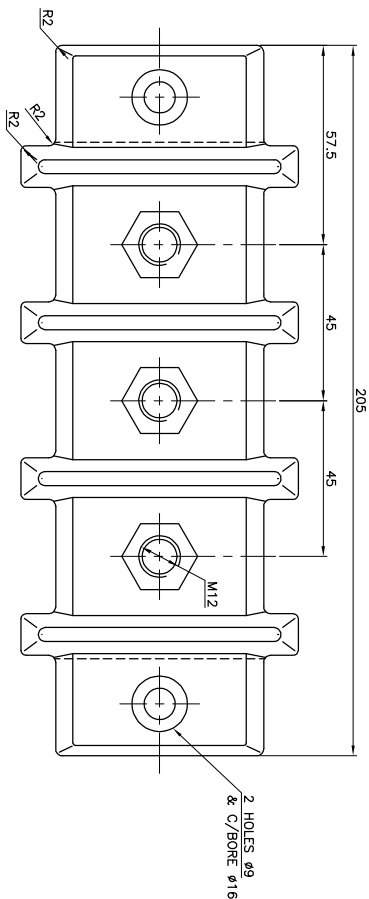



NOTES:-

1. THE FOLLOWING TESTS TO BE CONDUCTED ON TERMINAL BOARD, AFTER MOUNTING ON STEEL PLATE WITH M12 BOLTS.
  - a) BETWEEN INSERTS AND MOUNTING PLATE  
IR VALUE TO BE MIN. 200M Ω  
HV TEST 12.5 kV FOR 1MIN.
  - b) BETWEEN INSERTS TO INSERT  
IR VALUE TO BE MIN. 200M Ω  
HV TEST 12.5 kV FOR 1MIN.
2. FOR IT. 002 MATERIAL ST.12 SHAPE G CLOSED BY PLATE AND LONG (DIN 16903) WITHOUT BORDER AND THREADED DEPTH 17mm.
3. REMOVE ALL SHARP EDGES.
4. THIS DRG. IS SIMILAR TO CLW DRG. NO. 2.TWD.096.019, (ALT-00).
5. CONSIDER TOLERANCE OF ALL DIMENSIONS ±0.5MM IF NOT SPECIFIED.

[illegible]

ADDITIONAL INFORMATION SIM DRG. NO. HMMT 211214	STATUS OF DRAWING	DISTRIBUTION OF PRINTS TME-1, TXM-3, TXN-1	TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		GERA 6068 INDUCTION MOTOR FOR AC LOCO		
			BHARAT HEAVY ELECTRICALS LTD. BHOVAL				
			NAME	SIGN	DATE	NO. OF VRS.	
			DRN. R.B.U.	-sd-	08/09/10		
			CHD. D.K.	-sd-	08/09/10	01	
			APPRO. VIKAS	-sd-	08/09/10		

REV.	DATE	ALTERED	BY	DEPT.	TIME	UNTIL	DIMS.	OR.	SCALE	WEIGHT (K.G.)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEM
01	3.12.13	APPROVED	BY						NTS	0.761	0 445 33 64 053	025	0022
ZONE NOTE-5 WAS NOT ON.													
TITLE													

FILE NO.	FILE DATE	FILE NO.	FILE DATE
2 445	12 64	051	01

		SHL. NO.	01	NO. OF SHL.	0
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6	7	8
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SIZE	AS
A2	



## CORPORATE PURCHASING SPECIFICATION

AA 22826

Rev. No. 03

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**POLYESTER MOULDING COMPOUND (DMC)****1.0 GENERAL:**

This specification governs the quality requirements of the fibre glass polyester moulding compound (Dough Moulding Compound) consisting essentially of an unsaturated polyester resin system, combined with mineral fillers and/or reinforcing glass fibres to form a dough which is soft and pliable at normal room temperature and cured as moulding under a pressure of 100-300 kg/cm<sup>2</sup> at temperature of 165 + 5°C. The mouldings are self extinguishing and has a temperature index of at least 155.

**2.0 APPLICATION:**

Used for H.V Joint box moulding of A/C Machines and other components of Switchgear and Controlgear.

**3.0 COMPLIANCE WITH NATIONAL STANDARDS:**

There is no Indian Standard covering this type of material.

**4.0 COLOUR:**

Unless otherwise specified, Natural beige/Cream or black shall be supplied.

**5.0 FINISH:**

The moulded material shall be smooth, compact, bright and shall render mouldings free from cracks, blisters, gas pockets, foreign inclusions etc. and with uniformly distributed bond.

