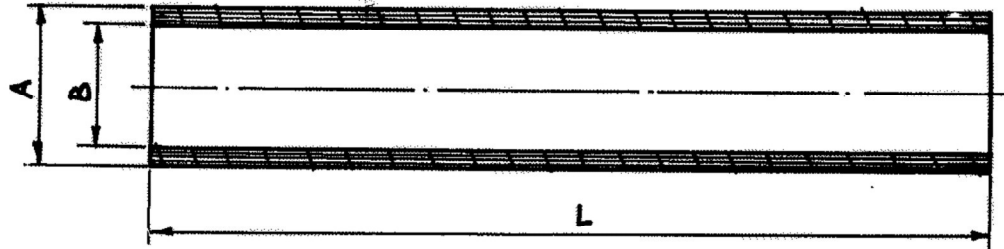


FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm.)

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 IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

REV. 02	DATE 19/9/06	ALTERED <u>CHD.</u>	REV. 01	DATE 28/9/06	ALTERED <u>CHD.</u>	ADDITIONAL INFORMATION W.O. 48240A-261-11 STATUS OF DRAWING U DISTRIBUTION OC-1, TCx(PLM)-1, OF PRINTS PLM-4, BCM-4.
ITEM 8 & 9 ADDED BP 22497 WAS P.R.S 7.1.04			ITS 6 & 7 ADDED.			
REV. 03	DATE 14/12/06	ALT. <u>CHD.</u>	REV. 04	DATE 13.1.2008	ALT. <u>REKHA</u>	
ITEMS 10 TO 13 ADDED ON PLM REQUEST.			IT. NO. 8 TO 11 STYLE NO. UPDATED, IT. NO. 12 & 13 STYLE NO. DELETED.			



ITEM	'A'	'B'	'L'	WT. (kg)	WORK ORDER/ STYLE NO.
01	$\phi 46 \pm 0.1$	$\phi 42 \pm 0.1$	140		48240A-261-11
02	$\phi 58 \pm 0.1$	$\phi 54 \pm 0.1$	1120		- do -
03	$\phi 46 \pm 0.1$	$\phi 42 \pm 0.1$	175		48239A-261-11
04	$\phi 58 \pm 0.1$	$\phi 54 \pm 0.1$	1075		- do -
05	$\phi 58 \pm 0.1$	$\phi 54 \pm 0.1$	1371		49036A-261-11
06	$\phi 58 \pm 0.1$	$\phi 54 \pm 0.1$	1062		49125A-261-11
07	$\phi 58 \pm 0.1$	$\phi 54 \pm 0.1$	1087		49157A-261-11
08	$\phi 46 \pm 0.1$	$\phi 42 \pm 0.1$	1000	0.47	BP9063029373
09	$\phi 58 \pm 0.1$	$\phi 54 \pm 0.1$	1000	0.60	BP9063029381
10	$\phi 26 \pm 0.1$	$\phi 22 \pm 0.1$	1000	0.25	BP9063029390
11	$\phi 52 \pm 0.1$	$\phi 48 \pm 0.1$	1000	0.53	BP9063029403
12	$\phi 14 \pm 0.1$	$\phi 11 \pm 0.1$	1000	0.10	—
13	$\phi 63 \pm 0.1$	$\phi 54 \pm 0.1$	1000	0.70	—

REMARKS	SEE TABLE	INSULATION SLEEVE I/D B'xO/D A' x L' LENGTH	BP 22497		
	ITEM NO.	DESCRIPTION	MATL. CODE	MATL. SPECN.	UNIT WT.
					QTY.

CARD TYPE-3 → 28 → CARD TYPE-1 → 28 → CARD TYPE-2 → 28

BHARAT HEAVY ELECTRICALS LIMITED BHOPAL	DRN.	NAME	SIGN.	DATE
	CHD.	दीनदयाल		11/11/09
	APPD.	PTP	005 etc	2/12/05

DEPT. AME	GRADE OF UN. TOL.	SCALE	WEIGHT (Kg.)	REF. TO ASSY. DRG.	ITEM NO.	75 77
CODE 404	DIM. C/M/F	NTS.	-	-	-	NO. OF ITEMS

TITLE	CARD CODE	DRAWING NO.	REV.
INSULATION SLEEVE	13	4-403-84-46-009	04
SHEET NO. 1		NO. OF SHEETS 1	



PLANT PURCHASING SPECIFICATION BHOPAL

BP 22497

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SUPERSEDES
BP 22497 Rev 03

EPOXIDE GLASS FABRIC TUBE

1. GENERAL :

This specification governs the requirements for an electrical grade tube with good mechanical and high heat resistance properties; made from fine woven glass fibre cloth, impregnated with epoxy resin. The tubes shall be well consolidated of circular cross-section and uniform wall thickness with ends trimmed smoothly at right angles to the axis of the tube. The external surfaces shall be uniformly finished with polyurethane varnish or epoxy resin.

