



**ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION**  
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 ERDA Road, Makarpura Industrial Estate, Vadodara-390 010, India.  
 EPABX : +91 (0265) 2642942, 2642964, 2642377, 3043128 / 29 / 30 / 31 / 33  
 Fax : +91 (0265) 2638382  
 E-mail : erda@erda.org  
 Web : http://www.erda.org



## TEST REPORT

**SHEET NO.: 1 OF 9**

<b>NAME &amp; ADDRESS OF CUSTOMER</b>  <b>M/s. Epoxy Terminal &amp; Equipment Pvt. Ltd.</b> Plot No : 6B, Phase -III APIIC, IDA, Pashamylaram, Medak, Telangana India 502 307	<b>REPORT NO.:</b> RP-1819-017991 <b>DATE</b> : 07/08/2018			
	<b>CUSTOMER REF. NO.:</b> NIL <b>DATED</b> : 08/06/2018			
	<b>DATE OF SAMPLE RECEIPT</b>	<b>DATE OF TESTING</b>		
	08/06/2018	02/07/2018 to 27/07/2018		
<b>SAMPLE DESCRIPTION</b>  <b>1.1 kV 1000 A L.T Transformer Bushing</b> Rated Voltage : 1.1 kV  Rated Current : 1000 A  Embossing : ETE	<b>SAMPLE IDENTIFICATION</b>  Serial No. : 05/17052018/A  Make : M/s. Epoxy Terminal & Equipment Pvt. Ltd.  Year of Mfg.: 2018  ERDA S.C. No.: ERDA-00261841			
<table border="0"> <tr> <td data-bbox="135 1108 837 1422"> <b>TEST DETAIL</b>            As per <b>SHEET NO.:</b> 2 OF 9             ENCLOSURES: DRG. No.: ETB 0021 REV 1             TEST WITNESSED BY: Mr. Ulpesh Parmar - M/s. Epoxy Terminal &amp; Equipment Pvt. Ltd.             REMARKS: As per <b>SHEET NO.:</b> 3 OF 9 to 8 OF 9         </td> <td data-bbox="837 1108 1500 1422"> <b>TEST SPECIFICATION</b>            As per customer requirement &amp; test procedure followed as per IS: 2099 - 1986         </td> </tr> </table>			<b>TEST DETAIL</b> As per <b>SHEET NO.:</b> 2 OF 9  ENCLOSURES: DRG. No.: ETB 0021 REV 1  TEST WITNESSED BY: Mr. Ulpesh Parmar - M/s. Epoxy Terminal & Equipment Pvt. Ltd.  REMARKS: As per <b>SHEET NO.:</b> 3 OF 9 to 8 OF 9	<b>TEST SPECIFICATION</b> As per customer requirement & test procedure followed as per IS: 2099 - 1986
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 <b>PREPARED BY</b>	 <b>CHECKED BY</b>	 <b>A.S. Khopkar</b> <b>APPROVED BY</b>		
<p><b>Note :</b> 1. This report relates only to the particular sample received in good condition for testing at ERDA.          2. This report cannot be reproduced in part under any circumstances.          3. Publication of this report requires prior permission in writing from Director, ERDA.          4. Only the tests asked for by the customer have been carried out.          5. In case of any dispute, Vadodara will be the exclusive jurisdiction &amp; shall be construed as where the cause has arisen.</p> <p><b>Caution:</b> ERDA is not responsible for the authenticity of photocopied or reproduced test reports.          ERDA provides support to customers for verification of the authenticity of test reports issued by ERDA.</p>				

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**REPORT NO.:** RP-1819-017991

**SHEET NO.:** 2 OF 9

**DATE** : 07/08/2018

### TEST DETAIL :

#### **1 Routine Test before type test.**

- 1.1 Dry power-frequency withstand voltage test
- 1.2 Measurement of partial discharge quantity

#### **2 Type test**

- 2.1 Wet Power Frequency Voltage withstand test
- 2.2 Dry lightning impulse voltage withstand test
- 2.3 Cantilever load Withstand Test

