



POLYPROPYLENE (PP) COPOLYMER, MEDIUM IMPACT COMPOUND

WSS-M4D1028-A1

1. SCOPE

The material defined by this specification is an extrusion, and blow moldable thermoplastic material based on polypropylene copolymer.

2. APPLICATION

This specification was released originally for material used for air induction system (AIS) applications.

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 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 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.

3.1.2 This specification is based on virgin materials, however materials with recycled content as defined by WRS-M99P42-A1 (post-consumer and/or postindustrial recyclates and repolymerised recycled materials) should be used whenever technically feasible and following all materials and PV testing required by Ford Materials Engineering.

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

3.1.4 Performance Criteria:
Parts using this specification shall meet the appropriate performance specifications, WSS-M15P50-B/Latest.

3.1.5 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:

Melt Flow Rate
Impact Strength, Notched Charpy at 23°C
Flexural Modulus

Date	Action	Revisions	Rev. 1
2013 12 13	Revised	Editorial – See Summary of Revisions	R. Harris, NA
2013 10 25	Released		R. Harris, NA





3.2 SAMPLE PREPARATION

Unless otherwise specified all tests shall be carried out on test specimens cut (in accordance with the ISO methods specified) from parts. Specimens are tested with the as-molded thickness of the part and are not machined to meet the thickness requirements of the Standard Test Methods except where necessary for fixturing. Greater variation in test values can be anticipated when evaluating materials that are thinner than recommended by an applicable Industry Standard/Test Method. The test specimens A and D shall be molded using molding conditions defined in ISO 1873-2. See Table 1 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	Melt Flow Rate (ISO 1133 230 °C, 2.16 kg)	0.3 – 3.0 g/10 minutes
3.3.2	Density (ISO 1183, Method A)	0.89 – 0.92 g/cm ³
3.3.3	Tensile Strength at Yield (ISO 527-1 and ISO 527-2, Specimen A, 50 mm/minute test speed)	19 MPa min
3.3.4	Tensile Modulus (ISO 527-1 and ISO 527-2, Specimen A, 1 mm/minute test speed)	0.9 GPa min
3.3.5	Impact Strength, Notched Charpy (ISO 179-1/1eA, Specimen D)	
3.3.5.1	At 23 +/- 2 °C	45, kJ/m ² min Report Break Type
3.3.5.2	At -40 +/- 2 °C	1.5, kJ/m ² min Report Break Type
3.3.6	Heat Deflection Temperature (ISO 75-1 and ISO 75-2, Specimen D, flatwise, 0.34 +/- 0.1 mm deflection. At 1.80 MPa)	44 °C 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.