SGS®
Solid Carbide Tools

VALUE AT THE SPINDLE®

Routers

Routing

HIGH PERFORMANCE ROUTERS	SERIES	DESCRIPTION	PAGE
Carbon Composite	20-CCR	Multi-Flute Carbon Composite Fractional	338
	20M-CCR	Multi-Flute Carbon Composite Metric	338
	20-CCR-LHC	Multi-Flute Carbon Composite Left Hand Cut Fractional	339
	20M-CCR-LHC	Multi-Flute Carbon Composite Left Hand Cut Metric	339
Coarse Cut Carbon Composite	31-CCR	Multi-Flute Coarse Composite Fractional	342
	31M-CCR	Multi-Flute Coarse Composite Metric	342
Compression	25	Multi-Flute Compression Fractional	345
	25M	Multi-Flute Compression Metric	345

GENERAL PURPOSE ROUTERS	SERIES	DESCRIPTION	PAGE
Up Cut	21	2 Flute Up Cut Fractional	348
	21M	2 Flute Up Cut Metric	348
Down Cut	22	2 Flute Down Cut Fractional	349
	22M	2 Flute Down Cut Metric	349

Speed & Feed Recommendations listed after each series

Ranurado

RANURADORES DE ALTO RENDIMIENTO	SERIE	DESCRIPCIÓN	PÁGINA
Compuesto de carbono	20-CCR	Filo múltiple, compuesto de carbono, fraccional	338
	20M-CCR	Filo múltiple, compuesto de carbono, métrico	338
	20-CCR-LHC	Filo múltiple, carbon composite corte hélice izquierda fraccional	339
	20M-CCR-LHC	Filo múltiple, carbo composite corte hélice izquierda métrico	339
Compuesto de carbono de corte grueso	31-CCR	Filo múltiple, compuesto grueso, fraccional	342
	31M-CCR	Filo múltiple, compuesto grueso, métrico	342
Compresión	25	Filo múltiple, compresión, fraccional	345
	25M	Filo múltiple, compresión, métrico	345

RANURADORES DE USO GENERAL	SERIE	DESCRIPCIÓN	PÁGINA
Corte ascendente	21	2 filos, corte ascendente, fraccional	348
	21M	2 filos, corte ascendente, métrico	348
Corte descendente	22	2 filos, corte descendente, fraccional	349
	22M	2 filos, corte descendente, métrico	349

Recomendaciones de velocidades y avances mostradas tras cada serie

Détourage

FRAISES A DETOURER HAUTE PERFORMANCE	SÈRIES	DESCRIPTION	PAGE
Composites carbone	20-CCR	Multi-dents pour composites carbone (fractionnel)	338
	20M-CCR	Multi-dents pour composites carbone (métrique)	338
	20-CCR-LHC	Multi-dents carbon composite coupe à gauche (fractionnel)	339
	20M-CCR-LHC	Multi-dents carbon composite coupe à gauche (métrique)	339
Pour composites carbone coupe grossière	31-CCR	Multi-dents pour composites grossiers (fractionnel)	342
	31M-CCR	Multi-dents pour composites grossiers (métrique)	342
Compression	25	Multi-dents de compression (fractionnel)	345
	25M	Multi-dents de compression (métrique)	345

FRAISES À DÉTOURER UNIVERSELLES	SÈRIES	DESCRIPTION	PAGE
Coupe ascendante	21	2 dents coupe ascendante (fractionnel)	348
	21M	2 dents coupe ascendante (métrique)	348
Coupe descendante	22	2 dents coupe descendante (fractionnel)	349
	22M	2 dents coupe descendante (métrique)	349

Recommandations de vitesse et avance indiquées après chaque série

Konturenfräsen

HOCHLEISTUNGS-KONTURENFRÄSER	SERIE	BESCHREIBUNG	SEITE
Kohlefaserverbundwerkstoff	20-CCR	Zölliger Konturenfräser für Kohlefaserverbundwerkstoff	338
	20M-CCR	Konturenfräser für Kohlefaserverbundwerkstoff	338
	20-CCR-LHC	Mehrschneider Carbon Composite Links geschnittene zöllig	339
	20M-CCR-LHC	Mehrschneider Carbon Composite Links geschnittene metrisch	339
Grobschnitt Kohlefaserverbundwerkstoff	31-CCR	Zölliger Konturenfräser für Verbundkunststoff	342
	31M-CCR	Konturenfräser für Verbundkunststoff	342
Gegenläufiger Drall	25	Zölliger Gegenläufiger Konturenfräser	345
	25M	Gegenläufiger Konturenfräser	345

STANDARD-KONTURENFRÄSER	SERIE	BESCHREIBUNG	SEITE
Rechtsspirale	21	Zölliger VHM-Fräser mit 2 Schneiden (ziehend)	348
	21M	VHM-Fräser mit 2 Schneiden (ziehend)	348
Linksspirale	22	Zölliger VHM-Fräser mit 2 Schneiden (drückend)	349
	22M	VHM-Fräser mit 2 Schneiden (drückend)	349