#### **3 Routine Test after type test**

- 3.1 Dry power-frequency withstand voltage test
- 3.2 Measurement of partial discharge quantity



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

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<b>REPORT NO.:</b> RP-1819-017991		<b>SHEET NO.:</b> 3 OF 9		
<b>DATE</b> : 07/08/2018				
<b>Routine Test before type test</b>				
<b>Sr. No.</b>	<b>Test Conducted (Cl.No. &amp; IS)</b>	<b>Test Requirement</b>	<b>Obtained Results</b>	<b>Remark</b>
<b>Atmospheric condition:</b>		Dry bulb Temperature : 28.0 °C Wet bulb Temperature : 24.0 °C Atmospheric Pressure : 741.2 mm of Hg		
1.1	<b>Dry power frequency withstand voltage test</b> (As per customer requirement & test procedure followed as per cl. no. 11.13 of IS: 2099 - 1986)	The power frequency voltage of 5 kVrms shall be applied between the H.V. terminal of bushing & earth.  The test duration shall be 60s.  No flashover or puncture shall be occurred during the test.	The power frequency voltage of 5 kVrms was applied between the H.V. terminal of bushing & earth.  The test duration was 60s.  No flashover or puncture was occurred during the test.	Conforms
1.2	<b>Measurement of partial discharge quantity</b> (As per customer requirement & test procedure followed as per cl. no. 11.14 of IS: 2099 - 1986) Measurement of partial discharge quantity shall be carried out - At $1.5U_m/\sqrt{3} = 0.6$ kV - At $1.05U_m/\sqrt{3} = 1.2$ kV	Max. 10 pC Max. 100 pC	01 pC 01 pC	Conforms Conforms
PREPARED BY 		CHECKED BY 		



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**REPORT NO.:** RP-1819-017991**SHEET NO.:** 4 OF 9**DATE** : 07/08/2018

**Atmospheric condition :**

Dry bulb Temperature : 28.0 °C

Wet bulb Temperature : 24.0 °C

Atmospheric Pressure : 741.2 mm of Hg

**2.1 Wet Power Frequency Voltage withstand test**

(As per customer requirement &amp; test procedure followed as per cl. no. 11.3 of IS: 2099 - 1986)

**Test requirement:**

The test Voltage of 5 kVrms corrected to reference atmospheric condition is applied between the H.V. terminals &amp; earth for one minute duration under artificial rainfall condition.

**REMARKS:** Conforms.**2.2 Dry lightning impulse voltage withstand test**

(As per customer requirement &amp; test procedure followed as per cl. no. 11.4 of IS: 2099 - 1986)

**Test Parameters:**

Rated Voltage : 1.1 kV

Test Voltage : 20 kVp  $\pm$  3%

No. of Shots to be applied: 15 +ve &amp; 15 -ve Polarity shots

**Test Observation:**Calibration Pulse : 12.494 kVp, Wave Shape: 1.261 / 47.901  $\mu$ s

No. of Shots applied : Calibration pulse, 15 +ve &amp; 15 -ve Polarity shots

No. of Shots recorded : Calibration pulse, First &amp; Last shot (for both polarity)

No. of Shot	Test Voltage Applied in kVp	
	Positive Polarity	Negative Polarity
1.	20.458	20.287
2.	20.191	20.517
3.	19.731	20.270
4.	20.276	19.914
5.	19.998	19.989
6.	20.393	19.623
7.	20.168	20.368
8.	20.005	20.273
9.	20.256	20.102
10.	19.913	19.631
11.	19.991	19.607
12.	19.651	20.150
13.	20.207	19.974
14.	19.884	19.965
15.	19.947	20.300

