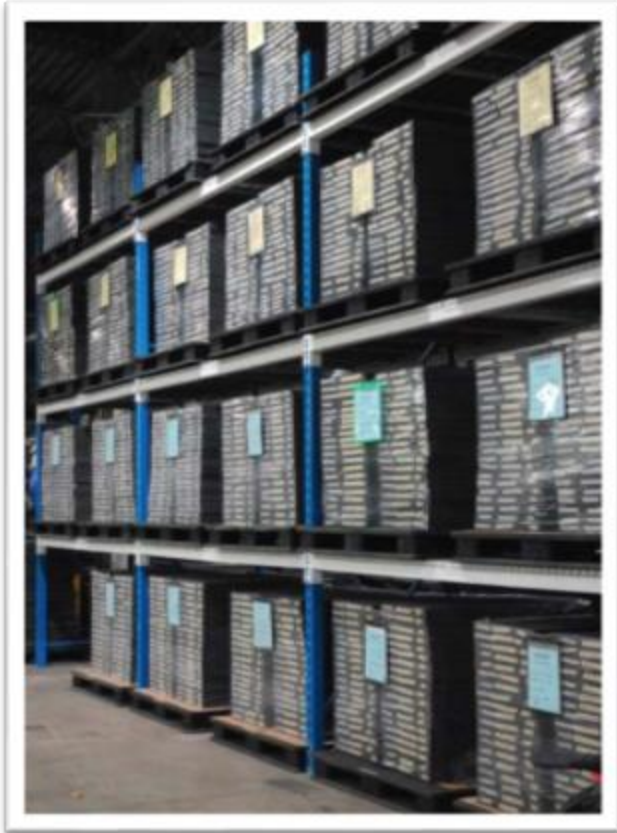


# Product Data Sheet: CFOAM Carbon Foams



CFOAM carbon foam is a next-generation structural material which is inexpensive, lightweight, fire-resistant, impact-absorbing, thermally insulating or conducting, and with electrical conductivity that can be varied over seven orders of magnitude. It can be fabricated in a variety of shapes, sizes, and densities to meet the property requirements of specific applications.

CFOAM carbon foam is applicable to a broad spectrum of commercial, defense and aerospace markets. It is an enabling technology for a host of next-generation material systems and components – replacing those currently based on more conventional materials such as balsa wood, intumescent mats, polymer matrices, metallic honeycombs, ceramic fibrous insulation, ceramic tile, Kevlar-based structures, polystyrene, plastics, fiberglass, rubber and various metals.

Carbon foams are currently being developed for a variety of uses including fire-resistant ship decking and bulkheads, noise and impact mitigation for aircraft, structural panels and firewalls for automobiles, lightweight personnel and vehicular armor, modular construction, and as part of spacecraft thermal management systems.

These foams will not off-gas at elevated temperatures and will not support ignition. Unlike those of most metals and ceramics, CFOAM carbon foam mechanical properties do not deteriorate with increased temperature if protected from oxidation, making carbon foams an attractive thermal protection material. Carbon foams are also tolerant to impact damage and can be repaired in-place using carbonaceous adhesives. For additional oxidation or impact protection CFOAM carbon foam can be integrated easily with dissimilar materials such as metals or polymer matrix composites (PMCs).

CFOAM carbon foam is a domestically produced material offering advantages such as low cost, enhanced structural properties, fire resistance, radar cross-section, corrosion susceptibility, and low weight.

CFOAM Physical Properties				
Property	Test Method	Units	CFOAM 20	CFOAM 30
Nominal Density	ASTM D 1622	lbs/ft <sup>3</sup>	20	30
Compressive Strength	ASTM D 365	PSI	1100	3200
Compressive Modulus	ASTM D 365	KSI	90	120
Tensile Strength	ASTM C 297	PSI	335	670
Tensile Modulus	ASTM C 297	KSI	60	120
Shear Strength	Torsion Shear	PSI	190	300
Coefficient of Thermal Expansion	ASTM E 228	Ppm/ <sup>o</sup> F (ppm/ <sup>o</sup> C)	2.8	2.8
			5	5
Thermal Conductivity	ASTM E 1225 / Laser Flash	W/m·K	Standard: 0.25 (RT)	Standard: 0.30 (RT)
			Tailorable Ranges:	Tailorable Ranges:
			RT: 0.25	RT: 0.30
			500 <sup>o</sup> C: 0.70	500 <sup>o</sup> C: TBD
1000 <sup>o</sup> C: 1.0	1000 <sup>o</sup> C: TBD			
2000 <sup>o</sup> C: 4.0	2000 <sup>o</sup> C: TBD			
Maximum Operational Use Temperature	Application Dependent	<sup>o</sup> F	Extended Use:	Extended Use:
			700 – Air	700 – Air
			5500 – Inert	5500 – Inert
Electrical Resistance	ASTM D 4496	ohm·in	Standard Product: 2x10 <sup>-2</sup>	Standard Product 2x10 <sup>-2</sup>
			Tailorable from 1x10 <sup>-3</sup> to 1x10 <sup>6</sup>	Tailorable from 1x10 <sup>-3</sup> to 1x10 <sup>6</sup>
Fire Resistance	ISO 1182 ASTM E1354, E119 IMO FTP Pt I & III UL 1709	N/A	PASS	PASS

The test data presented in this bulletin are believed by Carbon Innovations to be representative of this product. Most ASTM methods mentioned above have been modified to test CFOAM. However, the test data are not a guaranty or warranty. Carbon Innovations makes no warranty, whether expressed or implied, including warranties of merchant ability or of fitness for a particular purpose. Under no circumstances shall Carbon Innovations be liable for incidental, consequential, or other damages arising out of a claim from alleged negligence, breach of warranty, strict liability or any other theory, through the use or handling of this product or the inability to use the product. The sole liability of Carbon Innovations for any claims arising out of the manufacture, use, or sale of its products shall be for the replacement of the quantity of this product which has proven to not substantially comply with the data presented in this bulletin. Users should make their own assessment of the suitability of any product for the purposes required. The above supersedes any provision in your company's forms, letters, or other documents.

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