



# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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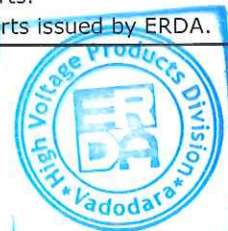


## TEST REPORT

SHEET No. 1 of 14

<b>NAME &amp; ADDRESS OF CUSTOMER</b> Rajasthan Powergen Transformer Pvt. Ltd. Bhinmal Karola Road, Sanchore - 343041 RJ	<b>REPORT NO.:</b> RP-1718-050437	
	<b>DATE</b> : 10 Jan 2018	
	<b>CUSTOMER REF NO.</b>	<b>DATE</b>
	NP/ERDA/TT/41/2017-18	29 Nov 2017
	<b>DATE OF SAMPLE RECEIPT</b>	<b>DATE OF TESTING</b>
	30 Nov 2017	06 Dec 2017 to 25 Dec 2017
<b>SAMPLE DESCRIPTION</b> <b>DISTRIBUTION TRANSFORMER</b> Make: RAJASTHAN POWERGEN TRANSFORMER PVT. LTD. Rating: 100 kVA 11000 / 433 Volts 5.25 / 133.34 Amp. Vector Group: Dyn11 Energy efficiency level: 3 Further details as per sheet No. 2.	<b>SAMPLE IDENTIFICATION</b> ERDA sample code number: ERDA-00229058 Manufacturer serial number: RPTPL/100KVA/2017-18/001 Year of manufacture: 2017 Enclosed drawing numbers: 1) RPTPL/100KVA/003 2) RPTPL/100KVA/002 3) RPTPL/17-18/100KVA/004 REV. 00 Sheet No. 01	
<b>TEST DETAILS</b> As per sheet 3.	<b>TEST SPECIFICATION</b> As per sheet 3.	
<b>TEST RESULTS:</b> As per sheets from 4 to 12		
<b>ENCLOSURE:</b> Photographs of test sample - As per sheets from 13 to 14		
<b>REMARKS:</b> 1) The transformer <b>conforms</b> to the guaranteed requirement as per above mentioned test specification for above mentioned test nos. 3, 4, 5, 6, 9, 10, 11, 12, 13. 2) Criteria limit has not been specified for test nos. 1, 2, 7, 8, 14.		
<b>PREPARED BY</b> 	<b>CHECKED BY</b> 	<b>APPROVED BY</b>  <b>(Kapil J. Sharma)</b>
<b>NOTE:</b> 1. This report relates only to the particular sample received for testing in good condition at ERDA, Vadodara. 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 & shall be construed as where the cause has arisen.		
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SHEET No. 2 of 4

REPORT NO.: RP-1718-050437

Date: 10 Jan 2018

### TECHNICAL SPECIFICATIONS OF TEST OBJECT ASSIGNED BY CUSTOMER

1	Name of manufacturer	RAJASTHAN POWERGEN TRANSFORMER PVT. LTD.
2	Serial No.	RPTPL/100KVA/2017-18/001
3	kVA rating	100
4	Rated voltage H.V. (Volts)	11000
5	Rated voltage L.V. (Volts)	433
6	Rated current H.V. (Amp.)	5.25
7	Rated current L.V. (Amp.)	133.34
8	Number of phases	3
9	Energy efficiency level	3
10	Vector group	Dyn11
11	Winding material	Aluminium
12	Type of cooling	ONAN
13	Frequency (Hz.)	50
14	Guaranteed percentage impedance(%)	4.5
15	Total losses at 50% load (Watts)	435
16	Total losses at 100% load (Watts)	1500
17	Guaranteed temperature rise of oil/winding	35°C /40°C
18	Year of manufacture	2017
19	Standard No.	IS: 1180 PART 1-2014 WITH AMENDMENT NO. 1 & 2, CBIP manual, IS 2026