**REMARKS:** Conforms.**PREPARED BY****CHECKED BY**

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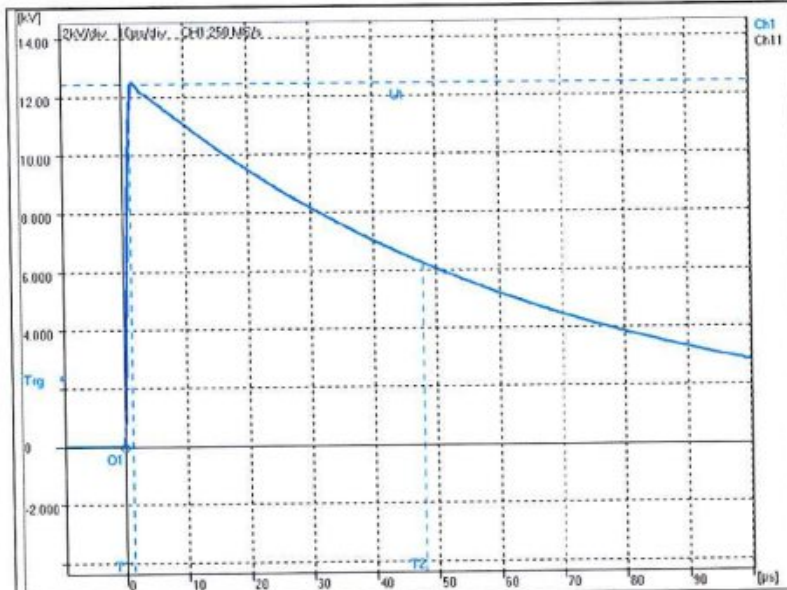
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**TEST REPORT NO. : RP-1819-017991**  
**DATE : 07/08/2018**

**SHEET NO.: 5 of 9**

**DRY LIGHTNING IMPULSE VOLTAGE WITHSTAND TEST**



**CALIBRATION PULSE**

$U_p = 12.49 \text{ kV}$   
 $T_1 = 1.26 \mu\text{s}$   
 $T_2 = 47.90 \mu\text{s}$   
 $T_c = \mu\text{s}$

Comment: LI RW

S. M.

**PREPARED BY**



*[Signature]*

**CHECKED BY**

**TC 2582278**





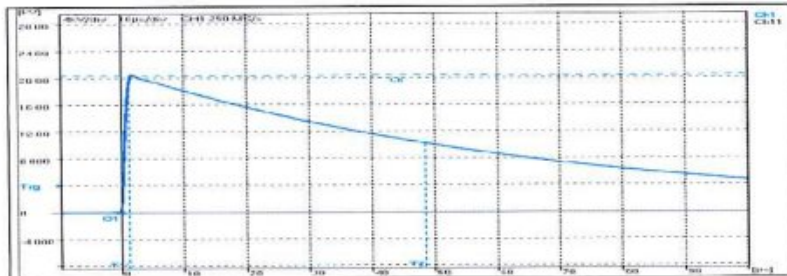
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**TEST REPORT NO. : RP-1819-017991**  
**DATE : 07/08/2018**

