SGS®
Solid Carbide Tools

S-CARB APR S-CARB APF

APR APF

Aluminum

Tools For Aluminum | *VALUE AT THE SPINDLE*

ISO 9001 Certified Company

HIGH PERFORMANCE ALUMINUM MACHINING APR - APF

NEW!

ADVANCED PRODUCTIVITY ROUGHING AND FINISHING ENDMILLS

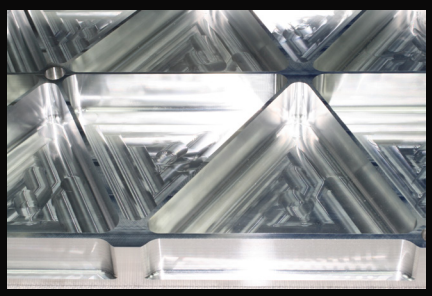
CARB
Solid Carbide End Mills for Aluminum

S-Carb APR

Developed and engineered for high power, high efficiency machining of aluminium aerospace structural parts (i.e. ribs, spars) and their equivalent. Material removal rates of 550 cubic inches achievable, dependent on machine.

S-Carb APF

Developed and engineered for high-feed finishing of thin wall aluminium sections typically on aerospace ribs. Vast reduction in machining times, with straighter walls and superior finishes compared to waterlining.



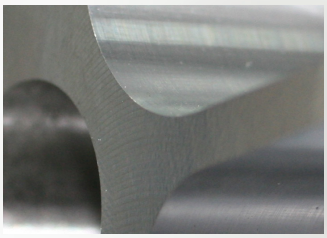
VALUE AT THE SPINDLE

Design and engineering ensure outstanding performance in a variety of aluminum applications.

Please contact your SGS representative for more information.

S-CARB APR

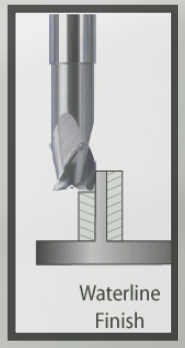
- 3 flute design for high feed power roughing
- High feed direct plunge ability
- Through coolant design
- Polished flute design to maximize chip evacuation



S-CARB APF

- 4 flute unique variable geometry reduces vibration and allows finishing of thin walls in one pass
- Through coolant design
- Polished flutes for superior finishes
- Significant reduction in cycle times

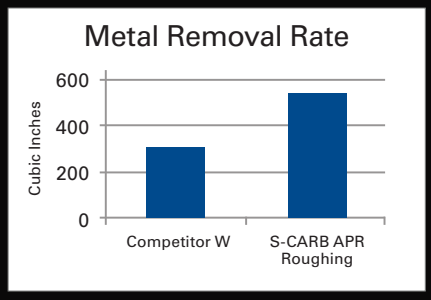
Typical Method: High-speed waterline finishing, multiple passes at numerous levels to produce acceptable thin walls



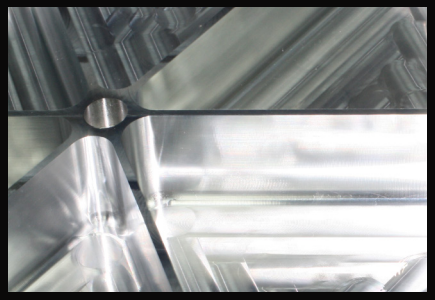
APF Method: High speed finishing at full depth without wall distortion

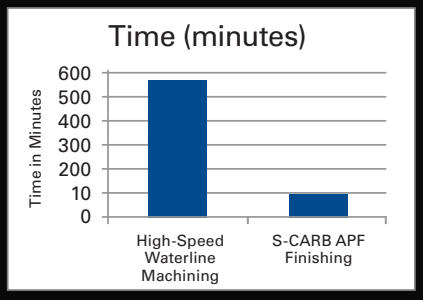
Please contact your SGS representative for more information.

Flute Design ENGINEERED

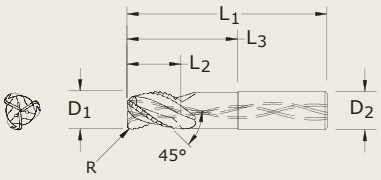


Superior metal removal rate achievement over competition.





