



**POLYPROPYLENE (PP) MOLDING COMPOUND,  
HOMOPOLYMER, HEAT STABILIZED, 30% GLASS  
FIBER/MICA REINFORCED, RECYCLED GRADE 25% PIR/PCR,  
NON-VISIBLE APPLICATIONS**

WRS-M4D941-B1

**1. SCOPE**

The material defined by this specification is a lubricated and heat stabilized 30% glass fiber/mica reinforced thermoplastic injection molding compound.

**2. APPLICATION**

This specification was released originally for material used for hidden structural components in floor console and for air cleaner housing and cover.

**2.1 LIMITATIONS**

- 2.1.1 This material is not intended for visible or decorated (wrapped, painted, etc) applications.

**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 to establish specification limits.
- 3.1.2 WRS-M4D941-B1 must contain 25% Post Consumer Recycled (PCR) / Post Industrial Recycled (PIR) content as defined by WRS-M99P42-A1. The remaining portion of the material can come from virgin sources.
- 3.1.3 Materials used in interior applications must meet the requirements outlined in WSS-M99P2222-D1/Latest, *Performance, Vehicle Interior Environment Quality Material/Component Requirements*. Data must be included in material submission package.
- 3.1.4 Performance Criteria:  
Parts using this specification shall meet the appropriate performance specifications, WSS-M15P4-F/Latest and any other appropriate System Design Specifications (SDS).
- 3.1.5 As specified in WSS-M99P1111-A, paragraph 3.5, 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:

| Date       | Action    | Revisions                             | Rev. 01        |
|------------|-----------|---------------------------------------|----------------|
| 2015 04 09 | Revision  | Revised VIEQ and Elongation at break. | B. Haggart, NA |
| 2012 03 14 | Activated | Replaces WSS-M4D941-A1                | B. Haggart, NA |



Melt Flow Rate  
Filler Content  
Impact Strength, Notched Charpy at 23°C  
Flexural 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 1873-2. No annealing is allowed. 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                                            |

### 3.3 MATERIAL PROPERTIES

|         |                                                                                             |                               |
|---------|---------------------------------------------------------------------------------------------|-------------------------------|
| 3.3.1   | Melt Flow Rate<br>(ISO 1133, 230 °C, 2.16 kg)                                               | 3.7 – 8.0 g/10 minutes        |
| 3.3.2   | Filler Content<br>(ISO 3451-1, Method A,<br>1h at 700 +/- 25 °C, Test portion 2 - 2.5 g)    | 27 – 33 %                     |
| 3.3.3   | Density<br>(ISO 1183, Method A)                                                             | 1.09 – 1.16 g/cm <sup>3</sup> |
| 3.3.4   | Tensile Strength at Yield<br>(ISO 527-1 & ISO 527-2, Specimen A<br>50 mm/minute test speed) | 53 MPa min                    |
| 3.3.5   | Elongation at Break<br>(ISO 527-1 & ISO 527-2, Specimen A<br>50 mm/minute test speed)       | 2.0 % min                     |
| 3.3.6   | Tensile Modulus<br>(ISO 527-1 & ISO 527-2, Specimen A,<br>1 mm/minute test speed)           | 4.0 GPa min                   |
| 3.3.7   | Flexural Modulus<br>(ISO 178, Specimen D<br>64 mm support span, 2 mm/minute test speed)     | 3.7 GPa min                   |
| 3.3.8   | Impact Strength, Notched Charpy<br>(ISO 179-1/eA, Specimen D)                               |                               |
| 3.3.8.1 | At 23 +/- 2 °C                                                                              | 4.5 kJ/m <sup>2</sup> min     |