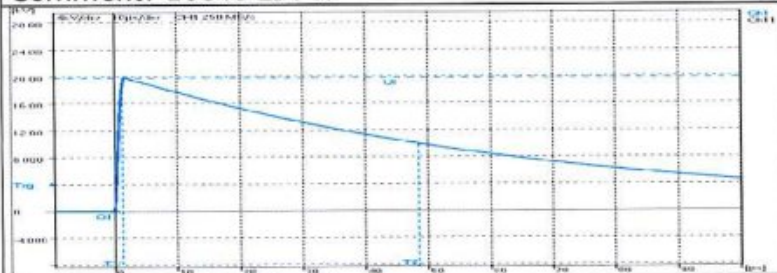
**SHEET NO.: 6 of 9**

**DRY LIGHTNING IMPULSE VOLTAGE WITHSTAND TEST**



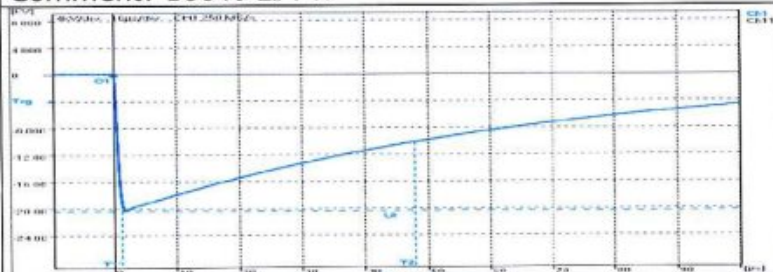
**FIRST SHOT**  
 $U_p = 20.46 \text{ kV}$   
 $T_1 = 1.25 \mu\text{s}$   
 $T_2 = 48.43 \mu\text{s}$   
 $T_c = \mu\text{s}$

Comment: 100% LI FW



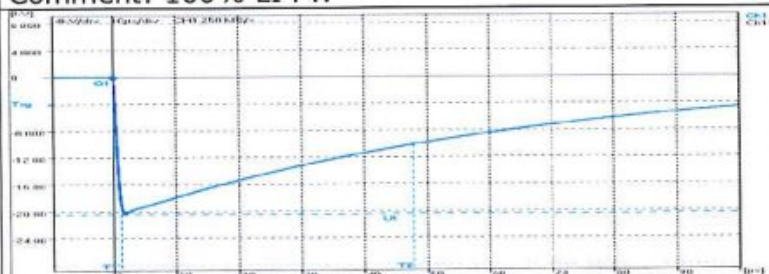
**LAST SHOT**  
 $U_p = 19.95 \text{ kV}$   
 $T_1 = 1.25 \mu\text{s}$   
 $T_2 = 48.40 \mu\text{s}$   
 $T_c = \mu\text{s}$

Comment: 100% LI FW



**FIRST SHOT**  
 $U_p = -20.29 \text{ kV}$   
 $T_1 = 1.25 \mu\text{s}$   
 $T_2 = 47.98 \mu\text{s}$   
 $T_c = \mu\text{s}$

Comment: 100% LI FW



**Fig.: 31**  
 $U_p = -20.30 \text{ kV}$   
 $T_1 = 1.25 \mu\text{s}$   
 $T_2 = 47.86 \mu\text{s}$   
 $T_c = \mu\text{s}$

Comment: 100% LI FW

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TEST REPORT NO: RP-1819-017991

SHEET No. 7 OF 9

DATE : 07/08/2018

Sr. No.	Particular of Tests & Cl. No.	Requirement as per Specification	Obtained Value/ Observation	Remarks
2.3	<b>Cantilever load withstand test</b> [Cl. No. 11.10 of IS 2099 & as per customer's requirement]  (The load of 1000 N* applied perpendicular to the axis of the bushing at the mid-point of the terminal for one minute) ERDA-00261841	The bushing shall be considered to have passed the test if there is no evidence of damage (deformation or rupture) and if it has withstood a repetition of routine tests without significant change from previous results.	No evidence of damage was observed in bushing and bushing withstood repetition of routine tests (Dry power frequency withstand voltage test and Measurement of partial discharge quantity) without any significant change from previous results.	Conforms

Note: "\*" As specified by customer.

*[Signature]*

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**REPORT NO.:** RP-1819-017991**SHEET NO.:** 8 OF 9**DATE** : 07/08/2018**Routine Test after type test**

Sr. No.	Test Conducted (Cl.No. & IS)	Test Requirement	Obtained Results	Remarks
<b>Atmospheric condition:</b>		Dry bulb Temperature : 29.0 °C Wet bulb Temperature : 25.0 °C Atmospheric Pressure : 743.2 mm of Hg		
3.1	<b>Dry power frequency withstand voltage test</b> (As per customer requirement & test procedure followed as per cl. no. 11.13 of IS: 2099 - 1986)	The power frequency voltage of 5 kVrms shall be applied between the H.V. terminal of bushing & earth.  The test duration shall be 60s.  No flashover or puncture shall be occurred during the test.	The power frequency voltage of 5 kVrms was applied between the H.V. terminal of bushing & earth.  The test duration was 60s.  No flashover or puncture was occurred during the test.	Conforms
3.2	<b>Measurement of partial discharge quantity</b> (As per customer requirement & test procedure followed as per cl. no. 11.14 of IS: 2099 - 1986) Measurement of partial discharge quantity shall be carried out - At $1.5U_m/\sqrt{3} = 0.6$ kV - At $1.05U_m/\sqrt{3} = 1.2$ kV	Max. 10 pC Max. 100 pC	01 pC 01 pC	Conforms Conforms
	<b>Change in measurement of partial discharge quantity</b> Change in partial discharge quantity - At $1.5U_m/\sqrt{3} = 0.6$ kV - At $1.05U_m/\sqrt{3} = 1.2$ kV	$\leq 05$ pC# $\leq 05$ pC#	0 pC 0 pC	Conforms Conforms

