



PRODUCT STANDARD
SWITCHGEAR ENGINEERING DIVISION

SG 10707 REV.05

PAGE 1 OF 3

FLAME RETARDANT SHEET MOULDING COMPOUND
LPMC / SMC SHEETS

1. APPLICATION :-

This specification governs the requirements of flame retardant sheet moulding compound sheets LPMC / SMC of electrical grade which are used as an insulating material for barriers in the indoor metal clad switchgear.

It consists essentially of an unsaturated polyester resin system with glass fiber reinforcing and cured as moulding under a pressure of 100-300 Kg/cm² for SMC and 150 Kg/cm² pressure for LPMC. These moulded sheets are fire retardant grade and have a temperature index of at least 155.

2. SIZES :-

Thickness : 1.5 mm to 15 mm
Sheet size : 1000 mm x 1000 mm

3. COLOUR :-

Standard : Off-white
Others : Signal red

4. PROPERTIES :

Important properties of SMC / LPMC sheets are as following :

<u>PROPERTY</u>	<u>UNIT</u>	<u>TEST METHOD</u>	<u>VALUE</u>
<u>PHYSICAL</u>			
Specific gravity	-	IS 10192-1982 Appendix-A	1.8 to 2.0
Glass content	% by weight	IS 14399 Appendix-E (C1. B)	20 to 25
Water absorption	%	IS 10192-1982 Appendix B	0.20 max
<u>FLAMMABILITY</u>			
Flame Class	Class	UL94	V0

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REV.	05	PRINTS TO :-		APPROVED -		
ALTD.	H.R.PATEL	SWM(P) QC/SCR SWE	1	R.K.SHUKLA		
APPD.	INDRAPAL		1	PREPARED	ISSUED	DATE
DATE.	25.08.2001		1	S.M.M	B.P.N	30.8.99



PRODUCT STANDARD
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SG 10707 REV.05

PAGE 2 OF 3

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<u>PROPERTY</u>	<u>UNIT</u>	<u>TEST METHOD</u>	<u>VALUE</u>
<u>ELECTRICAL</u>			
Electrical strength (Proof) in oil at 90 deg C (Testing on 3mm thick sheet as per IEC-243 Part-I)	kV/mm	IS 1998 Cl.13	>or=10
Volume resistivity	Ohm-cm	IS 3396	> 10 ¹⁴
Surface resistivity	Ohm	IS 3396	> 10 ¹²
Comparative Tracking Index	Volts	IEC 112-1979	> 600
Arc Resistance	sec	ASTM-D495	> 180
<u>MECHANICAL</u>			
Tensile strength	N/sq mm	IS 14399	> 50
Cross breaking strength	N/sq mm	IS 14399	> 130
Impact strength	J/sq cm	IS 1998	> 4.0

5. **FINISH** :

The SMC / LPMC moulded sheets shall be smooth, compact, bright and free from cracks, blisters, gas pockets, foreign inclusions etc and with uniformly distributed bonds. No warpage, undulation or deformation in sheets is allowed.

6. **ACCEPTANCE CRITERIA** :

6.1 For approved suppliers.

6.1.1 Supplier shall submit type test certificates with offer of any Govt. approved external agency for all the properties mentioned in para 4.

6.1.2 For subsequent lots test values for water absorption, electrical strength and flammability as stated in Para 4 shall be verified for acceptance of the lot 2 no. test samples each of size 3 x 300 x 300 mm shall be supplied along with the supply lot.



PRODUCT STANDARD
SWITCHGEAR ENGINEERING DIVISION

SG 10707 REV.05

PAGE 3 OF 3

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6.2 For new suppliers -

6.2.1 In addition of meeting the requirement mentioned in clause 6.1.1, for new supplier all the properties of para 4 shall be verified for 3 consecutive lots against P.O. 2 nos. each sample sheet of sizes 3 x 300 x 300 mm and 4 x 300 x 300 mm and test pieces 7 each for tensile and cross breaking strength shall be supplied with supply each lot for testing at BHEL works. Supplier shall be approved to supply the material as per SG10707 only when the material properties have been found OK after the tests.

6.2.2 After the approval for subsequent lots test values for water absorption, electrical strength and flammability as stated in para 4 shall be verified for acceptance of the lot. Test samples of 2 sheets size 3 x 300 x 300 mm shall be supplied alongwith the supply lot.

7. **IDENTIFICATION** :-

Supplier shall provide appropriate markings on each sheet giving following details:

- Suppliers name
- PO No and date
- Production batch no. and date.

8. **PACKAGING, STORAGE AND HANDLING** :-

The sheets shall be suitably packed by providing protective papers between each sheet & stretch wrap film to prevent scratches during handling.

The sheets shall be stacked over one another and packed in wooden crates with internal lining of 150 micron thick polythelene sheet and bitumen coated Hessian re-inforced craft paper.