



## POLYBUTYLENE TEREPHTHALATE (PBT) INJECTION MOLDING COMPOUND, GENERAL PURPOSE

WSS-M4D359-C1

### 1. SCOPE

The material defined by this specification is a general purpose thermoplastic polyester injection molding compound based on polybutylene terephthalate (PBT).

### 2. APPLICATION

This specification was released originally for material used for C520 glove box striker.

#### 2.1 LIMITATIONS

Material approved to this specification does not have high melt flow rate for direct metallized applications. Headlamp / rear lamp direct-metallized inner bezel application must use WSS-M4D1014-A.

The material was not tested to WSS-M99P2222-C1 due to the typical size of components being smaller than 100 cm<sup>2</sup> or 100g. Use in larger components would require the additional testing to WSS-M99P2222-C1.

### 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 meet specification limits.

3.1.2 This specification is based on virgin materials. Materials with post-consumer, post-industrial, or repolymerised recycled materials as defined by WRS-M99P42-A1 are preferred and should be used whenever feasible.

3.1.3 The use of regrind is permitted, for economic / environmental reasons, with compliance as indicated in Ford Engineering CAD and Drafting Standard E-4.

3.1.4 Performance Criteria:  
All components using this material must comply with relevant SDS requirements.

| Date       | Action    | Revisions                              | Rev. 1 |
|------------|-----------|----------------------------------------|--------|
| 2012 07 23 | Revised   | Removed spec number from Revision box. |        |
| 2012 06 26 | Activated |                                        |        |

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### 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 7792-2. No annealing is allowed. See Tables 1 and 2 for the number of samples 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   | Density<br>(ISO 1183, Method A)                                                              | 1.27 - 1.35 g/cm <sup>3</sup>                  |
| 3.3.2   | Tensile Strength at Yield<br>(ISO 527-1 & ISO 527-2, Specimen A,<br>50 mm/minute test speed) | 49 MPa min                                     |
| 3.3.3   | Elongation at Yield<br>(ISO 527-1 & ISO 527-2, Specimen A,<br>50 mm/minute test speed)       | 1.0% min                                       |
| 3.3.4   | Tensile Modulus<br>(ISO 527-1 & ISO 527-2, Specimen A,<br>1 mm/minute test speed)            | 2.0 GPa min                                    |
| 3.3.5   | Flexural Modulus<br>(ISO 178, Specimen D,<br>64 mm support span, 2 mm/minute test speed)     | 1.8 GPa min                                    |
| 3.3.6   | Impact Strength, Notched Charpy<br>(ISO 179-1/1eA, Specimen D)                               |                                                |
| 3.3.6.1 | At 23 +/- 2 °C                                                                               | 1.5 kJ/m <sup>2</sup> min<br>Report Break Type |
| 3.3.6.2 | At -40 +/- 2 °C                                                                              | 1.0 kJ/m <sup>2</sup> min<br>Report Break Type |

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.