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SHEET No. 3

REPORT NO.: RP-1718-050437

Date: 10 Jan 2018

Sr. No.	TEST DETAILS	TEST SPECIFICATION
1	Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load	As per cl.no.21.2.c of IS: 1180 PART 1-2014
2	Measurement of no-load loss and current	As per cl.no.21.2.d of IS: 1180 PART 1-2014
3	Total losses at 50% load	As per cl.no. 6.8 of IS: 1180 PART 1-2014
4	Total losses at 100% load	As per cl.no. 6.8 of IS: 1180 PART 1-2014
5	No load current at 112.5 percent voltage:	As per cl.no.21.4.c of IS: 1180 PART 1-2014
6	Magnetic balance test	As per CBIP manual; Publication no.317 - 2013
7	Measurement of zero-sequence impedance (s) on three-phase transformers	As per customer`s requirement testing procedure followed as per cl.no.10.7. of IS: 2026 PART 1-2011
8	Measurement of unbalance current	As per customer`s requirement
9	Temperature-rise test	As per cl.no.21.3.b of IS: 1180 PART 1-2014
10	Oil leakage test	As per cl.no.21.2.j of IS: 1180 PART 1-2014
11	Pressure test (routine test)	As per cl.no.21.2.h of IS: 1180 PART 1-2014
12	Pressure test (type test)	As per cl.no.21.3.d of IS: 1180 PART 1-2014
13	Permissible flux density and over fluxing	As per cl.no. 6.9 of IS: 1180 PART 1-2014
14	Measurement of the Harmonics of the No-load current	As per customer`s requirement testing procedure followed as per cl.no.10.6. of IS: 2026 (PART 1)-2011
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SHEET No. 4

REPORT NO.: RP-1718-050437		Date: 10 Jan 2018		
Sr. No.	Particular of Tests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks
1	<p><b>Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load</b> (As per cl.no.21.2.c of IS: 1180 PART 1-2014)</p> <p><b>At 50% load:</b> Tested with <b>2.6275</b> Amps (on HV side) Frequency: <b>50.008</b> Hz Average oil temperature: <b>19.6°C</b></p> <p style="text-align: right;"><b>Test current</b> (Amps) 2.6275 <b>Impedance voltage</b> (Volts) 255.349 <b>Measured load loss</b> (Watts) 179.7 <b>Impedance voltage</b> (%) (Computed to 50% load) At 19.6°C 2.318 At 75°C -- 2.321 <b>Load loss</b> (Watts) (Computed to 50% load) At 19.6°C 179.222 At 75°C -- 213.407</p> <p><b>At 100% load:</b> Tested with <b>5.2547</b> Amps (on HV side) Frequency: <b>49.982</b> Hz Average oil temperature: <b>19.6°C</b></p> <p style="text-align: right;"><b>Test current</b> (Amps) 5.2547 <b>Impedance voltage</b> (Volts) 511.113 <b>Measured load loss</b> (Watts) 719.6 <b>Impedance voltage</b> (%) (Computed to 100% load) At 19.6°C 4.642 At 75°C 4.667 <b>Load loss</b> (Watts) (Computed to 100% load) At 19.6°C 718.313</p>	4.5 (IS Tol.)		---

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REPORT NO.: RP-1718-050437		Date: 10 Jan 2018		
Sr. No.	Particular of Tests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks
	At 75°C	--	854.897	---
2	<b>Measurement of no-load loss and current</b> (As per cl.no.21.2.d of IS: 1180 PART 1-2014)  Tested with mean value of voltage <b>434.074</b> volts (On LV side) Frequency : <b>50.055</b> Hz  <b>RMS Voltage</b> (Volts) <b>No-load current</b> (Amps) <b>Measured no-load loss</b> (Watts) <b>Corrected no-load loss</b> (Watts)		434.974 0.507 204.28 203.856	---
3	<b>Total losses at 50% load</b> (As per cl.no. 6.8 of IS: 1180 PART 1-2014)	Max. 435	417.263	Conforms
4	<b>Total losses at 100% load</b> (As per cl.no. 6.8 of IS: 1180 PART 1-2014)	Max. 1500	1058.753	Conforms
5	<b>No load current at 112.5 percent voltage:</b> (As per cl.no.21.4.c of IS: 1180 PART 1-2014)  Test voltage of 112.5 percent of rated voltage at rated frequency was applied to the L.V. winding terminals and H.V. winding terminals were kept open circuited. No load current was recorded. <b>Test voltage</b> (Volts) <b>No load current</b> (Amps) <b>No Load Current (%)</b>	Max. 6.0	487.818 1.0655 0.799	Conforms
6	<b>Magnetic balance test</b> (As per CBIP manual; Publication no.317 -2013)			Conforms

