

military & aerospace



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Metals have a long history in the military and aerospace markets, but their shortcomings can result in discomfort, damage, and even disaster in many mission-critical land, sea, and air applications. Metals are heavy, easily dented, and highly susceptible to corrosion. And during combat operations, metals can be detected by enemy radar, with potentially deadly consequences for military personnel.

So it's no surprise that many designers and manufacturers are switching from metals to thermoset composite materials. Consisting of fiber reinforcement in a polymer resin, field-tested thermoset bulk molding compound (BMC) and sheet molding compound (SMC) offer many advantages in military and aerospace applications. These include:

- **High strength-to-weight ratio.** Thermoset components are up to 35 percent lighter than steel parts of equal strength.
- **Corrosion resistance.** Unlike metals, thermosets withstand long-term exposure to water and other corrosive substances.
- **Excellent memory characteristics.** While metal panels permanently deform on impact, SMC panels deform and spring back to their original shape, which minimizes denting.
- **Radar absorption.** This property minimizes thermosets visibility to enemy radar.

Among defense manufacturers, thermosets have become popular choices for electrical applications such as switches, transformers, and circuit breakers. Conforming to Mil Spec MAI-60, BMC and SMC meet the military's demanding requirements for electrical components. These include higher strength, flame retardancy, and smoke and toxicity standards than those promulgated by other industries.

In addition, BMC and SMC maintain their high strength during long-term exposure to natural elements, making them ideal for protecting sensitive military and aerospace equipment. Protective products made of thermosets include weapon housings, tote bins, equipment cases, and ballistic barriers. Thermosets are also used to make rifle grips and the body panels of military vehicles.

engineered for performance

Property	Unit	Test Method	44-10HGM	46-16	M-209	M-211
Physical and Mechanical Properties						
Impact Strength	FT-LBS/IN	ASTM D 256	9-11	14	23	28
Flexural Strength	PSI	ASTM D 790	20-22,000	18,000	38,000	41,000
Flexural Modulus	10 ⁶ PSI	ASTM D 790	--	--	2.0	2.0
Tensile Strength	PSI	ASTM D 638	9-11,000	8,000	19,000	20,000
Compressive Strength	PSI	ASTM D 695	21-24,000	26,000	36,000	35,000
Water Absorption	%	ASTM D 570	0.24	0.15	0.15	0.14
Specific Gravity	G/CM ³	ASTM D 792	1.80-1.86	1.80	1.62	1.66
Shrinkage	IN/IN	ASTM D 955	0.001-0.003	--	0.001	0.001
Hardness	Barcol	ASTM D 2583	--	45-55	45-55	--
Bulk Factor App.	--	ASTM D 1895	1	1	1	1
Electrical Properties						
Dielectric Strength	KV/IN	ASTM D 149	300	290	300	270
Arc Resistance	Seconds	ASTM D 495	180+	187	--	--
Thermal and Flame Retardant Properties						
Heat Deflection Temperature @264PSI	°F	ASTM D 648	>500	>500	>500	--
Flame Resistance	--	UL 94	--	--	--	--
	@1/16"	--	94-HB	--	94-HB	94-HB
	@1/8"	--	94V-0	--	94-HB	--
	@1/4"	--	94V-0	--	94V-0	--

IDI Composites International is the premier global formulator and manufacturer of thermoset molding compounds for custom molders and OEMs. The company provides customized polyester/vinylester-based bulk molding compounds (BMC) and sheet molding compounds (SMC) for the world's most demanding markets, including automotive/truck, electrical, food service, alternate energy, and appliance.

Headquartered in a 200,000 square foot facility in Noblesville, IN (USA), IDI has a strong presence in the international thermoset composites market. To support a growing customer base world-wide, the company operates multiple wholly-owned manufacturing facilities in Europe, Asia, and The Americas.

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