



PLANT PURCHASING SPECIFICATION BHOPAL

BP 22893

REV NO. 06

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SUPERSEDES
BP22893 Rev05

HAND MOULDED RANDOM GLASS FIBRE REINFORCED POLYESTER MOULDINGS

1. GENERAL:

This specification governs the quality of Glass fiber mouldings, consisting of a cold setting polyester resin, reinforced with random laid glass fibre made from Type E (low alkali) glass fibre containing not more than 1% alkali (Na_2O). The material has temperature index of at least 130.

2. APPLICATION:

Used for components of A.C. Machines e.g. Commutator Packing Ring, Air guides etc.

3. COMPLIANCE WITH NATIONAL STANDARDS:

There is no Indian Standard covering this of material.

4. DIMENSIONS AND TOLERANCES:

Shall be stated on order or the drawing accompanying the order.

5. FINISH:

Mouthings shall have smooth surface and shall be free from cracks, blisters, gas pockets, foreign inclusions etc. and with bond uniformly distributed.

6. TEST METHOD:

Unless otherwise stated, the tests shall be conducted in accordance with the relevant methods of Corporate Standard AA 085 17 01.

7. SAMPLE FOR TEST:

Two sheets of 5 ± 0.5 mm thickness in the size of 300 x 300 mm shall be supplied for testing and approval.

8. PHYSICAL PROPERTIES:

8.1 Specific Gravity : 1.4 Min.

8.2 Water Absorption : 1.0% Max.

Revision:
Reviewed & brought up to date.

Issued by: 
STANDARDS AND MATERIALS GROUP
TECHNICAL SERVICES DEPTMENT

Rev. 06

Date : 29-01-2022

Date of first Issue : June 1986



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8.3 Glass Content : 28 - 43%.

Shall be determined by any conventional method on three test specimens selected at random.

8.4 Fire Retardant Test (Annexure - II) : 30 secs. Max.

9. MECHANICAL PROPERTIES:

9.1 Tensile Strength : 63 N/mm², Min. (Annexure - I)

9.2 Cross Breaking Strength : 140 N/mm², Min. (Annexure - I)

9.3 Compression Strength : 130 N/mm², Min.

Tests shall be carried out on 2 specimens and both the samples should confirm to the requirement.

10. TEST OF COMPONENTS:

Glass content shall be determined individually on 3 to 5 integral pieces in the components. Integral pieces shall be left at the discretion of the supplier.

Average glass content of 3 to 5 test specimens, as the case may shall be reported and shall meet the requirements of CI.8.3.

11. TEST CERTIFICATE:

Three copies of test certificates shall be supplied with each consignment giving the following information:

In addition, the supplier shall ensure to enclose one copy of test certificate along with their dispatch documents to facilitate quick clearance of the material.

BP 22893 (Rev.06) : Hand Moulded Random Glass Fibre Reinforced Polyester Mouldings.

Our Order No.

Batch/Lot No.

Test values obtained / certificate for compliance for CI.5, 8 & 9.

12. PACKING AND MARKING:

The mouldings shall be suitably packed to avoid contamination and damage in transit. Packages shall be labelled with the following information:

BP 22893: Hand Moulded Random -Glass Fibre Reinforced polyester Mouldings.

Our Order No.

Supplier's / Manufacturer's Name & Grade.

Drawing and item Nos.

Net & Gross Weight.

ANNEXURE – I

TENSILE STRENGTH / CROSS BREAKING STRENGTH

Tensile strength / cross breaking strength test shall be carried out as per AA 085 17 01 except for the following.

Test shall be carried out on 5 test specimens irrespective of direction. Thickness shall be measured at five points equally placed to the nearest 0.03 mm in the effective portion of the test piece. This is required to be done due to variation in thickness of sheet because of hand lay up manufacturing method.

Average of these five reading shall be used for calculation purpose.

Tensile strength / cross breaking strength of five test specimens shall be determined.

