



POLYETHYLENE (PE) HIGH DENSITY MOLDING COMPOUND, MONOWALL FUEL TANK

WSS-M4D645-B1

1. SCOPE

The material defined by this specification is a thermoplastic high density molding compound based on polyethylene.

2. APPLICATION

This specification was released originally for material used for monowall fuel tanks.

2.1 LIMITATIONS

- This material does not contain UV stabilizers, long term exposure to direct sun light will cause chalking and loss of gloss.
- This material is susceptible to fluid stress cracking and high mold shrinkage.

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 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 specification, 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:

Date	Action	Revisions	Rev. 1
2015 02 16	Revised	See summary of revisions	G.Kowalski, NA
2013 09 09	Released		G. Kowalski, NA



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

3.2 SAMPLE PREPARATION

All tests specimens shall be prepared from compression molded sheets to approximately 400 x 200 x 4.0 +/- 0.2 mm unless otherwise specified. Preparation of compression molded sheets according to ISO 293, except; aluminum foil, 180 - 200 °C molding temperature, 15 +/- 2 °C/minute cooling rate. The values of this specification are based on unannealed specimens. See Table 1 for the number of samples required.

Specimens shall be defined 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 D center of specimen A, 80 x 10 x 4.0 +/- 0.2 mm)

3.3 MATERIAL PROPERTIES

3.3.1	Melt Flow Rate (ISO 1133 190 °C, 21.6 kg)	4.1 – 6.8 g/10 minutes
3.3.2	Density (ISO 1183, Method A)	0.943 – 0.949 g/cm ³
3.3.3	Tensile Strength at Yield (ISO 527-1 and ISO 527-2, Specimen A, 50 mm/minute test speed)	20 MPa min
3.3.4	Elongation at Yield (ISO 527-1 and ISO 527-2, Specimen A, 50 mm/minute test speed)	8 % min
3.3.5	Tensile Modulus (ISO 527-1 and ISO 527-2, Specimen A, 1 mm/minute test speed)	0.86 GPa min
3.3.6	Flexural Modulus (ISO 178, Specimen D, 64 mm support span, 2 mm/minute test speed)	0.58 GPa min
3.3.7	Impact Strength, Notched Charpy (ISO 179-1/1eA, Specimen D)	
3.3.7.1	At 23 +/- 2 °C	20 kJ/m ² min Report Break Type
3.3.7.2	At -40 +/- 2 °C	6.5 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.