QUALITY SYSTEM

IS09001 JMI-0036

EMS 635470 / ISO 14001

KYOCERA

KYOCERA Asia Pacific Pte. Ltd.

https://asia.kyocera.com/products/cuttingtools/

KYOCERA

2020 - 2021

KYOCERA Round Tools Catalog

KYOCERA

2020-2021
KYOCERA
Round Tools Catalog

ADVANCING PRODUCTIVITY

ADVANCING PRODUCTIVITY

Advancing your productivity through efficient cutting tool products and advanced tooling solutions

Kyocera is the global and comprehensive cutting tool manufacturer who provides innovative materials and tool designs as well as proposes solutions for technological improvements.

Kyocera contributes to a world manufacturing by the innovative products and technology.

Kyocera's Management aims to be focused on the User's Perspective.

We promise to be a Comprehensive Value-Added Manufacturer.

KYOCERA

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2020-2021
KYOCERA Round Tools Catalog

See the front page of each section for details.

Official Media Lineup

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- **Web site**
  KYOCERA Asia Pacific Cutting Tools
  https://asia.kyocera.com/products/cuttingtools/index.html

- **Application**
  KYOCERA Cutting Tools

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K-series

High Efficiency Coated Solid Carbide Drill

KDA

Highly Efficient and Cost Effective New Universal Solid Carbide Drill is Now Available!

High-Precision Design for a Wide Variety of Machining Solutions

Striking the Perfect Balance between Performance and Cost

High Efficiency Coated Solid Carbide Drill

KDA

New K-series is Now Available for Excellent All-Around Drilling Performance

The perfect balance between performance and cost

Large lineup accommodates a wide variety of applications

Styles Available

Type N

Normal type

Universal Design without Coolant Holes
Economical Style for Machining with External Coolant

Diameter Range	3D	5D
	ø3~ø16	

Cutting diameters available in 0.1 mm increments

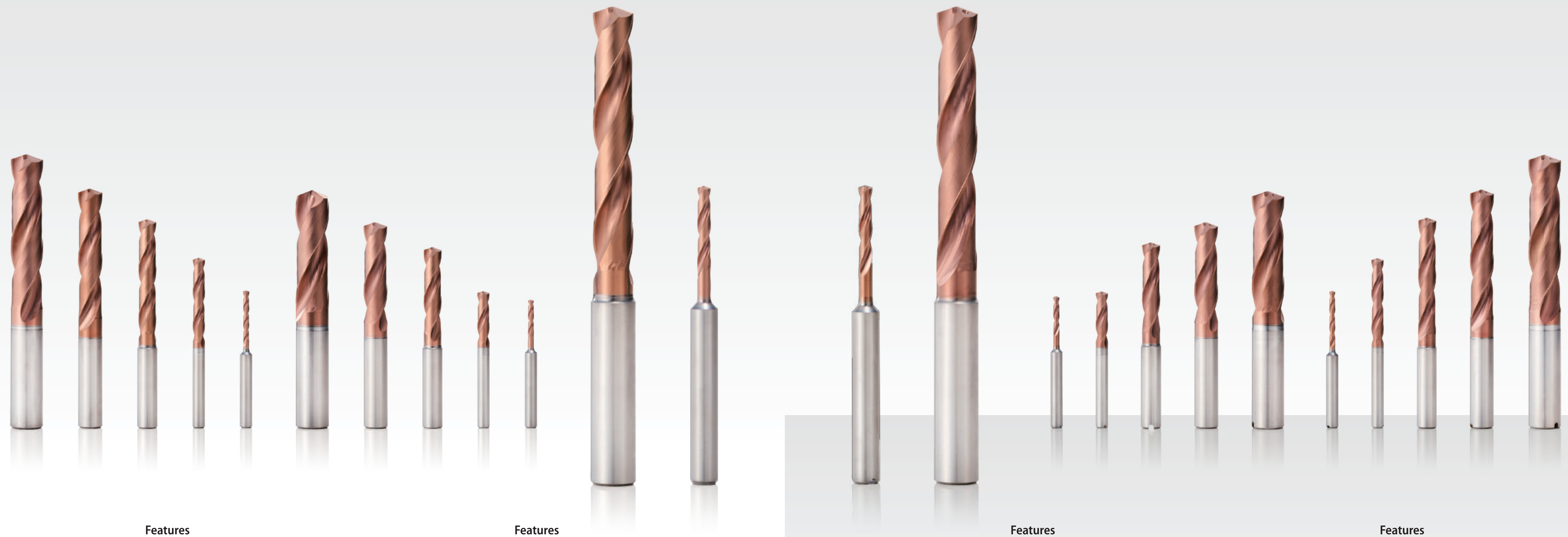
Type C

with Coolant hole

Coolant-Through Design
Provides Higher Efficiency and Stable Machining with Stainless Steel, etc.

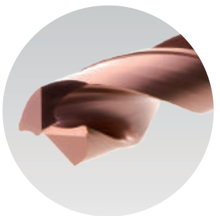
Diameter Range	3D	5D
	ø3~ø16	

Cutting diameters available in 0.1 mm increments



Features
1
Universal Design and Lineup Applicable to a Wide Range of Machining Applications

Type N: No Coolant Holes
Type C: With Coolant Holes
3D and 5D depths available



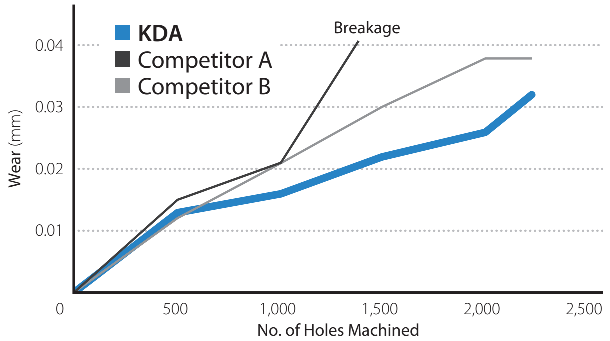
3D／131 Items
5D／131 Items

3D／131 Items
5D／131 Items

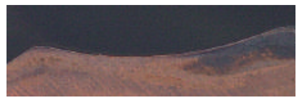
Features
2
High-Performance Coating Maintains Long tool life

Excellent Wear and Heat Resistance
Aluminum Chrome (AlCr) Coating

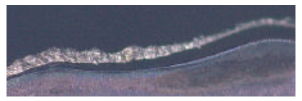
Wear Resistance Comparison (Internal evaluation)



Cutting Conditions: Vc = 120 m/min, f = 0.23 mm/rev, H = 24 mm,
Wet (Internal coolant) S50 C BT 50 ø 6 (5D) Type C



KDA

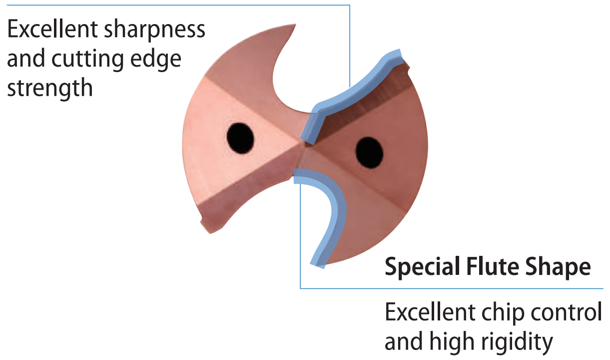


Competitor B

Features
3
Stable Machining with Unique Shape

Curved Cutting-edge Design and Special Flute Shape

Curved Cutting-edge Design



KDA

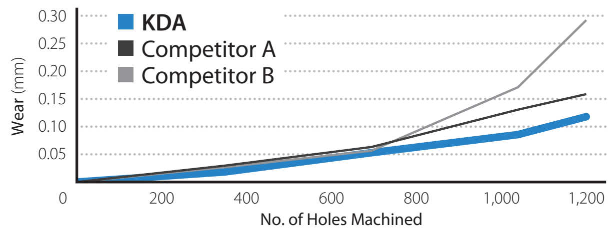
Chip Condition
(Internal evaluation)

Cutting Conditions:
Vc = 80 m/min, f = 0.14 mm/rev,
H = 24 mm, Wet (Internal coolant)
BT 50 ø 6 (5D) Type C

Features
4
Supports a Variety of Workpieces

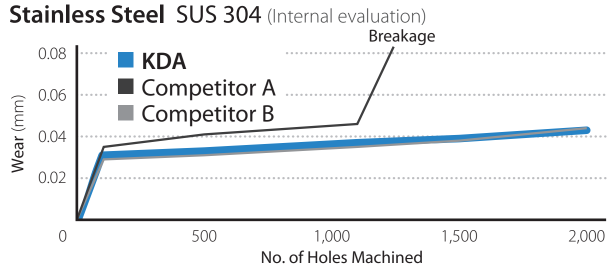
Compatible not only with carbon steel, but also mold steel, stainless steel, cast iron machining, etc.

Alloy Steel SCM 440 (32 HRC) (Internal evaluation)



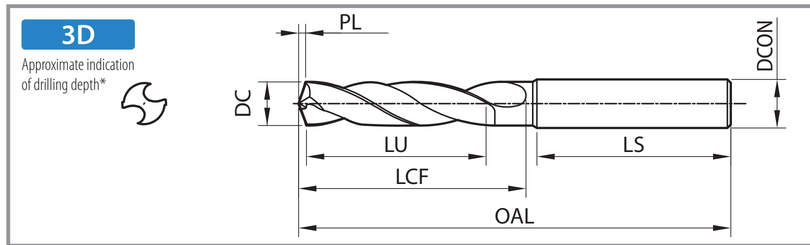
Cutting Conditions: Vc = 100 m/min, f = 0.15 mm/rev, H = 24 mm,
Wet (Internal coolant) BT 50 ø 6 (5D) Type C

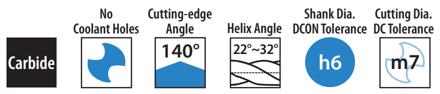
Stainless Steel SUS 304 (Internal evaluation)



Cutting Conditions: Vc = 80 m/min, f = 0.14 mm/rev, H = 24 mm,
Wet (Internal coolant) BT 50 ø 6 (5D) Type C

Type N No Coolant Holes 3D





Cutting Dia. DC	Tolerance m7 (mm)
ø3.0	+0.002 ~ +0.012
ø3.1 ~ ø6	+0.004 ~ +0.016
ø6.1 ~ ø10	+0.006 ~ +0.021
ø10.1 ~ ø16	+0.007 ~ +0.025

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0300X03S060N	●	3	6	62	15.5	20	36	0.5
KDA0310X03S060N	●	3.1	6	62	15.3	20	36	0.5
KDA0320X03S060N	●	3.2	6	62	15.2	20	36	0.5
KDA0330X03S060N	●	3.3	6	62	15.0	20	36	0.6
KDA0340X03S060N	●	3.4	6	62	14.9	20	36	0.6
KDA0350X03S060N	●	3.5	6	62	14.7	20	36	0.6
KDA0360X03S060N	●	3.6	6	62	14.6	20	36	0.6
KDA0370X03S060N	●	3.7	6	62	14.4	20	36	0.6
KDA0380X03S060N	●	3.8	6	66	18.3	24	36	0.6
KDA0390X03S060N	●	3.9	6	66	18.1	24	36	0.7
KDA0400X03S060N	●	4	6	66	18.0	24	36	0.7
KDA0410X03S060N	●	4.1	6	66	17.8	24	36	0.7
KDA0420X03S060N	●	4.2	6	66	17.7	24	36	0.7
KDA0430X03S060N	●	4.3	6	66	17.5	24	36	0.7
KDA0440X03S060N	●	4.4	6	66	17.4	24	36	0.8
KDA0450X03S060N	●	4.5	6	66	17.2	24	36	0.8
KDA0460X03S060N	●	4.6	6	66	17.1	24	36	0.8
KDA0470X03S060N	●	4.7	6	66	16.9	24	36	0.8
KDA0480X03S060N	●	4.8	6	66	20.8	28	36	0.8
KDA0490X03S060N	●	4.9	6	66	20.6	28	36	0.8
KDA0500X03S060N	●	5	6	66	20.5	28	36	0.9
KDA0510X03S060N	●	5.1	6	66	20.3	28	36	0.9
KDA0520X03S060N	●	5.2	6	66	20.2	28	36	0.9
KDA0530X03S060N	●	5.3	6	66	20.0	28	36	0.9
KDA0540X03S060N	●	5.4	6	66	19.9	28	36	0.9
KDA0550X03S060N	●	5.5	6	66	19.7	28	36	1.0
KDA0560X03S060N	●	5.6	6	66	19.6	28	36	1.0
KDA0570X03S060N	●	5.7	6	66	19.4	28	36	1.0
KDA0580X03S060N	●	5.8	6	66	19.3	28	36	1.0
KDA0590X03S060N	●	5.9	6	66	19.1	28	36	1.0
KDA0600X03S060N	●	6	6	66	19.0	28	36	1.0
KDA0610X03S080N	●	6.1	8	79	24.8	34	36	1.1
KDA0620X03S080N	●	6.2	8	79	24.7	34	36	1.1

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0630X03S080N	●	6.3	8	79	24.5	34	36	1.1
KDA0640X03S080N	●	6.4	8	79	24.4	34	36	1.1
KDA0650X03S080N	●	6.5	8	79	24.2	34	36	1.1
KDA0660X03S080N	●	6.6	8	79	24.1	34	36	1.2
KDA0670X03S080N	●	6.7	8	79	23.9	34	36	1.2
KDA0680X03S080N	●	6.8	8	79	23.8	34	36	1.2
KDA0690X03S080N	●	6.9	8	79	23.6	34	36	1.2
KDA0700X03S080N	●	7	8	79	23.5	34	36	1.2
KDA0710X03S080N	●	7.1	8	79	30.3	41	36	1.2
KDA0720X03S080N	●	7.2	8	79	30.2	41	36	1.3
KDA0730X03S080N	●	7.3	8	79	30.0	41	36	1.3
KDA0740X03S080N	●	7.4	8	79	29.9	41	36	1.3
KDA0750X03S080N	●	7.5	8	79	29.7	41	36	1.3
KDA0760X03S080N	●	7.6	8	79	29.6	41	36	1.3
KDA0770X03S080N	●	7.7	8	79	29.4	41	36	1.4
KDA0780X03S080N	●	7.8	8	79	29.3	41	36	1.4
KDA0790X03S080N	●	7.9	8	79	29.1	41	36	1.4
KDA0800X03S080N	●	8	8	79	29.0	41	36	1.4
KDA0810X03S100N	●	8.1	10	89	34.8	47	40	1.4
KDA0820X03S100N	●	8.2	10	89	34.7	47	40	1.4
KDA0830X03S100N	●	8.3	10	89	34.5	47	40	1.5
KDA0840X03S100N	●	8.4	10	89	34.4	47	40	1.5
KDA0850X03S100N	●	8.5	10	89	34.2	47	40	1.5
KDA0860X03S100N	●	8.6	10	89	34.1	47	40	1.5
KDA0870X03S100N	●	8.7	10	89	33.9	47	40	1.5
KDA0880X03S100N	●	8.8	10	89	33.8	47	40	1.6
KDA0890X03S100N	●	8.9	10	89	33.6	47	40	1.6
KDA0900X03S100N	●	9	10	89	33.5	47	40	1.6
KDA0910X03S100N	●	9.1	10	89	33.3	47	40	1.6
KDA0920X03S100N	●	9.2	10	89	33.2	47	40	1.6
KDA0930X03S100N	●	9.3	10	89	33.0	47	40	1.6
KDA0940X03S100N	●	9.4	10	89	32.9	47	40	1.7
KDA0950X03S100N	●	9.5	10	89	32.7	47	40	1.7

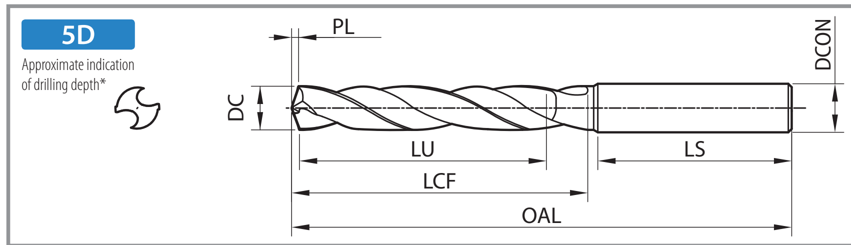
Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0960X03S100N	●	9.6	10	89	32.6	47	40	1.7
KDA0970X03S100N	●	9.7	10	89	32.4	47	40	1.7
KDA0980X03S100N	●	9.8	10	89	32.3	47	40	1.7
KDA0990X03S100N	●	9.9	10	89	32.1	47	40	1.8
KDA1000X03S100N	●	10	10	89	32.0	47	40	1.8
KDA1010X03S120N	●	10.1	12	102	39.8	55	45	1.8
KDA1020X03S120N	●	10.2	12	102	39.7	55	45	1.8
KDA1030X03S120N	●	10.3	12	102	39.5	55	45	1.8
KDA1040X03S120N	●	10.4	12	102	39.4	55	45	1.8
KDA1050X03S120N	●	10.5	12	102	39.2	55	45	1.9
KDA1060X03S120N	●	10.6	12	102	39.1	55	45	1.9
KDA1070X03S120N	●	10.7	12	102	38.9	55	45	1.9
KDA1080X03S120N	●	10.8	12	102	38.8	55	45	1.9
KDA1090X03S120N	●	10.9	12	102	38.6	55	45	1.9
KDA1100X03S120N	●	11	12	102	38.5	55	45	2.0
KDA1110X03S120N	●	11.1	12	102	38.3	55	45	2.0
KDA1120X03S120N	●	11.2	12	102	38.2	55	45	2.0
KDA1130X03S120N	●	11.3	12	102	38.0	55	45	2.0
KDA1140X03S120N	●	11.4	12	102	37.9	55	45	2.0
KDA1150X03S120N	●	11.5	12	102	37.7	55	45	2.0
KDA1160X03S120N	●	11.6	12	102	37.6	55	45	2.1
KDA1170X03S120N	●	11.7	12	102	37.4	55	45	2.1
KDA1180X03S120N	●	11.8	12	102	37.3	55	45	2.1
KDA1190X03S120N	●	11.9	12	102	37.1	55	45	2.1
KDA1200X03S120N	●	12	12	102	37.0	55	45	2.1
KDA1210X03S140N	●	12.1	14	107	41.8	60	45	2.2
KDA1220X03S140N	●	12.2	14	107	41.7	60	45	2.2
KDA1230X03S140N	●	12.3	14	107	41.5	60	45	2.2
KDA1240X03S140N	●	12.4	14	107	41.4	60	45	2.2
KDA1250X03S140N	●	12.5	14	107	41.2	60	45	2.2
KDA1260X03S140N	●	12.6	14	107	41.1	60	45	2.2
KDA1270X03S140N	●	12.7	14	107	40.9	60	45	2.3
KDA1280X03S140N	●	12.8	14	107	40.8	60	45	2.3

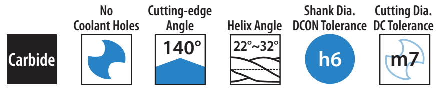
Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA1290X03S140N	●	12.9	14	107	40.6	60	45	2.3
KDA1300X03S140N	●	13	14	107	40.5	60	45	2.3
KDA1310X03S140N	●	13.1	14	107	40.3	60	45	2.3
KDA1320X03S140N	●	13.2	14	107	40.2	60	45	2.4
KDA1330X03S140N	●	13.3	14	107	40.0	60	45	2.4
KDA1340X03S140N	●	13.4	14	107	39.9	60	45	2.4
KDA1350X03S140N	●	13.5	14	107	39.7	60	45	2.4
KDA1360X03S140N	●	13.6	14	107	39.6	60	45	2.4
KDA1370X03S140N	●	13.7	14	107	39.4	60	45	2.4
KDA1380X03S140N	●	13.8	14	107	39.3	60	45	2.5
KDA1390X03S140N	●	13.9	14	107	39.1	60	45	2.5
KDA1400X03S140N	●	14	14	107	39.0	60	45	2.5
KDA1410X03S160N	●	14.1	16	115	43.8	65	48	2.5
KDA1420X03S160N	●	14.2	16	115	43.7	65	48	2.5
KDA1430X03S160N	●	14.3	16	115	43.5	65	48	2.6
KDA1440X03S160N	●	14.4	16	115	43.4	65	48	2.6
KDA1450X03S160N	●	14.5	16	115	43.2	65	48	2.6
KDA1460X03S160N	●	14.6	16	115	43.1	65	48	2.6
KDA1470X03S160N	●	14.7	16	115	42.9	65	48	2.6
KDA1480X03S160N	●	14.8	16	115	42.8	65	48	2.6
KDA1490X03S160N	●	14.9	16	115	42.6	65	48	2.7
KDA1500X03S160N	●	15	16	115	42.5	65	48	2.7
KDA1510X03S160N	●	15.1	16	115	42.3	65	48	2.7
KDA1520X03S160N	●	15.2	16	115	42.2	65	48	2.7
KDA1530X03S160N	●	15.3	16	115	42.0	65	48	2.7
KDA1540X03S160N	●	15.4	16	115	41.9	65	48	2.8
KDA1550X03S160N	●	15.5	16	115	41.7	65	48	2.8
KDA1560X03S160N	●	15.6	16	115	41.6	65	48	2.8
KDA1570X03S160N	●	15.7	16	115	41.4	65	48	2.8
KDA1580X03S160N	●	15.8	16	115	41.3	65	48	2.8
KDA1590X03S160N	●	15.9	16	115	41.1	65	48	2.8
KDA1600X03S160N	●	16	16	115	41.0	65	48	2.9

* Drilling depth is an approximate indication of L/D.
Depending on the size, it may be smaller than the listed L/D.

●: Standard Stock

Type N No Coolant Holes 5D





Cutting Dia. DC	Tolerance m7 (mm)
ø3.0	+0.002 ~ +0.012
ø3.1 ~ ø6	+0.004 ~ +0.016
ø6.1 ~ ø10	+0.006 ~ +0.021
ø10.1 ~ ø16	+0.007 ~ +0.025

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0300X05S060N	●	3	6	66	23.5	28	36	0.5
KDA0310X05S060N	●	3.1	6	66	23.3	28	36	0.5
KDA0320X05S060N	●	3.2	6	66	23.2	28	36	0.5
KDA0330X05S060N	●	3.3	6	66	23.0	28	36	0.6
KDA0340X05S060N	●	3.4	6	66	22.9	28	36	0.6
KDA0350X05S060N	●	3.5	6	66	22.7	28	36	0.6
KDA0360X05S060N	●	3.6	6	66	22.6	28	36	0.6
KDA0370X05S060N	●	3.7	6	66	22.4	28	36	0.6
KDA0380X05S060N	●	3.8	6	74	30.3	36	36	0.6
KDA0390X05S060N	●	3.9	6	74	30.1	36	36	0.7
KDA0400X05S060N	●	4	6	74	30.0	36	36	0.7
KDA0410X05S060N	●	4.1	6	74	29.8	36	36	0.7
KDA0420X05S060N	●	4.2	6	74	29.7	36	36	0.7
KDA0430X05S060N	●	4.3	6	74	29.5	36	36	0.7
KDA0440X05S060N	●	4.4	6	74	29.4	36	36	0.8
KDA0450X05S060N	●	4.5	6	74	29.2	36	36	0.8
KDA0460X05S060N	●	4.6	6	74	29.1	36	36	0.8
KDA0470X05S060N	●	4.7	6	74	28.9	36	36	0.8
KDA0480X05S060N	●	4.8	6	82	36.8	44	36	0.8
KDA0490X05S060N	●	4.9	6	82	36.6	44	36	0.8
KDA0500X05S060N	●	5	6	82	36.5	44	36	0.9
KDA0510X05S060N	●	5.1	6	82	36.3	44	36	0.9
KDA0520X05S060N	●	5.2	6	82	36.2	44	36	0.9
KDA0530X05S060N	●	5.3	6	82	36.0	44	36	0.9
KDA0540X05S060N	●	5.4	6	82	35.9	44	36	0.9
KDA0550X05S060N	●	5.5	6	82	35.7	44	36	1.0
KDA0560X05S060N	●	5.6	6	82	35.6	44	36	1.0
KDA0570X05S060N	●	5.7	6	82	35.4	44	36	1.0
KDA0580X05S060N	●	5.8	6	82	35.3	44	36	1.0
KDA0590X05S060N	●	5.9	6	82	35.1	44	36	1.0
KDA0600X05S060N	●	6	6	82	35.0	44	36	1.0
KDA0610X05S080N	●	6.1	8	91	43.8	53	36	1.1
KDA0620X05S080N	●	6.2	8	91	43.7	53	36	1.1

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0630X05S080N	●	6.3	8	91	43.5	53	36	1.1
KDA0640X05S080N	●	6.4	8	91	43.4	53	36	1.1
KDA0650X05S080N	●	6.5	8	91	43.2	53	36	1.1
KDA0660X05S080N	●	6.6	8	91	43.1	53	36	1.2
KDA0670X05S080N	●	6.7	8	91	42.9	53	36	1.2
KDA0680X05S080N	●	6.8	8	91	42.8	53	36	1.2
KDA0690X05S080N	●	6.9	8	91	42.6	53	36	1.2
KDA0700X05S080N	●	7	8	91	42.5	53	36	1.2
KDA0710X05S080N	●	7.1	8	91	42.3	53	36	1.2
KDA0720X05S080N	●	7.2	8	91	42.2	53	36	1.3
KDA0730X05S080N	●	7.3	8	91	42.0	53	36	1.3
KDA0740X05S080N	●	7.4	8	91	41.9	53	36	1.3
KDA0750X05S080N	●	7.5	8	91	41.7	53	36	1.3
KDA0760X05S080N	●	7.6	8	91	41.6	53	36	1.3
KDA0770X05S080N	●	7.7	8	91	41.4	53	36	1.4
KDA0780X05S080N	●	7.8	8	91	41.3	53	36	1.4
KDA0790X05S080N	●	7.9	8	91	41.1	53	36	1.4
KDA0800X05S080N	●	8	8	91	41.0	53	36	1.4
KDA0810X05S100N	●	8.1	10	103	48.8	61	40	1.4
KDA0820X05S100N	●	8.2	10	103	48.7	61	40	1.4
KDA0830X05S100N	●	8.3	10	103	48.5	61	40	1.5
KDA0840X05S100N	●	8.4	10	103	48.4	61	40	1.5
KDA0850X05S100N	●	8.5	10	103	48.2	61	40	1.5
KDA0860X05S100N	●	8.6	10	103	48.1	61	40	1.5
KDA0870X05S100N	●	8.7	10	103	47.9	61	40	1.5
KDA0880X05S100N	●	8.8	10	103	47.8	61	40	1.6
KDA0890X05S100N	●	8.9	10	103	47.6	61	40	1.6
KDA0900X05S100N	●	9	10	103	47.5	61	40	1.6
KDA0910X05S100N	●	9.1	10	103	47.3	61	40	1.6
KDA0920X05S100N	●	9.2	10	103	47.2	61	40	1.6
KDA0930X05S100N	●	9.3	10	103	47.0	61	40	1.6
KDA0940X05S100N	●	9.4	10	103	46.9	61	40	1.7
KDA0950X05S100N	●	9.5	10	103	46.7	61	40	1.7

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0960X05S100N	●	9.6	10	103	46.6	61	40	1.7
KDA0970X05S100N	●	9.7	10	103	46.4	61	40	1.7
KDA0980X05S100N	●	9.8	10	103	46.3	61	40	1.7
KDA0990X05S100N	●	9.9	10	103	46.1	61	40	1.8
KDA1000X05S100N	●	10	10	103	46.0	61	40	1.8
KDA1010X05S120N	●	10.1	12	118	55.8	71	45	1.8
KDA1020X05S120N	●	10.2	12	118	55.7	71	45	1.8
KDA1030X05S120N	●	10.3	12	118	55.5	71	45	1.8
KDA1040X05S120N	●	10.4	12	118	55.4	71	45	1.8
KDA1050X05S120N	●	10.5	12	118	55.2	71	45	1.9
KDA1060X05S120N	●	10.6	12	118	55.1	71	45	1.9
KDA1070X05S120N	●	10.7	12	118	54.9	71	45	1.9
KDA1080X05S120N	●	10.8	12	118	54.8	71	45	1.9
KDA1090X05S120N	●	10.9	12	118	54.6	71	45	1.9
KDA1100X05S120N	●	11	12	118	54.5	71	45	2.0
KDA1110X05S120N	●	11.1	12	118	54.3	71	45	2.0
KDA1120X05S120N	●	11.2	12	118	54.2	71	45	2.0
KDA1130X05S120N	●	11.3	12	118	54.0	71	45	2.0
KDA1140X05S120N	●	11.4	12	118	53.9	71	45	2.0
KDA1150X05S120N	●	11.5	12	118	53.7	71	45	2.0
KDA1160X05S120N	●	11.6	12	118	53.6	71	45	2.1
KDA1170X05S120N	●	11.7	12	118	53.4	71	45	2.1
KDA1180X05S120N	●	11.8	12	118	53.3	71	45	2.1
KDA1190X05S120N	●	11.9	12	118	53.1	71	45	2.1
KDA1200X05S120N	●	12	12	118	53.0	71	45	2.1
KDA1210X05S140N	●	12.1	14	124	58.8	77	45	2.2
KDA1220X05S140N	●	12.2	14	124	58.7	77	45	2.2
KDA1230X05S140N	●	12.3	14	124	58.5	77	45	2.2
KDA1240X05S140N	●	12.4	14	124	58.4	77	45	2.2
KDA1250X05S140N	●	12.5	14	124	58.2	77	45	2.2
KDA1260X05S140N	●	12.6	14	124	58.1	77	45	2.2
KDA1270X05S140N	●	12.7	14	124	57.9	77	45	2.3
KDA1280X05S140N	●	12.8	14	124	57.8	77	45	2.3

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA1290X05S140N	●	12.9	14	124	57.6	77	45	2.3
KDA1300X05S140N	●	13	14	124	57.5	77	45	2.3
KDA1310X05S140N	●	13.1	14	124	57.3	77	45	2.3
KDA1320X05S140N	●	13.2	14	124	57.2	77	45	2.4
KDA1330X05S140N	●	13.3	14	124	57.0	77	45	2.4
KDA1340X05S140N	●	13.4	14	124	56.9	77	45	2.4
KDA1350X05S140N	●	13.5	14	124	56.7	77	45	2.4
KDA1360X05S140N	●	13.6	14	124	56.6	77	45	2.4
KDA1370X05S140N	●	13.7	14	124	56.4	77	45	2.4
KDA1380X05S140N	●	13.8	14	124	56.3	77	45	2.5
KDA1390X05S140N	●	13.9	14	124	56.1	77	45	2.5
KDA1400X05S140N	●	14	14	124	56.0	77	45	2.5
KDA1410X05S160N	●	14.1	16	133	61.8	83	48	2.5
KDA1420X05S160N	●	14.2	16	133	61.7	83	48	2.5
KDA1430X05S160N	●	14.3	16	133	61.5	83	48	2.6
KDA1440X05S160N	●	14.4	16	133	61.4	83	48	2.6
KDA1450X05S160N	●	14.5	16	133	61.2	83	48	2.6
KDA1460X05S160N	●	14.6	16	133	61.1	83	48	2.6
KDA1470X05S160N	●	14.7	16	133	60.9	83	48	2.6
KDA1480X05S160N	●	14.8	16	133	60.8	83	48	2.6
KDA1490X05S160N	●	14.9	16	133	60.6	83	48	2.7
KDA1500X05S160N	●	15	16	133	60.5	83	48	2.7
KDA1510X05S160N	●	15.1	16	133	60.3	83	48	2.7
KDA1520X05S160N	●	15.2	16	133	60.2	83	48	2.7
KDA1530X05S160N	●	15.3	16	133	60.0	83	48	2.7
KDA1540X05S160N	●	15.4	16	133	59.9	83	48	2.8
KDA1550X05S160N	●	15.5	16	133	59.7	83	48	2.8
KDA1560X05S160N	●	15.6	16	133	59.6	83	48	2.8
KDA1570X05S160N	●	15.7	16	133	59.4	83	48	2.8
KDA1580X05S160N	●	15.8	16	133	59.3	83	48	2.8
KDA1590X05S160N	●	15.9	16	133	59.1	83	48	2.8
KDA1600X05S160N	●	16	16	133	59.0	83	48	2.9

* Drilling depth is an approximate indication of L/D.
Depending on the size, it may be smaller than the listed L/D.

●: Standard Stock

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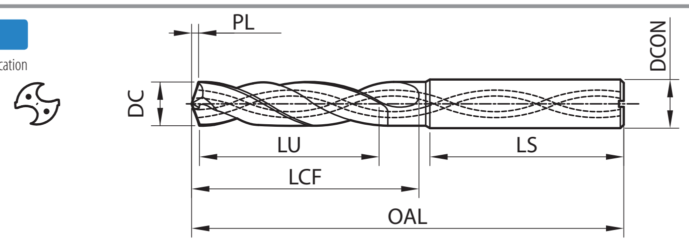
Type C with Coolant Holes 3D

3D
Approximate indication of drilling depth*



Carbide | With Coolant Holes | Cutting-edge Angle 140° | Helix Angle 22°~32° | Shank Dia. DCON Tolerance h6 | Cutting Dia. DC Tolerance m7

Cutting Dia. DC	Tolerance m7 (mm)
ø3.0	+0.002 ~ +0.012
ø3.1 ~ ø6	+0.004 ~ +0.016
ø6.1 ~ ø10	+0.006 ~ +0.021
ø10.1 ~ ø16	+0.007 ~ +0.025

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0300X03S060C	●	3	6	62	15.5	20	36	0.5
KDA0310X03S060C	●	3.1	6	62	15.3	20	36	0.5
KDA0320X03S060C	●	3.2	6	62	15.2	20	36	0.5
KDA0330X03S060C	●	3.3	6	62	15.0	20	36	0.6
KDA0340X03S060C	●	3.4	6	62	14.9	20	36	0.6
KDA0350X03S060C	●	3.5	6	62	14.7	20	36	0.6
KDA0360X03S060C	●	3.6	6	62	14.6	20	36	0.6
KDA0370X03S060C	●	3.7	6	62	14.4	20	36	0.6
KDA0380X03S060C	●	3.8	6	66	18.3	24	36	0.6
KDA0390X03S060C	●	3.9	6	66	18.1	24	36	0.7
KDA0400X03S060C	●	4	6	66	18.0	24	36	0.7
KDA0410X03S060C	●	4.1	6	66	17.8	24	36	0.7
KDA0420X03S060C	●	4.2	6	66	17.7	24	36	0.7
KDA0430X03S060C	●	4.3	6	66	17.5	24	36	0.7
KDA0440X03S060C	●	4.4	6	66	17.4	24	36	0.8
KDA0450X03S060C	●	4.5	6	66	17.2	24	36	0.8
KDA0460X03S060C	●	4.6	6	66	17.1	24	36	0.8
KDA0470X03S060C	●	4.7	6	66	16.9	24	36	0.8
KDA0480X03S060C	●	4.8	6	66	20.8	28	36	0.8
KDA0490X03S060C	●	4.9	6	66	20.6	28	36	0.8
KDA0500X03S060C	●	5	6	66	20.5	28	36	0.9
KDA0510X03S060C	●	5.1	6	66	20.3	28	36	0.9
KDA0520X03S060C	●	5.2	6	66	20.2	28	36	0.9
KDA0530X03S060C	●	5.3	6	66	20.0	28	36	0.9
KDA0540X03S060C	●	5.4	6	66	19.9	28	36	0.9
KDA0550X03S060C	●	5.5	6	66	19.7	28	36	1.0
KDA0560X03S060C	●	5.6	6	66	19.6	28	36	1.0
KDA0570X03S060C	●	5.7	6	66	19.4	28	36	1.0
KDA0580X03S060C	●	5.8	6	66	19.3	28	36	1.0
KDA0590X03S060C	●	5.9	6	66	19.1	28	36	1.0
KDA0600X03S060C	●	6	6	66	19.0	28	36	1.0
KDA0610X03S080C	●	6.1	8	79	24.8	34	36	1.1
KDA0620X03S080C	●	6.2	8	79	24.7	34	36	1.1

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0630X03S080C	●	6.3	8	79	24.5	34	36	1.1
KDA0640X03S080C	●	6.4	8	79	24.4	34	36	1.1
KDA0650X03S080C	●	6.5	8	79	24.2	34	36	1.1
KDA0660X03S080C	●	6.6	8	79	24.1	34	36	1.2
KDA0670X03S080C	●	6.7	8	79	23.9	34	36	1.2
KDA0680X03S080C	●	6.8	8	79	23.8	34	36	1.2
KDA0690X03S080C	●	6.9	8	79	23.6	34	36	1.2
KDA0700X03S080C	●	7	8	79	23.5	34	36	1.2
KDA0710X03S080C	●	7.1	8	79	30.3	41	36	1.2
KDA0720X03S080C	●	7.2	8	79	30.2	41	36	1.3
KDA0730X03S080C	●	7.3	8	79	30.0	41	36	1.3
KDA0740X03S080C	●	7.4	8	79	29.9	41	36	1.3
KDA0750X03S080C	●	7.5	8	79	29.7	41	36	1.3
KDA0760X03S080C	●	7.6	8	79	29.6	41	36	1.3
KDA0770X03S080C	●	7.7	8	79	29.4	41	36	1.4
KDA0780X03S080C	●	7.8	8	79	29.3	41	36	1.4
KDA0790X03S080C	●	7.9	8	79	29.1	41	36	1.4
KDA0800X03S080C	●	8	8	79	29.0	41	36	1.4
KDA0810X03S100C	●	8.1	10	89	34.8	47	40	1.4
KDA0820X03S100C	●	8.2	10	89	34.7	47	40	1.4
KDA0830X03S100C	●	8.3	10	89	34.5	47	40	1.5
KDA0840X03S100C	●	8.4	10	89	34.4	47	40	1.5
KDA0850X03S100C	●	8.5	10	89	34.2	47	40	1.5
KDA0860X03S100C	●	8.6	10	89	34.1	47	40	1.5
KDA0870X03S100C	●	8.7	10	89	33.9	47	40	1.5
KDA0880X03S100C	●	8.8	10	89	33.8	47	40	1.6
KDA0890X03S100C	●	8.9	10	89	33.6	47	40	1.6
KDA0900X03S100C	●	9	10	89	33.5	47	40	1.6
KDA0910X03S100C	●	9.1	10	89	33.3	47	40	1.6
KDA0920X03S100C	●	9.2	10	89	33.2	47	40	1.6
KDA0930X03S100C	●	9.3	10	89	33.0	47	40	1.6
KDA0940X03S100C	●	9.4	10	89	32.9	47	40	1.7
KDA0950X03S100C	●	9.5	10	89	32.7	47	40	1.7

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0960X03S100C	●	9.6	10	89	32.6	47	40	1.7
KDA0970X03S100C	●	9.7	10	89	32.4	47	40	1.7
KDA0980X03S100C	●	9.8	10	89	32.3	47	40	1.7
KDA0990X03S100C	●	9.9	10	89	32.1	47	40	1.8
KDA1000X03S100C	●	10	10	89	32.0	47	40	1.8
KDA1010X03S120C	●	10.1	12	102	39.8	55	45	1.8
KDA1020X03S120C	●	10.2	12	102	39.7	55	45	1.8
KDA1030X03S120C	●	10.3	12	102	39.5	55	45	1.8
KDA1040X03S120C	●	10.4	12	102	39.4	55	45	1.8
KDA1050X03S120C	●	10.5	12	102	39.2	55	45	1.9
KDA1060X03S120C	●	10.6	12	102	39.1	55	45	1.9
KDA1070X03S120C	●	10.7	12	102	38.9	55	45	1.9
KDA1080X03S120C	●	10.8	12	102	38.8	55	45	1.9
KDA1090X03S120C	●	10.9	12	102	38.6	55	45	1.9
KDA1100X03S120C	●	11	12	102	38.5	55	45	2.0
KDA1110X03S120C	●	11.1	12	102	38.3	55	45	2.0
KDA1120X03S120C	●	11.2	12	102	38.2	55	45	2.0
KDA1130X03S120C	●	11.3	12	102	38.0	55	45	2.0
KDA1140X03S120C	●	11.4	12	102	37.9	55	45	2.0
KDA1150X03S120C	●	11.5	12	102	37.7	55	45	2.0
KDA1160X03S120C	●	11.6	12	102	37.6	55	45	2.1
KDA1170X03S120C	●	11.7	12	102	37.4	55	45	2.1
KDA1180X03S120C	●	11.8	12	102	37.3	55	45	2.1
KDA1190X03S120C	●	11.9	12	102	37.1	55	45	2.1
KDA1200X03S120C	●	12	12	102	37.0	55	45	2.1
KDA1210X03S140C	●	12.1	14	107	41.8	60	45	2.2
KDA1220X03S140C	●	12.2	14	107	41.7	60	45	2.2
KDA1230X03S140C	●	12.3	14	107	41.5	60	45	2.2
KDA1240X03S140C	●	12.4	14	107	41.4	60	45	2.2
KDA1250X03S140C	●	12.5	14	107	41.2	60	45	2.2
KDA1260X03S140C	●	12.6	14	107	41.1	60	45	2.2
KDA1270X03S140C	●	12.7	14	107	40.9	60	45	2.3
KDA1280X03S140C	●	12.8	14	107	40.8	60	45	2.3

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA1290X03S140C	●	12.9	14	107	40.6	60	45	2.3
KDA1300X03S140C	●	13	14	107	40.5	60	45	2.3
KDA1310X03S140C	●	13.1	14	107	40.3	60	45	2.3
KDA1320X03S140C	●	13.2	14	107	40.2	60	45	2.4
KDA1330X03S140C	●	13.3	14	107	40.0	60	45	2.4
KDA1340X03S140C	●	13.4	14	107	39.9	60	45	2.4
KDA1350X03S140C	●	13.5	14	107	39.7	60	45	2.4
KDA1360X03S140C	●	13.6	14	107	39.6	60	45	2.4
KDA1370X03S140C	●	13.7	14	107	39.4	60	45	2.4
KDA1380X03S140C	●	13.8	14	107	39.3	60	45	2.5
KDA1390X03S140C	●	13.9	14	107	39.1	60	45	2.5
KDA1400X03S140C	●	14	14	107	39.0	60	45	2.5
KDA1410X03S160C	●	14.1	16	115	43.8	65	48	2.5
KDA1420X03S160C	●	14.2	16	115	43.7	65	48	2.5
KDA1430X03S160C	●	14.3	16	115	43.5	65	48	2.6
KDA1440X03S160C	●	14.4	16	115	43.4	65	48	2.6
KDA1450X03S160C	●	14.5	16	115	43.2	65	48	2.6
KDA1460X03S160C	●	14.6	16	115	43.1	65	48	2.6
KDA1470X03S160C	●	14.7	16	115	42.9	65	48	2.6
KDA1480X03S160C	●	14.8	16	115	42.8	65	48	2.6
KDA1490X03S160C	●	14.9	16	115	42.6	65	48	2.7
KDA1500X03S160C	●	15	16	115	42.5	65	48	2.7
KDA1510X03S160C	●	15.1	16	115	42.3	65	48	2.7
KDA1520X03S160C	●	15.2	16	115	42.2	65	48	2.7
KDA1530X03S160C	●	15.3	16	115	42.0	65	48	2.7
KDA1540X03S160C	●	15.4	16	115	41.9	65	48	2.8
KDA1550X03S160C	●	15.5	16	115	41.7	65	48	2.8
KDA1560X03S160C	●	15.6	16	115	41.6	65	48	2.8
KDA1570X03S160C	●	15.7	16	115	41.4	65	48	2.8
KDA1580X03S160C	●	15.8	16	115	41.3	65	48	2.8
KDA1590X03S160C	●	15.9	16	115	41.1	65	48	2.8
KDA1600X03S160C	●	16	16	115	41.0	65	48	2.9

* Drilling depth is an approximate indication of L/D.
Depending on the size, it may be smaller than the listed L/D.

● : Standard Stock

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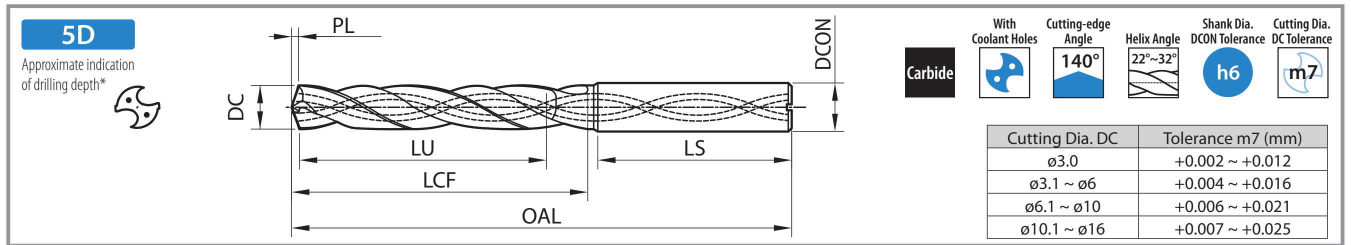
SGS Micro Tools

Type C with Coolant Holes 5D



Cutting Dia. DC	Tolerance m7 (mm)
ø3.0	+0.002 ~ +0.012
ø3.1 ~ ø6	+0.004 ~ +0.016
ø6.1 ~ ø10	+0.006 ~ +0.021
ø10.1 ~ ø16	+0.007 ~ +0.025

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0300X05S060C	●	3	6	66	23.5	28	36	0.5
KDA0310X05S060C	●	3.1	6	66	23.3	28	36	0.5
KDA0320X05S060C	●	3.2	6	66	23.2	28	36	0.5
KDA0330X05S060C	●	3.3	6	66	23.0	28	36	0.6
KDA0340X05S060C	●	3.4	6	66	22.9	28	36	0.6
KDA0350X05S060C	●	3.5	6	66	22.7	28	36	0.6
KDA0360X05S060C	●	3.6	6	66	22.6	28	36	0.6
KDA0370X05S060C	●	3.7	6	66	22.4	28	36	0.6
KDA0380X05S060C	●	3.8	6	74	30.3	36	36	0.6
KDA0390X05S060C	●	3.9	6	74	30.1	36	36	0.7
KDA0400X05S060C	●	4	6	74	30.0	36	36	0.7
KDA0410X05S060C	●	4.1	6	74	29.8	36	36	0.7
KDA0420X05S060C	●	4.2	6	74	29.7	36	36	0.7
KDA0430X05S060C	●	4.3	6	74	29.5	36	36	0.7
KDA0440X05S060C	●	4.4	6	74	29.4	36	36	0.8
KDA0450X05S060C	●	4.5	6	74	29.2	36	36	0.8
KDA0460X05S060C	●	4.6	6	74	29.1	36	36	0.8
KDA0470X05S060C	●	4.7	6	74	28.9	36	36	0.8
KDA0480X05S060C	●	4.8	6	82	36.8	44	36	0.8
KDA0490X05S060C	●	4.9	6	82	36.6	44	36	0.8
KDA0500X05S060C	●	5	6	82	36.5	44	36	0.9
KDA0510X05S060C	●	5.1	6	82	36.3	44	36	0.9
KDA0520X05S060C	●	5.2	6	82	36.2	44	36	0.9
KDA0530X05S060C	●	5.3	6	82	36.0	44	36	0.9
KDA0540X05S060C	●	5.4	6	82	35.9	44	36	0.9
KDA0550X05S060C	●	5.5	6	82	35.7	44	36	1.0
KDA0560X05S060C	●	5.6	6	82	35.6	44	36	1.0
KDA0570X05S060C	●	5.7	6	82	35.4	44	36	1.0
KDA0580X05S060C	●	5.8	6	82	35.3	44	36	1.0
KDA0590X05S060C	●	5.9	6	82	35.1	44	36	1.0
KDA0600X05S060C	●	6	6	82	35.0	44	36	1.0
KDA0610X05S080C	●	6.1	8	91	43.8	53	36	1.1
KDA0620X05S080C	●	6.2	8	91	43.7	53	36	1.1

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0630X05S080C	●	6.3	8	91	43.5	53	36	1.1
KDA0640X05S080C	●	6.4	8	91	43.4	53	36	1.1
KDA0650X05S080C	●	6.5	8	91	43.2	53	36	1.1
KDA0660X05S080C	●	6.6	8	91	43.1	53	36	1.2
KDA0670X05S080C	●	6.7	8	91	42.9	53	36	1.2
KDA0680X05S080C	●	6.8	8	91	42.8	53	36	1.2
KDA0690X05S080C	●	6.9	8	91	42.6	53	36	1.2
KDA0700X05S080C	●	7	8	91	42.5	53	36	1.2
KDA0710X05S080C	●	7.1	8	91	42.3	53	36	1.2
KDA0720X05S080C	●	7.2	8	91	42.2	53	36	1.3
KDA0730X05S080C	●	7.3	8	91	42.0	53	36	1.3
KDA0740X05S080C	●	7.4	8	91	41.9	53	36	1.3
KDA0750X05S080C	●	7.5	8	91	41.7	53	36	1.3
KDA0760X05S080C	●	7.6	8	91	41.6	53	36	1.3
KDA0770X05S080C	●	7.7	8	91	41.4	53	36	1.4
KDA0780X05S080C	●	7.8	8	91	41.3	53	36	1.4
KDA0790X05S080C	●	7.9	8	91	41.1	53	36	1.4
KDA0800X05S080C	●	8	8	91	41.0	53	36	1.4
KDA0810X05S100C	●	8.1	10	103	48.8	61	40	1.4
KDA0820X05S100C	●	8.2	10	103	48.7	61	40	1.4
KDA0830X05S100C	●	8.3	10	103	48.5	61	40	1.5
KDA0840X05S100C	●	8.4	10	103	48.4	61	40	1.5
KDA0850X05S100C	●	8.5	10	103	48.2	61	40	1.5
KDA0860X05S100C	●	8.6	10	103	48.1	61	40	1.5
KDA0870X05S100C	●	8.7	10	103	47.9	61	40	1.5
KDA0880X05S100C	●	8.8	10	103	47.8	61	40	1.6
KDA0890X05S100C	●	8.9	10	103	47.6	61	40	1.6
KDA0900X05S100C	●	9	10	103	47.5	61	40	1.6
KDA0910X05S100C	●	9.1	10	103	47.3	61	40	1.6
KDA0920X05S100C	●	9.2	10	103	47.2	61	40	1.6
KDA0930X05S100C	●	9.3	10	103	47.0	61	40	1.6
KDA0940X05S100C	●	9.4	10	103	46.9	61	40	1.7
KDA0950X05S100C	●	9.5	10	103	46.7	61	40	1.7

KYOCERA Solid Tools
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Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA0960X05S100C	●	9.6	10	103	46.6	61	40	1.7
KDA0970X05S100C	●	9.7	10	103	46.4	61	40	1.7
KDA0980X05S100C	●	9.8	10	103	46.3	61	40	1.7
KDA0990X05S100C	●	9.9	10	103	46.1	61	40	1.8
KDA1000X05S100C	●	10	10	103	46.0	61	40	1.8
KDA1010X05S120C	●	10.1	12	118	55.8	71	45	1.8
KDA1020X05S120C	●	10.2	12	118	55.7	71	45	1.8
KDA1030X05S120C	●	10.3	12	118	55.5	71	45	1.8
KDA1040X05S120C	●	10.4	12	118	55.4	71	45	1.8
KDA1050X05S120C	●	10.5	12	118	55.2	71	45	1.9
KDA1060X05S120C	●	10.6	12	118	55.1	71	45	1.9
KDA1070X05S120C	●	10.7	12	118	54.9	71	45	1.9
KDA1080X05S120C	●	10.8	12	118	54.8	71	45	1.9
KDA1090X05S120C	●	10.9	12	118	54.6	71	45	1.9
KDA1100X05S120C	●	11	12	118	54.5	71	45	2.0
KDA1110X05S120C	●	11.1	12	118	54.3	71	45	2.0
KDA1120X05S120C	●	11.2	12	118	54.2	71	45	2.0
KDA1130X05S120C	●	11.3	12	118	54.0	71	45	2.0
KDA1140X05S120C	●	11.4	12	118	53.9	71	45	2.0
KDA1150X05S120C	●	11.5	12	118	53.7	71	45	2.0
KDA1160X05S120C	●	11.6	12	118	53.6	71	45	2.1
KDA1170X05S120C	●	11.7	12	118	53.4	71	45	2.1
KDA1180X05S120C	●	11.8	12	118	53.3	71	45	2.1
KDA1190X05S120C	●	11.9	12	118	53.1	71	45	2.1
KDA1200X05S120C	●	12	12	118	53.0	71	45	2.1
KDA1210X05S140C	●	12.1	14	124	58.8	77	45	2.2
KDA1220X05S140C	●	12.2	14	124	58.7	77	45	2.2
KDA1230X05S140C	●	12.3	14	124	58.5	77	45	2.2
KDA1240X05S140C	●	12.4	14	124	58.4	77	45	2.2
KDA1250X05S140C	●	12.5	14	124	58.2	77	45	2.2
KDA1260X05S140C	●	12.6	14	124	58.1	77	45	2.2
KDA1270X05S140C	●	12.7	14	124	57.9	77	45	2.3
KDA1280X05S140C	●	12.8	14	124	57.8	77	45	2.3

Description	Stock	Dimensions (mm)						
		DC	DCON	OAL	LU	LCF	LS	PL
KDA1290X05S140C	●	12.9	14	124	57.6	77	45	2.3
KDA1300X05S140C	●	13	14	124	57.5	77	45	2.3
KDA1310X05S140C	●	13.1	14	124	57.3	77	45	2.3
KDA1320X05S140C	●	13.2	14	124	57.2	77	45	2.4
KDA1330X05S140C	●	13.3	14	124	57.0	77	45	2.4
KDA1340X05S140C	●	13.4	14	124	56.9	77	45	2.4
KDA1350X05S140C	●	13.5	14	124	56.7	77	45	2.4
KDA1360X05S140C	●	13.6	14	124	56.6	77	45	2.4
KDA1370X05S140C	●	13.7	14	124	56.4	77	45	2.4
KDA1380X05S140C	●	13.8	14	124	56.3	77	45	2.5
KDA1390X05S140C	●	13.9	14	124	56.1	77	45	2.5
KDA1400X05S140C	●	14	14	124	56.0	77	45	2.5
KDA1410X05S160C	●	14.1	16	133	61.8	83	48	2.5
KDA1420X05S160C	●	14.2	16	133	61.7	83	48	2.5
KDA1430X05S160C	●	14.3	16	133	61.5	83	48	2.6
KDA1440X05S160C	●	14.4	16	133	61.4	83	48	2.6
KDA1450X05S160C	●	14.5	16	133	61.2	83	48	2.6
KDA1460X05S160C	●	14.6	16	133	61.1	83	48	2.6
KDA1470X05S160C	●	14.7	16	133	60.9	83	48	2.6
KDA1480X05S160C	●	14.8	16	133	60.8	83	48	2.6
KDA1490X05S160C	●	14.9	16	133	60.6	83	48	2.7
KDA1500X05S160C	●	15	16	133	60.5	83	48	2.7
KDA1510X05S160C	●	15.1	16	133	60.3	83	48	2.7
KDA1520X05S160C	●	15.2	16	133	60.2	83	48	2.7
KDA1530X05S160C	●	15.3	16	133	60.0	83	48	2.7
KDA1540X05S160C	●	15.4	16	133	59.9	83	48	2.8
KDA1550X05S160C	●	15.5	16	133	59.7	83	48	2.8
KDA1560X05S160C	●	15.6	16	133	59.6	83	48	2.8
KDA1570X05S160C	●	15.7	16	133	59.4	83	48	2.8
KDA1580X05S160C	●	15.8	16	133	59.3	83	48	2.8
KDA1590X05S160C	●	15.9	16	133	59.1	83	48	2.8
KDA1600X05S160C	●	16	16	133	59.0	83	48	2.9

* Drilling depth is an approximate indication of L/D.
Depending on the size, it may be smaller than the listed L/D.

● : Standard Stock

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Reference Cutting Conditions Table

K-series 3D 5D

Workpiece	Vc (m/min) Type N	Vc (m/min) Type C	f (mm/rev) ø3	ø4	ø6	ø8	ø10	ø12	ø14	ø16
Mild Steel/Low Carbon Steel SS 400/S 10 C (< 125 HB)	50-100	60-140	0.09-0.16	0.11-0.19	0.14-0.23	0.19-0.31	0.23-0.38	0.24-0.41	0.28-0.45	0.30-0.50
Carbon Steel S 35C/S 50C (< 25 HRC)	45-90	60-120	0.09-0.16	0.11-0.19	0.14-0.23	0.19-0.31	0.23-0.38	0.24-0.41	0.28-0.45	0.30-0.50
Alloy Steel/Tool Steel SCM/SCr/SNCM (< 35 HRC)	45-90	50-110	0.09-0.16	0.11-0.19	0.14-0.23	0.19-0.31	0.23-0.38	0.24-0.41	0.28-0.45	0.30-0.50
Alloy Steel/Tool Steel SCM/SCr/SNCM (35 -48 HRC)	40-80	40-90	0.09-0.14	0.10-0.17	0.13-0.22	0.17-0.29	0.21-0.35	0.22-0.37	0.26-0.41	0.28-0.44
Austenitic Stainless Steel SUS 304 (130 -200 HB)	20-40	40-80	0.05-0.10	0.06-0.12	0.07-0.14	0.08-0.18	0.09-0.20	0.10-0.22	0.11-0.24	0.12-0.24
High Strength Austenitic Stainless Steel and Stainless Cast Steel (< 25 HRC)	20-40	40-80	0.03-0.08	0.04-0.10	0.05-0.10	0.06-0.12	0.07-0.14	0.08-0.16	0.09-0.18	0.10-0.18
Austenitic-ferritic Stainless Steel (< 30 HRC)	20-35	30-60	0.03-0.08	0.04-0.10	0.05-0.10	0.06-0.12	0.07-0.14	0.08-0.16	0.09-0.18	0.10-0.18
Gray Cast Iron FC 250 (< 32 HRC)	60-100	60-140	0.13-0.20	0.15-0.23	0.17-0.30	0.20-0.35	0.23-0.40	0.25-0.45	0.28-0.48	0.30-0.50
Alloy Cast Iron/Nodular Cast Iron FCD450 (< 28 HRC)	60-100	60-140	0.11-0.18	0.13-0.20	0.15-0.25	0.17-0.32	0.20-0.36	0.22-0.42	0.24-0.45	0.25-0.48
High Alloy Cast Iron and Nodular Cast Iron (< 45 HRC)	60-90	60-100	0.06-0.11	0.08-0.13	0.10-0.16	0.12-0.20	0.14-0.26	0.16-0.28	0.18-0.30	0.20-0.32

Precautions
1. Make sure the workpiece is fixed firmly to the machine.
Use of precision holders, hydro chucks, and high-quality collet chucks is recommended.
2. Use a drill with a run-out of less than 0.02 mm when mounting.
3. Standard cutting conditions is when water-soluble coolant is applied.
4. If the tool diameter you want to use is not listed in the table, please refer to the closest tool diameter value in the table.
Adjust the cutting parameters according to your working environment in Machining.

Description's view

KDA0950X03S100C

KDA	0950	X	03	S100	C
Product Name High Efficiency Coated Solid Carbide Drill	Cutting Dia. DC ø9.5		Drilling Depth* (L/D) 03 : 3D 05 : 5D	Shank Dia. DCON ø10.0	Type N: No Coolant Holes C: With Coolant Holes

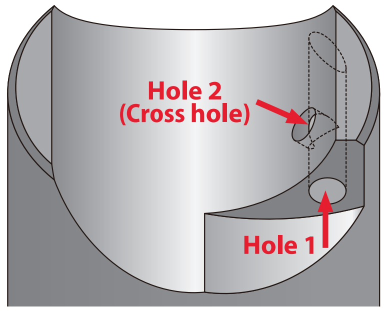
* Drilling depth is an approximate indication of L/D and depends on the size.
Depending on the size, the size may be smaller than the L/D indicated. Check the dimension table.

Case Studies

(User evaluation)

The KDA extends 20% longer than the current set life.
The condition of the cutting edge was good, and the wear of the shoulder was less than competitor.

Body SCM 440
ø6.9, Drilling



Type C
KDA0690X05S080C

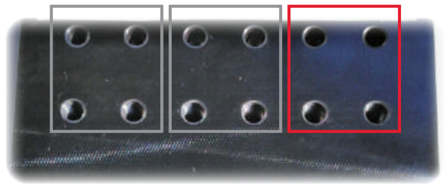
Tool life

KDA	**2,400** pcs or more/1KDA
Competitor C Competitor D	**2,000** pcs/1KDA

Cutting Conditions:
Hole 1: Vc = 50 m/min, f = 0.1 mm/rev, H = 25 mm
Hole 2: Vc = 40 m/min, f = 0.1 mm/rev, H = 15 mm
Wet (Internal coolant) Combined cutting machine

KDA showed less variation in hole diameter compared to competitor and achieved high efficiency machining. Machining sound was quiet and chip condition was good.

Mold Part Cold Tool Steel
ø5.1, Drilling



Type N
KDA0510X03S060N

Hole diameter variation (H = 7.5 mm)

KDA	**0.022** mm
Competitor E	**0.042** mm

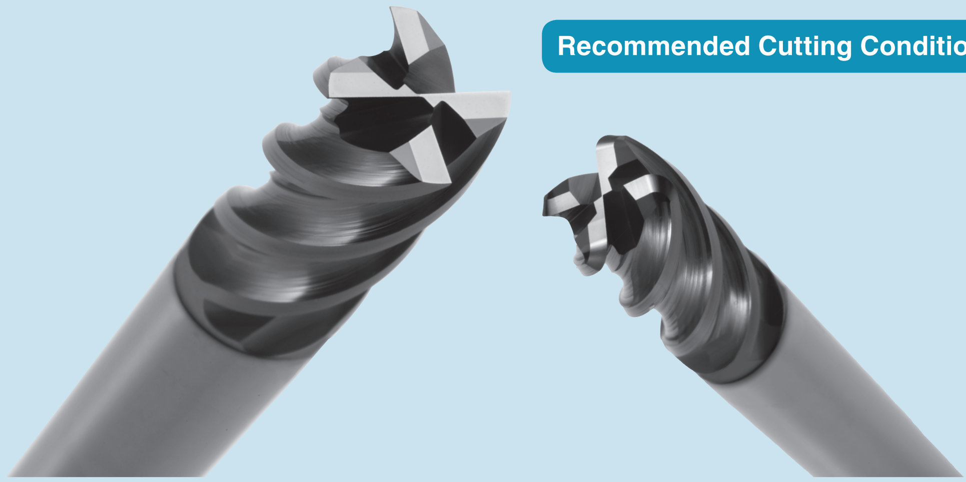
Cutting Conditions:
Vc = 80 m/min, f = 0.15 mm/rev, H = 15 mm
Wet (External coolant) BT 50

Solid Tools

Carbide Substrate

L

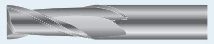
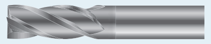
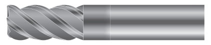
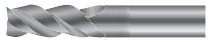
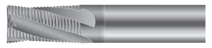
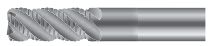
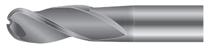
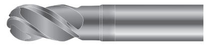
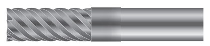
L1~L82



Tool Selection Guide

Carbide Substrate — Substrate of all solid end mills is carbide.

Application and selection

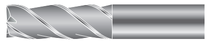
See Page	Applications	Description	Identification System	Features	Shape	Coating	No. of Flutes	Helix Angle	Outside Dia. DC (mm)	Steel ~30HRC (P ~30HRC)	Steel ~40HRC (P 30~40HRC)	Heat Treated Steel ~55HRC (H ~55HRC)	Heat Treated Steel ~68HRC (H ~68HRC)	Stainless Steel (M Stainless steel)	Titanium Alloys (S Titanium Alloy)	Heat-resistant Alloys (S Heat-resistant Alloy)	Cast Iron (K Cast Iron)	Aluminum & Non-ferrous Metals (N Aluminum & Non Ferrous Material)	Description	See Page
L10~L11	Surface finish oriented	2FES S/M/L	1	2 flutes, Sharp corner edge		MEGACOAT	2	30°	ø0.2~ø16	●	○	○		●			○	○	2FES S/M/L	L10~L11
L12		2FEK S/M		2 flutes, Tough corner edge					ø3~ø16										2FEK S/M	L12
L13		4FESM		4 flutes, Sharp corner edge			4		ø1~ø16										4FESM	L13
		4FEKM		4 flutes, Tough corner edge					ø3~ø16										4FEKM	
L14~L15		2/3/4 FESW		For Automatic Lathes (Overall length 35mm / 45mm)			2/3/4	35°	ø3~ø13										2/3/4 FESW	L14~L15
L16~L19	High efficiency chip evacuation	4MFK	2	4 flutes High feed rate, High efficiency		MEGACOAT NANO	4	Variable Lead 42°, 44°	ø3~ø16	●	○	○		○	○		○	○	4MFK	L16~L19
		4MFR																	4MFR	
L20~L21		4TFK	2	4 flutes Difficult-to-cut materials, High efficiency		MEGACOAT NANO	4	Variable Lead 42°, 44°	ø3~ø20	●	○			●	●	○	○		4TFK	L20~L21
		4TFR																	4TFR	
L22~L23		3ZFK S/M	1	Multi-functional, High efficiency		MEGACOAT	3	40°	ø3~ø16	●	○			●	○		○	○	3ZFK S/M	L22~L23
L24		5DERM	1	5 flutes, Steel and Difficult-to-cut materials Varied interval flute design		AlTiN	5	38°	ø4~ø25	●	●			●	●	●	○		5DERM	L24
L25	Multi-purpose	3UFSM	1	3 flutes, Multi-purpose		TiAlN	3	45°	ø1~ø20	●	●	○		●	○		●	○	3UFSM	L25
L26~L27	High efficiency, High feed rate with Multi-edge	6PFK	2	6/8 flutes,High efficiency, High feed rate, Finishing (Shouldering)		MEGACOAT NANO	6	Variable Lead 42°, 44°	ø6~ø25	●	○	○		●	●		○	○	6PFK	L26~L27
		8PFK					8												8PFK	
L28~L29	Superalloy	4JER	2	4 flutes High efficiency, Stable machining		MEGACOAT HARD	4	Variable Lead 32°, 35°	ø6~ø20	●	○			○	○	●			4JER	L28~L29
L30~L31	Roughing	4RFH	2	Special serrated edge, Difficult-to-cut materials with Coolant hole		MEGACOAT HARD	4	40°	ø6~ø20	●	●			●	●	○	○		4RFH	L30~L31
		5RFH					5												5RFH	
		6RFH					6												6RFH	
L32		3/4/5 RDSM	1	Serrated edge		TiAlN	3/4/5	20°	ø4~ø25	●	●			○			●		3/4/5 RDSM	L32
		3/4/5 RDSL																	3/4/5 RDSL	
L33		4/6 RFSM	1	Notched edge		TiAlN	4/6	45°	ø6~ø25	○	●	●	○	○	●	○	○		4/6 RFSM	L33
L34~L35	Ball-nose	2SEB	3	High efficiency Ball-nose End Mill with 2 flutes		MEGACOAT NANO	2	30°	ø2~ø16	●	●	●	○	○			○		2SEB	L34~L35
L36		3UEBS	1	Ball-nose End Mill with 3 flutes		TiAlN	3	30°	ø3~ø12	●	●			○	○		●	○	3UEBS	L36
		4YEBM	1	Ball-nose End Mill with 4 flutes		TiAlN	4	38°	ø5~ø20	●	○			●	●	○	○		4YEBM	
L37	Hard materials	4/5/6/7 HFSS	1	Multi-edge type Negative rake angle Hard Materials Finishing		MEGACOAT HARD	4/5/6/7	45°	ø1~ø12	●	●	●	●						4/5/6/7 HFSS	L37
		4/5/6/7/8 HFSM					4/5/6/7/8		ø1~ø25										4/5/6/7/8 HFSM	
L38~L39	Special corner-R shaped	6PDRS	1	6 flutes, High feed rate		AlTiN	6	20°	ø6~ø12	●	●	●	●						6PDRS	L38~L39

● : 1st Choice ○ : 2nd Choice

Carbide Substrate

Substrate of all solid end mills is carbide.

Application and selection

See Page	Applications	Description	Identification System	Features	Shape	Coating	No. of Flutes	Helix Angle	Outside Dia. DC (mm)		Workpiece Material: Steel P ~30HRC	Steel P 30~40HRC	Heat Treated Steel H ~55HRC	Heat Treated Steel H ~68HRC	Stainless Steel M	Titanium Alloys S	Heat-resistant Alloys S	Cast Iron K	Aluminum & Non-ferrous Metals N	Description	See Page
L40~L43	Aluminum & Non-ferrous metals	3AFK	2	High efficiency, High precision		-	3	45°	ø3~ø16										●	3AFK	L40~L43
L44		3NESM	1	Varied interval flute design with wiper edge		-	3	38°	ø3~ø20										●	3NESM	L44
L47	CFRP	4FCX-KCD	2	NEW For CFRP Diamond Coating		Diamond	4	10°	ø8~ø12										●	4FCX-KCD	L47

● : 1st Choice ○ : 2nd Choice

Solid End Mill Identification System

1

2 F E S M 020 - 060 - 04 XXXXXXXX
(1) (2) (3) (4) (5) (6) (7) (8) (9)

(1) No. of Flutes	(2) Applications	(3) Helix Angle	(4) Series	(5) Length of cut	(6) Outside Dia.	(7) Length of cut	(8) Shank Dia.	(9) Others
2 3 4 5 6 7 8	F : Surface finish oriented U : Multi-purpose Z : Multi-functional, High efficiency Y/D : High efficiency (Difficult-to-cut materials) R : Roughing H : Hard materials N : Aluminum & Non-ferrous metals	D : 20-29° E : 30-39° F : 40-49° G : 50-59°	B : Ball-nose R : Radius S,K : Square C : With corner chamfering	S : Short M : Medium L : Long W : For Automatic Lathes	020 ↓ 2.0mm	060 ↓ 6.0mm	04 ↓ 4.0mm	Corner-R, C width etc. ...

2

4 T F R 030 - 080 - R02
(1) (2) (3) (4) (5) (6) (7)

(1) No. of Flutes	(2) Applications	(3) Helix Angle	(4) Series	(5) Outside Dia.	(6) Length of cut	(7) Others
3 4 5 6 8	M : High feed rate, High efficiency P : Shouldering, High feed rate, Finishing T : High efficiency (Difficult-to-cut materials) J : Superalloy A : Aluminum & Non-ferrous metals R : Roughing F : For CFRP	C : 10-19° E : 30-39° F : 40-49°	K : Tough corner edge R : Radius H : Radius (with Coolant Hole) X : Special	030 ↓ 3.0mm	080 ↓ 8.0mm	R02 : Corner-R 0.2mm 090 : Under Neck Length 9mm KCD : Diamond Coating

3

2 S E B 020 - 050 - R10
(1) (2) (3) (4) (5) (6) (7)

(1) No. of Flutes	(2) Applications	(3) Helix Angle	(4) Series	(5) Outside Dia.	(6) Length of cut	(7) Radius of Ball-nose
2	S : High efficiency	E : 30-39°	B : Ball-nose	020 ↓ 2.0mm	050 ↓ 5.0mm	R10 ↓ R1.0mm

Icon Glossary

Coating

- MEGACOAT NANO
- MEGACOAT HARD
- MEGACOAT
- TiAlN Coating
- AlTiN Coating
- CVD Diamond Coating
- Uncoated

Shank Dia. Tolerance

- h5 Shank Dia. — Shank Dia. Tolerance is h5.
- h6 Shank Dia. — Shank Dia. Tolerance is h6.

Corner Form

- Radius R — Radius
- Sharp — Sharp corner edge
- Land — With corner land
- C — With corner chamfering
- Honing R — Honed

Corner Radius Tolerance

- 0~-0.02 mm R — Corner Radius Tolerance is 0~-0.02mm.

Ball-nose radius Tolerance

- 0~-0.02 mm R — The R tolerance of ball-nose end mill is 0~-0.02mm.

No. of Flutes

- 3 — 3 flutes design

Helix Angle

- 30° — Helix Angle 30°

Cutting edge shape

- Cutting shape — Roughing

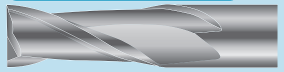
Tool Selection Guide

Introduction

Surface finish oriented

L10~L15

F Series — MEGACOAT is applied


(FES)

MEGACOAT and sharp cutting edge enable high precision finishing owing to excellent wear and heat resistance
Overall lengths 35mm and 45mm are available for automatic lathes

L10~L15

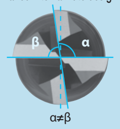
High efficiency, Excellent chip evacuation

L16~L24

M Series — MEGACOAT NANO is applied

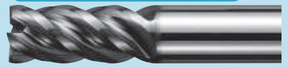

(4MFK)

Superior chattering resistance with Kyocera's unique varied interval flute design and variable lead
Achieves high rigidity and stable chip evacuation with new special flute design
Achieves high feed rate, high efficiency machining

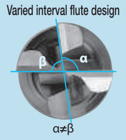
Varied interval flute design

α≠β

L16

T Series — MEGACOAT NANO is applied


(4TFK)

High efficiency end mill for difficult-to-cut materials
(stainless steel, titanium alloys and heat-resistant alloys)
Varied interval flute design / Variable Lead

Varied interval flute design

α≠β

L20

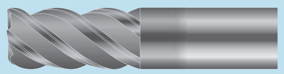
3ZFK — MEGACOAT is applied


(3ZFKS)

Multi-functional, high efficiency end mill
Applicable to plunge milling, slotting and finishing with one end mill.
Smooth chip evacuation because sub-groove on gash breaks chips during plunge milling.

L22

D Series


(5DERM)

Varied interval flute design with 5 flutes
For high efficiency slotting and shouldering
Applicable to difficult-to-cut materials like stainless steel and heat resistant steel

L24

High efficiency , High feed rate

L26~L27

PFK — MEGACOAT NANO is applied


(6PFK)

High feed rate and high efficiency shouldering with multi-edge design
(6 flutes /8 flutes)
Varied interval flute design and variable lead to minimize chattering

L26

Superalloy

L28~L29

J Series — MEGACOAT HARD is applied


(4JER)

High efficiency and stable machining for Heat Resistant Alloys such as Inconel®
Long tool life machining with MEGACOAT HARD for excellent heat resistance

L28

Roughing

L30~L33

R Series — MEGACOAT HARD is applied


(RFH)

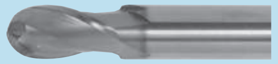
High efficiency machining of Difficult-to-cut material with multi-edge design and coolant hole
Deep slotting (ap = 2 x DC) for Stainless Steel and Titanium Alloy
Lineup of RDS with serrated edge and RFS with notched edge

L30

Ball-nose End Mill

L34~L36

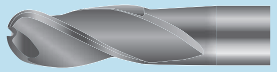
S Series — MEGACOAT NANO is applied


(2SEB)

High efficiency ball-nose end mill with 2 flutes
Sharp cutting with special nose geometry
Close tolerance edge diameter (R±0.005mm, ø16 excluded)
Stable chip evacuation by a large chip pocket design

L34

U Series Y Series (UEB,YEB)


(3UEBS)

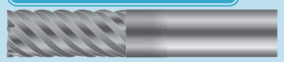
Boll-nose end mill with 3/4 flutes

L36

Hard Materials

L37~L39

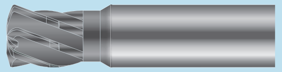
H Series — MEGACOAT HARD is applied


(HFS)

PVD coating "MEGACOAT HARD" for hard materials is applied
Large core diameter and negative rake angle improves edge strength
Helix angle is 45˚.High efficiency machining and long tool life with wide range of 4, 5, 6, 7 and 8 flutes types

L37

P Series (PDR)


(6PDRS)

High efficiency radius. Enables large cutting volume and high efficiency machining with special corner-R shaped
Ramping and arc cutting are possible

L38

Aluminum & Non-ferrous Metals

L40~L44

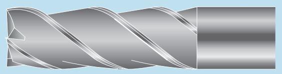
A Series


(3AFK)

High-efficiency and High-precision 3 flutes end mill
Sharp cutting edge and excellent anti-chattering performance
Delivers high stability in diverse machining situations

L40

N Series


(3NESM)

Good bottom surface finish with wiper edge on the end edge
Varied interval flute design prevents chattering and improves machining efficiency and surface finish quality of side wall of workpiece.

L44

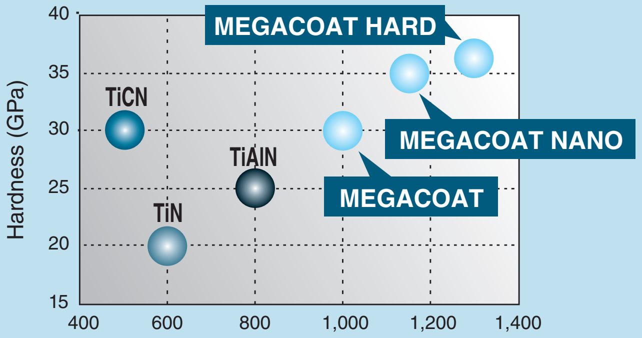
New PVD technology, MEGACOAT

MEGACOAT

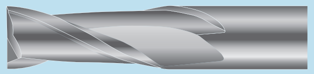
Superior wear and oxidation resistant MEGACOAT

MEGACOAT for Solid End Mill

1. For General Milling…
 ………MEGACOAT
2. For High Efficiency Milling
 ……MEGACOAT NANO
3. For Superalloy, Hard materials
 ……MEGACOAT HARD

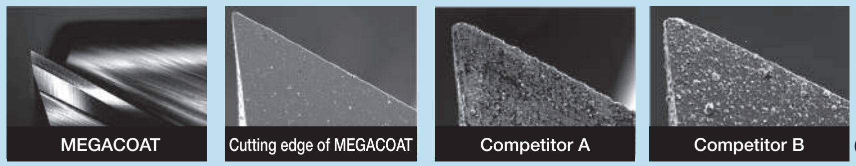


1. MEGACOAT for general milling



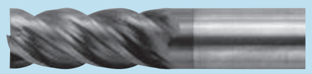
F Series
L10~L15

MEGACOAT extend tool life for roughing to finishing of various kinds of material with superior wear resistance and high oxidation resistance

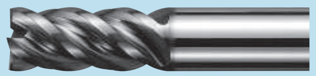


(Internal evaluation)

2. MEGACOAT NANO with special multilayer nano coating for high efficiency machining



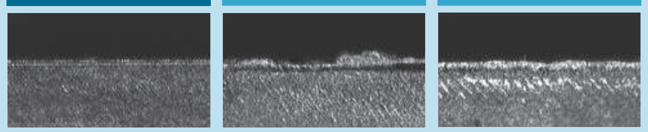
4MFK/4MFR



4TFK/4TFR

· Long Tool Life with "MEGACOAT NANO"
 Doubled Wear Resistance compared to the Competitor's!
Edge Conditions after 140m Machining

4MFK/4MFR	Competitor C	Competitor D



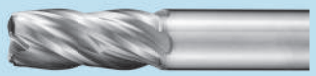
[Cutting Conditions:n=6,000min^{-1},Vf=1,100mm/min,apxae=5.0x0.8mm, ø8, SCM440, Shouldering] (Internal evaluation)

4MFK / 4MFR
L16

4TFK / 4TFR
L20

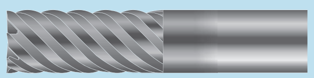
The special Multilayer Nano Coating realizes superior wear resistance due to high hardness and anti-chipping performance. Suitable for high feed rate machining

3. MEGACOAT HARD for machining of superalloy and hard materials



4JER

4/5/6RFH



(H Series)

4JER
L28

4/5/6RFH
L30

H Series
L37

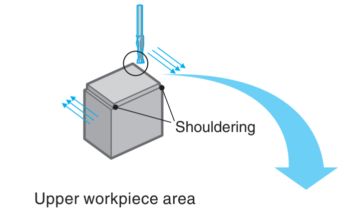
The special multilayer coating provides high hardness and excellent oxidation resistance
Longer tool life and stability at machining of superalloys and hard materials

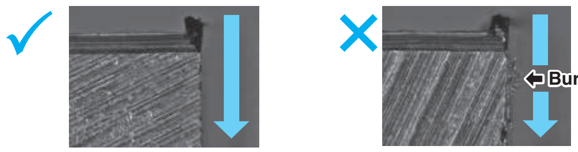
Case Studies

Block SUS304

Sharp Cutting Edge Reduced Burrs

n = 2,230 min^{-1}
(Vc = 70 m/min)
Vf = 134 mm/min
(fz = 0.03 mm/t)
ap x ae = 5.0 x 1.0 mm



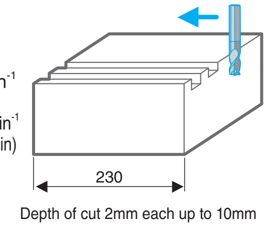


2FESM100-220-10 | Competitor Coated Carbide E

(Internal evaluation)

Slotting of Titanium Alloy

Outside Dia. ø10 mm
Workpiece Material Ti-6Al-4V
Spindle Revolution 3ZFK : n = 1,700 min^{-1}
(Vc = 54 m/min)
Spindle Revolution Competitor F : n = 1,300 min^{-1}
(Vc = 40 m/min)
Feed Rate Vf = 460 mm/min
(fz = 0.09 mm/t)
ap x ae = 2 x 10 mm
Wet



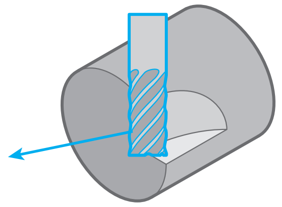
Number of slots

		Tool life
3ZFK	52 slots	1.4 times
Competitor F	35 slots	

Better surface finish and longer tool life with 3ZFK
Compared to competitor's coated product, the 3ZFK has a 1.4 times longer tool life
3ZFK prevents burr formation due to sharp cutting edge (Internal evaluation)

Machine parts SCM440

n = 2,400 min^{-1}
(Vc = 150 m/min)
Vf = 1,710 mm/min
(fz = 0.12 mm/t)
ap x ae = 18 x 1.0 mm
Shouldering



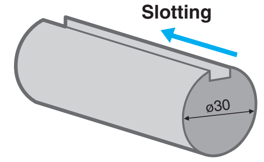
Cycle time for a set of workpiece (setup time included)

6PFK 200-450	159 sec	52% Cutting Time
Conventional G	336 sec	

Cycle time greatly reduced compared with conventional End Mill G
No heavy wear after machining 100 workpieces and still possible to continue machining
(User Evaluation)

Automotive parts S45C

n = 3,500 min^{-1}
(Vc = 77 m/min)
Vf = 1,000 mm/min
(fz = 0.071 mm/t)
ap x ae = 5 x 7 mm, Wet



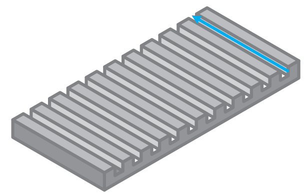
Number of workpiece

		Tool life	Productivity
4MFK070-160	255 pcs	5 times	6.6 times
Competitor H	50 pcs		

(Competitor H, Cutting Conditions)
ø7, 4 flutes n = 2,000 min^{-1} (Vc = 44 m/min)
Vf = 150 mm/min (fz = 0.019 mm/t), ap x ae = 5 x 7mm, Wet
Kyocera showed 5 times longer tool life than Competitor H
Kyocera showed 6.6 times productivity than Competitor H
No vibration occurred. Stable machining
(User Evaluation)

Plate SUS304

n = 1,590 min^{-1}
(Vc = 50 m/min)
Vf = 220 mm/min
(fz = 0.035 mm/t)
ap x ae = 4 ~ 10 x 10 mm, Wet



Number of workpiece

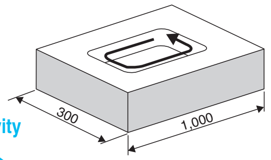
		Tool life
4TFK100-250	2 pcs	1.3 times longer
Competitor I (4 flutes)	1.5 pcs	

4TFK showed 1.3 times longer tool life than Competitor I
(User Evaluation)

Mold Heat Treated Steel (60HRC)

n=1,194min^{-1}
(Vc=60m/min)
Vf=400mm/min
(fz=0.056mm/t)
ap x ae=40 x 0.3mm
6HFSM160-420-16
(ø16, 6 flutes)

Tool life Productivity
Double Double



6HFSM160-420-16	Amount of chip evacuation 4.8cc/min	Tool life : 10pcs
Competitor Coated Carbide J	Amount of chip evacuation 2.4cc/min	Tool life : 5pcs

[Competitor Coated Carbide J]
ø16, 6 flutes
n=597min^{-1}
(Vc=30m/min)
Vf=200mm/min
(fz=0.056mm/t)
ap x ae=40 x 0.3mm

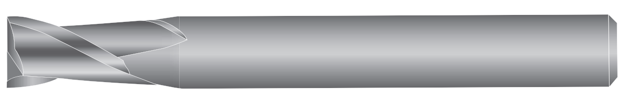
The cutting speed and table feed rate is doubled compared to competitor's coated carbide J. The cutting edge conditions was good and the tool life was also doubled.

(User Evaluation)

Surface finish oriented, 2 flutes, Sharp corner edge

No. of Flutes : 2

2FESS, 2FESM, 2FESL

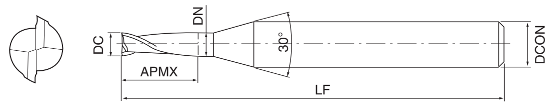


MEGACOAT is applied

Recommended Workpiece Materials ★ 1st Choice

P ~30HRC ★ | P 30~40HRC | H ~55HRC | M Stainless steel ★ | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT | Sharp | h5 Shank Dia. | 30°



2FESS (Short)

Shouldering | Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
2FESS010-015-04	●	1.0	0/-0.015	1.5	1.1	4	45	2
2FESS015-023-04	●	1.5	0/-0.015	2.3	1.6	4	45	2
2FESS020-030-04	●	2.0	0/-0.015	3.0	2.1	4	45	2
2FESS025-037-04	●	2.5	0/-0.015	3.7	2.6	4	45	2
2FESS030-045-06	●	3.0	0/-0.015	4.5	3.2	6	50	2
2FESS035-052-06	●	3.5	0/-0.015	5.2	3.7	6	50	2
2FESS040-060-06	●	4.0	0/-0.015	6.0	4.2	6	50	2
2FESS045-067-06	●	4.5	0/-0.015	6.7	4.7	6	50	2
2FESS050-075-06	●	5.0	0/-0.015	7.5	5.2	6	50	2
2FESS055-082-06	●	5.5	0/-0.015	8.2	5.7	6	50	2
2FESS060-090-06	●	6.0	0/-0.020	9.0	-	6	50	2
2FESS070-105-08	●	7.0	0/-0.020	10.5	7.2	8	60	2
2FESS080-120-08	●	8.0	-0.005/-0.025	12.0	-	8	60	2
2FESS090-135-10	●	9.0	-0.005/-0.025	13.5	9.2	10	70	2
2FESS100-150-10	●	10.0	-0.005/-0.025	15.0	-	10	70	2
2FESS120-180-12	●	12.0	-0.010/-0.030	18.0	-	12	75	2
2FESS140-210-16	●	14.0	-0.010/-0.030	21.0	14.2	16	75	2
2FESS150-230-16	●	15.0	-0.010/-0.030	23.0	15.2	16	90	2
2FESS160-240-16	●	16.0	-0.010/-0.030	24.0	-	16	90	2

2FESM (Medium)

Shouldering | Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
2FESM002-004-04	●	0.2	0/-0.015	0.4	0.22	4	45	2
2FESM003-006-04	●	0.3	0/-0.015	0.6	0.32	4	45	2
2FESM004-008-04	●	0.4	0/-0.015	0.8	0.42	4	45	2
2FESM005-010-04	●	0.5	0/-0.015	1.0	0.53	4	45	2
2FESM006-012-04	●	0.6	0/-0.015	1.2	0.63	4	45	2
2FESM007-014-04	●	0.7	0/-0.015	1.4	0.74	4	45	2
2FESM008-016-04	●	0.8	0/-0.015	1.6	0.84	4	45	2
2FESM009-020-04	●	0.9	0/-0.015	2.0	0.95	4	45	2
2FESM010-025-04	●	1.0	0/-0.015	2.5	1.1	4	45	2
2FESM011-025-04	●	1.1	0/-0.015	2.5	1.2	4	45	2
2FESM012-040-04	●	1.2	0/-0.015	4.0	1.3	4	45	2
2FESM013-040-04	●	1.3	0/-0.015	4.0	1.4	4	45	2
2FESM014-040-04	●	1.4	0/-0.015	4.0	1.5	4	45	2
2FESM015-040-04	●	1.5	0/-0.015	4.0	1.6	4	45	2
2FESM016-050-04	●	1.6	0/-0.015	5.0	1.7	4	45	2
2FESM017-050-04	●	1.7	0/-0.015	5.0	1.8	4	45	2
2FESM018-050-04	●	1.8	0/-0.015	5.0	1.9	4	45	2
2FESM019-050-04	●	1.9	0/-0.015	5.0	2.0	4	45	2
2FESM020-060-04	●	2.0	0/-0.015	6.0	2.1	4	45	2
2FESM021-060-04	●	2.1	0/-0.015	6.0	2.2	4	45	2
2FESM022-060-04	●	2.2	0/-0.015	6.0	2.3	4	45	2
2FESM023-060-04	●	2.3	0/-0.015	6.0	2.4	4	45	2
2FESM024-080-04	●	2.4	0/-0.015	8.0	2.5	4	45	2
2FESM025-080-04	●	2.5	0/-0.015	8.0	2.6	4	45	2
2FESM026-080-04	●	2.6	0/-0.015	8.0	2.7	4	45	2
2FESM027-080-04	●	2.7	0/-0.015	8.0	2.8	4	45	2
2FESM028-080-04	●	2.8	0/-0.015	8.0	2.9	4	45	2
2FESM029-080-04	●	2.9	0/-0.015	8.0	3.1	4	45	2
2FESM030-100-06	●	3.0	0/-0.015	10.0	3.2	6	50	2
2FESM031-100-06	●	3.1	0/-0.015	10.0	3.3	6	50	2
2FESM032-100-06	●	3.2	0/-0.015	10.0	3.4	6	50	2
2FESM033-100-06	●	3.3	0/-0.015	10.0	3.5	6	50	2

Recommended Cutting Conditions ➡ L63

●: Std. Item

2FESM (Medium)

Shouldering | Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
2FESM034-100-06	●	3.4	0/-0.015	10.0	3.6	6	50	2
2FESM035-100-06	●	3.5	0/-0.015	10.0	3.7	6	50	2
2FESM036-100-06	●	3.6	0/-0.015	10.0	3.8	6	50	2
2FESM037-100-06	●	3.7	0/-0.015	10.0	3.9	6	50	2
2FESM038-110-06	●	3.8	0/-0.015	11.0	4.0	6	50	2
2FESM039-110-06	●	3.9	0/-0.015	11.0	4.1	6	50	2
2FESM040-110-06	●	4.0	0/-0.015	11.0	4.2	6	50	2
2FESM041-110-06	●	4.1	0/-0.015	11.0	4.3	6	50	2
2FESM042-110-06	●	4.2	0/-0.015	11.0	4.4	6	50	2
2FESM043-110-06	●	4.3	0/-0.015	11.0	4.5	6	50	2
2FESM044-110-06	●	4.4	0/-0.015	11.0	4.6	6	50	2
2FESM045-110-06	●	4.5	0/-0.015	11.0	4.7	6	50	2
2FESM046-110-06	●	4.6	0/-0.015	11.0	4.8	6	50	2
2FESM047-110-06	●	4.7	0/-0.015	11.0	4.9	6	50	2
2FESM048-130-06	●	4.8	0/-0.015	13.0	5.0	6	50	2
2FESM049-130-06	●	4.9	0/-0.015	13.0	5.1	6	50	2
2FESM050-130-06	●	5.0	0/-0.015	13.0	5.2	6	50	2
2FESM051-130-06	●	5.1	0/-0.015	13.0	5.3	6	50	2
2FESM052-130-06	●	5.2	0/-0.015	13.0	5.4	6	50	2
2FESM053-130-06	●	5.3	0/-0.015	13.0	5.5	6	50	2
2FESM054-130-06	●	5.4	0/-0.015	13.0	5.6	6	50	2
2FESM055-130-06	●	5.5	0/-0.015	13.0	5.7	6	50	2
2FESM056-130-06	●	5.6	0/-0.015	13.0	5.8	6	50	2
2FESM057-130-06	●	5.7	0/-0.015	13.0	-	6	50	2
2FESM058-130-06	●	5.8	0/-0.015	13.0	-	6	50	2
2FESM059-130-06	●	5.9	0/-0.015	13.0	-	6	50	2
2FESM060-130-06	●	6.0	0/-0.020	13.0	-	6	50	2
2FESM060-150-06	●	6.0	0/-0.020	15.0	-	6	50	2
2FESM061-160-08	●	6.1	0/-0.020	16.0	6.3	8	60	2
2FESM062-160-08	●	6.2	0/-0.020	16.0	6.4	8	60	2
2FESM063-160-08	●	6.3	0/-0.020	16.0	6.5	8	60	2
2FESM064-160-08	●	6.4	0/-0.020	16.0	6.6	8	60	2
2FESM065-160-08	●	6.5	0/-0.020	16.0	6.7	8	60	2
2FESM066-160-08	●	6.6	0/-0.020	16.0	6.8	8	60	2
2FESM067-160-08	●	6.7	0/-0.020	16.0	6.9	8	60	2
2FESM068-160-08	●	6.8	0/-0.020	16.0	7.0	8	60	2
2FESM069-160-08	●	6.9	0/-0.020	16.0	7.1	8	60	2
2FESM070-160-08	●	7.0	0/-0.020	16.0	7.2	8	60	2
2FESM071-160-08	●	7.1	0/-0.020	16.0	7.3	8	60	2
2FESM072-160-08	●	7.2	0/-0.020	16.0	7.4	8	60	2
2FESM073-160-08	●	7.3	0/-0.020	16.0	7.5	8	60	2
2FESM074-160-08	●	7.4	0/-0.020	16.0	7.6	8	60	2
2FESM075-190-08	●	7.5	0/-0.020	19.0	7.7	8	60	2
2FESM076-190-08	●	7.6	0/-0.020	19.0	-	8	60	2
2FESM077-190-08	●	7.7	0/-0.020	19.0	-	8	60	2
2FESM078-190-08	●	7.8	0/-0.020	19.0	-	8	60	2
2FESM079-190-08	●	7.9	0/-0.020	19.0	-	8	60	2

●: Std. Item

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
2FESM080-190-08	●	8.0	-0.005/-0.025	19.0	-	8	60	2
2FESM080-200-08	●	8.0	-0.005/-0.025	20.0	-	8	60	2
2FESM081-190-10	●	8.1	-0.005/-0.025	19.0	8.3	10	70	2
2FESM082-190-10	●	8.2	-0.005/-0.025	19.0	8.4	10	70	2
2FESM083-190-10	●	8.3	-0.005/-0.025	19.0	8.5	10	70	2
2FESM084-190-10	●	8.4	-0.005/-0.025	19.0	8.6	10	70	2
2FESM085-190-10	●	8.5	-0.005/-0.025	19.0	8.7	10	70	2
2FESM086-190-10	●	8.6	-0.005/-0.025	19.0	8.8	10	70	2
2FESM087-190-10	●	8.7	-0.005/-0.025	19.0	8.9	10	70	2
2FESM088-190-10	●	8.8	-0.005/-0.025	19.0	9.0	10	70	2
2FESM089-190-10	●	8.9	-0.005/-0.025	19.0	9.1	10	70	2
2FESM090-190-10	●	9.0	-0.005/-0.025	19.0	9.2	10	70	2
2FESM091-190-10	●	9.1	-0.005/-0.025	19.0	9.3	10	70	2
2FESM092-190-10	●	9.2	-0.005/-0.025	19.0	9.4	10	70	2
2FESM093-190-10	●	9.3	-0.005/-0.025	19.0	9.5	10	70	2
2FESM094-190-10	●	9.4	-0.005/-0.025	19.0	9.6	10	70	2
2FESM095-190-10	●	9.5	-0.005/-0.025	19.0	9.7	10	70	2
2FESM096-220-10	●	9.6	-0.005/-0.025	22.0	-	10	70	2
2FESM097-220-10	●	9.7	-0.005/-0.025	22.0	-	10	70	2
2FESM098-220-10	●	9.8	-0.005/-0.025	22.0	-	10	70	2
2FESM099-220-10	●	9.9	-0.005/-0.025	22.0	-	10	70	2
2FESM100-220-10	●	10.0	-0.005/-0.025	22.0	-	10	70	2
2FESM100-250-10	●	10.0	-0.005/-0.025	25.0	-	10	70	2
2FESM105-220-12	●	10.5	-0.005/-0.025	22.0	10.7	12	75	2
2FESM110-220-12	●	11.0	-0.005/-0.025	22.0	11.2	12	75	2
2FESM115-220-12	●	11.5	-0.005/-0.025	22.0	11.7	12	75	2
2FESM120-260-12	●	12.0	-0.010/-0.030	26.0	-	12	75	2
2FESM130-260-16	●	13.0	-0.010/-0.030	26.0	13.2	16	75	2
2FESM140-260-16	●	14.0	-0.010/-0.030	26.0	14.2	16	75	2
2FESM150-300-16	●	15.0	-0.010/-0.030	30.0	15.2	16	90	2
2FESM160-320-16	●	16.0	-0.010/-0.030	32.0	-	16	90	2

2FESL (Long)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
2FESL010-040-04	●	1.0	0/-0.015	4.0	1.1	4	45	2
2FESL015-060-04	●	1.5	0/-0.015	6.0	1.6	4	45	2
2FESL020-090-04	●	2.0	0/-0.015	9.0	2.1	4	45	2
2FESL025-120-04	●	2.5	0/-0.015	12.0	2.6	4	45	2
2FESL030-140-06	●	3.0	0/-0.015	14.0	3.2	6	50	2
2FESL040-170-06	●	4.0	0/-0.015	17.0	4.2	6	50	2
2FESL050-200-06	●	5.0	0/-0.015	20.0	5.2	6	60	2
2FESL060-240-06	●	6.0	-0.005/-0.025	24.0	-	6	60	2
2FESL080-280-08	●	8.0	-0.005/-0.025	28.0	-	8	70	2
2FESL100-340-10	●	10.0	-0.005/-0.025	34.0	-	10	90	2
2FESL120-400-12	●	12.0	-0.010/-0.030	40.0	-	12	90	2
2FESL160-480-16	●	16.0	-0.010/-0.030	48.0	-	16	115	2

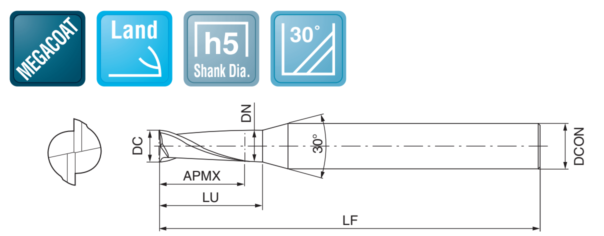
Recommended Cutting Conditions ➡ L63~L64

No. of Flutes : 2

2FEKS, 2FEKM

Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC | P 30~40HRC | H ~55HRC | ★M Stainless steel | K Cast Iron | N Aluminum & Non Ferrous Material



2

MEGACOAT is applied

2FEKS (Short)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
2FEKS030-045-06	●	3.0	0 -0.015	4.5	3.15	6.5	6	50	2
2FEKS035-052-06	●	3.5	0 -0.015	5.2	3.68	7.2	6	50	2
2FEKS040-060-06	●	4.0	0 -0.015	6.0	4.2	8.2	6	50	2
2FEKS045-067-06	●	4.5	0 -0.015	6.7	4.7	8.9	6	50	2
2FEKS050-075-06	●	5.0	0 -0.015	7.5	5.2	10.1	6	50	2
2FEKS055-082-06	●	5.5	0 -0.015	8.2	5.7	10.8	6	50	2
2FEKS060-090-06	●	6.0	0 -0.020	9.0	-	-	6	50	2
2FEKS080-120-08	●	8.0	-0.005 -0.025	12.0	-	-	8	60	2
2FEKS100-150-10	●	10.0	-0.005 -0.025	15.0	-	-	10	70	2
2FEKS120-180-12	●	12.0	-0.010 -0.030	18.0	-	-	12	75	2
2FEKS140-210-16	●	14.0	-0.010 -0.030	21.0	14.2	31.4	16	75	2
2FEKS150-230-16	●	15.0	-0.010 -0.030	23.0	15.2	35	16	90	2
2FEKS160-240-16	●	16.0	-0.010 -0.030	24.0	-	-	16	90	2

2FEKM (Medium)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
2FEKM030-100-06	●	3.0	0 -0.015	10.0	3.15	12.0	6	50	2
2FEKM035-100-06	●	3.5	0 -0.015	10.0	3.68	12.0	6	50	2
2FEKM040-110-06	●	4.0	0 -0.015	11.0	4.2	13.2	6	50	2
2FEKM045-110-06	●	4.5	0 -0.015	11.0	4.7	13.2	6	50	2
2FEKM050-130-06	●	5.0	0 -0.015	13.0	5.2	15.6	6	50	2
2FEKM055-130-06	●	5.5	0 -0.015	13.0	5.7	15.6	6	50	2
2FEKM060-130-06	●	6.0	0 -0.020	13.0	-	-	6	50	2
2FEKM065-160-08	●	6.5	0 -0.020	16.0	6.7	22.4	8	60	2
2FEKM070-160-08	●	7.0	0 -0.020	16.0	7.2	22.4	8	60	2
2FEKM075-190-08	●	7.5	0 -0.020	19.0	7.7	26.6	8	60	2
2FEKM080-190-08	●	8.0	-0.005 -0.025	19.0	-	-	8	60	2
2FEKM085-190-10	●	8.5	-0.005 -0.025	19.0	8.7	26.6	10	70	2
2FEKM090-190-10	●	9.0	-0.005 -0.025	19.0	9.2	26.6	10	70	2
2FEKM095-190-10	●	9.5	-0.005 -0.025	19.0	9.7	26.6	10	70	2
2FEKM100-220-10	●	10.0	-0.005 -0.025	22.0	-	-	10	70	2
2FEKM110-220-12	●	11.0	-0.005 -0.025	22.0	11.2	30.8	12	75	2
2FEKM120-260-12	●	12.0	-0.010 -0.030	26.0	-	-	12	75	2
2FEKM130-260-16	●	13.0	-0.010 -0.030	26.0	13.2	36.4	16	75	2
2FEKM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	36.4	16	75	2
2FEKM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	42.0	16	90	2
2FEKM160-320-16	●	16.0	-0.010 -0.030	32.0	-	-	16	90	2

● MEGACOAT and sharp cutting edge enable high precision finishing owing to excellent wear and heat resistance.

Recommended Cutting Conditions ➔ L64

● : Std. Item

No. of Flutes : 4

Sharp corner edge

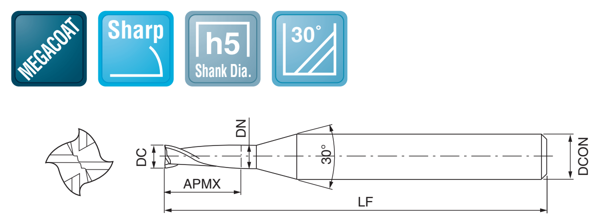
4FESM

Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC | P 30~40HRC | H ~55HRC | ★M Stainless steel | K Cast Iron | N Aluminum & Non Ferrous Material

4

MEGACOAT is applied



Tough corner edge

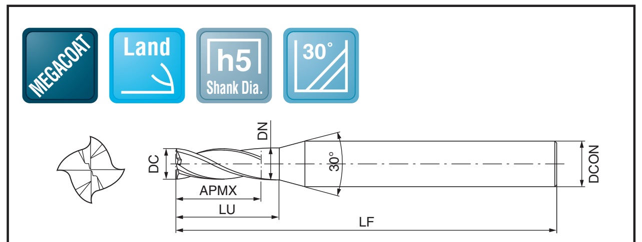
4FEKM

Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC | P 30~40HRC | H ~55HRC | ★M Stainless steel | K Cast Iron | N Aluminum & Non Ferrous Material

4

MEGACOAT is applied



4FESM

Shouldering

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
4FESM010-025-04	●	1.0	0 -0.015	2.5	1.1	4	45	4
4FESM015-040-04	●	1.5	0 -0.015	4.0	1.6	4	45	4
4FESM020-060-04	●	2.0	0 -0.015	6.0	2.1	4	45	4
4FESM025-080-04	●	2.5	0 -0.015	8.0	2.6	4	45	4
4FESM030-100-06	●	3.0	0 -0.015	10.0	3.2	6	50	4
4FESM035-100-06	●	3.5	0 -0.015	10.0	3.7	6	50	4
4FESM040-110-06	●	4.0	0 -0.015	11.0	4.2	6	50	4
4FESM045-110-06	●	4.5	0 -0.015	11.0	4.7	6	50	4
4FESM050-130-06	●	5.0	0 -0.015	13.0	5.2	6	50	4
4FESM055-130-06	●	5.5	0 -0.015	13.0	5.7	6	50	4
4FESM060-130-06	●	6.0	0 -0.020	13.0	-	6	50	4
4FESM060-150-06	●	6.0	0 -0.020	15.0	-	6	50	4
4FESM070-160-08	●	7.0	0 -0.020	16.0	7.2	8	60	4
4FESM080-190-08	●	8.0	-0.005 -0.025	19.0	-	8	60	4
4FESM080-200-08	●	8.0	-0.005 -0.025	20.0	-	8	60	4
4FESM090-190-10	●	9.0	-0.005 -0.025	19.0	9.2	10	70	4
4FESM100-220-10	●	10.0	-0.005 -0.025	22.0	-	10	70	4
4FESM100-250-10	●	10.0	-0.005 -0.025	25.0	-	10	70	4
4FESM120-260-12	●	12.0	-0.010 -0.030	26.0	-	12	75	4
4FESM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	16	75	4
4FESM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	16	90	4
4FESM160-320-16	●	16.0	-0.010 -0.030	32.0	-	16	90	4

● : Std. Item

4FEKM

Shouldering

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
4FEKM030-100-06	●	3.0	0 -0.015	10.0	3.15	12	6	50	4
4FEKM035-100-06	●	3.5	0 -0.015	10.0	3.68	12	6	50	4
4FEKM040-110-06	●	4.0	0 -0.015	11.0	4.2	13.2	6	50	4
4FEKM045-110-06	●	4.5	0 -0.015	11.0	4.7	13.2	6	50	4
4FEKM050-130-06	●	5.0	0 -0.015	13.0	5.2	15.6	6	50	4
4FEKM055-130-06	●	5.5	0 -0.015	13.0	5.7	15.6	6	50	4
4FEKM060-130-06	●	6.0	0 -0.020	13.0	-	-	6	50	4
4FEKM080-190-08	●	8.0	-0.005 -0.025	19.0	-	-	8	60	4
4FEKM100-220-10	●	10.0	-0.005 -0.025	22.0	-	-	10	70	4
4FEKM120-260-12	●	12.0	-0.010 -0.030	26.0	-	-	12	75	4
4FEKM140-260-16	●	14.0	-0.010 -0.030	26.0	14.2	36.4	16	75	4
4FEKM150-300-16	●	15.0	-0.010 -0.030	30.0	15.2	42	16	90	4
4FEKM160-320-16	●	16.0	-0.010 -0.030	32.0	-	-	16	90	4

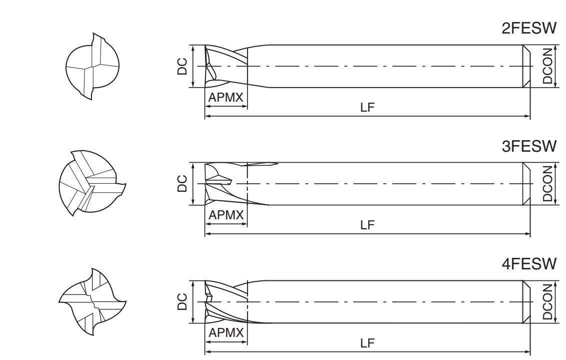
Recommended Cutting Conditions ➔ L65

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

No. of Flutes : 2,3,4

2FESW, 3FESW, 4FESW

(Overall length 35mm / 45mm)

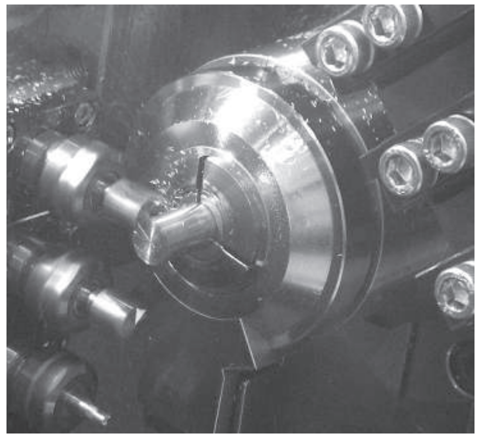


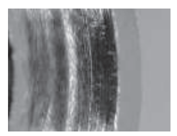
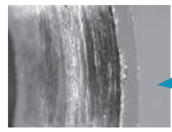
Recommended Workpiece Materials ★ 1st Choice

P ★	P	H	M ★	K	N
~30HRC	30~40HRC	~55HRC	Stainless steel	Cast Iron	Aluminum & Non Ferrous Material

MEGACOAT is applied

Sharp Cutting Edge Reduced Burrs



	Workpiece Material: Ni-Co alloy	
2FES (ø3, 2flutes) Excellent surface finish		Facing of machine parts ·n=2,150min^{-1} (Vc=20m/min) ·Vf=100mm/min (fz=0.023mm/t)
Competitor A (ø3, 2flutes) × Large burrs	 Large burrs	(Internal evaluation)

Comparison with competitor's end mill after 600 passes

2FESW

Shouldering Slotting (Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
2FESW050-050-05A	●	5	0/-0.020	5	5	35	2
2FESW060-060-05A	●	6	0/-0.020	6	5	35	2
2FESW030-030-04	●	3	0/-0.020	3	4	45	2
2FESW035-035-04	●	3.5	0/-0.020	3.5	4	45	2
2FESW040-040-04	●	4	0/-0.020	4	4	45	2
2FESW050-050-06	●	5	0/-0.020	5	6	45	2
2FESW060-060-06	●	6	0/-0.020	6	6	45	2
2FESW070-070-07	●	7	0/-0.025	7	7	45	2
2FESW080-080-07	●	8	0/-0.025	8	7	45	2
2FESW080-080-08	●	8	0/-0.025	8	8	45	2
2FESW100-080-07	●	10	0/-0.025	8	7	45	2
2FESW100-080-10	●	10	0/-0.025	8	10	45	2
2FESW120-080-10	●	12	0/-0.025	8	10	45	2
2FESW120-080-12	●	12	0/-0.030	8	12	45	2
2FESW130-080-13	●	13	0/-0.030	8	13	45	2

3FESW

Shouldering Slotting (Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
3FESW050-050-05A	●	5	0/-0.020	5	5	35	3
3FESW060-060-05A	●	6	0/-0.020	6	5	35	3
3FESW030-030-04	●	3	0/-0.020	3	4	45	3
3FESW035-035-04	●	3.5	0/-0.020	3.5	4	45	3
3FESW040-040-04	●	4	0/-0.020	4	4	45	3
3FESW050-050-06	●	5	0/-0.020	5	6	45	3
3FESW060-060-06	●	6	0/-0.020	6	6	45	3
3FESW070-070-07	●	7	0/-0.025	7	7	45	3
3FESW080-080-07	●	8	0/-0.025	8	7	45	3
3FESW080-080-08	●	8	0/-0.025	8	8	45	3
3FESW100-080-07	●	10	0/-0.025	8	7	45	3
3FESW100-080-10	●	10	0/-0.025	8	10	45	3
3FESW120-080-10	●	12	0/-0.025	8	10	45	3
3FESW120-080-12	●	12	0/-0.030	8	12	45	3
3FESW130-080-13	●	13	0/-0.030	8	13	45	3

Recommended Cutting Conditions ➔ L66

● : Std. Item

4FESW

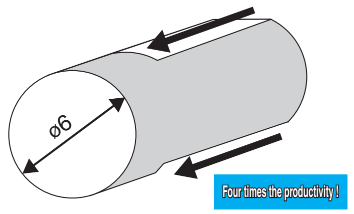
Shouldering Slotting (Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
4FESW030-030-04	●	3	0/-0.020	3	4	45	4
4FESW035-035-04	●	3.5	0/-0.020	3.5	4	45	4
4FESW040-040-04	●	4	0/-0.020	4	4	45	4
4FESW050-050-06	●	5	0/-0.020	5	6	45	4
4FESW060-060-06	●	6	0/-0.020	6	6	45	4
4FESW070-070-07	●	7	0/-0.025	7	7	45	4
4FESW080-080-07	●	8	0/-0.025	8	7	45	4
4FESW080-080-08	●	8	0/-0.025	8	8	45	4
4FESW100-080-07	●	10	0/-0.025	8	7	45	4
4FESW100-080-10	●	10	0/-0.025	8	10	45	4
4FESW120-080-10	●	12	0/-0.025	8	10	45	4
4FESW120-080-12	●	12	0/-0.030	8	12	45	4
4FESW130-080-13	●	13	0/-0.030	8	13	45	4

Case Studies

Machine parts S45C

n=3,980min^{-1}
(Vc=100m/min)
Vf=800mm/min
(fz=0.05mm/t)
ap=0.45mm, Wet
4FESW080-080-08 (ø8, 4 flutes)



4FESW080-080-08	Vf=800mm/min
Competitor Coated Carbide B	Vf=200mm/min

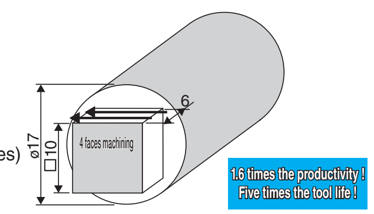
[Competitor Coated Carbide B]
ø8, 4 flutes
n=2,508min^{-1}
(Vc=63m/min)
Vf=200mm/min
(fz=0.02mm/t)
ap=0.45mm

Both cutting speed and table feed rate were improved. Despite the increase in cutting conditions, burr formation decreased.

(User Evaluation)

Machine parts SUM

n=3,200min^{-1}
(Vc=100m/min)
Vf =640mm/min
(fz=0.05mm/t)
ap x ae=3.5 x 3.0mm, Wet
4FESW100-080-10 (ø10, 4 flutes)



4FESW100-080-10	Vf=640mm/min
Competitor Coated Carbide C	Vf=400mm/min

[Competitor Coated Carbide C]
ø7, 4 flutes
n=2,000min^{-1}
(Vc=44m/min)
Vf=400mm/min
(fz=0.05mm/t)
ap×ae=3.5×3.0mm

4FESW has a shorter edge length with improved rigidity, which enabled an increase from conventional ø7 to ø10, thus improving cutting conditions. Compared to conventional tools, tool life improved five times.

(User Evaluation)

Recommended Cutting Conditions ➔ L66

● : Std. Item

4MFK / 4MFR

MEGACOAT NANO is applied

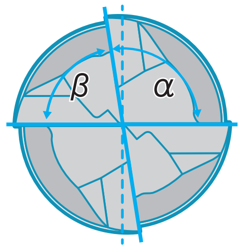
New standard of steel machining

Applicable for high feed machining by anti-chattering structure

1 Chattering control by varied interval flute and variable lead design

Excellent Surface Finish with Reduced Chattering

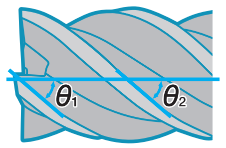
Varied interval flute design



Cutting force distribution varies due to variable flute width, which prevents periodical vibration during machining

$\alpha \neq \beta$

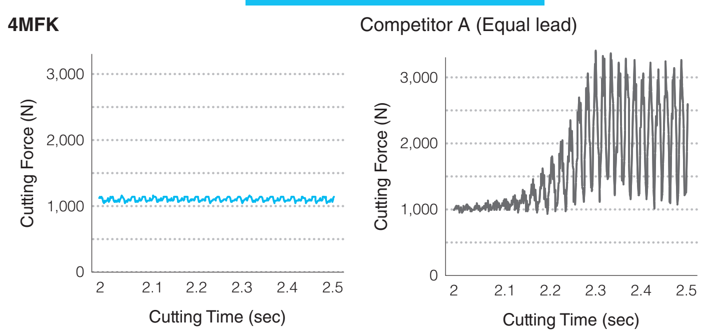
Variable lead



Each flute contains optimized helix angle (lead angle θ), which prevents vibration and achieves a clean surface finish
Chattering control, good surface finish

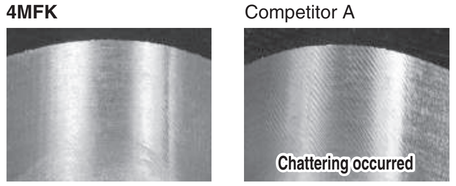
$\theta_1 \neq \theta_2$

Cutting Force Comparison (Internal evaluation) Drastically Reduced Vibration for Stable Machining



Cutting Conditions : n = 2,650 min⁻¹, Vf = 300 mm/min, ap × ae = 10 × 8 mm, End Mill Dia. ø8, Slotting Wet Workpiece Material : SCM440

Surface Comparison (Internal evaluation)

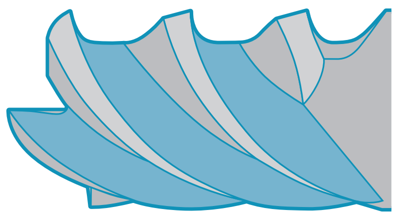


Cutting Conditions : n = 6,000 min⁻¹, Vf = 1,500 mm/min, ap × ae = 8 × 2 mm, End Mill Dia. ø8, Shouldering Wet Workpiece Material : S45C

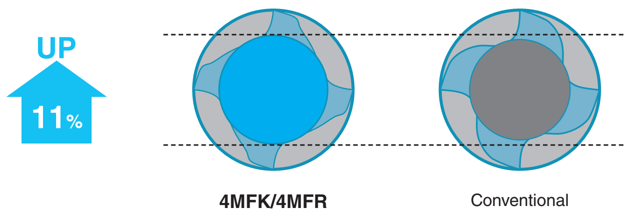
2 Good Chip Evacuation

Unique Flute Design for Smooth Chip Evacuation Even in Slotting and High Feed Machining Applications

Large Chip Pocket



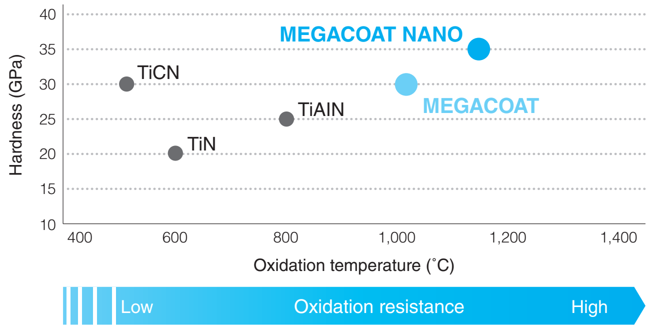
Core diameter comparison (Internal evaluation)



3 Achieves Long Tool Life and Stable Machining

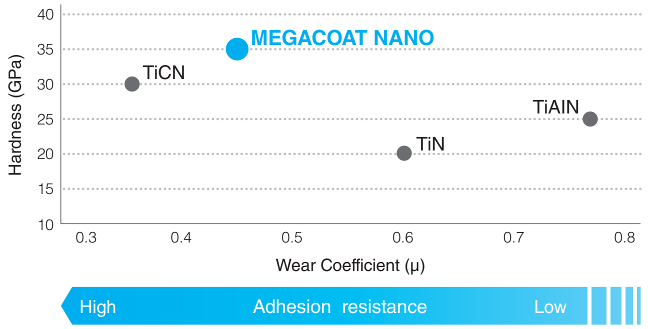
Special Nano-layer Coating MEGACOAT NANO controls wear progress and improves chipping resistance

Properties of PVD Coating (Abrasion Resistance)



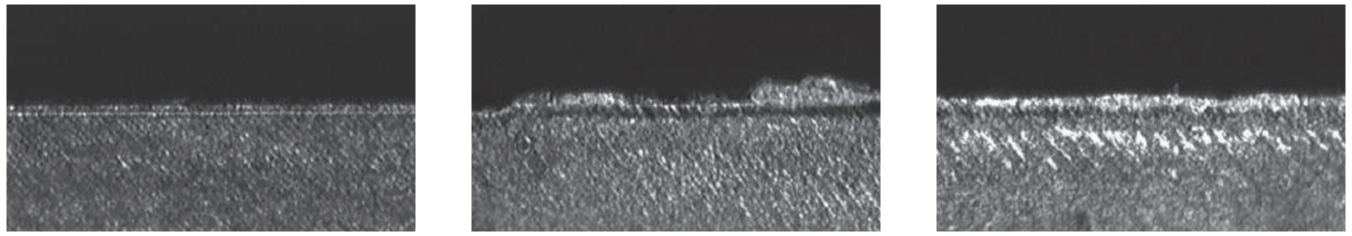
Achieve long tool life with the combination of a tough substrate and a special Nano coating layer

Properties of PVD Coating (Adhesion Resistance)



Stable Machining with Excellent Wear Resistance

Abrasion Resistance Comparison (Internal evaluation)



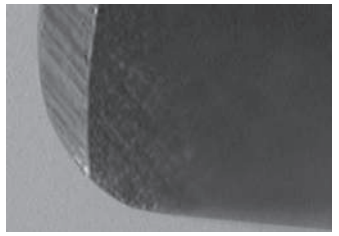
Edge Conditions after 140m Cutting

Cutting Conditions : n = 6,000 min⁻¹, Vf = 1,100 mm/min, ap × ae = 5.0 × 0.8 mm, End Mill Dia. ø8, Shouldering, Wet Workpiece Material : SCM440

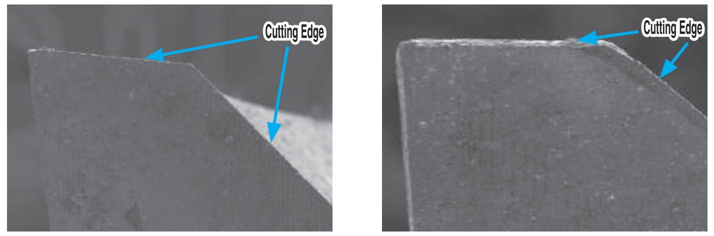
4 High Quality Sharp Edge

High Quality Sharp Edge with Advanced Grinding Technology
Enables Excellent Surface Finish

4MFR Corner Radius Type



Smooth and Sharp Cutting Edge Up to the Tip Preventing Burrs



4MFK Competitor D

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

4MFK

No. of Flutes : 4

MEGACOAT NANO is applied

Recommended Workpiece Materials ★ 1st Choice

★P	P	H	M	S	K	N
~30HRC	30~40HRC	~55HRC	Stainless steel	Titanium Alloy	Cast Iron	Aluminum & Non Ferrous Material

MEGACOAT NANO / h5 Shank Dia. / 42° 44° / Land

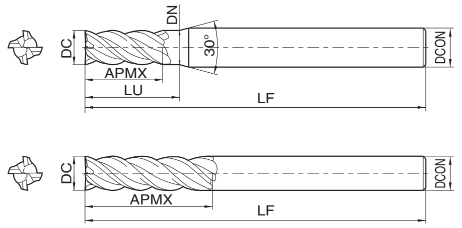


Fig.1

Fig.2

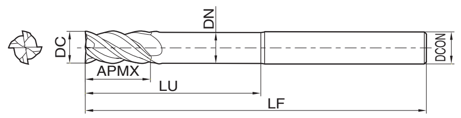


Fig.3

4MFK (With corner land)

(Unit : mm)

	Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	* Cutting edge length	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
	4MFK030-045	●	3.0	0 -0.015	4.5	S	3.15	5.4	6	60	4	Fig.1
	4MFK030-080	●			8	M		9.6				
	4MFK030-120	●			12	L		14.4				
	4MFK035-050	●	3.5	0 -0.015	5	S	3.7	6.0	6	60	4	
	4MFK035-095	●			9.5	M		11.4				
	4MFK035-140	●			14	L		16.8				
	4MFK040-060	●	4.0	0 -0.015	6	S	4.2	7.2	6	60	4	
	4MFK040-110	●			11	M		13.2				
	4MFK040-120	●			12	M (3D)		14.4				
	4MFK040-160	●			16	L		19.2				
	4MFK045-065	●	4.5	0 -0.015	6.5	S	4.7	7.8	6	60	4	
	4MFK045-120	●			12	M		14.4				
	4MFK045-180	●			18	L		21.6				
	4MFK050-075	●	5.0	0 -0.015	7.5	S	5.2	9.0	6	60	4	
	4MFK050-130	●			13	M		15.6				
	4MFK050-200	●			20	L		24.0				
	4MFK055-080	●	5.5	0 -0.015	8	S	5.7	9.6	6	60	4	
	4MFK055-130	●			13	M		15.6				
	4MFK055-210	●			21	L		25.2				
	4MFK060-090	●	6.0	0 -0.020	9	S	-	-	6	60	4	Fig.2
NEW	4MFK060-090-180	●				S'	5.8	18.0				Fig.3
NEW	4MFK060-090-300	●				S'		30.0		70		
	4MFK060-130	●			13	M	-	-		60		Fig.2
	4MFK060-150	●			15	M (2.5D)						
	4MFK060-220	●			22	L						
NEW	4MFK065-160	●	6.5	0 -0.020	16	M	6.7	19.2	8	70	4	Fig.1
	4MFK070-105	●	7.0	0 -0.020	10.5	S	7.2	12.6	8	70	4	
	4MFK070-160	●			16	M		19.2				
	4MFK070-250	●			25	L		30.0				

	Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	* Cutting edge length	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
NEW	4MFK075-190	●	7.5	0 -0.020	19	M	7.7	22.8	8	70	4	Fig.1
	4MFK080-120	●	8.0	-0.005 -0.025	12	S	-	-	8	70	4	Fig.2
NEW	4MFK080-120-240	●				S'	7.7	24.0				Fig.3
NEW	4MFK080-120-400	●				S'		40.0		80		
	4MFK080-190	●			19	M	-	-		70		Fig.2
	4MFK080-200	●			20	M (2.5D)						
	4MFK080-280	●			28	L						
NEW	4MFK085-190	●	8.5	-0.005 -0.025	19	M	8.7	22.8	10	80	4	Fig.1
	4MFK090-135	●	9.0	-0.005 -0.025	13.5	S	9.2	16.2	10	80	4	
	4MFK090-205	●			20.5	M		24.6				
NEW	4MFK095-220	●	9.5	-0.005 -0.025	22	M	9.7	26.4	10	80	4	Fig.1
	4MFK100-150	●	10.0	-0.005 -0.025	15	S	-	-	10	80	4	Fig.2
NEW	4MFK100-150-300	●				S'	9.7	30.0				Fig.3
NEW	4MFK100-150-500	●				S'		50.0		100		
	4MFK100-220	●			22	M	-	-		80		Fig.2
	4MFK100-250	●			25	M (2.5D)						
	4MFK100-330	●			33	L						
NEW	4MFK110-260	●	11.0	-0.010 -0.030	26	M	11.2	31.2	12	100	4	Fig.1
	4MFK120-180	●	12.0	-0.010 -0.030	18	S	-	-	12	100	4	Fig.2
NEW	4MFK120-180-360	●				S'	11.7	36.0				Fig.3
NEW	4MFK120-180-600	●				S'		60.0		110		
	4MFK120-260	●			26	M	-	-		100		Fig.2
	4MFK120-360	●			36	L						
	4MFK160-240	●	16.0	-0.010 -0.030	24	S	-	-	16	110	4	Fig.2
	4MFK160-350	●			35	M						
	4MFK160-480	●			48	L						

Recommended Cutting Conditions ➡ L67

* Applications for each cutting edge length

S : Short · · · · Shouldering Slotting

S' : Short (Long neck) · · · Shouldering

M : Medium · · · Shouldering Slotting

L : Long · · · · · · · · · Shouldering

● : Std. Item

4MFR

No. of Flutes : 4

Recommended Workpiece Materials ★ 1st Choice

★P	P	H	M	S	K	N
~30HRC	30~40HRC	~55HRC	Stainless steel	Titanium Alloy	Cast Iron	Aluminum & Non Ferrous Material

MEGACOAT NANO is applied

MEGACOAT NANO / h5 Shank Dia. / 42° 44° / Radius R

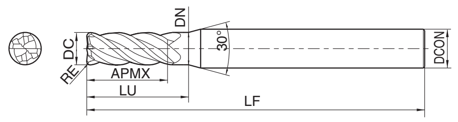


Fig.1

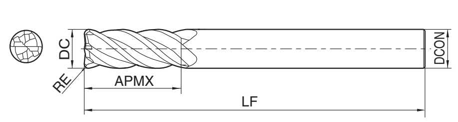


Fig.2

4MFR (Radius)

(Unit : mm)

	Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Corner-R RE	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
	4MFR030-080-R02	●	3.0	0 -0.015	0.2	8	3.15	9.6	6	60	4	Fig.1
	4MFR030-080-R03	●			0.3							
	4MFR030-080-R05	●			0.5							
	4MFR035-095-R02	●	3.5	0 -0.015	0.2	9.5	3.7	11.4	6	60	4	
	4MFR035-095-R03	●			0.3							
	4MFR035-095-R05	●			0.5							
	4MFR040-110-R02	●	4.0	0 -0.015	0.2	11	4.2	13.2	6	60	4	
	4MFR040-110-R03	●			0.3							
	4MFR040-110-R05	●			0.5							
	4MFR040-110-R10	●			1.0							
	4MFR045-120-R02	●	4.5	0 -0.015	0.2	12	4.7	14.4	6	60	4	
	4MFR045-120-R03	●			0.3							
	4MFR045-120-R05	●			0.5							
	4MFR045-120-R10	●			1.0							
	4MFR050-130-R02	●	5.0	0 -0.015	0.2	13	5.2	15.6	6	60	4	
	4MFR050-130-R03	●			0.3							
	4MFR050-130-R05	●			0.5							
	4MFR050-130-R10	●			1.0							
NEW	4MFR055-130-R02	●	5.5	0 -0.015	0.2	13	5.7	15.6	6	60	4	
	4MFR055-130-R03	●			0.3							
	4MFR055-130-R05	●			0.5							
	4MFR055-130-R10	●			1.0							
NEW	4MFR060-130-R02	●	6.0	0 -0.020	0.2	13	-	-	6	60	4	Fig.2
	4MFR060-130-R03	●			0.3							
	4MFR060-130-R05	●			0.5							
	4MFR060-130-R10	●			1.0							
	4MFR060-130-R15	●			1.5							

	Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Corner-R RE	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
NEW	4MFR080-190-R02	●	8.0	-0.005 -0.025	0.2	19	-	-	8	70	4	Fig.2
	4MFR080-190-R03	●			0.3							
	4MFR080-190-R05	●			0.5							
	4MFR080-190-R10	●			1.0							
	4MFR080-190-R15	●			1.5							
	4MFR080-190-R20	●			2.0							
	4MFR080-190-R30	●			3.0							
NEW	4MFR100-220-R02	●	10.0	-0.005 -0.025	0.2	22	-	-	10	80	4	
	4MFR100-220-R03	●			0.3							
	4MFR100-220-R05	●			0.5							
	4MFR100-220-R10	●			1.0							
	4MFR100-220-R15	●			1.5							
	4MFR100-220-R20	●			2.0							
	4MFR100-220-R30	●			3.0							
NEW	4MFR120-260-R03	●	12.0	-0.010 -0.030	0.3	26	-	-	12	100	4	
	4MFR120-260-R05	●			0.5							
	4MFR120-260-R10	●			1.0							
	4MFR120-260-R15	●			1.5							
	4MFR120-260-R20	●			2.0							
	4MFR120-260-R30	●			3.0							
	4MFR160-350-R10	●	16.0	-0.010 -0.030	1.0	35	-	-	16	110	4	
	4MFR160-350-R15	●			1.5							
	4MFR160-350-R20	●			2.0							
	4MFR160-350-R30	●			3.0							

Recommended Cutting Conditions ➡ L67

● : Std. Item

4TFK / 4TFR

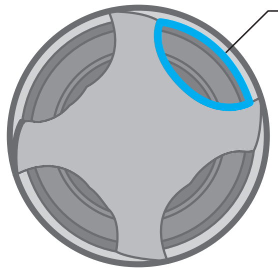
MEGACOAT NANO is applied

High feed and high efficiency machining of difficult-to-cut materials
Resistant to chattering and suppresses burr formation

1 Better chip evacuation at high feed machining

Excellent chip evacuation at high feed by large chip pocket and rake angle

4TFK / 4TFR



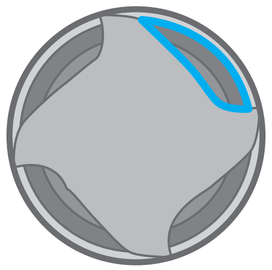
End mill cross-section

Optimum edge shape for high efficiency machining

No chip clogging

Cutting conditions : n = 2,800 min⁻¹, Vf = 550 mm/min, ap = 4 mm
End Mill Dia. ø8 mm, Slotting, Wet Workpiece Material : SUS304

Conventional



End mill cross-section

Chip clogging

Cutting Conditions : n = 2,800 min⁻¹, Vf = 270 mm/min, ap = 4 mm
End Mill Dia. ø8 mm, Slotting, Wet Workpiece Material : SUS304

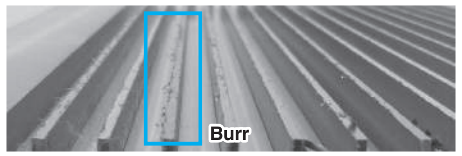
2 Decreased burr

Deep slotting (1xD) by low cutting force design and good chip evacuation

4TFK

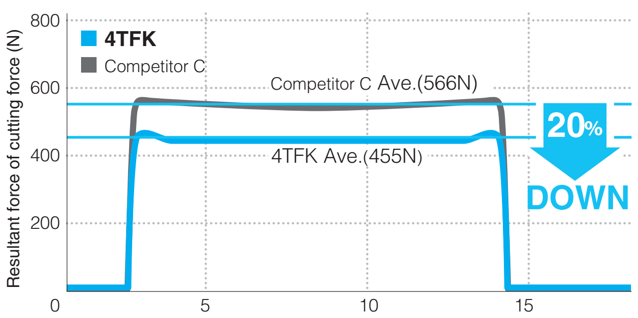
High quality surface finish

Competitor C



Cutting Conditions : n = 3,200 min⁻¹, Vf = 150 mm/min, ap = 6 mm
End Mill Dia. ø6 mm, Slotting, Wet Workpiece Material : SUS304

Cutting Force Comparison (Cutting force at machining 100mm)



Cutting Conditions : n = 4,800 min⁻¹, Vf = 500 mm/min, ap = 6 mm
End Mill Dia. ø6 mm, Dry Workpiece Material : SCM440

3 Chattering control by varied interval flute and variable lead design

No. of Flutes : 4

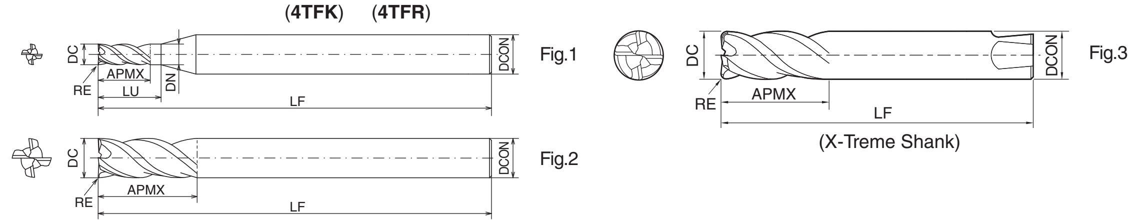
4TFK, 4TFR

MEGACOAT NANO is applied

Recommended Workpiece Materials ★ 1st Choice

P ★	P	H	M ★	S ★	S	K
~30HRC	30~40HRC	~55HRC	Stainless steel	Titanium Alloy	Heat-resistant Alloy	Cast Iron

MEGACOAT NANO | h5 Shank Dia. | 42° 44° | Land (4TFK) | Radius R (4TFR)



4TFK (With corner land)

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	* Cutting edge length	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4TFK030-045	●	3.0	0 / -0.015	4.5	S	3.15	5.4	6	60	4	Fig.1
4TFK030-080	●			8	M		9.6				
4TFK030-120	●			12	L		14.4				
4TFK040-060	●	4.0	0 / -0.015	6	S	4.2	7.2	6	60	4	
4TFK040-120	●			12	M		14.4				
4TFK040-160	●			16	L		19.2				
4TFK050-075	●	5.0	0 / -0.015	7.5	S	5.2	9	6	60	4	
4TFK050-130	●			13	M		15.6				
4TFK050-200	●			20	L		24				
4TFK060-090	●	6.0	0 / -0.020	9	S	-	-	6	60	4	Fig.2
4TFK060-150	●			15	M						
4TFK060-220	●			22	L						
4TFK070-105	●	7.0	0 / -0.020	10.5	S	7.2	12.6	8	70	4	Fig.1
4TFK070-160	●			16	M		19.2				
4TFK070-250	●			25	L		30				
4TFK080-120	●	8.0	-0.005 / -0.025	12	S	-	-	8	70	4	Fig.2
4TFK080-200	●			20	M						
4TFK080-280	●			28	L						
4TFK090-135	●	9.0	-0.005 / -0.025	13.5	S	9.2	16.2	10	80	4	Fig.1
4TFK090-205	●			20.5	M		24.6				
4TFK100-150	●	10.0	-0.005 / -0.025	15	S	-	-	10	80	4	Fig.2
4TFK100-250	●			25	M						
4TFK100-330	●			33	L						
4TFK120-180	●	12.0	-0.010 / -0.030	18	S	-	-	12	100	4	
4TFK120-260	●			26	M						
4TFK120-360	●			36	L						
4TFK160-240	●	16.0	-0.010 / -0.030	24	S	-	-	16	110	4	
4TFK160-350	●			35	M						
4TFK160-480	●			48	L						
4TFK200-300	●	20.0	-0.010 / -0.030	30	S	-	-	20	125	4	
4TFK200-450	●			45	M						

* Applications for each cutting edge length
S : Short, M : Medium · · · · Shouldering, Slotting
L : Long · · · · · · Shouldering

*4TFR...XT Shank (X-Treme Shank) is for NIKKEN X-Treme chuck

4TFR (Radius)

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Corner-R RE	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4TFR030-080-R02	●	3.0	0 / -0.015	0.2	8	3.15	9.6	6	60	4	Fig.1
4TFR030-080-R05	●			0.5							
4TFR040-120-R02	●	4.0	0 / -0.015	0.2	12	4.2	14.4	6	60	4	
4TFR040-120-R05	●			0.5							
4TFR050-130-R02	●	5.0	0 / -0.015	0.2	13	5.2	15.6	6	60	4	
4TFR050-130-R05	●			0.5							
4TFR050-130-R10	●			1.0							
4TFR060-150-R03	●	6.0	0 / -0.020	0.3	15	-	-	6	60	4	Fig.2
4TFR060-150-R05	●			0.5							
4TFR060-150-R10	●			1.0							
4TFR080-200-R03	●	8.0	-0.005 / -0.025	0.3	20	-	-	8	70	4	
4TFR080-200-R05	●			0.5							
4TFR080-200-R10	●			1.0							
4TFR080-200-R20	●			2.0							
4TFR100-250-R03	●	10.0	-0.005 / -0.025	0.3	25	-	-	10	80	4	
4TFR100-250-R05	●			0.5							
4TFR100-250-R10	●			1.0							
4TFR100-250-R15	●			1.5							
4TFR100-250-R20	●			2.0							
4TFR100-250-R30	●			3.0							
4TFR120-260-R05	●	12.0	-0.010 / -0.030	0.5	26	-	-	12	100	4	
4TFR120-260-R10	●			1.0							
4TFR120-260-R15	●			1.5							
4TFR120-260-R20	●			2.0							
4TFR120-260-R30	●			3.0							
4TFR160-350-R10	●	16.0	-0.010 / -0.030	1.0	35	-	-	16	110	4	
4TFR160-350-R20	●			2.0							
4TFR160-350-R30	●			3.0							
4TFR200-450-R10	●	20.0	-0.010 / -0.030	1.0	45	-	-	20	125	4	
4TFR200-450-R20	●			2.0							
4TFR200-450-R30	●			3.0							
4TFR120-260-R10-XT	●	12.0	-0.010 / -0.030	1.0	26	-	-	12	94	4	Fig.3
4TFR120-260-R20-XT	●			2.0							
4TFR120-260-R30-XT	●			3.0							
4TFR160-350-R10-XT	●	16.0	-0.010 / -0.030	1.0	35	-	-	16	116	4	
4TFR160-350-R20-XT	●			2.0							
4TFR160-350-R30-XT	●			3.0							
4TFR200-450-R10-XT	●	20.0	-0.010 / -0.030	1.0	45	-	-	20	130	4	
4TFR200-450-R20-XT	●			2.0							
4TFR200-450-R30-XT	●			3.0							

Applicable chuck for 4TFR...XT ➡ M90
Recommended Cutting Conditions ➡ L68

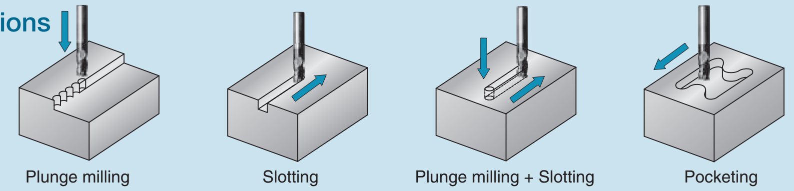
● : Std. Item

3ZFK

Triple functions

Applicable for plunge milling, slotting and finishing with one end mill

● Applications

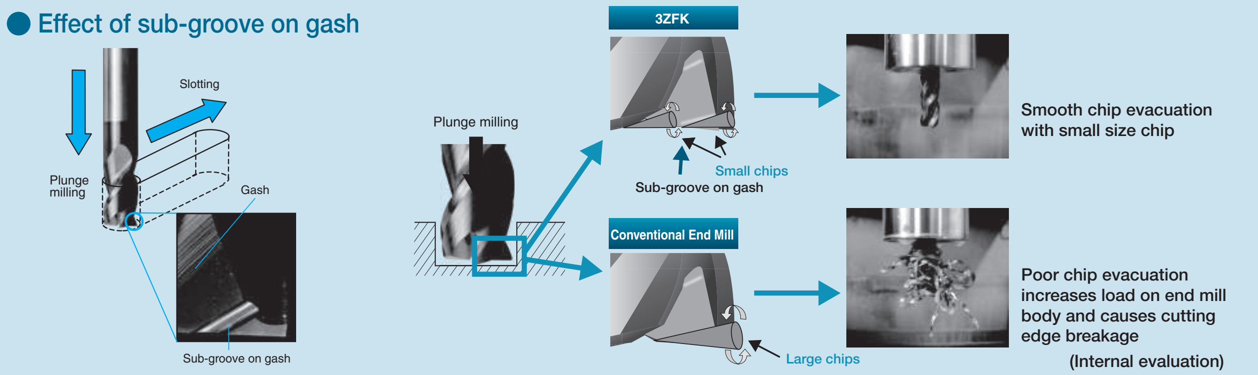


Triple Performances

1. High efficiency machining with new design

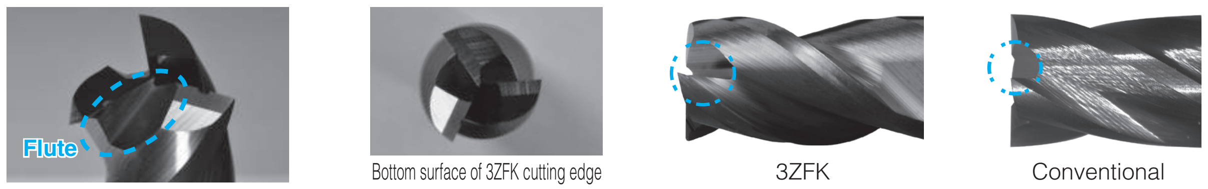
· Smooth chip evacuation because sub-groove on gash breaks chips during plunge milling

● Effect of sub-groove on gash



(Internal evaluation)

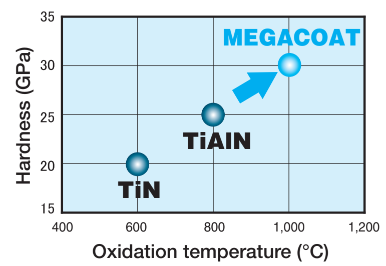
· Prevents chip clogging owing to deep flute and gash design



2. Longer tool life with MEGACOAT

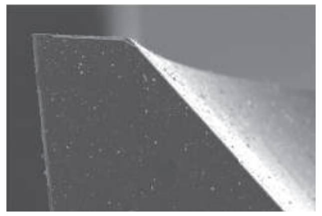
· Excellent wear resistance and heat resistance

MEGACOAT is applied



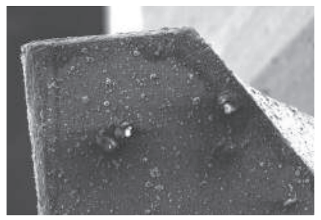
3. Better surface finish owing to sharp cutting edge quality

· Smooth and sharp to the tip of the cutting edge
· Controls burr formation. Better surface roughness



MEGACOAT

Smooth and sharp to the tip of the cutting edge
Longer tool life and improved surface finish



Competitor Coating A

Rough coating surface and round blunt cutting edge

(Internal evaluation)

No. of Flutes : 3

3ZFKS, 3ZFKM

3

MEGACOAT is applied

Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC | P 30~40HRC | ★M Stainless steel | S Titanium Alloy | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT | Land | h5 Shank Dia. | 40°

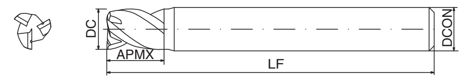


Fig.1

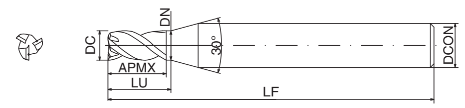


Fig.2

3ZFKS (Short)

Shouldering | Slotting | Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
3ZFKS060-090-06	●	6.0	0 / -0.020	9.0	-	-	6	50	3	Fig.1
3ZFKS070-105-08	●	7.0	0 / -0.020	10.5	7.2	11.3	8	60	3	Fig.2
3ZFKS080-120-08	●	8.0	-0.005 / -0.025	12.0	-	-	8	60	3	Fig.1
3ZFKS100-150-10	●	10.0	-0.005 / -0.025	15.0	-	-	10	70	3	Fig.1
3ZFKS120-180-12	●	12.0	-0.010 / -0.030	18.0	-	-	12	75	3	Fig.1

3ZFKM (Medium)

Shouldering | Slotting | Plunge milling

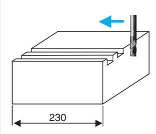
(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
3ZFKM030-060-06	●	3.0	0 / -0.015	6.0	3.2	6.5	6	50	3	Fig.2
3ZFKM030-080-06	●	3.0	0 / -0.015	8.0	3.2	8.6	6	50	3	Fig.2
3ZFKM040-080-06	●	4.0	0 / -0.015	8.0	4.2	8.6	6	50	3	Fig.2
3ZFKM040-120-06	●	4.0	0 / -0.015	12.0	4.2	13.0	6	50	3	Fig.2
3ZFKM050-100-06	●	5.0	0 / -0.015	10.0	5.2	10.8	6	50	3	Fig.2
3ZFKM050-130-06	●	5.0	0 / -0.015	13.0	5.2	14.0	6	50	3	Fig.2
3ZFKM060-130-06	●	6.0	0 / -0.020	13.0	-	-	6	50	3	Fig.1
3ZFKM070-160-08	●	7.0	0 / -0.020	16.0	7.2	17.3	8	60	3	Fig.2
3ZFKM080-190-08	●	8.0	-0.005 / -0.025	19.0	-	-	8	60	3	Fig.1
3ZFKM100-220-10	●	10.0	-0.005 / -0.025	22.0	-	-	10	70	3	Fig.1
3ZFKM120-260-12	●	12.0	-0.010 / -0.030	26.0	-	-	12	75	3	Fig.1
3ZFKM160-350-16	●	16.0	-0.010 / -0.030	35.0	-	-	16	90	3	Fig.1

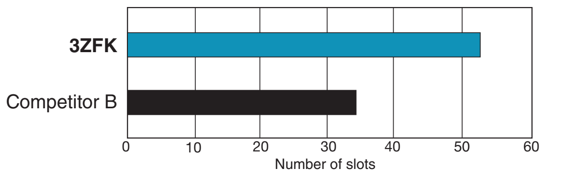
Case Studies

● Slotting of Titanium Alloy

Outside Dia.	⌀10
Workpiece Material	Ti-6Al-4V
Spindle Revolution	3ZFK : n=1,700min^{-1} / Competitor B:n=1,300min^{-1}
Feed Rate	Vf =460mm/min
Depth of Cut	ap x ae=2 x 10mm



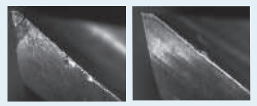
(Wet)

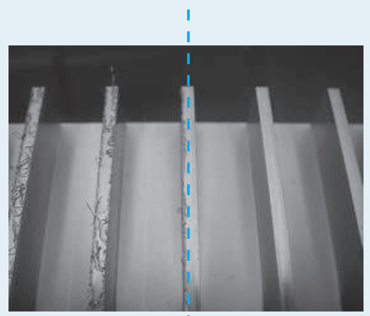


(Internal evaluation)

· Better surface finish and longer tool life with 3ZFK.
· Compared to competitor's coated product, the 3ZFK has a 1.4 times longer tool life.
· 3ZFK prevents burr formation due to sharp cutting edge.

