Certificate No. : TC-5389

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Web : http://www.erda.org

TEST REPORT SHEET No. 1 of 10

NAME & ADDRESS OF CUSTOMER Rajasthan Powergen Transformer Pvt. Ltd. Khasra No. 911-914, Karola - Bhinmal Road, Sanchore - 343041 RJ	**REPORT NO.:** RP-1718-058543 **DATE** : 22 Feb 2018

CUSTOMER REF NO.	**DATE**
Nil	01 Jan 2018
DATE OF SAMPLE RECEIPT	**DATE OF TESTING**
02 Jan 2018	18 Jan 2018 to 01 Feb 2018

SAMPLE DESCRIPTION **DISTRIBUTION TRANSFORMER (NON-SEALED TYPE)** Make: RAJASTHAN POWERGEN TRANSFORMER PVT.LTD Rating: 16 kVA 11000 / 433 Volts 0.84 / 21.33 Amp. Vector Group: Dyn11 Energy efficiency level: 2 Further details as per sheet No. 2.	**SAMPLE IDENTIFICATION** ERDA sample code number: ERDA-00234414 Manufacturer serial number: RPTPL-001 Year of manufacture: 2018 Enclosed drawing numbers: 1) RPTPL/RP16/01/02/18 2) RPTPL/RP16/02/02/18 3) RPTPL-GA-16-02-18 REV. NO. 00
TEST DETAILS As per sheet 3.	**TEST SPECIFICATION** As per sheet 3.

TEST RESULTS: As per sheets from 4 to 8

ENCLOSURE: Photographs of test sample - As per sheets from 9 to 10

REMARKS: 1) The transformer **conforms** to the guaranteed requirement as per above mentioned test specification for above mentioned test nos. 1, 2, 3, 4, 5.
2) Criteria limit has not been specified for test no. 6.

PREPARED BY **CHECKED BY** **APPROVED BY**
(Kapil J. Sharma)

NOTE:
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 writting 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 arised.

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REPORT NO.: RP-1718-058543 Date: 22 Feb 2018

TECHNICAL SPECIFICATIONS OF TEST OBJECT ASSIGNED BY CUSTOMER

1	Name of manufacturer	RAJASTHAN POWERGEN TRANSFORMER PVT.LTD
2	Serial No.	RPTPL-001
3	kVA rating	16
4	Rated voltage H.V. (Volts)	11000
5	Rated voltage L.V. (Volts)	433
6	Rated current H.V. (Amp.)	0.84
7	Rated current L.V. (Amp.)	21.33
8	Number of phases	3
9	Energy efficiency level	2
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)	135
16	Total losses at 100% load (Watts)	440
17	Guaranteed temperature rise of oil/winding	35°C /40°C
18	Year of manufacture	2018
19	Standard No.	IS: 1180 PART 1-2014 WITH AMENDMENT NO. 1 & 2, as per customer's requirement

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REPORT NO.: RP-1718-058543 Date: 22 Feb 2018

Sr. No.	TEST DETAILS	TEST SPECIFICATION
1	No load current at 112.5 percent voltage:	As per cl.no.21.4.c of IS: 1180 PART 1-2014
2	Temperature-rise test	As per customer`s requirement testing procedure followed as per cl.no.21.3.b of IS: 1180 PART 1-2014
3	Oil leakage test	As per cl.no.21.2.j of IS: 1180 PART 1-2014
4	Pressure test (routine test)	As per cl.no.21.2.h of IS: 1180 PART 1-2014
5	Pressure test (type test)	As per cl.no.21.3.d of IS: 1180 PART 1-2014
6	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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REPORT NO.: RP-1718-058543 Date: 22 Feb 2018

Sr. No.	Particular of Tests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks
1	**No load current at 112.5 percent voltage:** (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. **Test voltage** (Volts) **No load current** (Amps) **No Load Current (%)**	 Max. 6.0	 487.125 0.6246 2.928	**Conforms**
2	**Temperature-rise test** (As per customer`s requirement testing procedure followed as per cl.no.21.3.b of IS: 1180 PART 1-2014) Before starting test, the dimensions of tank were measured & recorded. Size of tank: L-635 mm, W-250 mm, H-700 mm **Losses fed for temperature-rise test were 440 Watts** (As specified by the customer) Specified 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.			**Conforms**