Dramatic increase in productivity versus the high speed waterline finishing method, which multiple passes are made to produce acceptable thin walls.



TOLERANCES (inch)		
DIAMETER	D_1	D_2
3/4 - 1	–0.00040/–0.00200	h6

CORNER RADIUS TOLERANCES (inch)
R= +/– 0.0018

TOLERANCES (mm)		
DIAMETER	D_1	D_2
12 - 25	–0,010/–0,050	h6

CORNER RADIUS TOLERANCES (mm)
R = +/– 0,03

43APR (FRACTIONAL)

Cutting Diameter D_1	Length of Cut L_2	Overall Length L_1	Shank Diameter D_2	Reach L_3	Corner Radius R	Ti-NAMITE-B (TiB_2) EDP No.
3/4	1-3/8	4-1/4	3/4	2-3/8	.030	34000
3/4	1-3/8	4-1/4	3/4	2-3/8	.060	34001
3/4	1-3/8	4-1/4	3/4	2-3/8	.090	34002
3/4	1-3/8	4-1/4	3/4	2-3/8	.120	34003
3/4	1-1/4	4-7/8	3/4	3	.030	34004
3/4	1-1/4	4-7/8	3/4	3	.060	34005
3/4	1-1/4	4-7/8	3/4	3	.090	34006
3/4	1-1/4	4-7/8	3/4	3	.120	34007
1	1-3/4	4-1/2	1	2-1/2	.030	34008
1	1-3/4	4-1/2	1	2-1/2	.060	34009
1	1-3/4	4-1/2	1	2-1/2	.090	34010
1	1-3/4	4-1/2	1	2-1/2	.120	34011
1	1-1/2	5-1/4	1	3-1/4	.030	34012
1	1-1/2	5-1/4	1	3-1/4	.060	34013
1	1-1/2	5-1/4	1	3-1/4	.090	34014
1	1-1/2	5-1/4	1	3-1/4	.120	34015

43MAPR (METRIC)

Cutting Diameter D_1	Length of Cut L_2	Overall Length L_1	Shank Diameter D_2	Reach L_3	Corner Radius R	Ti-NAMITE-B (TiB_2) EDP No.
12,0	18,0	83,0	12,0	38,0	–	44650
12,0	18,0	83,0	12,0	38,0	2,0	44685
12,0	18,0	83,0	12,0	38,0	3,0	44686
12,0	18,0	83,0	12,0	38,0	4,0	44687
16,0	24,0	92,0	16,0	51,0	–	44652
16,0	24,0	92,0	16,0	51,0	2,0	44688
16,0	24,0	92,0	16,0	51,0	3,0	44689
16,0	24,0	92,0	16,0	51,0	4,0	44690
20,0	30,0	86,0	20,0	45,0	–	44646
20,0	30,0	86,0	20,0	45,0	3,0	44647
20,0	30,0	86,0	20,0	45,0	4,0	44648
20,0	30,0	86,0	20,0	45,0	5,0	44649
20,0	35,0	104,0	20,0	64,0	–	44653
20,0	35,0	104,0	20,0	64,0	3,0	44691
20,0	35,0	104,0	20,0	64,0	4,0	44692
20,0	35,0	104,0	20,0	64,0	5,0	44693
25,0	35,0	108,0	25,0	55,0	3,0	44809
25,0	35,0	108,0	25,0	55,0	4,0	44810
25,0	35,0	108,0	25,0	55,0	5,0	44811
25,0	35,0	140,0	25,0	80,0	–	44654
25,0	35,0	140,0	25,0	80,0	3,0	44694
25,0	35,0	140,0	25,0	80,0	4,0	44695
25,0	35,0	140,0	25,0	80,0	5,0	44696
25,0	35,0	140,0	25,0	90,0	3,0	44645

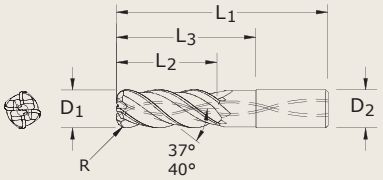
Available on request: • JetStream Technology • Side exits for MQL applications