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REPORT NO.: RP-1718-050437

Date: 10 Jan 2018

Sr. No.	Particular of Tests & Cl.No.			Requirement as per Specification	Obtained Value	Remarks
	<b>Voltage Applied Between</b>	<b>Applied Voltage (Volts)</b>	<b>Measured Voltage Between</b>			
	2u & 2n	100.3	2v & 2n	50 to 90 %	71.4 V	
			2w & 2n		31.8 V	
	2v & 2n	100.2	2u & 2n	30 to 70 %	50.1 V	
			2w & 2n	30 to 70 %	50 V	
	2w & 2n	100.2	2u & 2n		32.2 V	
			2v & 2n	50 to 90 %	70.6 V	
7	<b>Measurement of zero-sequence impedance(s) on three-phase transformers</b> (As per customer`s requirement testing procedure followed as per cl.no.10.7. of IS: 2026 PART 1-2011) The 2u, 2v and 2w terminals of LV winding shorted together. A test current (i.e. 1/3rd of rated current) was circulated between shorted terminals and 2n and measured a voltage across them. The obtained values are tabulated as below: <div style="text-align: center;"> <b>Test current (Amps)</b>  <b>Measured Voltage (Volts)</b>  <b>Z ps = 3V/I (Ω/Phase)</b>  <b>(3V * kVA)</b>  <b>Z ps = ----- (%)</b>  <b>(I * 10 (kV)2)</b> </div>				44.4 1.1924 0.081 4.297	---
8	<b>Measurement of unbalance current</b> (As per customer`s requirement)					---

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Date: 10 Jan 2018

REPORT NO.: RP-1718-050437

Sr. No.	Particular of Tests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks
	All the three terminals of the secondary (LV) winding shorted together, except neutral terminal. Current measuring terminal of ammeter was connected between short circuited secondary (LV) windings and neutral terminal for measurement of unbalance current. 3-phase voltage was applied to the primary (HV) winding for circulating rated current in both the windings and measured unbalance current. a) Rated secondary (LV) winding current (Amps): b) Measured unbalance current (Amps): c) Measured unbalance current (%):	--	133.34  <0.1 <0.075	
9	<b>Temperature-rise test</b> (As per cl.no.21.3.b of IS: 1180 PART 1-2014)  Before starting test, the dimensions of tank with radiators were measured & recorded.  Size of tank: L-1040 mm, W-395 mm, H1-835 mm, H2-815 mm Size of fins: L-500 mm, W-226 mm, No. of radiators-2, No. of fins per radiator-3  <b>Losses fed for temperature-rise test were 1058.753 Watts</b> (Measured no-load loss: 203.856 W and load loss at 75°C: 854.897 W)			<b>Conforms</b>

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Date: 10 Jan 2018

REPORT NO.: RP-1718-050437

Sr. No.	Particular of Tests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks
	<p>Total measured losses were fed to the transformer (i.e. supply was connected to HV winding and LV winding kept short circuited) till steady state temperature rise was attained. Top oil temperature was recorded hourly. After steady state condition, the losses were brought down in reference to the rated current one hour prior to shut down.</p> <p>At the shut down, the hot winding resistances were measured and temperature rise calculated.</p> <p>A) Top oil temperature-rise B) Winding temperature-rise (Resistance method)     1) HV winding     2) LV winding C) Ambient temperature at shutdown D) Time of shutdown (Hrs)</p>	<p>Max. 35°C</p> <p>Max. 40°C Max. 40°C</p>	<p>23.7°C</p> <p>29.6°C 31.2°C 21.3°C 09:30</p>	
10	<p><b>Oil leakage test</b> (As per cl.no.21.2.j of IS: 1180 PART 1-2014)</p> <p>The assembled transformer with all fittings including bushings in position was tested at a pressure at the top equivalent to the head that was available at the base of the tank for 8 hours.</p>	There should be no leakage at any point	No leakage observed	Conforms
11	<p><b>Pressure test (routine test)</b> (As per cl.no.21.2.h of IS: 1180 PART 1-2014)</p> <p>The transformer tank was tested at an air pressure of 35 kPa above atmosphere pressure maintained inside the tank for 10 min.</p>	There should be no leakage at any point	No leakage observed	Conforms