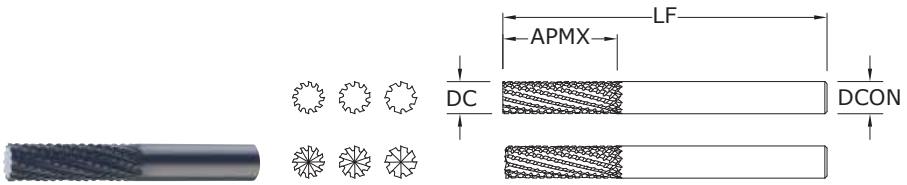
Empfehlungen für Drehzahl & Vorschub im Anhang zu jeder Serie

FRACTIONAL & METRIC

Carbon Composite

20-CCR

FRACTIONAL SERIES



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

inch						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	NO. OF FLUTES	END STYLE	UNCOATED	Di-NAMITE® (Diamond)
1/4	1	2-1/2	1/4	8	No End Cutting	72930	73013
1/4	1	2-1/2	1/4	8	End Cutting	72947	73012
5/16	1	2-1/2	5/16	10	No End Cutting	72948	73026
5/16	1	2-1/2	5/16	10	End Cutting	72949	73014
3/8	1-1/8	2-1/2	3/8	12	No End Cutting	72950	73028
3/8	1-1/8	2-1/2	3/8	12	End Cutting	72951	73027
1/2	1-1/2	3-1/2	1/2	12	No End Cutting	72952	73041
1/2	1-1/2	3-1/2	1/2	12	End Cutting	72953	73029

TOLERANCES (inch)

DC = +.000/–.005

DCON = 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)

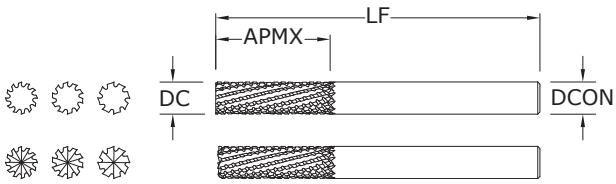
DC = +0,000/–0,130

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
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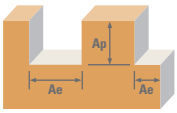
FRACTIONAL

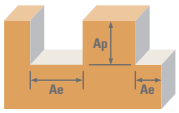
Carbon Composite



Series 20 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)	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)

Carbon Composite

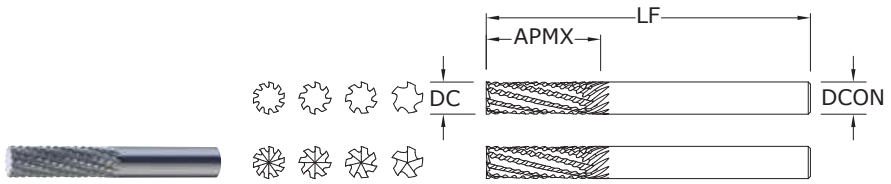


Series 20M Metric			Ae x DC	Ap x DC	Vc (m/min)		DC • mm 3	6	8	10	12
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	1	≤ 1	120 (96-164)	RPM	12722	6361	4771	3817	3181
						Fr	0.055	0.113	0.243	0.366	0.439
						Feed (mm/min)	700	720	1160	1395	1395
		Profile	≤ 0.5	≤ 1.5	150 (120-180)	RPM	15903	7951	5963	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)

FRACTIONAL

Coarse Cut Carbon Composite



31-CCR

FRACTIONAL SERIES

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

inch						EDP NO.	
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	NO. OF FLUTES	END STYLE	UNCOATED	Di-NAMITE® (Diamond)
1/4	1	2-1/2	1/4	5	End Cutting	72954	72955
1/4	1	2-1/2	1/4	5	No End Cutting	72956	72957
5/16	1	2-1/2	5/16	7	End Cutting	72958	72959
5/16	1	2-1/2	5/16	7	No End Cutting	72960	72961
3/8	1-1/8	2-1/2	3/8	8	End Cutting	72962	72963
3/8	1-1/8	2-1/2	3/8	8	No End Cutting	72964	72965
1/2	1-1/2	3-1/2	1/2	10	End Cutting	72966	72967
1/2	1-1/2	3-1/2	1/2	10	No End Cutting	72968	72969

TOLERANCES (inch)

