



**POLYPROPYLENE (PP), HOMOPOLYMER 20% CALCIUM
CARBONATE FILLED, HEAT STABILIZED, IMPACT
MODIFIED MOLDING COMPOUND, 25% MIN POST
CONSUMER CONTENT**

WSS-M4D959-A

1. SCOPE

The material defined by this specification is a 20% calcium carbonate filled thermoplastic molding compound based on polypropylene homopolymer (25% min post consumer content).

2. APPLICATION

This specification was released originally for material used in Fuel Vapor Storage System (FVSS) brackets.

3. REQUIREMENTS

3.0 STANDARD REQUIREMENTS FOR PRODCUTION 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.

3.4 MOLDING COMPOUND

3.4.1	Melt Flow Rate (ISO 1133, 230 °C, 2.16 kg)	8 - 14 g/ 10 minutes
3.4.2	Filler Content (ISO 3451-1, Method A, 650 +/- 25 °C, CaCO ₃)	17 - 23%

3.5 MOLDED TEST SPECIMEN

3.5.1 Preparation of Test Specimens

Unless otherwise specified all tests shall be carried out on injection molded one-end gated test specimens.

The following dimensions are required:

- A. 150 min x 10 x 4.0 +/- 0.2 mm (Tensile Bar, ISO 3167)
- B. 120 x 10 x 4.0 +/- 0.2 mm

Specimens with shorter dimensions shall be cut from the center portion of the test specimen A and/or B. The specimens shall be prepared according to ISO 294. No annealing allowed.

Date	Action	Revisions	Rev. 4
2011 08 08	Revised	See summary of Revisions	L. Soreide, FNA
2006 07 26	Revised	Inserted 3.0; Deleted 3.1, 3.2, 3.3, 3.8, 3.9 & 4	
1997 12 12	Activated		



Documents

L. Hess
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| 3.5.2 | Density
(ISO 1183, Method A) | 1.02 - 1.09 g/cm ³ |
| 3.5.3 | Tensile Strength at Break,
(ISO R 527, 150 min x 10 x 4.0 +/- 0.2 mm
specimen, 5 mm/minute test speed) | 14 MPa min |
| 3.5.4 | Flexural Modulus
(ISO 178, 80 x 10 x 4.0 +/- 0.2 mm
specimen, 2 mm/minute test speed, 64 mm
support span) | 1.2 GPa min |
| 3.5.5 | Shear Modulus at 23 °C
(ASTM D 4065, forced constant amplitude,
fixed frequency of 1 Hz +/- 15%, strain
level below 1%. Specimen approximately
60 x 10 x 4.0 +/- 0.2 mm cut from the
center of specimen A. Specimen length
between clamps 35 - 40 mm. Soak time at
each temperature interval - 3 minutes min) | 600 MPa min |

Additionally, a Shear Modulus vs. Temperature curve shall be plotted for -50 to +240 °C temperature range, at 5 °C min intervals. The plotted curve must be within tolerance range shown on page 4.

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|---------|---|---------------------------|
| 3.5.6 | Impact Strength, Notched Izod
(ISO 180/1A, 80 x 10 x 4.0 +/- 0.2 mm
specimen, 10 specimens for each test) | |
| 3.5.6.1 | At 23 +/- 2 °C | 6.5 kJ/m ² min |
| 3.5.6.2 | At -40 +/- 2 °C | 2.0 kJ/m ² min |

The test specimens must be conditioned for min of 6 h at the above specified temperature prior to impact test. Low temperature testing shall be done within the cold box.

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| 3.5.7 | Heat Deflection Temperature
(ISO 75, 120 x 10 x 4.0 +/- 0.2 mm
specimen, edgewise, 0.32 +/- 0.01 mm
deflection. At 1.80 MPa) | 46 °C min |
| 3.5.8 | Heat Aging Performance
(ISO 188, except 150 +/- 50 air changes/h,
1000 h at 120 +/- 2 °C. Unaged property
values shall be determined at the time of
the aged properties determination) | |
| 3.5.8.1 | Tensile Strength at Break
(Test Method per para 3.5.3) | +/- 25%
Change from original |