POLYPROPYLENE (PP) HOMOPOLYMER, 30% GLASS FIBER REINFORCED, MOLDING COMPOUND — **WSS-M4D854-B1**

POLYPROPYLENE (PP), 30% GLASS FIBER REINFORCED, MOLDING COMPOUND, 25% RECYCLED MATERIAL BY WEIGHT — **WRS-M4D854-B2**

POLYPROPYLENE (PP), 30% GLASS FIBER REINFORCED, MOLDING COMPOUND, 50% RECYCLED MATERIAL BY WEIGHT — **WRS-M4D854-B3**

POLYPROPYLENE (PP), 30% GLASS FIBER REINFORCED, LOW FOGGING, MOLDING COMPOUND, 50% RECYCLED MATERIAL BY WEIGHT — **WRS-M4D854-B5**

1. SCOPE

The material defined by this specification is a thermoplastic injection molding compound based on polypropylene 30% coupled glass fiber reinforced.

B2 - POLYPROPYLENE (PP), 30% GLASS FIBER REINFORCED, MOLDING COMPOUND, 25% RECYCLED MATERIAL BY WEIGHT

Type of Material	% Material Type by Weight
Recycled Resin PCR/PIR	25
Virgin Resin	45
Glass Fiber	30
Minimum % Recycled Material	25

B3/4 - POLYPROPYLENE (PP), 30% GLASS FIBER REINFORCED, MOLDING COMPOUND, 50% RECYCLED MATERIAL BY WEIGHT (STANDARD AND LOW FOGGING)

Type of Material	% Material Type by Weight
Recycled Resin PCR/PIR	50
Virgin Resin	20
Glass Fiber	30
Minimum % Recycled Material	50

2. APPLICATION

WSS-M4D854-B1 This specification is released for material used for battery trays and fan shrouds.

WRS-M4D854-B2/B3 These specifications are released for materials containing post consumer and/or post-industrial recycled content.

WRS-M4D854-B5 This specification is released for recycled content material used for headlamp housings.

Date	Action	Revisions	Rev. 3
2017 07 26	Revised	Added B5,See Summary of revisions	A. Weatherhead, EU
2013 09 09	Revised	See Summary of revisions	H. Santos, SA
2012 08 27	Released		V. Cerato, FoE

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2.1 LIMITATIONS

- These specifications are not for visible interior applications.
- Use only the B5 specification for Exterior Lighting Applications.
- For applications that have a direct impact on the interior air quality, such as heater and A/C unit use the B5 specification and include the odor test (FLTM BO 131-03, Variant C).

3. REQUIREMENTS

3.1 APPROVED SOURCES

This specification is part of the Ford Co-Managed Buy (CMB) agreement. Tier 1 molders who are participating under the CMB agreement must use one the following approved sources (deviations require approval from Raw Materials Purchasing and Materials Engineering):

Specification	***North American Programs***	***European Programs***
WSS-M4D854B1	*Washington Penn, PPH4GF3* *Lyondell Basell / Equistar, Hostacom G3*	*Washington Penn, PPH4GF3*
WRS-M4D854-B2	*Washington Penn, PRC25GF3*	*Washington Penn, PRC25GF3*
WRS-M4D854-B3	*Washington Penn, PRC50GF3* *Wellman Ecolon, PP8002*	*Washington Penn, PRC50GF3*

Molders not on the CMB program or regions without CMB are required to use materials listed on the Ford Approved Source List (ASL), and are encouraged to use the CMB sources listed above. Only the sources identified on the Approved Source List 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.

Approval of new sources requires the completion of the latest version of the FMD template. Data should be submitted at the time as the specification data package. Only one FMD package is required per trade name approved, FMD is not required for each manufacturing site. FMD is required for new site approvals that do not have an existing FMD record

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.

3.3 INFRARED SPECTROPHOTOMETRY AND/OR THERMAL ANALYSIS

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.

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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 to meet specification limits.

3.4.2 WSS-M4D854-B1 is based on virgin materials.

3.4.3 WRS-M4D854-B2 and B3/B4 must contain 25% and 50% Post Consumer (PCR) and/or Post Industrial (PIR) recycled content respectively, 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, with compliance as indicated in Ford Engineering CAD and Drafting Standard E-4.

3.4.5 Performance Criteria:
Parts using this specification shall meet the appropriate performance specifications.

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 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

3.6 MATERIAL PROPERTIES

3.6.1	Glass Fiber Content (ISO 3451-1, Method A, 1h at 750 +/-25°C, test portion 1 to 2g)	27-33 %
3.6.2	Density (ISO 1183, Method A)	1.08-1.21 g/cm^3

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