**6.0 TEST METHODS:**

Unless otherwise specified, the tests shall be conducted in accordance with the relevant methods of BHEL Standard AA 085 17 16.

**7.0 TEST SAMPLES:**

2 kg of Dough Compound or a set of moulded test specimens as per the quantity and size mentioned below, shall be supplied for testing.

**Revisions :**

Cl: 32.4.52 of MOM of MRC-E

**APPROVED :**

INTERPLANT MATERIAL  
RATIONALISATION COMMITTEE-MRC ( E )

Rev. No. 03

Amd.No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt:15.01.2003


Dt :

Year :

BHOPAL

Corp. R&amp;D

Feb, 1980

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**MOULDED TEST SPECIMENS ( mm)**

1. Specific Gravity	- 2 Nos. of 50 dia. x 2 tk.
2. Water Absorption	- 3 Nos. of 50 dia. x 3 tk.
3. Flammability	- 3 Nos. of 150 Lx13wx1.5 tk.
4. Martens' heat distortion Temp.	- 3 Nos. of 120 Lxl15wx10 tk.
5. Resin content	- 2 Nos. of 50 x 50 x 3 tk.
6. Tensile Strength	- 3 Nos. as per AA 085 17 16
7. Cross Breaking Strength	- 3 Nos. as per AA 085 17 16
8. Compressive Strength	- 3 Nos. of 10 dia x 10 tk.
9. Impact Strength	- 5 Nos. as per IS: 867
10. Electric Strength	- 4 Nos. of 100 dia x 3 tk.
11. Volume Resistivity	- 2 Nos. of 100 dia x 3 tk.
12. Comparative Tracking Index	- 3 Nos. of 100 dia x 3 tk.

In addition 100 g of Dough compound shall be supplied for testing at BHEL.

**8.0 PHYSICAL PROPERTIES:**

8.1 Specific Gravity	: 1.7, min.
8.2 Bulk Factor	: 2, max.
8.3 Water Absorption	: 30 mg, max.
8.4 Marten's Heat Distortion Temperature	: 175 <sup>0</sup> C, min.
8.5 Resin Content: (As per Annexure 1)	: 30 ± 5% by wt.
8.6 Resistance To Carbon Arc, ASTMD 495	: 180 seconds, min.
8.7 Flammability (Annexure-II)	: Self extinguishing.

**9.0 MECHANICAL PROPERTIES:**

9.1 Tensile Strength	: 40 to 70 N/mm <sup>2</sup> .
9.2 Cross - Breaking Strength	: 85 to 155 N/mm <sup>2</sup>
9.3 Compressive Strength	: 125 to 155 N/mm <sup>2</sup> .
9.4 Impact Strength, Izod ( IS : 867)	: 2.8 to 7 J

**10.0 ELECTRICAL PROPERTIES:**

10.1 Electric Strength in oil at 90 <sup>0</sup> C	: Proof for 1 minute at 6 kV/mm, flat wise
10.2 Volume Resistivity	: 10 <sup>10</sup> ohm-cm, min.
10.3 Comparative Tracking Index	: 700, min.

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**11.0 SHRINKAGE (FOR INFORMATION ONLY):**  
0.15%, max.

**12.0 KEEPING PROPERTY (FOR DOUGH ONLY):**  
One-month minimum under closed containers at 27<sup>0</sup>C. However the supplier shall specify the shelf life and storage conditions and date of manufacture.

**13.0 ENVIRONMENTAL REQUIREMENTS :**  
  
The supplier shall furnish Material Safety Data Sheet (MSDS) covering all information relating to human safety and environmental impacts of the hazardous materials particularly during their transportation, storage, handling and disposal along with each supply.

Each container shall be marked with corresponding symbol and minimum worded cautionary notice for flammable / corrosive / toxic / harmful / irritant and oxidizing etc. as applicable.

**14.0 TEST CERTIFICATE:**  
  
Unless otherwise, stated, three copies of test certificates shall be supplied with each consignment, along with the following information:  
  
In addition, the supplier shall ensure to enclose one copy of the test certificate along with the despatch document to facilitate quick clearance of the material.

The test certificate shall bear the following information:  
AA 22826: (Rev.No 03): Polyester Moulding Compound (DMC).  
BHEL Order No.  
Manufacture's/Supplier's Name & Grade.  
Batch/Lot No.  
Quantity Supplied  
Date of Manufacturing & Date of Expiry  
Test values obtained/Certificate for compliance for clause 8 to 10 for all routine tests.