The tube has a temperature index of at least 155.

2. APPLICATION : Used as core bolt insulation in transformers.

3. COMPLIANCE WITH NATIONAL STANDARDS:

There is no Indian Standard for this type of material.

4. DIMENSIONS & TOLERANCE:

4.1 ID x OD x Length of the tube shall be stated on the order.

4.2 Standard Sizes:

ID x OD	ID x OD
17 X 20	25X31.5
21 X 24	29 X 36
21 X 27.5	31 X 35
25 X 28	33 X 36
37 X 43.5	

However any other size can also be ordered.

4.3 Tolerance on dimensions :

Inside diameter (ID) : ± 0.05 mm

Outside diameter (OD) : $+ 0.25$ mm

Wall Thickness (WT) : ± 0.15 mm

Length (L) : ± 1.0 mm

**Revision : Reviewed & No. technical
change**

Issued by :

**STANDARDS AND MATERIALS GROUP
TECHNICAL SERVICES DEPARTMENT**

Rev. 04

Date : 05.10.2020

Date of first Issue: 25.05.1974



PLANT PURCHASING SPECIFICATION BHOPAL

BP 22497

REV NO. 04

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5. WARPING :

The tube shall be placed on a flat steel plate and rolled until the maximum gap between the tube and plate occurs with both ends of the tube in contact with the plate. This gap, as measured by a feeler gauge, when computed as a percentage based on the length of the tube, shall not exceed 0.1% for all sizes of tubes.

6. FINISH :

6.1 The tubes shall have a uniform and smooth finish and be free from splits, inclusions or foreign bodies, visible defects and voids.

6.2 Identification of Surface Varnish :

The surface finish shall be of Polyurethane or Epoxy resin varnish when identified by infrared spectrophotometer or by any conventional method.

7. TEST METHODS: As stated against each clause.

8. SAMPLE FOR TEST :

6 No. tubes of length 150 mm each shall be supplied for testing and approval.

9. PHYSICAL PROPERTIES :

9.1 Density (By any conventional method) : 1.7 g / cc, Min.

9.2 Water Absorption at Room temp. after 24 hours : 0.5 mg / cm², Max.

9.3 Glass Content :

50 to 70 %, by wt. by burning the bond at 600 ± 20°C for sufficient time.

10. MECHANICAL PROPERTIES :

10.1 Cohesion between layers (By any conventional method) :

10.1.1 Proof load (1 minute) : 105 t² N

10.1.2 Failure load : 210 t² N, Min.

Where t = Wall thickness of tube in mm

11. ELECTRICAL PROPERTIES :

11.1 Electric Strength (Proof) in air at room temperature (Appendix - I)

11.1.1 Radia: 4 kV/mm



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BP 22497

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12. TEST CERTIFICATES :

Unless otherwise specified three copies of test certificates shall be supplied along With each consignment.

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

The test certificate shall bear the following information :

BP 22497 : Epoxy Glass Fabric tube.

Rev.04

Our Order No.

Supplier's reference No.

Batch No.

Test values obtained / certificates for compliance for clause 4 to 6 & 9 to.12

13. PACKING AND MARKING :

The tubes shall.

BP 22497: Epoxy Glass Fabric Tube

Our Order No.

Manufacturer's and / or supplier's Name and Grade Batch No.

ID x OD x Length

No. of tubes



PLANT PURCHASING SPECIFICATION BHOPAL

BP 22497

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APPENDIX - I

METHOD OF APPLICATION OF ELECTRIC PROOF STRESS

Wrap a piece of metal foil, e.g. 0.05 to 0.1 mm thick copper or aluminum, of width equal to 1.5 times the circumference of the tube and of length 25 mm less than the length of the tube, tightly around the outside of the tube, to act as the external electrode. Position the coil centrally along the length of the tube, and secure it in this position with self adhesive paper masking tape or other suitable means.