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REPORT NO.: RP-1718-058543 Date: 22 Feb 2018

Sr. No.	Particular of Tests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks
	At the shut down, the hot winding resistances were measured and temperature rise calculated.			
	A) Top oil temperature-rise	Max. 35°C	21.8°C	
	B) Winding temperature-rise (Resistance method)			
	1) HV winding	Max. 40°C	24.5°C	
	2) LV winding	Max. 40°C	25.5°C	
	C) Ambient temperature at shutdown		28.3°C	
	D) Time of shutdown (Hrs)		06:30	
3	**Oil leakage test** (As per cl.no.21.2.j of IS: 1180 PART 1-2014) 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.	There should be no leakage at any point	No leakage observed	**Conforms**
4	**Pressure test (routine test)** (As per cl.no.21.2.h of IS: 1180 PART 1-2014) The transformer tank was tested at an air pressure of 35 kPa above atmosphere pressure maintained inside the tank for 10 min.	There should be no leakage at any point	No leakage observed	**Conforms**
5	**Pressure test (type test)** (As per cl.no.21.3.d of IS: 1180 PART 1-2014) 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.			**Conforms**
	Deflection measured at / **Length of plate (mm)**			
	HV side / 635	Max. 5.0 mm	0.5 mm	

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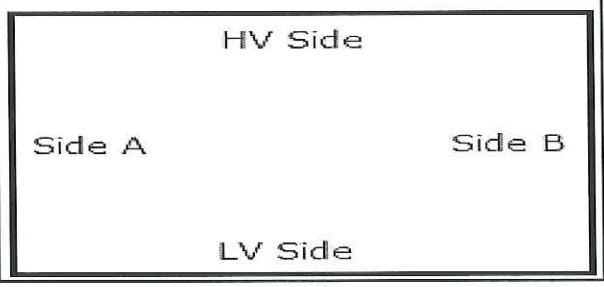
REPORT NO.: RP-1718-058543 Date: 22 Feb 2018

Sr. No.	Particular of Tests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks
	LV side 635	Max. 5.0 mm	0.5 mm	
	Side A 250	Max. 5.0 mm	0.3 mm	
	Side B 250	Max. 5.0 mm	0.3 mm	
	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.			
	Deflection measured at / **Length of plate (mm)**			
	HV side 635	Max. 5.0 mm	0.3 mm	
	LV side 635	Max. 5.0 mm	0.3 mm	
	Side A 250	Max. 5.0 mm	0.2 mm	
	Side B 250	Max. 5.0 mm	0.2 mm	
		There should be no leakage at any point	No leakage observed	

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REPORT NO.: RP-1718-058543 Date: 22-Feb-2018

Sr. No.	Particulars of test and clause no.	Requirement as per specification.	Obtained value	Remarks
6	**Measurement of the Harmonics of the No-load current** (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: 17.96% Y-ph: 26.59% B-ph: 19.57% Voltage THD: R-ph: 0.85% Y-ph: 0.85% B-ph: 0.98%	---

Prepared by: Checked by:

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REPORT NO.: RP-1718-058543 Date: 22-Feb-2018