Average result of five test specimens shall be reported as Tensile Strength/cross breaking strength.

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: -

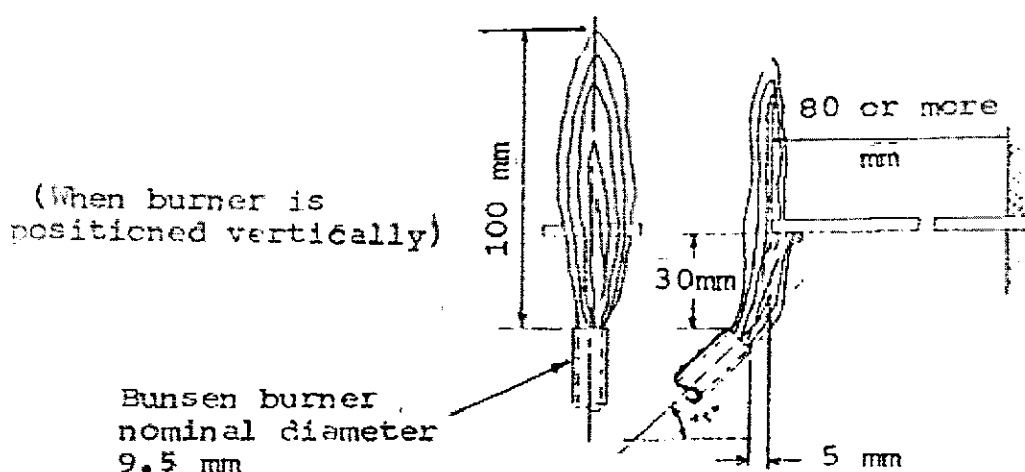


Figure 1. Assembly for burning time test

2.0 Conditioning:

Test the material in the as received condition.



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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 deg. towards the unclamped end of the test piece so that it is 30 mm below the bottom edge and 5 mm away from the test piece (see figure).

Adjust the Bunsen-burner, with closed air-ports (see note 3.2) to produce a flame approximately 100 mm long whilst in the vertical position. Whenever it is desired to ignite the test piece, the burner should be placed in the 45 deg. position described above it should not be moved during the test (see note below). After 60's 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.

NOTE:

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

5.0 Expression of Results.

For each of the five test pieces, record the time in seconds from the moment at which the Bunsen flame is turned off until the test piece ceases to burn provided some of the test piece remains unburned. Report the arithmetic mean of the results obtained on the five test pieces as

Burning time of test piece 10 mm to 15 mm wide: ----- seconds.

Alternatively, report if any test piece has burnt away completely, or has distorted away from and out of reach of the flame.

297786/2024/HEP-LEM21700



BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL
QUALITY PLAN FOR – AIR BAFFLE /WINDING SHEILD - MATERIAL: FIBRE GLASS REINFORCED POLYESTER
MOULDINGS TO SPEC. AA22827

QUALITY PLAN NO. QA/MT/BOI/090 REV 00

DATED: 09.10.2020
Page : 1 of 2

ABBREVIATION:

#	1. Vendor to conduct tests for characteristics once in 2 years in NABL Accredited Lab & shall furnish the valid TCs which shall be verified by inspection agency. TCs of NABL Lab, results of TC shall be strictly as per scope/range of NABL accreditation.
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SL. NO	COMPONENT	CHARACTERISTICS	TYPE OF CHECK	QUANTAM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	INSPECTION AGENCY	REMARKS
1.0		Physical Properties 1) Specific gravity (Min.) 2) Water Absorption (% Max.) 3) Glass content 4) Flammability	Test	Sample	AA22827 /IS10192/ BHEL Drg.	AA22827 /IS10192/ BHEL Drg.	TC/TR	BHEL/TPIA	#
2.0		Mechanical Properties 1) Tensile strength 2) Cross breaking strength 3) Compressive strength 4) Impact strength	Test	Sample	AA22827 /BHEL Drg.	AA22827 /BHEL Drg.	TC/TR	BHEL/TPIA	#

