**POLYAMIDE (PA) 6, HEAT STABILIZED 40% GLASS FIBER/MINERAL MOLDING COMPOUND** **WSS-M4D822-B1**

**POLYAMIDE (PA) 6, HEAT STABILIZED 40% GLASS FIBER/MINERAL MOLDING COMPOUND, 25% PCR AND/OR PIR RECYCLED RESIN CONTENT** **WRS-M4D822-B2**

## 1. SCOPE

The material defined by these specifications are heat stabilized with approximately 15% glass fiber and 25% mineral, reinforced polyamide 6 molding compounds.

## 2. APPLICATION

This specification was released originally for material used in underhood applications.

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### 2.1 LIMITATIONS

- This material absorbs and retains moisture. Part design and tolerances must accommodate changes in part dimensions and physical properties due to moisture absorption or loss in the service/assembly environment.
- This material does not contain UV stabilizers, long term exposure to direct sunlight will cause chalking or loss of gloss.
- This material is not suitable to long term exposure to engine coolant, or direct exposure to strong acids or bases. It is not suitable for use above 150 °C.

## 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 Many 4D resin specifications prior to 2011, identified certain requirements with the symbol (s), which indicated that the mean and +/- 3 sigma values were to be reported. The specification minimum, maximum or range was established using 3 sigma data. For 2011 and beyond, refer to Table 1 for number of samples required for each test.

3.1.2 WSS-M4D822-B1 is based on virgin materials.

3.1.3 WRS-M4D822-B2 must contain 25% Post Consumer Recycled (PCR) and/or Post Industrial Recycled (PIR) content as defined by WRS-M99P42-A1. The remaining portion of the material can come from virgin sources. The 25% must match the 25% PCR/PIR CONTENT in the title of the specification.

3.1.4 The use of regrind is permitted, for economic / environmental reasons, with compliance as indicated in Ford Engineering CAD and Drafting Standard E-4. Part manufacturers using this specification must complete DV and PV testing with the allowable amount of

| Date | Action | Revisions | Rev 01 |
|---|---|---|---|
| | | | |
| 2016 04 20 | Revision | See Summary of Revisions | R. Harris, NA |
| 2014 10 21 | Released | | R. Harris, NA |


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regrind and the maximum allowable regrind content must be specified on the engineering drawing. Any changes to what is specified on the drawing (no specification implies zero regrind) must be approved by Materials and PD Engineering through the formal Ford Motor process (SREA).

3.1.5 Dry as molded:
All test values indicated herein are based on material and specimens with moisture content not exceeding 0.2% except where noted (Moisture Conditioned, see paragraph 3.1.5) (test according to ISO 15512 Method B/ASTM D 6869).

All test materials have to be sealed in moisture-proof containers and stored at 23 +/- 2 °C for at least 24 h immediately after processing. If the moisture content exceeds 0.2%, conditioning the material for a minimum of 16 h at 40 – 50 °C at a reduced pressure below 133 kPa.

Conduct tests in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5% relative humidity. Individual specimens shall not be removed from closed containers until immediately before testing.

3.1.6 Moisture Conditioned:
The specimens shall be conditioned to a moisture content of 1.0 to 2.0 wt% moisture then place the specimens in standard atmosphere of 23 +/- 2 °C and 50 +/- 5% relative humidity for at least 1 h before testing (according to ISO 1110). Moisture content shall be reported to verify the moisture level. .

3.1.7 Performance Criteria:
Parts using these specifications must comply with all the requirements of WSS-M15P50-B/Latest and fulfill applicable SDS/CDS requirements.

3.1.8 As specified in WSS-M99P1111-A, paragraph 3.2, Ford Materials Engineering may request a Control Plan and Certificate of Analysis (CoA) containing lot testing requirements which must include, but are not limited to:

Filler Content
Impact Strength, Notched Charpy at 23C
Tensile Modulus

## 3.2 SAMPLE PREPARATION

Unless otherwise specified all tests shall be carried out on injection molded, one-end gated test specimens. The test specimens A and D shall be molded using molding conditions defined in ISO 1874-2**.** See Table 1 for the number of specimens required.

Specimens shall be as follows:

| | |
|---|---|
| Specimen A | 150 minimum x 10 x 4.0 +/- 0.2 mm (ISO 527-2, Specimen Type 1A) |
| Specimen B | 355 x 100 x 1.0 +/- 0.1 mm (ISO 3795) |
| Specimen C | 145 x 60 x 3.2 +/- 0.2 mm |
| Specimen D | Center of Specimen A. 80 x 10 x 4.0 +/- 0.2 mm |
| Specimen E | 100 mm diameter x 3.2 mm |
| Specimen F | 80 mm diameter x 3.2 mm |
| Specimen G | 90 mm x 200 mm |
| Specimen H | 50 +/- 1 mm diameter x 3.2 +/- 0.2 mm |
| Specimen I | 100 mm x 150 mm, min |

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