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

Harmonic order	Current I_R in %	Current I_R in Amps	Voltage V_{RY} in %	Current I_Y in %	Current I_Y in Amps	Voltage V_{YB} in %	Current I_B in %	Current I_B in Amps	Voltage V_{BR} in %
1	100.00	0.36	100.00	100.00	0.27	100.00	100.00	0.35	100.00
2	6.91	0.03	0.05	2.38	0.01	0.02	8.43	0.03	0.03
3	7.09	0.03	0.13	20.90	0.06	0.29	8.56	0.03	0.43
4	2.66	0.01	0.03	1.16	0.00	0.01	3.10	0.01	0.04
5	14.48	0.05	0.31	15.95	0.04	0.31	14.78	0.05	0.42
6	0.27	0.00	0.00	1.11	0.00	0.01	0.65	0.00	0.02
7	2.52	0.01	0.49	2.08	0.01	0.50	2.81	0.01	0.54
8	0.61	0.00	0.00	0.16	0.00	0.02	0.73	0.00	0.02
9	0.41	0.00	0.05	1.04	0.00	0.11	0.37	0.00	0.15
10	0.38	0.00	0.01	0.12	0.00	0.00	0.44	0.00	0.01
11	0.75	0.00	0.50	0.89	0.00	0.34	0.87	0.00	0.36
12	0.09	0.00	0.01	0.21	0.00	0.00	0.11	0.00	0.01
13	0.24	0.00	0.17	0.94	0.00	0.29	0.63	0.00	0.32
14	0.04	0.00	0.02	0.06	0.00	0.01	0.04	0.00	0.01
15	0.12	0.00	0.14	0.10	0.00	0.11	0.10	0.00	0.16
16	0.02	0.00	0.01	0.12	0.00	0.01	0.11	0.00	0.02
17	0.10	0.00	0.14	0.19	0.00	0.12	0.13	0.00	0.07
18	0.05	0.00	0.02	0.07	0.00	0.02	0.03	0.00	0.02
19	0.36	0.00	0.19	0.42	0.00	0.19	0.10	0.00	0.07
20	0.04	0.00	0.02	0.08	0.00	0.02	0.03	0.00	0.01
21	0.10	0.00	0.09	0.16	0.00	0.05	0.20	0.00	0.11
22	0.04	0.00	0.01	0.03	0.00	0.02	0.02	0.00	0.01
23	0.06	0.00	0.02	0.19	0.00	0.06	0.13	0.00	0.06
24	0.09	0.00	0.04	0.10	0.00	0.03	0.07	0.00	0.03
25	0.10	0.00	0.06	0.09	0.00	0.06	0.07	0.00	0.02
THD %	17.96		0.85	26.59		0.85	19.57		0.98
Parameter measured	0.37 A		435.48 V	0.28 A		436.65 V	0.36 A		433.21 V

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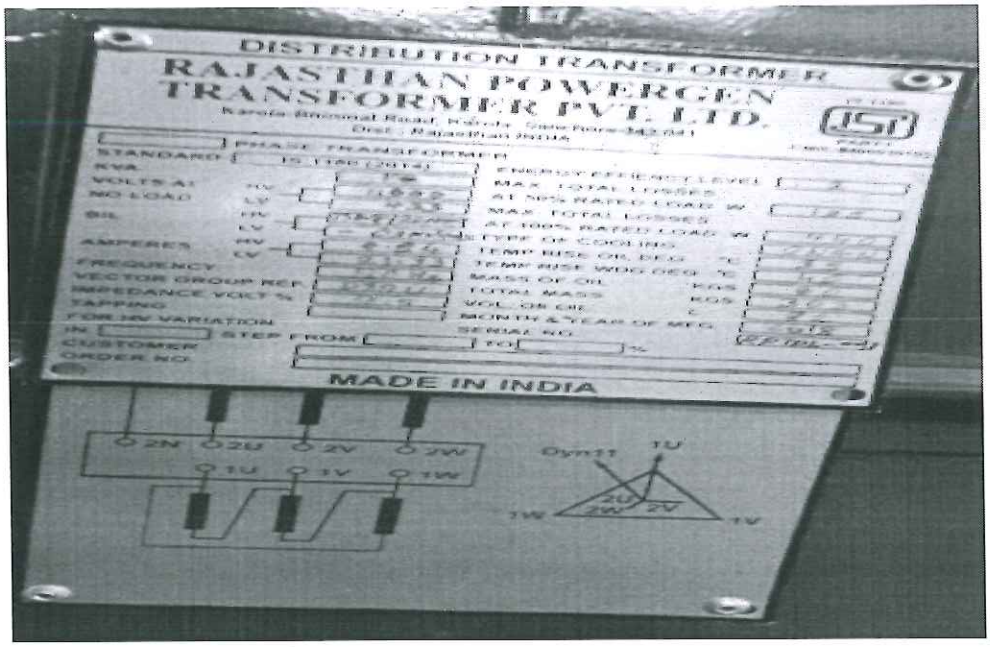
REPORT NO.: RP-1718-058543 Date: 22 Feb 2018