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REPORT NO.: RP-1718-050437		Date: 10 Jan 2018																																										
Sr. No.	Particular of Tests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks																																								
12	<p><b>Pressure test (type test)</b> (As per cl.no.21.3.d of IS: 1180 PART 1-2014)</p> <p>The transformer tank was subjected to air pressure of 80 kPa for 30 minutes. The permanent deflection of flat plates was recorded, after pressure had been released.</p> <table border="1"> <thead> <tr> <th>Deflection measured at</th> <th>Length of plate (mm)</th> <th>Requirement</th> <th>Obtained Value</th> </tr> </thead> <tbody> <tr> <td>HV side</td> <td>1040</td> <td>Max. 6.5 mm</td> <td>1.5 mm</td> </tr> <tr> <td>LV side</td> <td>1040</td> <td>Max. 6.5 mm</td> <td>1.2 mm</td> </tr> <tr> <td>Side A</td> <td>395</td> <td>Max. 5.0 mm</td> <td>0.0 mm</td> </tr> <tr> <td>Side B</td> <td>395</td> <td>Max. 5.0 mm</td> <td>0.0 mm</td> </tr> </tbody> </table> <p>The transformer tank was subjected to vacuum of 250 mm of Mercury for 30 minutes. The permanent deflections of flat plates was recorded, after vacuum had been released.</p> <table border="1"> <thead> <tr> <th>Deflection measured at</th> <th>Length of plate (mm)</th> <th>Requirement</th> <th>Obtained Value</th> </tr> </thead> <tbody> <tr> <td>HV side</td> <td>1040</td> <td>Max. 6.5 mm</td> <td>1.2 mm</td> </tr> <tr> <td>LV side</td> <td>1040</td> <td>Max. 6.5 mm</td> <td>1.1 mm</td> </tr> <tr> <td>Side A</td> <td>395</td> <td>Max. 5.0 mm</td> <td>0.0 mm</td> </tr> <tr> <td>Side B</td> <td>395</td> <td>Max. 5.0 mm</td> <td>0.0 mm</td> </tr> </tbody> </table> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">HV Side</p> <p style="display: flex; justify-content: space-between;"> <span>Side A</span> <span>Side B</span> </p> <p style="text-align: center;">LV Side</p> </div>	Deflection measured at	Length of plate (mm)	Requirement	Obtained Value	HV side	1040	Max. 6.5 mm	1.5 mm	LV side	1040	Max. 6.5 mm	1.2 mm	Side A	395	Max. 5.0 mm	0.0 mm	Side B	395	Max. 5.0 mm	0.0 mm	Deflection measured at	Length of plate (mm)	Requirement	Obtained Value	HV side	1040	Max. 6.5 mm	1.2 mm	LV side	1040	Max. 6.5 mm	1.1 mm	Side A	395	Max. 5.0 mm	0.0 mm	Side B	395	Max. 5.0 mm	0.0 mm			<p>Conforms</p> <p>There should be no leakage at any point</p> <p>No leakage observed</p>
Deflection measured at	Length of plate (mm)	Requirement	Obtained Value																																									
HV side	1040	Max. 6.5 mm	1.5 mm																																									
LV side	1040	Max. 6.5 mm	1.2 mm																																									
Side A	395	Max. 5.0 mm	0.0 mm																																									
Side B	395	Max. 5.0 mm	0.0 mm																																									
Deflection measured at	Length of plate (mm)	Requirement	Obtained Value																																									
HV side	1040	Max. 6.5 mm	1.2 mm																																									
LV side	1040	Max. 6.5 mm	1.1 mm																																									
Side A	395	Max. 5.0 mm	0.0 mm																																									
Side B	395	Max. 5.0 mm	0.0 mm																																									
13	<p><b>Permissible flux density and over fluxing</b> (As per cl.no. 6.9 of IS: 1180 PART 1-2014)</p>			Conforms																																								

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Sr. No.	Particular of Tests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks									
	<p><b>(a) Overfluxing test:</b>            Test voltage at rated frequency was applied to the L.V. winding terminals and H.V. winding terminals were kept open circuited and exciting current was recorded at 100% and 112.5% of rated voltage.            Rated full load current of L.V. winding = 133.34 Amps</p> <table border="1"> <thead> <tr> <th>% of rated voltage</th> <th>Test voltage (Volts)</th> <th>No load current (Amps)</th> </tr> </thead> <tbody> <tr> <td>100%</td> <td>434.974</td> <td>0.5070</td> </tr> <tr> <td>112.5%</td> <td>487.818</td> <td>1.0655</td> </tr> </tbody> </table>	% of rated voltage	Test voltage (Volts)	No load current (Amps)	100%	434.974	0.5070	112.5%	487.818	1.0655			
% of rated voltage	Test voltage (Volts)	No load current (Amps)											
100%	434.974	0.5070											
112.5%	487.818	1.0655											
	<p><b>(b) Permissible flux density:</b>            Transformer was opened for the measurement of total area of the core. The core was dismantled and various dimensions of width and thickness were measured to calculate the total area of the core. Number of turns of L.V. winding were counted.            Total measured area of the core: <b>12862.90 mm<sup>2</sup></b>            Stacking factor: <b>0.97</b> (As specified by customer)            Total no. of turns of L.V winding: <b>63</b> per phase            Rated voltage of L.V winding: <b>250 V</b> per phase            Rated frequency: <b>50 Hz</b>            Flux density is calculated with +12.5 percent combined voltage and frequency variation from rated voltage and frequency.            Flux density = <math>\frac{4.44 \times \text{Freq. (Hz)} \times \text{Turns} \times \text{Area of Core}}{112.5 \text{ \% of voltage/phase}}</math></p>	1.9 Tesla	1.61 Tesla										

