



UNSATURATED POLYESTER (UP), 35% GLASS FIBER REINFORCED
SHEET MOLDING COMPOUND U.V. STABILIZED

WSS-M3D187-A1

UNSATURATED POLYESTER (UP), 50% GLASS FIBER REINFORCED
SHEET MOLDING COMPOUND U.V. STABILIZED

WSS-M3D187-A2

1. SCOPE

The materials defined by these specifications are glass fiber reinforced unsaturated polyester (UP) sheet molding compounds which contain U.V. stabilizers for unpainted low gloss textured exterior applications.

2. APPLICATION

These specifications were released originally for material used for the pick-up tonneau cover (A1) and the pick-up box inner (A2).

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 using latest ISO test methods.

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.

		A1	A2
3.2.2	Density, g/cm ³ , range (ISO 1183, Method A)	1.6 – 1.9	1.6 – 1.9
(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)	65	65

Date	Action	Revisions
2005 05 10	Activated	

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ENGINEERING MATERIAL SPECIFICATION

WSS-M3D187-A1/A2

		A1	A2
(s)	3.2.3.2	Glass Fiber Content, % by Weight, range	
		30 – 40	45 - 55
		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.	
	3.2.4	Tensile Strength at Break, MPa, min (ISO R 527, 150 min 10 x 2.5 +/- 0.2 mm specimen, 5 mm/min test speed)	
		75	110
	3.2.5	Flexural Modulus, GPa, min (ISO 178, 80 x 10 x 4.0 +/- 0.2 mm specimen [use center section of specimen A], 2 mm/min test speed, 64 mm support span)	
		5.0	7.5
	3.2.6	Flexural Strength, MPa, min (ISO 180, Method A, 63.5 x 12.7 x 2.5 +/- 0.2 mm specimen, 40 mm support span, 2 mm/minute test speed)	
		130	145
(s)	3.2.7	Impact Strength, Izod, kJ/m ² , min (ISO 180/1A, 80 x 10 x 4.0 +/- 0.2 mm specimen [use center section of specimen A], 10 specimens for each test)	
	3.2.7.1	At 23 +/- 2 °C	
		50	55
		A1	A2
	3.2.7.2	At - 40 +/- 1 °C	
		50	70

The test specimen must be conditioned for minimum of 6 hours 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 seconds.



		A1	A2
(s)	3.2.8	Heat Deflection Temperature, C, min (ISO 75, 120 x 10 x 2.5 +/- 0.2 mm specimen [use center section of vc specimen]. At 1.80 MPa)	
		> 230	> 230
(s)	3.2.9	Water Absorption, %, max (ISO 62, Method 1, 24 h exposure, 75 x 25 x 2.5 +/- 0.2 mm specimen)	
		0.5	0.5
	3.2.10	Heat Aging Performance (ISO 188, except 150 +/- 50 air changes/h, 1000 h at 160 +/- 2 °C. Unaged property values shall be determined at the time of the aged properties determination)	
	3.2.10.1	Tensile Strength at Break Change (Test Method per para 3.2.4)	+/- 25%
	3.2.10.2	Flexural Strength Change (Test Method per para 3.2.6)	
	3.2.10.3	Impact Strength, Izod Change (Test Method per para 3.2.7.1, specimens to be notched before heat aging)	+/- 25%

3.3 RESISTANCE PROPERTIES

3.3.1 Fluid Spotting Resistance (FLTM BI 113-01)

Test Fluids: (Current production factory fill materials, Motorcraft products or equivalent)

Deionized Water

Liquid Soap

Windshield Washer Solution

Neat and 30% concentration in deionized water

Coolant solution

Neat and 30% concentration in deionized water

Motor Oil

Bug and Tar Remover

No color change in excess of Gray Scale rating of 4 - 5 (AATCC Evaluation Procedure 1/ISO 105-A02), surface distortion or permanent softening permitted. There shall be a minimum of 85% gloss retention as tested in para. 3.3.2 per FLTM BI 110-01.