**Note:** "#" Requirement of change in measurement of partial discharge quantity was specified by customer.

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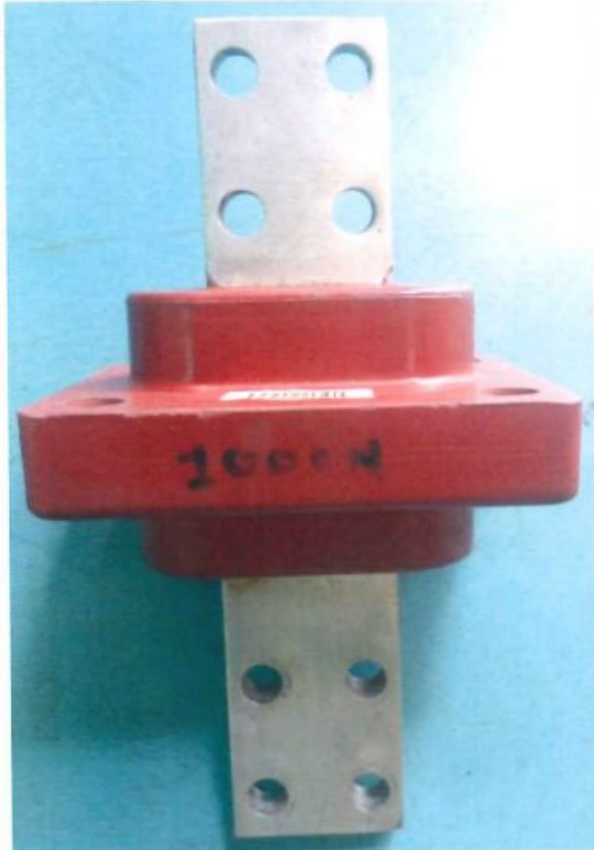
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**TEST REPORT NO. : RP-1819-017991**  
**DATE : 07/08/2018**