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*TS*

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SHEET No. 11 of 14

REPORT NO.: RP-1718-050437		Date: 10-Jan-2018		
Sr. No.	Particulars of test and clause no.	Requirement as per specification.	Obtained value	Remarks
14	<b>Measurement of the Harmonics of the No-load current</b> (As per customer's request testing procedure followed as per cl. no. 10.6 of IS 2026 (Part 1):2011)	The harmonics of the no-load current in the three phases shall be measured and magnitude of the harmonics shall be expressed as a percentage of the fundamental component.	Refer table 1 for individual current harmonics components & individual voltage harmonics components measured at LV side at rated voltage i.e. 433 V  Current THD: R-ph: 22.75% Y-ph: 25.14% B-ph: 19.28% Voltage THD: R-ph: 1.27% Y-ph: 1.28% B-ph: 1.28%	---
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REPORT NO.: RP-1718-050437

Date: 10-Jan-2018

**TABLE-1** : Harmonics in voltage and current (as a percentage of fundamental)

Harmonic order	Current I <sub>R</sub> in %	Current I <sub>R</sub> in Amps	Voltage V <sub>RY</sub> in %	Current I <sub>Y</sub> in %	Current I <sub>Y</sub> in Amps	Voltage V <sub>YB</sub> in %	Current I <sub>B</sub> in %	Current I <sub>B</sub> in Amps	Voltage V <sub>BR</sub> in %
1	100.00	0.57	100.00	100.00	0.39	100.00	100.00	0.53	100.00
2	1.56	0.01	0.02	2.14	0.01	0.03	1.57	0.01	0.02
3	12.06	0.07	0.06	18.03	0.07	0.17	8.74	0.05	0.28
4	0.68	0.00	0.02	0.83	0.00	0.02	0.81	0.00	0.02
5	19.05	0.11	1.17	17.28	0.07	1.01	16.58	0.09	1.16
6	0.02	0.00	0.02	0.31	0.00	0.02	0.25	0.00	0.03
7	2.18	0.01	0.06	0.67	0.00	0.11	3.98	0.02	0.05
8	0.14	0.00	0.00	0.03	0.00	0.02	0.13	0.00	0.02
9	0.37	0.00	0.20	1.29	0.01	0.32	0.55	0.00	0.17
10	0.07	0.00	0.01	0.10	0.00	0.01	0.08	0.00	0.01
11	1.12	0.01	0.13	0.93	0.00	0.50	0.91	0.00	0.24
12	0.04	0.00	0.01	0.08	0.00	0.02	0.08	0.00	0.00
13	0.25	0.00	0.36	0.52	0.00	0.45	0.47	0.00	0.23
14	0.02	0.00	0.01	0.05	0.00	0.01	0.04	0.00	0.02
15	0.07	0.00	0.14	0.10	0.00	0.05	0.15	0.00	0.14
16	0.02	0.00	0.02	0.03	0.00	0.01	0.02	0.00	0.02
17	0.07	0.00	0.05	0.13	0.00	0.06	0.08	0.00	0.09
18	0.02	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.01
19	0.18	0.00	0.04	0.13	0.00	0.07	0.21	0.00	0.14
20	0.02	0.00	0.00	0.03	0.00	0.01	0.02	0.00	0.01
21	0.02	0.00	0.04	0.10	0.00	0.01	0.09	0.00	0.06
22	0.02	0.00	0.01	0.03	0.00	0.01	0.00	0.00	0.01
23	0.07	0.00	0.03	0.08	0.00	0.02	0.06	0.00	0.02
24	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01
25	0.04	0.00	0.03	0.08	0.00	0.02	0.02	0.00	0.04
THD %	22.75		1.27	25.14		1.28	19.28		1.28
Parameter measured	0.58 A		432.41 V	0.40 A		436.45 V	0.54 A		435.98 V

Prepared by

Checked by

TC 2417934





Certificate No. : TC-5389

# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

(Accredited by the National Accreditation Board for Testing and Calibration Laboratories, Govt. of India)

