn or ≤ 7 HRc	660 (528-792)	RPM	20170	13446	10085	6723	5042	4034	3362
				Fr	0.0050	0.0074	0.0099	0.0149	0.0198	0.0248	0.0297
				Feed (ipm)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	550 (440-660)	RPM	16808	11205	8404	5603	4202	3362	2801
				Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
				Feed (ipm)	33.5	33.5	33.5	33.5	33.5	33.5	33.5
		≤ 200 Bhn or ≤ 23 HRc	440 (352-528)	RPM	13446	8964	6723	4482	3362	2689	2241
				Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
				Feed (ipm)	27.0	27.0	27.0	27.0	27.0	27.0	27.0
S	SUPER ALLOYS (NICKEL , COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	95 (76-114)	RPM	2903	1935	1452	968	726	581	484
				Fr	0.0008	0.0012	0.0016	0.0024	0.0032	0.0040	0.0048
				Feed (ipm)	2.3	2.3	2.3	2.3	2.3	2.3	2.3
		≤ 400 Bhn or ≤ 43 HRc	50 (40-60)	RPM	1528	1019	764	509	382	306	255
				Fr	0.0007	0.0010	0.0013	0.0020	0.0026	0.0033	0.0039
				Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	215 (172-258)	RPM	6570	4380	3285	2190	1643	1314	1095
				Fr	0.0018	0.0026	0.0035	0.0053	0.0070	0.0088	0.0105
				Feed (ipm)	11.5	11.5	11.5	11.5	11.5	11.5	11.5
		≤ 350 Bhn or ≤ 38 HRc	160 (128-192)	RPM	4890	3260	2445	1630	1222	978	815
				Fr	0.0016	0.0024	0.0032	0.0048	0.0064	0.0080	0.0096
				Feed (ipm)	7.8	7.8	7.8	7.8	7.8	7.8	7.8
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 440 Bhn or ≤ 47 HRc	85 (68-102)	RPM	2598	1732	1299	866	649	520	433
				Fr	0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072
				Feed (ipm)	3.1	3.1	3.1	3.1	3.1	3.1	3.1
		≤ 200 Bhn or ≤ 13 HRc	145 (116-174)	RPM	4431	2954	2216	1477	1108	886	739
				Fr	0.0026	0.0039	0.0052	0.0078	0.0104	0.0130	0.0156
				Feed (ipm)	11.5	11.5	11.5	11.5	11.5	11.5	11.5
		≤ 375 Bhn or ≤ 40 HRc	95 (76-114)	RPM	2903	1935	1452	968	726	581	484
				Fr	0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072
				Feed (ipm)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
		≤ 475 Bhn or ≤ 50 HRc	85 (68-102)	RPM	2598	1732	1299	866	649	520	433
				Fr	0.0008	0.0012	0.0015	0.0023	0.0031	0.0038	0.0046
				Feed (ipm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0

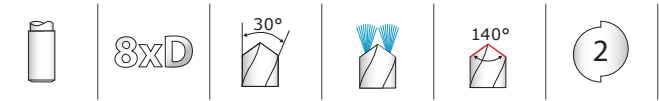
Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = Vc x 3.82 / DC
ipm = Fr x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

Series 140M 5D Metric		Hardness	Vc (m/min)	DC • mm									
				3	6	8	10	12	14	16			
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	130	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		
		M	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		
K	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		
		N	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
J	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
		I	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
H	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

continued on next page

Series 140M 5D Metric	Hardness	Vc (m/min)	DC • 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
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

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



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)

inch & mm									EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)
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

continued on next page



140 8xD
FRACTIONAL & METRIC SERIES

inch & mm									EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AITiN)
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

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+0.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+0.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+0.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+0.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+0.00114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

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

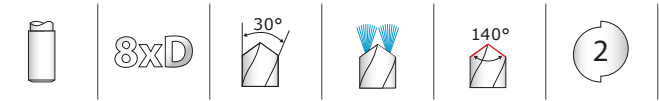
For patent information visit
www.ksptpatents.com

CONTINUED

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools



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)

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS		Ti-NAMITE-A (AITiN)
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



140 8xD
FRACTIONAL & METRIC SERIES

inch & mm										EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS		Ti-NAMITE-A (AITiN)
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

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+-.00047
DCON = h₆

>.1181–.2362 DIAMETER
DC = +.00016/+-.00063
DCON = h₆

>.2362–.3937 DIAMETER
DC = +.00024/+-.00083
DCON = h₆

>.3937–.7087 DIAMETER
DC = +.00028/+-.00098
DCON = h₆

>.7087–1.1811 DIAMETER
DC = +.00031/+-.00114
DCON = h₆

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h₆

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h₆

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h₆

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h₆

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

For patent information visit www.ksptpatents.com

CONTINUED

Series 140 8D Fractional	Hardness	Vc (sfm)	DC • in									
			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		
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	
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	

continued on next page

Series 140 8D Fractional		Hardness	Vc (sfm)	DC • in							
				1/8	3/16	1/4	3/8	1/2	5/8	3/4	
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
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
	≤ 440 Bhn or ≤ 47 HRc	75	RPM	2292	1528	1146	764	573	458	382	
		(60-90)	Fr	0.0010	0.0015	0.0020	0.0030	0.0040	0.0050	0.0060	
			Feed (ipm)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
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

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

Series 140M 8D Metric	Hardness	Vc (m/min)	DC • mm										
			3	6	8	10	12	14	16				
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	123	RPM	13087	6544	4908	3926	3272	2804	2454		
			(100-170)	Fr	0.085	0.171	0.228	0.285	0.342	0.399	0.455		
				Feed (mm/min)	1118	1118	1118	1118	1118	1118	1118		
		≤ 275 Bhn or ≤ 28 HRc	113	RPM	11956	5978	4484	3587	2989	2562	2242		
			(90-135)	Fr	0.072	0.144	0.193	0.241	0.289	0.337	0.385		
				Feed (mm/min)	864	864	864	864	864	864	864		
		≤ 425 Bhn or ≤ 45 HRc	64	RPM	6786	3393	2545	2036	1696	1454	1272		
			(51-77)	Fr	0.062	0.124	0.165	0.206	0.247	0.288	0.329		
				Feed (mm/min)	419	419	419	419	419	419	419		
		M	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	98	RPM	10340	5170	3878	3102	2585	2216	1939
					(78-117)	Fr	0.061	0.123	0.164	0.205	0.246	0.287	0.328
						Feed (mm/min)	635	635	635	635	635	635	635
≤ 375 Bhn or ≤ 40 HRc	58			RPM	6140	3070	2302	1842	1535	1316	1151		
	(46-69)			Fr	0.048	0.095	0.127	0.159	0.190	0.222	0.254		
				Feed (mm/min)	292	292	292	292	292	292	292		
≤ 450 Bhn or ≤ 48 HRc	41			RPM	4362	2181	1636	1309	1091	935	818		
	(33-49)			Fr	0.038	0.076	0.101	0.126	0.151	0.177	0.202		
				Feed (mm/min)	165	165	165	165	165	165	165		
K	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		
		≤ 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		
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		

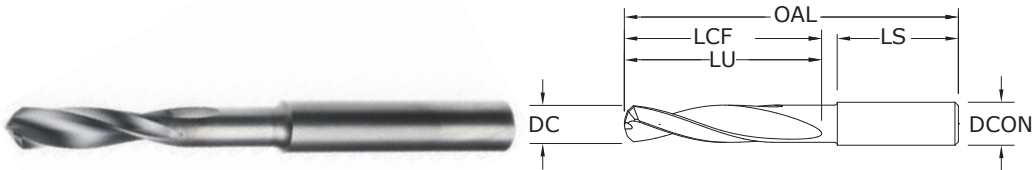
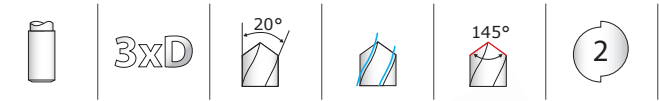
continued on next page

Series 140M 8D Metric		Hardness	Vc (m/min)	DC • mm							
				3	6	8	10	12	14	16	
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
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		
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

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

FRACTIONAL & METRIC

Series 120



120

FRACTIONAL & METRIC SERIES

- Double margin 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
- 90 degree secondary chamfer angle improves hole entrance and exit quality

inch & mm							EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF/LU	SHANK LENGTH LS	Di-NAMITE® (Diamond)
#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)

DC = +0.0000/−0.0005

DCON = h₆

TOLERANCES (mm)

DC = +0,000/−0,013

DCON = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

FRACTIONAL & METRIC

Series 120

Series 120 Fractional		Vc (sfm)	DC • in							
			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

rpm = Vc x 3.82 / DC

ipm = Fr x rpm

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

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

Series 120 Metric		Vc (m/min)	DC • 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

rpm = (Vc x 1000) / (DC x 3.14)

mm/min = Fr x rpm

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

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

General Purpose Drills



 Hole Making

Please put "S" at the beginning of all page numbers below.

GENERAL PURPOSE DRILLS	SERIES	DESCRIPTION	PAGE
2 Flute	101	2 Flute Slow Spiral	288
Short Length Self Centering (DIN6539)	108M Plus	2 Flute Short Length DIN 6539	293
Straight Flute	106	Straight Flute 140 Point Geometry	300
3 Flute with 150 Point Geometry	103	3 Flute 150 Point Geometry	304
GENERAL PURPOSE COUNTERSINKS	SERIES	DESCRIPTION	PAGE
Combined Drill & Countersink	301	2 Flute Straight Flute Combined Drill and Countersink Fractional	310
	301M	2 Flute Straight Flute Combined Drill and Countersink Metric	311
Single Flute Countersink	601	Single Flute Fractional	316
3 Flute Countersink	603	3 Flute Fractional	319
6 Flute Countersink	606	6 Flute Fractional	322
GENERAL PURPOSE REAMERS	SERIES	DESCRIPTION	PAGE
Straight Flute Accu-Reamer	200	Accu-Reamer	326
Straight Flute Reamer	201M	Metric Reamer	330

Speed & Feed Recommendations listed after each series

Taladrado

Please put "S" at the beginning of all page numbers below.

BROCAS DE USO GENERAL	SERIE	DESCRIPCIÓN	PÁGINA
2 filos	101	2 filos, espiral de avance lento	288
Autocentrante de longitud corta (DIN6539)	108M Plus	2 filos, longitud corta, DIN 6539	293
Filo recto	106	Filo recto, geometría de 140 puntos	300
3 filos con geometría de 150 puntos	103	3 filos, geometría de 150 puntos	304
BROCAS DE USO AVELLANADORES	SERIE	DESCRIPCIÓN	PÁGINA
Broca y avellanador combinados	301	2 filos, filo recto, broca y avellanador combinados, fraccional	310
	301M	2 filos, filo recto, broca y avellanador combinados, métrico	311
Avellanador de filo único	601	Filo único, fraccional	316
Avellanador de 3 filos	603	3 filos, fraccional	319
Avellanador de 6 filos	606	6 filos, fraccional	322
BROCAS DE USO ESCARIADORES	SERIE	DESCRIPCIÓN	PÁGINA
Escariador Accu de filo recto	200	Escariador Accu	326
Escariador de filo recto	201M	Escariador métrico	330

Recomendaciones de velocidades y avances mostradas tras cada serie

Outils de perçage

Please put "S" at the beginning of all page numbers below.

FORETS UNIVERSELS	SÉRIES	DESCRIPTION	PAGE
2 dents	101	2 dents à spirale lente	288
Court autocentrant (DIN 6539)	108M Plus	2 dents court DIN 6539	293
Denture droite	106	Denture droite à angle de pointe 140°	300
3 dents à angle de pointe 150°	103	3 dents à angle de pointe 150°	304
FORETS À FRAISER	SÉRIES	DESCRIPTION	PAGE
Foret et foret à fraiser combinés	301	2 dents denture droite foret et foret à fraiser combinés (fractionnel)	310
	301M	2 dents denture droite foret et foret à fraiser combinés (métrique)	311
Foret à fraiser à dent simple	601	Foret à dent simple (fractionnel)	316
Foret à fraiser 3 dents	603	3 dents (fractionnel)	319
Foret à fraiser 6 dents	606	6 dents (fractionnel)	322
FORETS À ALÉSOIRS	SÉRIES	DESCRIPTION	PAGE
Alésoir denture droite Accu-Reamer	200	Alésoir Accu-Reamer	326
Alésoir denture droite	201M	Alésoir (métrique)	330

Recommandations de vitesse et avance indiquées après chaque série

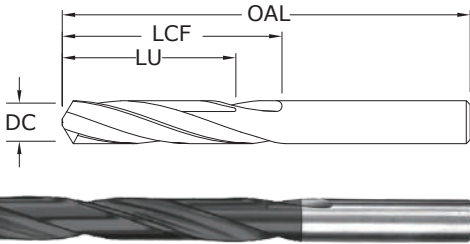
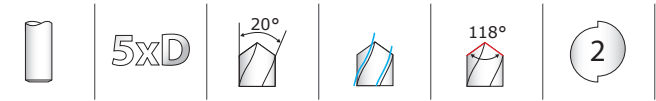
Bohren

Please put "S" at the beginning of all page numbers below.

STANDARD-BOHRER	SERIE	BESCHREIBUNG	SEITE
2 Schneiden	101	2 Schneiden mit kleinem Spanwinkel	288
Kurze Bauform Selbstzentrierung (DIN 6539)	108M Plus	2 Schneiden Kurze Bauform DIN 6539	293
Gerade Schneiden	106	Gerade Schneiden Spitzengeometrie 140	300
3 Schneiden mit Spitzengeometrie 150	103	3 Schneiden Spitzengeometrie 150	304
STANDARD-BOHRER	SERIE	BESCHREIBUNG	SEITE
Senkbohrer	301	Zölliger Senkbohrer mit 2 geraden Schneiden	310
	301M	Metrischer Senkbohrer mit 2 geraden Schneiden	311
Senker mit 1 Schneide	601	Zölliger Bohrer mit 1 Schneide	316
Senkbohrer mit 1 Schneide	603	Zölliger Bohrer mit 3 Schneiden	319
Senkbohrer mit 6 Schneiden	606	Zölliger Bohrer mit 6 Schneiden	322
STANDARD-BOHRER	SERIE	BESCHREIBUNG	SEITE
Reibahlen mit gerader Schneide	200	Accu-Reamer	326
Reibahle mit gerader Schneide	201M	Metrische Reibahle	330

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

2 Flute Drills • Metric: DIN 338



Pictured:
Series 101 Drill Set



101
FRACTIONAL & METRIC SERIES

CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	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

continued on next page

TOLERANCES (inch)

DC = +0.0000/-0.0005

TOLERANCES (mm)

DC = +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

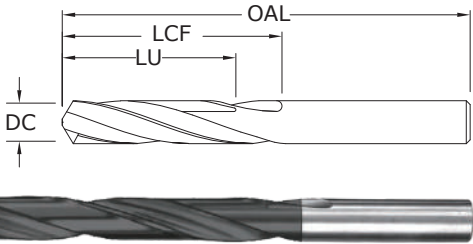
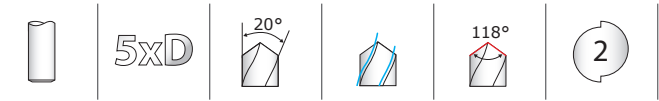
FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
#51	0.0670	1.70	1-1/2	3/4	39/64	51051	57109
#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

continued on next page

2 Flute Drills • Metric: DIN 338



Pictured:
Series 101 Drill Set



101
FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
3,9 mm	0.1535		75,0	43,0	34,0	61075	68317
#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

continued on next page

2 Flute Drills • Metric: DIN 338

101

FRACTIONAL & METRIC SERIES

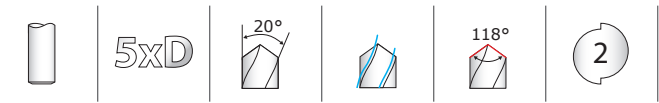
CONTINUED

CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
#2	0.2210	5.61	3	1-3/4	1-13/32	51002	57168
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

continued on next page

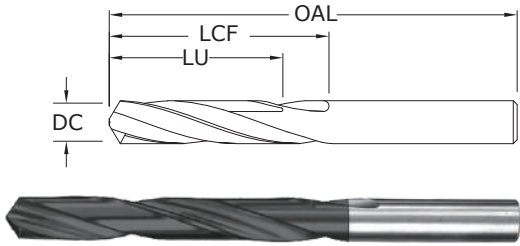
FRACTIONAL & METRIC

2 Flute Drills • Metric: DIN 338



101

FRACTIONAL & METRIC SERIES



CONTINUED

CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO.	
						UNCOATED	TI-NAMITE-A (AlTiN)
8,6 mm	0.3386		125,0	81,0	64,0	61112	68354
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)

DC = +0.0000/-0.0005

TOLERANCES (mm)

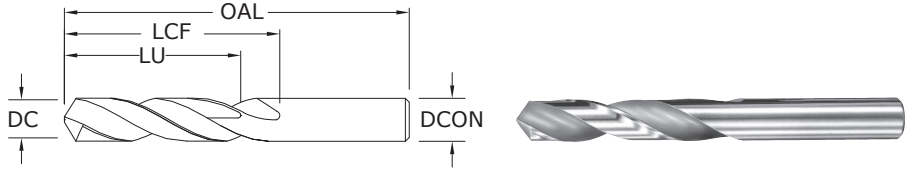
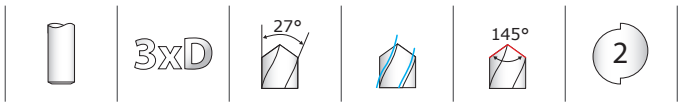
DC = +0.0000/-0.0127

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

For patent information visit
www.ksptpatents.com

METRIC

Short Length Self Centering Drills • DIN 6539



108M Plus

METRIC SERIES

TOLERANCES (mm)

≤3 DIAMETER

DC = +0,000/-0,010

DCON = h₆

>3-6 DIAMETER

DC = +0,000/-0,012

DCON = h₆

>6-10 DIAMETER

DC = +0,000/-0,015

DCON = h₆

>10-18 DIAMETER

DC = +0,000/-0,018

DCON = h₆

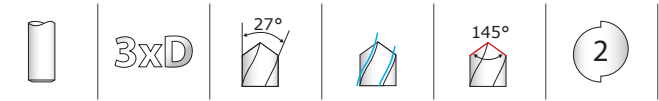
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

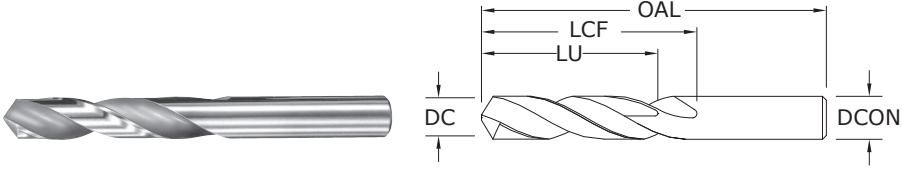
CUTTING DIAMETER DC/DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO.	
				UNCOATED	TI-NAMITE-A (AlTiN)
0,5	20,0	3,0	—	62001	68643
0,55	21,0	3,5	—	62003	68644
0,6	21,0	3,5	—	62005	68645
0,65	22,0	4,0	—	62007	68646
0,7	23,0	4,5	—	62009	68647
0,75	23,0	4,5	—	62011	68648
0,8	24,0	5,0	—	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

continued on next page

Short Length Self Centering Drills • DIN 6539



108M Plus
METRIC SERIES



CONTINUED	mm				EDP NO.	
	CUTTING DIAMETER DC/DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	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
DC = +0,000/-0,010
DCON = h₆

>3-6 DIAMETER
DC = +0,000/-0,012
DCON = h₆

>6-10 DIAMETER
DC = +0,000/-0,015
DCON = h₆

>10-16 DIAMETER
DC = +0,000/-0,018
DCON = h₆

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

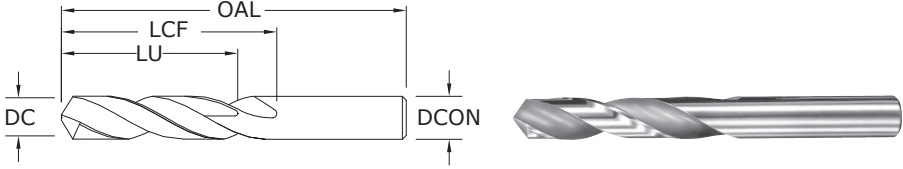
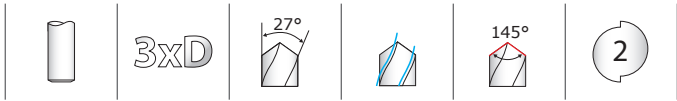
HARDENED STEELS

