

**UNSATURATED POLYESTER (UP), IMPACT MODIFIED, 28% GLASS
FIBER REINFORCED SHEET MOLDING COMPOUND****WSS-M3D184-A****1. SCOPE**

The material defined by this specification is a toughened and low moisture absorption 25 mm long glass fiber reinforced unsaturated polyester (UP) sheet molding compound.

2. APPLICATION

This specification was released originally for material used for exterior body panels where less "popping" is desired for better appearance and paintability.

3. REQUIREMENTS**3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS**

Material suppliers and part producers must conform to the Company's Standard Requirements for Production Materials (WSS-M99P1111-A).

3.1.1 All requirements of this specification, identified by symbol (s), shall be met with data representing 3 sigma values.

3.2 MOLDED TEST SPECIMEN**3.2.1 Preparation of Test Specimens**

All test specimens shall be prepared from cross-ply molded plaques or equivalent. The plaques are to be manufactured from the same material and under equivalent conditions as production parts. The plaques shall have the following dimensions:

300 x 300 mm, min x 2.5 +/- 0.2 mm

Prepared specimens must show no evidence of fiber tear or loose strands protruding from the specimens. No additional annealing of specimens is allowed.

3.2.2 Density (ISO 1183, Method A) 1.88 – 1.96 g/cm³

(s) 3.2.3 Filler Content, by weight, max

3.2.3.1 Ash Content (ISO 3451/1, Method A, 1 h at 650 +/- 25 °C) 50%

Date	Action	Revisions
2004 12 15	Revised	Format Updated; Revised Title 3.1
2002 10 14	Activated	

**Documents**

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	3.2.3.2	Glass Fiber Content, by Weight	26 - 31%
		Test Method: ISO 3451/1, Method B, 1 h at 650 +/- 25 °C, except use 5% by volume hydrochloric acid solution for 15 min. Rinse the glass fibers several times with distilled water before drying in an oven for 2 h at 120 +/- 2 °C. After cooling, weigh the crucibles and calculate the percent glass fibers.	
	3.2.3.3	Glass Fiber Length, min (Optical evaluation method)	25 mm
(s)	3.2.4	Tensile Strength at Break, min (ISO R 527, 150 mm x 10 x 2.5 +/- 0.2 mm specimen, 5 mm/min test speed)	50 MPa
(s)	3.2.5	Flexural Modulus, min (ISO 178, 60 x 10 x 2.5 +/- 0.2 mm specimen, 40 mm support span, 2 mm/minute test speed)	6 GPa
(s)	3.2.6	Flexural Strength, min (ISO 178, 60 x 10 x 2.5 +/- 0.2 mm specimen, 40 mm support span, 2 mm/minute test speed)	116 MPa
	3.2.7	Shear Modulus at 23 °C (ASTM D 4065, forced constant amplitude, fixed frequency of 1 Hz +/- 15%, strain level below 1%. Specimen approximately 60 x 10 x 2.5 +/- 0.2 mm cut from the center of the specimen. Specimen length between clamps 35 - 40 mm. Soak time at each temperature interval - 3 minutes min)	3.8 - 5.9 GPa
		Additionally, a Shear Modulus vs. Temperature curve shall be plotted for -50 to +250 °C temperature range, at 5 °C minimum intervals. The plotted curve must be within tolerance range granted on the original material approval and it shall constitute the reference standard for materials supplied to this specification and shall be kept on file at the designated material laboratory and be available on request.	
(s)	3.2.8	Impact Strength, Izod, min (ISO 180, Method A, 63.5 x 12.7 x 2.5 +/- 0.2 mm specimen [use center section of specimen], 10 specimens for each test)	
	3.2.8.1	At 23 °C +/- 2 °C	80 KJ/m ²
	3.2.8.2	At -40 °C +/- 1 °C	TBD KJ/m ²

The test specimen must be conditioned for minimum of 6 h at the above specified temperature prior to impact test. Low temperature testing shall be done within the cold chamber, if not possible, test may be conducted outside, but within 5 s.