

## NEWS RELEASE

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### Quantum Composites Launches First Hybrid Carbon Fiber Material

*New hybrid offers a cost-effective, lightweight  
and high-strength alternative*

**Bay City, Mich. – Feb. 17, 2014** – Quantum Composites, a business unit of The Composites Group, introduces its first hybrid carbon fiber material, a cost-effective, lightweight and high-strength alternative for traditional fiberglass and metal applications in the automotive, heavy truck, medical, sporting goods and industrial markets.

“Quantum Composites’ revolutionary hybrid carbon fiber has the power to open doors that were previously closed. This new material—with its improved flexural and tensile moduli at a significant cost reduction—has created the opportunity for new thermoset applications,” said Wisdom Dzotsi, general manager, Quantum Composites.

The hybrid carbon fiber material, AMC<sup>®</sup>-8590-12CFH, is an Advanced Molding Compound<sup>®</sup> that offers the performance benefits of carbon fiber at a cost similar to high-performance fiberglass. It is easily moldable, delivering parts that are high strength, low density, and resistant to fatigue.

To round out its value-added attributes, this innovative, hybrid compound can be customized to achieve specific application requirements and is suitable for fast cure compression molding to form complex parts in high-volume production.

AMC-8590-12CFH is part of Quantum’s AMC-8500 Engineered Structural Composite<sup>®</sup> (ESC<sup>®</sup>) series. Quantum’s ESC<sup>®</sup> materials are available in a range of product offerings, including carbon or glass reinforcement in epoxy, vinyl ester and polyester, phenolic, BMI and polyimide resin matrices.

For more information on the hybrid AMC-8590-12CFH material and potential applications, contact Matt Douglas, product manager, at 989-922-3863, ext. 108.

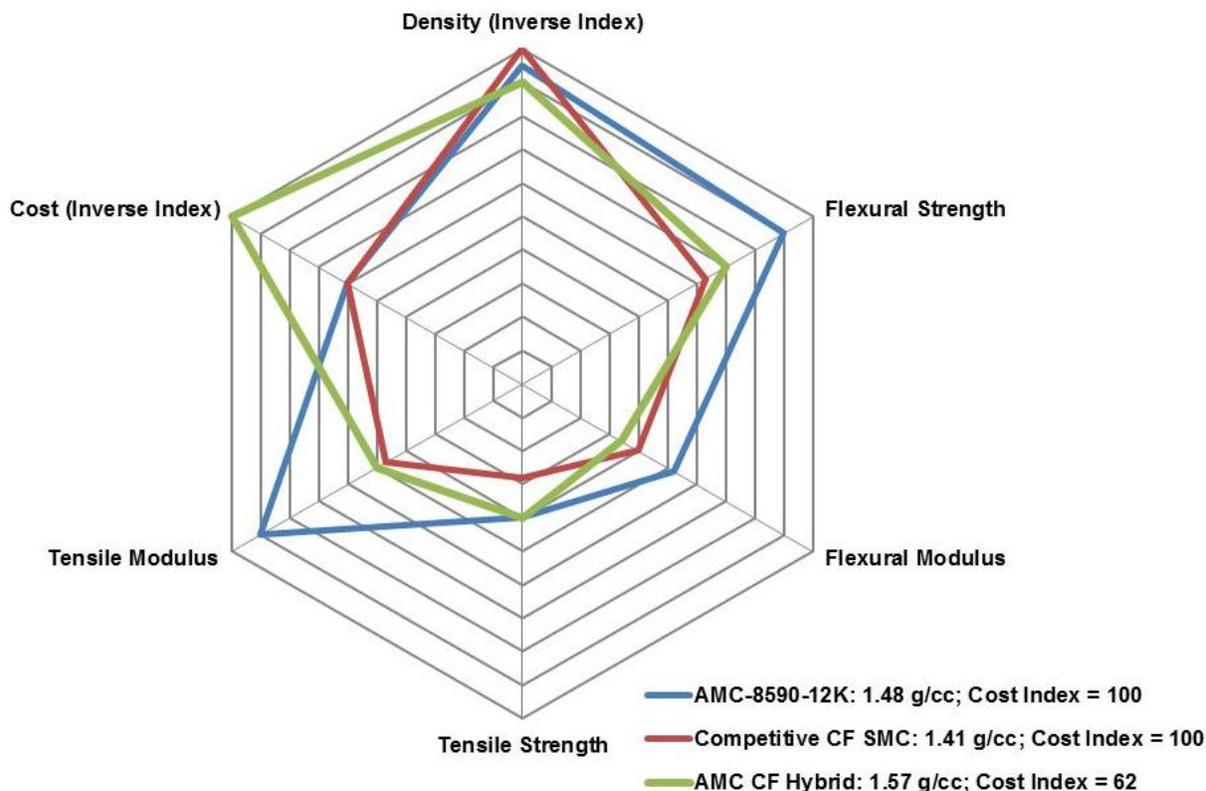
**Photo Caption:** *Manufactured using Quantum Composites’ new hybrid carbon fiber material, this heavy truck part shows detailed rib structures and air flow surface. It is representative of the cost-effective, lightweight and high-strength applications available with AMC<sup>®</sup>-8590-12CFH. A high-resolution image is available upon request.*

