THERMOPLASTIC POLYOLEFIN ELASTOMER, (TEO) MOLDING COMPOUND, <12% MINERAL FILLED — **WSS-M4D670-B1**

THERMOPLASTIC POLYOLEFIN ELASTOMER, (TEO) MOLDING COMPOUND, <12% MINERAL FILLED, RECYCLED GRADE, 25% PCR AND/OR PIR CONTENT — **WRS-M4D670-B2**

THERMOPLASTIC POLYOLEFIN ELASTOMER, (TEO) MOLDING COMPOUND, <12% MINERAL FILLED, RECYCLED GRADE, 75% PCR AND/OR PIR CONTENT — **WRS-M4D670-B3**

THERMOPLASTIC POLYOLEFIN ELASTOMER, (TEO) MOLDING COMPOUND, <12% MINERAL FILLED, RECYCLED GRADE, 90% PCR AND/OR PIR CONTENT — **WRS-M4D670-B4**

1. SCOPE

The materials defined by this specification are thermoplastic injection molding compounds based on thermoplastic polyolefin elastomers, with <12% mineral filler, for general purpose and non-visible exterior use.

2. APPLICATION

WSS-M4D670-B1 — This specification was released originally for use in underbody shields, wheel liners, and/or other non visible applications.

WRS-M4D670-B2/B3/B4 — This specification was released originally for materials containing post consumer and/or post industrial recycled content, for use in underbody shields, wheel liners, and/or other non-visible applications.

2.1 LIMITATIONS

These materials must not be used for visible (mold-in-color or painted) applications.

These materials should not be used for interior applications and have not been tested to meet Vehicle Interior Environment Quality Material/component Performance Requirements (WSS-M99P2222-D1).

3. REQUIREMENTS

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.1.1 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.

3.1.2 WSS-M4D670-B1 is based on virgin materials

Date	Action	Revisions	Rev 00
2015 03 27	Released		K. Mueller, NA

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3.1.3 WRS-M4D670-B2/B3/B4 must contain 25%/75%/90% Post Consumer Recycled (PCR) and/or Post Industrial Recycled (PIR) content, respectively, as defined by WRS-M99P42-A1. The remaining portion of the material can come from virgin sources.

3.1.4 The use of regrind is permitted, for economic / environmental reasons, with compliance as indicated in Ford Engineering CAD and Drafting Standard E-4

3.1.5 Performance Criteria:
Parts using this specification shall meet the appropriate performance specifications, WSS-M15P50-B/Latest. Parts must fulfill applicable SDS/CDS requirements.

3.1.6 As specified in WSS-M99P1111-A, paragraph 3.2, Ford Materials Engineering may request a Control Plan and Certificate of Analysis (CoA) containing lot testing requirements which must include, but are not limited to:

Density
Impact Strength, Notched Charpy at 23°C

3.2 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

3.3 MATERIAL PROPERTIES

3.3.1	Density (ISO 1183, Method A)	0.88 – 1.00 g/cm^3
3.3.2	Tensile Strength at Yield (ISO 527-1 and ISO 527-2, Specimen A, 50 mm/minute test speed)	14 MPa min
3.3.3	Elongation at Yield (ISO 527-1 and ISO 527-2, Specimen A, 50 mm/minute test speed)	4% min
3.3.4	Tensile Modulus (ISO 527-1 and ISO 527-2, Specimen A, 1 mm/minute test speed)	800 MPa min
3.3.5	Flexural Modulus (ISO 178, Specimen D, 64 mm support span, 2 mm/minute test speed)	800 MPa min
3.3.6	Impact Strength, Notched Charpy (ISO 179-1/1eA, Specimen D)	

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