◆ Cutting edge after 35 passes





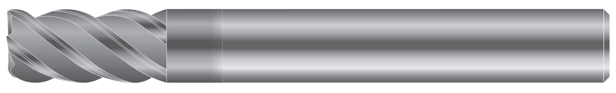
(Internal evaluation)

Recommended Cutting Conditions ➔ L69

● : Std. Item

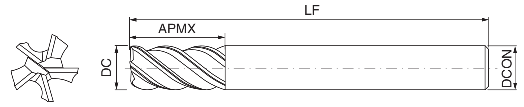
No. of Flutes : 5

5DERM



Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC | ★P 30~40HRC | ★M Stainless steel | ★S Titanium Alloy | ★S Heat-resistant Alloy | K Cast Iron



5DERM (Radius)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	Spec of Corners	No. of Flutes ZEFP
5DERM040-120-06-R025	▲	4	-0.020 -0.038	12	6	55	R0.25	5
5DERM050-130-06-R025	▲	5	-0.020 -0.038	13	6	57	R0.25	5
5DERM060-130-06-R040	▲	6	-0.020 -0.038	13	6	57	R0.4	5
5DERM080-160-08-R050	▲	8	-0.025 -0.047	16	8	63	R0.5	5
5DERM090-190-10-R050	▲	9	-0.025 -0.047	19	10	72	R0.5	5
5DERM100-220-10-R050	▲	10	-0.025 -0.047	22	10	72	R0.5	5
5DERM120-260-12-R075	▲	12	-0.032 -0.059	26	12	83	R0.75	5

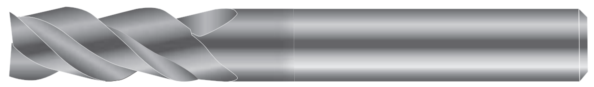
- 5 flutes design enables high feed rate machining. Varied intervals prevent vibration.
  Maximum groove width is 0.8DC.

Recommended Cutting Conditions ➡ L70

▲ : To be replaced by a new product

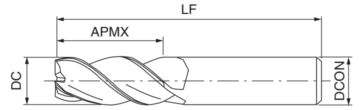
No. of Flutes : 3

3UFSM



Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC | ★P 30~40HRC | H ~55HRC | ★M Stainless steel | S Titanium Alloy | ★K Cast Iron | N Aluminum & Non Ferrous Material



3UFSM

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
3UFSM010-030-04	▲	1	-0.014 -0.028	3	4	50	3
3UFSM015-030-04	▲	1.5	-0.014 -0.028	3	4	50	3
3UFSM020-030-04	▲	2	-0.014 -0.028	3	4	50	3
3UFSM025-040-04	▲	2.5	-0.014 -0.028	4	4	50	3
3UFSM030-080-06	▲	3	-0.014 -0.028	8	6	50	3
3UFSM040-120-06	▲	4	-0.020 -0.038	12	6	50	3
3UFSM050-140-06	▲	5	-0.020 -0.038	14	6	50	3
3UFSM060-160-06	▲	6	-0.020 -0.038	16	6	50	3
3UFSM080-200-08	▲	8	-0.025 -0.047	20	8	63	3
3UFSM100-220-10	▲	10	-0.025 -0.047	22	10	76	3
3UFSM120-250-12	▲	12	-0.032 -0.059	25	12	76	3
3UFSM160-320-16	▲	16	-0.032 -0.059	32	16	89	3
3UFSM200-380-20	▲	20	-0.040 -0.073	38	20	104	3

- Products emphasizing high efficiency machining, three flutes type for general semi finishing.
  It is available for slotting and shouldering of wide range of workpiece materials.

Recommended Cutting Conditions ➡ L71

▲ : To be replaced by a new product

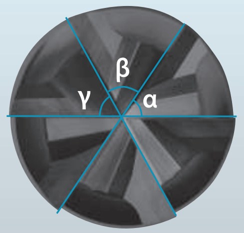
6PFK/8PFK

High efficiency machining and superior surface finish with new special flute design

● Varied interval flute design / Variable lead

Superior chattering resistance performance with Kyocera's unique varied interval flute design / variable lead

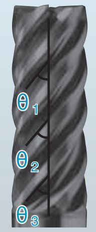
Varied interval flute design



$\alpha \neq \beta \neq \gamma$

Cutting force varies due to varied interval flute, which prevents periodical vibration during machining

Variable Lead



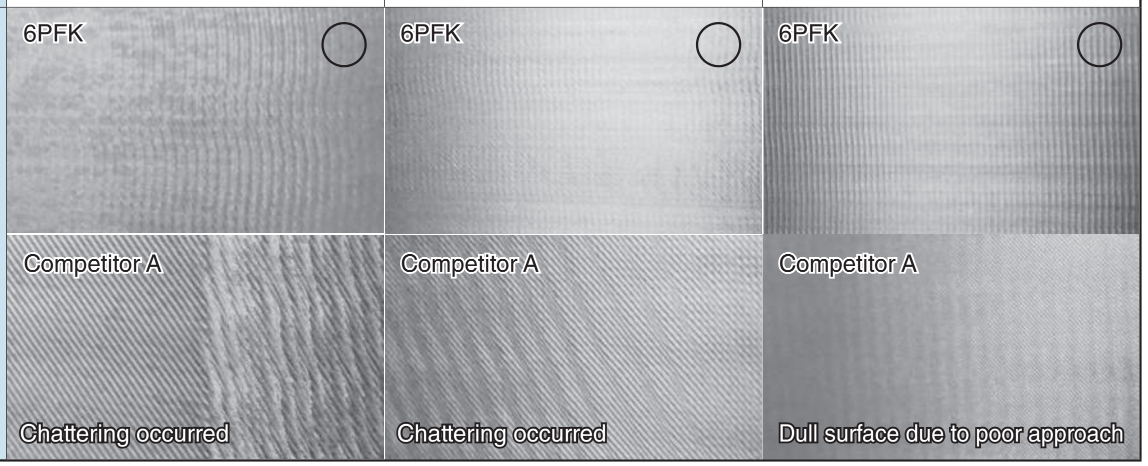
$\theta_1 \neq \theta_2 \neq \theta_3$

Every flute has its optimum helix angle (lead angleθ), which enables excellent and anti vibration effect and good surface finish

Surface finish comparison (side surface)

End Mill Dia. ø12 (Internal evaluation)

Workpiece Material	SCM440	SUS304	Ti-6Al-4V
Cutting Conditions	n=3,300min^{-1} (Vc=124m/min) Vf=2,000mm/min(fz=0.1mm/t) apxae=30×1.5mm	n=2,500min^{-1} (Vc=94m/min) Vf=1,130mm/min (fz=0.08mm/t) apxae=30×0.6mm	n=2,500min^{-1} (Vc=94m/min) Vf=1,130mm/min (fz=0.08mm/t) apxae=30×0.6mm
Results	6PFK	6PFK	6PFK
	Competitor A Chattering occurred	Competitor A Chattering occurred	Competitor A Dull surface due to poor approach



High feed rate and high efficiency shouldering with Multi-edge design (6 flutes /8 flutes)
Varied interval flute design and variable lead to minimize chattering
Good surface finish

● Special Flute Design

New Special Flute Design Enables Stable Chip Evacuation

Good chip evacuation with wide chip pocket
Good performance at high feed rate machining

6PFK, 8PFK

No. of Flutes : 6,8

6 8

MEGACOAT NANO is applied

Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC | P 30~40HRC | H ~55HRC | ★M Stainless steel | ★S Titanium Alloy | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT NANO | h5 Shank Dia. | 42° 44° | Land

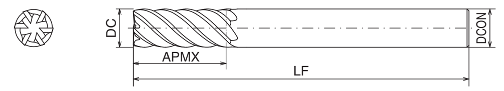


Fig.1

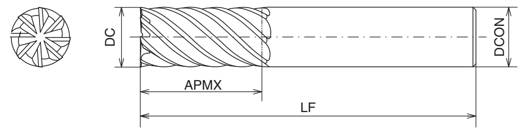


Fig.2

6PFK, 8PFK (Medium)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
6PFK060-150	●	6.0	0 -0.020	15	6	60	6	Fig.1
6PFK080-200	●	8.0	-0.005 -0.025	20	8	70	6	
6PFK100-250	●	10.0	-0.005 -0.025	25	10	80	6	
6PFK120-300	●	12.0	-0.010 -0.030	30	12	100	6	
6PFK160-400	●	16.0	-0.010 -0.030	40	16	110	6	
6PFK200-450	●	20.0	-0.010 -0.030	45	20	125	6	
8PFK250-500	●	25.0	-0.010 -0.030	50	25	140	8	Fig.2

6PFK, 8PFK (Long)

Shouldering

(Unit : mm)

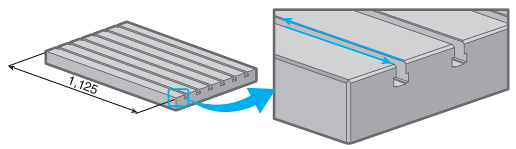
Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
6PFK060-250	●	6.0	0 -0.020	25	6	70	6	Fig.1
6PFK080-350	●	8.0	-0.005 -0.025	35	8	90	6	
6PFK100-450	●	10.0	-0.005 -0.025	45	10	100	6	
6PFK120-550	●	12.0	-0.010 -0.030	55	12	120	6	
6PFK160-650	●	16.0	-0.010 -0.030	65	16	135	6	
6PFK200-750	●	20.0	-0.010 -0.030	75	20	155	6	
6PFK200-1000	●	20.0	-0.010 -0.030	100	20	180	6	
8PFK250-1000	●	25.0	-0.010 -0.030	100	25	180	8	Fig.2

Recommended Cutting Conditions ➡ L72

Case Studies

Machine table FC250

6PFK200-450
Finishing (1 pass)
n = 2,500 min^{-1}
(Vc = 157 m/min)
Vf = 3,500 mm/min
(fz = 0.23 mm/t)
ap x ae = 35 x 1.2 mm



Competitor Coated Carbide B (2 passes)
Semi finishing n = 2,500 min^{-1} (Vc = 157 m/min)
Vf = 1,500 mm/min (fz = 0.1 mm/t)
ap x ae = 35 x 1.0 mm
Finishing n = 2,000 min^{-1} (Vc = 125 m/min)
Vf = 1,000 mm/min (fz = 0.1 mm/t)
ap x ae = 35 x 0.2 mm

Cutting Time (1,125mm x 24 slots)

Competitor B machined the workpiece with 2 passes due to chattering.
6PFK machined the workpiece with 1 pass without chattering.
Productivity has greatly improved by increasing cutting conditions.

(User Evaluation)

● : Std. Item

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

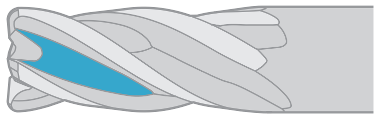
4JER

High Efficiency and Stable Machining for Superalloy such as Inconel®
Long Tool Life Machining with MEGACOAT HARD for Excellent Heat Resistance

1 Resistant to Breakage

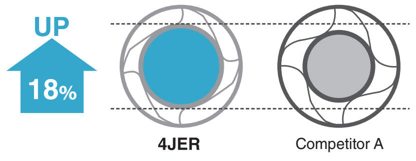
Stable Slotting and Trochoid Machining with Chip Pocket Grooves and Large Core Thickness

● Chip Pocket for Smooth Chip Evacuation During Slotting Applications



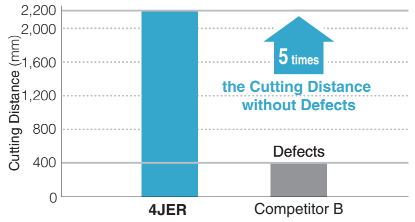
Excellent Chip Evacuation
2 times
Amount of chip evacuation

● Core Thickness Comparison



Decreases Tool Deflection and Achieves Excellent Machining Precision

● Slotting Performance Comparison (Internal evaluation)

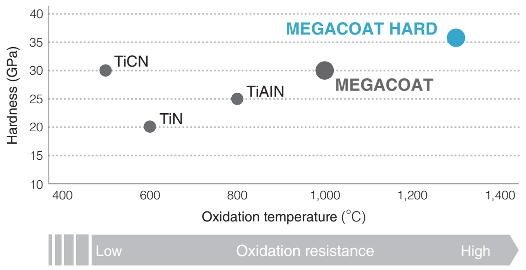


Cutting Conditions : n = 1,200 min⁻¹, Vf = 140 mm/min, ap = 4 mm
End Mill Dia. ø8 mm, Slotting, Wet
Workpiece Material : Inconel®718 (Aging treatment, 40HRC)

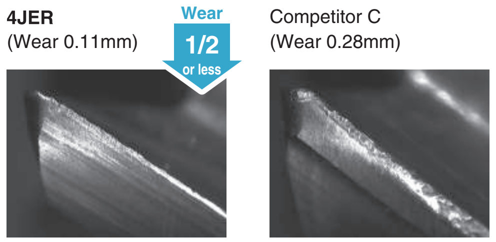
2 Achieves Long Tool Life and Stable Machining

The MEGACOAT HARD coating technology delivers the highest hardness and heat resistance in Kyocera's PVD coating

● Properties of Coating



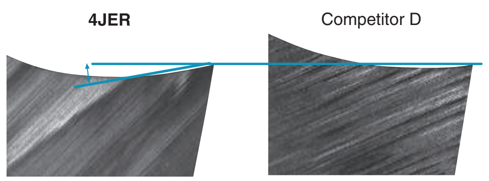
● Wear resistance comparison (Cutting distance 975mm)



Cutting Conditions : n= 1,200 min⁻¹, Vf = 140 mm/min, ap = 4 mm
End Mill Dia. ø8 mm, Slotting, Wet
Workpiece Material : Inconel®718 (Aging treatment, 40HRC)

3 Decreased burr

High Sharpness with a Large Rake Angle

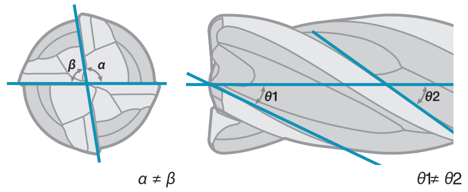


Burring During Slotting (Inconel® 718)

Cutting Conditions : n = 1,200 min⁻¹, Vf = 140 mm/min, ap = 4 mm
End Mill Dia. ø8 mm, Wet

4 Resistance to chattering

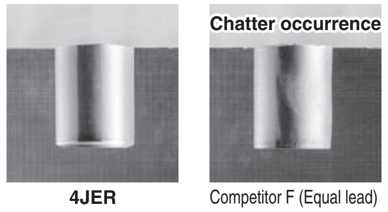
Improved Chatter Resistance with Varied interval flute and Variable Lead



Varied interval flute design
Prevents periodical vibration during machining

Variable Lead
Anti vibration effect
Prevents chattering, and superior surface finish

Slotting Surface in Trochoidal Machining (Inconel® 718)



Cutting Conditions : n =1,200min⁻¹, Vf = 300 mm/min, ap = 20 mm
End Mill Dia. ø16 mm, Width 20mm, Wet

4JER

No. of Flutes : 4

Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC | P 30~40HRC | M Stainless steel | S Titanium Alloy | ★S Heat-resistant Alloy

MEGACOAT HARD is applied

MEGACOAT HARD | Radius R | h5 Shank Dia. | 32° 35°

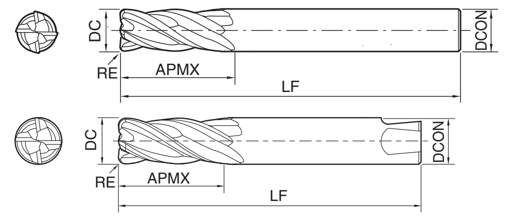


Fig.1

Fig.2
(X-Treme Shank)

4JER (Short)

Shouldering | Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Corner-R RE	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4JER060-090-R03	●	6.0	0 / -0.020	0.3	9	6	60	4	Fig.1
4JER060-090-R05	●			0.5					
4JER060-090-R10	●			1.0					
4JER080-120-R03	●	8.0	-0.005 / -0.025	0.3	12	8	70	4	
4JER080-120-R05	●			0.5					
4JER080-120-R10	●			1.0					
4JER080-120-R15	●			1.5					
4JER100-150-R03	●	10.0	-0.005 / -0.025	0.3	15	10	80	4	
4JER100-150-R05	●			0.5					
4JER100-150-R10	●			1.0					
4JER100-150-R15	●			1.5					
4JER100-150-R20	●			2.0					
4JER100-150-R30	●			3.0					
4JER120-180-R05	●	12.0	-0.010 / -0.030	0.5	18	12	100	4	
4JER120-180-R10	●			1.0					
4JER120-180-R15	●			1.5					
4JER120-180-R20	●			2.0					
4JER120-180-R30	●			3.0					
4JER160-240-R10	●	16.0	-0.010 / -0.030	1.0	24	16	110	4	
4JER160-240-R20	●			2.0					
4JER160-240-R30	●			3.0					
4JER200-300-R10	●	20.0	-0.010 / -0.030	1.0	30	20	125	4	
4JER200-300-R20	●			2.0					
4JER200-300-R30	●			3.0					

4JER (Medium)

Shouldering | Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Corner-R RE	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4JER060-150-R03	●	6.0	0 / -0.020	0.3	15	6	60	4	Fig.1
4JER060-150-R05	●			0.5					
4JER060-150-R10	●			1.0					
4JER080-200-R03	●	8.0	-0.005 / -0.025	0.3	20	8	70	4	
4JER080-200-R05	●			0.5					
4JER080-200-R10	●			1.0					
4JER080-200-R15	●			1.5					
4JER100-250-R03	●	10.0	-0.005 / -0.025	0.3	25	10	80	4	
4JER100-250-R05	●			0.5					
4JER100-250-R10	●			1.0					
4JER100-250-R15	●			1.5					
4JER100-250-R20	●			2.0					
4JER100-250-R30	●			3.0					
4JER120-260-R05	●	12.0	-0.010 / -0.030	0.5	26	12	100	4	
4JER120-260-R10	●			1.0					
4JER120-260-R15	●			1.5					
4JER120-260-R20	●			2.0					
4JER120-260-R30	●			3.0					
4JER160-350-R10	●	16.0	-0.010 / -0.030	1.0	35	16	110	4	
4JER160-350-R20	●			2.0					
4JER160-350-R30	●			3.0					
4JER200-450-R10	●	20.0	-0.010 / -0.030	1.0	45	20	125	4	
4JER200-450-R20	●			2.0					
4JER200-450-R30	●			3.0					
4JER120-260-R10-XT	●	12.0	-0.010 / -0.030	1.0	26	12	94	4	Fig.2
4JER120-260-R20-XT	●			2.0					
4JER120-260-R30-XT	●			3.0					
4JER160-350-R10-XT	●	16.0	-0.010 / -0.030	1.0	35	16	116	4	
4JER160-350-R20-XT	●			2.0					
4JER160-350-R30-XT	●			3.0					
4JER200-450-R10-XT	●	20.0	-0.010 / -0.030	1.0	45	20	130	4	
4JER200-450-R20-XT	●			2.0					
4JER200-450-R30-XT	●			3.0					

*4JER...XT Shank (X-Treme Shank) is for NIKKEN X-Treme chuck

Applicable chuck for 4JER...XT ➡ M90

Recommended Cutting Conditions ➡ L73

● : Std. Item

KYOCERA Solid Tools | SGS Solid Tools | SGS Micro Tools

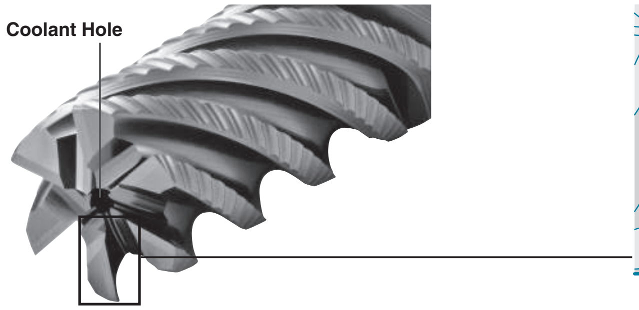
4 / 5 / 6RFH

High Efficiency and Stable Machining with Multi-edge Design and Coolant Hole
Deep Slotting for Stainless Steel and Titanium Alloy

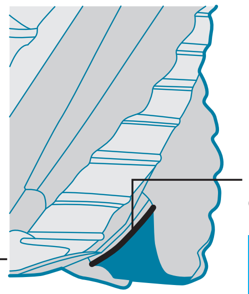
1 High Efficiency Machining with Multi-edge Design

Multi-edge Design with Coolant Hole. Good Chip Evacuation with Original Gash Shape

● Multi-edge Design (ø16 - 6 flutes)



● Original Gash Shape



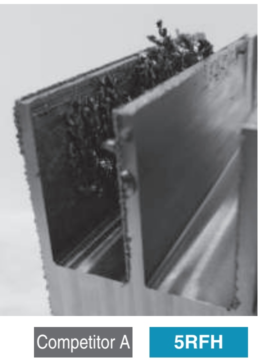
Radius gash creates better chip flow and evacuation

Good Chip Evacuation

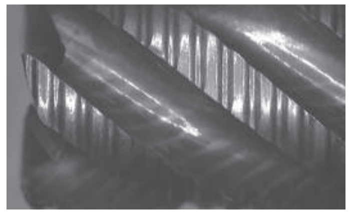
Deep Slotting (ap = 2 x DC) for Stainless Steel and Titanium Alloy

● Slotting Performance Comparison (Internal Evaluation)

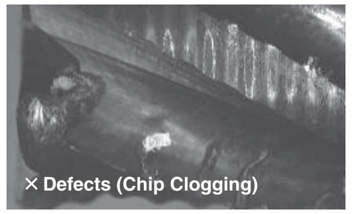
After Machining 1 Pass



5RFH (Internal and External Coolant)



Competitor A (External Coolant)



Cutting Conditions : n = 2,550 min⁻¹, Vf = 336 mm/min, ap = 20 mm
End Mill Dia. ø10, Wet, Slotting Workpiece Material : SUS304

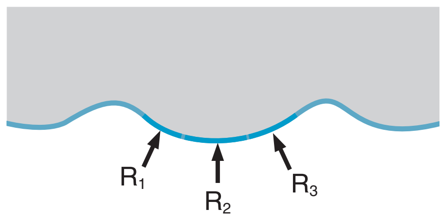
No Defects when Deep Slotting

2 Defect Resistant

Reduces Cutting Pressure and Defect with Special Curved Radius Serrated Edge. Enables Stable Machining

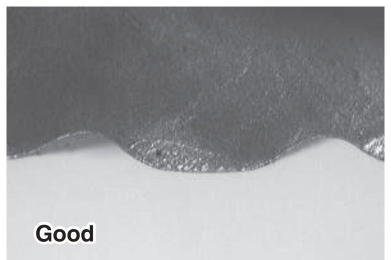
Cutting Conditions : n = 2,900 min⁻¹, Vf = 712 mm/min, ap x ae = 5 x 3 mm
End Mill Dia. ø10, Wet, Shouldering Workpiece Material : Ti-6Al-4V

● Special Curved Radius Serrated Edge

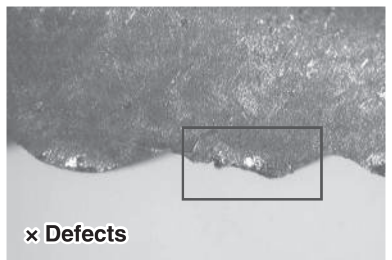


Serrated Curved Edge with Different Radii (Compound Radius Shape)
Distributes cutting pressure and increase defect resistance

● Blade Edge after Machining 12m (Internal Evaluation)



5RFH



Competitor B

3 Achieves Long Tool Life and Stable Machining

The MEGACOAT HARD coating technology delivers the highest hardness and heat resistance in Kyocera's PVD coating

No. of Flutes : 4, 5, 6

4 / 5 / 6RFH

4 5 6

MEGACOAT HARD is applied

with Coolant hole

Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC | ★P 30~40HRC | ★M Stainless steel | ★S Titanium Alloy | S Heat-resistant Alloy | K Cast Iron

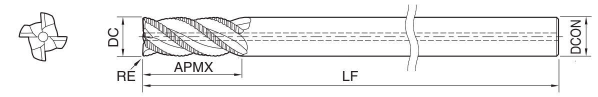


Fig.1

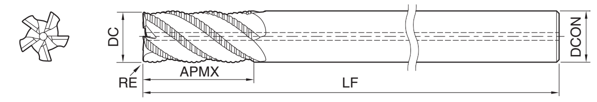


Fig.2

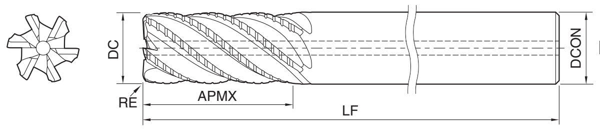


Fig.3

4 / 5 / 6RFH (Medium)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	* Corner-R RE	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4RFH060-150	●	6.0	0 / -0.050	0.3	15	6	60	4	Fig.1
4RFH080-200	●	8.0	0 / -0.050	0.3	20	8	70	4	
5RFH100-250	●	10.0	0 / -0.050	0.5	25	10	80	5	Fig.2
5RFH120-260	●	12.0	0 / -0.050	0.5	26	12	100	5	
6RFH160-350	●	16.0	0 / -0.060	0.5	35	16	110	6	Fig.3
6RFH200-450	●	20.0	0 / -0.060	0.5	45	20	125	6	

* Corner-R dimension is reference only

4 / 5 / 6RFH (Long)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	* Corner-R RE	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
4RFH060-300	●	6.0	0 / -0.050	0.3	30	6	80	4	Fig.1
4RFH080-400	●	8.0	0 / -0.050	0.3	40	8	100	4	
5RFH100-500	●	10.0	0 / -0.050	0.5	50	10	110	5	Fig.2
5RFH120-600	●	12.0	0 / -0.050	0.5	60	12	130	5	
6RFH160-800	●	16.0	0 / -0.060	0.5	80	16	160	6	Fig.3
6RFH200-1000	●	20.0	0 / -0.060	0.5	100	20	180	6	

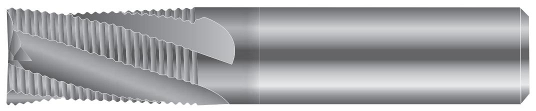
* Corner-R dimension is reference only

● : Std. Item

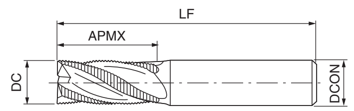
Recommended Cutting Conditions ➡ L74

No. of Flutes : 3,4,5

3RDS, 4RDS, 5RDS



Recommended Workpiece Materials ★ 1st Choice



3RDSM, 4RDSM, 5RDSM (Medium)

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	Spec of Corners CHW	No. of Flutes ZEFP
3RDSM040-110-06	●	4	-0.030 -0.105	11	6	55	0.3	3
3RDSM050-130-06	●	5	-0.030 -0.105	13	6	57	0.3	3
3RDSM060-130-06	●	6	-0.030 -0.105	13	6	57	0.3	3
3RDSM080-160-08	●	8	-0.040 -0.130	16	8	63	0.3	3
4RDSM100-220-10	●	10	-0.040 -0.130	22	10	72	0.5	4
4RDSM120-260-12	●	12	-0.050 -0.160	26	12	83	0.5	4
4RDSM160-320-16	●	16	-0.050 -0.160	32	16	92	0.5	4
4RDSM200-380-20	●	20	-0.065 -0.195	38	20	104	0.5	4
5RDSM250-450-25	●	25	-0.065 -0.195	45	25	121	0.5	5

3RDSL, 4RDSL, 5RDSL (Long)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	Spec of Corners CHW	No. of Flutes ZEFP
3RDSL060-240-06	●	6	-0.030 -0.105	24	6	76	0.3	3
3RDSL080-280-08	●	8	-0.040 -0.130	28	8	76	0.3	3
4RDSL100-340-10	●	10	-0.040 -0.130	34	10	89	0.5	4
4RDSL120-450-12	●	12	-0.050 -0.160	45	12	100	0.5	4
4RDSL160-560-16	●	16	-0.050 -0.160	56	16	125	0.5	4
4RDSL200-600-20	●	20	-0.065 -0.195	60	20	125	0.5	4
5RDSL250-800-25	●	25	-0.065 -0.195	80	25	150	0.5	5

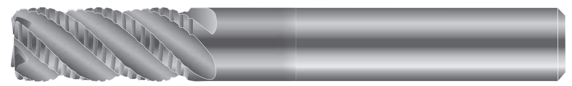
● Three, four and five flutes types are available for roughing. Their edge design with sine-curve pattern reduce cutting force.

Recommended Cutting Conditions ➡ L75

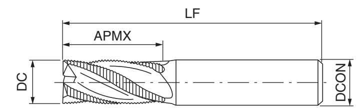
● : Std. Item

No. of Flutes : 4,6

4RFSM, 6RFSM



Recommended Workpiece Materials ★ 1st Choice



4RFSM

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	Spec of Corners CHW	No. of Flutes ZEFP
4RFSM060-130-06	●	6	-0.030 -0.105	13	6	57	0.3	4
4RFSM080-160-08	●	8	-0.040 -0.130	16	8	63	0.4	4
4RFSM100-220-10	●	10	-0.040 -0.130	22	10	72	0.5	4
4RFSM120-260-12	●	12	-0.050 -0.160	26	12	83	0.6	4
4RFSM160-320-16	●	16	-0.050 -0.160	32	16	92	0.6	4
4RFSM200-380-20	●	20	-0.065 -0.195	38	20	104	1.0	4

6RFSM

Shouldering Slotting

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	Spec of Corners CHW	No. of Flutes ZEFP
6RFSM160-320-16	●	16	-0.050 -0.160	32	16	92	0.6	6
6RFSM200-380-20	●	20	-0.065 -0.195	38	20	104	1.0	6
6RFSM250-450-25	●	25	-0.065 -0.195	45	25	121	1.1	6

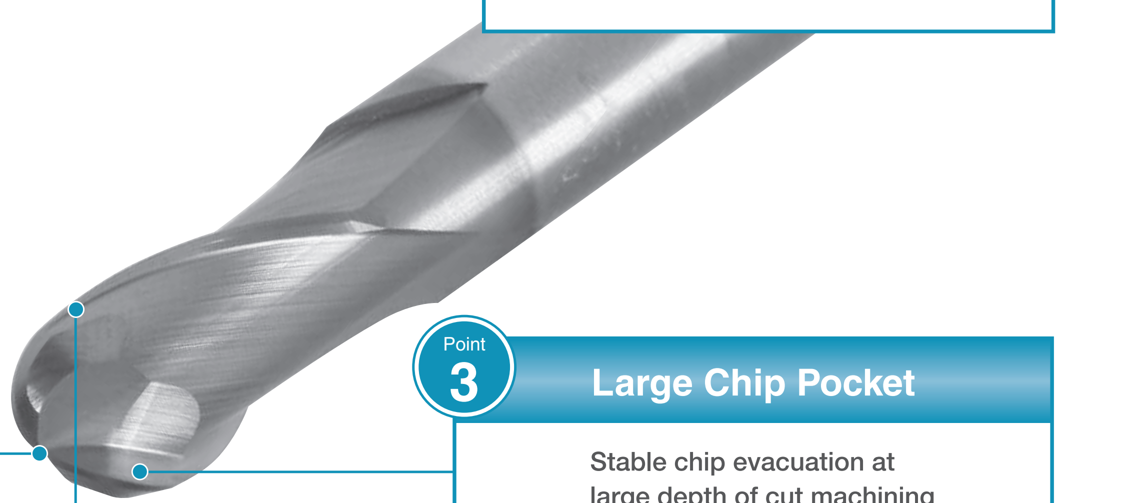
Recommended Cutting Conditions ➡ L76

● RFS has notched surface edge of 45° helix angle. It is applicable for hard materials and titanium alloys due to strong cutting edge.

● : Std. Item

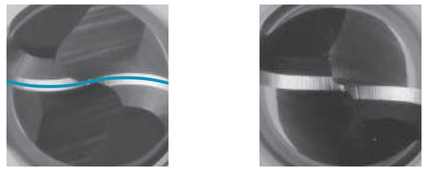
2SEB

Special cutting edge concept and nano layer coating realized high precision and long tool life machining



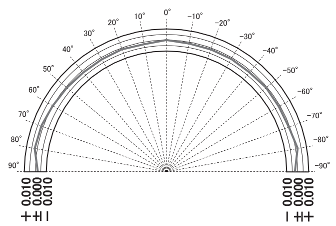
Point 1 Sharp cutting with special nose geometry

Arc-like cutting edge distributes the cutting force and controls wear progress



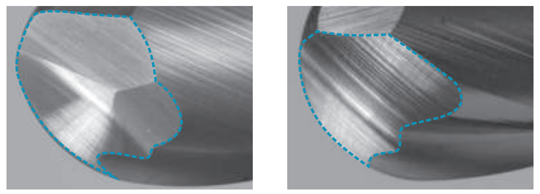
Point 2 R±0.005mm close tolerance edge diameter (R8.0 excluded)

Excellent surface finish quality when using entire cutting edge in machining of the mold's draft angle or profiling

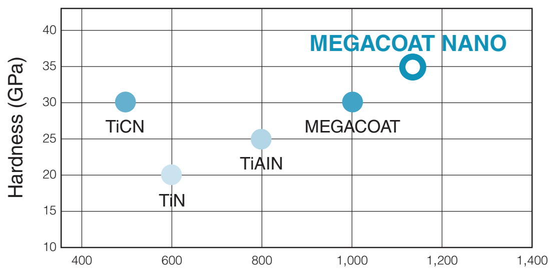


Point 3 Large Chip Pocket

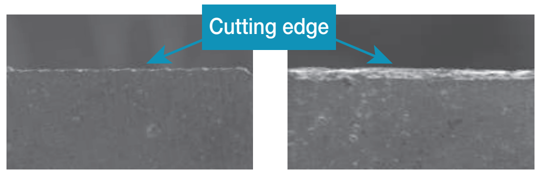
Stable chip evacuation at large depth of cut machining



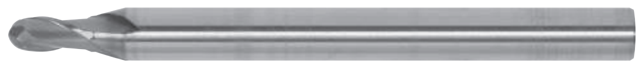
Point 4 High quality cutting edge by MEGACOAT NANO



Smooth and sharp cutting edge with superior wear resistance and adhesion resistance



2SEB

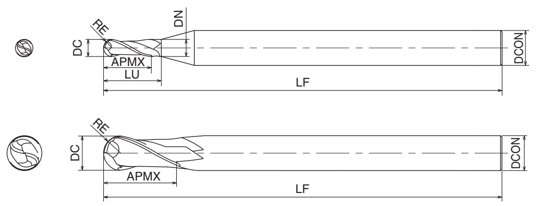


MEGACOAT NANO is applied

Recommended Workpiece Materials ★ 1st Choice

P ~30HRC ★ | P 30~40HRC ★ | H ~55HRC ★ | H ~68HRC | M Stainless steel | K Cast Iron

MEGACOAT NANO | ±0.005 mm R | ±0.010 mm R (R8.0) | h5 Shank Dia. | 30°



2SEB (Ball-nose End Mill with 2 Flutes)

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(Unit : mm)

Description	Stock	Radius of Ball-nose RE	Radius of Ball-nose Tolerance	Outside Dia. DC	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
2SEB020-050-R10	●	1.0	±0.005	2.0	5	2.10	6.6	6	50	2	Fig.1
2SEB030-080-R15	●	1.5	±0.005	3.0	8	3.15	9.8	6	70	2	Fig.1
2SEB040-080-R20	●	2.0	±0.005	4.0	8	4.2	10.0	6	70	2	Fig.1
2SEB050-100-R25	●	2.5	±0.005	5.0	10	5.2	12.4	6	80	2	Fig.1
2SEB060-120-R30	●	3.0	±0.005	6.0	12	-	-	6	90	2	Fig.2
2SEB080-140-R40	●	4.0	±0.005	8.0	14	-	-	8	100	2	Fig.2
2SEB100-180-R50	●	5.0	±0.005	10.0	18	-	-	10	100	2	Fig.2
2SEB120-220-R60	●	6.0	±0.005	12.0	22	-	-	12	110	2	Fig.2
2SEB160-300-R80	●	8.0	±0.010	16.0	30	-	-	16	140	2	Fig.2

Solid End Mill Identification System

2 S E B 020 - 050 - R10
(1) (2) (3) (4) (5) (6) (7)

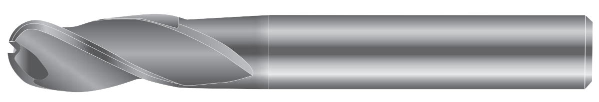
(1) No. of Flutes	(2) Applications	(3) Helix Angle	(4) Series	(5) Outside Dia.	(6) Length of cut	(7) Radius of Ball-nose
2	S : High efficiency	E : 30-39°	B : Ball-nose End Mill	020 → 2.0mm	050 → 5.0mm	R10 → R1.0mm

Recommended Cutting Conditions ➔ L77

● : Std. Item

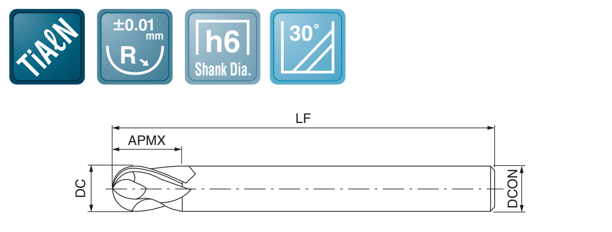
No. of Flutes : 3

3UEBS (Ball-nose End Mill with 3 Flutes)



Recommended Workpiece Materials ★ 1st Choice

★ P ~30HRC | ★ P 30~40HRC | M Stainless steel | S Titanium Alloy | ★ K Cast Iron | N Aluminum & Non Ferrous Material



3UEBS (Ball-nose End Mill with 3 Flutes)

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(Unit : mm)

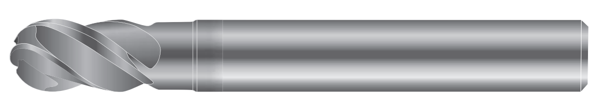
Description	Stock	* Radius of Ball-nose	Outside Dia.	Length of cut	Shank Dia.	Overall length
		RE	DC	APMX	DCON	LF
3UEBS030-070-06	▲	R1.5	3	7	6	57
3UEBS040-080-06	▲	R2	4	8	6	57
3UEBS050-100-06	▲	R2.5	5	10	6	57
3UEBS060-100-06	▲	R3	6	10	6	57
3UEBS080-160-08	▲	R4	8	16	8	63
3UEBS100-190-10	▲	R5	10	19	10	72
3UEBS120-220-12	▲	R6	12	22	12	83

● Ball-nose end mill with three flutes for machining of difficult-to-cut materials.

Recommended Cutting Conditions ➡ L77

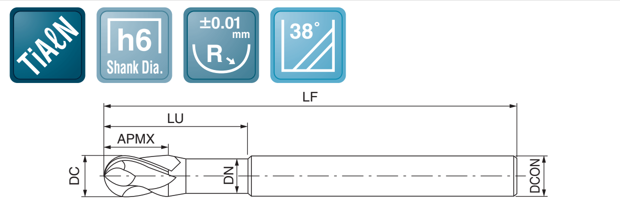
No. of Flutes : 4

4YEBM



Recommended Workpiece Materials ★ 1st Choice

★ P ~30HRC | P 30~40HRC | ★ M Stainless steel | ★ S Titanium Alloy | S Heat-resistant Alloy | K Cast Iron



4YEBM (Ball-nose End Mill with 4 Flutes)

Shouldering Slotting

(Unit : mm)

Description	Stock	* Radius of Ball-nose	Outside Dia.	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length
		RE	DC	APMX	DN	LU	DCON	LF
4YEBM050-090-06	▲	R2.5	5	9	4.5	15	6	57
4YEBM060-100-06	▲	R3	6	10	5.5	15	6	57
4YEBM080-120-08	▲	R4	8	12	7.4	20	8	63
4YEBM100-140-10	▲	R5	10	14	9.2	25	10	72
4YEBM120-160-12	▲	R6	12	16	11	30	12	83
4YEBM160-220-16	▲	R8	16	22	15	38	16	92
4YEBM200-260-20	▲	R10	20	26	19	50	20	104

● Ball-nose end mill for semi-finishing of difficult-to-cut materials.

* Actual ball-nose radius will be half of actual measurement of outside diameter.

Recommended Cutting Conditions ➡ L78

▲ : To be replaced by a new product

No. of Flutes : 4,5,6,7,8

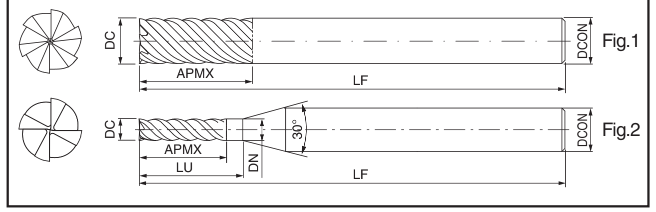
4HFS, 5HFS, 6HFS, 7HFS, 8HFS

MEGACOAT HARD is applied

High Efficiency Machining

Recommended Workpiece Materials ★ 1st Choice

★ P ~30HRC | ★ P 30~40HRC | ★ H ~55HRC | ★ H ~68HRC

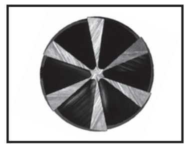


4HFSS, 5HFSS, 6HFSS, 7HFSS (Short)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length	No. of Flutes	Shape
		DC		APMX	DN	LU	DCON	LF	ZEFP	
4HFSS010-040-06	●	1	0 / -0.015	4	1.05	4.8	6	60	4	Fig.2
4HFSS020-060-06	●	2	0 / -0.015	6	2.10	7.2	6	60	4	
4HFSS030-080-06	●	3	0 / -0.015	8	3.15	9.6	6	60	4	
4HFSS040-100-06	●	4	0 / -0.015	10	4.2	12.0	6	60	4	
4HFSS050-120-06	●	5	0 / -0.015	12	5.2	14.4	6	60	4	
5HFSS040-100-06	●	4	0 / -0.015	10	4.2	12.0	6	60	5	
6HFSS060-140-06	●	6	0 / -0.020	14	-	-	6	60	6	Fig.1
6HFSS080-180-08	●	8	-0.005 / -0.025	18	-	-	8	70	6	
6HFSS100-220-10	●	10	-0.005 / -0.025	22	-	-	10	80	6	
6HFSS120-260-12	●	12	-0.010 / -0.030	26	-	-	12	90	6	
7HFSS060-140-06	●	6	0 / -0.020	14	-	-	6	60	7	
7HFSS080-180-08	●	8	-0.005 / -0.025	18	-	-	8	70	7	
7HFSS100-220-10	●	10	-0.005 / -0.025	22	-	-	10	80	7	
7HFSS120-260-12	●	12	-0.010 / -0.030	26	-	-	12	90	7	



Bottom surface of 6HFSS cutting edge

4HFSM, 5HFSM, 6HFSM, 7HFSM, 8HFSM (Medium)

Shouldering

(Unit : mm)

Description	Stock	Outside Dia.	Mill Dia. tolerance	Length of cut	Neck Dia.	Under Neck Length	Shank Dia.	Overall length	No. of Flutes	Shape
		DC		APMX	DN	LU	DCON	LF	ZEFP	
4HFSM010-050-06	●	1	0 / -0.015	5	1.05	6	6	60	4	Fig.2
4HFSM020-090-06	●	2	0 / -0.015	9	2.10	10.8	6	60	4	
4HFSM030-120-06	●	3	0 / -0.015	12	3.15	14.4	6	60	4	
4HFSM040-140-06	●	4	0 / -0.015	14	4.2	16.8	6	60	4	
4HFSM050-170-06	●	5	0 / -0.015	17	5.2	20.4	6	60	4	
5HFSM040-140-06	●	4	0 / -0.015	14	4.2	16.8	6	60	5	
6HFSM060-170-06	●	6	0 / -0.020	17	-	-	6	60	6	Fig.1
6HFSM070-200-08	●	7	-0.005 / -0.025	20	7.2	24.0	8	70	6	Fig.2
6HFSM080-230-08	●	8	-0.005 / -0.025	23	-	-	8	70	6	Fig.1
6HFSM100-280-10	●	10	-0.005 / -0.025	28	-	-	10	80	6	
6HFSM120-330-12	●	12	-0.010 / -0.030	33	-	-	12	90	6	
6HFSM140-370-16	●	14	-0.010 / -0.030	37	14.2	44.4	16	105	6	Fig.2
6HFSM150-420-16	●	15	-0.010 / -0.030	42	15.2	50.4	16	105	6	
6HFSM160-420-16	●	16	-0.010 / -0.030	42	-	-	16	105	6	Fig.1
6HFSM200-480-20	●	20	-0.010 / -0.030	48	-	-	20	110	6	
7HFSM060-170-06	●	6	0 / -0.020	17	-	-	6	60	7	
7HFSM080-230-08	●	8	-0.005 / -0.025	23	-	-	8	70	7	
7HFSM100-280-10	●	10	-0.005 / -0.025	28	-	-	10	80	7	
7HFSM120-330-12	●	12	-0.010 / -0.030	33	-	-	12	90	7	
7HFSM160-420-16	●	16	-0.010 / -0.030	42	-	-	16	105	7	
8HFSM250-530-25	●	25	-0.010 / -0.030	53	-	-	25	125	8	

● PVD coating "MEGACOAT HARD" for hard materials is applied.
Achieves high rigidity by ensuring a large core diameter, longer tool life and stable machining.
Also increases cutting edge strength and chip evacuation with a negative rake angle.

Recommended Cutting Conditions ➡ L78

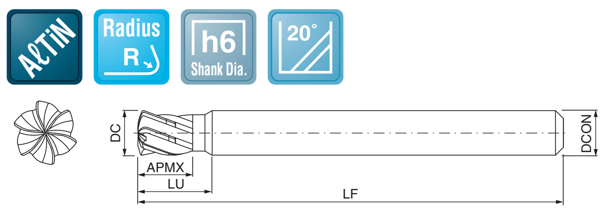
● : Std. Item

No. of Flutes : 6

6PDRS

Recommended Workpiece Materials ★ 1st Choice

★P ~30HRC ★P 30~40HRC ★H ~55HRC ★H ~68HRC



6

6PDRS

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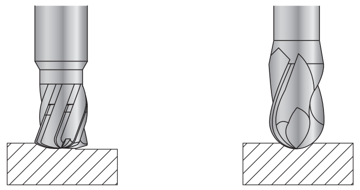
(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
6PDRS060-045-06	●	6	-0.020 -0.038	4.5	9	6	57	6
6PDRS080-060-08	●	8	-0.025 -0.047	6	12	8	63	6
6PDRS100-075-10	●	10	-0.025 -0.047	7.5	15	10	72	6
6PDRS120-090-12	●	12	-0.032 -0.059	9	18	12	83	6

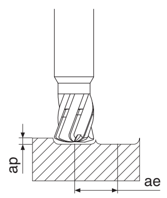
- Increased rigidity with large core diameter. 6 flutes design enables high feed rate machining.
  Achieves large cutting allowance and high efficiency machining with special corner-R shaped.
  Ramping and arc cutting are possible.



PDR

General Purpose Ball-nose End Mill

Recommended Cutting Conditions



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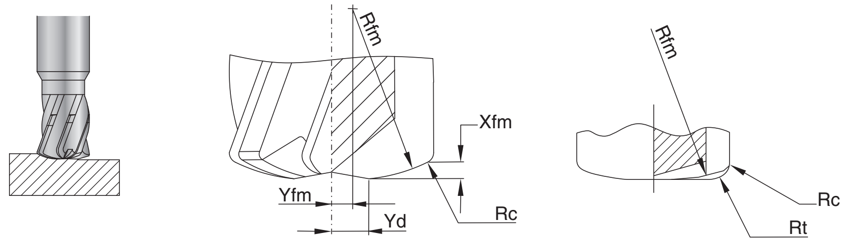
Workpiece Material		Depth of Cut (ap x ae) (mm)	Outside Dia.DC (mm)	ø6	ø8	ø10	ø12
Prehardened Steel	52HRC	ø6 : 0.32 x 3.3mm (0.32 x 0.55DC) ø8 : 0.42 x 4.4mm (0.42 x 0.55DC) ø10: 0.53 x 5.5mm (0.53 x 0.55DC) ø12: 0.63 x 6.6mm (0.63 x 0.55DC)	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200
			Feed Rate (mm/min)	7,600	7,200	6,900	7,600
Carbon Steel / Alloy Steel	＜45HRC		Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200
			Feed Rate (mm/min)	15,300	15,300	15,300	12,700

● : Std. Item

Details of 6PDRS cutting edge shape



Xfm : Maximum Depth of Cut
Yfm : Distance between the center line of tool and the center of Rfm
Yd : Distance between the center line of tool and the start position of cutting edge
Rfm : Radius of tool tip
Rc : Corner-R
Rt : Virtual radius in program

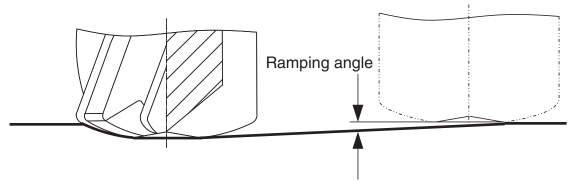
(Unit : mm)

Description	Outside Dia. DC	Maximum Depth of Cut Xfm	Radius of tool tip Rfm	Corner-R Rc	Distance between the center line of tool and the center of Rfm Yfm	Distance between the center line of tool and the start position of cutting edge Yd	Virtual radius in program Rt
6PDRS060-045-06	6	0.32	6	0.62	0.75	1.32	0.62
6PDRS080-060-08	8	0.42	8	0.83	1.00	1.76	0.83
6PDRS100-075-10	10	0.53	10	1.04	1.25	2.20	1.04
6PDRS120-090-12	12	0.63	12	1.24	1.50	2.64	1.24

- Cutting with cut amount exceeding the Xfm value is not recommended.

Ramping

During ramping, lower the feed rate to the ratio in the chart on the right.

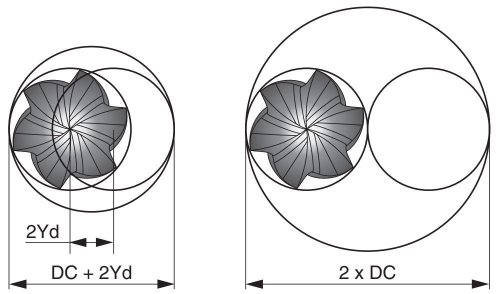


Ramping angle	1°	2°	3°	4°	5°
Ratio of feed rate	100%	70%	50%	30%	10%

- During pocket machining, set the ramping angle at 0.5°.
- Plunge milling is not recommended.

Arc cutting

For arc cutting, hole diameter of each machining should be within the range in the chart on the right.



(Unit : mm)

Description	Min.	Max.
6PDRS060-045-06	8.64	12.00
6PDRS080-060-08	11.52	16.00
6PDRS100-075-10	14.40	20.00
6PDRS120-090-12	17.28	24.00

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

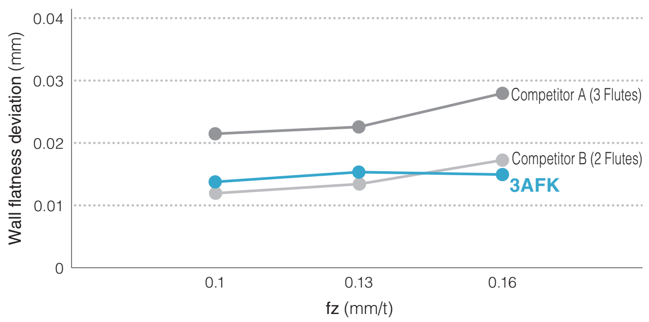
3AFK

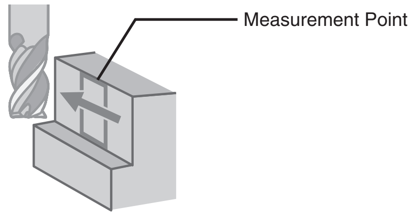
High Efficiency and Excellent Precision Machining with 3 Flutes
Stable Machining with Sharp Edge for Anti-chattering Performance
Wide Range of Applications including Slotting, Shouldering, Ramping, and Plunge milling

1 High-efficiency and High-precision Machining

High Efficiency with 3 Flutes. Excellent Machining Precision

Comparison of wall flatness (Internal evaluation)



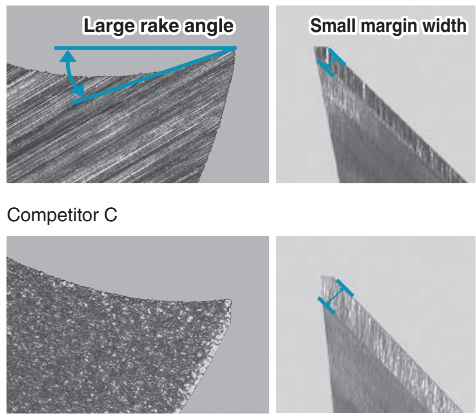


Cutting Conditions : n = 11,700 min-1, Vf = 3,500 - 5,600 mm/min, ap x ae = 15 x 1 mm
End Mill Dia. ø10, Shouldering, Down-cut, Wet, HSK A63 Workpiece Material : A5052

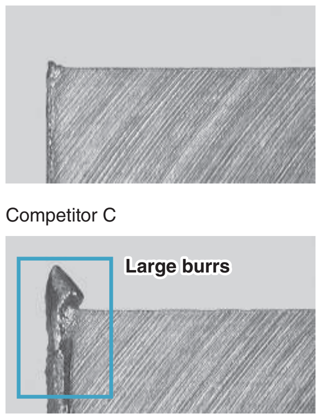
2 Decreased burr

Excellent Sharpness with Large Rake Angle and Small Margin Width

Comparison of the Rake Angle and Margin Width (Internal evaluation)

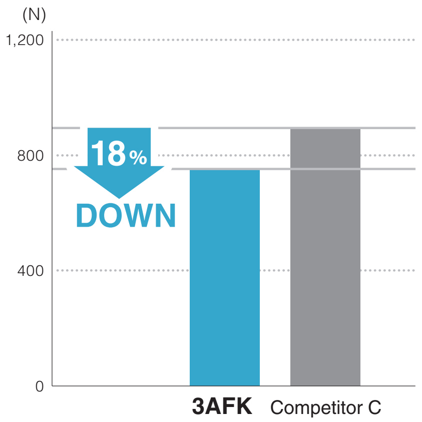


Burr Comparison after Machining (Internal evaluation)



Burr Comparison after Machining Cutting Conditions : n = 11,700 min-1, Vf = 4,600 mm/min, ap x ae = 10 x 1 mm
End Mill Dia. ø10, Shouldering, Down-cut, Wet, HSK A63 Workpiece Material : A7075

Cutting Force Comparison (Internal evaluation)

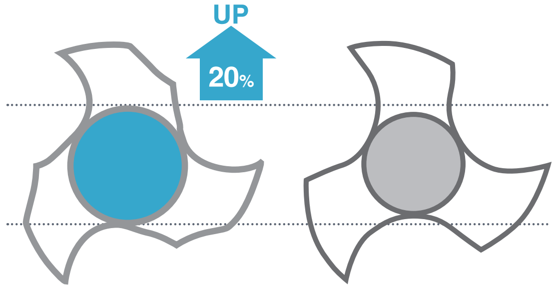


Cutting Conditions : n = 11,700 min-1, Vf = 3,400 mm/min
ap x ae = 10 x 10 mm
End Mill Dia. ø10, Slotting, Wet, BT50 Workpiece Material : A5052

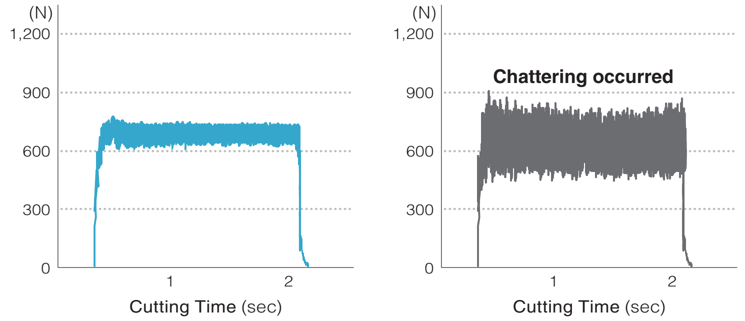
3 Resistance to chattering

Larger Core Thickness to Reduce Chattering

Core Thickness Comparison (Internal evaluation)

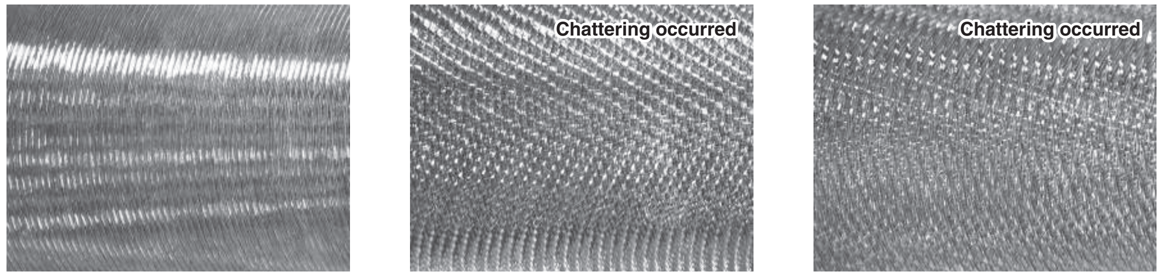


Cutting Force Comparison (Internal evaluation)



Cutting Conditions : n = 11,700 min-1, Vf = 3,400 mm/min, ap x ae = 10 x 10 mm, End Mill Dia. ø10, Slotting, Wet, BT50 Workpiece Material : A5052

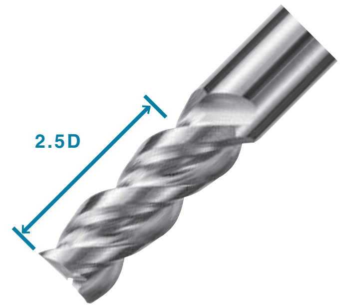
Comparison of Bottom Surface at Slotting (Internal evaluation)



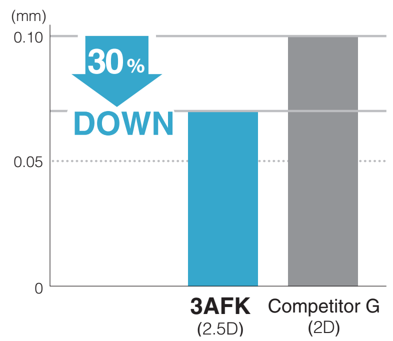
Cutting Conditions : n = 11,100min-1, Vf = 2,600 mm/min, ap = 10 mm, Wet Workpiece Material : A5052

4 Flute Length 2.5 D (medium type) Added to the Lineup

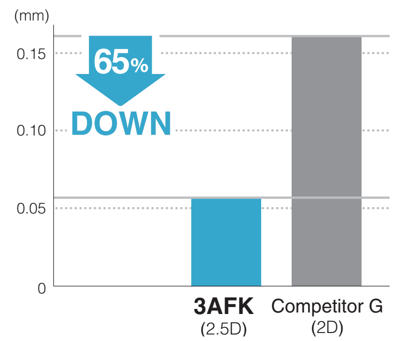
Stable Machining even while Deep Slotting



Comparison of wall flatness (Internal evaluation)



Burr Height Comparison (Internal evaluation)



Cutting Conditions : n = 11,100 min-1, Vf = 3,800 mm/min, ap x ae = 20 x 1 mm
End Mill Dia. ø10, Shouldering, Down-cut, Wet, HSK A63 Workpiece Material : A7075

No. of Flutes : 3

3AFK

Recommended Workpiece Materials ★ 1st Choice

N Aluminum & Non Ferrous Material

Uncoated | Land | h5 Shank Dia. | 45°

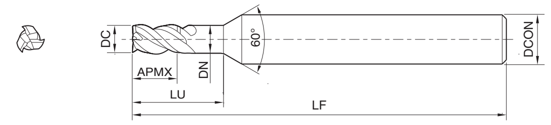


Fig.1

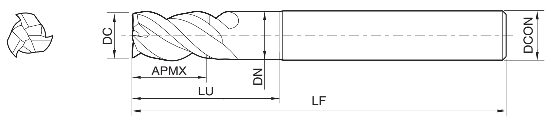


Fig.2

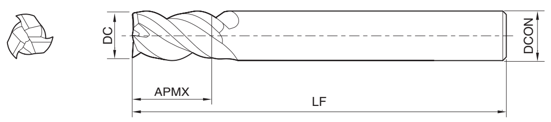


Fig.3

3AFK (Short : 1.5D)

Shouldering | Slotting | Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
3AFK030-045-090	●	3.0	0 / -0.015	4.5	2.7	9	6	70	3	Fig.1
3AFK040-060-120	●	4.0	0 / -0.015	6	3.7	12	6	70	3	
3AFK050-075-150	●	5.0	0 / -0.015	7.5	4.7	15	6	70	3	
3AFK060-090	●	6.0	0 / -0.005	9	-	-	6	70	3	Fig.3
3AFK060-090-180	●	6.0	0 / -0.005	9	5.7	18	6	70	3	Fig.2
3AFK070-105-210	●	7.0	0 / -0.015	10.5	6.7	21	8	80	3	Fig.1
3AFK080-120	●	8.0	0 / -0.006	12	-	-	8	80	3	Fig.3
3AFK080-120-240	●	8.0	0 / -0.006	12	7.7	24	8	80	3	Fig.2
3AFK090-135-270	●	9.0	0 / -0.015	13.5	8.7	27	10	90	3	Fig.1
3AFK100-150	●	10.0	0 / -0.006	15	-	-	10	90	3	Fig.3
3AFK100-150-300	●	10.0	0 / -0.006	15	9.7	30	10	90	3	Fig.2
3AFK110-165-330	●	11.0	0 / -0.015	16.5	10.7	33	12	110	3	Fig.1
3AFK120-180	●	12.0	0 / -0.008	18	-	-	12	110	3	Fig.3
3AFK120-180-360	●	12.0	0 / -0.008	18	11.7	36	12	110	3	Fig.2
3AFK160-240	●	16.0	0 / -0.008	24	-	-	16	120	3	Fig.3
3AFK160-240-480	●	16.0	0 / -0.008	24	15.7	48	16	120	3	Fig.2

Recommended Cutting Conditions ➔ L79

● : Std. Item

3AFK (Medium : 2.5D)

Shouldering | Slotting | Plunge milling

(Unit : mm)

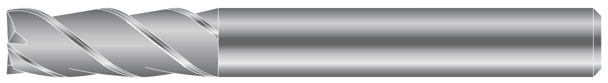
Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Neck Dia. DN	Under Neck Length LU	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP	Shape
3AFK030-075-150	●	3.0	0 / -0.015	7.5	2.7	15	6	70	3	Fig.1
3AFK040-100-200	●	4.0	0 / -0.015	10	3.7	20	6	70	3	
3AFK050-125-250	●	5.0	0 / -0.015	12.5	4.7	25	6	70	3	
3AFK060-150	●	6.0	0 / -0.005	15	-	-	6	70	3	Fig.3
3AFK060-150-300	●	6.0	0 / -0.005	15	5.7	30	6	70	3	Fig.2
3AFK070-175-350	●	7.0	0 / -0.015	17.5	6.7	35	8	80	3	Fig.1
3AFK080-200	●	8.0	0 / -0.006	20	-	-	8	80	3	Fig.3
3AFK080-200-400	●	8.0	0 / -0.006	20	7.7	40	8	80	3	Fig.2
3AFK090-225-450	●	9.0	0 / -0.015	22.5	8.7	45	10	90	3	Fig.1
3AFK100-250	●	10.0	0 / -0.006	25	-	-	10	90	3	Fig.3
3AFK100-250-500	●	10.0	0 / -0.006	25	9.7	50	10	90	3	Fig.2
3AFK110-275-550	●	11.0	0 / -0.015	27.5	10.7	55	12	110	3	Fig.1
3AFK120-300	●	12.0	0 / -0.008	30	-	-	12	110	3	Fig.3
3AFK120-300-600	●	12.0	0 / -0.008	30	11.7	60	12	110	3	Fig.2
3AFK160-400	●	16.0	0 / -0.008	40	-	-	16	120	3	Fig.3
3AFK160-400-800	●	16.0	0 / -0.008	40	15.7	80	16	120	3	Fig.2

Recommended Cutting Conditions ➔ L79

● : Std. Item

No. of Flutes : 3

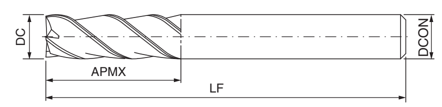
3NESM



Recommended Workpiece Materials ★ 1st Choice

N Aluminum & Non Ferrous Material

Uncoated · Land · h6 Shank Dia. · 38°



3NESM

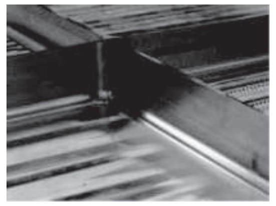
Shouldering · Slotting

(Unit : mm)

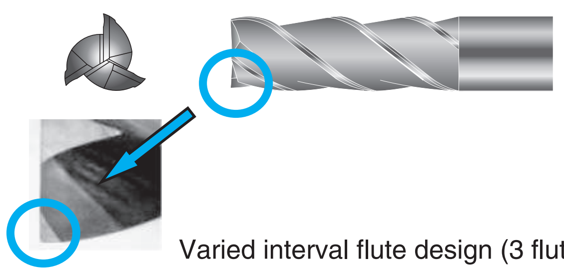
Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Length of cut APMX	Shank Dia. DCON	Overall length LF	No. of Flutes ZEFP
3NESM030-120-06	●	3	-0.014 -0.028	12	6	50	3
3NESM040-120-06	●	4	-0.020 -0.038	12	6	50	3
3NESM050-140-06	●	5	-0.020 -0.038	14	6	50	3
3NESM060-160-06	●	6	0 -0.008	16	6	50	3
3NESM080-200-08	●	8	0 -0.009	20	8	63	3
3NESM100-220-10	●	10	0 -0.009	22	10	76	3
3NESM120-250-12	●	12	0 -0.011	25	12	76	3
3NESM160-320-16	●	16	0 -0.011	32	16	89	3
3NESM200-380-20	●	20	0 -0.013	38	20	104	3

* Cutting edge of over 6mm øDC has margin.

- A wiper is attached at the lower edge for improving the bottom surface finish.
  Chattering is controlled with cutting edge slots at varied intervals, and finishing of lateral surfaces is improved.



Finished surface of aluminum alloy at high speed machining.
Reached 0.25μmRa
(Bottom face / side face / corner)



with wiper edge

Varied interval flute design (3 flutes)

Recommended Cutting Conditions ➡ L79

● : Std. Item

End Mill 4FCX-KCD · Drill 2ZDF-KCD

NEW

Diamond Coated Solid Tools

Newly Developed High Performance Diamond Coating
Long Tool Life and High Precision Machining of CFRP

End Mill 4FCX-KCD

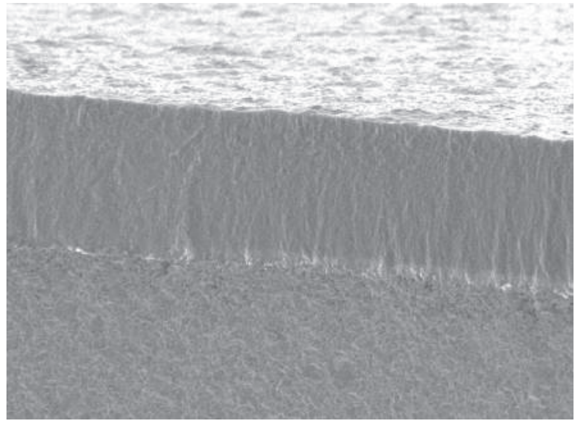
Drill 2ZDF-KCD

Special Order Items * Special order items such as routers are also available

1 **Diamond Coating with Superior Wear Resistance and Fracture Resistance**
High Degree of Crystallinity, Adhesion and Toughness Improve Tool Durability

Unique Preprocessing Technology and Special Carbide Material
Superior Adhesion Ensures Stable Machining

Smooth and Even Coating Surface



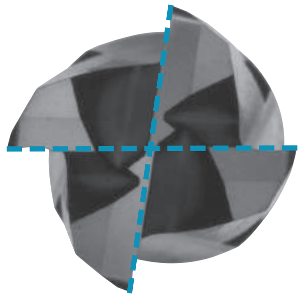
Cross-section of Diamond Coating

Solid Tools for CFRP

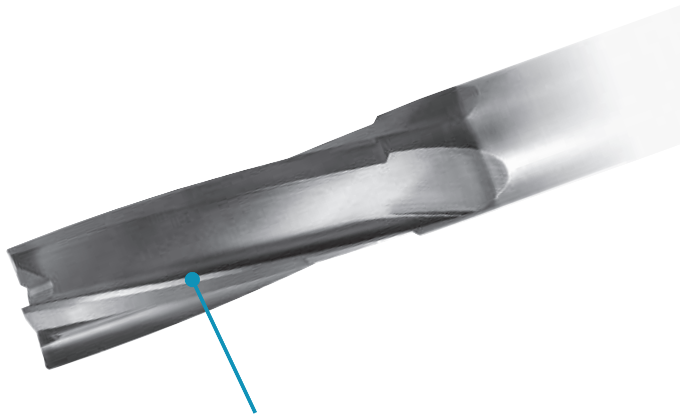
2 Special Tool Geometry Coated with a Smooth Diamond Coating Reduces Cutting Force
Long Tool Life, High Precision and High Quality Machining of CFRP

End Mill
Variable Flute Design Prevents Chattering and Stable Machining Provides High-quality Surface finishes
Sharp Cutting Edges Cut Off Strong Carbon Fibers. Reduces Delamination and Burr Build Up

New Geometry (Variable Flute Design)

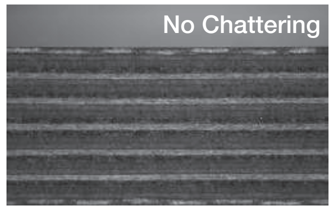


Variable flute design prevents chattering

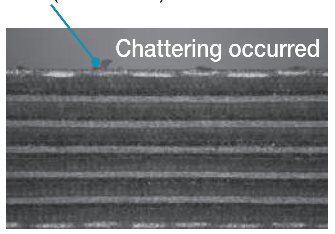


Surface Finish Comparison (Internal evaluation)

Excellent surface finish (Side wall) Burr (Uncut fiber)



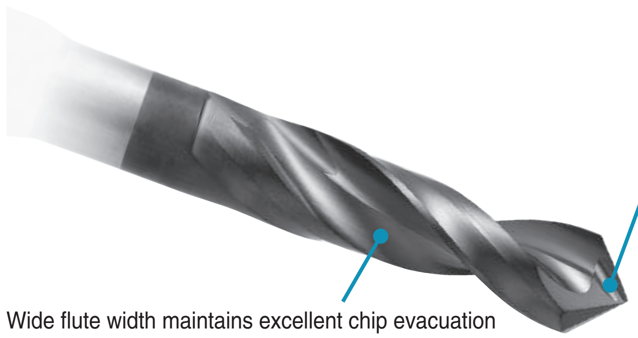
Kyocera

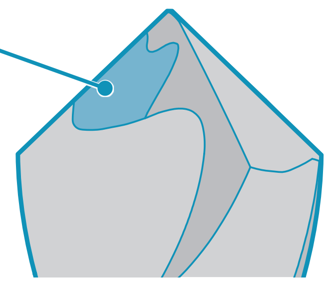


Conventional A

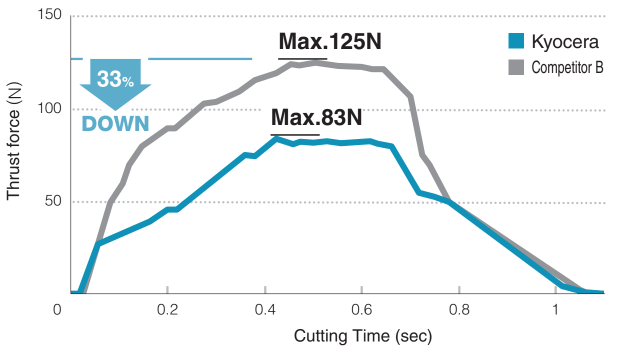
Cutting Conditions : Vc = 280 m/min, f = 0.1 mm/rev
Outside Dia. ø10 mm, ae = 10 mm (Slotting), Dry Workpiece Material : CFRP 4.6 mm (Thickness)

Drill
Unique Rake Face Delivers Sharpness at the top of Drill
Low Cutting Force Provides Long Tool Life





Cutting Force Comparison (Internal evaluation)



Cutting Conditions : Vc = 100 m/min, f = 0.08 mm/rev
Outside Dia. ø6 mm (Special order item), Dry Workpiece Material : CFRP 4.6 mm (Thickness)

No. of Cutting Holes Comparison (Internal evaluation)

Surface finish

Provides high quality surface finish and long tool life

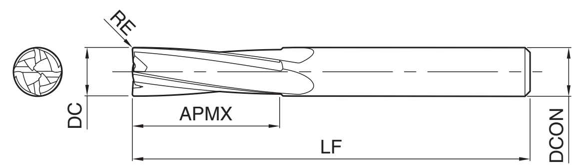
Cutting Conditions : Vc = 100 m/min, f = 0.08 mm/rev
Outside Dia. ø7 mm (Special order item), Dry Workpiece Material : CFRP 4.6 mm (Thickness)

No. of Flutes : 4

4FCX-KCD NEW

Recommended Workpiece Materials ★ 1st Choice
N Non Metal

Diamond h5 Shank Dia.



Shouldering

(Unit : mm)

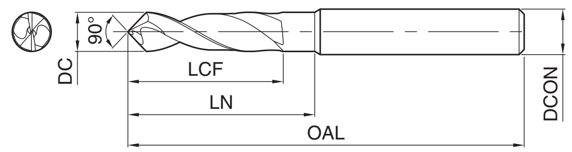
Description	Stock	Outside Dia.	Corner-R	Length of cut	Shank Dia.	Overall length	No. of Flutes
		DC	RE	APMX	DCON	LF	ZEFP
4FCX080-250-KCD	●	8	0.4	25	8	80	4
4FCX100-300-KCD	●	10	0.4	30	10	80	4
4FCX120-300-KCD	●	12	0.4	30	12	100	4

* Special order items such as routers are also available

2ZDF-KCD NEW

Recommended Workpiece Materials ★ 1st Choice
N Non Metal

Diamond h6 Shank Dia.



(Unit : mm)

Description	Stock	Outside Dia.		Flute length	Under Neck Length	Overall length	Shank Dia.
		DC (mm)	DC (inch)	LCF	LN	OAL	DCON
2ZDF04763-KCD	●	4.763	3/16	35	40	70	6
2ZDF06350-KCD	●	6.350	1/4	40	45	90	8
2ZDF07938-KCD	●	7.938	5/16	50	55	90	8

* Special ordering is available

Solid Drill Identification System

2ZDF - 04763 - KCD
(1) (2) (3)

(1) Series	(2) Outside Dia.	(3) Others
2ZDF : Drill for CFRP	04763 ↓ 4.763mm	KCD : Diamond Coating

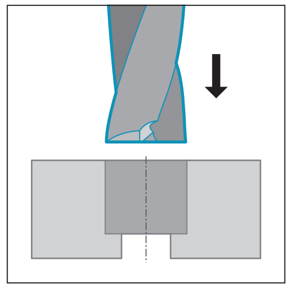
Recommended Cutting Conditions ➔ L79

● : Std. Item

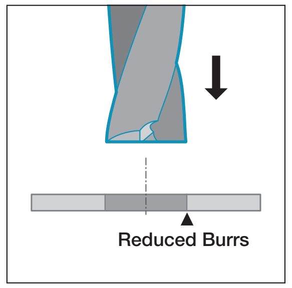
2ZDK-HP NEW

New Generation Flat Bottom Drill
Stable Machining in a Wide Range of Applications Including Counterboring and Drilling in Cylinder Surfaces
Low Cutting Force Corner Edge Prevents Burr Formation

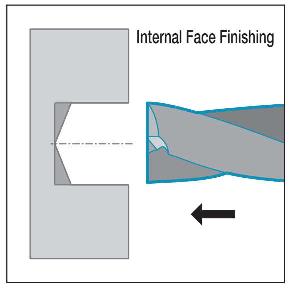
1 Flat Bottom Used in a Wide Range of Machining Applications



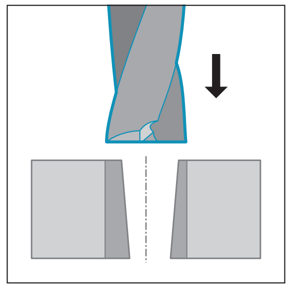
Counterboring



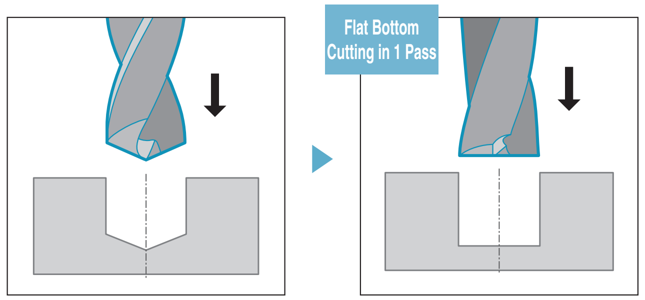
Plunge Milling on Thin Plate



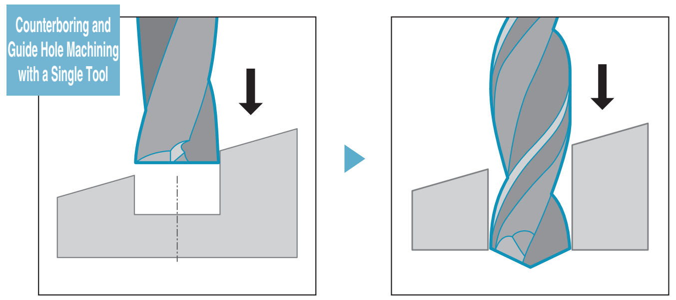
Turning in Automatic Lathes



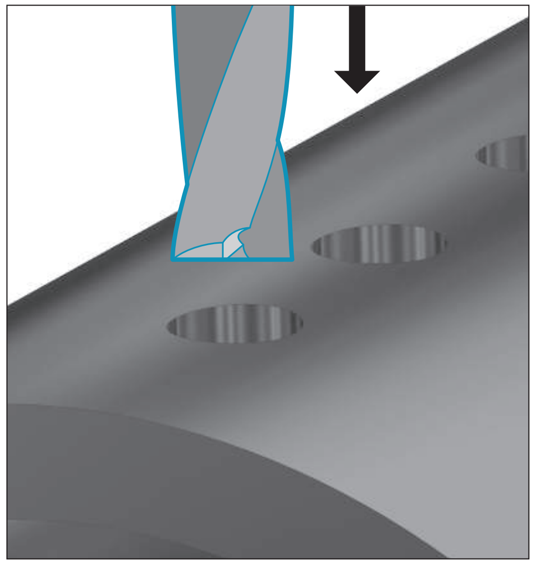
Hole Expanding



Bottom Finishing after Drilling



Counterboring on Slant Surface / Guide Hole Machining



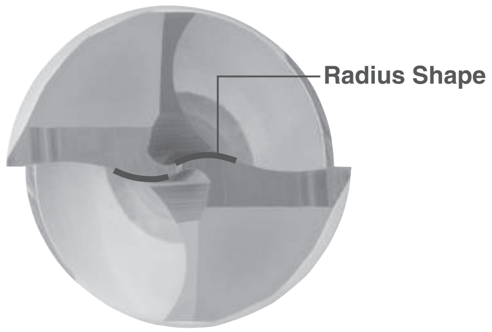
Achieves Stable Machining even in Difficult Drilling Situations

Drilling in Cylinder and Curved Surfaces

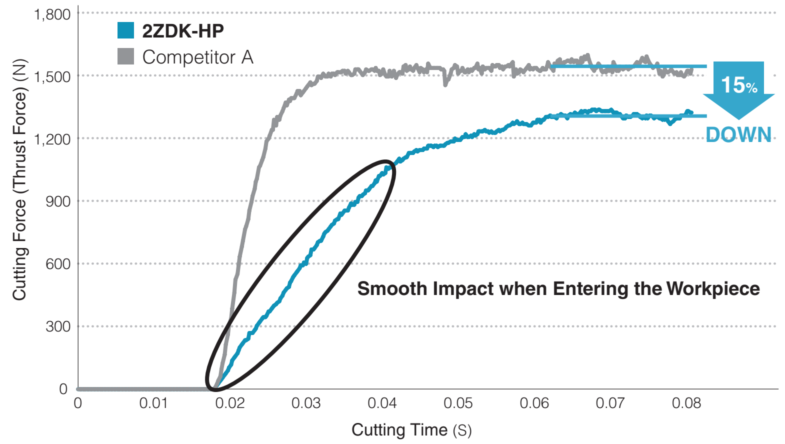
2 High-Precision Machining

Chisel Edge with S-curve Provides Lower Cutting Forces
Reduced Impact Forces when Entering the Workpiece and Provides Excellent Vibration Control for High Precision Drilling

Special Thinning Shape

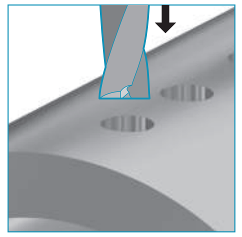


Cutting Force Comparison (Internal evaluation)



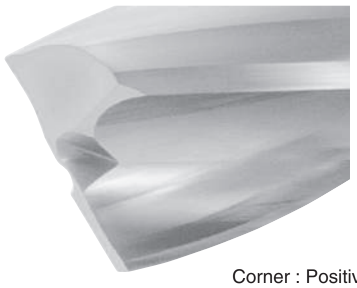
Cutting Conditions : n = 1,800 min-1, Vf = 400 mm/min, Drilling Depth 10 mm, Dry Drill Dia. ø12 mm (3D type)
Workpiece Material : S50C

3 Decreased burr



Low Cutting Force with Flat Bottom and Sharp Cutting Edge
Decreased burr

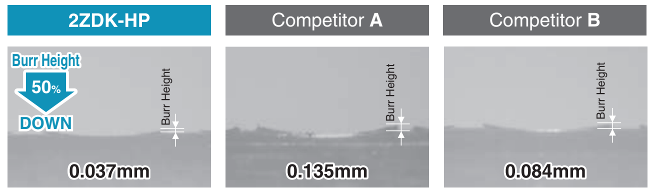
Low Cutting Force Corner Edge Design



Corner : Positive Rake Angle

Burr Comparison (Internal evaluation)

Drilling in Cylinder Surface

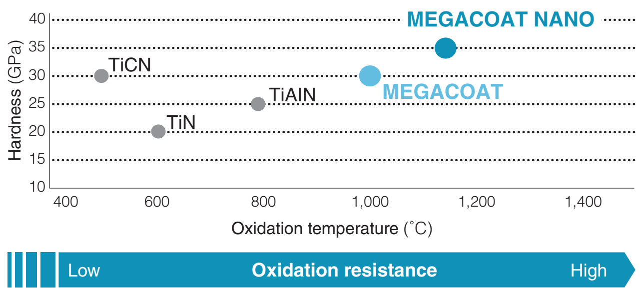


Cutting Conditions : n = 7,000 min⁻¹, Vf = 420 mm/min, Wet Drill Dia. ø3.5 mm (3D type)
Workpiece Material : Carbon Steel Pipe ø17.3 mm (Thickness 3.2 mm)

4 Extended Tool Life by MEGACOAT NANO Technology

The special Multilayer Nano Coating prevents wear and chipping with high hardness (35GPa) and superior oxidation resistance (oxidation temperature : 1,150 ˚C)

Properties of Coating



KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

No. of Flutes : 2

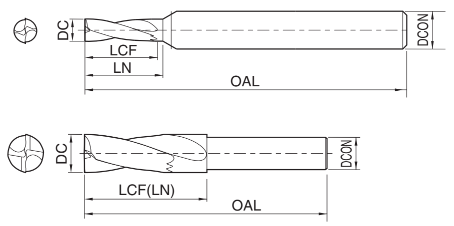
2ZDK-HP (Drilling Depth Short type) NEW

MEGACOAT NANO is applied

Recommended Workpiece Materials

P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT NANO | 20° | h5 Shank Dia. (~ø12) | h6 Shank Dia. (ø12.5~)



2ZDK-HP (Drilling Depth Short type)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK010HP-1.5D	●	1.0	0 / -0.010	3.5	4.3	4	50	Fig.1
2ZDK011HP-1.5D	●	1.1		3.9	4.7			
2ZDK012HP-1.5D	●	1.2		4.3	5.1			
2ZDK013HP-1.5D	●	1.3		4.7	5.5			
2ZDK014HP-1.5D	●	1.4		5.1	5.9			
2ZDK015HP-1.5D	●	1.5		5.5	6.3			
2ZDK016HP-1.5D	●	1.6		5.7	6.5			
2ZDK017HP-1.5D	●	1.7		5.9	6.7			
2ZDK018HP-1.5D	●	1.8		6.1	6.9			
2ZDK019HP-1.5D	●	1.9		6.3	7.1			
2ZDK020HP-1.5D	●	2.0		6.5	7.3			
2ZDK021HP-1.5D	●	2.1		6.9	7.7			
2ZDK022HP-1.5D	●	2.2		7.3	8.1			
2ZDK023HP-1.5D	●	2.3		7.7	8.5			
2ZDK024HP-1.5D	●	2.4		8.1	8.9			
2ZDK025HP-1.5D	●	2.5		8.5	9.3			
2ZDK026HP-1.5D	●	2.6		8.8	9.5			
2ZDK027HP-1.5D	●	2.7		9.1	9.8			
2ZDK028HP-1.5D	●	2.8		9.3	10.0			
2ZDK029HP-1.5D	●	2.9		9.5	10.3			
2ZDK030HP-1.5D	●	3.0		9	10	6	60	
2ZDK031HP-1.5D	●	3.1	0 / -0.012	10	11			
2ZDK032HP-1.5D	●	3.2						
2ZDK033HP-1.5D	●	3.3						
2ZDK034HP-1.5D	●	3.4		11	12			

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK035HP-1.5D	●	3.5	0 / -0.012	11	12	6	60	Fig.1
2ZDK036HP-1.5D	●	3.6						
2ZDK037HP-1.5D	●	3.7		12	13			
2ZDK038HP-1.5D	●	3.8						
2ZDK039HP-1.5D	●	3.9						
2ZDK040HP-1.5D	●	4.0						
2ZDK041HP-1.5D	●	4.1		13	14			
2ZDK042HP-1.5D	●	4.2						
2ZDK043HP-1.5D	●	4.3						
2ZDK044HP-1.5D	●	4.4		14	15			
2ZDK045HP-1.5D	●	4.5						
2ZDK046HP-1.5D	●	4.6						
2ZDK047HP-1.5D	●	4.7		15	16			
2ZDK048HP-1.5D	●	4.8						
2ZDK049HP-1.5D	●	4.9						
2ZDK050HP-1.5D	●	5.0		16	17			
2ZDK051HP-1.5D	●	5.1						
2ZDK052HP-1.5D	●	5.2						
2ZDK053HP-1.5D	●	5.3						
2ZDK054HP-1.5D	●	5.4		17	18			
2ZDK055HP-1.5D	●	5.5						
2ZDK056HP-1.5D	●	5.6						
2ZDK057HP-1.5D	●	5.7		18	19			
2ZDK058HP-1.5D	●	5.8						
2ZDK059HP-1.5D	●	5.9						

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

Recommended Cutting Conditions ➔ L80

· The drilling depth should be less than 1.5D(1.5 x DC).

● : Std. Item

2ZDK-HP (Drilling Depth Short type)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK060HP-1.5D	●	6.0	0 / -0.012	19	21	6	60	Fig.1
2ZDK061HP-1.5D	●	6.1	0 / -0.015	19	21	8	70	
2ZDK062HP-1.5D	●	6.2						
2ZDK063HP-1.5D	●	6.3		20	22			
2ZDK064HP-1.5D	●	6.4						
2ZDK065HP-1.5D	●	6.5						
2ZDK066HP-1.5D	●	6.6						
2ZDK067HP-1.5D	●	6.7		21	23			
2ZDK068HP-1.5D	●	6.8						
2ZDK069HP-1.5D	●	6.9						
2ZDK070HP-1.5D	●	7.0		22	24			
2ZDK071HP-1.5D	●	7.1						
2ZDK072HP-1.5D	●	7.2						
2ZDK073HP-1.5D	●	7.3		23	25			
2ZDK074HP-1.5D	●	7.4						
2ZDK075HP-1.5D	●	7.5						
2ZDK076HP-1.5D	●	7.6		24	25			
2ZDK077HP-1.5D	●	7.7						
2ZDK078HP-1.5D	●	7.8						
2ZDK079HP-1.5D	●	7.9						
2ZDK080HP-1.5D	●	8.0		25	27			
2ZDK081HP-1.5D	●	8.1				10	80	
2ZDK082HP-1.5D	●	8.2						
2ZDK083HP-1.5D	●	8.3		26	28			
2ZDK084HP-1.5D	●	8.4						
2ZDK085HP-1.5D	●	8.5						
2ZDK086HP-1.5D	●	8.6		27	29			
2ZDK087HP-1.5D	●	8.7						
2ZDK088HP-1.5D	●	8.8						
2ZDK089HP-1.5D	●	8.9		28	30			
2ZDK090HP-1.5D	●	9.0						
2ZDK091HP-1.5D	●	9.1						
2ZDK092HP-1.5D	●	9.2		29	31			
2ZDK093HP-1.5D	●	9.3						
2ZDK094HP-1.5D	●	9.4						
2ZDK095HP-1.5D	●	9.5						
2ZDK096HP-1.5D	●	9.6		30	32			
2ZDK097HP-1.5D	●	9.7						
2ZDK098HP-1.5D	●	9.8						

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK099HP-1.5D	●	9.9	0 / -0.015	31	33	10	80	Fig.1
2ZDK100HP-1.5D	●	10.0						
2ZDK101HP-1.5D	●	10.1	0 / -0.018	31	33	12	100	
2ZDK102HP-1.5D	●	10.2		32	34			
2ZDK103HP-1.5D	●	10.3						
2ZDK104HP-1.5D	●	10.4						
2ZDK105HP-1.5D	●	10.5		33	35			
2ZDK106HP-1.5D	●	10.6						
2ZDK107HP-1.5D	●	10.7						
2ZDK108HP-1.5D	●	10.8						
2ZDK109HP-1.5D	●	10.9		34	36			
2ZDK110HP-1.5D	●	11.0						
2ZDK111HP-1.5D	●	11.1						
2ZDK112HP-1.5D	●	11.2		35	37			
2ZDK113HP-1.5D	●	11.3						
2ZDK114HP-1.5D	●	11.4						
2ZDK115HP-1.5D	●	11.5		36	38			
2ZDK116HP-1.5D	●	11.6						
2ZDK117HP-1.5D	●	11.7						
2ZDK118HP-1.5D	●	11.8						
2ZDK119HP-1.5D	●	11.9						
2ZDK120HP-1.5D	●	12.0		37	39			
2ZDK125HP-1.5D	●	12.5	0 / -0.018	41	41	12	100	Fig.2
2ZDK130HP-1.5D	●	13.0		43	43			
2ZDK135HP-1.5D	●	13.5		44	44			
2ZDK140HP-1.5D	●	14.0		45	45			
2ZDK145HP-1.5D	●	14.5	0 / -0.018	47	47	12	115	Fig.2
2ZDK150HP-1.5D	●	15.0		48	48			
2ZDK155HP-1.5D	●	15.5		50	50			
2ZDK160HP-1.5D	●	16.0	0 / -0.018	52	52	16	115	Fig.1
2ZDK165HP-1.5D	●	16.5	0 / -0.018	53	53	16	115	Fig.2
2ZDK170HP-1.5D	●	17.0		54	54			
2ZDK175HP-1.5D	●	17.5		56	56			
2ZDK180HP-1.5D	●	18.0		57	57			
2ZDK185HP-1.5D	●	18.5	0 / -0.021	59	59	16	125	Fig.2
2ZDK190HP-1.5D	●	19.0		60	60			
2ZDK195HP-1.5D	●	19.5		62	62			
2ZDK200HP-1.5D	●	20.0	0 / -0.021	63	63	20	125	Fig.1

Recommended Cutting Conditions ➔ L80

● : Std. Item

2ZDK-HP (Drilling Depth Short type Long shank) NEW

No. of Flutes : 2

2

MEGACOAT NANO is applied

Recommended Workpiece Materials

P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT NANO | 20° | h5 Shank Dia. (~ø12)

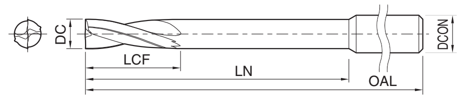


Fig.1

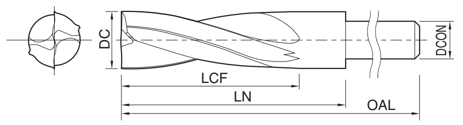


Fig.2

2ZDK-HP (Drilling Depth Short type Long shank)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK030HP-1.5D-LS	●	3.0	0 / -0.010	9.0	30.0	6	100	Fig.1
2ZDK031HP-1.5D-LS	MTO	3.1			31.0			
2ZDK032HP-1.5D-LS	MTO	3.2		10.0	32.0			
2ZDK033HP-1.5D-LS	MTO	3.3			33.0			
2ZDK034HP-1.5D-LS	MTO	3.4			34.0			
2ZDK035HP-1.5D-LS	●	3.5		11.0	35.0			
2ZDK036HP-1.5D-LS	MTO	3.6			36.0			
2ZDK037HP-1.5D-LS	MTO	3.7			37.0			
2ZDK038HP-1.5D-LS	MTO	3.8		12.0	38.0			
2ZDK039HP-1.5D-LS	MTO	3.9			39.0			
2ZDK040HP-1.5D-LS	●	4.0	0 / -0.012		40.0	6	100	Fig.1
2ZDK041HP-1.5D-LS	MTO	4.1			41.0			
2ZDK042HP-1.5D-LS	MTO	4.2		13.0	42.0			
2ZDK043HP-1.5D-LS	MTO	4.3			43.0			
2ZDK044HP-1.5D-LS	MTO	4.4			44.0			
2ZDK045HP-1.5D-LS	●	4.5		14.0	45.0			
2ZDK046HP-1.5D-LS	MTO	4.6			46.0			
2ZDK047HP-1.5D-LS	MTO	4.7			47.0			
2ZDK048HP-1.5D-LS	MTO	4.8		15.0	48.0			
2ZDK049HP-1.5D-LS	MTO	4.9			49.0			
2ZDK050HP-1.5D-LS	●	5.0			50.0			
2ZDK051HP-1.5D-LS	MTO	5.1	0 / -0.012	16.0	51.0	6	110	Fig.1
2ZDK052HP-1.5D-LS	MTO	5.2			52.0			

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK053HP-1.5D-LS	MTO	5.3		16.0	53.0			
2ZDK054HP-1.5D-LS	MTO	5.4			54.0			
2ZDK055HP-1.5D-LS	●	5.5		17.0	55.0			
2ZDK056HP-1.5D-LS	MTO	5.6	0 / -0.012		56.0	6	110	Fig.1
2ZDK057HP-1.5D-LS	MTO	5.7			57.0			
2ZDK058HP-1.5D-LS	MTO	5.8		18.0	58.0			
2ZDK059HP-1.5D-LS	MTO	5.9			59.0			
2ZDK060HP-1.5D-LS	●	6.0	0 / -0.012	19.0	60.0	6	120	Fig.1
2ZDK061HP-1.5D-LS	MTO	6.1		19.0	29.0			
2ZDK062HP-1.5D-LS	MTO	6.2						
2ZDK063HP-1.5D-LS	MTO	6.3						
2ZDK064HP-1.5D-LS	MTO	6.4		20.0	29.5			
2ZDK065HP-1.5D-LS	●	6.5						
2ZDK066HP-1.5D-LS	MTO	6.6						
2ZDK067HP-1.5D-LS	MTO	6.7						
2ZDK068HP-1.5D-LS	MTO	6.8	0 / -0.015	21.0	30.0	6	120	Fig.2
2ZDK069HP-1.5D-LS	MTO	6.9						
2ZDK070HP-1.5D-LS	●	7.0			30.0			
2ZDK071HP-1.5D-LS	MTO	7.1		22.0	30.5			
2ZDK072HP-1.5D-LS	MTO	7.2						
2ZDK073HP-1.5D-LS	MTO	7.3						
2ZDK074HP-1.5D-LS	MTO	7.4		23.0	30.5			
2ZDK075HP-1.5D-LS	●	7.5						

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

· The drilling depth should be less than 1.5D(1.5 x DC).

Recommended Cutting Conditions ➡ **L81**

●: Std. Item MTO : Made to order

2ZDK-HP (Drilling Depth Short type Long shank)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK076HP-1.5D-LS	MTO	7.6						
2ZDK077HP-1.5D-LS	MTO	7.7	0 / -0.015	24.0	31.0	6	120	Fig.2
2ZDK078HP-1.5D-LS	MTO	7.8						
2ZDK079HP-1.5D-LS	MTO	7.9						
2ZDK080HP-1.5D-LS	●	8.0			80.0			Fig.1
2ZDK081HP-1.5D-LS	MTO	8.1		25.0				
2ZDK082HP-1.5D-LS	MTO	8.2	0 / -0.015		31.5	8	130	
2ZDK083HP-1.5D-LS	MTO	8.3						Fig.2
2ZDK084HP-1.5D-LS	MTO	8.4		26.0	32.0			
2ZDK085HP-1.5D-LS	●	8.5						
2ZDK086HP-1.5D-LS	MTO	8.6			32.0			
2ZDK087HP-1.5D-LS	MTO	8.7		27.0				
2ZDK088HP-1.5D-LS	MTO	8.8	0 / -0.015			8	130	Fig.2
2ZDK089HP-1.5D-LS	MTO	8.9			32.5			
2ZDK090HP-1.5D-LS	●	9.0		28.0				
2ZDK091HP-1.5D-LS	MTO	9.1						
2ZDK092HP-1.5D-LS	MTO	9.2						
2ZDK093HP-1.5D-LS	MTO	9.3	0 / -0.015	29.0	32.5	8	130	Fig.2
2ZDK094HP-1.5D-LS	MTO	9.4						
2ZDK095HP-1.5D-LS	●	9.5						
2ZDK096HP-1.5D-LS	MTO	9.6						
2ZDK097HP-1.5D-LS	MTO	9.7	0 / -0.015	30.0	33.5	8	130	Fig.2
2ZDK098HP-1.5D-LS	MTO	9.8						

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK099HP-1.5D-LS	MTO	9.9	0 / -0.015	31.0	34.5	8	130	Fig.2
2ZDK100HP-1.5D-LS	●	10.0	0 / -0.015	31.0	100.0	10	150	Fig.1
2ZDK101HP-1.5D-LS	MTO	10.1		31.0	35.5			
2ZDK102HP-1.5D-LS	MTO	10.2						
2ZDK103HP-1.5D-LS	MTO	10.3		32.0	36.0			
2ZDK104HP-1.5D-LS	MTO	10.4	0 / -0.018			10	150	Fig.2
2ZDK105HP-1.5D-LS	●	10.5						
2ZDK106HP-1.5D-LS	MTO	10.6		33.0	36.5			
2ZDK107HP-1.5D-LS	MTO	10.7						
2ZDK108HP-1.5D-LS	MTO	10.8						
2ZDK109HP-1.5D-LS	MTO	10.9						
2ZDK110HP-1.5D-LS	●	11.0		34.0	37.5			
2ZDK111HP-1.5D-LS	MTO	11.1	0 / -0.018			10	150	Fig.2
2ZDK112HP-1.5D-LS	MTO	11.2						
2ZDK113HP-1.5D-LS	MTO	11.3		35.0	38.5			
2ZDK114HP-1.5D-LS	MTO	11.4						
2ZDK115HP-1.5D-LS	●	11.5						
2ZDK116HP-1.5D-LS	MTO	11.6						
2ZDK117HP-1.5D-LS	MTO	11.7	0 / -0.018	36.0	39.5	10	150	Fig.2
2ZDK118HP-1.5D-LS	MTO	11.8						
2ZDK119HP-1.5D-LS	MTO	11.9						
2ZDK120HP-1.5D-LS	●	12.0	0 / -0.018	37.0	120.0	12	170	Fig.1

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

· The drilling depth should be less than 1.5D(1.5 x DC).

Recommended Cutting Conditions ➡ **L81**

●: Std. Item MTO : Made to order

No. of Flutes : 2

2ZDK-HP (Drilling Depth Regular type) NEW

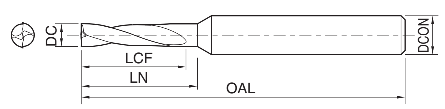
Recommended Workpiece Materials

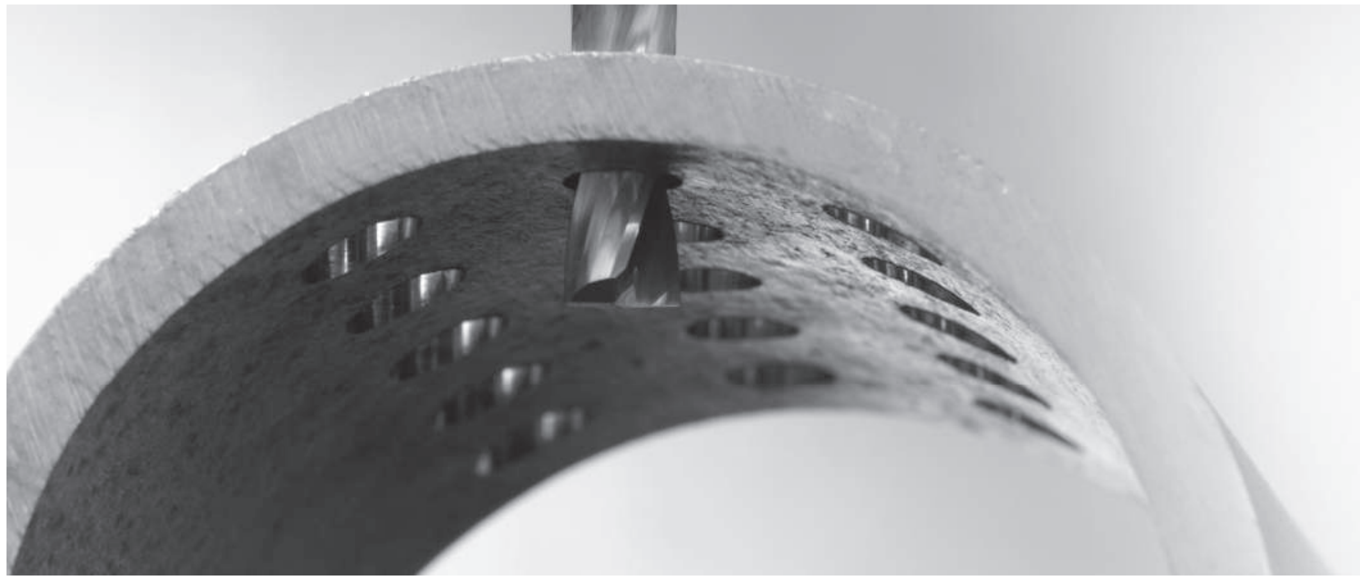
P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT NANO | 20° | h5 Shank Dia. (~ø12) | h6 Shank Dia. (ø12.5~)

2

MEGACOAT NANO is applied





2ZDK-HP (Drilling Depth Regular type)

Plunge milling

(Unit : mm)

<table>
<tr><th rowspan="2">Description</th><th rowspan="2">Stock</th><th>Outside Dia.</th><th rowspan="2">Mill Dia. tolerance</th><th>Flute length</th><th>Under Neck Length</th><th>Shank Dia.</th><th>Overall length</th></tr>
<tr><th>DC</th><th>LCF</th><th>LN</th><th>DCON</th><th>OAL</th></tr>
<tr><td>2ZDK030HP-3D</td><td>●</td><td>3.0</td><td>0
-0.010</td><td rowspan="3">14</td><td rowspan="3">15</td><td rowspan="23">6</td><td rowspan="23">60</td></tr>
<tr><td>2ZDK031HP-3D</td><td>●</td><td>3.1</td><td rowspan="22">0
-0.012</td></tr>
<tr><td>2ZDK032HP-3D</td><td>●</td><td>3.2</td></tr>
<tr><td>2ZDK033HP-3D</td><td>●</td><td>3.3</td><td rowspan="2">15</td><td rowspan="2">16</td></tr>
<tr><td>2ZDK034HP-3D</td><td>●</td><td>3.4</td></tr>
<tr><td>2ZDK035HP-3D</td><td>●</td><td>3.5</td><td rowspan="5">17</td><td rowspan="5">18</td></tr>
<tr><td>2ZDK036HP-3D</td><td>●</td><td>3.6</td></tr>
<tr><td>2ZDK037HP-3D</td><td>●</td><td>3.7</td></tr>
<tr><td>2ZDK038HP-3D</td><td>●</td><td>3.8</td></tr>
<tr><td>2ZDK039HP-3D</td><td>●</td><td>3.9</td></tr>
<tr><td>2ZDK040HP-3D</td><td>●</td><td>4.0</td><td rowspan="2">19</td><td rowspan="2">20</td></tr>
<tr><td>2ZDK041HP-3D</td><td>●</td><td>4.1</td></tr>
<tr><td>2ZDK042HP-3D</td><td>●</td><td>4.2</td><td rowspan="3">20</td><td rowspan="3">21</td></tr>
<tr><td>2ZDK043HP-3D</td><td>●</td><td>4.3</td></tr>
<tr><td>2ZDK044HP-3D</td><td>●</td><td>4.4</td></tr>
<tr><td>2ZDK045HP-3D</td><td>●</td><td>4.5</td><td rowspan="5">21</td><td rowspan="5">22</td></tr>
<tr><td>2ZDK046HP-3D</td><td>●</td><td>4.6</td></tr>
<tr><td>2ZDK047HP-3D</td><td>●</td><td>4.7</td></tr>
<tr><td>2ZDK048HP-3D</td><td>●</td><td>4.8</td></tr>
<tr><td>2ZDK049HP-3D</td><td>●</td><td>4.9</td></tr>
<tr><td>2ZDK050HP-3D</td><td>●</td><td>5.0</td><td rowspan="3">23</td><td rowspan="3">24</td></tr>
<tr><td>2ZDK051HP-3D</td><td>●</td><td>5.1</td></tr>
<tr><td>2ZDK052HP-3D</td><td>●</td><td>5.2</td></tr>
</table>

(Unit : mm)

<table>
<tr><th rowspan="2">Description</th><th rowspan="2">Stock</th><th>Outside Dia.</th><th rowspan="2">Mill Dia. tolerance</th><th>Flute length</th><th>Under Neck Length</th><th>Shank Dia.</th><th>Overall length</th></tr>
<tr><th>DC</th><th>LCF</th><th>LN</th><th>DCON</th><th>OAL</th></tr>
<tr><td>2ZDK053HP-3D</td><td>●</td><td>5.3</td><td rowspan="8">0
-0.012</td><td rowspan="2">24</td><td rowspan="2">25</td><td rowspan="8">6</td><td rowspan="8">60</td></tr>
<tr><td>2ZDK054HP-3D</td><td>●</td><td>5.4</td></tr>
<tr><td>2ZDK055HP-3D</td><td>●</td><td>5.5</td><td>25</td><td>26</td></tr>
<tr><td>2ZDK056HP-3D</td><td>●</td><td>5.6</td><td rowspan="4">26</td><td rowspan="4">27</td></tr>
<tr><td>2ZDK057HP-3D</td><td>●</td><td>5.7</td></tr>
<tr><td>2ZDK058HP-3D</td><td>●</td><td>5.8</td></tr>
<tr><td>2ZDK059HP-3D</td><td>●</td><td>5.9</td></tr>
<tr><td>2ZDK060HP-3D</td><td>●</td><td>6.0</td><td>28</td><td>28</td></tr>
<tr><td>2ZDK061HP-3D</td><td>●</td><td>6.1</td><td rowspan="15">0
-0.015</td><td rowspan="4">28</td><td rowspan="4">29</td><td rowspan="15">8</td><td rowspan="15">70</td></tr>
<tr><td>2ZDK062HP-3D</td><td>●</td><td>6.2</td></tr>
<tr><td>2ZDK063HP-3D</td><td>●</td><td>6.3</td></tr>
<tr><td>2ZDK064HP-3D</td><td>●</td><td>6.4</td></tr>
<tr><td>2ZDK065HP-3D</td><td>●</td><td>6.5</td><td rowspan="3">30</td><td rowspan="3">31</td></tr>
<tr><td>2ZDK066HP-3D</td><td>●</td><td>6.6</td></tr>
<tr><td>2ZDK067HP-3D</td><td>●</td><td>6.7</td></tr>
<tr><td>2ZDK068HP-3D</td><td>●</td><td>6.8</td><td rowspan="2">31</td><td rowspan="2">32</td></tr>
<tr><td>2ZDK069HP-3D</td><td>●</td><td>6.9</td></tr>
<tr><td>2ZDK070HP-3D</td><td>●</td><td>7.0</td><td rowspan="5">32</td><td rowspan="5">33</td></tr>
<tr><td>2ZDK071HP-3D</td><td>●</td><td>7.1</td></tr>
<tr><td>2ZDK072HP-3D</td><td>●</td><td>7.2</td></tr>
<tr><td>2ZDK073HP-3D</td><td>●</td><td>7.3</td></tr>
<tr><td>2ZDK074HP-3D</td><td>●</td><td>7.4</td></tr>
<tr><td>2ZDK075HP-3D</td><td>●</td><td>7.5</td><td>34</td><td>35</td></tr>
</table>

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

· The drilling depth should be less than 3.0D(3.0 x DC).

Recommended Cutting Conditions ➡ **L80**

● : Std. Item

2ZDK-HP (Drilling Depth Regular type)

Plunge milling

(Unit : mm)

<table>
<tr><th rowspan="2">Description</th><th rowspan="2">Stock</th><th>Outside Dia.</th><th rowspan="2">Mill Dia. tolerance</th><th>Flute length</th><th>Under Neck Length</th><th>Shank Dia.</th><th>Overall length</th></tr>
<tr><th>DC</th><th>LCF</th><th>LN</th><th>DCON</th><th>OAL</th></tr>
<tr><td>2ZDK076HP-3D</td><td>●</td><td>7.6</td><td rowspan="23">0
-0.015</td><td rowspan="4">34</td><td rowspan="4">35</td><td rowspan="5">8</td><td rowspan="5">70</td></tr>
<tr><td>2ZDK077HP-3D</td><td>●</td><td>7.7</td></tr>
<tr><td>2ZDK078HP-3D</td><td>●</td><td>7.8</td></tr>
<tr><td>2ZDK079HP-3D</td><td>●</td><td>7.9</td></tr>
<tr><td>2ZDK080HP-3D</td><td>●</td><td>8.0</td><td>36</td><td>36</td></tr>
<tr><td>2ZDK081HP-3D</td><td>●</td><td>8.1</td><td rowspan="4">36</td><td rowspan="4">37</td><td rowspan="18">10</td><td rowspan="18">80</td></tr>
<tr><td>2ZDK082HP-3D</td><td>●</td><td>8.2</td></tr>
<tr><td>2ZDK083HP-3D</td><td>●</td><td>8.3</td></tr>
<tr><td>2ZDK084HP-3D</td><td>●</td><td>8.4</td></tr>
<tr><td>2ZDK085HP-3D</td><td>●</td><td>8.5</td><td rowspan="3">38</td><td rowspan="3">39</td></tr>
<tr><td>2ZDK086HP-3D</td><td>●</td><td>8.6</td></tr>
<tr><td>2ZDK087HP-3D</td><td>●</td><td>8.7</td></tr>
<tr><td>2ZDK088HP-3D</td><td>●</td><td>8.8</td><td rowspan="2">39</td><td rowspan="2">40</td></tr>
<tr><td>2ZDK089HP-3D</td><td>●</td><td>8.9</td></tr>
<tr><td>2ZDK090HP-3D</td><td>●</td><td>9.0</td><td rowspan="5">40</td><td rowspan="5">41</td></tr>
<tr><td>2ZDK091HP-3D</td><td>●</td><td>9.1</td></tr>
<tr><td>2ZDK092HP-3D</td><td>●</td><td>9.2</td></tr>
<tr><td>2ZDK093HP-3D</td><td>●</td><td>9.3</td></tr>
<tr><td>2ZDK094HP-3D</td><td>●</td><td>9.4</td></tr>
<tr><td>2ZDK095HP-3D</td><td>●</td><td>9.5</td><td rowspan="4">42</td><td rowspan="4">43</td></tr>
<tr><td>2ZDK096HP-3D</td><td>●</td><td>9.6</td></tr>
<tr><td>2ZDK097HP-3D</td><td>●</td><td>9.7</td></tr>
<tr><td>2ZDK098HP-3D</td><td>●</td><td>9.8</td></tr>
</table>

(Unit : mm)

<table>
<tr><th rowspan="2">Description</th><th rowspan="2">Stock</th><th>Outside Dia.</th><th rowspan="2">Mill Dia. tolerance</th><th>Flute length</th><th>Under Neck Length</th><th>Shank Dia.</th><th>Overall length</th></tr>
<tr><th>DC</th><th>LCF</th><th>LN</th><th>DCON</th><th>OAL</th></tr>
<tr><td>2ZDK099HP-3D</td><td>●</td><td>9.9</td><td rowspan="2">0
-0.015</td><td>42</td><td>43</td><td rowspan="2">10</td><td rowspan="2">80</td></tr>
<tr><td>2ZDK100HP-3D</td><td>●</td><td>10.0</td><td>45</td><td>45</td></tr>
<tr><td>2ZDK101HP-3D</td><td>●</td><td>10.1</td><td rowspan="20">0
-0.018</td><td rowspan="2">45</td><td rowspan="2">46</td><td rowspan="20">12</td><td rowspan="20">100</td></tr>
<tr><td>2ZDK102HP-3D</td><td>●</td><td>10.2</td></tr>
<tr><td>2ZDK103HP-3D</td><td>●</td><td>10.3</td><td rowspan="2">46</td><td rowspan="2">47</td></tr>
<tr><td>2ZDK104HP-3D</td><td>●</td><td>10.4</td></tr>
<tr><td>2ZDK105HP-3D</td><td>●</td><td>10.5</td><td rowspan="5">47</td><td rowspan="5">48</td></tr>
<tr><td>2ZDK106HP-3D</td><td>●</td><td>10.6</td></tr>
<tr><td>2ZDK107HP-3D</td><td>●</td><td>10.7</td></tr>
<tr><td>2ZDK108HP-3D</td><td>●</td><td>10.8</td></tr>
<tr><td>2ZDK109HP-3D</td><td>●</td><td>10.9</td></tr>
<tr><td>2ZDK110HP-3D</td><td>●</td><td>11.0</td><td rowspan="5">51</td><td rowspan="5">52</td></tr>
<tr><td>2ZDK111HP-3D</td><td>●</td><td>11.1</td></tr>
<tr><td>2ZDK112HP-3D</td><td>●</td><td>11.2</td></tr>
<tr><td>2ZDK113HP-3D</td><td>●</td><td>11.3</td></tr>
<tr><td>2ZDK114HP-3D</td><td>●</td><td>11.4</td></tr>
<tr><td>2ZDK115HP-3D</td><td>●</td><td>11.5</td><td rowspan="5">53</td><td rowspan="5">54</td></tr>
<tr><td>2ZDK116HP-3D</td><td>●</td><td>11.6</td></tr>
<tr><td>2ZDK117HP-3D</td><td>●</td><td>11.7</td></tr>
<tr><td>2ZDK118HP-3D</td><td>●</td><td>11.8</td></tr>
<tr><td>2ZDK119HP-3D</td><td>●</td><td>11.9</td></tr>
<tr><td>2ZDK120HP-3D</td><td>●</td><td>12.0</td><td>54</td><td>54</td></tr>
</table>

Recommended Cutting Conditions ➡ **L80**

● : Std. Item

No. of Flutes : 2

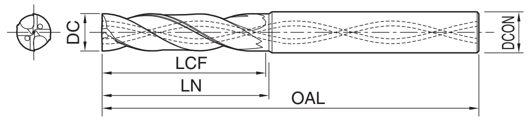
2ZDK-HP-OH (Drilling Depth Regular type with oil holes) NEW

MEGACOAT NANO is applied

Recommended Workpiece Materials

P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT NANO | 30° | h5 Shank Dia. (~ø12)



2ZDK-HP-OH (Drilling Depth Regular type with oil holes)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK030HP-3D-OH	●	3.0	0 / -0.010	13.5	15.5	3	68
2ZDK031HP-3D-OH	●	3.1	0 / -0.012	14	16	4	72
2ZDK032HP-3D-OH	●	3.2		14.4	16.4		
2ZDK033HP-3D-OH	●	3.3		14.9	16.9		
2ZDK034HP-3D-OH	●	3.4		15.3	17.3		
2ZDK035HP-3D-OH	●	3.5		15.8	17.8		
2ZDK036HP-3D-OH	●	3.6		16.2	18.2		
2ZDK037HP-3D-OH	●	3.7		16.7	18.7		
2ZDK038HP-3D-OH	●	3.8		17.1	19.1		
2ZDK039HP-3D-OH	●	3.9		17.6	19.6		
2ZDK040HP-3D-OH	●	4.0		18	20		
2ZDK041HP-3D-OH	●	4.1		18.5	20.5	5	80
2ZDK042HP-3D-OH	●	4.2		18.9	20.9		
2ZDK043HP-3D-OH	●	4.3		19.4	21.4		
2ZDK044HP-3D-OH	●	4.4		19.8	21.8		
2ZDK045HP-3D-OH	●	4.5		20.3	22.3		
2ZDK046HP-3D-OH	●	4.6		20.7	22.7		
2ZDK047HP-3D-OH	●	4.7		21.2	23.2		
2ZDK048HP-3D-OH	●	4.8		21.6	23.6		
2ZDK049HP-3D-OH	●	4.9		22.1	24.1		
2ZDK050HP-3D-OH	●	5.0		22.5	24.5		
2ZDK051HP-3D-OH	●	5.1		23	25	6	82
2ZDK052HP-3D-OH	●	5.2		23.4	25.4		

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK053HP-3D-OH	●	5.3	0 / -0.012	23.9	25.9	6	82
2ZDK054HP-3D-OH	●	5.4		24.3	26.3		
2ZDK055HP-3D-OH	●	5.5		24.8	26.8		
2ZDK056HP-3D-OH	●	5.6		25.2	27.2		
2ZDK057HP-3D-OH	●	5.7		25.7	27.7		
2ZDK058HP-3D-OH	●	5.8		26.1	28.1		
2ZDK059HP-3D-OH	●	5.9		26.6	28.6		
2ZDK060HP-3D-OH	●	6.0		27	29		
2ZDK061HP-3D-OH	●	6.1	0 / -0.015	27.5	29.5	7	88
2ZDK062HP-3D-OH	●	6.2		27.9	29.9		
2ZDK063HP-3D-OH	●	6.3		28.4	30.4		
2ZDK064HP-3D-OH	●	6.4		28.8	30.8		
2ZDK065HP-3D-OH	●	6.5		29.3	31.3		
2ZDK066HP-3D-OH	●	6.6		29.7	31.7		
2ZDK067HP-3D-OH	●	6.7		30.2	32.2		
2ZDK068HP-3D-OH	●	6.8		30.6	32.6		
2ZDK069HP-3D-OH	●	6.9		31.1	33.1		
2ZDK070HP-3D-OH	●	7.0		31.5	33.5		
2ZDK071HP-3D-OH	●	7.1		32	34	8	94
2ZDK072HP-3D-OH	●	7.2		32.4	34.4		
2ZDK073HP-3D-OH	●	7.3		32.9	34.9		
2ZDK074HP-3D-OH	●	7.4		33.3	35.3		
2ZDK075HP-3D-OH	●	7.5		33.8	35.8		

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

Recommended Cutting Conditions ➡ L81

· The drilling depth should be less than 3.0D(3.0 x DC).

● : Std. Item

2ZDK-HP-OH (Drilling Depth Regular type with oil holes)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK076HP-3D-OH	●	7.6	0 / -0.015	34.2	36.2	8	94
2ZDK077HP-3D-OH	●	7.7		34.7	36.7		
2ZDK078HP-3D-OH	●	7.8		35.1	37.1		
2ZDK079HP-3D-OH	●	7.9		35.6	37.6		
2ZDK080HP-3D-OH	●	8.0		36	38		
2ZDK081HP-3D-OH	●	8.1		36.5	38.5	9	100
2ZDK082HP-3D-OH	●	8.2		36.9	38.9		
2ZDK083HP-3D-OH	●	8.3		37.4	39.4		
2ZDK084HP-3D-OH	●	8.4		37.8	39.8		
2ZDK085HP-3D-OH	●	8.5		38.3	40.3		
2ZDK086HP-3D-OH	●	8.6		38.7	40.7		
2ZDK087HP-3D-OH	●	8.7		39.2	41.2		
2ZDK088HP-3D-OH	●	8.8		39.6	41.6		
2ZDK089HP-3D-OH	●	8.9		40.1	42.1		
2ZDK090HP-3D-OH	●	9.0		40.5	42.5		
2ZDK091HP-3D-OH	●	9.1		41	43	10	106
2ZDK092HP-3D-OH	●	9.2		41.4	43.4		
2ZDK093HP-3D-OH	●	9.3		41.9	43.9		
2ZDK094HP-3D-OH	●	9.4		42.3	44.3		
2ZDK095HP-3D-OH	●	9.5		42.8	44.8		
2ZDK096HP-3D-OH	●	9.6		43.2	45.2		
2ZDK097HP-3D-OH	●	9.7		43.7	45.7		
2ZDK098HP-3D-OH	●	9.8		44.1	46.1		

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL
2ZDK099HP-3D-OH	●	9.9	0 / -0.015	44.6	46.6	10	106
2ZDK100HP-3D-OH	●	10.0		45	47		
2ZDK101HP-3D-OH	●	10.1	0 / -0.018	45.5	47.5	11	116
2ZDK102HP-3D-OH	●	10.2		45.9	47.9		
2ZDK103HP-3D-OH	●	10.3		46.4	48.4		
2ZDK104HP-3D-OH	●	10.4		46.8	48.8		
2ZDK105HP-3D-OH	●	10.5		47.3	49.3		
2ZDK106HP-3D-OH	●	10.6		47.7	49.7		
2ZDK107HP-3D-OH	●	10.7		48.2	50.2		
2ZDK108HP-3D-OH	●	10.8		48.6	50.6		
2ZDK109HP-3D-OH	●	10.9		49.1	51.1		
2ZDK110HP-3D-OH	●	11.0		49.5	51.5		
2ZDK111HP-3D-OH	●	11.1		50	52	12	122
2ZDK112HP-3D-OH	●	11.2		50.4	52.4		
2ZDK113HP-3D-OH	●	11.3		50.9	52.9		
2ZDK114HP-3D-OH	●	11.4		51.3	53.3		
2ZDK115HP-3D-OH	●	11.5		51.8	53.8		
2ZDK116HP-3D-OH	●	11.6		52.2	54.2		
2ZDK117HP-3D-OH	●	11.7		52.7	54.7		
2ZDK118HP-3D-OH	●	11.8		53.1	55.1		
2ZDK119HP-3D-OH	●	11.9		53.6	55.6		
2ZDK120HP-3D-OH	●	12.0		54	56		

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

Recommended Cutting Conditions ➡ L81

· The drilling depth should be less than 3.0D(3.0 x DC).

