COMPOSITE TOOLING

GRAFOAM®
CARBON FOAM Solutions

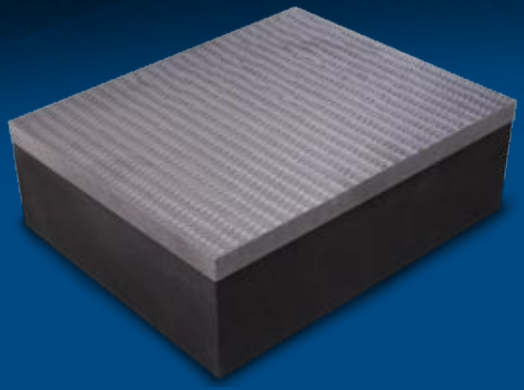
New generation of tooling material

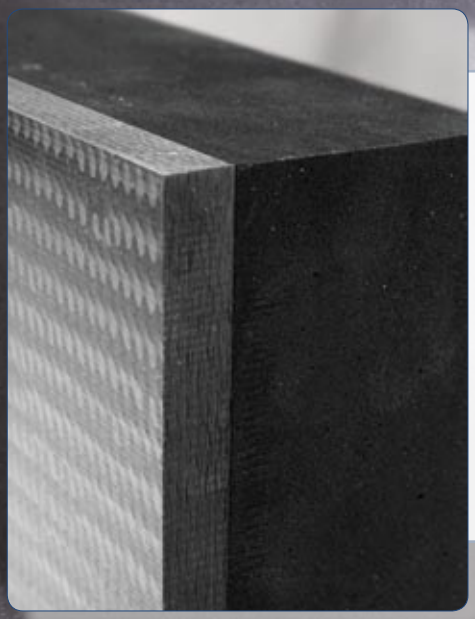
PROTOTYPE TOOLING

GRAFOAM® carbon foam is easily machined, and can be sealed for vacuum. It is ideal for prototype production because GRAFOAM® material can be used as a stand-alone tool without a face sheet while having the ability to handle higher cure temperatures of sophisticated composites.

PRODUCTION TOOLING

GRAFOAM® material can be used for both low and high rate production tooling. A face sheet can be applied to provide durability to the working surface. The CTE is low, an ideal match for carbon fiber composites.





GRAFOAM® technology has produced a unique carbon foam product designed to replace traditional materials used in the aerospace, automotive, and marine tooling markets.

BENEFITS

Fewer CTE-related problems in production
Substantial tool weight reduction
Eliminate expensive master model
Reduce cost and flow time

FEATURES

Thermal and mechanical stability
High temperature capable
Strong yet lightweight
Matched for carbon fiber composites/Low CTE
Large block size
Easily machined

GRAFTech International

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R&D 100

2006 R&D 100 AWARD WINNER

Contact GrafTech today for specifications and performance characteristics for your particular application!

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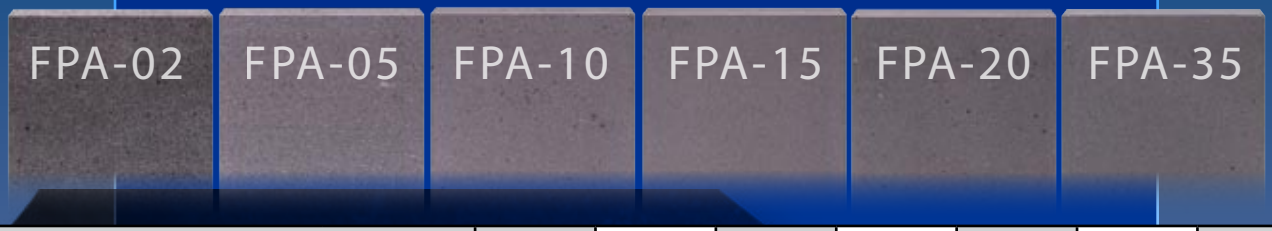
COMPOSITE TOOLING



GRAFOAM® Grades		FPA-2	FPA-5	FPA-10	FPA-15	FPA-20	FPA-30	FPA-35
Bulk Density	g/cm³	0.030	0.081	0.166	0.244	0.324	0.504	0.560
	lb/ft³	1.9	5.1	10.4	15.2	20.2	31.5	34.9
Specific Resistance (WR)	µOHMm	15000	8723	3542	1967	913	620	400
	Ohm-in	0.59	0.34	0.14	0.08	0.04	0.02	0.02
Specific Resistance (AR)	µOHMm		5801	2510	1608	747	544	
	Ohm-in		0.23	0.10	0.06	0.03	0.02	
Young's Modulus	GPa		0.10	0.50	1.00	2.00		3.50
	psi x 10^6		0.01	0.07	0.15	0.29		0.51
CTE (30-100°C)	x10^{-6}/°C	2.3	2.3	2.3	2.3	2.3	---	2.3
	x10^{-6}/°F	1.3	1.3	1.3	1.3	1.3		1.3
Thermal Conductivity (room temp.) WR	W/mK	0.06	0.08	0.12	0.17	0.21	0.32	0.30
	BTU/hr-ft-°F	0.03	0.05	0.07	0.10	0.12	0.18	0.17
Thermal Conductivity (room temp.) AR	W/mK		0.07	0.11	0.15	0.21	0.30	
	BTU/hr-ft-°F		0.04	0.06	0.09	0.12	0.17	
Flex Strength (WR)	MPa		0.4	1.2	2.1	3.8	5.4	
	psi		64	175	300	550	786	
Flex Strength (AR)	MPa		1.0	2.3	3.9	5.0	7.9	
	psi		140	335	566	720	1141	
Compressive Strength (WR)	MPa	0.2	1.0	5.2	10.0	18.0	40.6	60
	psi	29	143	760	1446	2614	5892	8702
Compressive Strength (AR)	MPa		0.6	3.2	7.5	13.1	30.1	
	psi		83	470	1086	1897	4370	
Shear Strength (torsional)	MPa	0.05	0.24	1.1	1.7	2.6	3.9	
	psi	7	35	160	247	377	566	
Tensile Strength (WR)	MPa		0.67	1.91	3.19	4.6	6.14	
	psi		98	276	462	666	890	
Tensile Strength (AR)	Mpa		0.37	1.02	2.18	3.5	4.63	
	psi		54	148	316	507	671	
Gas Permeability	Darcy				1	0.2	---	0.02
Apparent porosity	%	98.6	96	90	86	80		61

This information is not to be taken as a warranty or representation for which we will assume legal responsibility. It is offered solely for your consideration, investigation, and verification. GRAFOAM is a registered trademark of GrafTech International Holdings Inc., a Graftech International Ltd. company.
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