> heavy truck

Design engineers in the heavy truck industry face considerable challenges in controlling costs while retaining physical properties needed in high-performance applications. Traditional die-cast zinc, aluminum, and magnesium are increasing in price, while new emission regulations are resulting in more weight and other costs in under-the-hood assemblies.

Manufacturers require materials that can withstand years of abuse without losing the physical properties needed to maintain proper performance. High temperatures, corrosive substances, and structural demands are a few of the ways these materials are stressed during normal use. Yet, they are expected to last for the projected life cycle of the vehicle, which can often be measured in decades rather than years.

Many design engineers are discovering the advantages of switching to thermoset composites for under-the-hood applications such as valve covers, timing chain covers, intake manifolds, and oil drain pans. The unique physical properties of thermoset composite bulk molding compound (BMC) and sheet molding compound (SMC) make it the perfect alternative to die-cast metals for these applications. Thermosets have a high strength-to-weight ratio and an excellent NVH (Noise Vibration Harshness) rating, making them effective in dampening normal harmonic vibration.

Other features of BMC and SMC that make them ideal for heavy truck applications include:

- **Heat resistance:** maintain dimensional stability when exposed to engine heat
- **Corrosion resistance:** withstand corrosive substances commonly found in under-the-hood applications
- **Lightweight:** up to 35 percent lighter that steel parts of equal strength
- **Parts consolidation:** allow manufacturers to reduce the number of components required for a given assembly

IDI Composites International
THERMOSET MOLDING COMPOUNDS

Property	Unit	Test Method	44-1	44-10	C-105	AV-206
Physical and Mechanical Properties						
Impact Strength	FT-LBS/IN	ASTM D 256	3-4	4-5	10	--
Flexural Strength	PSI	ASTM D 790	15-18,000	15-17,000	22,000	26,192-27,734*
Flexural Modulus	10^6 PSI	ASTM D 790	1.9	--	1.8	1.646-2.149*
Tensile Strength	PSI	ASTM D 638	5-7,000	6,000	10,000	12,331-15,226*
Compressive Strength	PSI	ASTM D 695	22,000	21,000	27,000	--
Water Absorption	%	ASTM D 570	0.15	0.15	0.07	--
Specific Gravity	G/CM^3	ASTM D 792	1.95	1.96	1.90	1.75-1.94
Shrinkage	IN/IN	ASTM D 955	0.001-0.003	0.001-0.003	0.002	0.00095-0.00106
Hardness	Barcol	ASTM D 2583	30-40	40-50	30-40	--
Bulk Factor App.	--	ASTM D 1895	1	1	1	--
Electrical Properties						
Dielectric Strength	KV/IN	ASTM D 149	270	--	--	--
Arc Resistance	Seconds	ASTM D 495	180+	180+	--	--
Thermal and Flame Retardant Properties						
Heat Deflection Temperature @264PSI	°F	ASTM D 648	>500	>500	--	--
Flame Resistance	--	UL 94	--	--	--	--
	@ 1/16"	--	94-HB	94-HB	94-HB	--
	@ 1/8"	--	94-HB	94-5V	94-HB	--
	@ 1/4"	--	94V-0	94-5V	94-HB	--

*Specifications were tested with ISO test methods 178, 527.

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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