**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 |
|---|---|---|
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| | | |
| 2005 05 10 | Activated | M. Myers |

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| | | | 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 hyrdo chloric 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. | | |

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| | | | 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.

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