



ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

THERMOPLASTIC POLYOLEFIN ELASTOMER (TEO)
COLOR PIGMENTED MOLDING COMPOUND, EXTERIOR

WSK-M4D777-A6

1. SCOPE

The material defined by this specification is a rigid thermoplastic polyolefin elastomer (TEO) injection molding compound, color pigmented and with added UV-stabilization for exterior use. The material is also suitable for painting, provided that suitable surface pretreatment is used.

2. APPLICATION

This specification was released originally for material used for bumper shells.

3. REQUIREMENTS

3.1 STATISTICAL PROCESS

Suppliers must conform to the requirements of Ford Quality System Standard Q-101. A mutually acceptable Control Plan as described therein is required for material/source approval. Appropriate statistical tools must be used to analyze process/product data so that variation in the final product is continuously reduced.

3.1.1 All requirements of this specification, identified by symbol (s), shall be met with data representing 3 sigma values.

3.2 INFRARED SPECTROPHOTOMETRY AND/OR THERMAL ANALYSIS

Ford Motor Company, at its option, may conduct infrared and/or thermal analysis of material/parts supplied to this specification. The IR spectra and thermograms established for initial approval shall constitute the reference standard and shall be kept on file at the designated material laboratory. All samples shall produce IR spectra and thermograms that correspond to the reference standard when tested under the same conditions.

3.3 CONDITIONING AND TEST CONDITIONS

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

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1994 07 21	EP00E10426222000	Released L.Rodigas

WP 3948-a

Page 1 of 7

9009160 0006279 608



3.4 MOLDING COMPOUND

- (s) 3.4.1 Melt Flow Rate 7 - 15 g/10 minutes
(ISO 1133, 230 C, 2.16 kg)

3.5 MOLDED TEST SPECIMEN

3.5.1 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 min x 10 x 4.0 +/- 0.2 mm (Tensile Bar, ISO 3167)
B. 120 x 10 x 4.0 +/- 0.2 mm

Specimens with shorter dimensions shall be cut from the center portion of the test specimen A and/or B. The specimens shall be prepared according to ISO 294. No annealing allowed.

- 3.5.2 Density 0.895 - 0.93 g/cm³
(ISO 1183, Method A)
- 3.5.3 Hardness, Durometer D 51 - 61
(ISO 868, 15 s dwell)
- (s) 3.5.4 Tensile Strength at Yield, min 17 MPa
(ISO R 527, 150 minimum x
10 x 4.0 +/- 0.2 mm specimen,
50 mm/min test speed)
- (s) 3.5.4.1 Elongation at Yield, min 7 %
(Test Method according
to para 3.5.3)
- (s) 3.5.5 Flexural Modulus, min 850 MPa
(ISO 178, 80 x 10 x 4.0 +/- 0.2 mm
specimen, 2 mm/min test speed,
64 mm support span)
- 3.5.6 Shear Modulus at 23 C 300 - 550 MPa
(ASTM D 4065, forced constant
amplitude, fixed frequency of 1 Hz
+/- 15 %, strain level below 1 %.
Specimen approx. 60 x 10 x 4.0 +/-
0.2 mm cut from the center of specimen A.
Specimen length between clamps 35-40 mm.
Soak time at each temperature interval -
3 minutes minimum)



Additionally, a Shear Modulus versus Temperature curve shall be plotted for - 50 to + 160 C temperature range, at 5 C minimum intervals. The plotted curve must be within tolerance range shown on page 7.

- (s) 3.5.7 Impact Strength, Izod, min
(ISO 180/1A, 80 x 10 x 4.0
+/- 0.2 mm specimen, 10 specimens
for each test)

3.5.7.1 At 23 +/- 2 C 35 kJ/m2

3.5.7.2 At - 40 +/- 1 C 5 kJ/m2

3.5.7.3 At 0 +/- 2 C 15 kJ/m2

The test specimens must be conditioned for minimum of 6 h at the above specified temperature prior to impact test. Low temperature testing shall be done within the cold box.

- (s) 3.5.8 Heat Deflection Temperature, min
(ISO 75, 120 x 10 x 4.0
+/- 0.2 mm specimen, 0.32 +/-
0.01 mm deflection)

3.5.8.1 At 1.80 MPa 40 C

3.5.8.2 At 0.45 MPa 65 C

- 3.5.9 Heat Aging Performance
(ISO 188, except 150 +/- 50 air
changes/h, 1000 h at 120 +/- 2 C.
Unaged property values shall be
determined at the time of the aged
properties determination)

3.5.9.1 Tensile Strength at Yield
Change +/- 25 %
(Test Method per para 3.5.4)

3.5.9.2 Impact Strength, Izod
Change, max - 15 %
(Test Method per para 3.5.7.1,
specimens to be notched before
heat aging)