PHOTOGRAPHS OF TEST SAMPLE



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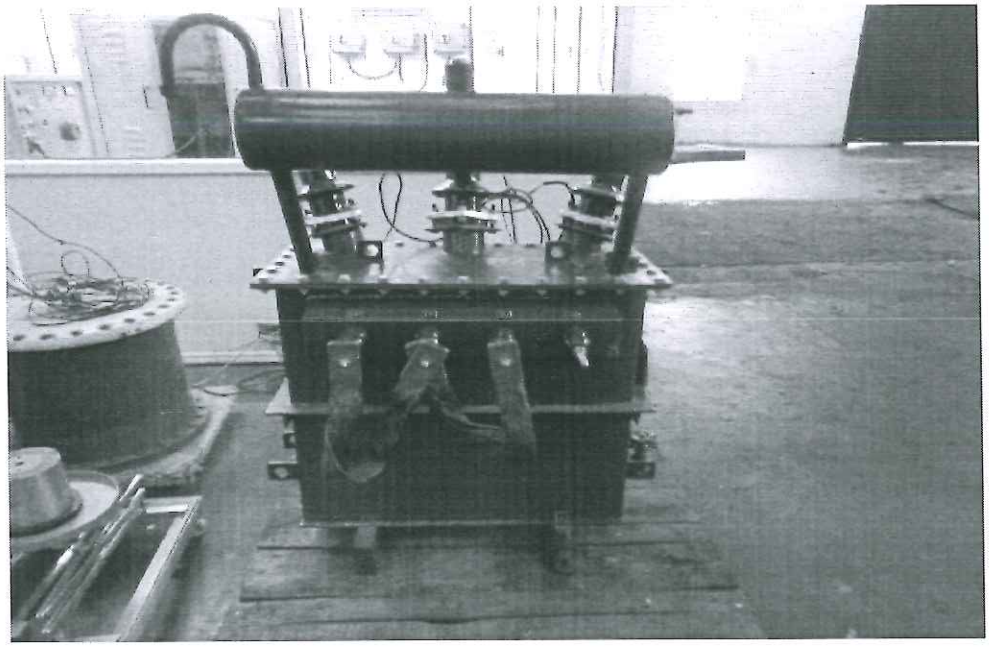
Web : http://www.erda.org