NON-FERROUS

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

Short Length Self Centering Drills • DIN 6539



108M Plus
METRIC SERIES

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

For patent information visit www.ksptpatents.com

FRACTIONAL

2 Flute Drills

Series 101 Fractional	Hardness	Vc (sfm)	DC • in								
				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	265	RPM	64787	32394	16197	8098	4049	2699	2025	
		≤ 175 Bhn or ≤ 7 HRc (212-318)	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	
		125	RPM	30560	15280	7640	3820	1910	1273	955	
		≤ 300 Bhn or ≤ 32 HRc (100-150)	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	
		85	RPM	20781	10390	5195	2598	1299	866	649	
		≤ 425 Bhn or ≤ 45 HRc (68-102)	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	230	RPM	56230	28115	14058	7029	3514	2343	1757	
		≤ 275 Bhn or ≤ 28 HRc (184-276)	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	
		145	RPM	35450	17725	8862	4431	2216	1477	1108	
		≤ 375 Bhn or ≤ 40 HRc (116-174)	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	
		60	RPM	14669	7334	3667	1834	917	611	458	
		≤ 450 Bhn or ≤ 48 HRc (48-72)	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	
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	210	RPM	51341	25670	12835	6418	3209	2139	1604	
		≤ 250 Bhn or ≤ 24 HRc (168-252)	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	
		110	RPM	26893	13446	6723	3362	1681	1121	840	
		≤ 330 Bhn or ≤ 36 HRc (88-132)	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	65	RPM	15891	7946	3973	1986	993	662	497	
		≤ 275 Bhn or ≤ 28 HRc (52-78)	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	
		55	RPM	13446	6723	3362	1681	840	560	420	
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	

continued on next page

FRACTIONAL

2 Flute Drills

Series 101 Fractional	Hardness	Vc (sfm)	DC • in								
			1/64	1/32	1/16	1/8	1/4	3/8	1/2		
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	540	RPM	132019	66010	33005	16502	8251	5501	4126
		(432-648)	Fr	0.00030	0.0006	0.0012	0.0024	0.0048	0.0073	0.0097	
			Feed (ipm)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	
		≤ 150 Bhn or ≤ 7 HRc	455	RPM	111238	55619	27810	13905	6952	4635	3476
		(364-546)	Fr	0.00031	0.0006	0.0013	0.0025	0.0050	0.0076	0.0101	
			Feed (ipm)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	190	RPM	46451	23226	11613	5806	2903	1935	1452
		(152-228)	Fr	0.00015	0.0003	0.0006	0.0012	0.0024	0.0036	0.0048	
			Feed (ipm)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
		≤ 200 Bhn or ≤ 23 HRc	175	RPM	42784	21392	10696	5348	2674	1783	1337
		(140-210)	Fr	0.00015	0.0003	0.0006	0.0012	0.0024	0.0036	0.0048	
			Feed (ipm)	6.4	6.4	6.4	6.4	6.4	6.4	6.4	
	PLASTICS Polycarbonate, PVC	500	RPM	122240	61120	30560	15280	7640	5093	3820	
		(400-600)	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	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	40	RPM	9779	4890	2445	1222	611	407	306
		(32-48)	Fr	0.00010	0.0002	0.0004	0.0008	0.0016	0.0025	0.0033	
			Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
		≤ 320 Bhn or ≤ 34 HRc	25	RPM	6112	3056	1528	764	382	255	191
		(20-30)	Fr	0.00010	0.0002	0.0004	0.0008	0.0016	0.0024	0.0031	
			Feed (ipm)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
		≤ 425 Bhn or ≤ 45 HRc	20	RPM	4890	2445	1222	611	306	204	153
		(16-24)	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	85	RPM	20781	10390	5195	2598	1299	866	649
		(68-102)	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	65	RPM	15891	7946	3973	1986	993	662	497
		(52-78)	Fr	0.00011	0.0002	0.0004	0.0009	0.0017	0.0026	0.0034	
			Feed (ipm)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	
		≤ 440 Bhn or ≤ 47 HRc	55	RPM	13446	6723	3362	1681	840	560	420
		(44-66)	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	
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	85	RPM	20781	10390	5195	2598	1299	866	649
		(68-102)	Fr	0.00011	0.0002	0.0004	0.0009	0.0018	0.0027	0.0035	
			Feed (ipm)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
		≤ 375 Bhn or ≤ 40 HRc	55	RPM	13446	6723	3362	1681	840	560	420
		(44-66)	Fr	0.00005	0.0001	0.0002	0.0004	0.0008	0.0012	0.0017	
			Feed (ipm)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
		≤ 475 Bhn or ≤ 50 HRc	40	RPM	9779	4890	2445	1222	611	407	306
		(32-48)	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	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = Vc x 3.82 / DC
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 SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

KYOCERA Solid Tools

SGS Solid Tools

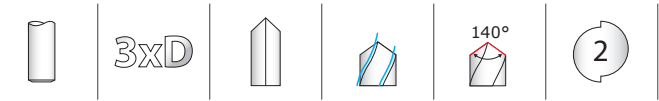
SGS Micro Tools

KYOCERA Solid Tools

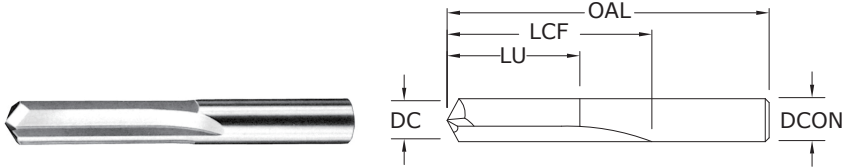
SGS Solid Tools

SGS Micro Tools

Straight Flute Drills • Metric: DIN 6539



106
FRACTIONAL & METRIC SERIES



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

continued on next page

TOLERANCES (inch)

DC = +0.0000/-0.0005
DCON = h₆

TOLERANCES (mm)

DC = +0,0000/-0,0127
DCON = h₆

STEELS

CAST IRON

HARDENED STEELS

For patent
information visit
www.ksptpatents.com

Straight Flute Drills • Metric: DIN 6539

106

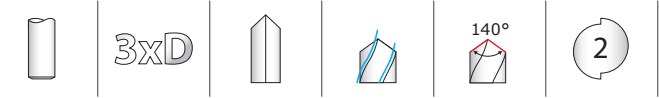
FRACTIONAL & METRIC SERIES

CONTINUED

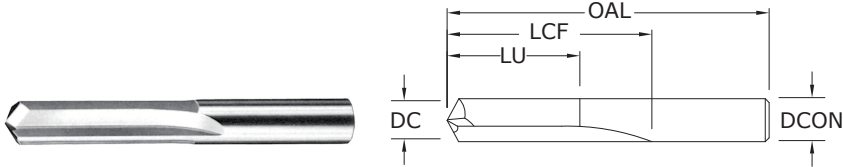
CUTTING DIAMETER DC / DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
#33	0.1130	2.87	1-7/8	7/8	45/64	56033	56242
#32	0.1160	2.95	1-7/8	7/8	45/64	56032	56241
3,0 mm	0.1181		46,0	16,0	12,0	66009	66010
#31	0.1200	3.05	1-7/8	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

continued on next page

Straight Flute Drills • Metric: DIN 6539



106
FRACTIONAL & METRIC SERIES



CUTTING DIAMETER DC / DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AITiN)
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)

DC = +0.0000/-0.0005
DCON = h₆

TOLERANCES (mm)

DC = +0,0000/-0,0127
DCON = h₆

STEELS

CAST IRON

HARDENED STEELS

For patent information visit
www.kspatents.com

Straight Flute Drills

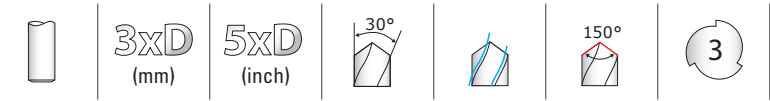
Series 106 Fractional	Hardness	Vc (sfm)	DC • in						
			1/16	1/8	3/16	1/4	3/8	1/2	
P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 500 Bhn or ≤ 52 HRc	60 (48-72)	RPM	3667	1834	1222	917	611	458
			Fr	0.0004	0.0007	0.0011	0.0014	0.0021	0.0028
			Feed (ipm)	1.3	1.3	1.3	1.3	1.3	1.3
	≤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

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

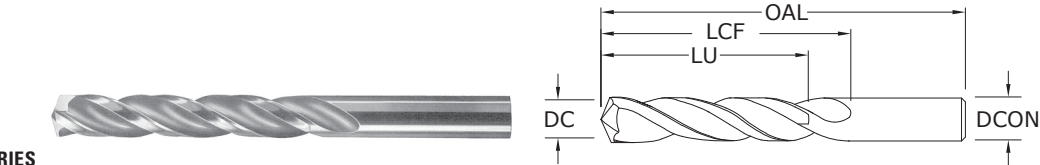
Series 106M Metric	Hardness	Vc (m/min)	DC • mm						
			1	3	6	8	10	12	
P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 500 Bhn or ≤ 52 HRc	18	RPM	5816	1939	969	727	582	485
		(15-22)	Fr	0.006	0.018	0.035	0.047	0.058	0.070
			Feed (mm/min)	34	34	34	34	34	34
	≤ 615 Bhn or ≤ 58 HRc	15	RPM	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
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
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

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

3 Flute Drills • Metric: DIN 6539



103
FRACTIONAL & METRIC SERIES



CUTTING DIAMETER DC / DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	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

continued on next page

TOLERANCES (inch)

DC = +0.0000/-0.0005
DCON = h₆

TOLERANCES (mm)

DC = +0.0000/-0.0127
DCON = h₆

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

For patent
information visit
www.ksptpatents.com

3 Flute Drills • Metric: DIN 6539

103

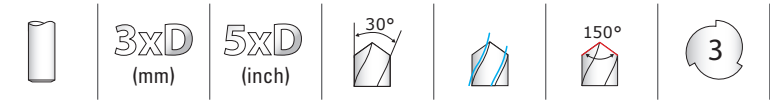
FRACTIONAL & METRIC SERIES

CONTINUED

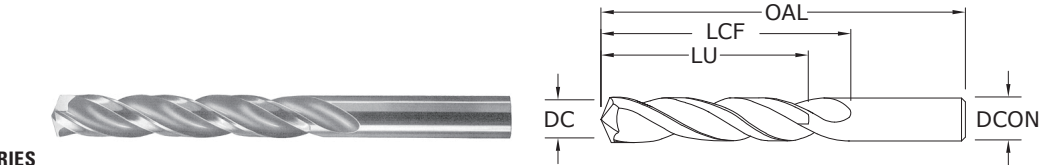
CUTTING DIAMETER DC / DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
#16	0.1770	4.50	2-3/4	1-5/8	1-19/64	53016	58036
4,5 mm	0.1772		58,0	24,0	18,0	63006	68980
#15	0.1800	4.57	2-3/4	1-5/18	1-19/64	53015	58037
4,6 mm	0.1811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



103
FRACTIONAL & METRIC SERIES



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

continued on next page

TOLERANCES (inch)

DC = +0.0000/-0.0005
DCON = h₆

TOLERANCES (mm)

DC = +0,0000/-0,0127
DCON = h₆

STEELS

CAST IRON

HARDENED STEELS

NON-FERROUS

For patent
information visit
www.ksptpatents.com

3 Flute Drills • Metric: DIN 6539

103

FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER DC/DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO.	
						UNCOATED	Ti-NAMITE-A (AlTiN)
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

FRACTIONAL

3 Flute Drills

Series 103 Fractional	Hardness	Vc (sfm)	DC • in							
			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
		≤ 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
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 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
		≤ 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
K	CAST IRONS Gray, Malleable, Ductile	≤ 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
		≤ 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
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 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
		≤ 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
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 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
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 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
		≤ 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		

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = Vc x 3.82 / DC
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 SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC

3 Flute Drills

Series 103M Metric	Hardness	Vc (m/min)	DC • 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
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
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	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = (Vc x 1000) / (DC 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 SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

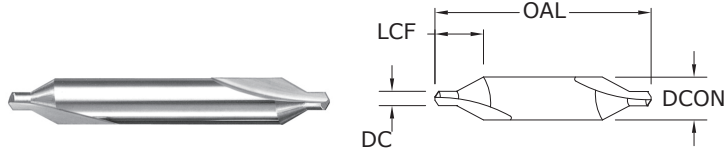
FRACTIONAL

Combined Drill & Countersink



301

FRACTIONAL SERIES



SIZE	inch				EDP NO.	
	DRILL DIAMETER DC	BODY DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	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)

DC = +0.003/-0.000

DCON = -0.0001/-0.0005

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

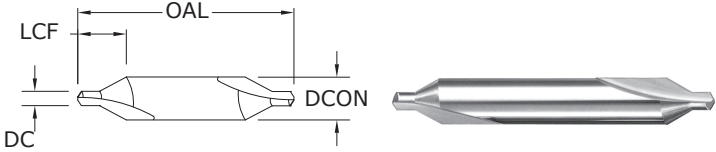
For patent information visit www.ksptpatents.com

Pictured:
Series 301 Set



METRIC

Combined Drill & Countersink



DRILL DIAMETER DC	BODY DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	EDP NO.	
				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

TOLERANCES (mm)

DC = +0,076/-0,000

DCON = -0,0025/-0,0127

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

For patent information visit www.ksptpatents.com

301M

METRIC SERIES

FRACTIONAL

Combined Drill & Countersink

Series 301 Fractional	Hardness	Vc (sfm)	DC • in						
			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	
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		
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

continued on next page

FRACTIONAL

Combined Drill & Countersink

Series 301 Fractional	Hardness	Vc (sfm)	DC • in						
			1/32	5/64	1/8	3/16	7/32		
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	540	RPM	16502	11002	6601	4715	4126
		(432-648)	Fr	0.00100	0.0015	0.0025	0.0035	0.0040	
			Feed (ipm)	16.5	16.5	16.5	16.5	16.5	
		≤ 150 Bhn or ≤ 7 HRc	455	RPM	13905	9270	5562	3973	3476
		(364-546)	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	≤ 140 Bhn or ≤ 3 HRc	190	RPM	5806	3871	2323	1659	1452
		(152-228)	Fr	0.00048	0.0007	0.0012	0.0017	0.0019	
			Feed (ipm)	2.8	2.8	2.8	2.8	2.8	
		≤ 200 Bhn or ≤ 23 HRc	175	RPM	5348	3565	2139	1528	1337
		(140-210)	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	RPM	15280	10187	6112	4366	3820	
	(400-600)	Fr	0.00100	0.0015	0.0025	0.0035	0.0040		
		Feed (ipm)	15.3	15.3	15.3	15.3	15.3		
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	40	RPM	1222	815	489	349	306
		(32-48)	Fr	0.00036	0.0005	0.0009	0.0013	0.0014	
			Feed (ipm)	0.4	0.4	0.4	0.4	0.4	
		≤ 320 Bhn or ≤ 34 HRc	25	RPM	764	509	306	218	191
		(20-30)	Fr	0.00033	0.0005	0.0008	0.0011	0.0013	
			Feed (ipm)	0.3	0.3	0.3	0.3	0.3	
		≤ 425 Bhn or ≤ 45 HRc	20	RPM	611	407	244	175	153
		(16-24)	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	≤ 275 Bhn or ≤ 28 HRc	85	RPM	2598	1732	1039	742	649
		(68-102)	Fr	0.00064	0.0010	0.0016	0.0022	0.0026	
			Feed (ipm)	1.7	1.7	1.7	1.7	1.7	
		≤ 350 Bhn or ≤ 38 HRc	65	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	
		≤ 440 Bhn or ≤ 47 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	
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	

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = Vc x 3.82 / DCON
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 SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

Combined Drill & Countersink

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

continued on next page

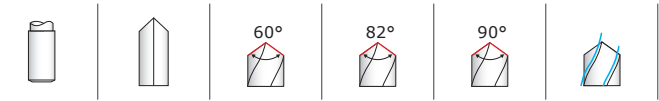
Combined Drill & Countersink

Series 301M Metric	Hardness	Vc (m/min)	DC • mm					
			1	1.6	2.5	4	5	
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	165	RPM	16619	13087	8309	5235	4188
		≤ 80 Bhn or ≤ 47 HRb (132-198)	Fr	0.025	0.032	0.050	0.079	0.099
			Feed (mm/min)	415	415	415	415	415
		139	RPM	14003	11027	7001	4411	3529
		≤ 150 Bhn or ≤ 7 HRc (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	58	RPM	5847	4605	2924	1842	1474
		≤ 140 Bhn or ≤ 3 HRc (46-69)	Fr	0.012	0.015	0.024	0.038	0.048
			Feed (mm/min)	70	70	70	70	70
		53	RPM	5386	4241	2693	1696	1357
		≤ 200 Bhn or ≤ 23 HRc (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	RPM	15388	12118	7694	4847	3878
(122-183)		Fr	0.025	0.032	0.050	0.079	0.099	
		Feed (mm/min)	385	385	385	385	385	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	12	RPM	1231	969	616	388	310
		≤ 220 Bhn or ≤ 19 HRc (10-15)	Fr	0.009	0.011	0.018	0.028	0.035
			Feed (mm/min)	11	11	11	11	11
		8	RPM	769	606	385	242	194
		≤ 320 Bhn or ≤ 34 HRc (6-9)	Fr	0.008	0.010	0.016	0.025	0.031
			Feed (mm/min)	6	6	6	6	6
	6	RPM	616	485	308	194	155	
	≤ 425 Bhn or ≤ 45 HRc (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	26	RPM	2616	2060	1308	824	659
		≤ 275 Bhn or ≤ 28 HRc (21-31)	Fr	0.016	0.020	0.032	0.051	0.064
			Feed (mm/min)	42	42	42	42	42
		20	RPM	2000	1575	1000	630	504
≤ 350 Bhn or ≤ 38 HRc (16-24)		Fr	0.009	0.011	0.018	0.029	0.036	
		Feed (mm/min)	18	18	18	18	18	
17	RPM	1693	1333	846	533	427		
≤ 440 Bhn or ≤ 47 HRc (13-20)	Fr	0.008	0.011	0.017	0.026	0.033		
	Feed (mm/min)	14	14	14	14	14		
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	26	RPM	2616	2060	1308	824	659
		≤ 250 Bhn or ≤ 24 HRc (21-31)	Fr	0.009	0.012	0.018	0.029	0.036
			Feed (mm/min)	24	24	24	24	24
		17	RPM	1693	1333	846	533	427
		≤ 375 Bhn or ≤ 40 HRc (13-20)	Fr	0.004	0.005	0.008	0.013	0.016
			Feed (mm/min)	7	7	7	7	7
		12	RPM	1231	969	616	388	310
		≤ 475 Bhn or ≤ 50 HRc (10-15)	Fr	0.004	0.005	0.008	0.013	0.016
			Feed (mm/min)	5	5	5	5	5

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = (Vc x 1000) / (DCON 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 SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

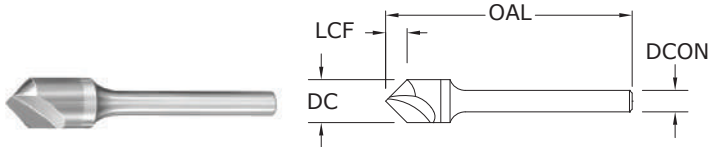
FRACTIONAL

Single Flute Countersink



601

FRACTIONAL SERIES



inch				EDP NO.		
CUTTING DIAMETER DC	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	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
DC = +0.0000/–0.0005

3/8–1 DIAMETER
DC = +0.003/–0.000

Included Angle +1°/–1°

STEELS

STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

HARDENED STEELS

NON-FERROUS

For patent information visit www.ksptpatents.com

FRACTIONAL

Single Flute Countersink

Series 601 Fractional	Hardness	Vc (sfm)	DC • in								
			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	
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
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

continued on next page

FRACTIONAL

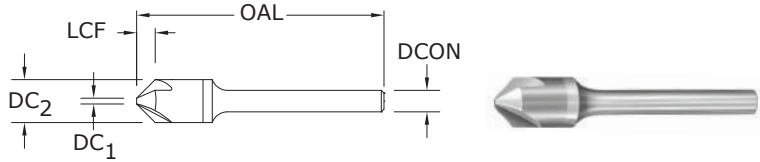
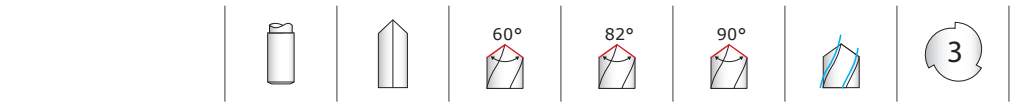
Single Flute Countersink

Series 601 Fractional	Hardness	Vc (sfm)	DC • in							
				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 (180-270)	RPM	6876	4584	3438	2292	1719	1146	860
			Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0061
			Feed (ipm)	5.2	5.2	5.2	5.2	5.2	5.2	5.2
		≤ 150 Bhn or ≤ 7 HRc (152-228)	RPM	5806	3871	2903	1935	1452	968	726
			Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0061
			Feed (ipm)	4.4	4.4	4.4	4.4	4.4	4.4	4.4
S	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc (76-114)	RPM	2903	1935	1452	968	726	484	363
			Fr	0.0004	0.0006	0.0008	0.0011	0.0015	0.0023	0.0030
			Feed (ipm)	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		≤ 200 Bhn or ≤ 23 HRc (64-96)	RPM	2445	1630	1222	815	611	407	306
			Fr	0.0004	0.0006	0.0008	0.0012	0.0016	0.0025	0.0033
			Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc (14-22)	RPM	550	367	275	183	138	92	69
			Fr	0.0002	0.0003	0.0004	0.0005	0.0007	0.0011	0.0015
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		≤ 320 Bhn or ≤ 34 HRc (11-17)	RPM	428	285	214	143	107	71	53
			Fr	0.0002	0.0004	0.0005	0.0007	0.0009	0.0014	0.0019
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		≤ 425 Bhn or ≤ 45 HRc (10-14)	RPM	367	244	183	122	92	61	46
			Fr	0.0003	0.0004	0.0005	0.0008	0.0011	0.0016	0.0022
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		≤ 275 Bhn or ≤ 28 HRc (29-43)	RPM	1100	733	550	367	275	183	138
			Fr	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
			Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
H	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 350 Bhn or ≤ 38 HRc (22-34)	RPM	856	570	428	285	214	143	107
			Fr	0.0004	0.0005	0.0007	0.0011	0.0014	0.0021	0.0028
			Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		≤ 440 Bhn or ≤ 47 HRc (17-25)	RPM	642	428	321	214	160	107	80
			Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		≤ 250 Bhn or ≤ 24 HRc (28-42)	RPM	1070	713	535	357	267	178	134
			Fr	0.0003	0.0004	0.0006	0.0008	0.0011	0.0017	0.0022
			Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		≤ 375 Bhn or ≤ 40 HRc (20-30)	RPM	764	509	382	255	191	127	96
			Fr	0.0001	0.0002	0.0003	0.0004	0.0005	0.0008	0.0010
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRc (16-24)	RPM	611	407	306	204	153	102	76
			Fr	0.0002	0.0002	0.0003	0.0005	0.0007	0.0010	0.0013
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1

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

FRACTIONAL

3 Flute Countersink



TOLERANCES (inch)

1/8–1/4 DIAMETER
DC = +0.0000/–0.0005

3/8–1 DIAMETER
DC = +0.003/–0.000

Included Angle +1°/–1°

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

For patent
information visit
www.ksptpatents.com

CUTTING DIAMETER DC ₂	SHANK DIAMETER DCON	inch			EDP NO.		
		OVERALL LENGTH OAL	FLUTE LENGTH LCF	TIP DIAMETER DC ₁	UNCOATED 60°	UNCOATED 82°	UNCOATED 90°
1/8	1/8	1-1/2	.045	.040	–	–	74225
1/8	1/8	1-1/2	.049	.040	–	74125	–
1/8	1/8	1-1/2	.078	.035	74025	–	–
3/16	3/16	2	.071	.060	–	–	74228
3/16	3/16	2	.073	.060	–	74128	–
3/16	3/16	2	.123	.045	74028	–	–
1/4	1/4	2	.090	.100	–	–	74231
1/4	1/4	2	.086	.100	–	74131	–
1/4	1/4	2	.156	.070	74031	–	–
*3/8	1/4	2-13/16	.138	.108	–	–	74234
*3/8	1/4	2-13/16	.154	.108	–	74134	–
*3/8	1/4	2-13/16	.238	.100	74034	–	–
*1/2	1/4	2-7/8	.194	.122	–	–	74237
*1/2	1/4	2-7/8	.217	.122	–	74137	–
*1/2	1/4	2-7/8	.335	.113	74037	–	–
*5/8	3/8	3	.249	.138	–	–	74240
*5/8	3/8	3	.280	.138	–	74140	–
*5/8	3/8	3	.430	.128	74040	–	–
*3/4	1/2	3	.304	.153	–	–	74243
*3/4	1/2	3	.343	.153	–	74143	–
*3/4	1/2	3	.526	.143	74043	–	–
*1	1/2	3-1/4	.421	.168	–	–	74246
*1	1/2	3-1/4	.479	.168	–	74146	–
*1	1/2	3-1/4	.729	.158	74046	–	–

*Steel Shank / Con mango de acero / Avec queue en acier / Mit Stahlschaft
NOTE: DC₁ dimension varies based on angle. Contact your KSPT representative
or consult SGS Tool Wizard® for dimension information.

