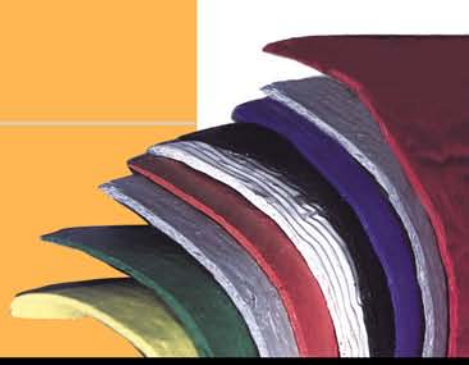

sheet molding **compounds**

> smc

Thermoset sheet molding compound (SMC) from IDI Composites International is predominantly used in compression molding — often of larger parts — where higher mechanical strengths need to be achieved. Unlike bulk molding compound (BMC), glass reinforcement is between 10% and 60% in SMC, and glass length is slightly longer — between 1/2-inch (12.7 mm) and 1-inch (25.4 mm).

SMC from IDI can be formulated in a wide variety of colors and properties. They exhibit outstanding physical, chemical and thermal characteristics, even following prolonged exposure to high temperatures and highly corrosive environments. SMC can be molded into complex shapes. Excellent mechanical properties and excellent surface appearance make SMC appropriate for Class A automotive body panels, high-strength electrical parts, HVAC components, personal watercraft, and various structural components. Its superior dielectric properties make it an ideal choice for large electrical enclosures as well.

Similar to BMC, SMC is a mixture of polymer resin, inert fillers, fiber reinforcement, catalysts, pigments and stabilizers, release agents, and thickeners. Manufacture of SMC is a continuous in-line process. The material is sheathed both top and bottom with a polyethylene or nylon plastic film to prevent auto-adhesion. The paste is spread uniformly onto the bottom film. Chopped glass fibers are randomly deposited onto the paste. The top film is introduced and the sandwich is rolled into a pre-determined thickness. The sheet is allowed to mature for 48 hours before shipment.

Heat represents one of the most difficult environments for a polymer. The cross-link reaction of covalent bonds that takes place when polyester thermoset is molded gives SMC compounds a distinct structural advantage over alternative materials, such as thermoplastics, at elevated temperatures. Relaxation or creep failure is far less in a chemically reacted thermoset composite than a "cooled to form" thermoplastic material.

Composites International®
THERMOSET MOLDING COMPOUNDS

Property	Unit	Test Method	E-203	E-204	E-205	E-206	E-207	M-203	M-205	M-207	M-209
Physical and Mechanical Properties											
Impact Strength	FT-LBS/IN	ASTM D 256	8	12	15	16	18	8	13	18	23
Flexural Strength	10^3 PSI	ASTM D 790	18	23	16	30	34	20	28	34	38
Flexural Modulus	10^6 PSI	ASTM D 790	1.5	1.6	1.8	2.0	2.1	1.7	1.8	1.9	2.0
Tensile Strength	10^3 PSI	ASTM D 638	8	11	14	16	18	10	13	16	19
Compressive Strength	10^3 PSI	ASTM D 695	24	27	30	32	34	24	28	32	36
Water Absorption	%	ASTM D 570	0.10	0.10	0.11	0.13	0.15	0.10	0.10	0.13	0.15
Specific Gravity	G/CM^3	ASTM D 792	1.82	1.78	1.75	1.72	1.68	1.84	1.78	1.70	1.62
Shrinkage	IN/IN	ASTM D 955	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Hardness	Barcol	ASTM D 2583	30-35	30-35	--	40-45	40-45	35-45	40-50	45-55	45-55
Bulk Factor App.	--	ASTM D 1895	1	1	1	1	1	1	1	1	1
Electrical Properties											
Dielectric Strength	KV/IN	ASTM D 149	400	380	160	340	320	420	380	340	300
Arc Resistance	Seconds	ASTM D 495	185	180+	130	180+	180+	--	--	--	--
Thermal and Flame Retardant Properties											
Heat Deflection Temperature	@264PSI, °F	ASTM D 648	>500	>500	>500	>500	>500	>500	>500	>500	>500
Flame Resistance	@1/16"	UL 94	94V-0	94V-0	94V-0	94V-0	94V-0	94-HB	94-HB	94-HB	94-HB
	@1/8"	UL 94	94V-0	94V-0	94V-0	94V-0	94V-0	94-HB	94-HB	94-HB	94-HB
	@1/4"	UL 94	94V-0	94V-0	94V-0	94V-0	94V-0	94V-0	94V-0	94V-0	94V-0

Property	Unit	Test Method	C-204	C-206	C-210	A-203	A-205	A-207	46-16-60
Physical and Mechanical Properties									
Impact Strength	FT-LBS/IN	ASTM D 256	12	20	30	10	15	21	25
Flexural Strength	10^3 PSI	ASTM D 790	26	33	37	20	28	34	30
Flexural Modulus	10^6 PSI	ASTM D 790	1.8	2.0	2.0	1.7	1.8	1.9	1.8
Tensile Strength	10^3 PSI	ASTM D 638	10	14	22	10	13	17	19
Compressive Strength	10^3 PSI	ASTM D 695	27	30	34	24	28	32	34
Water Absorption	%	ASTM D 570	0.08	0.09	0.10	0.10	0.10	0.13	0.15
Specific Gravity	G/CM^3	ASTM D 792	1.80	1.70	1.55	1.84	1.78	1.70	1.70
Shrinkage	IN/IN	ASTM D 955	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Hardness	Barcol	ASTM D 2583	40-50	40-50	50-55	30-40	35-45	40-50	50-55
Bulk Factor App.	--	ASTM D 1895	1	1	1	1	1	1	1
Electrical Properties									
Dielectric Strength	KV/IN	ASTM D 149	430	390	350	400	380	360	220
Arc Resistance	Seconds	ASTM D 495	--	--	--	--	--	--	185
Thermal and Flame Retardant Properties									
Heat Deflection Temperature	@264PSI, °F	ASTM D 648	>500	>500	>500	>500	>500	>500	>500
Flame Resistance	@1/16"	UL 94	94-HB	94-HB	94-HB	94-HB	94-HB	94-HB	V-0
	@1/8"	UL 94	94-HB	94-HB	94-HB	94-HB	94-HB	94-HB	V-0
	@1/4"	UL 94	94-HB	94-HB	94-HB	94-HB	94-HB	94-HB	V-0

www.idicomposites.com

The Americas

IDI Composites International
407 S. 7th Street
Noblesville, IN 46060 U.S.A.
317-773-1766
Fax: 317-773-3877
info@idicomposites.com

IDI Composites International
P.O. Box 400
Road #3, KM 151.8
Aguirre, Puerto Rico 00704
787-853-2186
Fax: 787-853-2187
idicomposites@coqui.net

Asia/Pacific

IDI Composites International
No. 8, Lane 275, QianPu Road
New Eastern Section of
Sonjiang Industrial Park
Shanghai, 201611 China
86-21-51096910
Fax: 86-21-67601689
rrodriguez@idicomposites.com

IDI Composites International
Shenzhen Company, LTD.
P.O. Box 107
Fucheng Industrial Park
Hongtian, Xinqiao, Sajing Town
Bao An, Shenzhen, 518125 China
86-755-27229550
Fax: 86-755-27229554
rrodriguez@idicomposites.com

Europe

IDI Composites International
Unit One, Oldbury Park
Popes Lane
Oldbury, West Midlands
B69 4RG U.K.
44-121-552-0038
Fax: 44-121-543-5377
pgarland@idicomposites.co.uk

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