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(Ashish Mohan Telgote)

Approved By

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BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL
QUALITY PLAN FOR – AIR BAFFLE /WINDING SHEILD - MATERIAL: FIBRE GLASS REINFORCED POLYESTER
MOULDINGS TO SPEC. AA22827

QUALITY PLAN NO. QA/MT/BOI/090 REV 00

DATED: 09.10.2020
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3.0	Electrical Properties 1) Electric strength in oil at 90 deg.C	Test	Sample	AA22827 /BHEL Drg.	AA22827 /BHEL Drg.	TC/TR	BHEL/TPIA	#
4.0	Thermal properties Martin's heat distribution temperature test	Test	Sample	AA22827 /BHEL Drg.	AA22827 /BHEL Drg.	TC/TR	BHEL/TPIA	#
5.0	Dimension	Meas.	100%	BHEL Drg.	BHEL Drg.	Inspection report	BHEL/TPIA	Witness
6.0	All hardware to be zinc plated & passivated	Visual	100%	AA0673603/4	AA0673603/4	TC/TR	BHEL/TPIA	Witness
7.0	Packing & marking as per clause 13 of AA22827	Visual	100%	AA22827 /BHEL Drg.	AA22827 /BHEL Drg.	Internal report	BHEL/TPIA	---

Legends: TR: Test report, TC: Test certificate, Meas.: measurement

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(Ashish Mohan Telgote)

Approved By

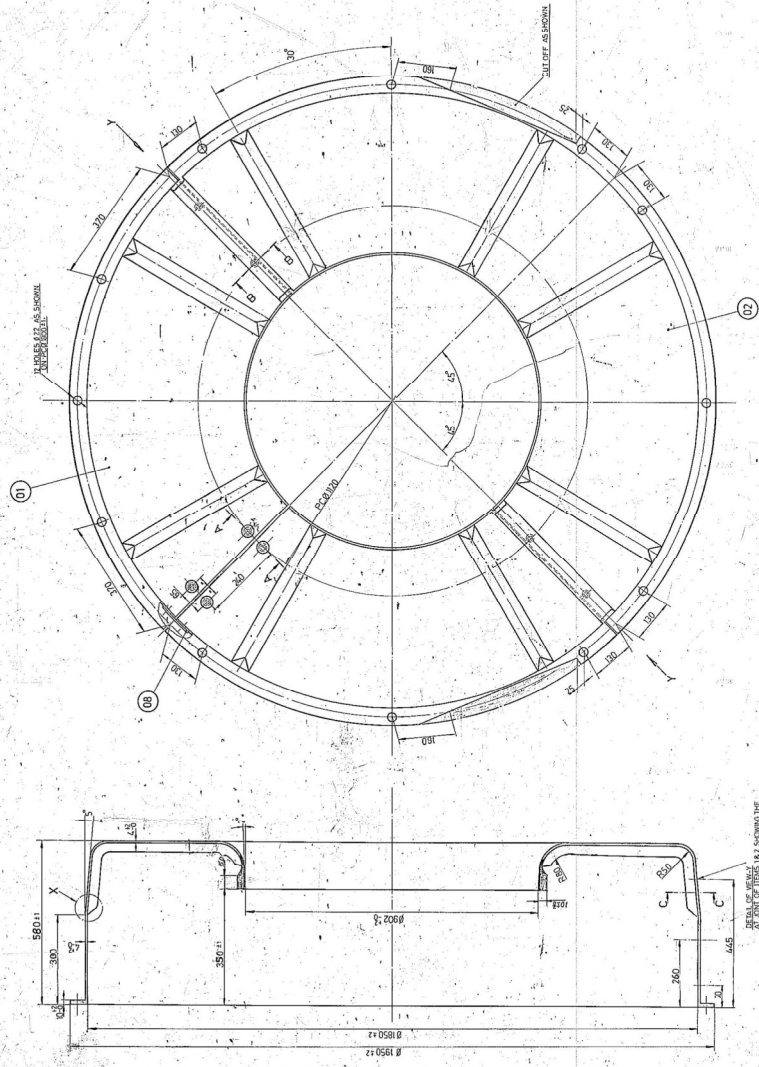
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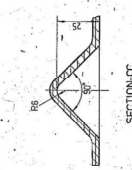
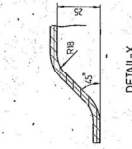
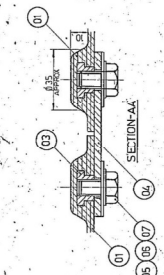
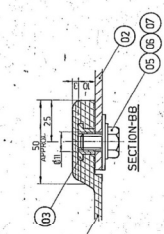
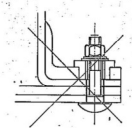
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297786/2024/HEP-LEM21700