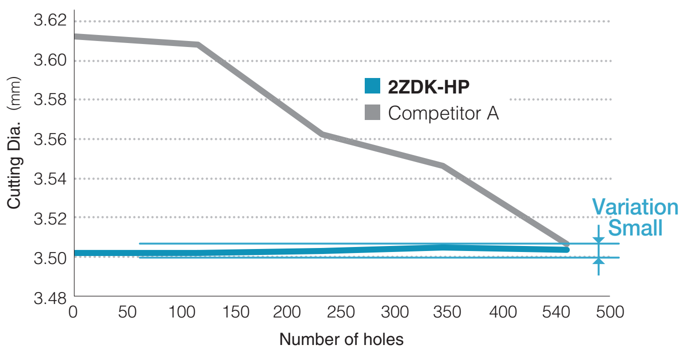
● : Std. Item

Drilling in Flat Surface

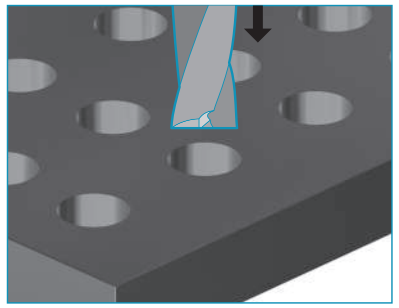
Cutting Performance Comparison (Internal evaluation)

Drill Dia. : ø3.5mm

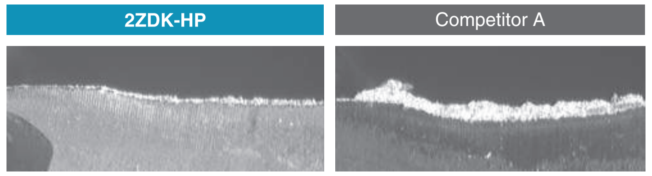
Stable and High Precision Machining with Less Variation in Hole Diameter
Excellent Cutting Edge Condition



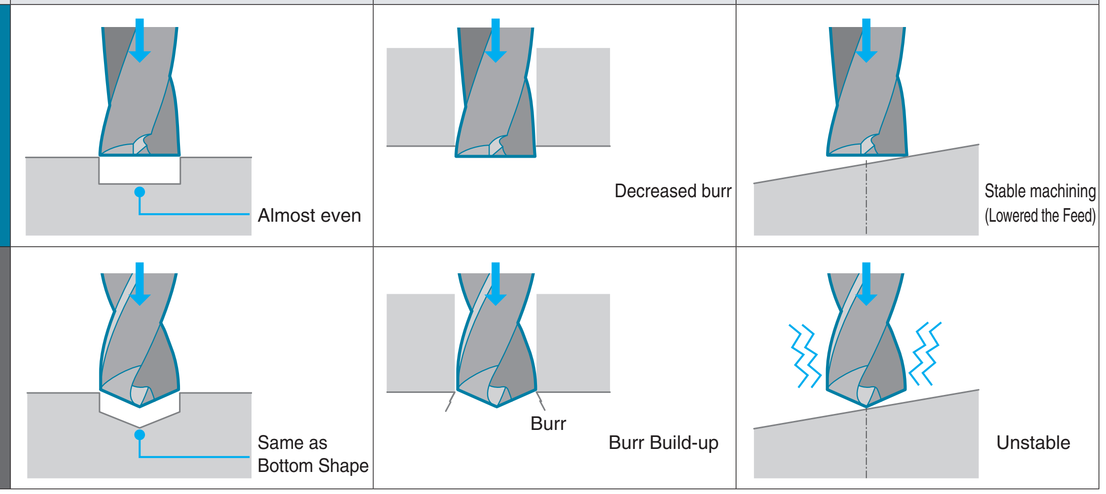
Cutting Conditions : n = 6,000 min⁻¹, Vf = 360 mm/min, Drilling Depth 5 mm, Wet
Drill Dia. ø3.5 mm (Regular type) Workpiece Material : SCM440



Cutting Edge after Machining 500 holes



Comparison with Standard Drill



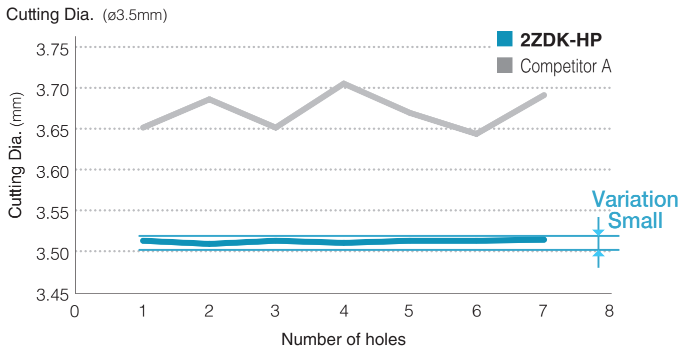
	Shape of the bottom	Burr	Drilling in Slant Surface
2ZDK-HP	Almost even	Decreased burr	Stable machining (Lowered the Feed)
Standard Drill	Same as Bottom Shape	Burr Burr Build-up	Unstable

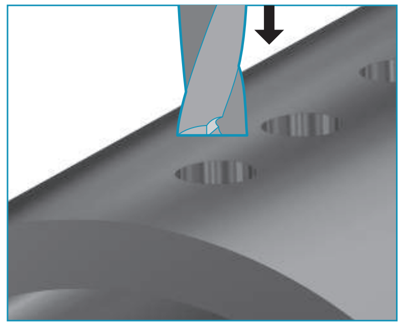
Drilling in Cylinder Surface

Cutting Performance Comparison (Internal evaluation)

Drill Dia. : ø3.5mm

Stable and High Precision Machining with Less Variation in Hole Diameter



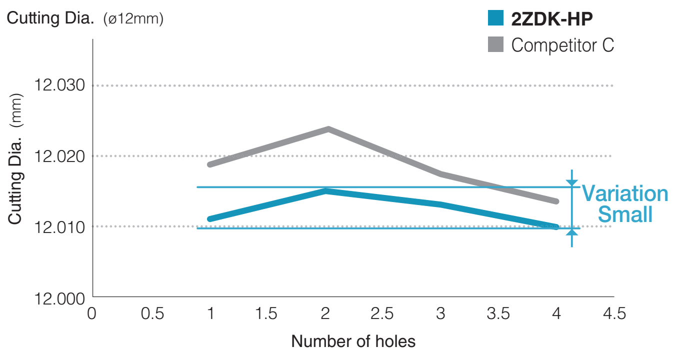


Cutting Conditions : n = 7,000 min⁻¹, Vf = 420 mm/min, Wet Drill Dia. ø3.5 mm (Regular type)
Workpiece Material : Carbon Steel Pipe ø17.3 mm (Thickness 3.2 mm)

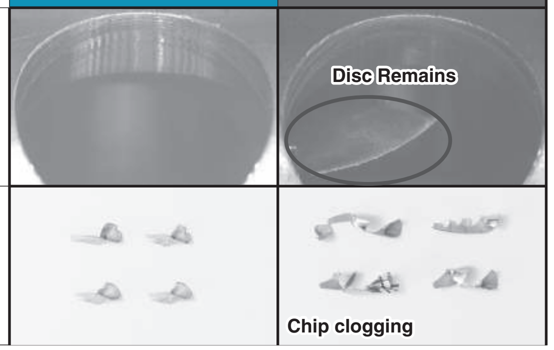
Cutting Performance Comparison (Internal evaluation)

Drill Dia. : ø12mm

Minimizes Hole Diameter Variation even at Feed Rates as High as 0.3mm/rev.
Stable Machining without Chip Clogging



Surface Finish and Chips



	2ZDK-HP	Competitor C
Surface Finish		Disc Remains
Chips		Chip clogging

Cutting Conditions : n = 1,800 min⁻¹, Vf = 540 mm/min, Wet Drill Dia. ø12 mm (Regular type)
Workpiece Material : Carbon Steel Pipe ø25 mm (Thickness 4 mm)

No. of Flutes : 2

2ZDK (Short type)

Recommended Workpiece Materials

P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT NANO is applied

MEGACOAT NANO | 20° | h5 Shank Dia. (~ø12) | h6 Shank Dia. (ø12.5~)

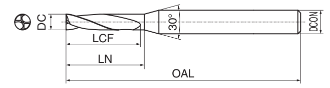


Fig.1

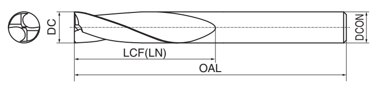


Fig.2

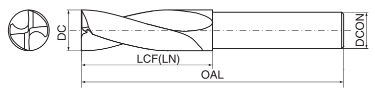


Fig.3

2ZDK (Drilling Depth Short type) (Refer to L50 for 2ZDK-HP)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK010S	▲	1.0	0 / -0.010	3	4	4	50	Fig.1
2ZDK011S	MTO	1.1		3.5	4.5			
2ZDK012S	MTO	1.2						
2ZDK013S	MTO	1.3		4	5			
2ZDK014S	MTO	1.4		4.5	5.5			
2ZDK015S	▲	1.5		5	6			
2ZDK016S	▲	1.6						
2ZDK017S	MTO	1.7		5.5	6.5			
2ZDK018S	MTO	1.8		6	7			
2ZDK019S	MTO	1.9						
2ZDK020S	▲	2.0						
2ZDK021S	MTO	2.1		7	8			
2ZDK022S	MTO	2.2						
2ZDK023S	MTO	2.3						
2ZDK024S	▲	2.4		8	9			
2ZDK025S	▲	2.5						
2ZDK026S	▲	2.6						
2ZDK027S	▲	2.7		9	10			
2ZDK028S	MTO	2.8						
2ZDK029S	▲	2.9						
2ZDK030S	▲	3.0				6	60	
2ZDK031S	▲	3.1	0 / -0.012	10	11			
2ZDK032S	MTO	3.2						
2ZDK033S	▲	3.3						
2ZDK034S	▲	3.4		11	12			
2ZDK035S	▲	3.5						
2ZDK036S	MTO	3.6						
2ZDK037S	▲	3.7		12	13			
2ZDK038S	MTO	3.8						
2ZDK039S	MTO	3.9						
2ZDK040S	▲	4.0						
2ZDK041S	▲	4.1		13	14			
2ZDK042S	▲	4.2	0 / -0.012	13	14	6	60	Fig.1
2ZDK043S	▲	4.3						
2ZDK044S	MTO	4.4		14	15			
2ZDK045S	▲	4.5						
2ZDK046S	MTO	4.6						
2ZDK047S	MTO	4.7		15	16			
2ZDK048S	▲	4.8						
2ZDK049S	▲	4.9						
2ZDK050S	▲	5.0		16	17			
2ZDK051S	▲	5.1						
2ZDK052S	▲	5.2						
2ZDK053S	▲	5.3						
2ZDK054S	MTO	5.4		17	18			
2ZDK055S	▲	5.5						
2ZDK056S	▲	5.6						
2ZDK057S	MTO	5.7		18	19			
2ZDK058S	▲	5.8						
2ZDK059S	MTO	5.9						
2ZDK060S	▲	6.0		19	(21)			Fig.2
2ZDK060S-P	▲	6.0	*+0.012 / 0	19	21	8	70	Fig.1
2ZDK061S	▲	6.1	0 / -0.015	19	21	8	70	
2ZDK062S	▲	6.2						
2ZDK063S	▲	6.3		20	22			
2ZDK064S	▲	6.4						
2ZDK065S	▲	6.5						
2ZDK066S	▲	6.6						
2ZDK067S	MTO	6.7		21	23			
2ZDK068S	▲	6.8						
2ZDK069S	MTO	6.9						
2ZDK070S	▲	7.0		22	24			
2ZDK071S	MTO	7.1						
2ZDK072S	MTO	7.2						

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

· The drilling depth should be less than 1.5D(1.5 x DC).

* Mill Dia. tolerance of 2ZDK60S-P is plus tolerance.

Recommended Cutting Conditions ➔ L82

▲ :To be replaced by a new product
MTO : Made to order

2ZDK (Drilling Depth Short type) (Refer to L50 and L51 for 2ZDK-HP)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK073S	▲	7.3	0 / -0.015	23	25	8	70	Fig.1
2ZDK074S	MTO	7.4						
2ZDK075S	▲	7.5						
2ZDK076S	MTO	7.6		24				
2ZDK077S	▲	7.7						
2ZDK078S	▲	7.8						
2ZDK079S	MTO	7.9						
2ZDK080S	▲	8.0		25	(27)			Fig.2
2ZDK081S	MTO	8.1			27	10	80	Fig.1
2ZDK082S	▲	8.2						
2ZDK083S	MTO	8.3		26	28			
2ZDK084S	MTO	8.4						
2ZDK085S	▲	8.5						
2ZDK086S	MTO	8.6		27	29			
2ZDK087S	▲	8.7						
2ZDK088S	▲	8.8						
2ZDK089S	MTO	8.9		28	30			
2ZDK090S	▲	9.0						
2ZDK091S	MTO	9.1						
2ZDK092S	MTO	9.2		29	31			
2ZDK093S	MTO	9.3						
2ZDK094S	MTO	9.4						
2ZDK095S	▲	9.5						
2ZDK096S	MTO	9.6		30	32			
2ZDK097S	MTO	9.7						
2ZDK098S	▲	9.8						
2ZDK099S	MTO	9.9		31	33			
2ZDK100S	▲	10.0			(33)			Fig.2
2ZDK101S	MTO	10.1	0 / -0.018		33	12	100	Fig.1
2ZDK102S	MTO	10.2		32	34			
2ZDK103S	▲	10.3						
2ZDK104S	MTO	10.4						
2ZDK105S	▲	10.5	0 / -0.018	33	35	12	100	Fig.1
2ZDK106S	MTO	10.6						
2ZDK107S	MTO	10.7						
2ZDK108S	MTO	10.8						
2ZDK109S	MTO	10.9		34	36			
2ZDK110S	▲	11.0						
2ZDK111S	MTO	11.1						
2ZDK112S	MTO	11.2		35	37			
2ZDK113S	MTO	11.3						
2ZDK114S	MTO	11.4						
2ZDK115S	▲	11.5		36	38			
2ZDK116S	MTO	11.6						
2ZDK117S	MTO	11.7						
2ZDK118S	MTO	11.8						
2ZDK119S	MTO	11.9						
2ZDK120S	▲	12.0		37	(39)			Fig.2
2ZDK125S	▲	12.5		41	41			Fig.3
2ZDK130S	▲	13.0		43	43			
2ZDK135S	▲	13.5		44	44			
2ZDK140S	▲	14.0		45	45			
2ZDK145S	▲	14.5		47	47		115	
2ZDK150S	▲	15.0		48	48			
2ZDK155S	▲	15.5		50	50			
2ZDK160S	▲	16.0		52	(52)	16		Fig.2
2ZDK165S	▲	16.5		53	53			Fig.3
2ZDK170S	▲	17.0		54	54			
2ZDK175S	▲	17.5		56	56			
2ZDK180S	▲	18.0		57	57			
2ZDK185S	▲	18.5	0 / -0.021	59	59		125	
2ZDK190S	▲	19.0		60	60			
2ZDK195S	▲	19.5		62	62			
2ZDK200S	▲	20.0		63	(63)	20		Fig.2

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

· The drilling depth should be less than 1.5D(1.5 x DC).

Recommended Cutting Conditions ➔ L82

▲ :To be replaced by a new product
MTO : Made to order

Flat Bottom Drill (Counterboring)

No. of Flutes : 2

2ZDK

Recommended Workpiece Materials

P ~30HRC | P 30~40HRC | K Cast Iron | N Aluminum & Non Ferrous Material

MEGACOAT NANO | 20° | h5 Shank Dia.

MEGACOAT NANO is applied

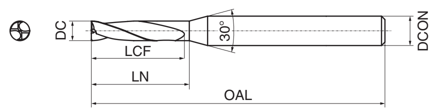


Fig.1

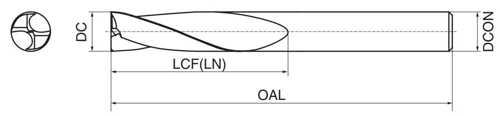


Fig.2

2ZDK (Refer to L54 and L55 for 2ZDK-HP)

Plunge milling

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK030	▲	3.0	0 / -0.010	14	15	6	60	Fig.1
2ZDK033	▲	3.3	0 / -0.012	15	16			
2ZDK035	▲	3.5		17	18			
2ZDK040	▲	4.0		19	20			
2ZDK042	▲	4.2		20	21			
2ZDK045	▲	4.5		21	22			
2ZDK050	▲	5.0		23	24			
2ZDK053	▲	5.3		24	25			
2ZDK055	▲	5.5		25	26			
2ZDK056	▲	5.6		26	27			
2ZDK060	▲	6.0		28	(28)			Fig.2
2ZDK065	▲	6.5	0 / -0.015	30	31	8	70	Fig.1
2ZDK068	▲	6.8		31	32			

(Unit : mm)

Description	Stock	Outside Dia. DC	Mill Dia. tolerance	Flute length LCF	Under Neck Length LN	Shank Dia. DCON	Overall length OAL	Shape
2ZDK070	▲	7.0	0 / -0.015	32	33	8	70	Fig.1
2ZDK075	▲	7.5		34	35			
2ZDK080	▲	8.0		36	(36)			Fig.2
2ZDK085	▲	8.5	0 / -0.015	38	39	10	80	Fig.1
2ZDK088	▲	8.8		39	40			
2ZDK090	▲	9.0		40	41			
2ZDK095	▲	9.5		42	43			
2ZDK100	▲	10.0		45	(45)			Fig.2
2ZDK103	▲	10.3	0 / -0.018	46	47	12	100	Fig.1
2ZDK105	▲	10.5		47	48			
2ZDK110	▲	11.0		51	52			
2ZDK115	▲	11.5		53	54			
2ZDK120	▲	12.0		54	(54)			Fig.2

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

· The drilling depth should be less than 2D(2 x DC).

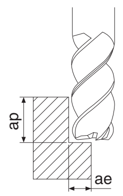
Recommended Cutting Conditions ➡ **L82**

▲ :To be replaced by a new product

Recommended Cutting Conditions

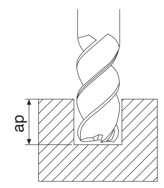
2FESS

Applications:



Shouldering

Depth of Cut (ap x ae) (mm)
1.2DC x 0.05DC (DC < ø3)
1.2DC x 0.1DC (DC ≥ ø3)



Slotting

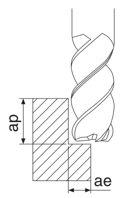
Depth of Cut (ap) (mm)
0.1DC (DC < ø1) 0.3DC (ø1 ≤ DC < ø3) 0.5DC (DC ≥ ø3)

Workpiece Material	Application	Outside Dia. DC (mm)	ø1	ø2	ø4	ø6	ø8	ø12	ø16
Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	25,500	13,200	6,600	4,400	3,300	2,200	1,700
		Feed Rate (mm/min)	225	230	375	415	420	310	240
	Slotting	Spindle Revolution (min^{-1})	19,000	11,000	6,000	4,000	3,000	2,000	1,500
		Feed Rate (mm/min)	135	140	225	250	250	245	245
Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	195	220	285	315	310	230	200
	Slotting	Spindle Revolution (min^{-1})	18,000	9,500	4,800	3,200	2,400	1,600	1,200
		Feed Rate (mm/min)	115	130	170	190	185	185	185
Prehardened Steel	Shouldering	Spindle Revolution (min^{-1})	17,000	8,800	4,400	3,000	2,200	1,500	1,100
		Feed Rate (mm/min)	55	80	100	105	105	110	110
	Slotting	Spindle Revolution (min^{-1})	16,000	8,000	4,000	2,700	2,000	1,300	990
		Feed Rate (mm/min)	35	50	60	63	63	65	65
Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	95	95	110	115	115	115	115
	Slotting	Spindle Revolution (min^{-1})	16,000	8,000	4,000	2,700	2,000	1,300	990
		Feed Rate (mm/min)	60	60	65	70	70	70	70

* Machining with water soluble coolant is recommended for stainless steel.

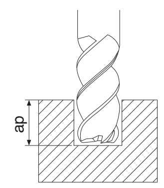
2FESM

Applications:



Shouldering

Depth of Cut (ap x ae) (mm)
1.5DC x 0.05DC (DC < ø3)
1.5DC x 0.1DC (DC ≥ ø3)



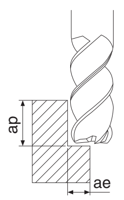
Slotting

Depth of Cut (ap) (mm)
0.1DC (DC < ø1) 0.3DC (ø1 ≤ DC < ø3) 0.5DC (DC ≥ ø3)

Workpiece Material	Application	Outside Dia. DC (mm)	ø0.5	ø1	ø2	ø4	ø6	ø8	ø12	ø16
Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	32,000	25,500	13,200	6,600	4,400	3,300	2,200	1,700
		Feed Rate (mm/min)	210	225	230	375	415	420	310	240
	Slotting	Spindle Revolution (min^{-1})	29,000	19,000	11,000	6,000	4,000	3,000	2,000	1,500
		Feed Rate (mm/min)	130	135	140	225	250	250	245	245
Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	27,000	22,000	11,000	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	180	195	220	285	315	310	230	200
	Slotting	Spindle Revolution (min^{-1})	27,000	18,000	9,500	4,800	3,200	2,400	1,600	1,200
		Feed Rate (mm/min)	105	115	130	170	190	185	185	185
Prehardened Steel	Shouldering	Spindle Revolution (min^{-1})	25,000	17,000	8,800	4,400	3,000	2,200	1,500	1,100
		Feed Rate (mm/min)	50	55	80	100	105	105	110	110
	Slotting	Spindle Revolution (min^{-1})	25,000	16,000	8,000	4,000	2,700	2,000	1,300	990
		Feed Rate (mm/min)	30	35	50	60	63	63	65	65
Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	27,000	22,000	11,000	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	60	95	95	110	115	115	115	115
	Slotting	Spindle Revolution (min^{-1})	25,000	16,000	8,000	4,000	2,700	2,000	1,300	990
		Feed Rate (mm/min)	35	60	60	65	70	70	70	70

* Machining with water soluble coolant is recommended for stainless steel.

2FESL (Shouldering)

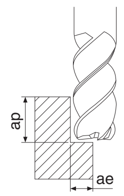


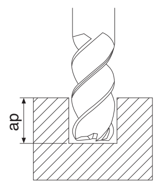
Applications	Workpiece Material	Outside Dia. DC (mm)	ø1	ø2	ø4	ø6	ø8	ø12	ø16
Shouldering Depth of Cut (ap x ae) (mm) 2.5DC x 0.05DC (DC < ø3) 2.5DC x 0.1DC (DC ≥ ø3)	Carbon Steel, Cast Iron	Spindle Revolution (min^{-1})	19,000	9,500	4,800	3,200	2,400	1,600	1,200
		Feed Rate (mm/min)	210	210	210	210	210	210	210
	Alloy Steel	Spindle Revolution (min^{-1})	14,300	7,200	3,600	2,400	2,000	1,300	1,000
		Feed Rate (mm/min)	155	160	160	160	170	170	150
	Prehardened Steel (30 ~ 45HRC)	Spindle Revolution (min^{-1})	11,200	5,600	2,800	1,900	1,600	1,000	800
		Feed Rate (mm/min)	85	85	90	90	100	95	80
	Stainless Steel	Spindle Revolution (min^{-1})	14,300	7,200	3,600	2,400	2,000	1,300	1,000
		Feed Rate (mm/min)	95	95	95	95	105	105	80

* Machining with water soluble coolant is recommended for stainless steel.

Slotting is not recommended.

2FEKS, 2FEKM

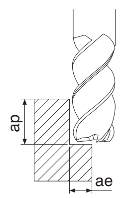




Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø6	ø8	ø10	ø12	ø16
Shouldering Depth of Cut (ap x ae) (mm) 1.2DC x 0.1DC Slotting Depth of Cut (ap) (mm) 0.5DC	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	9,300	7,000	4,600	3,600	2,900	2,400	2,000
			Feed Rate (mm/min)	450	450	470	430	400	360	320
		Slotting	Spindle Revolution (min^{-1})	7,500	6,000	4,400	3,300	2,700	2,300	1,900
			Feed Rate (mm/min)	240	260	340	340	340	340	320
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	8,800	6,600	4,400	3,300	2,600	2,200	1,800
			Feed Rate (mm/min)	370	370	440	400	360	330	290
		Slotting	Spindle Revolution (min^{-1})	7,200	5,400	3,600	2,700	2,200	1,800	1,500
			Feed Rate (mm/min)	270	270	270	270	270	270	270
	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min^{-1})	6,400	4,800	3,200	2,400	1,900	1,600	1,200
			Feed Rate (mm/min)	130	130	130	140	140	140	140
		Slotting	Spindle Revolution (min^{-1})	5,300	4,000	2,600	2,000	1,600	1,300	1,000
			Feed Rate (mm/min)	120	120	120	120	120	120	120
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	8,000	6,000	4,000	3,000	2,400	2,000	1,500
			Feed Rate (mm/min)	140	140	140	140	140	140	140
		Slotting	Spindle Revolution(min^{-1})	5,300	4,000	2,600	2,000	1,600	1,300	1,000
			Feed Rate (mm/min)	80	90	100	100	100	90	90

* Machining with water soluble coolant is recommended for stainless steel.

4FESM (Shouldering)

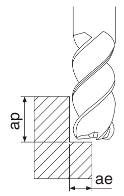


Applications	Workpiece Material	Outside Dia. DC (mm)	ø1	ø2	ø4	ø6	ø8	ø12	ø16
Shouldering Depth of Cut (ap x ae) (mm) 1.5DC x 0.05DC (DC < ø3) 1.5DC x 0.1DC (DC ≥ ø3)	Carbon Steel, Cast Iron	Spindle Revolution (min^{-1})	25,500	13,000	6,600	4,400	3,300	2,200	1,700
		Feed Rate (mm/min)	335	345	580	620	625	630	600
	Alloy Steel	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	290	290	395	455	455	470	460
	Prehardened Steel (30 ~ 45HRC)	Spindle Revolution (min^{-1})	12,000	7,200	4,200	3,000	2,200	1,500	1,100
		Feed Rate (mm/min)	105	125	150	160	160	165	140
	Stainless Steel	Spindle Revolution (min^{-1})	22,000	11,000	5,600	3,700	2,800	1,900	1,400
		Feed Rate (mm/min)	130	145	165	165	170	175	155

* Machining with water soluble coolant is recommended for stainless steel.

Slotting is not recommended.

4FEKM (Tough corner edge, Shouldering)

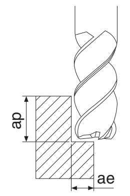
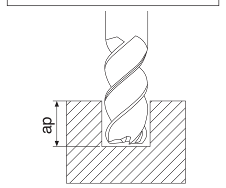


Applications	Workpiece Material	Outside Dia. DC (mm)	ø3	ø4	ø6	ø8	ø10	ø12	ø16
Shouldering Depth of Cut (ap x ae) (mm) 1.5DC x 0.1DC	Carbon Steel, Cast Iron	Spindle Revolution (min^{-1})	10,600	8,000	5,300	4,000	3,200	2,700	2,100
		Feed Rate (mm/min)	680	690	770	770	770	770	770
	Alloy Steel	Spindle Revolution (min^{-1})	8,800	6,600	4,400	3,300	2,600	2,200	1,800
		Feed Rate (mm/min)	500	550	620	630	630	630	610
	Prehardened Steel (30 ~ 45HRC)	Spindle Revolution (min^{-1})	6,400	4,800	3,200	2,400	1,900	1,600	1,200
		Feed Rate (mm/min)	180	180	180	190	190	190	190
	Stainless Steel	Spindle Revolution (min^{-1})	8,000	4,800	4,000	2,400	2,300	2,000	1,500
		Feed Rate (mm/min)	190	200	200	200	210	210	210

* Machining with water soluble coolant is recommended for stainless steel.

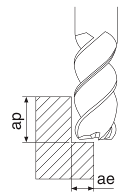
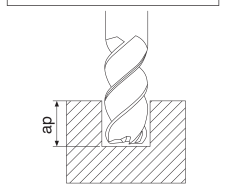
Slotting is not recommended.

2FESW

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø13
 Shouldering	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
Depth of Cut (ap x ae) (mm)			Feed Rate (mm/min)	660	640	640	640	520	450	410	400
1DC x 0.2DC		Slotting	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	550	480	510	530	480	440	410	400
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	420	430	430	430	350	300	270	260
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	300	340	360	370	340	310	270	260
 Slotting	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
Depth of Cut (ap) (mm)			Feed Rate (mm/min)	160	160	160	160	140	140	140	140
0.2DC		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	110	110	120	120	120	120	120	120
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	180	240	240	240	200	170	160	160
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	120	120	130	130	130	130	130	130

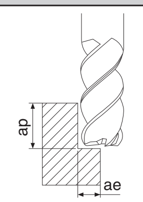
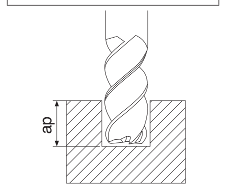
* Machining with water soluble coolant is recommended for stainless steel.

3FESW

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø13
 Shouldering	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
Depth of Cut (ap x ae) (mm)			Feed Rate (mm/min)	810	800	800	800	650	560	510	450
1DC x 0.2DC		Slotting	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	810	800	800	800	650	560	510	450
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	530	530	530	530	430	370	340	300
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	530	530	530	530	430	370	340	300
 Slotting	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
Depth of Cut (ap) (mm)			Feed Rate (mm/min)	200	200	200	200	180	180	180	180
0.2DC		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	140	140	150	150	150	150	150	150
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	300	300	300	300	240	210	200	200
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	150	150	160	160	160	160	160	160

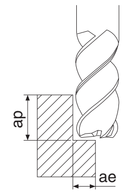
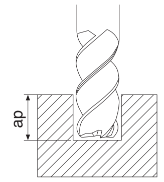
* Machining with water soluble coolant is recommended for stainless steel.

4FESW

Applications	Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø13
 Shouldering	Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
Depth of Cut (ap x ae) (mm)			Feed Rate (mm/min)	960	960	960	960	780	680	620	570
1DC x 0.2DC		Slotting	Spindle Revolution (min^{-1})	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,500
			Feed Rate (mm/min)	960	960	960	960	780	680	620	570
	Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	640	640	640	640	520	450	410	370
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	640	640	640	640	520	450	410	370
 Slotting	Prehardened Steel (30 ~ 45HRC)	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
Depth of Cut (ap) (mm)			Feed Rate (mm/min)	240	240	240	240	210	210	210	210
0.2DC		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	160	160	180	180	180	180	180	180
	Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	360	360	360	360	300	260	240	240
		Slotting	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,800
			Feed Rate (mm/min)	180	180	200	200	200	200	200	200

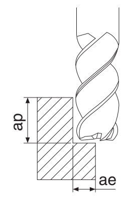
* Machining with water soluble coolant is recommended for stainless steel.

4MFK (Short, Medium), 4MFR (Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16
 Shouldering	Carbon Steel	Shouldering	Short 1.2DC x 0.15DC Medium 1.5DC x 0.15DC	Spindle Revolution (min^{-1})	13,800	10,700	8,800	7,500	6,000	4,800	4,000	3,300
				Feed Rate (mm/min)	1,400	1,400	1,400	1,500	1,500	1,400	1,400	1,300
		Slotting	ap ≤ 1DC	Spindle Revolution (min^{-1})	13,800	10,700	8,800	7,500	6,000	4,800	4,000	3,300
				Feed Rate (mm/min)	620	700	750	780	830	850	800	750
	Alloy Steel	Shouldering	Short 1.2DC x 0.1DC Medium 1.5DC x 0.1DC	Spindle Revolution (min^{-1})	10,600	9,300	8,300	7,400	6,000	4,700	3,800	2,800
				Feed Rate (mm/min)	1,000	1,000	1,000	1,100	1,100	1,000	1,000	900
		Slotting	ap ≤ 1DC	Spindle Revolution (min^{-1})	10,600	9,300	8,300	7,400	6,000	4,700	3,800	2,800
				Feed Rate (mm/min)	500	510	520	530	550	570	530	450
 Slotting	Prehardened Steel (30 ~ 45HRC)	Shouldering	Short 1.2DC x 0.07DC Medium 1.5DC x 0.07DC	Spindle Revolution (min^{-1})	8,700	6,800	5,500	4,600	3,500	2,800	2,300	1,700
				Feed Rate (mm/min)	670	730	790	840	900	810	770	630
		Slotting	ap ≤ 1DC	Spindle Revolution (min^{-1})	6,700	5,800	4,800	4,000	3,000	2,300	1,900	1,400
				Feed Rate (mm/min)	320	330	360	370	400	420	380	300
	Stainless Steel Titanium Alloys	Shouldering	Short 1.2DC x 0.1DC Medium 1.5DC x 0.1DC	Spindle Revolution (min^{-1})	8,700	7,000	6,000	5,200	4,000	3,000	2,500	1,700
				Feed Rate (mm/min)	670	720	780	830	840	760	710	520
		Slotting	ap ≤ 0.3DC	Spindle Revolution (min^{-1})	6,800	6,000	5,100	4,300	3,400	2,600	2,000	1,400
				Feed Rate (mm/min)	190	220	240	250	250	240	230	190

* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

4MFK (Long)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16
 Shouldering	Carbon Steel	Shouldering	3DC x 0.02DC	Spindle Revolution (min^{-1})	11,000	8,500	7,000	6,000	4,800	3,800	3,200	2,600
				Feed Rate (mm/min)	910	910	910	970	970	910	910	840
	Alloy Steel	Shouldering		Spindle Revolution (min^{-1})	6,500	5,700	5,100	4,500	3,700	2,900	2,300	1,700
				Feed Rate (mm/min)	540	540	540	600	600	540	540	490
	Prehardened Steel (30 ~ 45HRC)	Shouldering		Spindle Revolution (min^{-1})	4,900	3,900	3,100	2,600	2,000	1,600	1,300	1,000
				Feed Rate (mm/min)	330	360	400	420	450	400	380	310
	Stainless Steel Titanium Alloys	Shouldering		Spindle Revolution (min^{-1})	4,300	3,500	3,000	2,600	2,000	1,500	1,300	900
				Feed Rate (mm/min)	330	360	390	410	420	380	350	260

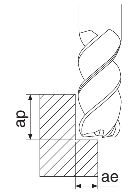
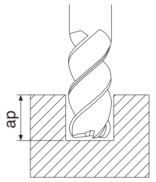
* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

Slotting is not recommended.

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

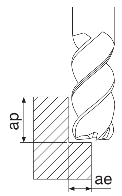
Recommended Cutting Conditions

4TFK (Short, Medium), 4TFR (Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20
 Shouldering	Carbon Steel, Cast Iron	Shouldering	1.5DC x 0.2DC	Spindle Revolution (min^{-1})	13,800	10,300	8,300	6,900	5,200	4,100	3,400	2,600	2,100
				Feed Rate (mm/min)	1,490	1,570	1,590	1,660	1,630	1,490	1,410	1,240	1,080
 Slotting		Slotting	DC ≤ ø12 : ap ≤ 1.0DC DC > ø12 : ap ≤ 12	Spindle Revolution (min^{-1})	11,100	8,400	6,700	5,600	4,200	3,300	2,800	2,100	1,700
				Feed Rate (mm/min)	770	790	790	800	750	690	600	540	410
	Alloy Steel	Shouldering	1.5DC x 0.2DC	Spindle Revolution (min^{-1})	10,600	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	900	1,020	1,020	1,020	920	870	800	720	640
		Slotting	DC ≤ ø12 : ap ≤ 1.0DC DC > ø12 : ap ≤ 12	Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	540	530	550	590	570	530	500	450	410
	Prehardened Steel (30 ~ 45HRC)	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	9,500	7,200	5,700	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	690	760	810	850	830	800	770	640	590
		Slotting	ap ≤ 0.5 x DC	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	480	540	570	600	550	490	460	380	340
	Stainless Steel	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	9,500	7,200	5,700	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	690	760	810	850	830	800	770	640	590
		Slotting	ap ≤ 0.5 x DC	Spindle Revolution (min^{-1})	5,500	4,200	3,800	3,500	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	120	130	180	360	420	370	340	280	250
	Titanium Alloys	Shouldering	1.5DC x 0.1DC	Spindle Revolution (min^{-1})	8,500	6,400	5,100	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	500	520	520	640	700	730	670	560	450
		Slotting	DC ≤ ø12 : ap ≤ 1.0DC DC > ø12 : ap ≤ 12	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	290	330	330	350	370	410	380	290	230
	Superalloy	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300	1,100	800	640
				Feed Rate (mm/min)	250	250	250	250	240	230	220	210	200
		Slotting	ap ≤ 0.3 x DC	Spindle Revolution (min^{-1})	3,000	2,200	1,800	1,500	1,100	900	700	600	400
				Feed Rate (mm/min)	90	100	100	100	110	130	120	90	70

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and Superalloy.

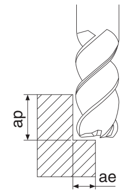
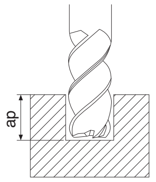
4TFK (Long)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20
 Shouldering	Carbon Steel, Cast Iron	Shouldering	2.5DC x 0.1DC	Spindle Revolution (min^{-1})	11,000	8,200	6,600	5,500	4,200	3,300	2,700	2,100	1,700
				Feed Rate (mm/min)	970	1,020	1,030	1,080	1,060	970	920	810	700
	Alloy Steel	Shouldering	2.5DC x 0.1DC	Spindle Revolution (min^{-1})	6,000	4,600	3,600	3,000	2,300	1,800	1,500	1,100	910
				Feed Rate (mm/min)	490	550	550	550	500	470	430	390	350
	Prehardened Steel (30 ~ 45HRC)	Shouldering	2.5DC x 0.05DC	Spindle Revolution (min^{-1})	6,000	4,600	3,600	3,000	2,300	1,800	1,500	1,100	910
				Feed Rate (mm/min)	490	550	550	550	500	470	430	390	350
	Stainless Steel	Shouldering	2.5DC x 0.05DC	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,500	1,200	900	700
				Feed Rate (mm/min)	350	380	410	430	420	400	390	320	300
	Titanium Alloys	Shouldering	2.5DC x 0.05DC	Spindle Revolution (min^{-1})	4,300	3,200	2,600	2,100	1,600	1,300	1,100	800	700
				Feed Rate (mm/min)	250	260	260	320	350	370	340	280	230
	Superalloy	Shouldering	2.5DC x 0.02DC	Spindle Revolution (min^{-1})	2,100	1,600	1,300	1,100	800	650	550	400	320
				Feed Rate (mm/min)	125	125	125	125	120	115	110	105	100

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and Superalloy.

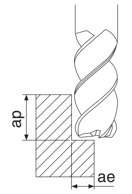
Slotting is not recommended.

3ZFKS (Short), 3ZFKM (Medium)

Applications	Workpiece Material	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)		ø3	ø4	ø5	ø6	ø7	ø8	ø10	ø12	ø16
 Shouldering	Carbon Steel	Shouldering: Short 1.2DC x 0.3DC, Medium 1.5DC x 0.3DC Plunge milling / Slotting: 1DC	Spindle Revolution (min^{-1})		13,800	10,700	8,800	7,500	6,600	6,000	4,800	4,000	3,000
			Feed Rate (mm/min)	Shouldering	850	950	1,100	1,200	1,100	1,000	910	850	800
				Plunge milling	180	170	170	170	160	150	120	100	70
				Slotting	570	650	700	730	750	780	800	750	650
 Plunge milling Slotting	Alloy Steel	Shouldering: Short 1.2DC x 0.3DC, Medium 1.5DC x 0.3DC Plunge milling / Slotting: 0.5DC	Spindle Revolution (min^{-1})		10,600	9,300	8,300	7,400	6,500	6,000	4,700	3,500	1,900
			Feed Rate (mm/min)	Shouldering	700	780	900	980	900	850	750	700	560
				Plunge milling	120	120	130	140	130	130	120	100	70
				Slotting	500	540	570	590	610	600	580	500	340
	Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min^{-1})		5,200	4,000	3,200	2,600	2,300	2,000	1,600	1,400	1,000
			Feed Rate (mm/min)	Shouldering	440	440	490	490	490	440	400	370	300
				Plunge milling	90	110	110	130	110	100	80	70	50
				Slotting	220	270	270	320	330	330	230	200	140
	Stainless Steel	Shouldering: Short 1.2DC x 0.2DC, Medium 1.5DC x 0.2DC Plunge milling / Slotting: 0.5DC	Spindle Revolution (min^{-1})		3,300	2,500	2,000	1,700	1,400	1,300	1,100	900	750
			Feed Rate (mm/min)	Shouldering	280	270	330	340	330	330	350	320	300
				Plunge milling	20	30	40	40	40	30	20	20	20
				Slotting	110	110	130	140	130	130	120	120	120
	Titanium Alloys		Spindle Revolution (min^{-1})		3,300	2,500	2,000	1,700	1,400	1,300	1,100	900	750
			Feed Rate (mm/min)	Shouldering	280	270	330	340	330	330	350	320	300
				Plunge milling	20	30	40	40	40	30	20	20	20
				Slotting	110	110	130	140	130	130	120	120	120

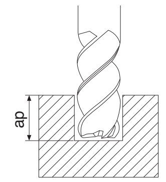
* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

5DERM



Shouldering

Depth of Cut (ap x ae) (mm)
1.5DC x 0.5DC



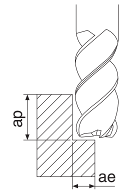
Slotting

Depth of Cut (ap) (mm)
0.8DC

Workpiece Material	Application	Outside Dia. DC (mm)	ø4	ø5	ø6	ø8	ø10	ø12
Medium Carbon Steel High Carbon Steel (> 0.3%C)	Shouldering	Spindle Revolution (min^{-1})	16,000	12,700	10,600	8,000	6,400	5,300
		Feed Rate (mm/min)	2,400	2,500	2,700	2,400	2,200	1,900
	Slotting	Spindle Revolution (min^{-1})	16,000	12,700	10,600	8,000	6,400	5,300
		Feed Rate (mm/min)	2,400	2,500	2,700	2,400	2,200	1,900
Alloy Steel Alloy Tool Steel (< 330HB < 35HRC)	Shouldering	Spindle Revolution (min^{-1})	14,300	11,500	9,600	7,200	5,700	4,800
		Feed Rate (mm/min)	2,100	1,700	1,900	1,800	1,700	1,700
	Slotting	Spindle Revolution (min^{-1})	14,300	11,500	9,600	7,200	5,700	4,800
		Feed Rate (mm/min)	2,100	1,700	1,900	1,800	1,700	1,700
Alloy Steel Alloy Tool Steel (340 ~ 450HB 36 ~ 48HRC)	Shouldering	Spindle Revolution (min^{-1})	13,000	10,000	8,500	6,400	5,100	4,200
		Feed Rate (mm/min)	1,300	1,500	1,700	1,300	1,300	1,300
	Slotting	Spindle Revolution (min^{-1})	13,000	10,000	8,500	6,400	5,100	4,200
		Feed Rate (mm/min)	1,300	1,500	1,700	1,300	1,300	1,300
Austenitic Stainless Steel SUS302 SUS303 SUS304	Shouldering	Spindle Revolution (min^{-1})	9,200	7,300	6,100	4,600	3,700	3,100
		Feed Rate (mm/min)	1,400	1,100	1,200	1,100	1,100	1,100
	Slotting	Spindle Revolution (min^{-1})	9,200	7,300	6,100	4,600	3,700	3,100
		Feed Rate (mm/min)	1,400	1,100	1,200	1,100	1,100	1,100
Austenitic Stainless Steel SUS316 SUS316L	Shouldering	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100
		Feed Rate (mm/min)	640	760	640	640	640	640
	Slotting	Spindle Revolution (min^{-1})	6,400	5,100	4,200	3,200	2,500	2,100
		Feed Rate (mm/min)	640	760	640	640	640	640
Titanium Alloys	Shouldering	Spindle Revolution (min^{-1})	4,800	3,800	3,200	2,400	1,900	1,600
		Feed Rate (mm/min)	480	380	480	480	380	400
	Slotting	Spindle Revolution (min^{-1})	4,800	3,800	3,200	2,400	1,900	1,600
		Feed Rate (mm/min)	480	380	480	480	380	400
Superalloy	Shouldering	Spindle Revolution (min^{-1})	3,200	2,500	2,100	1,600	1,300	1,100
		Feed Rate (mm/min)	160	130	210	240	190	210
	Slotting	Spindle Revolution (min^{-1})	3,200	2,500	2,100	1,600	1,300	1,100
		Feed Rate (mm/min)	160	130	210	240	190	210
Gray Cast Iron	Shouldering	Spindle Revolution (min^{-1})	14,000	11,000	9,000	6,800	5,400	4,500
		Feed Rate (mm/min)	2,000	2,200	2,300	2,000	2,200	1,800
	Slotting	Spindle Revolution (min^{-1})	14,000	11,000	9,000	6,800	5,400	4,500
		Feed Rate (mm/min)	2,000	2,200	2,300	2,000	2,200	1,800
Nodular Cast Iron Malleable Cast Iron	Shouldering	Spindle Revolution (min^{-1})	10,000	8,300	6,900	5,200	4,100	3,500
		Feed Rate (mm/min)	1,000	1,200	1,000	1,300	1,000	1,000
	Slotting	Spindle Revolution (min^{-1})	10,000	8,300	6,900	5,200	4,100	3,500
		Feed Rate (mm/min)	1,000	1,200	1,000	1,300	1,000	1,000

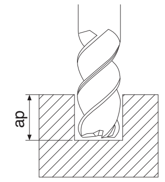
* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and superalloy.

3UFSM



Shouldering

Depth of Cut (ap x ae) (mm)
1.5DC x 0.1DC



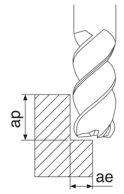
Slotting

Depth of Cut (ap) (mm)
0.25DC (Carbon Steel, Cast Iron 0.5DC)

Workpiece Material	Application	Outside Dia. DC (mm)	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16	ø20
Carbon Steel, Cast Iron	Shouldering	Spindle Revolution (min^{-1})	18,000	12,000	9,200	7,300	6,100	4,600	3,700	3,100	2,300	1,800
		Feed Rate (mm/min)	380	430	440	500	510	500	560	560	590	590
	Slotting	Spindle Revolution (min^{-1})	16,000	11,000	8,000	6,400	5,300	4,000	3,200	2,700	2,000	1,600
		Feed Rate (mm/min)	190	230	240	290	300	290	280	290	310	350
Alloy Steel	Shouldering	Spindle Revolution (min^{-1})	14,000	9,000	6,800	5,400	4,500	3,400	2,700	2,300	1,700	1,400
		Feed Rate (mm/min)	250	270	270	320	350	340	360	350	390	420
	Slotting	Spindle Revolution (min^{-1})	11,000	7,400	5,600	4,500	3,700	2,800	2,200	1,900	1,400	1,100
		Feed Rate (mm/min)	130	130	150	180	190	180	170	180	190	210
Stainless Steel	Shouldering	Spindle Revolution (min^{-1})	10,000	6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,200	1,000
		Feed Rate (mm/min)	180	170	170	210	230	220	230	220	220	230
	Slotting	Spindle Revolution (min^{-1})	10,000	6,400	4,800	3,800	3,200	2,400	1,900	1,600	1,200	1,000
		Feed Rate (mm/min)	120	120	120	140	150	140	140	140	150	180
Titanium Alloys Heat-resistant Alloys (40 ~ 50HRC)	Shouldering	Spindle Revolution (min^{-1})	6,000	4,200	3,200	2,500	2,100	1,600	1,300	1,100	800	600
		Feed Rate (mm/min)	60	90	100	120	110	110	120	110	120	130
	Slotting	Spindle Revolution (min^{-1})	6,000	4,200	3,200	2,500	2,100	1,600	1,300	1,100	800	600
		Feed Rate (mm/min)	50	60	70	80	90	90	90	80	90	100
Aluminum Alloys	Shouldering	Spindle Revolution (min^{-1})	32,000	21,000	16,000	13,000	11,000	8,000	6,400	5,300	4,000	3,200
		Feed Rate (mm/min)	670	760	770	900	920	860	1,000	1,100	1,100	1,200
	Slotting	Spindle Revolution (min^{-1})	32,000	21,000	16,000	13,000	11,000	8,000	6,400	5,300	4,000	3,200
		Feed Rate (mm/min)	480	440	480	590	630	580	670	730	860	960

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

6PFK, 8PFK (Medium)



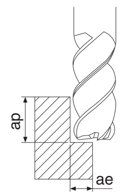
Shouldering

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
Shouldering	Carbon Steel, Cast Iron	Shouldering	DC < ø20 : 1.5DC x 0.2DC DC ≥ ø20 : 1.5DC x 0.1DC	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,800
				Feed Rate (mm/min)	2,650	2,640	2,410	2,250	2,010	1,700	1,500
	Alloy Steel	Shouldering	DC < ø20 : 1.5DC x 0.2DC DC ≥ ø20 : 1.5DC x 0.1DC	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,500
				Feed Rate (mm/min)	2,250	2,090	1,950	1,910	1,720	1,450	1,220
	Prehardened Steel (30 ~ 38HRC)	Shouldering	1.5DC x 0.1DC	Spindle Revolution (min^{-1})	5,600	4,200	3,300	2,800	2,100	1,700	1,300
				Feed Rate (mm/min)	1,780	1,710	1,520	1,400	1,220	1,120	980
	Stainless Steel Titanium Alloys	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	5,000	3,800	3,000	2,500	1,900	1,500	1,200
				Feed Rate (mm/min)	1,350	1,320	1,200	1,130	970	850	720

* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

Slotting is not recommended.

6PFK, 8PFK (Long)



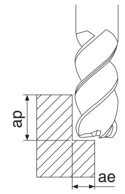
Shouldering

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
Shouldering	Carbon Steel, Cast Iron	Shouldering	3.0DC x 0.01DC	Spindle Revolution (min^{-1})	4,600	3,500	2,800	2,300	1,700	1,400	1,100
				Feed Rate (mm/min)	1,830	1,730	1,530	1,380	1,120	880	660
	Alloy Steel	Shouldering	3.0DC x 0.01DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,800	1,400	1,100	900
				Feed Rate (mm/min)	1,490	1,340	1,220	1,120	940	720	540
	Prehardened Steel (30 ~ 38HRC)	Shouldering	3.0DC x 0.01DC	Spindle Revolution (min^{-1})	2,800	2,100	1,700	1,400	1,100	850	650
				Feed Rate (mm/min)	920	680	750	670	550	480	390
	Stainless Steel Titanium Alloys	Shouldering	3.0DC x 0.01DC	Spindle Revolution (min^{-1})	2,500	1,900	1,500	1,300	950	750	600
				Feed Rate (mm/min)	700	670	590	540	440	370	290

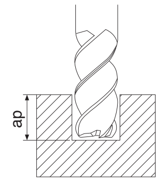
* Machining with water soluble coolant is recommended for stainless steel and titanium alloys.

Slotting is not recommended.

4JER (Short, Medium)



Shouldering



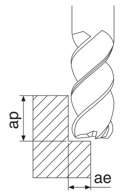
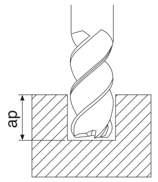
Slotting

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20
Shouldering, Slotting	Carbon Steel, Cast Iron	Shouldering	1.5DC x 0.1DC	Spindle Revolution (min^{-1})	6,900	5,200	4,100	3,400	2,600	2,100
				Feed Rate (mm/min)	1,500	1,500	1,400	1,400	1,300	1,100
		Slotting	DC ≤ ø12:ap ≤ 1.0DC DC > ø12:ap ≤ 12	Spindle Revolution (min^{-1})	5,600	4,200	3,300	2,800	2,100	1,700
				Feed Rate (mm/min)	720	670	620	540	480	360
	Alloy Steel	Shouldering	1.5DC x 0.1DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	1,020	920	870	800	720	640
		Slotting	DC ≤ ø12:ap ≤ 1.0DC DC > ø12:ap ≤ 12	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	530	510	470	450	400	360
	Prehardened Steel (30 ~ 45HRC)	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	4,600	3,500	2,800	2,300	1,700	1,300
				Feed Rate (mm/min)	850	830	800	770	640	590
		Slotting	ap ≤ 0.5 x DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	480	450	440	410	340	300
	Stainless Steel	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,400
				Feed Rate (mm/min)	850	830	800	770	640	590
		Slotting	ap ≤ 0.5 x DC	Spindle Revolution (min^{-1})	3,500	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	300	280	250	230	190	170
	Titanium Alloys	Shouldering	1.5DC x 0.1DC	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	580	630	660	600	500	400
		Slotting	DC ≤ ø12:ap ≤ 1.0DC DC > ø12:ap ≤ 12	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	320	340	370	340	260	210
	Superalloy Inconel® 718, etc.	Shouldering	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	2,400	1,800	1,400	1,200	900	720
				Feed Rate (mm/min)	330	320	320	320	320	290
		Slotting	ap ≤ 0.5 x DC	Spindle Revolution (min^{-1})	1,600	1,200	950	800	600	480
				Feed Rate (mm/min)	180	140	110	100	80	60

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and superalloy.

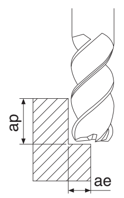
Recommended Cutting Conditions

4 / 5 / 6RFH (Medium)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20
 Shouldering  Slotting	Carbon Steel / Alloy Steel / Cast Iron	Shouldering	1.5DC x 0.3DC	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900
				Feed Rate (mm/min)	1,040	1,050	1,100	1,000	980	920
		Slotting	1DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	790	790	830	740	700	640
			2DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	550	550	580	510	490	450
	Prehardened Steel (30 ~ 45HRC)	Shouldering	1.5DC x 0.3DC	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	490	620	580	540	490	460
		Slotting	1DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	410	410	430	400	370	360
			2DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	290	290	300	280	260	250
	Stainless Steel	Shouldering	1.5DC x 0.3DC	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900
				Feed Rate (mm/min)	410	410	410	400	380	380
		Slotting	1DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	280	260	310	240	250	250
			2DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,700	2,000	1,600
				Feed Rate (mm/min)	220	210	250	190	200	200
	Titanium Alloys	Shouldering	1.5DC x 0.3DC	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300
				Feed Rate (mm/min)	330	420	410	390	380	370
		Slotting	1DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	220	240	240	240	250	250
			2DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100
				Feed Rate (mm/min)	180	190	190	190	200	200
	Superalloy	Shouldering	1.5DC x 0.2DC	Spindle Revolution (min^{-1})	800	600	480	400	300	240
				Feed Rate (mm/min)	60	60	60	60	60	60
		Slotting	1DC	Spindle Revolution (min^{-1})	530	400	320	270	200	160
				Feed Rate (mm/min)	28	28	28	28	28	28
			2DC	Spindle Revolution (min^{-1})	530	400	320	270	200	160
				Feed Rate (mm/min)	20	20	20	20	20	20

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and superalloy.

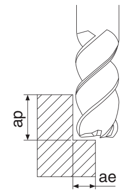
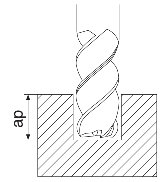
4 / 5 / 6RFH (Long)

Applications	Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20
 Shouldering	Carbon Steel / Alloy Steel / Cast Iron	Shouldering	ap : 4.0DC ae : 0.1DC (DC ≤ ø12) ae : 1.2mm (DC > ø12)	Spindle Revolution (min^{-1})	5,100	3,800	3,100	2,500	1,900	1,500
				Feed Rate (mm/min)	620	630	660	600	590	550
	Prehardened Steel (30 ~ 45HRC)	Shouldering	ap : 4.0DC ae : 0.1DC (DC ≤ ø12) ae : 1.2mm (DC > ø12)	Spindle Revolution (min^{-1})	3,400	2,500	2,000	1,700	1,300	1,000
				Feed Rate (mm/min)	340	430	410	380	340	320
	Stainless Steel	Shouldering	ap : 4.0DC ae : 0.1DC (DC ≤ ø12) ae : 1.2mm (DC > ø12)	Spindle Revolution (min^{-1})	5,100	3,800	3,100	2,500	1,900	1,500
				Feed Rate (mm/min)	290	290	290	280	270	270
	Titanium Alloys	Shouldering	ap : 4.0DC ae : 0.1DC (DC ≤ ø12) ae : 1.2mm (DC > ø12)	Spindle Revolution (min^{-1})	3,400	2,500	2,000	1,700	1,300	1,000
				Feed Rate (mm/min)	230	290	290	270	270	260
	Superalloy	Shouldering	ap : 4.0DC ae : 0.1DC (DC ≤ ø12) ae : 1.0mm (DC > ø12)	Spindle Revolution (min^{-1})	640	480	380	320	240	190
				Feed Rate (mm/min)	20	20	20	20	20	20

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and superalloy.

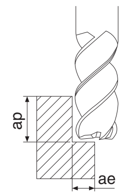
Slotting is not recommended.

3RDSM, 4RDSM, 5RDSM

Applications	Workpiece Material		Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
 Shouldering  Slotting	Steel	< 22HRC	Shouldering	1.5DC x 0.5DC	Spindle Revolution (min^{-1})	11,100	8,400	6,700	5,600	4,200	3,300	2,700
					Feed Rate (mm/min)	1,000	1,000	1,320	1,340	1,340	1,340	1,380
			Slotting	1DC	Spindle Revolution (min^{-1})	9,300	6,900	5,600	4,600	3,500	2,800	2,200
					Feed Rate (mm/min)	800	800	1,000	1,030	1,040	1,050	1,110
		22 ~ 32HRC	Shouldering	1.5DC x 0.4DC	Spindle Revolution (min^{-1})	9,600	7,200	5,700	4,800	3,600	2,900	2,300
					Feed Rate (mm/min)	720	720	860	860	860	920	1,030
			Slotting	0.75DC	Spindle Revolution (min^{-1})	7,900	5,900	4,800	4,000	3,000	2,400	1,900
					Feed Rate (mm/min)	550	550	740	740	740	760	860
		32 ~ 40HRC	Shouldering	1.5DC x 0.4DC	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	1,900	1,500
					Feed Rate (mm/min)	320	320	410	410	400	400	400
			Slotting	0.6DC	Spindle Revolution (min^{-1})	5,300	4,000	3,200	2,600	2,000	1,600	1,300
					Feed Rate (mm/min)	260	260	340	340	330	330	330
		40 ~ 45HRC	Shouldering	1DC x 0.4DC	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,400	1,100
					Feed Rate (mm/min)	220	220	260	260	250	250	250
			Slotting	0.5DC	Spindle Revolution (min^{-1})	4,300	3,200	2,600	2,200	1,600	1,300	1,000
					Feed Rate (mm/min)	180	180	240	230	230	220	220
		45 ~ 50HRC	Shouldering	1DC x 0.3DC	Spindle Revolution (min^{-1})	4,200	3,200	2,500	2,100	1,600	1,300	1,000
					Feed Rate (mm/min)	150	150	180	180	170	170	170
			Slotting	0.4DC	Spindle Revolution (min^{-1})	3,800	2,900	2,300	1,900	1,400	1,100	900
					Feed Rate (mm/min)	140	140	170	160	160	150	150
	Stainless Steel		Shouldering	1.5DC x 0.4DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100	900
					Feed Rate (mm/min)	190	230	310	300	340	310	360
			Slotting	0.5DC	Spindle Revolution (min^{-1})	2,700	2,000	1,600	1,300	1,000	800	600
					Feed Rate (mm/min)	110	130	180	170	190	180	190
	Cast Iron		Shouldering	1.5DC x 0.5DC	Spindle Revolution (min^{-1})	9,600	7,200	5,700	4,800	3,600	2,900	2,300
					Feed Rate (mm/min)	850	850	1,030	1,030	1,030	1,100	1,380
			Slotting	1DC	Spindle Revolution (min^{-1})	7,900	5,900	4,800	4,000	3,000	2,400	1,900
					Feed Rate (mm/min)	700	700	900	900	900	910	1,140

* Machining with water soluble coolant is recommended for stainless steel.

3RDSL, 4RDSL, 5RDSL (Shouldering)

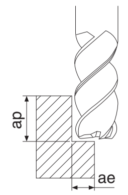
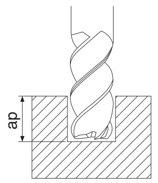
Applications	Workpiece Material		Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16	ø20	ø25
 Shouldering	Steel	< 22HRC	2.5DC x 0.5DC	Spindle Revolution (min^{-1})	7,800	5,900	4,700	3,900	2,900	2,300	1,900
				Feed Rate (mm/min)	700	700	770	780	840	840	940
		22 ~ 32HRC	2.5DC x 0.4DC	Spindle Revolution (min^{-1})	6,700	5,000	4,000	3,400	2,500	2,000	1,600
				Feed Rate (mm/min)	500	500	600	600	600	640	720
		32 ~ 40HRC		Spindle Revolution (min^{-1})	4,500	3,400	2,700	2,200	1,700	1,300	1,100
				Feed Rate (mm/min)	220	220	290	290	280	280	280
		40 ~ 45HRC		Spindle Revolution (min^{-1})	3,400	2,500	2,000	1,700	1,300	1,000	800
				Feed Rate (mm/min)	150	150	180	180	180	180	180
		45 ~ 50HRC	2.5DC x 0.3DC	Spindle Revolution (min^{-1})	2,900	2,200	1,800	1,500	1,100	900	700
				Feed Rate (mm/min)	110	110	130	130	120	120	120
	Stainless Steel		1.5DC x 0.1DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,100	900
				Feed Rate (mm/min)	120	150	200	200	220	200	230
	Cast Iron		2.5DC x 0.5DC	Spindle Revolution (min^{-1})	6,700	5,000	4,000	3,400	2,500	2,000	1,600
				Feed Rate (mm/min)	600	600	720	720	720	770	970

* Machining with water soluble coolant is recommended for stainless steel.

Slotting is not recommended.

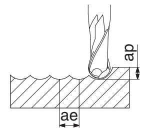
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

4RFSM, 6RFSM

Applications	Workpiece Material		Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø6	ø8	ø10	ø12	ø16 4 flutes	ø16 6 flutes	ø20 4 flutes	ø20 6 flutes	ø25
 Shouldering	Steel	35 ~ 45HRC	Shouldering	1.5DC x 0.4DC	Spindle Revolution (min^{-1})	8,000	6,000	4,800	4,000	3,000	3,000	2,400	2,400	1,900
					Feed Rate (mm/min)	630	630	630	640	640	900	640	930	800
			Slotting	0.5DC	Spindle Revolution (min^{-1})	6,400	4,800	3,800	3,200	2,400	2,400	1,900	1,900	1,500
					Feed Rate (mm/min)	480	480	490	500	500	720	500	750	640
		45 ~ 55HRC	Shouldering	1.5DC x 0.33DC	Spindle Revolution (min^{-1})	5,800	4,400	3,500	2,900	2,200	2,200	1,800	1,800	1,400
					Feed Rate (mm/min)	350	350	350	350	350	530	350	530	460
			Slotting	0.5DC	Spindle Revolution (min^{-1})	4,700	3,500	2,800	2,300	1,800	1,800	1,400	1,400	1,100
					Feed Rate (mm/min)	280	280	280	280	280	420	280	420	370
		55 ~ 60HRC	Shouldering	1.5DC x 0.25DC	Spindle Revolution (min^{-1})	4,800	3,600	2,900	2,400	1,800	1,800	1,400	1,400	1,100
					Feed Rate (mm/min)	190	220	230	240	220	320	230	340	310
			Slotting	0.3DC	Spindle Revolution (min^{-1})	3,800	2,900	2,300	1,900	1,400	1,400	1,100	1,100	900
					Feed Rate (mm/min)	150	170	180	180	180	260	180	280	250
 Slotting	Stainless Steel		Shouldering	1.5DC x 0.4DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,400	1,100	1,100	900
					Feed Rate (mm/min)	300	280	260	300	280	420	290	430	380
			Slotting	0.5DC	Spindle Revolution (min^{-1})	3,200	2,400	1,900	1,600	1,200	1,200	1,000	1,000	800
					Feed Rate (mm/min)	200	190	180	200	190	290	210	310	270
	Titanium Alloys	< 40HRC	Shouldering	2DC x 0.4DC	Spindle Revolution (min^{-1})	3,700	2,800	2,200	1,900	1,400	1,400	1,100	1,100	900
					Feed Rate (mm/min)	390	390	390	390	390	590	390	540	450
			Slotting	0.5DC	Spindle Revolution (min^{-1})	3,000	2,200	1,800	1,500	1,100	1,100	900	900	700
					Feed Rate (mm/min)	310	310	310	310	310	470	310	430	360
		> 40HRC	Shouldering	1.5DC x 0.25DC	Spindle Revolution (min^{-1})	3,200	2,400	1,900	1,600	1,200	1,200	1,000	1,000	800
					Feed Rate (mm/min)	300	300	300	300	300	430	300	430	370
			Slotting	0.3DC	Spindle Revolution (min^{-1})	2,500	1,900	1,500	1,300	1,000	1,000	800	800	600
					Feed Rate (mm/min)	230	230	230	230	230	340	230	340	290
	Heat-resistant Alloys (Ni-base heat-resistant alloys)		Shouldering	1DC x 0.2DC	Spindle Revolution (min^{-1})	1,600	1,200	1,000	800	600	600	500	500	400
					Feed Rate (mm/min)	100	100	100	100	100	140	100	140	130
			Slotting	0.25DC	Spindle Revolution (min^{-1})	1,300	1,000	800	600	500	500	400	400	300
					Feed Rate (mm/min)	80	80	80	80	80	120	80	120	100

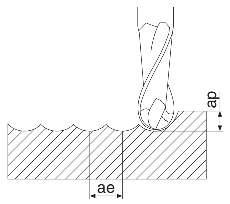
* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

2SEB

Applications	Workpiece Material		Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø2	ø3	ø4	ø5	ø6	ø8	ø10	ø12	ø16
 Copying	Carbon Steel, Cast Iron		0.05DC x 0.05DC	Spindle Revolution (min^{-1})	25,900	22,800	21,300	19,700	16,000	14,000	12,800	11,800	9,500
				Feed Rate (mm/min)	3,910	3,570	3,290	3,070	2,890	2,660	2,540	2,500	2,470
	Tool Steel, Alloy Steel		0.04DC x 0.04DC	Spindle Revolution (min^{-1})	23,300	20,500	19,100	17,700	15,200	12,600	11,500	10,600	8,500
				Feed Rate (mm/min)	3,100	2,880	2,670	2,490	2,330	2,110	2,010	1,980	1,970
	Stainless Steel		0.05DC x 0.05DC	Spindle Revolution (min^{-1})	23,300	20,500	19,100	17,700	15,200	12,600	11,500	10,600	8,500
				Feed Rate (mm/min)	3,150	2,880	2,660	2,500	2,370	2,190	2,060	1,970	1,920
	Prehardened Steel	30 ~ 38HRC	0.05DC x 0.05DC	Spindle Revolution (min^{-1})	23,300	20,500	19,100	17,700	15,200	12,600	11,500	10,600	8,500
				Feed Rate (mm/min)	3,150	2,880	2,660	2,500	2,370	2,190	2,060	1,970	1,920
		38 ~ 45HRC	0.03DC x 0.03DC	Spindle Revolution (min^{-1})	20,900	18,500	17,200	15,900	13,700	11,300	10,400	9,500	7,700
				Feed Rate (mm/min)	2,550	2,330	2,170	2,040	1,940	1,800	1,680	1,590	1,550
		45 ~ 55HRC	0.03DC x 0.03DC	Spindle Revolution (min^{-1})	18,600	16,400	15,300	14,200	12,200	10,000	9,200	8,500	6,800
				Feed Rate (mm/min)	2,060	1,850	1,700	1,600	1,520	1,410	1,320	1,230	1,190
	Heat Treated Steel	45 ~ 55HRC	0.03DC x 0.03DC	Spindle Revolution (min^{-1})	18,600	16,400	15,300	14,200	12,200	10,000	9,200	8,500	6,800
				Feed Rate (mm/min)	2,060	1,850	1,700	1,600	1,520	1,410	1,320	1,230	1,190
		55 ~ 60HRC	0.03DC x 0.03DC	Spindle Revolution (min^{-1})	14,300	12,600	11,800	10,900	9,400	7,700	7,100	6,500	5,200
				Feed Rate (mm/min)	1,230	1,130	1,030	980	930	850	800	780	760

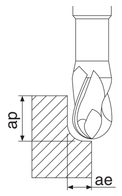
* Machining with water soluble coolant is recommended for stainless steel.

3UEBS

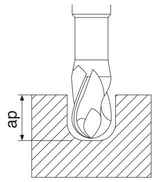
Applications	Workpiece Material	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12
 Copying	Carbon Steel, Cast Iron (< 20HRC)	0.2DC x 0.3DC	Spindle Revolution (min^{-1})	13,300	10,000	8,000	6,600	5,000	4,000	3,300
			Feed Rate (mm/min)	600	870	840	850	1,400	1,200	990
	Alloy Steel (< 35HRC)	0.2DC x 0.3DC	Spindle Revolution (min^{-1})	10,600	8,000	6,400	5,300	4,000	3,200	2,700
			Feed Rate (mm/min)	410	500	610	640	940	830	730
	Prehardened Steel (30 ~ 45HRC)	0.1DC x 0.2DC	Spindle Revolution (min^{-1})	7,400	5,600	4,500	3,700	2,800	2,200	1,900
			Feed Rate (mm/min)	220	250	257	280	250	240	230
	Stainless Steel	0.05DC x 0.1DC	Spindle Revolution (min^{-1})	5,800	4,400	3,500	2,900	2,200	1,800	1,500
			Feed Rate (mm/min)	160	180	190	180	190	190	170

* Machining with water soluble coolant is recommended for stainless steel.

4YEBM



Shouldering

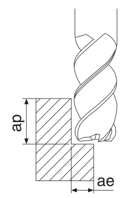


Slotting

Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø5	ø6	ø8	ø10	ø12	ø16	ø20
Low Carbon Steel	Shouldering	1DC x 0.5DC	Spindle Revolution (min^{-1})	9,400	7,900	5,900	4,700	3,900	2,900	2,400
			Feed Rate (mm/min)	1,020	1,130	1,270	1,020	990	800	760
	Slotting	1DC	Spindle Revolution (min^{-1})	8,600	7,200	5,400	4,300	3,600	2,700	2,200
			Feed Rate (mm/min)	930	1,030	1,160	930	900	730	700
Stainless Steel	Shouldering	1DC x 0.5DC	Spindle Revolution (min^{-1})	5,700	4,800	3,600	2,900	2,400	1,800	1,400
			Feed Rate (mm/min)	620	630	630	640	560	450	390
	Slotting	1DC	Spindle Revolution (min^{-1})	5,100	4,200	3,200	2,500	2,100	1,600	1,300
			Feed Rate (mm/min)	550	610	570	550	500	400	350
Titanium Alloys	Shouldering	1DC x 0.3DC	Spindle Revolution (min^{-1})	3,200	2,700	2,000	1,600	1,300	1,000	800
			Feed Rate (mm/min)	180	190	220	170	170	160	160
	Slotting	0.5DC	Spindle Revolution (min^{-1})	2,900	2,400	1,800	1,400	1,200	900	700
			Feed Rate (mm/min)	160	170	190	170	170	160	160
Heat-resistant Alloys	Shouldering	1DC x 0.2DC	Spindle Revolution (min^{-1})	1,700	1,400	1,000	800	700	500	400
			Feed Rate (mm/min)	70	80	100	80	90	90	80
	Slotting	0.5DC	Spindle Revolution (min^{-1})	1,400	1,200	900	700	600	400	400
			Feed Rate (mm/min)	60	70	80	80	80	80	70
Gray Cast Iron	Shouldering	1DC x 0.4DC	Spindle Revolution (min^{-1})	7,800	6,500	4,900	3,900	3,200	2,400	1,900
			Feed Rate (mm/min)	840	930	1,050	840	820	660	630
	Slotting	1DC	Spindle Revolution (min^{-1})	7,000	5,800	4,400	3,500	2,900	2,200	1,800
			Feed Rate (mm/min)	760	840	950	760	740	600	570

* Machining with water soluble coolant is recommended for stainless steel, titanium alloys and heat-resistant alloys.

4HFSS, 5HFSS, 6HFSS, 7HFSS (Shouldering)
4HFSM, 5HFSM, 6HFSM, 7HFSM, 8HFSM (Shouldering)



Shouldering

Workpiece Material		Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø1	ø2	ø4	ø6	ø8	ø12
Tool Steel (< 40HRC) Prehardened Steel		1.5DC x 0.05DC (DC < ø3) 1.5DC x 0.1DC (ø3 ≤ DC)	Spindle Revolution (min^{-1})	20,700	20,000	11,100	7,400	5,600	3,700
			Feed Rate (mm/min)	910	1,750	2,000	2,900	2,930	2,930
Tool Steel, Heat Treated Steel (40 ~ 45HRC) Prehardened Steel			Spindle Revolution (min^{-1})	20,700	20,000	9,900	6,600	5,000	3,300
			Feed Rate (mm/min)	910	1,750	1,800	2,630	2,650	2,650
Heat Treated Steel	45 ~ 55HRC	1.5DC x 0.05DC	Spindle Revolution (min^{-1})	20,700	16,000	8,000	5,300	4,000	2,700
			Feed Rate (mm/min)	910	1,400	1,400	2,100	2,100	2,100
	55 ~ 60HRC	1.5DC x 0.02DC	Spindle Revolution (min^{-1})	20,700	12,000	6,000	4,000	3,000	2,000
			Feed Rate (mm/min)	640	730	740	1,100	1,100	1,100
	60 ~ 65HRC		Spindle Revolution (min^{-1})	20,700	11,100	5,600	3,700	2,800	1,900
			Feed Rate (mm/min)	550	600	600	880	880	880
	65 ~ 70HRC		Spindle Revolution (min^{-1})	15,900	8,000	4,000	2,700	2,000	1,330
			Feed Rate (mm/min)	370	370	370	560	560	550

* Above is even number flute condition. In case of Odd number flute, please take standard with increasing feed rate 15 ~ 20% condition.

Slotting is not recommended.

3AFK (Short)

Workpiece Material	Applications	Depth of Cut (mm) ap x ae		Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø7	ø8	ø9	ø10	ø11	ø12	ø16
				Spindle Revolution (min^{-1})	20,000	20,000	20,000	19,500	16,800	14,700	13,000	11,700	10,700	9,800	7,300
Aluminum Alloys	Shouldering	1.5DC x 0.3DC	Feed Rate (mm/min)		2,400	2,800	3,500	4,200	4,300	4,400	4,500	4,600	4,700	4,700	3,500
	Slotting	1DC			1,600	2,000	2,500	3,000	3,100	3,200	3,300	3,400	3,500	3,500	2,200
	Plunge milling	1DC			350	350	350	350	350	350	350	350	350	350	350
Workpiece Material	Applications	Depth of Cut (mm) ap x ae		Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø7	ø8	ø9	ø10	ø11	ø12	ø16
				Spindle Revolution (min^{-1})	20,000	19,900	15,900	13,200	11,300	9,900	8,800	7,900	7,200	6,600	4,900
Aluminum Alloy Casting	Shouldering	1.5DC x 0.3DC	Feed Rate (mm/min)		2,400	2,500	2,500	2,500	2,500	2,600	2,600	2,600	2,600	2,600	1,900
	Slotting	1DC			1,300	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,800	1,300
	Plunge milling	1DC			300	250	200	200	190	150	150	100	100	80	60

· Water soluble coolant is recommended.
· The cutting conditions should be adjusted based on the overhang of the tool and the machine or workpiece rigidity.
· Spindle revolution and feed rate should be adjusted by the same percentage.
· Pecking may be necessary if chips become clogged while plunge milling.

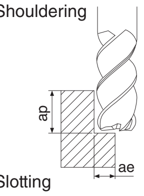
3AFK (Medium)

Workpiece Material	Applications	Depth of Cut (mm) ap x ae		Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø7	ø8	ø9	ø10	ø11	ø12	ø16
				Spindle Revolution (min^{-1})	20,000	20,000	19,000	16,000	13,500	12,000	10,500	9,500	8,500	8,000	6,000
Aluminum Alloys	Shouldering	2.5DC x 0.3DC	Feed Rate (mm/min)		2,300	2,600	3,200	3,600	3,600	3,600	3,700	3,900	4,000	4,000	2,800
	Slotting	0.5DC			1,500	1,900	2,300	2,600	2,600	2,700	2,700	2,800	2,900	2,900	1,600
	Plunge milling	0.5DC			300	300	300	300	300	300	300	300	300	300	300
Workpiece Material	Applications	Depth of Cut (mm) ap x ae		Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø7	ø8	ø9	ø10	ø11	ø12	ø16
				Spindle Revolution (min^{-1})	20,000	15,900	12,700	10,600	9,100	7,900	7,000	6,300	5,800	5,300	3,950
Aluminum Alloy Casting	Shouldering	2.5DC x 0.3DC	Feed Rate (mm/min)		2,300	2,200	2,000	2,000	2,000	2,000	2,000	2,000	2,100	2,100	1,500
	Slotting	0.5DC			1,300	1,300	1,300	1,400	1,400	1,400	1,400	1,400	1,400	1,500	1,100
	Plunge milling	0.5DC			300	200	150	160	160	120	120	80	80	60	50

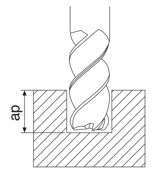
· Water soluble coolant is recommended.
· The cutting conditions should be adjusted based on the overhang of the tool and the machine or workpiece rigidity.
· Spindle revolution and feed rate should be adjusted by the same percentage.
· Pecking may be necessary if chips become clogged while plunge milling.

3NESM

Shouldering



Slotting



Workpiece Material	Application	Depth of Cut (ap x ae) (mm)	Outside Dia. DC (mm)	ø3	ø6	ø8	ø10	ø12	ø16	ø20
Aluminum Alloys	Shouldering	1.5DC x 0.5DC	Spindle Revolution (min^{-1})	34,000	17,000	13,000	10,200	8,500	6,400	5,100
			Feed Rate (mm/min)	2,750	2,750	2,750	2,750	2,750	2,750	2,750
	Slotting	1DC	Spindle Revolution (min^{-1})	26,500	13,000	9,800	8,000	6,600	5,000	4,000
			Feed Rate (mm/min)	1,100	1,100	1,100	1,100	1,100	1,100	1,100

4FCX-KCD

Workpiece Material	Cutting Conditions	DC (mm) ø8	DC (mm) ø10	DC (mm) ø12
CFRP	Spindle Revolution (min^{-1})	6,000~10,000	4,800~8,000	4,000~6,600
	Feed Rate (mm/rev)	0.05~0.08	0.05~0.08	0.05~0.08

2ZDF-KCD

Workpiece Material	Cutting Conditions	DC (mm) ø4.763	DC (mm) ø6.350	DC (mm) ø7.938
CFRP	Spindle Revolution (min^{-1})	3,400~6,700	2,500~5,000	2,000~4,000
	Feed Rate (mm/rev)	0.04~0.06	0.05~0.08	0.05~0.08

* The recommended cutting conditions are for Dry machining.
Adjust cutting conditions according to the machine rigidity, the workpiece rigidity and the overhang length.
Take sufficient measurement against the dust during machining.

2ZDK-HP (Drilling Depth Short type) (Drilling Depth Regular type)

Drilling Depth Short : ap ≤ 1.5DC Regular : ap ≤ 2DC

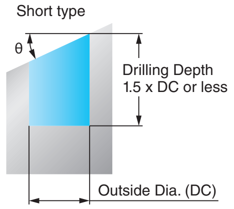
Workpiece Material	Application	Outside Dia. DC (mm)	ø1	ø1.5	ø2	ø2.5	ø3	ø3.5	ø4	ø4.5	ø5	ø6	ø8	ø10	ø12	ø14	ø16	ø18	ø20
Structural Steel Carbon Steel	Plunge milling	Spindle Revolution (min⁻¹)	20,700	13,800	11,150	9,200	9,100	7,800	6,800	6,100	5,500	4,600	3,500	2,800	2,300	1,800	1,600	1,400	1,300
		Feed Rate (mm/min)	350	350	430	430	520	520	520	520	520	520	520	520	520	480	480	480	480
Alloy Steel		Spindle Revolution (min⁻¹)	17,500	11,700	9,600	7,650	7,200	6,200	5,400	4,800	4,400	3,600	2,700	2,200	1,800	1,500	1,350	1,200	1,100
		Feed Rate (mm/min)	290	290	380	380	450	450	450	450	450	450	450	450	450	420	420	420	420
Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min⁻¹)	9,600	6,400	5,570	4,460	3,900	3,400	2,900	2,600	2,300	1,900	1,500	1,200	1,000	850	750	650	600
		Feed Rate (mm/min)	120	120	170	170	210	210	210	210	210	210	210	210	210	200	200	200	200
Nodular Cast Iron		Spindle Revolution (min⁻¹)	15,900	10,600	10,360	8,290	7,200	6,200	5,400	4,800	4,400	3,600	2,700	2,200	1,800	1,550	1,350	1,200	1,100
		Feed Rate (mm/min)	220	250	390	390	390	390	390	390	390	390	390	390	390	360	360	360	360
Aluminum Alloys		Spindle Revolution (min⁻¹)	39,800	26,600	23,000	18,500	17,800	15,200	13,100	11,800	10,500	8,900	6,700	5,400	4,500	3,800	3,400	3,000	2,700
		Feed Rate (mm/min)	900	1,000	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270	1,270
Aluminum Alloy Casting		Spindle Revolution (min⁻¹)	29,000	19,200	17,500	14,000	13,100	11,500	10,000	8,800	8,000	6,700	5,000	4,000	3,400	2,900	2,500	2,200	2,000
		Feed Rate (mm/min)	550	550	820	820	820	820	820	820	820	820	820	820	820	820	820	820	820

NOT recommended for slotting

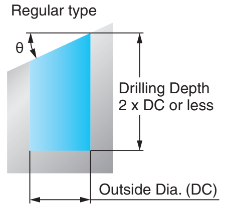
***This tool is specially designed for plunge milling and NOT recommended for slotting.**

- Coolant is recommended.
- Adjust cutting conditions to suit machine rigidity.
- Use chuck and machine with as high rigidity as possible.
- Pecking is recommended when drilling depth is 2D or over
- Stainless steel machining is NOT recommended.
- Cutting conditions adjustment is required when machining a slant surface, depending on the slant angle. (Ref. to the right figure)
  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%.

Short type



Regular type



2ZDK-HP (Drilling Depth Short type Long shank)

Drilling Depth : ap ≤ 1×D

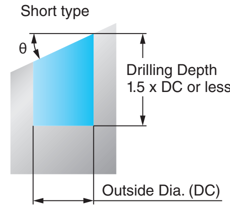
Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø3.5	ø4	ø4.5	ø5	ø6	ø8	ø10	ø12
Structural Steel Carbon Steel	Plunge milling	Spindle Revolution (min⁻¹)	10,600	9,100	8,000	7,100	6,400	5,300	4,000	3,200	2,700
		Feed Rate (mm/min)	830	830	830	830	830	830	830	830	830
Alloy Steel		Spindle Revolution (min⁻¹)	9,500	8,200	7,200	6,400	5,700	4,800	3,600	2,900	2,400
		Feed Rate (mm/min)	630	630	630	630	630	630	630	630	630
Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min⁻¹)	7,400	6,400	5,600	5,000	4,500	3,700	2,800	2,200	1,900
		Feed Rate (mm/min)	365	365	365	365	365	365	365	365	365
Nodular Cast Iron		Spindle Revolution (min⁻¹)	9,600	8,200	7,200	6,400	5,700	4,800	3,600	2,900	2,400
		Feed Rate (mm/min)	475	475	475	475	475	475	475	475	475
Aluminum Alloys		Spindle Revolution (min⁻¹)	12,700	10,900	9,600	8,500	7,600	6,400	4,800	3,800	3,200
		Feed Rate (mm/min)	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050
Aluminum Alloy Casting		Spindle Revolution (min⁻¹)	9,500	8,200	7,200	6,400	5,700	4,800	3,600	2,900	2,400
		Feed Rate (mm/min)	675	675	675	675	675	675	675	675	675

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.
- Pecking is recommended when drilling depth is 2D or over.
- Stainless steel machining is NOT recommended.
- Cutting conditions adjustment is required when machining a slant surface, depending on the slant angle. (Ref. to the right figure)
  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%.

Short type



2ZDK-HP-OH (Drilling Depth Regular type)

Drilling Depth : ap ≤ 3DC

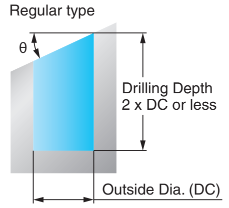
Workpiece Material	Application	Outside Dia. DC (mm)	ø3	ø4	ø5	ø6	ø8	ø10	ø12
Structural Steel Carbon Steel	Plunge milling	Spindle Revolution (min⁻¹)	10,600	7,950	6,350	5,300	3,980	3,180	2,650
		Feed Rate (mm/min)	750	750	750	750	750	750	750
Alloy Steel		Spindle Revolution (min⁻¹)	9,550	7,160	5,730	4,770	3,580	2,860	2,390
		Feed Rate (mm/min)	700	680	630	600	600	600	600
Prehardened Steel (30 ~ 45HRC)		Spindle Revolution (min⁻¹)	5,300	3,980	3,180	2,650	1,990	1,590	1,330
		Feed Rate (mm/min)	300	300	300	300	300	280	280
Stainless Steel		Spindle Revolution (min⁻¹)	7,430	5,570	5,100	4,240	3,180	2,550	2,120
		Feed Rate (mm/min)	400	400	400	500	500	500	500
Nodular Cast Iron		Spindle Revolution (min⁻¹)	9,550	7,160	5,730	4,770	3,580	2,860	2,390
		Feed Rate (mm/min)	580	580	500	500	500	450	450
Aluminum Alloys		Spindle Revolution (min⁻¹)	18,000	13,500	10,800	9,000	6,800	5,400	4,500
		Feed Rate (mm/min)	1,270	1,270	1,270	1,270	1,270	1,270	1,270
Aluminum Alloy Casting		Spindle Revolution (min⁻¹)	13,100	10,000	8,000	6,700	5,000	4,000	3,400
		Feed Rate (mm/min)	900	900	850	850	850	850	850

NOT recommended for slotting

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

- Internal coolant is recommended.
- Adjust cutting conditions to suit machine rigidity.
- Use chuck and machine with as high rigidity as possible.
- Pecking is recommended when drilling depth is 2D or over.
- Cutting conditions adjustment is required when machining a slant surface, depending on the slant angle. (Ref. to the right figure)
  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%.
- If there is insufficient chip evacuation at the specified drill depth, it is recommended to peck or change cutting conditions.
- Pre-drilling is recommended if cutting is unstable.
- Pre-drilling and pecking are recommended for stainless steel machining.

Regular type

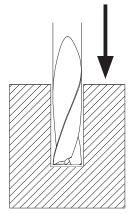


KYOCERA Solid Tools

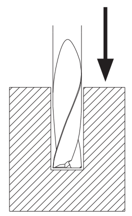
SGS Solid Tools

SGS Micro Tools

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%.

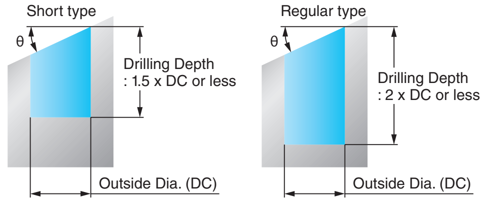


Fig. 1

SGS®
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VALUE AT THE SPINDLE®

2021 Global Product Catalog

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SGS
Solid Carbide Tools

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®.

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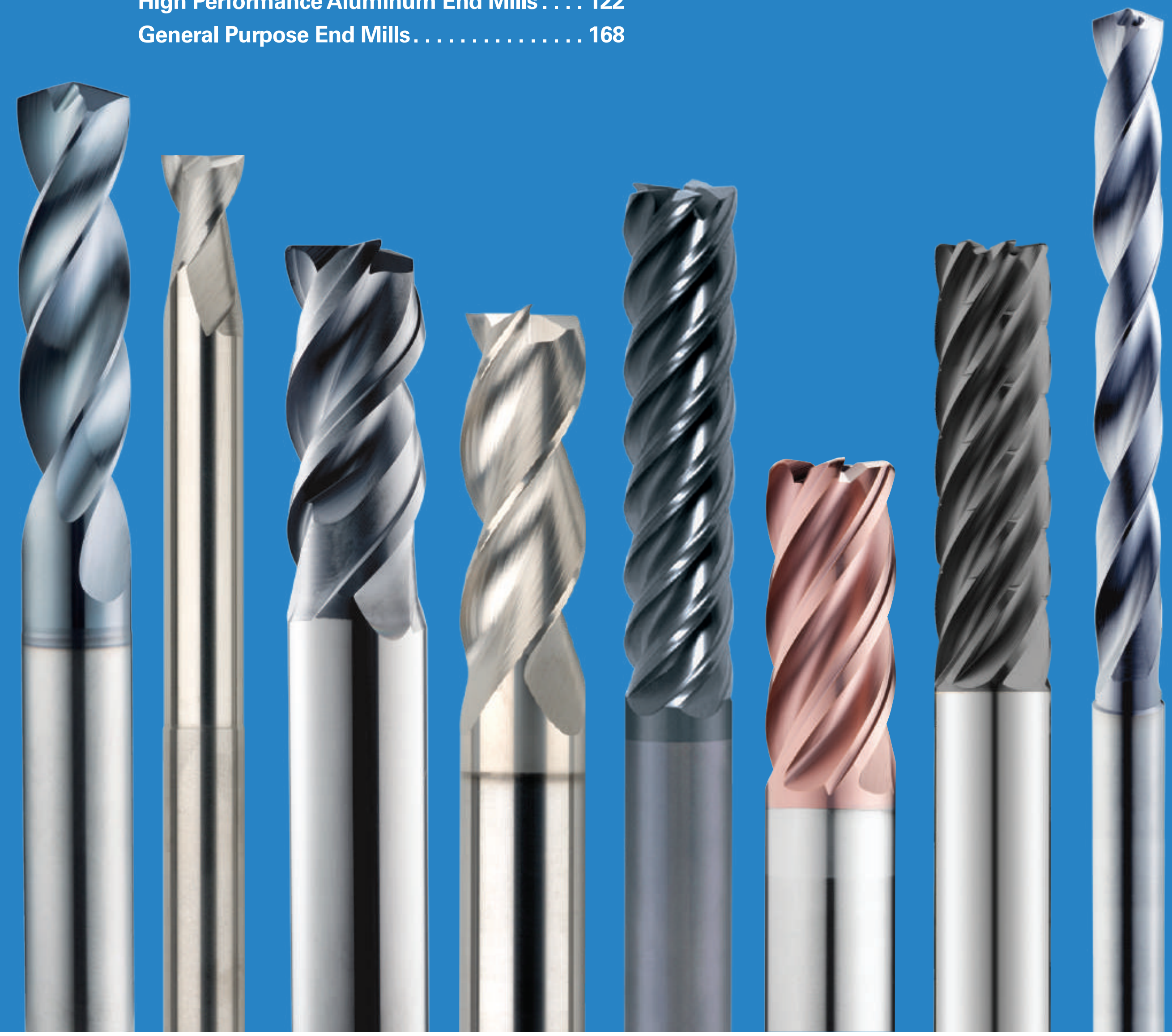

SGS®
Solid Carbide Tools

VALUE AT THE SPINDLE®

MORE THAN JUST ANOTHER CUTTING TOOL SUPPLIER

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

KYOCERA SGS Precision Tools Europe also offers a full range of end mill and drill products as follows:
- Multi-Million Euro Warehouse Stocking Full Range of Catalog Products
- Same Day Shipment on Stock Items
- Multi-Lingual Sales and Technical Support
- Online Portal for Stock Availability, Pricing, Discount Information and 24-Hour Order Placement
- High Performance Product and Application Training, Including the New KYOCERA SGS Tool Clinic

Additional services provided at this facility include:
- A Fast Track for Special Tools Via Our Rapid Response Centre
- Product Research and Development
- Product Engineering and Tool Application Support
- CAD/CAM Software Support

GLOBAL INNOVATION CENTER

INNOVATIVE CUTTING TOOL TECHNOLOGIES
The Global Innovation Center is an environment conducive to innovation. Through testing and development, the dedicated KYOCERA SGS Precision Tools Team focuses on the latest technical competence and machining techniques to bring a continuous stream of new products and advancements to market.
- Cutting Edge Equipment
- Highly Engineered Technology
- Incorporation of innovative machine tool technology for Research and Development

TECHNICAL TRAINING & EDUCATION
Our knowledge-based selling programs are specifically designed to challenge and educate by facilitating programs that mix classroom presentation with hands-on experience. Our own KSPT team members go through the same core training we provide to our valued distribution partners.
- KSPT Campus Tool Clinics
- On-Site Customer Training
- Basic, Advanced and Expert Level Material
- Market-Driven Knowledge

APPLICATION ENGINEERING
The KSPT expertise and global market knowledge allows us to translate customer needs into a commercial sales strategy. The portfolio of KSPT products and services offer an unparalleled track record in performance, cost savings, quality and value at the spindle.
- Market-Driven Productivity Improvements, including the Z-Carb HPR and S-Carb APR/APF®
- Tooling Solutions which include development of new tool geometries, extreme lab testing parameters and extensive field testing
- Technical Support and Troubleshooting
- Research and Development

TOOLING SERVICES

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

KSPT proudly offers Tooling Services in North America and Europe.

KSPT TOOLING SERVICES FACILITIES

UNITED STATES OF AMERICA KSPT
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Cuyahoga Falls, Ohio 44223 U.S.A.
customer service -
US and Canada: (330) 686-5700
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KYOCERA SGS Precision Tools West Coast Service Center
1814 W. Collins Ave.
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phone: (714) 363-3701
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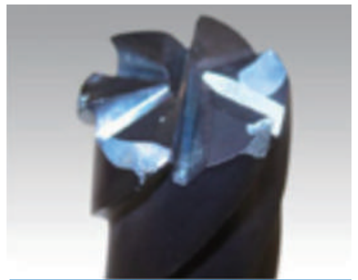
web: www.kyocera-techhub.com



BEFORE

AFTER

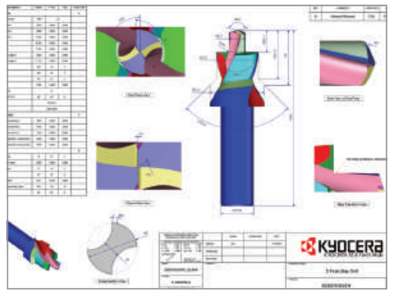
KYOCERA SGS Tech Hub LLC

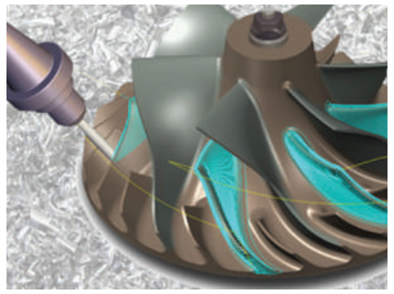
The KYOCERA SGS Tech Hub (KSTH) is an independent subsidiary of KYOCERA SGS Precision Tools Inc. created to focus on custom high-performance cutting tool solutions, while exploring emerging technologies. The state-of-the-art custom facility is designed with the purpose and resources to provide MORE than 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

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

FDA 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 LUNNETTES 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
PROPRIÈTÈ 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 2 Flutes 2 Filos 2 Dents 2 Schneiden	3 3 Flutes 3 Filos 3 Dents 3 Schneiden	4 4 Flutes 4 Filos 4 Dents 4 Schneiden	5 5 Flutes 5 Filos 5 Dents 5 Schneiden	6 6 Flutes 6 Filos 6 Dents 6 Schneiden	7 7 Flutes 7 Filos 7 Dents 7 Schneiden
8 8 Flutes 8 Filos 8 Dents 8 Schneiden	9 9 Flutes 9 Filos 9 Dents 9 Schneiden	10 10 Flutes 10 Filos 10 Dents 10 Schneiden	11 11 Flutes 11 Filos 11 Dents 11 Schneiden	12 12 Flutes 12 Filos 12 Dents 12 Schneiden	

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

COOLANT OPTIONS / OPCIONES DE REFRIGERACIÓN / OPTIONS DE REFROIDISSEMENT / KÜHLSCHMIERMITTEL-OPTIONEN

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

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

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

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

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

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

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

COOLANT OPTIONS / OPCIONES DE REFRIGERACIÓN / OPTIONS DE REFROIDISSEMENT / KÜHLSCHMIERMITTEL-OPTIONEN

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

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

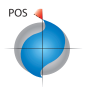
Chamfer Angle
Ángulo de chaflán
Angle de chanfrein
Fasenwinkel

Router Legend
Leyenda ranuradores
Légende détourage
Konturenfräser-Legende

SHANK TYPE
TIPO DE VÁSTAGO
TYPE DE TIGE
SCHAFTART

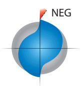
Straight
Recto
Cylindrique
Gerade

RAKE ANGLE
ANGULO DE DESPRENDIMIENTO
ANGLE DE PENTE
SPANWINKEL

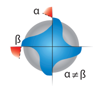


Positive
Positivo
Positif
Positiv

Neutral
Neutro
Neutre
Neutral

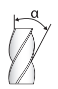


Negative
Negativo
Négatif
Negativ

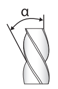


Variable
Variable
Variable
Variabel

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



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



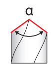
Left Spiral
Hélice con corte a la izquierda
Hélice à gauche
Linksspirale

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

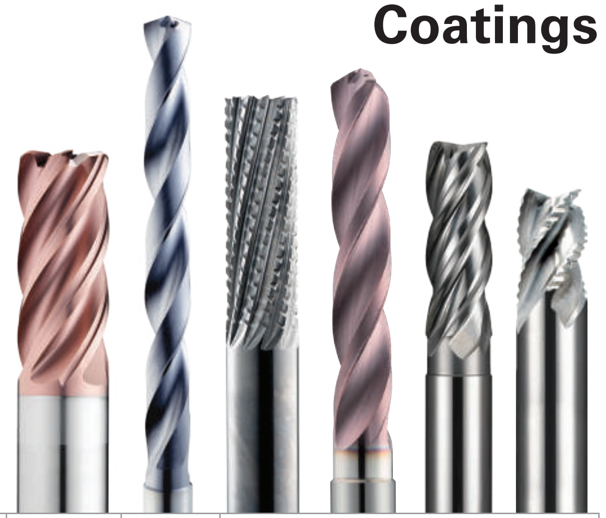
Chip Breaker
Rompevirutas
Brise-copeaux
Spanbrecher



Drill Point
Angulo de la Punta
Point de perçage
Bohrspitze

SGS®
Solid Carbide Tools

Coatings



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
Ti-NAMITE	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.
Ti-NAMITE-A	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.
Ti-NAMITE-B	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.
Ti-NAMITE-C	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.
Ti-NAMITE-X	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.
Di-NAMITE	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.
Ti-NAMITE-M	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.

SGS
Solid Carbide Tools

VALUE AT THE SPINDLE®

High Performance End Mills

Milling

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

Speed & Feed Recommendations listed after each series

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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

Speed & Feed Recommendations listed after each series

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

Fresado

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

Recomendaciones de velocidades y avances mostradas tras cada serie

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

Fraisage

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

Recommandativons de vitesse et avance indiquées après chaque série

Fräsen

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

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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

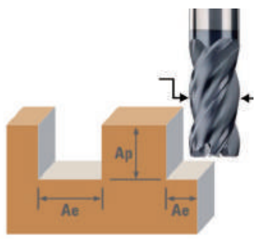
End Mill Matrix

SGS End Mill Matrix			Material								Preferred Cut Type for Series • Good •• Better ••• Best Not Recommended					Toolpath Preference* 1st 2nd	Flute Count
Name	Series	Page	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	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

Name	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
Series 33	0.125 to 1 3 to 20	2.25 to 3	–	R	By Request	SR, WF	Yes	90	32 / 48	Unequal	Ti-Namite-A
Z-Carb	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
Z-Carb-AP	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
Z-Carb-HTA	0.250 to 1 6 to 20	1.25 to 3	–	R	By Request	SR, WF	Yes	20	38 / 41	Unequal	Ti-Namite-A
Series 7	0.125 to 1 3 to 25	2.25 to 8.25	–	S, B	By Request	SR	Yes	1	38	Unequal	Ti-Namite-A
Z-Carb HPR	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
V-Carb	0.125 - 1 6 - 20	1.25 to 5	–	S, R, B	By Request	SR, WF	Yes	5	45	Unequal	Ti-Namite-A
T-Carb®	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
H-Carb	0.250 to 1 6 to 25	2.5 to 4	–	S, R	In Stock Available	SR	No	1	37	Unequal	Ti-Namite-M Ti-Namite-A
Multi Carb	0.188 to 1 6 to 25	1.5 to 3.25	–	S, R	By Request	SR	No	1	35	Equal	Ti-Namite-A
Turbo Carb	0.031 to 0.750 1 to 20	1	2 to 2.25	B	By Request	SR	Yes	25	30	Equal	Ti-Namite-A
Z-Carb-MD	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
Power-Carb®	0.250 to 0.500 6 to 20	2 to 2.25	–	S	By Request	SR	Yes	1	45	Equal	Ti-Namite-A
Ski-Carb	0.250 to 1 3 to 20	1.25 to 7	–	S, R	By Request	SR, WF	Yes	90	45	Equal	Ti-Namite-B
S-Carb® 2 Flute	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
S-Carb® 3 Flute	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
S-Carb® Chipbreaker	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
S-Carb® APR-3®	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
S-Carb APR-4®	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
S-Carb APF®	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
Slow Helix	0.250 to 0.750 6 to 16	1.75 to 4	–	S	By Request	SR	Yes	5	10, 12	Unequal	Di-Namite (optional)
CCR (20-CCR)	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)
CCR (31-CCR)	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)
Compression Router	0.250 to 0.500 6 to 12	2.75 to 4	–	S	By Request	SR	Yes	5	30	Equal	Di-Namite (optional)
Up Cut Router	0.125 to 0.750 3 to 12	2.5 to 4.25	–	S	By Request	SR	Yes	90	35	Equal	various optional
Down Cut Router	0.125 to 0.750 3 to 12	2.5 to 4.25	–	S	By Request	SR	Yes	–	35	Equal	various optional

Preferred materials for each Series are highlighted above

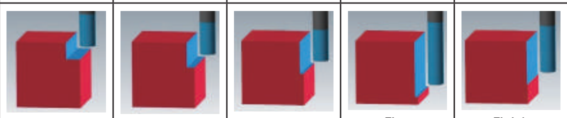
Cut depths (Ae & Ap) are based on a percentage of the cutter diamter (DC)



Material: 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

Coolant required in these materials: Stainless Steel M1 to M3, High Temp Alloy S1 to S3, Titanium Alloy S4, Non Ferrous N1 to N4

Plunging not recommended in these materials: Stainless Steel M1 to M3, High Temp Alloy S1 to S3, Titanium Alloy S4, Hardened Steel H1 to H4



Heavy	Moderate	Light	Fine	Finish
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

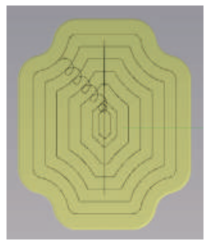
Coolant required in these materials

Plunging not recommended in these materials

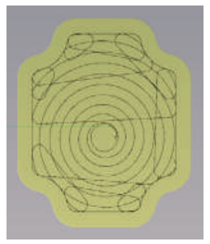
Material hardness and machinability affect speed, feed, and cut depths

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



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®

SGS TOOL WIZARD

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

Application Tips

Tool
- Whenever possible, select an end mill with the largest diameter, shortest flute length, and shortest overall length for the best rigidity
- Long flute tools are not intended for pocketing, slotting, or heavy profiling – limit Ae to .02D
- High Performance tools minimize cycle time and extend tool life

Tool Holders
- Holders with adequate gripping pressure and TIR are required
- Stub holders or zero length collet style holders are recommended for heavy stock removal
- When using solid holders, hand ground screw flats are not recommended

Workpiece
- Secure clamping of the workpiece will reduce chatter and deflection

Machine
- Spindle must be in optimum condition for precise TIR and maximum tool life
- Sufficient horsepower is required to perform at recommended speeds and feeds
- Reduce rates for low power machines to prevent workpiece and / or tool damage

Coolant
- Avoid re-milling chips through use of air blast or liquid coolant as necessary
- Maintain clean coolant with appropriate concentration
- General recommendations:
  —Water Soluble Oil or Air Blast: Tool Steels, Mold & Die Steels, Carbon or Alloy Steels
  —Water Soluble Oil: Stainless Steels, Titanium, High Temperature Alloys, Non-Ferrous Alloys

Methods
- Climb milling is generally preferred
- Attention to programming details, tool holders, TIR, balance, fixturing, etc. improve cutting tool performance and extend tool life

END MILLING GUIDELINE

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

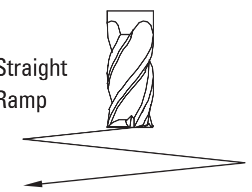
ENTRY METHODS

Pre-Drilled Hole

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

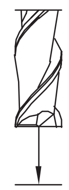
Helical Ramp

Straight Ramp



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

Plunge



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

Recomendaciones de uso

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)

Reducciones 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

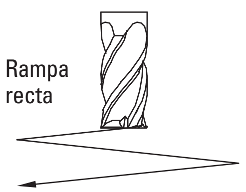
MÉTODOS DE ENTRADA

Barreno previo

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

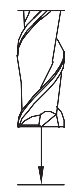
Rampa helicoidal

Rampa recta



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

Agujero o Barrenado



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

Conseils relatifs à l’application

Outil
- Chaque fois que possible, choisissez une fraise de plus grand diamètre possible, la plus courte possible, elle garantira la meilleure rigidité
- Les outils longs ne sont pas optimum pour l’ébauche, le pocketing, le rainurage – Ae limité à 0,02 D
- Les outils Haute performance optimisent les temps de cycle et de augmentent la durée de vie

Porte-outils
- Des attachements à serrage puissant et à faux rond précis sont recommandés
- Attachements à méplats ou pinces à serrage nominale sont recommandées pour les ébauches
- Lorsque vous utilisez des attachement rigides, les serrage de l’outil par vis ne sont pas recommandés

Pièce
- Le système de fixation et de bridage de la pièce devra permettre de réduire les vibrations et la déformation

Machine
- Broche doit être en bon état optimal au niveau de son faux rond
- Suffisamment puissance est nécessaire pour effectuer à des vitesses recommandées et se nourrit
- Réduire les efforts pour les machines de faible puissance pour éviter l’endommagement de la pièce et / ou de l’outil

Liquide de refroidissement
- Évitez les recyclage de copeaux par l'utilisation de soufflage d'air comprimé ou de liquide de refroidissement.
- Maintenir le lubrifiant propre à la concentration appropriée
- Recommandations générales –
  –Huile soluble ou Air comprimé: aciers à outils, aciers pour moules, 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

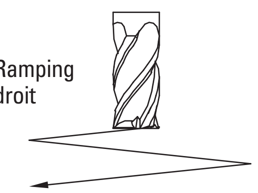
TYPES D’ENTREE MATIERE

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 Gleichlauffräsen anwenden
- Das Beachten der Fräsparameter, 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

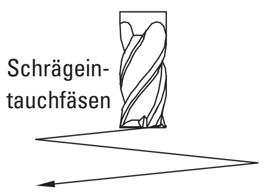
VORBEREITUNGEN

Vorbohrung

Vorbohren ist in den meisten Fällen ratsam.

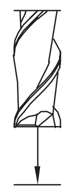
Zirkularein-tauchfräsen

Schrägein-tauchfäsen



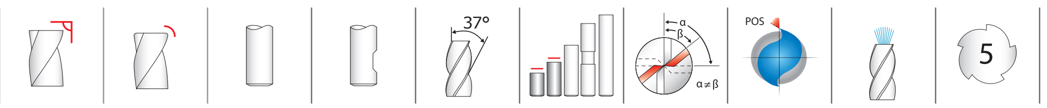
Alternative Verfahren sind Zirkulareintauchen und Schrägeintauchen. Starke Tauchwinkel erfordern verringerte Vorschubgeschwindigkeiten. Geringe Tauchwinkel ermöglichen höhere Vorschubgeschwindigkeiten und verlängern die Standzeit. Verwenden Sie die Drehzahlen und Vorschübe zum Schlitzfräsen für Tauchwinkel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

Stechen



Stechen Sie in Nichteisenmetalle und kurzspanende Werkstoffe nur mit Schlitzfrädrehzahl und 25 % der Schlitzvorschubgeschwindig-keit ein.

Z-Carb-HPR



CARB-HPR
HIGH PERFORMANCE ROUGHER

TOLERANCES (inch)

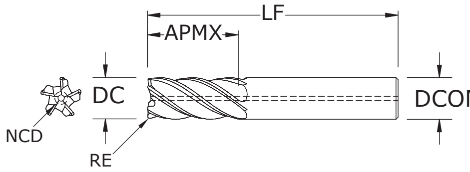
1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h_6
RE = +0.0000/–0.0020

>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h_6
RE = +0.0000/–0.0020

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

Z5 • Z5CR

FRACTIONAL SERIES



- 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
- 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
1/8	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	–	–

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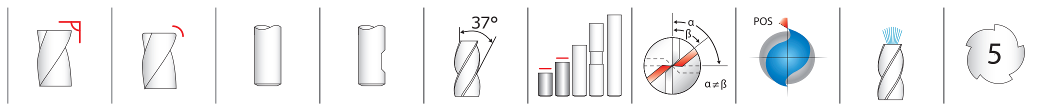
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

Z-Carb-HPR

CARB-HPR
HIGH PERFORMANCE ROUGHER



TOLERANCES (inch)

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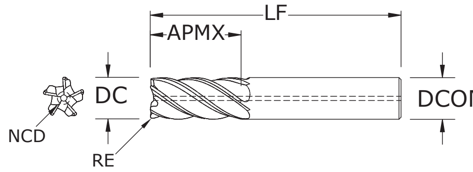
>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h_6
RE = +0.0000/–0.0020



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
5/16	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	–	–

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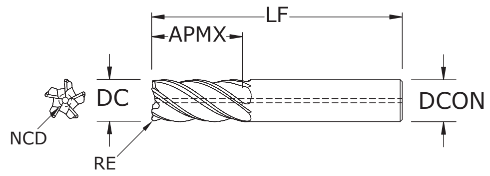
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

Z-Carb-HPR

Z5 • Z5CR
FRACTIONAL SERIES



TOLERANCES (inch)

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DC = +0.0000/–0.0012
DCON = h_6
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>3/8–1 DIAMETER
DC = +0.0000/–0.0020
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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
- 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

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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

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FRACTIONAL
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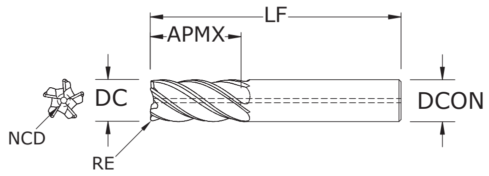

Z5 • Z5CR
FRACTIONAL SERIES

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CONTINUED

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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	–	–

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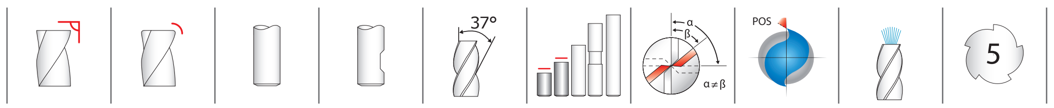
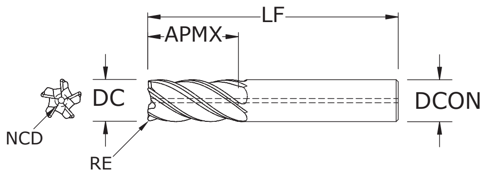


CARB-HPR
HIGH PERFORMANCE ROUGHER

Z5 • Z5CR
FRACTIONAL SERIES



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CONTINUED

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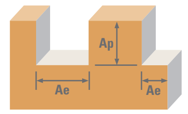
3/4	2	4-1/2	3/4	0.120	0.2630	37236	–	–	37237	–	–
1	1-1/8	4	1	–	0.3500	38510	38516	38522	37116	37123	37288
1	1-1/8	4	1	0.010	0.3500	38869	38871	38873	38868	38870	38872
1	1-1/8	4	1	0.030	0.3500	38563	38608	38647	37117	37124	37289
1	1-1/8	4	1	0.060	0.3500	38564	38609	38648	37118	37125	37290
1	1-1/8	4	1	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

Z-Carb-HPR



	Series Z5, Z5CR 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	≤ 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

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KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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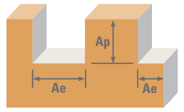
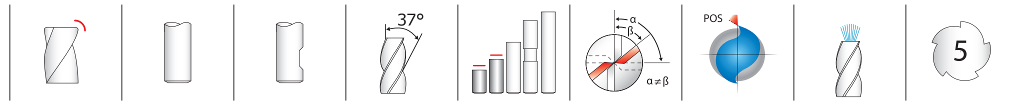


Series Z5, Z5CR Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/8	1/4	3/8	1/2	5/8	3/4	1
S SUPER ALLOYS (NICKEL , COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.5	≤ 1.5	80 (64-96)	RPM	2445	1222	815	611	489	407	306
						Fz	0.00025	0.00068	0.00128	0.00170	0.00187	0.00204	0.00238
						Feed (ipm)	3.1	4.2	5.2	5.2	4.6	4.2	3.6
		Slot	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
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 (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
		Slot	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
TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ 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
		Slot	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
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ 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
		Slot	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
H TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 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
		Slot	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)

Z-Carb-HPR

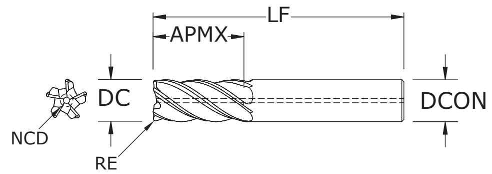


TOLERANCES (mm)

6 DIAMETER
DC = +0,000/–0,030
DCON = h_6
RE = +0,000/–0,050

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6
RE = +0,000/–0,050

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050



Z5MCR
METRIC SERIES

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

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

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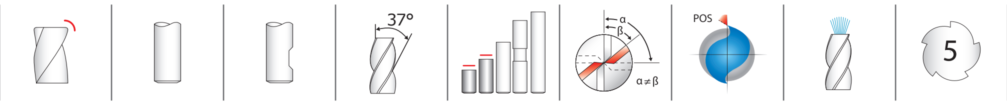


TOLERANCES (mm)

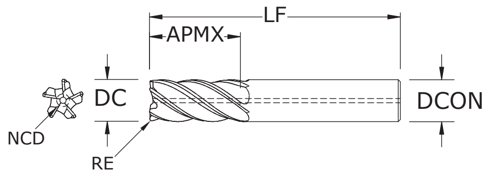
6 DIAMETER
DC = +0,000/–0,030
DCON = h_6
RE = +0,000/–0,050

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6
RE = +0,000/–0,050

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h_6
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
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- Excels at roughing, ramping, high speed machining and finishing in a variety of materials
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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

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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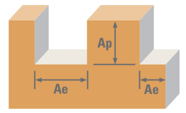

	Series Z5MCR Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	6	8	10	12	16	20	25
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	169 (135-203)	RPM	8967	6725	5380	4484	3363	2690	2152
							Fz	0.029	0.049	0.061	0.074	0.087	0.099	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

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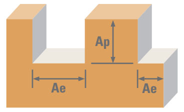
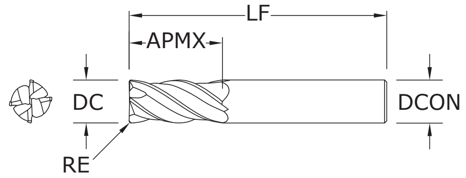


	Series Z5MCR Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	6	8	10	12	16	20	25
S	**SUPER ALLOYS (NICKEL , COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400**	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.5	≤ 1.5	24 (20-29)	RPM	1293	969	776	646	485	388	310
							Fz	0.0160	0.0272	0.0340	0.0409	0.0478	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	≤ 400 Bhn or ≤ 43 HRc	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 Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	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	≤ 440 Bhn or ≤ 47 HRc	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**	≤ 375 Bhn or ≤ 40 HRc	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)

Z-Carb-AP



Z1PCR
FRACTIONAL SERIES

TOLERANCES (inch)

<1/8 DIAMETER
DC = +0.0005/–0.0005
DCON = h_6
RE = +0.000/–0.0010

1/8–1/4 DIAMETER
DC = +0.000/–0.0012
DCON = h_6
RE = +0.000/–0.0020

>1/4–3/8 DIAMETER
DC = +0.000/–0.0016
DCON = h_6
RE = +0.000/–0.0020

>3/8–1 DIAMETER
DC = +0.000/–0.0020
DCON = h_6
RE = +0.000/–0.0020

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
1/64	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

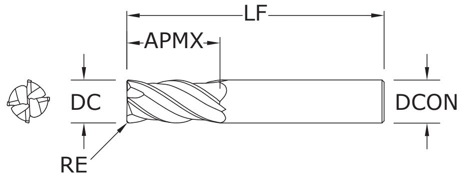
*Variable flute spacing. Helix and rake do not vary.

continued on next page

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

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 = h_6
RE = +0.000/–0.0010

1/8–1/4 DIAMETER
DC = +0.000/–0.0012
DCON = h_6
RE = +0.000/–0.0020

>1/4–3/8 DIAMETER
DC = +0.000/–0.0016
DCON = h_6
RE = +0.000/–0.0020

>3/8–1 DIAMETER
DC = +0.000/–0.0020
DCON = h_6
RE = +0.000/–0.0020

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

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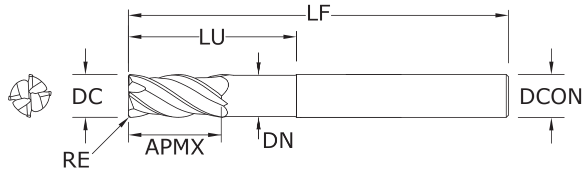
FRACTIONAL
Z-Carb-AP

Z1PLC

FRACTIONAL SERIES



TOLERANCES (inch)

1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h_6
RE = +0.000/–0.005

>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h_6
RE = +0.000/–0.005

>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h_6
RE = +0.000/–0.005

- STEELS
- STAINLESS STEELS
- CAST IRON
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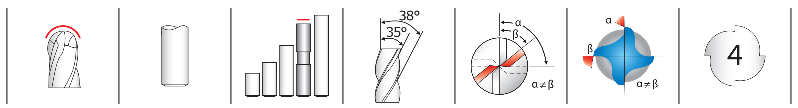
- TITANIUM
- HARDENED STEELS

For patent information visit www.ksptpatents.com

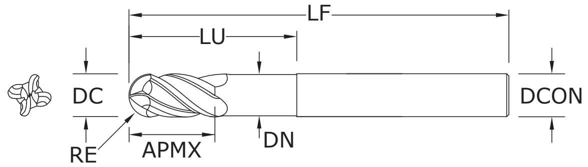
inch							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	Ti-NAMITE-X
1/4	1/2	2-1/2	1/4	1-1/8	.230	.020	36447
1/4	1/2	3-1/2	1/4	1-5/8	.230	.020	36448
1/4	1/2	4	1/4	1-1/4	.230	.020	36450
1/4	1/2	4	1/4	2-1/8	.230	.020	36449
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 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)



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
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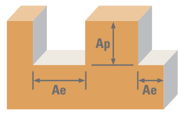

	Series Z1, Z16CR, Z1PCR, Z1PLC, Z1PLB Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/64	1/8	1/4	3/8	1/2	5/8	3/4	1
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	555	RPM	135904	16961	8480	5654	4240	3392	2827	2120
						(444-666)	Fz	0.00005	0.00046	0.0012	0.0023	0.0031	0.0034	0.0037	0.0043
							Feed (ipm)	27.2	31.2	40.7	52.0	52.6	46.1	41.8	36.5
			Slot	1	≤ 1	440	RPM	107744	13446	6723	4482	3362	2689	2241	1681
						(352-528)	Fz	0.00005	0.00046	0.0012	0.0023	0.0031	0.0034	0.0037	0.0043
							Feed (ipm)	21.5	24.7	32.3	41.2	41.7	36.6	33.2	28.9
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.5	≤ 1.5	315	RPM	77135	9626	4813	3209	2407	1925	1604	1203
						(252-378)	Fz	0.00004	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032
							Feed (ipm)	12.3	13.1	17.3	21.8	22.1	20.0	18.0	15.4
			Slot	1	≤ 1	250	RPM	61218	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.00004	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032
							Feed (ipm)	9.8	10.4	13.8	17.3	17.6	15.9	14.3	12.2
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	490	RPM	119987	14974	7487	4991	3744	2995	2496	1872
						(392-588)	Fz	0.00004	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032
							Feed (ipm)	19.2	20.4	27.0	33.9	34.4	31.1	28.0	24.0
			Slot	1	≤ 1	390	RPM	95500	11918	5959	3973	2980	2384	1986	1490
						(312-468)	Fz	0.00004	0.00034	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032
							Feed (ipm)	15.3	16.2	21.5	27.0	27.4	24.8	22.2	19.1
	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
			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
			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
			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

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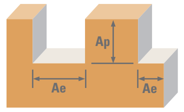
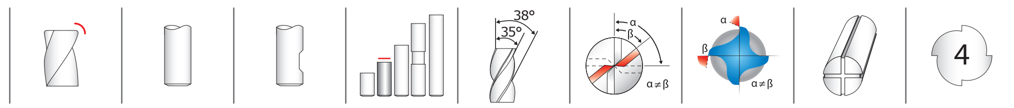
Z-Carb-AP

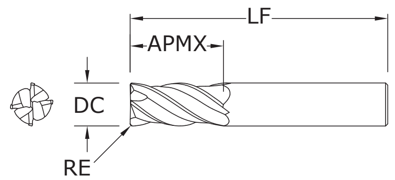


Group	Series Z1, Z16CR, Z1PCR, Z1PLC, Z1PLB Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/64	1/8	1/4	3/8	1/2	5/8	3/4	1
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile	≤ 0.5	≤ 1.5	340	RPM	83256	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.00004	0.00031	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	≤ 300 Bhn or ≤ 32 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
S	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	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
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	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
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	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)

Z-Carb-AP





Z1MPCR

METRIC SERIES

TOLERANCES (mm)

<3 DIAMETER
DC = +0,012/–0,012
DCON = h_6
RE = +0,000/–0,025

3–6 DIAMETER
DC = +0,000/–0,030
DCON = h_6
RE = +0,000/–0,050

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6
RE = +0,000/–0,050

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050

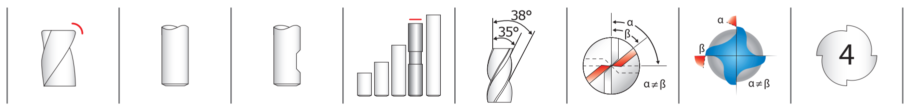
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM

For patent information visit www.ksptpatents.com

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

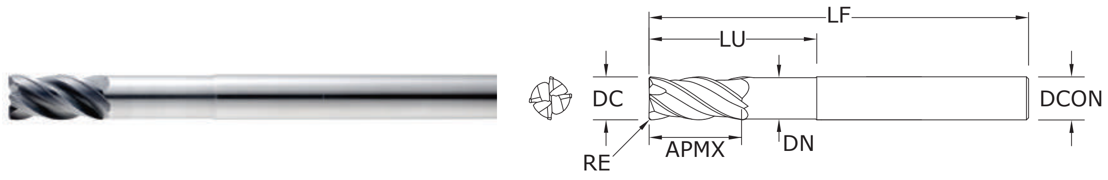
*Variable flute spacing. Helix and rake do not vary.

