



**POLYPROPYLENE (PP) HOMOPOLYMER, 20% GLASS
FIBER REINFORCED MOLDING COMPOUND**

WSS-M4D731-B1

**POLYPROPYLENE (PP), 20% GLASS FIBER REINFORCED MOLDING
COMPOUND, 75% RECYCLED MATERIAL BY WEIGHT**

WRS-M4D731-B2

1. SCOPE

The materials defined by these specifications are thermoplastic 20% glass fiber reinforced injection molded polypropylene compound. Material with recycled content should be used whenever feasible.

**B2- POLYPROPYLENE (PP), 20% GLASS FIBER REINFORCED MOLDING COMPOUND, 75%
RECYCLED MATERIAL BY WEIGHT**

Type of Material	% Material Type By Weight
Recycled Resin PCR/PIR	75
Virgin Resin	5
Glass Fiber	20
Minimum % Recycled Content	75

2. APPLICATION

These specifications were released originally for material used for fuse junction panel box assembly, floor console substrate (interior non visible components) and carbon canisters.

2.1 LIMITATIONS

This material does not contain UV stabilizers, long term exposure to direct sunlight will cause chalking and loss of gloss.

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.

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 +/- 5% relative humidity. Testing of the material should occur in the conditioning environment or soon after removal.

Date	Action	Revisions	Rev 1
2018 02 26	Revised	B2 Activated, See Summary of revisions	A. Weatherhead, F1
2011 10 10	Activated	Replaces WSK-M4D731-A1/A2	v. Cerato, EU



3.3 INFRARED SPECTROPHOTOMETRY AND/OR THERMAL

IR spectra and thermograms from initial material approval shall constitute the reference standard and shall be kept on file at the designated material laboratory. The material supplier shall ensure that all future material supplied to the specification shall produce IR spectra and thermograms that correspond to the reference standard when tested under the same conditions.

3.4 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

- 3.4.1 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.
- 3.4.2 WSS-M4D731-B1 is based on virgin materials.
- 3.4.3 WRS-M4D731-B2 This specification must contain 75% of recycled content as defined by WRS-M99P42-A1. The remaining portion of the material can come from virgin sources.
- 3.4.4 The use of regrind is permitted, for economic / environmental reasons. Part manufacturers using this specification must complete DV and PV testing with the maximum allowable amount of regrind and the maximum allowable regrind content must be specified on the engineering drawing. Any changes to what is specified on the drawing (no specific amount implies zero regrind) must be approved by Materials and PD Engineering through the formal Ford Motor Company process (SREA) or Engineering Notice.
- 3.4.5 Mold-in-color parts using this material must comply with all the requirements of WSS-M15P50-C2/Latest for under hood applications and WSS-M15P4-H/Latest for interior applications. Production level materials must be used in preparing test parts / panels.
- 3.4.6 Ford Materials Engineering may request a Control Plan and Certificate of Analysis (C of A) containing lot testing requirements which must include, but are not limited to:
- Filler Content
 - Impact Strength, Notched Charpy at 23°C
 - Flexural Modulus

3.5 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 19069-2. 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



**3.6 MATERIAL PROPERTIES**

3.6.1	Filler Content (ISO 3451-1, Method A, 1 h at 850 +/- 50 °C, test portion 2 to 2.5 g)	18-22 %
3.6.2	Density (ISO 1183, Method A)	1.02-1.08 g/cm ³
3.6.3	Tensile Strength at Yield, (ISO 527-1 & ISO 527-2, Specimen A, 50 mm/minute test speed)	32 MPa min
3.6.4	Tensile Modulus (ISO 527-1 & ISO 527-2, Specimen A, 1 mm/minute test speed)	2.5 GPa min
3.6.5	Flexural Modulus (ISO 178, Specimen D, 64 mm support span, 2 mm/minute test speed)	2.5 GPa min
3.6.6	Impact Strength, Notched Charpy (ISO 179-1/1eA, specimen D))	
3.6.6.1	At 23 +/- 2 °C	2.3 kJ/m ² min Report Break Type
3.6.6.2	At -40 +/- 2 °C	1.5 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 (ISO 75-1 & ISO 75-2 Specimen D, flatwise, 0.34 +/- 0.1 mm deflection. At 1.80 MPa)	65°C min
3.6.8	Heat Aging Performance (ISO 188, except 150 +/- 50 air changes/h, 1000 h at 140 +/- 2 °C. Unaged property values shall be determined at the time of the aged properties determination)	
3.6.8.1	Tensile Strength at Break, Change (Test method per para 3.3.3)	+/- 25% max
3.6.8.2	Impact Strength, Notched Charpy Change (Test Method per para 3.6.6. specimens to be notched before Heat Aging)	+/- 25% max