



ABS + POLYAMIDE BLEND (ABS+PA) MOLDING COMPOUND IMPACT MODIFIED INTERIOR

WSS-M4D960-B1

1. SCOPE

The material defined by this specification is a molded in color molding compound based on acrylo-nitrile-butadiene-styrene + polyamide blend (ABS+PA) that has been UV stabilized for unpainted interior applications.

2. APPLICATION

This specification was released originally for material used for non-direct sun-load interior trim applications.

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 indicated herein are based on material and specimens with moisture content not exceeding 0.2% except where noted (Moisture Conditioned) (test according to ISO 15512 Method B/ASTM D6869).

All test materials have to be sealed in moisture-proof containers and stored at 23 +/- 2 °C for at least 24 h immediately after processing. If the moisture content exceeds 0.2%, condition the material for a minimum of 16 h at 40 – 50 °C at a reduced pressure below 133 kPa.

Conduct tests in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5% relative humidity. Individual specimens shall not be removed from closed containers until immediately before testing

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

3.4.2 The use of regrind is permitted, for economic / environmental reasons. Part manufacturers using this specification must complete DV and PV testing with the allowable amount of regrind and the maximum allowable regrind content must be specified on the engineering drawing. Any changes to what is specified on the drawing (no specific amount implies zero

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Documents

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regrind) must be approved by Materials and PD Engineering through the formal Ford Motor Company process (SREA) or Engineering Notice.

3.4.3 Materials requiring High Strain Rate, Creep or fiber oriented Tensile Modulus may be required to test to the requirements of WSS-M99D68-A1/Latest, *Thermoplastic Property Determination For CAE, High Strain Rate Tensile, Creep and Tensile Modulus*. Material Suppliers should be prepared to submit data upon request.

3.4.4 Performance Criteria:
Parts using this specification shall meet the appropriate performance specifications, WSS-M15P4-G/Latest for mold in color applications and WSS-M15P45-C/Latest for wrapped applications and all SDS requirements.

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 (not for filled materials)
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 1873- 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, 601.6 kJ/m² exposure Specimen C, ungrained, non-polished mold, Use a smooth, polished tool to prepare specimens for A and B gloss 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.



3.6.2	Density (ISO 1183, Method A)	1.01 - 1.09 g/cm ³
3.6.3	Tensile Strength at Max Load (ISO R 527-1 and ISO 527-2, Sample A, 50 mm/minute)	35 MPa min
3.6.3.1	Elongation at Break (Test Method according to para 3.6.3)	50% min
3.6.4	Flexural Modulus (ISO 178, 80 x 10 x 4.0 +/- 0.2 mm specimen D 2 mm/minute test speed, 64 mm support span)	1.6 GPa min
3.6.5	Impact Strength, Charpy (ISO 179/1eA, 80 x 10 x 4.0 +/- 0.2 mm Specimen D, 10 specimens for each test)	
3.6.5.1	At 23 +/- 2 °C	40 kJ/m ² min
3.6.5.2	At -40 +/- 2 °C	9 kJ/m ² min

The test specimens 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.

3.6.6	Heat Deflection Temperature (ISO 75-1 and ISO 75-2, 120 x 10 x 4.0 +/-0.2 mm Specimen D flatwise, 0.32 +/- 0.01 mm deflection. At 1.80 MPa)	63 °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.

3.6.7	Vicat Softening Temperature (ISO 306, 10 x 10 x 4.0 +/- 0.2 mm Specimen D. Bath silicone oil, temperature raise 50 +/- 5 °C/h. Dial gage reset to '0' after addition of 5 kg weight. At 50 N load)	103 °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.

3.6.8	Heat Aging Performance (ISO 188, except 150 +/- 50 air changes/h, 1000 h at 90 +/- 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)	
3.6.8.1	Tensile Strength at Max Load Change (Test Method per para 3.5.3)	+/- 25%
3.6.8.2	Impact Strength, Charpy Change, max (Test Method per para 3.6.5.1, specimens to be notched before heat aging)	+/- 25%