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



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 = h_6
RE = +0,000/–0,050

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6
RE = +0,000/–0,050

>10–20 DIAMETER
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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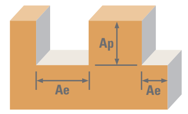

Series Z1M, Z1MPCR, Z1MPIC, Z1MPLC Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	1	3	6	8	10	12	16	20	25
P – **CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	169	RPM	53803	17934	8967	6725	5380	4484	3363	2690	2152
					(135-203)	Fz	0.0030	0.0109	0.029	0.049	0.061	0.074	0.087	0.099	0.108
						Feed (mm/min)	646	782	1040	1318	1313	1327	1170	1065	930
		Slot	1	≤ 1	134	RPM	42654	14218	7109	5332	4265	3555	2666	2133	1706
					(107-161)	Fz	0.0030	0.0109	0.029	0.049	0.061	0.074	0.087	0.099	0.108
						Feed (mm/min)	512	620	825	1045	1041	1052	928	845	737
P – **ALLOY STEELS** 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.5	≤ 1.5	96	RPM	30537	10179	5089	3817	3054	2545	1909	1527	1221
					(77-115)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	281	330	448	550	550	560	511	458	391
		Slot	1	≤ 1	76	RPM	24235	8078	4039	3029	2424	2020	1515	1212	969
					(61-91)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	223	262	355	436	436	444	406	364	310
M – **STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	149	RPM	47501	15834	7917	5938	4750	3958	2969	2375	1900
					(119-179)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	437	513	697	855	855	871	796	713	608
		Slot	1	≤ 1	119	RPM	37807	12602	6301	4726	3781	3151	2363	1890	1512
					(95-143)	Fz	0.0023	0.0081	0.022	0.036	0.045	0.055	0.067	0.075	0.080
						Feed (mm/min)	348	408	555	681	681	693	633	567	484
M – **STAINLESS STEELS (DIFFICULT)** 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	104	RPM	32960	10987	5493	4120	3296	2747	2060	1648	1318
					(83-124)	Fz	0.0018	0.0064	0.017	0.030	0.037	0.043	0.051	0.059	0.063
						Feed (mm/min)	237	281	374	494	488	472	420	389	332
		Slot	1	≤ 1	82	RPM	26174	8725	4362	3272	2617	2181	1636	1309	1047
					(66-99)	Fz	0.0018	0.0064	0.017	0.030	0.037	0.043	0.051	0.059	0.063
						Feed (mm/min)	188	223	297	393	387	375	334	309	264
M – **STAINLESS STEELS (PH)** 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ 0.5	≤ 1.5	94	RPM	30052	10017	5009	3756	3005	2504	1878	1503	1202
					(76-113)	Fz	0.0018	0.0064	0.017	0.030	0.037	0.043	0.051	0.059	0.063
						Feed (mm/min)	216	256	341	451	445	431	383	355	303
		Slot	1	≤ 1	76	RPM	24235	8078	4039	3029	2424	2020	1515	1212	969
					(61-91)	Fz	0.0018	0.0064	0.017	0.030	0.037	0.043	0.051	0.059	0.063
						Feed (mm/min)	174	207	275	364	359	347	309	286	244
K – **CAST IRONS (LOW & MEDIUM ALLOY)** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ 0.5	≤ 1.5	136	RPM	43139	14380	7190	5392	4314	3595	2696	2157	1726
					(109-163)	Fz	0.0028	0.0099	0.026	0.045	0.056	0.067	0.079	0.091	0.098
						Feed (mm/min)	483	569	748	971	966	963	852	785	676
		Slot	1	≤ 1	108	RPM	34414	11471	5736	4302	3441	2868	2151	1721	1377
					(87-130)	Fz	0.0028	0.0099	0.026	0.045	0.056	0.067	0.079	0.091	0.098
						Feed (mm/min)	385	454	597	774	771	769	680	626	540

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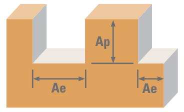
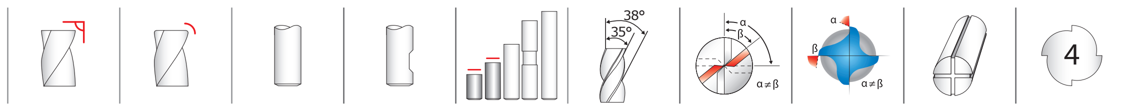
Z-Carb-AP



Series Z1M, Z1MPCR, Z1MPIC, Z1MPLC Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	1	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	32960	10987	5493	4120	3296	2747	2060	1648	1318
					(83-124)	Fz	0.0020	0.0074	0.020	0.034	0.043	0.050	0.059	0.067	0.074
						Feed (mm/min)	264	325	439	560	567	549	486	442	390
		Slot	1	≤ 1	82	RPM	26174	8725	4362	3272	2617	2181	1636	1309	1047
					(66-99)	Fz	0.0020	0.0074	0.020	0.034	0.043	0.050	0.059	0.067	0.074
						Feed (mm/min)	209	258	349	445	450	436	386	351	310
S **SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.5	≤ 1.5	24	RPM	7755	2585	1293	969	776	646	485	388	310
					(20-29)	Fz	0.0018	0.0061	0.016	0.027	0.034	0.041	0.048	0.053	0.060
						Feed (mm/min)	56	63	83	105	105	106	93	82	74
		Slot	1	≤ 1	20	RPM	6301	2100	1050	788	630	525	394	315	252
					(16-24)	Fz	0.0018	0.0061	0.016	0.027	0.034	0.041	0.048	0.053	0.060
						Feed (mm/min)	45	51	67	85	86	86	76	67	60
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ 0.5	≤ 1.5	19	RPM	6010	2003	1002	751	601	501	376	301	240
					(15-23)	Fz	0.0013	0.0043	0.011	0.019	0.024	0.028	0.033	0.037	0.042
						Feed (mm/min)	31	34	44	57	58	56	50	44	40
		Slot	1	≤ 1	15	RPM	4847	1616	808	606	485	404	303	242	194
					(12-18)	Fz	0.0013	0.0043	0.011	0.019	0.024	0.028	0.033	0.037	0.042
						Feed (mm/min)	25	28	36	46	47	45	40	36	33
TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ 0.5	≤ 1.5	66	RPM	20842	6947	3474	2605	2084	1737	1303	1042	834
					(52-79)	Fz	0.0020	0.0071	0.019	0.032	0.040	0.048	0.056	0.064	0.070
						Feed (mm/min)	167	197	264	333	333	333	292	267	233
		Slot	1	≤ 1	52	RPM	16480	5493	2747	2060	1648	1373	1030	824	659
					(41-62)	Fz	0.0020	0.0071	0.019	0.032	0.040	0.048	0.056	0.064	0.070
						Feed (mm/min)	132	156	209	264	264	264	231	211	185
TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ 0.5	≤ 1.5	23	RPM	7271	2424	1212	909	727	606	454	364	291
					(18-27)	Fz	0.0020	0.0071	0.019	0.032	0.040	0.048	0.056	0.064	0.070
						Feed (mm/min)	58	69	92	116	116	116	102	93	81
		Slot	1	≤ 1	18	RPM	5816	1939	969	727	582	485	364	291	233
					(15-22)	Fz	0.0020	0.0071	0.019	0.032	0.040	0.048	0.056	0.064	0.070
						Feed (mm/min)	47	55	74	93	93	93	81	74	65
H **TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.5	≤ 1.5	56	RPM	17934	5978	2989	2242	1793	1495	1121	897	717
					(45-68)	Fz	0.0018	0.0066	0.017	0.030	0.037	0.043	0.051	0.059	0.065
						Feed (mm/min)	129	158	203	269	265	257	229	212	187
		Slot	1	≤ 1	44	RPM	14057	4686	2343	1757	1406	1171	879	703	562
					(35-53)	Fz	0.0018	0.0066	0.017	0.030	0.037	0.043	0.051	0.059	0.065
						Feed (mm/min)	101	124	159	211	208	201	179	166	146

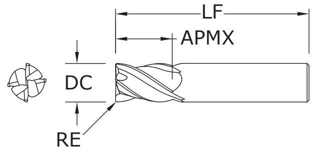
Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fz x 4 x rpm
maximum Slotting Ap for Z1PCR <3mm diameter and all Z1MPLC / Z1MPLB is .25 x DC
maximum Profile Ae for Z1PCR <3mm diameter and all Z1MPLC / Z1MPLB is .20 x DC
reduce speed and feed for materials harder than listed
reduce 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)

Z-Carb



Z1 • Z16CR

FRACTIONAL SERIES



TOLERANCES (inch)

1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h_6
RE = +0.000/–0.002

>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h_6
RE = +0.000/–0.002

>3/8–3/4 DIAMETER
DC = +0.0000/–0.0020
DCON = h_6
RE = +0.000/–0.002

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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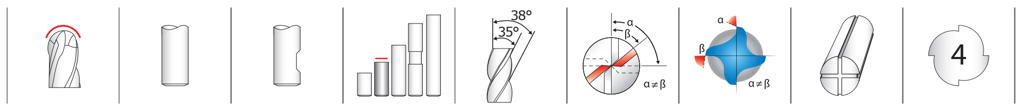
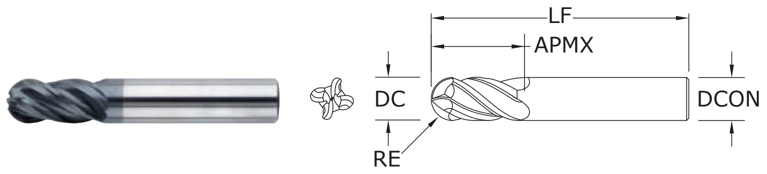
inch					EDP NO.		
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT	JetStream
1/8	1/4	1-1/2	1/8	.015	36505	–	–
1/8	3/8	1-1/2	1/8	–	36404	–	–
5/32	5/16	2	3/16	.015	36506	–	–
5/32	7/16	2	3/16	–	36406	–	–
3/16	3/8	2	3/16	.015	36507	–	–
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)

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools





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 = 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

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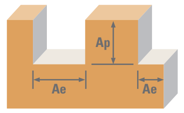
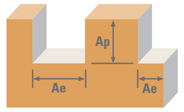
FRACTIONAL
Z-Carb



	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	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	555	RPM	16961	8480	5654	4240	3392	2827	2120
						(444-666)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (ipm)	25.8	33.9	43.0	42.4	42.1	36.5	29.7
			Slot	1	≤ 1	440	RPM	13446	6723	4482	3362	2689	2241	1681
						(352-528)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (ipm)	20.4	26.9	34.1	33.6	33.3	29.0	23.5
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.5	≤ 1.5	315	RPM	9626	4813	3209	2407	1925	1604	1203
						(252-378)	Fz	0.0003	0.0008	0.0014	0.0019	0.0024	0.0025	0.0027
							Feed (ipm)	10.8	15.4	18.0	18.3	18.5	16.0	13.0
			Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0003	0.0008	0.0014	0.0019	0.0024	0.0025	0.0027
							Feed (ipm)	8.6	12.2	14.3	14.5	14.7	12.7	10.3
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	490	RPM	14974	7487	4991	3744	2995	2496	1872
						(392-588)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (ipm)	18.0	21.0	28.0	27.0	27.6	24.0	18.7
			Slot	1	≤ 1	390	RPM	11918	5959	3973	2980	2384	1986	1490
						(312-468)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (ipm)	14.3	16.7	22.2	21.5	21.9	19.1	14.9
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (ipm)	8.3	12.5	15.2	14.5	15.0	13.2	10.4
			Slot	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (ipm)	6.6	9.9	12.1	11.6	11.9	10.5	8.3
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ 0.5	≤ 1.5	310	RPM	9474	4737	3158	2368	1895	1579	1184
						(248-372)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (ipm)	7.6	11.4	13.9	13.3	13.6	12.0	9.5
			Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (ipm)	6.1	9.2	11.2	10.7	11.0	9.7	7.6
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ 0.5	≤ 1.5	445	RPM	13599	6800	4533	3400	2720	2267	1700
						(356-534)	Fz	0.0004	0.0010	0.0018	0.0024	0.0030	0.0031	0.0034
							Feed (ipm)	19.0	27.2	32.6	32.6	32.6	28.1	23.1
			Slot	1	≤ 1	355	RPM	10849	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0004	0.0010	0.0018	0.0024	0.0030	0.0031	0.0034
							Feed (ipm)	15.2	21.7	26.0	26.0	26.0	22.4	18.4

continued on next page

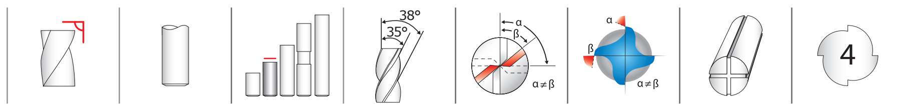
Z-Carb

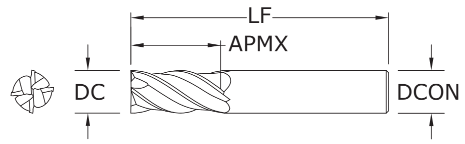


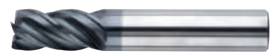
Series Z1B Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/8	1/4	3/8	1/2	5/8	3/4	1
K — CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
					(272-408)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
						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)

Z-Carb







Z1M
METRIC SERIES

TOLERANCES (mm)

3–6 DIAMETER
DC = +0,000/–0,030
DCON = h_6

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h_6

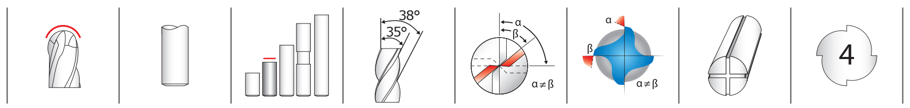
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

For patent information visit www.ksptpatents.com

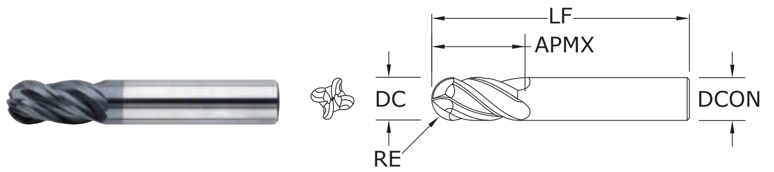
mm CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	EDP NO. Ti-NAMITE-X (TX)	JetStream
3,0	8,0	57,0	6,0	46357	–
4,0	11,0	57,0	6,0	46358	–
5,0	13,0	57,0	6,0	46359	–
6,0	13,0	57,0	6,0	46360	–
8,0	19,0	63,0	8,0	46362	–
10,0	22,0	72,0	10,0	46364	–
12,0	26,0	83,0	12,0	46366	–
14,0	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)



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)

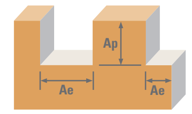
3–6 DIAMETER
DC = +0,000/–0,030
DCON = h_6
RE = +0,000/–0,015

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6
RE = +0,000/–0,020

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,025

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

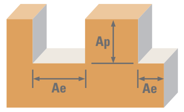
For patent information visit www.ksptpatents.com



	Series Z1MB Metric	Hardness		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	Profile	≤ 0.5	≤ 1.5	169	RPM	17934	8967	6725	5380	4484	3363	2690	2152
						(135-203)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.086	0.088
							Feed (mm/min)	654	861	1091	1090	1076	1067	927	753
			Slot	1	≤ 1	134	RPM	14218	7109	5332	4265	3555	2666	2133	1706
						(107-161)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.086	0.088
							Feed (mm/min)	519	682	865	864	853	846	735	597
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.5	≤ 1.5	96	RPM	10179	5089	3817	3054	2545	1909	1527	1221
						(77-115)	Fz	0.007	0.019	0.030	0.037	0.046	0.061	0.067	0.068
							Feed (mm/min)	274	391	456	456	464	469	407	330
			Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.007	0.019	0.030	0.037	0.046	0.061	0.067	0.068
							Feed (mm/min)	217	310	362	362	368	372	323	262
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	149	RPM	15834	7917	5938	4750	3958	2969	2375	1900
						(119-179)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	456	532	709	709	684	699	608	475
			Slot	1	≤ 1	119	RPM	12602	6301	4726	3781	3151	2363	1890	1512
						(95-143)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	363	423	565	565	544	557	484	378
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	211	316	387	387	369	380	334	264
			Slot	1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	168	251	307	307	293	302	265	209
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ 0.5	≤ 1.5	94	RPM	10017	5009	3756	3005	2504	1878	1503	1202
						(76-113)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	192	288	353	353	337	346	305	240
			Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	155	233	284	284	271	279	246	194
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ 0.5	≤ 1.5	136	RPM	14380	7190	5392	4314	3595	2696	2157	1726
						(109-163)	Fz	0.008	0.024	0.038	0.048	0.058	0.077	0.083	0.085
							Feed (mm/min)	483	690	828	828	828	828	713	587
			Slot	1	≤ 1	108	RPM	11471	5736	4302	3441	2868	2151	1721	1377
						(87-130)	Fz	0.008	0.024	0.038	0.048	0.058	0.077	0.083	0.085
							Feed (mm/min)	385	551	661	661	661	661	569	468

continued on next page

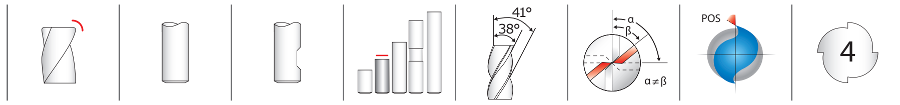
Z-Carb

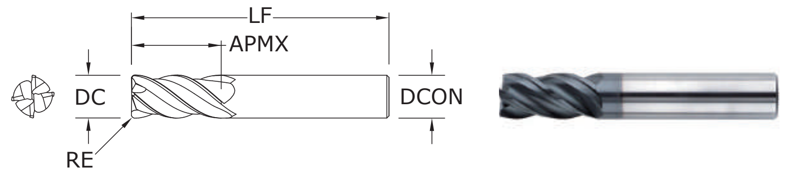


Series Z1MB Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	3	6	8	10	12	16	20	25
K CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648	1318
					(83-124)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
						Feed (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)

Z-Carb-HTA





ZH1CR

FRACTIONAL SERIES

TOLERANCES (inch)

1/4 DIAMETER
DC = +0.0000/−0.0012
DCON = h_6
RE = +0.0000/−0.0020

>1/4–3/8 DIAMETER
DC = +0.0000/−0.0016
DCON = h_6
RE = +0.0000/−0.0020

>3/8–1 DIAMETER
DC = +0.0000/−0.0020
DCON = h_6
RE = +0.0000/−0.0020

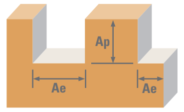
HIGH TEMP ALLOYS
TITANIUM

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	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
1/4	1/2	2-1/2	1/4	.020	36570	–
1/4	3/4	2-1/2	1/4	.020	36616	–
5/16	13/16	2-1/2	5/16	.020	36571	–
3/8	7/8	2-1/2	3/8	.020	36572	36555
7/16	1	2-3/4	7/16	.020	36573	36556
1/2	1	3	1/2	.030	36574	36557
1/2	1-1/4	3-1/4	1/2	.030	36618	36617
9/16	1-1/8	3-1/2	9/16	.030	36575	36558
5/8	1-1/4	3-1/2	5/8	.040	36576	36559
3/4	1-1/2	4	3/4	.040	36577	36560
1	1-1/2	4	1	.040	36578	36561

- 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)

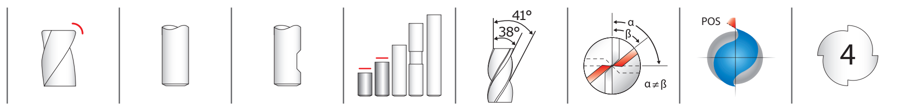
Z-Carb-HTA

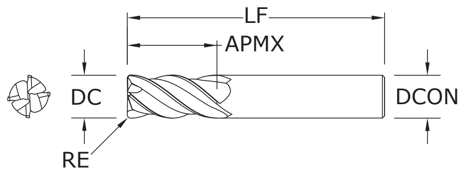


Series ZH1CR Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		Diameter (DC) (inch) 1/4	3/8	1/2	3/4	1
S — SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.5	≤ 1.5	85	RPM	1299	866	649	433	325
					(68-102)	Fz	0.0007	0.0012	0.0017	0.0020	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)

Z-Carb-HTA





ZH1MCRS • ZH1MCR

METRIC SERIES

TOLERANCES (mm)

6 DIAMETER
DC = +0,000/–0,030
DCON = h_6
RE = +0,000/–0,050

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6
RE = +0,000/–0,050

>10–20 DIAMETER
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050

HIGH TEMP ALLOYS

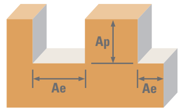
TITANIUM

For patent information visit www.ksptpatents.com

mm CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	EDP NO. Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
6,0	10,0	54,0	6,0	0,50	–	42712
6,0	13,0	57,0	6,0	0,5	46450	–
6,0	13,0	57,0	6,0	1,0	46451	–
6,0	13,0	57,0	6,0	1,5	46452	–
8,0	12,0	58,0	8,0	0,50	–	42713
8,0	19,0	63,0	8,0	0,5	46453	–
8,0	19,0	63,0	8,0	1,0	46454	–
8,0	19,0	63,0	8,0	1,5	46455	–
10,0	14,0	66,0	10,0	0,50	–	42714
10,0	22,0	72,0	10,0	0,5	46456	–
10,0	22,0	72,0	10,0	1,0	46457	–
10,0	22,0	72,0	10,0	1,5	46458	–
10,0	22,0	72,0	10,0	2,0	46459	–
12,0	16,0	73,0	12,0	0,75	–	42715
12,0	26,0	83,0	12,0	0,5	46460	46471
12,0	26,0	83,0	12,0	1,0	46461	46472
12,0	26,0	83,0	12,0	1,5	46462	46473
12,0	26,0	83,0	12,0	2,0	46463	46474
12,0	26,0	83,0	12,0	3,0	46464	46475
16,0	22,0	82,0	16,0	1,00	–	42716
16,0	32,0	92,0	16,0	1,5	46465	46476
16,0	32,0	92,0	16,0	2,0	46466	46477
16,0	32,0	92,0	16,0	3,0	46467	46478
16,0	32,0	92,0	16,0	4,0	46482	46483
20,0	26,0	92,0	20,0	1,00	–	42717
20,0	38,0	104,0	20,0	3,0	46468	46479
20,0	38,0	104,0	20,0	4,0	46469	46480
20,0	38,0	104,0	20,0	5,0	46470	46481

- 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)

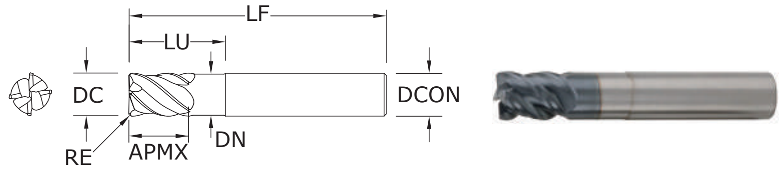
Z-Carb-HTA



Series ZH1MCRS, ZH1MCR Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	10	12	20
S										
SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.5	≤ 1.5	26	RPM	1373	824	687	412
					(21-31)	Fz	0.017	0.032	0.041	0.053
						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)

Z-Carb-MD



ZD1CR
FRACTIONAL SERIES

TOLERANCES (inch)

1/8–1/4 DIAMETER
DC = +0.0000/−0.0012
DCON = h_6
RE = +0.0000/−0.0020

>1/4–3/8 DIAMETER
DC = +0.0000/−0.0016
DCON = h_6
RE = +0.0000/−0.0020

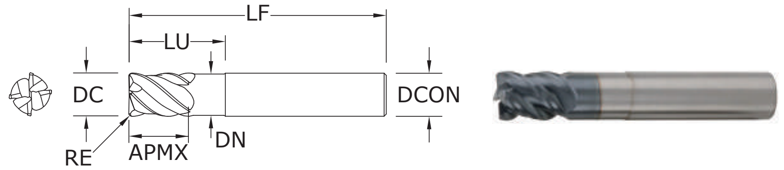
>3/8–3/4 DIAMETER
DC = +0.0000/−0.0020
DCON = h_6
RE = +0.0000/−0.0020

HARDENED STEELS

For patent information visit www.ksptpatents.com

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	EDP NO. Ti-NAMITE-X
inch							
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

- 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)



ZD1MCR
METRIC SERIES

TOLERANCES (mm)

3–6 DIAMETER
DC = +0,000/−0,030
DCON = h_6
RE = +0,000/−0,050

>6–10 DIAMETER
DC = +0,000/−0,040
DCON = h_6
RE = +0,000/−0,050

>10–20 DIAMETER
DC = +0,000/−0,050
DCON = h_6
RE = +0,000/−0,050

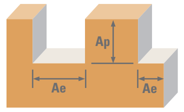
HARDENED STEELS

For patent information visit www.ksptpatents.com

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	EDP NO. Ti-NAMITE-X
mm							
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

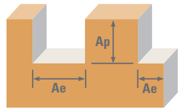
- The original Z-Carb design with negative rake, heavy core, and higher helix for strength and shearing of hard mold & die materials
- Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge helping to suppress damaging harmonics
- Enhanced corner geometry with tight tolerance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

Z-Carb-MD



Series ZD1CR Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		1/8	1/4	3/8	1/2	5/8	3/4
							Diameter (DC) (inch)					
H — 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
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

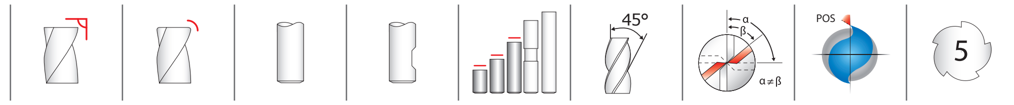
Bhn (Brinell) HRc (Rockwell C)
rpm = Vc x 3.82 / DC
ipm = Fz x 4 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x DC maximum)
feed rates listed have chip thinning adjustments included where applicable
refer to the SGS Tool Wizard® for complete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

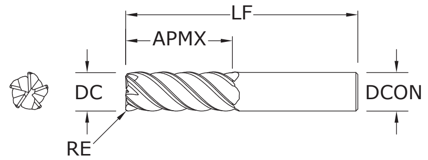


Series ZD1MCR Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)		3	6	8	10	12	16	20
							Diameter (DC) (mm)						
H — TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.4	≤ 1	123	RPM	13087	6544	4908	3926	3272	2454	1963
					(99-148)	Fz	0.012	0.029	0.049	0.061	0.072	0.083	0.112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

Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 1000) / (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)

V-Carb





55 • 55CR
FRACTIONAL SERIES

TOLERANCES (inch)
DC = +0.0000/–0.0020
DCON = h_6
RE = +0.0000/–0.0020

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

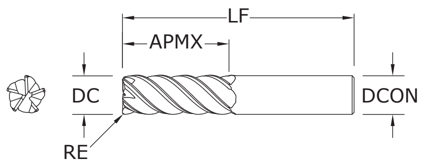
For patent information visit www.ksptpatents.com

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

55 • 55CR
FRACTIONAL SERIES



CONTINUED

inch					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	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 = h_6
RE = +0.0000/–0.0020

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

For patent information visit www.ksptpatents.com

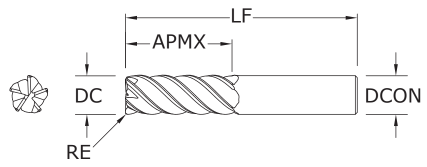
TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050

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

For patent information visit www.ksptpatents.com

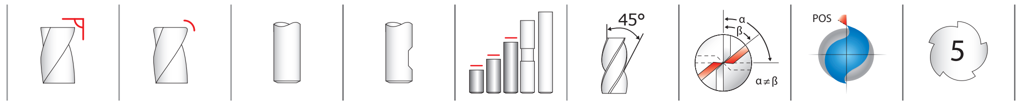
55M • 55MCR
METRIC SERIES



mm					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	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	–

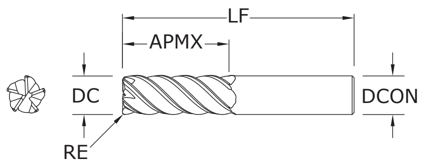
continued on next page

- 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)



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 (AlTiN)	Ti-NAMITE-A (AlTiN) 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	–

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TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050

- 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 = h_6
RE = +0,000/–0,050

- STEELS
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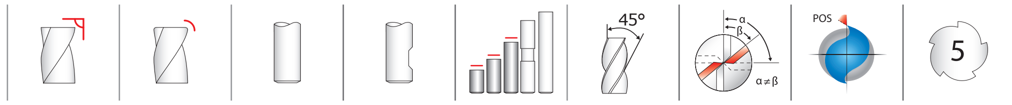
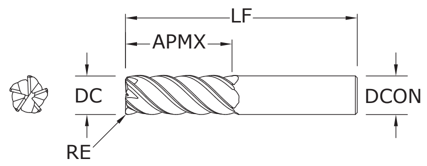


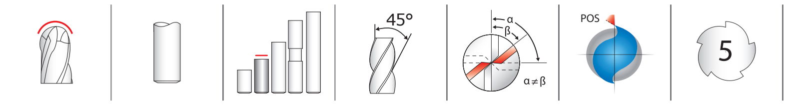


55M • 55MCR

METRIC SERIES

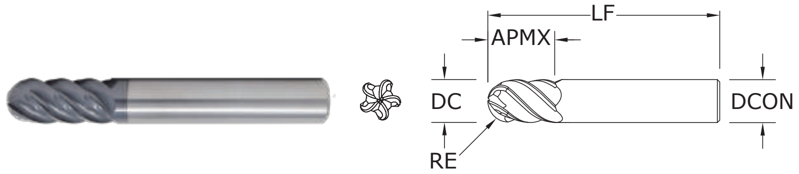
CONTINUED

mm					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) 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 (AlTiN)
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 = h_6
RE = +0.0005/–0.0010

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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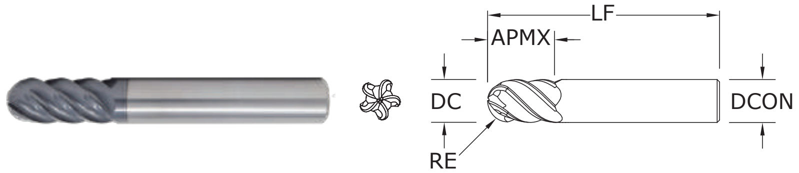
55MB

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 (AlTiN)
6,0	13,0	57,0	6,0	42750
8,0	19,0	63,0	8,0	42751
10,0	22,0	72,0	10,0	42752
12,0	26,0	83,0	12,0	42753
16,0	32,0	92,0	16,0	42754
20,0	38,0	104,0	20,0	42755

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,025

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

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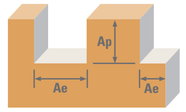

	Series 55, 55CR, 55B Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)	DC • in	1/8	1/4	3/8	1/2	5/8	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.25	≤ 1.5	385	RPM	11766	5883	3922	2941	2353	1961	1471
						(308-462)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0028	0.0032
							Feed (ipm)	20.6	26.5	33.3	33.8	34.1	27.5	23.5
			HSM	≤ 0.05	≤ 2	630	RPM	19253	9626	6418	4813	3851	3209	2407
						(504-756)	Fz	0.0007	0.0018	0.0034	0.0046	0.0057	0.0055	0.0064
							Feed (ipm)	67.4	86.6	109.1	110.7	109.7	88.2	77.0
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.25	≤ 1.5	325	RPM	9932	4966	3311	2483	1986	1655	1242
						(260-390)	Fz	0.0003	0.0007	0.0013	0.0017	0.0022	0.0021	0.0024
							Feed (ipm)	12.9	17.4	21.5	21.1	21.9	17.4	14.9
			HSM	≤ 0.05	≤ 2	530	RPM	16197	8098	5399	4049	3239	2699	2025
						(424-636)	Fz	0.0005	0.0014	0.0026	0.0034	0.0043	0.0041	0.0048
							Feed (ipm)	42.1	56.7	70.2	68.8	69.6	55.3	48.6
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.25	≤ 1.5	370	RPM	11307	5654	3769	2827	2261	1885	1413
						(296-444)	Fz	0.0003	0.0007	0.0013	0.0017	0.0022	0.0023	0.0024
							Feed (ipm)	14.7	19.8	24.5	24.0	24.9	21.7	17.0
			HSM	≤ 0.05	≤ 2	560	RPM	17114	8557	5705	4278	3423	2852	2139
						(448-672)	Fz	0.0005	0.0014	0.0026	0.0034	0.0043	0.0044	0.0048
							Feed (ipm)	44.5	59.9	74.2	72.7	73.6	62.7	51.3
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 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
			HSM	≤ 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	Profile	≤ 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
			HSM	≤ 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	Profile	≤ 0.25	≤ 1.5	470	RPM	14363	7182	4788	3591	2873	2394	1795
						(376-564)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (ipm)	25.1	32.3	40.7	41.3	41.7	35.9	28.7
			HSM	≤ 0.05	≤ 2	705	RPM	21545	10772	7182	5386	4309	3591	2693
						(564-846)	Fz	0.0007	0.0018	0.0034	0.0046	0.0057	0.0059	0.0064
							Feed (ipm)	75.4	97.0	122.1	123.9	122.8	105.9	86.2

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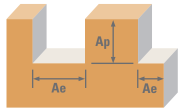
FRACTIONAL

V-Carb

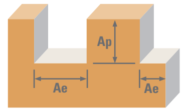


	Series 55, 55CR, 55B Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/8	1/4	3/8	1/2	5/8	3/4	1
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile	≤ 0.25	≤ 1.5	360	RPM	11002	5501	3667	2750	2200	1834	1375
						(288-432)	Fz	0.0003	0.0007	0.0013	0.0017	0.0022	0.0023	0.0024
							Feed (ipm)	14.3	19.3	23.8	23.4	24.2	21.1	16.5
			HSM	≤ 0.05	≤ 2	540	RPM	16502	8251	5501	4126	3300	2750	2063
						(432-648)	Fz	0.0005	0.0014	0.0026	0.0034	0.0043	0.0044	0.0048
							Feed (ipm)	42.9	57.8	71.5	70.1	71.0	60.5	49.5
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 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
			HSM	≤ 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	Profile	≤ 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
			HSM	≤ 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	Profile	≤ 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
			HSM	≤ 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	Profile	≤ 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
			HSM	≤ 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	Profile	≤ 0.25	≤ 1.5	175	RPM	5348	2674	1783	1337	1070	891	669
						(140-210)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (ipm)	5.3	6.7	8.9	8.7	8.6	7.6	6.0
			HSM	≤ 0.05	≤ 2	290	RPM	8862	4431	2954	2216	1772	1477	1108
						(232-348)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0033	0.0035
							Feed (ipm)	17.7	22.2	28.1	27.7	28.4	24.4	19.4

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)

METRIC

V-Carb



	Series 55M, 55MCR, 55MB Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	8	10	12	16	20
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.25	≤ 1.5	117	RPM	6220	4665	3732	3110	2333	1866
						(94-141)	Fz	0.022	0.036	0.061	0.070	0.072	0.085
							Feed (mm/min)	672	846	1145	1082	836	796
			HSM	≤ 0.05	≤ 2	192	RPM	10179	7634	6107	5089	3817	3054
						(154-230)	Fz	0.043	0.073	0.123	0.137	0.141	0.154
							Feed (mm/min)	2198	2769	3746	3481	2687	2345
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.25	≤ 1.5	99	RPM	5251	3938	3151	2626	1969	1575
						(79-119)	Fz	0.017	0.028	0.045	0.053	0.054	0.064
							Feed (mm/min)	441	546	571	693	529	504
			HSM	≤ 0.05	≤ 2	162	RPM	8563	6422	5138	4282	3211	2569
						(129-194)	Fz	0.034	0.055	0.091	0.103	0.105	0.128
							Feed (mm/min)	1438	1781	2329	2209	1685	1644
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.25	≤ 1.5	113	RPM	5978	4484	3587	2989	2242	1793
						(90-135)	Fz	0.017	0.028	0.045	0.053	0.059	0.064
							Feed (mm/min)	502	622	813	789	660	574
			HSM	≤ 0.05	≤ 2	171	RPM	9048	6786	5429	4524	3393	2714
						(137-205)	Fz	0.034	0.055	0.091	0.103	0.113	0.128
							Feed (mm/min)	1520	1882	2461	2334	1911	1737
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.25	≤ 1.5	78	RPM	4120	3090	2472	2060	1545	1236
						(62-93)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
							Feed (mm/min)	297	396	527	494	415	379
			HSM	≤ 0.05	≤ 2	117	RPM	6220	4665	3732	3110	2333	1866
						(94-141)	Fz	0.031	0.051	0.085	0.096	0.105	0.120
							Feed (mm/min)	970	1194	1592	1493	1224	1120
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ 0.25	≤ 1.5	72	RPM	3797	2848	2278	1898	1424	1139
						(57-86)	Fz	0.014	0.021	0.037	0.041	0.046	0.051
							Feed (mm/min)	273	304	425	387	328	289
			HSM	≤ 0.05	≤ 2	108	RPM	5736	4302	3441	2868	2151	1721
						(87-130)	Fz	0.026	0.045	0.075	0.082	0.092	0.104
							Feed (mm/min)	757	964	1285	1170	991	895

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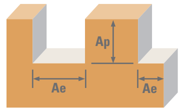
V-Carb



Group	Series 55M, 55MCR, 55MB Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	6	8	10	12	16	20
K	**CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile**	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ 0.25	≤ 1.5	143	RPM	7594	5695	4556	3797	2848	2278
						(115-172)	Fz	0.022	0.036	0.061	0.070	0.077	0.085
							Feed (mm/min)	820	1033	1397	1321	1093	972
			HSM	≤ 0.05	≤ 2	215	RPM	11391	8543	6834	5695	4271	3417
						(172-258)	Fz	0.043	0.073	0.123	0.137	0.151	0.171
							Feed (mm/min)	2460	3099	4192	3895	3226	2916
	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile	≤ 0.25	≤ 1.5	110	RPM	5816	4362	3490	2908	2181	1745
						(88-132)	Fz	0.017	0.028	0.045	0.053	0.059	0.064
							Feed (mm/min)	489	605	791	768	642	558
			HSM	≤ 0.05	≤ 2	165	RPM	8725	6544	5235	4362	3272	2617
						(132-198)	Fz	0.034	0.055	0.091	0.103	0.113	0.128
							Feed (mm/min)	1466	1815	2373	2251	1843	1675
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400**	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.25	≤ 1.5	21	RPM	1131	848	679	565	424	339
						(17-26)	Fz	0.014	0.021	0.037	0.041	0.046	0.051
							Feed (mm/min)	81	90	127	115	98	86
			HSM	≤ 0.05	≤ 2	33	RPM	1729	1297	1037	864	648	519
						(26-39)	Fz	0.026	0.045	0.075	0.082	0.092	0.104
							Feed (mm/min)	228	290	387	353	299	270
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ 0.25	≤ 1.5	17	RPM	889	666	533	444	333	267
						(13-20)	Fz	0.010	0.017	0.027	0.031	0.036	0.040
							Feed (mm/min)	43	57	71	69	60	53
			HSM	≤ 0.05	≤ 2	26	RPM	1373	1030	824	687	515	412
						(21-31)	Fz	0.019	0.032	0.056	0.062	0.069	0.077
							Feed (mm/min)	132	165	231	214	178	159

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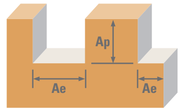
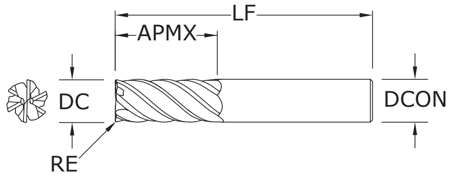
V-Carb



Group	Series 55M, 55MCR, 55MB Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	6	8	10	12	16	20
S	**TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si**	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ 0.25	≤ 1.5	72	RPM	3797	2848	2278	1898	1424	1139
						(57-86)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
							Feed (mm/min)	273	365	486	456	383	349
			HSM	≤ 0.05	≤ 2	119	RPM	6301	4726	3781	3151	2363	1890
						(95-143)	Fz	0.031	0.051	0.085	0.096	0.105	0.120
							Feed (mm/min)	983	1210	1613	1512	1240	1134
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ 0.25	≤ 1.5	26	RPM	1373	1030	824	687	515	412
						(21-31)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
							Feed (mm/min)	99	132	176	165	138	126
			HSM	≤ 0.05	≤ 2	43	RPM	2262	1696	1357	1131	848	679
						(34-51)	Fz	0.031	0.051	0.085	0.096	0.108	0.120
							Feed (mm/min)	353	434	579	543	456	407
H	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.25	≤ 1.5	53	RPM	2827	2121	1696	1414	1060	848
						(43-64)	Fz	0.012	0.021	0.035	0.038	0.044	0.048
							Feed (mm/min)	170	226	294	271	231	204
			HSM	≤ 0.05	≤ 2	88	RPM	4686	3514	2811	2343	1757	1406
						(71-106)	Fz	0.024	0.041	0.067	0.077	0.084	0.093
							Feed (mm/min)	562	712	937	900	742	656

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

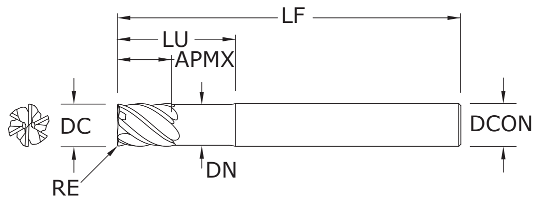
TOLERANCES (inch)

DC = +0.0000/–0.0020
DCON = h_6
RE = +0.0000/–0.0020

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

For patent information visit www.ksptpatents.com

51L • 51LC
FRACTIONAL SERIES



TOLERANCES (inch)

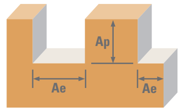
DC = +0.0000/–0.0020
DCON = h_6
RE = +0.0000/–0.0020

- 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

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

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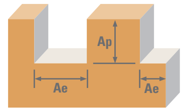
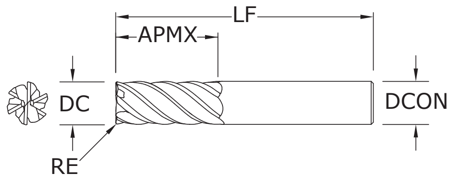


	Series 51, 51CR, 51L, 51LC Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)	DC • in	1/4	3/8	1/2	5/8	3/4	1
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.1	≤ 1	105	RPM	1604	1070	802	642	535	401
						(84-126)	Fz	0.0014	0.0027	0.0036	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
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ 0.1	≤ 1	80	RPM	1222	815	611	489	407	306
						(64-96)	Fz	0.0010	0.0018	0.0025	0.0027	0.0029	0.0034
							Feed (ipm)	7	9	9	8	7	6
			HSM	≤ 0.05	≤ 2	100	RPM	1528	1019	764	611	509	382
						(80-120)	Fz	0.0013	0.0025	0.0034	0.0037	0.0041	0.0047
							Feed (ipm)	12	15	16	14	13	11
S	**TITANIUM ALLOYS** Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ 0.1	≤ 1	280	RPM	4278	2852	2139	1711	1426	1070
						(224-336)	Fz	0.0010	0.0018	0.0025	0.0027	0.0029	0.0034
							Feed (ipm)	26	31	32	28	25	22
			HSM	≤ 0.05	≤ 2	355	RPM	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0013	0.0025	0.0034	0.0037	0.0041	0.0047
							Feed (ipm)	42	54	55	48	44	38
S	**TITANIUM ALLOYS (DIFFICULT)** Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ 0.1	≤ 1	155	RPM	2368	1579	1184	947	789	592
						(124-186)	Fz	0.0010	0.0018	0.0025	0.0027	0.0029	0.0034
							Feed (ipm)	14	17	18	15	14	12
			HSM	≤ 0.05	≤ 2	200	RPM	3056	2037	1528	1222	1019	764
						(160-240)	Fz	0.0013	0.0025	0.0034	0.0037	0.0041	0.0047
							Feed (ipm)	24	31	31	27	25	22
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.1	≤ 1	240	RPM	3667	2445	1834	1467	1222	917
						(192-288)	Fz	0.0012	0.0023	0.0030	0.0034	0.0037	0.0043
							Feed (ipm)	26	34	33	30	27	24
			HSM	≤ 0.05	≤ 2	305	RPM	4660	3107	2330	1864	1553	1165
						(244-366)	Fz	0.0017	0.0032	0.0042	0.0046	0.0050	0.0059
							Feed (ipm)	48	60	59	51	47	41

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)

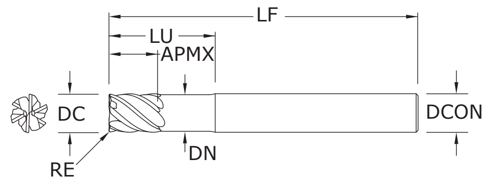
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050

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

For patent information visit www.ksptpatents.com

51ML • 51MLC

METRIC SERIES



TOLERANCES (mm)

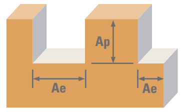
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050

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

For patent information visit www.ksptpatents.com

mm							EDP NO.
CUTTING DIAMETER 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

- 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)



Group	Series 51M, 51MCR, 51ML, 51MLC Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	8	10	12	16	20
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.1	≤ 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
			HSM	≤ 0.05	≤ 2	279	RPM	14784	11088	8870	7392	5544	4435
						(223-335)	Fz	0.066	0.113	0.141	0.169	0.197	0.220
							Feed (mm/min)	5854	7517	7504	7495	6553	5854
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 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
			HSM	≤ 0.05	≤ 2	189	RPM	10017	7513	6010	5009	3756	3005
						(151-227)	Fz	0.049	0.083	0.104	0.125	0.146	0.163
							Feed (mm/min)	2945	3741	3750	3756	3291	2939
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 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
			HSM	≤ 0.05	≤ 2	198	RPM	10502	7877	6301	5251	3938	3151
						(178-218)	Fz	0.048	0.082	0.102	0.122	0.143	0.159
							Feed (mm/min)	3025	3875	3856	3844	3379	3006
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 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
			HSM	≤ 0.05	≤ 2	137	RPM	7271	5453	4362	3635	2726	2181
						(123-151)	Fz	0.040	0.069	0.086	0.103	0.120	0.134
							Feed (mm/min)	1745	2258	2251	2247	1963	1754
	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ 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
			HSM	≤ 0.05	≤ 2	125	RPM	6624	4968	3975	3312	2484	1987
						(112-137)	Fz	0.040	0.069	0.086	0.103	0.120	0.134
							Feed (mm/min)	1590	2057	2051	2047	1789	1598

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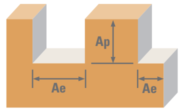
METRIC
T-Carb®



Group	Series 51M, 51MCR, 51ML, 51MLC Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	8	10	12	16	20
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	≤ 0.1	≤ 1	32	RPM	1696	1272	1018	848	636	509
						(26-38)	Fz	0.034	0.057	0.071	0.085	0.100	0.110
							Feed (mm/min)	346	435	434	433	382	336
			HSM	≤ 0.05	≤ 2	40	RPM	2100	1575	1260	1050	788	630
						(32-48)	Fz	0.046	0.077	0.097	0.120	0.140	0.150
							Feed (mm/min)	580	728	733	756	662	567
	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ 0.1	≤ 1	24	RPM	1293	969	776	646	485	388
						(20-29)	Fz	0.023	0.039	0.049	0.059	0.068	0.077
							Feed (mm/min)	178	227	228	229	198	179
			HSM	≤ 0.05	≤ 2	30	RPM	1616	1212	969	808	606	485
						(24-37)	Fz	0.032	0.054	0.068	0.081	0.095	0.110
							Feed (mm/min)	310	393	396	393	345	320
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ 0.1	≤ 1	85	RPM	4524	3393	2714	2262	1696	1357
						(68-102)	Fz	0.023	0.039	0.049	0.059	0.068	0.077
							Feed (mm/min)	624	794	798	801	692	627
			HSM	≤ 0.05	≤ 2	108	RPM	5736	4302	3441	2868	2151	1721
						(87-130)	Fz	0.032	0.054	0.068	0.081	0.095	0.110
							Feed (mm/min)	1101	1394	1404	1394	1226	1136
	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	≤ 0.1	≤ 1	47	RPM	2504	1878	1503	1252	939	751
						(38-57)	Fz	0.023	0.039	0.049	0.059	0.068	0.077
							Feed (mm/min)	346	440	442	443	383	347
			HSM	≤ 0.05	≤ 2	61	RPM	3231	2424	1939	1616	1212	969
						(49-73)	Fz	0.032	0.054	0.068	0.081	0.095	0.110
							Feed (mm/min)	620	785	791	785	691	640
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 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
			HSM	≤ 0.05	≤ 2	93	RPM	4928	3696	2957	2464	1848	1478
						(74-112)	Fz	0.040	0.069	0.086	0.103	0.120	0.134
							Feed (mm/min)	1183	1530	1526	1523	1331	1189

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)

H-CARB

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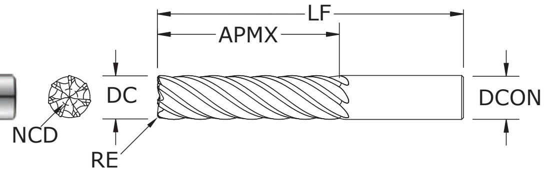
FRACTIONAL SERIES



- 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

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TOLERANCES (inch)

1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h_6
RE = +0.000 / -0.002

>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h_6
RE = +0.000 / -0.002

>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h_6
RE = +0.000 / -0.002

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

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H-CARB

TOLERANCES (inch)

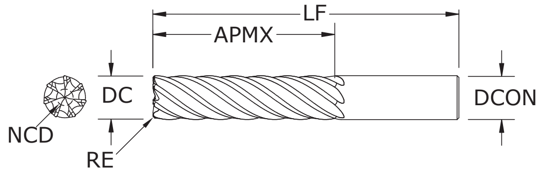
1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h_6
RE = +0.000 / -0.002

>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h_6
RE = +0.000 / -0.002

>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h_6
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

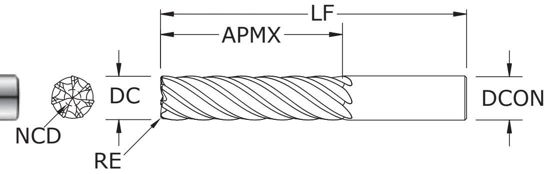


77 • 77CR
FRACTIONAL SERIES

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

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 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
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

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TOLERANCES (mm)

6 DIAMETER
DC = +0,000/–0,030
DCON = h_6
RE = +0,000 / -0,050

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6
RE = +0,000 / -0,050

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h_6
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 = h_6
RE = +0,000 / -0,050

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6
RE = +0,000 / -0,050

>10–25 DIAMETER
DC = +0,000/–0,050
DCON = h_6
RE = +0,000 / -0,050

- STEELS
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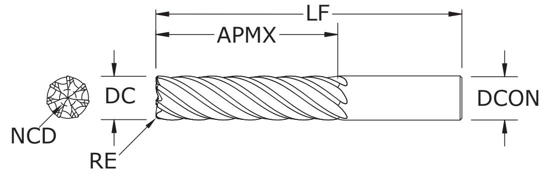
77M • 77MCR
METRIC SERIES



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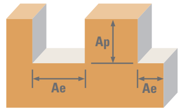
mm						EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	TI-NAMITE-A (TA) EDP NO.	TI-NAMITE-A (TA) EDP NO. CHIP BREAKER	TI-NAMITE-M (TM) EDP NO.	TI-NAMITE-M (TM) EDP NO. CHIP BREAKER
12,0	48,0	100,0	12,0	–	4,06	74456	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

H-CARB



	Series 77, 77CR Fractional	Hardness		Ae x D_1	Ap x D_1	Vc (sfm)	D_1 • inch	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 (653-979)	Fz	0.0015	0.0024	0.0031	0.0035	0.0038	0.0042
				≤ 0.2	≤ APMX		Feed (ipm)	121	129	125	113	102	85
			HSM	3xD		845 (676-1014)	Fz	0.0017	0.0027	0.0035	0.0040	0.0043	0.0047
				≤ 0.15	≤ APMX		Feed (ipm)	136	146	140	129	116	95
			HSM	4xD		756 (605-907)	Fz	0.0018	0.0028	0.0036	0.0041	0.0044	0.0049
				≤ 0.1	≤ APMX		Feed (ipm)	146	151	146	133	119	99
P	**ALLOY STEELS** 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc					RPM	8419	5613	4210	3368	2806	2105
			HSM	2.5xD		595 (476-714)	Fz	0.0009	0.0019	0.0026	0.0028	0.0031	0.0035
				≤ 0.2	≤ APMX		Feed (ipm)	53	75	77	66	61	52
			HSM	3xD		616 (493-739)	Fz	0.0010	0.0021	0.0030	0.0033	0.0035	0.0039
				≤ 0.15	≤ APMX		Feed (ipm)	59	83	88	78	69	57
			HSM	4xD		551 (441-661)	Fz	0.0011	0.0022	0.0031	0.0034	0.0036	0.0041
				≤ 0.1	≤ APMX		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 (517-775)	Fz	0.0009	0.0017	0.0023	0.0025	0.0028	0.0032
				≤ 0.2	≤ APMX		Feed (ipm)	58	72	74	64	60	51
			HSM	3xD		669 (535-803)	Fz	0.0010	0.0019	0.0026	0.0029	0.0031	0.0036
				≤ 0.15	≤ APMX		Feed (ipm)	64	81	83	74	66	58
			HSM	4xD		598 (478-718)	Fz	0.0011	0.0020	0.0027	0.0030	0.0033	0.0037
				≤ 0.1	≤ APMX		Feed (ipm)	70	85	86	77	70	59
M	**STAINLESS STEELS (DIFFICULT)** 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc					RPM	6020	4014	3010	2408	2007	1505
			HSM	2.5xD		425 (340-510)	Fz	0.0007	0.0014	0.0019	0.0023	0.0026	0.0030
				≤ 0.2	≤ APMX		Feed (ipm)	29	39	40	39	37	32
			HSM	3xD		440 (352-528)	Fz	0.0008	0.0016	0.0021	0.0025	0.0029	0.0034
				≤ 0.15	≤ APMX		Feed (ipm)	34	45	44	42	41	36
			HSM	4xD		394 (315-473)	Fz	0.0008	0.0016	0.0022	0.0026	0.0030	0.0035
				≤ 0.1	≤ APMX		Feed (ipm)	34	45	46	44	42	37
M	**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 (326-490)	Fz	0.0007	0.0014	0.0019	0.0023	0.0026	0.0030
				≤ 0.2	≤ APMX		Feed (ipm)	28	38	38	37	35	30
			HSM	3xD		422 (338-506)	Fz	0.0008	0.0016	0.0021	0.0025	0.0029	0.0034
				≤ 0.15	≤ APMX		Feed (ipm)	32	43	42	40	39	34
			HSM	4xD		378 (302-454)	Fz	0.0008	0.0016	0.0022	0.0026	0.0030	0.0035
				≤ 0.1	≤ APMX		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	3367	2525
			HSM	2.5xD		714 (571-857)	Fz	0.0010	0.0018	0.0024	0.0028	0.0033	0.0037
				≤ 0.2	≤ APMX		Feed (ipm)	71	85	85	79	78	65
			HSM	3xD		739 (591-887)	Fz	0.0011	0.0020	0.0027	0.0033	0.0037	0.0042
				≤ 0.15	≤ APMX		Feed (ipm)	78	94	95	93	87	73
			HSM	4xD		661 (529-793)	Fz	0.0012	0.0021	0.0028	0.0034	0.0039	0.0043
				≤ 0.1	≤ APMX		Feed (ipm)	85	99	99	96	92	76
P	**CAST IRONS (HIGH ALLOY)** Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc					RPM	6020	4014	3010	2408	2007	1505
			HSM	2.5xD		425 (340-510)	Fz	0.0007	0.0014	0.0019	0.0023	0.0026	0.0030
				≤ 0.2	≤ APMX		Feed (ipm)	29	39	40	39	37	32
			HSM	3xD		440 (352-528)	Fz	0.0008	0.0016	0.0021	0.0025	0.0029	0.0037
				≤ 0.15	≤ APMX		Feed (ipm)	34	45	44	42	41	39
			HSM	4xD		394 (315-473)	Fz	0.0008	0.0016	0.0022	0.0026	0.0030	0.0035
				≤ 0.1	≤ APMX		Feed (ipm)	34	45	46	44	42	37

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FRACTIONAL

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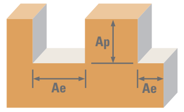
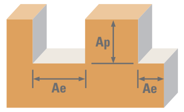
H-CARB



	Series 77, 77CR Fractional	Hardness		Ae x D_1	Ap x D_1	Vc (sfm)	D_1 • inch	1/4	3/8	1/2	5/8	3/4	1
N	**NON-FERROUS MATERIALS**						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					RPM	1925	1284	963	770	642	481
			HSM	2.5xD		136 (109-163)	Fz	0.0006	0.0011	0.0016	0.0018	0.0021	0.0025
				≤ 0.2	≤ APMX		Feed (ipm)	8	10	11	10	9	8
			HSM	3xD		141 (113-169)	Fz	0.0007	0.0012	0.0018	0.0021	0.0024	0.0028
				≤ 0.15	≤ APMX		Feed (ipm)	9	11	12	11	11	9
			HSM	4xD		126 (101-151)	Fz	0.0007	0.0013	0.0018	0.0022	0.0025	0.0029
				≤ 0.1	≤ APMX		Feed (ipm)	9	12	12	12	11	10
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc					RPM	1207	805	604	483	402	302
			HSM	2.5xD		85 (68-102)	Fz	0.0005	0.0009	0.0013	0.0015	0.0018	0.0022
				≤ 0.2	≤ APMX		Feed (ipm)	4	5	5	5	5	5
			HSM	3xD		88 (70-106)	Fz	0.0005	0.0010	0.0015	0.0018	0.0020	0.0025
				≤ 0.15	≤ APMX		Feed (ipm)	4	6	6	6	6	5
			HSM	4xD		79 (63-95)	Fz	0.0006	0.0011	0.0015	0.0018	0.0021	0.0026
				≤ 0.1	≤ APMX		Feed (ipm)	5	6	6	6	6	5
S	**TITANIUM ALLOYS** Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc					RPM	4095	2730	2048	1638	1365	1024
			HSM	2.5xD		289 (231-347)	Fz	0.0008	0.0015	0.0021	0.0024	0.0028	0.0032
				≤ 0.2	≤ APMX		Feed (ipm)	23	29	30	28	27	23
			HSM	3xD		299 (239-359)	Fz	0.0009	0.0017	0.0023	0.0025	0.0028	0.0036
				≤ 0.15	≤ APMX		Feed (ipm)	26	32	33	29	27	26
			HSM	4xD		268 (214-322)	Fz	0.0009	0.0018	0.0024	0.0029	0.0033	0.0037
				≤ 0.1	≤ APMX		Feed (ipm)	26	34	34	33	32	27
S	**TITANIUM ALLOYS (DIFFICULT)** Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc					RPM	2399	1599	1199	960	800	600
			HSM	2.5xD		170 (136-204)	Fz	0.0008	0.0015	0.0021	0.0024	0.0028	0.0032
				≤ 0.2	≤ APMX		Feed (ipm)	13	17	18	16	16	13
			HSM	3xD		176 (141-211)	Fz	0.0009	0.0017	0.0023	0.0025	0.0028	0.0036
				≤ 0.15	≤ APMX		Feed (ipm)	15	19	19	17	16	15
			HSM	4xD		157 (126-188)	Fz	0.0009	0.0018	0.0024	0.0029	0.0033	0.0037
				≤ 0.1	≤ APMX		Feed (ipm)	15	20	20	19	18	16
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc					RPM	3851	2567	1925	1540	1284	963
			HSM	2.5xD		272 (218-326)	Fz	0.0006	0.0011	0.0014	0.0017	0.0020	0.0024
				≤ 0.2	≤ APMX		Feed (ipm)	16	20	19	18	18	16
			HSM	3xD		282 (226-338)	Fz	0.0007	0.0012	0.0016	0.0019	0.0022	0.0027
				≤ 0.15	≤ APMX		Feed (ipm)	19	22	22	20	20	18
			HSM	4xD		252 (202-302)	Fz	0.0007	0.0013	0.0017	0.0020	0.0023	0.0028
				≤ 0.1	≤ APMX		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)

KYOCERA SGS Solid Tools
SGS Solid Tools
SGS Micro Tools



H-CARB

	Series 77M, 77MCR Metric	Hardness		Ae x D_1	Ap x D_1	Vc (m/min)	D_1 • mm	6	8	10	12	16	20	25
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc					RPM	12208	9156	7325	6104	4578	3662	2930
			HSM	2.5xD		284	Fz	0.0413	0.0411	0.0640	0.0711	0.0889	0.1013	0.1050
				≤ 0.2	≤ APMX	(227-341)	Feed (ipm)	3529	2634	3282	3038	2849	2597	2154
			HSM	3xD		257	Fz	0.0347	0.0461	0.0717	0.0797	0.0996	0.1135	0.1176
				≤ 0.15	≤ APMX	(206-308)	Feed (ipm)	2965	2955	3676	3405	3192	2910	2412
			HSM	4xD		230	Fz	0.0362	0.0480	0.0747	0.0830	0.1037	0.1182	0.0919
				≤ 0.1	≤ APMX	(184-276)	Feed (ipm)	3094	3076	3830	3546	3323	3030	1885
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc					RPM	8068	6051	4841	4034	3025	2420	1936
			HSM	2.5xD		132	Fz	0.0213	0.0285	0.0512	0.0610	0.0711	0.0827	0.0875
				≤ 0.2	≤ APMX	(106-159)	Feed (ipm)	1203	1207	1735	1723	1506	1401	1186
			HSM	3xD		138	Fz	0.0239	0.0319	0.0574	0.0683	0.0797	0.0926	0.0980
				≤ 0.15	≤ APMX	(111-166)	Feed (ipm)	1350	1351	1945	1929	1688	1569	1328
			HSM	4xD		152	Fz	0.0249	0.0332	0.0597	0.0711	0.0830	0.0964	0.1021
				≤ 0.1	≤ APMX	(122-182)	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
			HSM	2.5xD		197	Fz	0.0216	0.0285	0.0448	0.0533	0.0635	0.0747	0.0800
				≤ 0.2	≤ APMX	(158-236)	Feed (ipm)	1461	1445	1818	1803	1610	1515	1298
			HSM	3xD		204	Fz	0.0242	0.0319	0.0502	0.0598	0.0711	0.0837	0.0896
				≤ 0.15	≤ APMX	(163-245)	Feed (ipm)	1636	1618	2037	2022	1803	1698	1454
			HSM	4xD		182	Fz	0.0252	0.0332	0.0523	0.0622	0.0741	0.0871	0.0933
				≤ 0.1	≤ APMX	(146-218)	Feed (ipm)	1704	1684	2122	2104	1879	1767	1514
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc					RPM	6369	4777	3822	3185	2389	1911	1529
			HSM	2.5xD		130	Fz	0.0168	0.0221	0.0371	0.0432	0.0584	0.0693	0.0750
				≤ 0.2	≤ APMX	(104-156)	Feed (ipm)	749	739	993	963	976	927	803
			HSM	3xD		134	Fz	0.0188	0.0248	0.0416	0.0484	0.0655	0.0777	0.0840
				≤ 0.15	≤ APMX	(107-161)	Feed (ipm)	838	829	1113	1079	1095	1039	899
			HSM	4xD		120	Fz	0.0196	0.0258	0.0433	0.0504	0.0682	0.0809	0.0875
				≤ 0.1	≤ APMX	(96-144)	Feed (ipm)	874	863	1158	1124	1140	1082	936
M	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
			HSM	2.5xD		124	Fz	0.0168	0.0221	0.0371	0.0432	0.0584	0.0693	0.0750
				≤ 0.2	≤ APMX	(99-149)	Feed (ipm)	718	708	952	923	936	888	769
			HSM	3xD		129	Fz	0.0188	0.0248	0.0416	0.0484	0.0655	0.0777	0.0840
				≤ 0.15	≤ APMX	(103-155)	Feed (ipm)	803	795	1066	1034	1050	996	861
			HSM	4xD		115	Fz	0.0196	0.0258	0.0433	0.0504	0.0682	0.0809	0.0875
				≤ 0.1	≤ APMX	(92-138)	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
			HSM	2.5xD		218	Fz	0.0239	0.0315	0.0474	0.0559	0.0762	0.0880	0.0925
				≤ 0.2	≤ APMX	(174-262)	Feed (ipm)	1794	1773	2135	2098	2145	1981	1666
			HSM	3xD		225	Fz	0.0268	0.0353	0.0531	0.0626	0.0854	0.0986	0.1036
				≤ 0.15	≤ APMX	(180-270)	Feed (ipm)	2011	1987	2391	2349	2404	2220	1866
			HSM	4xD		202	Fz	0.0279	0.0368	0.0553	0.0652	0.0889	0.1027	0.1079
				≤ 0.1	≤ APMX	(162-242)	Feed (ipm)	2094	2071	2490	2447	2502	2312	1944
P	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc					RPM	6369	4777	3822	3185	2389	1911	1529
			HSM	2.5xD		130	Fz	0.0168	0.0221	0.0371	0.0432	0.0584	0.0693	0.0750
				≤ 0.2	≤ APMX	(104-156)	Feed (ipm)	749	739	993	963	976	927	803
			HSM	3xD		134	Fz	0.0188	0.0248	0.0416	0.0484	0.0655	0.0777	0.0840
				≤ 0.15	≤ APMX	(107-161)	Feed (ipm)	838	829	1113	1079	1095	1039	899
			HSM	4xD		120	Fz	0.0196	0.0258	0.0433	0.0504	0.0682	0.0809	0.0875
				≤ 0.1	≤ APMX	(96-144)	Feed (ipm)	874	863	1158	1124	1140	1082	936
N	NON-FERROUS MATERIALS	Not Recommended for this Material Group												

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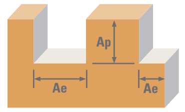
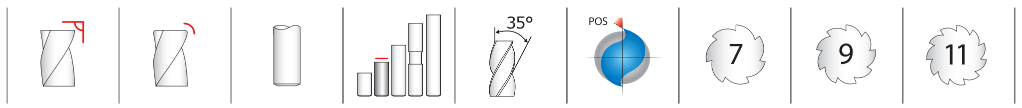
H-CARB



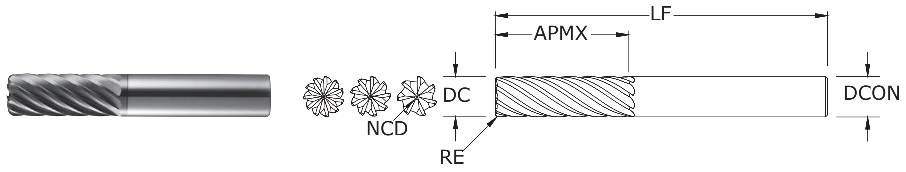
	Series 77M, 77MCR Metric	Hardness		Ae x D_1	Ap x D_1	Vc (m/min)	D_1 • mm	6	8	10	12	16	20	25
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc					RPM	2017	1513	1210	1008	756	605	484
			HSM	2.5xD		41	Fz	0.0140	0.0183	0.0294	0.0356	0.0457	0.0560	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
				≤ 0.1	≤ APMX	(30-46)	Feed (ipm)	230	226	291	293	282	277	247
S	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
				≤ 0.1	≤ APMX	(19-29)	Feed (ipm)	119	119	152	159	149	150	137
S	TITANIUM ALLOYS Pure Ttanium, 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
				≤ 0.1	≤ APMX	(66-98)	Feed (ipm)	676	676	846	858	847	796	682
S	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
				≤ 0.1	≤ APMX	(38-58)	Feed (ipm)	339	396	495	502	496	466	399
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
				≤ 0.1	≤ APMX	(62-92)	Feed (ipm)	466	457	590	594	572	560	501

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 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)

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools



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)

CUTTING DIAMETER DC (inch)	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	NON-CUTTING CENTER DIAMETER NCD	NO. OF FLUTES	EDP NO. 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

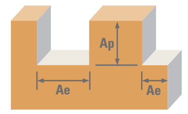
Neck Option Available

TOLERANCES (inch)

DC = +0.0000/–0.0020
DCON = h_6
RE = +0.0000/–0.0020

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

For patent information visit www.ksptpatents.com



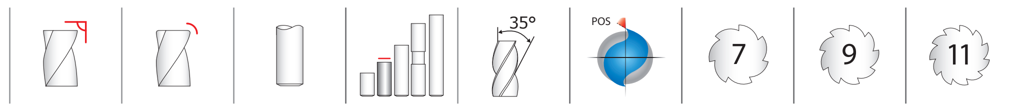
	Series 66, 66CR Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)	DC • in	3/16	1/4	3/8	1/2	5/8	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.05	≤ 1	635 (508-762)	RPM	12937	9703	6469	4851	3881	3234	2426
							Fz	0.0008	0.0012	0.0022	0.0030	0.0037	0.0038	0.0042
							Feed (ipm)	72.4	81.5	99.6	131.0	129.2	135.2	112.1
			Finish	≤ 0.02	≤ 2	762 (610-914)	RPM	15524	11643	7762	5822	4657	3881	2911
							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 (288-432)	RPM	7334	5501	3667	2750	2200	1834	1375
							Fz	0.0006	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (ipm)	30.8	34.7	43.6	56.9	57.4	60.5	48.4
			Finish	≤ 0.02	≤ 2	432 (346-518)	RPM	8801	6601	4401	3300	2640	2200	1650
							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 (448-672)	RPM	11409	8557	5705	4278	3423	2852	2139
							Fz	0.0006	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (ipm)	47.9	53.9	67.9	88.6	89.3	94.1	75.3
			Finish	≤ 0.02	≤ 2	448 (358-538)	RPM	9127	6845	4564	3423	2738	2282	1711
							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 (308-462)	RPM	7844	5883	3922	2941	2353	1961	1471
							Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (ipm)	27.5	28.8	38.4	47.7	48.7	51.8	42.1
			Finish	≤ 0.02	≤ 2	462 (370-554)	RPM	9412	7059	4706	3530	2824	2353	1765
							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 (284-426)	RPM	7233	5424	3616	2712	2170	1808	1356
							Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (ipm)	25.3	26.6	35.4	43.9	44.9	47.7	38.8
			Finish	≤ 0.02	≤ 2	426 (341-511)	RPM	8679	6509	4340	3255	2604	2170	1627
							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 (564-846)	RPM	14363	10772	7182	5386	4309	3591	2693
							Fz	0.0008	0.0012	0.0022	0.0030	0.0037	0.0038	0.0042
							Feed (ipm)	80.4	90.5	110.6	145.4	143.5	150.1	124.4
			Finish	≤ 0.02	≤ 2	846 (677-1015)	RPM	17236	12927	8618	6463	5171	4309	3232
							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

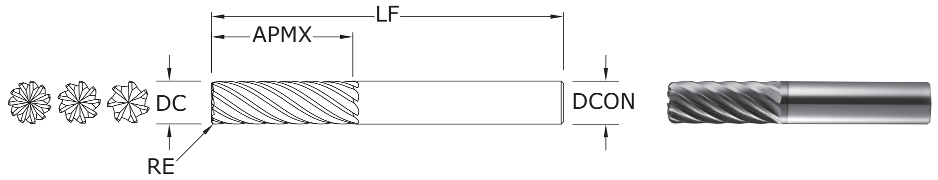
continued on next page

Series 66, 66CR Fractional		Hardness		Ae x DC	Ap x DC	Vc (sfm)	DC • in	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)

MULTI Carb
HIGH PERFORMANCE FINISHING END MILLS





66M • 66MCR
METRIC SERIES

TOLERANCES (mm)
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

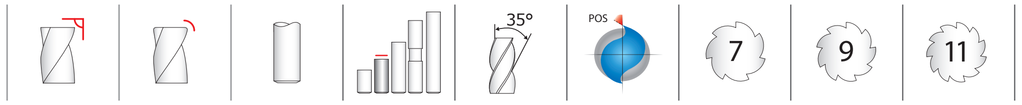
For patent information visit www.ksptpatents.com

CUTTING DIAMETER DC (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	SHANK DIAMETER DCON (mm)	CORNER RADIUS RE (mm)	NON-CUTTING CENTER DIAMETER NCD (mm)	NO. OF FLUTES	EDP NO. 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

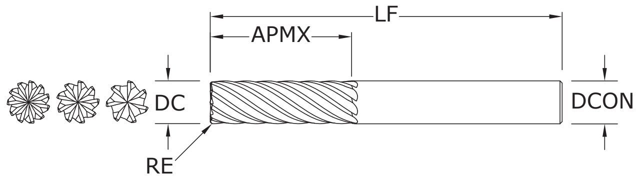
Neck Option Available

- 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)



66M • 66MCR

METRIC SERIES



CONTINUED

CUTTING DIAMETER DC (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	SHANK DIAMETER DCON (mm)	CORNER RADIUS RE (mm)	NON-CUTTING CENTER DIAMETER NCD (mm)	NO. OF FLUTES	EDP NO. 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

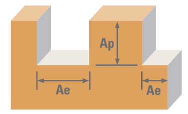
Neck Option Available

TOLERANCES (mm)

DC = +0,000/−0,050
DCON = h_6
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		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	8	10	12	16	20	25
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.05	≤ 1	194	RPM	10260	7695	6156	5130	3847	3078	2462
						(155-232)	Fz	0.029	0.047	0.059	0.072	0.095	0.101	0.105
							Feed (mm/min)	2068	2528	2528	3324	3280	3431	2844
			Finish	≤ 0.02	≤ 2	232	RPM	12312	9234	7387	6156	4617	3693	2955
						(186-279)	Fz	0.023	0.038	0.047	0.058	0.076	0.081	0.084
							Feed (mm/min)	1985	2427	2427	3191	3149	3294	2730
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.05	≤ 1	110	RPM	5816	4362	3490	2908	2181	1745	1396
						(88-132)	Fz	0.022	0.036	0.045	0.055	0.074	0.080	0.080
							Feed (mm/min)	879	1108	1107	1445	1457	1536	1229
			Finish	≤ 0.02	≤ 2	132	RPM	6980	5235	4188	3490	2617	2094	1675
						(105-158)	Fz	0.017	0.029	0.036	0.044	0.059	0.064	0.064
							Feed (mm/min)	844	1063	1063	1387	1399	1474	1179
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.05	≤ 1	171	RPM	9048	6786	5429	4524	3393	2714	2171
						(137-205)	Fz	0.022	0.036	0.045	0.055	0.074	0.080	0.080
							Feed (mm/min)	1368	1723	1723	2247	2267	2389	1911
			Finish	≤ 0.02	≤ 2	137	RPM	7238	5429	4343	3619	2714	2171	1737
						(109-164)	Fz	0.017	0.029	0.036	0.044	0.059	0.064	0.064
							Feed (mm/min)	875	1103	1103	1438	1451	1529	1223
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.05	≤ 1	117	RPM	6220	4665	3732	3110	2333	1866	1493
						(94-141)	Fz	0.017	0.030	0.037	0.043	0.059	0.064	0.065
							Feed (mm/min)	731	975	975	1209	1236	1314	1067
			Finish	≤ 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	Profile	≤ 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
			Finish	≤ 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	Profile	≤ 0.05	≤ 1	215	RPM	11391	8543	6834	5695	4271	3417	2734
						(172-258)	Fz	0.029	0.047	0.059	0.072	0.095	0.101	0.105
							Feed (mm/min)	2296	2807	2807	3690	3641	3809	3158
			Finish	≤ 0.02	≤ 2	258	RPM	13669	10252	8201	6834	5126	4101	3281
						(206-309)	Fz	0.023	0.038	0.047	0.058	0.076	0.081	0.084
							Feed (mm/min)	2204	2695	2694	3543	3496	3657	3031

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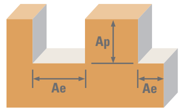
Multi-Carb

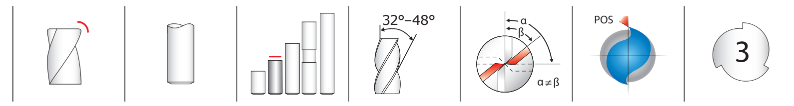


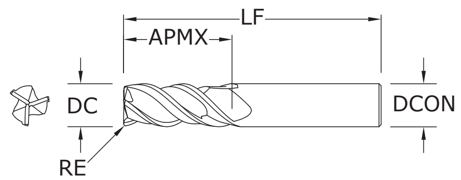
Series 66M, 66MCR Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	8	10	12	16	20	25
K **CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile**	≤ 260 Bhn or ≤ 26 HRc	Profile	≤ 0.05	≤ 1	165	RPM	8725	6544	5235	4362	3272	2617	2094
					(132-198)	Fz	0.022	0.036	0.045	0.055	0.074	0.080	0.080
						Feed (mm/min)	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
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
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
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)

SERIES33 THREE FLUTE END MILLS

Series 33





33CR

FRACTIONAL SERIES

TOLERANCES (inch)

1/8–1/4 DIAMETER
DC = +0.0000/–0.0012
DCON = h_6
RE = +0.0000/–0.0020

>1/4–3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h_6
RE = +0.0000/–0.0020

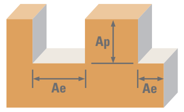
>3/8–1 DIAMETER
DC = +0.0000/–0.0020
DCON = h_6
RE = +0.0000/–0.0020

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

For patent information visit www.ksptpatents.com

inch CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	EDP NO. TI-NAMITE-A (AlTiN)
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)

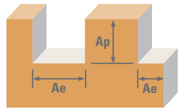


	Series 33CR Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		1/8	1/4	3/8	1/2	5/8	3/4	1
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	550	RPM	16808	8404	5603	4202	3362	2801	2101
						(440-660)	Fz	0.0005	0.0012	0.0023	0.0031	0.0039	0.0040	0.0043
							Feed (ipm)	25.2	30.3	38.7	39.1	39.3	33.6	27.1
			Slot	1	≤ 1	440	RPM	13446	6723	4482	3362	2689	2241	1681
						(352-528)	Fz	0.0005	0.0012	0.0023	0.0031	0.0039	0.0040	0.0043
							Feed (ipm)	20.2	24.2	30.9	31.3	31.5	26.9	21.7
P	**ALLOY STEELS** 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.5	≤ 1.5	315	RPM	9626	4813	3209	2407	1925	1604	1203
						(252-378)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (ipm)	11.6	13.0	16.4	16.6	16.7	14.4	11.6
			Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (ipm)	9.2	10.3	13.0	13.2	13.3	11.5	9.2
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	490	RPM	14974	7487	4991	3744	2995	2496	1872
						(392-588)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (ipm)	17.1	22.5	28.5	28.1	27.9	24.0	19.7
			Slot	1	≤ 1	390	RPM	11918	5959	3973	2980	2384	1986	1490
						(312-468)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (ipm)	13.6	17.9	22.6	22.3	22.2	19.1	15.6
M	**STAINLESS STEELS (DIFFICULT)** 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
							Feed (ipm)	9.4	12.5	15.6	15.6	15.6	13.5	10.9
			Slot	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
							Feed (ipm)	7.4	9.9	12.4	12.4	12.4	10.7	8.7
M	**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	9474	4737	3158	2368	1895	1579	1184
						(248-372)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
							Feed (ipm)	8.5	11.4	14.2	14.2	14.2	12.3	9.9
			Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0003	0.0008	0.0015	0.0020	0.0025	0.0026	0.0028
							Feed (ipm)	6.9	9.2	11.5	11.5	11.5	9.9	8.0
K	**CAST IRONS (LOW & MEDIUM ALLOY)** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ 0.5	≤ 1.5	445	RPM	13599	6800	4533	3400	2720	2267	1700
						(356-534)	Fz	0.0004	0.0011	0.0021	0.0028	0.0035	0.0036	0.0039
							Feed (ipm)	14.3	22.4	28.6	28.6	28.6	24.5	19.9
			Slot	1	≤ 1	355	RPM	10849	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0004	0.0011	0.0021	0.0028	0.0035	0.0036	0.0039
							Feed (ipm)	11.4	17.9	22.8	22.8	22.8	19.5	15.9

DC • in

continued on next page

FRACTIONAL
Series 33



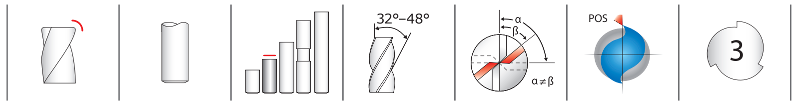
	Series 33CR Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		1/8	1/4	3/8	1/2	5/8	3/4	1
K	**CAST IRONS (HIGH ALLOY)** Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0003	0.0008	0.0016	0.0021	0.0026	0.0027	0.0029
							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
S	**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
S	**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
S	**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

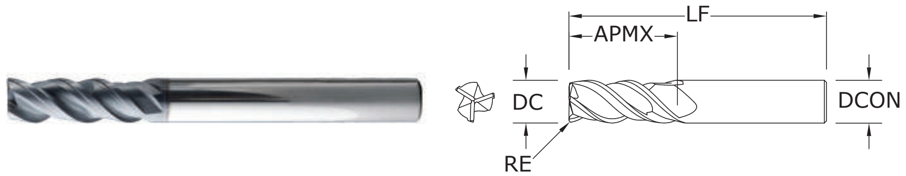
DC • in

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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

SERIES33 THREE FLUTE END MILLS





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 = h_6
RE = +0,000/–0,050

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6
RE = +0,000/–0,050

>10–20 DIAMETER
DC = +0,000/–0,050
DCON = h_6
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		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 3	6	8	10	12	16	20
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	168	RPM	17773	8886	6665	5332	4443	3332	2666
						(134-201)	Fz	0.012	0.029	0.049	0.061	0.074	0.100	0.107
							Feed (mm/min)	640	768	981	981	992	998	853
			Slot	1	≤ 1	134	RPM	14218	7109	5332	4265	3555	2666	2133
						(107-161)	Fz	0.012	0.029	0.049	0.061	0.074	0.100	0.107
							Feed (mm/min)	512	614	785	785	793	798	682
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.5	≤ 1.5	96	RPM	10179	5089	3817	3054	2545	1909	1527
						(77-115)	Fz	0.010	0.022	0.036	0.045	0.055	0.074	0.080
							Feed (mm/min)	293	330	415	415	421	425	366
			Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212
						(61-91)	Fz	0.010	0.022	0.036	0.045	0.055	0.074	0.080
							Feed (mm/min)	233	262	330	330	334	337	291
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	149	RPM	15834	7917	5938	4750	3958	2969	2375
						(119-179)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.085
							Feed (mm/min)	433	570	722	722	712	707	608
			Slot	1	≤ 1	119	RPM	12602	6301	4726	3781	3151	2363	1890
						(95-143)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.085
							Feed (mm/min)	345	454	575	575	567	563	484
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648
						(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	≤ 325 Bhn or ≤ 35 HRc	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	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ 0.5	≤ 1.5	136	RPM	14380	7190	5392	4314	3595	2696	2157
						(109-163)	Fz	0.008	0.026	0.045	0.056	0.067	0.090	0.096
							Feed (mm/min)	362	569	725	725	725	725	621
			Slot	1	≤ 1	108	RPM	11471	5736	4302	3441	2868	2151	1721
						(87-130)	Fz	0.008	0.026	0.045	0.056	0.067	0.090	0.096
							Feed (mm/min)	289	454	578	578	578	578	496

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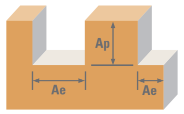
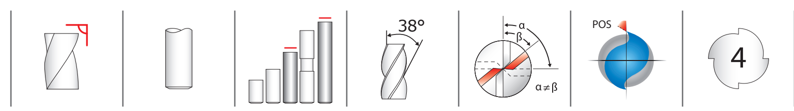
Series 33

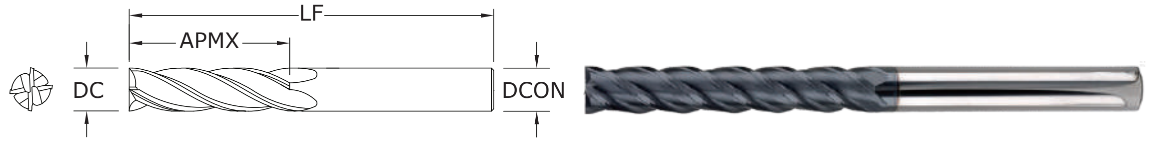


Series 33MCR Metric		Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 3	6	8	10	12	16	20
K	**CAST IRONS (HIGH ALLOY)** Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648
						(83-124)	Fz	0.007	0.019	0.034	0.043	0.050	0.067	0.072
							Feed (mm/min)	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)

Series 7





7
FRACTIONAL SERIES

TOLERANCES (inch)

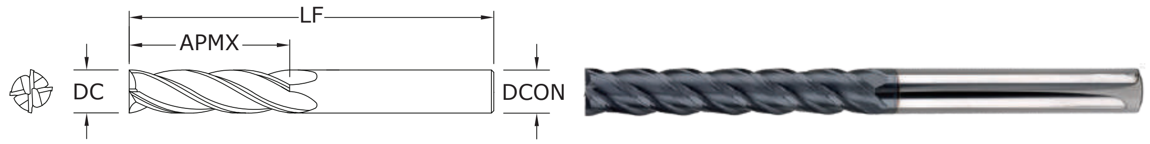
DC = +0.0000/–0.0020
DCON = h_6

- 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	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

- 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)



7M
METRIC SERIES

TOLERANCES (mm)

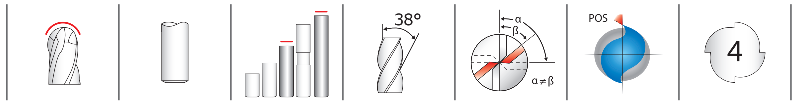
DC = +0,000/+0,050
DCON = h_6

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

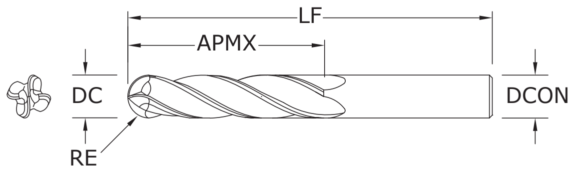
For patent information visit www.ksptpatents.com

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



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)

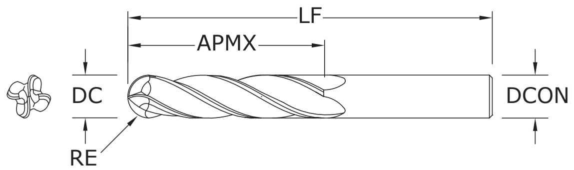
TOLERANCES (inch)

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

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

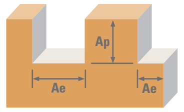
RE = 1/2 Cutting Diameter (DC)

TOLERANCES (mm)

DC = +0,000/+0,050
DCON = h_6
RE = +0,000/–0,025

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

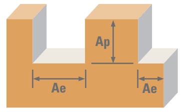
For patent information visit www.ksptpatents.com



	Series 7, 7B Fractional	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	≤ 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
P	**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
M	**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
M	**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
K	**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
S	**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
S	**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
S	**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)

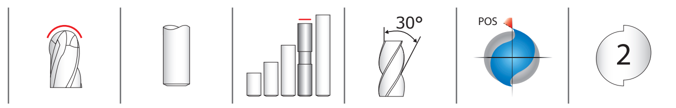
Series 7

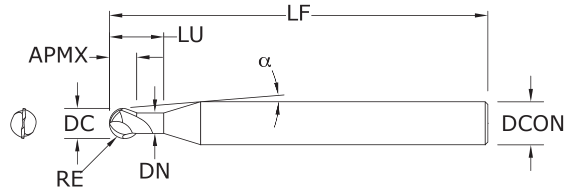


	Series 7M, 7MB Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 3	6	8	10	12	16	20	25
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Finish	≤ 0.02	≤ 2	146	RPM	15511	7755	5816	4653	3878	2908	2327	1861
						(117-176)	Fz	0.0166	0.043	0.075	0.093	0.110	0.125	0.147	0.160
							Feed (mm/min)	1030	1334	1745	1731	1706	1454	1368	1191
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Finish	≤ 0.02	≤ 2	84	RPM	8886	4443	3332	2666	2222	1666	1333	1066
						(67-101)	Fz	0.0122	0.034	0.051	0.069	0.082	0.091	0.109	0.120
							Feed (mm/min)	434	604	680	736	729	606	581	512
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Finish	≤ 0.02	≤ 2	128	RPM	13572	6786	5089	4072	3393	2545	2036	1629
						(102-154)	Fz	0.0086	0.024	0.040	0.048	0.058	0.065	0.077	0.087
							Feed (mm/min)	467	651	814	782	787	662	627	567
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Finish	≤ 0.02	≤ 2	88	RPM	9371	4686	3514	2811	2343	1757	1406	1125
						(71-106)	Fz	0.0082	0.022	0.037	0.045	0.048	0.060	0.072	0.078
							Feed (mm/min)	307	412	520	506	450	422	405	351
M	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Finish	≤ 0.02	≤ 2	81	RPM	8563	4282	3211	2569	2141	1606	1284	1028
						(65-97)	Fz	0.0070	0.019	0.029	0.040	0.048	0.055	0.064	0.070
							Feed (mm/min)	240	325	372	411	411	353	329	288
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Finish	≤ 0.02	≤ 2	184	RPM	19550	9775	7331	5865	4887	3666	2932	2346
						(148-221)	Fz	0.0132	0.036	0.052	0.075	0.089	0.099	0.117	0.130
							Feed (mm/min)	1032	1408	1525	1759	1740	1452	1372	1220
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	≤ 260 Bhn or ≤ 26 HRc	Finish	≤ 0.02	≤ 2	142	RPM	15026	7513	5635	4508	3756	2817	2254	1803
						(113-170)	Fz	0.0132	0.036	0.052	0.075	0.089	0.099	0.117	0.130
							Feed (mm/min)	793	1082	1172	1352	1337	1116	1055	938
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Finish	≤ 0.02	≤ 2	24	RPM	2585	1293	969	776	646	485	388	310
						(20-29)	Fz	0.0072	0.019	0.029	0.037	0.046	0.053	0.061	0.085
							Feed (mm/min)	74	98	112	90	119	103	95	105
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Finish	≤ 0.02	≤ 2	20	RPM	2100	1050	788	630	525	394	315	252
						(16-24)	Fz	0.0075	0.016	0.021	0.030	0.038	0.044	0.051	0.070
							Feed (mm/min)	63	67	66	76	80	69	64	71
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Finish	≤ 0.02	≤ 2	91	RPM	9694	4847	3635	2908	2424	1818	1454	1163
						(73-110)	Fz	0.0091	0.024	0.040	0.050	0.060	0.070	0.080	0.088
							Feed (mm/min)	353	465	51	59	582	509	465	409
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Finish	≤ 0.02	≤ 2	32	RPM	3393	1696	1272	1018	848	636	509	407
						(26-38)	Fz	0.0082	0.019	0.029	0.037	0.046	0.053	0.061	0.085
							Feed (mm/min)	111	129	148	151	156	135	124	138
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)

Turbo-Carb





56B
FRACTIONAL SERIES

TOLERANCES (inch)

1/32–3/32 DIAMETER
DC = +0.0000/–0.0010
DCON = h_6
RE = +0.0000/–0.0005

>3/32–1/4 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

>3/8–3/4 DIAMETER
DC = +0.0000/–0.0020
DCON = h_6
RE = +0.0000/–0.0010

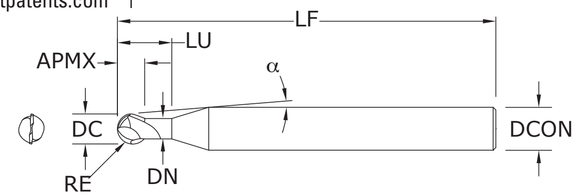
HARDENED STEELS

For patent information visit www.ksptpatents.com

inch							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CENTER LINE ANGLE α	REACH LU	NECK DIAMETER DN	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)

- 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)



56MB
METRIC SERIES

TOLERANCES (mm)

1–2,5 DIAMETER
DC = +0,000/–0,025
DCON = h_6
RE = +0,000/–0,0013

>2,5–6 DIAMETER
DC = +0,000/–0,030
DCON = h_6
RE = +0,000/–0,0013

>6–10 DIAMETER
DC = +0,000/–0,040
DCON = h_6
RE = +0,000/–0,0020

>10–20 DIAMETER
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,0025

HARDENED STEELS

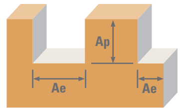
For patent information visit www.ksptpatents.com

mm							EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CENTER LINE ANGLE α	REACH LU	NECK DIAMETER DN	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)

Turbo-Carb

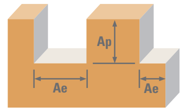


Series 56B Fractional

	Material	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 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
			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
			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
			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)

Turbo-Carb

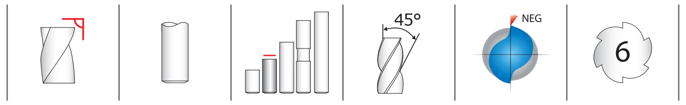


Series 56MB Metric

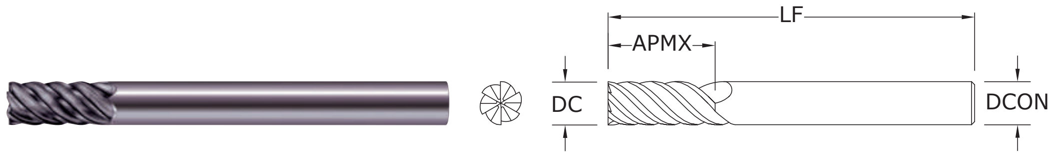
	Material	Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 1	1.5	3	5	6	10	12	20
H	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Rough	≤ 0.4	≤ 0.1	191	RPM	60748	40498	20249	12150	10125	6075	5062	3037
						(153-229)	Fz	0.015	0.038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

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
rpm = (Vc x 1000) / (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)

FRACTIONAL & METRIC
Power-Carb®



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 = h_6

5/16 DIAMETER
DC = +0.0000/–0.0016
DCON = h_6

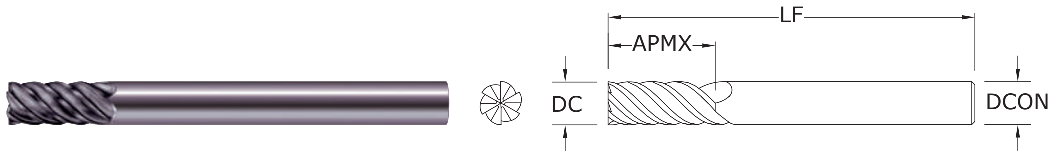
3/8 DIAMETER
DC = +0.0000/–0.0016
DCON = h_6

1/2 DIAMETER
DC = +0.0000/–0.0020
DCON = h_6

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 = h_6

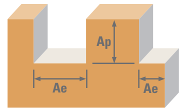
8 DIAMETER
DC = +0,000/–0,040
DCON = h_6

10 DIAMETER
DC = +0,000/–0,040
DCON = h_6

12–20 DIAMETER
DC = +0,000/–0,050
DCON = h_6

HARDENED STEELS

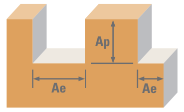
For patent information visit www.ksptpatents.com



	Series 57 Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/4	5/16	3/8	1/2
H	**TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 420 Bhn or ≤ 45 HRc	Slot	1	≤ 0.3	215	RPM	3285	2628	2190	1643
						(172-258)	Fz	0.0013	0.0019	0.0025	0.0031
							Feed (ipm)	26	30	33	31
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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)

Power-Carb®

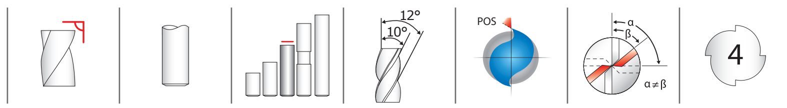


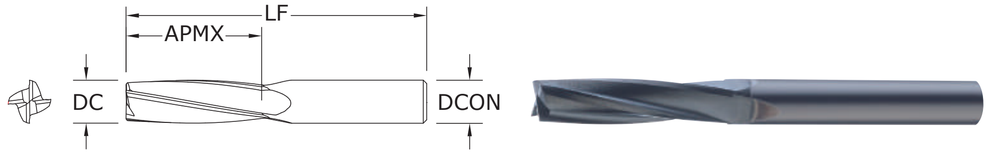
Series 57M Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	6	8	10	12	16	20
H **TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 420 Bhn or ≤ 45 HRc	Slot	1	≤ 0.3	66	RPM	3499	2624	2099	1749	1312	1050
					(53-79)	Fz	0.032	0.048	0.064	0.079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

Bhn (Brinell) HRc (Rockwell C) HSM (High Speed Machining)
rpm = (Vc 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)

Series27 HIGH PERFORMANCE END MILLS

Series 27





27
FRACTIONAL SERIES

TOLERANCES (inch)

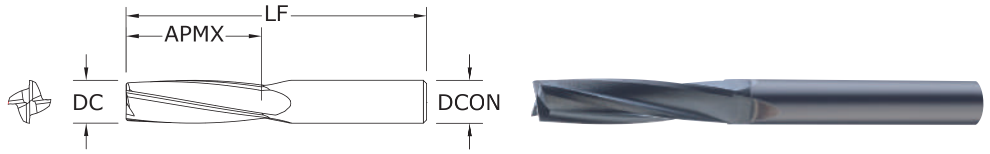
DC = +0.0000/–0.0030
DCON = h_6

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

- 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



27M
METRIC SERIES

TOLERANCES (mm)

DC = +0,000/–0,080
DCON = h_6

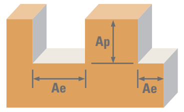
PLASTICS/COMPOSITES

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

- 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

Series 27

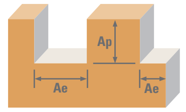


	Series 27 Fractional		Ae x DC	Ap x DC	Vc (sfm)	DC • in	1/4	3/8	1/2	3/4
	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	1	≤ 1	400	RPM	6112	4075	3056	2037
					(320-480)	Fz	0.0016	0.0030	0.0040	0.0048
						Feed (ipm)	39	49	49	39
		Profile	≤ 0.5	≤ 1.5	500	RPM	7640	5093	3820	2547
					(400-600)	Fz	0.0016	0.0030	0.0040	0.0048
						Feed (ipm)	49	61	61	49
		HSM	≤ 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)	Slot	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
		Profile	≤ 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
		HSM	≤ 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	Slot	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
		Profile	≤ 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
		HSM	≤ 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	Slot	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
		Profile	≤ 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
		HSM	≤ 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	Slot	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
		Profile	≤ 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
		HSM	≤ 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)

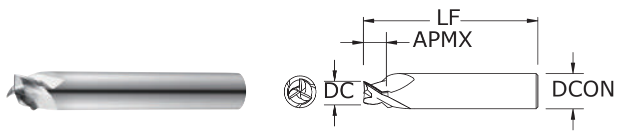
Series 27



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

HSM (High Speed Machining)
rpm = Vc 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)



Non-Ferrous Recoil Groove Tool

FRACTIONAL SERIES

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

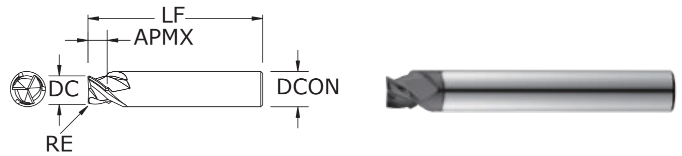
inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	Ti-NAMITE-B (TiB_2)
0.2100	1/4	0.118	1-3/4	34760	34761

TOLERANCES (inch)

DC = +0.0080/–0.0000
APMX= +0.0060/–0.0000
DCON = h_6

NON-FERROUS

For patent information visit www.ksptpatents.com



Ferrous Recoil Groove Tool

FRACTIONAL SERIES

TOLERANCES (inch)

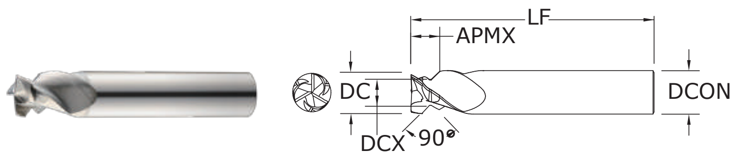
DC = +0.0080/–0.0000
APMX= +0.0060/–0.0000
DCON = h_6
RE = +0.0000/–0.0005

STEELS
STAINLESS STEELS
TITANIUM
HARDENED STEELS

For patent information visit www.ksptpatents.com

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 supression.
- Symmetrical end gashing improves balance in high speed operations.
- Meets MIL-STD 1913.

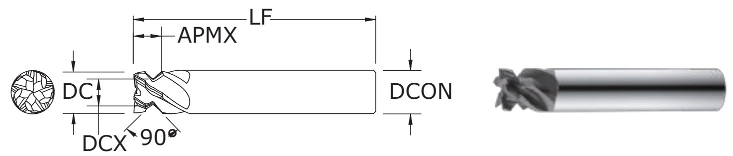
inch					EDP NO.	
CUTTING DIAMETER DC	INNER CUTTING DIAMETER DCX	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	Ti-NAMITE-B (TiB_2)
0.6050	0.384	5/8	0.410	3-1/2	34762	34763

TOLERANCES (inch)

DC = +0.0010/–0.0010
DCON = h_6

NON-FERROUS

For patent information visit www.ksptpatents.com



Ferrous Dovetail Form Tool

FRACTIONAL SERIES

TOLERANCES (inch)

DC = +0.0010/–0.0010
DCON = h_6

STEELS
STAINLESS STEELS
TITANIUM
HARDENED STEELS

For patent information visit www.ksptpatents.com

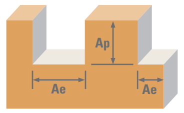
inch					EDP NO.	
CUTTING DIAMETER DC	INNER CUTTING DIAMETER DCX	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	Ti-NAMITE-A (TA)	Ti-NAMITE-M (TM)
0.6050	0.384	5/8	0.410	3-1/2	37391	37390

- 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 Tools

FRACTIONAL

Picatinny Rail Ferrous Recoil Groove Tool

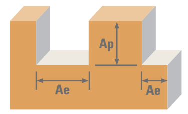


	Picatinny Rail Ferrous Recoil Groove Tool 3 Flute Made to MIL-STD-1913	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 0.2100
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Slot	0.210	0.118	440 (352-528)	RPM	8004
							Fz	0.0009
							Feed (ipm)	22.99
P	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
M	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
M	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						
N	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B-390	Tool not recommended for this material group						
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	Tool not recommended for this material group						
N	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
S	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
S	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
S	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

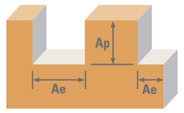


	Picatinny Rail Non-Ferrous Recoil Groove Tool 3 Flute Made to MIL-STD-1913	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 0.2100
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	Tool not recommended for this material group						
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 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						
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	Tool not recommended for this material group						
M	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
N	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
N	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
N	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						
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	Tool not recommended for this material group						
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	Tool not recommended for this material group						
S	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)

FRACTIONAL

Picatinny Rail Ferrous Dovetail Form Tool



	Picatinny Rail Ferrous Dovetail Form Tool 5 Flute Made to MIL-STD-1913	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 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
P	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
M	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
M	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						
N	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B-390	Tool not recommended for this material group						
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	Tool not recommended for this material group						
N	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
S	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
S	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
S	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)

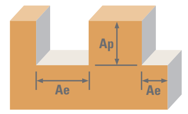
KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

FRACTIONAL

Picatinny Rail Non-Ferrous Dovetail Form Tool



	Picatinny Rail Non-Ferrous Dovetail Form Tool 3 Flute Made to MIL-STD-1913	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 0.6050
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	Tool not recommended for this material group						
P	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						
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	Tool not recommended for this material group						
M	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
N	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
N	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
N	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						
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	Tool not recommended for this material group						
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	Tool not recommended for this material group						
S	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)

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

Solid Carbide Tools

VALUE AT THE SPINDLE®

High Performance Aluminum End Mills

Milling

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

Speed & Feed Recommendations listed after each series

Fresado

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
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	43LB	3 filos, no férrico, punta esférica, largo alcance, fraccional	145
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	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
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	43MCB	3 filos, desbastador, no férrico, rompevirutas, métrico	155
S-Carb® (2 filos)	47	2 filos, no férrico, punta cuadrada, fraccional	157
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	47MB	2 filos, no férrico, punta esférica, métrico	161
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Ski-Carb	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

Fraisage

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
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S-Carb® (3 dents)	43	3 dents non-ferreux non rayonné (fractionnel)	136
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	43B	3 dents non-ferreux à bout hémisphérique (fractionnel)	144
	43LB	3 dents non-ferreux à bout hémisphérique longue portée (fractionnel)	145
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	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
	47MLB	2 dents non-ferreux à bout hémisphérique longue portée (métrique)	161
Ski-Carb	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

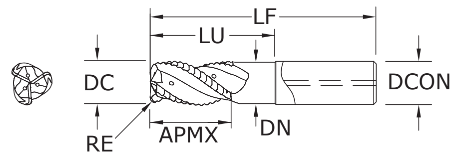
Fräsen

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

Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

FRACTIONAL

S-Carb APR®



43APR-3

FRACTIONAL SERIES

TOLERANCES (inch)

1/2–1 DIAMETER
DC = –0.0004/–0.004
DCON = h_6
RE = +/–0.002

NON-FERROUS

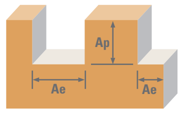
For patent information visit www.ksptpatents.com

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	EDP NO. Ti-NAMITE-B (TiB_2)
mm							
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 I³ 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)

S-Carb APR®



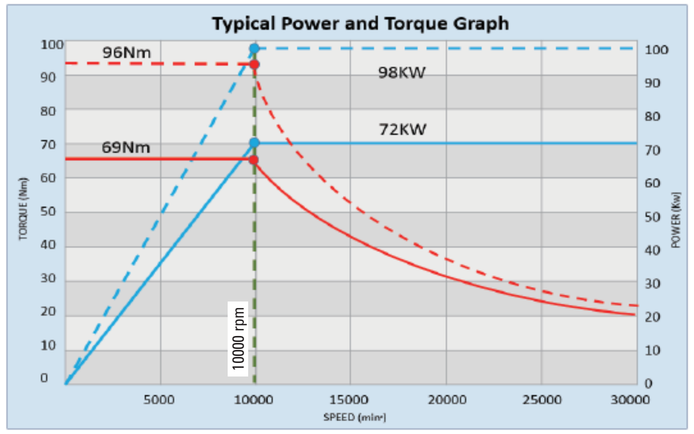
DC • inch

Series 43APR-3 Fractional			Ae x DC	Ap x DC	Vc (sfm)		APR-3 0.75	APR-3 1
N	ALUMINIUM ALLOYS 6068, 7075	Slot	1	≤ 1	5250	RPM	26740	20055
					(980-6900)	Fz	0.0055	0.0059
						Feed (ipm)	441	355
		Profile	≤ 0.5	≤ 1.5	5900	RPM	30051	22538
					(980-6900)	Fz	0.0063	0.0067
						Feed (ipm)	568	453
		HSM	≤ 0.1	≤ 2	6900	RPM	35144	26358
					(980-6900)	Fz	0.0075	0.0079
						Feed (ipm)	791	625

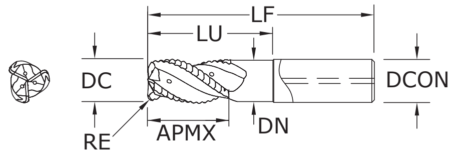
DC • inch

Series 43APR-3L Fractional			Ae x DC	Ap x DC	Vc (sfm)		APR-3 LONG 0.5	APR-3 LONG 0.625	APR-3 LONG 0.75	APR-3 LONG 1
N	ALUMINIUM ALLOYS 6068, 7075	Slot	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
		Profile	≤ 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
		HSM	≤ 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).



S-Carb APR®



43APR-3
METRIC SERIES

TOLERANCES (mm)

12–25 DIAMETER
DC = –0,010/–0,100
DCON = h_6
RE = +/–0,05

NON-FERROUS

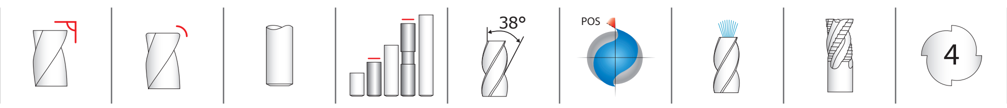
For patent information visit www.ksptpatents.com

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

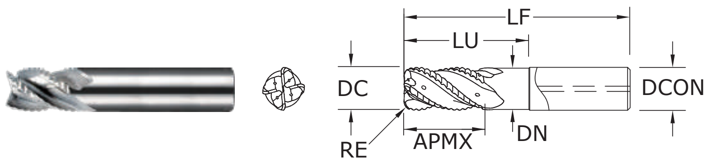
- Ultra high-productivity rougher for Aluminum alloys, specifically for aircraft components
- Designed for machine tools with capability of 12 l³ per minute material removal rates
- New 3 flute variable geometry with side exit coolant holes
- Open fluting for deep slotting and profiling
- Recommended for materials ≤ 150 Bhn (≤ 7 HRc)

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools



43APR-4

METRIC SERIES



- Ultra high-productivity rougher for Aluminium 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)

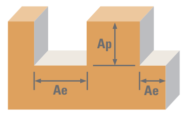
20–25 DIAMETER

DC = –0,010/–0,100
DCON = h_6
RE = ±0,050

NON-FERROUS

For patent information visit www.ksptpatents.com

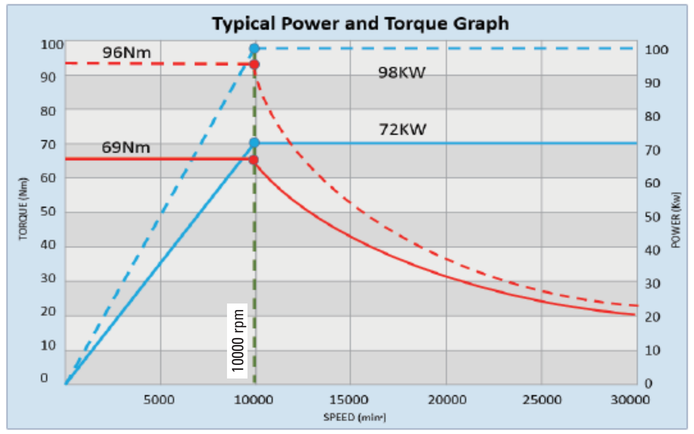
METRIC
S-Carb APR®

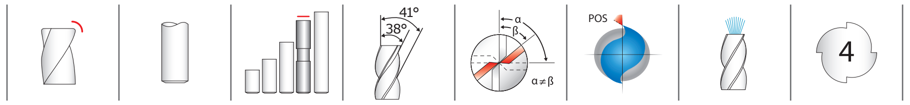


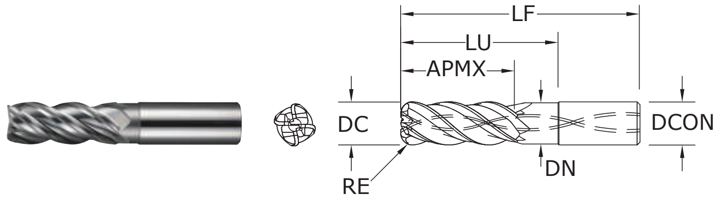
Series 43APR-3 43APR-4 Metric			Ae x DC	Ap x DC	Vc (m/min)		DC • mm APR-3 20	APR-3 25	APR-4 20	APR-4 25
N	ALUMINIUM ALLOYS 6068, 7075	Slot	1	≤ 1	1600	RPM	25461	20369	25461	20369
					(300-2100)	Fz	0.14	0.15	0.12	0.13
						Feed (mm/min)	10694	9166	12222	10592
		Profile	≤ 0.5	≤ 1.5	1800	RPM	28644	22915	28644	22915
					(300-2100)	Fz	0.16	0.17	0.14	015
						Feed (mm/min)	13749	11687	16041	13749
		HSM	≤ 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			Ae x DC	Ap x DC	Vc (m/min)		DC • mm APR-3 LONG 12	16	20	25
N	ALUMINIUM ALLOYS 6068, 7075	Slot	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
		Profile	≤ 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
		HSM	≤ 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 typicaly 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).







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)

CUTTING DIAMETER DC (inch)	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	EDP NO. 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

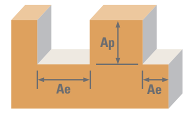
TOLERANCES (inch)

1/2–3/4 DIAMETER

DC = −0.0004/−0.0020
DCON = h_6
RE = +0.0000/−0.0012

NON-FERROUS

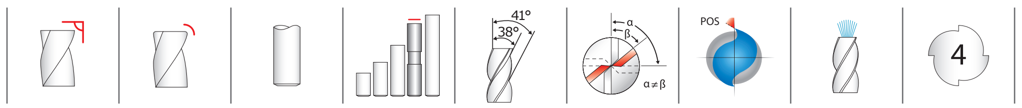
For patent information visit www.ksptpatents.com

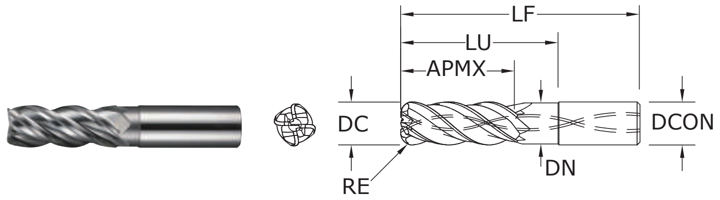


Series 43APF Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/2	3/4
N ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ 0.1	≤ 2.5	2625	RPM	20055	13370
					(2100-3150)	Fz	0.0030	0.0050
						Feed (in/min)	241	267
		Profile	≤ 0.1	≤ 4	2625	RPM	20055	13370
					(2100-3150)	Fz	0.0020	0.0040
						Feed (in/min)	160	214
ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ 0.1	≤ 2.5	1970	RPM	15051	10034
					(1576-2364)	Fz	0.0030	0.0050
						Feed (in/min)	181	201
		Profile	≤ 0.1	≤ 4	1970	RPM	15051	10034
					(1576-2364)	Fz	0.0020	0.0040
						Feed (in/min)	120	161

Bhn (Brinell) HRc (Rockwell C)
surface speed is dependent on machine spindle and fixturing
balancing is recommended at ultra high surface speeds
tool life may be reduced when machining Lithium Alloys
rpm = Vc 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-sgstool.com)

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)

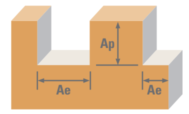
6–25 DIAMETER

DC = –0,010/–0,050
DCON = h_6
RE = +0,000/–0,030

NON-FERROUS

For patent information visit www.ksptpatents.com

S-Carb APF®

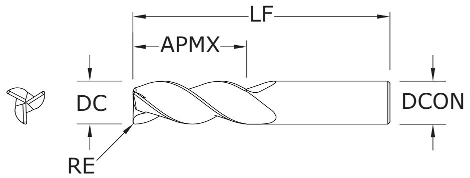


	Series 43MAPF Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	8	10	12	16	20	25
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	≤ 0.1	≤ 2.5	800	RPM	42440	31830	25464	21220	15915	12732	10186
						(640-960)	Fz	0.050	0.055	0.060	0.070	0.100	0.140	0.170
							Feed (mm/min)	8488	7003	6111	5942	6366	7130	6926
			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
							Feed (mm/min)	6366	5252	4584	4456	4774	5347	5195
			Profile	≤ 0.1	≤ 4	600	RPM	31830	23873	19098	15915	11936	9549	7639
						(480-720)	Fz	0.040	0.045	0.050	0.050	0.070	0.100	0.120
							Feed (mm/min)	5093	4297	3820	3183	3342	3820	3667

Bhn (Brinell)   HRc (Rockwell C)
surface speed is dependent on machine spindle and fixturing
balancing is recommended at ultra high surface speeds
*tool life may be reduced when machining Lithium Alloys
rpm = (Vc x 1000) / (DC x 3.14)
mm/min = 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-sgstool.com)

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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)

inch					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	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 = h_6
RE = +0.0000/–0.0020

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0000/–0.0020

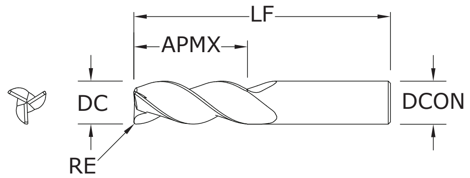
3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0000/–0.0020

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

FRACTIONAL
S-Carb®



43 • 43CR
FRACTIONAL SERIES

CONTINUED

TOLERANCES (inch)

1/8–3/16 DIAMETER
DC = +0.0000/–0.00032
DCON = h_6
RE = +0.0000/–0.0020

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
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	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

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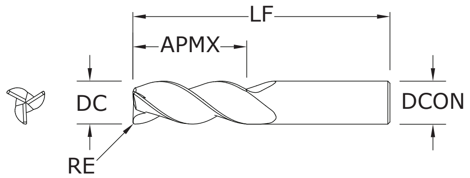
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

43 • 43CR
FRACTIONAL SERIES



CONTINUED

inch					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	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

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TOLERANCES (inch)

1/8–3/16 DIAMETER
DC = +0.0000/–0.00032
DCON = h_6
RE = +0.0000/–0.0020

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
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 = h_6
RE = +0.0000/–0.0020

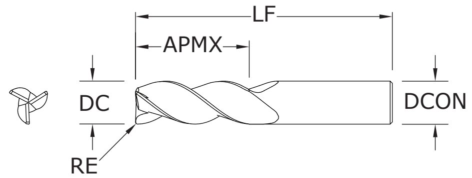
1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0000/–0.0020

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



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FRACTIONAL SERIES

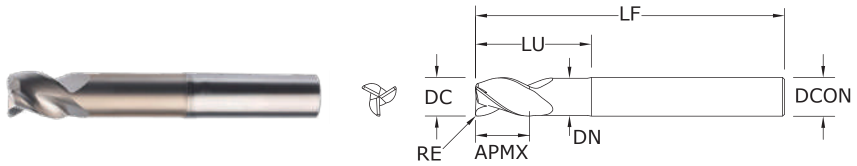
CONTINUED

inch					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-B (TiB_2)
inch								
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

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TOLERANCES (inch)

1/8–3/16 DIAMETER
DC = +0.0000/–0.00032
DCON = h_6
RE = +0.0000/–0.0020

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0000/–0.0020

NON-FERROUS
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FRACTIONAL
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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
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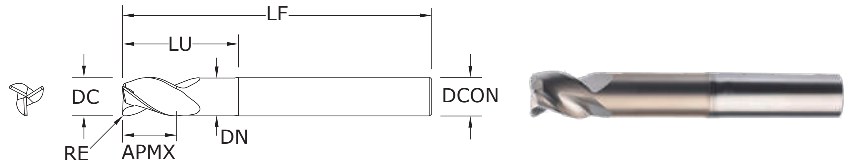

43L • 43LC
FRACTIONAL SERIES

CONTINUED

CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-B (TiB_2)
inch								
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

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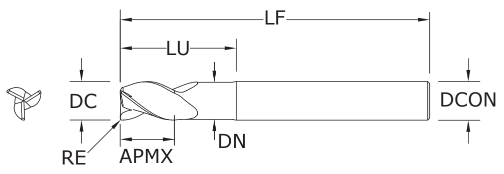
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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 = h_6
RE = +0.0000/–0.0020

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0000/–0.0020

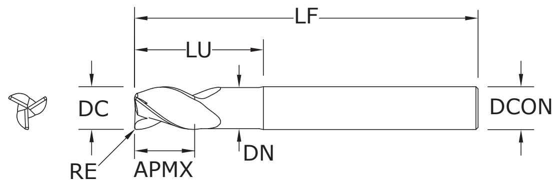
1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0000/–0.0020

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

43EC
FRACTIONAL SERIES



TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0000/–0.0020

NON-FERROUS
PLASTICS/COMPOSITES

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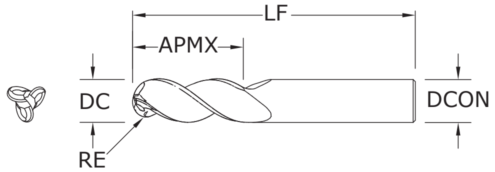
inch							EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB_2)
1/4	3/8	3	1/4	1-1/8	.230	.015	35789	36237
1/4	3/8	3	1/4	1-1/8	.230	.060	35790	36238
3/8	1/2	4	3/8	2-1/8	.355	.015	35793	36241
3/8	1/2	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

- 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)

TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0005/–0.0005

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0005/–0.0005

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0005/–0.0005

NON-FERROUS
PLASTICS/COMPOSITES

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FRACTIONAL
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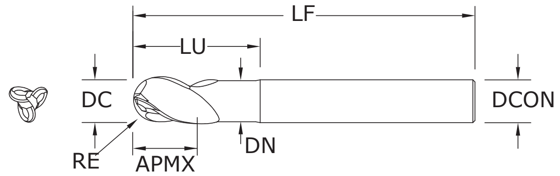
43LB
FRACTIONAL SERIES



TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0005/–0.0005

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0005/–0.0005

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0005/–0.0005

NON-FERROUS
PLASTICS/COMPOSITES

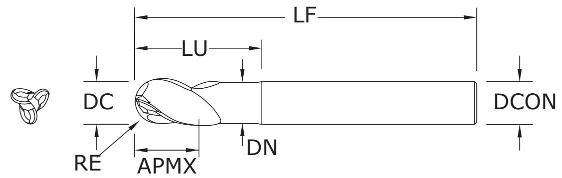
For patent information visit www.ksptpatents.com

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	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)

- 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)

43EB
FRACTIONAL SERIES



TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0005/–0.0005

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0005/–0.0005

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0005/–0.0005

NON-FERROUS
PLASTICS/COMPOSITES

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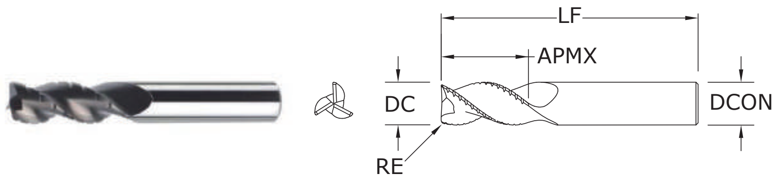
inch						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	UNCOATED	Ti-NAMITE-B (TiB_2)
1/4	3/8	3	1/4	1-1/8	.230	34942	35006
3/8	1/2	4	3/8	2-1/8	.355	34944	35008
1/2	5/8	5	1/2	3-3/8	.480	34947	35011
1/2	5/8	6	1/2	4-1/4	.480	34948	35012
5/8	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)

- 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)

inch					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	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 = h_6
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0000/–0.0020

NON-FERROUS
PLASTICS/COMPOSITES

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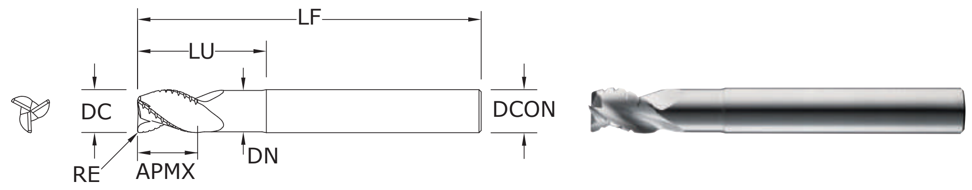
43LCB
FRACTIONAL SERIES



TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0000/–0.0020

NON-FERROUS
PLASTICS/COMPOSITES

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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	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

- 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)

FRACTIONAL
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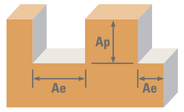
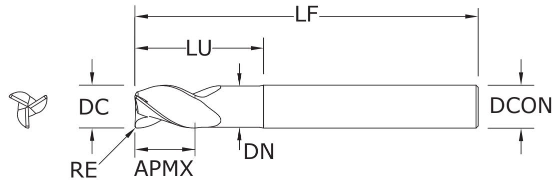


Series 43CR, 43CB, 43LC, 43, 43L, 43LCB, 43B, 43LB, 43ELB, 43EC Fractional		Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/8	1/4	3/8	1/2	5/8	3/4	1
N	**ALUMINUM ALLOYS** 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc	Slot	1	≤ 1	1600	RPM	48896	24448	16299	12224	9779	8149	6112
						(1280-1920)	Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
							Feed (ipm)	132	183	220	220	191	171	156
			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)	165	229	275	275	238	214	195
			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)	635	832	1059	1059	908	832	737
	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B- 390	≤ 125 Bhn or ≤ 77 HRb	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)	50	69	83	83	72	64	58
			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)	62	86	103	103	89	80	73
			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)	239	313	398	398	341	313	277
	COPPER ALLOYS Aluminum Bronze, Brass, Naval Brass, Red Brass	≤ 140 Bhn or ≤ 3 HRc	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)	63	79	106	99	87	79	69
			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)	79	99	132	124	109	99	87
			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)	277	367	462	469	408	381	326
N	**COPPER ALLOYS** Beryllium Copper, C110, Malleable 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)	25	32	42	40	35	32	28
			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)	32	39	53	49	43	39	34
			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)	111	146	184	187	163	152	130
	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)	220	293	367	367	323	293	257
			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)	275	367	458	458	403	367	321
			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)	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)

METRIC
S-Carb®



43M • 43MCR
METRIC SERIES

TOLERANCES (mm)

6 DIAMETER
DC = +0,000/–0,008
DCON = h_6
RE = +0,000/–0,050

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h_6
RE = +0,000/–0,050

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h_6
RE = +0,000/–0,050

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h_6
RE = +0,000/–0,050

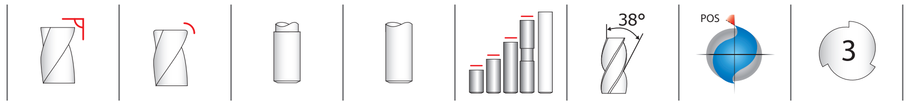
NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

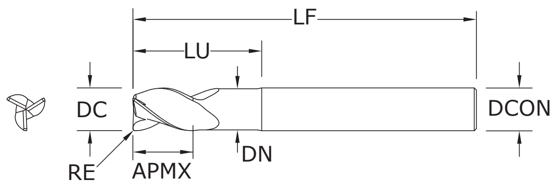
mm CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	REACH LU	NECK DIAMETER DN	POLISHED FLUTE	EDP NO. UNCOATED	Ti-NAMITE-B (TiB_2)
3,0	8,0	52,0	6,0	–	–	–	•	–	44890
4,0	11,0	55,0	6,0	–	–	–	•	–	44891
5,0	13,0	57,0	6,0	–	–	–	•	–	44892
6,0	13,0	57,0	6,0	–	–	–		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

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



43M • 43MCR
METRIC SERIES



CONTINUED

CUTTING DIAMETER DC (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	SHANK DIAMETER DCON (mm)	CORNER RADIUS RE (mm)	REACH LU (mm)	NECK DIAMETER DN (mm)	POLISHED FLUTE	EDP NO. UNCOATED	EDP NO. 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 = h_6
RE = +0,000/–0,050

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h_6
RE = +0,000/–0,050

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h_6
RE = +0,000/–0,050

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h_6
RE = +0,000/–0,050

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PLASTICS/COMPOSITES

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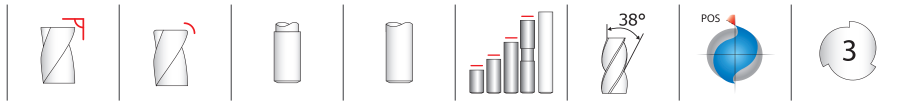

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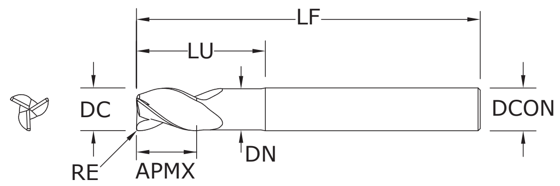
METRIC SERIES



CONTINUED

CUTTING DIAMETER DC (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	SHANK DIAMETER DCON (mm)	CORNER RADIUS RE (mm)	REACH LU (mm)	NECK DIAMETER DN (mm)	POLISHED FLUTE	EDP NO. UNCOATED	EDP NO. 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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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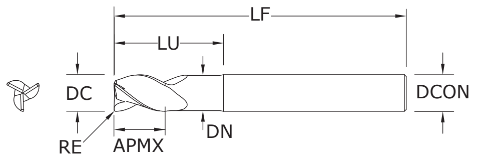
METRIC SERIES



- 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 = h_6

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h_6
RE = +0,000/–0,050

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h_6
RE = +0,000/–0,050

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h_6
RE = +0,000/–0,050

NON-FERROUS

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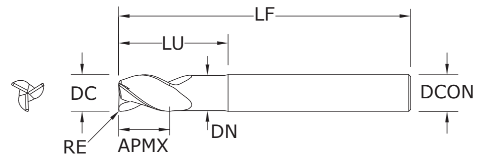

43ML • 43MLC

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

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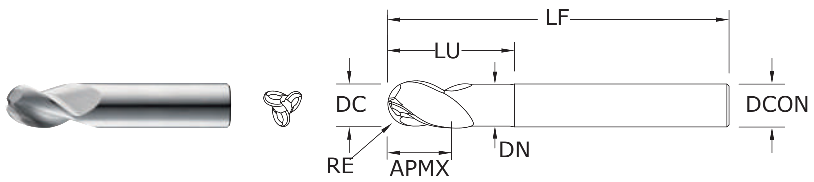
SGS Solid Tools
SGS Micro Tools



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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 = h_6
RE = +0,0127/–0,0127

>3–6 DIAMETER
DC = +0,000/–0,008
DCON = h_6
RE = +0,0127/–0,0127

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h_6
RE = +0,0127/–0,0127

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h_6
RE = +0,0127/–0,0127

>18–25 DIAMETER
DC = +0,000/–0,013
DCON = h_6
RE = +0,0127/–0,0127

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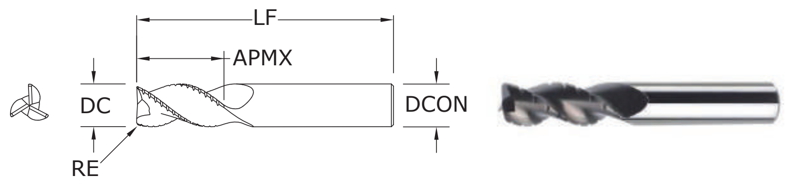

43MCB

METRIC SERIES

TOLERANCES (mm)

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h_6
RE = +0,000/–0,050

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h_6
RE = +0,000/–0,050

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h_6
RE = +0,000/–0,050

NON-FERROUS
PLASTICS/COMPOSITES

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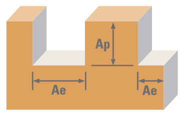
mm					EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	CORNER RADIUS RE	UNCOATED	Ti-NAMITE-B (TiB_2)
6,0	19,0	63,0	6,0	0,5	44298	44299
8,0	19,0	63,0	8,0	0,3	44300	44305
10,0	22,0	72,0	10,0	0,3	44301	44306
12,0	26,0	83,0	12,0	1,0	44302	44307
16,0	32,0	92,0	16,0	1,0	44303	44308
20,0	38,0	104,0	20,0	1,0	44304	44309

- 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)

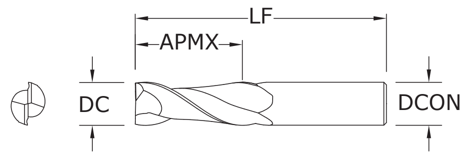
S-Carb®



Series 43M, 43MB, 43MCR, 43ML, 43MLC, 43MCB Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	3	6	10	12	16	20	25
N ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc	Slot	1	≤ 1	490	RPM	52022	26011	15607	13005	9754	7803	6243
					(392-588)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
						Feed (mm/min)	3371	4682	5618	5618	4869	4370	3980
		Profile	≤ 0.5	≤ 1.5	610	RPM	64762	32381	19429	16190	12143	9714	7771
					(488-732)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
						Feed (mm/min)	4196	5828	6994	6994	6061	5440	4955
		HSM	≤ 0.05	≤ 2	1005	RPM	106698	53349	32009	26674	20006	16005	12804
					(804-1206)	Fz	0.050	0.132	0.280	0.336	0.384	0.440	0.488
						Feed (mm/min)	16131	21124	26888	26885	23046	21126	18726
ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B- 390	≤ 125 Bhn or ≤ 77 HRb	Slot	1	≤ 1	185	RPM	19641	9820	5892	4910	3683	2946	2357
					(148-222)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
						Feed (mm/min)	1273	1768	2121	2121	1838	1650	1503
		Profile	≤ 0.5	≤ 1.5	230	RPM	24418	12209	7326	6105	4578	3663	2930
					(184-276)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
						Feed (mm/min)	1582	2197	2637	2637	2285	2051	1868
		HSM	≤ 0.05	≤ 2	380	RPM	40343	20172	12103	10086	7564	6052	4841
					(304-456)	Fz	0.050	0.132	0.280	0.336	0.384	0.440	0.488
						Feed (mm/min)	6099	7987	10166	10166	8714	7988	7081
COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass	≤ 140 Bhn or ≤ 3 HRc	Slot	1	≤ 1	265	RPM	28134	14067	8440	7034	5275	4220	3376
					(212-318)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
						Feed (mm/min)	1620	2025	2701	2532	2228	2026	1773
		Profile	≤ 0.5	≤ 1.5	330	RPM	35035	17518	10511	8759	6569	5255	4204
					(264-396)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
						Feed (mm/min)	2018	2522	3363	3153	2775	2523	2207
		HSM	≤ 0.05	≤ 2	545	RPM	57861	28930	17358	14465	10849	8679	6943
					(436-654)	Fz	0.041	0.108	0.227	0.276	0.320	0.373	0.400
						Feed (mm/min)	7082	9373	11804	11976	10415	9721	8332
COPPER ALLOYS Beryllium Copper C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc	Slot	1	≤ 1	105	RPM	11148	5574	3344	2787	2090	1672	1338
					(84-126)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
						Feed (mm/min)	642	803	1070	1003	883	803	702
		Profile	≤ 0.5	≤ 1.5	130	RPM	13802	6901	4141	3450	2588	2070	1656
					(104-156)	Fz	0.019	0.048	0.107	0.120	0.141	0.160	0.175
						Feed (mm/min)	795	994	1325	1242	1093	994	870
		HSM	≤ 0.05	≤ 2	215	RPM	22826	11413	6848	5706	4280	3424	2739
					(172-258)	Fz	0.041	0.108	0.227	0.276	0.320	0.373	0.400
						Feed (mm/min)	2794	3697	4656	4725	4109	3835	3287
PLASTICS ABS, Polycarbonate, PVC, Polypropylene		Slot	1	≤ 1	490	RPM	52022	26011	15607	13005	9754	7803	6243
					(392-588)	Fz	0.036	0.096	0.200	0.240	0.282	0.320	0.350
						Feed (mm/min)	5618	7490	9364	9363	8240	7491	6555
		Profile	≤ 0.5	≤ 1.5	610	RPM	64762	32381	19429	16190	12143	9714	7771
					(488-732)	Fz	0.036	0.096	0.200	0.240	0.282	0.320	0.350
						Feed (mm/min)	6994	9325	11657	11656	10258	9326	8160
		HSM	≤ 0.05	≤ 2	1005	RPM	106698	53349	32009	26674	20006	16005	12804
					(804-1206)	Fz	0.082	0.216	0.453	0.552	0.640	0.733	0.800
						Feed (mm/min)	26117	34567	43532	44169	38410	35210	30730

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
rpm = (Vc x 1000) / (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)

S-Carb®



47
FRACTIONAL SERIES

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

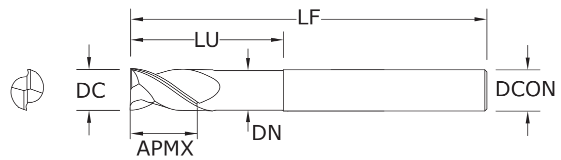
3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h6

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

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

- 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)



47L
FRACTIONAL SERIES

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

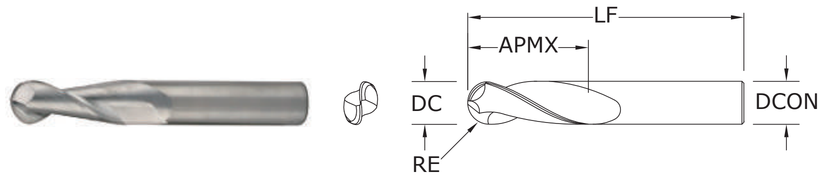
NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

CUTTING DIAMETER DC (inch)	LENGTH OF CUT APMX (inch)	OVERALL LENGTH LF (inch)	SHANK DIAMETER DCON (inch)	REACH LU (inch)	NECK DIAMETER DN (inch)	EDP NO. UNCOATED	EDP NO. 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

- 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)

TOLERANCES (inch)

1/8–3/16 DIAMETER
DC = +0.0000/–0.00032
DCON = h_6
RE = +.0005/–.0005

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +.0005/–.0005

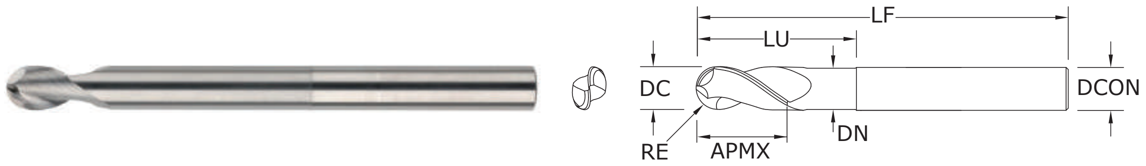
1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +.0005/–.0005

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +.0005/–.0005

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

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)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +.0005/–.0005

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +.0005/–.0005

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +.0005/–.0005

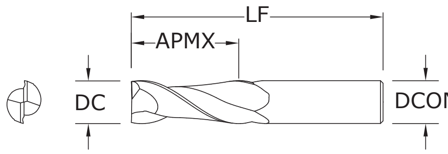
NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

Series 47, 47B, 47L, 47LB Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		1/8	1/4	3/8	1/2	5/8	3/4	1
							DC • in						
N — **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
		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
N — **ALUMINUM DIE CAST ALLOYS (HIGH SILICONE)** A-390, A-392, B- 390	≤ 125 Bhn or ≤ 77 HRb	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
N — **COPPER ALLOYS** **Aluminum Bronze Brass Naval Brass Red Brass**	≤ 140 Bhn or ≤ 3 HRc	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
N — **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
		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
N — **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
		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 = h_6

>3–6 DIAMETER
DC = +0,000/–0,008
DCON = h_6

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h_6

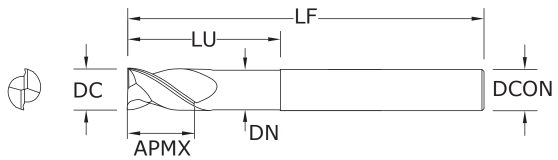
>10–18 DIAMETER
DC = +0,000/–0,012
DCON = h_6

>18–25 DIAMETER
DC = +0,000/–0,013
DCON = h_6

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

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 = h_6

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h_6

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h_6

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h_6

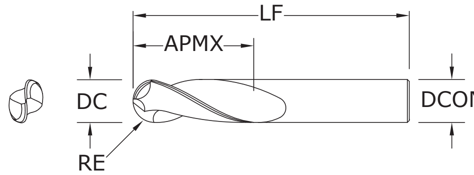
NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

METRIC
S-Carb®

47MB
METRIC SERIES



TOLERANCES (mm)

3 DIAMETER
DC = +0,000/–0,006
DCON = h_6
RE = +0,0127/–0,0127

>3–6 DIAMETER
DC = +0,000/–0,008
DCON = h_6
RE = +0,0127/–0,0127

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h_6
RE = +0,0127/–0,0127

>10–18 DIAMETER
DC = +0,000/–0,012
DCON = h_6
RE = +0,0127/–0,0127

>18–25 DIAMETER
DC = +0,000/–0,013
DCON = h_6
RE = +0,0127/–0,0127

NON-FERROUS
PLASTICS/COMPOSITES

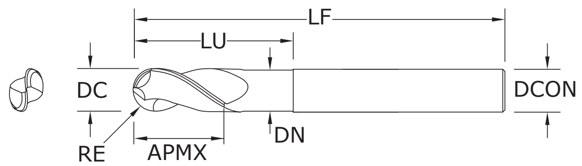
For patent information visit www.ksptpatents.com

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

- 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)

47MLB
METRIC SERIES



TOLERANCES (mm)

6 DIAMETER
DC = +0,000/–0,008
DCON = h_6
RE = +0,0127/–0,0127

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h_6
RE = +0,0127/–0,0127

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h_6
RE = +0,0127/–0,0127

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h_6
RE = +0,0127/–0,0127

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

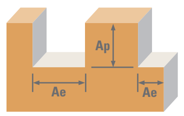
mm						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	REACH LU	NECK DIAMETER DN	UNCOATED	Ti-NAMITE-B (TiB_2)
6,0	10,0	100,0	6,0	54,0	5,62	44581	44615
8,0	12,0	100,0	8,0	54,0	7,62	44582	44616
10,0	12,0	100,0	10,0	54,0	9,62	44583	44617
12,0	16,0	150,0	12,0	80,0	11,62	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)

- 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)

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

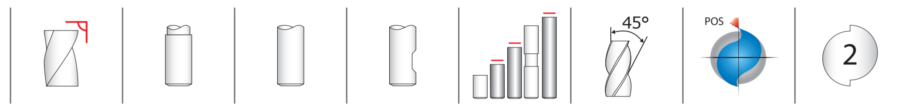
S-Carb®

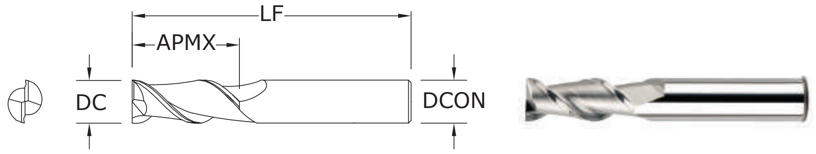


	Series 47M, 47MB, 47ML, 47MLB Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 3	6	10	12	16	20	25
	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075	≤ 150 Bhn or ≤ 7 HRc	Slot	1	≤ 1	490	RPM	52022	26011	15607	13005	9754	7803	6243
						(392-588)	Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
						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

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B) HSM (High Speed Machining)
rpm = (Vc x 1000) / (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)

Ski-Carb





44
FRACTIONAL SERIES

TOLERANCES (inch)

1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6

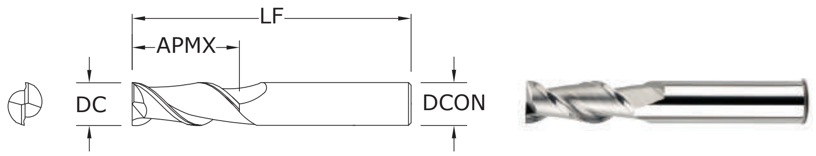
NON-FERROUS
PLASTICS/COMPOSITES

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.

- 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

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,000/–0,006
DCON = h_6

>3–6 DIAMETER
DC = +0,000/–0,008
DCON = h_6

>6–10 DIAMETER
DC = +0,000/–0,009
DCON = h_6

>10–18 DIAMETER
DC = +0,000/–0,011
DCON = h_6

>18–20 DIAMETER
DC = +0,000/–0,013
DCON = h_6

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

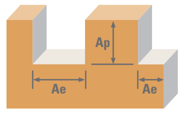
mm				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED W/FLAT	UNCOATED	Ti-NAMITE-B (TiB_2) W/FLAT	Ti-NAMITE-B (TiB_2)
3,0	8,0	52,0	6,0	44505	49663	44506	49674
4,0	11,0	55,0	6,0	44509	49664	44510	49675
5,0	13,0	57,0	6,0	44513	49665	44514	49676
6,0	13,0	57,0	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.