REPORT NO.: RP-1718-058543 Date: 22 Feb 2018

PHOTOGRAPHS OF TEST SAMPLE



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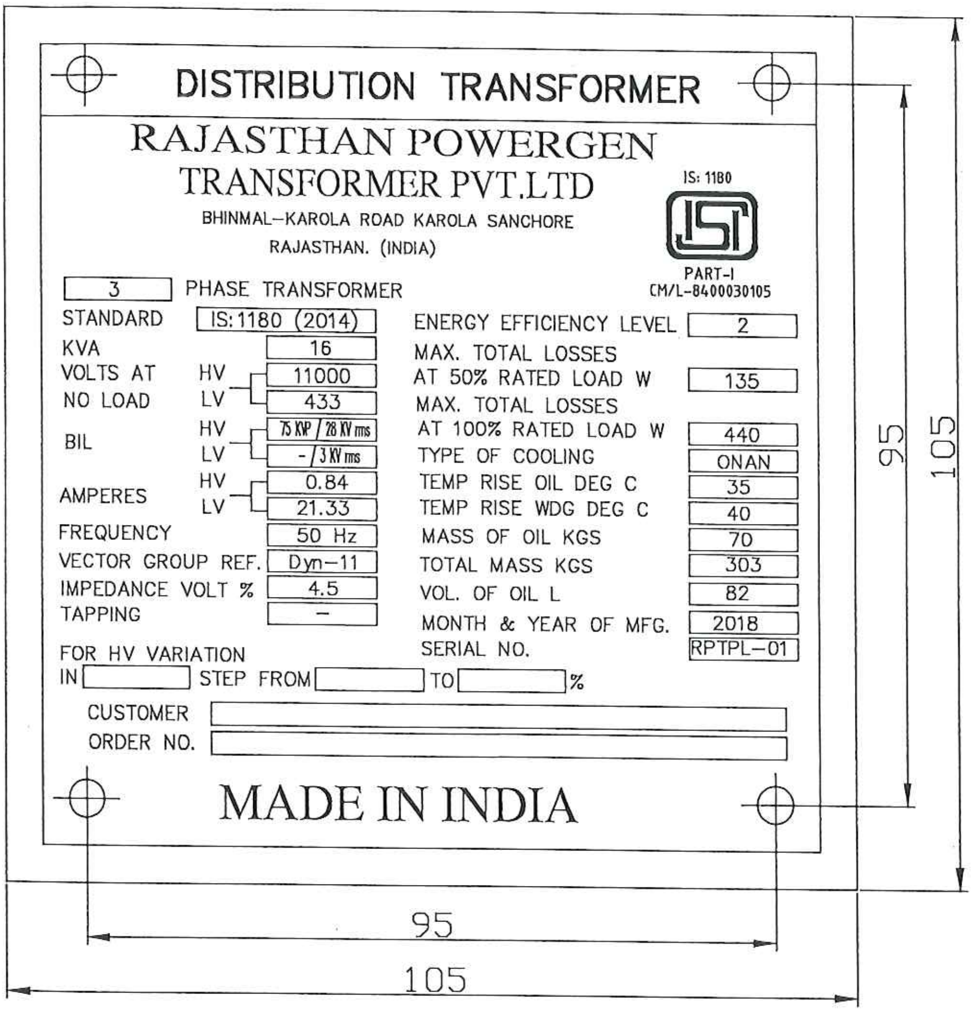


SIZE: 105x105 mm HOLE CENTER: 95x95 mm

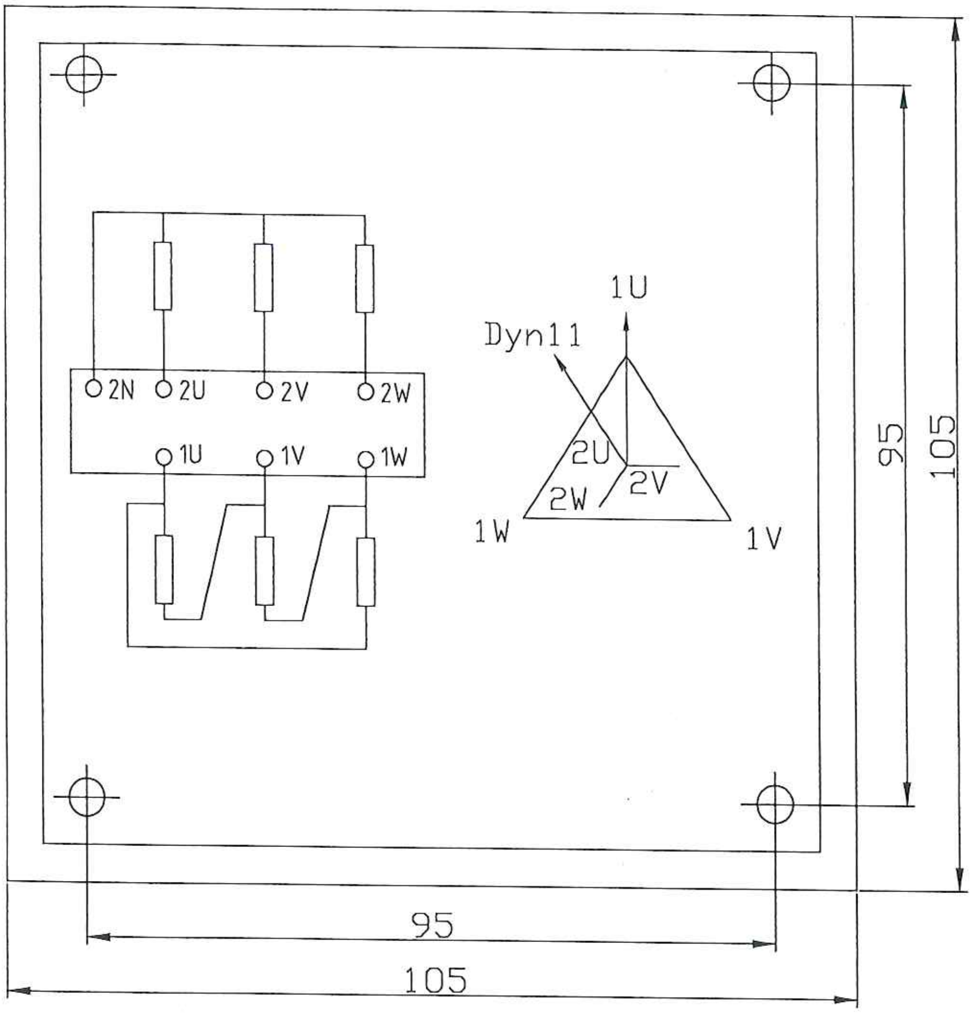
NOTE:
* SERIAL NO ,ACTUAL IMPEDANCE(%) VOLTAGE , YEAR OF MANUFACTURE & MONTH OF MANUFACTURE WILL BE PUNCHED AT THE TIME OF DESPATCH
MATERIAL : ANODISED ALUMINIUM SHEET
THICKNESS : 0.9 mm