603

FRACTIONAL SERIES

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

FRACTIONAL

3 Flute Countersink

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

continued on next page

FRACTIONAL

3 Flute Countersink

Series 603 Fractional	Hardness	Vc (sfm)	DC • in								
			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	0.0011	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
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
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 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
		≤ 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
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	0.0004	0.0006	0.0007	0.0011	0.0015	0.0022	0.0030
				Feed (ipm)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		≤ 375 Bhn or ≤ 40 HRc	25	RPM	764	509	382	255	191	127	96
			(20-30)	Fr	0.0003	0.0004	0.0005	0.0008	0.0010	0.0016	0.0021
				Feed (ipm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	≤ 475 Bhn or ≤ 50 HRc	20	RPM	611	407	306	204	153	102	76	
		(16-24)	Fr	0.0002	0.0002	0.0003	0.0005	0.0007	0.0010	0.0013	
			Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

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

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

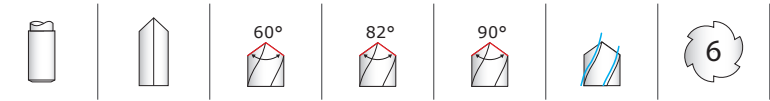
KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

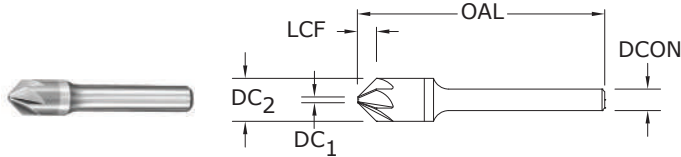
FRACTIONAL

6 Flute Countersink



606

FRACTIONAL SERIES



inch					EDP NO.		
CUTTING DIAMETER DC ₂	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	TIP DIAMETER DC ₁	UNCOATED 60°	UNCOATED 82°	UNCOATED 90°
1/8	1/8	1-1/2	.045	.035	—	—	74249
1/8	1/8	1-1/2	.052	.035	—	74149	—
1/8	1/8	1-1/2	.078	.035	74049	—	—
3/16	3/16	2	.071	.045	—	—	74252
3/16	3/16	2	.082	.045	—	74152	—
3/16	3/16	2	.123	.045	74052	—	—
1/4	1/4	2	.090	.070	—	—	74255
1/4	1/4	2	.104	.070	—	74155	—
1/4	1/4	2	.156	.070	74055	—	—
*3/8	1/4	2-13/16	.138	.100	—	—	74258
*3/8	1/4	2-13/16	.158	.100	—	74158	—
*3/8	1/4	2-13/16	.238	.100	74058	—	—
*1/2	1/4	2-7/8	.170	.160	—	—	74261
*1/2	1/4	2-7/8	.196	.160	—	74161	—
*1/2	1/4	2-7/8	.294	.160	74061	—	—
*5/8	3/8	3	.218	.190	—	—	74264
*5/8	3/8	3	.250	.190	—	74164	—
*5/8	3/8	3	.377	.190	74064	—	—
*3/4	1/2	3	.265	.220	—	—	74267
*3/4	1/2	3	.305	.220	—	74167	—
*3/4	1/2	3	.459	.220	74067	—	—
*1	1/2	3-1/4	.370	.260	—	—	74270
*1	1/2	3-1/4	.426	.260	—	74170	—
*1	1/2	3-1/4	.641	.260	74070	—	—

*Steel Shank / Con mango de acero / Avec queue en acier / Mit Stahlschaft
NOTE: DC₁ dimension varies based on angle. Contact your KSPT representative or consult SGS Tool Wizard® for dimension information.

TOLERANCES (inch)

1/8–1/4 DIAMETER
DC = +0.0000/–0.0005

3/8–1 DIAMETER
DC = +0.003/–0.000

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)	DC • in									
			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		
	M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 330 Bhn or ≤ 36 HRc	(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	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		
≤ 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				
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		

continued on next page

FRACTIONAL

6 Flute Countersink

Series 606 Fractional	Hardness	Vc (sfm)	DC • in									
			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		
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

FRACTIONAL

6 Flute Countersink

Series 606 Fractional		Hardness	Vc (sfm)	DC • in							
				1/8	3/16	1/4	3/8	1/2	3/4	1	
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

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

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

KYOCERA Solid Tools

SGS Solid Tools

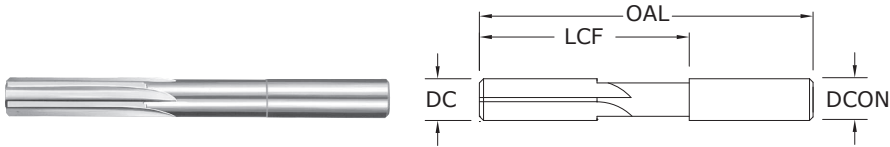
SGS Micro Tools

FRACTIONAL

Straight Flute Accu-Reamer



200
FRACTIONAL SERIES



inch					EDP NO.
CUTTING DIAMETER DC	SHANK DIAMETER DCON	MAXIMUM REAM LENGTH LCF	OVERALL LENGTH OAL	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

continued on next page

TOLERANCES (inch)

DC = +0.0002/-0.0000
DCON = +0.0002/-0.0000

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

For patent information visit www.ksptpatents.com

FRACTIONAL

Straight Flute Accu-Reamer



200
FRACTIONAL SERIES

CONTINUED

inch				NO. OF FLUTES
CUTTING DIAMETER DC	SHANK DIAMETER DCON	MAXIMUM REAM LENGTH LCF	OVERALL LENGTH OAL	
.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 DC. Please order as:

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

All other dimensions are fractional as per table including the Shank

FRACTIONAL

Straight Flute Accu-Reamer

Series 200 Fractional	Hardness	Vc (sfm)	DC • in								
			1/16	1/8	3/16	1/4	5/16	3/8	1/2		
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	150	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
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
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
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

continued on next page

FRACTIONAL

Straight Flute Accu-Reamer

Series 200 Fractional	Hardness	Vc (sfm)	DC • in								
			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
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

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = Vc x 3.82 / DC
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 SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC

Straight Flute Reamer



201M

METRIC SERIES



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

TOLERANCES (mm)

1–6 DIAMETER
DC = +0,008/–0,000

>6–10 DIAMETER
DC = +0,010/–0,000

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

For patent information visit www.ksptpatents.com

METRIC

Straight Flute Reamer

Series 201M Metric	Hardness	Vc (m/min)	DC • 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	
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
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	38	RPM	12118	6059	4039	3029	2020	1515	1212
			(30-46)	Fr	0.032	0.064	0.097	0.129	0.193	0.257	0.322
				Feed (mm/min)	390	390	390	390	390	390	390
		≤ 330 Bhn or ≤ 36 HRc	29	RPM	9209	4605	3070	2302	1535	1151	921
			(23-35)	Fr	0.032	0.064	0.096	0.128	0.192	0.256	0.320
				Feed (mm/min)	295	295	295	295	295	295	295

continued on next page

Straight Flute Reamer

Series 201M Metric	Hardness	Vc (m/min)	DC • mm									
			1	2	3	4	6	8	10			
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	82	RPM	26174	13087	8725	6544	4362	3272	2617	
			(66-99)	Fr	0.040	0.080	0.120	0.160	0.240	0.320	0.400	
				Feed (mm/min)	1047	1047	1047	1047	1047	1047	1047	
		≤ 150 Bhn or ≤ 7 HRc	70	RPM	22297	11148	7432	5574	3716	2787	2230	
			(56-84)	Fr	0.040	0.080	0.120	0.160	0.240	0.320	0.400	
				Feed (mm/min)	892	892	892	892	892	892	892	
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	35	RPM	11148	5574	3716	2787	1858	1394	1115	
			(28-42)	Fr	0.020	0.041	0.061	0.081	0.122	0.163	0.204	
				Feed (mm/min)	227	227	227	227	227	227	227	
		≤ 200 Bhn or ≤ 23 HRc	29	RPM	9209	4605	3070	2302	1535	1151	921	
			(23-35)	Fr	0.020	0.041	0.061	0.082	0.122	0.163	0.204	
				Feed (mm/min)	188	188	188	188	188	188	188	
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	6	RPM	1939	969	646	485	323	242	194	
			(5-7)	Fr	0.012	0.024	0.036	0.047	0.071	0.095	0.119	
				Feed (mm/min)	23	23	23	23	23	23	23	
		≤ 320 Bhn or ≤ 34 HRc	5	RPM	1454	727	485	364	242	182	145	
			(4-5)	Fr	0.010	0.021	0.031	0.041	0.062	0.083	0.103	
				Feed (mm/min)	15	15	15	15	15	15	15	
		≤ 425 Bhn or ≤ 45 HRc	3	RPM	969	485	323	242	162	121	97	
			(2-4)	Fr	0.006	0.012	0.019	0.025	0.037	0.050	0.062	
				Feed (mm/min)	6	6	6	6	6	6	6	
		TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	14	RPM	4362	2181	1454	1091	727	545	436
				(11-16)	Fr	0.024	0.048	0.072	0.096	0.144	0.193	0.241
					Feed (mm/min)	105	105	105	105	105	105	105
	≤ 350 Bhn or ≤ 38 HRc		11	RPM	3393	1696	1131	848	565	424	339	
			(9-13)	Fr	0.015	0.029	0.044	0.059	0.088	0.118	0.147	
				Feed (mm/min)	50	50	50	50	50	50	50	
	≤ 440 Bhn or ≤ 47 HRc	8	RPM	2424	1212	808	606	404	303	242		
		(6-9)	Fr	0.010	0.020	0.030	0.040	0.059	0.079	0.099		
			Feed (mm/min)	24	24	24	24	24	24	24		

continued on next page

Straight Flute Reamer

Series 201M Metric		Hardness	Vc (m/min)	DC • mm							
				1	2	3	4	6	8	10	
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

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

Routers



 Routing

Please put "S" at the beginning of all page numbers below.

HIGH PERFORMANCE ROUTERS	SERIES	DESCRIPTION	PAGE
Carbon Composite	20-CCR	Multi-Flute Carbon Composite Fractional	338
	20M-CCR	Multi-Flute Carbon Composite Metric	338
	20-CCR-LHC	Multi-Flute Carbon Composite Left Hand Cut Fractional	339
	20M-CCR-LHC	Multi-Flute Carbon Composite Left Hand Cut Metric	339
Coarse Cut Carbon Composite	31-CCR	Multi-Flute Coarse Composite Fractional	342
	31M-CCR	Multi-Flute Coarse Composite Metric	342
Compression	25	Multi-Flute Compression Fractional	345
	25M	Multi-Flute Compression Metric	345
GENERAL PURPOSE ROUTERS	SERIES	DESCRIPTION	PAGE
Up Cut	21	2 Flute Up Cut Fractional	348
	21M	2 Flute Up Cut Metric	348
Down Cut	22	2 Flute Down Cut Fractional	349
	22M	2 Flute Down Cut Metric	349
Speed & Feed Recommendations listed after each series			

Ranurado

Please put "S" at the beginning of all page numbers below.

RANURADORES DE ALTO RENDIMIENTO	SERIE	DESCRIPCIÓN	PÁGINA
Compuesto de carbono	20-CCR	Filo múltiple, compuesto de carbono, fraccional	338
	20M-CCR	Filo múltiple, compuesto de carbono, métrico	338
	20-CCR-LHC	Filo múltiple, carbon composite corte hélice izquierda fraccional	339
	20M-CCR-LHC	Filo múltiple, carbo composite corte hélice izquierda métrico	339
Compuesto de carbono de corte grueso	31-CCR	Filo múltiple, compuesto grueso, fraccional	342
	31M-CCR	Filo múltiple, compuesto grueso, métrico	342
Compresión	25	Filo múltiple, compresión, fraccional	345
	25M	Filo múltiple, compresión, métrico	345

RANURADORES DE USO GENERAL	SERIE	DESCRIPCIÓN	PÁGINA
Corte ascendente	21	2 filos, corte ascendente, fraccional	348
	21M	2 filos, corte ascendente, métrico	348
Corte descendente	22	2 filos, corte descendente, fraccional	349
	22M	2 filos, corte descendente, métrico	349

Recomendaciones de velocidades y avances mostradas tras cada serie

Détourage

Please put "S" at the beginning of all page numbers below.

FRAISES A DETOURER HAUTE PERFORMANCE	SÈRIES	DESCRIPTION	PAGE
Composites carbone	20-CCR	Multi-dents pour composites carbone (fractionnel)	338
	20M-CCR	Multi-dents pour composites carbone (métrique)	338
	20-CCR-LHC	Multi-dents carbon composite coupe à gauche (fractionnel)	339
	20M-CCR-LHC	Multi-dents carbon composite coupe à gauche (métrique)	339
Pour composites carbone coupe grossière	31-CCR	Multi-dents pour composites grossiers (fractionnel)	342
	31M-CCR	Multi-dents pour composites grossiers (métrique)	342
Compression	25	Multi-dents de compression (fractionnel)	345
	25M	Multi-dents de compression (métrique)	345

FRAISES À DÉTOURER UNIVERSELLES	SÈRIES	DESCRIPTION	PAGE
Coupe ascendante	21	2 dents coupe ascendante (fractionnel)	348
	21M	2 dents coupe ascendante (métrique)	348
Coupe descendante	22	2 dents coupe descendante (fractionnel)	349
	22M	2 dents coupe descendante (métrique)	349

Recommandations de vitesse et avance indiquées après chaque série

Konturenfräsen

Please put "S" at the beginning of all page numbers below.

HOCHLEISTUNGS-KONTURENFRÄSER	SERIE	BESCHREIBUNG	SEITE
Kohlefaserverbundwerkstoff	20-CCR	Zölliger Konturenfräser für Kohlefaserverbundwerkstoff	338
	20M-CCR	Konturenfräser für Kohlefaserverbundwerkstoff	338
	20-CCR-LHC	Mehrschneider Carbon Composite Links geschnittene zöllig	339
	20M-CCR-LHC	Mehrschneider Carbon Composite Links geschnittene metrisch	339
Grobschnitt Kohlefaserverbundwerkstoff	31-CCR	Zölliger Konturenfräser für Verbundkunststoff	342
	31M-CCR	Konturenfräser für Verbundkunststoff	342
Gegenläufiger Drall	25	Zölliger Gegenläufiger Konturenfräser	345
	25M	Gegenläufiger Konturenfräser	345

STANDARD-KONTURENFRÄSER	SERIE	BESCHREIBUNG	SEITE
Rechtsspirale	21	Zölliger VHM-Fräser mit 2 Schneiden (ziehend)	348
	21M	VHM-Fräser mit 2 Schneiden (ziehend)	348
Linksspirale	22	Zölliger VHM-Fräser mit 2 Schneiden (drückend)	349
	22M	VHM-Fräser mit 2 Schneiden (drückend)	349

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

FRACTIONAL & METRIC

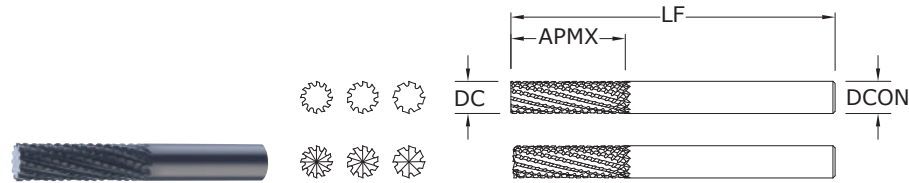
Carbon Composite



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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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)

DC = +.000/-.005
DCON = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

20M-CCR

METRIC SERIES

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

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

TOLERANCES (mm)

DC = +0,000/-0,130
DCON = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

FRACTIONAL & METRIC

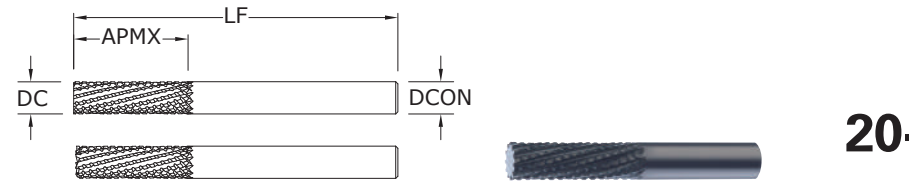
Carbon Composite



20-CCR-LHC

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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

TOLERANCES (inch)

DC = +.000/-.005
DCON = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

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 DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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)

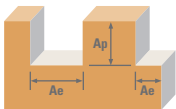
DC = +0,000/-0,130
DCON = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

FRACTIONAL

Carbon Composite

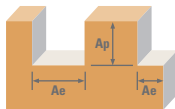
Series 20 Fractional			Vc (sfm)	DC • in						
	Ae x DC	Ap x DC			1/4	5/16	3/8	1/2		
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)		1	≤ 1	400 (320-480)	RPM	6112	4890	4075	3056
						Fr	0.0049	0.0094	0.0135	0.0180
						Feed (ipm)	30	46	55	55
			≤ 0.5	≤ 1.5	500 (400-600)	RPM	7640	6112	5093	3820
						Fr	0.0049	0.0094	0.0135	0.0180
						Feed (ipm)	38	58	69	69
			≤ 0.05	≤ 2	825 (660-990)	RPM	12606	10085	8404	6303
						Fr	0.0111	0.0215	0.0309	0.0413
						Feed (ipm)	140	217	260	260
	GFRP (FIBERGLASS)		1	≤ 1	320 (256-384)	RPM	4890	3912	3260	2445
						Fr	0.0049	0.0095	0.0135	0.0180
						Feed (ipm)	24	37	44	44
			≤ 0.5	≤ 1.5	400 (320-480)	RPM	6112	4890	4075	3056
						Fr	0.0049	0.0095	0.0135	0.0180
						Feed (ipm)	30	46	55	55
			≤ 0.05	≤ 2	660 (528-792)	RPM	10085	8068	6723	5042
						Fr	0.0110	0.0214	0.0311	0.0414
						Feed (ipm)	111	173	209	209
	CARBON, GRAPHITE		1	≤ 1	480 (384-576)	RPM	7334	5868	4890	3667
						Fr	0.0064	0.0124	0.0180	0.0240
						Feed (ipm)	47	73	88	88
			≤ 0.5	≤ 1.5	600 (480-720)	RPM	9168	7334	6112	4584
						Fr	0.0064	0.0124	0.0180	0.0240
						Feed (ipm)	59	91	110	110
		≤ 0.05	≤ 2	990 (792-1188)	RPM	15127	12102	10085	7564	
					Fr	0.0147	0.0287	0.0412	0.0549	
					Feed (ipm)	223	347	415	415	
PLASTICS		1	≤ 1	665 (640-690)	RPM	10161	8129	6774	5081	
					Fr	0.0077	0.0150	0.0217	0.0241	
					Feed (ipm)	78	122	147	147	
		≤ 0.5	≤ 1.5	1000 (800-1200)	RPM	15280	12224	10187	7640	
					Fr	0.0077	0.0150	0.0217	0.0241	
					Feed (ipm)	118	183	221	184	
		≤ 0.05	≤ 2	1650 (1320-1980)	RPM	25212	20170	16808	12606	
					Fr	0.0147	0.0287	0.0413	0.0551	
					Feed (ipm)	370	579	694	694	

HSM (high speed machining)
rpm = Vc x 3.82 / DC
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 SGS Tool Wizard® for complete technical information
(www.kyocera-sgstool.com)

METRIC

Carbon Composite

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

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

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

FRACTIONAL

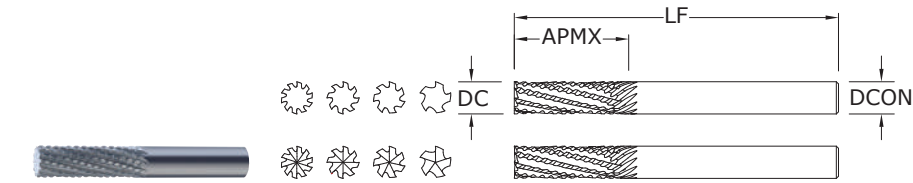
Coarse Cut Carbon Composite



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
- Excels at trimming and profiling difficult and abrasive fiber filled plastics



inch						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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)

DC = +.000/- .005

DCON = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

31M-CCR

METRIC 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
- Excels at trimming and profiling difficult and abrasive fiber filled plastics

mm						EDP NO.		
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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)

DC = +0,000/- 0,130

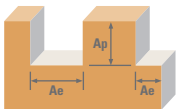
DCON = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

