



ENGINEERING MATERIAL SPECIFICATION

Material Name

Specification Number

POLYPROPYLENE (PP) COPOLYMER, MEDIUM HIGH
IMPACT, COLOR PIGMENTED MOLDING COMPOUND,
EXTERIOR

WSK-M4D670-A4

1. SCOPE

The material defined by this specification is a thermoplastic molding compound based on polypropylene copolymer with medium high impact strength, color pigmented and with added UV-stabilization for exterior use. This material is suitable for injection, extrusion and blow molding.

2. APPLICATION

This specification was released originally for material used for sections of bumper shells on Transit.

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 96 h prior to testing and tested under the same conditions unless otherwise specified.

Date	Release No.	Released
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3.4 MOLDING COMPOUND

- (s) 3.4.1 Melt Flow Rate 0.1 - 5.0 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 mm 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 0.855 - 0.92 g/cm³
(ISO 1183, Method A)

- (s) 3.5.3 Tensile Strength at Yield, min 20 MPa
(ISO R 527, 150 minimum x
10 x 4.0 +/- 0.2 mm specimen,
50 mm/min test speed)

- (s) 3.5.3.1 Elongation at Yield, min 5 %
(Test Method according
to para 3.5.3)

- (s) 3.5.4 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)

- 3.5.5 Shear Modulus at 23 C 310 - 580 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 + 150 C temperature range, at 5 C minimum intervals. The plotted curve must be within tolerance range shown on page 6.