TOLERANCES (inch)		
DIAMETER	D_1	D_2
1/2 - 3/4	–0.00040/–0.00200	h6

CORNER RADIUS TOLERANCES (inch)
R= +/– 0.0018

TOLERANCES (mm)		
DIAMETER	D_1	D_2
6 - 25	–0,010/–0,050	h6

CORNER RADIUS TOLERANCES (mm)
R = +/– 0,03



CARB
Solid Carbide End Mills for Aluminum

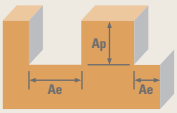
43APF (FRACTIONAL)

Cutting Diameter D_1	Length of Cut L_2	Overall Length L_1	Shank Diameter D_2	Reach L_3	Corner Radius R	Ti-NAMITE-B (TiB_2) EDP No.
1/2	1-1/4	3-1/4	1/2	1-5/8	.030	34016
1/2	1-1/4	3-1/4	1/2	1-5/8	.060	34017
1/2	1-1/4	3-1/4	1/2	1-5/8	.090	34018
1/2	1-1/4	3-1/4	1/2	1-5/8	.120	34019
1/2	2	4	1/2	2-3/8	.030	34020
1/2	2	4	1/2	2-3/8	.060	34021
1/2	2	4	1/2	2-3/8	.090	34022
1/2	2	4	1/2	2-3/8	.120	34023
3/4	1-7/8	4-1/4	3/4	2-3/8	.030	34024
3/4	1-7/8	4-1/4	3/4	2-3/8	.060	34025
3/4	1-7/8	4-1/4	3/4	2-3/8	.090	34026
3/4	1-7/8	4-1/4	3/4	2-3/8	.120	34027
3/4	3	5-3/8	3/4	3-1/2	.030	34028
3/4	3	5-3/8	3/4	3-1/2	.060	34029
3/4	3	5-3/8	3/4	3-1/2	.090	34030
3/4	3	5-3/8	3/4	3-1/2	.120	34031

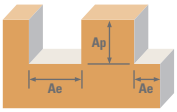
43MAPF (METRIC)

Cutting Diameter D_1	Length of Cut L_2	Overall Length L_1	Shank Diameter D_2	Reach L_3	Corner Radius R	Ti-NAMITE-B (TiB_2) EDP No.
6,0	24,0	58,0	6,0	30,0	–	44627
8,0	32,0	64,0	8,0	40,0	–	44628
10,0	40,0	80,0	10,0	50,0	–	44629
12,0	30,0	83,0	12,0	40,0	–	44630
12,0	30,0	83,0	12,0	40,0	2,0	44745
12,0	30,0	83,0	12,0	40,0	3,0	44746
12,0	30,0	83,0	12,0	40,0	4,0	44747
12,0	30,0	83,0	12,0	50,0	0,5	44641
12,0	30,0	83,0	12,0	50,0	5,0	44642
12,0	48,0	100,0	12,0	62,0	–	44631
12,0	48,0	100,0	12,0	62,0	2,0	44748
12,0	48,0	100,0	12,0	62,0	3,0	44749
12,0	48,0	100,0	12,0	62,0	4,0	44750
16,0	42,0	93,0	16,0	51,0	5,0	44643
16,0	40,0	92,0	16,0	51,0	–	44634
16,0	40,0	92,0	16,0	51,0	2,0	44751
16,0	40,0	92,0	16,0	51,0	3,0	44752
16,0	40,0	92,0	16,0	51,0	4,0	44753
16,0	64,0	125,0	16,0	82,0	–	44635
16,0	64,0	125,0	16,0	82,0	2,0	44754
16,0	64,0	125,0	16,0	82,0	3,0	44755
16,0	64,0	125,0	16,0	82,0	4,0	44756
20,0	50,0	108,0	20,0	63,0	–	44636
20,0	50,0	108,0	20,0	63,0	3,0	44757
20,0	50,0	108,0	20,0	63,0	4,0	44758
20,0	50,0	108,0	20,0	63,0	5,0	44759
20,0	80,0	150,0	20,0	102,0	–	44637
20,0	80,0	150,0	20,0	102,0	3,0	44760
20,0	80,0	150,0	20,0	102,0	4,0	44761
20,0	80,0	150,0	20,0	102,0	5,0	44762
25,0	63,0	130,0	25,0	79,0	–	44638
25,0	63,0	130,0	25,0	79,0	3,0	44763
25,0	63,0	130,0	25,0	79,0	4,0	44764
25,0	63,0	130,0	25,0	79,0	5,0	44765
25,0	100,0	175,0	25,0	120,0	–	44639
25,0	100,0	175,0	25,0	120,0	3,0	44766
25,0	100,0	175,0	25,0	120,0	4,0	44767
25,0	100,0	175,0	25,0	120,0	5,0	44768