FRACTIONAL

Coarse Cut Carbon Composite



Series 31 Fractional	Ae x DC	Ap x DC	Vc (sfm)		DC • in			
					1/4	5/16	3/8	1/2
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	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
	Profile	≤ 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
GFRP (FIBERGLASS)	HSM	≤ 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
	Slot	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
CARBON, GRAPHITE	Profile	≤ 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
	HSM	≤ 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
PLASTICS	Slot	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
	Profile	≤ 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
N	HSM	≤ 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
	Slot	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
PLASTICS	Profile	≤ 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
	HSM	≤ 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 / DC
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 SGS Tool Wizard® for complete technical information
(www.kyocera-sgtool.com)

METRIC

Coarse Cut Carbon Composite

Series 31M

Metric

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

HSM (high speed machining)

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

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

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

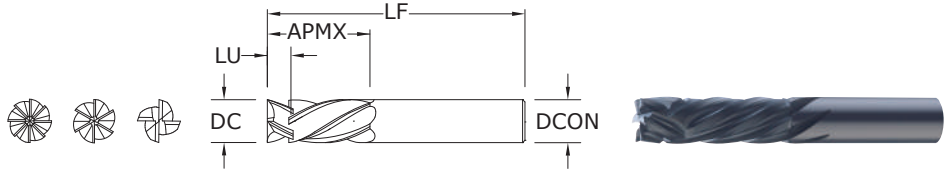
refer to the SGS Tool Wizard® for complete technical information

(www.kyocera-sgstool.com)



FRACTIONAL & METRIC

Compression



TOLERANCES (inch)

DC = +.000/-.003
DCON = h₆

PLASTICS/COMPOSITES

For patent information visit
www.ksptpatents.com

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	INTERSECT LENGTH LU	NO. OF FLUTES	EDP NO.	
						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

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

TOLERANCES (mm)

DC = +0,000/-0,080
DCON = h₆

PLASTICS/COMPOSITES

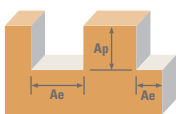
For patent information visit
www.ksptpatents.com

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

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

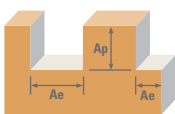
FRACTIONAL
Compression

Series 25 Fractional				Vc (sfm)	DC • in				
		Ae x DC	Ap x DC			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)
rpm = Vc x 3.82 / DC
ipm = Fz x number of flutes 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

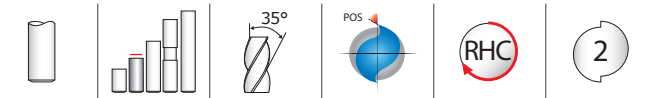
finish cuts typically required reduced feed and cutting depths
rates shown are for use without coolant; rates may be increased with coolant
dust collection is vital when machining dry
diamond coating will increase tool life in graphite and composite materials
refer to the SGS Tool Wizard® for complete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

METRIC
Compression

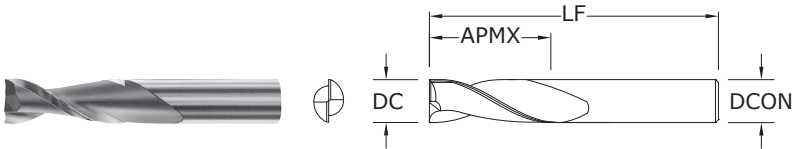
Series 25M Metric				Vc (m/min)	DC • mm				
		Ae x DC	Ap x DC		6	8	10	12	
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	 Profile	≤ 0.5	≤ 1.5	150	RPM	7951	5963	4771	3976
				(96-164)	Fz	0.040	0.065	0.075	0.100
				Feed (mm/min)	1272	1550	2147	3181	
	 HSM	≤ 0.05	≤ 2	250	RPM	13252	9939	7951	6626
				(200-300)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

HSM (high speed machining)
rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fz x number of flutes 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 SGS Tool Wizard® for complete technical information
(www.kyocera-sgstool.com)



21
FRACTIONAL SERIES



inch				EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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)

DC = +.000/-.003
DCON = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

21M
METRIC SERIES

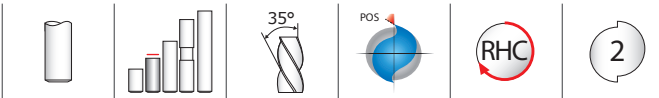
mm				EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED
3,0	13,0	50,0	6,0	90101
4,0	16,0	63,0	6,0	90107
5,0	19,0	63,0	6,0	90109
6,0	25,0	63,0	6,0	90113
8,0	25,0	63,0	8,0	90121
10,0	31,0	75,0	10,0	90129
12,0	31,0	75,0	12,0	90137

TOLERANCES (mm)

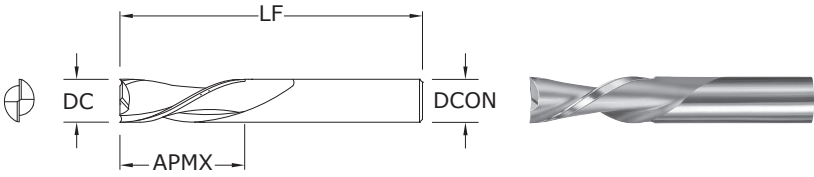
DC = +0,000/-0,080
DCON = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



22
FRACTIONAL SERIES



inch				EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

TOLERANCES (inch)

DC = +.000/-.003
DCON = h₆

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

22M
METRIC SERIES

mm				EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	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

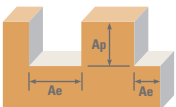
TOLERANCES (mm)

DC = +0,000/-0,080
DCON = h₆

PLASTICS/COMPOSITES

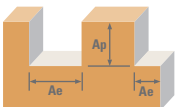
For patent information visit www.ksptpatents.com

FRACTIONAL
Up Cut
Down Cut

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

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

METRIC
Up Cut
Down Cut

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

rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fz x 2 x rpm

EDP Number Index

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
30000.....	195	30134.....	201	30343.....	177	30473.....	180	30561.....	189	30819.....	189	30925.....	191
30001.....	195	30135.....	196	30344.....	181	30474.....	180	30562.....	191	30820.....	189	30926.....	191
30002.....	195	30136.....	201	30345.....	177	30475.....	180	30563.....	189	30821.....	189	30927.....	191
30003.....	195	30137.....	196	30346.....	181	30476.....	180	30564.....	191	30822.....	189	30928.....	191
30004.....	195	30138.....	201	30347.....	177	30477.....	180	30565.....	189	30823.....	189	30929.....	191
30005.....	195	30139.....	196	30348.....	181	30478.....	180	30566.....	191	30824.....	189	30930.....	191
30006.....	195	30140.....	201	30349.....	177	30479.....	180	30567.....	189	30825.....	189	30931.....	191
30007.....	196	30141.....	196	30350.....	181	30480.....	180	30568.....	191	30826.....	189	30932.....	191
30008.....	196	30142.....	201	30351.....	177	30481.....	180	30569.....	189	30827.....	189	30933.....	191
30009.....	196	30143.....	196	30352.....	181	30482.....	180	30570.....	191	30828.....	189	30934.....	191
30010.....	196	30145.....	196	30353.....	177	30483.....	180	30571.....	189	30829.....	189	30935.....	191
30011.....	196	30147.....	196	30354.....	181	30484.....	180	30572.....	191	30830.....	189	30936.....	191
30012.....	196	30149.....	196	30355.....	177	30485.....	180	30573.....	189	30831.....	189	30937.....	191
30013.....	196	30151.....	196	30356.....	181	30486.....	180	30574.....	191	30832.....	189	30938.....	191
30014.....	196	30153.....	196	30357.....	177	30487.....	180	30575.....	189	30833.....	189	30939.....	191
30015.....	196	30155.....	196	30358.....	181	30488.....	180	30576.....	191	30834.....	189	30940.....	191
30016.....	196	30157.....	196	30359.....	177	30489.....	180	30577.....	189	30835.....	189	30941.....	191
30017.....	196	30159.....	196	30360.....	181	30490.....	180	30578.....	189	30836.....	189	30942.....	191
30018.....	196	30161.....	197	30361.....	177	30491.....	180	30589.....	189	30837.....	189	30943.....	191
30019.....	196	30163.....	197	30362.....	181	30492.....	181	30589.....	210	30838.....	189	30944.....	191
30020.....	196	30165.....	197	30363.....	177	30493.....	181	30590.....	191	30839.....	189	30944.....	211
30021.....	197	30167.....	197	30364.....	181	30494.....	181	30590.....	211	30840.....	189	31130.....	191
30022.....	197	30169.....	197	30365.....	178	30495.....	181	30591.....	181	30841.....	189	31131.....	191
30023.....	197	30171.....	197	30366.....	181	30496.....	181	30592.....	181	30842.....	189	31132.....	191
30024.....	197	30173.....	197	30367.....	178	30497.....	181	30593.....	181	30843.....	189	31133.....	191
30025.....	197	30175.....	198	30368.....	181	30498.....	181	30594.....	181	30844.....	189	31134.....	191
30026.....	197	30177.....	195	30369.....	178	30499.....	181	30595.....	181	30845.....	189	31135.....	191
30027.....	197	30178.....	201	30370.....	181	30500.....	181	30596.....	181	30846.....	189	31136.....	191
30028.....	198	30179.....	196	30371.....	178	30501.....	189	30597.....	181	30847.....	189	31137.....	191
30029.....	195	30180.....	197	30372.....	181	30502.....	191	30598.....	181	30848.....	189	31138.....	191
30030.....	198	30181.....	197	30373.....	178	30503.....	189	30599.....	180	30849.....	189	31139.....	191
30030.....	210	30182.....	197	30374.....	181	30504.....	191	30600.....	181	30850.....	189	31140.....	191
30031.....	201	30183.....	198	30375.....	178	30505.....	189	30600.....	211	30850.....	210	31141.....	191
30032.....	201	30189.....	198	30376.....	181	30506.....	191	30602.....	191	30851.....	191	31142.....	191
30033.....	201	30189.....	210	30377.....	176	30507.....	189	30604.....	191	30852.....	191	31143.....	191
30034.....	201	30190.....	211	30378.....	180	30508.....	191	30606.....	191	30853.....	191	31144.....	191
30035.....	201	30191.....	195	30379.....	196	30509.....	189	30608.....	191	30854.....	191	31145.....	191
30036.....	201	30192.....	195	30380.....	197	30510.....	191	30610.....	191	30855.....	191	31146.....	191
30037.....	201	30193.....	195	30381.....	197	30511.....	189	30612.....	191	30856.....	191	31147.....	191
30038.....	201	30194.....	195	30382.....	197	30512.....	191	30771.....	189	30857.....	191	31148.....	191
30039.....	201	30195.....	195	30383.....	198	30513.....	189	30772.....	189	30858.....	191	31149.....	191
30040.....	201	30196.....	195	30389.....	178	30514.....	191	30773.....	189	30859.....	191	31150.....	191
30041.....	201	30197.....	195	30389.....	210	30515.....	189	30774.....	189	30860.....	191	31151.....	191
30042.....	201	30198.....	195	30390.....	181	30516.....	191	30775.....	189	30861.....	191	31152.....	191
30043.....	201	30199.....	195	30390.....	211	30517.....	189	30776.....	189	30862.....	191	31153.....	191
30044.....	201	30300.....	195	30397.....	176	30518.....	191	30777.....	189	30863.....	191	31154.....	191
30045.....	201	30301.....	176	30398.....	176	30519.....	189	30778.....	189	30864.....	191	31155.....	191
30046.....	201	30302.....	180	30399.....	176	30520.....	191	30779.....	189	30865.....	191	31156.....	191
30047.....	201	30303.....	176	30400.....	176	30521.....	189	30780.....	189	30866.....	191	31157.....	191
30048.....	201	30304.....	180	30435.....	176	30522.....	191	30781.....	189	30867.....	191	31158.....	191
30049.....	201	30305.....	176	30436.....	176	30523.....	189	30782.....	189	30868.....	191	31159.....	191
30050.....	201	30306.....	180	30437.....	176	30524.....	191	30783.....	189	30869.....	191	31160.....	191
30051.....	201	30307.....	176	30438.....	176	30525.....	189	30784.....	189	30870.....	191	31161.....	191
30069.....	201	30308.....	180	30439.....	176	30526.....	191	30785.....	189	30871.....	191	31162.....	191
30070.....	211	30309.....	176	30440.....	176	30527.....	189	30786.....	189	30872.....	191	31163.....	191
30101.....	195	30310.....	180	30441.....	176	30528.....	191	30787.....	189	30873.....	191	31164.....	191
30102.....	201	30311.....	176	30442.....	176	30529.....	189	30788.....	189	30874.....	191	31165.....	191
30103.....	195	30312.....	180	30443.....	176	30530.....	191	30789.....	189	30875.....	191	31166.....	191
30104.....	201	30313.....	176	30444.....	176	30531.....	189	30790.....	189	30876.....	191	31167.....	191
30105.....	195	30314.....	180	30445.....	176	30532.....	191	30791.....	189	30877.....	191	31168.....	191
30106.....	201	30315.....	176	30446.....	176	30533.....	189	30792.....	189	30878.....	191	31169.....	191
30107.....	195	30316.....	180	30447.....	176	30534.....	191	30793.....	189	30879.....	191	31169.....	211
30108.....	201	30317.....	176	30448.....	176	30535.....	189	30794.....	189	30880.....	191	31170.....	203
30109.....	195	30318.....	180	30449.....	177	30536.....	191	30795.....	189	30881.....	191	31171.....	203
30110.....	201	30319.....	176	30450.....	177	30537.....	189	30796.....	189	30882.....	191	31172.....	203
30111.....	195	30320.....	180	30451.....	177	30538.....	191	30797.....	189	30883.....	191	31173.....	203
30112.....	201	30321.....	176	30452.....	177	30539.....	189	30798.....	189	30884.....	191	31174.....	203
30113.....	195	30322.....	180	30453.....	177	30540.....	191	30799.....	189	30885.....	191	31175.....	203
30114.....	201	30323.....	176	30454.....	177	30541.....	189	30800.....	189	30886.....	191	31176.....	203
30115.....	195	30324.....	180	30455.....	177	30542.....	191	30801.....	189	30887.....	191	31177.....	203
30116.....	201	30325.....	176	30456.....	177	30543.....	189	30802.....	189	30888.....	191	31178.....	203
30117.....	195	30326.....	180	30457.....	177	30544.....	191	30803.....	189	30889.....	191	31179.....	203
30118.....	201	30327.....	176	30458.....	177	30545.....	189	30804.....	189	30900.....	191	31180.....	203
30119.....	195	30328.....	180	30459.....	177	30546.....	191	30805.....	189	30900.....	211	31181.....	203
30120.....	201	30329.....	176	30460.....	177	30547.....	189	30806.....	189	30902.....	191	31182.....	203
30121.....	195	30330.....	180	30461.....	177	30548.....	191	30807.....	189	30904.....	191	31183.....	203
30122.....	201	30331.....	176	30462.....	177	30549.....	189	30808.....	189	30906.....	191	31184.....	203
30123.....	195	30332.....	180	30463.....	178	30550.....	191	30809.....	189	30908.....	191	31185.....	203
30124.....	201	30333.....	176	30464.....	178	30551.....	189	30810.....	189	30910.....	191	31186.....	203
30125.....	195	30334.....	180	30465.....	178	30552.....	191	30810.....	210	30912.....	191	31187.....	203
30126.....	201	30335.....	176	30466.....	178	30553.....	189	30811.....	189	30914.....	191	31188.....	203
30127.....	195	30336.....	180	30467.....	178	30554.....	191	30812.....	189	30916.....	191	31189.....	203
30128.....	201	30337.....	177	30468.....	178	30555.....	189	30813.....	189	30918.....	191	31190.....	203
30129.....	195	30338.....	180	30469.....	176	30556.....	191	30814.....	189	30920.....	191	31190.....	210
30130.....	201	30339.....	177	30470.....	178	30557.....	189	30815.....	189	30921.....	191	31217.....	204
30131.....	195	30340.....	180	30470.....	210	30558.....	189	30816.....	189	30922.....	191	31217.....	211
30132.....	201	30341.....	177	30471.....	180	30559.....	189	30817.....	189	30923.....	191	31218.....	204
30133.....	196	30342.....	180	30472.....	180	30560.....	191	30818.....	189	30924.....	191	31219.....	204

EDP Number Index

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
31220.	204	31346.	184	31463.	203	31563.	183	31752.	185	31871.	195	31985.	181
31221.	204	31347.	184	31464.	204	31564.	184	31753.	185	31872.	196	31986.	181
31222.	204	31348.	184	31465.	203	31565.	183	31754.	185	31873.	196	31987.	181
31223.	204	31349.	184	31466.	204	31566.	184	31755.	185	31874.	196	31988.	180
31224.	204	31350.	184	31467.	203	31567.	183	31756.	185	31875.	196	31989.	180
31225.	204	31351.	184	31468.	204	31568.	184	31757.	185	31876.	197	31990.	180
31226.	204	31352.	184	31469.	203	31569.	183	31758.	185	31877.	197	31991.	180
31227.	204	31353.	184	31470.	204	31570.	184	31759.	185	31878.	197	31992.	181
31228.	204	31354.	184	31471.	203	31571.	183	31760.	185	31879.	198	31993.	181
31229.	204	31355.	184	31472.	204	31572.	184	31761.	185	31880.	195	31994.	181
31230.	204	31356.	184	31473.	203	31573.	183	31762.	185	31881.	195	31995.	181
31231.	204	31357.	184	31474.	204	31574.	184	31763.	196	31882.	196	31996.	181
31232.	204	31357.	211	31475.	203	31575.	183	31764.	196	31883.	196	31997.	181
31233.	204	31358.	185	31476.	204	31576.	184	31765.	196	31884.	196	32033.	163
31234.	204	31359.	185	31477.	203	31577.	183	31766.	197	31885.	196	32034.	163
31235.	204	31360.	185	31478.	204	31578.	184	31767.	197	31886.	197	32035.	163
31236.	204	31361.	185	31479.	203	31579.	183	31768.	197	31887.	197	32036.	163
31237.	204	31362.	185	31480.	204	31580.	184	31769.	198	31888.	197	32037.	163
31238.	205	31363.	185	31481.	203	31581.	183	31770.	201	31889.	198	32038.	163
31239.	205	31364.	185	31481.	210	31581.	210	31771.	201	31890.	180	32039.	163
31240.	205	31365.	185	31482.	204	31582.	184	31772.	201	31891.	180	32040.	163
31241.	205	31366.	185	31482.	211	31582.	211	31773.	201	31892.	180	32041.	163
31242.	205	31367.	185	31489.	203	31589.	183	31780.	201	31893.	180	32042.	163
31243.	205	31368.	185	31489.	210	31589.	210	31781.	201	31894.	181	32043.	163
31244.	205	31369.	185	31490.	204	31590.	184	31782.	201	31895.	181	32044.	163
31245.	205	31370.	185	31490.	211	31590.	211	31783.	201	31896.	181	32045.	163
31246.	205	31401.	203	31501.	183	31601.	205	31790.	201	31897.	181	32046.	163
31247.	205	31402.	204	31502.	184	31603.	205	31791.	201	31898.	181	32047.	163
31248.	205	31403.	203	31503.	183	31605.	205	31792.	201	31899.	181	32048.	163
31249.	205	31404.	204	31504.	184	31607.	205	31793.	201	31900.	201	32049.	163
31250.	205	31405.	203	31505.	183	31609.	205	31800.	176	31902.	201	32053.	163
31251.	205	31406.	204	31506.	184	31611.	205	31802.	176	31904.	201	32054.	163
31252.	205	31407.	203	31507.	183	31613.	205	31804.	177	31906.	201	32055.	163
31253.	205	31408.	204	31508.	184	31615.	205	31806.	177	31918.	201	32056.	163
31254.	205	31409.	203	31509.	183	31617.	205	31810.	176	31919.	201	32057.	163
31255.	205	31410.	204	31510.	184	31619.	205	31812.	176	31920.	201	32058.	163
31256.	205	31411.	203	31511.	183	31621.	205	31814.	177	31921.	201	32059.	163
31257.	205	31412.	204	31512.	184	31623.	205	31816.	177	31928.	201	32060.	163
31258.	205	31413.	203	31513.	183	31625.	205	31817.	178	31929.	201	32061.	163
31259.	205	31414.	204	31514.	184	31650.	205	31819.	178	31930.	201	32062.	163
31260.	205	31415.	203	31515.	183	31651.	205	31820.	176	31931.	201	32063.	163
31261.	205	31416.	204	31516.	184	31652.	205	31821.	177	31938.	176	32064.	163
31262.	205	31417.	203	31517.	183	31653.	205	31822.	177	31939.	176	32065.	163
31263.	205	31418.	204	31518.	184	31654.	205	31823.	178	31940.	176	32066.	163
31303.	185	31419.	203	31519.	183	31655.	205	31824.	177	31941.	177	32067.	163
31304.	185	31420.	204	31520.	184	31656.	205	31825.	176	31942.	177	32068.	163
31305.	185	31421.	203	31521.	183	31657.	205	31826.	177	31943.	177	32069.	163
31306.	185	31422.	204	31522.	184	31658.	205	31827.	177	31944.	178	32200.	188
31307.	185	31423.	203	31523.	183	31659.	205	31830.	180	31945.	178	32201.	188
31308.	185	31424.	204	31524.	184	31660.	205	31831.	180	31946.	178	32202.	188
31309.	185	31425.	203	31525.	183	31661.	205	31832.	180	31947.	178	32203.	188
31310.	185	31426.	204	31526.	184	31662.	205	31833.	180	31948.	176	32204.	188
31311.	185	31427.	203	31527.	183	31701.	185	31834.	181	31949.	176	32205.	188
31312.	185	31428.	204	31528.	184	31703.	185	31835.	181	31950.	176	32206.	188
31313.	185	31429.	203	31529.	183	31705.	185	31836.	181	31951.	177	32207.	188
31314.	185	31430.	204	31530.	184	31707.	185	31837.	181	31952.	177	32210.	188
31315.	185	31431.	203	31531.	183	31709.	185	31838.	181	31953.	177	32211.	188
31316.	183	31432.	204	31532.	184	31711.	185	31839.	181	31954.	178	32212.	188
31317.	183	31433.	203	31533.	183	31713.	185	31840.	180	31955.	178	32213.	188
31318.	183	31434.	204	31534.	184	31715.	185	31841.	180	31956.	178	32214.	188
31319.	183	31435.	203	31535.	183	31717.	185	31842.	180	31957.	178	32215.	188
31320.	183	31436.	204	31536.	184	31719.	185	31843.	180	31958.	176	32216.	188
31321.	183	31437.	203	31537.	183	31721.	185	31844.	181	31959.	176	32217.	188
31322.	183	31438.	204	31538.	184	31723.	185	31845.	181	31960.	176	32260.	187
31323.	183	31439.	203	31539.	183	31725.	185	31846.	181	31961.	177	32261.	187
31324.	183	31440.	204	31540.	184	31727.	195	31847.	181	31962.	177	32262.	187
31325.	183	31441.	203	31541.	183	31728.	195	31848.	181	31963.	177	32263.	187
31326.	183	31442.	204	31542.	184	31729.	196	31849.	181	31964.	178	32264.	187
31327.	183	31443.	203	31543.	183	31730.	196	31850.	176	31965.	178	32265.	187
31328.	183	31444.	204	31544.	184	31731.	196	31851.	176	31966.	178	32266.	187
31329.	183	31445.	203	31545.	183	31732.	196	31852.	176	31967.	178	32267.	187
31330.	183	31446.	204	31546.	184	31733.	197	31853.	177	31968.	180	32270.	187
31331.	183	31447.	203	31547.	183	31735.	197	31854.	177	31969.	180	32271.	187
31332.	183	31448.	204	31548.	184	31736.	198	31855.	177	31970.	180	32272.	187
31333.	183	31449.	203	31549.	183	31737.	195	31856.	177	31971.	180	32273.	187
31334.	183	31450.	204	31550.	184	31738.	195	31857.	178	31972.	181	32274.	187
31335.	183	31451.	203	31551.	183	31739.	196	31859.	178	31973.	181	32275.	187
31336.	183	31452.	204	31552.	184	31740.	196	31860.	195	31974.	181	32276.	187
31337.	184	31453.	203	31553.	183	31741.	196	31861.	195	31975.	181	32277.	187
31338.	184	31454.	204	31554.	184	31742.	196	31862.	196	31976.	181	32280.	187
31339.	184	31455.	203	31555.	183	31743.	197	31863.	196	31977.	181	32281.	187
31340.	184	31456.	204	31556.	184	31745.	197	31864.	196	31978.	180	32282.	187
31341.	184	31457.	203	31557.	183	31746.	198	31865.	196	31979.	180	32283.	187
31342.	184	31458.	204	31558.	184	31747.	195	31866.	197	31980.	180	32284.	187
31343.	184	31459.	203	31559.	183	31748.	195	31867.	197	31981.	180	32285.	187
31344.	184	31460.	204	31560.	184	31749.	196	31868.	197	31982.	181	32286.	187
31345.	184	31461.	203	31561.	183	31750.	185	31869.	198	31983.	181	32287.	187
31346.	184	31462.	204	31562.	184	31751.	185	31870.	195	31984.	181	32290.	187