**About Quantum Composites:** Founded in 1983 and headquartered in Bay City, Mich., Quantum Composites develops and manufactures high-performance fiberglass and carbon fiber composite compounds. It is a business unit of The Composites Group, which is comprised of three longstanding entities within the thermoset composites industry—Quantum Composites, Premix and Hadlock Plastics. The Composites Group offers a comprehensive portfolio of thermoset composite compounds and parts along with forward-thinking research and development initiatives plus a successful history of delivering creative solutions for myriad applications throughout diverse markets. For more information about Quantum Composites, visit [quantumcomposites.com](http://quantumcomposites.com).

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# QUANTUM COMPOSITES

## Value Profile



Data Comparisons	AMC <sup>®</sup> 8590	Competitive CF Vinyl Ester	AMC <sup>®</sup> 8590-12CFH Hybrid	Hybrid vs. AMC <sup>®</sup> 8590	Hybrid vs. Competitive CF Vinyl Ester
Carbon Fiber (PAN)	12K	50K	12K / E Glass		
Density (g/cm <sup>3</sup> )	1.48	1.41	1.57	6%	11%
Flexural Strength D-790 (ksi / MPa)	90.0 / 620	62.7 / 431	70.0 / 483	-22%	12%
Flexural Modulus D-790 (msi / GPa)	5.2 / 35.8	4.0 / 27.5	3.4 / 23.4	-35%	-15%
Tensile Strength D-638 (ksi / MPa)	40.0 / 276	27.7 / 191	40.0 / 276	0%	44%
Tensile Modulus D-638 (msi / GPa)	9.0 / 62.0	4.7 / 32.6	5.0 / 34.5	-44%	5%
Cost Index	100	100	62	-38%	-38%

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PREMIX

HADLOCK

## TECHNICAL DATA SHEET

### AMC® 8590-12CFH Hybrid, 126-76-148 Engineered Structural Composite® (ESC®) Molding Compound

AMC® 8590-12CFH is a chopped carbon fiber combination E-glass reinforced ESC® molding compound. It is easily moldable and provides parts that are high strength, fatigue resistant, with high heat resistance and a low density. The carbon fiber is standard modulus PAN based 12K tow.

