



**POLYBUTYLENE TEREPHTHALATE + ACRYLONITRILE
STYRENE ACRYLATE BLEND (PBT+ASA), 10%
GLASS FIBER REINFORCED MOLDING COMPOUND, INTERIOR**

WSK-M4D894-A2

1. SCOPE

The materials defined by these specifications are 10% glass fiber reinforced blends of polybutylene terephthalate and acrylonitrile-styrene-acrylate (PBT+ASA), UV stabilized and scratch resistant for interior use.

2. APPLICATION

This specification was released originally for material used for tweeter mesh.

3. REQUIREMENTS**3.1 APPROVED SOURCES**

This specification requires the use of approved sources. Only the sources identified on the Ford Approved Source List (ASL) can be used when this specification is listed on the drawing, CAD file, or other documents. The list of approved sources is located within Ford at www.mats.ford.com or available externally through a Ford Materials Engineer.

3.2 CONDITIONING AND TEST CONDITIONS

All test values are based on material conditioned for not less than 24 h prior to testing in a controlled environment of 23 +/- 2 °C and 50 +/- 5% relative humidity. Testing of the material should occur in the conditioning environment or soon after removal.

3.3 INFRARED SPECTROPHOTOMETRY AND/OR THERMAL ANALYSIS

IR spectra and thermograms from initial material approval shall constitute the reference standard and shall be kept on file at the designated material laboratory. The material supplier shall ensure that all future material supplied to the specification shall produce IR spectra and thermograms that correspond to the reference standard when tested under the same conditions.

3.4 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

3.4.1 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.

3.4.2 This specification is based on virgin material and does not allow the addition of recycled content (PIR/PCR).

3.4.3 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.

Date	Action	Revisions	Rev 04
2016 04 11	Re-Activated		T.Nover, EU
2010 01 20	N-Status	No replacement named	J. Crist, NA
1995 04 03	Activated		L. Rodrigues

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3.4.4 Performance Criteria:

Parts using this specification shall meet the appropriate performance specifications, WSS-M15P4-FLatest.

3.4.5 Ford Materials Engineering may request a Control Plan and Certificate of Analysis (C of A) containing lot testing requirements which must include, but are not limited to:

Melt Flow Rate
Filler Content
Impact Strength, Notched Charpy at 23°C
Flexural Modulus

3.5 SAMPLE PREPARATION

All tests shall be carried out on production materials manufactured from the production process unless correlation to a non-production process has been reviewed and approved by Ford Materials Engineering.

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 additional 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
Specimen C	145 x 60 x 3.2 +/- 0.2 mm
Specimen D	80 x 10 x 4.0 +/- 0.2 mm (may be cut from the center of Specimen A)
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

For Appearance Testing: Use an ungrained, non-polished, tool to prepare specimens for C through N gloss surfaces. Use a smooth, polished tool to prepare specimens for A and B gloss surfaces.

3.6 APPEARANCE

3.6.1 Weathering Resistance

Rating 4 min

(FLTM BO 116-01, 2481.6 kJ/m² exposure
Specimen C, ungrained, non-polished mold,
ISO 105-A02 / AATCC Evaluation Procedure 1)

After exposure the material shall show no fading or color change in excess of the specified AATCC rating. In addition, there shall be no cracking, crazing or other deterioration.

Use regional choice for initial approval and report the color house used. See Table 2 for additional color durability submission requirements.



3.7 MATERIAL PROPERTIES

3.7.1 Glass Fiber Content (ISO 3451-2, 2 h at 750 +/- 25 °C test portion 2.5 - 3.0 g)	8 - 12%
3.7.2 Density (ISO 1183, Method A)	1.29 - 1.34 g/cm ³
3.7.3 Tensile Strength at Break (ISO 527-1 and ISO 527-2, Specimen A, 50 mm/minute test speed)	60 MPa min
3.7.4 Tensile Modulus (ISO 527-1 and ISO 527-2, Specimen A, 1 mm/minute test speed)	4.1 GPa min
3.7.5 Flexural Modulus (ISO 178, Specimen D, 64 mm support span, 2 mm/minute test speed)	3.4 GPa min
3.7.6 Impact Strength, Notched Charpy (ISO 179-1/1eA, Specimen D)	
3.7.6.1 At 23 +/- 2 °C	2.0 kJ/m ² min Report Break Type
3.7.6.2 At -40 +/- 2 °C	1.5 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. Test specimens must be reviewed by Materials Engineering.

3.7.7 Heat Deflection Temperature (ISO 75-1 and ISO 75-2, Specimen D, flatwise, Bath – silicone oil, 0.34 +/- 0.1 mm deflection. At 1.80 MPa)	118 °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.

3.7.8 Heat Aging Performance (ISO 188, 150 +/- 50 air changes/h, 1000 h at 140 +/- 2 °C. After heat aging test specimens are to be conditioned in a desiccator for 3 - 5 h at 23 +/- 2 °C. Unaged property values shall be determined at the time of the aged properties determination)
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3.7.8.1 Tensile Strength at Break, Change (Test Method per para 3.7.3)	+/- 25% max
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