**15.0 PACKING AND MARKING:**  
  
The material shall be packed in thick polyethylene bage of 5 kgs, totally sealed and further 5 such packs shall be kept in a tin container. The container shall be labelled with the following information.  
  
AA 22826: Polyester Moulding Compound (DMC).  
BHEL order No.  
Batch/Lot No.  
Manufacturer's/Supplier's Name & Grade,  
Date of manufacture and date of expiry.  
Quantity supplied.

**16.0 REFERRED STANDARDS (Latest Publications Including Amendments) :**  
  
1) AA 0851716                      2) IS:867                      3) ASTM D 495

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## CORPORATE PURCHASING SPECIFICATION



## ANNEXURE - I

## RESIN CONTENT

100 gms of dough compound shall be dried in an oven at  $105 \pm 5^{\circ}\text{C}$  for 4 hours and shall then be cooled and weighed (W1). The compound shall then be refluxed with a suitable blend of solvent mixture in a Soxhlet apparatus for 4 hours or till it is free from resin content. The compound shall be allowed to dry in air for 10 minutes and then transferred in to an oven at  $105 \pm 5^{\circ}\text{C}$ , dried for 1 hour, cooled and re-weighed (W2).

$$\text{Resin Content \%} = \frac{W1 - W2}{W1} \times 100$$

Where W1 = Wt. of Volatile free sample, grams.

W2 = Wt. of resin free sample after solvent extraction, grams.

## ANNEXURE - II

## TEST METHOD FOR FIRE RETARDANT TEST

## 1.0 TEST PIECES:

Use five test pieces 10 to 15 mm wide of thickness of the sheet under test. However if thickness of sheet exceeds 3 mm, then thickness shall be reduced to 3 mm keeping one surface intact. Length of test piece shall be such that the exposed length is 80 mm or more as detailed in figure given below:

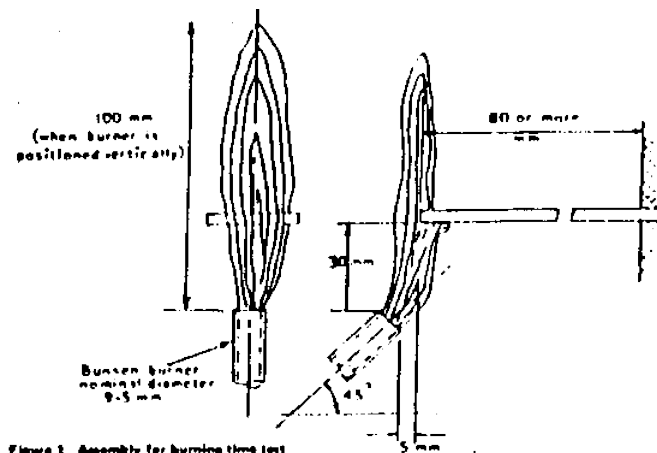



Figure 1: Assembly for burning time test

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**2.0 CONDITIONING:**

Test the material in the as received condition.

**3.0 APPARATUS:**

The following apparatus is required.

**3.1** Draught free enclosure that permits observation. For safety and convenience it is desirable that this enclosure be fitted with a device. Such as an exhaust fan to remove products of combustion that may be toxic. However, it is important that this device be turned off during the actual test.

**3.2** Bunsen burner of nominal diameter 9.5 mm and gas supply.

**Note:** It has been found that for a wide range of materials the character of the flame. i.e. luminous or non-luminous, using common gases, does not affect the result obtained by this method of test.

**3.3** Installation to fix the test piece and the Bunsen burner in the positions specified.

**3.4** Stop Watch.

**4.0 PROCEDURE:**

Clamp the test piece horizontally by one end so that the width dimension is in the horizontal plane. The Bunsen burner should be fixed at an angle of 45<sup>0</sup> towards the unclamped end of the piece so that it is 30mm below the bottom edge and 5 mm away from the test piece (see figure).

Adjust the Bunsen-burner, with closed air-ports (see note to 3.2) to produce a flame approximately 100 mm long whilst in the vertical position. Whenever it is desired to ignite the test pieces, the burner should be placed in the 45<sup>0</sup> position described above; it should not be moved during the test (see note below). After 60 seconds turn the burner off. Check the burning time with the aid of the stop watch from the moment at which the flame is turned off. It should extinguish within 30 seconds.

**Note:** No burning time can be assigned if, during the 60 seconds ignition period, the test piece distorts away from and out of reach of the flame.