



POLYBUTYLENE TEREPHTHALATE (PBT) MOLDING COMPOUND, DIRECT METALLIZABLE GRADE

WSS-M4D1014-A

1. SCOPE

The material defined by this specification is a direct metallizable, melt flow rate higher than 28g/10 minutes, low moisture uptake thermoplastic polyester molding compound based on polybutylene terephthalate (PBT).

2. APPLICATION

This specification was released originally for material used for headlamp / rear lamp direct-metallized inner bezel.

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 All requirements of this specification, identified by symbol(s), shall be met with data representing 3 sigma values using latest ISO test methods.

3.1.2 This specification is based on virgin materials, however materials with recycled content as defined by WSS-M99P42-A (post-consumer and/or post industrial recyclates and repolymerised recycled materials) should be used whenever technically feasible and following all materials and PV testing required by Ford Materials Engineering. The use of regrind is permitted, for economic / environmental reasons, with compliance as indicated in WSS-M99P1111-A.

Critical Process Parameters

At the request of Ford Materials Engineering the supplier shall be responsible to collect critical process control data on each lot of material produced. Testing required will be jointly developed between Ford Materials Engineering and the supplier based on Control Plan and PFMEA review at the time of initial approval. Annually the supplier will review the in process data with Ford Materials Engineering to show that the process has remained under control. The data needs to be submitted in January for the previous calendar year. Data showing poor quality control measures or lack of submitted data may result in deletion from the Ford Approved Source List.

3.2 MOLDING COMPOUND

(s) 3.2.1 Melt Flow Rate, min 28 g/10 minutes
(ISO 1133, 250 °C, 2.16 kg)

The material shall be dried for 4 h minimum at 120 °C in a mechanical convection oven immediately preceding the test.

The high flow reduces cycle times and enables molding of more complex geometries.

Date	Action	Revisions	Ver. 0
2010 06 11	Actiavted	A. Pan and Global Materials Team	

**3.3 MOLDED TEST SPECIMEN****3.3.1 Preparation of Test Specimens**

Unless otherwise specified all tests shall be carried out on injection molded one-end gated test specimens.

The following dimensions are required:

- A. 150 minimum x 10 x 4.0 +/- 0.2 mm (ISO 527-2, specimen type 1A)
- B. 355 x 100 x 1.0 +/- 0.1 mm (ISO 3795)

Test specimen A shall be molded using molding conditions defined in ISO 7792-2. Specimens with shorter dimensions shall be cut from the center of the specimen A. No annealing allowed.

	3.3.2	Density (ISO 1183, Method A)	1.28 - 1.34 g/cm ³
(s)	3.3.3	Tensile Strength at Yield, min (ISO 527-1 & ISO 527-2, 150 minimum x 10 x 4.0 +/- 0.2 mm specimen A, test speed: 50 mm/minute)	52 MPa
(s)	3.3.3.1	Elongation at Yield, min (Test Method according to para 3.3.3)	3%
(s)	3.3.4	Tensile Modulus, min (ISO 527-1 & ISO 527-2, 150 minimum x 10 x 4.0 +/- 0.2 mm specimen A test speed: 1 mm/min, 10 specimens)	2.0 GPa
(s)	3.3.5	Flexural Modulus (Initial Qualification), min (ISO 178, 80 x 10 x 4.0 +/- 0.2 mm specimen [use center section of specimen A], 2 mm/min test speed, 64 mm support span)	2.0 GPa
	3.3.6	Impact Strength, Izod, notched (Initial Qualification), min (ISO 180/1A, 80 x 10 x 4.0 +/- 0.2 mm specimen [use center section of specimen A], 10 specimens for each test)	
(s)	3.3.6.1	At 23 +/- 2 °C	2.5 kJ/m ²
(s)	3.3.6.2	At -40 +/- 2 °C	1.8 kJ/m ²

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	Impact Strength Charpy, notched, min (ISO 179/1eA, 80 x 10 x 4.0 +/- 0.2 mm specimen [use center section of specimen A], 10 specimens for each test)	
(s)	3.3.7.1	At 23 +/- 2 °C	2.0 kJ/m ²
(s)	3.3.7.2	At -40 +/- 2 °C	2.0 kJ/m ²

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.