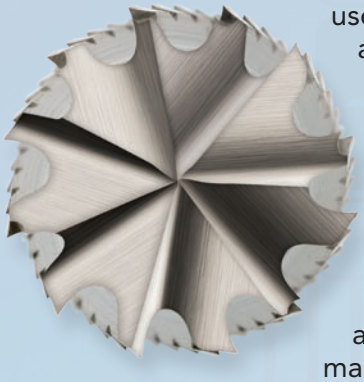
SOARING RESULTS
IN AEROSPACE CARBON FIBER COMPOSITES

SGS®
Solid Carbide Tools
An ISO 9001 Certified Company

Eliminate Fiber Breakout

SGS introduces Series 20-CCR Carbon Composite Routers for aerospace cutting applications.

Series 20-CCR reduces fiber breakout in carbon-fiber reinforced polymer materials used in the manufacture of aerospace components.



The unique flute structure provides longer tool life and requires less cutting force.

The **Series 20-CCR** allows the aerospace industry to achieve better results and maintain higher efficiencies.

Series 20-CCR is available exclusively from SGS Tool Company.

Features & Benefits

- **SGS Tool Company's unique fluting form reduces and, in most cases, eliminates fiber breakout**
- **Designed for carbon fiber composites**
- **Longer tool life**
- **Less cutting force**
- **Reduces delamination**
- **Available with and without end cut**
- **Both fractional and metric cutting diameters**

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Conventional Router vs. SGS Series 20-CCR Carbon Composite Routers

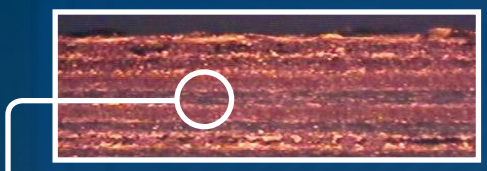
Conventional Router Results
Carbon-Fiber-Reinforced Polymer (CFRP)

Tool side edge, unacceptable fiber breakout (10X view)

Unacceptable edge finish (25X view)

SGS Series 20-CCR Results
Carbon-Fiber-Reinforced Polymer (CFRP)

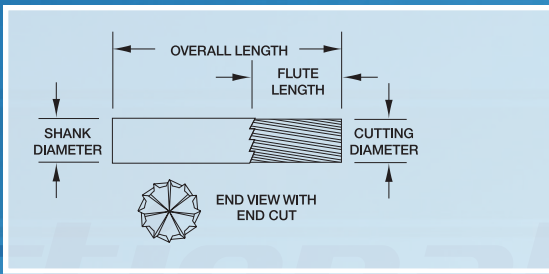
Tool side edge, no fiber breakout, acceptable edge (10X view)



Acceptable edge finish (25X view)

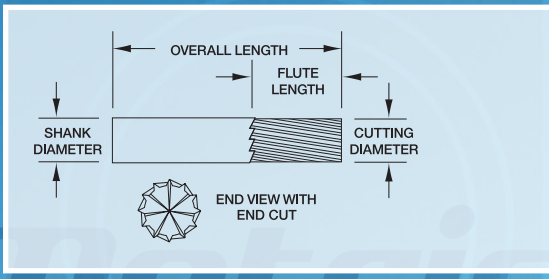
Series 20-CCR Fractional Multi-Flute Carbon Composite Router

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	EDP	End Style	List Price USD	Series Number
3/8	1-1/8	2-1/2	3/8	72950	No End Cutting	$ 78.84	20-CCR
3/8	1-1/8	2-1/2	3/8	72951	End Cutting	98.70	20-CCR
1/2	1-1/2	3-1/2	1/2	72952	No End Cutting	164.59	20-CCR
1/2	1-1/2	3-1/2	1/2	72953	End Cutting	203.17	20-CCR



Series 20M-CCR Metric Multi-Flute Carbon Composite Router

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	EDP	End Style	List Price USD	Series Number
10mm	28mm	63mm	10mm	82970	No End Cutting	$ 107.58	20M-CCR
10mm	28mm	63mm	10mm	82971	End Cutting	123.42	20M-CCR
12mm	38mm	89mm	12mm	82972	No End Cutting	163.16	20M-CCR
12mm	38mm	89mm	12mm	82973	End Cutting	207.35	20M-CCR



CFRP Speed and Feed Recommendations

DRY		
Diameter	Spindle Speed - rpm	Feed Rate
3/8	3,600 - 6,000	30 - 60 ipm
10mm	3,400 - 5,700	750 - 1,500 mm/min
1/2	2,700 - 4,500	30 - 60 ipm
12mm	2,900 - 4,800	750 - 1,500 mm/min

WITH FLOOD COOLANT		
Diameter	Spindle Speed - rpm	Feed Rate
3/8	10,000 - 15,000	90 - 120 ipm
10mm	9,500 - 14,500	2,300 - 3,000 mm/min
1/2	7,500 - 11,500	90 - 120 ipm
12mm	7,900 - 12,000	2,300 - 3,000 mm/min

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