DC = +.000/–.005

DCON = h_6

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

31M-CCR

METRIC SERIES

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

mm						EDP NO.		
CUTTING DIAMETER DC	LENGTH OF CUT APMX	OVERALL LENGTH LF	SHANK DIAMETER DCON	NO. OF FLUTES	END STYLE	UNCOATED	Ti-NAMITE-B (TiB_2)	Di-NAMITE® (Diamond)
6,0	25,0	63,0	6,0	5	End Cutting	82974	83200	82982
6,0	25,0	63,0	6,0	5	No End Cutting	82975	83201	82983
8,0	25,0	63,0	8,0	7	End Cutting	82976	83202	82984
8,0	25,0	63,0	8,0	7	No End Cutting	82977	83203	82985
10,0	28,0	63,0	10,0	8	End Cutting	82978	83204	82986
10,0	28,0	63,0	10,0	8	No End Cutting	82979	83205	82987
12,0	38,0	89,0	12,0	10	End Cutting	82980	83206	82988
12,0	38,0	89,0	12,0	10	No End Cutting	82981	83207	82989

TOLERANCES (mm)

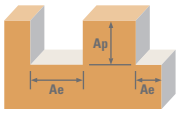
DC = +0,000/–0,130

DCON = h_6

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

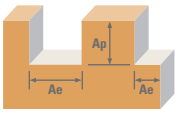
Coarse Cut Carbon Composite



Series 31 Fractional		Ae x DC	Ap x DC	Vc (sfm)		DC • in 1/4	5/16	3/8	1/2
N	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
	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

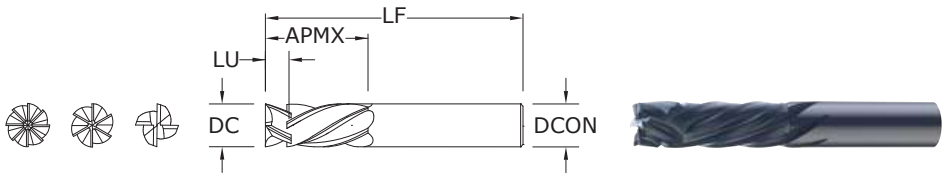


Series 31M Metric		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	8	10	12
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	1	≤ 1	120	RPM	6361	4771	3817	3181
					(96-164)	Fr	0.071	0.170	0.244	0.366
						Feed (mm/min)	450	810	930	1165
		Profile	≤ 0.5	≤ 1.5	150	RPM	7951	5963	4771	3976
					(120-180)	Fr	0.071	0.170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

HSM (high speed machining)
rpm = (Vc 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)

Compression

SERIES 25
COMPRESSION ROUTER



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

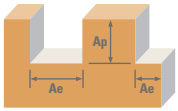
For patent information visit www.ksptpatents.com

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

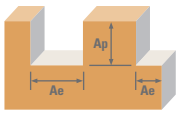
Compression



	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)

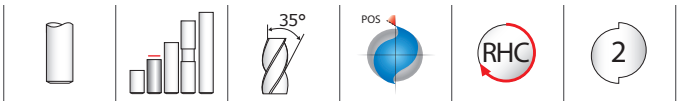
Compression



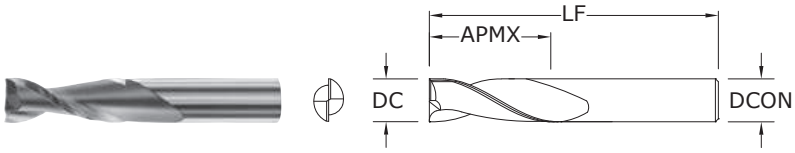
	Series 25M Metric		Ae x DC	Ap x DC	Vc (m/min)		DC • mm 6	8	10	12
N	CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Profile	≤ 0.5	≤ 1.5	150	RPM	7951	5963	4771	3976
					(96-164)	Fz	0.040	0.065	0.075	0.100
						Feed (mm/min)	1272	1550	2147	3181
		HSM	≤ 0.05	≤ 2	250	RPM	13252	9939	7951	6626
					(200-300)	Fz	0.095	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)

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)

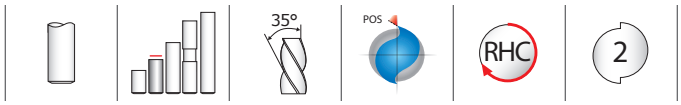
DC = +0,000/–0,080

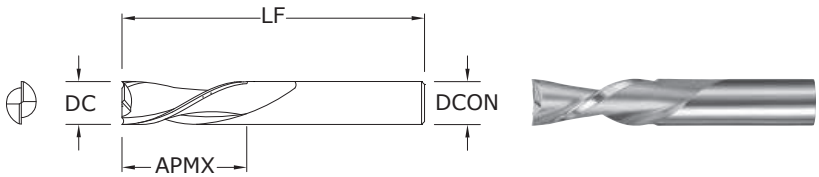
DCON = h_6

PLASTICS/COMPOSITES

For patent information visit www.ksptpatents.com

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

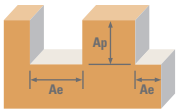
PLASTICS/COMPOSITES

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

FRACTIONAL

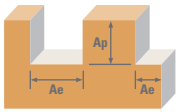
Up Cut
Down Cut



	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