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

EDP Number Index

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
35704.....	138	36126.....	207	36385.....	40	36570.....	57	36786.....	61	37020.....	29	37108.....	31
35705.....	138	36128.....	207	36386.....	40	36571.....	57	36787.....	61	37021.....	29	37109.....	31
35706.....	138	36129.....	207	36387.....	40	36572.....	57	36788.....	61	37022.....	29	37110.....	31
35707.....	138	36130.....	207	36388.....	40	36573.....	57	36789.....	61	37023.....	29	37111.....	31
35708.....	138	36140.....	110	36389.....	40	36574.....	57	36790.....	61	37024.....	30	37112.....	31
35709.....	138	36141.....	110	36390.....	40	36575.....	57	36791.....	61	37025.....	30	37113.....	31
35710.....	138	36142.....	110	36391.....	40	36576.....	57	36792.....	61	37026.....	30	37114.....	31
35711.....	138	36143.....	110	36392.....	40	36577.....	57	36793.....	61	37027.....	30	37115.....	31
35712.....	138	36206.....	208	36393.....	40	36578.....	57	36804.....	39	37028.....	30	37116.....	32
35713.....	138	36207.....	208	36404.....	49	36590.....	50	36805.....	39	37029.....	30	37117.....	32
35714.....	138	36208.....	208	36406.....	49	36591.....	50	36806.....	40	37030.....	30	37118.....	32
35715.....	138	36209.....	208	36408.....	49	36592.....	50	36807.....	40	37031.....	30	37119.....	32
35716.....	138	36210.....	208	36416.....	49	36596.....	49	36808.....	40	37032.....	30	37120.....	32
35717.....	138	36211.....	208	36418.....	49	36597.....	49	36809.....	40	37033.....	30	37121.....	32
35718.....	138	36212.....	208	36420.....	49	36598.....	49	36810.....	39	37034.....	30	37122.....	32
35719.....	138	36213.....	208	36422.....	49	36599.....	39	36811.....	39	37035.....	30	37123.....	32
35720.....	138	36214.....	208	36424.....	49	36600.....	39	36812.....	39	37036.....	30	37124.....	32
35721.....	138	36216.....	208	36426.....	49	36601.....	39	36813.....	39	37037.....	30	37125.....	32
35722.....	138	36217.....	208	36428.....	49	36602.....	40	36814.....	40	37038.....	30	37126.....	32
35723.....	139	36218.....	208	36430.....	49	36603.....	40	36815.....	40	37039.....	30	37127.....	32
35724.....	139	36220.....	208	36432.....	49	36604.....	40	36816.....	40	37040.....	30	37128.....	32
35725.....	139	36221.....	208	36436.....	49	36605.....	40	36817.....	40	37041.....	30	37129.....	32
35726.....	139	36222.....	208	36440.....	49	36610.....	40	36818.....	40	37042.....	30	37130.....	32
35727.....	139	36224.....	208	36442.....	49	36611.....	40	36819.....	40	37043.....	30	37131.....	32
35728.....	139	36225.....	208	36444.....	49	36612.....	40	36820.....	40	37044.....	30	37132.....	32
35729.....	139	36226.....	208	36447.....	41	36613.....	40	36821.....	40	37045.....	30	37133.....	32
35730.....	139	36228.....	208	36448.....	41	36614.....	40	36822.....	40	37046.....	30	37134.....	32
35731.....	139	36229.....	208	36449.....	41	36615.....	40	36823.....	40	37047.....	30	37135.....	32
35732.....	139	36230.....	208	36450.....	41	36616.....	57	36824.....	40	37048.....	30	37136.....	32
35733.....	139	36235.....	140	36452.....	41	36617.....	57	36825.....	40	37049.....	30	37137.....	32
35734.....	139	36236.....	140	36453.....	41	36618.....	57	36826.....	49	37050.....	30	37138.....	32
35735.....	139	36237.....	143	36454.....	41	36620.....	90	36827.....	49	37051.....	30	37139.....	32
35736.....	139	36238.....	143	36456.....	41	36621.....	90	36828.....	49	37052.....	30	37140.....	32
35737.....	139	36239.....	140	36457.....	41	36622.....	90	36829.....	49	37053.....	30	37141.....	32
35738.....	139	36240.....	140	36458.....	41	36623.....	90	36830.....	49	37054.....	30	37142.....	32
35739.....	139	36241.....	143	36460.....	41	36624.....	90	36846.....	50	37055.....	30	37143.....	32
35740.....	139	36242.....	143	36462.....	41	36625.....	90	36847.....	50	37056.....	30	37144.....	32
35741.....	139	36243.....	140	36463.....	41	36626.....	90	36848.....	50	37057.....	30	37145.....	32
35742.....	139	36244.....	140	36464.....	41	36627.....	90	36849.....	50	37058.....	30	37146.....	32
35743.....	139	36245.....	143	36466.....	41	36628.....	90	36850.....	50	37059.....	30	37147.....	32
35744.....	139	36246.....	143	36468.....	41	36629.....	90	36851.....	39	37060.....	30	37148.....	32
35787.....	140	36247.....	143	36469.....	41	36630.....	90	36852.....	39	37061.....	30	37149.....	32
35788.....	140	36248.....	143	36470.....	41	36631.....	90	36853.....	39	37062.....	30	37150.....	32
35789.....	143	36249.....	143	36472.....	41	36632.....	90	36854.....	39	37063.....	30	37151.....	32
35790.....	143	36250.....	143	36474.....	41	36633.....	90	36855.....	39	37064.....	30	37152.....	32
35791.....	140	36251.....	141	36475.....	41	36634.....	90	36856.....	39	37065.....	30	37153.....	32
35792.....	140	36252.....	141	36480.....	42	36635.....	90	36857.....	39	37066.....	30	37154.....	32
35793.....	143	36253.....	143	36482.....	42	36636.....	90	36858.....	39	37067.....	30	37155.....	32
35794.....	143	36254.....	143	36486.....	42	36637.....	90	36859.....	39	37068.....	30	37156.....	32
35795.....	140	36257.....	142	36500.....	42	36638.....	90	36860.....	40	37069.....	30	37157.....	32
35796.....	140	36258.....	142	36502.....	42	36639.....	90	37070.....	30	37070.....	30	37160.....	29
35797.....	143	36259.....	142	36504.....	42	36640.....	90	36862.....	40	37071.....	30	37161.....	29
35798.....	143	36260.....	142	36505.....	49	36641.....	90	36863.....	40	37072.....	30	37162.....	29
35799.....	143	36261.....	143	36506.....	49	36701.....	39	36864.....	39	37073.....	30	37163.....	29
35800.....	143	36262.....	143	36507.....	49	36702.....	39	36865.....	39	37074.....	30	37164.....	29
35801.....	143	36263.....	143	36508.....	49	36704.....	39	36866.....	39	37075.....	31	37165.....	29
35802.....	143	36264.....	143	36509.....	49	36706.....	39	36867.....	40	37076.....	31	37166.....	29
35803.....	141	36265.....	143	36511.....	49	36707.....	39	36868.....	40	37077.....	31	37167.....	29
35804.....	141	36266.....	143	36513.....	49	36709.....	40	36869.....	40	37078.....	31	37174.....	29
35805.....	143	36344.....	50	36515.....	49	36710.....	40	36870.....	40	37079.....	31	37180.....	28
35806.....	143	36345.....	50	36517.....	49	36711.....	40	36871.....	50	37080.....	31	37181.....	28
35809.....	142	36346.....	50	36519.....	49	36712.....	40	36872.....	39	37081.....	30	37182.....	28
35810.....	142	36347.....	50	36520.....	49	36713.....	40	36873.....	39	37082.....	31	37183.....	28
35811.....	142	36348.....	50	36530.....	49	36714.....	40	36874.....	39	37083.....	31	37184.....	28
35812.....	142	36349.....	50	36531.....	49	36715.....	40	36875.....	39	37084.....	31	37185.....	28
35813.....	143	36350.....	50	36532.....	49	36716.....	40	36876.....	39	37085.....	31	37186.....	28
35814.....	143	36351.....	50	36533.....	49	36717.....	40	36877.....	39	37086.....	31	37187.....	29
35815.....	143	36352.....	50	36534.....	49	36718.....	40	36878.....	39	37087.....	31	37188.....	29
35816.....	143	36353.....	50	36535.....	49	36719.....	40	37000.....	28	37088.....	31	37189.....	29
35817.....	143	36354.....	50	36536.....	49	36722.....	39	37190.....	28	37089.....	31	37190.....	30
35818.....	143	36355.....	50	36537.....	49	36723.....	39	37002.....	28	37090.....	31	37191.....	30
36106.....	207	36356.....	50	36538.....	49	36724.....	39	37003.....	28	37091.....	31	37192.....	30
36107.....	207	36357.....	50	36539.....	50	36725.....	39	37004.....	28	37092.....	31	37193.....	30
36108.....	207	36358.....	50	36540.....	50	36727.....	39	37005.....	28	37093.....	31	37194.....	30
36109.....	207	36359.....	50	36541.....	50	36729.....	39	37006.....	28	37094.....	31	37195.....	30
36110.....	207	36361.....	50	36542.....	50	36731.....	40	37007.....	28	37095.....	31	37196.....	30
36111.....	207	36370.....	39	36543.....	50	36733.....	40	37008.....	28	37096.....	31	37197.....	30
36112.....	207	36371.....	39	36544.....	50	36736.....	39	37009.....	28	37097.....	31	37198.....	30
36113.....	207	36372.....	39	36545.....	50	36738.....	39	37010.....	28	37098.....	31	37199.....	31
36114.....	207	36373.....	39	36546.....	50	36740.....	39	37011.....	28	37099.....	31	37200.....	31
36116.....	207	36374.....	39	36547.....	50	36742.....	40	37012.....	28	37100.....	31	37201.....	31
36117.....	207	36375.....	39	36555.....	57	36744.....	40	37013.....	28	37101.....	31	37202.....	30
36118.....	207	36376.....	39	36556.....	57	36780.....	61	37014.....	29	37102.....	31	37203.....	31
36120.....	207	36378.....	39	36557.....	57	36781.....	61	37015.....	29	37103.....	31	37204.....	31
36121.....	207	36380.....	39	36558.....	57	36782.....	61	37016.....	29	37104.....	31	37205.....	31
36122.....	207	36381.....	39	36559.....	57	36783.....	61	37017.....	29	37105.....	31	37206.....	31
36124.....	207	36383.....	40	36560.....	57	36784.....	61	37018.....	29	37106.....	31	37207.....	31
36125.....	207	36384.....	40	36561.....	57	36785.....	61	37019.....	29	37107.....	31	37208.....	31

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
37209.....	31	37334.....	30	38091.....	197	38179.....	197	38299.....	178	38387.....	178	38573.....	32
37210.....	31	37335.....	30	38092.....	197	38180.....	197	38300.....	178	38388.....	178	38574.....	32
37211.....	31	37337.....	30	38093.....	197	38181.....	197	38301.....	178	38389.....	178	38575.....	32
37212.....	31	37338.....	30	38094.....	197	38182.....	197	38302.....	178	38390.....	178	38576.....	32
37213.....	31	37339.....	30	38095.....	197	38183.....	197	38303.....	178	38391.....	178	38577.....	32
37214.....	32	37340.....	30	38096.....	197	38184.....	197	38304.....	178	38392.....	178	38578.....	30
37215.....	32	37341.....	30	38097.....	197	38185.....	197	38305.....	178	38393.....	178	38579.....	30
37216.....	32	37342.....	30	38098.....	197	38186.....	197	38306.....	178	38394.....	178	38580.....	30
37217.....	32	37343.....	30	38099.....	197	38187.....	197	38307.....	178	38395.....	178	38581.....	30
37218.....	32	37344.....	30	38100.....	197	38188.....	197	38308.....	178	38396.....	178	38582.....	30
37219.....	32	37345.....	30	38101.....	198	38189.....	197	38309.....	178	38397.....	178	38583.....	30
37220.....	32	37346.....	30	38102.....	198	38190.....	197	38310.....	178	38398.....	178	38584.....	30
37221.....	32	37348.....	30	38103.....	198	38191.....	197	38311.....	178	38490.....	42	38585.....	30
37222.....	31	37349.....	30	38104.....	198	38192.....	198	38312.....	178	38492.....	42	38586.....	30
37223.....	31	37350.....	30	38105.....	198	38193.....	198	38313.....	178	38496.....	42	38587.....	30
37224.....	31	37351.....	30	38106.....	198	38194.....	198	38314.....	178	38500.....	28	38588.....	30
37225.....	31	37352.....	30	38107.....	198	38195.....	198	38315.....	176	38501.....	28	38589.....	30
37226.....	31	37353.....	30	38108.....	198	38196.....	198	38316.....	176	38502.....	28	38590.....	30
37227.....	31	37354.....	30	38109.....	198	38197.....	198	38317.....	176	38503.....	29	38591.....	30
37228.....	31	37355.....	30	38110.....	198	38198.....	198	38318.....	176	38504.....	29	38592.....	30
37229.....	31	37356.....	30	38111.....	198	38201.....	176	38319.....	176	38505.....	29	38593.....	30
37230.....	31	37357.....	30	38112.....	198	38202.....	176	38320.....	176	38506.....	30	38594.....	30
37231.....	31	37359.....	30	38113.....	198	38203.....	176	38321.....	176	38507.....	30	38595.....	30
37232.....	31	37360.....	30	38114.....	198	38204.....	176	38322.....	176	38508.....	30	38596.....	31
37233.....	31	37361.....	30	38115.....	195	38209.....	176	38323.....	176	38509.....	31	38597.....	31
37234.....	31	37362.....	30	38116.....	195	38210.....	176	38324.....	177	38510.....	32	38598.....	31
37235.....	31	37390.....	117	38117.....	195	38211.....	176	38325.....	177	38511.....	32	38599.....	31
37236.....	32	37391.....	117	38118.....	195	38212.....	176	38326.....	177	38512.....	30	38600.....	31
37237.....	32	38001.....	195	38119.....	195	38213.....	176	38327.....	177	38513.....	30	38601.....	31
37260.....	30	38002.....	195	38120.....	195	38214.....	176	38328.....	177	38514.....	30	38602.....	31
37261.....	30	38003.....	195	38121.....	195	38219.....	176	38329.....	177	38515.....	31	38603.....	31
37262.....	30	38004.....	195	38122.....	195	38220.....	176	38330.....	177	38516.....	32	38604.....	31
37263.....	30	38009.....	195	38123.....	195	38221.....	176	38331.....	177	38517.....	32	38605.....	31
37264.....	30	38010.....	195	38124.....	196	38222.....	176	38332.....	177	38518.....	30	38606.....	31
37265.....	30	38011.....	195	38125.....	196	38223.....	176	38333.....	177	38519.....	30	38607.....	31
37266.....	30	38012.....	195	38126.....	196	38224.....	176	38334.....	177	38520.....	31	38608.....	32
37267.....	30	38013.....	195	38127.....	196	38225.....	176	38335.....	177	38521.....	31	38609.....	32
37268.....	31	38014.....	195	38128.....	196	38226.....	176	38336.....	177	38522.....	32	38610.....	32
37269.....	31	38019.....	195	38129.....	196	38231.....	177	38337.....	178	38523.....	32	38611.....	32
37270.....	31	38020.....	195	38130.....	196	38232.....	177	38338.....	178	38524.....	32	38612.....	32
37271.....	31	38021.....	195	38131.....	196	38233.....	177	38339.....	178	38525.....	28	38613.....	32
37272.....	31	38022.....	195	38132.....	197	38234.....	177	38340.....	178	38526.....	28	38614.....	32
37273.....	31	38023.....	195	38133.....	197	38235.....	177	38341.....	178	38527.....	28	38615.....	32
37274.....	31	38024.....	195	38134.....	197	38236.....	177	38342.....	178	38528.....	28	38616.....	32
37275.....	31	38025.....	195	38135.....	197	38237.....	177	38343.....	178	38529.....	29	38617.....	32
37276.....	31	38026.....	195	38136.....	197	38238.....	177	38344.....	178	38530.....	29	38618.....	32
37277.....	31	38031.....	196	38137.....	197	38245.....	177	38345.....	178	38531.....	29	38619.....	32
37278.....	31	38032.....	196	38138.....	197	38246.....	177	38346.....	178	38532.....	29	38620.....	32
37279.....	31	38033.....	196	38139.....	197	38247.....	177	38347.....	178	38533.....	30	38621.....	32
37280.....	31	38034.....	196	38140.....	197	38248.....	177	38348.....	178	38534.....	30	38622.....	32
37281.....	31	38035.....	196	38141.....	197	38249.....	177	38349.....	178	38535.....	30	38623.....	30
37282.....	31	38036.....	196	38142.....	197	38250.....	177	38350.....	178	38536.....	30	38624.....	30
37283.....	31	38037.....	196	38143.....	197	38251.....	177	38351.....	178	38537.....	30	38625.....	30
37284.....	31	38038.....	196	38144.....	197	38252.....	177	38352.....	178	38538.....	30	38626.....	30
37285.....	31	38045.....	196	38145.....	197	38259.....	177	38353.....	178	38539.....	30	38627.....	30
37286.....	31	38046.....	196	38146.....	197	38260.....	177	38354.....	178	38540.....	30	38628.....	30
37287.....	31	38047.....	196	38147.....	197	38261.....	177	38355.....	178	38541.....	30	38629.....	31
37288.....	32	38048.....	196	38148.....	197	38262.....	177	38356.....	178	38542.....	30	38630.....	31
37289.....	32	38049.....	196	38149.....	197	38263.....	177	38357.....	176	38543.....	30	38631.....	31
37290.....	32	38050.....	196	38150.....	198	38264.....	177	38358.....	176	38544.....	30	38632.....	31
37291.....	32	38051.....	196	38151.....	198	38265.....	177	38359.....	176	38545.....	30	38633.....	31
37292.....	32	38052.....	196	38152.....	198	38266.....	177	38360.....	176	38546.....	30	38634.....	31
37293.....	32	38059.....	197	38153.....	198	38267.....	177	38361.....	176	38547.....	30	38635.....	31
37294.....	32	38060.....	197	38154.....	198	38268.....	177	38362.....	176	38548.....	30	38636.....	31
37295.....	32	38061.....	197	38155.....	198	38273.....	178	38363.....	176	38549.....	30	38637.....	31
37296.....	32	38062.....	197	38156.....	198	38274.....	178	38364.....	176	38550.....	30	38638.....	31
37297.....	32	38063.....	197	38157.....	195	38275.....	178	38365.....	176	38551.....	31	38639.....	31
37298.....	32	38064.....	197	38158.....	195	38276.....	178	38366.....	177	38552.....	31	38640.....	31
37299.....	32	38065.....	197	38159.....	195	38277.....	178	38367.....	177	38553.....	31	38641.....	31
37300.....	32	38066.....	197	38160.....	195	38278.....	178	38368.....	177	38554.....	31	38642.....	31
37301.....	32	38067.....	197	38161.....	195	38279.....	178	38369.....	177	38555.....	31	38643.....	31
37302.....	32	38068.....	197	38162.....	195	38280.....	178	38370.....	177	38556.....	31	38644.....	31
37303.....	32	38073.....	197	38163.....	195	38281.....	178	38371.....	177	38557.....	31	38645.....	31
37304.....	32	38074.....	197	38164.....	195	38282.....	178	38372.....	177	38558.....	31	38646.....	31
37305.....	32	38075.....	197	38165.....	195	38283.....	178	38373.....	177	38559.....	31	38647.....	32
37306.....	32	38076.....	197	38166.....	196	38284.....	178	38374.....	177	38560.....	31	38648.....	32
37307.....	32	38077.....	197	38167.....	196	38287.....	178	38375.....	177	38561.....	31	38649.....	32
37308.....	32	38078.....	197	38168.....	196	38288.....	178	38376.....	177	38562.....	31	38650.....	32
37320.....	30	38079.....	197	38169.....	196	38289.....	178	38377.....	177	38563.....	32	38651.....	32
37321.....	30	38080.....	197	38170.....	196	38290.....	178	38378.....	177	38564.....	32	38652.....	32
37322.....	30	38081.....	197	38171.....	196	38291.....	178	38379.....	178	38565.....	32	38653.....	32
37323.....	30	38082.....	197	38172.....	196	38292.....	178	38380.....	178	38566.....	32	38654.....	32
37324.....	30	38083.....	197	38173.....	196	38293.....	178	38381.....	178	38567.....	32	38655.....	32
37325.....	30	38084.....	197	38174.....	197	38294.....	178	38382.....	178	38568.....	32	38656.....	32
37330.....	30	38087.....	197	38175.....	197	38295.....	178	38383.....	178	38569.....	32	38657.....	32
37331.....	30	38088.....	197	38176.....	197	38296.....	178	38384.....	178	38570.....	32	38658.....	32
37332.....	30	38089.....	197	38177.....	197	38297.....	178	38385.....	178	38571.....	32	38659.....	32
37333.....	30	38090.....	197	38178.....	197	38298.....	178	38386.....	178	38572.....	32	38660.....	32

