



POLYBUTYLENE TEREPHTHALATE (PBT), 30% GLASS FIBER REINFORCED MOLDING COMPOUND, HYDROLYSIS RESISTANT

WSS-M4D1017-A1

1. SCOPE

The material defined by this specification is a hydrolysis resistant, 30% glass fiber reinforced thermoplastic polyester injection molding compound based on polybutylene terephthalate (PBT).

2. APPLICATION

This specification was released originally for material used for non-visible Auto E/E applications like electrical connectors, Ignition components, and electronic modules. Materials approved to this specification are hydrolysis resistant.

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:
Parts using this specification shall meet the relevant SDS requirements.

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)

Date	Action	Revisions	Rev. 0
2012 06 26	Activated		

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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	Filler Content (ISO 3451/2, glass fiber, test temperature 750 +/- 25 °C, test portion 2.5 - 3.0 g)	27 - 33%
3.3.2	Density (ISO 1183, Method A)	1.38 - 1.58 g/cm ³
3.3.3	Tensile Strength at Break (ISO 527-1 & ISO 527-2, Specimen A, 5 mm/minute test speed)	80 MPa min
3.3.4	Tensile Modulus (ISO 527-1 & ISO 527-2, Specimen A, 1 mm/minute test speed)	6.0 GPa min
3.4.5	Flexural Modulus (ISO 178, Specimen D, 64 mm support span, 2 mm/minute test speed)	6.5 GPa min
3.3.6	Impact Strength, Notched Charpy (ISO 179-1/1eA, Specimen D)	
3.3.6.1	At 23 +/- 2 °C	5.0 kJ/m ² min Report Break Type
3.3.6.2	At -40 +/- 2 °C	6.4 kJ/m ² min 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.

3.3.7	Heat Deflection Temperature (ISO 75-1 & ISO 75-2 Specimen D, flatwise, 0.34 +/- 0.1 mm deflection. At 1.80 MPa)	170 °C min
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All specimens dry as molded. If not tested immediately after molding, specimens must be stored in a sealed, moisture-proof container filled with silica gel.

3.3.8	Heat Aging Performance (ISO 188, except 150 +/- 50 air changes/h, 1000 h at 140 +/- 2 °C.	
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