



POLYPROPYLENE (PP) HOMOPOLYMER COOLING AGENT RESISTANT MOLDING COMPOUND

WSS-M4D741-B1

1. SCOPE

The material defined by this specification is a thermoplastic injection molding compound based on polypropylene homopolymer. This material is resistant to engine coolant.

2. APPLICATION

This specification was released originally for material used for overflow/degas bottles.

2.1 LIMITATIONS

- This material has low impact resistance at low temperatures.
- The material undergoes creep at elevated temperatures.
- Load limiters are required for fasteners and inserts may be necessary on outlets where clamping is required.

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). Note: 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 values. For 2011 and beyond, refer to Table 1 for number of samples required for each test to establish specification limits.

3.1.1 This specification is based on virgin materials, however materials with recycled content as defined by WRS-M99P42-A1 (post-consumer and/or post industrial recyclates and repolymerised recycled materials) should be used whenever technically feasible and following all materials and PV testing required by Ford Materials Engineering. The use of regrind is permitted, for economic / environmental reasons, with compliance as indicated in WSS-M99P1111-A.

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 527-2) and ISO 3795. No annealing is allowed. See Tables 1 and 2 for the number of samples required.

Specimens shall be as follows:

Date	Action	Revisions	Rev 01
2012 06 25	Revised	Corrected Typo in 3.3.11	G. Kowalski, NA
2011 11 22		New specification	G. Kowalski, NA



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	Melt Flow Rate (ISO 1133 230 °C, 216 kg)	0.24 – 0.71 g/10 minutes
3.3.2	Density (ISO 1183, Method A)	0.885 – 0.918 g/cm ³
3.3.3	Tensile Strength at Yield (ISO 527-1 and ISO 527-2, Specimen A, 50 mm/minute test speed)	28 MPa min
3.3.4	Elongation at Yield (ISO 527-1 and ISO 527-2, Specimen A, 50 mm/minute test speed)	10.7 % min
3.3.5	Tensile Modulus (ISO 527-1 and ISO 527-2, Specimen A, 1 mm/minute test speed)	0.6 GPa min
3.3.6	Flexural Modulus (ISO 178, Specimen D, 64 mm support span, 2 mm/minute test speed)	0.9 GPa min
3.3.7	Impact Strength, Notched Charpy (ISO 179-1/2, Specimen D)	
3.3.7.1	At 23 +/- 2 °C	1.6 kJ/m ² min Report Break Type
3.3.7.2	At -40 +/- 2 °C	1.0 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.

3.3.8	Heat Deflection Temperature (ISO 75-1 and ISO 75-2, Specimen D, flatwise, 0.34 +/- 0.1 mm deflection. At 1.80 Mpa)	45 °C min
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All specimens dry as molded. If not tested immediately after molding, specimens must be stored in a sealed, moisture-proof container filled with silica gel.