If the tube is not presented for test on the winding mandrel, select a round clean metal rod at least 50 mm longer than the tube and of diameter not less than ($d = 0.75$ mm)

where d is the inside diameter in millimeters of the tube, to act as the internal electrode. Insert the selected rod (which should be a snug fit) into the bore of the tube, and position the tube centrally along the length of the rod.



Apply a 50 Hz voltage between the electrodes and raise it from zero to 4 kV r.m.s. as quickly as possible consistent with avoiding transient over-voltages. Maintain this proof voltage for 1 minute before reducing the voltage to zero and switching off the test set.

Any tube failing to withstand this test shall be rejected.

	<div><div>BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL</div><div>QUALITY PLAN FOR – INSULATED ITEMS</div></div> <div><div>QUALITY PLAN NO. QA/MT/BOI/188</div><div>DATE:28/02/2024</div></div>
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ABBREVIATION:

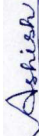

#	1. In case TCs of NABL Lab, results of TC shall be strictly as per scope/range of NABL accreditation. BHEL/TPIA witness shall be waived off in such case. TC/TR shall be cleared based on Record Review basis.
	2. In case of TCs of Labs other than accredited by NABL, traceability shall be verified by inspection agency for the equipment/ instrument used for conducting the test and shall be reported in the TCs. BHEL/TPIA shall witness the tests in such cases.
V	Visual,
M	Measurement
T	Testing
RT	Routine Test
TT	Type test (Validity in 2 years)

SL. NO	COMPONENT	CHARACTERISTICS	TYPE OF CHECK	QUANTAM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	INSPECTIO N AGENCY	REMARKS
1.0		Physical Properties, Mechanical properties, Electrical Properties as per specification	T	Sample	As per Specification/Drawing in PO	As per Specification/Drawing in PO	TC	BHEL/TPIA	. #
2.0		Dimensional & Visual check	M	Random Sample	Drawing	Drawing	TC	BHEL/TPIA	“Witness” as per Sampling Plan (enclosed)
6.0	PACKING AND MARKING:	Marking BHEL order No. Manufacturer's / Supplier's Name Batch/Lot No, Thickness, Width and Length. The items shall be suitably packed in wooden case lined with water proof paper from inside.	V	100%	As per Specification/Drawing in PO	As per Specification/Drawing in PO	----	----	
PREPARED BY:					APPROVED BY:				
 अशिश शर्मा / Ashish Sharma अधीक्षक (ग.स.) / Manager (G.A.) गुणवत्ता प्रबंधन विभाग / Quality Assurance Section भारत भारती, भोपाल / BHEL, BHOPAL					 व.के.सिंह / V.K. Singh अधीक्षक (ग.स.) / Manager (G.A.) गुणवत्ता प्रबंधन विभाग / Quality Assurance Section भारत भारती, भोपाल / BHEL, BHOPAL				

	<div><div><div>BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL</div><div>QUALITY PLAN FOR – INSULATED ITEMS</div></div><div><div>QUALITY PLAN NO. QA/MT/BOI/188</div><div>DATE:28/02/2024</div></div></div>
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SINGLE SAMPLING PLAN FOR NORMAL INSPECTION (AS PER IS -2500)

Lot or batch size (In nos.)	Inspection Level	Sample size
2 to 8	I	2
9 to 15	I	2
16 to 25	I	3
26 to 50	I	5
51 to 90	I	5
91 to 150	I	8
150 to 280	I	13
281-to 500	I	20
501 to 1200	I	32
1201 to 3200	I	50
3201 to 1000	I	80
1001 to 35000	I	125
35001 to 150000	I	200
150001 to 500000	I	315

<div>PREPARED BY:  <div>अशिश भारद्वाज तेलंगी अधीक्षक (QA) / मध्यम स्तर की गुणवत्ता नियंत्रण - भारती भारद्वाज तेलंगी अधीक्षक (QA) - भारती भारद्वाज तेलंगी, BHOPAL</div></div>	<div>APPROVED BY  <div>अशिश भारद्वाज तेलंगी / F.A. TOPPO अधीक्षक (QA) / मध्यम स्तर की गुणवत्ता नियंत्रण - भारती भारद्वाज तेलंगी अधीक्षक (QA) - भारती भारद्वाज तेलंगी, BHOPAL</div></div>
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