

**ACETAL (POM) MOLDING COMPOUND, HOMOPOLYMER,
HIGH IMPACT, LOW VOC EMISSION, INTERIOR****WSS-M4D744-A5****1. SCOPE**

The material defined by this specification is a low volatile organic compound (VOC) emission, UV stabilized thermoplastic homopolymer acetal.

2. APPLICATION

This specification was released originally for material used for visible, mold-in-color interior applications such as head rest guides, restraint push buttons and D-rings.

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.

The approved source for this specification is DuPont Delrin 127UVE

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 $50 \pm 5\%$ relative humidity. Testing of the material should occur in the conditioning environment or soon after removal.

3.3 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

- 3.3.1 This specification is based on virgin material and does not allow the addition of recycled content (PIR/PCR).
- 3.3.2 Materials requiring High Strain Rate, Creep or fiber oriented Tensile Modulus must test to the requirements of WSS-M99D68-A1/Latest, *Thermoplastic Property Determination. For CAE, High Strain Rate Tensile, Creep and Tensile Modulus*. Data must be included in the material submission package.
- 3.3.3 Performance Criteria:
Parts using this specification shall meet the appropriate performance specification, WSS-M15P4-F/Latest.

3.4 PREPARATION OF TEST SPECIMENS

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.

Date	Action	Revisions	Rev. 0
2016 05 12	Released		



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

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

3.5 APPEARANCE

3.5.1	Weathering Resistance (FLTM BO 116-01, 2406.4 kJ/m ² exposure Specimen C, ungrained, non-polished mold. ISO 105-A02 / AATCC Evaluation Procedure 1)	Rating 4 min
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3.6 MATERIAL PROPERTIES

3.6.1	Density (ISO 1183, Method A)	1.39 – 1.44 g/cm ³
3.6.2	Tensile Strength at Yield (ISO 527-1 and ISO 527-2, Specimen A, 50 mm/minute test speed)	71 MPa min
3.6.3	Elongation at Break (ISO 527-1 and ISO 527-2, Specimen A, 50 mm/minute test speed)	25% min
3.6.4	Tensile Modulus (ISO 527-1 and ISO 527-2, Specimen A, 1 mm/minute test speed)	2.8 GPa min
3.6.5	Flexural Modulus 2.8 GPa min (ISO 527-1 and ISO 527-2, Specimen A, 1 mm/minute test speed, 2 mm/min test speed, 64 mm support span, the radius of the loading nose 5 +/- 0.1 mm and of the supports 2.0 +/- 0.2 mm)	
3.6.6	Impact Strength, Notched Charpy (ISO 179-1/1eA, Specimen D)	
3.6.6.1	At 23 ± 2 °C	15 kJ/m ² min Report Break Type
3.6.6.2	At -40 ± 2 °C	10 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.

- 3.6.7 Heat Deflection Temperature 93 °C min
(ISO 75-1/ISO 175-2, specimen D, flatwise
Bath – silicone oil, 0.34 +/- 0.1 mm deflection.
At 1.80 MPa)

- 3.6.8 Heat Aging Performance
(ISO 188, 150 ± 50 air changes/h, 1000 h at 110 ± 2 °C)

Anneal the test specimens at 120 °C for 72 hours.

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 120 °C, Change ± 2.5 % max
(Test Method per para 3.6.2
Annealing is allowed to calculate
the percent change in Tensile Strength.
The initial and final heat age tensile
strength should be determined using
annealed samples.)

- 3.6.8.2 Impact Strength, Charpy at 120 °C, Change ± 11% max
(Test Method per para 3.6.6
specimens to be notched before
heat aging)

- 3.6.9 Interior Odor Test Rating 3 max
(FLTM BO 131-03, Variant C, Specimen G)

- 3.6.10 Determination of the Fogging Characteristics of Interior Automotive Materials

Photometric
(SAE J1756, Specimen F, 3 h at 100 °C heating, 21 °C cooling plate,
post test conditioning 16 h)

Fog Number 70 min

Formation of clear film, droplets or crystals is cause for rejection.

- 3.6.11 Flammability
(ISO 3795/SAE J369,
Specimen B, smooth surface)

Burn Rate 100 mm/min max