#### TYPICAL PROPERTIES | UNCURED

Form and Color . . . . .	Roll Sheet, Black or Natural	Fiber Length . . . . .	Nominal 1.0-inch
Glass Fiber Content . . . . .	Nominal-30% w/w	Shelf Life: @ 75°F . . . . .	2 months
Carbon Fiber Content . . . . .	Nominal-21% w/w	Resin Content . . . . .	Nominal-49% w/w

#### TYPICAL PROPERTIES | CURED | “Net Shape” Specimen

<u>Test</u>	<u>Procedure</u>	<u>Value</u>
Specific Gravity, g/cc	ASTM D-792	1.57
Molding Shrinkage, inch/inch (mm/mm)	ASTM D-955	<0.001 (<0.001)
Flexural Strength, psi (MPa) <sup>1</sup>	ASTM D-790	70,000 (483)
Flexural Modulus, psi (GPa) <sup>1</sup>	ASTM D-790	3.4 x10 <sup>6</sup> (23.4)
Tensile Strength, psi (MPa) <sup>1</sup>	ASTM D-638	40,000 (276)
Tensile Modulus, psi (GPa) <sup>1</sup>	ASTM D-638	5.0 x10 <sup>6</sup> (34.5)
Izod Impact (notched) ft.lb./in. (J/M)	ASTM D-256	26 (1338)

<sup>1</sup> Tensile and Flexural Properties are determined using net shape molded specimens.

#### TYPICAL PROPERTIES | CURED | “Machined” Specimen

<u>Test</u>	<u>Procedure</u>	<u>Value</u>
Flexural Strength, psi (MPa) <sup>2</sup>	ASTM D-790	51,000 (352)
Flexural Modulus, psi (GPa) <sup>2</sup>	ASTM D-790	2.5 x10 <sup>6</sup> (17.2)
Tensile Strength, psi (MPa) <sup>2</sup>	ASTM D-3039	26,000 (179)
Tensile Modulus, psi (GPa) <sup>2</sup>	ASTM D-3039	3.1 x10 <sup>6</sup> (21.3)
Short Beam Shear, psi (MPa) <sup>2</sup>	ASTM D-2344	7,000 (48.3)
Glass Transition Temp. °F (°C) TanDelta	ASTM D-7028	288 (142)

<sup>2</sup> Machined Properties are determined using specimen machined from molded 12"x12" panels with 80% mold coverage.

Note: The above cured properties are for both “Net Shape” and “Machined” specimens to respective test methods. Net shape specimens produce higher mechanical properties than machined specimens due to favorable fiber orientation in net shape molding. Established engineering practices use machined specimen data for structural analysis. Net shape specimen data represent best case, pristine properties.

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## Data Sheet Continued

### Product Data Sheet AMC® 8590-12CFH, 126-76-148

Molding Suggestions – AMC® 8590-12CFH can be molded at temperatures in the range of 260-310°F, with 280°F suggested as a starting point. Cure times will be dependent on molding temperature and part thickness and will typically be 5-10 minutes. Detailed molding suggestions are available on request. Cool molded parts at ambient temperature. A cooling fixture may be needed depending on part thickness and geometry.

Precautions – AMC® 8590 contains both glass and carbon fibers and should be handled carefully in order to minimize skin contact. Molding areas should be well ventilated to minimize exposure to fumes. Presses must be provided with local exhaust to remove vapors from work areas. If adequate ventilation is not available, a respirator approved for removing organic vapor must be used. Care must be taken to prevent contact of carbon fibers with electrical equipment.

Typical Uncured and Cured Properties tested each lot of – AMC® 8590:

- Fiber Content/Resin Content
- Specific Gravity
- Molding Shrinkage
- Mat Weight, (Areal Density)

Additional technical information and data on this material is available from Quantum Composites, Inc. Please contact us via phone, local representative, web site [www.quantumcomposites.com](http://www.quantumcomposites.com) or email [info@quantumcomposites.com](mailto:info@quantumcomposites.com)

**WARRANTY** – The above information is offered for your consideration, investigation, and verification. No warranty, expressed or implied, is given, nor is freedom from any patents owned by Quantum Composites® inc. or others implied. Final determination of the suitability of this material is the sole responsibility of the buyer. Contact our sales representative for assistance in developing procedures to fit individual requirements.

This ESC product is generally intended to be compression molded in matched-metal die molds. Strength values may be affected by the molding process. **The values presented in this data sheet are typical values and are not to be interpreted as product specifications.**