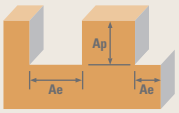
Available on request: • JetStream Technology

	Series S-Carb APR Fractional		 Ae x D_1	Ap x D_1	Vc (sfm)		Diameter (D_1) (inch) 3/4	1
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	Slot <40hp	1	≤ 1	3280	RPM	16706	12530
					(2624-3936)	Fz	0.0060	0.0070
						Feed (IPM)	301	263
		Slot >67hp	1	≤ 1	4920	RPM	25059	18794
					(3936-5904)	Fz	0.0090	0.0110
						Feed (IPM)	677	620
		Profile	≤ 0.5	≤ 1.5	6560	RPM	33412	25059
					(5248-7872)	Fz	0.0090	0.0110
						Feed (IPM)	902	827
N	ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	Slot <40hp	1	≤ 1	2620	RPM	13345	10008
					(2096-3144)	Fz	0.0060	0.0070
						Feed (IPM)	240	210
		Slot >67hp	1	≤ 1	3940	RPM	20068	15051
					(3152-4728)	Fz	0.0090	0.0110
						Feed (IPM)	542	497
		Profile	≤ 0.5	≤ 1.5	4920	RPM	25059	18794
					(3936-5904)	Fz	0.0090	0.0110
						Feed (IPM)	677	620

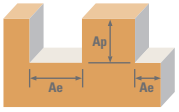
Note:
- surface speed is dependent on machine spindle & fixturing*
- balancing is recommended at ultra high surface speeds
- tool life may be reduced when machining Lithium Alloys
- rpm = sfm x 3.82 / D_1
- ipm = (inch / flute) x number of flutes x rpm
- maximum recommended depths shown
- reduce speed and feed for materials harder than listed
- ramp angle = 15˚ (feed rate = 30%)
- maximum ramp depth = 1 x D_1
- plunge depth = 1 x D_1 (feed rate = 30%)
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series S-Carb APR Metric		 Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 12	16	20	25
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	Slot <30 kW	1	1	1000	RPM	26525	19894	15915	12732
					(800-1200)	Fz	0.080	0.110	0.150	0.180
						Feed (mm/min)	6366	6565	7162	6875
		Slot >50kW	1	≤ 1	1500	RPM	39788	29841	23873	19098
					(1200-1800)	Fz	0.120	0.160	0.220	0.270
						Feed (mm/min)	14324	14324	15756	15469
		Profile	≤ 0.5	≤ 1.5	2000	RPM	53050	39788	31830	25464
					(1600-2400)	Fz	0.120	0.160	0.220	0.270
						Feed (mm/min)	19098	19098	21008	20626
N	ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090	Slot <30 kW	1	≤ 1	800	RPM	21220	15915	12732	10186
					(640-960)	Fz	0.080	0.110	0.150	0.180
						Feed (mm/min)	5093	5252	5729	5500
		Slot >50kW	1	≤ 1	1200	RPM	31830	23873	19098	15278
					(960-1440)	Fz	0.120	0.160	0.220	0.270
						Feed (mm/min)	11459	11459	12605	12375
		Profile	≤ 0.5	≤ 1.5	1500	RPM	39788	29841	23873	19098
					(1200-1800)	Fz	0.120	0.160	0.220	0.270
						Feed (mm/min)	14324	14324	15756	15469

