



**POLYPROPYLENE (PP), HOMOPOLYMER
40% MINERAL FILLED, INJECTION MOLDING COMPOUND**

WSS-M4D643-B1

**POLYPROPYLENE (PP), 40% MINERAL FILLED,
INJECTION MOLDING COMPOUND, RECYCLED WITH 25% PCR AND/OR
PIR CONTENT**

WRS-M4D643-B2

**POLYPROPYLENE (PP), 40% MINERAL FILLED, INJECTION MOLDING
COMPOUND, RECYCLED WITH 50% PCR AND/OR PIR CONTENT**

WRS-M4D643-B3

1. SCOPE

The materials defined by these specifications are 40% mineral filled injection molding compounds based on polypropylene.

2. APPLICATION

These specifications were released originally for materials used for air conditioning housing and headlamp housing.

2.1 LIMITATIONS

These materials have low impact resistance at low temperatures. Production level materials must be used in preparing test parts / panels. The use of improper sample prep materials can influence test results.

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 for number of samples required for each test.

3.1.2 WSS-M4D643-B1 is based on virgin materials.

3.1.3 WRS-M4D643-B2/B3 must contain 25% and 50% 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.

Date	Action	Revisions	Rev. 3
2013 03 01	Released	B2 Released. Revised B1 and B3	V.Cerato, EU
2012 12 06	Released	Revised B1. Released WRS-M4D643-B3	V.Cerato, EU
2010 06 17	Released	B1 Released 2010 06 17. B3 Released 2012 12 06	V.Cerato, EU



3.1.5 Performance Criteria:

Parts using this material must comply with all the requirements of WSK-M98P10-A/Latest for exterior lighting application or WSS-M15P50-B/Latest for engine compartment and underbody applications.

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.

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	Filler Content (ISO 3451-1, Method A, talc filler, 1 h at 750 +/- 25 °C, test portion 2 to 2.5 g)	35 - 45%
3.3.2	Density (ISO 1183, Method A)	1.18-1.32 g/cm ³
3.3.3	Tensile Strength at Yield (ISO 527-1 & ISO 527-2, Specimen A, test speed: 50 mm/minute)	24 MPa min
3.3.4	Tensile Modulus (ISO 527-1 & ISO 527-2, Specimen A, test speed: 1 mm/min, 10 specimens)	3.0 GPa min
3.3.5	Flexural Modulus (ISO 178, Specimen D, 64 mm support span, 2 mm/min test speed)	3.2 GPa min
3.3.6	Impact Strength, Izod (ISO 180/1A, Specimen D)	
3.3.6.1	At 23 +/- 2 °C	1.5 kJ/m ² min
3.3.6.2	At - 40 +/- 2 °C	1.0 kJ/m ² min

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.

