



PHENOLIC (PF) 40% GLASS FIBER REINFORCED SHEET

WSK-M97D2-A

1. SCOPE

The material defined by this specification is a high heat resistant composite sheet of 40% chopped strand E glass fibers homogeneously encapsulated in a fully curable phenolic resin. This material is self-extinguishing (SE) without flame retardant additives. It may be used for the hand-lay process, direct fiber preform process or modified wet-lay-up molding.

2. APPLICATION

This specification was released originally for material used for heat insulation shields.

Note: This material absorbs water and should not be used without surface protection.

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).

3.4 MOLDED TEST SPECIMEN

3.4.1 Preparation of Test Specimens

All test specimens shall be die-cut from strainless molded flat test sheets manufactured from the same material composition and under equivalent process conditions as production parts. The thickness of test specimen shall be 2.5 +/- 0.5 mm. Edges of specimens shall be flat, clean and at right angles to the surface. Before die-cutting of the individual test specimen, the molded test sheets shall be annealed according to the following cycle:

30 minutes at 50 - 55 °C
4 h at 80 - 85 °C
24 h minimum at 23 +/- 2 °C

3.4.2 Density (ISO 1183, Method A/ASTM D 792, Method A1)

Hand-lay-up Process 1.15 - 1.35 g/cm³

Direct Fiber Preform Process 1.10 - 1.30 g/cm³

3.4.3 Ash Content 30 - 45% (ISO 3451/1, Method A, except 2 h at 850 +/- 50 °C)

Date	Action	Revisions
2006 09 20	Revised	Inserted 3.0; Deleted 3.1, 3.2, 3.3, 3.6, 3.7 & 4
1992 05 01	Released	EP00E10176267000



Documents

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3.4.4 Tensile Strength at Break, min 50 MPa
(ISO R 527/ASTM D 638M, 150 min x
10 x 2.5 +/- 0.5 mm specimen,
5 mm/min test speed)

3.4.5 Flexural Modulus, min 4.7 GPa
(ISO 178/ASTM D 790M, Method I,
Procedure A, 80 x 10 x 2.5 +/- 0.5 mm
specimen, 1.25 mm/min test speed,
64 mm support span, the radius of
the loading nose 5.0 +/- 0.1 mm
and of the supports 2.0 +/- 0.2 mm)

3.4.6 Flexural Strength, min 75 MPa
(Test method per para 3.4.5)

3.4.7 Impact Strength, Izod, Unnotched, min
(ISO 180/ASTM D 256, no notch
on either side, 80 x 10 x 2.5 +/- 0.5 mm
specimen, 10 specimens for each test)

3.4.7.1 At 23 +/- 2 °C 55 kJ/m²

3.4.7.2 At -40 +/- 2 °C 55 kJ/m²

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.

3.4.8 Heat Aging Performance
(ISO 188/ASTM D 573, 150 +/- 50 air
changes/h, 1000 h at 190 +/- 2 °C.
Unaged property values shall be
determined at the time of the aged
properties determination)

3.4.8.1 Impact Strength, min 20 kJ/m²
(Test Method per para 3.4.7.1,
10 specimens for each test)

3.4.8.2 Flexural Strength, min 10 MPa
(Test Method per para 3.4.6,
10 specimens for each test)

3.4.9 Water Absorption, max 12%
(ISO 62, 96 h/ASTM D 570, 96 h)