- 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

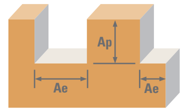


	Series 44 Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)	DC • in	1/8	1/4	3/8	1/2	5/8	3/4	1
N	**ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075**	≤ 150 Bhn or ≤ 7 HRc	Slot	1	≤ 1	1600 (1280-1920)	RPM	48896	24448	16299	12224	9779	8149	6112
							Fz	0.0009	0.0025	0.0045	0.0060	0.0065	0.0070	0.0085
							Feed (ipm)	88	122	147	147	127	114	104
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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		Slot	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
			Profile	≤ 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
			HSM	≤ 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

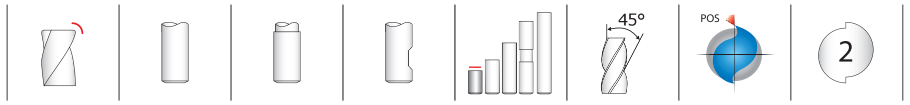
Ski-Carb

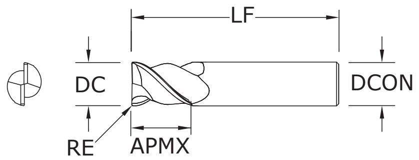


	Series 44M Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	3	6	10	12	16	20	25
N	**ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075**	≤ 150 Bhn or ≤ 7HRc	Slot	1	≤ 1	490 (392-588)	RPM	52022	26011	15607	13005	9754	7803	6243
							Fz	0.022	0.060	0.120	0.144	0.166	0.187	0.213
							Feed (mm/min)	2247	3121	3746	3745	3246	2913	2653
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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		Slot	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
			Profile	≤ 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
			HSM	≤ 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

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)

FRACTIONAL
Ski-Carb





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)

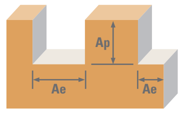
1/4–3/8 DIAMETER
DC = +0.0000/–0.00035
DCON = h_6
RE = +0.0000/–0.0020

1/2–5/8 DIAMETER
DC = +0.0000/–0.00043
DCON = h_6
RE = +0.0000/–0.0020

3/4–1 DIAMETER
DC = +0.0000/–0.00051
DCON = h_6
RE = +0.0000/–0.0020

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com



	Series 45 Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)	DC • in	1/4	3/8	1/2	5/8	3/4	1
N	**ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7075**	≤ 150 Bhn or ≤ 7 HRc	Slot	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
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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	Slot	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
			Profile	≤ 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
			HSM	≤ 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		Slot	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
			Profile	≤ 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
			HSM	≤ 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)

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

General Purpose End Mills

Milling

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

Speed & Feed Recommendations listed at the end of this section

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

Speed & Feed Recommendations listed at the end of this section

Fresado

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

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

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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

Fraisage

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

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

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

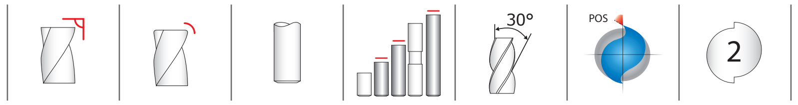
Fräsen

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

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

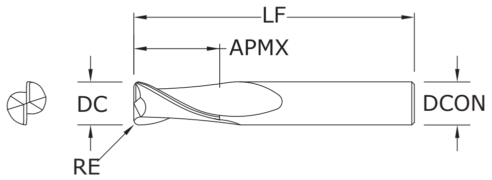
Schnittwertempfehlungen finden Sie am Ende dieses Abschnitts

2 Flute Square End • 2 Flute Corner Radius



3 • 3L • 3EL • 3CR

FRACTIONAL SERIES



TOLERANCES (inch)

DC = –0.001/–0.002
DCON = h_6
RE = +0.0000/–0.0020

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.					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

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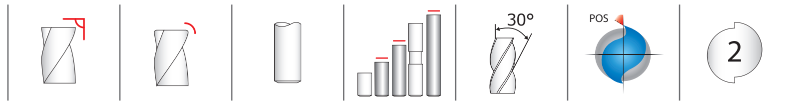
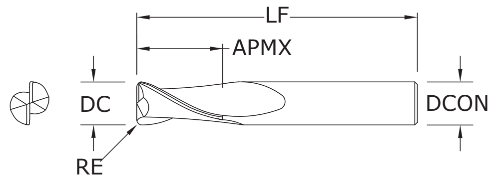
2 Flute Square End • 2 Flute Corner Radius



TOLERANCES (inch)

DC = –0.001/–0.002
DCON = h_6
RE = +0.0000/–0.0020



3 • 3L • 3EL • 3CR

FRACTIONAL SERIES

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)	
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

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

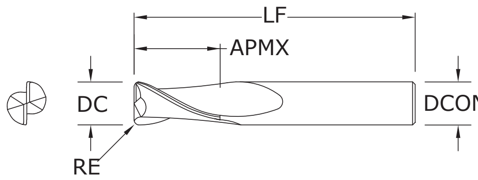
For patent information visit www.ksptpatents.com

FRACTIONAL

2 Flute Square End • 2 Flute Corner Radius

3 • 3L • 3EL • 3CR

FRACTIONAL SERIES



TOLERANCES (inch)

DC = –0.001/–0.002
DCON = h_6
RE = +0.0000/–0.0020

CONTINUED

CUTTING DIAMETER DC (inch)	LENGTH OF CUT APMX (inch)	OVERALL LENGTH LF (inch)	SHANK DIAMETER DCON (inch)	CORNER RADIUS RE (inch)	UNCOATED (EDP NO.)	Ti-NAMITE (TiN) (EDP NO.)	Ti-NAMITE-C (TiCN) (EDP NO.)	Ti-NAMITE-A (AlTiN) (EDP NO.)	Di-NAMITE® (Diamond) (EDP NO.)	SERIES
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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

METRIC

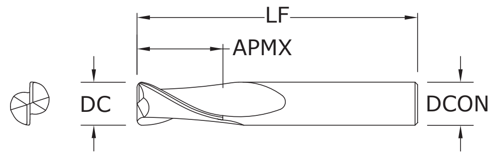
2 Flute Square End

3M • 3XLM

METRIC SERIES

TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h_6



CUTTING DIAMETER DC (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	SHANK DIAMETER DCON (mm)	UNCOATED (EDP NO.)	Ti-NAMITE (TiN) (EDP NO.)	Ti-NAMITE-C (TiCN) (EDP NO.)	Ti-NAMITE-A (AlTiN) (EDP NO.)	SERIES
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

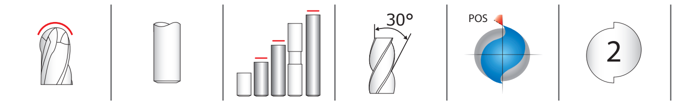
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

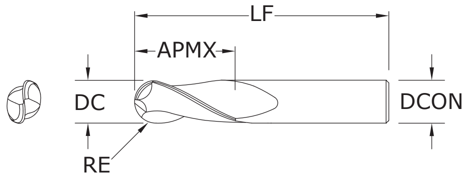
FRACTIONAL

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

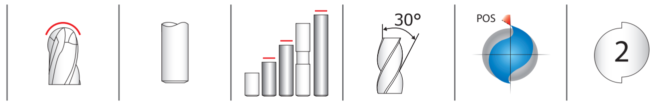
continued on next page

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

For patent information visit www.ksptpatents.com

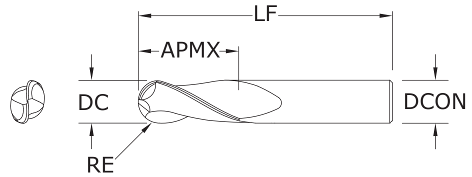
FRACTIONAL

2 Flute Ball End



TOLERANCES (inch)

DC = –0.0000/–0.0020
DCON = h_6
RE = +0.0000/–0.0010



3B•3LB• 3ELB

FRACTIONAL SERIES

CONTINUED

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
*Series 3B Set				30390	39390	39590	30600	3B

RE = 1/2 Cutting Diameter (DC)

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

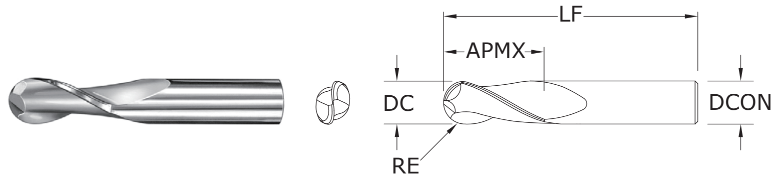
For patent information visit www.ksptpatents.com

METRIC

2 Flute Ball End

3MB• 3XLMB

METRIC SERIES



TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,025

CUTTING DIAMETER DC (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	SHANK DIAMETER DCON (mm)	EDP NO. UNCOATED	EDP NO. Ti-NAMITE (TiN)	EDP NO. Ti-NAMITE-C (TiCN)	EDP NO. Ti-NAMITE-A (AlTiN)	SERIES
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

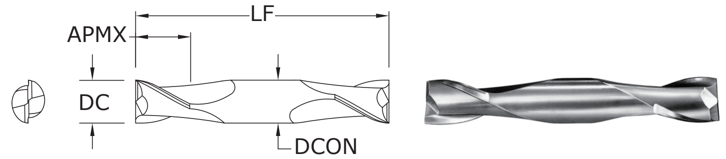
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

FRACTIONAL & METRIC

2 Flute Double End

15

FRACTIONAL SERIES



TOLERANCES (inch)

DC = +0.0000/–0.0020
DCON = h_6

CUTTING DIAMETER DC (inch)	LENGTH OF CUT APMX (inch)	OVERALL LENGTH LF (inch)	SHANK DIAMETER DCON (inch)	EDP NO. UNCOATED	EDP NO. Ti-NAMITE (TiN)	EDP NO. Ti-NAMITE-C (TiCN)	EDP NO. 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

15M

METRIC SERIES

TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h_6

CUTTING DIAMETER DC (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	SHANK DIAMETER DCON (mm)	EDP NO. UNCOATED	EDP NO. Ti-NAMITE (TiN)	EDP NO. Ti-NAMITE-C (TiCN)	EDP NO. 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

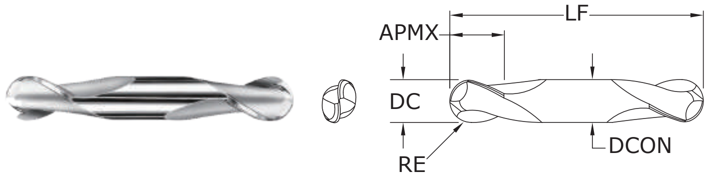
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

2 Flute Double End Ball End

15B
FRACTIONAL SERIES



TOLERANCES (inch)
DC = –0.0000/–0.0020
DCON = h_6
RE = +0.0000/–0.0010

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

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

For patent information visit www.ksptpatents.com

15MB
METRIC SERIES

TOLERANCES (mm)
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/0,025

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

RE = 1/2 Cutting Diameter (DC)

- STEELS
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- NON-FERROUS
- PLASTICS/COMPOSITES

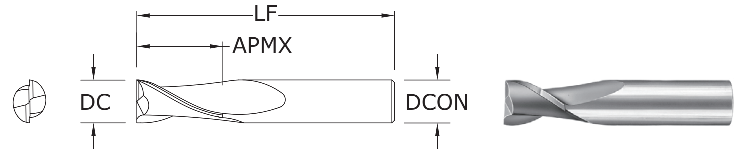
For patent information visit www.ksptpatents.com

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

2 Flute Square End Stub

17
FRACTIONAL SERIES

TOLERANCES (inch)
DC = +0.0000/–0.0020
DCON = h_6



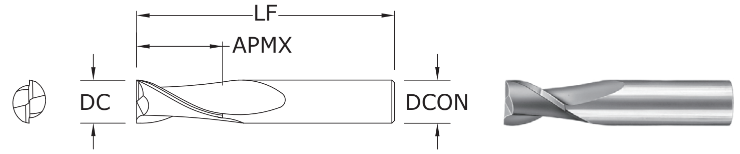
CUTTING DIAMETER DC (inch)	LENGTH OF CUT APMX (inch)	OVERALL LENGTH LF (inch)	SHANK DIAMETER DCON (inch)	EDP NO. UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/16	1/8	1-1/2	1/8	31701	31750	31303	31358
3/32	3/16	1-1/2	1/8	31703	31751	31304	31359
1/8	1/4	1-1/2	1/8	31705	31752	31305	31360
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

17M
METRIC SERIES

TOLERANCES (mm)
DC = +0,000/–0,050
DCON = h_6



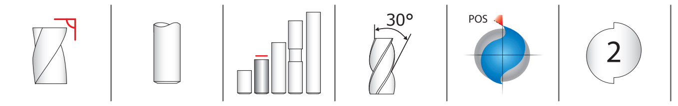
CUTTING DIAMETER DC (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	SHANK DIAMETER DCON (mm)	EDP NO. UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41705	49262	49283	49304
1,5	3,0	38,0	3,0	41709	49263	49284	49305
2,0	4,0	38,0	3,0	41713	49264	49285	49306
2,5	5,0	38,0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

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

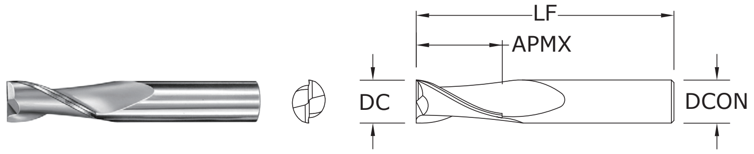
For patent information visit www.ksptpatents.com

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

2 Flute High Shear



52
FRACTIONAL SERIES



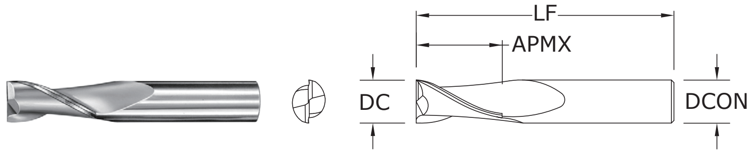
TOLERANCES (inch)
DC = +0.0000/−0.0020
DCON = h_6

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

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

52M
METRIC SERIES



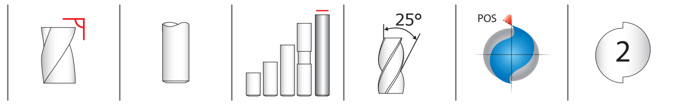
TOLERANCES (mm)
DC = +0,000/−0,050
DCON = h_6

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

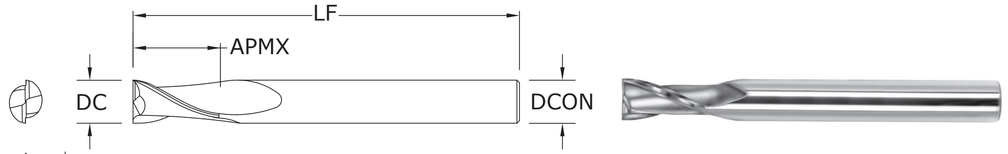
NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

2 Flute Square End Long Reach



59
FRACTIONAL SERIES



TOLERANCES (mm)
DC = +0,000/−0,050
DCON = h_6

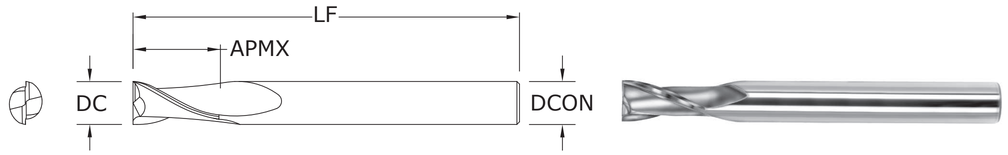
CUTTING DIAMETER DC (inch)	LENGTH OF CUT APMX (inch)	OVERALL LENGTH LF (inch)	SHANK DIAMETER DCON (inch)	EDP NO. Ti-NAMITE (TiN)	EDP NO. Ti-NAMITE-C (TiCN)	EDP NO. Ti-NAMITE-A (AlTiN)
1/8	3/8	2-1/2	1/4	32280	32260	32270
3/16	9/16	3	1/4	32281	32261	32271
1/4	5/8	3-1/2	1/4	32282	32262	32272
5/16	11/16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

Neck Option Available

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

For patent information visit www.ksptpatents.com

59M
METRIC SERIES



TOLERANCES (mm)
DC = +0,000/−0,050
DCON = h_6

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

Neck Option Available

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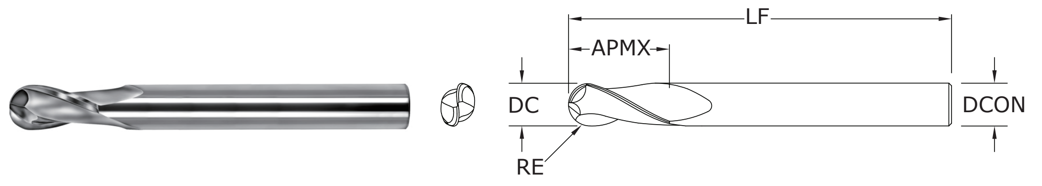
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

FRACTIONAL & METRIC

2 Flute Ball End Long Reach



59B

FRACTIONAL SERIES

TOLERANCES (inch)

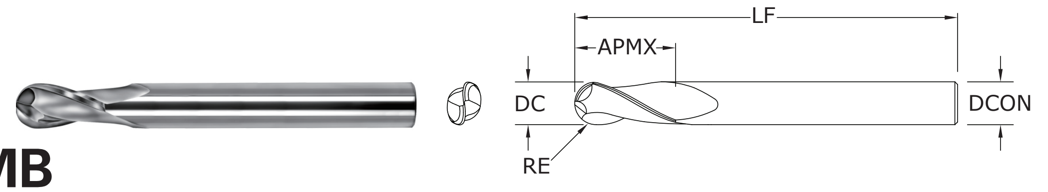
DC = –0.0000/–0.0020
DCON = h_6
RE = +0.0000/–0.0010

- 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)



59MB

METRIC SERIES

TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,025

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

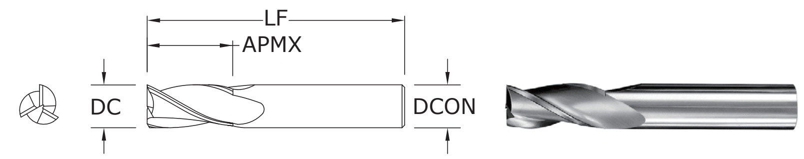
For patent information visit www.ksptpatents.com

mm				EDP NO.			
CUTTING DIAMETER 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)

FRACTIONAL

3 Flute Square End



5

FRACTIONAL SERIES

TOLERANCES (inch)

DC = –0.0000/–0.0020
DCON = h_6

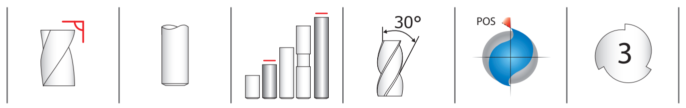
inch				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/64	1/32	1-1/2	1/8	30501	39701	30771	30811
1/32	5/64	1-1/2	1/8	30503	39703	30772	30812
3/64	7/64	1-1/2	1/8	30505	39705	30773	30813
1/16	3/16	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

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

For patent information visit www.ksptpatents.com

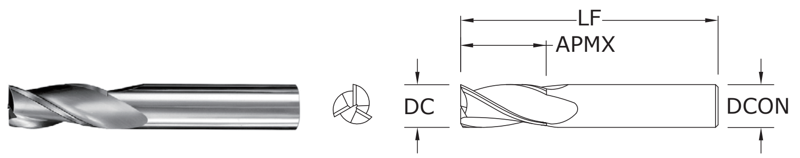
METRIC

3 Flute Square End



5M• 5XLM

METRIC SERIES



TOLERANCES (mm)

DC = +0,000/–0,050

DCON = h_6

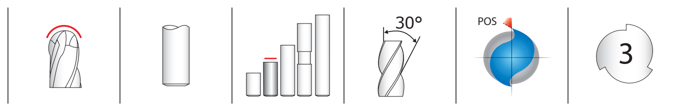
mm				EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40505	48756	48778	48799	5M
1,5	4,5	38,0	3,0	40509	48757	48779	48800	5M
2,0	6,3	38,0	3,0	40513	48758	48780	48801	5M
2,5	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

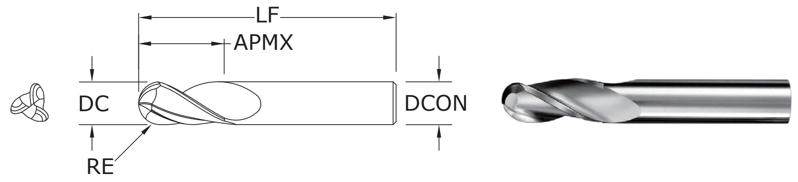


TOLERANCES (inch)

DC = –0.0000/–0.0020

DCON = h_6

RE = +0.0000/–0.0010



5B

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

RE = 1/2 Cutting Diameter (DC)

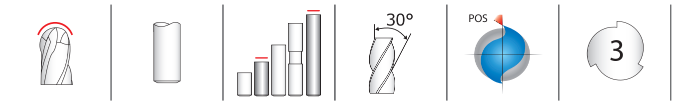
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

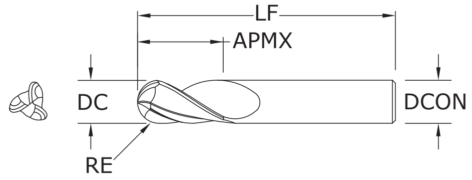
METRIC

3 Flute Ball End



5MB • 5XLMB

METRIC SERIES



TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,025

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

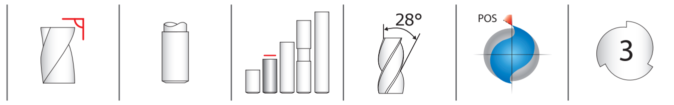
For patent information visit www.ksptpatents.com

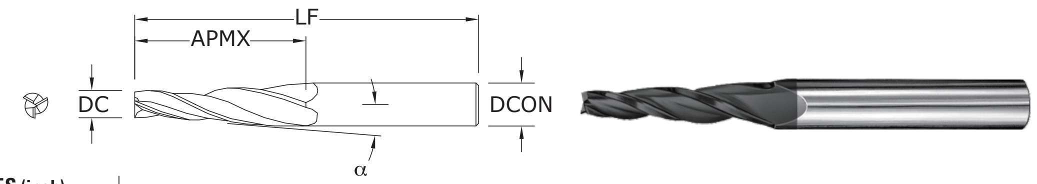
mm				EDP NO.				SERIES
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40506	48820	48842	48863	5MB
1,5	4,5	38,0	3,0	40510	48821	48843	48864	5MB
2,0	6,3	38,0	3,0	40514	48822	48844	48865	5MB
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)

FRACTIONAL

Tapered Square End





23

FRACTIONAL SERIES

TOLERANCES (inch)

DC = –0.0000/–0.0020
DCON = h_6

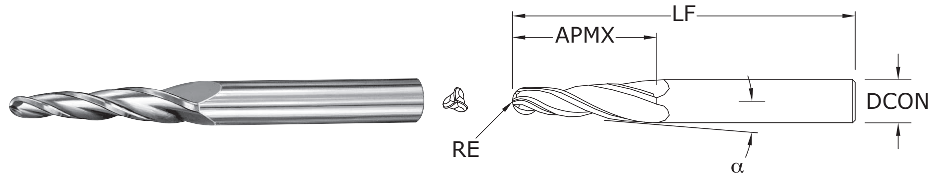
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

inch					EDP NO.			
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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

Tapered Ball End



24
FRACTIONAL SERIES

TOLERANCES (inch)

DCON = h_6
RE = +0.0000/–0.0010

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

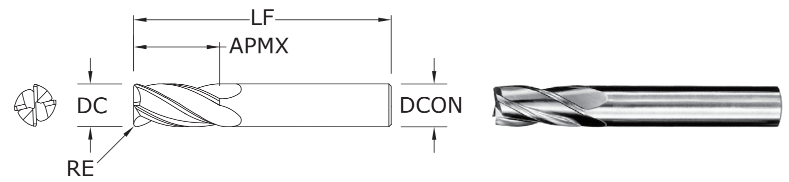
For patent information visit www.ksptpatents.com

inch					EDP NO.			
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

4 Flute Square End • 4 Flute Corner Radius

TOLERANCES (inch)

DC = +0.0000/–0.0020
1CR DC = –0.0010/–0.0020
DCON = h_6
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

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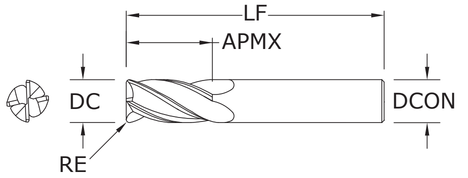
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS
NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

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 = h_6
RE = +0.000/–0.002

CONTINUED

- STEELS
- STAINLESS STEELS
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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

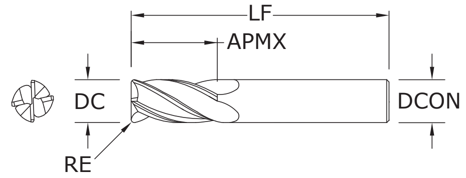
FRACTIONAL

4 Flute Square End • 4 Flute Corner Radius

KYOCERA SGS Solid Tools
SGS Solid Tools
SGS Micro Tools

TOLERANCES (inch)

DC = +0.0000/–0.0020
1CR DC = –0.0010/–0.0020
DCON = h_6
RE = +0.000/–0.002



1 • 1L • 1EL • 1CR

FRACTIONAL SERIES

CONTINUED

- STEELS
- STAINLESS STEELS
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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

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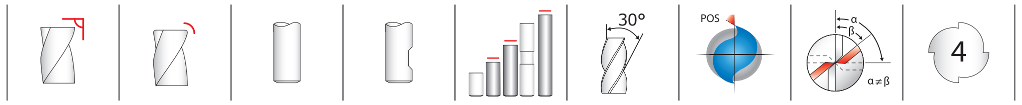
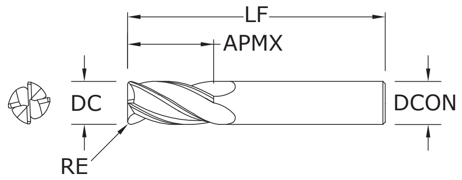
4 Flute Square End • 4 Flute Corner Radius



1 • 1L • 1EL • 1CR

FRACTIONAL SERIES



TOLERANCES (inch)

DC = +0.0000/–0.0020
1CR DC = –0.0010/–0.0020
DCON = h_6
RE = +0.000/–0.002

CONTINUED

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
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HIGH TEMP ALLOYS
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KYOCERA Solid Tools
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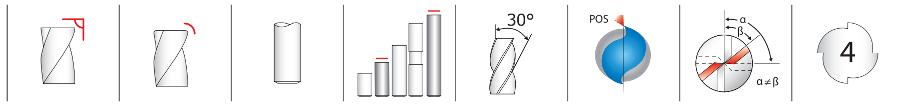
4 Flute Square End • 4 Flute Corner Radius

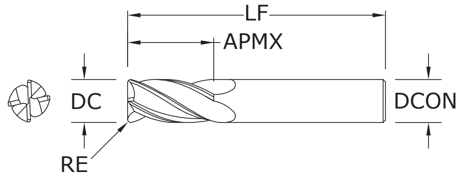


1M • 1XLM • 1MCR

METRIC SERIES

TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050



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

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STEELS
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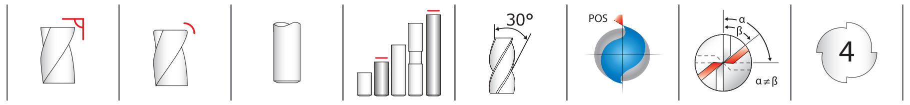
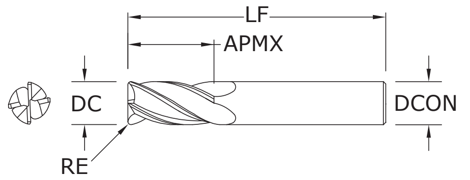


1M • 1XLM • 1MCR

METRIC SERIES



TOLERANCES (mm)

DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,050

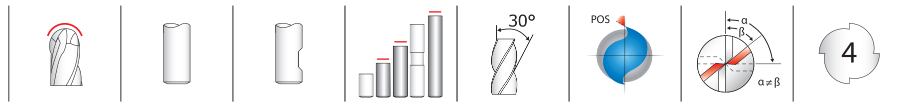
CONTINUED

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)	Ti-NAMITE-A (AlTiN)	
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

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

For patent information visit www.ksptpatents.com

4 Flute Ball End

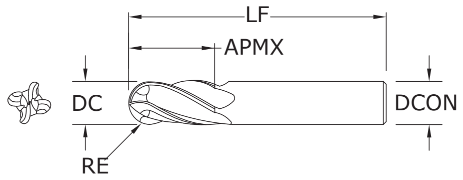


1B • 1LB • 1ELB

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	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
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HARDENED STEELS
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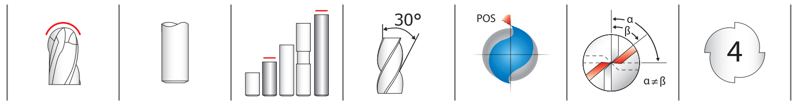
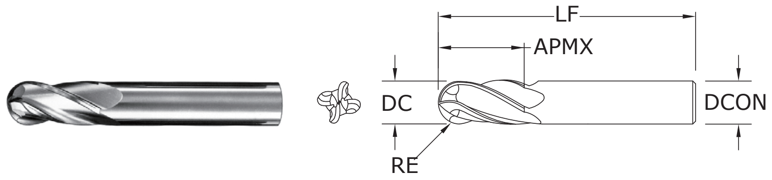
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

4 Flute Ball End



1MB • 1XLMB
METRIC SERIES



TOLERANCES (mm)
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,025

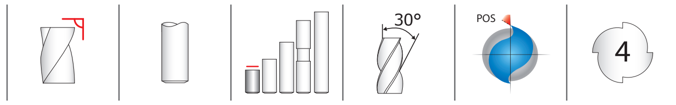
CUTTING DIAMETER DC (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	SHANK DIAMETER DCON (mm)	EDP NO. UNCOATED	EDP NO. Ti-NAMITE (TiN)	EDP NO. Ti-NAMITE-C (TiCN)	EDP NO. Ti-NAMITE-A (AlTiN)	SERIES
1,0	4,0	38,0	3,0	40106	48564	48586	48607	1MB
1,5	4,5	38,0	3,0	40110	48565	48587	48608	1MB
2,0	6,3	38,0	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)

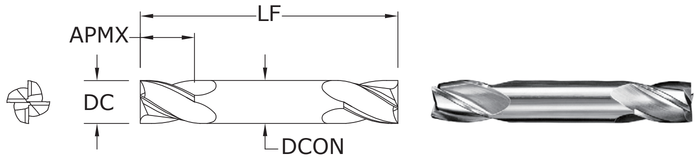
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

4 Flute Double End



14
FRACTIONAL SERIES



TOLERANCES (inch)
DC = +0.0000/–0.0020
DCON = h_6

CUTTING DIAMETER DC (inch)	LENGTH OF CUT APMX (inch)	OVERALL LENGTH LF (inch)	SHANK DIAMETER DCON (inch)	EDP NO. UNCOATED	EDP NO. Ti-NAMITE (TiN)	EDP NO. Ti-NAMITE-C (TiCN)	EDP NO. Ti-NAMITE-A (AlTiN)
1/32	1/16	1-1/2	1/8	31401	31441	39601	31170
3/64	3/32	1-1/2	1/8	31403	31443	39603	31171
1/16	1/8	1-1/2	1/8	31405	31445	39605	31172
5/64	1/8	1-1/2	1/8	31407	31447	39607	31173
3/32	3/16	1-1/2	1/8	31409	31449	39609	31174
7/64	3/16	1-1/2	1/8	31411	31451	39611	31175
*1/8	1/4	1-1/2	1/8	31413	31453	39613	31176
9/64	5/16	2	3/16	31415	31455	39615	31177
5/32	5/16	2	3/16	31417	31457	39617	31178
11/64	5/16	2	3/16	31419	31459	39619	31179
*3/16	3/8	2	3/16	31421	31461	39621	31180
13/64	1/2	2-1/2	1/4	31423	31463	39623	31181
7/32	1/2	2-1/2	1/4	31425	31465	39625	31182
15/64	1/2	2-1/2	1/4	31427	31467	39627	31183
*1/4	1/2	2-1/2	1/4	31429	31469	39629	31184
9/32	1/2	2-1/2	5/16	31431	31471	39631	31185
*5/16	1/2	2-1/2	5/16	31433	31473	39633	31186
*3/8	9/16	2-1/2	3/8	31435	31475	39635	31187
7/16	9/16	2-3/4	7/16	31437	31477	39637	31188
*1/2	5/8	3	1/2	31439	31479	39639	31189
*Series 14 Set				31489	31481	39641	31190

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

For patent information visit www.ksptpatents.com

14M
METRIC SERIES

TOLERANCES (mm)
DC = +0,000/–0,050
DCON = h_6

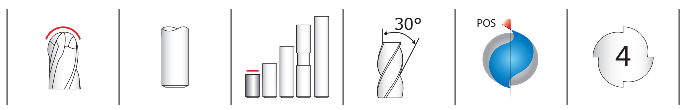
CUTTING DIAMETER DC (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	SHANK DIAMETER DCON (mm)	EDP NO. UNCOATED	EDP NO. Ti-NAMITE (TiN)	EDP NO. Ti-NAMITE-C (TiCN)	EDP NO. Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41405	48884	48905	48926
1,5	3,0	38,0	3,0	41409	48885	48906	48927
2,0	4,0	38,0	3,0	41413	48886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

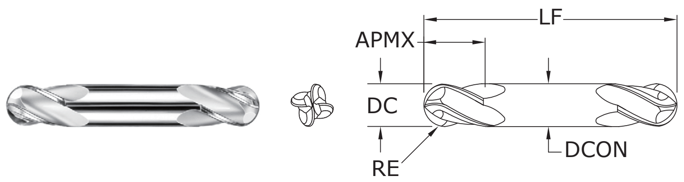
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

FRACTIONAL & METRIC

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
*Series 14B Set				31490	31482	39642	31217

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

14MB
METRIC SERIES

TOLERANCES (mm)
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,025

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)

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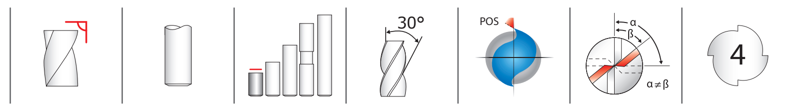
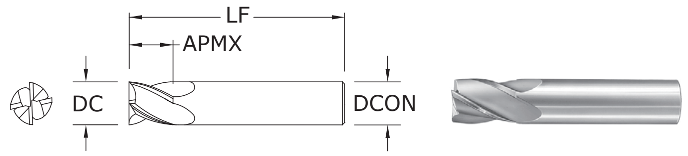
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

FRACTIONAL & METRIC

4 Flute Square End Stub





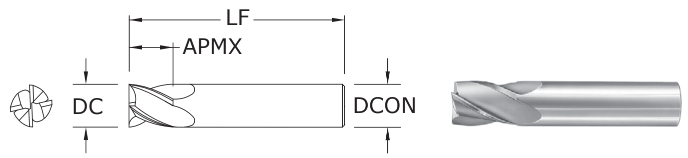
16
FRACTIONAL SERIES

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	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

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

For patent information visit www.ksptpatents.com



16M
METRIC SERIES

TOLERANCES (mm)
DC = +0,000/–0,050
DCON = h_6

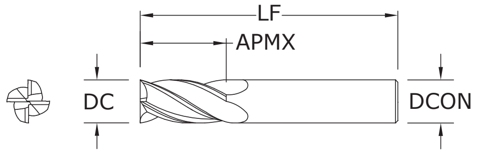
mm				EDP NO.			
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41605	49136	49157	49178
1,5	3,0	38,0	3,0	41609	49137	49158	49179
2,0	4,0	38,0	3,0	41613	49138	49159	49180
2,5	5,0	38,0	3,0	41617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

- 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



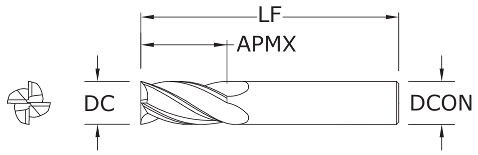
TOLERANCES (inch)
DC = +0.0000/–0.0020
DCON = h_6

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-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



TOLERANCES (mm)
DC = +0,000/–0,050
DCON = h_6
RE = +0,000/–0,025

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	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

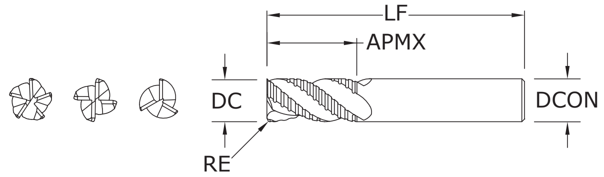
FRACTIONAL & METRIC

Single End Roughers (Coarse Pitch)

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

61
FRACTIONAL SERIES

TOLERANCES (inch)
DC = +0.0000/–0.0040
DCON = h_6
RE = +0.0050/–0.0050



STEELS
CAST IRON
HARDENED STEELS

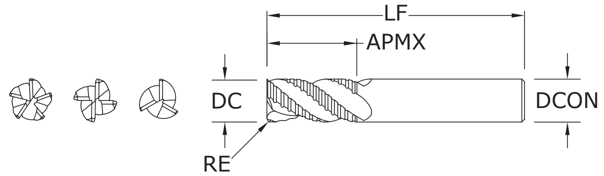
For patent information visit www.ksptpatents.com

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

61M
METRIC SERIES

TOLERANCES h10 (mm)
DC = +0,000 / –0,100
DCON = h_6
RE = +0,127/–0,127



STEELS
CAST IRON
HARDENED STEELS

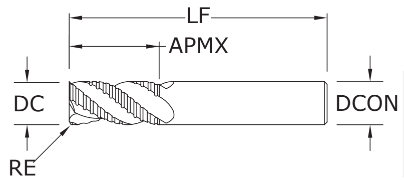
For patent information visit www.ksptpatents.com

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

FRACTIONAL

Single End Roughers (Fine Pitch)

62
FRACTIONAL SERIES



TOLERANCES (inch)

DC = +0.0000/–0.0040
DCON = h_6
RE = +0.0050/–0.0050

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

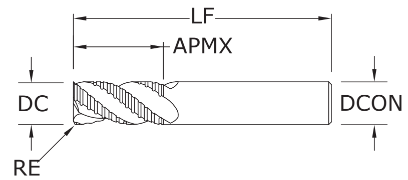
METRIC

Single End Roughers (Fine Pitch)

62M
METRIC SERIES

TOLERANCES h10 (mm)

DC = +0,000 / –0,100
DCON = h_6
RE = +0,127/–0,127

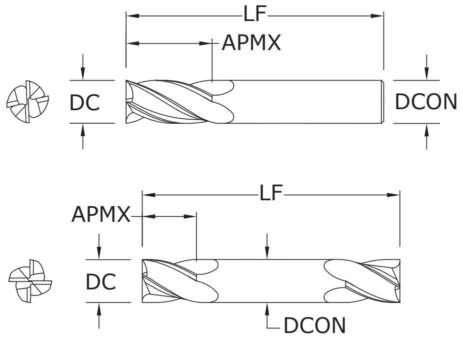


STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM

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

End Mill Sets

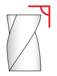


Pictured:
Series 1 4 Flute Single End Square Endmill Set

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

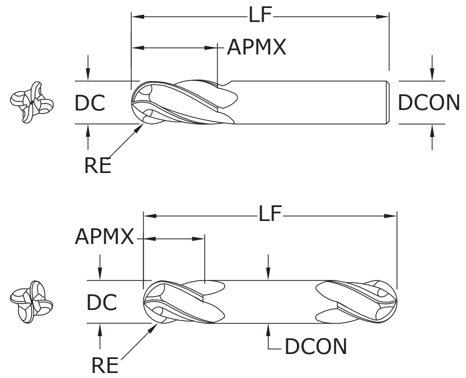
FRACTIONAL SERIES



For patent information visit www.ksptpatents.com

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

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

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

Diamond 1, 1B, 3, 3B Fractional		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/8	1/4	5/16	3/8	1/2
GRAPHITE Ultrafine, Superfine	Profile	≤ 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
	Slot	≤ 1	≤ 1	580	RPM	17725	8862	7090	5908	4431
				(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
COMPOSITES FRP, CFRP, GRP	Profile	≤ 0.25	≤ 1.5	385	RPM	11766	5883	4706	3922	2941
				(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
	Slot	≤ 1	≤ 1	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
PLASTICS Polycarbonate, PVC, Polypropylene	Profile	≤ 0.25	≤ 1.5	1200	RPM	36672	18336	14669	12224	9168
				(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
	Slot	≤ 1	≤ 1	960	RPM	29338	14669	11735	9779	7334
				(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

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)

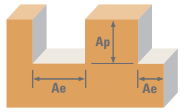
2 Flute: Square, Double, Stub, Long, Ball, Corner Radius
3 Flute: Square, Ball, Tapered
4 Flute: Square, Double, Stub, Ball, Corner Radius
Tapered: Square, Radius

	Series 1, 3, 5, 14, 15, 16, 17, 23, 24, 59 Fractional	Hardness		Flutes	Ae x DC	Ap x DC	Vc (sfm)		DC • in 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	Profile				460	RPM	112461	56230	28115	14058	7029	4686	3514	2343	1757
							(368-552)	Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	≤ 0.50	≤ 1.5		Feed (ipm)	6.7	6.7	7.3	8.4	11.2	14.1	14.1	11.2	9.8
				3	≤ 0.25	≤ 1.5			10.1	10.1	11.0	12.7	16.9	21.1	21.1	16.9	14.8
				4	≤ 0.25	≤ 1.5			13.5	13.5	14.6	16.9	22.5	28.1	28.1	22.5	19.7
			Slot				335	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280
							(268-402)	Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	1	≤ 1		Feed (ipm)	4.9	4.9	5.3	6.1	8.2	10.2	10.2	8.2	7.2
				3	1	≤ 0.5			7.4	7.4	8.0	9.2	12.3	15.4	15.4	12.3	10.7
				4	1	≤ 0.4			9.8	9.8	10.6	12.3	16.4	20.5	20.5	16.4	14.3
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	Profile				335	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280
							(268-402)	Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	≤ 0.50	≤ 1.5		Feed (ipm)	3.3	4.1	3.7	4.1	6.1	7.5	7.7	6.1	5.4
				3	≤ 0.25	≤ 1.5			4.9	6.1	5.5	6.1	9.2	11.3	11.5	9.2	8.1
				4	≤ 0.25	≤ 1.5			6.6	8.2	7.4	8.2	12.3	15.0	15.4	12.3	10.7
			Slot				245	RPM	59898	29949	14974	7487	3744	2496	1872	1248	936
							(196-294)	Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	1	≤ 1		Feed (ipm)	2.4	3.0	2.7	3.0	4.5	5.5	5.6	4.5	3.9
				3	1	≤ 0.5			3.6	4.5	4.0	4.5	6.7	8.2	8.4	6.7	5.9
				4	1	≤ 0.4			4.8	6.0	5.4	6.0	9.0	11.0	11.2	9.0	7.9
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F 440F	≤ 275 Bhn or ≤ 28 HRc	Profile				370	RPM	90458	45229	22614	11307	5654	3769	2827	1885	1413
							(296-444)	Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	≤ 0.50	≤ 1.5		Feed (ipm)	3.6	4.5	4.1	4.5	6.8	8.3	8.5	6.8	5.9
				3	≤ 0.25	≤ 1.5			5.4	6.8	6.1	6.8	10.2	12.4	12.7	10.2	8.9
				4	≤ 0.25	≤ 1.5			7.2	9.0	8.1	9.0	13.6	16.6	17.0	13.6	11.9
			Slot				270	RPM	66010	33005	16502	8251	4126	2750	2063	1375	1031
							(216-324)	Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	1	≤ 1		Feed (ipm)	2.6	3.3	3.0	3.3	5.0	6.1	6.2	5.0	4.3
				3	1	≤ 0.5			4.0	5.0	4.5	5.0	7.4	9.1	9.3	7.4	6.5
				4	1	≤ 0.4			5.3	6.6	5.9	6.6	9.9	12.1	12.4	9.9	8.7
	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4 PH, 15-5, 13-4, Custom 450	≤ 275 Bhn or ≤ 28 HRc	Profile				255	RPM	62342	31171	15586	7793	3896	2598	1948	1299	974
							(204-306)	Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
				2	≤ 0.50	≤ 1.5		Feed (ipm)	2.5	2.5	2.5	2.6	3.9	4.7	4.7	3.6	3.3
				3	≤ 0.25	≤ 1.5			3.7	3.7	3.7	4.0	5.8	7.0	7.0	5.5	5.0
				4	≤ 0.25	≤ 1.5			5.0	5.0	5.0	5.3	7.8	9.4	9.4	7.3	6.6
			Slot				185	RPM	45229	22614	11307	5654	2827	1885	1413	942	707
							(148-222)	Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
				2	1	≤ 1		Feed (ipm)	1.8	1.8	1.8	1.9	2.8	3.4	3.4	2.6	2.4
				3	1	≤ 0.5			2.7	2.7	2.7	2.9	4.2	5.1	5.1	4.0	3.6
				4	1	≤ 0.4			3.6	3.6	3.6	3.8	5.7	6.8	6.8	5.3	4.8
K	**CAST IRONS** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile				335	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280
							(268-402)	Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	≤ 0.50	≤ 1.5		Feed (ipm)	4.9	4.9	5.3	6.1	8.2	10.2	10.2	8.2	7.2
				3	≤ 0.25	≤ 1.5			7.4	7.4	8.0	9.2	12.3	15.4	15.4	12.3	10.7
				4	≤ 0.25	≤ 1.5			9.8	9.8	10.6	12.3	16.4	20.5	20.5	16.4	14.3
			Slot				245	RPM	59898	29949	14974	7487	3744	2496	1872	1248	936
							(196-294)	Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	1	≤ 1		Feed (ipm)	3.6	3.6	3.9	4.5	6.0	7.5	7.5	6.0	5.2
				3	1	≤ 0.5			5.4	5.4	5.8	6.7	9.0	11.2	11.2	9.0	7.9
				4	1	≤ 0.4			7.2	7.2	7.8	9.0	12.0	15.0	15.0	12.0	10.5
N	**ALUMINUM ALLOYS** 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile				880	RPM	215142	107571	53786	26893	13446	8964	6723	4482	3362
							(704-1056)	Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
				2	≤ 0.50	≤ 1.5		Feed (ipm)	25.8	28.0	26.9	32.3	43.0	53.8	53.8	43.0	37.6
				3	≤ 0.25	≤ 1.5			38.7	42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5
			Slot				640	RPM	156467	78234	39117	19558	9779	6519	4890	3260	2445
							(512-768)	Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
				2	1	≤ 1		Feed (ipm)	18.8	20.3	19.6	23.5	31.3	39.1	39.1	31.3	27.4
				3	1	≤ 0.5			28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile				485	RPM	118573	59286	29643	14822	7411	4941	3705	2470	1853
							(388-582)	Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	≤ 0.50	≤ 1.5		Feed (ipm)	7.1	7.1	7.7	8.9	11.9	14.8	14.8	11.9	10.4
				3	≤ 0.25	≤ 1.5			10.7	10.7	11.6	13.3	17.8	22.2	22.2	17.8	15.6
				4	≤ 0.25	≤ 1.5			14.2	14.2	15.4	17.8	23.7	29.6	29.6	23.7	20.8
			Slot				350	RPM	85568	42784	21392	10696	5348	3565	2674	1783	1337
							(280-420)	Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	1	≤ 1		Feed (ipm)	5.1	5.1	5.6	6.4	8.6	10.7	10.7	8.6	7.5
				3	1	≤ 0.5			7.7	7.7	8.3	9.6	12.8	16.0	16.0	12.8	11.2
				4	1	≤ 0.4			10.3	10.3	11.1	12.8	17.1	21.4	21.4	17.1	15.0

continued on next page

FRACTIONAL

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



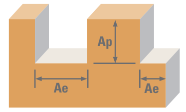
DC • in

	Series 1, 3, 5, 14, 15, 16, 17, 23, 24, 59 Fractional	Hardness		Flutes	Ae x DC	Ap x DC	Vc (sfm)		1/64	1/32	1/16	1/8	1/4	3/8	1/2	3/4	1
N	**PLASTICS** Polycarbonate, PVC, Polypropylene		Profile				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
				2	≤ 0.50	≤ 1.5	(704-1056)	Feed (ipm)	25.8	28.0	26.9	32.3	43.0	53.8	53.8	43.0	37.6
				3	≤ 0.25	≤ 1.5			38.7	42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5
				4	≤ 0.25	≤ 1.5			51.6	55.9	53.8	64.5	86.1	107.6	107.6	86.1	75.3
			Slot				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
				2	1	≤ 1	(512-768)	Feed (ipm)	18.8	20.3	19.6	23.5	31.3	39.1	39.1	31.3	27.4
				3	1	≤ 0.5			28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1
				4	1	≤ 0.4			37.6	40.7	39.1	46.9	62.6	78.2	78.2	62.6	54.8
	GRAPHITE		Profile				660	RPM	161357	80678	40339	20170	10085	6723	5042	3362	2521
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
				2	≤ 0.50	≤ 1.5	(528-792)	Feed (ipm)	19.4	21.0	20.2	24.2	32.3	40.3	40.3	32.3	28.2
				3	≤ 0.25	≤ 1.5			29.0	31.5	30.3	36.3	48.4	60.5	60.5	48.4	42.4
				4	≤ 0.25	≤ 1.5			38.7	42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5
			Slot				480	RPM	117350	58675	29338	14669	7334	4890	3667	2445	1834
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
				2	1	≤ 1	(384-576)	Feed (ipm)	14.1	15.3	14.7	17.6	23.5	29.3	29.3	23.5	20.5
				3	1	≤ 0.5			21.1	22.9	22.0	26.4	35.2	44.0	44.0	35.2	30.8
				4	1	≤ 0.4			28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, 718, Incoloy 800, Monel 400,Rene, Waspalloy	≤ 300 Bhn or ≤ 32 HRc	Profile				65	RPM	15891	7946	3973	1986	993	662	497	331	248
								Fz	0.00002	0.00003	0.00006	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014
				2	≤ 0.50	≤ 1.5	(52-78)	Feed (ipm)	0.6	0.5	0.5	0.7	0.7	1.1	1.0	0.8	0.7
				3	≤ 0.25	≤ 1.5			1.0	0.7	0.7	1.1	1.0	1.6	1.5	1.2	1.0
				4	≤ 0.25	≤ 1.5			1.3	1.0	1.0	1.4	1.4	2.1	2.0	1.6	1.4
			Slot				45	RPM	11002	5501	2750	1375	688	458	344	229	172
								Fz	0.00002	0.00003	0.00006	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014
				2	1	≤ 1	(36-54)	Feed (ipm)	0.4	0.3	0.3	0.5	0.5	0.7	0.7	0.6	0.5
				3	1	≤ 0.5			0.7	0.5	0.5	0.7	0.7	1.1	1.0	0.8	0.7
				4	1	≤ 0.4			0.9	0.7	0.7	1.0	1.0	1.5	1.4	1.1	1.0
	TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	≤ 350 Bhn or ≤ 38 HRc	Profile				180	RPM	44006	22003	11002	5501	2750	1834	1375	917	688
								Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
				2	≤ 0.50	≤ 1.5	(144-216)	Feed (ipm)	1.8	1.8	1.8	2.2	2.8	3.3	3.3	2.6	2.3
				3	≤ 0.25	≤ 1.5			2.6	2.6	2.6	3.3	4.1	5.0	5.0	3.9	3.5
				4	≤ 0.25	≤ 1.5			3.5	3.5	3.5	4.4	5.5	6.6	6.6	5.1	4.7
			Slot				130	RPM	31782	15891	7946	3973	1986	1324	993	662	497
								Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
				2	1	≤ 1	(104-156)	Feed (ipm)	1.3	1.3	1.3	1.6	2.0	2.4	2.4	1.9	1.7
				3	1	≤ 0.5			1.9	1.9	1.9	2.4	3.0	3.6	3.6	2.8	2.5
				4	1	≤ 0.4			2.5	2.5	2.5	3.2	4.0	4.8	4.8	3.7	3.4
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	Profile				315	RPM	77011	38506	19253	9626	4813	3209	2407	1604	1203
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	≤ 0.50	≤ 1.5	(252-378)	Feed (ipm)	3.1	3.9	3.5	3.9	5.8	7.1	7.2	5.8	5.1
				3	≤ 0.25	≤ 1.5			4.6	5.8	5.2	5.8	8.7	10.6	10.8	8.7	7.6
				4	≤ 0.25	≤ 1.5			6.2	7.7	6.9	7.7	11.6	14.1	14.4	11.6	10.1
			Slot				230	RPM	56230	28115	14058	7029	3514	2343	1757	1171	879
								Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	1	≤ 1	(184-276)	Feed (ipm)	2.2	2.8	2.5	2.8	4.2	5.2	5.3	4.2	3.7
				3	1	≤ 0.5			3.4	4.2	3.8	4.2	6.3	7.7	7.9	6.3	5.5
				4	1	≤ 0.4			4.5	5.6	5.1	5.6	8.4	10.3	10.5	8.4	7.4

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
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.kyocera-sgstool.com)

FRACTIONAL

2 Flute: High Shear
4 Flute: High Shear

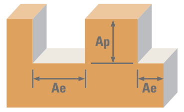


DC • in

	Series 52, 54 Fractional	Hardness		Flutes	Ae x DC	Ap x DC	Vc (sfm)		1/8	1/4	3/8	1/2	3/4	1
N	**ALUMINUM ALLOYS** 2024, 5052, 5086, 6061, 6063, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile				1360	RPM	41562	20781	13854	10390	6927	5195
								Fz	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
				2	≤ 0.3	≤ 1.5	(1088-1632)	Feed (ipm)	57.4	74.8	94.2	95.6	76.2	66.5
				4	≤ 0.3	≤ 1.5			114.7	149.6	188.4	191.2	152.4	133.0
			Slot				1090	RPM	33310	16655	11103	8328	5552	4164
								Fz	0.00063	0.0017	0.0032	0.0042	0.0050	0.0059
				2	1	≤ 1	(872-1308)	Feed (ipm)	42.0	56.6	71.1	70.0	55.5	49.1
				4	1	≤ 0.25			83.9	113.3	142.1	139.9	111.0	98.3
	ALUMINUM DIE CAST ALLOYS (HIGH SILICON) A-390, A-392, B-390	≤ 125 Bhn or ≤ 77 HRb	Profile				510	RPM	15586	7793	5195	3896	2598	1948
								Fz	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
				2	≤ 0.3	≤ 1.5	(408-612)	Feed (ipm)	21.5	28.1	35.3	35.8	28.6	24.9
				4	≤ 0.3	≤ 1.5			43.0	56.1	70.7	71.7	57.1	49.9
			Slot				410	RPM	12530	6265	4177	3132	2088	1566
								Fz	0.00063	0.0017	0.0032	0.0042	0.0050	0.0059
				2	1	≤ 1	(328-492)	Feed (ipm)	15.8	21.3	26.7	26.3	20.9	18.5
				4	1	≤ 0.25			31.6	42.6	53.5	52.6	41.8	37.0
	COPPER ALLOYS Aluminum Bronze, Muntz Brass, Naval, Brass, Red Brass	≤ 140 Bhn or ≤ 3 HRc	Profile				590	RPM	18030	9015	6010	4508	3005	2254
								Fz	0.00039	0.0010	0.0020	0.0026	0.0031	0.0037
				2	≤ 0.3	≤ 1.5	(472-708)	Feed (ipm)	14.1	18.0	24.0	23.4	18.6	16.7
				4	≤ 0.3	≤ 1.5			28.1	36.1	48.1	46.9	37.3	33.4
			Slot				475	RPM	14516	7258	4839	3629	2419	1815
								Fz	0.00036	0.0010	0.0018	0.0024	0.0029	0.0034
				2	1	≤ 1	(380-570)	Feed (ipm)	10.5	14.5	17.4	17.4	14.0	12.3
				4	1	≤ 0.25			20.9	29.0	34.8	34.8	28.1	24.7
	COPPER ALLOYS Beryllium Copper, C110, Manganese Bronze, Tin Bronze	≤ 200 Bhn or ≤ 23 HRc	Profile				235	RPM	7182	3591	2394	1795	1197	898
								Fz	0.00039	0.0010	0.0020	0.0026	0.0031	0.0037
				2	≤ 0.3	≤ 1.5	(188-282)	Feed (ipm)	5.6	7.2	9.6	9.3	7.4	6.6
				4	≤ 0.3	≤ 1.5			11.2	14.4	19.2	18.7	14.8	13.3
			Slot				190	RPM	5806	2903	1935	1452	968	726
								Fz	0.00036	0.0010	0.0018	0.0024	0.0029	0.0034
				2	1	≤ 1	(152-228)	Feed (ipm)	4.2	5.8	7.0	7.0	5.6	4.9
				4	1	≤ 0.25			8.4	11.6	13.9	13.9	11.2	9.9
	PLASTICS ABS, Polycarbonate, PVC, Polypropylene		Profile				1600	RPM	48896	24448	16299	12224	8149	6112
								Fz	0.00110	0.0030	0.0056	0.0074	0.0089	0.0100
				2	≤ 0.3	≤ 1.5	(1280-1920)	Feed (ipm)	107.6	146.7	182.5	180.9	145.1	122.2
				4	≤ 0.3	≤ 1.5			215.1	293.4	365.1	361.8	290.1	244.5
			Slot				1280	RPM	39117	19558	13039	9779	6519	4890
								Fz	0.00100	0.0027	0.0051	0.0068	0.0082	0.0095
				2	1	≤ 1	(1024-1536)	Feed (ipm)	78.2	105.6	133.0	133.0	106.9	92.9
				4	1	≤ 0.25			156.5	211.2	266.0	266.0	213.8	185.8
	PLASTICS Fiberglass, Glass Filled		Profile				720	RPM	22003	11002	7334	5501	3667	2750
								Fz	0.00082	0.0022	0.0041	0.0055	0.0065	0.0076
				2	≤ 0.3	≤ 1.5	(576-864)	Feed (ipm)	36.1	48.4	60.1	60.5	47.7	41.8
				4	≤ 0.3	≤ 1.5			72.2	96.8	120.3	121.0	95.3	83.6
			Slot				575	RPM	17572	8786	5857	4393	2929	2197
								Fz	0.00075	0.0020	0.0037	0.0050	0.0060	0.0070
				2	1	≤ 1	(460-690)	Feed (ipm)	26.4	35.1	43.3	43.9	35.1	30.8
				4	1	≤ 0.25			52.7	70.3	86.7	87.9	70.3	61.5

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = (Vc x 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.kyocera-sgstool.com)

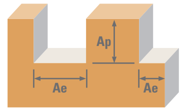
Single End Roughers (Coarse Pitch)



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

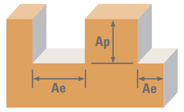
Single End Roughers (Fine Pitch)



Group	Series 62 Fractional	Hardness	Operation	Ae x DC	Ap x DC	Vc (sfm)		DC • in 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



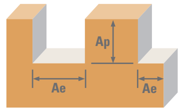
DC • mm

	Series 1M, 3M, 5M, 14M, 15M, 16M, 17M, 59M Metric	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				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
				2	≤ 0.50	≤ 1.5	(112-168)	Feed (mm/min)	178	178	184	208	282	357	357	285	250
				3	≤ 0.25	≤ 1.5			268	268	276	312	424	535	535	428	375
				4	≤ 0.25	≤ 1.5			357	357	369	416	565	713	713	571	499
			Slot				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
				2	1	≤ 1	(82-123)	Feed (mm/min)	130	130	134	152	206	260	260	208	182
				3	1	≤ 0.5			195	195	201	227	309	390	390	312	273
				4	1	≤ 0.4			260	260	268	303	411	520	520	416	364
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	Profile				102	RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299
								Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
				2	≤ 0.50	≤ 1.5	(82-123)	Feed (mm/min)	81	104	95	130	152	188	195	156	135
				3	≤ 0.25	≤ 1.5			122	156	143	195	227	283	292	234	203
				4	≤ 0.25	≤ 1.5			162	208	191	260	303	377	390	312	270
			Slot				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
				2	1	≤ 1	(60-90)	Feed (mm/min)	59	76	70	95	111	138	143	114	99
				3	1	≤ 0.5			119	152	139	190	222	276	285	228	198
				4	1	≤ 0.4			119	152	139	190	222	276	285	228	198
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275 Bhn or ≤ 28 HRc	Profile				113	RPM	89671	47825	23912	11956	5978	3587	2989	1793	1435
								Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
				2	≤ 0.50	≤ 1.5	(90-135)	Feed (mm/min)	90	115	105	143	167	208	215	172	149
				3	≤ 0.25	≤ 1.5			135	172	158	215	251	312	323	258	224
				4	≤ 0.25	≤ 1.5			179	230	210	287	335	416	430	344	298
			Slot				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
				2	1	≤ 1	(66-99)	Feed (mm/min)	65	84	77	105	122	152	157	126	109
				3	1	≤ 0.5			98	126	115	157	183	228	236	188	163
				4	1	≤ 0.4			131	168	154	209	244	304	314	251	218
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4 PH, 15-5, 13-4, Custom 450	≤ 275 Bhn or ≤ 28 HRc	Profile				78	RPM	61800	32960	16480	8240	4120	2472	2060	1236	989
								Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
				2	≤ 0.50	≤ 1.5	(62-93)	Feed (mm/min)	62	66	63	66	99	119	119	91	83
				3	≤ 0.25	≤ 1.5			93	99	94	99	148	178	179	137	125
				4	≤ 0.25	≤ 1.5			124	132	125	132	198	237	239	183	166
			Slot				56	RPM	44836	23912	11956	5978	2989	1793	1495	897	717
								Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
				2	1	≤ 1	(45-68)	Feed (mm/min)	45	48	45	48	72	86	87	66	60
				3	1	≤ 0.5			67	72	68	72	108	129	130	100	90
				4	1	≤ 0.4			90	96	91	96	143	172	173	133	121
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile				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
				2	≤ 0.50	≤ 1.5	(82-123)	Feed (mm/min)	130	130	134	152	206	260	260	208	182
				3	≤ 0.25	≤ 1.5			195	195	201	227	309	390	390	312	273
				4	≤ 0.25	≤ 1.5			260	260	268	303	411	520	520	416	364
			Slot				75	RPM	59377	31668	15834	7917	3958	2375	1979	1188	950
								Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
				2	1	≤ 1	(60-90)	Feed (mm/min)	95	95	98	111	150	190	190	152	133
				3	1	≤ 0.5			143	143	147	166	226	285	285	228	200
				4	1	≤ 0.4			190	190	196	222	301	380	380	304	266
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile				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
				2	≤ 0.50	≤ 1.5	(215-322)	Feed (mm/min)	640	728	682	796	1081	1365	1365	1092	955
				3	≤ 0.25	≤ 1.5			960	1092	1024	1194	1621	2047	2047	1638	1433
			Slot				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
				2	1	≤ 1	(156-234)	Feed (mm/min)	465	529	496	579	786	993	993	794	695
				3	1	≤ 0.5			698	794	745	869	1179	1489	1489	1191	1042

continued on next page

METRIC

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



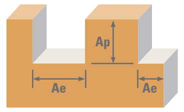
DC • mm

	Series 1M, 3M, 5M, 14M, 15M, 16M, 17M, 59M Metric	Hardness		Flutes	Ae x DC	Ap x DC	Vc (m/min)		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				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
				2	≤ 0.50	≤ 1.5	(118-177)	Feed (mm/min)	188	188	194	219	298	376	376	301	263
				3	≤ 0.25	≤ 1.5			282	282	292	329	447	564	564	451	395
				4	≤ 0.25	≤ 1.5			376	376	389	439	596	752	752	602	527
			Slot					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
				2	1	≤ 1		Feed (mm/min)	136	136	140	158	215	271	271	217	190
				3	1	≤ 0.5			204	204	210	238	322	407	407	326	285
				4	1	≤ 0.4			271	271	280	317	430	543	543	434	380
N	PLASTICS Polycarbonate, PVC, Polypropylene		Profile				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
				2	≤ 0.50	≤ 1.5	(215-322)	Feed (mm/min)	640	728	682	796	1081	1365	1365	1092	955
				3	≤ 0.25	≤ 1.5			960	1092	1024	1194	1621	2047	2047	1638	1433
				4	≤ 0.25	≤ 1.5			1280	1456	1365	1592	2161	2730	2730	2184	1911
			Slot				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
				2	1	≤ 1	(156-234)	Feed (mm/min)	465	529	496	579	786	993	993	794	695
				3	1	≤ 0.5			698	794	745	869	1179	1489	1489	1191	1042
				4	1	≤ 0.4			931	1059	993	1158	1572	1985	1985	1588	1390
N	GRAPHITE		Profile				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
				2	≤ 0.50	≤ 1.5	(161-241)	Feed (mm/min)	480	546	512	597	810	1024	1024	819	717
				3	≤ 0.25	≤ 1.5			720	819	768	896	1216	1536	1536	1228	1075
				4	≤ 0.25	≤ 1.5			960	1092	1024	1194	1621	2047	2047	1638	1433
			Slot				146	RPM	116330	62043	31021	15511	7755	4653	3878	2327	1861
								Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
				2	1	≤ 1	(117-176)	Feed (mm/min)	349	397	372	434	589	745	745	596	521
				3	1	≤ 0.5			523	596	558	651	884	1117	1117	893	782
				4	1	≤ 0.4			698	794	745	869	1179	1489	1489	1191	1042
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, 718, Incoloy 800, Monel 400,Rene, Waspalloy	≤ 300 Bhn or ≤ 32 HRc	Profile				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
				2	≤ 0.50	≤ 1.5	(16-24)	Feed (mm/min)	16	12	12	17	21	26	25	20	18
				3	≤ 0.25	≤ 1.5			24	18	18	25	32	40	38	30	26
				4	≤ 0.25	≤ 1.5			32	24	24	34	42	53	50	40	35
			Slot				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
				2	1	≤ 1	(11-16)	Feed (mm/min)	11	8	8	12	15	18	17	14	12
				3	1	≤ 0.5			16	12	12	17	22	27	26	21	18
				4	1	≤ 0.4			22	16	16	23	29	37	35	28	24
S	TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	≤ 350 Bhn or ≤ 38 HRc	Profile				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
				2	≤ 0.50	≤ 1.5	(44-66)	Feed (mm/min)	44	47	44	47	70	84	84	65	59
				3	≤ 0.25	≤ 1.5			65	70	66	70	105	126	127	97	88
				4	≤ 0.25	≤ 1.5			87	93	88	93	140	168	169	129	117
			Slot				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
				2	1	≤ 1	(32-48)	Feed (mm/min)	32	34	32	34	50	60	61	47	42
				3	1	≤ 0.5			47	50	48	50	76	91	91	70	64
				4	1	≤ 0.4			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				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
				2	≤ 0.50	≤ 1.5	(77-115)	Feed (mm/min)	76	98	90	122	143	177	183	147	127
				3	≤ 0.25	≤ 1.5			115	147	134	183	214	266	275	220	191
				4	≤ 0.25	≤ 1.5			153	195	179	244	285	354	366	293	254
			Slot				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
				2	1	≤ 1	(56-84)	Feed (mm/min)	56	71	65	89	104	129	134	107	93
				3	1	≤ 0.5			84	107	98	134	156	194	201	161	139
				4	1	≤ 0.4			111	143	131	178	208	259	268	214	186

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

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-sgstool.com)

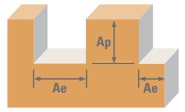
2 Flute: High Shear
4 Flute: High Shear



Series 52M, 54M Metric	Hardness		Flutes	Ae x DC	Ap x DC	Vc (m/min)	DC • mm	3	6	10	12	20	25
N													
ALUMINUM ALLOYS **2024, 5052, 5086, 6061, 6063, 7075**	≤ 150 Bhn or ≤ 7 HRc	Profile				415	RPM	43947	21973	13184	10987	6592	5274
							Fz	0.0166	0.043	0.091	0.110	0.147	0.160
			2	≤ 0.3	≤ 1.5	(332-497)	Feed (mm/min)	1459	1890	2399	2417	1938	1688
			4	≤ 0.3	≤ 1.5			2918	3779	4799	4834	3876	3375
		Slot				332	RPM	35222	17611	10567	8806	5283	4227
							Fz	0.0151	0.041	0.085	0.101	0.133	0.148
			2	1	≤ 1	(266-399)	Feed (mm/min)	1064	1444	1796	1779	1405	1251
			4	1	≤ 0.25			2127	2888	3593	3557	2811	2502
ALUMINUM DIE CAST ALLOYS (HIGH SILICON) **A-390, A-392, B-390**	≤ 125 Bhn or ≤ 77 HRb	Profile				155	RPM	16480	8240	4944	4120	2472	1978
							Fz	0.0166	0.043	0.091	0.110	0.147	0.160
			2	≤ 0.3	≤ 1.5	(124-187)	Feed (mm/min)	547	709	900	906	727	633
			4	≤ 0.3	≤ 1.5			1094	1417	1800	1813	1454	1266
		Slot				125	RPM	13249	6624	3975	3312	1987	1590
							Fz	0.0151	0.041	0.085	0.101	0.133	0.148
			2	1	≤ 1	(100-150)	Feed (mm/min)	400	543	676	669	529	471
			4	1	≤ 0.25			800	1086	1351	1338	1057	941
COPPER ALLOYS **Aluminum Bronze, Muntz Brass, Naval, Brass, Red Brass**	≤ 140 Bhn or ≤ 3 HRc	Profile				180	RPM	19065	9533	5720	4766	2860	2288
							Fz	0.0094	0.024	0.053	0.062	0.083	0.093
			2	≤ 0.3	≤ 1.5	(144-216)	Feed (mm/min)	358	458	606	591	475	426
			4	≤ 0.3	≤ 1.5			717	915	1213	1182	949	851
		Slot				145	RPM	15349	7675	4605	3837	2302	1842
							Fz	0.0086	0.024	0.048	0.058	0.077	0.085
			2	1	≤ 1	(116-174)	Feed (mm/min)	264	368	442	445	355	313
			4	1	≤ 0.25			528	737	884	890	709	626
COPPER ALLOYS **Beryllium Copper, C110, Manganese Bronze, Tin Bronze**	≤ 200 Bhn or ≤ 23 HRc	Profile				72	RPM	7594	3797	2278	1898	1139	911
							Fz	0.0094	0.024	0.053	0.062	0.083	0.093
			2	≤ 0.3	≤ 1.5	(57-86)	Feed (mm/min)	143	182	241	235	189	169
			4	≤ 0.3	≤ 1.5			286	365	483	471	378	339
		Slot				58	RPM	6140	3070	1842	1535	921	737
							Fz	0.0086	0.024	0.048	0.058	0.077	0.085
			2	1	≤ 1	(46-69)	Feed (mm/min)	106	147	177	178	142	125
			4	1	≤ 0.25			211	295	354	356	284	250

continued on next page

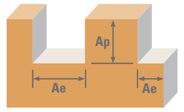
2 Flute: High Shear
4 Flute: High Shear



Series 52M, 54M Metric	Hardness		Flutes	Ae x DC	Ap x DC	Vc (m/min)	DC • mm	3	6	10	12	20	25
N													
PLASTICS **ABS, Polycarbonate, PVC, Polypropylene**		Profile				488	RPM	51702	25851	15511	12926	7755	6204
							Fz	0.0264	0.072	0.149	0.178	0.237	0.250
			2	≤ 0.3	≤ 1.5	(390-585)	Feed (mm/min)	2730	3723	4622	4601	3676	3102
			4	≤ 0.3	≤ 1.5			5460	7445	9244	9203	7352	6204
		Slot				390	RPM	41362	20681	12409	10340	6204	4963
							Fz	0.0240	0.065	0.136	0.163	0.210	0.238
			2	1	≤ 1	(312-468)	Feed (mm/min)	1985	2689	3375	3371	2606	2363
			4	1	≤ 0.25			3971	5377	6750	6742	5212	4725
PLASTICS **Fiberglass, Glass Filled**		Profile				219	RPM	23266	11633	6980	5816	3490	2792
							Fz	0.0197	0.053	0.109	0.132	0.173	0.190
			2	≤ 0.3	≤ 1.5	(176-263)	Feed (mm/min)	917	1233	1522	1536	1208	1061
			4	≤ 0.3	≤ 1.5			1833	2466	3043	3071	2415	2122
		Slot				175	RPM	18580	9290	5574	4645	2787	2230
							Fz	0.0180	0.048	0.101	0.120	0.160	0.175
			2	1	≤ 1	(140-210)	Feed (mm/min)	669	892	1126	1115	892	780
			4	1	≤ 0.25			1338	1784	2252	2230	1784	1561

Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = (Vc x 1000) / (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)

Single End Roughers (Coarse Pitch)

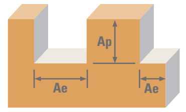


Group	Series 61M Metric	Hardness	Cut	Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	10	12	20	25
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	Profile	≤ 0.5	≤ 1.5	152 (122-183)	RPM	8078	4847	4039	2424	1939
							Fz	0.014	0.029	0.034	0.045	0.050
							Feed (mm/min)	339	422	549	436	485
			Slot	1	≤ 1	122 (98-146)	RPM	6463	3878	3231	1939	1551
							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 (89-134)	RPM	5897	3538	2949	1769	1415
							Fz	0.010	0.021	0.026	0.035	0.038
							Feed (mm/min)	177	223	307	248	269
			Slot	1	≤ 1	90 (72-108)	RPM	4766	2860	2383	1430	1144
							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 (89-134)	RPM	5897	3538	2949	1769	1415
							Fz	0.019	0.040	0.048	0.064	0.070
							Feed (mm/min)	336	425	566	453	495
			Slot	1	≤ 1	90 (72-108)	RPM	4766	2860	2383	1430	1144
							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 (84-126)	RPM	5574	3344	2787	1672	1338
							Fz	0.014	0.024	0.036	0.048	0.053
							Feed (mm/min)	234	241	401	321	355
			Slot	1	≤ 1	84 (67-101)	RPM	4443	2666	2222	1333	1066
							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)



Group	Series 62M Metric	Hardness	Cut	Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	10	12	20	25
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.5	≤ 1.5	123 (99-148)	RPM	6544	3926	3272	1963	1570
							Fz	0.014	0.029	0.036	0.051	0.053
							Feed (mm/min)	283	345	471	398	495
			Slot	1	≤ 1	99 (79-119)	RPM	5251	3151	2626	1575	1260
							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 (68-102)	RPM	4524	2714	2262	1357	1086
							Fz	0.012	0.024	0.029	0.040	0.043
							Feed (mm/min)	163	195	261	217	277
			Slot	1	≤ 1	69 (55-82)	RPM	3635	2181	1818	1091	872
							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 (17-26)	RPM	1131	679	565	339	271
							Fz	0.010	0.021	0.024	0.035	0.035
							Feed (mm/min)	33	43	54	47	57
			Slot	1	≤ 1	17 (14-20)	RPM	905	543	452	271	217
							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 (38-57)	RPM	2504	1503	1252	751	601
							Fz	0.012	0.024	0.029	0.040	0.043
							Feed (mm/min)	90	108	144	120	153
			Slot	1	≤ 1	59 (48-71)	RPM	3151	1890	1575	945	756
							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)

Solid Carbide Tools

VALUE AT THE SPINDLE®

High Performance Drills

Hole Making

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

HIGH PERFORMANCE DRILLS	SERIES	DESCRIPTION	APPLICATION ● PREFERRED ○ ALTERNATE	PAGE
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 ● PREFERRED ○ ALTERNATE	PÁGINA
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 ● PREFERRED ○ ALTERNATE						PAGE
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

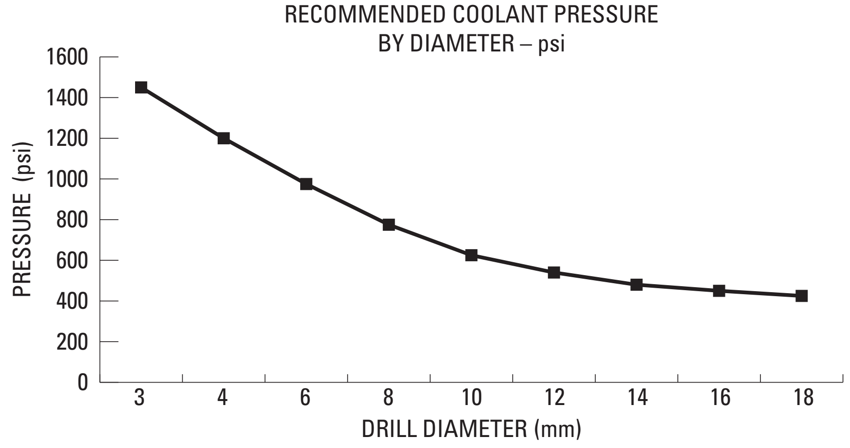
Please put "S" at the beginning of all page numbers below.

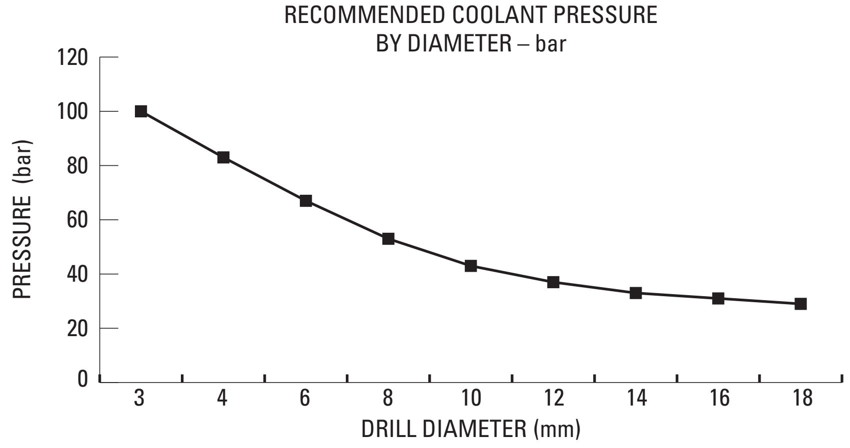
HOCHLEISTUNGS-BOHRER	SERIE	BESCHREIBUNG	APPLICATION ● PREFERRED ○ ALTERNATE						SEITE
Hi-PerCarb®	135 (3xD)	Doppelfasenbohrer 3xD mit 2 Schneiden und Außenkühlung	●	●	○	●	●	○	231
	135 (5xD)	Doppelfasenbohrer 5xD mit 2 Schneiden und Außenkühlung	●	●	○	●	●	○	240
	131N (3xD)	Dreifasenbohrer 3xD mit 3 Schneiden 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

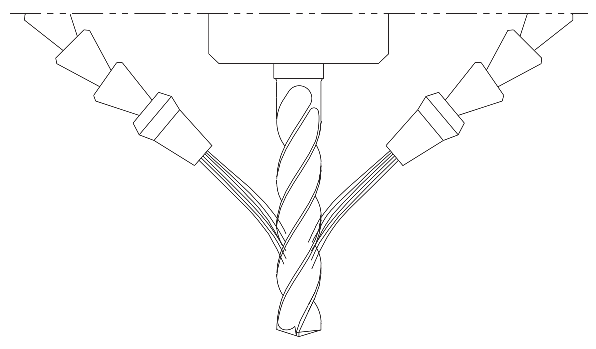
Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

Drilling Operations Coolant Recommendations

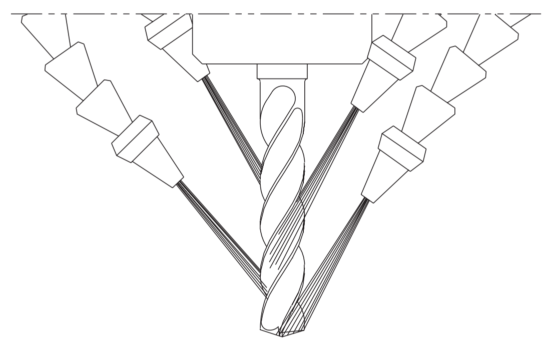
- Coolant works to mobilize chips away from the cut zone, reduce the heat created during the cutting process and minimize friction.
- It is important to optimize the coolant pressure and position in order to gain the full benefits coolant offers the cutting process.
- Proper coolant application promotes 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

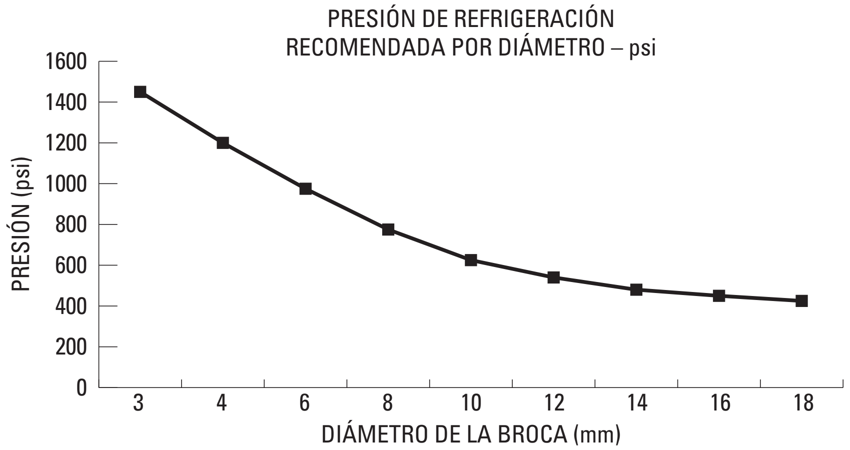


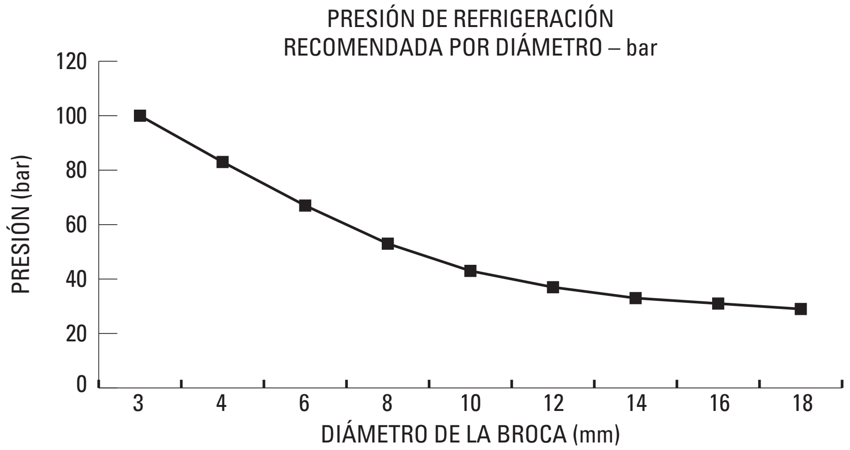
SMALL TIP – HIGH VELOCITY
COMPLETE COVERAGE

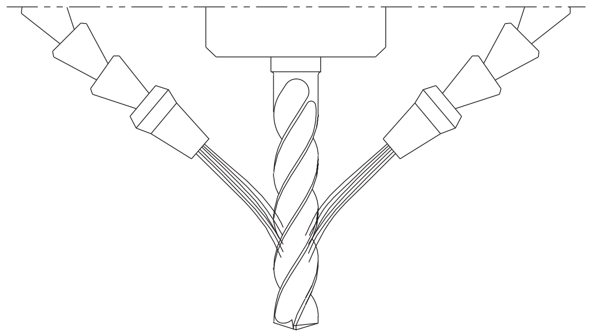
- Reducing the nozzle size helps maximize the cooling benefits of the unique double margin design on the Hi-PerCarb drill by increasing velocity. Aim the nozzles in line with the secondary flute located between the two margins as well as the flute for best results.

Recomendaciones en operacion de taladrado

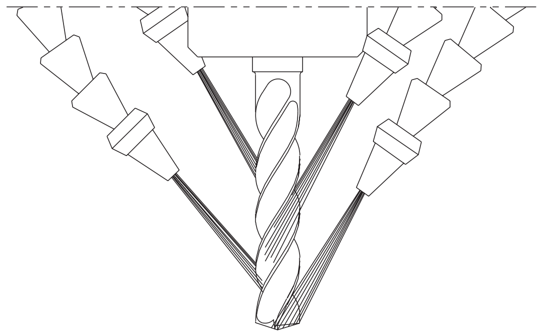
- El líquido de refrigeración actúa movilizando las virutas fuera de la zona de corte, disminuyendo el calor generado durante el proceso de corte y minimizando la fricción.
- Es importante optimizar la presión de la refrigeración y la posición para poder obtener todos los beneficios del refrigerante 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

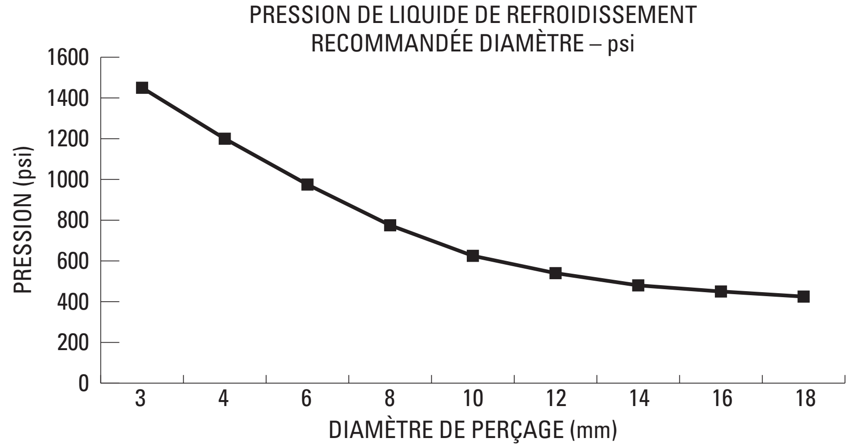


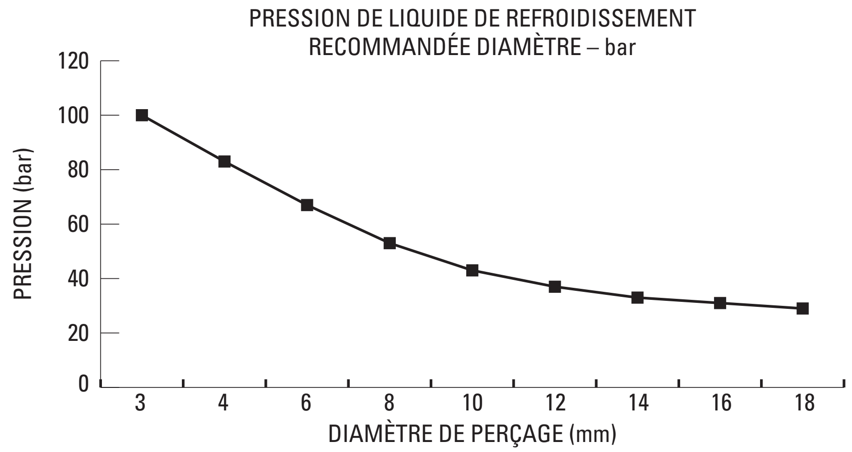
PUNTA PEQUEÑA – ALTA VELOCIDAD
COMPLETO ALCANCE

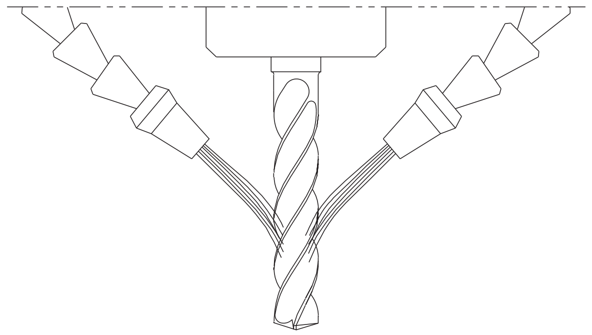
- Reducir el tamaño de la boquilla ayuda a maximizar los beneficios de refrigeración del exclusivo diseño de doble margen de la broca. Hi-PerCarb aumentando la velocidad. Coloque las boquillas en línea con el segundo filo que se encuentra entre los dos márgenes y también el filo para obtener mejores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

Opérations de perçage
Recommandations en matière de refroidissement

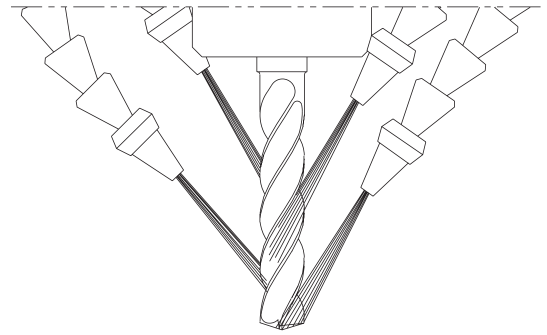
- Le liquide de refroidissement sert à éloigner les copeaux de la zone de coupe, à réduire la chaleur dégagée durant la coupe et à minimiser la friction.
- Il est important d’optimiser la pression et la position du réfrigérant pour en retirer les bénéfices maximums durant la coupe.
- L’application adéquate 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

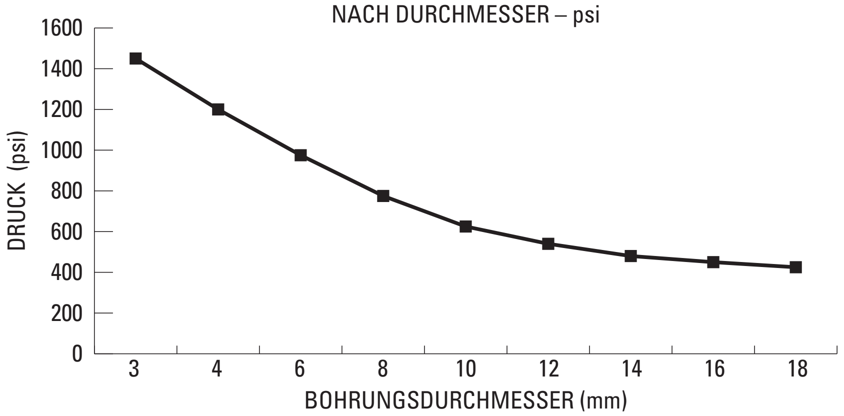
- La réduction de la taille de l’embout permet de maximiser les bienfaits du refroidissement du concept à double listel original de la perceuse Hi-PerCarb en augmentant la vitesse. Pour les meilleurs résultats, orientez les embouts dans l'axe de la goujure secondaire située entre les deux listels, de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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

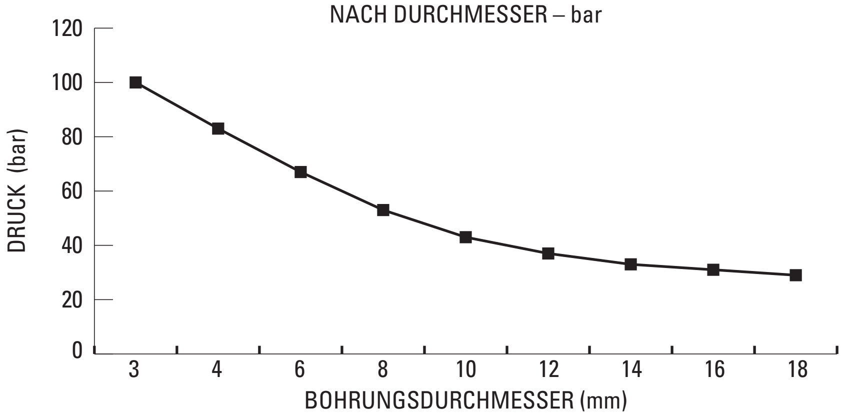
Bohrarbeiten Kühlmittelempfehlungen

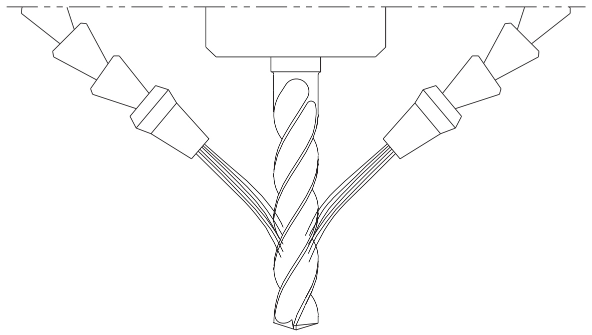
- Kühlmittel dienen dazu, die Späne aus dem Schneidenbereich zu entfernen, die beim Schneiden erzeugte Wärme abzutransportieren und die Reibung zu verringern.
- Es kommt darauf an, den Kühlschmiermitteldruck und die Zufuhr zu optimieren, um alle Vorteile beim Bohren nutzen zu können.
- Der richtige Kühlschmiermitteleinsatz 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.

EMPFOHLENER KÜHLSCHMIERMITTELDRUCK NACH DURCHMESSER – psi

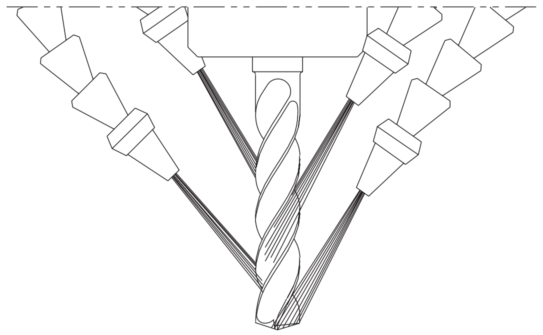


EMPFOHLENER KÜHLMITTELDRUCK NACH DURCHMESSER – bar





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



SCHMALE QUERSCHNEIDE – HOHE DREHZAHL
VOLLSTÄNDIGE BENETZUNG

- Durch Verringern der 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.

HI-PERCARB®
HIGH PERFORMANCE CARBIDE DRILLS

FRACTIONAL & METRIC
Hi-PerCarb®

3xD 32° 145° 2

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

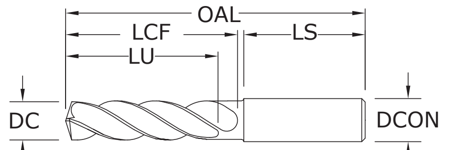
>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

>18–30 DIAMETER
DC = +0,008/+0,029
DCON = h_6

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

For patent information visit www.ksptpatents.com



135 3xD
FRACTIONAL & METRIC SERIES

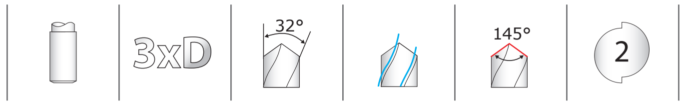
inch & mm									EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIV.	METRIC EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	SHANK LENGTH LS	Ti-NAMITE-A (AlTiN)
1/64	0.0156	0.40		1/8	1-1/2	1/8	5/64	1	51752*
1/32	0.0312	0.79		1/8	1-1/2	1/4	3/16	1	51269*
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

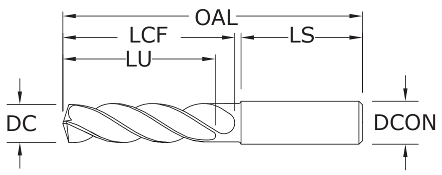
continued on next page

- 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)

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools



135 3xD
FRACTIONAL & METRIC SERIES



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3,8 mm	0.1496			6,0	66,0	24,0	21,0	36,0	63742
#24	0.1520	3.86	10-28	1/4	2-5/8	7/8	23/32	1-7/16	51763
3,9 mm	0.1535			6,0	66,0	24,0	21,0	36,0	63743
#23	0.1540	3.91		1/4	2-5/8	7/8	23/32	1-7/16	51764
5/32	0.1562	3.97		1/4	2-5/8	7/8	23/32	1-7/16	51334
#22	0.1570	3.99	10-30	1/4	2-5/8	7/8	23/32	1-7/16	51765
4,0 mm	0.1575		M4,5 X 0,5	6,0	66,0	24,0	21,0	36,0	63162
#21	0.1590	4.04	10-32	1/4	2-5/8	7/8	23/32	1-7/16	51335
#20	0.1610	4.09	13/64-24	1/4	2-5/8	7/8	23/32	1-7/16	51279
4,1 mm	0.1614			6,0	66,0	24,0	21,0	36,0	63744
4,2 mm	0.1654		M5 / M5 X 0,75	6,0	66,0	24,0	21,0	36,0	63163
#19	0.1660	4.22		1/4	2-5/8	7/8	23/32	1-7/16	51766
4,3 mm	0.1693			6,0	66,0	24,0	21,0	36,0	63164
#18	0.1695	4.31		1/4	2-5/8	7/8	23/32	1-7/16	51767
11/64	0.1719	4.37		1/4	2-5/8	7/8	23/32	1-7/16	51336
#17	0.1730	4.39		1/4	2-5/8	7/8	23/32	1-7/16	51768
4,4 mm	0.1732			6,0	66,0	24,0	21,0	36,0	63745
#16	0.1770	4.50	12-24	1/4	2-5/8	7/8	23/32	1-7/16	51769
4,5 mm	0.1772		M5 X 0,5	6,0	66,0	24,0	21,0	36,0	63165
#15	0.1800	4.57		1/4	2-5/8	7/8	23/32	1-7/16	51770
4,6 mm	0.1811		12-28	6,0	66,0	24,0	21,0	36,0	63166
#14	0.1820	4.62		1/4	2-5/8	7/8	23/32	1-7/16	51771
#13	0.1850	4.70	12-32	1/4	2-5/8	7/8	23/32	1-7/16	51772
4,7 mm	0.1850			6,0	66,0	24,0	21,0	36,0	63746
3/16	0.1875	4.76		1/4	2-5/8	1	53/64	1-7/16	51337
#12	0.1890	4.80	7/32-32	1/4	2-5/8	1	53/64	1-7/16	51773
4,8 mm	0.1890			6,0	66,0	28,0	24,0	36,0	63167
#11	0.1910	4.85		1/4	2-5/8	1	53/64	1-7/16	51774
4,9 mm	0.1929			6,0	66,0	28,0	24,0	36,0	63747
#10	0.1935	4.91	14-20	1/4	2-5/8	1	53/64	1-7/16	51775
#9	0.1960	4.98		1/4	2-5/8	1	53/64	1-7/16	51776
5,0 mm	0.1969		M6 X 1	6,0	66,0	28,0	24,0	36,0	63168
#8	0.1990	5.05		1/4	2-5/8	1	53/64	1-7/16	51777
5,1 mm	0.2008			6,0	66,0	28,0	24,0	36,0	63748
#7	0.2010	5.11	1/4-20	1/4	2-5/8	1	53/64	1-7/16	51338
13/64	0.2031	5.16		1/4	2-5/8	1	53/64	1-7/16	51339
#6	0.2040	5.18		1/4	2-5/8	1	53/64	1-7/16	51778
5,2 mm	0.2047		M6 X 0,75	6,0	66,0	28,0	24,0	36,0	63749
#5	0.2055	5.22		1/4	2-5/8	1	53/64	1-7/16	51779
5,25 mm	0.2067			6,0	66,0	28,0	24,0	36,0	63169
5,3 mm	0.2087			6,0	66,0	28,0	24,0	36,0	63170
#4	0.2090	5.31	1/4-24	1/4	2-5/8	1	53/64	1-7/16	51780
5,4 mm	0.2126			6,0	66,0	28,0	24,0	36,0	63750
#3	0.2130	5.41	1/4-28	1/4	2-5/8	1	53/64	1-7/16	51340
5,5 mm	0.2165		M6 X 0,5	6,0	66,0	28,0	24,0	36,0	63171
7/32	0.2188	5.56	1/4-32	1/4	2-5/8	1	53/64	1-7/16	51341

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TOLERANCES (inch)

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DCON = h_6

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DCON = h_6

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

For patent information visit www.ksptpatents.com

FRACTIONAL & METRIC
Hi-PerCarb®

135 3xD
FRACTIONAL & METRIC SERIES

CONTINUED

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 (AlTiN)
5,6 mm	0.2205			6,0	66,0	28,0	24,0	36,0	63751
#2	0.2210	5.61		1/4	2-5/8	1	53/64	1-7/16	51781
5,7 mm	0.2244			6,0	66,0	28,0	24,0	36,0	63752
#1	0.2280	5.79		1/4	2-5/8	1	53/64	1-7/16	51782
5,8 mm	0.2283			6,0	66,0	28,0	24,0	36,0	63172
5,9 mm	0.2323			6,0	66,0	28,0	24,0	36,0	63753
A	0.2340	5.94		1/4	2-5/8	1	53/64	1-7/16	51601
15/64	0.2344	5.95		1/4	2-5/8	1	53/64	1-7/16	51342
6,0 mm	0.2362	6.00	M7 X 1	6,0	66,0	28,0	24,0	36,0	63173
B	0.2380	6.05		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51602
6,1 mm	0.2402			8,0	79,0	34,0	28,0	36,0	63754
C	0.2420	6.15		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51603
6,2 mm	0.2441			8,0	79,0	34,0	28,0	36,0	63755
D	0.2460	6.25		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51604
6,25 mm	0.2461		M7 X 0,75	8,0	79,0	34,0	28,0	36,0	63174
6,3 mm	0.2480			8,0	79,0	34,0	28,0	36,0	63756
1/4	0.2500	6.35		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51343
6,4 mm	0.2520			8,0	79,0	34,0	28,0	36,0	63175
6,5 mm	0.2559			8,0	79,0	34,0	28,0	36,0	63213
F	0.2570	6.53	5/16-18	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51344
6,6 mm	0.2598			8,0	79,0	34,0	28,0	36,0	63757
G	0.2610	6.63		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51606
6,7 mm	0.2638			8,0	79,0	34,0	28,0	36,0	63758
17/64	0.2656	6.75	5/16-20	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51345
H	0.2660	6.76		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51607
6,8 mm	0.2677		M8 X 1,25	8,0	79,0	34,0	28,0	36,0	63176
6,9 mm	0.2717			8,0	79,0	34,0	28,0	36,0	63759
I	0.2720	6.91	5/16-24	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51346
7,0 mm	0.2756		M8 X 1	8,0	79,0	34,0	28,0	36,0	63177
J	0.2770	7.04		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51608
7,1 mm	0.2795			8,0	79,0	41,0	34,0	36,0	63760
K	0.2810	7.14		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51609
9/32	0.2812	7.14	5/16-32	5/16	3-1/8	1-9/16	1-3/16	1-7/16	51347
7,2 mm	0.2835			8,0	79,0	41,0	34,0	36,0	63761
7,25 mm	0.2854		M8 X 0,75	8,0	79,0	41,0	34,0	36,0	63178
7,3 mm	0.2874			8,0	79,0	41,0	34,0	36,0	63762
L	0.2900	7.37		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51610
7,4 mm	0.2913			8,0	79,0	41,0	34,0	36,0	63763
M	0.2950	7.49		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51611
7,5 mm	0.2953		M8 X 0,5	8,0	79,0	41,0	34,0	36,0	63179
19/64	0.2969	7.54		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51348
7,6 mm	0.2992			8,0	79,0	41,0	34,0	36,0	63764
N	0.3020	7.67		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51612
7,7 mm	0.3031			8,0	79,0	41,0	34,0	36,0	63765
7,8 mm	0.3071		M9 X 1,25	8,0	79,0	41,0	34,0	36,0	63180
7,9 mm	0.3110			8,0	79,0	41,0	34,0	36,0	63766
5/16	0.3125	7.94	3/8-16	5/16	3-1/8	1-9/16	1-3/16	1-7/16	51349
8,0 mm	0.3150		M9 x 1	8,0	79,0	41,0	34,0	36,0	63181
O	0.3160	8.03		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51613
8,1 mm	0.3189			10,0	89,0	47,0	40,0	40,0	63767
8,2 mm	0.3228			10,0	89,0	47,0	40,0	40,0	63768
P	0.3230	8.20		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51614
8,3 mm	0.3268			10,0	89,0	47,0	40,0	40,0	63769
21/64	0.3281	8.33	3/8-20	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51350
8,4 mm	0.3307			10,0	89,0	47,0	40,0	40,0	63182
Q	0.3320	8.43	3/8-24	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51351
8,5 mm	0.3346		M10 X 1,5	10,0	89,0	47,0	40,0	40,0	63183
8,6 mm	0.3386			10,0	89,0	47,0	40,0	40,0	63770

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SGS Solid Tools
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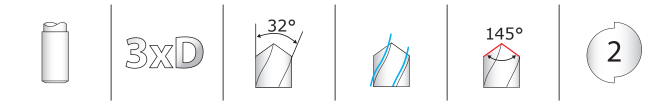
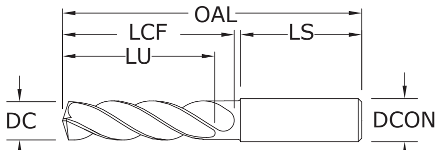
HI-PERCARB® HIGH PERFORMANCE CARBIDE DRILLS



135 3xD

FRACTIONAL & METRIC SERIES



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- 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 (AlTiN)
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

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TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

>18–30 DIAMETER
DC = +0,008/+0,029
DCON = h_6

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

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135 3xD

FRACTIONAL & METRIC SERIES

CONTINUED

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 (AlTiN)
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	64515
7/8	0.8750	22.23	15/16-16, 1-8	7/8	6	3-11/16	2-11/16	2-1/8	51374
59/64	0.9219	23.42	1-12	1	6	3-11/16	2-11/16	2-1/8	51375

KYOCERA Solid Tools
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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

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

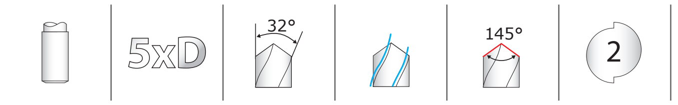
	Series 135 3D Metric	Hardness	Vc (m/min)		DC • mm							
					1.5	3	6	8	10	12	16	20
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	117	RPM	24882	12441	6220	4665	3732	3110	2333	1866
			(94-141)	Fr	0.047	0.094	0.189	0.252	0.315	0.378	0.504	0.630
				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

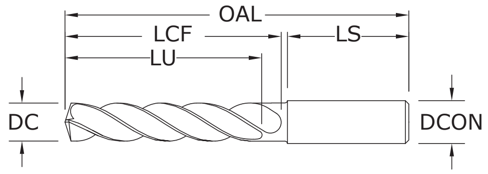
continued on next page

	Series 135 3D Metric	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	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)

HI-PERCARB® HIGH PERFORMANCE CARBIDE DRILLS





135 5xD

FRACTIONAL & METRIC SERIES

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

CUTTING DIAMETER 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 (AlTiN)
inch & mm									
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/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

>18–30 DIAMETER
DC = +0,008/+0,029
DCON = h_6

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

For patent information visit www.ksptpatents.com

HI-PERCARB® HIGH PERFORMANCE CARBIDE DRILLS

135 5xD

FRACTIONAL & METRIC SERIES

CONTINUED

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 (AlTiN)
inch & mm									
3,5 mm	0.1378			6,0	66,0	28,0	23,0	36,0	64105
#28	0.1405	3.57	8-40	1/4	3	1	53/64	1- 7/16	52317
9/64	0.1406	3.57		1/4	3	1	53/64	1-7/16	51583
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	64106
#27	0.1440	3.66		1/4	3	1	53/64	1-7/16	52318
3,7 mm	0.1457		M4.5 X 0,75	6,0	66,0	28,0	23,0	36,0	64107
#26	0.1470	3.73	3/16-24	1/4	3	1	53/64	1-7/16	52319
#25	0.1495	3.80	10-24	1/4	3-1/4	1-1/4	1-5/64	1-7/16	51584
3,8 mm	0.1496			6,0	74,0	36,0	29,0	36,0	64108
#24	0.1520	3.86	10-28	1/4	3-1/4	1-1/4	1-5/64	1-7/16	52321
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	64109
#23	0.1540	3.91		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52322
5/32	0.1562	3.97		1/4	3-1/4	1-1/4	1-5/64	1-7/16	51585
#22	0.1570	3.99	10-30	1/4	3-1/4	1-1/4	1-5/64	1-7/16	52323
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	64110
#21	0.1590	4.04	10-32	1/4	3-1/4	1-1/4	1-5/64	1-7/16	51586
#20	0.1610	4.09	13/64-24	1/4	3-1/4	1-1/4	1-5/64	1-7/16	51587
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	64111
4,2 mm	0.1654		M5 / M5 X 0,75	6,0	74,0	36,0	29,0	36,0	64112
#19	0.1660	4.22		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52324
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	64113
#18	0.1695	4.31		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52325
11/64	0.1719	4.37		1/4	3-1/4	1-1/4	1-5/64	1-7/16	51588
#17	0.1730	4.39		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52326
4,4 mm	0.1732			6,0	74,0	36,0	29,0	36,0	64114
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	64115
#15	0.1800	4.57		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52327
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	64116
#14	0.1820	4.62		1/4	3-1/4	1-1/4	1-5/64	1-7/16	52328
#13	0.1850	4.70	12-32	1/4	3-1/4	1-1/4	1-5/64	1-7/16	52329
4,7 mm	0.1850			6,0	74,0	36,0	29,0	36,0	64117
3/16	0.1875	4.76		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51589
#12	0.1890	4.80	7/32-32	1/4	3-1/4	1-3/4	1-37/64	1-7/16	52330
4,8 mm	0.1890			6,0	82,0	44,0	35,0	36,0	64118
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	64119
#10	0.1935	4.91	14-20	1/4	3-1/4	1-3/4	1-37/64	1-7/16	52331
#9	0.1960	4.98		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52332
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	64120
#8	0.1990	5.05		1/4	3-1/4	1-3/4	1-37/64	1-7/16	52333
5,1 mm	0.2008			6,0	82,0	44,0	35,0	36,0	64121
#7	0.2010	5.11	1/4-20	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51506
13/64	0.2031	5.16		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51507
#6	0.2040	5.18		1/4	3 1/4	1 3/4	1 37/64	1 7/16	52334
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	64122
#5	0.2055	5.22		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51590
5,25 mm	0.2067			6,0	82,0	44,0	35,0	36,0	64123
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	64124
#4	0.2090	5.31	1/4-24	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51508

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KYOCERA Solid Tools
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SGS Micro Tools

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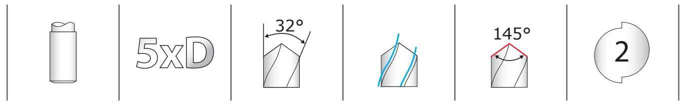
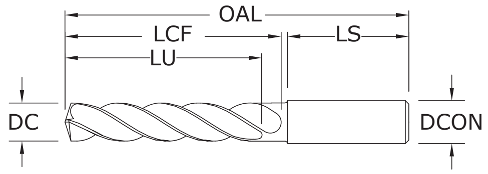
HIGH PERFORMANCE CARBIDE DRILLS





135 5xD
FRACTIONAL & METRIC SERIES

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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 (AlTiN)
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/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

>18–30 DIAMETER
DC = +0,008/+0,029
DCON = h_6

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

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HI-PERCARB®
HIGH PERFORMANCE CARBIDE DRILLS

135 5xD
FRACTIONAL & METRIC SERIES

CONTINUED

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 (AlTiN)
7,25 mm	0.2854		M8 X 0,75	8,0	91,0	53,0	43,0	36,0	64145
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0	64146
L	0.2900	7.37		5/16	3-5/8	2-5/64	1-51/64	1-7/16	52345
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0	64147
M	0.2950	7.49		5/16	3-5/8	2-5/64	1-51/64	1-7/16	52346
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0	64148
19/64	0.2969	7.54		5/16	3-5/8	2-5/64	1-51/64	1-7/16	51516
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0	64149
N	0.3020	7.67		5/16	3-5/8	2-5/64	1-51/64	1-7/16	52347
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0	64150
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0	64151
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0	64152
5/16	0.3125	7.94	3/8-16	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51517
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0	64153
O	0.3160	8.03		3/8	4	2-13/32	2-1/8	1-9/16	52348
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0	64154
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0	64155
P	0.3230	8.20		3/8	4	2-13/32	2-1/8	1-9/16	51518
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0	64156
21/64	0.3281	8.33	3/8-20	3/8	4	2-13/32	2-1/8	1-9/16	51519
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0	64157
Q	0.3320	8.43	3/8-24	3/8	4	2-13/32	2-1/8	1-9/16	51520
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0	64158
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0	64159
R	0.3390	8.61	3/8-32	3/8	4	2-13/32	2-1/8	1-9/16	52349
8,7 mm	0.3425		M10 X 1,25	10,0	103,0	61,0	49,0	40,0	64160
11/32	0.3438	8.73		3/8	4	2-13/32	2-1/8	1-9/16	51521
8,8 mm	0.3465			10,0	103,0	61,0	49,0	40,0	64161
S	0.3480	8.84		3/8	4	2-13/32	2-1/8	1-9/16	51522
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0	64162
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0	64163
T	0.3580	9.09		3/8	4	2 13/32	2 1/8	1 9/16	52350
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0	64164
23/64	0.3594	9.13		3/8	4	2-13/32	2-1/8	1-9/16	51523
9,2 mm	0.3622		M10 X 0,75	10,0	103,0	61,0	49,0	40,0	64165
9,25 mm	0.3642			10,0	103,0	61,0	49,0	40,0	64166
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0	64167
U	0.3680	9.35	7/16-14	3/8	4	2-13/32	2-1/8	1-9/16	51524
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0	64168
9,5 mm	0.3740		M10 X 0,5	10,0	103,0	61,0	49,0	40,0	64169
3/8	0.3750	9.53		3/8	4	2-13/32	2-1/8	1-9/16	51525
V	0.3770	9.58		1/2	4	2-13/32	2-1/8	1-9/16	52351
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0	64170
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0	64171
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0	64172
W	0.3860	9.80		1/2	4	2-13/32	2-1/8	1-9/16	51526
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0	64173
25/64	0.3906	9.92	7/16-20	1/2	4	2-13/32	2-1/8	1-9/16	51527

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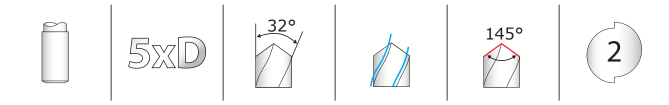
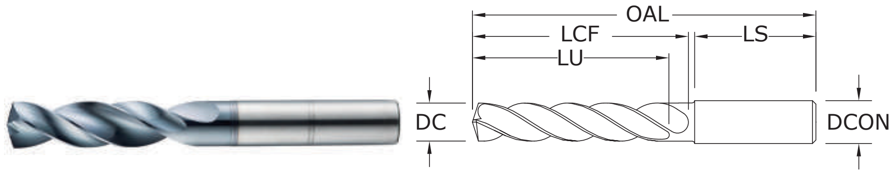
HIGH PERFORMANCE CARBIDE DRILLS





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 (AlTiN)
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	64174
X	0.3970	10.08	7/16-24	1/2	4-11/16	2-3/4	2-23/64	1-49/64	52352
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	64175
10,2 mm	0.4016			12,0	118,0	71,0	56,0	45,0	64176
Y	0.4040	10.26	7/16-28	1/2	4-11/16	2-3/4	2-23/64	1-49/64	52353
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	64177
13/32	0.4062	10.32		1/2	4-11/16	2-3/4	2-23/64	1-49/64	51528
10,4 mm	0.4095			12,0	118,0	71,0	56,0	45,0	64178
Z	0.4130	10.49		1/2	4-11/16	2-3/4	2-23/64	1-49/64	52354
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	64179
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	64180
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	64181
27/64	0.4219	10.72	1/2-13	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51529
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	64182
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	64183
11,0 mm	0.4331			12,0	118,0	71,0	56,0	45,0	64184
11,1 mm	0.4370		M12 X 1	12,0	118,0	71,0	56,0	45,0	64185
7/16	0.4375	11.11	1/4-18 NPT	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51530
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	64186
11,25 mm	0.4429			12,0	118,0	71,0	56,0	45,0	64187
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	64188
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	64189
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	64190
29/64	0.4531	11.51	1/2-20	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51531
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	64191
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	64192
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	64193
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	64194
15/32	0.4688	11.91	1/2-28	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51532
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	64195
31/64	0.4844	12.30	9/16-12	1/2	4-7/8	3-1/32	2-19/32	1-49/64	51533
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	64196
1/2	0.5000	12.70		1/2	4-7/8	3-1/32	2-19/32	1-49/64	51534
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	64197
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	64198
33/64	0.5156	13.10	9/16-18	5/8	4-7/8	3-1/32	2-19/32	1-49/64	51535
17/32	0.5312	13.49	5/8-11	5/8	4-7/8	3-1/32	2-19/32	1-49/64	51536
13,5 mm	0.5315			14,0	124,0	77,0	60,0	45,0	64199

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

>18–30 DIAMETER
DC = +0,008/+0,029
DCON = h_6

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

For patent information visit www.ksptpatents.com

135 5xD
FRACTIONAL & METRIC SERIES

CONTINUED

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 (AlTiN)
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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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

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FRACTIONAL
Hi-PerCarb®

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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

Hi-PerCarb®

	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

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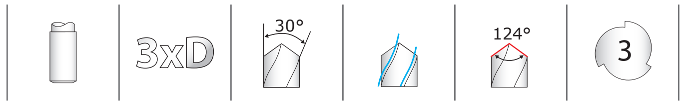
METRIC

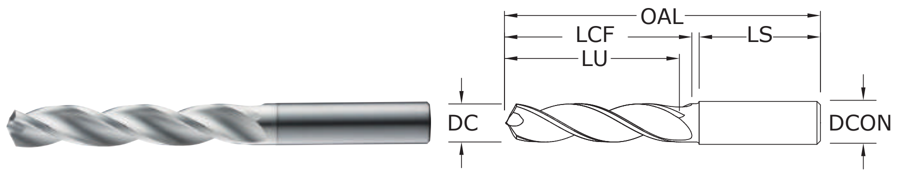
Hi-PerCarb®

	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	194	RPM	41039	20519	10260	7695	6156	5130	3847	3078
			(155-232)	Fr	0.059	0.118	0.237	0.316	0.395	0.474	0.632	0.790
				Feed (mm/min)	2430	2430	2430	2430	2430	2430	2430	2430
		≤ 150 Bhn or ≤ 7 HRc	165	RPM	34899	17449	8725	6544	5235	4362	3272	2617
			(132-198)	Fr	0.059	0.118	0.237	0.316	0.394	0.473	0.631	0.789
				Feed (mm/min)	2065	2065	2065	2065	2065	2065	2065	2065
	Copper Alloys Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	137	RPM	29082	14541	7271	5453	4362	3635	2726	2181
			(110-165)	Fr	0.027	0.053	0.107	0.142	0.178	0.213	0.284	0.355
				Feed (mm/min)	775	775	775	775	775	775	775	775
		≤ 200 Bhn or ≤ 23 HRc	110	RPM	23266	11633	5816	4362	3490	2908	2181	1745
			(88-132)	Fr	0.027	0.054	0.108	0.144	0.181	0.217	0.289	0.361
				Feed (mm/min)	630	630	630	630	630	630	630	630
S	**SUPER ALLOYS (Nickel , Cobalt, Iron Base)** Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	12	RPM	2585	1293	646	485	388	323	242	194
			(10-15)	Fr	0.010	0.019	0.039	0.052	0.064	0.077	0.103	0.129
				Feed (mm/min)	25	25	25	25	25	25	25	25
		≤ 400 Bhn or ≤ 43 HRc	6	RPM	1293	646	323	242	194	162	121	97
			(5-7)	Fr	0.007	0.014	0.028	0.037	0.046	0.056	0.074	0.093
				Feed (mm/min)	9	9	9	9	9	9	9	9
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	32	RPM	6786	3393	1696	1272	1018	848	636	509
			(26-38)	Fr	0.021	0.043	0.085	0.114	0.142	0.171	0.228	0.285
				Feed (mm/min)	145	145	145	145	145	145	145	145
		≤ 350 Bhn or ≤ 38 HRc	24	RPM	5170	2585	1293	969	776	646	485	388
			(20-29)	Fr	0.019	0.039	0.077	0.103	0.129	0.155	0.206	0.258
				Feed (mm/min)	100	100	100	100	100	100	100	100
		≤ 440 Bhn or ≤ 47 HRc	13	RPM	2714	1357	679	509	407	339	254	204
			(10-15)	Fr	0.015	0.029	0.059	0.079	0.098	0.118	0.157	0.196
				Feed (mm/min)	40	40	40	40	40	40	40	40
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	37	RPM	7755	3878	1939	1454	1163	969	727	582
			(29-44)	Fr	0.031	0.062	0.124	0.165	0.206	0.248	0.330	0.413
				Feed (mm/min)	240	240	240	240	240	240	240	240
		≤ 375 Bhn or ≤ 40 HRc	24	RPM	5170	2585	1293	969	776	646	485	388
			(20-29)	Fr	0.015	0.029	0.058	0.077	0.097	0.116	0.155	0.193
				Feed (mm/min)	75	75	75	75	75	75	75	75
		≤ 475 Bhn or ≤ 50 HRc	21	RPM	4524	2262	1131	848	679	565	424	339
			(17-26)	Fr	0.010	0.020	0.040	0.053	0.066	0.080	0.106	0.133
				Feed (mm/min)	45	45	45	45	45	45	45	45

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)

HIGH PERFORMANCE CARBIDE DRILLS





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 = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

HIGH PERFORMANCE CARBIDE DRILLS

131N 3xD

FRACTIONAL & METRIC SERIES

CONTINUED

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

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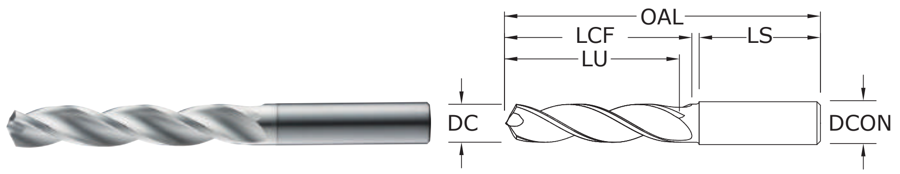
HI-PERCARB® HIGH PERFORMANCE CARBIDE DRILLS

3xD 30° 124° 3



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

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TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

NON-FERROUS

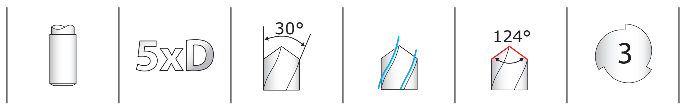
PLASTICS/COMPOSITES

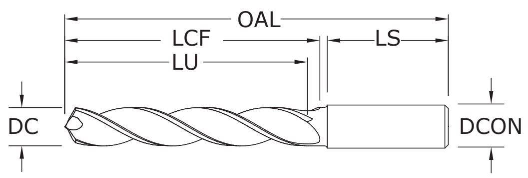
For patent information visit www.ksptpatents.com

131N 3xD
FRACTIONAL & METRIC SERIES

CONTINUED

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





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 = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

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DC = +.00024/+.00083
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DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

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DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

NON-FERROUS

PLASTICS/COMPOSITES

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131N 5xD

FRACTIONAL & METRIC SERIES

CONTINUED

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

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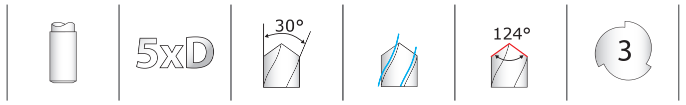
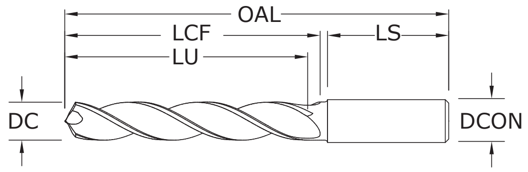
HI-PERCARB®
HIGH PERFORMANCE CARBIDE DRILLS





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

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TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

NON-FERROUS
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

HI-PERCARB®
HIGH PERFORMANCE CARBIDE DRILLS

131N 5xD

FRACTIONAL & METRIC SERIES

CONTINUED

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

Hi-PerCarb®

	Series 131N 3D & 5D Fractional	Hardness	Vc (sfm)		DC • in 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)

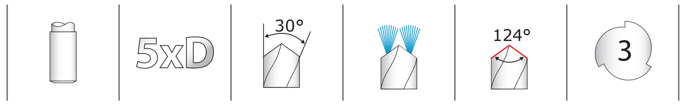
Hi-PerCarb®

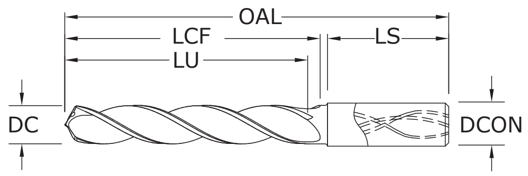
	Series 131N 3D & 5D Metric	Hardness	Vc (m/min)		DC • mm 3	6	8	10	12	14	16
N	**ALUMINUM ALLOYS < 12% SI 6061, 2024, 7075**	≤ 150 Bhn or ≤ 7 HRc	244	RPM	25851	12926	9694	7755	6463	5540	4847
			(195-293)	Fr	0.133	0.265	0.354	0.442	0.531	0.619	0.708
				Feed (mm/min)	3430	3430	3430	3430	3430	3430	3430
	ALUMINUM 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)

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

HI-PERCARB® HIGH PERFORMANCE CARBIDE DRILLS





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/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

CAST IRON

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HI-PERCARB® HIGH PERFORMANCE CARBIDE DRILLS

FRACTIONAL & METRIC
Hi-PerCarb®

141K 5xD

FRACTIONAL & METRIC SERIES

CONTINUED

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

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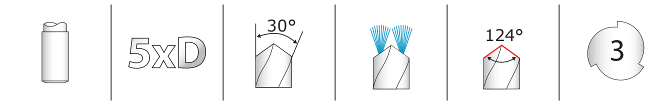
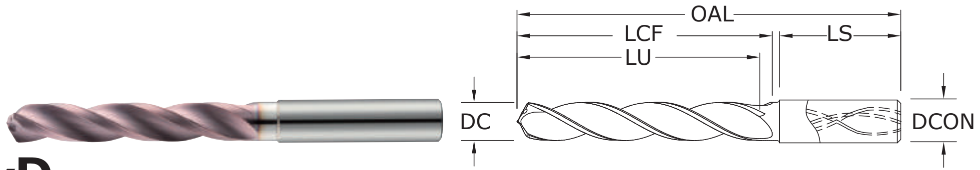
SGS Solid Tools
SGS Micro Tools





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/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

CAST IRON

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141K 5xD

FRACTIONAL & METRIC SERIES

CONTINUED

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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

Hi-PerCarb®

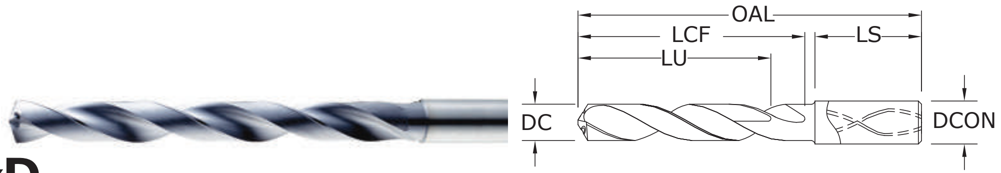
Series 141K 5D Fractional	Hardness	Vc (sfm)		DC • in 1/8	3/16	1/4	3/8	1/2	5/8	3/4
K — GRAY CAST IRON FERRITIC ASTM A48: CLASS 20 SAE J431C: GRADE 1800	≤ 150 Bhn or ≤ 80 HRb	450	RPM	13752	9168	6876	4584	3438	2750	2292
		(360-540)	Fr	0.0049	0.0074	0.0099	0.0148	0.0198	0.0247	0.0297
			Feed (ipm)	68	68	68	68	68	68	68
GRAY CAST IRON PEARLITIC ASTM A48: CLASS 30, 35, 40 SAE J431C: GRADE 3000	≤ 220 Bhn or ≤ 19 HRb	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)

Hi-PerCarb®

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 (AlTiN)
3,0 mm	0.1181			6,0	66,0	28,0	23,0	36,0	63901
3,1 mm	0.1220			6,0	66,0	28,0	23,0	36,0	63902
1/8	0.1250	3.18		6,0	66,0	28,0	23,0	36,0	51901
3,2 mm	0.1260		M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	63903
3,3 mm	0.1299		M4 X 0,7	6,0	66,0	28,0	23,0	36,0	63904
3,4 mm	0.1339			6,0	66,0	28,0	23,0	36,0	63905
#29	0.1360	3.45	8-32,8-36	6,0	66,0	28,0	23,0	36,0	51902
3,5 mm	0.1378		M4 X 0,5	6,0	66,0	28,0	23,0	36,0	63906
9/64	0.1406	3.57		6,0	66,0	28,0	23,0	36,0	51903
3,6 mm	0.1417		M4 X 0,35	6,0	66,0	28,0	23,0	36,0	63907
3,7 mm	0.1457		M4,5 X 0,75	6,0	66,0	28,0	23,0	36,0	63908
3,8 mm	0.1496		10-24	6,0	74,0	36,0	29,0	36,0	51904
3,9 mm	0.1535			6,0	74,0	36,0	29,0	36,0	63909
5/32	0.1562	3.97		6,0	74,0	36,0	29,0	36,0	51905
4,0 mm	0.1575		M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	63910
#21	0.1590	4.04	10-32	6,0	74,0	36,0	29,0	36,0	51906
4,1 mm	0.1614			6,0	74,0	36,0	29,0	36,0	63911
4,2 mm	0.1654		M5 / M5 x 0,75	6,0	74,0	36,0	29,0	36,0	63912
4,3 mm	0.1693			6,0	74,0	36,0	29,0	36,0	63913
11/64	0.1719	4.37		6,0	74,0	36,0	29,0	36,0	51907
4,4 mm	0.1732		12-24	6,0	74,0	36,0	29,0	36,0	63914
4,5 mm	0.1772		M5 X 0,5	6,0	74,0	36,0	29,0	36,0	63915
4,6 mm	0.1811		12-28	6,0	74,0	36,0	29,0	36,0	63916
4,7 mm	0.1850		12-32	6,0	74,0	36,0	29,0	36,0	63917
3/16	0.1875	4.76		6,0	82,0	44,0	35,0	36,0	51908
4,8 mm	0.1890		7/32-32	6,0	82,0	44,0	35,0	36,0	63918
4,9 mm	0.1929			6,0	82,0	44,0	35,0	36,0	63919
5,0 mm	0.1969		M6 X 1	6,0	82,0	44,0	35,0	36,0	63920
5,1 mm	0.2008		1/4-20	6,0	82,0	44,0	35,0	36,0	63900
13/64	0.2031	5.16		6,0	82,0	44,0	35,0	36,0	51910
5,2 mm	0.2047		M6 X 0,75	6,0	82,0	44,0	35,0	36,0	63921
5,3 mm	0.2087			6,0	82,0	44,0	35,0	36,0	63922
5,4 mm	0.2126			6,0	82,0	44,0	35,0	36,0	63998
5,5 mm	0.2165		M6 X 0,5	6,0	82,0	44,0	35,0	36,0	63923

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TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

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

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140 5xD

FRACTIONAL & METRIC SERIES

CONTINUED

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 (AlTiN)
7/32	0.2188	5.56	1/4-32	6,0	82,0	44,0	35,0	36,0	51912
5,6 mm	0.2205			6,0	82,0	44,0	35,0	36,0	63924
5,7 mm	0.2244			6,0	82,0	44,0	35,0	36,0	63925
5,8 mm	0.2283			6,0	82,0	44,0	35,0	36,0	63926
5,9 mm	0.2323			6,0	82,0	44,0	35,0	36,0	63927
15/64	0.2344	5.95		6,0	82,0	44,0	35,0	36,0	51913
6,0 mm	0.2362		M7 X 1	6,0	82,0	44,0	35,0	36,0	63928
6,1 mm	0.2402			8,0	91,0	53,0	43,0	36,0	63929
6,2 mm	0.2441		M7 X 0,75	8,0	91,0	53,0	43,0	36,0	63930
6,3 mm	0.2480			8,0	91,0	53,0	43,0	36,0	63931
1/4	0.2500	6.35		8,0	91,0	53,0	43,0	36,0	51914
6,4 mm	0.2520			8,0	91,0	53,0	43,0	36,0	63932
6,5 mm	0.2559			8,0	91,0	53,0	43,0	36,0	63933
F	0.2570	6.53	5/16-18	8,0	91,0	53,0	43,0	36,0	51915
6,6 mm	0.2598			8,0	91,0	53,0	43,0	36,0	63934
6,7 mm	0.2638			8,0	91,0	53,0	43,0	36,0	63935
17/64	0.2656	6.75	5/16-20	8,0	91,0	53,0	43,0	36,0	51916
6,8 mm	0.2677		M8 X 1,25	8,0	91,0	53,0	43,0	36,0	63936
6,9 mm	0.2717		5/16-24	8,0	91,0	53,0	43,0	36,0	63999
7,0 mm	0.2756		M8 X 1	8,0	91,0	53,0	43,0	36,0	63937
7,1 mm	0.2795			8,0	91,0	53,0	43,0	36,0	63938
9/32	0.2812	7.14	5/16-32	8,0	91,0	53,0	43,0	36,0	51918
7,2 mm	0.2835		M8 X 0,75	8,0	91,0	53,0	43,0	36,0	63939
7,3 mm	0.2874			8,0	91,0	53,0	43,0	36,0	63940
7,4 mm	0.2913			8,0	91,0	53,0	43,0	36,0	63941
7,5 mm	0.2953		M8 X 0,5	8,0	91,0	53,0	43,0	36,0	63942
19/64	0.2969	7.54		8,0	91,0	53,0	43,0	36,0	51919
7,6 mm	0.2992			8,0	91,0	53,0	43,0	36,0	63943
7,7 mm	0.3031			8,0	91,0	53,0	43,0	36,0	63944
7,8 mm	0.3071		M9 X 1,25	8,0	91,0	53,0	43,0	36,0	63945
7,9 mm	0.3110			8,0	91,0	53,0	43,0	36,0	63946
5/16	0.3125	7.94	3/8-16	8,0	91,0	53,0	43,0	36,0	51920
8,0 mm	0.3150		M9 X 1	8,0	91,0	53,0	43,0	36,0	63947
8,1 mm	0.3189			10,0	103,0	61,0	49,0	40,0	63948
8,2 mm	0.3228			10,0	103,0	61,0	49,0	40,0	63949
8,3 mm	0.3268			10,0	103,0	61,0	49,0	40,0	63950
21/64	0.3281	8.33	3/8-20	10,0	103,0	61,0	49,0	40,0	51921
8,4 mm	0.3307			10,0	103,0	61,0	49,0	40,0	63951
Q	0.3320	8.43	3/8-24	10,0	103,0	61,0	49,0	40,0	51922
8,5 mm	0.3346		M10 X 1,5	10,0	103,0	61,0	49,0	40,0	63952
8,6 mm	0.3386			10,0	103,0	61,0	49,0	40,0	63953
8,7 mm	0.3425			10,0	103,0	61,0	49,0	40,0	63954

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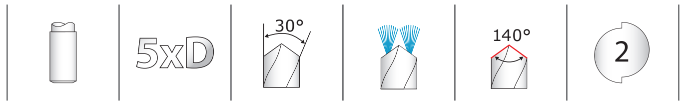
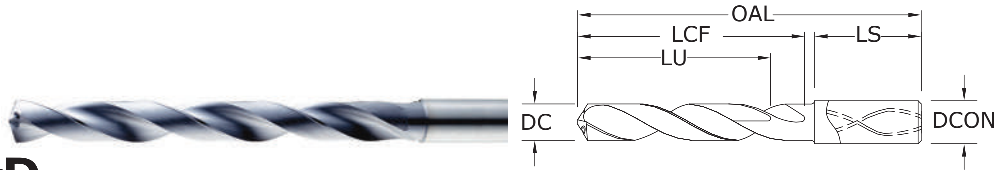
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools





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 (AlTiN)
11/32	0.3438	8.73	3/8-32	10,0	103,0	61,0	49,0	40,0	51923
8,8 mm	0.3465		M10 X 1,25	10,0	103,0	61,0	49,0	40,0	63955
8,9 mm	0.3504			10,0	103,0	61,0	49,0	40,0	63956
9,0 mm	0.3543		M10 X 1	10,0	103,0	61,0	49,0	40,0	63957
9,1 mm	0.3583			10,0	103,0	61,0	49,0	40,0	63958
23/64	0.3594	9.13		10,0	103,0	61,0	49,0	40,0	51924
9,2 mm	0.3622		M10 X 0,75	10,0	103,0	61,0	49,0	40,0	63959
9,3 mm	0.3661			10,0	103,0	61,0	49,0	40,0	63960
U	0.3680	9.35	7/16-14	10,0	103,0	61,0	49,0	40,0	51925
9,4 mm	0.3701			10,0	103,0	61,0	49,0	40,0	63961
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	103,0	61,0	49,0	40,0	63962
3/8	0.3750	9.53		10,0	103,0	61,0	49,0	40,0	51926
9,6 mm	0.3780			10,0	103,0	61,0	49,0	40,0	63963
9,7 mm	0.3819			10,0	103,0	61,0	49,0	40,0	63964
9,8 mm	0.3858			10,0	103,0	61,0	49,0	40,0	63965
9,9 mm	0.3898			10,0	103,0	61,0	49,0	40,0	63966
25/64	0.3906	9.92	7/16-20	10,0	103,0	61,0	49,0	40,0	51927
10,0 mm	0.3937			10,0	103,0	61,0	49,0	40,0	63967
10,1 mm	0.3976			12,0	118,0	71,0	56,0	45,0	63968
10,2 mm	0.4016		M12 X 1,75	12,0	118,0	71,0	56,0	45,0	63969
10,3 mm	0.4055			12,0	118,0	71,0	56,0	45,0	63970
13/32	0.4062	10.32		12,0	118,0	71,0	56,0	45,0	51928
10,4 mm	0.4094			12,0	118,0	71,0	56,0	45,0	63971
10,5 mm	0.4134		M12 X 1,5	12,0	118,0	71,0	56,0	45,0	63972
10,6 mm	0.4173			12,0	118,0	71,0	56,0	45,0	63973
10,7 mm	0.4213			12,0	118,0	71,0	56,0	45,0	63974
27/64	0.4219	10.72	1/2-13	12,0	118,0	71,0	56,0	45,0	51929
10,8 mm	0.4252		M12 X 1,25	12,0	118,0	71,0	56,0	45,0	63975
10,9 mm	0.4291			12,0	118,0	71,0	56,0	45,0	63976
11,0 mm	0.4331		M12 X 1	12,0	118,0	71,0	56,0	45,0	63977
11,1 mm	0.4370			12,0	118,0	71,0	56,0	45,0	63978
7/16	0.4375	11.11	1/4-18NPT	12,0	118,0	71,0	56,0	45,0	51930
11,2 mm	0.4409			12,0	118,0	71,0	56,0	45,0	63979
11,3 mm	0.4449			12,0	118,0	71,0	56,0	45,0	63980

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TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

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

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140 5xD

FRACTIONAL & METRIC SERIES

CONTINUED

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 (AlTiN)
11,4 mm	0.4488			12,0	118,0	71,0	56,0	45,0	63981
11,5 mm	0.4528		M12 X 0,5	12,0	118,0	71,0	56,0	45,0	64000
11,6 mm	0.4567			12,0	118,0	71,0	56,0	45,0	63982
11,7 mm	0.4606			12,0	118,0	71,0	56,0	45,0	63983
11,8 mm	0.4646			12,0	118,0	71,0	56,0	45,0	63984
11,9 mm	0.4685			12,0	118,0	71,0	56,0	45,0	63985
15/32	0.4688	11.91	1/2-28	12,0	118,0	71,0	56,0	45,0	51932
12,0 mm	0.4724		M14 X 2	12,0	118,0	71,0	56,0	45,0	63986
31/64	0.4844	12.30	9/16-12	14,0	124,0	77,0	60,0	45,0	51933
12,5 mm	0.4921		M14 X 1,5	14,0	124,0	77,0	60,0	45,0	63987
1/2	0.5000	12.70		14,0	124,0	77,0	60,0	45,0	51934
12,8 mm	0.5039		M14 X 1,25	14,0	124,0	77,0	60,0	45,0	63988
13,0 mm	0.5118		M14 X 1	14,0	124,0	77,0	60,0	45,0	63989
33/64	0.5156	13.10	9/16-18	14,0	124,0	77,0	60,0	45,0	51935
13,5 mm	0.5315		5/8-11	14,0	124,0	77,0	60,0	45,0	64001
13,8 mm	0.5433			14,0	124,0	77,0	60,0	45,0	63990
14,0 mm	0.5512		M16 X 2	14,0	124,0	77,0	60,0	45,0	63991
9/16	0.5625	14.29		16,0	133,0	83,0	63,0	48,0	51937
14,5 mm	0.5709		M16 X 1,5	16,0	133,0	83,0	63,0	48,0	63992
37/64	0.5781	14.68	5/8-18	16,0	133,0	83,0	63,0	48,0	51938
14,8 mm	0.5827			16,0	133,0	83,0	63,0	48,0	63993
15,0 mm	0.5906		M16 X 1	16,0	133,0	83,0	63,0	48,0	63994
15,5 mm	0.6102		M18 X 2,5	16,0	133,0	83,0	63,0	48,0	63995
15,8 mm	0.6220			16,0	133,0	83,0	63,0	48,0	63996
5/8	0.6250	15.88	11/16-16	16,0	133,0	83,0	63,0	48,0	51939
16,0 mm	0.6299			16,0	133,0	83,0	63,0	48,0	63997
21/32	0.6562	16.67	3/4-10	18,0	143,0	93,0	71,0	48,0	51940
11/16	0.6875	17.46	3/4-16	18,0	143,0	93,0	71,0	48,0	51941
3/4	0.7500	19.05	13/16-16	20,0	153,0	101,0	77,0	50,0	51942

	Series 140 5D Fractional	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	425	RPM	12988	8659	6494	4329	3247	2598	2165
			(340-510)	Fr	0.0039	0.0059	0.0079	0.0118	0.0157	0.0196	0.0236
				Feed (ipm)	51.0	51.0	51.0	51.0	51.0	51.0	51.0
		≤ 275 Bhn or ≤ 28 HRc	380	RPM	11613	7742	5806	3871	2903	2323	1935
			(304-456)	Fr	0.0035	0.0053	0.0071	0.0106	0.0141	0.0177	0.0212
				Feed (ipm)	41.0	41.0	41.0	41.0	41.0	41.0	41.0
		≤ 425 Bhn or ≤ 45 HRc	220	RPM	6723	4482	3362	2241	1681	1345	1121
			(176-264)	Fr	0.0030	0.0045	0.0059	0.0089	0.0119	0.0149	0.0178
				Feed (ipm)	20.0	20.0	20.0	20.0	20.0	20.0	20.0
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	330	RPM	10085	6723	5042	3362	2521	2017	1681
			(264-396)	Fr	0.0030	0.0045	0.0059	0.0089	0.0119	0.0149	0.0178
				Feed (ipm)	30.0	30.0	30.0	30.0	30.0	30.0	30.0
		≤ 375 Bhn or ≤ 40 HRc	200	RPM	6112	4075	3056	2037	1528	1222	1019
			(160-240)	Fr	0.0025	0.0038	0.0051	0.0076	0.0101	0.0127	0.0152
				Feed (ipm)	15.5	15.5	15.5	15.5	15.5	15.5	15.5
		≤ 450 Bhn or ≤ 48 HRc	140	RPM	4278	2852	2139	1426	1070	856	713
			(112-168)	Fr	0.0018	0.0027	0.0036	0.0054	0.0072	0.0090	0.0108
				Feed (ipm)	7.7	7.7	7.7	7.7	7.7	7.7	7.7
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	305	RPM	9321	6214	4660	3107	2330	1864	1553
			(244-366)	Fr	0.0026	0.0039	0.0051	0.0077	0.0103	0.0129	0.0154
				Feed (ipm)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
		≤ 275 Bhn or ≤ 28 HRc	195	RPM	5959	3973	2980	1986	1490	1192	993
			(156-234)	Fr	0.0020	0.0030	0.0040	0.0060	0.0081	0.0101	0.0121
				Feed (ipm)	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	150	RPM	4584	3056	2292	1528	1146	917	764
			(120-180)	Fr	0.0020	0.0030	0.0040	0.0060	0.0079	0.0099	0.0119
				Feed (ipm)	9.1	9.1	9.1	9.1	9.1	9.1	9.1
		≤ 375 Bhn or ≤ 40 HRc	110	RPM	3362	2241	1681	1121	840	672	560
			(88-132)	Fr	0.0018	0.0027	0.0036	0.0054	0.0071	0.0089	0.0107
				Feed (ipm)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
K	**CAST IRONS** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	360	RPM	11002	7334	5501	3667	2750	2200	1834
			(288-432)	Fr	0.0045	0.0068	0.0091	0.0136	0.0182	0.0227	0.0273
				Feed (ipm)	50.0	50.0	50.0	50.0	50.0	50.0	50.0
		≤ 260 Bhn or ≤ 26 HRc	335	RPM	10238	6825	5119	3413	2559	2048	1706
			(268-402)	Fr	0.0045	0.0068	0.0091	0.0136	0.0182	0.0227	0.0273
				Feed (ipm)	46.5	46.5	46.5	46.5	46.5	46.5	46.5

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	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	RPM	23531	15687	11766	7844	5883	4706	3922
			(616-924)	Fr	0.0049	0.0073	0.0098	0.0147	0.0195	0.0244	0.0293
				Feed (ipm)	115.0	115.0	115.0	115.0	115.0	115.0	115.0
		≤ 150 Bhn or ≤ 7 HRc	660	RPM	20170	13446	10085	6723	5042	4034	3362
			(528-792)	Fr	0.0050	0.0074	0.0099	0.0149	0.0198	0.0248	0.0297
				Feed (ipm)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	550	RPM	16808	11205	8404	5603	4202	3362	2801
			(440-660)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
				Feed (ipm)	33.5	33.5	33.5	33.5	33.5	33.5	33.5
		≤ 200 Bhn or ≤ 23 HRc	440	RPM	13446	8964	6723	4482	3362	2689	2241
			(352-528)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
				Feed (ipm)	27.0	27.0	27.0	27.0	27.0	27.0	27.0
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy	≤ 300 Bhn or ≤ 32 HRc	95	RPM	2903	1935	1452	968	726	581	484
			(76-114)	Fr	0.0008	0.0012	0.0016	0.0024	0.0032	0.0040	0.0048
				Feed (ipm)	2.3	2.3	2.3	2.3	2.3	2.3	2.3
		≤ 400 Bhn or ≤ 43 HRc	50	RPM	1528	1019	764	509	382	306	255
			(40-60)	Fr	0.0007	0.0010	0.0013	0.0020	0.0026	0.0033	0.0039
				Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	215	RPM	6570	4380	3285	2190	1643	1314	1095
			(172-258)	Fr	0.0018	0.0026	0.0035	0.0053	0.0070	0.0088	0.0105
				Feed (ipm)	11.5	11.5	11.5	11.5	11.5	11.5	11.5
		≤ 350 Bhn or ≤ 38 HRc	160	RPM	4890	3260	2445	1630	1222	978	815
			(128-192)	Fr	0.0016	0.0024	0.0032	0.0048	0.0064	0.0080	0.0096
				Feed (ipm)	7.8	7.8	7.8	7.8	7.8	7.8	7.8
		≤ 440 Bhn or ≤ 47 HRc	85	RPM	2598	1732	1299	866	649	520	433
			(68-102)	Fr	0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072
				Feed (ipm)	3.1	3.1	3.1	3.1	3.1	3.1	3.1
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 200 Bhn or ≤ 13 HRc	145	RPM	4431	2954	2216	1477	1108	886	739
			(116-174)	Fr	0.0026	0.0039	0.0052	0.0078	0.0104	0.0130	0.0156
				Feed (ipm)	11.5	11.5	11.5	11.5	11.5	11.5	11.5
		≤ 375 Bhn or ≤ 40 HRc	95	RPM	2903	1935	1452	968	726	581	484
			(76-114)	Fr	0.0012	0.0018	0.0024	0.0036	0.0048	0.0060	0.0072
				Feed (ipm)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
		≤ 475 Bhn or ≤ 50 HRc	85	RPM	2598	1732	1299	866	649	520	433
			(68-102)	Fr	0.0008	0.0012	0.0015	0.0023	0.0031	0.0038	0.0046
				Feed (ipm)	2.0	2.0	2.0	2.0	2.0	2.0	2.0

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)

ICe-Carb®

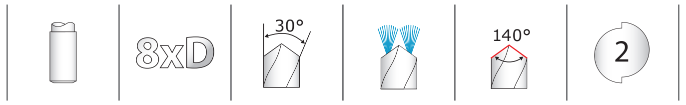
	Series 140M 5D Metric	Hardness	Vc (m/min)		DC • mm 3	6	8	10	12	14	16
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	130	RPM	13733	6867	5150	4120	3433	2943	2575
				Fr	0.095	0.189	0.252	0.316	0.379	0.442	0.505
			(104-155)	Feed (mm/min)	1300	1300	1300	1300	1300	1300	1300
		≤ 275 Bhn or ≤ 28 HRc	116	RPM	12279	6140	4605	3684	3070	2631	2302
				Fr	0.086	0.171	0.228	0.285	0.342	0.399	0.456
			(93-139)	Feed (mm/min)	1050	1050	1050	1050	1050	1050	1050
		≤ 425 Bhn or ≤ 45 HRc	67	RPM	7109	3555	2666	2133	1777	1523	1333
				Fr	0.071	0.142	0.189	0.237	0.284	0.332	0.379
			(54-80)	Feed (mm/min)	505	505	505	505	505	505	505
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	101	RPM	10664	5332	3999	3199	2666	2285	1999
				Fr	0.071	0.143	0.190	0.238	0.285	0.333	0.380
			(80-121)	Feed (mm/min)	760	760	760	760	760	760	760
		≤ 375 Bhn or ≤ 40 HRc	61	RPM	6463	3231	2424	1939	1616	1385	1212
				Fr	0.062	0.124	0.165	0.206	0.248	0.289	0.330
			(49-73)	Feed (mm/min)	400	400	400	400	400	400	400
		≤ 450 Bhn or ≤ 48 HRc	43	RPM	4524	2262	1696	1357	1131	969	848
				Fr	0.043	0.086	0.115	0.144	0.172	0.201	0.230
			(34-51)	Feed (mm/min)	195	195	195	195	195	195	195
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	93	RPM	9856	4928	3696	2957	2464	2112	1848
				Fr	0.061	0.123	0.164	0.205	0.246	0.286	0.327
			(74-112)	Feed (mm/min)	605	605	605	605	605	605	605
		≤ 275 Bhn or ≤ 28 HRc	59	RPM	6301	3151	2363	1890	1575	1350	1181
				Fr	0.048	0.095	0.127	0.159	0.190	0.222	0.254
			(48-71)	Feed (mm/min)	300	300	300	300	300	300	300
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	46	RPM	4847	2424	1818	1454	1212	1039	909
				Fr	0.047	0.095	0.127	0.158	0.190	0.221	0.253
			(37-55)	Feed (mm/min)	230	230	230	230	230	230	230
		≤ 375 Bhn or ≤ 40 HRc	34	RPM	3555	1777	1333	1066	889	762	666
				Fr	0.042	0.084	0.113	0.141	0.169	0.197	0.225
			(27-40)	Feed (mm/min)	150	150	150	150	150	150	150
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	110	RPM	11633	5816	4362	3490	2908	2493	2181
				Fr	0.109	0.218	0.291	0.364	0.437	0.509	0.582
			(88-132)	Feed (mm/min)	1270	1270	1270	1270	1270	1270	1270
		≤ 260 Bhn or ≤ 26 HRc	102	RPM	10825	5413	4059	3248	2706	2320	2030
				Fr	0.109	0.218	0.291	0.363	0.436	0.509	0.581
			(82-123)	Feed (mm/min)	1180	1180	1180	1180	1180	1180	1180
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	235	RPM	24882	12441	9331	7465	6220	5332	4665
				Fr	0.118	0.237	0.316	0.395	0.473	0.552	0.631
			(188-282)	Feed (mm/min)	2945	2945	2945	2945	2945	2945	2945
		≤ 150 Bhn or ≤ 7 HRc	201	RPM	21327	10664	7998	6398	5332	4570	3999
				Fr	0.119	0.238	0.318	0.397	0.476	0.556	0.635
			(161-241)	Feed (mm/min)	2540	2540	2540	2540	2540	2540	2540
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	168	RPM	17773	8886	6665	5332	4443	3808	3332
				Fr	0.048	0.096	0.128	0.159	0.191	0.223	0.255
			(134-201)	Feed (mm/min)	850	850	850	850	850	850	850
		≤ 200 Bhn or ≤ 23 HRc	134	RPM	14218	7109	5332	4265	3555	3047	2666
				Fr	0.048	0.096	0.128	0.161	0.193	0.225	0.257
			(107-161)	Feed (mm/min)	685	685	685	685	685	685	685

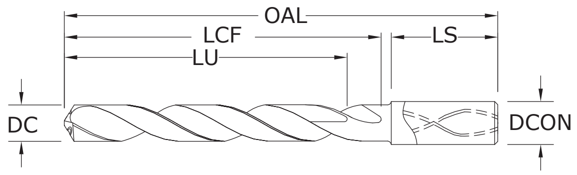
continued on next page

ICe-Carb®

	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
				Fr	0.020	0.039	0.052	0.065	0.078	0.091	0.104
			(23-35)	Feed (mm/min)	60	60	60	60	60	60	60
		≤ 400 Bhn or ≤ 43 HRc	15	RPM	1616	808	606	485	404	346	303
				Fr	0.015	0.031	0.041	0.052	0.062	0.072	0.083
			(12-18)	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
				Fr	0.040	0.079	0.106	0.132	0.158	0.185	0.211
			(52-79)	Feed (mm/min)	275	275	275	275	275	275	275
		≤ 350 Bhn or ≤ 38 HRc	49	RPM	5170	2585	1939	1551	1293	1108	969
				Fr	0.039	0.077	0.103	0.129	0.155	0.181	0.206
			(39-59)	Feed (mm/min)	200	200	200	200	200	200	200
		≤ 440 Bhn or ≤ 47 HRc	26	RPM	2747	1373	1030	824	687	589	515
				Fr	0.029	0.058	0.078	0.097	0.117	0.136	0.155
			(21-31)	Feed (mm/min)	80	80	80	80	80	80	80
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
				Fr	0.061	0.122	0.162	0.203	0.243	0.284	0.324
			(35-53)	Feed (mm/min)	285	285	285	285	285	285	285
		≤ 375 Bhn or ≤ 40 HRc	29	RPM	3070	1535	1151	921	767	658	576
				Fr	0.029	0.059	0.078	0.098	0.117	0.137	0.156
			(23-35)	Feed (mm/min)	90	90	90	90	90	90	90
		≤ 475 Bhn or ≤ 50 HRc	26	RPM	2747	1373	1030	824	687	589	515
				Fr	0.018	0.036	0.049	0.061	0.073	0.085	0.097
			(21-31)	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 (AlTiN)
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

TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

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

For patent information visit www.ksptpatents.com

140 8xD

FRACTIONAL & METRIC SERIES

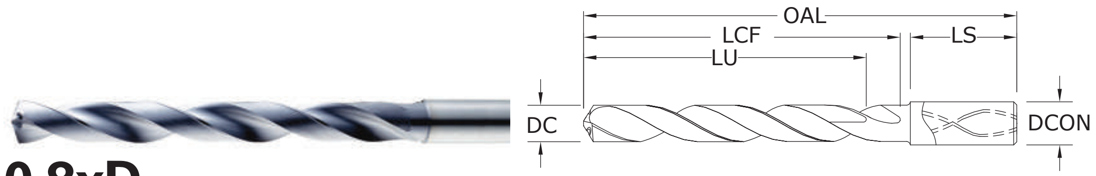
CONTINUED

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 (AlTiN)
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

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 (AlTiN)
11/32	0.3438	8.73	3/8-32	10,0	142,0	95,0	80,0	40,0	51819
8,8 mm	0.3465		M10 X 1,25	10,0	142,0	95,0	80,0	40,0	63633
8,9 mm	0.3504			10,0	142,0	95,0	80,0	40,0	63634
9,0 mm	0.3543		M10 X 1	10,0	142,0	95,0	80,0	40,0	63635
9,1 mm	0.3583			10,0	142,0	95,0	80,0	40,0	63636
23/64	0.3594	9.13		10,0	142,0	95,0	80,0	40,0	51820
9,2 mm	0.3622		M10 X 0,75	10,0	142,0	95,0	80,0	40,0	63637
9,3 mm	0.3661			10,0	142,0	95,0	80,0	40,0	63638
U	0.3680	9.35	7/16-14	10,0	142,0	95,0	80,0	40,0	51821
9,4 mm	0.3701			10,0	142,0	95,0	80,0	40,0	63639
9,5 mm	0.3740		M11 / M10 X 0,5	10,0	142,0	95,0	80,0	40,0	63640
3/8	0.3750	9.53		10,0	142,0	95,0	80,0	40,0	51822
9,6 mm	0.3780			10,0	142,0	95,0	80,0	40,0	63641
9,7 mm	0.3819			10,0	142,0	95,0	80,0	40,0	63642
9,8 mm	0.3858			10,0	142,0	95,0	80,0	40,0	63643
9,9 mm	0.3898			10,0	142,0	95,0	80,0	40,0	63644
25/64	0.3906	9.92	7/16-20	10,0	142,0	95,0	80,0	40,0	51823
10,0 mm	0.3937			10,0	142,0	95,0	80,0	40,0	63645
10,1 mm	0.3976			12,0	162,0	114,0	96,0	45,0	63646
10,2 mm	0.4016		M12 X 1,75	12,0	162,0	114,0	96,0	45,0	63647
10,3 mm	0.4055			12,0	162,0	114,0	96,0	45,0	63648
13/32	0.4062	10.32		12,0	162,0	114,0	96,0	45,0	51824
10,4 mm	0.4094			12,0	162,0	114,0	96,0	45,0	63649
10,5 mm	0.4134		M12 X 1,5	12,0	162,0	114,0	96,0	45,0	63650
10,6 mm	0.4173			12,0	162,0	114,0	96,0	45,0	63651
10,7 mm	0.4213			12,0	162,0	114,0	96,0	45,0	63652
27/64	0.4219	10.72	1/2-13	12,0	162,0	114,0	96,0	45,0	51825
10,8 mm	0.4252		M12 X 1,25	12,0	162,0	114,0	96,0	45,0	63653
10,9 mm	0.4291			12,0	162,0	114,0	96,0	45,0	63654
11,0 mm	0.4331		M12 X 1	12,0	162,0	114,0	96,0	45,0	63655
11,1 mm	0.4370			12,0	162,0	114,0	96,0	45,0	63656
7/16	0.4375	11.11	1/4-18NPT	12,0	162,0	114,0	96,0	45,0	51826

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TOLERANCES (inch)

≤.1181 DIAMETER
DC = +.00008/+.00047
DCON = h_6

>.1181–.2362 DIAMETER
DC = +.00016/+.00063
DCON = h_6

>.2362–.3937 DIAMETER
DC = +.00024/+.00083
DCON = h_6

>.3937–.7087 DIAMETER
DC = +.00028/+.00098
DCON = h_6

>.7087–1.1811 DIAMETER
DC = +.00031/+.00114
DCON = h_6

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,002/+0,012
DCON = h_6

>3–6 DIAMETER
DC = +0,004/+0,016
DCON = h_6

>6–10 DIAMETER
DC = +0,006/+0,021
DCON = h_6

>10–18 DIAMETER
DC = +0,007/+0,025
DCON = h_6

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

For patent information visit www.ksptpatents.com

140 8xD

FRACTIONAL & METRIC SERIES

CONTINUED

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 (AlTiN)
11,2 mm	0.4409			12,0	162,0	114,0	96,0	45,0	63657
11,3 mm	0.4449			12,0	162,0	114,0	96,0	45,0	63658
11,4 mm	0.4488			12,0	162,0	114,0	96,0	45,0	63659
11,5 mm	0.4528		M12 X 0,5	12,0	162,0	114,0	96,0	45,0	63660
11,6 mm	0.4567			12,0	162,0	114,0	96,0	45,0	63661
11,7 mm	0.4606			12,0	162,0	114,0	96,0	45,0	63662
11,8 mm	0.4646			12,0	162,0	114,0	96,0	45,0	63663
11,9 mm	0.4685			12,0	162,0	114,0	96,0	45,0	63664
15/32	0.4688	11.91	1/2-28	12,0	162,0	114,0	96,0	45,0	51827
12,0 mm	0.4724		M14 X 2	12,0	162,0	114,0	96,0	45,0	63665
31/64	0.4844	12.30	9/16-12	14,0	178,0	133,0	112,0	45,0	51828
12,5 mm	0.4921		M14 X 1,5	14,0	178,0	133,0	112,0	45,0	63666
1/2	0.5000	12.70		14,0	178,0	133,0	112,0	45,0	51829
12,8 mm	0.5039		M14 X 1,25	14,0	178,0	133,0	112,0	45,0	63667
13,0 mm	0.5118		M14 X 1	14,0	178,0	133,0	112,0	45,0	63668
33/64	0.5156	13.10	9/16-18	14,0	178,0	133,0	112,0	45,0	51830
13,5 mm	0.5315		5/8-11	14,0	178,0	133,0	112,0	45,0	63669
13,8 mm	0.5433			14,0	178,0	133,0	112,0	45,0	63670
14,0 mm	0.5512		M16 X 2	14,0	178,0	133,0	112,0	45,0	63671
9/16	0.5625	14.29		16,0	203,0	152,0	128,0	48,0	51831
14,5 mm	0.5709		M16 X 1,5	16,0	203,0	152,0	128,0	48,0	63672
37/64	0.5781	14.68	5/8-18	16,0	203,0	152,0	128,0	48,0	51832
14,8 mm	0.5827			16,0	203,0	152,0	128,0	48,0	63673
15,0 mm	0.5906		M16 X 1	16,0	203,0	152,0	128,0	48,0	63674
15,5 mm	0.6102		M18 X 2,5	16,0	203,0	152,0	128,0	48,0	63675
15,8 mm	0.6220			16,0	203,0	152,0	128,0	48,0	63676
5/8	0.6250	15.88	11/16-16	16,0	203,0	152,0	128,0	48,0	51833
16,0 mm	0.6299			16,0	203,0	152,0	128,0	48,0	63677
21/32	0.6562	16.67	3/4-10	18,0	222,0	171,0	144,0	48,0	51834
11/16	0.6875	17.46	3/4-16	18,0	222,0	171,0	144,0	48,0	51835
3/4	0.7500	19.05	13/16-16	20,0	243,0	190,0	160,0	50,0	51836

	Series 140 8D Fractional	Hardness	Vc (sfm)		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

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FRACTIONAL
ICe-Carb®

	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)

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

ICe-Carb®

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
P – **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
M – **STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 185 Bhn or ≤ 9 HRc	88	RPM	9371	4686	3514	2811	2343	2008	1757
		(71-106)	Fr	0.047	0.095	0.126	0.158	0.190	0.221	0.253
			Feed (mm/min)	445	445	445	445	445	445	445
	≤ 275 Bhn or ≤ 28 HRc	55	RPM	5816	2908	2181	1745	1454	1246	1091
		(44-66)	Fr	0.044	0.087	0.116	0.146	0.175	0.204	0.233
			Feed (mm/min)	254	254	254	254	254	254	254
M – **STAINLESS STEELS (DIFFICULT)** 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	40	RPM	4201	2100	1575	1260	1050	900	788
		(32-48)	Fr	0.042	0.085	0.113	0.141	0.169	0.198	0.226
			Feed (mm/min)	178	178	178	178	178	178	178
	≤ 375 Bhn or ≤ 40 HRc	29	RPM	3070	1535	1151	921	767	658	576
		(23-35)	Fr	0.037	0.074	0.099	0.124	0.149	0.174	0.199
			Feed (mm/min)	114	114	114	114	114	114	114
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

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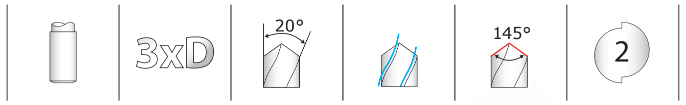
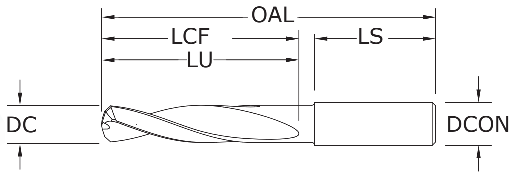
ICe-Carb®

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
N – **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
S – **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)





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 = h_6

TOLERANCES (mm)

DC = +0,000/−0,013
DCON = h_6

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

	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)

Solid Carbide Tools

VALUE AT THE SPINDLE®

General Purpose Drills

Hole Making

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

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	SÈRIES	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	**SÈRIES**	**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	**SÈRIES**	**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

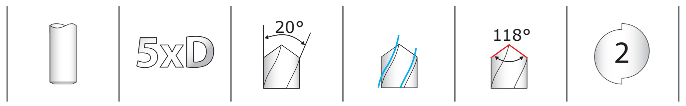
Bohren

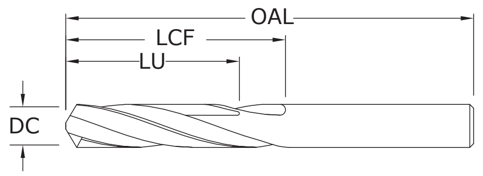
Please put "S" at the beginning of all page numbers below.