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN MM)



NOTES:
1. WINNINGS SHIELD SHALL BE MADE IN THREE PIECES AS SHOWN.
2. ALL HARDWARE TO BE ZINC PLATED & PASSIVATED TO AA057603 & AA057604 (10 TO 15 MICRONS)



ITEM NO.	DESCRIPTION	QTY	UNIT	REMARKS
01	CLAMP PLATE	40274/0225	03	
02	WASHER SPRING	AA176/0205	03	
03	WASHER	AA176/0205	03	
04	SCREW 4.0x1	AA176/0205	03	
05	CAMP PLATE	40274/0201	03	
06	THREAD INSERT	AA154/02	03	
07	SHIELD SEGMENT	AA154/02	03	
08	SHIELD SEGMENT	AA154/02	03	
09	FIBRE GLASS	AA154/02	03	

TYPE OF PRODUCT : 177 782-4
NAME OF CUSTOMER/PROJECT : MB CHANDRASEKAR IPS
DRAWING NO : 041774.0022
DATE : 04/07/2024
SCALE : 1:1
SHEET NO : 01 OF 01



CORPORATE PURCHASING SPECIFICATION

AA 22827

Rev. No. 04

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FIBRE GLASS REINFORCED POLYESTER MOULDINGS**1.0 GENERAL:**

This specification governs the quality requirements of the fibre glass mouldings manufactured by hand lay up process. The mouldings shall consist of cold setting polyester resin reinforced with strands of glass fibre. The glass fibre shall be of Type E (Low Alkali) containing not more than 1% alkali (Na_2O). No filler shall be used in the manufacture of mouldings. The material shall have a temperature Index of at least 130.

2.0 APPLICATION:

Used for roof fuse box and switch gear group cases in traction control gears, insulated baffles of liquid rotor starter in industrial control gears, blower duct, collector duct in turbo generators commutator packing ring, air guides and end support of heavy machines etc.,

3.0 COMPLIANCE WITH NATIONAL STANDARDS:

There is no Indian standard covering this type of material.

4.0 DIMENSION AND TOLERANCES:

Shall be as stated on the order or the drawing accompanying BHEL order.

5.0 FINISH:

Shall have a reasonably smooth surface. The surfaces shall be even, free from visible defects like blisters, cracks, loose fibres, resin concentration wrinkles, local deformation, gas pockets, foreign inclusions and dents etc., and with bond uniformly distributed within the specified limits.

6.0 TEST METHODS:

Unless otherwise specified, the tests shall be conducted in accordance with the order or with the relevant clauses of BHEL standard AA 085 17 01.

7.0 TEST SAMPLES:

Three moulded sheets of size $300 \times 300 \times 3 \pm 0.25\text{mm}$ thick and one sheet of $10 \pm 0.5\text{mm}$ thick and of size $300 \times 300\text{mm}$ prepared from the same batch shall be supplied for test and approval.