Note:
- surface speed is dependent on machine spindle & fixturing*
- balancing is recommended at ultra high surface speeds
- tool life may be reduced when machining Lithium Alloys
- rpm = (1000 x m/min) / (3.14 x D_1)
- mm/min = (mm / flute) x rpm
- maximum recommended depths shown
- reduce speed and feed for materials harder than listed
- ramp angle = 15˚ (feed rate = 30%)
- maximum ramp depth = 1 x D_1
- plunge depth = 1 x D_1 (feed rate = 30%)
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series S-Carb APF Fractional		 Ae x D_1	Ap x D_1	Vc (sfm)		Diameter (D_1) (inch) 1/2	3/4
N	**ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075**	Profile	≤ 0.1	≤ 2.5	2625	RPM	20055	13370
					(2100-3150)	Fz	0.0030	0.0050
						Feed (IPM)	241	267
		Profile	≤ 0.1	≤ 4	2625	RPM	20055	13370
					(2100-3150)	Fz	0.0020	0.0040
						Feed (IPM)	160	214
N	**ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090**	Profile	≤ 0.1	≤ 2.5	1970	RPM	15051	10034
					(1576-2364)	Fz	0.0030	0.0050
						Feed (IPM)	181	201
		Profile	≤ 0.1	≤ 4	1970	RPM	15051	10034
					(1576-2364)	Fz	0.0020	0.0040
						Feed (IPM)	120	161

Note:
- surface speed is dependent on machine spindle & fixturing*
- balancing is recommended at ultra high surface speeds
- tool life may be reduced when machining Lithium Alloys
- rpm = sfm x 3.82 / D_1
- ipm = (inch / flute) x number of flutes 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 D_1 maximum
- ramp angle = 6° (feed rate = 30%)
- maximum ramp depth = .25 x D_1
- plunging not recommended
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series S-Carb APF Metric		 Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12	16	20	25
N	**ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075**	Profile	≤ 0.1	≤ 2.5	800	RPM	42440	31830	25464	21220	15915	12732	10186
					(640-960)	Fz	0.050	0.055	0.060	0.070	0.100	0.140	0.170
						Feed (mm/min)	8488	7003	6111	5942	6366	7130	6926
		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
N	**ALUMINUM ALLOYS (LITHIUM)* 2090, 2091, 2099, 2195, 2199, 2297, 8090**	Profile	≤ 0.1	≤ 2.5	600	RPM	31830	23873	19098	15915	11936	9549	7639
					(480-720)	Fz	0.050	0.055	0.060	0.070	0.100	0.140	0.170
						Feed (mm/min)	6366	5252	4584	4456	4774	5347	5195
		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

Note:
- surface speed is dependent on machine spindle & fixturing*
- balancing is recommended at ultra high surface speeds
- tool life may be reduced when machining Lithium Alloys
- rpm = (1000 x m/min) / (3.14 x D_1)
- mm/min = (mm / flute) 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 D_1 maximum
- ramp angle = 6° (feed rate = 30%)
- maximum ramp depth = .25 x D_1
- plunging not recommended
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

Tool Wizard
CALCULATE APPLICATION PARAMETERS
www.sgstool.com

SGS
Solid Carbide Tools

Solutions Around The Globe
SGS Tool Company is a privately-held, ISO-certified leader of round solid carbide cutting tool technology for the aerospace, metalworking, and automotive industries with manufacturing sites in the United States and United Kingdom. Our global network of Sales Representatives, Industrial Distributors, and Agents blanket the world selling into more than 60 countries.

Leaders in Solid Carbide Tool Technology
Brand names such as Z-Carb, S-Carb, V-Carb, Hi-PerCarb, Multi-Carb have become synonymous with high performance tooling in the machining and metalworking industry.

We're proud to have pioneered some of the world's most advanced cutting technology right here in our Northeast Ohio manufacturing campus. SGS high performance end mills, drills and routers are increasing productivity and reducing cost around the world.

Exceeding Customer Expectations
In addition to our substantial R&D facilities, we offer a portfolio of products and services that have an unparalleled track record in manufacture, supply and value at the spindle.

- Incredible batch-to-batch consistency
- Metallurgical lab dedicated to testing and rigorous quality control
- ISO-certified quality procedures
- Patented geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality—even at extreme parameters
- Specialists in extreme and demanding product applications
- Specialty Group tooling services
- Experienced Field Sales Engineers who work to optimize a tool for your particular application
- Dedicated multi-lingual customer service representatives

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