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

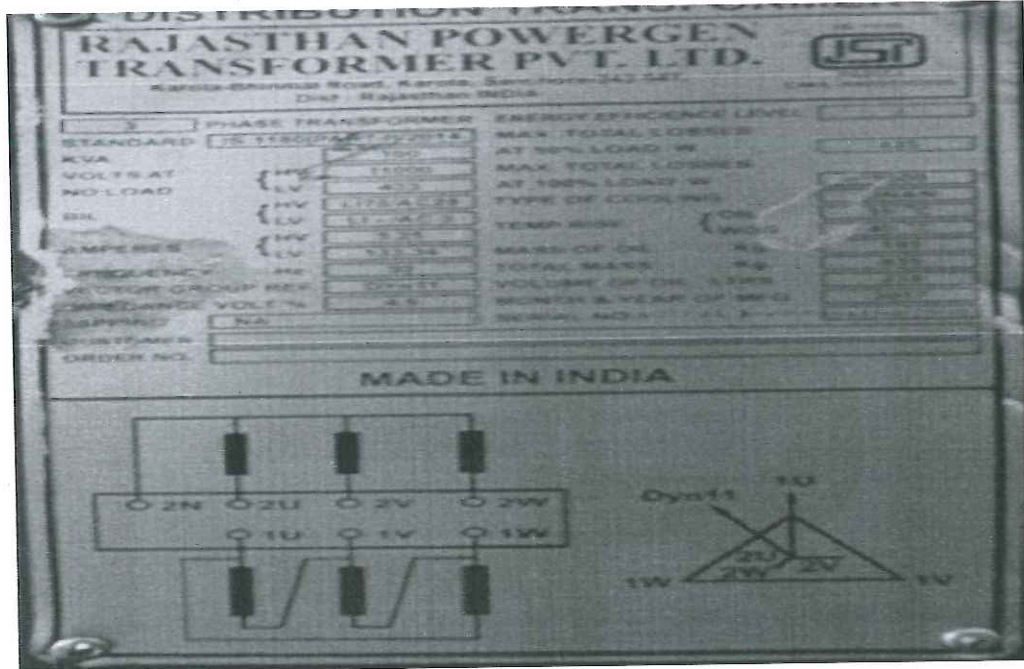


SHEET No. 13 of 14

REPORT NO.: RP-1718-050437

Date: 10 Jan 2018

## PHOTOGRAPHS OF TEST SAMPLE



*TG*

PREPARED BY

*[Signature]*

CHECKED BY

TC 2417937





Certificate No. : TC-5389

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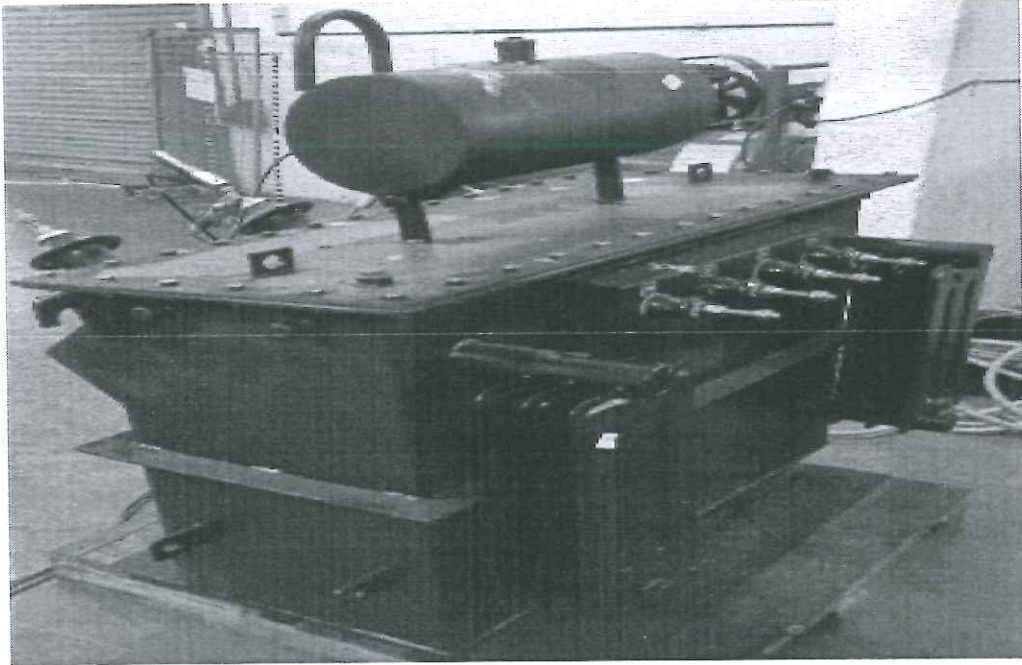


