THERMOPLASTIC ELASTOMERIC MOLDING COMPOUND UNPAINTED STEERING WHEEL/SIDE AIRBAG COVER **WSS-M4D979-B2**

THERMOPLASTIC ELASTOMERIC MOLDING COMPOUND UNPAINTED KNEE AIRBAG COVER **WSS-M4D979-B3**

1. SCOPE

The material defined by this specification is a thermoplastic polyolefinic elastomer.

2. APPLICATION

WSS-M4D979-B2 This specification was released originally for unpainted airbag covers with high sun exposure such as steering wheel/side airbag covers. Parts produced from materials of the specification must also meet the appropriate airbag System Design Specification (SDS)

WSS-M4D979-B3 This specification was released originally to be used for airbag covers with low sun exposure such as knee airbag covers. Parts produced from materials of the specification must also meet the appropriate airbag System Design Specification (SDS)

LIMITATIONS

These materials should not be used for painted 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.

Approval of new sources requires the completion of the latest version of the FMD template. Data should be submitted at the time as the specification data package. Only one FMD package is required per trade name approved, FMD is not required for each manufacturing site. FMD is required for new site approvals that do not have an extisting FMD record.

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

Date	Action	Revisions	Rev. 1
2017 07 29	Revised	See Summary of Revisions	A. Wagenhals, NA
2013 03 14	Released		T.Nover, M.Corley, V.Cerato; FoE

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

3.4.5 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.

3.4.6 Performance Criteria:
Parts using this specification shall meet the appropriate performance specifications, WSS-M15P5-H/Latest.

3.4.7 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
Impact Strength, Notched Charpy at 23 °C
Flexural Modulus

3.5 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 1873-2*. 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

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3.6 APPEARANCE

3.6.1 Weathering Resistance (Interior, unpainted)
(FLTM BO 116-01, exposure in kJ/m^2
Specimen C from smooth polished mold,
ISO 105-A02 / AATCC Evaluation Procedure 1)

	Rating 4 min	
	B2	**B3**
	2406.4	451.1

For B2: Every 526.4 kJ/m^2 remove the samples from the weatherometer and allow them to cool for one hour. Conduct a tactile evaluation and report any tackiness. Visually evaluate and report any spewing or other exudation.

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 Resistance to Scratch and Mar
(FLTM BO 162-01, Specimen I)

Scratch	Rating 2 at 2N, max
Whitening/Color Change	Rating 1 at 7N, max
Marring	Rating 2 at 2N, max

These values are derived from colored and grained samples in agreement with Materials Engineering. Details regarding color house, let down ratio, colors, grain, etc can be found in the approval package.

3.7 MATERIAL PROPERTIES

3.7.1 Density — 0.87 – 0.93 g/cm^3
(ISO 1183, Method A)

3.7.2 Hardness, Durometer D — 39 - 54
(ISO 868, 15 s dwell)

3.7.3 Tensile Strength at Break — 7 - 25 MPa
(ISO 527-1 and ISO 527-2, Specimen A,
50 mm/minute test speed*)*

3.7.4 Elongation at Break — 300 % min
(ISO 527-1 and ISO 527-2, Specimen A,
50 mm/minute test speed*)*

3.7.5 Flexural Modulus — 185 MPa min
(ISO 178, Specimen D,
64 mm support span, 2 mm/minute test speed)

3.7.6 Heat Aging Performance
(ISO 188, 150 +/- 50 air changes/h, 1000 h at
WSS-M4D979-B2: 110+/- 2 °C.
WSS-M4D979-B3: 100+/- 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.

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