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

359

EDP Number Index

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
44764.....	134	44857.....	149	44965.....	153	45129.....	79	46110.....	207	46470.....	59	46830.....	46
44765.....	134	44858.....	149	44966.....	153	45130.....	79	46111.....	207	46471.....	59	46831.....	46
44766.....	134	44859.....	150	44967.....	153	45131.....	79	46112.....	207	46472.....	59	46832.....	46
44767.....	134	44860.....	150	44968.....	153	45132.....	79	46113.....	207	46473.....	59	46833.....	46
44768.....	134	44861.....	150	44969.....	153	45133.....	79	46114.....	207	46474.....	59	46834.....	46
44769.....	152	44862.....	150	44970.....	153	45134.....	79	46116.....	207	46475.....	59	46835.....	46
44770.....	152	44863.....	150	44971.....	153	45135.....	79	46117.....	207	46476.....	59	46836.....	46
44771.....	152	44864.....	150	44972.....	153	45136.....	79	46118.....	207	46477.....	59	46837.....	46
44772.....	152	44865.....	150	44973.....	153	45137.....	79	46120.....	207	46478.....	59	46838.....	46
44773.....	152	44866.....	150	44974.....	153	45138.....	79	46121.....	207	46479.....	59	46839.....	46
44774.....	152	44867.....	150	44975.....	129	45139.....	79	46122.....	207	46480.....	59	46840.....	46
44775.....	152	44868.....	150	44976.....	129	45140.....	79	46128.....	207	46481.....	59	46841.....	46
44776.....	152	44869.....	150	44977.....	129	45141.....	79	46129.....	207	46482.....	59	46849.....	45
44777.....	152	44870.....	150	44978.....	129	45150.....	78	46130.....	207	46483.....	59	46850.....	45
44778.....	152	44871.....	150	44979.....	129	45170.....	78	46131.....	207	46493.....	45	46851.....	45
44779.....	152	44872.....	150	44980.....	129	45171.....	78	46132.....	207	46494.....	45	46852.....	45
44780.....	152	44873.....	150	44981.....	129	45172.....	78	46133.....	207	46495.....	45	46853.....	45
44781.....	152	44874.....	150	44982.....	129	45173.....	78	46140.....	110	46497.....	45	46854.....	45
44782.....	152	44875.....	150	44983.....	129	45174.....	78	46141.....	110	46498.....	45	46855.....	45
44783.....	152	44876.....	150	44984.....	129	45175.....	78	46142.....	110	46506.....	53	46856.....	45
44784.....	152	44877.....	151	44985.....	129	45176.....	78	46143.....	110	46507.....	53	46857.....	45
44785.....	153	44878.....	151	44986.....	129	45177.....	78	46145.....	110	46508.....	53	46858.....	45
44786.....	153	44879.....	151	44987.....	129	45178.....	78	46147.....	110	46509.....	53	46859.....	45
44787.....	153	44880.....	151	44990.....	129	45179.....	78	46206.....	209	46510.....	53	46860.....	45
44788.....	153	44881.....	151	44991.....	129	45180.....	78	46207.....	209	46518.....	54	46861.....	45
44789.....	152	44882.....	151	44992.....	129	45181.....	78	46208.....	209	46519.....	54	46862.....	45
44790.....	152	44883.....	151	44993.....	129	45182.....	78	46209.....	209	46520.....	54	46863.....	45
44791.....	152	44884.....	151	44994.....	129	45183.....	78	46210.....	209	46521.....	54	46864.....	45
44792.....	152	44885.....	151	44995.....	129	45184.....	78	46211.....	209	46522.....	54	46865.....	45
44793.....	152	44886.....	151	44996.....	129	45185.....	78	46212.....	209	46560.....	61	46866.....	45
44794.....	152	44890.....	149	44997.....	129	45186.....	78	46213.....	209	46561.....	61	46867.....	45
44794.....	152	44891.....	149	44998.....	129	45187.....	79	46214.....	209	46562.....	61	46868.....	45
44795.....	152	44892.....	149	44999.....	129	45188.....	79	46216.....	209	46563.....	61	46869.....	45
44796.....	152	44893.....	149	45000.....	129	45189.....	79	46217.....	209	46564.....	61	46873.....	45
44797.....	152	44894.....	149	45001.....	129	45190.....	79	46218.....	209	46565.....	61	46874.....	45
44798.....	152	44895.....	149	45002.....	129	45191.....	79	46220.....	209	46566.....	61	46880.....	45
44799.....	152	44896.....	149	45003.....	129	45192.....	79	46221.....	209	46567.....	61	46881.....	45
44800.....	152	44897.....	150	45004.....	129	45193.....	79	46222.....	209	46568.....	61	46882.....	45
44801.....	152	44898.....	150	45005.....	130	45194.....	79	46228.....	209	46620.....	93	46884.....	45
44802.....	152	44899.....	150	45006.....	130	45195.....	79	46229.....	209	46621.....	93	46886.....	45
44803.....	152	44900.....	150	45007.....	130	45196.....	79	46230.....	209	46622.....	93	46887.....	45
44804.....	152	44901.....	151	45008.....	130	45197.....	79	46231.....	209	46623.....	93	46889.....	45
44805.....	153	44902.....	149	45009.....	130	45198.....	79	46232.....	209	46624.....	93	46890.....	45
44806.....	153	44916.....	154	45010.....	130	45199.....	79	46233.....	209	46625.....	93	46891.....	45
44807.....	153	44917.....	154	45011.....	130	45200.....	79	46343.....	54	46626.....	94	46893.....	45
44808.....	153	44918.....	154	45012.....	130	45201.....	79	46344.....	54	46627.....	93	46894.....	45
44814.....	150	44919.....	154	45013.....	130	45202.....	79	46345.....	54	46628.....	93	46895.....	45
44815.....	150	44920.....	154	45014.....	130	45203.....	79	46346.....	54	46629.....	93	46896.....	45
44816.....	150	44921.....	154	45015.....	130	45277.....	186	46347.....	54	46630.....	93	46898.....	45
44817.....	150	44922.....	154	45016.....	130	45279.....	186	46348.....	54	46631.....	93	46899.....	45
44818.....	150	44923.....	154	45017.....	130	45281.....	186	46349.....	54	46632.....	93	46900.....	45
44819.....	150	44924.....	154	45018.....	130	45283.....	186	46350.....	54	46633.....	93	46903.....	45
44820.....	150	44925.....	154	45019.....	130	45285.....	186	46351.....	54	46634.....	93	46904.....	45
44821.....	150	44926.....	154	45020.....	129	45287.....	186	46354.....	54	46635.....	93	46905.....	45
44822.....	151	44927.....	154	45021.....	129	45289.....	186	46355.....	54	46636.....	93	46909.....	45
44823.....	151	44928.....	154	45022.....	129	45291.....	186	46356.....	54	46637.....	93	46910.....	45
44824.....	151	44929.....	154	45023.....	129	45293.....	186	46357.....	53	46638.....	93	46911.....	45
44826.....	150	44930.....	154	45024.....	129	45295.....	186	46358.....	53	46639.....	93	46912.....	45
44827.....	150	44931.....	154	45025.....	129	45297.....	186	46359.....	53	46640.....	93	46913.....	45
44828.....	150	44932.....	154	45100.....	78	45299.....	186	46360.....	53	46641.....	93	46914.....	45
44829.....	150	44933.....	154	45101.....	78	45477.....	206	46362.....	53	46642.....	93	46915.....	45
44830.....	151	44934.....	154	45102.....	78	45478.....	206	46364.....	53	46643.....	93	46916.....	45
44831.....	151	44935.....	154	45103.....	78	45479.....	206	46366.....	53	46644.....	93	46917.....	45
44832.....	152	44936.....	154	45104.....	78	45480.....	206	46368.....	53	46645.....	93	46918.....	45
44833.....	152	44937.....	154	45105.....	78	45481.....	206	46370.....	53	46646.....	93	46919.....	45
44834.....	153	44938.....	154	45106.....	79	45482.....	206	46372.....	53	46647.....	93	46920.....	45
44835.....	153	44939.....	154	45107.....	79	45483.....	206	46374.....	53	46648.....	93	46921.....	45
44836.....	153	44940.....	154	45108.....	79	45484.....	206	46376.....	53	46649.....	93	46922.....	45
44837.....	153	44941.....	154	45109.....	79	45485.....	206	46450.....	59	46650.....	93	46923.....	45
44838.....	153	44942.....	154	45110.....	79	45486.....	206	46451.....	59	46651.....	93	46924.....	45
44839.....	152	44943.....	154	45111.....	79	45487.....	206	46452.....	59	46652.....	93	46925.....	45
44840.....	153	44944.....	154	45112.....	78	45488.....	206	46453.....	59	46653.....	94	46926.....	45
44841.....	153	44945.....	154	45113.....	78	45489.....	206	46454.....	59	46654.....	94	46927.....	45
44842.....	149	44950.....	152	45114.....	78	45490.....	206	46455.....	59	46655.....	94	46928.....	46
44843.....	149	44951.....	152	45115.....	78	45491.....	206	46456.....	59	46656.....	94	46929.....	46
44844.....	149	44952.....	152	45116.....	78	45492.....	206	46457.....	59	46657.....	94	46930.....	46
44845.....	149	44953.....	152	45117.....	78	45493.....	206	46458.....	59	46658.....	94	46931.....	46
44846.....	149	44954.....	152	45118.....	78	45494.....	206	46459.....	59	46659.....	94	46932.....	46
44847.....	149	44955.....	152	45119.....	78	45495.....	206	46460.....	59	46660.....	94	46933.....	46
44848.....	149	44956.....	152	45120.....	78	45496.....	206	46461.....	59	46821.....	46	46934.....	46
44849.....	149	44957.....	152	45121.....	78	45497.....	206	46462.....	59	46822.....	46	46935.....	46
44850.....	149	44958.....	152	45122.....	78	45498.....	206	46463.....	59	46823.....	46	46936.....	46
44851.....	149	44959.....	152	45123.....	78	45499.....	206	46464.....	59	46824.....	46	46937.....	46
44852.....	149	44960.....	152	45124.....	78	45500.....	206	46465.....	59	46825.....	46	46938.....	46
44853.....	149	44961.....	153	45125.....	78	46106.....	207	46466.....	59	46826.....	46	46939.....	46
44854.....	149	44962.....	153	45126.....	78	46107.....	207	46467.....	59	46827.....	46	46940.....	46
44855.....	149	44963.....	153	45127.....	79	46108.....	207	46468.....	59	46828.....	46	46941.....	46
44856.....	149	44964.....	153	45128.....	79	46109.....	207	46469.....	59	46829.....	46	46942.....	46

EDP Number Index

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
46943.....	46	47084.....	36	48031.....	35	48549.....	199	48638.....	179	48728.....	182	48817.....	190
46944.....	45	47085.....	36	48032.....	35	48550.....	199	48639.....	179	48729.....	182	48818.....	190
46945.....	45	47086.....	36	48033.....	35	48551.....	199	48640.....	179	48730.....	182	48819.....	190
46946.....	45	47087.....	36	48034.....	35	48552.....	199	48641.....	179	48731.....	182	48820.....	192
47000.....	35	47088.....	36	48035.....	35	48553.....	199	48642.....	179	48732.....	182	48821.....	192
47001.....	35	47089.....	36	48036.....	35	48554.....	199	48643.....	179	48733.....	182	48822.....	192
47002.....	35	47090.....	36	48037.....	36	48555.....	199	48644.....	179	48734.....	182	48823.....	192
47003.....	35	47091.....	36	48038.....	36	48556.....	199	48645.....	179	48735.....	182	48824.....	192
47004.....	35	47092.....	36	48039.....	36	48557.....	200	48646.....	179	48736.....	182	48825.....	192
47005.....	35	47093.....	36	48040.....	36	48558.....	200	48647.....	179	48737.....	182	48826.....	192
47006.....	35	47094.....	36	48041.....	36	48559.....	200	48648.....	179	48738.....	182	48827.....	192
47007.....	35	47095.....	36	48042.....	36	48560.....	200	48650.....	179	48739.....	182	48828.....	192
47008.....	35	47096.....	36	48043.....	36	48561.....	200	48651.....	179	48740.....	182	48829.....	192
47009.....	35	47097.....	36	48044.....	36	48562.....	200	48652.....	179	48741.....	182	48830.....	192
47010.....	35	47120.....	35	48045.....	36	48563.....	200	48653.....	179	48742.....	182	48831.....	192
47011.....	35	47121.....	35	48046.....	36	48564.....	202	48654.....	179	48743.....	182	48832.....	192
47012.....	35	47122.....	35	48047.....	36	48565.....	202	48655.....	179	48744.....	182	48833.....	192
47013.....	35	47123.....	35	48048.....	36	48566.....	202	48656.....	179	48745.....	182	48834.....	192
47014.....	35	47124.....	35	48049.....	36	48567.....	202	48657.....	179	48746.....	182	48835.....	192
47015.....	35	47125.....	35	48050.....	36	48568.....	202	48658.....	179	48747.....	182	48836.....	192
47016.....	35	47126.....	35	48051.....	36	48569.....	202	48659.....	179	48748.....	182	48837.....	192
47017.....	35	47127.....	35	48052.....	36	48570.....	202	48660.....	179	48749.....	182	48838.....	192
47018.....	35	47128.....	35	48053.....	36	48571.....	202	48661.....	179	48750.....	182	48839.....	192
47019.....	35	47129.....	35	48054.....	36	48572.....	202	48662.....	179	48751.....	182	48840.....	192
47020.....	35	47130.....	35	48055.....	36	48573.....	202	48663.....	179	48752.....	182	48842.....	192
47021.....	35	47131.....	35	48056.....	35	48574.....	202	48664.....	179	48753.....	182	48843.....	192
47022.....	35	47132.....	36	48057.....	35	48575.....	202	48665.....	179	48754.....	182	48844.....	192
47023.....	35	47133.....	36	48058.....	36	48576.....	202	48666.....	179	48755.....	182	48845.....	192
47024.....	35	47134.....	35	48059.....	36	48577.....	202	48667.....	179	48756.....	190	48846.....	192
47025.....	35	47135.....	36	48060.....	36	48578.....	202	48668.....	179	48757.....	190	48847.....	192
47026.....	35	47136.....	36	48061.....	36	48579.....	202	48669.....	179	48758.....	190	48848.....	192
47027.....	35	47137.....	36	48062.....	36	48580.....	202	48670.....	179	48759.....	190	48849.....	192
47028.....	35	47138.....	36	48063.....	36	48581.....	202	48671.....	179	48760.....	190	48850.....	192
47029.....	35	47139.....	36	48064.....	36	48582.....	202	48672.....	179	48761.....	190	48851.....	192
47030.....	35	47140.....	36	48065.....	36	48583.....	202	48673.....	179	48762.....	190	48852.....	192
47031.....	35	47141.....	36	48066.....	36	48584.....	202	48674.....	179	48763.....	190	48853.....	192
47032.....	35	47142.....	36	48067.....	36	48586.....	202	48675.....	179	48764.....	190	48854.....	192
47033.....	35	47143.....	36	48068.....	36	48587.....	202	48676.....	179	48765.....	190	48855.....	192
47034.....	35	47144.....	36	48070.....	35	48588.....	202	48677.....	179	48766.....	190	48856.....	192
47035.....	36	47145.....	36	48071.....	35	48589.....	202	48678.....	179	48767.....	190	48857.....	192
47036.....	36	47146.....	36	48500.....	199	48590.....	202	48679.....	179	48768.....	190	48858.....	192
47037.....	36	47147.....	36	48501.....	199	48591.....	202	48680.....	179	48769.....	190	48859.....	192
47038.....	36	47148.....	36	48502.....	199	48592.....	202	48681.....	179	48770.....	190	48860.....	192
47039.....	35	47160.....	35	48503.....	199	48593.....	202	48682.....	179	48771.....	190	48861.....	192
47040.....	35	47161.....	35	48504.....	199	48594.....	202	48683.....	179	48772.....	190	48862.....	192
47041.....	35	47162.....	35	48505.....	199	48595.....	202	48684.....	179	48773.....	190	48863.....	192
47042.....	36	47163.....	35	48506.....	199	48596.....	202	48685.....	179	48774.....	190	48864.....	192
47043.....	36	47164.....	35	48507.....	199	48597.....	202	48686.....	179	48775.....	190	48865.....	192
47044.....	36	47165.....	35	48508.....	199	48598.....	202	48687.....	179	48776.....	190	48866.....	192
47045.....	36	47166.....	35	48509.....	199	48599.....	202	48688.....	179	48777.....	190	48867.....	192
47046.....	35	47167.....	35	48510.....	199	48600.....	202	48689.....	179	48779.....	190	48868.....	192
47047.....	35	47168.....	35	48511.....	199	48601.....	202	48690.....	179	48780.....	190	48869.....	192
47048.....	35	47169.....	35	48512.....	199	48602.....	202	48691.....	179	48781.....	190	48870.....	192
47049.....	36	47170.....	35	48513.....	199	48603.....	202	48692.....	182	48782.....	190	48871.....	192
47050.....	36	47171.....	35	48514.....	200	48604.....	202	48693.....	182	48783.....	190	48872.....	192
47051.....	36	47172.....	35	48515.....	200	48605.....	202	48694.....	182	48784.....	190	48873.....	192
47052.....	36	47173.....	35	48516.....	200	48606.....	202	48695.....	182	48785.....	190	48874.....	192
47053.....	36	48000.....	35	48517.....	200	48607.....	202	48696.....	182	48786.....	190	48875.....	192
47054.....	36	48001.....	35	48518.....	200	48608.....	202	48697.....	182	48787.....	190	48876.....	192
47055.....	36	48002.....	35	48519.....	200	48609.....	202	48698.....	182	48788.....	190	48877.....	192
47056.....	36	48003.....	35	48520.....	200	48610.....	202	48699.....	182	48789.....	190	48878.....	192
47057.....	36	48004.....	35	48522.....	199	48611.....	202	48700.....	182	48790.....	190	48879.....	192
47058.....	36	48005.....	35	48523.....	199	48612.....	202	48701.....	182	48791.....	190	48880.....	192
47059.....	36	48006.....	35	48524.....	199	48613.....	202	48702.....	182	48792.....	190	48881.....	192
47060.....	36	48007.....	35	48525.....	199	48614.....	202	48703.....	182	48793.....	190	48882.....	192
47061.....	36	48008.....	35	48526.....	199	48615.....	202	48704.....	182	48794.....	190	48883.....	192
47062.....	36	48009.....	35	48527.....	199	48616.....	202	48705.....	182	48795.....	190	48884.....	203
47063.....	36	48010.....	35	48528.....	199	48617.....	202	48706.....	182	48796.....	190	48885.....	203
47064.....	36	48011.....	35	48529.....	199	48618.....	202	48707.....	182	48797.....	190	48886.....	203
47065.....	36	48012.....	35	48530.....	199	48619.....	202	48708.....	182	48798.....	190	48887.....	203
47066.....	36	48013.....	35	48531.....	199	48620.....	202	48709.....	182	48799.....	190	48888.....	203
47067.....	36	48014.....	35	48532.....	199	48621.....	202	48710.....	182	48800.....	190	48889.....	203
47068.....	36	48015.....	35	48533.....	199	48622.....	202	48711.....	182	48801.....	190	48890.....	203
47069.....	36	48016.....	35	48534.....	199	48623.....	202	48712.....	182	48802.....	190	48891.....	203
47070.....	36	48017.....	35	48535.....	199	48624.....	202	48714.....	182	48803.....	190	48892.....	203
47071.....	36	48018.....	36	48536.....	200	48625.....	202	48715.....	182	48804.....	190	48893.....	203
47072.....	36	48019.....	36	48537.....	200	48626.....	202	48716.....	182	48805.....	190	48894.....	203
47073.....	36	48020.....	36	48538.....	200	48627.....	202	48717.....	182	48806.....	190	48895.....	203
47074.....	36	48021.....	36	48539.....	200	48628.....	179	48718.....	182	48807.....	190	48896.....	203
47075.....	36	48022.....	36	48540.....	200	48629.....	179	48719.....	182	48808.....	190	48897.....	203
47076.....	36	48023.....	36	48541.....	200	48630.....	179	48720.....	182	48809.....	190	48898.....	203
47077.....	36	48024.....	36	48542.....	200	48631.....	179	48721.....	182	48810.....	190	48899.....	203
47078.....	36	48025.....	36	48543.....	199	48632.....	179	48722.....	182	48811.....	190	48905.....	203
47079.....	36	48026.....	36	48544.....	199	48633.....	179	48723.....	182	48812.....	190	48906.....	203
47080.....	36	48027.....	36	48545.....	199	48634.....	179	48724.....	182	48813.....	190	48907.....	203
47081.....	36	48028.....	36	48546.....	199	48635.....	179	48725.....	182	48814.....	190	48908.....	203
47082.....	36	48029.....	35	48547.....	199	48636.....	179	48726.....	182	48815.....	190	48909.....	203
47083.....	36	48030.....	35	48548.....	199	48637.....	179	48727.....	182	48816.....	190	48910.....	203