SHEET No. 14 of

REPORT NO.: RP-1718-050437

Date: 10 Jan 2018

## PHOTOGRAPHS OF TEST SAMPLE



*TS*

PREPARED BY

*Qud*

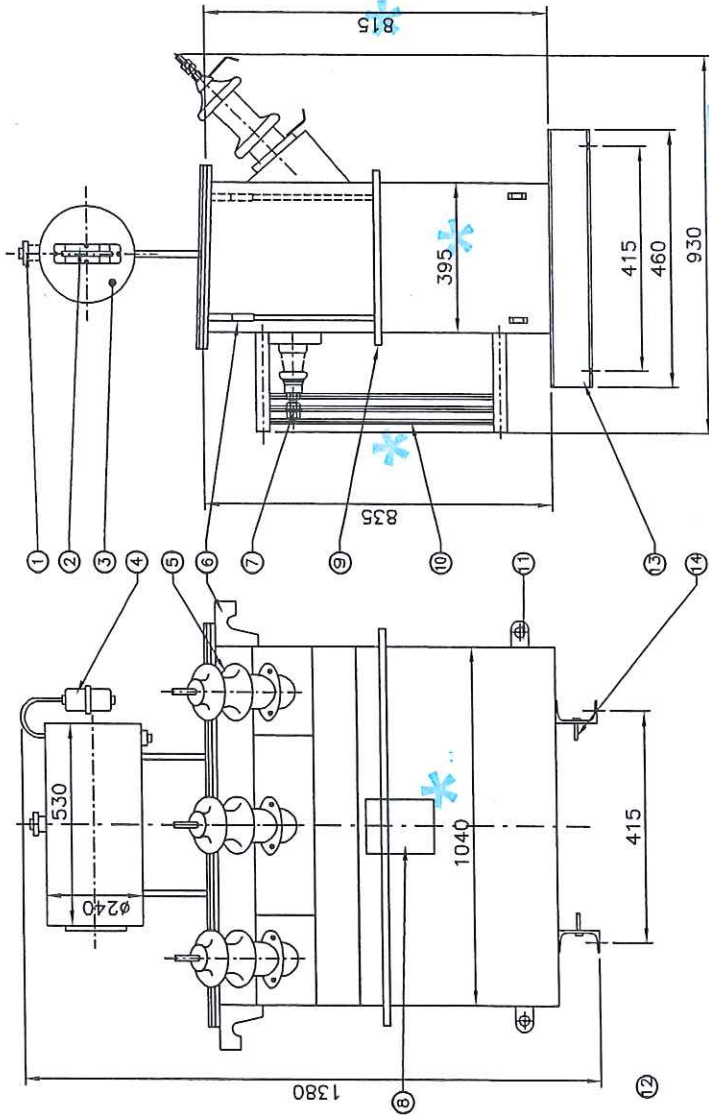
CHECKED BY



TC 2417936



Test Report No. RT-17786-050137  
 Date: 10.15.01/2018  
 Product: 100kVA / 4 mcb  
 Prepared By: J.E.  
 Verification of this drawing by ERDA is limited to relevant dimensions and shall not be a certified dimension or that the manufacturer.



WEIGHT CHART	
1. CORE & WINDING	475 Kgs.
2. TANK & FITTING	165 Kgs.
3. WEIGHT OF OIL	195 Kgs.
4. TOTAL WEIGHT	835 Kgs.
5. VOLUME OF OIL	238 Ltrs.

MIN ELECTRICAL CLEARANCE IN AIR		SHEET THICKNESS	
PH. TO PH.	PH. TO EARTH	SIDE	3.15mm
HV 255	HV 140	TOP	5.0mm
LV 75	LV 40	BOTTOM	5.0mm

