

**UNSATURATED POLYESTER (UP), 12% GLASS FIBER
REINFORCED, HIGH HEAT RESISTANT COMPRESSION
MOLDING COMPOUND**

WSF-M3D165-A

1. SCOPE

The material defined by this specification is a natural color glass reinforced unsaturated polyester (UP). This material is highly filled with calcium carbonate and mineral fillers.

2. APPLICATION

This specification was released originally for material used for brush holders.

3. REQUIREMENTS**3.0 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 All requirements of this specification, identified by symbol (s), shall be met with data representing 3 sigma values.

3.4 MOLDING COMPOUND

(s) 3.4.1 Filler Content

3.4.1.1 Ash Content 45 - 50%
(ISO 3451/1, Method A
1 h at 650 +/- 25 °C)

3.4.1.2 Glass Fiber Content, by weight 11 - 13%

Test Method: ISO 3451/1, Method B, 1 h at 650 +/- 25 °C, except use 5% by volume hydrochloric acid solution for 15 minutes. Rinse and filter the glass fibers several times with distilled water (use of glass filter with 50 micrometre size pores, maximum is recommended) before drying in an oven for 2 h at 120 +/- 2 °C. After cooling, weigh the crucibles and calculate the percent glass fibers.

3.5 MOLDED TEST SPECIMEN

3.5.1 Preparation of Test Specimens

Unless otherwise specified all tests shall be carried out on compression molded test specimens. The following dimensions are required:

- A. 150 minimum x 10 x 4.0 +/- 0.2 mm (Tensile Bar)
- B. 120 x 10 x 4.0 +/- 0.2 mm
- C. 13 x 13 x 25 mm (Compressive Strength Bar, ASTM D 695)

Date	Action	Revisions
2006 08 16	Revised	Inserted 3.0, Deleted 3.1, 3.2, 3.3, 3.8, 3.9, 4
1994 01 31	Completely Revised	NGA1E10370437001 A. Vallabhanath
1992 03 19	Released	DF00E00107002134 A. Vallabhanath L. P. Ruma



Specimens with shorter dimensions shall be cut from the center portion of the test specimen A and/or B. The specimens shall be prepared under optimum conditions as defined by the manufacturer of raw material. No annealing allowed.

	3.5.2	Density (ISO 1183, Method A)	1.76 - 1.85 g/cm ³
(s)	3.5.3	Tensile Strength at Max Load, min (ISO R 527, 150 x 10 x 4.0 +/- 0.2 mm specimen, 5 mm/minute test speed)	32 MPa
(s)	3.5.4	Flexural Modulus, min (ISO 178, 80 x 10 x 4.0 +/- 0.2 mm specimen, 64 mm support span, 2 mm/minute test speed)	12 GPa
(s)	3.5.5	Flexural Strength, min (ISO 178, 80 x 10 x 4.0 +/- 0.2 mm specimen, 64 mm support span, 2 mm/minute test speed)	82 MPa
(s)	3.5.6	Compressive Strength, min (ASTM D 695, 13 x 13 x 25 mm specimen, 1.3 mm/minute test speed)	100 MPa
	3.5.7	Shear Modulus at 23 °C (ASTM D 4065, forced constant amplitude, fixed frequency of 1 Hz +/- 15%, strain level below 1%. Specimen approx. 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 minimum)	3.9 - 4.6 GPa
		Additionally, a Shear Modulus vs. Temperature curve shall be plotted for -50 to +280 °C temperature range, at 5 °C minimum intervals. The plotted curve must be within tolerance range shown on page 5.	
(s)	3.5.8	Impact Strength, Izod, min (ISO 180/1A, 80 x 10 x 4.0 +/- 0.2 mm specimen, 10 specimens for each test)	
	3.5.8.1	At 23 +/- 2 °C	31.3 kJ/m ²
	3.5.8.2	At -40 +/- 2 °C	31.3 kJ/m ²

The test specimens must be conditioned for minimum of 6 h at the above specified temperature prior to impact test. Low temperature testing shall be done within the cold box, if not possible, test can be conducted outside, but within 5 s.