Revisions :

CI: 32.4.53 of MOM of MRC-E

APPROVED :

INTERPLANT MATERIAL
RATIONALISATION COMMITTEE-MRC (E)

Rev. No. 04

Amd.No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt:15.01.2003


Dt :

Year :

BHOPAL

Corp. R&D

Feb, 1980

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8.0 PHYSICAL PROPERTIES:

8.1 Specific Gravity : 1.6. to 2.0

8.2 Water Absorption : 0.8%, max.

8.3 Glass Content : 30%, min.
Shall be determined by burning the bond at 600⁰C for sufficient time.

8.4 Flammability:
When tested as per Annexure -1 of the material shall self extinguish within 30 seconds.

8.5 Effect of 10% Sodium Carbonate (Na₂CO₃) solution (Optional Test):
A sample fo 3 x 75 x 75 mm shall be immersed in 10% sodium carbonate solution (by weight) in water at 80⁰ C for 7 days and then tested for the following physical properties:

Change in weight : 1.5%, max.
Change in dimensions : 1.0%, max
Surface finish through visual inspection : There shall be no appreciable change in the surface finish. Surface shall be free from defects like pitting, blistering, swelling and deposit etc.

9.0 MECHANICAL PROPERTIES:

9.1 Tensile Strength : 100 N/mm², min.


9.2 Cross - Breaking Strength : 170 N/mm², min.

9.3 Compressive Strength : 160 N/mm², min.

9.4 Impact Strength - Charpy-Flatwise - Un Notched:
10 J/cm², min., on 10 mm thick sample.

10.0 ELECTRICAL PROPERTIES:
Electric Strength In oil at 90⁰C : Proof for 1 minute at 8 kV/mm, flat wise.

11.0 THERMAL PROPERTIES:
Martin's heat distribution temperature 110⁰C , min., after post curing at 100⁰C for 4 - 6 hours.

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12.0 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 22827: (Rev.No 04): Fibre Reinforced Polyester Mouldings.
 BHEL Order No.
 Manufacture's/Supplier's Name.
 Batch/Lot No.
 Quantity Supplied
 Date of Manufacturing
 Test Results of clauses 4.0, 8.0, 9.0 and 10.0.

13.0 PACKING AND MARKING:

The material shall be packed to avoid contamination and damage in transit. Each container shall be marked with the following information.

AA 22827: Fibre Glass Reinforced Polyester Mouldings.
 BHEL order No.
 Batch/Lot No.
 Manufacturer's/Supplier's Name.
 Date of manufacture and expiry.
 Quantity supplied.

14.0 REFERRED STANDARDS (Latest Publications Including Amendments) :

1. AA 085 17 01

ANNEXURE - I

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:

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CORPORATE PURCHASING SPECIFICATION

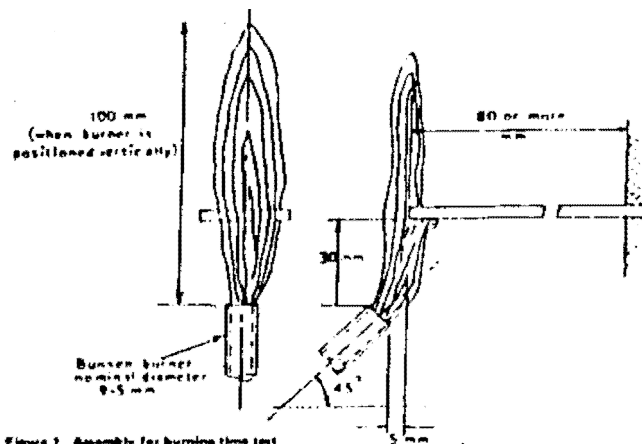


Figure 1. Assembly for burning time test

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° towards the unclamped end of the test 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 piece, the burner should be placed in the 45° position described above; it should not be moved during the test (see note below). After 60s 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 with in 30 seconds.

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