EDP Number Index

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
48911	203	49024	183	49142	205	49318	185	49474	190	49562	182	49650	188
48912	203	49025	183	49143	205	49319	185	49475	190	49563	182	49651	188
48913	203	49031	183	49144	205	49388	199	49476	190	49564	182	49663	163
48914	203	49032	183	49145	205	49389	199	49477	190	49565	182	49664	163
48915	203	49033	183	49146	205	49390	199	49478	190	49566	182	49665	163
48916	203	49034	183	49147	205	49391	199	49479	190	49567	182	49666	163
48917	203	49035	183	49148	205	49392	199	49480	190	49568	182	49667	163
48918	203	49036	183	49149	205	49393	200	49481	190	49569	182	49668	163
48919	203	49037	183	49150	205	49394	200	49482	190	49570	182	49669	163
48920	203	49038	183	49151	205	49395	200	49483	190	49571	182	49670	163
48926	203	49039	183	49157	205	49396	200	49484	190	49572	182	49671	163
48927	203	49040	183	49158	205	49397	200	49485	190	49573	182	49672	163
48928	203	49041	183	49159	205	49398	200	49486	190	49574	182	49673	163
48929	203	49042	183	49160	205	49399	200	49487	190	49575	182	49674	163
48930	203	49043	183	49161	205	49400	200	49488	190	49576	182	49675	163
48931	203	49044	183	49162	205	49401	199	49489	190	49577	182	49676	163
48932	203	49045	183	49163	205	49402	199	49490	190	49578	182	49677	163
48933	203	49046	183	49164	205	49403	199	49491	190	49579	182	49678	163
48934	203	49052	183	49165	205	49404	199	49492	190	49580	182	49679	163
48935	203	49053	183	49166	205	49405	199	49493	190	49581	182	49680	163
48936	203	49054	183	49167	205	49406	200	49494	190	49582	182	49681	163
48937	203	49055	183	49168	205	49407	200	49495	190	49583	192	49682	163
48938	203	49056	183	49169	205	49408	200	49496	190	49584	192	49683	163
48939	203	49057	183	49170	205	49409	200	49497	190	49585	192	49684	163
48940	203	49058	183	49171	205	49410	200	49498	190	49586	192	49829	186
48941	203	49059	183	49172	205	49411	200	49499	190	49587	192	49830	186
48947	204	49060	183	49178	205	49412	200	49500	190	49588	192	49831	186
48948	204	49061	183	49179	205	49413	200	49501	190	49589	192	49832	186
48949	204	49062	183	49180	205	49414	199	49502	190	49590	192	49833	186
48950	204	49063	183	49181	205	49415	199	49503	190	49591	192	49834	186
48951	204	49064	183	49182	205	49416	199	49504	190	49592	192	49835	186
48952	204	49065	183	49183	205	49417	199	49505	202	49593	192	49836	186
48953	204	49066	183	49184	205	49418	199	49506	202	49594	192	49837	186
48954	204	49067	183	49185	205	49419	200	49507	202	49595	192	49838	186
48955	204	49073	184	49186	205	49420	200	49508	202	49596	192	49839	186
48956	204	49074	184	49187	205	49421	200	49509	202	49597	192	49840	186
48957	204	49075	184	49188	205	49422	200	49510	202	49598	192	50000	282
48958	204	49076	184	49189	205	49423	200	49511	202	49599	192	50001	282
48959	204	49077	184	49190	205	49424	200	49512	202	49600	192	50002	282
48960	204	49078	184	49191	205	49425	200	49513	202	49601	192	50003	282
48961	204	49079	184	49192	205	49426	200	49514	202	49602	192	50004	282
48962	204	49080	184	49193	205	49427	179	49515	202	49603	192	50005	282
48968	204	49081	184	49262	185	49428	179	49516	202	49604	192	50006	282
48969	204	49082	184	49263	185	49429	179	49517	202	49605	192	50007	282
48970	204	49083	184	49264	185	49430	179	49518	202	49606	192	50008	282
48971	204	49084	184	49265	185	49431	179	49519	202	49607	192	50009	282
48972	204	49085	184	49266	185	49432	179	49520	202	49608	192	50010	282
48973	204	49086	184	49267	185	49433	179	49521	202	49609	192	50011	282
48974	204	49087	184	49268	185	49434	179	49522	202	49610	192	50012	282
48975	204	49088	184	49269	185	49435	179	49523	202	49611	192	50013	282
48976	204	49094	184	49270	185	49436	179	49524	202	49612	192	50014	282
48977	204	49095	184	49271	185	49437	179	49525	202	49613	192	50015	282
48978	204	49096	184	49272	185	49438	179	49526	202	49614	192	50016	282
48979	204	49097	184	49273	185	49439	179	49527	202	49615	192	50017	282
48980	204	49098	184	49274	185	49440	179	49528	202	49616	192	50018	282
48981	204	49099	184	49275	185	49441	179	49529	202	49617	192	50019	282
48982	204	49100	184	49276	185	49442	179	49530	202	49618	192	50020	282
48983	204	49101	184	49277	185	49443	179	49531	202	49619	192	50021	282
48989	204	49102	184	49283	185	49444	179	49532	202	49620	192	50022	282
48990	204	49103	184	49284	185	49445	179	49533	202	49621	192	50023	282
48991	204	49104	184	49285	185	49446	179	49534	202	49622	188	50024	282
48992	204	49105	184	49286	185	49447	179	49535	202	49623	188	50025	282
48993	204	49106	184	49287	185	49448	179	49536	202	49624	188	50026	282
48994	204	49107	184	49288	185	49449	179	49537	202	49625	188	50027	282
48995	204	49108	184	49289	185	49450	179	49538	202	49626	188	50028	282
48996	204	49109	184	49290	185	49451	179	49539	202	49627	188	50029	282
48997	204	49115	184	49291	185	49452	179	49540	202	49628	188	50030	282
48998	204	49116	184	49292	185	49453	179	49541	202	49629	188	50031	282
48999	204	49117	184	49293	185	49454	179	49542	202	49630	188	51001	291
49000	204	49118	184	49294	185	49455	179	49543	202	49631	188	51002	291
49001	204	49119	184	49295	185	49456	179	49544	182	49632	188	51003	290
49002	204	49120	184	49296	185	49457	179	49545	182	49633	188	51004	290
49003	204	49121	184	49297	185	49458	179	49546	182	49634	188	51005	290
49004	204	49122	184	49298	185	49459	179	49547	182	49635	188	51006	290
49010	183	49123	184	49304	185	49460	179	49548	182	49636	188	51007	290
49011	183	49124	184	49305	185	49461	179	49549	182	49637	188	51008	290
49012	183	49125	184	49306	185	49462	179	49550	182	49638	188	51009	290
49013	183	49126	184	49307	185	49463	179	49551	182	49639	188	51010	290
49014	183	49127	184	49308	185	49464	179	49552	182	49640	188	51011	290
49015	183	49128	184	49309	185	49465	179	49553	182	49641	188	51012	290
49016	183	49129	184	49310	185	49466	179	49554	182	49642	188	51013	290
49017	183	49130	184	49311	185	49467	190	49555	182	49643	188	51014	290
49018	183	49136	205	49312	185	49468	190	49556	182	49644	188	51015	290
49019	183	49137	205	49313	185	49469	190	49557	182	49645	188	51016	290
49020	183	49138	205	49314	185	49470	190	49558	182	49646	188	51017	290
49021	183	49139	205	49315	185	49471	190	49559	182	49647	188	51018	290
49022	183	49140	205	49316	185	49472	190	49560	182	49648	188	51019	290
49023	183	49141	205	49317	185	49473	190	49561	182	49649	188	51020	290

EDP Number Index

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
51021	290	51129	292	51508	241	51764	232	51927	268	53015	305	54610	251
51022	290	51130	292	51509	242	51765	232	51928	268	53016	305	54611	251
51023	290	51131	292	51510	242	51766	232	51929	268	53017	304	54612	251
51024	289	51132	292	51511	242	51767	232	51930	268	53018	304	54613	251
51025	289	51201	291	51512	242	51768	232	51932	269	53019	304	54614	251
51026	289	51202	291	51513	242	51769	232	51933	269	53020	304	54615	251
51027	289	51203	291	51514	242	51770	232	51934	269	53021	304	54616	251
51028	289	51204	291	51515	242	51771	232	51935	269	53022	304	54617	251
51029	289	51206	291	51516	243	51772	232	51937	269	53023	304	54618	251
51030	289	51207	291	51517	243	51773	232	51938	269	53024	304	54619	251
51031	289	51208	291	51518	243	51774	232	51939	269	53025	304	54620	252
51032	289	51209	291	51519	243	51775	232	51940	269	53026	304	54621	252
51033	289	51210	291	51520	243	51776	232	51941	269	53027	304	54622	252
51034	289	51211	291	51521	243	51777	232	51942	269	53028	304	54623	252
51035	289	51212	291	51522	243	51778	232	52300	240	53029	304	54624	252
51036	289	51213	291	51523	243	51779	232	52301	240	53030	304	54625	252
51037	289	51214	291	51524	243	51780	232	52302	240	53031	304	54626	252
51038	289	51215	291	51525	243	51781	233	52303	240	53032	304	54627	253
51039	289	51216	291	51526	243	51782	233	52304	240	53033	304	54628	253
51040	289	51217	291	51527	243	51783	235	52305	240	53034	304	54629	253
51041	289	51218	292	51528	244	51784	235	52306	240	53035	304	54630	253
51042	289	51219	292	51529	244	51785	235	52307	240	53036	304	54631	253
51043	289	51220	292	51530	244	51786	235	52308	240	53107	304	54632	253
51044	289	51221	292	51531	244	51787	235	52309	240	53108	304	54633	253
51045	289	51222	292	51532	244	51788	235	52310	240	53109	304	54634	253
51046	289	51223	292	51533	244	51789	235	52311	240	53110	304	54635	253
51047	289	51224	292	51534	244	51790	235	52312	240	53111	304	54700	250
51048	289	51225	292	51535	244	51791	235	52313	240	53112	305	54701	250
51049	289	51226	292	51536	244	51792	235	52314	240	53113	305	54702	250
51050	289	51269	231	51537	245	51801	274	52315	240	53114	305	54703	250
51051	289	51270	231	51538	245	51802	274	52316	240	53115	305	54704	250
51052	288	51271	231	51539	245	51803	274	52317	241	53116	305	54705	250
51053	288	51272	231	51540	245	51804	274	52318	241	53117	306	54706	250
51054	288	51273	231	51541	245	51805	274	52319	241	53118	306	54707	250
51055	288	51274	231	51542	245	51806	274	52321	241	53119	306	54708	250
51056	288	51275	231	51543	245	51807	274	52322	241	53120	306	54709	251
51057	288	51276	231	51544	245	51808	274	52323	241	53121	306	54710	251
51058	288	51277	231	51545	245	51809	275	52324	241	53122	306	54711	251
51059	288	51278	231	51580	240	51810	275	52325	241	53123	307	54712	251
51060	288	51279	232	51581	240	51811	275	52326	241	53124	307	54713	251
51061	288	51330	231	51582	240	51812	275	52327	241	53125	307	54714	251
51062	288	51331	231	51583	241	51813	275	52328	241	53126	307	54715	251
51063	288	51332	231	51584	241	51814	275	52329	241	53127	307	54716	251
51064	288	51333	231	51585	241	51815	275	52330	241	53128	307	54717	251
51065	288	51334	232	51586	241	51816	275	52331	241	53129	307	54718	251
51066	288	51335	232	51587	241	51817	275	52332	241	53130	307	54719	251
51067	288	51336	232	51588	241	51818	275	52333	241	53131	307	54720	252
51068	288	51337	232	51589	241	51819	276	52334	241	53132	307	54721	252
51069	288	51338	232	51590	241	51820	276	52335	242	53133	307	54722	252
51070	288	51339	232	51591	242	51821	276	52336	242	53134	307	54723	252
51071	288	51340	232	51592	245	51822	276	52337	242	53135	307	54724	252
51072	288	51341	232	51593	245	51823	276	52338	242	53136	307	54725	252
51073	288	51342	233	51594	245	51824	276	52339	242	53137	307	54726	252
51074	288	51343	233	51595	245	51825	276	52340	242	53201	305	54727	253
51075	288	51344	233	51596	245	51826	276	52341	242	53202	305	54728	253
51076	288	51345	233	51601	233	51827	277	52342	242	53203	305	54729	253
51077	288	51346	233	51602	233	51828	277	52343	242	53204	305	54730	253
51078	288	51347	233	51603	233	51829	277	52344	242	53206	305	54731	253
51079	288	51348	233	51604	233	51830	277	52345	243	53207	305	54732	253
51080	288	51349	233	51606	233	51831	277	52346	243	53208	306	54733	253
51101	288	51350	233	51607	233	51832	277	52347	243	53209	306	54734	253
51102	288	51351	233	51608	233	51833	277	52348	243	53210	306	54735	253
51103	288	51352	234	51609	233	51834	277	52349	243	53211	306	54800	254
51104	288	51353	234	51610	233	51835	277	52350	243	53212	306	54801	254
51105	289	51354	234	51611	233	51836	277	52351	243	53213	306	54802	254
51106	289	51355	234	51612	233	51901	266	52352	244	53214	306	54803	254
51107	289	51356	234	51613	233	51902	266	52353	244	53215	306	54804	254
51108	289	51357	234	51614	233	51903	266	52354	244	53216	306	54805	254
51109	289	51358	234	51615	234	51904	266	52355	245	53217	306	54806	254
51110	290	51359	234	51616	234	51905	266	52356	245	53218	306	54807	254
51111	290	51360	235	51617	234	51906	266	52357	245	53219	306	54808	254
51112	290	51361	235	51618	234	51907	266	52358	245	53220	306	54809	255
51113	290	51362	235	51619	234	51908	266	52359	245	53221	307	54810	255
51114	290	51363	235	51620	235	51910	266	52360	245	53222	307	54811	255
51115	291	51364	235	51621	234	51912	267	53001	305	53223	307	54812	255
51116	291	51365	235	51622	234	51913	267	53002	305	53224	307	54813	255
51117	291	51366	235	51752	231	51914	267	53003	305	53225	307	54814	255
51118	291	51367	235	51753	231	51915	267	53004	305	53226	307	54815	255
51119	291	51368	235	51754	231	51916	267	53005	305	54600	250	54816	255
51120	291	51369	235	51755	231	51918	267	53006	305	54601	250	54817	255
51121	291	51370	235	51756	231	51919	267	53007	305	54602	250	54818	255
51122	292	51371	235	51757	231	51920	267	53008	305	54603	250	54819	256
51123	292	51372	235	51758	231	51921	267	53009	305	54604	250	54820	256
51124	292	51373	235	51759	231	51922	267	53010	305	54605	250	54821	256
51125	292	51374	235	51760	231	51923	268	53011	305	54606	250	54822	256
51126	292	51375	235	51761	231	51924	268	53012	305	54607	250	54823	256
51127	292	51506	241	51762	231	51925	268	53013	305	54608	250	54824	256
51128	292	51507	241	51763	232	51926	268	53014	305	54609	251	54825	256

EDP Number Index

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
54826	257	56008	301	56141	301	57010	310	57153	290	58039	305	61051	292
54827	257	56009	301	56142	301	57011	310	57154	290	58040	305	61052	288
54828	257	56010	301	56143	301	57012	310	57155	290	58041	305	61053	288
54829	257	56011	301	56144	301	57015	310	57156	290	58042	305	61054	288
54830	257	56012	301	56145	301	57016	310	57157	290	58043	305	61055	288
54831	257	56013	301	56146	301	57017	310	57158	290	58044	305	61056	288
54832	257	56014	301	56147	302	57018	310	57159	290	58045	305	61057	288
54833	257	56015	301	56148	302	57019	310	57160	290	58046	305	61058	289
54834	257	56016	301	56149	302	57020	310	57161	290	58047	305	61059	289
54835	257	56017	301	56150	302	57021	310	57162	290	58048	305	61060	289
55000	254	56018	301	56151	302	57022	310	57163	290	58049	305	61061	289
55001	254	56019	301	56152	302	57075	310	57164	290	58050	305	61062	289
55002	254	56020	301	56153	302	57076	288	57165	290	58051	305	61063	289
55003	254	56021	301	56154	302	57077	288	57166	290	58052	305	61064	289
55004	254	56022	301	56155	302	57078	288	57167	290	58053	305	61065	289
55005	254	56023	301	56156	302	57079	288	57168	291	58054	305	61066	289
55006	254	56024	301	56157	302	57080	288	57169	291	58055	305	61067	289
55007	254	56025	301	56158	302	57081	288	57170	291	58056	305	61068	289
55008	254	56026	301	56159	302	57082	288	57171	291	58057	305	61069	289
55009	255	56027	301	56160	302	57083	288	57172	291	58058	305	61070	289
55010	255	56028	301	56161	302	57084	288	57173	291	58059	305	61071	289
55011	255	56029	301	56162	302	57085	288	57174	291	58061	305	61072	289
55012	255	56030	301	56163	302	57086	288	57176	291	58062	305	61073	289
55013	255	56031	301	56164	302	57087	288	57177	291	58063	305	61074	289
55014	255	56032	301	56210	301	57088	288	57178	291	58064	306	61075	290
55015	255	56033	301	56211	301	57089	288	57179	291	58065	306	61076	290
55016	255	56034	300	56212	301	57090	288	57180	291	58066	306	61077	290
55017	255	56035	300	56213	301	57091	288	57181	291	58067	306	61078	290
55018	255	56036	300	56214	301	57092	288	57182	291	58068	306	61079	290
55019	256	56037	300	56215	301	57093	288	57183	291	58069	306	61080	290
55020	256	56038	300	56216	301	57094	288	57184	291	58070	306	61081	290
55021	256	56039	300	56217	301	57095	288	57185	291	58071	306	61082	290
55022	256	56040	300	56218	301	57096	288	57186	291	58072	306	61083	290
55023	256	56041	300	56219	301	57097	288	57187	291	58073	306	61084	290
55024	256	56042	300	56220	301	57098	288	57188	291	58074	306	61085	290
55025	256	56043	300	56221	301	57099	288	57189	291	58075	306	61086	290
55026	257	56044	300	56222	301	57100	288	57190	291	58076	306	61087	290
55027	257	56045	300	56223	301	57101	288	57191	291	58077	306	61088	290
55028	257	56046	300	56224	301	57102	288	57192	291	58078	306	61089	291
55029	257	56047	300	56225	301	57103	288	57193	291	58079	306	61090	291
55030	257	56048	300	56226	301	57104	288	57194	292	58080	306	61091	291
55031	257	56049	300	56227	301	57105	288	57195	292	58081	306	61092	291
55032	257	56050	300	56228	301	57106	288	57196	292	58082	306	61093	291
55033	257	56051	300	56229	301	57107	288	57197	292	58083	307	61094	291
55034	257	56052	300	56230	301	57108	288	57198	292	58084	307	61095	291
55035	257	56053	300	56231	301	57109	289	57199	292	58085	307	61096	291
55160	260	56054	300	56232	301	57110	289	57200	292	58086	307	61097	291
55161	260	56055	300	56233	301	57111	289	57201	292	58087	307	61098	291
55162	260	56056	300	56234	301	57112	289	57202	292	58088	307	61099	291
55163	260	56057	300	56235	301	57113	289	57203	292	58089	307	61100	291
55164	260	56058	300	56236	301	57114	289	57204	292	58090	307	61101	291
55165	260	56059	300	56237	301	57115	289	57205	292	58091	307	61102	291
55166	260	56060	300	56238	301	57116	289	57206	292	58092	307	61103	291
55167	260	56103	300	56239	301	57117	289	57207	292	58093	307	61104	291
55168	260	56104	300	56240	301	57118	289	57208	292	58094	307	61105	291
55169	261	56105	300	56241	301	57119	289	57209	292	58095	307	61106	291
55170	261	56106	300	56242	301	57120	289	57210	292	58096	307	61107	291
55171	261	56107	300	56243	300	57121	289	57211	292	58097	307	61108	291
55172	261	56108	301	56244	300	57122	289	57212	292	58098	307	61109	291
55173	261	56109	301	56245	300	57123	289	57213	292	58099	307	61110	291
55174	261	56110	301	56246	300	57124	289	57351	292	58100	307	61111	291
55175	261	56111	301	56247	300	57125	289	58011	304	58101	307	61112	292
55176	261	56112	301	56248	300	57126	289	58012	304	58102	307	61113	292
55177	261	56113	301	56249	300	57127	289	58013	304	58103	307	61114	292
55178	261	56114	301	56250	300	57128	289	58014	304	61001	288	61115	292
55179	261	56115	302	56251	300	57129	289	58015	304	61003	288	61116	292
55180	262	56116	302	56252	300	57130	289	58016	304	61005	288	61117	292
55181	262	56117	302	56253	300	57131	289	58017	304	61007	288	61118	292
55182	262	56118	302	56254	300	57132	289	58018	304	61009	288	61119	292
55183	262	56119	302	56255	300	57133	289	58019	304	61011	289	61120	292
55184	262	56120	302	56256	300	57134	289	58020	304	61013	289	61121	292
55185	262	56121	302	56257	300	57135	289	58021	304	61015	289	61122	292
55186	262	56122	302	56258	300	57136	289	58022	304	61017	289	61123	292
55187	263	56123	302	56259	300	57137	289	58023	304	61019	290	61124	292
55188	263	56124	302	56260	300	57138	289	58024	304	61021	290	61175	292
55189	263	56125	302	56261	300	57139	289	58025	304	61023	290	62001	293
55190	263	56126	302	56262	300	57140	289	58026	304	61025	290	62003	293
55191	263	56127	302	56263	300	57141	289	58027	304	61027	291	62005	293
55192	263	56128	302	56264	300	57142	290	58028	304	61029	291	62007	293
55193	263	56129	302	56265	300	57143	290	58029	304	61031	291	62009	293
55194	263	56130	302	56266	300	57144	290	58030	304	61033	291	62011	293
55195	263	56131	302	56267	300	57145	290	58031	304	61035	291	62013	293
56001	301	56132	302	56268	300	57146	290	58032	304	61037	291	62015	293
56002	301	56135	300	56269	300	57147	290	58033	304	61039	292	62017	293
56003	301	56136	300	57005	310	57148	290	58034	304	61041	292	62019	293
56004	301	56137	300	57006	310	57149	290	58035	304	61043	292	62021	293
56005	301	56138	300	57007	310	57150	290	58036	305	61045	292	62023	293
56006	301	56139	300	57008	310	57151	290	58037	305	61047	292	62025	293
56007	301	56140	301	57009	310	57152	290	58038	305	61049	292	62027	293