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	Klöliger 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	EDP NO. 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

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	EDP NO. 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

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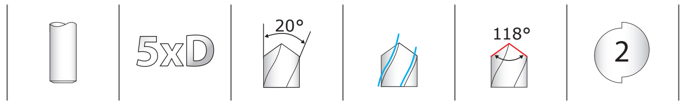
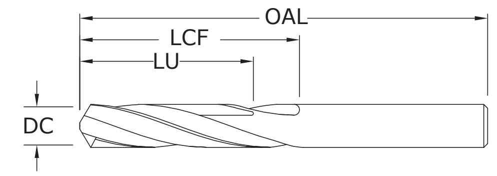
2 Flute Drills • Metric: DIN 338



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	EDP NO. 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

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

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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	EDP NO. 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

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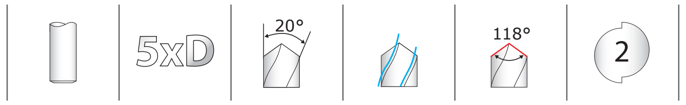
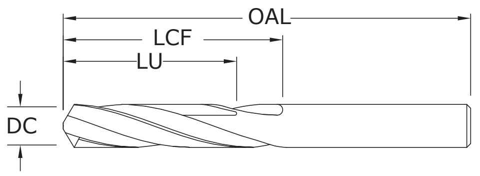
2 Flute Drills • Metric: DIN 338



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	EDP NO. 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

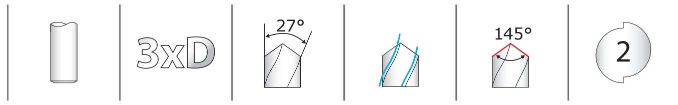
TOLERANCES (mm)

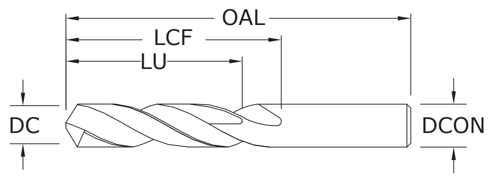
DC = +0,0000/–0,0127

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

For patent information visit www.ksptpatents.com

Short Length Self Centering Drills • DIN 6539





108M Plus

METRIC SERIES

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,000/–0,010
DCON = h_6

>3–6 DIAMETER
DC = +0,000/–0,012
DCON = h_6

>6–10 DIAMETER
DC = +0,000/–0,015
DCON = h_6

>10–18 DIAMETER
DC = +0,000/–0,018
DCON = h_6

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

For patent information visit www.ksptpatents.com

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

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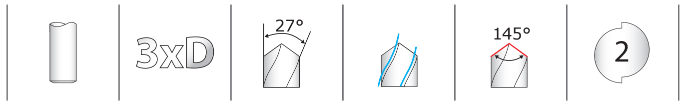
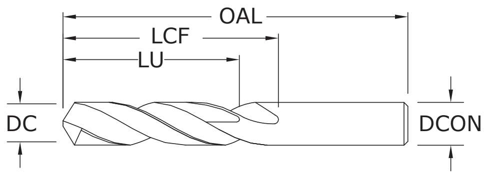
Short Length Self Centering Drills • DIN 6539



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 (AlTiN)
2,9	46,0	16,0	12,0	62069	68677
3,0	46,0	16,0	12,0	62071	68678
3,1	49,0	18,0	14,0	62073	68679
3,2	49,0	18,0	14,0	62075	68680
3,3	49,0	18,0	14,0	62077	68681
3,4	52,0	20,0	15,0	62079	68682
3,5	52,0	20,0	15,0	62081	68683
3,6	52,0	20,0	15,0	62083	68684
3,7	52,0	20,0	15,0	62085	68685
3,8	55,0	22,0	17,0	62087	68686
3,9	55,0	22,0	17,0	62089	68687
4,0	55,0	22,0	17,0	62091	68688
4,1	55,0	22,0	17,0	62093	68689
4,2	55,0	22,0	17,0	62095	68690
4,3	58,0	24,0	18,0	62097	68691
4,4	58,0	24,0	18,0	62099	68692
4,5	58,0	24,0	18,0	62101	68693
4,6	58,0	24,0	18,0	62103	68694
4,7	58,0	24,0	18,0	62105	68695
4,8	62,0	26,0	20,0	62107	68696
4,9	62,0	26,0	20,0	62109	68697
5,0	62,0	26,0	20,0	62111	68698
5,1	62,0	26,0	20,0	62113	68699
5,2	62,0	26,0	20,0	62115	68700
5,3	62,0	26,0	20,0	62117	68701
5,4	66,0	28,0	21,0	62119	68702
5,5	66,0	28,0	21,0	62121	68703
5,6	66,0	28,0	21,0	62123	68704
5,7	66,0	28,0	21,0	62125	68705
5,8	66,0	28,0	21,0	62127	68706
5,9	66,0	28,0	21,0	62129	68707
6,0	66,0	28,0	21,0	62131	68708

continued on next page

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,000/–0,010
DCON = h_6

>3–6 DIAMETER
DC = +0,000/–0,012
DCON = h_6

>6–10 DIAMETER
DC = +0,000/–0,015
DCON = h_6

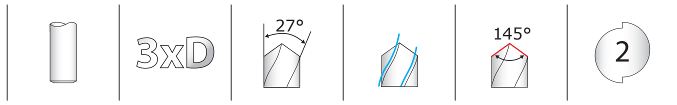
>10–16 DIAMETER
DC = +0,000/–0,018
DCON = h_6

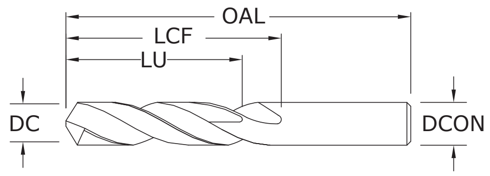
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
- NON-FERROUS
- PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

METRIC

Short Length Self Centering Drills • DIN 6539





108M Plus

METRIC SERIES

CONTINUED

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

TOLERANCES (mm)

≤3 DIAMETER
DC = +0,000/–0,010
DCON = h_6

>3–6 DIAMETER
DC = +0,000/–0,012
DCON = h_6

>6–10 DIAMETER
DC = +0,000/–0,015
DCON = h_6

>10–16 DIAMETER
DC = +0,000/–0,018
DCON = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS
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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	≤ 175 Bhn or ≤ 7 HRc	265	RPM	64787	32394	16197	8098	4049	2699	2025
			(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
		≤ 300 Bhn or ≤ 32 HRc	125	RPM	30560	15280	7640	3820	1910	1273	955
			(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
		≤ 425 Bhn or ≤ 45 HRc	85	RPM	20781	10390	5195	2598	1299	866	649
			(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	≤ 275 Bhn or ≤ 28 HRc	230	RPM	56230	28115	14058	7029	3514	2343	1757
			(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
		≤ 375 Bhn or ≤ 40 HRc	145	RPM	35450	17725	8862	4431	2216	1477	1108
			(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
		≤ 450 Bhn or ≤ 48 HRc	60	RPM	14669	7334	3667	1834	917	611	458
			(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	≤ 250 Bhn or ≤ 24 HRc	210	RPM	51341	25670	12835	6418	3209	2139	1604
			(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
		≤ 330 Bhn or ≤ 36 HRc	110	RPM	26893	13446	6723	3362	1681	1121	840
			(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	≤ 275 Bhn or ≤ 28 HRc	65	RPM	15891	7946	3973	1986	993	662	497
			(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
		≤ 375 Bhn or ≤ 40 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
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	280	RPM	68454	34227	17114	8557	4278	2852	2139
			(224-336)	Fr	0.00026	0.0005	0.0010	0.0020	0.0041	0.0061	0.0082
				Feed (ipm)	17.5	17.5	17.5	17.5	17.5	17.5	17.5
		≤ 330 Bhn or ≤ 36 HRc	250	RPM	61120	30560	15280	7640	3820	2547	1910
			(200-300)	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

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

2 Flute Drills
Short Length Self Centering Drills • DIN 6539

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

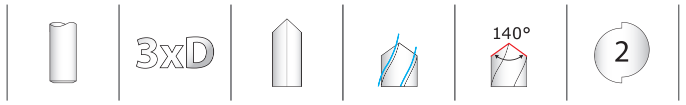
continued on next page

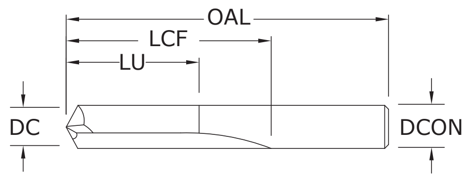
2 Flute Drills
Short Length Self Centering Drills • DIN 6539

	Series 101M, 108M Metric	Hardness	Vc (m/min)		DC • mm 1	3	6	8	10	12	16
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	165 (132-198)	RPM	52348	17449	8725	6544	5235	4362	3272
				Fr	0.020	0.060	0.120	0.160	0.200	0.240	0.319
				Feed (mm/min)	1045	1045	1045	1045	1045	1045	1045
		≤ 150 Bhn or ≤ 7 HRc	139 (111-166)	RPM	44108	14703	7351	5514	4411	3676	2757
				Fr	0.020	0.060	0.120	0.160	0.200	0.239	0.319
				Feed (mm/min)	880	880	880	880	880	880	880
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	58 (46-69)	RPM	18419	6140	3070	2302	1842	1535	1151
				Fr	0.010	0.030	0.060	0.080	0.100	0.121	0.161
				Feed (mm/min)	185	185	185	185	185	185	185
		≤ 200 Bhn or ≤ 23 HRc	53 (43-64)	RPM	16965	5655	2827	2121	1696	1414	1060
				Fr	0.010	0.030	0.060	0.080	0.100	0.120	0.160
				Feed (mm/min)	170	170	170	170	170	170	170
	PLASTICS Polycarbonate, PVC		152 (122-183)	RPM	48471	16157	8078	6059	4847	4039	3029
				Fr	0.020	0.060	0.120	0.160	0.200	0.240	0.320
				Feed (mm/min)	970	970	970	970	970	970	970
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	12 (10-15)	RPM	3878	1293	646	485	388	323	242
				Fr	0.006	0.019	0.039	0.052	0.064	0.077	0.103
				Feed (mm/min)	25	25	25	25	25	25	25
		≤ 320 Bhn or ≤ 34 HRc	8 (6-9)	RPM	2424	808	404	303	242	202	151
				Fr	0.006	0.019	0.037	0.050	0.062	0.074	0.099
				Feed (mm/min)	15	15	15	15	15	15	15
		≤ 425 Bhn or ≤ 45 HRc	6 (5-7)	RPM	1939	646	323	242	194	162	121
				Fr	0.005	0.015	0.031	0.041	0.052	0.062	0.083
				Feed (mm/min)	10	10	10	10	10	10	10
S	TITANIUM ALLOYS (DIFFICULT) Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	26 (21-31)	RPM	8240	2747	1373	1030	824	687	515
				Fr	0.013	0.040	0.080	0.107	0.133	0.160	0.214
				Feed (mm/min)	110	110	110	110	110	110	110
		≤ 350 Bhn or ≤ 38 HRc	20 (16-24)	RPM	6301	2100	1050	788	630	525	394
				Fr	0.007	0.021	0.043	0.057	0.071	0.086	0.114
				Feed (mm/min)	45	45	45	45	45	45	45
		≤ 440 Bhn or ≤ 47 HRc	17 (13-20)	RPM	5332	1777	889	666	533	444	333
				Fr	0.007	0.020	0.039	0.053	0.066	0.079	0.105
				Feed (mm/min)	35	35	35	35	35	35	35
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	26 (21-31)	RPM	8240	2747	1373	1030	824	687	515
				Fr	0.007	0.020	0.040	0.053	0.067	0.080	0.107
				Feed (mm/min)	55	55	55	55	55	55	55
		≤ 375 Bhn or ≤ 40 HRc	17 (13-20)	RPM	5332	1777	889	666	533	444	333
				Fr	0.003	0.010	0.020	0.027	0.034	0.041	0.054
				Feed (mm/min)	18	18	18	18	18	18	18
		≤ 475 Bhn or ≤ 50 HRc	12 (10-15)	RPM	3878	1293	646	485	388	323	242
				Fr	0.003	0.009	0.019	0.025	0.031	0.037	0.050
				Feed (mm/min)	12	12	12	12	12	12	12

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)

Straight Flute Drills • Metric: DIN 6539





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FRACTIONAL & METRIC SERIES

CUTTING DIAMETER DC / DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO. UNCOATED	EDP NO. 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

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TOLERANCES (inch)

DC = +0.0000/–0.0005
DCON = h_6

TOLERANCES (mm)

DC = +0,0000/–0,0127
DCON = h_6

STEELS
CAST IRON
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For patent information visit www.ksptpatents.com

Straight Flute Drills • Metric: DIN 6539

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FRACTIONAL & METRIC SERIES

CONTINUED

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

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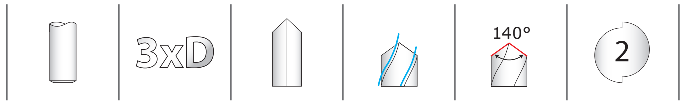
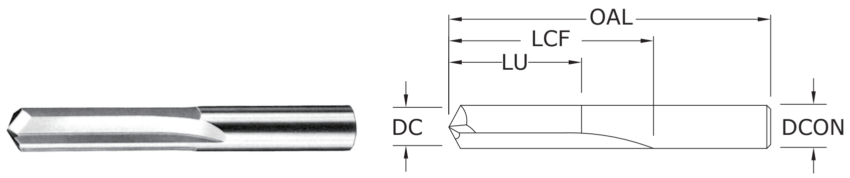
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

Straight Flute Drills • Metric: DIN 6539





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FRACTIONAL & METRIC SERIES

CUTTING DIAMETER DC / DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
15/64	0.2344	5.95	2-7/16	1-5/16	1-3/64	56115	56147
6,0 mm	0.2362		66,0	28,0	21,0	66021	66045
1/4	0.2500	6.35	2-1/2	1-3/8	1-7/64	56116	56148
6,5 mm	0.2559		70,0	31,0	23,0	66022	66046
17/64	0.2656	6.75	2-5/8	1-7/16	1-7/64	56117	56149
7,0 mm	0.2756		74,0	34,0	25,0	66023	66024
9/32	0.2812	7.14	2-11/16	1-1/2	1-13/64	56118	56150
7,5 mm	0.2953		74,0	34,0	25,0	66025	66026
19/64	0.2969	7.54	2-3/4	1-9/16	1-1/4	56119	56151
5/16	0.3125	7.94	2-13/16	1-5/8	1-19/64	56120	56152
8,0 mm	0.3150		79,0	37,0	27,0	66027	66028
21/64	0.3281	8.33	2-15/16	1-11/16	1-23/64	56121	56153
8,5 mm	0.3346		79,0	37,0	27,0	66029	66030
11/32	0.3438	8.73	3	1-11/16	1-23/64	56122	56154
9,0 mm	0.3543		84,0	40,0	29,0	66031	66032
23/64	0.3594	9.13	3-1/16	1-3/4	1-13/32	56123	56155
9,5 mm	0.3740		84,0	40,0	29,0	66033	66034
3/8	0.3750	9.53	3-1/8	1-13/16	1-29/64	56124	56156
25/64	0.3906	9.92	3-1/4	1-7/8	1-1/2	56125	56157
10,0 mm	0.3937		89,0	43,0	31,0	66035	66036
13/32	0.4062	10.32	3-5/16	1-15/16	1-35/64	56126	56158
10,5 mm	0.4134		89,0	43,0	31,0	66037	66038
27/64	0.4219	10.72	3-3/8	2	1-39/64	56127	56159
11,0 mm	0.4331		95,0	47,0	33,0	66039	66040
7/16	0.4375	11.11	3-7/16	2-1/16	1-21/32	56128	56160
11,5 mm	0.4528		95,0	47,0	33,0	66041	66042
29/64	0.4531	11.51	3-9/16	2-1/8	1-45/64	56129	56161
15/32	0.4688	11.91	3-5/8	2-1/8	1-45/64	56130	56162
12,0 mm	0.4724		102,0	51,0	35,0	66043	66044
31/64	0.4844	12.30	3-11/16	2-3/16	1-3/4	56131	56163
1/2	0.5000	12.70	3-3/4	2-1/4	1-51/64	56132	56164

TOLERANCES (inch)

DC = +0.0000/–0.0005
DCON = h_6

TOLERANCES (mm)

DC = +0,0000/–0,0127
DCON = h_6

STEELS
CAST IRON
HARDENED STEELS

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Straight Flute Drills

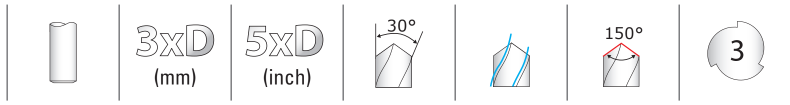
	Series 106 Fractional	Hardness	Vc (sfm)	DC • in	1/16	1/8	3/16	1/4	3/8	1/2
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 500 Bhn or ≤ 52 HRc	60	RPM	3667	1834	1222	917	611	458
			(48-72)	Fr	0.0004	0.0007	0.0011	0.0014	0.0021	0.0028
				Feed (ipm)	1.3	1.3	1.3	1.3	1.3	1.3
		≤ 615 Bhn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

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



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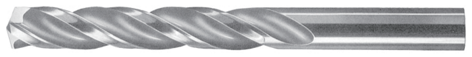
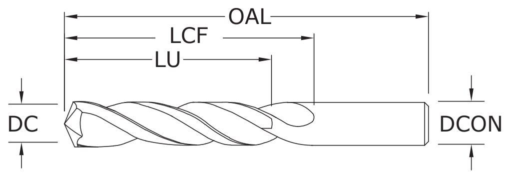
FRACTIONAL & METRIC SERIES





CUTTING DIAMETER DC / DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO. UNCOATED	EDP NO. 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 = h_6

TOLERANCES (mm)

DC = +0,0000/−0,0127
DCON = h_6

STEELS
CAST IRON
HARDENED STEELS
NON-FERROUS

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KYOCERA Solid Tools
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FRACTIONAL & METRIC

3 Flute Drills • Metric: DIN 6539

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FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER DC / DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO. UNCOATED	EDP NO. 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

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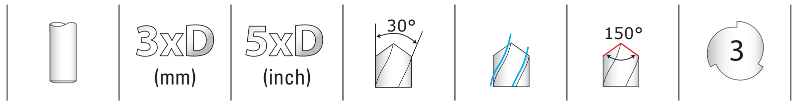

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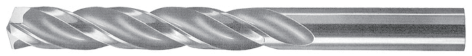
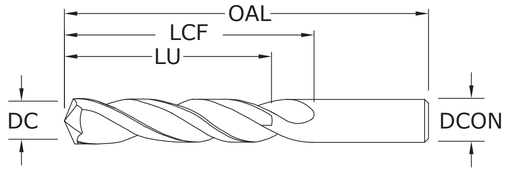
FRACTIONAL & METRIC SERIES





CUTTING DIAMETER DC / DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO. UNCOATED	EDP NO. 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

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TOLERANCES (inch)

DC = +0.0000/–0.0005
DCON = h_6

TOLERANCES (mm)

DC = +0,0000/–0,0127
DCON = h_6

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

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3 Flute Drills • Metric: DIN 6539

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FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER DC / DCON	DECIMAL EQUIV.	METRIC EQUIV.	OVERALL LENGTH OAL	FLUTE LENGTH LCF	CLEARED LENGTH LU	EDP NO. UNCOATED	EDP NO. 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	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

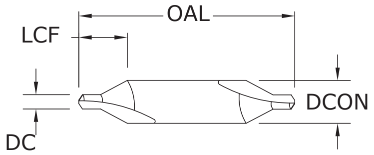
FRACTIONAL

Combined Drill & Countersink

118°
60°
2

Pictured:
Series 301 Set

301
FRACTIONAL SERIES



	inch				EDP NO.	
SIZE	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

METRIC

Combined Drill & Countersink

118°
60°
2

TOLERANCES (mm)
DC = +0,076/−0,000
DCON = −0,0025/−0,0127

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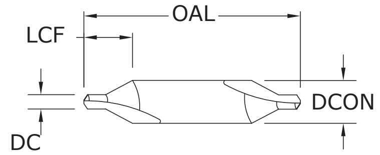
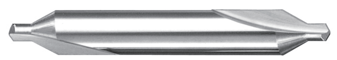
PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com





301M
METRIC SERIES

mm				EDP NO.	
DRILL DIAMETER DC	BODY DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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

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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)

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

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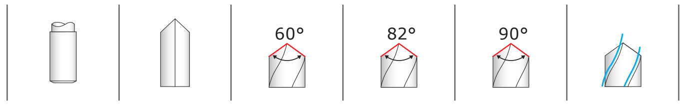
Combined Drill & Countersink

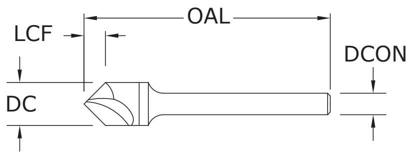
	Series 301M Metric	Hardness	Vc (m/min)		DC • mm 1	1.6	2.5	4	5
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	165	RPM	16619	13087	8309	5235	4188
			(132-198)	Fr	0.025	0.032	0.050	0.079	0.099
				Feed (mm/min)	415	415	415	415	415
		≤ 150 Bhn or ≤ 7 HRc	139	RPM	14003	11027	7001	4411	3529
			(111-166)	Fr	0.025	0.032	0.050	0.079	0.099
				Feed (mm/min)	350	350	350	350	350
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	58	RPM	5847	4605	2924	1842	1474
			(46-69)	Fr	0.012	0.015	0.024	0.038	0.048
				Feed (mm/min)	70	70	70	70	70
		≤ 200 Bhn or ≤ 23 HRc	53	RPM	5386	4241	2693	1696	1357
			(43-64)	Fr	0.012	0.015	0.024	0.038	0.048
				Feed (mm/min)	65	65	65	65	65
	PLASTICS Polycarbonate, PVC		152	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	≤ 220 Bhn or ≤ 19 HRc	12	RPM	1231	969	616	388	310
			(10-15)	Fr	0.009	0.011	0.018	0.028	0.035
				Feed (mm/min)	11	11	11	11	11
		≤ 320 Bhn or ≤ 34 HRc	8	RPM	769	606	385	242	194
			(6-9)	Fr	0.008	0.010	0.016	0.025	0.031
				Feed (mm/min)	6	6	6	6	6
		≤ 425 Bhn or ≤ 45 HRc	6	RPM	616	485	308	194	155
			(5-7)	Fr	0.003	0.004	0.006	0.010	0.013
				Feed (mm/min)	2	2	2	2	2
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	26	RPM	2616	2060	1308	824	659
			(21-31)	Fr	0.016	0.020	0.032	0.051	0.064
				Feed (mm/min)	42	42	42	42	42
		≤ 350 Bhn or ≤ 38 HRc	20	RPM	2000	1575	1000	630	504
			(16-24)	Fr	0.009	0.011	0.018	0.029	0.036
				Feed (mm/min)	18	18	18	18	18
		≤ 440 Bhn or ≤ 47 HRc	17	RPM	1693	1333	846	533	427
			(13-20)	Fr	0.008	0.011	0.017	0.026	0.033
				Feed (mm/min)	14	14	14	14	14
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	26	RPM	2616	2060	1308	824	659
			(21-31)	Fr	0.009	0.012	0.018	0.029	0.036
				Feed (mm/min)	24	24	24	24	24
		≤ 375 Bhn or ≤ 40 HRc	17	RPM	1693	1333	846	533	427
			(13-20)	Fr	0.004	0.005	0.008	0.013	0.016
				Feed (mm/min)	7	7	7	7	7
		≤ 475 Bhn or ≤ 50 HRc	12	RPM	1231	969	616	388	310
			(10-15)	Fr	0.004	0.005	0.008	0.013	0.016
				Feed (mm/min)	5	5	5	5	5

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)

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

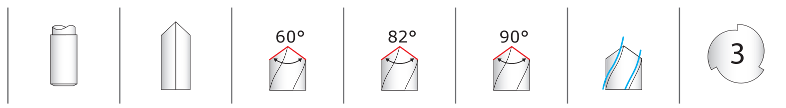
continued on next page

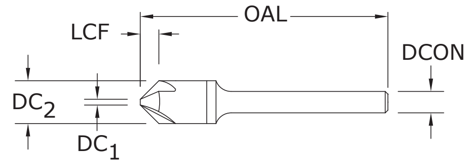
Single Flute Countersink

	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	225	RPM	6876	4584	3438	2292	1719	1146	860
			(180-270)	Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0061
				Feed (ipm)	5.2	5.2	5.2	5.2	5.2	5.2	5.2
		≤ 150 Bhn or ≤ 7 HRc	190	RPM	5806	3871	2903	1935	1452	968	726
			(152-228)	Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0061
				Feed (ipm)	4.4	4.4	4.4	4.4	4.4	4.4	4.4
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	95	RPM	2903	1935	1452	968	726	484	363
			(76-114)	Fr	0.0004	0.0006	0.0008	0.0011	0.0015	0.0023	0.0030
				Feed (ipm)	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		≤ 200 Bhn or ≤ 23 HRc	80	RPM	2445	1630	1222	815	611	407	306
			(64-96)	Fr	0.0004	0.0006	0.0008	0.0012	0.0016	0.0025	0.0033
				Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 220 Bhn or ≤ 19 HRc	18	RPM	550	367	275	183	138	92	69
			(14-22)	Fr	0.0002	0.0003	0.0004	0.0005	0.0007	0.0011	0.0015
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		≤ 320 Bhn or ≤ 34 HRc	14	RPM	428	285	214	143	107	71	53
			(11-17)	Fr	0.0002	0.0004	0.0005	0.0007	0.0009	0.0014	0.0019
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		≤ 425 Bhn or ≤ 45 HRc	12	RPM	367	244	183	122	92	61	46
			(10-14)	Fr	0.0003	0.0004	0.0005	0.0008	0.0011	0.0016	0.0022
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	36	RPM	1100	733	550	367	275	183	138
			(29-43)	Fr	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
				Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		≤ 350 Bhn or ≤ 38 HRc	28	RPM	856	570	428	285	214	143	107
			(22-34)	Fr	0.0004	0.0005	0.0007	0.0011	0.0014	0.0021	0.0028
				Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		≤ 440 Bhn or ≤ 47 HRc	21	RPM	642	428	321	214	160	107	80
			(17-25)	Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	35	RPM	1070	713	535	357	267	178	134
			(28-42)	Fr	0.0003	0.0004	0.0006	0.0008	0.0011	0.0017	0.0022
				Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		≤ 375 Bhn or ≤ 40 HRc	25	RPM	764	509	382	255	191	127	96
			(20-30)	Fr	0.0001	0.0002	0.0003	0.0004	0.0005	0.0008	0.0010
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		≤ 475 Bhn or ≤ 50 HRc	20	RPM	611	407	306	204	153	102	76
			(16-24)	Fr	0.0002	0.0002	0.0003	0.0005	0.0007	0.0010	0.0013
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1

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)

3 Flute Countersink





603
FRACTIONAL SERIES

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 (inch)	SHANK DIAMETER DCON	OVERALL LENGTH OAL	FLUTE LENGTH LCF	TIP DIAMETER DC_1	EDP NO. 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: DC_1 dimension varies based on angle. Contact your KSPT representative or consult SGS Tool Wizard® for dimension information.

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

3 Flute Countersink

Series 603 Fractional

ISO	Material	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

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FRACTIONAL

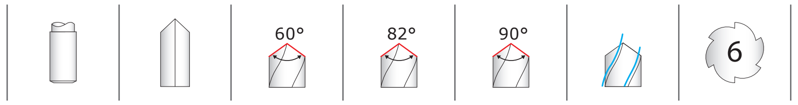
3 Flute Countersink

Series 603 Fractional

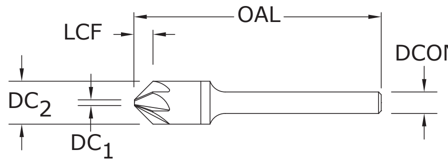
ISO	Material	Hardness	Vc (sfm)		DC • in 1/8	3/16	1/4	3/8	1/2	3/4	1
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	225	RPM	6876	4584	3438	2292	1719	1146	860
			(180-270)	Fr	0.0011	0.0017	0.0023	0.0034	0.0045	0.0068	0.0091
				Feed (ipm)	7.8	7.8	7.8	7.8	7.8	7.8	7.8
		≤ 150 Bhn or ≤ 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
		≤ 425 Bhn or ≤ 45 HRc	12	RPM	367	244	183	122	92	61	46
			(10-14)	Fr	0.0003	0.0004	0.0005	0.0008	0.0011	0.0016	0.0022
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	36	RPM	1100	733	550	367	275	183	138
			(29-43)	Fr	0.0007	0.0011	0.0015	0.0022	0.0029	0.0044	0.0058
				Feed (ipm)	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		≤ 350 Bhn or ≤ 38 HRc	28	RPM	856	570	428	285	214	143	107
			(22-34)	Fr	0.0006	0.0009	0.0012	0.0018	0.0023	0.0035	0.0047
				Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		≤ 440 Bhn or ≤ 47 HRc	21	RPM	642	428	321	214	160	107	80
			(17-25)	Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
				Feed (ipm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
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)

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: DC_1 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

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			(42-64)	Fr	0.0006	0.0009	0.0012	0.0019	0.0025	0.0037	0.0049
				Feed (ipm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		≤ 330 Bhn or ≤ 36 HRc	46	RPM	1406	937	703	469	351	234	176
			(37-55)	Fr	0.0005	0.0007	0.0010	0.0015	0.0020	0.0030	0.0040
				Feed (ipm)	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	28	RPM	856	570	428	285	214	143	107
			(22-34)	Fr	0.0007	0.0011	0.0014	0.0021	0.0028	0.0042	0.0056
				Feed (IPM)	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		≤ 375 Bhn or ≤ 40 HRc	21	RPM	642	428	321	214	160	107	80
			(17-25)	Fr	0.0003	0.0005	0.0006	0.0009	0.0012	0.0019	0.0025
				Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	105	RPM	3209	2139	1604	1070	802	535	401
			(84-126)	Fr	0.0012	0.0018	0.0024	0.0036	0.0049	0.0073	0.0097
				Feed (ipm)	3.9	3.9	3.9	3.9	3.9	3.9	3.9
		≤ 330 Bhn or ≤ 36 HRc	75	RPM	2292	1528	1146	764	573	382	287
			(60-90)	Fr	0.0012	0.0018	0.0024	0.0037	0.0049	0.0073	0.0098
				Feed (ipm)	2.8	2.8	2.8	2.8	2.8	2.8	2.8

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6 Flute Countersink

ISO	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

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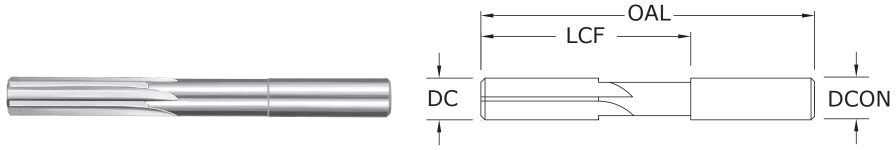
6 Flute Countersink

ISO	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

200
FRACTIONAL SERIES



CUTTING DIAMETER DC (inch)	SHANK DIAMETER DCON (inch)	MAXIMUM REAM LENGTH LCF (inch)	OVERALL LENGTH OAL (inch)	NO. OF FLUTES	EDP NO. 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

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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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

200
FRACTIONAL SERIES

CONTINUED

TOLERANCES (inch)

DC = +0.0002/–0.0000
DCON = +0.0002/–0.0000

CUTTING DIAMETER DC (inch)	SHANK DIAMETER DCON (inch)	MAXIMUM REAM LENGTH LCF (inch)	OVERALL LENGTH OAL (inch)	NO. OF FLUTES
.0470 – .0625	1/16	3/4	1-1/2	4
.0626 – .0781	5/64	1	2	4
.0782 – .0938	3/32	1-1/4	2-1/4	4
.0939 – .1094	7/64	1-1/4	2-1/4	4
.1095 – .1250	1/8	1-1/4	2-1/4	4
.1251 – .1406	9/64	1-1/2	2-1/2	4
.1407 – .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

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 (120-180)	RPM	9168	4584	3056	2292	1834	1528	1146
				Fr	0.0018	0.0035	0.0053	0.0071	0.0088	0.0106	0.0141
				Feed (ipm)	16.5	16.0	16.2	16.3	16.1	16.2	16.2
		≤ 300 Bhn or ≤ 32 HRc	75 (60-90)	RPM	4584	2292	1528	1146	917	764	573
				Fr	0.0016	0.0031	0.0047	0.0062	0.0078	0.0093	0.0124
				Feed (ipm)	7.3	7.1	7.2	7.1	7.2	7.1	7.1
		≤ 425 Bhn or ≤ 45 HRc	55 (44-66)	RPM	3362	1681	1121	840	672	560	420
				Fr	0.0009	0.0019	0.0028	0.0037	0.0046	0.0056	0.0074
				Feed (ipm)	3.0	3.2	3.1	3.1	3.1	3.1	3.1
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	115 (92-138)	RPM	7029	3514	2343	1757	1406	1171	879
				Fr	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
				Feed (ipm)	10.5	10.5	10.5	10.5	10.5	10.5	10.5
		≤ 375 Bhn or ≤ 40 HRc	70 (56-84)	RPM	4278	2139	1426	1070	856	713	535
				Fr	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
				Feed (ipm)	6.4	6.4	6.4	6.4	6.4	6.4	6.4
		≤ 450 Bhn or ≤ 48 HRc	45 (36-54)	RPM	2750	1375	917	688	550	458	344
				Fr	0.0009	0.0019	0.0028	0.0037	0.0046	0.0056	0.0074
				Feed (ipm)	2.5	2.6	2.6	2.5	2.5	2.6	2.5
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250 Bhn or ≤ 24 HRc	75 (60-90)	RPM	4584	2292	1528	1146	917	764	573
				Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078
				Feed (ipm)	4.6	4.6	4.4	4.5	4.5	4.5	4.5
		≤ 330 Bhn or ≤ 36 HRc	55 (44-66)	RPM	3362	1681	1121	840	672	560	420
				Fr	0.0008	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060
				Feed (ipm)	2.7	2.5	2.6	2.5	2.6	2.5	2.5
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 275 Bhn or ≤ 28 HRc	35 (28-42)	RPM	2139	1070	713	535	428	357	267
				Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078
				Feed (ipm)	2.1	2.1	2.1	2.1	2.1	2.1	2.1
		≤ 375 Bhn or ≤ 40 HRc	25 (20-30)	RPM	1528	764	509	382	306	255	191
				Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
				Feed (ipm)	0.9	1.0	1.0	1.0	0.9	1.0	1.0
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	125 (100-150)	RPM	7640	3820	2547	1910	1528	1273	955
				Fr	0.0020	0.0040	0.0060	0.0081	0.0101	0.0121	0.0161
				Feed (ipm)	15.3	15.3	15.3	15.5	15.4	15.4	15.4
		≤ 330 Bhn or ≤ 36 HRc	95 (76-114)	RPM	5806	2903	1935	1452	1161	968	726
				Fr	0.0020	0.0040	0.0060	0.0081	0.0101	0.0121	0.0161
				Feed (ipm)	11.6	11.6	11.6	11.8	11.7	11.7	11.7
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80 Bhn or ≤ 47 HRb	270 (216-324)	RPM	16502	8251	5501	4126	3300	2750	2063
				Fr	0.0025	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200
				Feed (ipm)	41.3	41.3	41.3	41.3	41.3	41.3	41.3
		≤ 150 Bhn or ≤ 7 HRc	230 (184-276)	RPM	14058	7029	4686	3514	2812	2343	1757
				Fr	0.0025	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200
				Feed (ipm)	35.1	35.1	35.1	35.1	35.1	35.1	35.1
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	115 (92-138)	RPM	7029	3514	2343	1757	1406	1171	879
				Fr	0.0013	0.0026	0.0038	0.0051	0.0064	0.0077	0.0102
				Feed (ipm)	9.1	9.1	8.9	9.0	9.0	9.0	9.0
		≤ 200 Bhn or ≤ 23 HRc	95 (76-114)	RPM	5806	2903	1935	1452	1161	968	726
				Fr	0.0013	0.0026	0.0038	0.0051	0.0064	0.0077	0.0102
				Feed (ipm)	7.5	7.5	7.4	7.4	7.4	7.5	7.4

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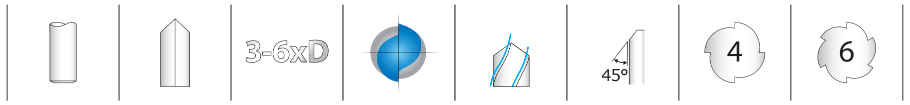
Straight Flute Accu-Reamer

	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 (16-24)	RPM	1222	611	407	306	244	204	153
				Fr	0.0008	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060
				Feed (ipm)	1.0	0.9	0.9	0.9	0.9	0.9	0.9
		≤ 320 Bhn or ≤ 34 HRc	15 (12-18)	RPM	917	458	306	229	183	153	115
				Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
				Feed (ipm)	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		≤ 425 Bhn or ≤ 45 HRc	10 (8-12)	RPM	611	306	204	153	122	102	76
				Fr	0.0004	0.0007	0.0011	0.0015	0.0018	0.0022	0.0029
				Feed (ipm)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 275 Bhn or ≤ 28 HRc	45 (36-54)	RPM	2750	1375	917	688	550	458	344
				Fr	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
				Feed (ipm)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
		≤ 350 Bhn or ≤ 38 HRc	35 (28-42)	RPM	2139	1070	713	535	428	357	267
				Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078
				Feed (ipm)	2.1	2.1	2.1	2.1	2.1	2.1	2.1
		≤ 440 Bhn or ≤ 47 HRc	25 (20-30)	RPM	1528	764	509	382	306	255	191
				Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
				Feed (ipm)	0.9	1.0	1.0	1.0	0.9	1.0	1.0
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250 Bhn or ≤ 24 HRc	40 (32-48)	RPM	2445	1222	815	611	489	407	306
				Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078
				Feed (ipm)	2.4	2.4	2.4	2.4	2.4	2.4	2.4
		≤ 375 Bhn or ≤ 40 HRc	25 (20-30)	RPM	1528	764	509	382	306	255	191
				Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
				Feed (ipm)	0.9	1.0	1.0	1.0	0.9	1.0	1.0
		≤ 475 Bhn or ≤ 50 HRc	20 (16-24)	RPM	1222	611	407	306	244	204	153
				Fr	0.0004	0.0008	0.0012	0.0016	0.0019	0.0023	0.0031
				Feed (ipm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		≤ 655 Bhn or ≤ 60 HRc	14 (11-17)	RPM	856	428	285	214	171	143	107
				Fr	0.0003	0.0007	0.0011	0.0014	0.0018	0.0021	0.0028
				Feed (ipm)	0.3	0.3	0.3	0.3	0.3	0.3	0.3

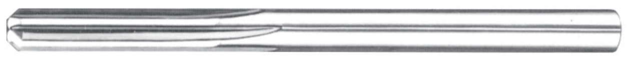
Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
rpm = Vc x 3.82 / DC
ipm = Fr x rpm
increase speed and feed 30 percent when using coated reamers
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

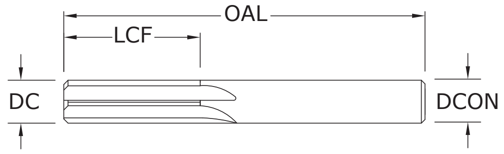
Straight Flute Reamer



201M

METRIC SERIES





CUTTING DIAMETER DC (mm)	SHANK DIAMETER DCON (mm)	MAXIMUM REAM LENGTH LCF (mm)	OVERALL LENGTH OAL (mm)	NO. OF FLUTES	EDP NO. 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

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

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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

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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)

Solid Carbide Tools

VALUE AT THE SPINDLE®

Routers

Routing

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

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**
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Corte descendente	22	2 filos, corte descendente, fraccional	349
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Recomendaciones de velocidades y avances mostradas tras cada serie

Détourage

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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
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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
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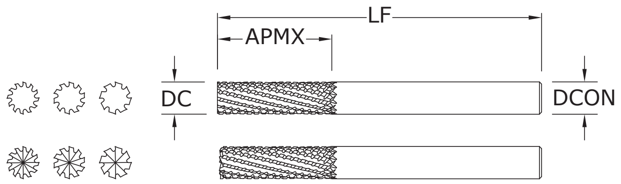
Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

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 = h_6

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

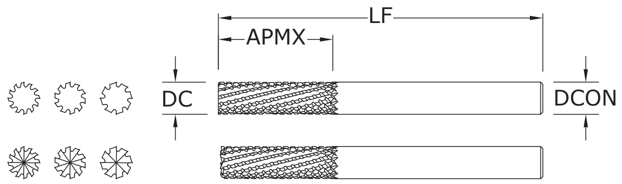
TOLERANCES (mm)

DC = +0,000/–0,130
DCON = h_6

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

Carbon Composite



20-CCR-LHC

FRACTIONAL SERIES

TOLERANCES (inch)

DC = +.000/–.005
DCON = h_6

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	NO. OF FLUTES	END STYLE	UNCOATED	Di-NAMITE® (Diamond)
1/4	1	2-1/2	1/4	8	No End Cutting	73070	73078
1/4	1	2-1/2	1/4	8	End Cutting	73071	73079
5/16	1	2-1/2	5/16	10	No End Cutting	73072	73080
5/16	1	2-1/2	5/16	10	End Cutting	73073	73081
3/8	1-1/8	2-1/2	3/8	12	No End Cutting	73074	73082
3/8	1-1/8	2-1/2	3/8	12	End Cutting	73075	73083

- Multi-flute design and positive geometry to shear with minimal pressure and delamination
- 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

20M-CCR-LHC

METRIC SERIES

TOLERANCES (mm)

DC = +0,000/–0,130
DCON = h_6

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

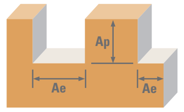
mm						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	NO. OF FLUTES	END STYLE	UNCOATED	Di-NAMITE® (Diamond)
6,0	25,0	63,0	6,0	8	No End Cutting	83220	83230
6,0	25,0	63,0	6,0	8	End Cutting	83221	83231
8,0	25,0	63,0	8,0	10	No End Cutting	83222	83232
8,0	25,0	63,0	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

- 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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

FRACTIONAL

Carbon Composite



Series 20 Fractional

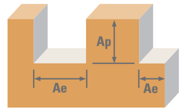
	Material	Operation	Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/4	5/16	3/8	1/2
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	1	≤ 1	400 (320-480)	RPM	6112	4890	4075	3056
						Fr	0.0049	0.0094	0.0135	0.0180
						Feed (ipm)	30	46	55	55
		Profile	≤ 0.5	≤ 1.5	500 (400-600)	RPM	7640	6112	5093	3820
						Fr	0.0049	0.0094	0.0135	0.0180
						Feed (ipm)	38	58	69	69
		HSM	≤ 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)	Slot	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
		Profile	≤ 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
		HSM	≤ 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	Slot	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
		Profile	≤ 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
		HSM	≤ 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	Slot	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
		Profile	≤ 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
		HSM	≤ 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



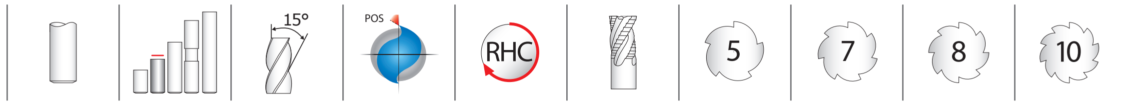
Series 20M Metric

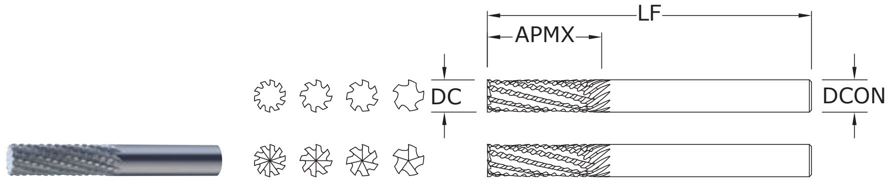
	Material	Operation	Ae x DC	Ap x DC	Vc (m/min)		DC • mm 3	6	8	10	12
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	1	≤ 1	120 (96-164)	RPM	12722	6361	4771	3817	3181
						Fr	0.055	0.113	0.243	0.366	0.439
						Feed (mm/min)	700	720	1160	1395	1395
		Profile	≤ 0.5	≤ 1.5	150 (120-180)	RPM	15903	7951	5963	4771	3976
						Fr	0.055	0.113	0.243	0.366	0.439
						Feed (mm/min)	875	900	1450	1744	1744
		HSM	≤ 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)	Slot	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
		Profile	≤ 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
		HSM	≤ 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	Slot	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
		Profile	≤ 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
		HSM	≤ 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	Slot	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
		Profile	≤ 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
		HSM	≤ 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)

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 = h_6

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

31M-CCR

METRIC SERIES

- Fewer, deeper flutes to prevent clogging in heavy routing
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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

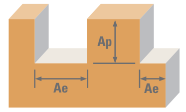
TOLERANCES (mm)

DC = +0,000/–0,130
DCON = h_6

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

Coarse Cut Carbon Composite

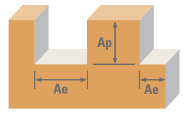


Series 31 Fractional		Ae x DC	Ap x DC	Vc (sfm)	DC • in	1/4	5/16	3/8	1/2
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	1	≤ 1	400	RPM	6112	4890	4075	3056
				(320-480)	Fr	0.0029	0.0065	0.0088	0.0147
					Feed (ipm)	18	32	36	45
	Profile	≤ 0.5	≤ 1.5	500	RPM	7640	6112	5093	3820
				(400-600)	Fr	0.0029	0.0065	0.0088	0.0147
					Feed (ipm)	23	40	45	56
	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
GFRP (FIBERGLASS)	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
	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
N — CARBON, GRAPHITE	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
	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
PLASTICS	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
	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-sgstool.com)

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
N — CARBON, GRAPHITE	Slot	1	≤ 1	145	RPM	7686	5765	4612	3843
				(116-174)	Fr	0.095	0.226	0.321	0.483
					Feed (mm/min)	728	1300	1480	1855
	Profile	≤ 0.5	≤ 1.5	185	RPM	9807	7355	5884	4903
				(148-222)	Fr	0.095	0.226	0.321	0.483
					Feed (mm/min)	929	1659	1888	2367
	HSM	≤ 0.05	≤ 2	300	RPM	15903	11927	9542	7951
				(240-360)	Fr	0.217	0.517	0.739	1.111
					Feed (mm/min)	3450	6170	7050	8830
PLASTICS	Slot	1	≤ 1	245	RPM	12987	9740	7792	6494
				(196-294)	Fr	0.094	0.223	0.318	0.477
					Feed (mm/min)	1215	2175	2475	3100
	Profile	≤ 0.5	≤ 1.5	305	RPM	16168	12126	9701	8084
				(244-366)	Fr	0.094	0.223	0.318	0.477
					Feed (mm/min)	1513	2708	3081	3859
	HSM	≤ 0.05	≤ 2	505	RPM	26769	20077	16062	13385
				(404-606)	Fr	0.215	0.512	0.731	1.098
					Feed (mm/min)	5760	10280	11745	14700

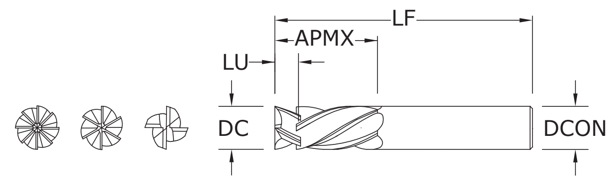
HSM (high speed machining)
rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fr x rpm
adjust parameters based on resin type and fiber structure
reduce speed when overheating causes melting or damage to resin
reduce feed if delamination or fraying occur

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)

SERIES 25
COMPRESSION ROUTER

Compression

30°
30°
POS
RHC
4
6
8



25
FRACTIONAL SERIES

TOLERANCES (inch)
DC = +.000/–.003
DCON = h_6

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	INTERSECT LENGTH LU	NO. OF FLUTES	UNCOATED	Di-NAMITE® (Diamond)
1/4	1	2-1/2	1/4	11/64	4	72970	72971
5/16	1	2-1/2	5/16	7/32	4	72972	72973
3/8	1-1/8	2-1/2	3/8	17/64	6	72974	72975
1/2	1-1/2	3-1/2	1/2	23/64	8	72976	72977

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

25M
METRIC SERIES

TOLERANCES (mm)
DC = +0,000/–0,080
DCON = h_6

PLASTICS/COMPOSITES

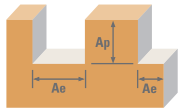
For patent information visit www.ksptpatents.com

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

- 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



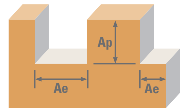
Series 25 Fractional		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/4	5/16	3/8	1/2
N — CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Profile	≤ 0.5	≤ 1.5	500	RPM	7640	6112	5093	3820
				(400-600)	Fz	0.0016	0.0030	0.0040	0.0048
					Feed (ipm)	49	73	122	147
	HSM	≤ 0.05	≤ 2	825	RPM	12606	10085	8404	6303
				(660-990)	Fz	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
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		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	8	10	12
N — 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
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

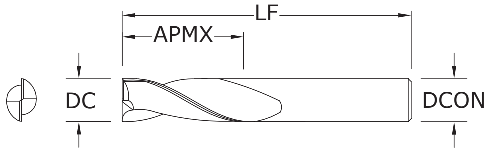
HSM (high speed machining)
rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fz x number of flutes x rpm
adjust parameters based on resin type and fiber structure
reduce speed when overheating causes melting or damage to resin
reduce feed if delamination or fraying occur

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)

FRACTIONAL & METRIC

Up Cut

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 = h_6

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 = h_6

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

KYOCERA Solid Tools

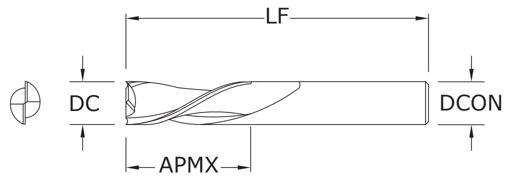
SGS Solid Tools

SGS Micro Tools

FRACTIONAL & METRIC

Down Cut

22
FRACTIONAL SERIES



TOLERANCES (inch)

DC = +.000/–.003

DCON = h_6

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
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

22M
METRIC SERIES

TOLERANCES (mm)

DC = +0,000/–0,080

DCON = h_6

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

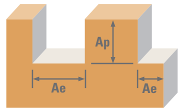
mm				EDP NO.
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	UNCOATED
3,0	13,0	50,0	6,0	91101
4,0	16,0	63,0	6,0	91107
5,0	19,0	63,0	6,0	91109
6,0	25,0	63,0	6,0	91113
8,0	25,0	63,0	8,0	91121
10,0	31,0	75,0	10,0	91129
12,0	31,0	75,0	12,0	91137

KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

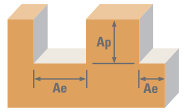
Up Cut
Down Cut



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

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

Up Cut
Down Cut



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

rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fz x 2 x rpm

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

EDP Number Index

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

EDP Number Index

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KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

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KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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

sfm = rpm x .262 x cutting diameter

rpm = sfm x 3.82 / cutting diameter

feed (inches per tooth) = ipm / (number of teeth x rpm)

feed (inches / minute) = inches per tooth x number of teeth x rpm

feed (inches / minute) = ipr x rpm

feed (inches / revolution) = ipm / rpm

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

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

mrr – milling – (in³/min) = width of cut x depth of cut x ipm

cutting time – drilling – (minutes) = length / ipm

METRIC FORMULAS

m/min = (3.14 x cutting diameter x rpm) / 1000

rpm = (1000 x m / min) / (3.14 x cutting diameter)

feed (mm per tooth) = millimeters per minute / (number of teeth x rpm)

feed (mm/minute) = feed per tooth x number of teeth x rpm

feed (mm/minute) = mmr x rpm

feed (mm per revolution) = mmr / rpm

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

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

mrr – milling – (cm³/min) = (width of cut x depth of cut x mm/min) / 1000

cutting time – drilling – (minutes) = length / mm/min

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

GENERAL FORMULAS

coolant pressure: 1 Bar = 14.5 Pounds per Square Inch (PSI)

calculation of coolant pressure: Pounds Per Square Inch (PSI) = (Horsepower of Pump x 1.460) / Gallons per Minute (GPM)

1 Liter = 0.254 Gallons

inch = millimeters / 25.4 millimeters = inch x 25.4

inch tap drill sizes = major diameter – ((1.299 x % of thread) / threads per inch)

metric tap drill sizes = major diameter – (1.082 x pitch x % of thread)

inch thread forming drill size: maximum diameter = basic major diameter – (3/8 x number of threads per inch)

inch thread forming drill size: minimum diameter = basic major diameter – (1/2 x number of threads per inch)

metric thread forming drill size: maximum diameter = basic major diameter – (.375 x pitch)

metric thread forming drill size: minimum diameter = basic major diameter – (.500 x pitch)

Decimal Equivalents

Fraction • Number • Letter • Metric Sizes

INCH	METRIC	DECIMAL EQUIVALENT
–	0,10	0.0039
–	0,20	0.0079
–	0,25	0.0098
–	0,30	0.0118
#80	0,34	0.0135
–	0,35	0.0138
#79	0,37	0.0145
1/64	0,40	0.0156
#78	0,41	0.0160
–	0,45	0.0177
#77	0,46	0.0180
–	0,50	0.0197
#76	0,51	0.0200
#75	0,53	0.0210
–	0,55	0.0217
#74	0,57	0.0225
–	0,60	0.0236
#73	0,61	0.0240
#72	0,64	0.0250
–	0,65	0.0256
#71	0,66	0.0260
–	0,70	0.0276
#70	0,71	0.0280
#69	0,74	0.0292
–	0,75	0.0295
#68	0,79	0.0310
1/32	0,79	0.0313
–	0,80	0.0315
#67	0,81	0.0320
#66	0,84	0.0330
–	0,85	0.0335
#65	0,89	0.0350
–	0,90	0.0354
#64	0,91	0.0360
#63	0,94	0.0370
–	0,95	0.0374
#62	0,97	0.0380
#61	0,99	0.0390
–	1,00	0.0394
#60	1,02	0.0400
#59	1,04	0.0410
–	1,05	0.0413
#58	1,07	0.0420
#57	1,09	0.0430
–	1,10	0.0433
–	1,15	0.0453
#56	1,18	0.0465
3/64	1,19	0.0469
–	1,20	0.0472
–	1,25	0.0492
–	1,30	0.0512
#55	1,32	0.0520
–	1,35	0.0531
#54	1,40	0.0550
#53	1,51	0.0595
–	1,55	0.0610
1/16	1,59	0.0625

INCH	METRIC	DECIMAL EQUIVALENT
–	1,60	0.0630
#52	1,61	0.0635
–	1,65	0.0650
#51	1,70	0.0669
–	1,75	0.0689
#50	1,78	0.0700
–	1,80	0.0709
#49	1,85	0.0728
–	1,90	0.0748
#48	1,93	0.0760
–	1,95	0.0768
5/64	1,98	0.0781
#47	1,99	0.0785
–	2,00	0.0787
–	2,05	0.0807
#46	2,06	0.0810
#45	2,08	0.0820
–	2,10	0.0827
–	2,15	0.0846
#44	2,18	0.0860
–	2,20	0.0866
–	2,25	0.0886
#43	2,26	0.0890
–	2,30	0.0906
–	2,35	0.0925
#42	2,37	0.0935
3/32	2,38	0.0938
–	2,40	0.0945
#41	2,44	0.0960
–	2,45	0.0965
#40	2,50	0.0984
#39	2,53	0.0995
#38	2,58	0.1015
–	2,60	0.1024
#37	2,64	0.1040
–	2,70	0.1063
#36	2,71	0.1065
–	2,75	0.1083
7/64	2,78	0.1094
#35	2,79	0.1100
–	2,80	0.1102
#34	2,82	0.1110
#33	2,87	0.1130
–	2,90	0.1142
#32	2,95	0.1160
–	3,00	0.1181
#31	3,05	0.1200
–	3,10	0.1220
1/8	3,18	0.1250
–	3,20	0.1260
–	3,25	0.1280
#30	3,26	0.1285
–	3,30	0.1299
–	3,40	0.1339
#29	3,45	0.1360
–	3,50	0.1378
#28	3,57	0.1405

INCH	METRIC	DECIMAL EQUIVALENT
9/64	3,57	0.1406
–	3,60	0.1417
#27	3,66	0.1440
–	3,70	0.1457
#26	3,73	0.1470
–	3,75	0.1476
#25	3,80	0.1495
–	3,80	0.1496
#24	3,86	0.1520
–	3,90	0.1535
#23	3,91	0.1540
5/32	3,97	0.1562
#22	3,99	0.1570
–	4,00	0.1575
#21	4,04	0.1590
#20	4,09	0.1610
–	4,10	0.1614
–	4,20	0.1654
#19	4,22	0.1660
–	4,25	0.1673
–	4,30	0.1693
#18	4,31	0.1695
11/64	4,37	0.1719
#17	4,39	0.1730
–	4,40	0.1732
#16	4,50	0.1770
–	4,50	0.1772
#15	4,57	0.1800
–	4,60	0.1811
#14	4,62	0.1820
#13	4,70	0.1850
–	4,75	0.1870
3/16	4,76	0.1875
#12	4,80	0.1890
#11	4,85	0.1910
–	4,90	0.1929
#10	4,91	0.1935
#9	4,98	0.1960
–	5,00	0.1969
#8	5,05	0.1990
–	5,10	0.2008
#7	5,11	0.2010
13/64	5,16	0.2031
#6	5,18	0.2040
–	5,20	0.2047
#5	5,22	0.2055
–	5,25	0.2067
–	5,3	0.2087
#4	5,31	0.2090
–	5,40	0.2126
#3	5,41	0.2130
–	5,50	0.2165
7/32	5,56	0.2188
–	5,60	0.2205
#2	5,61	0.2210
–	5,70	0.2244
–	5,75	0.2264

INCH	METRIC	DECIMAL EQUIVALENT
#1	5,79	0.2280
–	5,80	0.2283
–	5,90	0.2323
A	5,94	0.2340
15/64	5,95	0.2344
–	6,00	0.2362
B	6,05	0.2380
–	6,10	0.2402
C	6,15	0.2420
–	6,20	0.2441
D	6,25	0.2461
–	6,30	0.2480
E	6,35	0.2500
1/4	6,35	0.2500
–	6,40	0.2520
–	6,50	0.2559
F	6,53	0.2570
–	6,60	0.2598
G	6,63	0.2610
–	6,70	0.2638
17/64	6,75	0.2656
H	6,76	0.2660
–	6,80	0.2677
–	6,90	0.2717
I	6,91	0.2720
–	7,00	0.2756
J	7,04	0.2770
–	7,10	0.2795
K	7,14	0.2810
9/32	7,14	0.2812
–	7,20	0.2835
–	7,25	0.2854
–	7,30	0.2874
L	7,37	0.2900
–	7,40	0.2913
M	7,49	0.2950
–	7,50	0.2953
19/64	7,54	0.2969
–	7,60	0.2992
N	7,67	0.3020
–	7,70	0.3031
–	7,75	0.3051
–	7,80	0.3071
–	7,90	0.3110
5/16	7,94	0.3125
–	8,00	0.3150
O	8,03	0.3160
–	8,10	0.3189
–	8,20	0.3228
P	8,20	0.3230
–	8,25	0.3248
–	8,30	0.3268
21/64	8,33	0.3281
–	8,40	0.3307
Q	8,43	0.3320
–	8,50	0.3346
–	8,60	0.3386

INCH	METRIC	DECIMAL EQUIVALENT
R	8,61	0.3390
–	8,70	0.3425
11/32	8,73	0.3438
–	8,75	0.3445
–	8,80	0.3465
S	8,84	0.3480
–	8,90	0.3504
–	9,00	0.3543
T	9,09	0.3580
–	9,10	0.3583
23/64	9,13	0.3594
–	9,20	0.3622
–	9,25	0.3642
–	9,30	0.3661
U	9,35	0.3680
–	9,40	0.3701
–	9,50	0.3740
3/8	9,53	0.3750
V	9,56	0.3770
–	9,60	0.3780
–	9,70	0.3819
–	9,75	0.3839
W	9,80	0.3858
–	9,90	0.3898
25/64	9,92	0.3906
–	10,00	0.3937
X	10,08	0.3970
–	10,10	0.3976
–	10,20	0.4016
Y	10,26	0.4040
–	10,30	0.4055
13/32	10,32	0.4062
–	10,40	0.4094
Z	10,49	0.4130
–	10,50	0.4134
–	10,60	0.4173
–	10,70	0.4213
27/64	10,72	0.4219
–	10,80	0.4252
–	10,90	0.4291
–	11,00	0.4331
–	11,10	0.4370
7/16	11,11	0.4375
–	11,20	0.4409
–	11,30	0.4449
–	11,40	0.4488
–	11,50	0.4528
29/64	11,51	0.4531
–	11,60	0.4567
–	11,70	0.4606
–	11,80	0.4646
–	11,90	0.4685
15/32	11,91	0.4688
–	12,00	0.4724
31/64	12,30	0.4844
–	12,50	0.4921
1/2	12,70	0.5000

INCH	METRIC	DECIMAL EQUIVALENT
–	13,00	0.5118
33/64	13,10	0.5156
17/32	13,49	0.5312
–	13,50	0.5315
35/64	13,89	0.5469
–	14,00	0.5512
9/16	14,29	0.5625
–	14,50	0.5709
37/64	14,68	0.5781
–	15,00	0.5906
19/32	15,08	0.5938
39/64	15,48	0.6094
–	15,50	0.6102
5/8	15,88	0.6250
–	16,00	0.6299
41/64	16,27	0.6406
–	16,50	0.6496
21/32	16,67	0.6562
–	17,00	0.6693
43/64	17,07	0.6719
11/16	17,46	0.6875
–	17,50	0.6890
45/64	17,86	0.7031
–	18,00	0.7087
23/32	18,26	0.7188
–	18,50	0.7283
47/64	18,65	0.7344
–	19,00	0.7480
3/4	19,05	0.7500
49/64	19,45	0.7656
–	19,50	0.7677
25/32	19,84	0.7812
–	20,00	0.7874
51/64	20,24	0.7969
–	20,50	0.8071
13/16	20,64	0.8125
–	21,00	0.8268
53/64	21,03	0.8281
27/32	21,43	0.8438
–	21,50	0.8465
55/64	21,84	0.8594
–	22,00	0.8661
7/8	22,23	0.8750
–	22,50	0.8858
57/64	22,62	0.8906
–	23,00	0.9055
29/32	23,02	0.9062
59/64	23,42	0.9219
–	23,50	0.9252
15/16	23,81	0.9375
–	24,00	0.9449
61/64	24,21	0.9531
–	24,50	0.9646
31/32	24,61	0.9688
–	25,00	0.9843
63/64	25,00	0.9844
1	25,40	1.0000

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

Hardness Conversion Chart

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

Conversions from each scale are approximate

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

MICRO SGS® Solid Carbide Tools

KYOCERA

VALUE AT THE SPINDLE®

Micro Tool Catalog

New Expanded Offering

www.sgsmicrotools.com

ISO 9001:2015 Certified

MICRO SGS® Solid Carbide Tools

KYOCERA

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

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

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

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New Expanded Tools

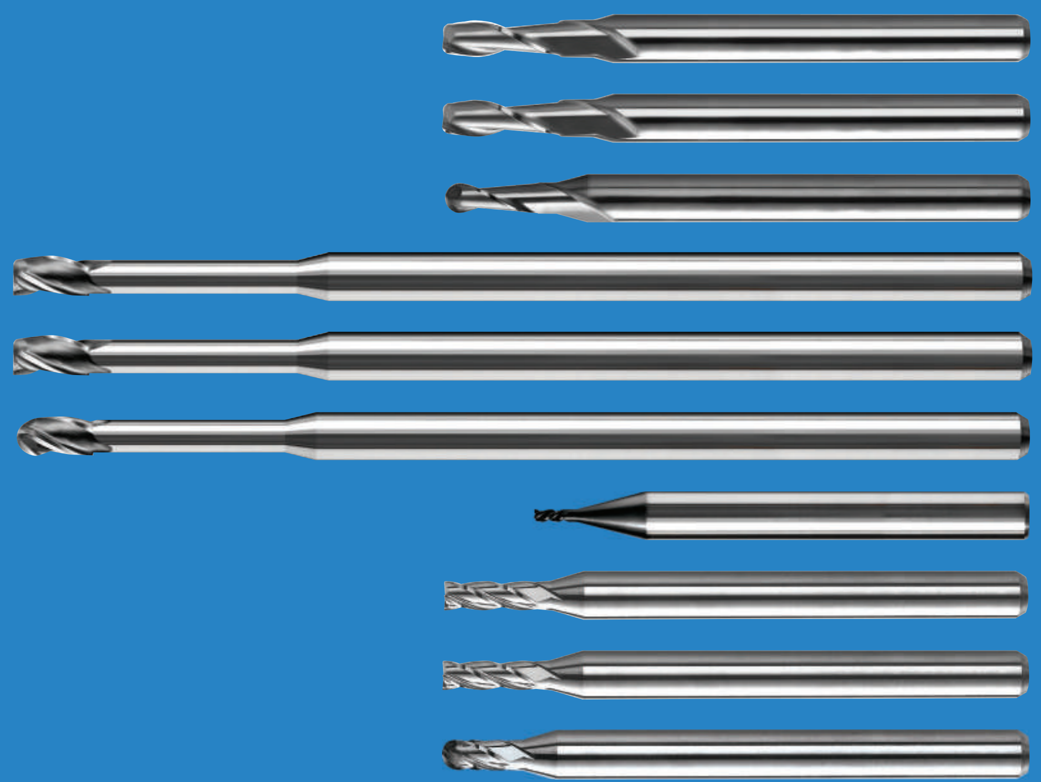
KSPT MICRO END MILLS

SMALL TOOLS. EPIC PROPORTIONS.

KYOCERA SGS Precision Tools (KSPT) commitment to providing superior quality round solid carbide cutting tools is unwavering, and these efforts are being taken one step further by introducing an impressive micro tool expansion. With a staggering expansion of over 2,500 tools in various lengths of cut, reach variations, end configurations and coating options, the portfolio can satisfy a variety of machining applications tailored for small diameter milling environments. Explore the portfolio below and discover how these small tools can deliver epic VALUE AT THE SPINDLE®!

EXPANSION HIGHLIGHTS:

- 2, 3, and 4 flutes in square, corner radii, and ball nose end configurations options standard
- Lengths of cut ranging from 1.5 times diameter through 12 times diameter
- Expansive reach options ranging from 3 times diameter through 25 times diameter overall reach
- Fractional tools on 1/8” common shank and metric tools on 3MM and 4MM shanks to suit global application demands
- Uncoated options for tools in expanded and legacy portfolio
- Offered in Ti-NAMITE®-A coating for superior chip flow at low spindle speeds in a variety of applications
- All micro tools are manufactured in accordance with KSPT ISO 9001: 2015 quality standards



M2, M2M
M2CR
M2B, M2MB
M3
M3CR
M3B
M032
M4, M4M
M4CR
M4B, M4MB

CASE STUDY M4 8XD MICRO END MILL

INDUSTRY
AEROSPACE

MATERIAL
347 Stainless Steel (28 HRc Hardness)

PRODUCT
M4 8XD Micro End Mills

APPLICATION
Plunging

COMPETITOR
3 Flute Extended Reach Micro End Mill

COOLANT
Soluble Flood

TOOL INFORMATION
0.07" Dia / 0.21" LOC / 2" OAL

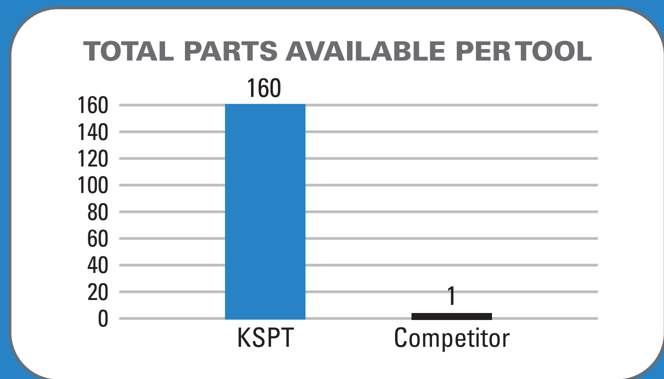
GOALS
The goals of this study were to significantly reduce job cost through the implementation of superior tooling and increased manufacturing efficiencies.

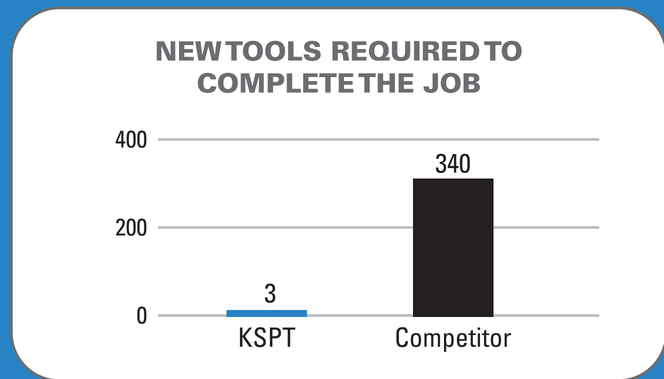
STRATEGY
KSPT approached the job with a 4 flute 8XD Micro End Mill. The four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.

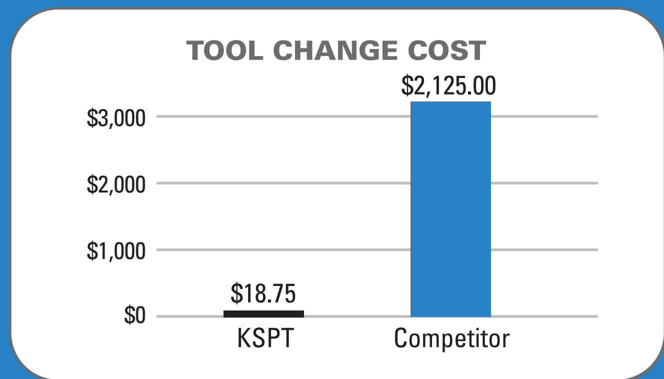
	KSPT	COMPETITOR
TOOL DIAMETER	.07”	.07
SPEED	6600 RPM	3400 RPM
FEED	4 IPM	2 IPM
RADIAL CUT (AE)	N/A	N/A
AXIAL CUT (AP)	0.38	0.38
CYCLE TIME	6 SECONDS	11.4 SECONDS

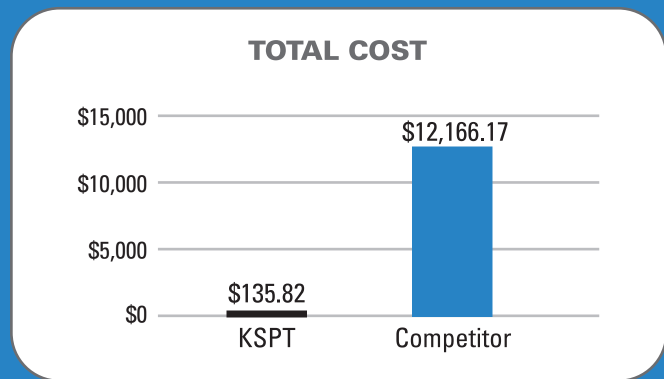
RESULTS

The overall findings of this study indicate **KSPT’s 4 flute micro end mill blew away the competitor’s 3 flute tool** in efficiency and effectiveness. **KSPT’s tool was able to capacitate a 48% higher speed and a 50% greater feed rate.** Those combined efficiencies were able to **cut the cycle time in half!** Because of the higher quality tool, the customer was able to **produce 160 parts per KSPT tool.** The competitor’s 3 flute end mill was only able to produce 1 part per tool. Thus, the **tool change cost was reduced by over 99%!** Additionally, since KSPT only used 3 total tools to complete the job, the customer benefited from a **new tool cost reduction by over 99%.** The **M4 8XD 4 flute micro end mill ultimately saved the customer a grand total of $12,030.34, resulting in a 98.88% cost reduction! These tools, albeit small, are an epic step forward for micro machining.**









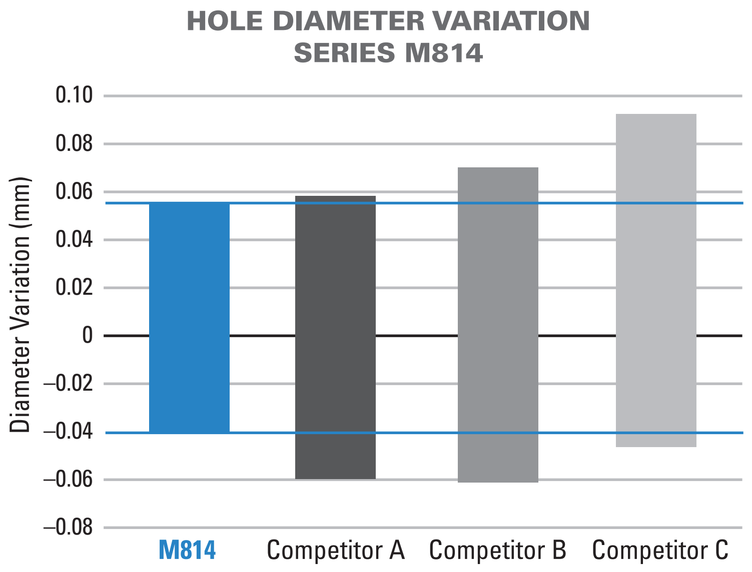
KSPT MICRO DRILLS

SMALL TOOLS. EPIC PROPORTIONS.

KYOCERA SGS Precision Tools (KSPT) commitment to providing superior quality round solid carbide cutting tools is unwavering, and these efforts are being taken one step further by introducing an impressive micro tool expansion. Within the expansion, KSPT introduces a new lineup of micro drills totaling more than 1,400 tools with a variety of coolant and length options to meet the demands of global hole making applications. Explore the portfolio below and discover how these small tools can deliver epic VALUE AT THE SPINDLE®!

DRILL PORTFOLIO HIGHLIGHTS:

- 2 flutes for optimal chip evacuation and cutting edge strength
- Internal coolant options on select series promotes controlled and consistent operating temperatures
- Lengths of cut ranging from 3 times diameter through 15 times diameter
- Fractional tools on 1/8” common shank and metric tools on 3MM and 4MM shanks to suit global market demands
- Uncoated options standard in select series
- Offered with Ti-NAMITE®-A coating for superior tool life and all-around value across a variety of applications
- Select series offered in new Ti-NAMITE®-Cr (AlCrN) coating for exceptional wear resistance in wet and dry drilling of cast iron and steel materials up to 52 HRc
- All micro tools are manufactured in accordance with KSPT ISO 9001: 2015 quality standards

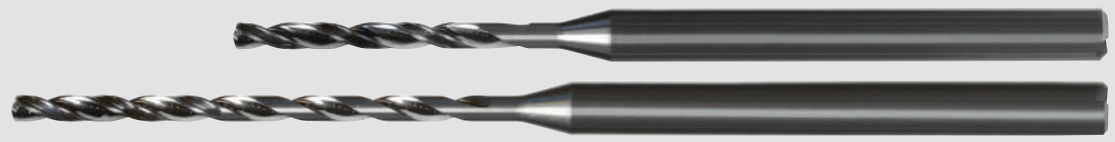


	No. of Holes	Dia. Variation (mm)
M814	600	0.0937
Competitor A	600	0.1141
Competitor B	269 (Broken)	0.1281
Competitor C	600	0.1347

Cutting Conditions:
N = 6468 rpm, Vf = 575 mm/min
Drill Diameter 0,3 mm
Drilling Depth 25,4 mm, 17-4PH-900

M814

- Split point and double margin design provide superior hole finish and size control
- Coolant hole feature allows straight through drilling without a peck cycle
- High-performance Ti-NAMITE®-Cr coating and mirror polished fluting increase tool life and productivity in moderate-to-difficult workpiece materials
- Available from stock in a selection of popular lengths and diameters
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures



M814 8XD

M814 15XD

M105

- 4-facet point design stabilizes on entry for superior hole size control and tool life
- Mirror surface finishes improve chip flow as hole depth increases
- Ti-NAMITE®-A coating and uncoated options for the ultimate performance in a variety of ferrous and non-ferrous workpiece materials
- Available from stock in a selection of popular lengths and diameters
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

M105

M080 & M081

- 4-facet point design, stub length, and mirror finish provide the highest quality spot
- Ti-NAMITE®-A coating and uncoated options for the ultimate performance and tool life in a variety of ferrous and non-ferrous workpiece materials
- Available from stock in all popular diameters and point configurations
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

M080

M081

M226 & L226

- 4-facet point design stabilizes on entry for superior hole size control and tool life (>.08mm)
- Mirror surface finishes improve chip flow as hole depth increases
- Ti-NAMITE®-A coating and uncoated options for the ultimate performance in a variety of ferrous and non-ferrous workpiece materials
- Right and left hand cut available from stock in a wide selection of popular lengths and diameters
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

M226

L226

KSPT COATINGS

Ti-NAMITE-A

With excellent thermal and chemical resistance, Ti-NAMITE®-A (AlTiN) allows for dry cutting and improvements in performance of carbide. The coating has a high hardness giving ultimate protection against abrasive wear and erosion. Ideal for cast iron, high temperature alloys, steels, and stainless steel applications.

Hardness (HV): 3700
Oxidation Temperature: 1100°C / 2010°F
Coefficient of Friction: 0.30
Thickness: 1 – 4 Microns (based on tool diameter)

KYOCERA SGS PRECISION TOOLS AlTiN COATING PERFORMANCE (LAB RESULTS)

SEM photography shows the KSPT proprietary coating method provides a significant reduction in macro particle deposition on the tool surface, which contributes to increased performance due to smoother chip flow. Another benefit of the KSPT micro-tool coating is a significant reduction in edge rounding due to excessive thick- ness, typical of most normal coatings.


NORMAL AlTiN MICRO-TOOL COATING
@ 1.06KX MAGNFICATION


KSPT PROPRIETARY AlTiN MICRO-TOOL COATING
@ 1.06KX MAGNFICATION

Ti-NAMITE-CR

With very high wear resistance and excellent hot hardness, Ti-NAMITE®-Cr (AlCrN) allows for wet and dry machining versatility at the highest of cutting speeds for increased machine utilization and productivity. The coating provides optimal thermal shock stability and is ideal for cast iron and steel applications up to 52 HRc.

Hardness (HV): 3200
Oxidation Temperature: 1100°C / 2010°F
Coefficient of Friction: 0.35
Thickness: 1 – 4 Microns (based on tool diameter)

Common Legend

TO ORDER: Please specify quantity and EDP number.
RETURN POLICY: An RMA number must accompany all product returns. Contact your Customer Service Representative for an RMA number.

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

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

MATERIALS

Steels	Stainless Steels	Cast Iron	High Temp Alloys
Titanium	Non-Ferrous	Plastics/Composites	Hardened Steels

END MILLS

TOOL LENGTH: Stub, Regular, Long, Long Reach, Extra Long

FLUTES: 2 Flutes, 3 Flutes, 4 Flutes

END CONFIGURATIONS: Ball, Corner, Square

SHANK TYPE: Common

HELIX ANGLE: Right Spiral

PROFILE ANGLE: Profile Angle

RAKE ANGLE: Positive

All tools are in Right Cut Direction unless noted

DRILLS

SHANK TYPE: Common, Straight

HELIX ANGLES: Right Spiral, Left Spiral, None

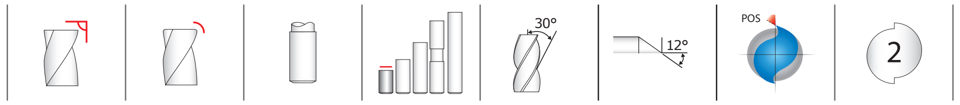
COOLANT OPTIONS: Internal Coolant, External Coolant

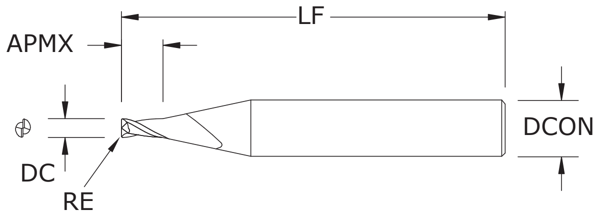
POINT ANGLE: Drill Point

REACH

1.5xD	3xD	5xD	8xD	12xD	15xD
1.5xD Reach	3xD Reach	5xD Reach	8xD Reach	12xD Reach	15xD Reach

MICRO SGS Solid Carbide Tools | KYOCERA





M2 • M2CR 1.5xD
FRACTIONAL SERIES

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Enhanced corner geometry with tight tolerance corner radii
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

New Expanded Tools

TOLERANCES (inch)

.004–.120 DIAMETER

DC = +0.000/–0.001
DCON = h_6
RE = +0.0000/–0.0005

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

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.004	1/8	0.006	1-1/2	–	04004	04000
0.005	1/8	0.008	1-1/2	–	00301	02201
0.006	1/8	0.009	1-1/2	–	00302	02202
0.007	1/8	0.011	1-1/2	–	00303	02203
0.008	1/8	0.012	1-1/2	–	00304	02204
0.009	1/8	0.014	1-1/2	–	00305	02205
0.010	1/8	0.015	1-1/2	–	00306	02206
0.011	1/8	0.017	1-1/2	–	00307	02207
0.012	1/8	0.018	1-1/2	–	00308	02208
0.013	1/8	0.020	1-1/2	–	00309	02209
0.014	1/8	0.021	1-1/2	–	00310	02210
0.015	1/8	0.023	1-1/2	–	00311	02211
0.015	1/8	0.023	1-1/2	0.003	08500	08641
0.016	1/8	0.024	1-1/2	–	00312	02212
0.017	1/8	0.026	1-1/2	–	00313	02213
0.018	1/8	0.027	1-1/2	–	00314	02214
0.019	1/8	0.029	1-1/2	–	00315	02215
0.020	1/8	0.030	1-1/2	–	00316	02216
0.020	1/8	0.030	1-1/2	0.003	08502	08643
0.020	1/8	0.030	1-1/2	0.005	08504	08645
0.021	1/8	0.032	1-1/2	–	00317	02217
0.022	1/8	0.033	1-1/2	–	00318	02218
0.023	1/8	0.035	1-1/2	–	00319	02219
0.024	1/8	0.036	1-1/2	–	00320	02220
0.025	1/8	0.038	1-1/2	–	00321	02221
0.025	1/8	0.038	1-1/2	0.010	08505	08646
0.026	1/8	0.039	1-1/2	–	00322	02222
0.027	1/8	0.041	1-1/2	–	00323	02223
0.028	1/8	0.042	1-1/2	–	00324	02224
0.029	1/8	0.044	1-1/2	–	00325	02225
0.030	1/8	0.045	1-1/2	–	00326	02226
0.030	1/8	0.045	1-1/2	0.010	08507	08648
0.031	1/8	0.047	1-1/2	–	00327	02227
0.032	1/8	0.048	1-1/2	–	00328	02228
0.033	1/8	0.050	1-1/2	–	00329	02229
0.034	1/8	0.051	1-1/2	–	00330	02230

continued on next page

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

M2 • M2CR 1.5xD
FRACTIONAL SERIES

continued

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.035	1/8	0.053	1-1/2	–	00331	02231
0.035	1/8	0.053	1-1/2	0.005	08509	08650
0.035	1/8	0.053	1-1/2	0.010	08511	08652
0.036	1/8	0.054	1-1/2	–	00332	02232
0.037	1/8	0.056	1-1/2	–	00333	02233
0.038	1/8	0.057	1-1/2	–	00334	02234
0.039	1/8	0.059	1-1/2	–	00335	02235
0.040	1/8	0.060	1-1/2	–	00336	02236
0.040	1/8	0.060	1-1/2	0.005	08513	08654
0.040	1/8	0.060	1-1/2	0.010	08515	08656
0.041	1/8	0.062	1-1/2	–	00337	02368
0.042	1/8	0.063	1-1/2	–	00338	02369
0.043	1/8	0.065	1-1/2	–	00339	02370
0.044	1/8	0.066	1-1/2	–	00340	02371
0.045	1/8	0.068	1-1/2	–	00341	02372
0.045	1/8	0.068	1-1/2	0.005	08517	08658
0.045	1/8	0.068	1-1/2	0.010	08519	08660
0.046	1/8	0.069	1-1/2	–	00342	02373
0.047	1/8	0.071	1-1/2	–	00343	02374
0.048	1/8	0.072	1-1/2	–	00344	02375
0.049	1/8	0.074	1-1/2	–	00345	02376
0.050	1/8	0.075	1-1/2	–	00346	02377
0.050	1/8	0.075	1-1/2	0.005	08521	08662
0.050	1/8	0.075	1-1/2	0.010	08523	08664
0.050	1/8	0.075	1-1/2	0.015	08525	08666
0.051	1/8	0.077	1-1/2	–	00347	02378
0.052	1/8	0.078	1-1/2	–	00348	02379
0.053	1/8	0.080	1-1/2	–	00349	02380
0.054	1/8	0.081	1-1/2	–	00350	02381
0.055	1/8	0.083	1-1/2	–	00351	02382
0.055	1/8	0.083	1-1/2	0.005	08527	08668
0.055	1/8	0.083	1-1/2	0.010	08529	08670
0.055	1/8	0.083	1-1/2	0.015	08531	08672
0.056	1/8	0.084	1-1/2	–	00352	02383
0.057	1/8	0.086	1-1/2	–	00353	02384
0.058	1/8	0.087	1-1/2	–	00354	02385

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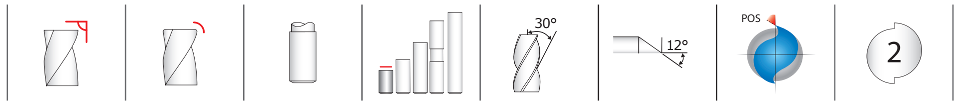
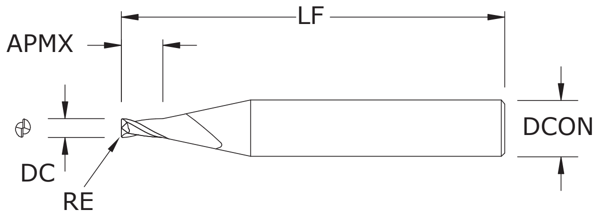
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

MICRO SGS Solid Carbide Tools | KYOCERA



M2 • M2CR 1.5xD

FRACTIONAL SERIES



New Expanded Tools

continued

CUTTING DIAMETER DC (inch)	SHANK DIAMETER DCON (inch)	LENGTH OF CUT APMX (inch)	OVERALL LENGTH LF (inch)	CORNER RADIUS RE (inch)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0.059	1/8	0.089	1-1/2	–	00355	02386
0.060	1/8	0.090	1-1/2	–	00356	02387
0.060	1/8	0.090	1-1/2	0.005	08533	08674
0.060	1/8	0.090	1-1/2	0.010	08535	08676
0.060	1/8	0.090	1-1/2	0.015	08537	08678
0.062	1/8	0.093	1-1/2	–	00357	02388
0.065	1/8	0.098	1-1/2	–	00358	02389
0.065	1/8	0.098	1-1/2	0.005	08539	08680
0.065	1/8	0.098	1-1/2	0.010	08541	08682
0.065	1/8	0.098	1-1/2	0.015	08543	08684
0.070	1/8	0.105	1-1/2	–	00359	02390
0.070	1/8	0.105	1-1/2	0.005	08545	08686
0.070	1/8	0.105	1-1/2	0.010	08547	08688
0.070	1/8	0.105	1-1/2	0.015	08549	08690
0.075	1/8	0.112	1-1/2	–	04006	04002
0.075	1/8	0.113	1-1/2	0.005	08551	08692
0.075	1/8	0.113	1-1/2	0.010	08553	08694
0.075	1/8	0.113	1-1/2	0.015	08555	08696
0.075	1/8	0.113	1-1/2	0.020	08557	08698
0.078	1/8	0.117	1-1/2	–	00360	02391
0.080	1/8	0.120	1-1/2	–	00361	02392
0.080	1/8	0.120	1-1/2	0.005	08559	08700
0.080	1/8	0.120	1-1/2	0.010	08561	08702
0.080	1/8	0.120	1-1/2	0.015	08563	08704
0.080	1/8	0.120	1-1/2	0.020	08565	08706
0.085	1/8	0.128	1-1/2	–	00362	02393
0.085	1/8	0.128	1-1/2	0.005	08567	08708
0.085	1/8	0.128	1-1/2	0.010	08569	08710
0.085	1/8	0.128	1-1/2	0.015	08571	08712
0.085	1/8	0.128	1-1/2	0.020	08573	08714
0.090	1/8	0.135	1-1/2	–	00363	02394
0.090	1/8	0.135	1-1/2	0.005	08575	08716
0.090	1/8	0.135	1-1/2	0.010	08577	08718
0.090	1/8	0.135	1-1/2	0.015	08579	08720
0.090	1/8	0.135	1-1/2	0.020	08581	08722
0.093	1/8	0.140	1-1/2	–	00364	02395

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TOLERANCES (inch)

.004–.120 DIAMETER

DC = +0.000/–0.001
DCON = h_6
RE = +0.0000/–0.0005

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

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

M2 • M2CR 1.5xD

FRACTIONAL SERIES

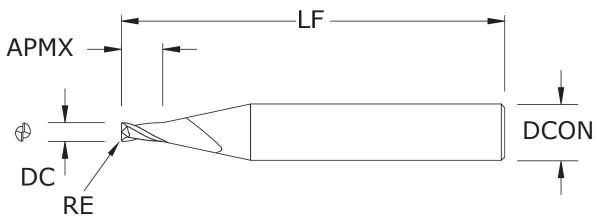
continued

CUTTING DIAMETER DC (inch)	SHANK DIAMETER DCON (inch)	LENGTH OF CUT APMX (inch)	OVERALL LENGTH LF (inch)	CORNER RADIUS RE (inch)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0.095	1/8	0.143	1-1/2	–	00365	02396
0.095	1/8	0.143	1-1/2	0.005	08583	08724
0.095	1/8	0.143	1-1/2	0.010	08585	08726
0.095	1/8	0.143	1-1/2	0.015	08587	08728
0.095	1/8	0.143	1-1/2	0.020	08589	08730
0.100	1/8	0.150	1-1/2	–	00366	02397
0.100	1/8	0.150	1-1/2	0.005	08591	08732
0.100	1/8	0.150	1-1/2	0.010	08593	08734
0.100	1/8	0.150	1-1/2	0.015	08595	08736
0.100	1/8	0.150	1-1/2	0.020	08597	08738
0.100	1/8	0.150	1-1/2	0.030	08599	08740
0.105	1/8	0.158	1-1/2	–	00367	02398
0.105	1/8	0.158	1-1/2	0.005	08601	08742
0.105	1/8	0.158	1-1/2	0.010	08603	08744
0.105	1/8	0.158	1-1/2	0.015	08605	08746
0.105	1/8	0.158	1-1/2	0.020	08607	08748
0.105	1/8	0.158	1-1/2	0.030	08609	08750
0.110	1/8	0.165	1-1/2	–	00368	02399
0.110	1/8	0.165	1-1/2	0.005	08611	08752
0.110	1/8	0.165	1-1/2	0.010	08613	08754
0.110	1/8	0.165	1-1/2	0.015	08615	08756
0.110	1/8	0.165	1-1/2	0.020	08617	08758
0.110	1/8	0.165	1-1/2	0.030	08619	08760
0.115	1/8	0.173	1-1/2	–	00369	02400
0.115	1/8	0.173	1-1/2	0.005	08621	08762
0.115	1/8	0.173	1-1/2	0.010	08623	08764
0.115	1/8	0.173	1-1/2	0.015	08625	08766
0.115	1/8	0.173	1-1/2	0.020	08627	08768
0.115	1/8	0.173	1-1/2	0.030	08629	08770
0.120	1/8	0.180	1-1/2	–	00370	02401
0.120	1/8	0.180	1-1/2	0.005	08631	08772
0.120	1/8	0.180	1-1/2	0.010	08633	08774
0.120	1/8	0.180	1-1/2	0.015	08635	08776
0.120	1/8	0.180	1-1/2	0.020	08637	08778
0.120	1/8	0.180	1-1/2	0.030	08639	08780

FRACTIONAL

M2 • M2CR • 3xD

MICRO SGS Solid Carbide Tools | KYOCERA



New Expanded Tools

M2 • M2CR 3xD

FRACTIONAL SERIES

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
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inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.004	1/8	0.012	1-1/2	–	04005	04001
0.005	1/8	0.015	1-1/2	–	00811	02275
0.006	1/8	0.018	1-1/2	–	00812	02276
0.007	1/8	0.021	1-1/2	–	00813	02277
0.008	1/8	0.024	1-1/2	–	00814	02278
0.009	1/8	0.027	1-1/2	–	00815	02279
0.010	1/8	0.030	1-1/2	–	00816	02280
0.011	1/8	0.033	1-1/2	–	00817	02281
0.012	1/8	0.036	1-1/2	–	00818	02282
0.013	1/8	0.039	1-1/2	–	00819	02283
0.014	1/8	0.042	1-1/2	–	00820	02284
0.015	1/8	0.045	1-1/2	–	00821	02285
0.015	1/8	0.045	1-1/2	0.003	08501	08642
0.016	1/8	0.048	1-1/2	–	00822	02286
0.017	1/8	0.051	1-1/2	–	00823	02287
0.018	1/8	0.054	1-1/2	–	00824	02288
0.019	1/8	0.057	1-1/2	–	00825	02289
0.020	1/8	0.060	1-1/2	–	00826	02290
0.020	1/8	0.060	1-1/2	0.003	08503	08644
0.020	1/8	0.060	1-1/2	0.005	04020	04021
0.021	1/8	0.063	1-1/2	–	00827	02291
0.022	1/8	0.066	1-1/2	–	00828	02292
0.023	1/8	0.069	1-1/2	–	00829	02293
0.024	1/8	0.072	1-1/2	–	00830	02294
0.025	1/8	0.075	1-1/2	–	00831	02295
0.025	1/8	0.075	1-1/2	0.005	04022	04023
0.025	1/8	0.075	1-1/2	0.010	08506	08647
0.026	1/8	0.078	1-1/2	–	00832	02296
0.027	1/8	0.081	1-1/2	–	00833	02297
0.028	1/8	0.084	1-1/2	–	00834	02298
0.029	1/8	0.087	1-1/2	–	00835	02299
0.030	1/8	0.090	1-1/2	–	00836	02300
0.030	1/8	0.090	1-1/2	0.010	08508	08649
0.031	1/8	0.093	1-1/2	–	00837	02301
0.032	1/8	0.096	1-1/2	–	00838	02302
0.033	1/8	0.099	1-1/2	–	00839	02303

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TOLERANCES (inch)

.004–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

RE = +0.0000/–0.0005

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

MICRO SGS Solid Carbide Tools | KYOCERA

FRACTIONAL

M2 • M2CR • 3xD

New Expanded Tools

M2 • M2CR 3xD

FRACTIONAL SERIES

continued

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.034	1/8	0.102	1-1/2	–	00840	02304
0.035	1/8	0.105	1-1/2	–	00841	02305
0.035	1/8	0.105	1-1/2	0.005	08510	08651
0.035	1/8	0.105	1-1/2	0.010	08512	08653
0.036	1/8	0.108	1-1/2	–	00842	02306
0.037	1/8	0.111	1-1/2	–	00843	02307
0.038	1/8	0.114	1-1/2	–	00844	02308
0.039	1/8	0.117	1-1/2	–	00845	02309
0.040	1/8	0.120	1-1/2	–	00846	02310
0.040	1/8	0.120	1-1/2	0.005	08514	08655
0.040	1/8	0.120	1-1/2	0.010	08516	08657
0.041	1/8	0.123	1-1/2	–	00479	02436
0.042	1/8	0.126	1-1/2	–	00480	02437
0.043	1/8	0.129	1-1/2	–	00481	02438
0.044	1/8	0.132	1-1/2	–	00482	02439
0.045	1/8	0.135	1-1/2	–	00483	02440
0.045	1/8	0.135	1-1/2	0.005	08518	08659
0.045	1/8	0.135	1-1/2	0.010	08520	08661
0.046	1/8	0.138	1-1/2	–	00484	02441
0.047	1/8	0.141	1-1/2	–	00485	02442
0.048	1/8	0.144	1-1/2	–	00486	02443
0.049	1/8	0.147	1-1/2	–	00487	02444
0.050	1/8	0.150	1-1/2	–	00488	02445
0.050	1/8	0.150	1-1/2	0.005	08522	08663
0.050	1/8	0.150	1-1/2	0.010	08524	08665
0.050	1/8	0.150	1-1/2	0.015	08526	08667
0.051	1/8	0.153	1-1/2	–	00489	02446
0.052	1/8	0.156	1-1/2	–	00490	02447
0.053	1/8	0.159	1-1/2	–	00491	02448
0.054	1/8	0.162	1-1/2	–	00492	02449
0.055	1/8	0.165	1-1/2	–	00493	02450
0.055	1/8	0.165	1-1/2	0.005	08528	08669
0.055	1/8	0.165	1-1/2	0.010	08530	08671
0.055	1/8	0.165	1-1/2	0.015	08532	08673
0.056	1/8	0.168	1-1/2	–	00494	02451
0.057	1/8	0.171	1-1/2	–	00495	02452

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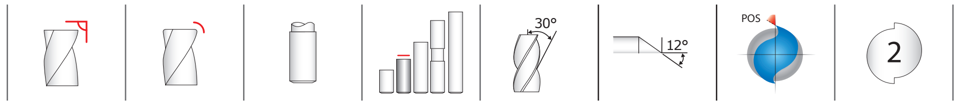
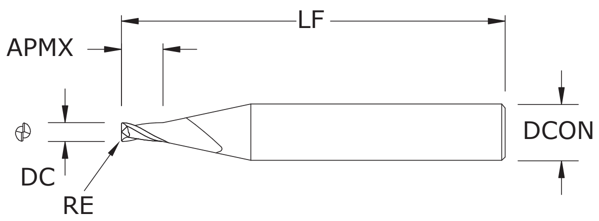
MICRO SGS Solid Carbide Tools | KYOCERA



M2 • M2CR 3xD

FRACTIONAL SERIES



New Expanded Tools

TOLERANCES (inch)

.004–.120 DIAMETER

DC = +0.000/–0.001
DCON = h_6
RE = +0.0000/–0.0005

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

continued

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.058	1/8	0.174	1-1/2	–	00496	02453
0.059	1/8	0.177	1-1/2	–	00865	02454
0.060	1/8	0.180	1-1/2	–	00498	02455
0.060	1/8	0.180	1-1/2	0.005	08534	08675
0.060	1/8	0.180	1-1/2	0.010	08536	08677
0.060	1/8	0.180	1-1/2	0.015	08538	08679
0.062	1/8	0.186	1-1/2	–	00499	02456
0.065	1/8	0.195	1-1/2	–	00500	02457
0.065	1/8	0.195	1-1/2	0.005	08540	08681
0.065	1/8	0.195	1-1/2	0.010	08542	08683
0.065	1/8	0.195	1-1/2	0.015	08544	08685
0.070	1/8	0.210	1-1/2	–	00501	02458
0.070	1/8	0.210	1-1/2	0.005	08546	08687
0.070	1/8	0.210	1-1/2	0.010	08548	08689
0.070	1/8	0.210	1-1/2	0.015	08550	08691
0.075	1/8	0.225	1-1/2	–	04007	04003
0.075	1/8	0.225	1-1/2	0.005	08552	08693
0.075	1/8	0.225	1-1/2	0.010	08554	08695
0.075	1/8	0.225	1-1/2	0.015	08556	08697
0.075	1/8	0.225	1-1/2	0.020	08558	08699
0.078	1/8	0.234	1-1/2	–	00870	02459
0.080	1/8	0.240	1-1/2	–	00503	02460
0.080	1/8	0.240	1-1/2	0.005	08560	08701
0.080	1/8	0.240	1-1/2	0.010	08562	08703
0.080	1/8	0.240	1-1/2	0.015	08564	08705
0.080	1/8	0.240	1-1/2	0.020	08566	08707
0.085	1/8	0.255	1-1/2	–	00504	02461
0.085	1/8	0.255	1-1/2	0.005	08568	08709
0.085	1/8	0.255	1-1/2	0.010	08570	08711
0.085	1/8	0.255	1-1/2	0.015	08572	08713
0.085	1/8	0.255	1-1/2	0.020	08574	08715
0.090	1/8	0.270	1-1/2	–	00505	02462
0.090	1/8	0.270	1-1/2	0.005	08576	08717
0.090	1/8	0.270	1-1/2	0.010	08578	08719
0.090	1/8	0.270	1-1/2	0.015	08580	08721
0.090	1/8	0.270	1-1/2	0.020	08582	08723

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MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

M2 • M2CR 3xD

FRACTIONAL SERIES

continued

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.093	1/8	0.279	1-1/2	–	00506	02463
0.095	1/8	0.285	1-1/2	–	00507	02464
0.095	1/8	0.285	1-1/2	0.005	08584	08725
0.095	1/8	0.285	1-1/2	0.010	08586	08727
0.095	1/8	0.285	1-1/2	0.015	08588	08729
0.095	1/8	0.285	1-1/2	0.020	08590	08731
0.100	1/8	0.300	1-1/2	–	00508	02465
0.100	1/8	0.300	1-1/2	0.005	08592	08733
0.100	1/8	0.300	1-1/2	0.010	08594	08735
0.100	1/8	0.300	1-1/2	0.015	08596	08737
0.100	1/8	0.300	1-1/2	0.020	08598	08739
0.100	1/8	0.300	1-1/2	0.030	08600	08741
0.105	1/8	0.315	1-1/2	–	00509	02466
0.105	1/8	0.315	1-1/2	0.005	08602	08743
0.105	1/8	0.315	1-1/2	0.010	08604	08745
0.105	1/8	0.315	1-1/2	0.015	08606	08747
0.105	1/8	0.315	1-1/2	0.020	08608	08749
0.105	1/8	0.315	1-1/2	0.030	08610	08751
0.110	1/8	0.330	1-1/2	–	00878	02467
0.110	1/8	0.330	1-1/2	0.005	08612	08753
0.110	1/8	0.330	1-1/2	0.010	08614	08755
0.110	1/8	0.330	1-1/2	0.015	08616	08757
0.110	1/8	0.330	1-1/2	0.020	08618	08759
0.110	1/8	0.330	1-1/2	0.030	08620	08761
0.115	1/8	0.345	1-1/2	–	00511	02468
0.115	1/8	0.345	1-1/2	0.005	08622	08763
0.115	1/8	0.345	1-1/2	0.010	08624	08765
0.115	1/8	0.345	1-1/2	0.015	08626	08767
0.115	1/8	0.345	1-1/2	0.020	08628	08769
0.115	1/8	0.345	1-1/2	0.030	08630	08771
0.120	1/8	0.360	1-1/2	–	00512	02469
0.120	1/8	0.360	1-1/2	0.005	08632	08773
0.120	1/8	0.360	1-1/2	0.010	08634	08775
0.120	1/8	0.360	1-1/2	0.015	08636	08777
0.120	1/8	0.360	1-1/2	0.020	08638	08779
0.120	1/8	0.360	1-1/2	0.030	08640	08781

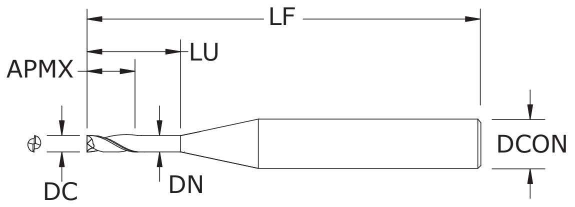
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

M2 • 3xD • 8xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA

M2 • 3xD 8xD

FRACTIONAL SERIES



New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.030	0.080	0.009	1-1/2	09353	03400
0.015	1/8	0.045	0.120	0.014	1-1/2	09355	03401
0.020	1/8	0.060	0.160	0.018	1-1/2	09357	03402
0.025	1/8	0.075	0.200	0.023	1-1/2	09359	03403
0.030	1/8	0.090	0.240	0.028	1-1/2	09361	03404
0.031	1/8	0.093	0.248	0.029	1-1/2	09363	03405
0.035	1/8	0.105	0.280	0.032	1-1/2	09365	03406
0.040	1/8	0.120	0.320	0.037	1-1/2	09367	03407
0.045	1/8	0.135	0.360	0.042	2	09369	03408
0.047	1/8	0.141	0.376	0.044	2	09371	03409
0.050	1/8	0.150	0.400	0.047	2	09373	03410
0.055	1/8	0.165	0.440	0.051	2	09375	03411
0.060	1/8	0.180	0.480	0.056	2	09377	03412
0.062	1/8	0.186	0.496	0.058	2	09379	03413
0.065	1/8	0.195	0.520	0.061	2	09381	03414
0.070	1/8	0.210	0.560	0.065	2	09383	03415
0.075	1/8	0.225	0.600	0.070	2	09385	03416
0.078	1/8	0.234	0.624	0.073	2	09387	03417
0.080	1/8	0.240	0.640	0.075	2	09389	03418
0.085	1/8	0.255	0.680	0.079	2	09391	03419
0.090	1/8	0.270	0.720	0.084	2	09393	03420
0.093	1/8	0.279	0.744	0.087	2	09395	03421
0.095	1/8	0.285	0.760	0.089	2	09397	03422
0.100	1/8	0.300	0.800	0.094	2	09399	03423
0.110	1/8	0.330	0.880	0.103	2	09401	03424
0.115	1/8	0.345	0.920	0.108	2	09403	03425
0.120	1/8	0.360	0.960	0.112	2	09405	03426

M2 • 3xD • 12xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

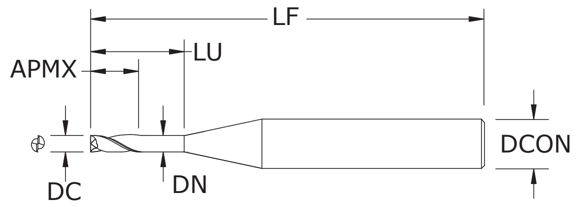
TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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



M2 • 3xD 12xD

FRACTIONAL SERIES

inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.030	0.120	0.009	1-1/2	09352	03427
0.015	1/8	0.045	0.180	0.014	1-1/2	09354	03428
0.020	1/8	0.060	0.240	0.018	1-1/2	09356	03429
0.025	1/8	0.075	0.300	0.023	1-1/2	09358	03430
0.030	1/8	0.090	0.360	0.028	2	09360	03431
0.031	1/8	0.093	0.372	0.029	2	09362	03432
0.035	1/8	0.105	0.420	0.032	2	09364	03433
0.040	1/8	0.120	0.480	0.037	2	09366	03434
0.045	1/8	0.135	0.540	0.042	2	09368	03435
0.047	1/8	0.141	0.564	0.044	2	09370	03436
0.050	1/8	0.150	0.600	0.047	2	09372	03437
0.055	1/8	0.165	0.660	0.051	2	09374	03438
0.060	1/8	0.180	0.720	0.056	2	09376	03439
0.062	1/8	0.186	0.744	0.058	2	09378	03440
0.065	1/8	0.195	0.780	0.061	2	09380	03441
0.070	1/8	0.210	0.840	0.065	2	09382	03442
0.075	1/8	0.225	0.900	0.070	2	09384	03443
0.078	1/8	0.234	0.936	0.073	2-1/2	09386	03444
0.080	1/8	0.240	0.960	0.075	2-1/2	09388	03445
0.085	1/8	0.255	1.020	0.079	2-1/2	09390	03446
0.090	1/8	0.270	1.080	0.084	2-1/2	09392	03447
0.093	1/8	0.279	1.116	0.087	2-1/2	09394	03448
0.095	1/8	0.285	1.140	0.089	2-1/2	09396	03449
0.100	1/8	0.300	1.200	0.094	2-1/2	09398	03450
0.110	1/8	0.330	1.320	0.103	2-1/2	09400	03451
0.115	1/8	0.345	1.380	0.108	2-1/2	09402	03452
0.120	1/8	0.360	1.440	0.112	2-1/2	09404	03453

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
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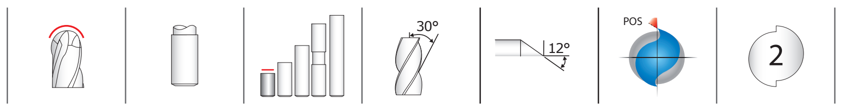
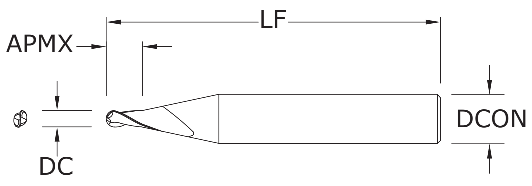
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.