NOTES:-  
 1. ALL DIMENSIONS ARE IN mm.  
 2. TOLERANCES ON OVERALL DIMENSION & WEIGHT ARE  $\pm 10\%$

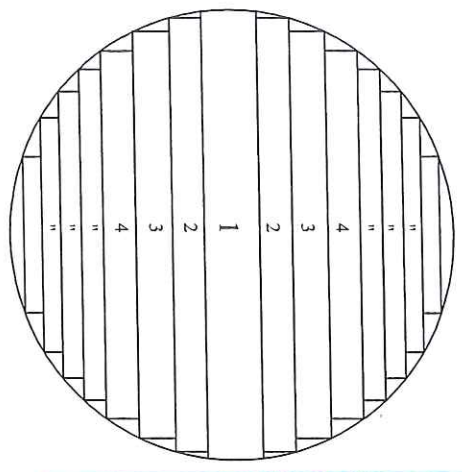
16. TANK COVER LIFTING LUGS	2
15. AIR RELEASE PLUG	1
14. EARTHING TERMINALS	2
13. UNDER BASE CHANNELS (75mm x 40 mm)	2
12. THERMOMETER POCKET	1
11. PULLING LUGS 8 mm THICK	4
10. RADIATOR (500 C/C x 226 ) 3 FINS	2
9. STIFFNER	1
8. NAME RATING & DIAGRAM PLATE	1
7. L.V. BUSHING	4
6. TRANSFORMER LIFTING LUGS 8 mm THICK	2
5. H.V. BUSHING	3
4. SILICAGEL BREATHER 500 grm.	1
3. OIL CONSERVATOR WITH DRAIN PLUG	1
2. PLAIN OIL LEVEL INDICATORS PLAIN	1
1. OIL FILLING HOLE WITH CAP	1
S.No. DESCRIPTIONS	QTY.

RAJASTHAN POWERGEN TRANSFORMER PVT. LTD  
 KAROLA BHINMAL ROAD, KAROLA, SANCHORE  
 RAJASTHAN - 343041

Title:- OUTLINE GENERAL ARRANGEMENT DRAWING OF 100KVA/11/0.433KV ENERGY EFFICIENCY LEVEL-3 TRANSFORMER

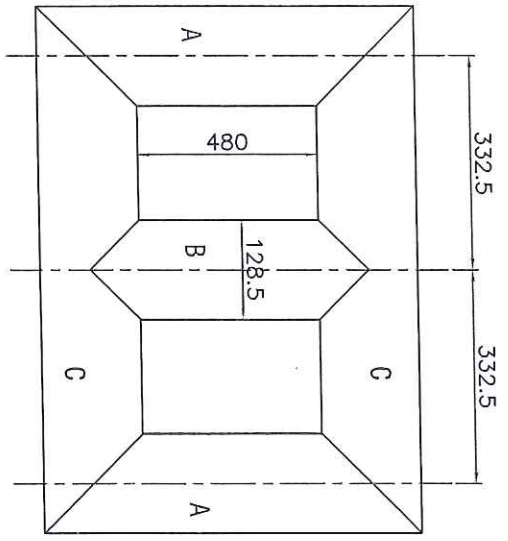
CUSTOMER	---
T.S. No.	RPTPL/17-18/100KVA/001
SCALE	N T S
DWG. No.	RPTPL/100KVA/002





Test Report No.: RP-1718-050437  
 Date: 10/Jan/2018  
 Product: 100kVA, 2wires  
 Verified by: [Signature]  
 Verification of this drawing by ERDA is limited to relevant dimensional checks only. Verified dimensions are marked with 'A'.

STEP REF.	WIDTH (mm)	STEP THICKNESS (mm)	GROSS SECTION AREA (mm <sup>2</sup> )
1	125	29.70	3712.50
2	120	16.10	1932.00
3	115	11.30	1299.00
4	110	9.10	1001.00
5	100	14.20	1420.00
6	90	11.00	990.00
7	80	8.80	704.00
8	70	7.20	504.00
9	60	5.80	348.00
10	50	4.70	235.00
11	40	3.70	148.00
TOTAL GROSS SECTION AREA (in mm <sup>2</sup> )			12294.00
SAFETY FACTOR			0.97
NET GROSS SECTION AREA (in mm <sup>2</sup> )			11925.18



SAY NET AREA (A x 0.97) = 11925.18

$E = 4.44 \times f \times B_{max} \times A \times N \times 0.97 \times 10^{-6}$

$B_{max} = \frac{E \times 10^6}{4.44 \times f \times A \times N \times 0.97}$

$= \frac{250 \times 10^6}{4.44 \times 50 \times 63 \times 31616.18} \text{ TESLA}$

$= 1.499 \text{ TESLA}$



Rev	Date	Draw	Checked	Approved	Description
00	17.04.2017				ORIGINAL ISSUE

**RAJASTHAN POWERGEN TRANSFORMER P. LTD.**  
 Karol - Bihari Road, Karol, Sancton - 340911 Dist - Jaipur, Rajasthan (India)

**OUTLINE GENERAL ARRANGEMENT**

Rating: 100 KVA, 11/0.433 kV, 50 Hz, TRF.

Drawing No.: RPTPL/17-18/100 KVA/004

Rev.: 00

Sheet No.: 01

Total Sheets: 01

Scale: N.T.S