EDP Number Index

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
62029.....	293	63008.....	305	63161.....	231	63612.....	275	63765.....	233	63960.....	268	64148.....	243
62031.....	293	63009.....	305	63162.....	232	63613.....	275	63766.....	233	63961.....	268	64149.....	243
62033.....	293	63010.....	305	63163.....	232	63614.....	275	63767.....	233	63962.....	268	64150.....	243
62035.....	293	63011.....	305	63164.....	232	63615.....	275	63768.....	233	63963.....	268	64151.....	243
62037.....	293	63012.....	305	63165.....	232	63616.....	275	63769.....	233	63964.....	268	64152.....	243
62039.....	293	63013.....	306	63166.....	232	63617.....	275	63770.....	233	63965.....	268	64153.....	243
62041.....	293	63014.....	306	63167.....	232	63618.....	275	63771.....	234	63966.....	268	64154.....	243
62043.....	293	63015.....	306	63168.....	232	63619.....	275	63772.....	234	63967.....	268	64155.....	243
62045.....	293	63016.....	306	63169.....	232	63620.....	275	63773.....	234	63968.....	268	64156.....	243
62047.....	293	63017.....	306	63170.....	232	63621.....	275	63774.....	234	63969.....	268	64157.....	243
62049.....	293	63018.....	306	63171.....	232	63622.....	275	63775.....	234	63970.....	268	64158.....	243
62051.....	293	63019.....	306	63172.....	233	63623.....	275	63776.....	234	63971.....	268	64159.....	243
62053.....	293	63020.....	306	63173.....	233	63624.....	275	63777.....	234	63972.....	268	64160.....	243
62055.....	293	63021.....	306	63174.....	233	63625.....	275	63778.....	234	63973.....	268	64161.....	243
62057.....	293	63022.....	306	63175.....	233	63626.....	275	63779.....	234	63974.....	268	64162.....	243
62059.....	293	63023.....	306	63176.....	233	63627.....	275	63780.....	234	63975.....	268	64163.....	243
62061.....	293	63024.....	307	63177.....	233	63628.....	275	63781.....	234	63976.....	268	64164.....	243
62063.....	293	63025.....	307	63178.....	233	63629.....	275	63782.....	234	63977.....	268	64165.....	243
62065.....	293	63026.....	307	63179.....	233	63630.....	275	63783.....	234	63978.....	268	64166.....	243
62066.....	295	63027.....	307	63180.....	233	63631.....	275	63784.....	234	63979.....	268	64167.....	243
62067.....	293	63028.....	307	63181.....	233	63632.....	275	63785.....	234	63980.....	268	64168.....	243
62069.....	294	63029.....	307	63182.....	233	63633.....	276	63786.....	234	63981.....	269	64169.....	243
62071.....	294	63030.....	307	63183.....	233	63634.....	276	63787.....	234	63982.....	269	64170.....	243
62073.....	294	63031.....	307	63184.....	234	63635.....	276	63788.....	234	63983.....	269	64171.....	243
62075.....	294	63032.....	307	63185.....	234	63636.....	276	63789.....	234	63984.....	269	64172.....	243
62077.....	294	63033.....	307	63186.....	234	63637.....	276	63790.....	235	63985.....	269	64173.....	243
62079.....	294	63034.....	307	63187.....	234	63638.....	276	63791.....	235	63986.....	269	64174.....	244
62081.....	294	63035.....	307	63188.....	234	63639.....	276	63792.....	235	63987.....	269	64175.....	244
62083.....	294	63036.....	307	63189.....	234	63640.....	276	63793.....	235	63988.....	269	64176.....	244
62084.....	295	63037.....	307	63190.....	234	63641.....	276	63794.....	235	63989.....	269	64177.....	244
62085.....	294	63038.....	307	63191.....	234	63642.....	276	63900.....	266	63990.....	269	64178.....	244
62087.....	294	63039.....	307	63192.....	234	63643.....	276	63901.....	266	63991.....	269	64179.....	244
62089.....	294	63040.....	307	63193.....	234	63644.....	276	63902.....	266	63992.....	269	64180.....	244
62091.....	294	63041.....	307	63194.....	235	63645.....	276	63903.....	266	63993.....	269	64181.....	244
62093.....	294	63042.....	307	63195.....	235	63646.....	276	63904.....	266	63994.....	269	64182.....	244
62095.....	294	63043.....	307	63196.....	235	63647.....	276	63905.....	266	63995.....	269	64183.....	244
62097.....	294	63044.....	304	63197.....	235	63648.....	276	63906.....	266	63996.....	269	64184.....	244
62099.....	294	63045.....	304	63198.....	235	63649.....	276	63907.....	266	63997.....	269	64185.....	244
62101.....	294	63046.....	304	63199.....	235	63650.....	276	63908.....	266	63998.....	269	64186.....	244
62102.....	295	63047.....	304	63200.....	235	63651.....	276	63909.....	266	63999.....	267	64187.....	244
62103.....	294	63048.....	304	63201.....	235	63652.....	276	63910.....	266	64000.....	269	64188.....	244
62105.....	294	63049.....	304	63202.....	235	63653.....	276	63911.....	266	64001.....	269	64189.....	244
62107.....	294	63050.....	304	63203.....	235	63654.....	276	63912.....	266	64100.....	240	64190.....	244
62109.....	294	63051.....	304	63204.....	235	63655.....	276	63913.....	266	64101.....	240	64191.....	244
62111.....	294	63052.....	304	63205.....	235	63656.....	276	63914.....	266	64102.....	240	64192.....	244
62112.....	295	63053.....	305	63206.....	235	63657.....	277	63915.....	266	64103.....	240	64193.....	244
62113.....	294	63054.....	305	63207.....	235	63658.....	277	63916.....	266	64104.....	240	64194.....	244
62115.....	294	63055.....	305	63208.....	235	63659.....	277	63917.....	266	64105.....	241	64195.....	244
62116.....	295	63056.....	305	63209.....	235	63660.....	277	63918.....	266	64106.....	241	64196.....	244
62117.....	294	63057.....	305	63210.....	235	63661.....	277	63919.....	266	64107.....	241	64197.....	244
62119.....	294	63058.....	305	63211.....	235	63662.....	277	63920.....	266	64108.....	241	64198.....	244
62121.....	294	63059.....	305	63212.....	235	63663.....	277	63921.....	266	64109.....	241	64199.....	244
62123.....	294	63060.....	305	63213.....	233	63664.....	277	63922.....	266	64110.....	241	64200.....	245
62125.....	294	63061.....	305	63575.....	274	63665.....	277	63923.....	266	64111.....	241	64201.....	245
62127.....	294	63062.....	305	63576.....	274	63666.....	277	63924.....	267	64112.....	241	64202.....	245
62129.....	294	63063.....	305	63577.....	274	63667.....	277	63925.....	267	64113.....	241	64203.....	245
62131.....	294	63064.....	305	63578.....	274	63668.....	277	63926.....	267	64114.....	241	64204.....	245
62133.....	295	63065.....	305	63579.....	274	63669.....	277	63927.....	267	64115.....	241	64205.....	245
62135.....	295	63066.....	305	63580.....	274	63670.....	277	63928.....	267	64116.....	241	64206.....	245
62137.....	295	63067.....	305	63581.....	274	63671.....	277	63929.....	267	64117.....	241	64207.....	245
62139.....	295	63068.....	305	63582.....	274	63672.....	277	63930.....	267	64118.....	241	64208.....	245
62141.....	295	63069.....	306	63583.....	274	63673.....	277	63931.....	267	64119.....	241	64209.....	245
62142.....	295	63070.....	306	63584.....	274	63674.....	277	63932.....	267	64120.....	241	64210.....	245
62143.....	295	63071.....	306	63585.....	274	63675.....	277	63933.....	267	64121.....	241	64211.....	245
62145.....	295	63072.....	306	63586.....	274	63676.....	277	63934.....	267	64122.....	241	64212.....	245
62146.....	295	63073.....	306	63587.....	274	63677.....	277	63935.....	267	64123.....	241	64500.....	231
62147.....	295	63074.....	306	63588.....	274	63741.....	231	63936.....	267	64124.....	241	64501.....	231
62149.....	295	63075.....	306	63589.....	274	63742.....	232	63937.....	267	64125.....	242	64502.....	231
62151.....	295	63076.....	306	63590.....	274	63743.....	232	63938.....	267	64126.....	242	64503.....	231
62153.....	295	63077.....	306	63591.....	274	63744.....	232	63939.....	267	64127.....	242	64504.....	231
62154.....	295	63078.....	306	63592.....	274	63745.....	232	63940.....	267	64128.....	242	64505.....	231
62155.....	295	63079.....	306	63593.....	274	63746.....	232	63941.....	267	64129.....	242	64506.....	231
62156.....	295	63080.....	306	63594.....	274	63747.....	232	63942.....	267	64130.....	242	64507.....	231
62157.....	295	63081.....	307	63595.....	274	63748.....	232	63943.....	267	64131.....	242	64508.....	231
62158.....	295	63082.....	307	63596.....	274	63749.....	232	63944.....	267	64132.....	242	64509.....	231
62159.....	295	63083.....	307	63597.....	274	63750.....	232	63945.....	267	64133.....	242	64510.....	231
62164.....	295	63084.....	307	63598.....	274	63751.....	233	63946.....	267	64134.....	242	64511.....	231
62166.....	295	63085.....	307	63599.....	274	63752.....	233	63947.....	267	64135.....	242	64512.....	231
62167.....	295	63086.....	307	63600.....	274	63753.....	233	63948.....	267	64136.....	242	64513.....	235
62168.....	295	63087.....	307	63601.....	275	63754.....	233	63949.....	267	64137.....	242	64514.....	235
62170.....	295	63088.....	307	63602.....	275	63755.....	233	63950.....	267	64138.....	242	64515.....	235
62171.....	295	63089.....	307	63603.....	275	63756.....	233	63951.....	267	64139.....	242	64520.....	240
63000.....	304	63090.....	307	63604.....	275	63757.....	233	63952.....	267	64140.....	242	64521.....	240
63001.....	304	63091.....	307	63605.....	275	63758.....	233	63953.....	267	64141.....	242	64522.....	240
63002.....	304	63155.....	231	63606.....	275	63759.....	233	63954.....	267	64142.....	242	64523.....	240
63003.....	304	63156.....	231	63607.....	275	63760.....	233	63955.....	268	64143.....	242	64524.....	240
63004.....	304	63157.....	231	63608.....	275	63761.....	233	63956.....	268	64144.....	242	64525.....	240
63005.....	304	63158.....	231	63609.....	275	63762.....	233	63957.....	268	64145.....	243	64526.....	240
63006.....	305	63159.....	231	63610.....	275	63763.....	233	63958.....	268	64146.....	243	64527.....	240
63007.....	305	63160.....	231	63611.....	275	63764.....	233	63959.....</					

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

S366

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

EDP Number Index

Please put "S" at the beginning of all page numbers below.

EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE	EDP NO.	PAGE
74455.....	84	74543.....	85	77131.....	82	77219.....	82	77307.....	83	83041.....	338	91113.....	349
74456.....	85	74544.....	85	77132.....	82	77220.....	83	77308.....	83	83042.....	338	91121.....	349
74457.....	85	74545.....	85	77133.....	82	77221.....	83	77309.....	83	83043.....	338	91129.....	349
74458.....	85	74546.....	85	77134.....	82	77222.....	83	77310.....	83	83044.....	338	91137.....	349
74459.....	85	74547.....	85	77135.....	82	77223.....	83	77311.....	83	83056.....	113	91235.....	166
74460.....	85	74548.....	85	77136.....	82	77224.....	83	77312.....	83	83057.....	113	91236.....	166
74461.....	85	74549.....	85	77137.....	82	77225.....	83	77313.....	83	83058.....	113	91237.....	166
74462.....	85	74550.....	85	77138.....	82	77226.....	83	77314.....	83	83059.....	113	91238.....	166
74463.....	85	74551.....	85	77139.....	82	77227.....	83	77315.....	83	83060.....	113	91239.....	166
74464.....	85	74552.....	85	77140.....	82	77228.....	83	77316.....	83	83061.....	113	91240.....	166
74465.....	85	74553.....	85	77141.....	82	77229.....	83	77317.....	83	83062.....	113	91241.....	166
74466.....	85	74554.....	85	77142.....	82	77230.....	83	77318.....	83	83063.....	113	91242.....	166
74467.....	85	74555.....	85	77143.....	82	77231.....	83	77319.....	83	83064.....	113	91243.....	166
74468.....	85	74556.....	85	77144.....	82	77232.....	83	77320.....	83	83065.....	113	91244.....	166
74469.....	85	74557.....	85	77145.....	82	77233.....	83	77321.....	83	83070.....	338	91245.....	166
74470.....	85	74558.....	85	77146.....	82	77234.....	83	77322.....	83	83071.....	338	91246.....	166
74471.....	85	74559.....	85	77147.....	82	77235.....	83	77323.....	83	83072.....	338	91247.....	166
74472.....	85	74560.....	85	77148.....	82	77236.....	83	77324.....	83	83073.....	338	91248.....	166
74473.....	85	74561.....	85	77149.....	82	77237.....	83	77325.....	83	83100.....	338	91250.....	166
74474.....	85	74562.....	85	77150.....	82	77238.....	83	77326.....	83	83101.....	338	91251.....	166
74475.....	85	74563.....	85	77151.....	82	77239.....	83	77327.....	83	83102.....	338	91252.....	166
74476.....	85	74564.....	85	77152.....	82	77240.....	83	77328.....	83	83103.....	338	91253.....	166
74477.....	85	74565.....	85	77153.....	82	77241.....	83	77329.....	83	83104.....	338	91254.....	166
74478.....	85	74566.....	85	77154.....	82	77242.....	83	77330.....	83	83105.....	338	91255.....	166
74479.....	85	74567.....	85	77155.....	82	77243.....	83	77331.....	83	83106.....	338	91256.....	166
74480.....	85	74568.....	85	77156.....	82	77244.....	83	77332.....	83	83107.....	338	91257.....	166
74481.....	85	74569.....	85	77157.....	82	77245.....	83	77333.....	83	83108.....	338	91258.....	166
74482.....	85	74570.....	85	77158.....	82	77246.....	83	77334.....	83	83109.....	338	91259.....	166
74483.....	85	74571.....	85	77159.....	82	77247.....	83	77335.....	83	83110.....	338	91260.....	166
74484.....	85	74572.....	85	77160.....	82	77248.....	83	77336.....	83	83111.....	338	91261.....	166
74485.....	85	74573.....	85	77161.....	82	77249.....	83	77337.....	83	83200.....	342	91262.....	166
74486.....	85	74574.....	85	77162.....	82	77250.....	83	77338.....	83	83201.....	342	91263.....	166
74487.....	85	74575.....	85	77163.....	82	77251.....	83	77339.....	83	83202.....	342	91266.....	176
74488.....	85	74576.....	85	77164.....	82	77252.....	83	81001.....	330	83203.....	342	91268.....	195
74489.....	85	74577.....	85	77165.....	82	77253.....	83	81003.....	330	83204.....	342	91269.....	201
74490.....	85	74578.....	85	77166.....	82	77254.....	83	81005.....	330	83205.....	342	91270.....	176
74491.....	85	74579.....	85	77167.....	82	77255.....	83	81007.....	330	83206.....	342	91272.....	195
74492.....	85	74580.....	85	77168.....	82	77256.....	83	81009.....	330	83207.....	342	91273.....	201
74493.....	85	74581.....	85	77169.....	82	77257.....	83	81011.....	330	83220.....	339	91274.....	176
74494.....	85	74582.....	85	77170.....	82	77258.....	83	81013.....	330	83221.....	339	91276.....	195
74495.....	85	74583.....	85	77171.....	82	77259.....	83	81015.....	330	83222.....	339	91277.....	201
74496.....	85	74584.....	85	77172.....	82	77260.....	83	81017.....	330	83223.....	339	91278.....	176
74497.....	85	74585.....	85	77173.....	82	77261.....	83	81019.....	330	83224.....	339	91280.....	195
74498.....	85	74586.....	85	77174.....	82	77262.....	83	81021.....	330	83225.....	339	91281.....	201
74499.....	85	74587.....	85	77175.....	82	77263.....	83	81023.....	330	83230.....	339	91282.....	177
74500.....	85	74588.....	85	77176.....	82	77264.....	83	81025.....	330	83231.....	339	91284.....	196
74501.....	85	74589.....	85	77177.....	82	77265.....	83	81027.....	330	83232.....	339	91285.....	201
74502.....	85	74590.....	85	77178.....	82	77266.....	83	81029.....	330	83233.....	339	91286.....	177
74503.....	85	74591.....	85	77179.....	82	77267.....	83	82930.....	338	83234.....	339	91288.....	196
74504.....	85	74592.....	85	77180.....	82	77268.....	83	82931.....	338	83235.....	339	91290.....	177
74505.....	85	74593.....	85	77181.....	82	77269.....	83	82932.....	338	90001.....	348	91292.....	197
74506.....	85	74594.....	85	77182.....	82	77270.....	83	82933.....	338	90005.....	348	91349.....	107
74507.....	85	74595.....	85	77183.....	82	77271.....	83	82966.....	338	90009.....	348	91350.....	107
74508.....	85	74596.....	85	77184.....	82	77272.....	83	82967.....	338	90013.....	348	91351.....	107
74509.....	85	74597.....	85	77185.....	82	77273.....	83	82968.....	338	90017.....	348	91352.....	107
74510.....	85	74598.....	85	77186.....	82	77274.....	83	82969.....	338	90021.....	348	91353.....	107
74511.....	85	74599.....	85	77187.....	82	77275.....	83	82970.....	338	90025.....	348	91354.....	107
74512.....	85	77100.....	82	77188.....	82	77276.....	83	82971.....	338	90029.....	348	91355.....	107
74513.....	85	77101.....	82	77189.....	82	77277.....	83	82972.....	338	90033.....	348	91356.....	107
74514.....	85	77102.....	82	77190.....	82	77278.....	83	82973.....	338	90037.....	348	91357.....	107
74515.....	85	77103.....	82	77191.....	82	77279.....	83	82974.....	342	90041.....	348	91358.....	107
74516.....	85	77104.....	82	77192.....	82	77280.....	83	82975.....	342	90045.....	348	91359.....	107
74517.....	85	77105.....	82	77193.....	82	77281.....	83	82976.....	342	90049.....	348	91360.....	107
74518.....	85	77106.....	82	77194.....	82	77282.....	83	82977.....	342	90053.....	348	91361.....	107
74519.....	85	77107.....	82	77195.....	82	77283.....	83	82978.....	342	90101.....	348	93272.....	107
74520.....	85	77108.....	82	77196.....	82	77284.....	83	82979.....	342	90107.....	348	93273.....	107
74521.....	85	77109.....	82	77197.....	82	77285.....	83	82980.....	342	90109.....	348	93274.....	107
74522.....	85	77110.....	82	77198.....	82	77286.....	83	82981.....	342	90113.....	348	93275.....	107
74523.....	85	77111.....	82	77199.....	82	77287.....	83	82982.....	342	90121.....	348	93276.....	107
74524.....	85	77112.....	82	77200.....	82	77288.....	83	82983.....	342	90129.....	348	93277.....	107
74525.....	85	77113.....	82	77201.....	82	77289.....	83	82984.....	342	90137.....	348	93278.....	107
74526.....	85	77114.....	82	77202.....	82	77290.....	83	82985.....	342	91001.....	349	93279.....	107
74527.....	85	77115.....	82	77203.....	82	77291.....	83	82986.....	342	91005.....	349	93280.....	107
74528.....	85	77116.....	82	77204.....	82	77292.....	83	82987.....	342	91009.....	349	93281.....	107
74529.....	85	77117.....	82	77205.....	82	77293.....	83	82988.....	342	91013.....	349	93282.....	107
74530.....	85	77118.....	82	77206.....	82	77294.....	83	82989.....	342	91017.....	349		
74531.....	85	77119.....	82	77207.....	82	77295.....	83	82990.....	345	91021.....	349		
74532.....	85	77120.....	82	77208.....	82	77296.....	83	82991.....	345	91025.....	349		
74533.....	85	77121.....	82	77209.....	82	77297.....	83	82992.....	345	91029.....	349		
74534.....	85	77122.....	82	77210.....	82	77298.....	83	82993.....	345	91033.....	349		
74535.....	85	77123.....	82	77211.....	82	77299.....	83	82994.....	345	91037.....	349		
74536.....	85	77124.....	82	77212.....	82	77300.....	83	82995.....	345	91041.....	349		
74537.....	85	77125.....	82	77213.....	82	77301.....	83	82996.....	345	91045.....	349		
74538.....	85	77126.....	82	77214.....	82	77302.....	83	82997.....	345	91049.....	349		
74539.....	85	77127.....	82	77215.....	82	77303.....	83	83026.....	338	91053.....	349		
74540.....	85	77128.....	82	77216.....	82	77304.....	83	83027.....	338	91101.....	349		
74541.....	85	77129.....	82	77217.....	82	77305.....	83	83028.....	338	91107.....	349		
74542.....	85	77130.....	82	77218.....	82	77306.....	83	83029.....	338	91109.....	349		

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

Decimal Equivalentts

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	31/64	8,43	0.3320	—	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	—	—