MICRO SGS Solid Carbide Tools | KYOCERA

MICRO SGS Solid Carbide Tools | KYOCERA

FRACTIONAL
M2B • 1.5xD



New Expanded Tools

New Expanded Tools

M2B • 1.5xD

FRACTIONAL SERIES

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
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inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.005	1/8	0.008	1-1/2	00669	03029
0.006	1/8	0.009	1-1/2	00670	03030
0.007	1/8	0.011	1-1/2	00671	03031
0.008	1/8	0.012	1-1/2	00672	03032
0.009	1/8	0.014	1-1/2	00673	03033
0.010	1/8	0.015	1-1/2	00674	03034
0.011	1/8	0.017	1-1/2	00675	03035
0.012	1/8	0.018	1-1/2	00676	03036
0.013	1/8	0.020	1-1/2	00677	03037
0.014	1/8	0.021	1-1/2	00678	03038
0.015	1/8	0.023	1-1/2	00679	03039
0.016	1/8	0.024	1-1/2	00680	03040
0.017	1/8	0.026	1-1/2	00681	03041
0.018	1/8	0.027	1-1/2	00682	03042
0.019	1/8	0.029	1-1/2	00683	03043
0.020	1/8	0.030	1-1/2	00684	03044
0.021	1/8	0.032	1-1/2	00685	03045
0.022	1/8	0.033	1-1/2	00686	03046
0.023	1/8	0.035	1-1/2	00687	03047
0.024	1/8	0.036	1-1/2	00688	03048
0.025	1/8	0.038	1-1/2	00689	03049
0.026	1/8	0.039	1-1/2	00690	03050
0.027	1/8	0.041	1-1/2	00691	03051
0.028	1/8	0.042	1-1/2	00692	03052
0.029	1/8	0.044	1-1/2	00693	03053
0.030	1/8	0.045	1-1/2	00694	03054
0.031	1/8	0.047	1-1/2	00695	03055
0.032	1/8	0.048	1-1/2	00696	03056
0.033	1/8	0.050	1-1/2	00697	03057
0.034	1/8	0.051	1-1/2	00698	03058
0.035	1/8	0.053	1-1/2	00699	03059
0.036	1/8	0.054	1-1/2	00700	03060
0.037	1/8	0.056	1-1/2	00701	03061
0.038	1/8	0.057	1-1/2	00702	03062
0.039	1/8	0.059	1-1/2	00703	03063
0.040	1/8	0.060	1-1/2	00704	03064

RE = 1/2 Cutting Diameter (DC)

continued on next page

TOLERANCES (inch)

.005–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

M2B • 1.5xD
FRACTIONAL SERIES

continued

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.041	1/8	0.062	1-1/2	00705	02504
0.042	1/8	0.063	1-1/2	00706	02505
0.043	1/8	0.065	1-1/2	00707	02506
0.044	1/8	0.066	1-1/2	00708	02507
0.045	1/8	0.068	1-1/2	00709	02508
0.046	1/8	0.069	1-1/2	00710	02509
0.047	1/8	0.071	1-1/2	00711	02510
0.048	1/8	0.072	1-1/2	00712	02511
0.049	1/8	0.074	1-1/2	00713	02512
0.050	1/8	0.075	1-1/2	00714	02513
0.051	1/8	0.077	1-1/2	00715	02514
0.052	1/8	0.078	1-1/2	00716	02515
0.053	1/8	0.080	1-1/2	00717	02516
0.054	1/8	0.081	1-1/2	00718	02517
0.055	1/8	0.083	1-1/2	00719	02518
0.056	1/8	0.084	1-1/2	00720	02519
0.057	1/8	0.086	1-1/2	00721	02520
0.058	1/8	0.087	1-1/2	00722	02521
0.059	1/8	0.089	1-1/2	00723	02522
0.060	1/8	0.090	1-1/2	00724	02523
0.062	1/8	0.093	1-1/2	00725	02524
0.065	1/8	0.098	1-1/2	00726	02525
0.070	1/8	0.105	1-1/2	00727	02526
0.075	1/8	0.112	1-1/2	04010	04008
0.078	1/8	0.117	1-1/2	00728	02527
0.080	1/8	0.120	1-1/2	00729	02528
0.085	1/8	0.128	1-1/2	00730	02529
0.090	1/8	0.135	1-1/2	00731	02530
0.093	1/8	0.140	1-1/2	00732	02531
0.095	1/8	0.143	1-1/2	00733	02532
0.100	1/8	0.150	1-1/2	00734	02533
0.105	1/8	0.158	1-1/2	00735	02534
0.110	1/8	0.165	1-1/2	00736	02535
0.115	1/8	0.173	1-1/2	00737	02536
0.120	1/8	0.180	1-1/2	00738	02537

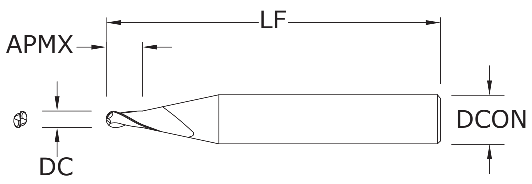
RE = 1/2 Cutting Diameter (DC)

MICRO SGS Solid Carbide Tools | KYOCERA

MICRO SGS Solid Carbide Tools | KYOCERA

FRACTIONAL
M2B • 3xD

New Expanded Tools



M2B • 3xD
FRACTIONAL SERIES

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inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.005	1/8	0.015	1-1/2	00443	03103
0.006	1/8	0.018	1-1/2	00444	03104
0.007	1/8	0.021	1-1/2	00445	03105
0.008	1/8	0.024	1-1/2	00446	03106
0.009	1/8	0.027	1-1/2	00447	03107
0.010	1/8	0.030	1-1/2	00448	03108
0.011	1/8	0.033	1-1/2	00449	03109
0.012	1/8	0.036	1-1/2	00450	03110
0.013	1/8	0.039	1-1/2	00451	03111
0.014	1/8	0.042	1-1/2	00452	03112
0.015	1/8	0.045	1-1/2	00453	03113
0.016	1/8	0.048	1-1/2	00454	03114
0.017	1/8	0.051	1-1/2	00455	03115
0.018	1/8	0.054	1-1/2	00456	03116
0.019	1/8	0.057	1-1/2	00457	03117
0.020	1/8	0.060	1-1/2	00458	03118
0.021	1/8	0.063	1-1/2	00459	03119
0.022	1/8	0.066	1-1/2	00460	03120
0.023	1/8	0.069	1-1/2	00461	03121
0.024	1/8	0.072	1-1/2	00462	03122
0.025	1/8	0.075	1-1/2	00463	03123
0.026	1/8	0.078	1-1/2	00464	03124
0.027	1/8	0.081	1-1/2	00465	03125
0.028	1/8	0.084	1-1/2	00466	03126
0.029	1/8	0.087	1-1/2	00467	03127
0.030	1/8	0.090	1-1/2	00468	03128
0.031	1/8	0.093	1-1/2	00469	03129
0.032	1/8	0.096	1-1/2	00470	03130
0.033	1/8	0.099	1-1/2	00471	03131
0.034	1/8	0.102	1-1/2	00472	03132
0.035	1/8	0.105	1-1/2	00473	03133
0.036	1/8	0.108	1-1/2	00474	03134
0.037	1/8	0.111	1-1/2	00475	03135
0.038	1/8	0.114	1-1/2	00476	03136
0.039	1/8	0.117	1-1/2	00477	03137
0.040	1/8	0.120	1-1/2	00478	03138

continued on next page

TOLERANCES (inch)

.005–.120 DIAMETER
DC = +0.000/–0.001
DCON = h_6

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

New Expanded Tools

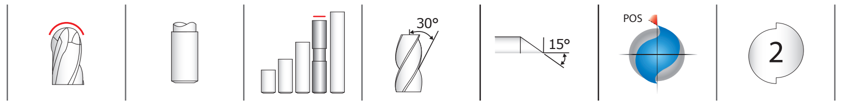
M2B • 3xD
FRACTIONAL SERIES

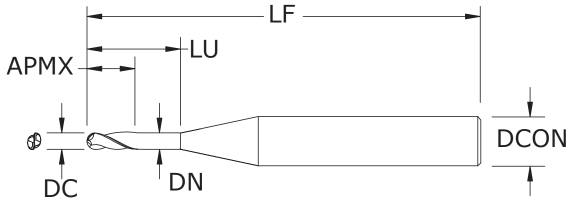
continued

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.041	1/8	0.123	1-1/2	00847	02572
0.042	1/8	0.126	1-1/2	00848	02573
0.043	1/8	0.129	1-1/2	00849	02574
0.044	1/8	0.132	1-1/2	00850	02575
0.045	1/8	0.135	1-1/2	00851	02576
0.046	1/8	0.138	1-1/2	00852	02577
0.047	1/8	0.141	1-1/2	00853	02578
0.048	1/8	0.144	1-1/2	00854	02579
0.049	1/8	0.147	1-1/2	00855	02580
0.050	1/8	0.150	1-1/2	00856	02581
0.051	1/8	0.153	1-1/2	00857	02582
0.052	1/8	0.156	1-1/2	00858	02583
0.053	1/8	0.159	1-1/2	00859	02584
0.054	1/8	0.162	1-1/2	00860	02585
0.055	1/8	0.165	1-1/2	00861	02586
0.056	1/8	0.168	1-1/2	00862	02587
0.057	1/8	0.171	1-1/2	00863	02588
0.058	1/8	0.174	1-1/2	00864	02589
0.059	1/8	0.177	1-1/2	00497	02590
0.060	1/8	0.180	1-1/2	00866	02591
0.062	1/8	0.186	1-1/2	00867	02592
0.065	1/8	0.195	1-1/2	00868	02593
0.070	1/8	0.210	1-1/2	00869	02594
0.075	1/8	0.225	1-1/2	04011	04009
0.078	1/8	0.234	1-1/2	00502	02595
0.080	1/8	0.240	1-1/2	00871	02596
0.085	1/8	0.255	1-1/2	00872	02597
0.090	1/8	0.270	1-1/2	00873	02598
0.093	1/8	0.279	1-1/2	00874	02599
0.095	1/8	0.285	1-1/2	00875	02600
0.100	1/8	0.300	1-1/2	00876	02601
0.105	1/8	0.315	1-1/2	00877	02602
0.110	1/8	0.330	1-1/2	00510	02603
0.115	1/8	0.345	1-1/2	00879	02604
0.120	1/8	0.360	1-1/2	00880	02605

M2B • 3xD • 8xD Overall Reach

MICRO SGS® Solid Carbide Tools | KYOCERA





M2B • 3xD 8xD

FRACTIONAL SERIES

New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

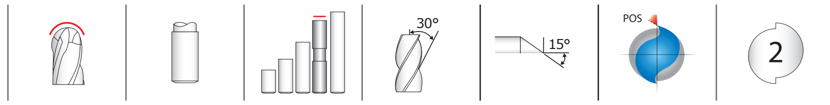
- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

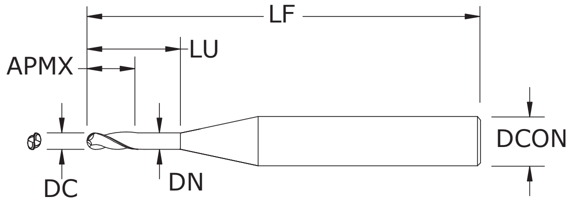
inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.030	0.080	0.009	1-1/2	09299	03697
0.015	1/8	0.045	0.120	0.014	1-1/2	09301	03698
0.020	1/8	0.060	0.160	0.018	1-1/2	09303	03699
0.025	1/8	0.075	0.200	0.023	1-1/2	09305	03700
0.030	1/8	0.090	0.240	0.028	1-1/2	09307	03701
0.031	1/8	0.093	0.248	0.029	1-1/2	09309	03702
0.035	1/8	0.105	0.280	0.032	1-1/2	09311	03703
0.040	1/8	0.120	0.320	0.037	1-1/2	09313	03704
0.045	1/8	0.135	0.360	0.042	2	09315	03705
0.047	1/8	0.141	0.376	0.044	2	09317	03706
0.050	1/8	0.150	0.400	0.047	2	09319	03707
0.055	1/8	0.165	0.440	0.051	2	09321	03708
0.060	1/8	0.180	0.480	0.056	2	09323	03709
0.062	1/8	0.186	0.496	0.058	2	09325	03710
0.065	1/8	0.195	0.520	0.061	2	09327	03711
0.070	1/8	0.210	0.560	0.065	2	09329	03712
0.075	1/8	0.225	0.600	0.070	2	09331	03713
0.078	1/8	0.234	0.624	0.073	2	09333	03714
0.080	1/8	0.240	0.640	0.075	2	09335	03715
0.085	1/8	0.255	0.680	0.079	2	09337	03716
0.090	1/8	0.270	0.720	0.084	2	09339	03717
0.093	1/8	0.279	0.744	0.087	2	09341	03718
0.095	1/8	0.285	0.760	0.089	2	09343	03719
0.100	1/8	0.300	0.800	0.094	2	09345	03720
0.110	1/8	0.330	0.880	0.103	2	09347	03721
0.115	1/8	0.345	0.920	0.108	2	09349	03722
0.120	1/8	0.360	0.960	0.112	2	09351	03723

RE = 1/2 Cutting Diameter (DC)

M2B • 3xD • 12xD Overall Reach

MICRO SGS® Solid Carbide Tools | KYOCERA





M2B • 3xD 12xD

FRACTIONAL SERIES

New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

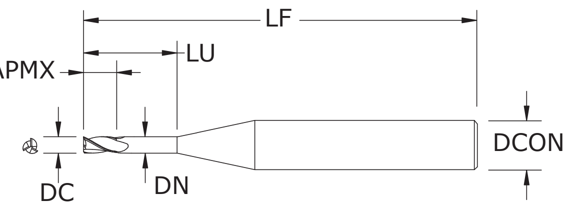
inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.030	0.120	0.009	1-1/2	09298	03724
0.015	1/8	0.045	0.180	0.014	1-1/2	09300	03725
0.020	1/8	0.060	0.240	0.018	1-1/2	09302	03726
0.025	1/8	0.075	0.300	0.023	1-1/2	09304	03727
0.030	1/8	0.090	0.360	0.028	2	09306	03728
0.031	1/8	0.093	0.372	0.029	2	09308	03729
0.035	1/8	0.105	0.420	0.032	2	09310	03730
0.040	1/8	0.120	0.480	0.037	2	09312	03731
0.045	1/8	0.135	0.540	0.042	2	09314	03732
0.047	1/8	0.141	0.564	0.044	2	09316	03733
0.050	1/8	0.150	0.600	0.047	2	09318	03734
0.055	1/8	0.165	0.660	0.051	2	09320	03735
0.060	1/8	0.180	0.720	0.056	2	09322	03736
0.062	1/8	0.186	0.744	0.058	2	09324	03737
0.065	1/8	0.195	0.780	0.061	2	09326	03738
0.070	1/8	0.210	0.840	0.065	2	09328	03739
0.075	1/8	0.225	0.900	0.070	2	09330	03740
0.078	1/8	0.234	0.936	0.073	2-1/2	09332	03741
0.080	1/8	0.240	0.960	0.075	2-1/2	09334	03742
0.085	1/8	0.255	1.020	0.079	2-1/2	09336	03743
0.090	1/8	0.270	1.080	0.084	2-1/2	09338	03744
0.093	1/8	0.279	1.116	0.087	2-1/2	09340	03745
0.095	1/8	0.285	1.140	0.089	2-1/2	09342	03746
0.100	1/8	0.300	1.200	0.094	2-1/2	09344	03747
0.110	1/8	0.330	1.320	0.103	2-1/2	09346	03748
0.115	1/8	0.345	1.380	0.108	2-1/2	09348	03749
0.120	1/8	0.360	1.440	0.112	2-1/2	09350	03750

RE = 1/2 Cutting Diameter (DC)

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

M3 • 1.5xD • 3xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA



New Expanded Tools

M3 • 1.5xD 3xD

FRACTIONAL SERIES

- Three flute design features improved chip space over four flutes and increased strength and feed capability over two flutes.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.030	0.009	2-1/2	09599	03508
0.015	1/8	0.023	0.045	0.014	2-1/2	09606	03509
0.020	1/8	0.030	0.060	0.018	2-1/2	09613	03510
0.025	1/8	0.038	0.075	0.023	2-1/2	09620	03511
0.030	1/8	0.045	0.090	0.028	2-1/2	09627	03512
0.031	1/8	0.047	0.093	0.029	2-1/2	09634	03513
0.035	1/8	0.053	0.105	0.032	2-1/2	09641	03514
0.040	1/8	0.060	0.120	0.037	2-1/2	09648	03515
0.045	1/8	0.068	0.135	0.042	2-1/2	09655	03516
0.047	1/8	0.071	0.141	0.044	2-1/2	09662	03517
0.050	1/8	0.075	0.150	0.047	2-1/2	09669	03518
0.055	1/8	0.083	0.165	0.051	2-1/2	09676	03519
0.060	1/8	0.090	0.180	0.056	2-1/2	09683	03520
0.062	1/8	0.093	0.186	0.058	2-1/2	09690	03521
0.065	1/8	0.098	0.195	0.061	2-1/2	09697	03522
0.070	1/8	0.105	0.210	0.065	2-1/2	09704	03523
0.075	1/8	0.113	0.225	0.070	2-1/2	09711	03524
0.078	1/8	0.117	0.234	0.073	2-1/2	09718	03525
0.080	1/8	0.120	0.240	0.075	2-1/2	09725	03526
0.085	1/8	0.128	0.255	0.079	2-1/2	09732	03527
0.090	1/8	0.135	0.270	0.084	2-1/2	09739	03528
0.093	1/8	0.140	0.279	0.087	2-1/2	09746	03529
0.095	1/8	0.143	0.285	0.089	2-1/2	09753	03530
0.100	1/8	0.150	0.300	0.094	2-1/2	09760	03531
0.110	1/8	0.165	0.330	0.103	2-1/2	09767	03532
0.115	1/8	0.173	0.345	0.108	2-1/2	09774	03533
0.120	1/8	0.180	0.360	0.112	2-1/2	09781	03534

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

M3 • M3CR • 1.5xD • 5xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

TOLERANCES (inch)

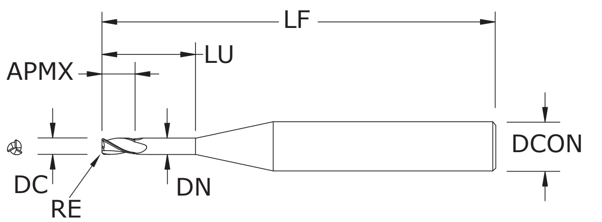
.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

RE = +0.0000/–0.0005

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



M3 • M3CR • 1.5xD 5xD

FRACTIONAL SERIES

inch							EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.050	0.009	2-1/2	–	09600	03535
0.015	1/8	0.023	0.075	0.014	2-1/2	–	09607	03536
0.015	1/8	0.023	0.075	0.014	2-1/2	0.003	08782	08884
0.020	1/8	0.030	0.100	0.018	2-1/2	–	09614	03537
0.020	1/8	0.030	0.100	0.018	2-1/2	0.005	08785	08887
0.025	1/8	0.038	0.125	0.023	2-1/2	–	09621	03538
0.025	1/8	0.038	0.125	0.023	2-1/2	0.005	08788	08890
0.030	1/8	0.045	0.150	0.028	2-1/2	–	09628	03539
0.030	1/8	0.045	0.150	0.028	2-1/2	0.005	08791	08893
0.031	1/8	0.047	0.155	0.029	2-1/2	–	09635	03540
0.035	1/8	0.053	0.175	0.032	2-1/2	–	09642	03541
0.035	1/8	0.053	0.175	0.032	2-1/2	0.005	08794	08896
0.035	1/8	0.053	0.175	0.032	2-1/2	0.010	08797	08899
0.040	1/8	0.060	0.200	0.037	2-1/2	–	09649	03542
0.040	1/8	0.060	0.200	0.037	2-1/2	0.005	08800	08902
0.040	1/8	0.060	0.200	0.037	2-1/2	0.010	08803	08905
0.045	1/8	0.068	0.225	0.042	2-1/2	–	09656	03543
0.045	1/8	0.068	0.225	0.042	2-1/2	0.005	08806	08908
0.045	1/8	0.068	0.225	0.042	2-1/2	0.010	08809	08911
0.047	1/8	0.071	0.235	0.044	2-1/2	–	09663	03544
0.050	1/8	0.075	0.250	0.047	2-1/2	–	09670	03545
0.050	1/8	0.075	0.250	0.047	2-1/2	0.005	08812	08914
0.050	1/8	0.075	0.250	0.047	2-1/2	0.010	08815	08917
0.050	1/8	0.075	0.250	0.047	2-1/2	0.015	08818	08920
0.055	1/8	0.083	0.275	0.051	2-1/2	–	09677	03546
0.060	1/8	0.090	0.300	0.056	2-1/2	–	09684	03547
0.060	1/8	0.090	0.300	0.056	2-1/2	0.005	08821	08923
0.060	1/8	0.090	0.300	0.056	2-1/2	0.010	08824	08926
0.060	1/8	0.090	0.300	0.056	2-1/2	0.015	08827	08929
0.062	1/8	0.093	0.310	0.058	2-1/2	–	09691	03548
0.065	1/8	0.098	0.325	0.061	2-1/2	–	09698	03549
0.070	1/8	0.105	0.350	0.065	2-1/2	–	09705	03550
0.070	1/8	0.105	0.350	0.065	2-1/2	0.005	08830	08932
0.070	1/8	0.105	0.350	0.065	2-1/2	0.010	08833	08935

continued on next page

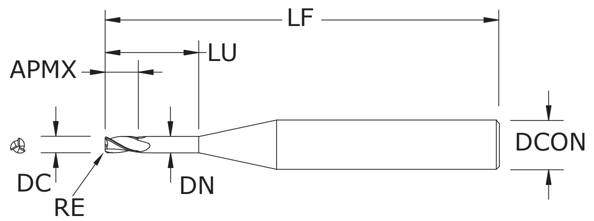
- Three flute design features improved chip space over four flutes and increased strength and feed capability over two flutes.
- Enhanced corner geometry with tight tolerance corner radii
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

M3 • M3CR • 1.5xD • 5xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA

M3 • M3CR • 1.5xD 5xD

FRACTIONAL SERIES



New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

RE = +0.0000 / –0.0005

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

continued

inch							EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.070	1/8	0.105	0.350	0.065	2-1/2	0.015	08836	08938
0.075	1/8	0.113	0.375	0.070	2-1/2	–	09712	03551
0.078	1/8	0.117	0.390	0.073	2-1/2	–	09719	03552
0.080	1/8	0.120	0.400	0.075	2-1/2	–	09726	03553
0.080	1/8	0.120	0.400	0.075	2-1/2	0.005	08839	08941
0.080	1/8	0.120	0.400	0.075	2-1/2	0.010	08842	08944
0.080	1/8	0.120	0.400	0.075	2-1/2	0.015	08845	08947
0.085	1/8	0.128	0.425	0.079	2-1/2	–	09733	03554
0.090	1/8	0.135	0.450	0.084	2-1/2	–	09740	03555
0.090	1/8	0.135	0.450	0.084	2-1/2	0.005	08848	08950
0.090	1/8	0.135	0.450	0.084	2-1/2	0.010	08851	08953
0.090	1/8	0.135	0.450	0.084	2-1/2	0.015	08854	08956
0.093	1/8	0.140	0.465	0.087	2-1/2	–	09747	03556
0.095	1/8	0.143	0.475	0.089	2-1/2	–	09754	03557
0.100	1/8	0.150	0.500	0.094	2-1/2	–	09761	03558
0.100	1/8	0.150	0.500	0.094	2-1/2	0.005	08857	08959
0.100	1/8	0.150	0.500	0.094	2-1/2	0.010	08860	08962
0.100	1/8	0.150	0.500	0.094	2-1/2	0.015	08863	08965
0.110	1/8	0.165	0.550	0.103	2-1/2	–	09768	03559
0.110	1/8	0.165	0.550	0.103	2-1/2	0.005	08866	08968
0.110	1/8	0.165	0.550	0.103	2-1/2	0.010	08869	08971
0.110	1/8	0.165	0.550	0.103	2-1/2	0.015	08872	08974
0.115	1/8	0.173	0.575	0.108	2-1/2	–	09775	03560
0.120	1/8	0.180	0.600	0.112	2-1/2	–	09782	03561
0.120	1/8	0.180	0.600	0.112	2-1/2	0.005	08875	08977
0.120	1/8	0.180	0.600	0.112	2-1/2	0.010	08878	08980
0.120	1/8	0.180	0.600	0.112	2-1/2	0.015	08881	08983

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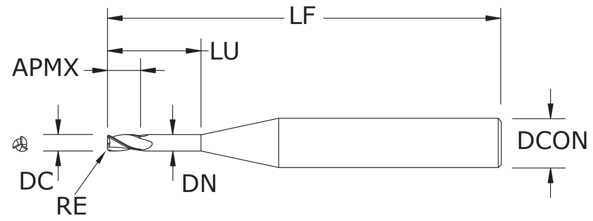
FRACTIONAL SERIES

New Expanded Tools



TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

RE = +0.0000 / –0.0005

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

inch							EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.080	0.009	2-1/2	–	09601	03562
0.015	1/8	0.023	0.120	0.014	2-1/2	–	09608	03563
0.015	1/8	0.023	0.120	0.014	2-1/2	0.003	08783	08885
0.020	1/8	0.030	0.160	0.018	2-1/2	–	09615	03564
0.020	1/8	0.030	0.160	0.018	2-1/2	0.005	08786	08888
0.025	1/8	0.038	0.200	0.023	2-1/2	–	09622	03565
0.025	1/8	0.038	0.200	0.023	2-1/2	0.005	08789	08891
0.030	1/8	0.045	0.240	0.028	2-1/2	–	09629	03566
0.030	1/8	0.045	0.240	0.028	2-1/2	0.005	08792	08894
0.031	1/8	0.047	0.248	0.029	2-1/2	–	09636	03567
0.035	1/8	0.053	0.280	0.032	2-1/2	–	09643	03568
0.035	1/8	0.053	0.280	0.032	2-1/2	0.005	08795	08897
0.035	1/8	0.053	0.280	0.032	2-1/2	0.010	08798	08900
0.040	1/8	0.060	0.320	0.037	2-1/2	–	09650	03569
0.040	1/8	0.060	0.320	0.037	2-1/2	0.005	08801	08903
0.040	1/8	0.060	0.320	0.037	2-1/2	0.010	08804	08906
0.045	1/8	0.068	0.360	0.042	2-1/2	–	09657	03570
0.045	1/8	0.068	0.360	0.042	2-1/2	0.005	08807	08909
0.045	1/8	0.068	0.360	0.042	2-1/2	0.010	08810	08912
0.047	1/8	0.071	0.376	0.044	2-1/2	–	09664	03571
0.050	1/8	0.075	0.400	0.047	2-1/2	–	09671	03572
0.050	1/8	0.075	0.400	0.047	2-1/2	0.005	08813	08915
0.050	1/8	0.075	0.400	0.047	2-1/2	0.010	08816	08918
0.050	1/8	0.075	0.400	0.047	2-1/2	0.015	08819	08921
0.055	1/8	0.083	0.440	0.051	2-1/2	–	09678	03573
0.060	1/8	0.090	0.480	0.056	2-1/2	–	09685	03574
0.060	1/8	0.090	0.480	0.056	2-1/2	0.005	08822	08924
0.060	1/8	0.090	0.480	0.056	2-1/2	0.010	08825	08927
0.060	1/8	0.090	0.480	0.056	2-1/2	0.015	08828	08930
0.062	1/8	0.093	0.496	0.058	2-1/2	–	09692	03575
0.065	1/8	0.098	0.520	0.061	2-1/2	–	09699	03576
0.070	1/8	0.105	0.560	0.065	2-1/2	–	09706	03577
0.070	1/8	0.105	0.560	0.065	2-1/2	0.005	08831	08933
0.070	1/8	0.105	0.560	0.065	2-1/2	0.010	08834	08936
0.070	1/8	0.105	0.560	0.065	2-1/2	0.015	08837	08939
0.075	1/8	0.113	0.600	0.070	2-1/2	–	09713	03578

continued on next page

- Three flute design features improved chip space over four flutes and increased strength and feed capability over two flutes.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

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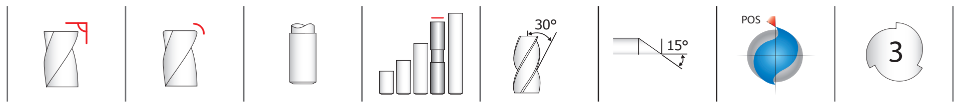

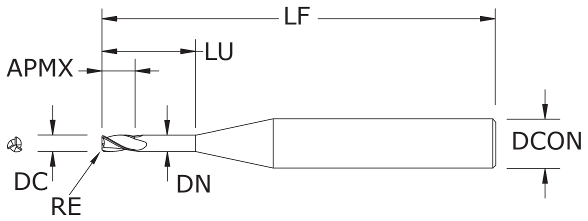

■ New Expanded Tools

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FRACTIONAL SERIES

continued

CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	CORNER RADIUS RE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
inch								
0.078	1/8	0.117	0.624	0.073	2-1/2	–	09720	03579
0.080	1/8	0.120	0.640	0.075	2-1/2	–	09727	03580
0.080	1/8	0.120	0.640	0.075	2-1/2	0.005	08840	08942
0.080	1/8	0.120	0.640	0.075	2-1/2	0.010	08843	08945
0.080	1/8	0.120	0.640	0.075	2-1/2	0.015	08846	08948
0.085	1/8	0.128	0.680	0.079	2-1/2	–	09734	03581
0.090	1/8	0.135	0.720	0.084	2-1/2	–	09741	03582
0.090	1/8	0.135	0.720	0.084	2-1/2	0.005	08849	08951
0.090	1/8	0.135	0.720	0.084	2-1/2	0.010	08852	08954
0.090	1/8	0.135	0.720	0.084	2-1/2	0.015	08855	08957
0.093	1/8	0.140	0.744	0.087	2-1/2	–	09748	03583
0.095	1/8	0.143	0.760	0.089	2-1/2	–	09755	03584
0.100	1/8	0.150	0.800	0.094	2-1/2		09762	03585
0.100	1/8	0.150	0.800	0.094	2-1/2	0.005	08858	08960
0.100	1/8	0.150	0.800	0.094	2-1/2	0.010	08861	08963
0.100	1/8	0.150	0.800	0.094	2-1/2	0.015	08864	08966
0.110	1/8	0.165	0.880	0.103	2-1/2		09769	03586
0.110	1/8	0.165	0.880	0.103	2-1/2	0.005	08867	08969
0.110	1/8	0.165	0.880	0.103	2-1/2	0.010	08870	08972
0.110	1/8	0.165	0.880	0.103	2-1/2	0.015	08873	08975
0.115	1/8	0.173	0.920	0.108	2-1/2		09776	03587
0.120	1/8	0.180	0.960	0.112	2-1/2		09783	03588
0.120	1/8	0.180	0.960	0.112	2-1/2	0.005	08876	08978
0.120	1/8	0.180	0.960	0.112	2-1/2	0.010	08879	08981
0.120	1/8	0.180	0.960	0.112	2-1/2	0.015	08882	08984

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001
DCON = h_6
RE = +0.0000 / –0.0005

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

FRACTIONAL

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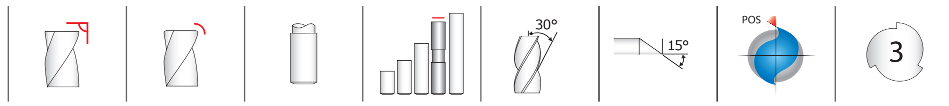

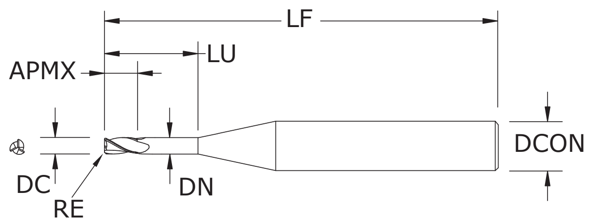

■ New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001
DCON = h_6
RE = +0.0000 / –0.0005

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

M3 • M3CR • 1.5xD 12xD

FRACTIONAL SERIES

CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	CORNER RADIUS RE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
inch								
0.010	1/8	0.015	0.120	0.009	2-1/2	–	09595	03589
0.015	1/8	0.023	0.180	0.014	2-1/2	–	09602	03590
0.015	1/8	0.023	0.180	0.014	2-1/2	0.003	08784	08886
0.020	1/8	0.030	0.240	0.018	2-1/2	–	09609	03591
0.020	1/8	0.030	0.240	0.018	2-1/2	0.005	08787	08889
0.025	1/8	0.038	0.300	0.023	2-1/2	–	09616	03592
0.025	1/8	0.038	0.300	0.023	2-1/2	0.005	08790	08892
0.030	1/8	0.045	0.360	0.028	2-1/2	–	09623	03593
0.030	1/8	0.045	0.360	0.028	2-1/2	0.005	08793	08895
0.031	1/8	0.047	0.372	0.029	2-1/2	–	09630	03594
0.035	1/8	0.053	0.420	0.032	2-1/2	–	09637	03595
0.035	1/8	0.053	0.420	0.032	2-1/2	0.005	08796	08898
0.035	1/8	0.053	0.420	0.032	2-1/2	0.010	08799	08901
0.040	1/8	0.060	0.480	0.037	2-1/2	–	09644	03596
0.040	1/8	0.060	0.480	0.037	2-1/2	0.005	08802	08904
0.040	1/8	0.060	0.480	0.037	2-1/2	0.010	08805	08907
0.045	1/8	0.068	0.540	0.042	2-1/2	–	09651	03597
0.045	1/8	0.068	0.540	0.042	2-1/2	0.005	08808	08910
0.045	1/8	0.068	0.540	0.042	2-1/2	0.010	08811	08913
0.047	1/8	0.071	0.564	0.044	2-1/2	–	09658	03598
0.050	1/8	0.075	0.600	0.047	2-1/2	–	09665	03599
0.050	1/8	0.075	0.600	0.047	2-1/2	0.005	08814	08916
0.050	1/8	0.075	0.600	0.047	2-1/2	0.010	08817	08919
0.050	1/8	0.075	0.600	0.047	2-1/2	0.015	08820	08922
0.055	1/8	0.083	0.660	0.051	2-1/2	–	09672	03600
0.060	1/8	0.090	0.720	0.056	2-1/2	–	09679	03601
0.060	1/8	0.090	0.720	0.056	2-1/2	0.005	08823	08925
0.060	1/8	0.090	0.720	0.056	2-1/2	0.010	08826	08928
0.060	1/8	0.090	0.720	0.056	2-1/2	0.015	08829	08931
0.062	1/8	0.093	0.744	0.058	2-1/2	–	09686	03602
0.065	1/8	0.098	0.780	0.061	2-1/2	–	09693	03603
0.070	1/8	0.105	0.840	0.065	2-1/2	–	09700	03604
0.070	1/8	0.105	0.840	0.065	2-1/2	0.005	08832	08934
0.070	1/8	0.105	0.840	0.065	2-1/2	0.010	08835	08937
0.070	1/8	0.105	0.840	0.065	2-1/2	0.015	08838	08940
0.075	1/8	0.113	0.900	0.070	2-1/2	–	09707	03605

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- Three flute design features improved chip space over four flutes and increased strength and feed capability over two flutes.
- Enhanced corner geometry with tight tolerance corner radii
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

M3 • M3CR • 1.5xD • 12xD Overall Reach

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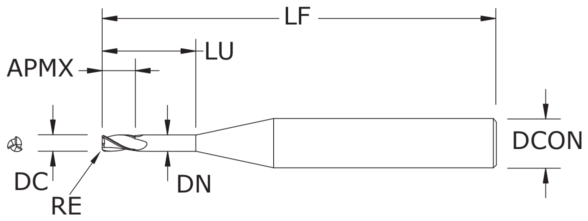
FRACTIONAL SERIES



New Expanded Tools

continued

CUTTING DIAMETER DC (inch)	SHANK DIAMETER DCON (inch)	LENGTH OF CUT APMX (inch)	REACH LU (inch)	NECK DIAMETER DN (inch)	OVERALL LENGTH LF (inch)	CORNER RADIUS RE (inch)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0.078	1/8	0.117	0.936	0.073	2-1/2	–	09714	03606
0.080	1/8	0.120	0.960	0.075	2-1/2	–	09721	03607
0.080	1/8	0.120	0.960	0.075	2-1/2	0.005	08841	08943
0.080	1/8	0.120	0.960	0.075	2-1/2	0.010	08844	08946
0.080	1/8	0.120	0.960	0.075	2-1/2	0.015	08847	08949
0.085	1/8	0.128	1.020	0.079	2-1/2	–	09728	03608
0.090	1/8	0.135	1.080	0.084	2-1/2	–	09735	03609
0.090	1/8	0.135	1.080	0.084	2-1/2	0.005	08850	08952
0.090	1/8	0.135	1.080	0.084	2-1/2	0.010	08853	08955
0.090	1/8	0.135	1.080	0.084	2-1/2	0.015	08856	08958
0.093	1/8	0.140	1.116	0.087	2-1/2	–	09742	03610
0.095	1/8	0.143	1.140	0.089	2-1/2	–	09749	03611
0.100	1/8	0.150	1.200	0.094	2-1/2	–	09756	03612
0.100	1/8	0.150	1.200	0.094	2-1/2	0.005	08859	08961
0.100	1/8	0.150	1.200	0.094	2-1/2	0.010	08862	08964
0.100	1/8	0.150	1.200	0.094	2-1/2	0.015	08865	08967
0.110	1/8	0.165	1.320	0.103	2-1/2	–	09763	03613
0.110	1/8	0.165	1.320	0.103	2-1/2	0.005	08868	08970
0.110	1/8	0.165	1.320	0.103	2-1/2	0.010	08871	08973
0.110	1/8	0.165	1.320	0.103	2-1/2	0.015	08874	08976
0.115	1/8	0.173	1.380	0.108	2-1/2	–	09770	03614
0.120	1/8	0.180	1.440	0.112	2-1/2	–	09777	03615
0.120	1/8	0.180	1.440	0.112	2-1/2	0.005	08877	08979
0.120	1/8	0.180	1.440	0.112	2-1/2	0.010	08880	08982
0.120	1/8	0.180	1.440	0.112	2-1/2	0.015	08883	08985

TOLERANCES (inch)

.010–.120 DIAMETER
DC = +0.000/–0.001
DCON = h_6
RE = +0.0000 / –0.0005

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

M3 • 1.5xD • 15xD Overall Reach

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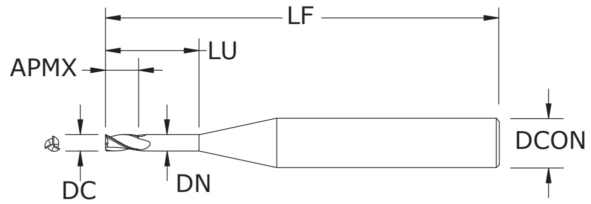
M3 • 1.5xD 15xD

FRACTIONAL SERIES

New Expanded Tools



TOLERANCES (inch)

.010–.120 DIAMETER
DC = +0.000/–0.001
DCON = h_6

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

CUTTING DIAMETER DC (inch)	SHANK DIAMETER DCON (inch)	LENGTH OF CUT APMX (inch)	REACH LU (inch)	NECK DIAMETER DN (inch)	OVERALL LENGTH LF (inch)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.150	0.009	2-1/2	09596	03616
0.015	1/8	0.023	0.225	0.014	2-1/2	09603	03617
0.020	1/8	0.030	0.300	0.018	2-1/2	09610	03618
0.025	1/8	0.038	0.375	0.023	2-1/2	09617	03619
0.030	1/8	0.045	0.450	0.028	2-1/2	09624	03620
0.031	1/8	0.047	0.465	0.029	2-1/2	09631	03621
0.035	1/8	0.053	0.525	0.032	2-1/2	09638	03622
0.040	1/8	0.060	0.600	0.037	2-1/2	09645	03623
0.045	1/8	0.068	0.675	0.042	2-1/2	09652	03624
0.047	1/8	0.071	0.705	0.044	2-1/2	09659	03625
0.050	1/8	0.075	0.750	0.047	2-1/2	09666	03626
0.055	1/8	0.083	0.825	0.051	2-1/2	09673	03627
0.060	1/8	0.090	0.900	0.056	2-1/2	09680	03628
0.062	1/8	0.093	0.930	0.058	2-1/2	09687	03629
0.065	1/8	0.098	0.975	0.061	2-1/2	09694	03630
0.070	1/8	0.105	1.050	0.065	2-1/2	09701	03631
0.075	1/8	0.113	1.125	0.070	2-1/2	09708	03632
0.078	1/8	0.117	1.170	0.073	2-1/2	09715	03633
0.080	1/8	0.120	1.200	0.075	2-1/2	09722	03634
0.085	1/8	0.128	1.275	0.079	2-1/2	09729	03635
0.090	1/8	0.135	1.350	0.084	2-1/2	09736	03636
0.093	1/8	0.140	1.395	0.087	3	09743	03637
0.095	1/8	0.143	1.425	0.089	3	09750	03638
0.100	1/8	0.150	1.500	0.094	3	09757	03639
0.110	1/8	0.165	1.650	0.103	3	09764	03640
0.115	1/8	0.173	1.725	0.108	3	09771	03641
0.120	1/8	0.180	1.800	0.112	3	09778	03642

- Three flute design features improved chip space over four flutes and increased strength and feed capability over two flutes.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
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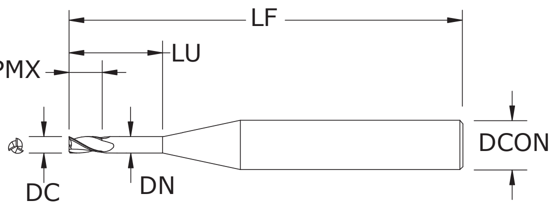
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

M3 • 1.5xD • 20xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA

M3 • 1.5xD 20xD

FRACTIONAL SERIES



New Expanded Tools

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inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.200	0.009	2-1/2	09597	03643
0.015	1/8	0.023	0.300	0.014	2-1/2	09604	03644
0.020	1/8	0.030	0.400	0.018	2-1/2	09611	03645
0.025	1/8	0.038	0.500	0.023	2-1/2	09618	03646
0.030	1/8	0.045	0.600	0.028	2-1/2	09625	03647
0.031	1/8	0.047	0.620	0.029	2-1/2	09632	03648
0.035	1/8	0.053	0.700	0.032	2-1/2	09639	03649
0.040	1/8	0.060	0.800	0.037	2-1/2	09646	03650
0.045	1/8	0.068	0.900	0.042	2-1/2	09653	03651
0.047	1/8	0.071	0.940	0.044	2-1/2	09660	03652
0.050	1/8	0.075	1.000	0.047	2-1/2	09667	03653
0.055	1/8	0.083	1.100	0.051	2-1/2	09674	03654
0.060	1/8	0.090	1.200	0.056	2-1/2	09681	03655
0.062	1/8	0.093	1.240	0.058	2-1/2	09688	03656
0.065	1/8	0.098	1.300	0.061	3	09695	03657
0.070	1/8	0.105	1.400	0.065	3	09702	03658
0.075	1/8	0.113	1.500	0.070	3	09709	03659
0.078	1/8	0.117	1.560	0.073	3	09716	03660
0.080	1/8	0.120	1.600	0.075	3	09723	03661
0.085	1/8	0.128	1.700	0.079	3	09730	03662
0.090	1/8	0.135	1.800	0.084	3	09737	03663
0.093	1/8	0.140	1.860	0.087	3	09744	03664
0.095	1/8	0.143	1.900	0.089	3	09751	03665
0.100	1/8	0.150	2.000	0.094	4	09758	03666
0.110	1/8	0.165	2.200	0.103	4	09765	03667
0.115	1/8	0.173	2.300	0.108	4	09772	03668
0.120	1/8	0.180	2.400	0.112	4	09779	03669

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

MICRO SGS Solid Carbide Tools | KYOCERA

M3 • 1.5xD • 25xD Overall Reach

New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
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- TITANIUM
- HARDENED STEELS
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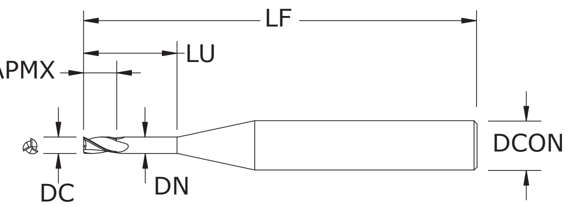
- PLASTICS/COMPOSITES



M3 • 1.5xD 25xD

FRACTIONAL SERIES

inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.250	0.009	2-1/2	09598	03670
0.015	1/8	0.023	0.375	0.014	2-1/2	09605	03671
0.020	1/8	0.030	0.500	0.018	2-1/2	09612	03672
0.025	1/8	0.038	0.625	0.023	2-1/2	09619	03673
0.030	1/8	0.045	0.750	0.028	2-1/2	09626	03674
0.031	1/8	0.047	0.775	0.029	2-1/2	09633	03675
0.035	1/8	0.053	0.875	0.032	2-1/2	09640	03676
0.040	1/8	0.060	1.000	0.037	2-1/2	09647	03677
0.045	1/8	0.068	1.125	0.042	2-1/2	09654	03678
0.047	1/8	0.071	1.175	0.044	2-1/2	09661	03679
0.050	1/8	0.075	1.250	0.047	2-1/2	09668	03680
0.055	1/8	0.083	1.375	0.051	3	09675	03681
0.060	1/8	0.090	1.500	0.056	3	09682	03682
0.062	1/8	0.093	1.550	0.058	3	09689	03683
0.065	1/8	0.098	1.625	0.061	3	09696	03684
0.070	1/8	0.105	1.750	0.065	3	09703	03685
0.075	1/8	0.113	1.875	0.070	3	09710	03686
0.078	1/8	0.117	1.950	0.073	4	09717	03687
0.080	1/8	0.120	2.000	0.075	4	09724	03688
0.085	1/8	0.128	2.125	0.079	4	09731	03689
0.090	1/8	0.135	2.250	0.084	4	09738	03690
0.093	1/8	0.140	2.325	0.087	4	09745	03691
0.095	1/8	0.143	2.375	0.089	4	09752	03692
0.100	1/8	0.150	2.500	0.094	4	09759	03693
0.110	1/8	0.165	2.750	0.103	4	09766	03694
0.115	1/8	0.173	2.875	0.108	4	09773	03695
0.120	1/8	0.180	3.000	0.112	4	09780	03696

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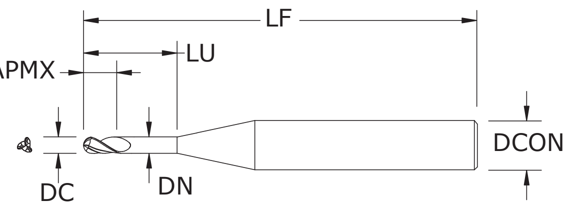
FRACTIONAL

M3B • 1.5xD • 3xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA



New Expanded Tools

M3B • 1.5xD 3xD

FRACTIONAL SERIES

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inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.030	0.009	2-1/2	09410	03805
0.015	1/8	0.023	0.045	0.014	2-1/2	09417	03806
0.020	1/8	0.030	0.060	0.018	2-1/2	09424	03807
0.025	1/8	0.038	0.075	0.023	2-1/2	09431	03808
0.030	1/8	0.045	0.090	0.028	2-1/2	09438	03809
0.031	1/8	0.047	0.093	0.029	2-1/2	09445	03810
0.035	1/8	0.053	0.105	0.032	2-1/2	09452	03811
0.040	1/8	0.060	0.120	0.037	2-1/2	09459	03812
0.045	1/8	0.068	0.135	0.042	2-1/2	09466	03813
0.047	1/8	0.071	0.141	0.044	2-1/2	09473	03814
0.050	1/8	0.075	0.150	0.047	2-1/2	09480	03815
0.055	1/8	0.083	0.165	0.051	2-1/2	09487	03816
0.060	1/8	0.090	0.180	0.056	2-1/2	09494	03817
0.062	1/8	0.093	0.186	0.058	2-1/2	09501	03818
0.065	1/8	0.098	0.195	0.061	2-1/2	09508	03819
0.070	1/8	0.105	0.210	0.065	2-1/2	09515	03820
0.075	1/8	0.113	0.225	0.070	2-1/2	09522	03821
0.078	1/8	0.117	0.234	0.073	2-1/2	09529	03822
0.080	1/8	0.120	0.240	0.075	2-1/2	09536	03823
0.085	1/8	0.128	0.255	0.079	2-1/2	09543	03824
0.090	1/8	0.135	0.270	0.084	2-1/2	09550	03825
0.093	1/8	0.140	0.279	0.087	2-1/2	09557	03826
0.095	1/8	0.143	0.285	0.089	2-1/2	09564	03827
0.100	1/8	0.150	0.300	0.094	2-1/2	09571	03828
0.110	1/8	0.165	0.330	0.103	2-1/2	09578	03829
0.115	1/8	0.173	0.345	0.108	2-1/2	09585	03830
0.120	1/8	0.180	0.360	0.112	2-1/2	09592	03831

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

FRACTIONAL

M3B • 1.5xD • 5xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

TOLERANCES (inch)

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DC = +0.000/–0.001

DCON = h_6

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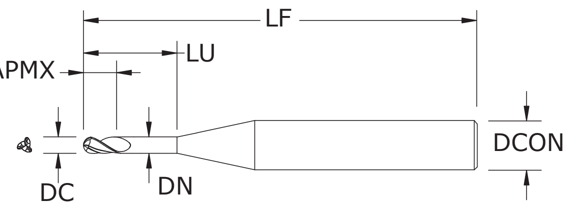

M3B • 1.5xD 5xD

FRACTIONAL SERIES

inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.050	0.009	2-1/2	09411	03832
0.015	1/8	0.023	0.075	0.014	2-1/2	09418	03833
0.020	1/8	0.030	0.100	0.018	2-1/2	09425	03834
0.025	1/8	0.038	0.125	0.023	2-1/2	09432	03835
0.030	1/8	0.045	0.150	0.028	2-1/2	09439	03836
0.031	1/8	0.047	0.155	0.029	2-1/2	09446	03837
0.035	1/8	0.053	0.175	0.032	2-1/2	09453	03838
0.040	1/8	0.060	0.200	0.037	2-1/2	09460	03839
0.045	1/8	0.068	0.225	0.042	2-1/2	09467	03840
0.047	1/8	0.071	0.235	0.044	2-1/2	09474	03841
0.050	1/8	0.075	0.250	0.047	2-1/2	09481	03842
0.055	1/8	0.083	0.275	0.051	2-1/2	09488	03843
0.060	1/8	0.090	0.300	0.056	2-1/2	09495	03844
0.062	1/8	0.093	0.310	0.058	2-1/2	09502	03845
0.065	1/8	0.098	0.325	0.061	2-1/2	09509	03846
0.070	1/8	0.105	0.350	0.065	2-1/2	09516	03847
0.075	1/8	0.113	0.375	0.070	2-1/2	09523	03848
0.078	1/8	0.117	0.390	0.073	2-1/2	09530	03849
0.080	1/8	0.120	0.400	0.075	2-1/2	09537	03850
0.085	1/8	0.128	0.425	0.079	2-1/2	09544	03851
0.090	1/8	0.135	0.450	0.084	2-1/2	09551	03852
0.093	1/8	0.140	0.465	0.087	2-1/2	09558	03853
0.095	1/8	0.143	0.475	0.089	2-1/2	09565	03854
0.100	1/8	0.150	0.500	0.094	2-1/2	09572	03855
0.110	1/8	0.165	0.550	0.103	2-1/2	09579	03856
0.115	1/8	0.173	0.575	0.108	2-1/2	09586	03857
0.120	1/8	0.180	0.600	0.112	2-1/2	09593	03858

RE = 1/2 Cutting Diameter (DC)

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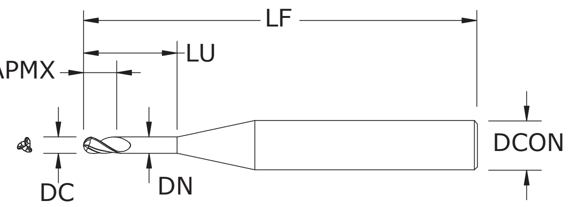
FRACTIONAL

M3B • 1.5xD • 8xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA

M3B • 1.5xD 8xD

FRACTIONAL SERIES



New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

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inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.080	0.009	2-1/2	09412	03859
0.015	1/8	0.023	0.120	0.014	2-1/2	09419	03860
0.020	1/8	0.030	0.160	0.018	2-1/2	09426	03861
0.025	1/8	0.038	0.200	0.023	2-1/2	09433	03862
0.030	1/8	0.045	0.240	0.028	2-1/2	09440	03863
0.031	1/8	0.047	0.248	0.029	2-1/2	09447	03864
0.035	1/8	0.053	0.280	0.032	2-1/2	09454	03865
0.040	1/8	0.060	0.320	0.037	2-1/2	09461	03866
0.045	1/8	0.068	0.360	0.042	2-1/2	09468	03867
0.047	1/8	0.071	0.376	0.044	2-1/2	09475	03868
0.050	1/8	0.075	0.400	0.047	2-1/2	09482	03869
0.055	1/8	0.083	0.440	0.051	2-1/2	09489	03870
0.060	1/8	0.090	0.480	0.056	2-1/2	09496	03871
0.062	1/8	0.093	0.496	0.058	2-1/2	09503	03872
0.065	1/8	0.098	0.520	0.061	2-1/2	09510	03873
0.070	1/8	0.105	0.560	0.065	2-1/2	09517	03874
0.075	1/8	0.113	0.600	0.070	2-1/2	09524	03875
0.078	1/8	0.117	0.624	0.073	2-1/2	09531	03876
0.080	1/8	0.120	0.640	0.075	2-1/2	09538	03877
0.085	1/8	0.128	0.680	0.079	2-1/2	09545	03878
0.090	1/8	0.135	0.720	0.084	2-1/2	09552	03879
0.093	1/8	0.140	0.744	0.087	2-1/2	09559	03880
0.095	1/8	0.143	0.760	0.089	2-1/2	09566	03881
0.100	1/8	0.150	0.800	0.094	2-1/2	09573	03882
0.110	1/8	0.165	0.880	0.103	2-1/2	09580	03883
0.115	1/8	0.173	0.920	0.108	2-1/2	09587	03884
0.120	1/8	0.180	0.960	0.112	2-1/2	09594	03885

RE = 1/2 Cutting Diameter (DC)

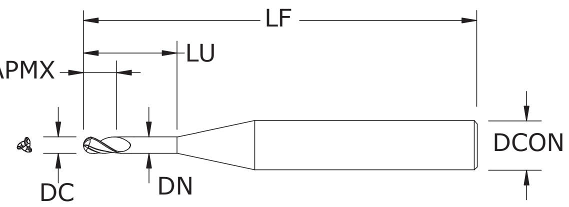
FRACTIONAL

M3B • 1.5xD • 12xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA

M3B • 1.5xD 12xD

FRACTIONAL SERIES



New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

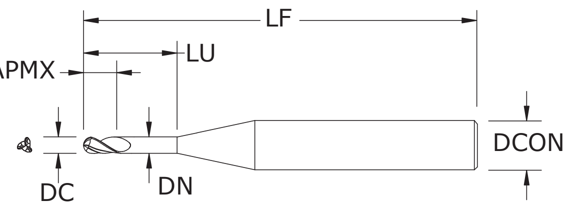
inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.120	0.009	2-1/2	09406	03886
0.015	1/8	0.023	0.180	0.014	2-1/2	09413	03887
0.020	1/8	0.030	0.240	0.018	2-1/2	09420	03888
0.025	1/8	0.038	0.300	0.023	2-1/2	09427	03889
0.030	1/8	0.045	0.360	0.028	2-1/2	09434	03890
0.031	1/8	0.047	0.372	0.029	2-1/2	09441	03891
0.035	1/8	0.053	0.420	0.032	2-1/2	09448	03892
0.040	1/8	0.060	0.480	0.037	2-1/2	09455	03893
0.045	1/8	0.068	0.540	0.042	2-1/2	09462	03894
0.047	1/8	0.071	0.564	0.044	2-1/2	09469	03895
0.050	1/8	0.075	0.600	0.047	2-1/2	09476	03896
0.055	1/8	0.083	0.660	0.051	2-1/2	09483	03897
0.060	1/8	0.090	0.720	0.056	2-1/2	09490	03898
0.062	1/8	0.093	0.744	0.058	2-1/2	09497	03899
0.065	1/8	0.098	0.780	0.061	2-1/2	09504	03900
0.070	1/8	0.105	0.840	0.065	2-1/2	09511	03901
0.075	1/8	0.113	0.900	0.070	2-1/2	09518	03902
0.078	1/8	0.117	0.936	0.073	2-1/2	09525	03903
0.080	1/8	0.120	0.960	0.075	2-1/2	09532	03904
0.085	1/8	0.128	1.020	0.079	2-1/2	09539	03905
0.090	1/8	0.135	1.080	0.084	2-1/2	09546	03906
0.093	1/8	0.140	1.116	0.087	2-1/2	09553	03907
0.095	1/8	0.143	1.140	0.089	2-1/2	09560	03908
0.100	1/8	0.150	1.200	0.094	2-1/2	09567	03909
0.110	1/8	0.165	1.320	0.103	2-1/2	09574	03910
0.115	1/8	0.173	1.380	0.108	2-1/2	09581	03911
0.120	1/8	0.180	1.440	0.112	2-1/2	09588	03912

RE = 1/2 Cutting Diameter (DC)

- Three flute design features improved chip space over four flutes and increased strength and feed capability over two flutes.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

M3B • 1.5xD • 15xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA



New Expanded Tools

M3B • 1.5xD 15xD

FRACTIONAL SERIES

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inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.150	0.009	2-1/2	09407	03913
0.015	1/8	0.023	0.225	0.014	2-1/2	09414	03914
0.020	1/8	0.030	0.300	0.018	2-1/2	09421	03915
0.025	1/8	0.038	0.375	0.023	2-1/2	09428	03916
0.030	1/8	0.045	0.450	0.028	2-1/2	09435	03917
0.031	1/8	0.047	0.465	0.029	2-1/2	09442	03918
0.035	1/8	0.053	0.525	0.032	2-1/2	09449	03919
0.040	1/8	0.060	0.600	0.037	2-1/2	09456	03920
0.045	1/8	0.068	0.675	0.042	2-1/2	09463	03921
0.047	1/8	0.071	0.705	0.044	2-1/2	09470	03922
0.050	1/8	0.075	0.750	0.047	2-1/2	09477	03923
0.055	1/8	0.083	0.825	0.051	2-1/2	09484	03924
0.060	1/8	0.090	0.900	0.056	2-1/2	09491	03925
0.062	1/8	0.093	0.930	0.058	2-1/2	09498	03926
0.065	1/8	0.098	0.975	0.061	2-1/2	09505	03927
0.070	1/8	0.105	1.050	0.065	2-1/2	09512	03928
0.075	1/8	0.113	1.125	0.070	2-1/2	09519	03929
0.078	1/8	0.117	1.170	0.073	2-1/2	09526	03930
0.080	1/8	0.120	1.200	0.075	2-1/2	09533	03931
0.085	1/8	0.128	1.275	0.079	2-1/2	09540	03932
0.090	1/8	0.135	1.350	0.084	2-1/2	09547	03933
0.093	1/8	0.140	1.395	0.087	3	09554	03934
0.095	1/8	0.143	1.425	0.089	3	09561	03935
0.100	1/8	0.150	1.500	0.094	3	09568	03936
0.110	1/8	0.165	1.650	0.103	3	09575	03937
0.115	1/8	0.173	1.725	0.108	3	09582	03938
0.120	1/8	0.180	1.800	0.112	3	09589	03939

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

M3B • 1.5xD • 20xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

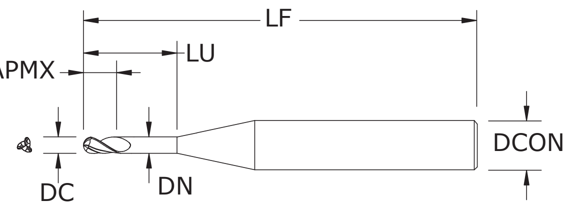
TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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



M3B • 1.5xD 20xD

FRACTIONAL SERIES

inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.200	0.009	2-1/2	09408	03940
0.015	1/8	0.023	0.300	0.014	2-1/2	09415	03941
0.020	1/8	0.030	0.400	0.018	2-1/2	09422	03942
0.025	1/8	0.038	0.500	0.023	2-1/2	09429	03943
0.030	1/8	0.045	0.600	0.028	2-1/2	09436	03944
0.031	1/8	0.047	0.620	0.029	2-1/2	09443	03945
0.035	1/8	0.053	0.700	0.032	2-1/2	09450	03946
0.040	1/8	0.060	0.800	0.037	2-1/2	09457	03947
0.045	1/8	0.068	0.900	0.042	2-1/2	09464	03948
0.047	1/8	0.071	0.940	0.044	2-1/2	09471	03949
0.050	1/8	0.075	1.000	0.047	2-1/2	09478	03950
0.055	1/8	0.083	1.100	0.051	2-1/2	09485	03951
0.060	1/8	0.090	1.200	0.056	2-1/2	09492	03952
0.062	1/8	0.093	1.240	0.058	2-1/2	09499	03953
0.065	1/8	0.098	1.300	0.061	3	09506	03954
0.070	1/8	0.105	1.400	0.065	3	09513	03955
0.075	1/8	0.113	1.500	0.070	3	09520	03956
0.078	1/8	0.117	1.560	0.073	3	09527	03957
0.080	1/8	0.120	1.600	0.075	3	09534	03958
0.085	1/8	0.128	1.700	0.079	3	09541	03959
0.090	1/8	0.135	1.800	0.084	3	09548	03960
0.093	1/8	0.140	1.860	0.087	3	09555	03961
0.095	1/8	0.143	1.900	0.089	3	09562	03962
0.100	1/8	0.150	2.000	0.094	4	09569	03963
0.110	1/8	0.165	2.200	0.103	4	09576	03964
0.115	1/8	0.173	2.300	0.108	4	09583	03965
0.120	1/8	0.180	2.400	0.112	4	09590	03966

RE = 1/2 Cutting Diameter (DC)

- Three flute design features improved chip space over four flutes and increased strength and feed capability over two flutes.
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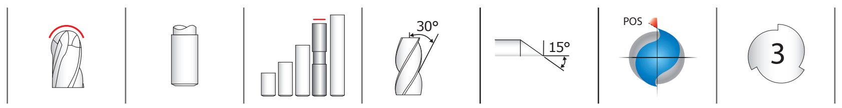
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

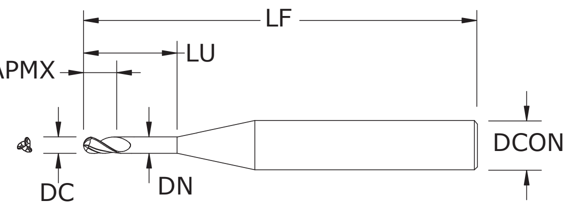
M3B • 1.5xD • 25xD Overall Reach

MICRO SGS Solid Carbide Tools | KYOCERA



M3B • 1.5xD 25xD

FRACTIONAL SERIES



New Expanded Tools

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inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	0.250	0.009	2-1/2	09409	03967
0.015	1/8	0.023	0.375	0.014	2-1/2	09416	03968
0.020	1/8	0.030	0.500	0.018	2-1/2	09423	03969
0.025	1/8	0.038	0.625	0.023	2-1/2	09430	03970
0.030	1/8	0.045	0.750	0.028	2-1/2	09437	03971
0.031	1/8	0.047	0.775	0.029	2-1/2	09444	03972
0.035	1/8	0.053	0.875	0.032	2-1/2	09451	03973
0.040	1/8	0.060	1.000	0.037	2-1/2	09458	03974
0.045	1/8	0.068	1.125	0.042	2-1/2	09465	03975
0.047	1/8	0.071	1.175	0.044	2-1/2	09472	03976
0.050	1/8	0.075	1.250	0.047	2-1/2	09479	03977
0.055	1/8	0.083	1.375	0.051	3	09486	03978
0.060	1/8	0.090	1.500	0.056	3	09493	03979
0.062	1/8	0.093	1.550	0.058	3	09500	03980
0.065	1/8	0.098	1.625	0.061	3	09507	03981
0.070	1/8	0.105	1.750	0.065	3	09514	03982
0.075	1/8	0.113	1.875	0.070	3	09521	03983
0.078	1/8	0.117	1.950	0.073	4	09528	03984
0.080	1/8	0.120	2.000	0.075	4	09535	03985
0.085	1/8	0.128	2.125	0.079	4	09542	03986
0.090	1/8	0.135	2.250	0.084	4	09549	03987
0.093	1/8	0.140	2.325	0.087	4	09556	03988
0.095	1/8	0.143	2.375	0.089	4	09563	03989
0.100	1/8	0.150	2.500	0.094	4	09570	03990
0.110	1/8	0.165	2.750	0.103	4	09577	03991
0.115	1/8	0.173	2.875	0.108	4	09584	03992
0.120	1/8	0.180	3.000	0.112	4	09591	03993

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (inch)

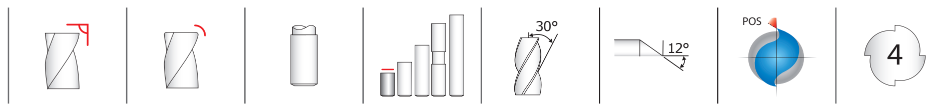
.010–.120 DIAMETER

DC = +0.000/–0.001
DCON = h_6

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

M4 • M4CR • 1.5xD

MICRO SGS Solid Carbide Tools | KYOCERA



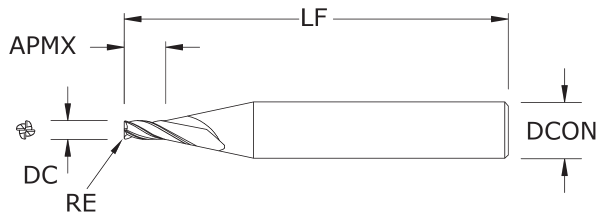
New Expanded Tools

TOLERANCES (inch)

.005–.120 DIAMETER

DC = +0.000/–0.001
DCON = h_6
RE = +0.0000 / –0.0005

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



M4 • M4CR 1.5xD

FRACTIONAL SERIES

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.005	1/8	0.008	1-1/2	–	00372	02238
0.006	1/8	0.009	1-1/2	–	00373	02239
0.007	1/8	0.011	1-1/2	–	00374	02240
0.008	1/8	0.012	1-1/2	–	00375	02241
0.009	1/8	0.014	1-1/2	–	00376	02242
0.010	1/8	0.015	1-1/2	–	00377	02243
0.011	1/8	0.017	1-1/2	–	00378	02244
0.012	1/8	0.018	1-1/2	–	00379	02245
0.013	1/8	0.020	1-1/2	–	00380	02246
0.014	1/8	0.021	1-1/2	–	00381	02247
0.015	1/8	0.023	1-1/2	–	00382	02248
0.015	1/8	0.023	1-1/2	0.003	08986	09126
0.016	1/8	0.024	1-1/2	–	00383	02249
0.017	1/8	0.026	1-1/2	–	00384	02250
0.018	1/8	0.027	1-1/2	–	00385	02251
0.019	1/8	0.029	1-1/2	–	00386	02252
0.020	1/8	0.030	1-1/2	–	00387	02253
0.020	1/8	0.030	1-1/2	0.003	08988	09128
0.020	1/8	0.030	1-1/2	0.005	04024	04025
0.021	1/8	0.032	1-1/2	–	00388	02254
0.022	1/8	0.033	1-1/2	–	00389	02255
0.023	1/8	0.035	1-1/2	–	00390	02256
0.024	1/8	0.036	1-1/2	–	00391	02257
0.025	1/8	0.038	1-1/2	–	00392	02258
0.025	1/8	0.038	1-1/2	0.005	04026	04027
0.025	1/8	0.038	1-1/2	0.010	08990	09130
0.026	1/8	0.039	1-1/2	–	00393	02259
0.027	1/8	0.041	1-1/2	–	00394	02260
0.028	1/8	0.042	1-1/2	–	00395	02261
0.029	1/8	0.044	1-1/2	–	00396	02262
0.030	1/8	0.045	1-1/2	–	00397	02263
0.030	1/8	0.045	1-1/2	0.010	08992	09132
0.031	1/8	0.047	1-1/2	–	00398	02264
0.032	1/8	0.048	1-1/2	–	00399	02265
0.033	1/8	0.050	1-1/2	–	00400	02266
0.034	1/8	0.051	1-1/2	–	00401	02267

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- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Enhanced corner geometry with tight tolerance corner radii
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
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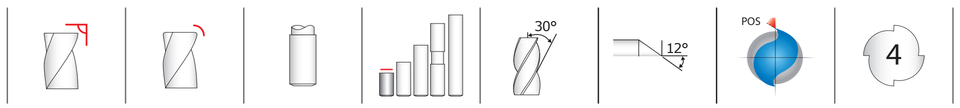
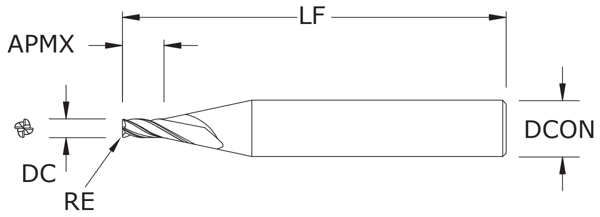
MICRO SGS Solid Carbide Tools | KYOCERA





M4 • M4CR 1.5xD

FRACTIONAL SERIES

New Expanded Tools

TOLERANCES (inch)

.005–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

RE = +0.0000 / –0.0005

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

continued

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.035	1/8	0.053	1-1/2	–	00402	02268
0.035	1/8	0.053	1-1/2	0.005	08994	09134
0.035	1/8	0.053	1-1/2	0.010	08996	09136
0.036	1/8	0.054	1-1/2	–	00403	02269
0.037	1/8	0.056	1-1/2	–	00404	02270
0.038	1/8	0.057	1-1/2	–	00405	02271
0.039	1/8	0.059	1-1/2	–	00406	02272
0.040	1/8	0.060	1-1/2	–	00407	02273
0.040	1/8	0.060	1-1/2	0.005	08998	09138
0.040	1/8	0.060	1-1/2	0.010	09000	09140
0.041	1/8	0.062	1-1/2	–	00408	02402
0.042	1/8	0.063	1-1/2	–	00409	02403
0.043	1/8	0.065	1-1/2	–	00410	02404
0.044	1/8	0.066	1-1/2	–	00411	02405
0.045	1/8	0.068	1-1/2	–	00412	02406
0.045	1/8	0.068	1-1/2	0.005	09002	09142
0.045	1/8	0.068	1-1/2	0.010	09004	09144
0.046	1/8	0.069	1-1/2	–	00413	02407
0.047	1/8	0.071	1-1/2	–	00414	02408
0.048	1/8	0.072	1-1/2	–	00415	02409
0.049	1/8	0.074	1-1/2	–	00416	02410
0.050	1/8	0.075	1-1/2	–	00417	02411
0.050	1/8	0.075	1-1/2	0.005	09006	09146
0.050	1/8	0.075	1-1/2	0.010	09008	09148
0.050	1/8	0.075	1-1/2	0.015	09010	09150
0.051	1/8	0.077	1-1/2	–	00418	02412
0.052	1/8	0.078	1-1/2	–	00419	02413
0.053	1/8	0.080	1-1/2	–	00420	02414
0.054	1/8	0.081	1-1/2	–	00421	02415
0.055	1/8	0.083	1-1/2	–	00422	02416
0.055	1/8	0.083	1-1/2	0.005	09012	09152
0.055	1/8	0.083	1-1/2	0.010	09014	09154
0.055	1/8	0.083	1-1/2	0.015	09016	09156
0.056	1/8	0.084	1-1/2	–	00423	02417

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MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

M4 • M4CR 1.5xD

FRACTIONAL SERIES

continued

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.057	1/8	0.086	1-1/2	–	00424	02418
0.058	1/8	0.087	1-1/2	–	00425	02419
0.059	1/8	0.089	1-1/2	–	00426	02420
0.060	1/8	0.090	1-1/2	–	00427	02421
0.060	1/8	0.090	1-1/2	0.005	09018	09158
0.060	1/8	0.090	1-1/2	0.010	09020	09160
0.060	1/8	0.090	1-1/2	0.015	09022	09162
0.062	1/8	0.093	1-1/2	–	00428	02422
0.065	1/8	0.098	1-1/2	–	00429	02423
0.065	1/8	0.098	1-1/2	0.005	09024	09164
0.065	1/8	0.098	1-1/2	0.010	09026	09166
0.065	1/8	0.098	1-1/2	0.015	09028	09168
0.070	1/8	0.105	1-1/2	–	00430	02424
0.070	1/8	0.105	1-1/2	0.005	09030	09170
0.070	1/8	0.105	1-1/2	0.010	09032	09172
0.070	1/8	0.105	1-1/2	0.015	09034	09174
0.075	1/8	0.1125	1-1/2	–	04014	04012
0.075	1/8	0.113	1-1/2	0.005	09036	09176
0.075	1/8	0.113	1-1/2	0.010	09038	09178
0.075	1/8	0.113	1-1/2	0.015	09040	09180
0.075	1/8	0.113	1-1/2	0.020	09042	09182
0.078	1/8	0.117	1-1/2	–	00431	02425
0.080	1/8	0.120	1-1/2	–	00432	02426
0.080	1/8	0.120	1-1/2	0.005	09044	09184
0.080	1/8	0.120	1-1/2	0.010	09046	09186
0.080	1/8	0.120	1-1/2	0.015	09048	09188
0.080	1/8	0.120	1-1/2	0.020	09050	09190
0.085	1/8	0.128	1-1/2	–	00433	02427
0.085	1/8	0.128	1-1/2	0.005	09052	09192
0.085	1/8	0.128	1-1/2	0.010	09054	09194
0.085	1/8	0.128	1-1/2	0.015	09056	09196
0.085	1/8	0.128	1-1/2	0.020	09058	09198
0.090	1/8	0.135	1-1/2	–	00434	02428
0.090	1/8	0.135	1-1/2	0.005	09060	09200

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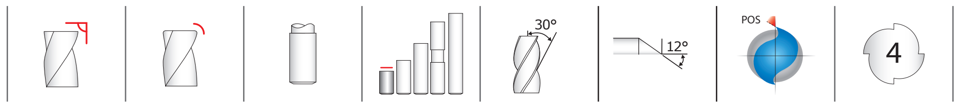

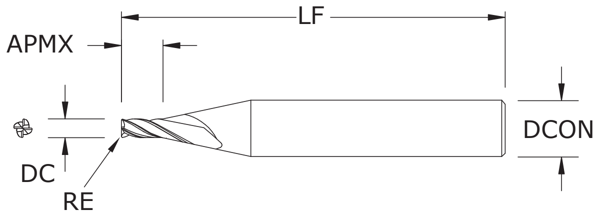

M4 • M4CR 1.5xD

FRACTIONAL SERIES

continued

CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0.090	1/8	0.135	1-1/2	0.010	09062	09202
0.090	1/8	0.135	1-1/2	0.015	09064	09204
0.090	1/8	0.135	1-1/2	0.020	09066	09206
0.093	1/8	0.140	1-1/2	–	00435	02429
0.095	1/8	0.143	1-1/2	–	00436	02430
0.095	1/8	0.143	1-1/2	0.005	09068	09208
0.095	1/8	0.143	1-1/2	0.010	09070	09210
0.095	1/8	0.143	1-1/2	0.015	09072	09212
0.095	1/8	0.143	1-1/2	0.020	09074	09214
0.100	1/8	0.150	1-1/2	–	00437	02431
0.100	1/8	0.150	1-1/2	0.005	09076	09216
0.100	1/8	0.150	1-1/2	0.010	09078	09218
0.100	1/8	0.150	1-1/2	0.015	09080	09220
0.100	1/8	0.150	1-1/2	0.020	09082	09222
0.100	1/8	0.150	1-1/2	0.030	09084	09224
0.105	1/8	0.158	1-1/2	–	00438	02432
0.105	1/8	0.158	1-1/2	0.005	09086	09226
0.105	1/8	0.158	1-1/2	0.010	09088	09228
0.105	1/8	0.158	1-1/2	0.015	09090	09230
0.105	1/8	0.158	1-1/2	0.020	09092	09232
0.105	1/8	0.158	1-1/2	0.030	09094	09234
0.110	1/8	0.165	1-1/2	–	00439	02433
0.110	1/8	0.165	1-1/2	0.005	09096	09236
0.110	1/8	0.165	1-1/2	0.010	09098	09238
0.110	1/8	0.165	1-1/2	0.015	09100	09240
0.110	1/8	0.165	1-1/2	0.020	09102	09242
0.110	1/8	0.165	1-1/2	0.030	09104	09244
0.115	1/8	0.173	1-1/2	–	00440	02434
0.115	1/8	0.173	1-1/2	0.005	09106	09246
0.115	1/8	0.173	1-1/2	0.010	09108	09248
0.115	1/8	0.173	1-1/2	0.015	09110	09250
0.115	1/8	0.173	1-1/2	0.020	09112	09252
0.115	1/8	0.173	1-1/2	0.030	09114	09254
0.120	1/8	0.180	1-1/2	–	00441	02435

Dimensions in inch.

continued on next page

New Expanded Tools

TOLERANCES (inch)

.005–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

RE = +0.0000 / –0.0005

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

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

M4 • M4CR 1.5xD

FRACTIONAL SERIES

continued

CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0.120	1/8	0.180	1-1/2	0.005	09116	09256
0.120	1/8	0.180	1-1/2	0.010	09118	09258
0.120	1/8	0.180	1-1/2	0.015	09120	09260
0.120	1/8	0.180	1-1/2	0.020	09122	09262
0.120	1/8	0.180	1-1/2	0.030	09124	09264

Dimensions in inch.

M4 • M4CR • 3xD

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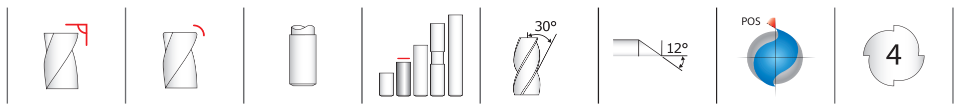

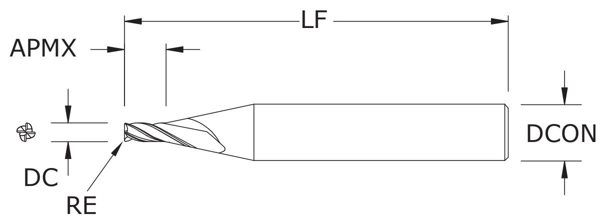

M4 • M4CR • 3xD

FRACTIONAL SERIES

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Enhanced corner geometry with tight tolerance corner radii
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.005	1/8	0.015	1-1/2	–	00514	02312
0.006	1/8	0.018	1-1/2	–	00515	02313
0.007	1/8	0.021	1-1/2	–	00516	02314
0.008	1/8	0.024	1-1/2	–	00517	02315
0.009	1/8	0.027	1-1/2	–	00518	02316
0.010	1/8	0.030	1-1/2	–	00519	02317
0.011	1/8	0.033	1-1/2	–	00520	02318
0.012	1/8	0.036	1-1/2	–	00521	02319
0.013	1/8	0.039	1-1/2	–	00522	02320
0.014	1/8	0.042	1-1/2	–	00523	02321
0.015	1/8	0.045	1-1/2	–	00524	02322
0.015	1/8	0.045	1-1/2	0.003	08987	09127
0.016	1/8	0.048	1-1/2	–	00525	02323
0.017	1/8	0.051	1-1/2	–	00526	02324
0.018	1/8	0.054	1-1/2	–	00527	02325
0.019	1/8	0.057	1-1/2	–	00528	02326
0.020	1/8	0.060	1-1/2	–	00529	02327
0.020	1/8	0.060	1-1/2	0.003	08989	09129
0.020	1/8	0.060	1-1/2	0.005	04028	04029
0.021	1/8	0.063	1-1/2	–	00530	02328
0.022	1/8	0.066	1-1/2	–	00531	02329
0.023	1/8	0.069	1-1/2	–	00532	02330
0.024	1/8	0.072	1-1/2	–	00533	02331
0.025	1/8	0.075	1-1/2	–	00534	02332
0.025	1/8	0.075	1-1/2	0.005	04030	04031
0.025	1/8	0.075	1-1/2	0.010	08991	09131
0.026	1/8	0.078	1-1/2	–	00535	02333
0.027	1/8	0.081	1-1/2	–	00536	02334
0.028	1/8	0.084	1-1/2	–	00537	02335
0.029	1/8	0.087	1-1/2	–	00538	02336
0.030	1/8	0.090	1-1/2	–	00539	02337
0.030	1/8	0.090	1-1/2	0.010	08993	09133
0.031	1/8	0.093	1-1/2	–	00540	02338
0.032	1/8	0.096	1-1/2	–	00541	02339
0.033	1/8	0.099	1-1/2	–	00542	02340
0.034	1/8	0.102	1-1/2	–	00543	02341

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TOLERANCES (inch)

.004–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

RE = +0.0000/–0.0005

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

MICRO SGS Solid Carbide Tools | KYOCERA

FRACTIONAL

M4 • M4CR • 3xD

M4 • M4CR • 3xD

FRACTIONAL SERIES

continued

inch					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	CORNER RADIUS RE	UNCOATED	TI-NAMITE-A (AlTiN)
0.035	1/8	0.105	1-1/2	–	00544	02342
0.035	1/8	0.105	1-1/2	0.005	08995	09135
0.035	1/8	0.105	1-1/2	0.010	08997	09137
0.036	1/8	0.108	1-1/2	–	00545	02343
0.037	1/8	0.111	1-1/2	–	00546	02344
0.038	1/8	0.114	1-1/2	–	00547	02345
0.039	1/8	0.117	1-1/2	–	00548	02346
0.040	1/8	0.120	1-1/2	–	00549	02347
0.040	1/8	0.120	1-1/2	0.005	08999	09139
0.040	1/8	0.120	1-1/2	0.010	09001	09141
0.041	1/8	0.123	1-1/2	–	00550	02470
0.042	1/8	0.126	1-1/2	–	00551	02471
0.043	1/8	0.129	1-1/2	–	00552	02472
0.044	1/8	0.132	1-1/2	–	00553	02473
0.045	1/8	0.135	1-1/2	–	00554	02474
0.045	1/8	0.135	1-1/2	0.005	09003	09143
0.045	1/8	0.135	1-1/2	0.010	09005	09145
0.046	1/8	0.138	1-1/2	–	00555	02475
0.047	1/8	0.141	1-1/2	–	00556	02476
0.048	1/8	0.144	1-1/2	–	00557	02477
0.049	1/8	0.147	1-1/2	–	00558	02478
0.050	1/8	0.150	1-1/2	–	00559	02479
0.050	1/8	0.150	1-1/2	0.005	09007	09147
0.050	1/8	0.150	1-1/2	0.010	09009	09149
0.050	1/8	0.150	1-1/2	0.015	09011	09151
0.051	1/8	0.153	1-1/2	–	00560	02480
0.052	1/8	0.156	1-1/2	–	00561	02481
0.053	1/8	0.159	1-1/2	–	00562	02482
0.054	1/8	0.162	1-1/2	–	00563	02483
0.055	1/8	0.165	1-1/2	–	00564	02484
0.055	1/8	0.165	1-1/2	0.005	09013	09153
0.055	1/8	0.165	1-1/2	0.010	09015	09155
0.055	1/8	0.165	1-1/2	0.015	09017	09157
0.056	1/8	0.168	1-1/2	–	00565	02485
0.057	1/8	0.171	1-1/2	–	00566	02486
0.058	1/8	0.174	1-1/2	–	00567	02487

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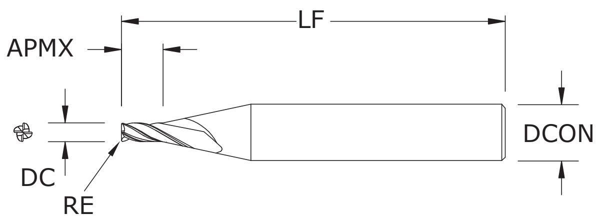
MICRO SGS Solid Carbide Tools | KYOCERA



New Expanded Tools

M4 • M4CR • 3xD
FRACTIONAL SERIES

continued

CUTTING DIAMETER DC (inch)	SHANK DIAMETER DCON (inch)	LENGTH OF CUT APMX (inch)	OVERALL LENGTH LF (inch)	CORNER RADIUS RE (inch)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0.059	1/8	0.177	1-1/2	–	00568	02488
0.060	1/8	0.180	1-1/2	–	00569	02489
0.060	1/8	0.180	1-1/2	0.005	09019	09159
0.060	1/8	0.180	1-1/2	0.010	09021	09161
0.060	1/8	0.180	1-1/2	0.015	09023	09163
0.062	1/8	0.186	1-1/2	–	00570	02490
0.065	1/8	0.195	1-1/2	–	00571	02491
0.065	1/8	0.195	1-1/2	0.005	09025	09165
0.065	1/8	0.195	1-1/2	0.010	09027	09167
0.065	1/8	0.195	1-1/2	0.015	09029	09169
0.070	1/8	0.210	1-1/2	–	00572	02492
0.070	1/8	0.210	1-1/2	0.005	09031	09171
0.070	1/8	0.210	1-1/2	0.010	09033	09173
0.070	1/8	0.210	1-1/2	0.015	09035	09175
0.075	1/8	0.225	1-1/2	–	04015	04013
0.075	1/8	0.225	1-1/2	0.005	09037	09177
0.075	1/8	0.225	1-1/2	0.010	09039	09179
0.075	1/8	0.225	1-1/2	0.015	09041	09181
0.075	1/8	0.225	1-1/2	0.020	09043	09183
0.078	1/8	0.234	1-1/2	–	00573	02493
0.080	1/8	0.240	1-1/2	–	00574	02494
0.080	1/8	0.240	1-1/2	0.005	09045	09185
0.080	1/8	0.240	1-1/2	0.010	09047	09187
0.080	1/8	0.240	1-1/2	0.015	09049	09189
0.080	1/8	0.240	1-1/2	0.020	09051	09191
0.085	1/8	0.255	1-1/2	–	00575	02495
0.085	1/8	0.255	1-1/2	0.005	09053	09193
0.085	1/8	0.255	1-1/2	0.010	09055	09195
0.085	1/8	0.255	1-1/2	0.015	09057	09197
0.085	1/8	0.255	1-1/2	0.020	09059	09199
0.090	1/8	0.270	1-1/2	–	00576	02496
0.090	1/8	0.270	1-1/2	0.005	09061	09201
0.090	1/8	0.270	1-1/2	0.010	09063	09203
0.090	1/8	0.270	1-1/2	0.015	09065	09205
0.090	1/8	0.270	1-1/2	0.020	09067	09207
0.093	1/8	0.279	1-1/2	–	00577	02497

continued on next page

TOLERANCES (inch)

.004–.120 DIAMETER
DC = +0.000/–0.001
DCON = h_6
RE = +0.0000/–0.0005

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

MICRO SGS Solid Carbide Tools | KYOCERA

FRACTIONAL
M4 • M4CR • 3xD

New Expanded Tools

M4 • M4CR • 3xD
FRACTIONAL SERIES

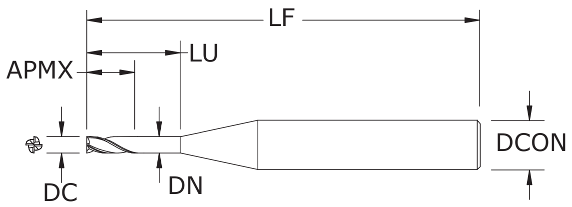
continued

CUTTING DIAMETER DC (inch)	SHANK DIAMETER DCON (inch)	LENGTH OF CUT APMX (inch)	OVERALL LENGTH LF (inch)	CORNER RADIUS RE (inch)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0.095	1/8	0.285	1-1/2	–	00578	02498
0.095	1/8	0.285	1-1/2	0.005	09069	09209
0.095	1/8	0.285	1-1/2	0.010	09071	09211
0.095	1/8	0.285	1-1/2	0.015	09073	09213
0.095	1/8	0.285	1-1/2	0.020	09075	09215
0.100	1/8	0.300	1-1/2	–	00579	02499
0.100	1/8	0.300	1-1/2	0.005	09077	09217
0.100	1/8	0.300	1-1/2	0.010	09079	09219
0.100	1/8	0.300	1-1/2	0.015	09081	09221
0.100	1/8	0.300	1-1/2	0.020	09083	09223
0.100	1/8	0.300	1-1/2	0.030	09085	09225
0.105	1/8	0.315	1-1/2	–	00580	02500
0.105	1/8	0.315	1-1/2	0.005	09087	09227
0.105	1/8	0.315	1-1/2	0.010	09089	09229
0.105	1/8	0.315	1-1/2	0.015	09091	09231
0.105	1/8	0.315	1-1/2	0.020	09093	09233
0.105	1/8	0.315	1-1/2	0.030	09095	09235
0.110	1/8	0.330	1-1/2	–	00581	02501
0.110	1/8	0.330	1-1/2	0.005	09097	09237
0.110	1/8	0.330	1-1/2	0.010	09099	09239
0.110	1/8	0.330	1-1/2	0.015	09101	09241
0.110	1/8	0.330	1-1/2	0.020	09103	09243
0.110	1/8	0.330	1-1/2	0.030	09105	09245
0.115	1/8	0.345	1-1/2	–	00582	02502
0.115	1/8	0.345	1-1/2	0.005	09107	09247
0.115	1/8	0.345	1-1/2	0.010	09109	09249
0.115	1/8	0.345	1-1/2	0.015	09111	09251
0.115	1/8	0.345	1-1/2	0.020	09113	09253
0.115	1/8	0.345	1-1/2	0.030	09115	09255
0.120	1/8	0.360	1-1/2	–	00583	02503
0.120	1/8	0.360	1-1/2	0.005	09117	09257
0.120	1/8	0.360	1-1/2	0.010	09119	09259
0.120	1/8	0.360	1-1/2	0.015	09121	09261
0.120	1/8	0.360	1-1/2	0.020	09123	09263
0.120	1/8	0.360	1-1/2	0.030	09125	09265

FRACTIONAL

M4 • 3xD • 8xD Overall Reach

MICRO SGS Solid Carbide Tools KYOCERA



M4 • 3xD 8xD

FRACTIONAL SERIES

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.030	0.080	0.009	1-1/2	09839	03454
0.015	1/8	0.045	0.120	0.014	1-1/2	09841	03455
0.020	1/8	0.060	0.160	0.018	1-1/2	09843	03456
0.025	1/8	0.075	0.200	0.023	1-1/2	09845	03457
0.030	1/8	0.090	0.240	0.028	1-1/2	09847	03458
0.031	1/8	0.093	0.248	0.029	1-1/2	09849	03459
0.035	1/8	0.105	0.280	0.032	1-1/2	09851	03460
0.040	1/8	0.120	0.320	0.037	1-1/2	09853	03461
0.045	1/8	0.135	0.360	0.042	2	09855	03462
0.047	1/8	0.141	0.376	0.044	2	09857	03463
0.050	1/8	0.150	0.400	0.047	2	09859	03464
0.055	1/8	0.165	0.440	0.051	2	09861	03465
0.060	1/8	0.180	0.480	0.056	2	09863	03466
0.062	1/8	0.186	0.496	0.058	2	09865	03467
0.065	1/8	0.195	0.520	0.061	2	09867	03468
0.070	1/8	0.210	0.560	0.065	2	09869	03469
0.075	1/8	0.225	0.600	0.070	2	09871	03470
0.078	1/8	0.234	0.624	0.073	2	09873	03471
0.080	1/8	0.240	0.640	0.075	2	09875	03472
0.085	1/8	0.255	0.680	0.079	2	09877	03473
0.090	1/8	0.270	0.720	0.084	2	09879	03474
0.093	1/8	0.279	0.744	0.087	2	09881	03475
0.095	1/8	0.285	0.760	0.089	2	09883	03476
0.100	1/8	0.300	0.800	0.094	2	09885	03477
0.110	1/8	0.330	0.880	0.103	2	09887	03478
0.115	1/8	0.345	0.920	0.108	2	09889	03479
0.120	1/8	0.360	0.960	0.112	2	09891	03480

New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

MICRO SGS Solid Carbide Tools KYOCERA

New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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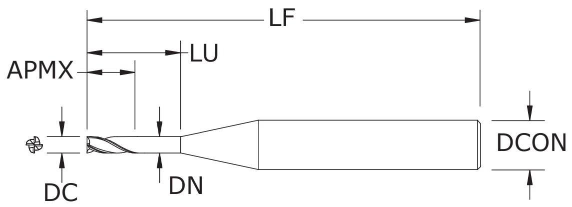
- NON-FERROUS
- PLASTICS/COMPOSITES

FRACTIONAL

M4 • 3xD • 12xD Overall Reach



M4 • 3xD 12xD

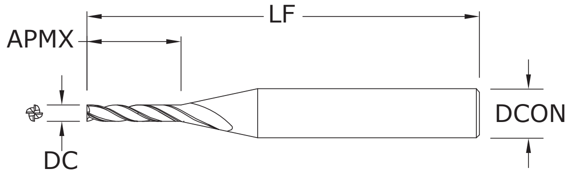
FRACTIONAL SERIES

inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.030	0.120	0.009	1-1/2	09838	03481
0.015	1/8	0.045	0.180	0.014	1-1/2	09840	03482
0.020	1/8	0.060	0.240	0.018	1-1/2	09842	03483
0.025	1/8	0.075	0.300	0.023	1-1/2	09844	03484
0.030	1/8	0.090	0.360	0.028	2	09846	03485
0.031	1/8	0.093	0.372	0.029	2	09848	03486
0.035	1/8	0.105	0.420	0.032	2	09850	03487
0.040	1/8	0.120	0.480	0.037	2	09852	03488
0.045	1/8	0.135	0.540	0.042	2	09854	03489
0.047	1/8	0.141	0.564	0.044	2	09856	03490
0.050	1/8	0.150	0.600	0.047	2	09858	03491
0.055	1/8	0.165	0.660	0.051	2	09860	03492
0.060	1/8	0.180	0.720	0.056	2	09862	03493
0.062	1/8	0.186	0.744	0.058	2	09864	03494
0.065	1/8	0.195	0.780	0.061	2	09866	03495
0.070	1/8	0.210	0.840	0.065	2	09868	03496
0.075	1/8	0.225	0.900	0.070	2	09870	03497
0.078	1/8	0.234	0.936	0.073	2-1/2	09872	03498
0.080	1/8	0.240	0.960	0.075	2-1/2	09874	03499
0.085	1/8	0.255	1.020	0.079	2-1/2	09876	03500
0.090	1/8	0.270	1.080	0.084	2-1/2	09878	03501
0.093	1/8	0.279	1.116	0.087	2-1/2	09880	03502
0.095	1/8	0.285	1.140	0.089	2-1/2	09882	03503
0.100	1/8	0.300	1.200	0.094	2-1/2	09884	03504
0.110	1/8	0.330	1.320	0.103	2-1/2	09886	03505
0.115	1/8	0.345	1.380	0.108	2-1/2	09888	03506
0.120	1/8	0.360	1.440	0.112	2-1/2	09890	03507

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools



M4L • 5xD

FRACTIONAL SERIES

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
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inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.050	2-1/2	00584	02640
0.015	1/8	0.075	2-1/2	00585	02641
0.020	1/8	0.100	2-1/2	00586	02642
0.025	1/8	0.125	2-1/2	00587	02643
0.030	1/8	0.150	2-1/2	00588	02644
0.031	1/8	0.155	2-1/2	00589	02645
0.035	1/8	0.175	2-1/2	00590	02646
0.040	1/8	0.200	2-1/2	00591	02647
0.045	1/8	0.225	2-1/2	00592	02648
0.047	1/8	0.235	2-1/2	00593	02649
0.050	1/8	0.250	2-1/2	00594	02650
0.055	1/8	0.275	2-1/2	00595	02651
0.060	1/8	0.300	2-1/2	00596	02652
0.062	1/8	0.310	2-1/2	00597	02653
0.065	1/8	0.325	2-1/2	00598	02654
0.070	1/8	0.350	2-1/2	00599	02655
0.075	1/8	0.375	2-1/2	00600	02656
0.078	1/8	0.390	2-1/2	00601	02657
0.080	1/8	0.400	2-1/2	00602	02658
0.085	1/8	0.425	2-1/2	00603	02659
0.090	1/8	0.450	2-1/2	00604	02660
0.093	1/8	0.465	2-1/2	00605	02661
0.095	1/8	0.475	2-1/2	00606	02662
0.100	1/8	0.500	2-1/2	00607	02663
0.110	1/8	0.550	2-1/2	00608	02664
0.115	1/8	0.575	2-1/2	00609	02665
0.120	1/8	0.600	2-1/2	00610	02666

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
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- TITANIUM
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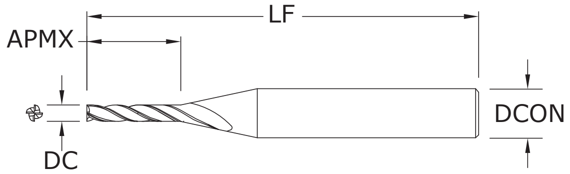
- PLASTICS/COMPOSITES



M4E • 8xD

FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.080	2-1/2	00611	02667
0.015	1/8	0.120	2-1/2	00612	02668
0.020	1/8	0.160	2-1/2	00613	02669
0.025	1/8	0.200	2-1/2	00614	02670
0.030	1/8	0.240	2-1/2	00615	02671
0.031	1/8	0.248	2-1/2	00616	02672
0.035	1/8	0.280	2-1/2	00617	02673
0.040	1/8	0.320	2-1/2	00618	02674
0.045	1/8	0.360	2-1/2	00619	02675
0.047	1/8	0.376	2-1/2	00620	02676
0.050	1/8	0.400	2-1/2	00621	02677
0.055	1/8	0.440	2-1/2	00622	02678
0.060	1/8	0.480	2-1/2	00623	02679
0.062	1/8	0.496	2-1/2	00624	02680
0.065	1/8	0.520	2-1/2	00625	02681
0.070	1/8	0.560	2-1/2	00626	02682
0.075	1/8	0.600	2-1/2	00627	02683
0.078	1/8	0.624	2-1/2	00628	02684
0.080	1/8	0.640	2-1/2	00629	02685
0.085	1/8	0.680	2-1/2	00630	02686
0.090	1/8	0.720	2-1/2	00631	02687
0.093	1/8	0.744	2-1/2	00632	02688
0.095	1/8	0.760	2-1/2	00633	02689
0.100	1/8	0.800	2-1/2	00634	02690
0.110	1/8	0.880	2-1/2	00635	02691
0.115	1/8	0.920	2-1/2	00636	02692
0.120	1/8	0.960	2-1/2	00637	02693

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
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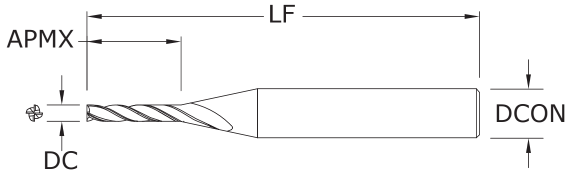

New Expanded Tools

M4X • 12xD

FRACTIONAL SERIES

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inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.015	1/8	0.180	2-1/2	00639	02694
0.020	1/8	0.240	2-1/2	00640	02695
0.025	1/8	0.300	2-1/2	00641	02696
0.030	1/8	0.360	2-1/2	00642	02697
0.031	1/8	0.372	2-1/2	00643	02698
0.035	1/8	0.420	2-1/2	00644	02699
0.040	1/8	0.480	2-1/2	00645	02700
0.045	1/8	0.540	2-1/2	00646	02701
0.047	1/8	0.564	2-1/2	00647	02702
0.050	1/8	0.600	2-1/2	00648	02703
0.055	1/8	0.660	2-1/2	00649	02704
0.060	1/8	0.720	2-1/2	00650	02705
0.062	1/8	0.744	2-1/2	00651	02706
0.065	1/8	0.780	2-1/2	00652	02707
0.070	1/8	0.840	2-1/2	00653	02708
0.075	1/8	0.900	2-1/2	00654	02709
0.078	1/8	0.936	2-1/2	00655	02710
0.080	1/8	0.960	2-1/2	00656	02711
0.085	1/8	1.020	2-1/2	00657	02712
0.090	1/8	1.080	2-1/2	00658	02713
0.093	1/8	1.116	2-1/2	00659	02714
0.095	1/8	1.140	2-1/2	00660	02715
0.100	1/8	1.200	2-1/2	00661	02716
0.110	1/8	1.320	2-1/2	00662	02717
0.115	1/8	1.380	2-1/2	00663	02718
0.120	1/8	1.440	2-1/2	00664	02719

TOLERANCES (inch)

.015–.120 DIAMETER

DC = +0.000/−0.001

DCON = h_6

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

New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/−0.001

DCON = h_6

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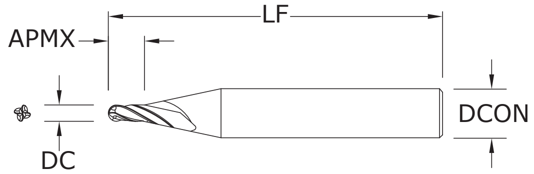
- PLASTICS/COMPOSITES



M4B • 1.5xD

FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.015	1-1/2	00745	03071
0.011	1/8	0.017	1-1/2	00746	03072
0.012	1/8	0.018	1-1/2	00747	03073
0.013	1/8	0.020	1-1/2	00748	03074
0.014	1/8	0.021	1-1/2	00749	03075
0.015	1/8	0.023	1-1/2	00750	03076
0.016	1/8	0.024	1-1/2	00751	03077
0.017	1/8	0.026	1-1/2	00752	03078
0.018	1/8	0.027	1-1/2	00753	03079
0.019	1/8	0.029	1-1/2	00754	03080
0.020	1/8	0.030	1-1/2	00755	03081
0.021	1/8	0.032	1-1/2	00756	03082
0.022	1/8	0.033	1-1/2	00757	03083
0.023	1/8	0.035	1-1/2	00758	03084
0.024	1/8	0.036	1-1/2	00759	03085
0.025	1/8	0.038	1-1/2	00760	03086
0.026	1/8	0.039	1-1/2	00761	03087
0.027	1/8	0.041	1-1/2	00762	03088
0.028	1/8	0.042	1-1/2	00763	03089
0.029	1/8	0.044	1-1/2	00764	03090
0.030	1/8	0.045	1-1/2	00765	03091
0.031	1/8	0.047	1-1/2	00766	03092
0.032	1/8	0.048	1-1/2	00767	03093
0.033	1/8	0.050	1-1/2	00768	03094
0.034	1/8	0.051	1-1/2	00769	03095
0.035	1/8	0.053	1-1/2	00770	03096
0.036	1/8	0.054	1-1/2	00771	03097
0.037	1/8	0.056	1-1/2	00772	03098
0.038	1/8	0.057	1-1/2	00773	03099
0.039	1/8	0.059	1-1/2	00774	03100
0.040	1/8	0.060	1-1/2	00775	03101
0.041	1/8	0.062	1-1/2	00776	02538
0.042	1/8	0.063	1-1/2	00777	02539
0.043	1/8	0.065	1-1/2	00778	02540

RE = 1/2 Cutting Diameter (DC)

continued on next page

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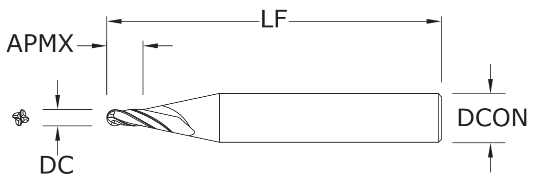
New Expanded Tools



M4B • 1.5xD
FRACTIONAL SERIES

continued

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.044	1/8	0.066	1-1/2	00779	02541
0.045	1/8	0.068	1-1/2	00780	02542
0.046	1/8	0.069	1-1/2	00781	02543
0.047	1/8	0.071	1-1/2	00782	02544
0.048	1/8	0.072	1-1/2	00783	02545
0.049	1/8	0.074	1-1/2	00784	02546
0.050	1/8	0.075	1-1/2	00785	02547
0.051	1/8	0.077	1-1/2	00786	02548
0.052	1/8	0.078	1-1/2	00787	02549
0.053	1/8	0.080	1-1/2	00788	02550
0.054	1/8	0.081	1-1/2	00789	02551
0.055	1/8	0.083	1-1/2	00790	02552
0.056	1/8	0.084	1-1/2	00791	02553
0.057	1/8	0.086	1-1/2	00792	02554
0.058	1/8	0.087	1-1/2	00793	02555
0.059	1/8	0.089	1-1/2	00794	02556
0.060	1/8	0.090	1-1/2	00795	02557
0.062	1/8	0.093	1-1/2	00796	02558
0.065	1/8	0.098	1-1/2	00797	02559
0.070	1/8	0.105	1-1/2	00798	02560
0.075	1/8	0.112	1-1/2	04018	04016
0.078	1/8	0.117	1-1/2	00799	02561
0.080	1/8	0.120	1-1/2	00800	02562
0.085	1/8	0.128	1-1/2	00801	02563
0.090	1/8	0.135	1-1/2	00802	02564
0.093	1/8	0.140	1-1/2	00803	02565
0.095	1/8	0.143	1-1/2	00804	02566
0.100	1/8	0.150	1-1/2	00805	02567
0.105	1/8	0.158	1-1/2	00806	02568
0.110	1/8	0.165	1-1/2	00807	02569
0.115	1/8	0.173	1-1/2	00808	02570
0.120	1/8	0.180	1-1/2	00809	02571

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

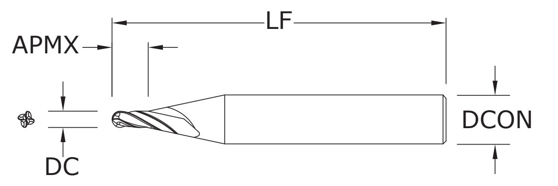
TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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



M4B • 3xD
FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.030	1-1/2	00887	03145
0.011	1/8	0.033	1-1/2	00888	03146
0.012	1/8	0.036	1-1/2	00889	03147
0.013	1/8	0.039	1-1/2	00890	03148
0.014	1/8	0.042	1-1/2	00891	03149
0.015	1/8	0.045	1-1/2	00892	03150
0.016	1/8	0.048	1-1/2	00893	03151
0.017	1/8	0.051	1-1/2	00894	03152
0.018	1/8	0.054	1-1/2	00895	03153
0.019	1/8	0.057	1-1/2	00896	03154
0.020	1/8	0.060	1-1/2	00897	03155
0.021	1/8	0.063	1-1/2	00898	03156
0.022	1/8	0.066	1-1/2	00899	03157
0.023	1/8	0.069	1-1/2	00900	03158
0.024	1/8	0.072	1-1/2	00901	03159
0.025	1/8	0.075	1-1/2	00902	03160
0.026	1/8	0.078	1-1/2	00903	03161
0.027	1/8	0.081	1-1/2	00904	03162
0.028	1/8	0.084	1-1/2	00905	03163
0.029	1/8	0.087	1-1/2	00906	03164
0.030	1/8	0.090	1-1/2	00907	03165
0.031	1/8	0.093	1-1/2	00908	03166
0.032	1/8	0.096	1-1/2	00909	03167
0.033	1/8	0.099	1-1/2	00910	03168
0.034	1/8	0.102	1-1/2	00911	03169
0.035	1/8	0.105	1-1/2	00912	03170
0.036	1/8	0.108	1-1/2	00913	03171
0.037	1/8	0.111	1-1/2	00914	03172
0.038	1/8	0.114	1-1/2	00915	03173
0.039	1/8	0.117	1-1/2	00916	03174
0.040	1/8	0.120	1-1/2	00917	03175
0.041	1/8	0.123	1-1/2	00918	02606
0.042	1/8	0.126	1-1/2	00919	02607
0.043	1/8	0.129	1-1/2	00920	02608

RE = 1/2 Cutting Diameter (DC)

continued on next page

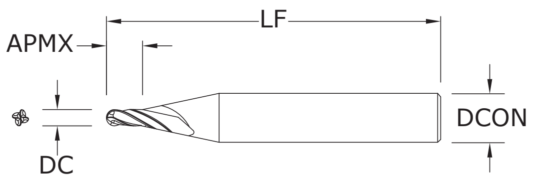
- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

M4B • 3xD

MICRO SGS Solid Carbide Tools

KYOCERA

M4B • 3xD
FRACTIONAL SERIES



New Expanded Tools

continued

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.044	1/8	0.132	1-1/2	00921	02609
0.045	1/8	0.135	1-1/2	00922	02610
0.046	1/8	0.138	1-1/2	00923	02611
0.047	1/8	0.141	1-1/2	00924	02612
0.048	1/8	0.144	1-1/2	00925	02613
0.049	1/8	0.147	1-1/2	00926	02614
0.050	1/8	0.150	1-1/2	00927	02615
0.051	1/8	0.153	1-1/2	00928	02616
0.052	1/8	0.156	1-1/2	00929	02617
0.053	1/8	0.159	1-1/2	00930	02618
0.054	1/8	0.162	1-1/2	00931	02619
0.055	1/8	0.165	1-1/2	00932	02620
0.056	1/8	0.168	1-1/2	00933	02621
0.057	1/8	0.171	1-1/2	00934	02622
0.058	1/8	0.174	1-1/2	00935	02623
0.059	1/8	0.177	1-1/2	00936	02624
0.060	1/8	0.180	1-1/2	00937	02625
0.062	1/8	0.186	1-1/2	00938	02626
0.065	1/8	0.195	1-1/2	00939	02627
0.070	1/8	0.210	1-1/2	00940	02628
0.075	1/8	0.225	1-1/2	04019	04017
0.078	1/8	0.234	1-1/2	00941	02629
0.080	1/8	0.240	1-1/2	00942	02630
0.085	1/8	0.255	1-1/2	00943	02631
0.090	1/8	0.270	1-1/2	00944	02632
0.093	1/8	0.279	1-1/2	00945	02633
0.095	1/8	0.285	1-1/2	00946	02634
0.100	1/8	0.300	1-1/2	00947	02635
0.105	1/8	0.315	1-1/2	00948	02636
0.110	1/8	0.330	1-1/2	00949	02637
0.115	1/8	0.345	1-1/2	00950	02638
0.120	1/8	0.360	1-1/2	00951	02639

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

MICRO SGS Solid Carbide Tools

KYOCERA

M4B • 3xD • 8xD Overall Reach

New Expanded Tools

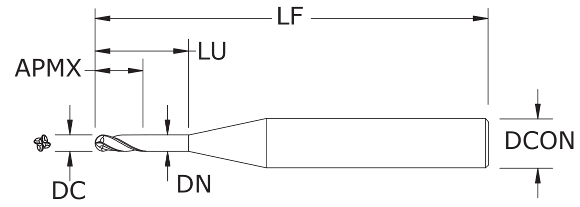
TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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



M4B • 3xD 8xD
FRACTIONAL SERIES

inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.030	0.080	0.009	1-1/2	09785	03751
0.015	1/8	0.045	0.120	0.014	1-1/2	09787	03752
0.020	1/8	0.060	0.160	0.018	1-1/2	09789	03753
0.025	1/8	0.075	0.200	0.023	1-1/2	09791	03754
0.030	1/8	0.090	0.240	0.028	1-1/2	09793	03755
0.031	1/8	0.093	0.248	0.029	1-1/2	09795	03756
0.035	1/8	0.105	0.280	0.032	1-1/2	09797	03757
0.040	1/8	0.120	0.320	0.037	1-1/2	09799	03758
0.045	1/8	0.135	0.360	0.042	2	09801	03759
0.047	1/8	0.141	0.376	0.044	2	09803	03760
0.050	1/8	0.150	0.400	0.047	2	09805	03761
0.055	1/8	0.165	0.440	0.051	2	09807	03762
0.060	1/8	0.180	0.480	0.056	2	09809	03763
0.062	1/8	0.186	0.496	0.058	2	09811	03764
0.065	1/8	0.195	0.520	0.061	2	09813	03765
0.070	1/8	0.210	0.560	0.065	2	09815	03766
0.075	1/8	0.225	0.600	0.070	2	09817	03767
0.078	1/8	0.234	0.624	0.073	2	09819	03768
0.080	1/8	0.240	0.640	0.075	2	09821	03769
0.085	1/8	0.255	0.680	0.079	2	09823	03770
0.090	1/8	0.270	0.720	0.084	2	09825	03771
0.093	1/8	0.279	0.744	0.087	2	09827	03772
0.095	1/8	0.285	0.760	0.089	2	09829	03773
0.100	1/8	0.300	0.800	0.094	2	09831	03774
0.110	1/8	0.330	0.880	0.103	2	09833	03775
0.115	1/8	0.345	0.920	0.108	2	09835	03776
0.120	1/8	0.360	0.960	0.112	2	09837	03777

RE = 1/2 Cutting Diameter (DC)

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
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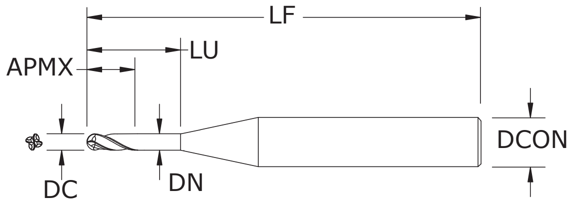
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

M4B • 3xD • 12xD Overall Reach

MICRO SGS Solid Carbide Tools KYOCERA

4



M4B • 3xD 12xD

FRACTIONAL SERIES

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
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inch						EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.030	0.120	0.009	1-1/2	09784	03778
0.015	1/8	0.045	0.180	0.014	1-1/2	09786	03779
0.020	1/8	0.060	0.240	0.018	1-1/2	09788	03780
0.025	1/8	0.075	0.300	0.023	1-1/2	09790	03781
0.030	1/8	0.090	0.360	0.028	2	09792	03782
0.031	1/8	0.093	0.372	0.029	2	09794	03783
0.035	1/8	0.105	0.420	0.032	2	09796	03784
0.040	1/8	0.120	0.480	0.037	2	09798	03785
0.045	1/8	0.135	0.540	0.042	2	09800	03786
0.047	1/8	0.141	0.564	0.044	2	09802	03787
0.050	1/8	0.150	0.600	0.047	2	09804	03788
0.055	1/8	0.165	0.660	0.051	2	09806	03789
0.060	1/8	0.180	0.720	0.056	2	09808	03790
0.062	1/8	0.186	0.744	0.058	2	09810	03791
0.065	1/8	0.195	0.780	0.061	2	09812	03792
0.070	1/8	0.210	0.840	0.065	2	09814	03793
0.075	1/8	0.225	0.900	0.070	2	09816	03794
0.078	1/8	0.234	0.936	0.073	2-1/2	09818	03795
0.080	1/8	0.240	0.960	0.075	2-1/2	09820	03796
0.085	1/8	0.255	1.020	0.079	2-1/2	09822	03797
0.090	1/8	0.270	1.080	0.084	2-1/2	09824	03798
0.093	1/8	0.279	1.116	0.087	2-1/2	09826	03799
0.095	1/8	0.285	1.140	0.089	2-1/2	09828	03800
0.100	1/8	0.300	1.200	0.094	2-1/2	09830	03801
0.110	1/8	0.330	1.320	0.103	2-1/2	09832	03802
0.115	1/8	0.345	1.380	0.108	2-1/2	09834	03803
0.120	1/8	0.360	1.440	0.112	2-1/2	09836	03804

RE = 1/2 Cutting Diameter (DC)

New Expanded Tools

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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

M4LB • 5xD

MICRO SGS Solid Carbide Tools KYOCERA

4

New Expanded Tools

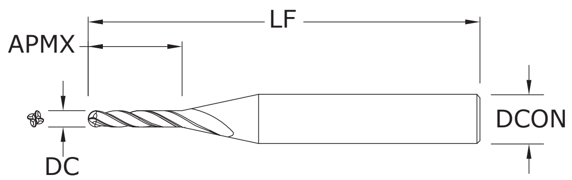
TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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



M4LB • 5xD

FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.050	2-1/2	00952	02720
0.015	1/8	0.075	2-1/2	00953	02721
0.020	1/8	0.100	2-1/2	00954	02722
0.025	1/8	0.125	2-1/2	00955	02723
0.030	1/8	0.150	2-1/2	00956	02724
0.031	1/8	0.155	2-1/2	00957	02725
0.035	1/8	0.175	2-1/2	00958	02726
0.040	1/8	0.200	2-1/2	00959	02727
0.045	1/8	0.225	2-1/2	00960	02728
0.047	1/8	0.235	2-1/2	00961	02729
0.050	1/8	0.250	2-1/2	00962	02730
0.055	1/8	0.275	2-1/2	00963	02731
0.060	1/8	0.300	2-1/2	00964	02732
0.062	1/8	0.310	2-1/2	00965	02733
0.065	1/8	0.325	2-1/2	00966	02734
0.070	1/8	0.350	2-1/2	00967	02735
0.075	1/8	0.375	2-1/2	00968	02736
0.078	1/8	0.390	2-1/2	00969	02737
0.080	1/8	0.400	2-1/2	00970	02738
0.085	1/8	0.425	2-1/2	00971	02739
0.090	1/8	0.450	2-1/2	00972	02740
0.093	1/8	0.465	2-1/2	00973	02741
0.095	1/8	0.475	2-1/2	00974	02742
0.100	1/8	0.500	2-1/2	00975	02743
0.110	1/8	0.550	2-1/2	00976	02744
0.115	1/8	0.575	2-1/2	00977	02745
0.120	1/8	0.600	2-1/2	00978	02746

RE = 1/2 Cutting Diameter (DC)

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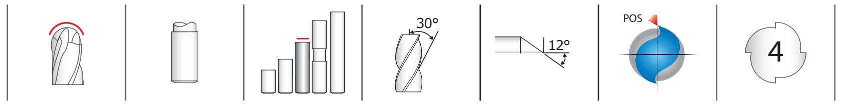
FRACTIONAL

M4EB • 8xD



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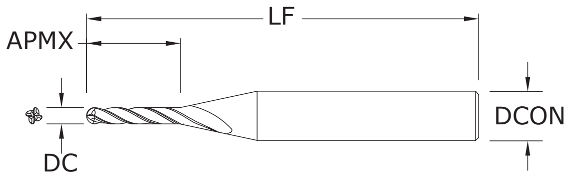

New Expanded Tools

M4EB • 8xD

FRACTIONAL SERIES

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- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.010	1/8	0.080	2-1/2	00979	02747
0.015	1/8	0.120	2-1/2	00980	02748
0.020	1/8	0.160	2-1/2	00981	02749
0.025	1/8	0.200	2-1/2	00982	02750
0.030	1/8	0.240	2-1/2	00983	02751
0.031	1/8	0.248	2-1/2	00984	02752
0.035	1/8	0.280	2-1/2	00985	02753
0.040	1/8	0.320	2-1/2	00986	02754
0.045	1/8	0.360	2-1/2	00987	02755
0.047	1/8	0.376	2-1/2	00988	02756
0.050	1/8	0.400	2-1/2	00989	02757
0.055	1/8	0.440	2-1/2	00990	02758
0.060	1/8	0.480	2-1/2	00991	02759
0.062	1/8	0.496	2-1/2	00992	02760
0.065	1/8	0.520	2-1/2	00993	02761
0.070	1/8	0.560	2-1/2	00994	02762
0.075	1/8	0.600	2-1/2	00995	02763
0.078	1/8	0.624	2-1/2	00996	02764
0.080	1/8	0.640	2-1/2	00997	02765
0.085	1/8	0.680	2-1/2	00998	02766
0.090	1/8	0.720	2-1/2	00999	02767
0.093	1/8	0.744	2-1/2	01000	02768
0.095	1/8	0.760	2-1/2	01001	02769
0.100	1/8	0.800	2-1/2	01002	02770
0.110	1/8	0.880	2-1/2	01003	02771
0.115	1/8	0.920	2-1/2	01004	02772
0.120	1/8	0.960	2-1/2	01005	02773

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (inch)

.010–.120 DIAMETER

DC = +0.000/–0.001

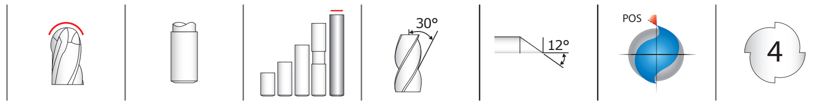
DCON = h_6

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

FRACTIONAL

M4XB • 12xD

MICRO SGS Solid Carbide Tools | KYOCERA



New Expanded Tools

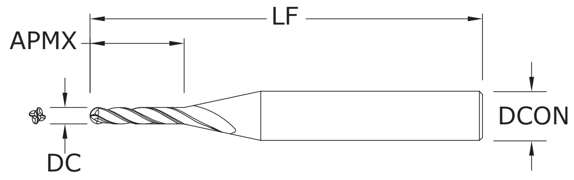
TOLERANCES (inch)

.015–.120 DIAMETER

DC = +0.000/–0.001

DCON = h_6

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



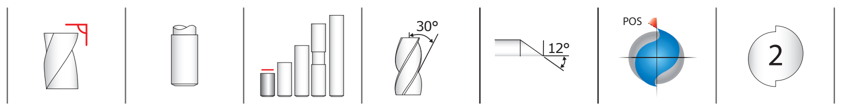
M4XB • 12xD

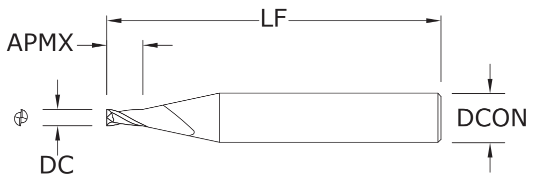
FRACTIONAL SERIES

inch				EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0.015	1/8	0.180	2-1/2	01007	02774
0.020	1/8	0.240	2-1/2	01008	02775
0.025	1/8	0.300	2-1/2	01009	02776
0.030	1/8	0.360	2-1/2	01010	02777
0.031	1/8	0.372	2-1/2	01011	02778
0.035	1/8	0.420	2-1/2	01012	02779
0.040	1/8	0.480	2-1/2	01013	02780
0.045	1/8	0.540	2-1/2	01014	02781
0.047	1/8	0.564	2-1/2	01015	02782
0.050	1/8	0.600	2-1/2	01016	02783
0.055	1/8	0.660	2-1/2	01017	02784
0.060	1/8	0.720	2-1/2	01018	02785
0.062	1/8	0.744	2-1/2	01019	02786
0.065	1/8	0.780	2-1/2	01020	02787
0.070	1/8	0.840	2-1/2	01021	02788
0.075	1/8	0.900	2-1/2	01022	02789
0.078	1/8	0.936	2-1/2	01023	02790
0.080	1/8	0.960	2-1/2	01024	02791
0.085	1/8	1.020	2-1/2	01025	02792
0.090	1/8	1.080	2-1/2	01026	02793
0.093	1/8	1.116	2-1/2	01027	02794
0.095	1/8	1.140	2-1/2	01028	02795
0.100	1/8	1.200	2-1/2	01029	02796
0.110	1/8	1.320	2-1/2	01030	02797
0.115	1/8	1.380	2-1/2	01031	02798
0.120	1/8	1.440	2-1/2	01032	02799

RE = 1/2 Cutting Diameter (DC)

- Four flute design allows for higher feed rates and decreased deflection, improving productivity and surface finish.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.





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METRIC SERIES

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
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- Advanced geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality.
- All tools in stock to meet customer order requirements.
- All micro tools are manufactured in accordance with the KSPT ISO certified quality procedures.

mm					EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIVALENT	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0,1	0.0039	3,0	0,1	38,0	05002	05000
0,2	0.0079	3,0	0,3	38,0	01801	02801
0,3	0.0118	3,0	0,4	38,0	01802	02802
0,4	0.0157	3,0	0,6	38,0	01803	02803
0,5	0.0197	3,0	0,7	38,0	01804	02804
0,6	0.0236	3,0	0,9	38,0	01805	02805
0,7	0.0276	3,0	1,0	38,0	01806	02806
0,8	0.0315	3,0	1,2	38,0	01807	02807
0,9	0.0354	3,0	1,3	38,0	01808	02808
1,0	0.0394	3,0	1,5	38,0	01809	02809
1,0	0.0394	4,0	1,5	50,0	01861	02819
1,1	0.0433	3,0	1,6	38,0	01810	02860
1,1	0.0433	4,0	1,6	50,0	01862	02892
1,2	0.0472	3,0	1,8	38,0	01811	02861
1,2	0.0472	4,0	1,8	50,0	01863	02893
1,3	0.0512	3,0	1,9	38,0	01812	02862
1,3	0.0512	4,0	1,9	50,0	01864	02894
1,4	0.0551	3,0	2,1	38,0	01813	02863
1,4	0.0551	4,0	2,1	50,0	01865	02895
1,5	0.0591	3,0	2,2	38,0	01814	02864
1,5	0.0591	4,0	2,2	50,0	01866	02896
1,6	0.0630	3,0	2,4	38,0	01815	02865
1,6	0.0630	4,0	2,4	50,0	01867	02897
1,7	0.0669	3,0	2,5	38,0	01816	02866
1,7	0.0669	4,0	2,5	50,0	01868	02898
1,8	0.0709	3,0	2,7	38,0	01817	02867
1,8	0.0709	4,0	2,7	50,0	01869	02899
1,9	0.0748	3,0	2,8	38,0	01818	02868
1,9	0.0748	4,0	2,8	50,0	01870	02900
2,0	0.0787	3,0	3,0	38,0	01819	02869
2,0	0.0787	4,0	3,0	50,0	01871	02901
2,5	0.0984	3,0	3,7	38,0	01820	02870
2,5	0.0984	4,0	3,7	50,0	01872	02902
3,0	0.1181	3,0	4,5	38,0	01821	02871
3,0	0.1181	4,0	4,5	50,0	01873	02903

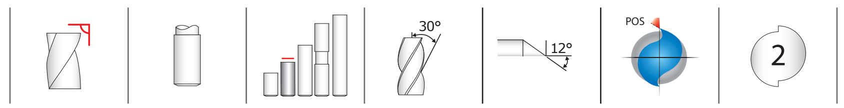
TOLERANCES (mm)

0,1–3,0 DIAMETER

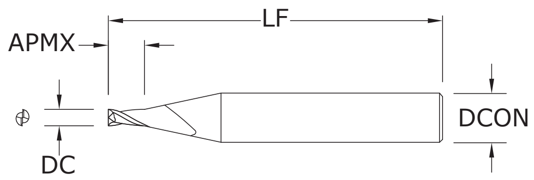
DC = +0,0000/–0,0254

DCON = h_6

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



New Expanded Tools



TOLERANCES (mm)

0,1–3,0 DIAMETER

DC = +0,0000/–0,0254

DCON = h_6

- STEELS
- STAINLESS STEELS
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M2M • 3xD
METRIC SERIES

mm					EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIVALENT	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0,1	0.0039	3,0	0,3	38,0	05003	05001
0,2	0.0079	3,0	0,6	38,0	01823	02811
0,2	0.0079	4,0	0,6	50,0	01875	02349
0,3	0.0118	3,0	0,9	38,0	01824	02350
0,3	0.0118	4,0	0,9	50,0	01876	02360
0,4	0.0157	3,0	1,2	38,0	01825	02351
0,4	0.0157	4,0	1,2	50,0	01877	02361
0,5	0.0197	3,0	1,5	38,0	01826	02352
0,5	0.0197	4,0	1,5	50,0	01878	02362
0,6	0.0236	3,0	1,8	38,0	01827	02353
0,6	0.0236	4,0	1,8	50,0	01879	02363
0,7	0.0276	3,0	2,1	38,0	01828	02354
0,7	0.0276	4,0	2,1	50,0	01880	02364
0,8	0.0315	3,0	2,4	38,0	01829	02355
0,8	0.0315	4,0	2,4	50,0	01881	02365
0,9	0.0354	3,0	2,7	38,0	01830	02356
0,9	0.0354	4,0	2,7	50,0	01882	02366
1,0	0.0394	3,0	3,0	38,0	01831	02357
1,0	0.0394	4,0	3,0	50,0	01883	02367
1,1	0.0433	3,0	3,3	38,0	01832	02872
1,1	0.0433	4,0	3,3	50,0	01884	02904
1,2	0.0472	3,0	3,6	38,0	01833	02873
1,2	0.0472	4,0	3,6	50,0	01885	02905
1,3	0.0512	3,0	3,9	38,0	01834	02874
1,3	0.0512	4,0	3,9	50,0	01886	02906
1,4	0.0551	3,0	4,2	38,0	01835	02875
1,4	0.0551	4,0	4,2	50,0	01887	02907
1,5	0.0591	3,0	4,5	38,0	01836	02876
1,5	0.0591	4,0	4,5	50,0	01888	02908
1,6	0.0630	3,0	4,8	38,0	01837	02877
1,6	0.0630	4,0	4,8	50,0	01889	02909
1,7	0.0669	3,0	5,1	38,0	01838	02878
1,7	0.0669	4,0	5,1	50,0	01890	02910
1,8	0.0709	3,0	5,4	38,0	01839	02879

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KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

METRIC

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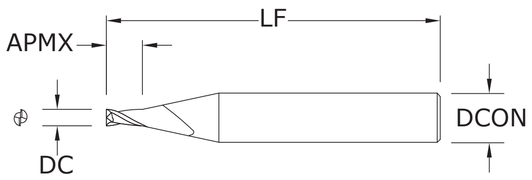

M2M • 3xD

METRIC SERIES

continued

CUTTING DIAMETER DC (mm)	DECIMAL EQUIVALENT	SHANK DIAMETER DCON (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
1,8	0.0709	4,0	5,4	50,0	01891	02911
1,9	0.0748	3,0	5,7	38,0	01840	02880
1,9	0.0748	4,0	5,7	50,0	01892	02912
2,0	0.0787	3,0	6,0	38,0	01841	02881
2,0	0.0787	4,0	6,0	50,0	01893	02913
2,1	0.0827	3,0	6,3	38,0	01842	02882
2,2	0.0866	3,0	6,6	38,0	01843	02883
2,3	0.0906	3,0	6,9	38,0	01844	02884
2,4	0.0945	3,0	7,2	38,0	01845	02885
2,5	0.0984	3,0	7,5	38,0	01846	02886
2,5	0.0984	4,0	7,5	50,0	01894	02914
2,6	0.1024	3,0	7,8	38,0	01847	02887
2,7	0.1063	3,0	8,1	38,0	01848	02888
2,8	0.1102	3,0	8,4	38,0	01849	02889
2,9	0.1142	3,0	8,7	38,0	01850	02890
3,0	0.1181	3,0	9,0	38,0	01851	02891
3,0	0.1181	4,0	9,0	50,0	01895	02915

TOLERANCES (mm)

0,1–3,0 DIAMETER

DC = +0,0000/–0,0254

DCON = h_6

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

New Expanded Tools

TOLERANCES (mm)

0,1–3,0 DIAMETER

DC = +0,0000/–0,0254

DCON = h_6

- STEELS
- STAINLESS STEELS
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- HARDENED STEELS
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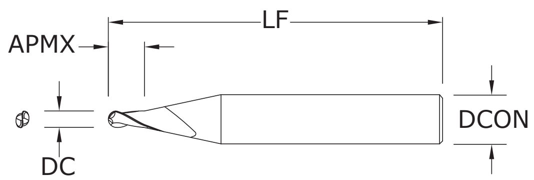

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METRIC SERIES

CUTTING DIAMETER DC (mm)	DECIMAL EQUIVALENT	SHANK DIAMETER DCON (mm)	LENGTH OF CUT APMX (mm)	OVERALL LENGTH LF (mm)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0,1	0.0039	3,0	0,1	38,0	05017	05004
0,2	0.0079	3,0	0,3	38,0	05019	05006
0,3	0.0118	3,0	0,3	38,0	05021	05008
0,4	0.0157	3,0	0,6	38,0	05023	05010
0,5	0.0197	3,0	0,7	38,0	01900	03180
0,6	0.0236	3,0	0,9	38,0	01901	03181
0,7	0.0276	3,0	1,0	38,0	01902	03182
0,8	0.0315	3,0	1,2	38,0	01903	03183
0,9	0.0354	3,0	1,3	38,0	01904	03184
1,0	0.0394	3,0	1,5	38,0	01905	03185
1,0	0.0394	4,0	1,5	50,0	02009	02849
1,1	0.0433	3,0	1,6	38,0	01906	02916
1,1	0.0433	4,0	1,6	50,0	02010	02980
1,2	0.0472	3,0	1,8	38,0	01907	02917
1,2	0.0472	4,0	1,8	50,0	02011	02981
1,3	0.0512	3,0	1,9	38,0	01908	02918
1,3	0.0512	4,0	1,9	50,0	02012	02982
1,4	0.0551	3,0	2,1	38,0	01909	02919
1,4	0.0551	4,0	2,1	50,0	02013	02983
1,5	0.0591	3,0	2,2	38,0	01910	02920
1,5	0.0591	4,0	2,2	50,0	02014	02984
1,6	0.0630	3,0	2,4	38,0	01911	02921
1,6	0.0630	4,0	2,4	50,0	02015	02985
1,7	0.0669	3,0	2,5	38,0	01912	02922
1,7	0.0669	4,0	2,5	50,0	02016	02986
1,8	0.0709	3,0	2,7	38,0	01913	02923
1,8	0.0709	4,0	2,7	50,0	02017	02987
1,9	0.0748	3,0	2,8	38,0	01914	02924
1,9	0.0748	4,0	2,8	50,0	02018	02988
2,0	0.0787	3,0	3,0	38,0	01915	02925
2,0	0.0787	4,0	3,0	50,0	02019	02989
2,5	0.0984	3,0	3,7	38,0	01916	02926
2,5	0.0984	4,0	3,7	50,0	02020	02990
3,0	0.1181	3,0	4,5	38,0	01917	02927
3,0	0.1181	4,0	4,5	50,0	02021	02991

RE = 1/2 Cutting Diameter (DC)

- Two flute design is ideal for softer alloyed, non-ferrous material applications that require slotting or involve heavy chip loads.
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- High performance carbide substrate designed specifically for Micro Tool applications.
- Broad portfolio, offering consistent lengths of cut, to ensure application demands are met.
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- All tools in stock to meet customer order requirements.
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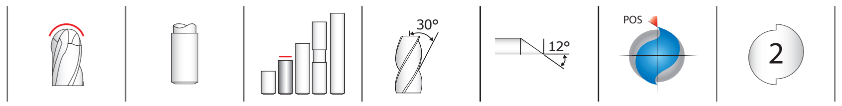

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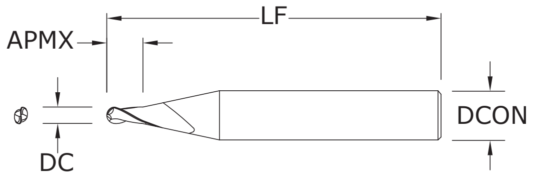

New Expanded Tools

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METRIC SERIES

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CUTTING DIAMETER DC	DECIMAL EQUIVALENT	mm SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	EDP NO. UNCOATED	TI-NAMITE-A (AlTiN)
0,1	0.0039	3,0	0,3	38,0	05018	05005
0,2	0.0079	3,0	0,6	38,0	05020	05007
0,3	0.0118	3,0	0,9	38,0	05022	05009
0,4	0.0157	3,0	1,2	38,0	05024	05011
0,5	0.0197	3,0	1,5	38,0	05025	05012
0,5	0.0197	4,0	1,5	50,0	02048	03200
0,6	0.0236	3,0	1,8	38,0	05026	05013
0,6	0.0236	4,0	1,8	50,0	02049	03201
0,7	0.0276	3,0	2,1	38,0	05027	05014
0,7	0.0276	4,0	2,1	50,0	02050	03202
0,8	0.0315	3,0	2,4	38,0	05028	05015
0,8	0.0315	4,0	2,4	50,0	02051	03203
0,9	0.0354	3,0	2,7	38,0	05029	05016
0,9	0.0354	4,0	2,7	50,0	02052	03204
1,0	0.0394	3,0	3,0	38,0	01949	02829
1,0	0.0394	4,0	3,0	50,0	02053	03205
1,1	0.0433	3,0	3,3	38,0	01950	02940
1,1	0.0433	4,0	3,3	50,0	02054	03004
1,2	0.0472	3,0	3,6	38,0	01951	02941
1,2	0.0472	4,0	3,6	50,0	02055	03005
1,3	0.0512	3,0	3,9	38,0	01952	02942
1,3	0.0512	4,0	3,9	50,0	02056	03006
1,4	0.0551	3,0	4,2	38,0	01953	02943
1,4	0.0551	4,0	4,2	50,0	02057	03007
1,5	0.0591	3,0	4,5	38,0	01954	02944
1,5	0.0591	4,0	4,5	50,0	02058	03008
1,6	0.0630	3,0	4,8	38,0	01955	02945
1,6	0.0630	4,0	4,8	50,0	02059	03009
1,7	0.0669	3,0	5,1	38,0	01956	02946
1,7	0.0669	4,0	5,1	50,0	02060	03010
1,8	0.0709	3,0	5,4	38,0	01957	02947
1,8	0.0709	4,0	5,4	50,0	02061	03011
1,9	0.0748	3,0	5,7	38,0	01958	02948
1,9	0.0748	4,0	5,7	50,0	02062	03012

RE = 1/2 Cutting Diameter (DC)

continued on next page

TOLERANCES (mm)

0,1–3,0 DIAMETER

DC = +0,0000/–0,0254

DCON = h_6

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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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New Expanded Tools

TOLERANCES (mm)

0,1–3,0 DIAMETER

DC = +0,0000/–0,0254

DCON = h_6

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

M2MB • 3xD
METRIC SERIES

continued

CUTTING DIAMETER DC	DECIMAL EQUIVALENT	mm SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	EDP NO. UNCOATED	TI-NAMITE-A (AlTiN)
2,0	0.0787	3,0	6,0	38,0	01959	02949
2,0	0.0787	4,0	6,0	50,0	02063	03013
2,1	0.0827	3,0	6,3	38,0	01960	02950
2,2	0.0866	3,0	6,6	38,0	01961	02951
2,3	0.0906	3,0	6,9	38,0	01962	02952
2,4	0.0945	3,0	7,2	38,0	01963	02953
2,5	0.0984	3,0	7,5	38,0	01964	02954
2,5	0.0984	4,0	7,5	50,0	02064	03014
2,6	0.1024	3,0	7,8	38,0	01965	02955
2,7	0.1063	3,0	8,1	38,0	01966	02956
2,8	0.1102	3,0	8,4	38,0	01967	02957
2,9	0.1142	3,0	8,7	38,0	01968	02958
3,0	0.1181	3,0	9,0	38,0	01969	02959
3,0	0.1181	4,0	9,0	50,0	02065	03015

RE = 1/2 Cutting Diameter (DC)

KYOCERA Solid Tools
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SGS Micro Tools

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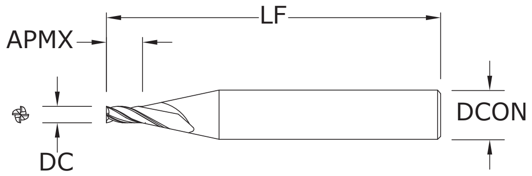
M4M • 1.5xD

METRIC SERIES



New Expanded Tools

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mm					EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIVALENT	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0,1	0.0039	3,0	0,15	38,0	05112	05076
0,2	0.0079	3,0	0,30	38,0	05113	05077
0,3	0.0118	3,0	0,45	38,0	05114	05078
0,4	0.0157	3,0	0,60	38,0	05115	05079
0,5	0.0197	3,0	0,75	38,0	05116	05080
0,6	0.0236	3,0	0,90	38,0	05117	05081
0,7	0.0276	3,0	1,05	38,0	05118	05082
0,8	0.0315	3,0	1,20	38,0	05119	05083
0,9	0.0354	3,0	1,35	38,0	05120	05084
1,0	0.0394	3,0	1,50	38,0	05121	05085
1,1	0.0433	3,0	1,65	38,0	09282	09290
1,2	0.0472	3,0	1,80	38,0	09283	09291
1,3	0.0512	3,0	1,95	38,0	09284	09292
1,4	0.0551	3,0	2,10	38,0	09285	09293
1,5	0.0591	3,0	2,25	38,0	05122	05086
1,6	0.0630	3,0	2,40	38,0	09286	09294
1,7	0.0669	3,0	2,55	38,0	09287	09295
1,8	0.0709	3,0	2,70	38,0	09288	09296
1,9	0.0748	3,0	2,85	38,0	09289	09297
2,0	0.0787	3,0	3,00	38,0	05123	05087
2,1	0.0827	3,0	3,15	38,0	09270	09278
2,2	0.0866	3,0	3,30	38,0	09271	09279
2,3	0.0906	3,0	3,45	38,0	09272	09280
2,4	0.0945	3,0	3,60	38,0	09273	09281
2,5	0.0984	3,0	3,75	38,0	05124	05088
3,0	0.1181	3,0	4,50	38,0	05125	05089

TOLERANCES (mm)

0,1–3,0 DIAMETER
DC = +0,0000/–0,0254
DCON = h_6

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

MICRO SGS Solid Carbide Tools | KYOCERA

New Expanded Tools

TOLERANCES (mm)

0,1–3,0 DIAMETER
DC = +0,0000/–0,0254
DCON = h_6

- STEELS
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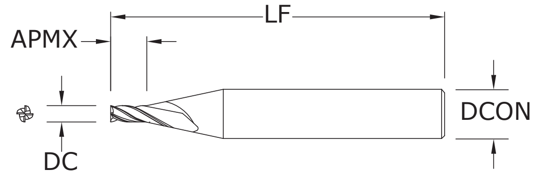

M4M • 3xD

METRIC SERIES

mm					EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIVALENT	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0,1	0.0039	3,0	0,3	38,0	05090	05054
0,2	0.0079	3,0	0,6	38,0	05091	05055
0,3	0.0118	3,0	0,9	38,0	05092	05056
0,4	0.0157	3,0	1,2	38,0	05093	05057
0,5	0.0197	3,0	1,5	38,0	05094	05058
0,6	0.0236	3,0	1,8	38,0	05095	05059
0,7	0.0276	3,0	2,1	38,0	05096	05060
0,8	0.0315	3,0	2,4	38,0	05097	05061
0,9	0.0354	3,0	2,7	38,0	05098	05062
1,0	0.0394	3,0	3,0	38,0	05099	05063
1,1	0.0433	3,0	3,3	38,0	05100	05064
1,2	0.0472	3,0	3,6	38,0	05101	05065
1,3	0.0512	3,0	3,9	38,0	05102	05066
1,4	0.0551	3,0	4,2	38,0	05103	05067
1,5	0.0591	3,0	4,5	38,0	05104	05068
1,6	0.0630	3,0	4,8	38,0	05105	05069
1,7	0.0669	3,0	5,1	38,0	05106	05070
1,8	0.0709	3,0	5,4	38,0	05107	05071
1,9	0.0748	3,0	5,7	38,0	05108	05072
2,0	0.0787	3,0	6,0	38,0	05109	05073
2,1	0.0827	3,0	6,3	38,0	09266	09274
2,2	0.0866	3,0	6,6	38,0	09267	09275
2,3	0.0906	3,0	6,9	38,0	09268	09276
2,4	0.0945	3,0	7,2	38,0	09269	09277
2,5	0.0984	3,0	7,5	38,0	05110	05074
3,0	0.1181	3,0	9,0	38,0	05111	05075

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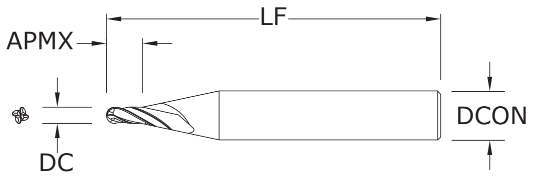
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

M4MB • 1.5xD

MICRO SGS® Solid Carbide Tools

KYOCERA

New Expanded Tools



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METRIC SERIES

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CUTTING DIAMETER DC	DECIMAL EQUIVALENT	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0,4	0.0157	3,0	0,6	38,0	05042	05030
0,5	0.0197	3,0	0,7	38,0	05044	05032
0,6	0.0236	3,0	0,9	38,0	05046	05034
0,7	0.0276	3,0	1,0	38,0	05048	05036
0,8	0.0315	3,0	1,2	38,0	05050	05038
0,9	0.0354	3,0	1,3	38,0	05052	05040
1,0	0.0394	3,0	1,5	38,0	01927	03195
1,0	0.0394	4,0	1,5	50,0	02031	02859
1,1	0.0433	3,0	1,6	38,0	01928	02928
1,1	0.0433	4,0	1,6	50,0	02032	02992
1,2	0.0472	3,0	1,8	38,0	01929	02929
1,2	0.0472	4,0	1,8	50,0	02033	02993
1,3	0.0512	3,0	1,9	38,0	01930	02930
1,3	0.0512	4,0	1,9	50,0	02034	02994
1,4	0.0551	3,0	2,1	38,0	01931	02931
1,4	0.0551	4,0	2,1	50,0	02035	02995
1,5	0.0591	3,0	2,2	38,0	01932	02932
1,5	0.0591	4,0	2,2	50,0	02036	02996
1,6	0.0630	3,0	2,4	38,0	01933	02933
1,6	0.0630	4,0	2,4	50,0	02037	02997
1,7	0.0669	3,0	2,5	38,0	01934	02934
1,7	0.0669	4,0	2,5	50,0	02038	02998
1,8	0.0709	3,0	2,7	38,0	01935	02935
1,8	0.0709	4,0	2,7	50,0	02039	02999
1,9	0.0748	3,0	2,8	38,0	01936	02936
1,9	0.0748	4,0	2,8	50,0	02040	03000
2,0	0.0787	3,0	3,0	38,0	01937	02937
2,0	0.0787	4,0	3,0	50,0	02041	03001
2,5	0.0984	3,0	3,7	38,0	01938	02938
2,5	0.0984	4,0	3,7	50,0	02042	03002
3,0	0.1181	3,0	4,5	38,0	01939	02939
3,0	0.1181	4,0	4,5	50,0	02043	03003

RE = 1/2 Cutting Diameter (DC)

TOLERANCES (mm)

0,4–3,0 DIAMETER

DC = +0,0000/–0,0254

DCON = h_6

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M4MB • 3xD

MICRO SGS® Solid Carbide Tools

KYOCERA

New Expanded Tools

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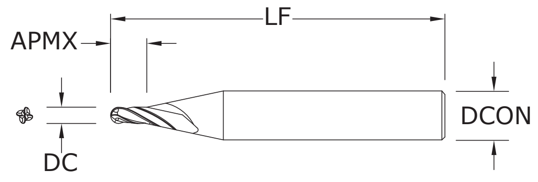

M4MB • 3xD

METRIC SERIES

mm					EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIVALENT	SHANK DIAMETER DCON	LENGTH OF CUT APMX	OVERALL LENGTH LF	UNCOATED	TI-NAMITE-A (AlTiN)
0,4	0.0157	3,0	1,2	38,0	05043	05031
0,5	0.0197	3,0	1,5	38,0	05045	05033
0,6	0.0236	3,0	1,8	38,0	05047	05035
0,7	0.0276	3,0	2,1	38,0	05049	05037
0,8	0.0315	3,0	2,4	38,0	05051	05039
0,9	0.0354	3,0	2,7	38,0	05053	05041
1,0	0.0394	3,0	3,0	38,0	01979	02839
1,0	0.0394	4,0	3,0	50,0	02075	03215
1,1	0.0433	3,0	3,3	38,0	01980	02960
1,1	0.0433	4,0	3,3	50,0	02076	03016
1,2	0.0472	3,0	3,6	38,0	01981	02961
1,2	0.0472	4,0	3,6	50,0	02077	03017
1,3	0.0512	3,0	3,9	38,0	01982	02962
1,3	0.0512	4,0	3,9	50,0	02078	03018
1,4	0.0551	3,0	4,2	38,0	01983	02963
1,4	0.0551	4,0	4,2	50,0	02079	03019
1,5	0.0591	3,0	4,5	38,0	01984	02964
1,5	0.0591	4,0	4,5	50,0	02080	03020
1,6	0.0630	3,0	4,8	38,0	01985	02965
1,6	0.0630	4,0	4,8	50,0	02081	03021
1,7	0.0669	3,0	5,1	38,0	01986	02966
1,7	0.0669	4,0	5,1	50,0	02082	03022
1,8	0.0709	3,0	5,4	38,0	01987	02967
1,8	0.0709	4,0	5,4	50,0	02083	03023
1,9	0.0748	3,0	5,7	38,0	01988	02968
1,9	0.0748	4,0	5,7	50,0	02084	03024
2,0	0.0787	3,0	6,0	38,0	01989	02969
2,0	0.0787	4,0	6,0	50,0	02085	03025
2,1	0.0827	3,0	6,3	38,0	01990	02970
2,2	0.0866	3,0	6,6	38,0	01991	02971
2,3	0.0906	3,0	6,9	38,0	01992	02972
2,4	0.0945	3,0	7,2	38,0	01993	02973
2,5	0.0984	3,0	7,5	38,0	01994	02974
2,5	0.0984	4,0	7,5	50,0	02086	03026
2,6	0.1024	3,0	7,8	38,0	01995	02975
2,7	0.1063	3,0	8,1	38,0	01996	02976
2,8	0.1102	3,0	8,4	38,0	01997	02977
2,9	0.1142	3,0	8,7	38,0	01998	02978
3,0	0.1181	3,0	9,0	38,0	01999	02979
3,0	0.1181	4,0	9,0	50,0	02087	03027

RE = 1/2 Cutting Diameter (DC)

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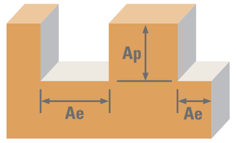
Speeds and Feeds

Instructions:
- rpm = use speed from INCH or METRIC Baseline chart
- ipm = INCH Baseline Feed (ipm) x Feed Multiplier [from selected chart below]
- mm/min = METRIC Baseline Feed (mm/min) x Feed Multiplier [from selected chart below]
- Reduce speed and feed 30 percent when using uncoated tools
- Find Width of Cut (Ae) and Depth of Cut (Ap) recommendations on chart below
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for detailed technical charts by series



INCH 2-Flute, Square, Corner Radius & Ball Without Reach	Flute Length	1.5 x DC		3 x DC	
	Feed Multiplier	1		0.9	
	Width/Depth	Ae x DC	Ap x DC	Ae x DC	Ap x DC
	Diameter (DC)	≤0.0312	>0.0312	≤0.0312	>0.0312
P H K M S N — ALL	Profile	≤.30 ≤.50	≤1	≤.10 ≤.25	≤2
	Slot	1	≤.20 ≤.50	1	≤.15 ≤.35

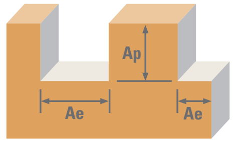
INCH 4-Flute, Square, Corner Radius & Ball Without Reach	Flute Length	1.5 x DC		3 x DC		5 x DC		8 x DC		12 x DC	
	Feed Multiplier	1.57		1.41		0.59		0.59		0.36	
	Width/Depth	Ae x DC	Ap x DC	Ae x DC	Ap x DC	Ae x DC	Ap x DC	Ae x DC	Ap x DC	Ae x DC	Ap x DC
	Diameter (DC)	≤0.0312	>0.0312	≤0.0312	>0.0312	≤0.0312	>0.0312	≤0.0312	>0.0312	≤0.0312	>0.0312
P H K M S N — ALL	Profile	≤.30 ≤.50	≤1	≤.10 ≤.25	≤2	≤.10 ≤.25	≤3	≤.05 ≤.10	≤4	≤.03 ≤.06	≤6
	Slot	1	≤.20 ≤.50	1	≤.15 ≤.35	1	≤.10 ≤.20				

METRIC 2-Flute Square & Ball Without Reach	Flute Length	1.5 x DC		3 x DC	
	Feed Multiplier	1		0.9	
	Width/Depth	Ae x DC	Ap x DC	Ae x DC	Ap x DC
	Diameter (DC)	≤0.0312	>0.0312	≤0.0312	>0.0312
P H K M S N — ALL	Profile	≤.30 ≤.50	≤1	≤.10 ≤.25	≤2
	Slot	1	≤.20 ≤.50	1	≤.15 ≤.35

METRIC 4-Flute Square & Ball Without Reach	Flute Length	1.5 x DC		3 x DC	
	Feed Multiplier	1.57		1.41	
	Width/Depth	Ae x DC	Ap x DC	Ae x DC	Ap x DC
	Diameter (DC)	≤0.0312	>0.0312	≤0.0312	>0.0312
P H K M S N — ALL	Profile	≤.30 ≤.50	≤1	≤.10 ≤.25	≤2
	Slot	1	≤.20 ≤.50	1	≤.15 ≤.35

Speeds and Feeds

Instructions:
- rpm = use speed from INCH or METRIC Baseline chart
- ipm = INCH Baseline Feed (ipm) x Feed Multiplier [from selected chart below]
- mm/min = METRIC Baseline Feed (mm/min) x Feed Multiplier [from selected chart below]
- Reduce speed and feed 30 percent when using uncoated tools
- Find Width of Cut (Ae) and Depth of Cut (Ap) recommendations on chart below
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for detailed technical charts by series



INCH 2-Flute Square & Ball With Reach	Flute Length	8 x DC		12 x DC	
	Feed Multiplier	0.6		0.5	
	Width/Depth	Ae x DC	Ap x DC	Ae x DC	Ap x DC
	Diameter (DC)	≤0.0312	>0.0312	≤0.0312	>0.0312
P H K M S N — ALL	Profile	≤.25 ≤.50	≤.30	≤.22 ≤.45	≤.25
	Slot	1	≤.07 ≤.17	1	≤.06 ≤.15

INCH 3-Flute Square, Corner Radius & Ball With Reach	Flute Length	3 x DC		5 x DC		8 x DC		12 x DC		15 x DC		20 x DC		25 x DC	
	Feed Multiplier	1.4		1.15		0.9		0.7		0.6		0.45		0.35	
	Width/Depth	Ae x DC	Ap x DC	Ae x DC	Ap x DC	Ae x DC	Ap x DC	Ae x DC	Ap x DC	Ae x DC	Ap x DC	Ae x DC	Ap x DC	Ap x DC	Ap x DC
	Diameter (DC)	≤0.0312	>0.0312	≤0.0312	>0.0312	≤0.0312	>0.0312	≤0.0312	>0.0312	≤0.0312	>0.0312	≤0.0312	>0.0312	≤0.0312	>0.0312
P H K M S N — ALL	Profile	≤.30 ≤.60	≤.5	≤.30 ≤.60	≤.35	≤.25 ≤.50	≤.30	≤.22 ≤.45	≤.25	≤.15 ≤.30	≤.25	≤.12 ≤.25	≤.20	≤.12 ≤.25	≤.20
	Slot	1	≤.15 ≤.30	1	≤.08 ≤.20	1	≤.07 ≤.17	1	≤.06 ≤.15	1	≤.06 ≤.15	1	≤.04 ≤.10	1	≤.04 ≤.10

INCH 4-Flute Square & Ball With Reach	Flute Length	8 x DC		12 x DC	
	Feed Multiplier	0.95		0.75	
	Width/Depth	Ae x DC	Ap x DC	Ae x DC	Ap x DC
	Diameter (DC)	≤0.0312	>0.0312	≤0.0312	>0.0312
P H K M S N — ALL	Profile	≤.25 ≤.50	≤.30	≤.22 ≤.45	≤.25
	Slot	1	≤.07 ≤.17	1	≤.06 ≤.15

Note:
- Bhn (Brinell) HRc (Rockwell C)
- reduce speed and feed 30 percent when using uncoated tools
- Fz x No. of Flutes x max available rpm when recommendation exceeds machine limit
- helical ramp at 1 degrees or less, using slotting speed and feed rates (plunging is not recommended)
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x DC maximum)
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for detailed technical charts by series

Baseline

INCH Baseline Speed and Feed Square, Corner Radius & Ball End With and Without Reach	Hardness		Vc (sfm)		DC • in 0.0050	0.0156	0.0312	0.0625	0.0938	0.1200
P **CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	365	RPM	278860	89378	44689	22309	14865	11619
			(292-438)	Fz	0.000022	0.00007	0.00013	0.00027	0.00041	0.00052
				Feed (ipm)	12.05	12.05	12.05	12.05	12.05	12.05
		Slot	290	RPM	221560	71013	35506	17725	11810	9232
			(232-348)	Fz	0.000022	0.00007	0.00013	0.00027	0.00041	0.00052
				Feed (ipm)	9.57	9.57	9.57	9.57	9.57	9.57
P **ALLOY STEELS** 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	210	RPM	160440	51423	25712	12835	8552	6685
			(168-252)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00046
				Feed (ipm)	6.16	6.16	6.16	6.16	6.16	6.16
		Slot	165	RPM	126060	40404	20202	10085	6720	5253
			(132-198)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00046
				Feed (ipm)	4.84	4.84	4.84	4.84	4.84	4.84
M **STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	340	RPM	259760	83256	41628	20781	13846	10823
			(272-408)	Fz	0.000022	0.00007	0.00013	0.00027	0.00041	0.00052
				Feed (ipm)	11.22	11.22	11.22	11.22	11.22	11.22
		Slot	270	RPM	206280	66115	33058	16502	10996	8595
			(216-324)	Fz	0.000022	0.00007	0.00013	0.00027	0.00041	0.00052
				Feed (ipm)	8.91	8.91	8.91	8.91	8.91	8.91
M **STAINLESS STEELS (DIFFICULT)** 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	235	RPM	179540	57545	28772	14363	9570	7481
			(188-282)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00046
				Feed (ipm)	6.90	6.90	6.90	6.90	6.90	6.90
		Slot	185	RPM	141340	45301	22651	11307	7534	5889
			(148-222)	Fz	0.000019	0.00006	0.00012	0.00024	0.00036	0.00046
				Feed (ipm)	5.43	5.43	5.43	5.43	5.43	5.43
M **STAINLESS STEELS (PH)** 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	215	RPM	164260	52647	26324	13141	8756	6844
			(172-258)	Fz	0.000014	0.00004	0.00008	0.00017	0.00025	0.00033
				Feed (ipm)	4.46	4.46	4.46	4.46	4.46	4.46
		Slot	170	RPM	129880	41628	20814	10390	6923	5412
			(136-204)	Fz	0.000014	0.00004	0.00008	0.00017	0.00025	0.00033
				Feed (ipm)	3.53	3.53	3.53	3.53	3.53	3.53
K **CAST IRONS (LOW & MEDIUM ALLOY)** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	305	RPM	233020	74686	37343	18642	12421	9709
			(244-366)	Fz	0.000022	0.00007	0.00014	0.00027	0.00041	0.00052
				Feed (ipm)	10.08	10.08	10.08	10.08	10.08	10.08
		Slot	245	RPM	187180	59994	29997	14974	9978	7799
			(196-294)	Fz	0.000022	0.00007	0.00014	0.00027	0.00041	0.00052
				Feed (ipm)	8.10	8.10	8.10	8.10	8.10	8.10
N **ALUMINUM ALLOYS** 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	1000	RPM	764000	244872	122436	61120	40725	31833
			(800-1200)	Fz	0.000064	0.00020	0.00040	0.00080	0.00120	0.00153
				Feed (ipm)	97.50	97.50	97.50	97.50	97.50	97.50
		Slot	800	RPM	611200	195897	97949	48896	32580	25467
			(640-960)	Fz	0.000064	0.00020	0.00040	0.00080	0.00120	0.00153
				Feed (ipm)	78.00	78.00	78.00	78.00	78.00	78.00
N **COPPER ALLOYS** Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	515	RPM	393460	126109	63054	31477	20973	16394
			(412-618)	Fz	0.000048	0.00015	0.00030	0.00060	0.00090	0.00115
				Feed (ipm)	37.68	37.68	37.68	37.68	37.68	37.68
		Slot	410	RPM	313240	100397	50199	25059	16697	13052
			(328-492)	Fz	0.000048	0.00015	0.00030	0.00060	0.00090	0.00115
				Feed (ipm)	30.00	30.00	30.00	30.00	30.00	30.00

