**UNSATURATED POLYESTER (UP), GLASS FIBER REINFORCED, BULK MOLDING COMPOUND (BMC)**

**ESF-M3D121-A1**
**ESF-M3D121-A2**

## 1. SCOPE

The materials defined by these specifications are glass fiber reinforced thermoset polyester resin premixes. These materials have high strength, are self-extinguishing, and have a relatively high heat deflection temperature values.

## 2. APPLICATION

These specifications were released originally for materials used to mold such items as blower motor housing and brush plates (ESF-M3D121-A1), the alternator rotor (ESF-M3D121-A2).

ESF-M3D121-A1 replaces and is same as ESF-M3D121-A.

## 3. REQUIREMENTS

### 3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

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

### 3.4 MOLDED TEST SPECIMEN

3.4.1 Preparation of Test Specimens

All test specimens shall be prepared from molded plaques or equivalent. The plaques are to be manufactured from the same material and under equivalent conditions as production parts. Prepared specimens must show no evidence of fiber tear or loose fibers protruding from the specimens. No additional annealing of specimens is allowed.

| | | A1 | A2 |
|---|---|---|---|
| 3.4.2 | Density<br>ISO 1183, Method A/ASTM<br>D 792, Method A1) | 1.70 - 2.05 | 1.70 - 2.05 |
| 3.4.3 | Glass Fiber Content,<br>By Weight, % min | 15 | 12 |

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.

| Date | Action | Revisions |
|---|---|---|
| 2004 11 17 | Revised | Inserted 3.0; Deleted 3.1, 3.2, 3.3, 3.7, 3.8 & 4 |
| 1988 09 15 | Released | ESF-M3D121-A2 107002-185-CF4S |
| 1973 04 19 | Released | ESF-M3D121-A F6C-136 |

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| | | A1 | A2 |
|---|---|---|---|
| 3.4.4 | Tensile Strength, MPa, min (ISO R 527/ASTM D 638, 150 min x 12.7 x 3.2 mm specimen, 5 mm/min test speed) | 41.4 | 49 |
| 3.4.5 | Flexural Strength, MPa, min (ISO 178/ASTM D 790, Method I, Procedure A, 130 x 12.7 x 3.2 mm specimen, 50 mm support span) | 128 | 112 |
| 3.4.6 | Compressive Strength, MPa, min (ASTM D 695, 12.7 x 12.7 x 25 mm specimen, 1.3 mm/min test speed) | 152 | 168 |
| 3.4.7 | Impact Strength, Izod, J/m, min (ISO 180, Method A/ASTM D 256, Method A, 63.5 x 12.7 x 3.2 mm specimen, 10 specimen minimum) | 267 | 424 |
| 3.4.8 | Water Absorption, % max (ISO 62, 24 h/ASTM D 570, 24 h) | 0.2 | 0.2 |
| 3.4.9 | Heat Deflection Temperature, C min (ISO 75/ASTM D 648, 130 x 12.7 x 12.7 mm specimen, at 1.82 MPa) | 232 | 260 |

**3.5 FLAMMABILITY** SE/NBR
(ISO 3795/SAE J369)

The specimen size required for material approval is 355 x 100 x 6.4 +/- 0.2 mm with a smooth surface.

**3.6 ELECTRICAL PROPERTIES**

| | | | | |
|---|---|---|---|---|
| 3.6.1 | Dielectric Strength, kV/mm, min (IEC 243/ASTM D 149, in insulating oil, 3.2 +/- 0.2 mm thick specimen) | | | |
| | 3.6.1.1 | Short Time | 12.8 | 13.6 |
| | 3.6.1.2 | Step by Step (5 - 10 kV starting voltage, 20 s steps) | 11.8 | 11.8 |
| 3.6.2 | Arc Resistance, s, min (ASTM D 495) | | 150 | 180 |

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