**SHEET NO.: 9 of 9**

### PHOTOGRAPH OF TEST SAMPLE



### PHOTOGRAPH OF NAME PLATE



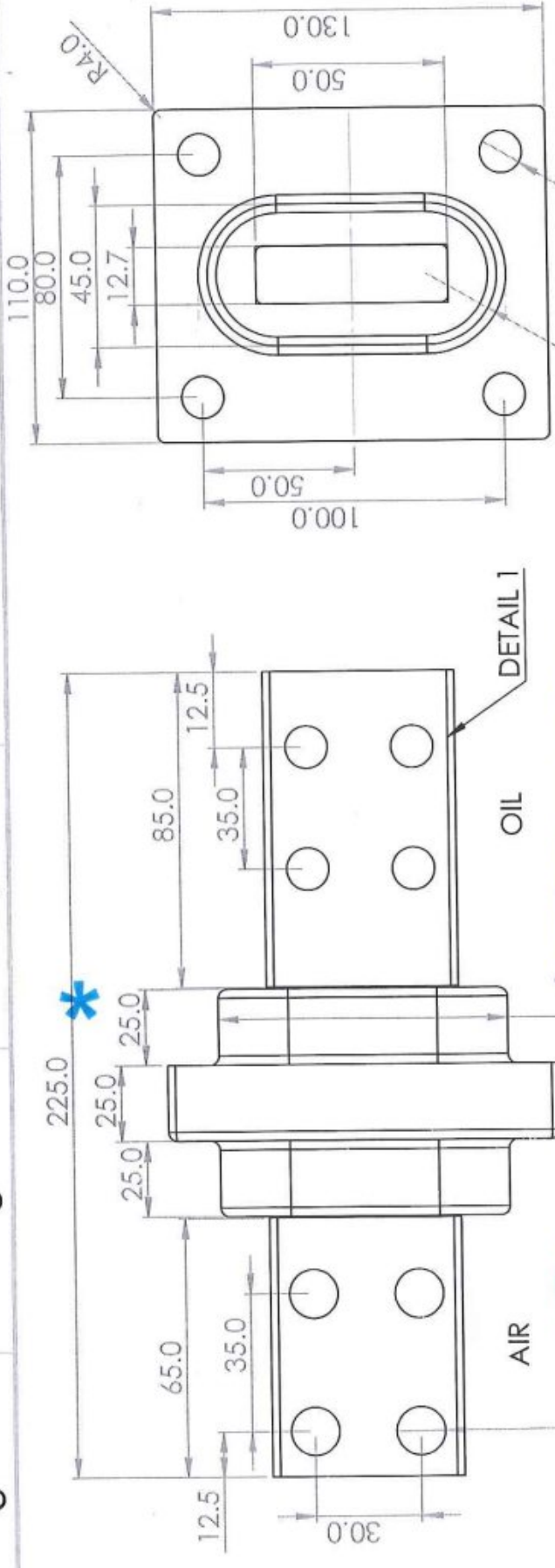
G.S.A.

**PREPARED BY**



**CHECKED BY**

**TC 2576038**



Test Report No. RP-1819-013991  
 Date: 07/08/2018  
 Product: 1.1KV, 1000A L.T. X-Mer Bushing  
 Verified By: S.M.  
 Verification of this drawing by ERDA is limited to relevant dimensional checks only. Verified dimensions are marked with \*

CONTROLLED COPY

S.NO	Description	value
1	RATED VOLTAGE	1.1 Kv
2	one min.DRY FREQUENCY WITH STAND VOLTAGE	5.0 Kv
3	CREEPAGE DISTANCE	-
4	MAX CURRENT	1000A
5	COPPER FLAT DIMENSION TOLERANCE	IS 613-2008
6	COPPER AND EPOXY DIMENSION TOLERANCE	IS 2102-1993
7	ELECTRICAL SPECIFICATION	IS 2099-1986
8	ELECTRO TIN PLATING	12-15 $\mu$
9	COLOUR CODE	RAL 2001
10	COPPER FLAT GRADE	CuETP HB CONFORMING to IS:191-2007

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
DETAIL 1	ETB 0021-1		1
<b>EPOXY TERMINAL AND EQUIPMENT PVT. LTD.</b> PLOT 68, PHASE III, IDA PASHAMAILARAM, PATANCHERU, SANGAREDDY, TELANGANA - 502 307.			
<b>EPOXY BUSHING ASSEMBLY (1.1KV, 1000A)</b>			
Date :	09/02/2018	TITLE:	
Drawn by:	PANKAJ		
Checked by:	RK		
Approved by:	RAGHU		
REV - 0	09/12/2013	DWG NO.	ETB 0021
NOTE: All Dimensions Are in mm			REV 1

- NOTE:
- 1) KNURLING /SHOT BLASTING /ANY SUITABLE SURFACE TREATMENT TO ENSURE LEAK PROOF JOINT BETWEEN COPPER FLAT AND EPOXY.
  - 2)EPOXY CAST ASSEMBLY SHOULD NOT LEAK AT 90°C In transformer oil to IS:335-1983 AT 1 KG /SQ.MM.
  - 3)GLASS TRANSITION TEMPERATURE SHELL BE 105-120°C.
  - 4) PRODUCT MUST BE FREE FROM SURFACE DEFECT.