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KYOCERA Solid Tools
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Baseline

INCH Baseline Speed and Feed Square, Corner Radius & Ball End With and Without Reach	Hardness		Vc (sfm)		DC • in 0.0050	0.0156	0.0312	0.0625	0.0938	0.1200
N **PLASTICS** Polycarbonate, PVC, Polypropylene		Profile	1000	RPM	764000	244872	122436	61120	40725	31833
			(800-1200)	Fz	0.000064	0.00020	0.00040	0.00080	0.00120	0.00153
				Feed (ipm)	97.50	97.50	97.50	97.50	97.50	97.50
		Slot	800	RPM	611200	195897	97949	48896	32580	25467
			(640-960)	Fz	0.000064	0.00020	0.00040	0.00080	0.00120	0.00153
				Feed (ipm)	78.00	78.00	78.00	78.00	78.00	78.00
S **SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	60	RPM	45840	14692	7346	3667	2443	1910
			(48-72)	Fz	0.000012	0.00004	0.00008	0.00015	0.00023	0.00029
				Feed (ipm)	1.11	1.11	1.11	1.11	1.11	1.11
		Slot	45	RPM	34380	11019	5510	2750	1833	1433
			(36-54)	Fz	0.000012	0.00004	0.00008	0.00015	0.00023	0.00029
				Feed (ipm)	0.83	0.83	0.83	0.83	0.83	0.83
S **SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	45	RPM	34380	11019	5510	2750	1833	1433
			(36-54)	Fz	0.000008	0.00003	0.00005	0.00010	0.00015	0.00019
				Feed (ipm)	0.55	0.55	0.55	0.55	0.55	0.55
		Slot	35	RPM	26740	8571	4285	2139	1425	1114
			(28-42)	Fz	0.000008	0.00003	0.00005	0.00010	0.00015	0.00019
				Feed (ipm)	0.43	0.43	0.43	0.43	0.43	0.43
S **TITANIUM ALLOYS** Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	160	RPM	122240	39179	19590	9779	6516	5093
			(128-192)	Fz	0.000014	0.00004	0.00008	0.00017	0.00025	0.00033
				Feed (ipm)	3.32	3.32	3.32	3.32	3.32	3.32
		Slot	130	RPM	99320	31833	15917	7946	5294	4138
			(104-156)	Fz	0.000014	0.00004	0.00008	0.00017	0.00025	0.00033
				Feed (ipm)	2.70	2.70	2.70	2.70	2.70	2.70
S **TITANIUM ALLOYS (DIFFICULT)** Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	60	RPM	45840	14692	7346	3667	2443	1910
			(48-72)	Fz	0.000010	0.00003	0.00006	0.00012	0.00018	0.00023
				Feed (ipm)	0.88	0.88	0.88	0.88	0.88	0.88
		Slot	45	RPM	34380	11019	5510	2750	1833	1433
			(36-54)	Fz	0.000010	0.00003	0.00006	0.00012	0.00018	0.00023
				Feed (ipm)	0.66	0.66	0.66	0.66	0.66	0.66
H **TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	175	RPM	133700	42853	21426	10696	7127	5571
			(140-210)	Fz	0.000016	0.00005	0.00010	0.00020	0.00030	0.00038
				Feed (ipm)	4.28	4.28	4.28	4.28	4.28	4.28
		Slot	140	RPM	106960	34282	17141	8557	5701	4457
			(112-168)	Fz	0.000016	0.00005	0.00010	0.00020	0.00030	0.00038
				Feed (ipm)	3.42	3.42	3.42	3.42	3.42	3.42

Note:
- 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 No. of flutes x rpm
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D_1 maximum)
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for detailed technical charts by series

KYOCERA Solid Tools
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Baseline

	METRIC Baseline Speed and Feed Square & Ball End With and Without Reach	Hardness		Vc (m/min)		DC • (mm) 0.1	0.5	1	1.5	2	2.5	3
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	111	RPM	353837	70767	35384	23589	17692	14153	11795
				(89-134)	Fz	0.00043	0.00216	0.00432	0.00648	0.00865	0.01081	0.01297
					Feed (mm/min)	306	306	306	306	306	306	306
			Slot	88	RPM	281131	56226	28113	18742	14057	11245	9371
				(71-106)	Fz	0.00043	0.00216	0.00432	0.00648	0.00865	0.01081	0.01297
					Feed (mm/min)	243	243	243	243	243	243	243
P	**ALLOY STEELS** 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	64	RPM	203577	40715	20358	13572	10179	8143	6786
				(51-77)	Fz	0.00038	0.00192	0.00384	0.00576	0.00769	0.00961	0.01153
					Feed (mm/min)	156	156	156	156	156	156	156
			Slot	50	RPM	159954	31991	15995	10664	7998	6398	5332
				(40-60)	Fz	0.00038	0.00192	0.00384	0.00576	0.00769	0.00961	0.01153
					Feed (mm/min)	123	123	123	123	123	123	123
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	Profile	104	RPM	329602	65920	32960	21973	16480	13184	10987
				(83-124)	Fz	0.00043	0.00216	0.00432	0.00648	0.00865	0.01081	0.01295
					Feed (mm/min)	285	285	285	285	285	285	285
			Slot	82	RPM	261742	52348	26174	17449	13087	10470	8725
				(66-99)	Fz	0.00043	0.00216	0.00432	0.00648	0.00865	0.01081	0.01295
					Feed (mm/min)	226	226	226	226	226	226	226
M	**STAINLESS STEELS (DIFFICULT)** 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	72	RPM	227813	45563	22781	15188	11391	9113	7594
				(57-86)	Fz	0.00038	0.00192	0.00385	0.00577	0.00769	0.00961	0.01154
					Feed (mm/min)	175	175	175	175	175	175	175
			Slot	56	RPM	179342	35868	17934	11956	8967	7174	5978
				(45-68)	Fz	0.00038	0.00192	0.00385	0.00577	0.00769	0.00961	0.01154
					Feed (mm/min)	138	138	138	138	138	138	138
M	**STAINLESS STEELS (PH)** 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	Profile	66	RPM	208425	41685	20842	13895	10421	8337	6947
				(52-79)	Fz	0.00027	0.00136	0.00272	0.00408	0.00544	0.00680	0.00819
					Feed (mm/min)	113	113	113	113	113	113	113
			Slot	52	RPM	164801	32960	16480	10987	8240	6592	5493
				(41-62)	Fz	0.00027	0.00136	0.00272	0.00408	0.00544	0.00680	0.00819
					Feed (mm/min)	90	90	90	90	90	90	90
K	**CAST IRONS (LOW & MEDIUM ALLOY)** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	93	RPM	295672	59134	29567	19711	14784	11827	9856
				(74-112)	Fz	0.00043	0.00217	0.00433	0.00650	0.00866	0.01083	0.01301
					Feed (mm/min)	256	256	256	256	256	256	256
			Slot	75	RPM	237507	47501	23751	15834	11875	9500	7917
				(60-90)	Fz	0.00043	0.00217	0.00433	0.00650	0.00866	0.01083	0.01301
					Feed (mm/min)	206	206	206	206	206	206	206
N	**ALUMINUM ALLOYS** 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	Profile	305	RPM	969416	193883	96942	64628	48471	38777	32314
				(244-366)	Fz	0.00128	0.00639	0.01277	0.01916	0.02555	0.03193	0.03832
					Feed (mm/min)	2477	2477	2477	2477	2477	2477	2477
			Slot	244	RPM	775533	155107	77553	51702	38777	31021	25851
				(195-293)	Fz	0.00128	0.00639	0.01277	0.01916	0.02555	0.03193	0.03832
					Feed (mm/min)	1981	1981	1981	1981	1981	1981	1981
N	**COPPER ALLOYS** Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	Profile	157	RPM	499249	99850	49925	33283	24962	19970	16642
				(126-188)	Fz	0.00096	0.00479	0.00959	0.01438	0.01917	0.02396	0.02876
					Feed (mm/min)	957	957	957	957	957	957	957
			Slot	125	RPM	397461	79492	39746	26497	19873	15898	13249
				(100-150)	Fz	0.00096	0.00479	0.00959	0.01438	0.01917	0.02396	0.02876
					Feed (mm/min)	762	762	762	762	762	762	762

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METRIC

Baseline

	METRIC Baseline Speed and Feed Square & Ball End With and Without Reach	Hardness		Vc (m/min)		DC • (mm) 0.1	0.5	1	1.5	2	2.5	3
N	**PLASTICS** Polycarbonate, PVC, Polypropylene		Profile	305	RPM	969416	193883	96942	64628	48471	38777	32314
				(244-366)	Fz	0.00128	0.00639	0.01277	0.01916	0.02555	0.03193	0.03832
					Feed (mm/min)	2477	2477	2477	2477	2477	2477	2477
			Slot	244	RPM	775533	155107	77553	51702	38777	31021	25851
				(195-293)	Fz	0.00128	0.00639	0.01277	0.01916	0.02555	0.03193	0.03832
					Feed (mm/min)	1981	1981	1981	1981	1981	1981	1981
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy, Monel 400	≤ 300 Bhn or ≤ 32 HRc	Profile	18	RPM	58165	11633	5816	3878	2908	2327	1939
				(15-22)	Fz	0.00024	0.00121	0.00242	0.00362	0.00483	0.00604	0.00722
					Feed (mm/min)	28	28	28	28	28	28	28
			Slot	14	RPM	43624	8725	4362	2908	2181	1745	1454
				(11-16)	Fz	0.00024	0.00121	0.00242	0.00362	0.00483	0.00604	0.00722
					Feed (mm/min)	21	21	21	21	21	21	21
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	14	RPM	43624	8725	4362	2908	2181	1745	1454
				(11-16)	Fz	0.00016	0.00080	0.00161	0.00241	0.00322	0.00402	0.00486
					Feed (mm/min)	14	14	14	14	14	14	14
			Slot	11	RPM	33930	6786	3393	2262	1696	1357	1131
				(9-13)	Fz	0.00016	0.00080	0.00161	0.00241	0.00322	0.00402	0.00486
					Feed (mm/min)	11	11	11	11	11	11	11
S	**TITANIUM ALLOYS** Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	49	RPM	155107	31021	15511	10340	7755	6204	5170
				(39-59)	Fz	0.00027	0.00136	0.00272	0.00408	0.00544	0.00680	0.00821
					Feed (mm/min)	84	84	84	84	84	84	84
			Slot	40	RPM	126024	25205	12602	8402	6301	5041	4201
				(32-48)	Fz	0.00027	0.00136	0.00272	0.00408	0.00544	0.00680	0.00821
					Feed (mm/min)	69	69	69	69	69	69	69
S	**TITANIUM ALLOYS (DIFFICULT)** Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	≤ 440 Bhn or ≤ 47 HRc	Profile	18	RPM	58165	11633	5816	3878	2908	2327	1939
				(15-22)	Fz	0.00019	0.00096	0.00192	0.00288	0.00384	0.00480	0.00585
					Feed (mm/min)	22	22	22	22	22	22	22
			Slot	14	RPM	43624	8725	4362	2908	2181	1745	1454
				(11-16)	Fz	0.00019	0.00096	0.00192	0.00288	0.00384	0.00480	0.00585
					Feed (mm/min)	17	17	17	17	17	17	17
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	53	RPM	169648	33930	16965	11310	8482	6786	5655
				(43-64)	Fz	0.00032	0.00160	0.00320	0.00480	0.00640	0.00800	0.00962
					Feed (mm/min)	109	109	109	109	109	109	109
			Slot	43	RPM	135718	27144	13572	9048	6786	5429	4524
				(34-51)	Fz	0.00032	0.00160	0.00320	0.00480	0.00640	0.00800	0.00962
					Feed (mm/min)	87	87	87	87	87	87	87

Note:
- Bhn (Brinell)   HRc (Rockwell C)
- when recommended speed exceeds your capability, use maximum available and recalculate mm/min
- rpm = (Vc x 1000) / (DC x 3.14)
- mm/min = Fz x No. of flutes x rpm
- reduce speed and feed for materials harder than listed
- reduce feed and Ae when finish milling (.02 x D_1 maximum)
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for detailed technical charts by series

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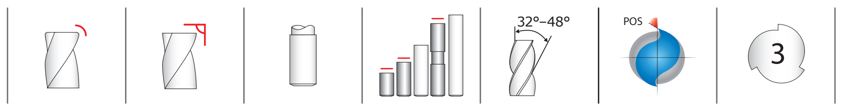

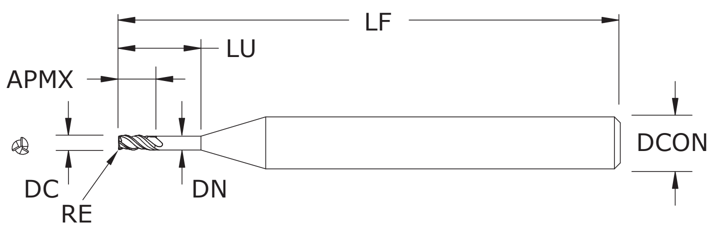

New Expanded Tools

M032
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- Variable helix design improves stability, extends tool life, and improves part quality in challenging applications
- Reinforced shank maximizes rigidity, especially in applications requiring additional tool extension
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- Available from stock in a selection of popular diameters, flute lengths, and end configurations
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

inch							EDP NO.
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	CORNER RADIUS RE	TI-NAMITE-A (AITiN)
0.0312	1/4	0.063	–	–	2-1/2	–	05271
0.0312	1/4	0.063	0.155	0.029	2-1/2	–	05272
0.0312	1/4	0.063	–	–	2-1/2	0.006	05270
0.0312	1/4	0.094	–	–	2-1/2	–	05274
0.0312	1/4	0.094	–	–	2-1/2	0.006	05273
0.0312	1/4	0.094	0.155	0.029	2-1/2	0.006	05275
0.0469	1/4	0.094	–	–	2-1/2	–	05277
0.0469	1/4	0.094	0.230	0.043	2-1/2	–	05278
0.0469	1/4	0.094	–	–	2-1/2	0.010	05276
0.0469	1/4	0.141	–	–	2-1/2	–	05280
0.0469	1/4	0.141	–	–	2-1/2	0.010	05279
0.0469	1/4	0.141	0.230	0.043	2-1/2	0.010	05281
0.0625	1/4	0.140	–	–	2-1/2	–	05283
0.0625	1/4	0.140	0.312	0.058	2-1/2	–	05284
0.0625	1/4	0.140	–	–	2-1/2	0.010	05282
0.0625	1/4	0.188	–	–	2-1/2	–	05286
0.0625	1/4	0.188	–	–	2-1/2	0.010	05285
0.0625	1/4	0.188	0.312	0.058	2-1/2	0.010	05287
0.0781	1/4	0.140	–	–	2-1/2	–	05289
0.0781	1/4	0.140	0.390	0.072	2-1/2	–	05290
0.0781	1/4	0.140	–	–	2-1/2	0.010	05288
0.0781	1/4	0.234	–	–	2-1/2	–	05292
0.0781	1/4	0.234	–	–	2-1/2	0.010	05291
0.0781	1/4	0.234	0.390	0.072	2-1/2	0.010	05293
0.0938	1/4	0.188	–	–	2-1/2	–	05295
0.0938	1/4	0.188	0.465	0.086	2-1/2	–	05296
0.0938	1/4	0.188	–	–	2-1/2	0.010	05294
0.0938	1/4	0.375	–	–	2-1/2	–	05298
0.0938	1/4	0.375	–	–	2-1/2	0.010	05297
0.0938	1/4	0.375	0.465	0.086	2-1/2	0.010	05299
0.1094	1/4	0.188	–	–	2-1/2	–	05301
0.1094	1/4	0.188	0.545	0.101	2-1/2	–	05302
0.1094	1/4	0.188	–	–	2-1/2	0.010	05300
0.1094	1/4	0.438	–	–	2-1/2	–	05304
0.1094	1/4	0.438	–	–	2-1/2	0.010	05303
0.1094	1/4	0.438	0.545	0.101	2-1/2	0.010	05305

TOLERANCES (inch)

.031–.109 DIAMETER
DC = +0.000/–0.001
DCON = h_6
RE = +0.002/–0.002

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

MICRO SGS Solid Carbide Tools

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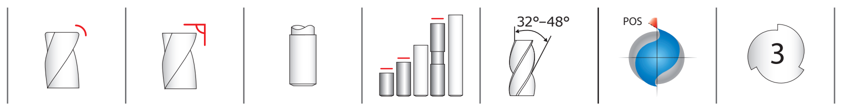
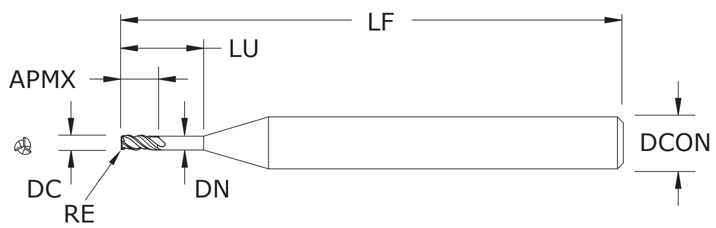


New Expanded Tools



TOLERANCES (mm)

1,0–3,0 DIAMETER
DC = +0,0000/–0,0254
DCON = h_6
RE = +0,050/–0,050

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

M032
METRIC SERIES

mm							EDP NO,
CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	CORNER RADIUS RE	TI-NAMITE-A (AITiN)
1,0	6,0	1,5	–	–	63,5	–	05324
1,0	6,0	1,5	–	–	63,5	0,1	05321
1,0	6,0	1,5	–	–	63,5	0,2	05322
1,0	6,0	1,5	–	–	63,5	0,3	05323
1,0	6,0	3,0	–	–	63,5	–	05328
1,0	6,0	3,0	–	–	63,5	0,1	05325
1,0	6,0	3,0	–	–	63,5	0,2	05326
1,0	6,0	3,0	–	–	63,5	0,3	05327
1,0	6,0	3,0	10,0	0,92	75,0	–	05332
1,0	6,0	3,0	10,0	0,92	63,5	0,1	05329
1,0	6,0	3,0	10,0	0,92	63,5	0,2	05330
1,0	6,0	3,0	10,0	0,92	63,5	0,3	05331
1,5	6,0	2,5	–	–	63,5	–	05310
1,5	6,0	2,5	–	–	63,5	0,1	05306
1,5	6,0	2,5	–	–	63,5	0,2	05307
1,5	6,0	2,5	–	–	63,5	0,3	05308
1,5	6,0	2,5	–	–	63,5	0,5	05309
1,5	6,0	4,5	–	–	63,5	–	05315
1,5	6,0	4,5	–	–	63,5	0,1	05311
1,5	6,0	4,5	–	–	63,5	0,2	05312
1,5	6,0	4,5	–	–	63,5	0,3	05313
1,5	6,0	4,5	–	–	63,5	0,5	05314
1,5	6,0	4,5	15,0	1,38	75,0	–	05320
1,5	6,0	4,5	15,0	1,38	63,5	0,1	05316
1,5	6,0	4,5	15,0	1,38	63,5	0,2	05317
1,5	6,0	4,5	15,0	1,38	63,5	0,3	05318
1,5	6,0	4,5	15,0	1,38	63,5	0,5	05319
2,0	6,0	3,0	–	–	63,5	–	05348
2,0	6,0	3,0	–	–	63,5	0,2	05345
2,0	6,0	3,0	–	–	63,5	0,3	05346
2,0	6,0	3,0	–	–	63,5	0,5	05347
2,0	6,0	6,0	–	–	63,5	–	05352
2,0	6,0	6,0	–	–	63,5	0,2	05349
2,0	6,0	6,0	–	–	63,5	0,3	05350

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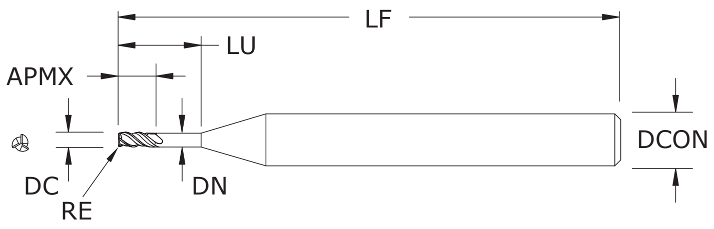
- Variable helix design improves stability, extends tool life, and improves part quality in challenging applications
- Reinforced shank maximizes rigidity, especially in applications requiring additional tool extension
- Proprietary coating allows for superior chip flow, driving industry leading productivity and value, even at low spindle speeds.
- Available from stock in a selection of popular diameters, flute lengths, and end configurations
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

MICRO SGS® Solid Carbide Tools | KYOCERA



New Expanded Tools

M032
METRIC SERIES

continued

CUTTING DIAMETER DC	SHANK DIAMETER DCON	LENGTH OF CUT APMX	REACH LU	NECK DIAMETER DN	OVERALL LENGTH LF	CORNER RADIUS RE	EDP NO. TI-NAMITE-A (AlTiN)
		mm					
2,0	6,0	6,0	–	–	63,5	0,5	05351
2,0	6,0	6,0	20,0	1,84	75,0	–	05356
2,0	6,0	6,0	20,0	1,84	63,5	0,2	05353
2,0	6,0	6,0	20,0	1,84	63,5	0,3	05354
2,0	6,0	6,0	20,0	1,84	63,5	0,5	05355
2,5	6,0	4,0	–	–	63,5	–	05336
2,5	6,0	4,0	–	–	63,5	0,2	05333
2,5	6,0	4,0	–	–	63,5	0,3	05334
2,5	6,0	4,0	–	–	63,5	0,5	05335
2,5	6,0	7,5	–	–	63,5	–	05340
2,5	6,0	7,5	–	–	63,5	0,2	05337
2,5	6,0	7,5	–	–	63,5	0,3	05338
2,5	6,0	7,5	–	–	63,5	0,5	05339
2,5	6,0	7,5	25,0	2,3	75,0	–	05344
2,5	6,0	7,5	25,0	2,3	63,5	0,2	05341
2,5	6,0	7,5	25,0	2,3	63,5	0,3	05342
2,5	6,0	7,5	25,0	2,3	63,5	0,5	05343
3,0	6,0	5,0	–	–	63,5	–	05361
3,0	6,0	5,0	–	–	63,5	0,2	05357
3,0	6,0	5,0	–	–	63,5	0,3	05358
3,0	6,0	5,0	–	–	63,5	0,5	05359
3,0	6,0	5,0	–	–	63,5	1,0	05360
3,0	6,0	9,0	–	–	63,5	–	05366
3,0	6,0	9,0	–	–	63,5	0,2	05362
3,0	6,0	9,0	–	–	63,5	0,3	05363
3,0	6,0	9,0	–	–	63,5	0,5	05364
3,0	6,0	9,0	–	–	63,5	1,0	05365
3,0	6,0	9,0	30,0	2,76	75,0	–	05371
3,0	6,0	9,0	30,0	2,76	63,5	0,2	05367
3,0	6,0	9,0	30,0	2,76	63,5	0,3	05368
3,0	6,0	9,0	30,0	2,76	63,5	0,5	05369
3,0	6,0	9,0	30,0	2,76	63,5	1,0	05370

TOLERANCES (mm)

1,0–3,0 DIAMETER
DC = +0,0000/–0,0254
DCON = h_6
RE = +0,050/–0,050

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

	Series M032 Fractional	Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/32	5/64	7/64
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.25	≤ 1	790	RPM	96570	38628	27591
						(632-948)	Fz	0.00009	0.00022	0.00031
							Feed (ipm)	26.0	26.0	26.0
			Slot	1	≤ .5	630	RPM	77011	30804	22003
						(504-756)	Fz	0.00009	0.00022	0.00031
							Feed (ipm)	20.5	20.5	20.5
			Finish	≤ .02	1	1565	RPM	191306	76522	54659
						(1252-1878)	Fz	0.00017	0.00041	0.00058
							Feed (ipm)	95.0	95.0	95.0
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.25	≤ 1	450	RPM	55008	22003	15717
						(360-540)	Fz	0.00007	0.00017	0.00023
							Feed (ipm)	11.0	11.0	11.0
			Slot	1	≤ .5	360	RPM	44006	17603	12573
						(288-432)	Fz	0.00007	0.00017	0.00024
							Feed (ipm)	8.9	8.9	8.9
			Finish	≤ .02	1	895	RPM	109405	43762	31259
						(716-1074)	Fz	0.00012	0.00030	0.00043
							Feed (ipm)	40.0	40.0	40.0
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 560 Bhn or ≤ 55 HRc	Profile	≤ 0.25	≤ 1	93	RPM	11368	4547	3248
						(74-112)	Fz	0.00003	0.00007	0.00010
							Feed (ipm)	0.9	0.9	0.9
			Slot	1	≤ .5	65	RPM	7946	3178	2270
						(52-78)	Fz	0.00003	0.00006	0.00009
							Feed (ipm)	0.6	0.6	0.6
			Finish	≤ .02	1	167	RPM	20414	8166	5833
						(134-200)	Fz	0.00004	0.00011	0.00016
							Feed (ipm)	2.8	2.8	2.8
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.25	≤ 1	69	RPM	8435	3374	2410
						(55-83)	Fz	0.00003	0.00007	0.00010
							Feed (ipm)	0.8	0.8	0.8
			Slot	1	≤ .5	50	RPM	6112	2445	1746
						(40-60)	Fz	0.00002	0.00006	0.00009
							Feed (ipm)	0.5	0.5	0.5
			Finish	≤ .02	1	124	RPM	15158	6063	4331
						(99-149)	Fz	0.00005	0.00012	0.00017
							Feed (ipm)	2.2	2.2	2.2
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ 0.25	≤ 1	620	RPM	75789	30316	21654
						(496-744)	Fz	0.00011	0.00028	0.00039
							Feed (ipm)	25.5	25.5	25.5
			Slot	1	≤ .5	450	RPM	55008	22003	15717
						(360-540)	Fz	0.00010	0.00024	0.00034
							Feed (ipm)	16.0	16.0	16.0
			Finish	≤ .02	1	1115	RPM	136298	54519	38942
						(892-1338)	Fz	0.00018	0.00045	0.00062
							Feed (ipm)	73.0	73.0	73.0

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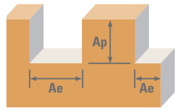
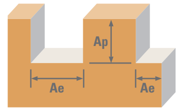
FRACTIONAL
Series M032



Series M032 Fractional		Hardness		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/32	5/64	7/64
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.25	≤ 1	335	RPM	40950	16380	11700
						(268-402)	Fz	0.00008	0.00020	0.00028
							Feed (ipm)	9.9	9.9	9.9
			Slot	1	≤ .5	245	RPM	29949	11980	8557
						(196-294)	Fz	0.00007	0.00017	0.00023
							Feed (ipm)	6.0	6.0	6.0
			Finish	≤ .02	1	605	RPM	73955	29582	21130
						(484-726)	Fz	0.00012	0.00031	0.00043
							Feed (ipm)	27.5	27.5	27.5
M	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ 0.25	≤ 1	310	RPM	37894	15158	10827
						(248-372)	Fz	0.00008	0.00020	0.00028
							Feed (ipm)	9.0	9.0	9.0
			Slot	1	≤ .5	225	RPM	27504	11002	7858
						(180-270)	Fz	0.00007	0.00017	0.00023
							Feed (ipm)	5.5	5.5	5.5
			Finish	≤ .02	1	555	RPM	67843	27137	19384
						(444-666)	Fz	0.00013	0.00031	0.00044
							Feed (ipm)	25.5	25.5	25.5
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ 0.5	≤ 1.5	200	RPM	24448	9779	6985
						(160-240)	Fz	0.00007	0.00017	0.00024
							Feed (ipm)	5.1	5.1	5.1
			Slot	1	≤ 1	145	RPM	17725	7090	5064
						(116-174)	Fz	0.00006	0.00015	0.00021
							Feed (ipm)	3.2	3.2	3.2
			Finish	≤ .02	1	360	RPM	44006	17603	12573
						(288-432)	Fz	0.00011	0.00027	0.00038
							Feed (ipm)	14.5	14.5	14.5
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ 0.5	≤ 1.5	245	RPM	29949	11980	8557
						(196-294)	Fz	0.00007	0.00018	0.00025
							Feed (ipm)	6.3	6.3	6.3
			Slot	1	≤ 1	180	RPM	22003	8801	6287
						(144-216)	Fz	0.00006	0.00015	0.00021
							Feed (ipm)	3.9	3.9	3.9
			Finish	≤ .02	1	440	RPM	53786	21514	15367
						(352-528)	Fz	0.00011	0.00028	0.00039
							Feed (ipm)	18.0	18.0	18.0

Bhn (Brinell)   HRc (Rockwell C)
rpm = Vc x 3.82 / DC
ipm = Fz x 3 x rpm (Fz x 3 x max available rpm when recommendation exceeds machine limit)
ramp up to 5 degrees using slotting speed and feed rates. Do not plunge.
reduce speed and feed for materials harder than listed
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

METRIC
Series M032



Series M032 Metric		Hardness		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 1	2	3
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.25	≤ 1	241	RPM	76584	38292	25528
						(193-289)	Fz	0.0029	0.0057	0.0086
							Feed (mm/min)	660	660	660
			Slot	1	≤ .5	192	RPM	61073	30537	20358
						(154-230)	Fz	0.0028	0.0057	0.0085
							Feed (ipm)	521	521	521
			Finish	≤ .02	1	477	RPM	151714	75857	50571
						(382-572)	Fz	0.0053	0.0106	0.0159
							Feed (ipm)	2413	2413	2413
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.25	≤ 1	137	RPM	43624	21812	14541
						(110-165)	Fz	0.0021	0.0043	0.0064
							Feed (ipm)	279	279	279
			Slot	1	≤ .5	110	RPM	34899	17449	11633
						(88-132)	Fz	0.0022	0.0043	0.0065
							Feed (ipm)	226	226	226
			Finish	≤ .02	1	273	RPM	86763	43381	28921
						(218-327)	Fz	0.0039	0.0078	0.0117
							Feed (ipm)	1016	1016	1016
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 560 Bhn or ≤ 55 HRc	Profile	≤ 0.25	≤ 1	28	RPM	9016	4508	3005
						(23-34)	Fz	0.0009	0.0018	0.0026
							Feed (ipm)	24	24	24
			Slot	1	≤ .5	20	RPM	6301	3151	2100
						(16-24)	Fz	0.0008	0.0016	0.0025
							Feed (ipm)	15	15	15
			Finish	≤ .02	1	51	RPM	16189	8095	5396
						(41-61)	Fz	0.0014	0.0029	0.0043
							Feed (ipm)	70	70	70
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375 Bhn or ≤ 40 HRc	Profile	≤ 0.25	≤ 1	21	RPM	6689	3344	2230
						(17-25)	Fz	0.0009	0.0019	0.0028
							Feed (ipm)	19	19	19
			Slot	1	≤ .5	15	RPM	4847	2424	1616
						(12-18)	Fz	0.0008	0.0016	0.0024
							Feed (ipm)	11	11	11
			Finish	≤ .02	1	38	RPM	12021	6010	4007
						(30-45)	Fz	0.0015	0.0031	0.0046
							Feed (ipm)	56	56	56
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	Profile	≤ 0.25	≤ 1	189	RPM	60104	30052	20035
						(151-227)	Fz	0.0036	0.0072	0.0108
							Feed (ipm)	648	648	648
			Slot	1	≤ .5	137	RPM	43624	21812	14541
						(110-165)	Fz	0.0031	0.0062	0.0093
							Feed (ipm)	406	406	406
			Finish	≤ .02	1	340	RPM	108090	54045	36030
						(272-408)	Fz	0.0057	0.0114	0.0172
							Feed (ipm)	1854	1854	1854

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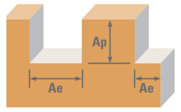
Series M032



	Series M032 Metric	Hardness		Ae x DC	Ap x DC	Vc (m/min)	DC • mm	1	2	3
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L	≤ 275 Bhn or ≤ 28 HRc	Profile	≤ 0.25	≤ 1	102	RPM	32475	16238	10825
						(82-123)	Fz	0.0026	0.0052	0.0077
							Feed (ipm)	251	251	251
			Slot	1	≤ .5	75	RPM	23751	11875	7917
						(60-90)	Fz	0.0021	0.0043	0.0064
							Feed (ipm)	152	152	152
			Finish	≤ .02	1	184	RPM	58650	29325	19550
						(148-221)	Fz	0.0040	0.0079	0.0119
							Feed (ipm)	699	699	699
M	STAINLESS STEELS (PH) 13-8 PH, 15-5 PH, 17-4 PH, Custom 450	≤ 325 Bhn or ≤ 35 HRc	Profile	≤ 0.25	≤ 1	94	RPM	30052	15026	10017
						(76-113)	Fz	0.0025	0.0051	0.0076
							Feed (ipm)	229	229	229
			Slot	1	≤ .5	69	RPM	21812	10906	7271
						(55-82)	Fz	0.0021	0.0043	0.0064
							Feed (ipm)	140	140	140
			Finish	≤ .02	1	169	RPM	53803	26901	17934
						(135-203)	Fz	0.0040	0.0080	0.0120
							Feed (ipm)	648	648	648
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, X-750, Incoloy, Waspaloy, Hastelloy, Rene	≤ 400 Bhn or ≤ 43 HRc	Profile	≤ 0.5	≤ 1.5	61	RPM	19388	9694	6463
						(49-73)	Fz	0.0022	0.0045	0.0067
							Feed (ipm)	130	130	130
			Slot	1	≤ 1	44	RPM	14057	7028	4686
						(35-53)	Fz	0.0019	0.0039	0.0058
							Feed (ipm)	81	81	81
			Finish	≤ .02	1	110	RPM	34899	17449	11633
						(88-132)	Fz	0.0035	0.0070	0.0106
							Feed (ipm)	368	368	368
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	Profile	≤ 0.5	≤ 1.5	75	RPM	23751	11875	7917
						(60-90)	Fz	0.0022	0.0045	0.0067
							Feed (ipm)	160	160	160
			Slot	1	≤ 1	55	RPM	17449	8725	5816
						(44-66)	Fz	0.0019	0.0038	0.0057
							Feed (ipm)	99	99	99
			Finish	≤ .02	1	134	RPM	42654	21327	14218
						(107-161)	Fz	0.0036	0.0071	0.0107
							Feed (ipm)	457	457	457

Bhn (Brinell) HRc (Rockwell C)
rpm = (Vc x 1000) / (DC x 3.14)
mm/min = Fz x 3 x rpm (Fz x 3 x max available rpm when recommendation exceeds machine limit)
reduce speed and feed for materials harder than listed
refer to the KYOCERA SGS Tool Wizard® for complete technical information (www.kyocera-sgstool.com)

MICRO SGS® Solid Carbide Tools

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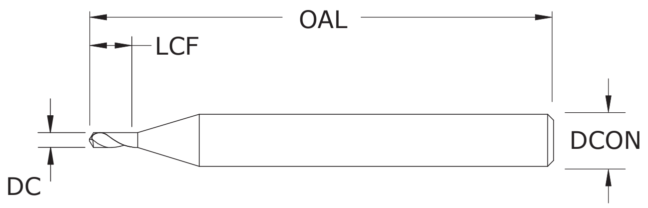
2 Flute Spotting External Coolant

90° 130° 2

New Expanded Tools



TOLERANCES (inch)

.005–.125 DIAMETER

DC = +0.0000/–0.0003

DCON = h_6

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

M080

FRACTIONAL SERIES

CUTTING DIAMETER DC (inch)	SHANK DIAMETER DCON (inch)	FLUTE LENGTH LCF (inch)	OVERALL LENGTH OAL (inch)	POINT ANGLE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0.0050	1/8	0.025	1-1/2	90	07016	07000
0.0100	1/8	0.035	1-1/2	90	07017	07001
0.0150	1/8	0.045	1-1/2	90	07018	07002
0.0200	1/8	0.050	1-1/2	90	07019	07003
0.0312	1/8	0.090	1-1/2	90	07020	07004
0.0625	1/8	0.200	1-1/2	90	07021	07005
0.0938	1/8	0.200	1-1/2	90	07022	07006
0.1250	1/8	0.200	1-1/2	90	07023	07007
0.0050	1/8	0.025	1-1/2	130	07024	07008
0.0100	1/8	0.035	1-1/2	130	07025	07009
0.0150	1/8	0.045	1-1/2	130	07026	07010
0.0200	1/8	0.050	1-1/2	130	07027	07011
0.0312	1/8	0.090	1-1/2	130	07028	07012
0.0625	1/8	0.200	1-1/2	130	07029	07013
0.0938	1/8	0.200	1-1/2	130	07030	07014
0.1250	1/8	0.200	1-1/2	130	07031	07015

- 4-facet point design, stub length, and mirror finish provide the highest quality spot
- Ti-Namite A coating and uncoated options for the ultimate performance and tool life in a variety of ferrous and non-ferrous workpiece materials
- Available from stock in all popular diameters and point configurations
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

2 Flute Spotting External Coolant

MICRO SGS® Solid Carbide Tools

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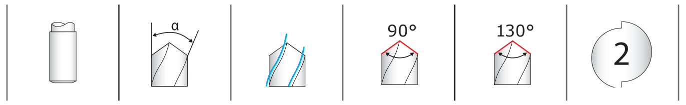


New Expanded Tools

M081

METRIC SERIES

- 4-facet point design, stub length, and mirror finish provide the highest quality spot
- Ti-Namite A coating and uncoated options for the ultimate performance and tool life in a variety of ferrous and non-ferrous workpiece materials
- Available from stock in all popular diameters and point configurations
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

mm					EDP NO.	
CUTTING DIAMETER DC	SHANK DIAMETER DCON	FLUTE LENGTH LCF	OVERALL LENGTH OAL	POINT ANGLE	UNCOATED	TI-NAMITE-A (AlTiN)
0,15	3,0	0,65	38,0	90	07048	07032
0,25	3,0	0,90	38,0	90	07049	07033
0,40	3,0	1,15	38,0	90	07050	07034
0,50	3,0	1,30	38,0	90	07051	07035
1,00	3,0	2,30	38,0	90	07052	07036
1,50	3,0	5,00	38,0	90	07053	07037
2,00	3,0	5,00	38,0	90	07054	07038
3,00	3,0	5,00	38,0	90	07055	07039
0,15	3,0	0,65	38,0	130	07056	07040
0,25	3,0	0,90	38,0	130	07057	07041
0,40	3,0	1,15	38,0	130	07058	07042
0,50	3,0	1,30	38,0	130	07059	07043
1,00	3,0	2,30	38,0	130	07060	07044
1,50	3,0	5,00	38,0	130	07061	07045
2,00	3,0	5,00	38,0	130	07062	07046
3,00	3,0	5,00	38,0	130	07063	07047

TOLERANCES (mm)

0,15–3,0 DIAMETER

DC = +0,000/–0,008

DCON = h_6

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

Series M080

	Series M080	Hardness	Vc (sfm)	DC • in	0.005	0.010	0.020	0.040	0.080	0.125
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	280 (224-336)	RPM	213920	106960	53480	26740	13370	8557
				Fz	0.00010	0.00021	0.0004	0.0008	0.0016	0.0026
				Feed (ipm)	22.0	22.0	22.0	22.0	22.0	22.0
	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	180 (144-216)	RPM	137520	68760	34380	17190	8595	5501
				Fz	0.00010	0.00019	0.0004	0.0008	0.0015	0.0024
				Feed (ipm)	13.3	13.3	13.3	13.3	13.3	13.3
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRc	70 (56-84)	RPM	53480	26740	13370	6685	3343	2139
				Fz	0.00004	0.00008	0.0002	0.0003	0.0006	0.0010
				Feed (ipm)	2.1	2.1	2.1	2.1	2.1	2.1
K	**CAST IRONS** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	280 (224-336)	RPM	213920	106960	53480	26740	13370	8557
				Fz	0.00007	0.00015	0.0003	0.0006	0.0012	0.0018
				Feed (ipm)	15.8	15.8	15.8	15.8	15.8	15.8
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 250 Bhn or ≤ 24 HRc	210 (168-252)	RPM	160440	80220	40110	20055	10028	6418
				Fz	0.00011	0.00021	0.0004	0.0008	0.0017	0.0026
				Feed (ipm)	17.0	17.0	17.0	17.0	17.0	17.0
	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 275 Bhn or ≤ 28 HRc	180 (144-216)	RPM	137520	68760	34380	17190	8595	5501
				Fz	0.0001	0.0002	0.0004	0.0008	0.0015	0.0024
				Feed (ipm)	13.3	13.3	13.3	13.3	13.3	13.3
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 320 Bhn or ≤ 34 HRc	70 (56-84)	RPM	53480	26740	13370	6685	3343	2139
				Fz	0.00006	0.00012	0.0002	0.0005	0.0010	0.0015
				Feed (ipm)	3.2	3.2	3.2	3.2	3.2	3.2
	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	120 (96-144)	RPM	91680	45840	22920	11460	5730	3667
				Fz	0.00006	0.00012	0.0002	0.0005	0.0010	0.0015
				Feed (ipm)	5.6	5.6	5.6	5.6	5.6	5.6
N	**ALUMINUM ALLOYS** 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	600 (480-720)	RPM	458400	229200	114600	57300	28650	18336
				Fz	0.00012	0.00024	0.0005	0.0009	0.0019	0.0029
				Feed (ipm)	54.0	54.0	54.0	54.0	54.0	54.0
	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	190 (152-228)	RPM	145160	72580	36290	18145	9073	5806
				Fz	0.00010	0.00019	0.0004	0.0008	0.0016	0.0024
				Feed (ipm)	14.1	14.1	14.1	14.1	14.1	14.1
	PLASTICS Polycarbonate, PVC		500 (400-600)	RPM	382000	191000	95500	47750	23875	15280
				Fz	0.00012	0.00024	0.0005	0.0009	0.0019	0.0029
				Feed (ipm)	45.0	45.0	45.0	45.0	45.0	45.0

Note:
- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = Vc x 3.82 / DC
- ipm = Fr x rpm (Fr x maximum available rpm when recommendation exceeds machine limit)
- reduce speed and feed 30% when using uncoated drills
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for complete technical information

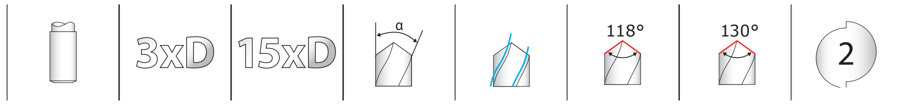
Series M081

Group	Series M081	Hardness	Vc (m/min)	DC • mm	0.15	0.25	0.5	1	2	3
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	85 (68-102)	RPM	180958	108575	54287	27144	13572	9048
				Fz	0.0031	0.0051	0.0103	0.0206	0.0412	0.0618
				Feed (mm/min)	559	559	559	559	559	559
P	**ALLOY STEELS** 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	55 (44-66)	RPM	116330	69798	34899	17449	8725	5816
				Fz	0.0029	0.0048	0.0097	0.0194	0.0387	0.0581
				Feed (mm/min)	338	338	338	338	338	338
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRc	21 (17-26)	RPM	45239	27144	13572	6786	3393	2262
				Fz	0.0012	0.0020	0.0039	0.0079	0.0157	0.0236
				Feed (mm/min)	53	53	53	53	53	53
K	**CAST IRONS** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	85 (68-102)	RPM	180958	108575	54287	27144	13572	9048
				Fz	0.0022	0.0037	0.0074	0.0148	0.0296	0.0444
				Feed (mm/min)	401	401	401	401	401	401
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 250 Bhn or ≤ 24 HRc	64 (51-77)	RPM	135718	81431	40715	20358	10179	6786
				Fz	0.0032	0.0053	0.0106	0.0212	0.0424	0.0636
				Feed (mm/min)	432	432	432	432	432	432
M	**STAINLESS STEELS (DIFFICULT)** 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 275 Bhn or ≤ 28 HRc	55 (44-66)	RPM	116330	69798	34899	17449	8725	5816
				Fz	0.0029	0.0048	0.0097	0.0194	0.0387	0.0581
				Feed (mm/min)	338	338	338	338	338	338
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 320 Bhn or ≤ 34 HRc	21 (17-26)	RPM	45239	27144	13572	6786	3393	2262
				Fz	0.0018	0.0030	0.0060	0.0120	0.0240	0.0359
				Feed (mm/min)	81	81	81	81	81	81
S	**TITANIUM ALLOYS** Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	37 (29-44)	RPM	77553	46532	23266	11633	5816	3878
				Fz	0.0018	0.0031	0.0061	0.0122	0.0245	0.0367
				Feed (mm/min)	142	142	142	142	142	142
N	**ALUMINUM ALLOYS** 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	183 (146-219)	RPM	387767	232660	116330	58165	29082	19388
				Fz	0.0035	0.0059	0.0118	0.0236	0.0472	0.0707
				Feed (mm/min)	1372	1372	1372	1372	1372	1372
N	**COPPER ALLOYS** Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	58 (46-69)	RPM	122793	73676	36838	18419	9209	6140
				Fz	0.0029	0.0049	0.0097	0.0194	0.0389	0.0583
				Feed (mm/min)	358	358	358	358	358	358
N	**PLASTICS** Polycarbonate, PVC		152 (122-183)	RPM	323139	193883	96942	48471	24235	16157
				Fz	0.0035	0.0059	0.0118	0.0236	0.0472	0.0707
				Feed (mm/min)	1143	1143	1143	1143	1143	1143

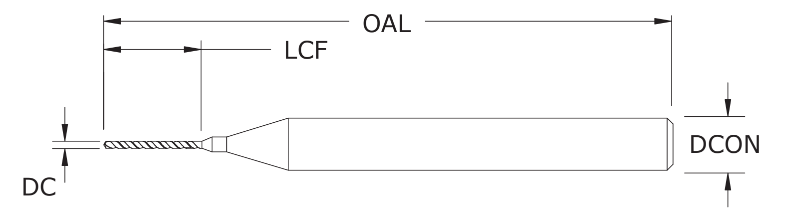
Note:
- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = (Vc x 1000) / (DC x 3.14)
- mm/min = Fr x rpm (Fr x maximum available rpm when recommendation exceeds machine limit)
- reduce speed and feed 30% when using uncoated drills
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for complete technical information

MICRO SGS Solid Carbide Tools KYOCERA

2 Flute External Coolant • Standard & Extended Length



New Expanded Tools



M105
FRACTIONAL & METRIC SERIES

TOLERANCES (inch)
≤.125 DIAMETER
DC = +.0000/+.0003
DCON = h_6

TOLERANCES (mm)
0,1–3,0 DIAMETER
DC = +0,000/+0,008
DCON = h_6

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

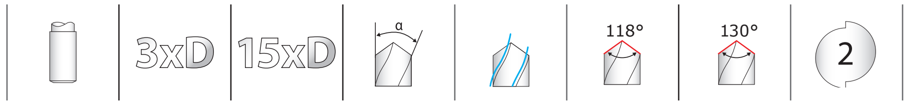
CUTTING DIAMETER DC (inch & mm)	DECIMAL EQUIV.	SHANK DIAMETER DCON	FLUTE LENGTH LCF	OVERALL LENGTH OAL	POINT ANGLE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0,1mm	0.0040	1/8	0.040	1-1/2	118	07088	07098
0,1mm	0.0040	1/8	0.070	1-1/2	118	07089	07099
0,13mm	0.0050	1/8	0.040	1-1/2	118	07064	07066
0,13mm	0.0050	1/8	0.070	1-1/2	118	07065	07067
#97	0.0059	1/8	0.080	1-1/2	118	07236	07068
#97	0.0059	1/8	0.120	1-1/2	118	07237	07069
#96	0.0063	1/8	0.080	1-1/2	118	07238	07070
#96	0.0063	1/8	0.120	1-1/2	118	07239	07071
#95	0.0067	1/8	0.080	1-1/2	118	07240	07072
#95	0.0067	1/8	0.120	1-1/2	118	07241	07073
#94	0.0071	1/8	0.100	1-1/2	118	07242	07074
#94	0.0071	1/8	0.150	1-1/2	118	07243	07075
#93	0.0075	1/8	0.100	1-1/2	118	07244	07076
#93	0.0075	1/8	0.150	1-1/2	118	07245	07077
#92	0.0079	1/8	0.100	1-1/2	118	07246	07078
#92	0.0079	1/8	0.150	1-1/2	118	07247	07079
#91	0.0083	1/8	0.100	1-1/2	118	07248	07080
#91	0.0083	1/8	0.150	1-1/2	118	07249	07081
#90	0.0087	1/8	0.100	1-1/2	118	07250	07082
#90	0.0087	1/8	0.150	1-1/2	118	07251	07083
#89	0.0091	1/8	0.150	1-1/2	118	07252	07084
#89	0.0091	1/8	0.220	1-1/2	118	07253	07085
#88	0.0095	1/8	0.150	1-1/2	118	07254	07086
#88	0.0095	1/8	0.220	1-1/2	118	07255	07087
0,25mm	0.0098	1/8	0.150	1-1/2	118	07108	07114
0,25mm	0.0098	1/8	0.220	1-1/2	118	07109	07115
#87	0.0100	1/8	0.150	1-1/2	118	07258	07090
#87	0.0100	1/8	0.220	1-1/2	118	07259	07091
#86	0.0105	1/8	0.150	1-1/2	118	07260	07092
#86	0.0105	1/8	0.220	1-1/2	118	07261	07093
#85	0.0110	1/8	0.150	1-1/2	118	07262	07094
#85	0.0110	1/8	0.220	1-1/2	118	07263	07095
#84	0.0115	1/8	0.150	1-1/2	118	07264	07096
#84	0.0115	1/8	0.220	1-1/2	118	07265	07097
0,3mm	0.0118	1/8	0.225	1-1/2	118	07127	07132
0,3mm	0.0118	1/8	0.280	1-1/2	118	07129	07134

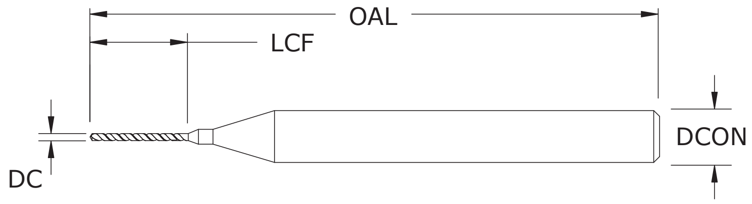
continued on next page

- 4-facet point design stabilizes on entry for superior hole size control and tool life
- Mirror surface finishes improve chip flow as hole depth increases
- Ti-Namite A coating and uncoated options for the ultimate performance in a variety of ferrous and non-ferrous workpiece materials
- Available from stock in a selection of popular lengths and diameters
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

2 Flute External Coolant • Standard & Extended Length

MICRO SGS Solid Carbide Tools | KYOCERA





New Expanded Tools

M105

FRACTIONAL & METRIC SERIES

continued

	inch & mm					EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	SHANK DIAMETER DCON	FLUTE LENGTH LCF	OVERALL LENGTH OAL	POINT ANGLE	UNCOATED	TI-NAMITE-A (AlTiN)
#83	0.0120	1/8	0.225	1-1/2	118	07268	07100
#83	0.0120	1/8	0.280	1-1/2	118	07269	07101
#82	0.0125	1/8	0.225	1-1/2	118	07270	07102
#82	0.0125	1/8	0.280	1-1/2	118	07271	07103
#81	0.0130	1/8	0.225	1-1/2	118	07272	07104
#81	0.0130	1/8	0.280	1-1/2	118	07273	07105
#80	0.0135	1/8	0.225	1-1/2	130	07274	07106
#80	0.0135	1/8	0.280	1-1/2	130	07275	07107
0,35mm	0.0138	1/8	0.225	1-1/2	130	07118	07122
0,35mm	0.0138	1/8	0.280	1-1/2	130	07119	07123
#79	0.0145	1/8	0.225	1-1/2	130	07278	07110
#79	0.0145	1/8	0.280	1-1/2	130	07279	07111
1/64	0.0156	1/8	0.250	1-1/2	130	07280	07112
1/64	0.0156	1/8	0.295	1-1/2	130	07281	07113
0,4mm	0.0157	1/8	0.250	1-1/2	130	07148	07233
0,4mm	0.0157	1/8	0.295	1-1/2	130	07232	07234
#78	0.0160	1/8	0.250	1-1/2	130	07284	07116
#78	0.0160	1/8	0.295	1-1/2	130	07285	07117
0,45mm	0.0177	1/8	0.250	1-1/2	130	07137	07143
0,45mm	0.0177	1/8	0.295	1-1/2	130	07140	07145
#77	0.0180	1/8	0.250	1-1/2	130	07288	07120
#77	0.0180	1/8	0.295	1-1/2	130	07289	07121
0,5mm	0.0197	1/8	0.260	1-1/2	130	07257	07267
0,5mm	0.0197	1/8	0.310	1-1/2	130	07266	07276
#76	0.0200	1/8	0.260	1-1/2	130	07292	07124
#76	0.0200	1/8	0.310	1-1/2	130	07293	07125
#75	0.0210	1/8	0.310	1-1/2	130	07294	07126
0,55mm	0.0217	1/8	0.340	1-1/2	130	07235	07256
#74	0.0225	1/8	0.340	1-1/2	130	07296	07128
0,6mm	0.0236	1/8	0.340	1-1/2	130	07283	07286
#73	0.0240	1/8	0.340	1-1/2	130	07298	07130
#72	0.0250	1/8	0.340	1-1/2	130	07299	07131
0,65mm	0.0256	1/8	0.340	1-1/2	130	07277	07282
#71	0.0260	1/8	0.340	1-1/2	130	07301	07133

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TOLERANCES (inch)

≤.125 DIAMETER
DC = +.0000/+.0003
DCON = h_6

TOLERANCES (mm)

0,1–3,0 DIAMETER
DC = +0,000/+0,008
DCON = h_6

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

KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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FRACTIONAL & METRIC

2 Flute External Coolant • Standard & Extended Length

M105

FRACTIONAL & METRIC SERIES

continued

	inch & mm					EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	SHANK DIAMETER DCON	FLUTE LENGTH LCF	OVERALL LENGTH OAL	POINT ANGLE	UNCOATED	TI-NAMITE-A (AlTiN)
0,7mm	0.0276	1/8	0.400	1-1/2	130	07291	07295
#70	0.0280	1/8	0.400	1-1/2	130	07303	07135
#69	0.0292	1/8	0.400	1-1/2	130	07304	07136
0,75mm	0.0295	1/8	0.400	1-1/2	130	07287	07290
#68	0.0310	1/8	0.400	1-1/2	130	07306	07138
1/32	0.0312	1/8	0.400	1-1/2	130	07307	07139
0,8mm	0.0315	1/8	0.400	1-1/2	130	07302	07305
#67	0.0320	1/8	0.400	1-1/2	130	07309	07141
#66	0.0330	1/8	0.400	1-1/2	130	07310	07142
0,85mm	0.0335	1/8	0.400	1-1/2	130	07297	07300
#65	0.0350	1/8	0.400	1-1/2	130	07312	07144
0,9mm	0.0354	1/8	0.400	1-1/2	130	07313	07316
#64	0.0360	1/8	0.400	1-1/2	130	07314	07146
#63	0.0370	1/8	0.400	1-1/2	130	07315	07147
0,95mm	0.0374	1/8	0.400	1-1/2	130	07308	07311
#62	0.0380	1/8	0.400	1-1/2	130	07317	07149
#61	0.0390	1/8	0.400	1-1/2	130	07318	07150
1,0mm	0.0394	1/8	0.400	1-1/2	130	07319	07151
#60	0.0400	1/8	0.400	1-1/2	130	07320	07152
#59	0.0410	1/8	0.400	1-1/2	130	07321	07153
1,05mm	0.0413	1/8	0.400	1-1/2	130	07322	07154
#58	0.0420	1/8	0.400	1-1/2	130	07323	07155
#57	0.0430	1/8	0.400	1-1/2	130	07324	07156
1,1mm	0.0433	1/8	0.400	1-1/2	130	07325	07157
1,12mm	0.0440	1/8	0.400	1-1/2	130	07326	07158
1,15mm	0.0453	1/8	0.400	1-1/2	130	07327	07159
#56	0.0465	1/8	0.400	1-1/2	130	07328	07160
3/64	0.0469	1/8	0.400	1-1/2	130	07329	07161
1,2mm	0.0472	1/8	0.400	1-1/2	130	07330	07162
1,25mm	0.0492	1/8	0.400	1-1/2	130	07331	07163
1,3mm	0.0512	1/8	0.400	1-1/2	130	07332	07164
#55	0.0520	1/8	0.400	1-1/2	130	07333	07165
1,35mm	0.0531	1/8	0.400	1-1/2	130	07334	07166
#54	0.0550	1/8	0.400	1-1/2	130	07335	07167
1,4mm	0.0551	1/8	0.400	1-1/2	130	07336	07168
1,45mm	0.0571	1/8	0.400	1-1/2	130	07337	07169
1,5mm	0.0591	1/8	0.400	1-1/2	130	07338	07170
#53	0.0595	1/8	0.400	1-1/2	130	07339	07171
1,55mm	0.0610	1/8	0.400	1-1/2	130	07340	07172
1/16	0.0625	1/8	0.400	1-1/2	130	07341	07173
1,6mm	0.0630	1/8	0.400	1-1/2	130	07342	07174
#52	0.0635	1/8	0.400	1-1/2	130	07343	07175
1,65mm	0.0650	1/8	0.400	1-1/2	130	07344	07176
1,7mm	0.0669	1/8	0.400	1-1/2	130	07345	07177

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KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

2 Flute External Coolant • Standard & Extended Length

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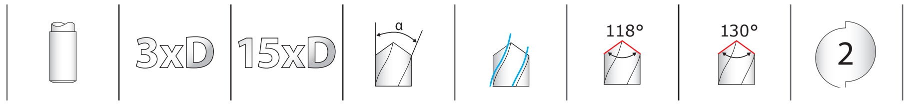
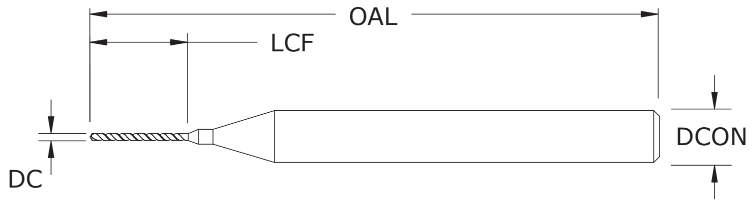




New Expanded Tools

M105
FRACTIONAL & METRIC SERIES

continued

CUTTING DIAMETER DC (inch & mm)	DECIMAL EQUIV.	SHANK DIAMETER DCON	FLUTE LENGTH LCF	OVERALL LENGTH OAL	POINT ANGLE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
#51	0.0670	1/8	0.400	1-1/2	130	07346	07178
1,75mm	0.0689	1/8	0.400	1-1/2	130	07347	07179
#50	0.0700	1/8	0.400	1-1/2	130	07348	07180
1,8mm	0.0709	1/8	0.400	1-1/2	130	07349	07181
1,85mm	0.0728	1/8	0.400	1-1/2	130	07350	07182
#49	0.0730	1/8	0.400	1-1/2	130	07351	07183
1,9mm	0.0748	1/8	0.400	1-1/2	130	07352	07184
#48	0.0760	1/8	0.400	1-1/2	130	07353	07185
1,95mm	0.0768	1/8	0.400	1-1/2	130	07354	07186
5/64	0.0781	1/8	0.400	1-1/2	130	07355	07187
#47	0.0785	1/8	0.400	1-1/2	130	07356	07188
2,0mm	0.0787	1/8	0.400	1-1/2	130	07357	07189
2,05mm	0.0807	1/8	0.400	1-1/2	130	07358	07190
#46	0.0810	1/8	0.400	1-1/2	130	07359	07191
#45	0.0820	1/8	0.400	1-1/2	130	07360	07192
2,1mm	0.0827	1/8	0.400	1-1/2	130	07361	07193
2,15mm	0.0846	1/8	0.400	1-1/2	130	07362	07194
#44	0.0860	1/8	0.400	1-1/2	130	07363	07195
2,2mm	0.0866	1/8	0.400	1-1/2	130	07364	07196
2,25mm	0.0886	1/8	0.400	1-1/2	130	07365	07197
#43	0.0890	1/8	0.400	1-1/2	130	07366	07198
2,3mm	0.0906	1/8	0.400	1-1/2	130	07367	07199
2,35mm	0.0925	1/8	0.400	1-1/2	130	07368	07200
#42	0.0935	1/8	0.400	1-1/2	130	07369	07201
3/32	0.0938	1/8	0.400	1-1/2	130	07370	07202
2,4mm	0.0945	1/8	0.400	1-1/2	130	07371	07203
#41	0.0960	1/8	0.400	1-1/2	130	07372	07204
2,45mm	0.0965	1/8	0.400	1-1/2	130	07373	07205
#40	0.0980	1/8	0.400	1-1/2	130	07374	07206
2,5mm	0.0984	1/8	0.400	1-1/2	130	07375	07207
#39	0.0995	1/8	0.400	1-1/2	130	07376	07208
2,55mm	0.1004	1/8	0.400	1-1/2	130	07377	07209
#38	0.1015	1/8	0.400	1-1/2	130	07378	07210
2,6mm	0.1024	1/8	0.400	1-1/2	130	07379	07211
#37	0.1040	1/8	0.400	1-1/2	130	07380	07212
2,65mm	0.1043	1/8	0.400	1-1/2	130	07381	07213
2,7mm	0.1063	1/8	0.400	1-1/2	130	07382	07214
#36	0.1065	1/8	0.400	1-1/2	130	07383	07215
2,75mm	0.1083	1/8	0.400	1-1/2	130	07384	07216
7/64	0.1094	1/8	0.400	1-1/2	130	07385	07217
#35	0.1100	1/8	0.400	1-1/2	130	07386	07218
2,8mm	0.1102	1/8	0.400	1-1/2	130	07387	07219
#34	0.1110	1/8	0.400	1-1/2	130	07388	07220
2,85mm	0.1122	1/8	0.400	1-1/2	130	07389	07221
#33	0.1130	1/8	0.400	1-1/2	130	07390	07222
2,9mm	0.1142	1/8	0.400	1-1/2	130	07391	07223
#32	0.1160	1/8	0.400	1-1/2	130	07392	07224
2,95mm	0.1161	1/8	0.400	1-1/2	130	07393	07225
3,0mm	0.1181	1/8	0.400	1-1/2	130	07394	07226
#31	0.1200	1/8	0.400	1-1/2	130	07395	07227
3,05mm	0.1201	1/8	0.400	1-1/2	130	07396	07228
3,1mm	0.1220	1/8	0.400	1-1/2	130	07397	07229
3,15mm	0.1240	1/8	0.400	1-1/2	130	07398	07230
1/8	0.1250	1/8	0.400	1-1/2	130	07399	07231

continued on next page

TOLERANCES (inch)

≤.125 DIAMETER
DC = +.0000/+.0003
DCON = h_6

TOLERANCES (mm)

0,1–3,0 DIAMETER
DC = +0,000/+0,008
DCON = h_6

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

FRACTIONAL & METRIC
2 Flute External Coolant • Standard & Extended Length
MICRO SGS Solid Carbide Tools | KYOCERA
M105
FRACTIONAL & METRIC SERIES
continued

Series M105

	Series M105	Hardness	Vc (sfm)		DC • in 0.004	0.010	0.020	0.040	0.080	0.125
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	130 (104-156)	RPM	124150	49660	24830	12415	6208	3973
				Fz	0.00012	0.00029	0.0006	0.0012	0.0023	0.0036
				Feed (ipm)	14.3	14.3	14.3	14.3	14.3	14.3
P	**ALLOY STEELS** 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	195 (156-234)	RPM	186225	74490	37245	18623	9311	5959
				Fz	0.00010	0.00026	0.0005	0.0010	0.0021	0.0033
				Feed (ipm)	19.4	19.4	19.4	19.4	19.4	19.4
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRc	80 (64-96)	RPM	76400	30560	15280	7640	3820	2445
				Fz	0.00005	0.00013	0.0003	0.0005	0.0010	0.0016
				Feed (ipm)	4.0	4.0	4.0	4.0	4.0	4.0
K	**CAST IRONS** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	280 (224-336)	RPM	267400	106960	53480	26740	13370	8557
				Fz	0.00007	0.00016	0.0003	0.0007	0.0013	0.0020
				Feed (ipm)	17.5	17.5	17.5	17.5	17.5	17.5
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	65 (52-78)	RPM	62075	24830	12415	6208	3104	1986
				Fz	0.00009	0.00022	0.0004	0.0009	0.0017	0.0027
				Feed (ipm)	5.4	5.4	5.4	5.4	5.4	5.4
M	**STAINLESS STEELS (DIFFICULT)** 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	40 (32-48)	RPM	38200	15280	7640	3820	1910	1222
				Fz	0.0001	0.0002	0.0004	0.0007	0.0014	0.0022
				Feed (ipm)	2.7	2.7	2.7	2.7	2.7	2.7
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 320 Bhn or ≤ 34 HRc	50 (40-60)	RPM	47750	19100	9550	4775	2388	1528
				Fz	0.00004	0.00011	0.0002	0.0004	0.0009	0.0014
				Feed (ipm)	2.1	2.1	2.1	2.1	2.1	2.1
S	**TITANIUM ALLOYS** Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	50 (40-60)	RPM	47750	19100	9550	4775	2388	1528
				Fz	0.00005	0.00013	0.0003	0.0005	0.0010	0.0016
				Feed (ipm)	2.5	2.5	2.5	2.5	2.5	2.5
N	**ALUMINUM ALLOYS** 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	245 (196-294)	RPM	233975	93590	46795	23398	11699	7487
				Fz	0.00020	0.00049	0.0010	0.0020	0.0039	0.0062
				Feed (ipm)	46.1	46.1	46.1	46.1	46.1	46.1
N	**COPPER ALLOYS** Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	180 (144-216)	RPM	171900	68760	34380	17190	8595	5501
				Fz	0.00020	0.00049	0.0010	0.0020	0.0039	0.0062
				Feed (ipm)	33.9	33.9	33.9	33.9	33.9	33.9
N	**PLASTICS** Polycarbonate, PVC		245 (196-294)	RPM	233975	93590	46795	23398	11699	7487
				Fz	0.00020	0.00049	0.0010	0.0020	0.0039	0.0062
				Feed (ipm)	46.1	46.1	46.1	46.1	46.1	46.1

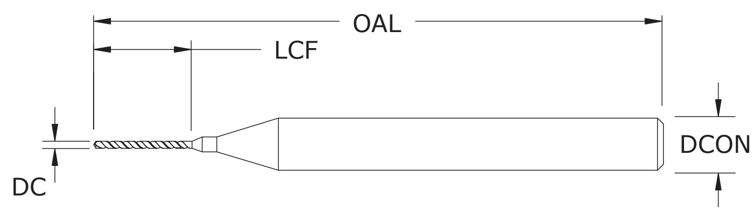
Note:
- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = Vc x 3.82 / DC
- ipm = Fr x rpm (Fr x maximum available rpm when recommendation exceeds machine limit)
- reduce speed and feed 30% when using uncoated drills
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for complete technical information

MICRO SGS Solid Carbide Tools KYOCERA

2 Flute External Coolant

3xD 12xD 118° 130° 2

New Expanded Tools



TOLERANCES (mm)

0,04–3,0 DIAMETER
DC = +0,000/–0,008
DCON = h_6

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

M226
METRIC SERIES

CUTTING DIAMETER DC (mm)	DECIMAL EQUIV.	SHANK DIAMETER DCON	FLUTE LENGTH LCF	OVERALL LENGTH OAL	POINT ANGLE	EDP NO. UNCOATED	TI-NAMITE-A (AlTiN)
0,04	0.0016	3,0	0,5	38,0	118	07722	–
0,04	0.0018	3,0	0,6	38,0	118	07723	–
0,05	0.0020	3,0	0,8	38,0	118	07724	–
0,06	0.0024	3,0	0,8	38,0	118	07725	–
0,07	0.0028	3,0	1,3	38,0	118	07726	–
0,08	0.0031	3,0	1,3	38,0	118	07727	–
0,09	0.0035	3,0	1,3	38,0	118	07728	–
0,10	0.0039	3,0	1,0	38,0	118	07729	–
0,11	0.0043	3,0	1,0	38,0	118	07730	–
0,12	0.0047	3,0	1,0	38,0	118	07731	–
0,13	0.0051	3,0	1,0	38,0	118	07732	–
0,14	0.0055	3,0	1,0	38,0	118	07733	–
0,15	0.0059	3,0	2,0	38,0	118	07734	–
0,16	0.0063	3,0	2,0	38,0	118	07735	–
0,17	0.0067	3,0	2,0	38,0	118	07736	–
0,18	0.0071	3,0	2,5	38,0	118	07737	–
0,19	0.0075	3,0	2,5	38,0	118	07738	–
0,20	0.0079	3,0	2,5	38,0	118	07739	–
0,21	0.0083	3,0	2,5	38,0	118	07740	–
0,22	0.0087	3,0	2,5	38,0	118	07741	–
0,23	0.0091	3,0	3,8	38,0	118	07742	–
0,24	0.0094	3,0	3,8	38,0	118	07743	–
0,25	0.0098	3,0	3,8	38,0	118	07744	07400
0,26	0.0102	3,0	3,8	38,0	118	07745	07401
0,27	0.0106	3,0	3,8	38,0	118	07746	07402
0,28	0.0110	3,0	3,8	38,0	118	07747	07403
0,29	0.0114	3,0	3,8	38,0	118	07748	07404
0,30	0.0118	3,0	5,7	38,0	118	07749	07405
0,31	0.0122	3,0	5,7	38,0	118	07750	07406
0,32	0.0126	3,0	5,7	38,0	118	07751	07407
0,33	0.0130	3,0	5,7	38,0	118	07752	07408
0,34	0.0134	3,0	5,7	38,0	118	07753	07409
0,35	0.0138	3,0	5,7	38,0	130	07754	07410
0,36	0.0142	3,0	5,7	38,0	130	07755	07411
0,37	0.0146	3,0	5,7	38,0	130	07756	07412
0,38	0.0150	3,0	6,4	38,0	130	07757	07413

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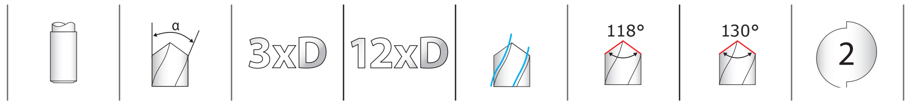
- 4-facet point design stabilizes on entry for superior hole size control and tool life (>.08mm). 2-facet point on 0,08 and smaller.
- Mirror surface finishes improve chip flow as hole depth increases
- Ti-Namite A coating and uncoated options for the ultimate performance in a variety of ferrous and non-ferrous workpiece materials
- Available from stock in a selection of popular lengths and diameters
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

2 Flute External Coolant



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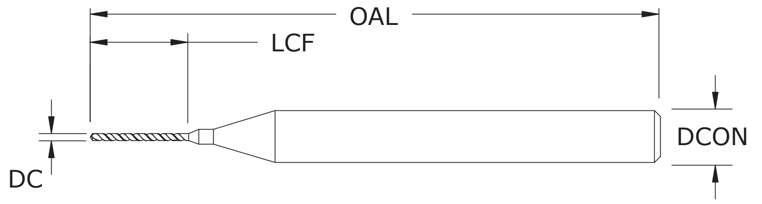

New Expanded Tools

M226

METRIC SERIES

continued

TOLERANCES (mm)

0,04–3,0 DIAMETER

DC = +0,000/–0,008

DCON = h_6

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

mm						EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	SHANK DIAMETER DCON	FLUTE LENGTH LCF	OVERALL LENGTH OAL	POINT ANGLE	UNCOATED	TI-NAMITE-A (AlTiN)
0,39	0.0154	3,0	6,4	38,0	130	07758	07414
0,40	0.0157	3,0	6,4	38,0	130	07759	07415
0,41	0.0161	3,0	6,4	38,0	130	07760	07416
0,42	0.0165	3,0	6,4	38,0	130	07761	07417
0,43	0.0169	3,0	6,4	38,0	130	07762	07418
0,44	0.0173	3,0	6,4	38,0	130	07763	07419
0,45	0.0177	3,0	6,4	38,0	130	07764	07420
0,46	0.0181	3,0	6,4	38,0	130	07765	07421
0,47	0.0185	3,0	6,4	38,0	130	07766	07422
0,48	0.0189	3,0	6,6	38,0	130	07767	07423
0,49	0.0193	3,0	6,6	38,0	130	07768	07424
0,50	0.0197	3,0	6,6	38,0	130	07769	07425
0,51	0.0201	3,0	6,6	38,0	130	07770	07426
0,52	0.0205	3,0	6,6	38,0	130	07771	07427
0,53	0.0209	3,0	6,6	38,0	130	07772	07428
0,54	0.0213	3,0	6,6	38,0	130	07773	07429
0,55	0.0217	3,0	8,6	38,0	130	07774	07430
0,56	0.0220	3,0	8,6	38,0	130	07775	07431
0,57	0.0224	3,0	8,6	38,0	130	07776	07432
0,58	0.0228	3,0	8,6	38,0	130	07777	07433
0,59	0.0232	3,0	8,6	38,0	130	07778	07434
0,60	0.0236	3,0	8,6	38,0	130	07779	07435
0,61	0.0240	3,0	8,6	38,0	130	07780	07436
0,62	0.0244	3,0	8,6	38,0	130	07781	07437
0,63	0.0248	3,0	8,6	38,0	130	07782	07438
0,64	0.0252	3,0	8,6	38,0	130	07783	07439
0,65	0.0256	3,0	8,6	38,0	130	07784	07440
0,66	0.0260	3,0	8,6	38,0	130	07785	07441
0,67	0.0264	3,0	8,6	38,0	130	07786	07442
0,68	0.0268	3,0	8,6	38,0	130	07787	07443
0,69	0.0272	3,0	8,6	38,0	130	07788	07444
0,70	0.0276	3,0	10,2	38,0	130	07789	07445
0,71	0.0280	3,0	10,2	38,0	130	07790	07446
0,72	0.0283	3,0	10,2	38,0	130	07791	07447
0,73	0.0287	3,0	10,2	38,0	130	07792	07448
0,74	0.0291	3,0	10,2	38,0	130	07793	07449

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MICRO SGS Solid Carbide Tools | KYOCERA

2 Flute External Coolant

M226

METRIC SERIES

continued

mm						EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	SHANK DIAMETER DCON	FLUTE LENGTH LCF	OVERALL LENGTH OAL	POINT ANGLE	UNCOATED	TI-NAMITE-A (AlTiN)
0,75	0.0295	3,0	10,2	38,0	130	07794	07450
0,75	0.0295	3,0	11,0	50,0	130	07795	07451
0,76	0.0299	3,0	10,2	38,0	130	07796	07452
0,77	0.0303	3,0	10,2	38,0	130	07797	07453
0,78	0.0307	3,0	10,2	38,0	130	07798	07454
0,79	0.0311	3,0	10,2	38,0	130	07799	07455
0,80	0.0315	3,0	10,2	38,0	130	07800	07456
0,80	0.0315	3,0	11,0	50,0	130	07801	07457
0,81	0.0319	3,0	10,2	38,0	130	07802	07458
0,82	0.0323	3,0	10,2	38,0	130	07803	07459
0,83	0.0327	3,0	10,2	38,0	130	07804	07460
0,84	0.0331	3,0	10,2	38,0	130	07805	07461
0,85	0.0335	3,0	10,2	38,0	130	07806	07462
0,85	0.0335	3,0	13,0	50,0	130	07807	07463
0,86	0.0339	3,0	10,2	38,0	130	07808	07464
0,87	0.0343	3,0	10,2	38,0	130	07809	07465
0,88	0.0346	3,0	10,2	38,0	130	07810	07466
0,89	0.0350	3,0	10,2	38,0	130	07811	07467
0,90	0.0354	3,0	10,2	38,0	130	07812	07468
0,90	0.0354	3,0	13,0	50,0	130	07813	07469
0,91	0.0358	3,0	10,2	38,0	130	07814	07470
0,92	0.0362	3,0	10,2	38,0	130	07815	07471
0,93	0.0366	3,0	10,2	38,0	130	07816	07472
0,94	0.0370	3,0	10,2	38,0	130	07817	07473
0,95	0.0374	3,0	10,2	38,0	130	07818	07474
0,95	0.0374	3,0	15,0	50,0	130	07819	07475
0,96	0.0378	3,0	10,2	38,0	130	07820	07476
0,97	0.0382	3,0	10,2	38,0	130	07821	07477
0,98	0.0386	3,0	10,2	38,0	130	07822	07478
0,99	0.0390	3,0	10,2	38,0	130	07823	07479
1,00	0.0394	3,0	10,2	38,0	130	07824	07480
1,00	0.0394	3,0	15,0	50,0	130	07825	07481
1,01	0.0398	3,0	10,2	38,0	130	07826	07482
1,02	0.0402	3,0	10,2	38,0	130	07827	07483
1,03	0.0406	3,0	10,2	38,0	130	07828	07484
1,04	0.0409	3,0	10,2	38,0	130	07829	07485
1,05	0.0413	3,0	10,2	38,0	130	07830	07486
1,05	0.0413	3,0	17,0	50,0	130	07831	07487
1,06	0.0417	3,0	10,2	38,0	130	07832	07488
1,07	0.0421	3,0	10,2	38,0	130	07833	07489
1,08	0.0425	3,0	10,2	38,0	130	07834	07490
1,09	0.0429	3,0	10,2	38,0	130	07835	07491
1,10	0.0433	3,0	10,2	38,0	130	07836	07492
1,10	0.0433	3,0	17,0	50,0	130	07837	07493
1,11	0.0437	3,0	10,2	38,0	130	07838	07494
1,12	0.0441	3,0	10,2	38,0	130	07839	07495

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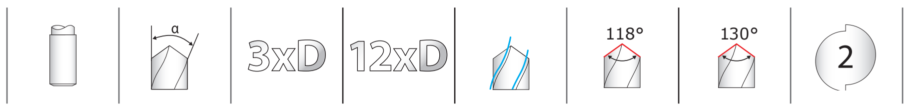
2 Flute External Coolant

MICRO SGS Solid Carbide Tools | KYOCERA



New Expanded Tools

M226
METRIC SERIES

continued

CUTTING DIAMETER DC (mm)	DECIMAL EQUIV.	SHANK DIAMETER DCON (mm)	FLUTE LENGTH LCF (mm)	OVERALL LENGTH OAL (mm)	POINT ANGLE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
1,13	0.0445	3,0	10,2	38,0	130	07840	07496
1,14	0.0449	3,0	10,2	38,0	130	07841	07497
1,15	0.0453	3,0	10,2	38,0	130	07842	07498
1,15	0.0453	3,0	17,0	50,0	130	07843	07499
1,16	0.0457	3,0	10,2	38,0	130	07844	07500
1,17	0.0461	3,0	10,2	38,0	130	07845	07501
1,18	0.0465	3,0	10,2	38,0	130	07846	07502
1,19	0.0469	3,0	10,2	38,0	130	07847	07503
1,20	0.0472	3,0	10,2	38,0	130	07848	07504
1,20	0.0472	3,0	17,0	50,0	130	07849	07505
1,21	0.0476	3,0	10,2	38,0	130	07850	07506
1,22	0.0480	3,0	10,2	38,0	130	07851	07507
1,23	0.0484	3,0	10,2	38,0	130	07852	07508
1,24	0.0488	3,0	10,2	38,0	130	07853	07509
1,25	0.0492	3,0	10,2	38,0	130	07854	07510
1,25	0.0492	3,0	19,0	50,0	130	07855	07511
1,26	0.0496	3,0	10,2	38,0	130	07856	07512
1,27	0.0500	3,0	10,2	38,0	130	07857	07513
1,28	0.0504	3,0	10,2	38,0	130	07858	07514
1,29	0.0508	3,0	10,2	38,0	130	07859	07515
1,30	0.0512	3,0	10,2	38,0	130	07860	07516
1,30	0.0512	3,0	19,0	50,0	130	07861	07517
1,31	0.0516	3,0	10,2	38,0	130	07862	07518
1,32	0.0520	3,0	10,2	38,0	130	07863	07519
1,33	0.0524	3,0	10,2	38,0	130	07864	07520
1,34	0.0528	3,0	10,2	38,0	130	07865	07521
1,35	0.0531	3,0	10,2	38,0	130	07866	07522
1,35	0.0531	3,0	19,0	50,0	130	07867	07523
1,36	0.0535	3,0	10,2	38,0	130	07868	07524
1,37	0.0539	3,0	10,2	38,0	130	07869	07525
1,38	0.0543	3,0	10,2	38,0	130	07870	07526
1,39	0.0547	3,0	10,2	38,0	130	07871	07527
1,40	0.0551	3,0	10,2	38,0	130	07872	07528
1,40	0.0551	3,0	19,0	50,0	130	07873	07529
1,41	0.0555	3,0	10,2	38,0	130	07874	07530
1,42	0.0559	3,0	10,2	38,0	130	07875	07531

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TOLERANCES (mm)

0,04–3,0 DIAMETER

DC = +0,000/–0,008

DCON = h_6

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

MICRO SGS Solid Carbide Tools | KYOCERA

2 Flute External Coolant

M226
METRIC SERIES

continued

CUTTING DIAMETER DC (mm)	DECIMAL EQUIV.	SHANK DIAMETER DCON (mm)	FLUTE LENGTH LCF (mm)	OVERALL LENGTH OAL (mm)	POINT ANGLE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
1,43	0.0563	3,0	10,2	38,0	130	07876	07532
1,44	0.0567	3,0	10,2	38,0	130	07877	07533
1,45	0.0571	3,0	10,2	38,0	130	07878	07534
1,45	0.0571	3,0	20,0	50,0	130	07879	07535
1,46	0.0575	3,0	10,2	38,0	130	07880	07536
1,47	0.0579	3,0	10,2	38,0	130	07881	07537
1,48	0.0583	3,0	10,2	38,0	130	07882	07538
1,49	0.0587	3,0	10,2	38,0	130	07883	07539
1,50	0.0591	3,0	10,2	38,0	130	07884	07540
1,50	0.0591	3,0	20,0	50,0	130	07885	07541
1,51	0.0594	3,0	10,2	38,0	130	07886	07542
1,52	0.0598	3,0	10,2	38,0	130	07887	07543
1,53	0.0602	3,0	10,2	38,0	130	07888	07544
1,54	0.0606	3,0	10,2	38,0	130	07889	07545
1,55	0.0610	3,0	10,2	38,0	130	07890	07546
1,55	0.0610	3,0	20,0	50,0	130	07891	07547
1,56	0.0614	3,0	10,2	38,0	130	07892	07548
1,57	0.0618	3,0	10,2	38,0	130	07893	07549
1,58	0.0622	3,0	10,2	38,0	130	07894	07550
1,59	0.0626	3,0	10,2	38,0	130	07895	07551
1,60	0.0630	3,0	10,2	38,0	130	07896	07552
1,60	0.0630	3,0	20,0	50,0	130	07897	07553
1,61	0.0634	3,0	10,2	38,0	130	07898	07554
1,62	0.0638	3,0	10,2	38,0	130	07899	07555
1,63	0.0642	3,0	10,2	38,0	130	07900	07556
1,64	0.0646	3,0	10,2	38,0	130	07901	07557
1,65	0.0650	3,0	10,2	38,0	130	07902	07558
1,65	0.0650	3,0	20,0	50,0	130	07903	07559
1,66	0.0654	3,0	10,2	38,0	130	07904	07560
1,67	0.0657	3,0	10,2	38,0	130	07905	07561
1,68	0.0661	3,0	10,2	38,0	130	07906	07562
1,69	0.0665	3,0	10,2	38,0	130	07907	07563
1,70	0.0669	3,0	10,2	38,0	130	07908	07564
1,70	0.0669	3,0	20,0	50,0	130	07909	07565
1,71	0.0673	3,0	10,2	38,0	130	07910	07566
1,72	0.0677	3,0	10,2	38,0	130	07911	07567
1,73	0.0681	3,0	10,2	38,0	130	07912	07568
1,74	0.0685	3,0	10,2	38,0	130	07913	07569
1,75	0.0689	3,0	10,2	38,0	130	07914	07570
1,75	0.0689	3,0	20,0	50,0	130	07915	07571
1,76	0.0693	3,0	10,2	38,0	130	07916	07572
1,77	0.0697	3,0	10,2	38,0	130	07917	07573
1,78	0.0701	3,0	10,2	38,0	130	07918	07574
1,79	0.0705	3,0	10,2	38,0	130	07919	07575
1,80	0.0709	3,0	10,2	38,0	130	07920	07576
1,80	0.0709	3,0	20,0	50,0	130	07921	07577

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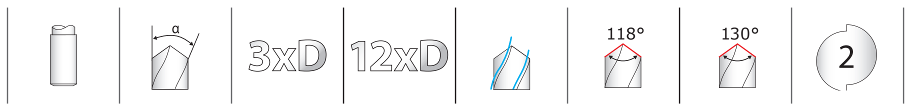
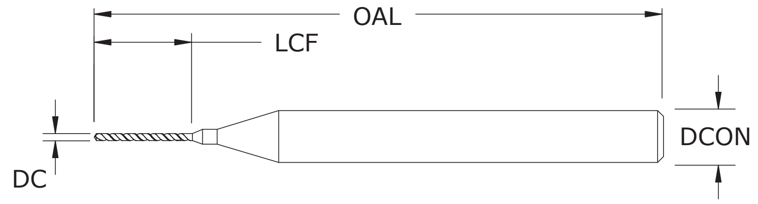
2 Flute External Coolant

MICRO SGS Solid Carbide Tools | KYOCERA





New Expanded Tools

TOLERANCES (mm)

0,04–3,0 DIAMETER

DC = +0,000/−0,008

DCON = h_6

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

M226

METRIC SERIES

continued

CUTTING DIAMETER DC (mm)	DECIMAL EQUIV.	SHANK DIAMETER DCON (mm)	FLUTE LENGTH LCF (mm)	OVERALL LENGTH OAL (mm)	POINT ANGLE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
1,81	0.0713	3,0	10,2	38,0	130	07922	07578
1,82	0.0717	3,0	10,2	38,0	130	07923	07579
1,83	0.0720	3,0	10,2	38,0	130	07924	07580
1,84	0.0724	3,0	10,2	38,0	130	07925	07581
1,85	0.0728	3,0	10,2	38,0	130	07926	07582
1,85	0.0728	3,0	22,8	60,0	130	07927	07583
1,86	0.0732	3,0	10,2	38,0	130	07928	07584
1,87	0.0736	3,0	10,2	38,0	130	07929	07585
1,88	0.0740	3,0	10,2	38,0	130	07930	07586
1,89	0.0744	3,0	10,2	38,0	130	07931	07587
1,90	0.0748	3,0	10,2	38,0	130	07932	07588
1,90	0.0748	3,0	22,8	60,0	130	07933	07589
1,91	0.0752	3,0	10,2	38,0	130	07934	07590
1,92	0.0756	3,0	10,2	38,0	130	07935	07591
1,93	0.0760	3,0	10,2	38,0	130	07936	07592
1,94	0.0764	3,0	10,2	38,0	130	07937	07593
1,95	0.0768	3,0	10,2	38,0	130	07938	07594
1,95	0.0768	3,0	24,0	60,0	130	07939	07595
1,96	0.0772	3,0	10,2	38,0	130	07940	07596
1,97	0.0776	3,0	10,2	38,0	130	07941	07597
1,98	0.0780	3,0	10,2	38,0	130	07942	07598
1,99	0.0783	3,0	10,2	38,0	130	07943	07599
2,00	0.0787	3,0	10,2	38,0	130	07944	07600
2,00	0.0787	3,0	24,0	60,0	130	07945	07601
2,01	0.0791	3,0	10,2	38,0	130	07946	07602
2,02	0.0795	3,0	10,2	38,0	130	07947	07603
2,03	0.0799	3,0	10,2	38,0	130	07948	07604
2,04	0.0803	3,0	10,2	38,0	130	07949	07605
2,05	0.0807	3,0	10,2	38,0	130	07950	07606
2,05	0.0807	3,0	25,2	60,0	130	07951	07607
2,06	0.0811	3,0	10,2	38,0	130	07952	07608
2,07	0.0815	3,0	10,2	38,0	130	07953	07609
2,08	0.0819	3,0	10,2	38,0	130	07954	07610
2,09	0.0823	3,0	10,2	38,0	130	07955	07611
2,10	0.0827	3,0	10,2	38,0	130	07956	07612
2,10	0.0827	3,0	25,2	60,0	130	07957	07613

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2 Flute External Coolant

MICRO SGS Solid Carbide Tools | KYOCERA

M226

METRIC SERIES

continued

CUTTING DIAMETER DC (mm)	DECIMAL EQUIV.	SHANK DIAMETER DCON (mm)	FLUTE LENGTH LCF (mm)	OVERALL LENGTH OAL (mm)	POINT ANGLE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
2,11	0.0831	3,0	10,2	38,0	130	07958	07614
2,12	0.0835	3,0	10,2	38,0	130	07959	07615
2,13	0.0839	3,0	10,2	38,0	130	07960	07616
2,14	0.0843	3,0	10,2	38,0	130	07961	07617
2,15	0.0846	3,0	10,2	38,0	130	07962	07618
2,15	0.0846	3,0	26,4	60,0	130	07963	07619
2,16	0.0850	3,0	10,2	38,0	130	07964	07620
2,17	0.0854	3,0	10,2	38,0	130	07965	07621
2,18	0.0858	3,0	10,2	38,0	130	07966	07622
2,19	0.0862	3,0	10,2	38,0	130	07967	07623
2,20	0.0866	3,0	10,2	38,0	130	07968	07624
2,20	0.0866	3,0	26,4	60,0	130	07969	07625
2,21	0.0870	3,0	10,2	38,0	130	07970	07626
2,22	0.0874	3,0	10,2	38,0	130	07971	07627
2,23	0.0878	3,0	10,2	38,0	130	07972	07628
2,24	0.0882	3,0	10,2	38,0	130	07973	07629
2,25	0.0886	3,0	10,2	38,0	130	07974	07630
2,25	0.0886	3,0	27,6	60,0	130	07975	07631
2,26	0.0890	3,0	10,2	38,0	130	07976	07632
2,27	0.0894	3,0	10,2	38,0	130	07977	07633
2,28	0.0898	3,0	10,2	38,0	130	07978	07634
2,29	0.0902	3,0	10,2	38,0	130	07979	07635
2,30	0.0906	3,0	10,2	38,0	130	07980	07636
2,30	0.0906	3,0	27,6	60,0	130	07981	07637
2,31	0.0909	3,0	10,2	38,0	130	07982	07638
2,32	0.0913	3,0	10,2	38,0	130	07983	07639
2,33	0.0917	3,0	10,2	38,0	130	07984	07640
2,34	0.0921	3,0	10,2	38,0	130	07985	07641
2,35	0.0925	3,0	10,2	38,0	130	07986	07642
2,35	0.0925	3,0	28,8	60,0	130	07987	07643
2,36	0.0929	3,0	10,2	38,0	130	07988	07644
2,37	0.0933	3,0	10,2	38,0	130	07989	07645
2,38	0.0937	3,0	10,2	38,0	130	07990	07646
2,39	0.0941	3,0	10,2	38,0	130	07991	07647
2,40	0.0945	3,0	10,2	38,0	130	07992	07648
2,40	0.0945	3,0	28,8	60,0	130	07993	07649
2,41	0.0949	3,0	10,2	38,0	130	07994	07650
2,42	0.0953	3,0	10,2	38,0	130	07995	07651
2,43	0.0957	3,0	10,2	38,0	130	07996	07652
2,44	0.0961	3,0	10,2	38,0	130	07997	07653
2,45	0.0965	3,0	10,2	38,0	130	07998	07654
2,45	0.0965	3,0	30,0	60,0	130	07999	07655
2,46	0.0969	3,0	10,2	38,0	130	08000	07656
2,47	0.0972	3,0	10,2	38,0	130	08001	07657
2,48	0.0976	3,0	10,2	38,0	130	08002	07658
2,49	0.0980	3,0	10,2	38,0	130	08003	07659

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KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

2 Flute External Coolant

MICRO SGS Solid Carbide Tools KYOCERA

3xD 12xD 118° 130° 2

New Expanded Tools

M226
METRIC SERIES

continued

CUTTING DIAMETER DC (mm)	DECIMAL EQUIV. (mm)	SHANK DIAMETER DCON (mm)	FLUTE LENGTH LCF (mm)	OVERALL LENGTH OAL (mm)	POINT ANGLE (mm)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
2,50	0.0984	3,0	10,2	38,0	130	08004	07660
2,50	0.0984	3,0	30,0	60,0	130	08005	07661
2,51	0.0988	3,0	10,2	38,0	130	08006	07662
2,52	0.0992	3,0	10,2	38,0	130	08007	07663
2,53	0.0996	3,0	10,2	38,0	130	08008	07664
2,54	0.1000	3,0	10,2	38,0	130	08009	07665
2,55	0.1004	3,0	10,2	38,0	130	08010	07666
2,55	0.1004	3,0	31,2	60,0	130	08011	07667
2,56	0.1008	3,0	10,2	38,0	130	08012	07668
2,57	0.1012	3,0	10,2	38,0	130	08013	07669
2,58	0.1016	3,0	10,2	38,0	130	08014	07670
2,59	0.1020	3,0	10,2	38,0	130	08015	07671
2,60	0.1024	3,0	10,2	38,0	130	08016	07672
2,60	0.1024	3,0	31,2	60,0	130	08017	07673
2,61	0.1028	3,0	10,2	38,0	130	08018	07674
2,62	0.1031	3,0	10,2	38,0	130	08019	07675
2,63	0.1035	3,0	10,2	38,0	130	08020	07676
2,64	0.1039	3,0	10,2	38,0	130	08021	07677
2,65	0.1043	3,0	10,2	38,0	130	08022	07678
2,65	0.1043	3,0	32,4	60,0	130	08023	07679
2,66	0.1047	3,0	10,2	38,0	130	08024	07680
2,67	0.1051	3,0	10,2	38,0	130	08025	07681
2,68	0.1055	3,0	10,2	38,0	130	08026	07682
2,69	0.1059	3,0	10,2	38,0	130	08027	07683
2,70	0.1063	3,0	10,2	38,0	130	08028	07684
2,70	0.1063	3,0	32,4	60,0	130	08029	07685
2,71	0.1067	3,0	10,2	38,0	130	08030	07686
2,72	0.1071	3,0	10,2	38,0	130	08031	07687
2,73	0.1075	3,0	10,2	38,0	130	08032	07688
2,74	0.1079	3,0	10,2	38,0	130	08033	07689
2,75	0.1083	3,0	10,2	38,0	130	08034	07690
2,75	0.1083	3,0	33,6	60,0	130	08035	07691
2,76	0.1087	3,0	10,2	38,0	130	08036	07692
2,77	0.1091	3,0	10,2	38,0	130	08037	07693
2,78	0.1094	3,0	10,2	38,0	130	08038	07694
2,79	0.1098	3,0	10,2	38,0	130	08039	07695

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TOLERANCES (mm)

0,04–3,0 DIAMETER

DC = +0,000/–0,008

DCON = h_6

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

MICRO SGS Solid Carbide Tools KYOCERA

2 Flute External Coolant

M226
METRIC SERIES

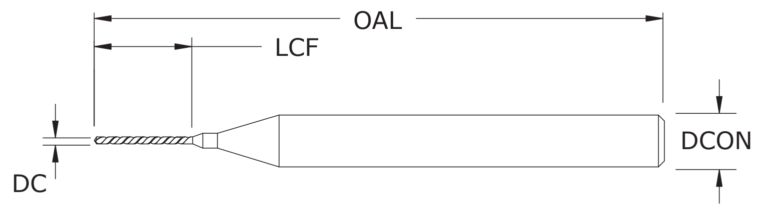
continued

CUTTING DIAMETER DC (mm)	DECIMAL EQUIV. (mm)	SHANK DIAMETER DCON (mm)	FLUTE LENGTH LCF (mm)	OVERALL LENGTH OAL (mm)	POINT ANGLE (mm)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
2,80	0.1102	3,0	10,2	38,0	130	08040	07696
2,80	0.1102	3,0	33,6	60,0	130	08041	07697
2,81	0.1106	3,0	10,2	38,0	130	08042	07698
2,82	0.1110	3,0	10,2	38,0	130	08043	07699
2,83	0.1114	3,0	10,2	38,0	130	08044	07700
2,84	0.1118	3,0	10,2	38,0	130	08045	07701
2,85	0.1122	3,0	10,2	38,0	130	08046	07702
2,85	0.1122	3,0	34,8	60,0	130	08047	07703
2,86	0.1126	3,0	10,2	38,0	130	08048	07704
2,87	0.1130	3,0	10,2	38,0	130	08049	07705
2,88	0.1134	3,0	10,2	38,0	130	08050	07706
2,89	0.1138	3,0	10,2	38,0	130	08051	07707
2,90	0.1142	3,0	10,2	38,0	130	08052	07708
2,90	0.1142	3,0	34,8	60,0	130	08053	07709
2,91	0.1146	3,0	10,2	38,0	130	08054	07710
2,92	0.1150	3,0	10,2	38,0	130	08055	07711
2,93	0.1154	3,0	10,2	38,0	130	08056	07712
2,94	0.1157	3,0	10,2	38,0	130	08057	07713
2,95	0.1161	3,0	10,2	38,0	130	08058	07714
2,95	0.1161	3,0	36,0	60,0	130	08059	07715
2,96	0.1165	3,0	10,2	38,0	130	08060	07716
2,97	0.1169	3,0	10,2	38,0	130	08061	07717
2,98	0.1173	3,0	10,2	38,0	130	08062	07718
2,99	0.1177	3,0	10,2	38,0	130	08063	07719
3,00	0.1181	3,0	10,2	38,0	130	08064	07720
3,00	0.1181	3,0	36,0	60,0	130	08065	07721

2 Flute Left Hand Cut External Coolant

MICRO SGS Solid Carbide Tools | KYOCERA

3xD 12xD 118° 130° 2



New Expanded Tools

L226
METRIC SERIES

- 4-facet point design stabilizes on entry for superior hole size control and tool life (>.08mm). 2-facet point on 0,08 and smaller.
- Mirror surface finishes improve chip flow as hole depth increases
- Ti-Namite A coating and uncoated options for the ultimate performance in a variety of ferrous and non-ferrous workpiece materials
- Available from stock in a selection of popular lengths and diameters
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

TOLERANCES (mm)

0,04–3,0 DIAMETER

DC = +0,000/−0,008

DCON = h_6

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

mm						EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	SHANK DIAMETER DCON	FLUTE LENGTH LCF	OVERALL LENGTH OAL	POINT ANGLE	UNCOATED	TI-NAMITE-A (AlTiN)
0,04	0.0016	3,0	0,5	38,0	118	08228	–
0,05	0.0020	3,0	0,8	38,0	118	08229	–
0,06	0.0024	3,0	0,8	38,0	118	08230	–
0,07	0.0028	3,0	1,3	38,0	118	08231	–
0,08	0.0031	3,0	1,3	38,0	118	08232	–
0,09	0.0035	3,0	1,3	38,0	118	08233	–
0,10	0.0039	3,0	1,0	38,0	118	08234	–
0,11	0.0043	3,0	1,0	38,0	118	08235	–
0,12	0.0047	3,0	1,0	38,0	118	08236	–
0,13	0.0051	3,0	1,0	38,0	118	08237	–
0,14	0.0055	3,0	2,0	38,0	118	08238	–
0,15	0.0059	3,0	2,0	38,0	118	08239	–
0,16	0.0063	3,0	2,0	38,0	118	08240	–
0,17	0.0067	3,0	2,0	38,0	118	08241	–
0,18	0.0071	3,0	2,5	38,0	118	08242	–
0,19	0.0075	3,0	2,5	38,0	118	08243	–
0,20	0.0079	3,0	2,5	38,0	118	08244	–
0,21	0.0083	3,0	2,5	38,0	118	08245	–
0,22	0.0087	3,0	2,5	38,0	118	08246	–
0,23	0.0091	3,0	3,8	38,0	118	08247	–
0,24	0.0094	3,0	3,8	38,0	118	08248	–
0,25	0.0098	3,0	3,8	38,0	118	08249	08066
0,26	0.0102	3,0	3,8	38,0	118	08250	08067
0,27	0.0106	3,0	3,8	38,0	118	08251	08068
0,28	0.0110	3,0	3,8	38,0	118	08252	08069
0,29	0.0114	3,0	3,8	38,0	118	08253	08070
0,30	0.0118	3,0	5,7	38,0	118	08254	08071
0,31	0.0122	3,0	5,7	38,0	118	08255	08072
0,32	0.0126	3,0	5,7	38,0	118	08256	08073
0,33	0.0130	3,0	5,7	38,0	118	08257	08074
0,34	0.0134	3,0	5,7	38,0	118	08258	08075
0,35	0.0138	3,0	5,7	38,0	130	08259	08076
0,36	0.0142	3,0	5,7	38,0	130	08260	08077
0,37	0.0146	3,0	5,7	38,0	130	08261	08078
0,38	0.0150	3,0	6,4	38,0	130	08262	08079
0,39	0.0154	3,0	6,4	38,0	130	08263	08080

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METRIC

2 Flute Left Hand Cut External Coolant

MICRO SGS Solid Carbide Tools | KYOCERA

L226
METRIC SERIES

continued

mm						EDP NO.	
CUTTING DIAMETER DC	DECIMAL EQUIV.	SHANK DIAMETER DCON	FLUTE LENGTH LCF	OVERALL LENGTH OAL	POINT ANGLE	UNCOATED	TI-NAMITE-A (AlTiN)
0,40	0.0157	3,0	6,4	38,0	130	08264	08081
0,41	0.0161	3,0	6,4	38,0	130	08265	08082
0,42	0.0165	3,0	6,4	38,0	130	08266	08083
0,43	0.0169	3,0	6,4	38,0	130	08267	08084
0,44	0.0173	3,0	6,4	38,0	130	08268	08085
0,45	0.0177	3,0	6,4	38,0	130	08269	08086
0,46	0.0181	3,0	6,4	38,0	130	08270	08087
0,47	0.0185	3,0	6,4	38,0	130	08271	08088
0,48	0.0189	3,0	6,6	38,0	130	08272	08089
0,49	0.0193	3,0	6,6	38,0	130	08273	08090
0,50	0.0197	3,0	6,6	38,0	130	08274	08091
0,51	0.0201	3,0	6,6	38,0	130	08275	08092
0,52	0.0205	3,0	6,6	38,0	130	08276	08093
0,53	0.0209	3,0	6,6	38,0	130	08277	08094
0,54	0.0213	3,0	6,6	38,0	130	08278	08095
0,55	0.0217	3,0	8,6	38,0	130	08279	08096
0,56	0.0220	3,0	8,6	38,0	130	08280	08097
0,57	0.0224	3,0	8,6	38,0	130	08281	08098
0,58	0.0228	3,0	8,6	38,0	130	08282	08099
0,59	0.0232	3,0	8,6	38,0	130	08283	08100
0,60	0.0236	3,0	8,6	38,0	130	08284	08101
0,61	0.0240	3,0	8,6	38,0	130	08285	08102
0,62	0.0244	3,0	8,6	38,0	130	08286	08103
0,63	0.0248	3,0	8,6	38,0	130	08287	08104
0,64	0.0252	3,0	8,6	38,0	130	08288	08105
0,65	0.0256	3,0	8,6	38,0	130	08289	08106
0,66	0.0260	3,0	8,6	38,0	130	08290	08107
0,67	0.0264	3,0	8,6	38,0	130	08291	08108
0,68	0.0268	3,0	8,6	38,0	130	08292	08109
0,69	0.0272	3,0	8,6	38,0	130	08293	08110
0,70	0.0276	3,0	10,2	38,0	130	08294	08111
0,71	0.0280	3,0	10,2	38,0	130	08295	08112
0,72	0.0283	3,0	10,2	38,0	130	08296	08113
0,73	0.0287	3,0	10,2	38,0	130	08297	08114
0,74	0.0291	3,0	10,2	38,0	130	08298	08115
0,75	0.0295	3,0	10,2	38,0	130	08299	08116
0,75	0.0295	3,0	11,0	50,0	130	08300	08117
0,76	0.0299	3,0	10,2	38,0	130	08301	08118
0,77	0.0303	3,0	10,2	38,0	130	08302	08119
0,78	0.0307	3,0	10,2	38,0	130	08303	08120
0,79	0.0311	3,0	10,2	38,0	130	08304	08121
0,80	0.0315	3,0	10,2	38,0	130	08305	08122
0,80	0.0315	3,0	11,0	50,0	130	08306	08123
0,81	0.0319	3,0	10,2	38,0	130	08307	08124
0,82	0.0323	3,0	10,2	38,0	130	08308	08125
0,83	0.0327	3,0	10,2	38,0	130	08309	08126

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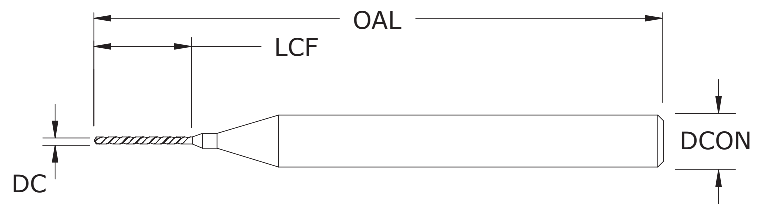
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

2 Flute Left Hand Cut External Coolant

MICRO SGS Solid Carbide Tools | KYOCERA

3xD 12xD 118° 130° 2



New Expanded Tools

TOLERANCES (mm)

0,04–3,0 DIAMETER

DC = +0,000/–0,008

DCON = h_6

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

L226

METRIC SERIES

continued

CUTTING DIAMETER DC (mm)	DECIMAL EQUIV.	SHANK DIAMETER DCON (mm)	FLUTE LENGTH LCF (mm)	OVERALL LENGTH OAL (mm)	POINT ANGLE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
0,84	0.0331	3,0	10,2	38,0	130	08310	08127
0,85	0.0335	3,0	10,2	38,0	130	08311	08128
0,85	0.0335	3,0	13,0	50,0	130	08312	08129
0,86	0.0339	3,0	10,2	38,0	130	08313	08130
0,87	0.0343	3,0	10,2	38,0	130	08314	08131
0,88	0.0346	3,0	10,2	38,0	130	08315	08132
0,89	0.0350	3,0	10,2	38,0	130	08316	08133
0,90	0.0354	3,0	10,2	38,0	130	08317	08134
0,90	0.0354	3,0	13,0	50,0	130	08318	08135
0,91	0.0358	3,0	10,2	38,0	130	08319	08136
0,92	0.0362	3,0	10,2	38,0	130	08320	08137
0,93	0.0366	3,0	10,2	38,0	130	08321	08138
0,94	0.0370	3,0	10,2	38,0	130	08322	08139
0,95	0.0374	3,0	10,2	38,0	130	08323	08140
0,95	0.0374	3,0	15,0	50,0	130	08324	08141
0,96	0.0378	3,0	10,2	38,0	130	08325	08142
0,97	0.0382	3,0	10,2	38,0	130	08326	08143
0,98	0.0386	3,0	10,2	38,0	130	08327	08144
0,99	0.0390	3,0	10,2	38,0	130	08328	08145
1,00	0.0394	3,0	10,2	38,0	130	08329	08146
1,00	0.0394	3,0	15,0	50,0	130	08330	08147
1,05	0.0413	3,0	10,2	38,0	130	08331	08148
1,05	0.0413	3,0	17,0	50,0	130	08332	08149
1,10	0.0433	3,0	10,2	38,0	130	08333	08150
1,10	0.0433	3,0	17,0	50,0	130	08334	08151
1,15	0.0453	3,0	10,2	38,0	130	08335	08152
1,15	0.0453	3,0	17,0	50,0	130	08336	08153
1,20	0.0472	3,0	10,2	38,0	130	08337	08154
1,20	0.0472	3,0	17,0	50,0	130	08338	08155
1,25	0.0492	3,0	10,2	38,0	130	08339	08156
1,25	0.0492	3,0	19,0	50,0	130	08340	08157
1,30	0.0512	3,0	10,2	38,0	130	08341	08158
1,30	0.0512	3,0	19,0	50,0	130	08342	08159
1,35	0.0531	3,0	10,2	38,0	130	08343	08160
1,35	0.0531	3,0	19,0	50,0	130	08344	08161
1,40	0.0551	3,0	10,2	38,0	130	08345	08162

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KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

MICRO SGS Solid Carbide Tools | KYOCERA

2 Flute Left Hand Cut External Coolant

L226

METRIC SERIES

continued

CUTTING DIAMETER DC (mm)	DECIMAL EQUIV.	SHANK DIAMETER DCON (mm)	FLUTE LENGTH LCF (mm)	OVERALL LENGTH OAL (mm)	POINT ANGLE	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
1,40	0.0551	3,0	19,0	50,0	130	08346	08163
1,45	0.0571	3,0	10,2	38,0	130	08347	08164
1,45	0.0571	3,0	20,0	50,0	130	08348	08165
1,50	0.0591	3,0	10,2	38,0	130	08349	08166
1,50	0.0591	3,0	20,0	50,0	130	08350	08167
1,55	0.0610	3,0	10,2	38,0	130	08351	08168
1,55	0.0610	3,0	20,0	50,0	130	08352	08169
1,60	0.0630	3,0	10,2	38,0	130	08353	08170
1,60	0.0630	3,0	20,0	50,0	130	08354	08171
1,65	0.0650	3,0	10,2	38,0	130	08355	08172
1,65	0.0650	3,0	20,0	50,0	130	08356	08173
1,70	0.0669	3,0	10,2	38,0	130	08357	08174
1,70	0.0669	3,0	20,0	50,0	130	08358	08175
1,75	0.0689	3,0	10,2	38,0	130	08359	08176
1,75	0.0689	3,0	20,0	50,0	130	08360	08177
1,80	0.0709	3,0	10,2	38,0	130	08361	08178
1,80	0.0709	3,0	20,0	50,0	130	08362	08179
1,85	0.0728	3,0	10,2	38,0	130	08363	08180
1,85	0.0728	3,0	22,8	60,0	130	08364	08181
1,90	0.0748	3,0	10,2	38,0	130	08365	08182
1,90	0.0748	3,0	22,8	60,0	130	08366	08183
1,95	0.0768	3,0	10,2	38,0	130	08367	08184
1,95	0.0768	3,0	23,4	60,0	130	08368	08185
2,00	0.0787	3,0	10,2	38,0	130	08369	08186
2,00	0.0787	3,0	24,0	60,0	130	08370	08187
2,05	0.0807	3,0	10,2	38,0	130	08371	08188
2,05	0.0807	3,0	25,2	60,0	130	08372	08189
2,10	0.0827	3,0	10,2	38,0	130	08373	08190
2,10	0.0827	3,0	25,2	60,0	130	08374	08191
2,15	0.0846	3,0	10,2	38,0	130	08375	08192
2,15	0.0846	3,0	26,4	60,0	130	08376	08193
2,20	0.0866	3,0	10,2	38,0	130	08377	08194
2,20	0.0866	3,0	26,4	60,0	130	08378	08195
2,25	0.0886	3,0	10,2	38,0	130	08379	08196
2,25	0.0886	3,0	27,6	60,0	130	08380	08197
2,30	0.0906	3,0	10,2	38,0	130	08381	08198
2,30	0.0906	3,0	27,6	60,0	130	08382	08199
2,35	0.0925	3,0	10,2	38,0	130	08383	08200
2,35	0.0925	3,0	28,8	60,0	130	08384	08201
2,40	0.0945	3,0	10,2	38,0	130	08385	08202
2,40	0.0945	3,0	28,8	60,0	130	08386	08203
2,45	0.0965	3,0	10,2	38,0	130	08387	08204
2,45	0.0965	3,0	30,0	60,0	130	08388	08205
2,50	0.0984	3,0	10,2	38,0	130	08389	08206
2,50	0.0984	3,0	30,0	60,0	130	08390	08207
2,55	0.1004	3,0	10,2	38,0	130	08391	08208

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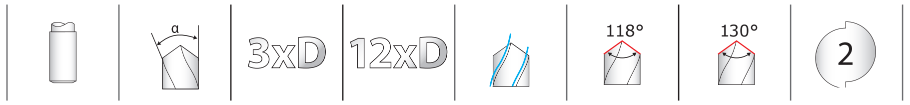
KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

2 Flute Left Hand Cut External Coolant

MICRO SGS Solid Carbide Tools

KYOCERA



New Expanded Tools

L226
METRIC SERIES

continued

CUTTING DIAMETER DC (mm)	DECIMAL EQUIV. (mm)	SHANK DIAMETER DCON (mm)	FLUTE LENGTH LCF (mm)	OVERALL LENGTH OAL (mm)	POINT ANGLE (mm)	EDP NO. UNCOATED	EDP NO. TI-NAMITE-A (AlTiN)
2,55	0.1004	3,0	31,2	60,0	130	08392	08209
2,60	0.1024	3,0	10,2	38,0	130	08393	08210
2,60	0.1024	3,0	31,2	60,0	130	08394	08211
2,65	0.1043	3,0	10,2	38,0	130	08395	08212
2,65	0.1043	3,0	32,4	60,0	130	08396	08213
2,70	0.1063	3,0	10,2	38,0	130	08397	08214
2,70	0.1063	3,0	32,4	60,0	130	08398	08215
2,75	0.1083	3,0	10,2	38,0	130	08399	08216
2,75	0.1083	3,0	33,6	60,0	130	08400	08217
2,80	0.1102	3,0	10,2	38,0	130	08401	08218
2,80	0.1102	3,0	33,6	60,0	130	08402	08219
2,85	0.1122	3,0	10,2	38,0	130	08403	08220
2,85	0.1122	3,0	34,8	60,0	130	08404	08221
2,90	0.1142	3,0	10,2	38,0	130	08405	08222
2,90	0.1142	3,0	34,8	60,0	130	08406	08223
2,95	0.1161	3,0	10,2	38,0	130	08407	08224
2,95	0.1161	3,0	36,0	60,0	130	08408	08225
3,00	0.1181	3,0	10,2	38,0	130	08409	08226
3,00	0.1181	3,0	36,0	60,0	130	08410	08227

TOLERANCES (mm)

0,04–3,0 DIAMETER

DC = +0,000/–0,008

DCON = h_6

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

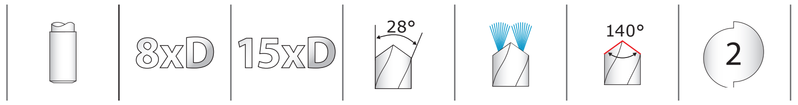
Series M226 • L226

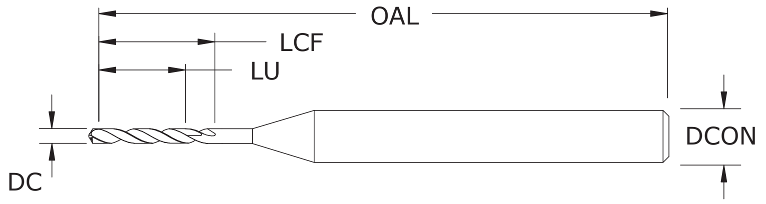
	Series M226 • L226	Hardness	Vc (m/min)	DC • mm	0.04	0.25	0.5	1	2	3
P	**CARBON STEELS** 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	40 (32-48)	RPM	315060	50410	25205	12602	6301	4201
				Fz	0.001	0.007	0.014	0.029	0.058	0.086
				Feed (mm/min)	363	363	363	363	363	363
P	**ALLOY STEELS** 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	59 (48-71)	RPM	472590	75614	37807	18904	9452	6301
				Fz	0.001	0.007	0.013	0.026	0.052	0.078
				Feed (mm/min)	493	493	493	493	493	493
H	**TOOL STEELS** A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRc	24 (20-29)	RPM	193883	31021	15511	7755	3878	2585
				Fz	0.001	0.003	0.007	0.013	0.026	0.039
				Feed (mm/min)	102	102	102	102	102	102
K	**CAST IRONS** Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	85 (68-102)	RPM	678591	108575	54287	27144	13572	9048
				Fz	0.001	0.004	0.008	0.016	0.033	0.049
				Feed (mm/min)	445	445	445	445	445	445
M	**STAINLESS STEELS (FREE MACHINING)** 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	20 (16-24)	RPM	157530	25205	12602	6301	3151	2100
				Fz	0.001	0.005	0.011	0.022	0.044	0.065
				Feed (mm/min)	137	137	137	137	137	137
M	**STAINLESS STEELS (DIFFICULT)** 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	12 (10-15)	RPM	96942	15511	7755	3878	1939	1293
				Fz	0.001	0.004	0.009	0.018	0.035	0.053
				Feed (mm/min)	69	69	69	69	69	69
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE)** Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 320 Bhn or ≤ 34 HRc	15 (12-18)	RPM	121177	19388	9694	4847	2424	1616
				Fz	0.000	0.003	0.006	0.011	0.022	0.033
				Feed (mm/min)	53	53	53	53	53	53
S	**TITANIUM ALLOYS** Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	15 (12-18)	RPM	121177	19388	9694	4847	2424	1616
				Fz	0.001	0.004	0.008	0.017	0.034	0.051
				Feed (mm/min)	82	82	82	82	82	82
N	**ALUMINUM ALLOYS** 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	75 (60-90)	RPM	593768	95003	47501	23751	11875	7917
				Fz	0.002	0.012	0.025	0.049	0.099	0.148
				Feed (mm/min)	1171	1171	1171	1171	1171	1171
N	**COPPER ALLOYS** Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	55 (44-66)	RPM	436237	69798	34899	17449	8725	5816
				Fz	0.002	0.012	0.025	0.049	0.099	0.148
				Feed (mm/min)	861	861	861	861	861	861
N	**PLASTICS** Polycarbonate, PVC		75 (60-90)	RPM	593768	95003	47501	23751	11875	7917
				Fz	0.002	0.012	0.025	0.049	0.099	0.148
				Feed (mm/min)	1171	1171	1171	1171	1171	1171

Note:
- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = Vc x 3.82 / DC
- ipm = Fr x rpm (Fr x maximum available rpm when recommendation exceeds machine limit)
- reduce speed and feed 30% when using uncoated drills
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for complete technical information

2 Flute Internal Coolant

MICRO SGS Solid Carbide Tools | KYOCERA





New Expanded Tools

M814
METRIC SERIES

- Split point and double margin design provide superior hole finish and size control
- Coolant hole feature allows straight through drilling without a peck cycle
- Proprietary high-performance coating and mirror polished fluting increase tool life and productivity in moderate-to-difficult workpiece materials
- Available from stock in a selection of popular lengths and diameters
- Application specific sub-micron grain carbide designed specifically for micro-tool applications
- Manufactured in accordance with KSPT ISO certified quality procedures

TOLERANCES (mm)

1,0–4,0 DIAMETER
DC = +0,000/–0,008
DCON = h_6

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

mm						EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIVALENT	SHANK DIAMETER DCON	FLUTE LENGTH LCF	CLEARED LENGTH LU	OVERALL LENGTH OAL	TI-NAMITE-CR (AlCrN)
1,0	0.0394	4,0	13,3	8,0	53,0	06000
1,1	0.0433	4,0	14,1	8,8	53,0	06001
1,2	0.0472	4,0	14,9	9,6	53,0	06002
1,3	0.0512	4,0	15,7	10,4	53,0	06003
1,4	0.0551	4,0	16,5	11,2	53,0	06004
1,5	0.0591	4,0	17,3	12,0	53,0	06005
1,6	0.0630	4,0	18,1	12,8	64,0	06006
1,7	0.0669	4,0	18,9	13,6	64,0	06007
1,8	0.0709	4,0	20,4	14,4	64,0	06008
1,9	0.0748	4,0	21,2	15,2	64,0	06009
2,0	0.0787	4,0	22,0	16,0	64,0	06010
2,1	0.0827	4,0	22,8	16,8	64,0	06011
2,2	0.0866	4,0	25,7	17,6	64,0	06012
2,3	0.0906	4,0	26,5	18,4	64,0	06013
2,4	0.0945	4,0	27,3	19,2	64,0	06014
2,5	0.0984	4,0	28,1	20,0	64,0	06015
2,6	0.1024	4,0	28,9	20,8	76,0	06016
2,7	0.1063	4,0	29,7	21,6	76,0	06017
2,8	0.1102	4,0	30,5	22,4	76,0	06018
2,9	0.1142	4,0	32,2	23,2	76,0	06019
3,0	0.1181	4,0	33,0	24,0	76,0	06020
3,1	0.1220	4,0	33,8	24,8	76,0	06021
3,2	0.1260	4,0	34,6	25,6	76,0	06022
3,3	0.1299	4,0	35,4	26,4	76,0	06023
3,4	0.1339	4,0	38,1	27,2	76,0	06024
3,5	0.1378	4,0	38,9	28,0	76,0	06025
3,6	0.1417	4,0	39,7	28,8	76,0	06026
3,7	0.1457	4,0	40,5	29,6	76,0	06027
3,8	0.1496	4,0	41,3	30,4	76,0	06028
3,9	0.1535	4,0	42,1	31,2	76,0	06029
4,0	0.1575	4,0	42,9	32,0	76,0	06030
1,0	0.0394	4,0	20,3	15,0	64,0	06031
1,1	0.0433	4,0	21,8	16,5	64,0	06032
1,2	0.0472	4,0	23,3	18,0	64,0	06033

continued on next page

MICRO SGS Solid Carbide Tools | KYOCERA

2 Flute Internal Coolant

M814
METRIC SERIES

continued

mm						EDP NO.
CUTTING DIAMETER DC	DECIMAL EQUIVALENT	SHANK DIAMETER DCON	FLUTE LENGTH LCF	CLEARED LENGTH LU	OVERALL LENGTH OAL	TI-NAMITE-CR (AlCrN)
1,3	0.0512	4,0	24,8	19,5	64,0	06034
1,4	0.0551	4,0	26,3	21,0	64,0	06035
1,5	0.0591	4,0	27,8	22,5	64,0	06036
1,6	0.0630	4,0	29,3	24,0	81,0	06037
1,7	0.0669	4,0	30,8	25,5	81,0	06038
1,8	0.0709	4,0	33,0	27,0	81,0	06039
1,9	0.0748	4,0	34,5	28,5	81,0	06040
2,0	0.0787	4,0	36,0	30,0	81,0	06041
2,1	0.0827	4,0	37,5	31,5	81,0	06042
2,2	0.0866	4,0	41,1	33,0	81,0	06043
2,3	0.0906	4,0	42,6	34,5	81,0	06044
2,4	0.0945	4,0	44,1	36,0	81,0	06045
2,5	0.0984	4,0	45,6	37,5	90,0	06046
2,6	0.1024	4,0	47,1	39,0	90,0	06047
2,7	0.1063	4,0	48,6	40,5	90,0	06048
2,8	0.1102	4,0	50,1	42,0	90,0	06049
2,9	0.1142	4,0	52,5	43,5	90,0	06050
3,0	0.1181	4,0	54,0	45,0	90,0	06051
3,1	0.1220	4,0	55,5	46,5	106,0	06052
3,2	0.1260	4,0	57,0	48,0	106,0	06053
3,3	0.1299	4,0	58,5	49,5	106,0	06054
3,4	0.1339	4,0	61,9	51,0	106,0	06055
3,5	0.1378	4,0	63,4	52,5	106,0	06056
3,6	0.1417	4,0	64,9	54,0	106,0	06057
3,7	0.1457	4,0	66,4	55,5	106,0	06058
3,8	0.1496	4,0	67,9	57,0	106,0	06059
3,9	0.1535	4,0	69,4	58,6	106,0	06060
4,0	0.1575	4,0	70,9	60,0	106,0	06061

Series M814 8xD

	Series M814 8xD	Hardness	Vc (m/min)		DC • mm 1	2	3	4
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	125 (100-150)	RPM	39746	19873	13249	9937
				Fz	0.0229	0.0458	0.0686	0.0915
				Feed (mm/min)	909	909	909	909
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	94 (76-113)	RPM	30052	15026	10017	7513
				Fz	0.0216	0.0431	0.0647	0.0862
				Feed (mm/min)	648	648	648	648
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRc	46 (37-55)	RPM	14541	7271	4847	3635
				Fz	0.0101	0.0203	0.0304	0.0405
				Feed (mm/min)	147	147	147	147
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	110 (88-132)	RPM	34899	17449	11633	8725
				Fz	0.0318	0.0636	0.0954	0.1272
				Feed (mm/min)	1110	1110	1110	1110
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	55 (44-66)	RPM	17449	8725	5816	4362
				Fz	0.0178	0.0355	0.0533	0.0710
				Feed (mm/min)	310	310	310	310
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	38 (30-46)	RPM	12118	6059	4039	3029
				Fz	0.0140	0.0281	0.0421	0.0562
				Feed (mm/min)	170	170	170	170
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 320 Bhn or ≤ 34 HRc	27 (22-33)	RPM	8725	4362	2908	2181
				Fz	0.0096	0.0192	0.0288	0.0384
				Feed (mm/min)	84	84	84	84
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	46 (37-55)	RPM	14541	7271	4847	3635
				Fz	0.0093	0.0185	0.0278	0.0370
				Feed (mm/min)	135	135	135	135
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	130 (104-155)	RPM	41200	20600	13733	10300
				Fz	0.0395	0.0789	0.1184	0.1578
				Feed (mm/min)	1626	1626	1626	1626
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	99 (79-119)	RPM	31506	15753	10502	7877
				Fz	0.0407	0.0814	0.1221	0.1629
				Feed (mm/min)	1283	1283	1283	1283

Note:
- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = (Vc x 1000) / (DC x 3.14)
- mm/min = Fr x rpm (Fr x maximum available rpm when recommendation exceeds machine limit)
- reduce speed and feed 30% when using uncoated drills
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for complete technical information

Series M814 15xD

	Series M814 15xD	Hardness	Vc (m/min)		DC • mm 1	2	3	4
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175 Bhn or ≤ 7 HRc	125 (100-150)	RPM	39746	19873	13249	9937
				Fz	0.0160	0.0320	0.0479	0.0639
				Feed (mm/min)	635	635	635	635
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275 Bhn or ≤ 28 HRc	94 (76-113)	RPM	30052	15026	10017	7513
				Fz	0.0139	0.0279	0.0418	0.0558
				Feed (mm/min)	419	419	419	419
H	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 475 Bhn or ≤ 50 HRc	46 (37-55)	RPM	14541	7271	4847	3635
				Fz	0.0070	0.0140	0.0210	0.0279
				Feed (mm/min)	102	102	102	102
K	CAST IRONS Gray, Malleable, Ductile	≤ 220 Bhn or ≤ 19 HRc	110 (68-132)	RPM	34899	17449	11633	8725
				Fz	0.0229	0.0459	0.0688	0.0917
				Feed (mm/min)	800	800	800	800
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275 Bhn or ≤ 28 HRc	55 (44-66)	RPM	17449	8725	5816	4362
				Fz	0.0127	0.0253	0.0380	0.0507
				Feed (mm/min)	221	221	221	221
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450	≤ 325 Bhn or ≤ 35 HRc	38 (30-46)	RPM	12118	6059	4039	3029
				Fz	0.0094	0.0189	0.0283	0.0377
				Feed (mm/min)	114	114	114	114
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy 800, Monel 400, Rene, Waspaloy	≤ 320 Bhn or ≤ 34 HRc	27 (22-33)	RPM	8725	4362	2908	2181
				Fz	0.0064	0.0128	0.0192	0.0256
				Feed (mm/min)	56	56	56	56
S	TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350 Bhn or ≤ 38 HRc	46 (37-55)	RPM	14541	7271	4847	3635
				Fz	0.0077	0.0154	0.0231	0.0307
				Feed (mm/min)	112	112	112	112
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150 Bhn or ≤ 7 HRc	130 (104-155)	RPM	41200	20600	13733	10300
				Fz	0.0287	0.0573	0.0860	0.1147
				Feed (mm/min)	1181	1181	1181	1181
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140 Bhn or ≤ 3 HRc	99 (79-119)	RPM	31506	15753	10502	7877
				Fz	0.0286	0.0572	0.0859	0.1145
				Feed (mm/min)	902	902	902	902

Note:
- Bhn (Brinell) HRc (Rockwell C) HRb (Rockwell B)
- rpm = (Vc x 1000) / (DC x 3.14)
- mm/min = Fr x rpm (Fr x maximum available rpm when recommendation exceeds machine limit)
- reduce speed and feed 30% when using uncoated drills
- reduce speed and feed for materials harder than listed
- refer to the KYOCERA SGS Tool Wizard® or sgsmicrotools.com for complete technical information

EDP Number Index

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EDP Number Index

EDP Number Index

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KYOCERA Solid Tools
SGS Solid Tools
SGS Micro Tools

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KYOCERA Solid Tools

SGS Solid Tools

SGS Micro Tools

Decimal Equivalents

Fraction • Number • Letter • Metric Sizes

INCH	METRIC	DECIMAL EQUIVALENT
–	0,10	0.0039
–	0,20	0.0079
–	0,25	0.0098
–	0,30	0.0118
#80	0,34	0.0135
–	0,35	0.0138
#79	0,37	0.0145
1/64	0,40	0.0156
#78	0,41	0.0160
–	0,45	0.0177
#77	0,46	0.0180
–	0,50	0.0197
#76	0,51	0.0200
#75	0,53	0.0210
–	0,55	0.0217
#74	0,57	0.0225
–	0,60	0.0236
#73	0,61	0.0240
#72	0,64	0.0250
–	0,65	0.0256
#71	0,66	0.0260
–	0,70	0.0276
#70	0,71	0.0280
#69	0,74	0.0292
–	0,75	0.0295
#68	0,79	0.0310
1/32	0,79	0.0313
–	0,80	0.0315
#67	0,81	0.0320
#66	0,84	0.0330
–	0,85	0.0335
#65	0,89	0.0350
–	0,90	0.0354
#64	0,91	0.0360
#63	0,94	0.0370
–	0,95	0.0374
#62	0,97	0.0380
#61	0,99	0.0390
–	1,00	0.0394
#60	1,02	0.0400
#59	1,04	0.0410
–	1,05	0.0413
#58	1,07	0.0420
#57	1,09	0.0430
–	1,10	0.0433
–	1,15	0.0453
#56	1,18	0.0465
3/64	1,19	0.0469
–	1,20	0.0472
–	1,25	0.0492
–	1,30	0.0512
#55	1,32	0.0520
–	1,35	0.0531
#54	1,40	0.0550
#53	1,51	0.0595
–	1,55	0.0610
1/16	1,59	0.0625

INCH	METRIC	DECIMAL EQUIVALENT
–	1,60	0.0630
#52	1,61	0.0635
–	1,65	0.0650
#51	1,70	0.0669
–	1,75	0.0689
#50	1,78	0.0700
–	1,80	0.0709
#49	1,85	0.0728
–	1,90	0.0748
#48	1,93	0.0760
–	1,95	0.0768
5/64	1,98	0.0781
#47	1,99	0.0785
–	2,00	0.0787
–	2,05	0.0807
#46	2,06	0.0810
#45	2,08	0.0820
–	2,10	0.0827
–	2,15	0.0846
#44	2,18	0.0860
–	2,20	0.0866
–	2,25	0.0886
#43	2,26	0.0890
–	2,30	0.0906
–	2,35	0.0925
#42	2,37	0.0935
3/32	2,38	0.0938
–	2,40	0.0945
#41	2,44	0.0960
–	2,45	0.0965
#40	2,50	0.0984
#39	2,53	0.0995
#38	2,58	0.1015
–	2,60	0.1024
#37	2,64	0.1040
–	2,70	0.1063
#36	2,71	0.1065
–	2,75	0.1083
7/64	2,78	0.1094
#35	2,79	0.1100
–	2,80	0.1102
#34	2,82	0.1110
#33	2,87	0.1130
–	2,90	0.1142
#32	2,95	0.1160
–	3,00	0.1181
#31	3,05	0.1200
–	3,10	0.1220
1/8	3,18	0.1250
–	3,20	0.1260
–	3,25	0.1280
#30	3,26	0.1285
–	3,30	0.1299
–	3,40	0.1339
#29	3,45	0.1360
–	3,50	0.1378
#28	3,57	0.1405

INCH	METRIC	DECIMAL EQUIVALENT
9/64	3,57	0.1406
–	3,60	0.1417
#27	3,66	0.1440
–	3,70	0.1457
#26	3,73	0.1470
–	3,75	0.1476
#25	3,80	0.1495
–	3,80	0.1496
#24	3,86	0.1520
–	3,90	0.1535
#23	3,91	0.1540
5/32	3,97	0.1562
#22	3,99	0.1570
–	4,00	0.1575
#21	4,04	0.1590
#20	4,09	0.1610
–	4,10	0.1614
–	4,20	0.1654
#19	4,22	0.1660
–	4,25	0.1673
–	4,30	0.1693
#18	4,31	0.1695
11/64	4,37	0.1719
#17	4,39	0.1730
–	4,40	0.1732
#16	4,50	0.1770
–	4,50	0.1772
#15	4,57	0.1800
–	4,60	0.1811
#14	4,62	0.1820
#13	4,70	0.1850
–	4,75	0.1870
3/16	4,76	0.1875
#12	4,80	0.1890
#11	4,85	0.1910
–	4,90	0.1929
#10	4,91	0.1935
#9	4,98	0.1960
–	5,00	0.1969
#8	5,05	0.1990
–	5,10	0.2008
#7	5,11	0.2010
13/64	5,16	0.2031
#6	5,18	0.2040
–	5,20	0.2047
#5	5,22	0.2055
–	5,25	0.2067
–	5,3	0.2087
#4	5,31	0.2090
–	5,40	0.2126
#3	5,41	0.2130
–	5,50	0.2165
7/32	5,56	0.2188
–	5,60	0.2205
#2	5,61	0.2210
–	5,70	0.2244
–	5,75	0.2264

INCH	METRIC	DECIMAL EQUIVALENT
#1	5,79	0.2280
–	5,80	0.2283
–	5,90	0.2323
A	5,94	0.2340
15/64	5,95	0.2344
–	6,00	0.2362
B	6,05	0.2380
–	6,10	0.2402
C	6,15	0.2420
–	6,20	0.2441
D	6,25	0.2461
–	6,30	0.2480
E	6,35	0.2500
1/4	6,35	0.2500
–	6,40	0.2520
–	6,50	0.2559
F	6,53	0.2570
–	6,60	0.2598
G	6,63	0.2610
–	6,70	0.2638
17/64	6,75	0.2656
H	6,76	0.2660
–	6,80	0.2677
–	6,90	0.2717
I	6,91	0.2720
–	7,00	0.2756
J	7,04	0.2770
–	7,10	0.2795
K	7,14	0.2810
9/32	7,14	0.2812
–	7,20	0.2835
–	7,25	0.2854
–	7,30	0.2874
L	7,37	0.2900
–	7,40	0.2913
M	7,49	0.2950
–	7,50	0.2953
19/64	7,54	0.2969
–	7,60	0.2992
N	7,67	0.3020
–	7,70	0.3031
–	7,75	0.3051
–	7,80	0.3071
–	7,90	0.3110
5/16	7,94	0.3125
–	8,00	0.3150
O	8,03	0.3160
–	8,10	0.3189
–	8,20	0.3228
P	8,20	0.3230
–	8,25	0.3248
–	8,30	0.3268
21/64	8,33	0.3281
–	8,40	0.3307
Q	8,43	0.3320
–	8,50	0.3346
–	8,60	0.3386

INCH	METRIC	DECIMAL EQUIVALENT
R	8,61	0.3390
–	8,70	0.3425
11/32	8,73	0.3438
–	8,75	0.3445
–	8,80	0.3465
S	8,84	0.3480
–	8,90	0.3504
–	9,00	0.3543
T	9,09	0.3580
–	9,10	0.3583
23/64	9,13	0.3594
–	9,20	0.3622
–	9,25	0.3642
–	9,30	0.3661
U	9,35	0.3680
–	9,40	0.3701
–	9,50	0.3740
3/8	9,53	0.3750
V	9,56	0.3770
–	9,60	0.3780
–	9,70	0.3819
–	9,75	0.3839
W	9,80	0.3858
–	9,90	0.3898
25/64	9,92	0.3906
–	10,00	0.3937
X	10,08	0.3970
–	10,10	0.3976
–	10,20	0.4016
Y	10,26	0.4040
–	10,30	0.4055
13/32	10,32	0.4062
–	10,40	0.4094
Z	10,49	0.4130
–	10,50	0.4134
–	10,60	0.4173
–	10,70	0.4213
27/64	10,72	0.4219
–	10,80	0.4252
–	10,90	0.4291
–	11,00	0.4331
–	11,10	0.4370
7/16	11,11	0.4375
–	11,20	0.4409
–	11,30	0.4449
–	11,40	0.4488
–	11,50	0.4528
29/64	11,51	0.4531
–	11,60	0.4567
–	11,70	0.4606
–	11,80	0.4646
–	11,90	0.4685
15/32	11,91	0.4688
–	12,00	0.4724
31/64	12,30	0.4844
–	12,50	0.4921
1/2	12,70	0.5000

INCH	METRIC	DECIMAL EQUIVALENT
–	13,00	0.5118
33/64	13,10	0.5156
17/32	13,49	0.5312
–	13,50	0.5315
35/64	13,89	0.5469
–	14,00	0.5512
9/16	14,29	0.5625
–	14,50	0.5709
37/64	14,68	0.5781
–	15,00	0.5906
19/32	15,08	0.5938
39/64	15,48	0.6094
–	15,50	0.6102
5/8	15,88	0.6250
–	16,00	0.6299
41/64	16,27	0.6406
–	16,50	0.6496
21/32	16,67	0.6562
–	17,00	0.6693
43/64	17,07	0.6719
11/16	17,46	0.6875
–	17,50	0.6890
45/64	17,86	0.7031
–	18,00	0.7087
23/32	18,26	0.7188
–	18,50	0.7283
47/64	18,65	0.7344
–	19,00	0.7480
3/4	19,05	0.7500
49/64	19,45	0.7656
–	19,50	0.7677
25/32	19,84	0.7812
–	20,00	0.7874
51/64	20,24	0.7969
–	20,50	0.8071
13/16	20,64	0.8125
–	21,00	0.8268
53/64	21,03	0.8281
27/32	21,43	0.8438
–	21,50	0.8465
55/64	21,84	0.8594
–	22,00	0.8661
7/8	22,23	0.8750
–	22,50	0.8858
57/64	22,62	0.8906
–	23,00	0.9055
29/32	23,02	0.9062
59/64	23,42	0.9219
–	23,50	0.9252
15/16	23,81	0.9375
–	24,00	0.9449
61/64	24,21	0.9531
–	24,50	0.9646
31/32	24,61	0.9688
–	25,00	0.9843
63/64	25,00	0.9844
1	25,40	1.0000

Hardness Conversion Chart

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

Conversions from each scale are approximate

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