RAJASTHAN POWERGEN TRANSFORMER PVT.LTD
BHINMAL–KAROLA ROAD KAROLA SANCHORE
RAJASTHAN. (INDIA)

DRN BY		RATING & TERMINAL MARKING PLATE FOR 16 KVA ,11/0.433 KV DISTRIBUTION TRANSFORMER 3 PHASE, ENERGY EFFICIENCY LEVEL–2
CHD BY	S.G.M.	
APPD BY	J.P.C.	
		DRG. NO.RPTPL/RP16/01/02/18 — REV. NO.

REV. NO.	DATE SIGN	BRIEF DESCRIPTION
		01 of 02

Test Report No.: RP-IT18-0585?3
Date: 22-2-18
Product: 16 KVA ...
Verified By:
Verification of this drawing by ERDA is limited to relevant dimensions only



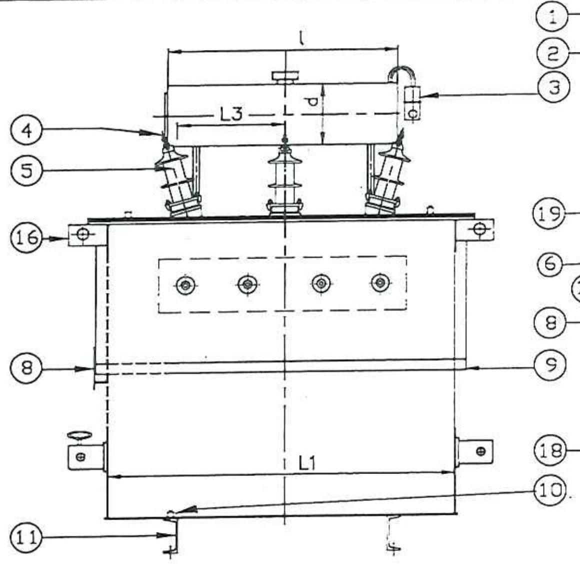
SIZE: 105x105 mm HOLE CENTER: 95x95 mm

NOTE:
* SERIAL NO ,ACTUAL IMPEDANCE(%) VOLTAGE , YEAR OF MANUFACTURE & MONTH OF MANUFACTURE WILL BE PUNCHED AT THE TIME OF DESPATCH
MATERIAL : ANODISED ALUMINIUM SHEET
THICKNESS : 0.9 mm

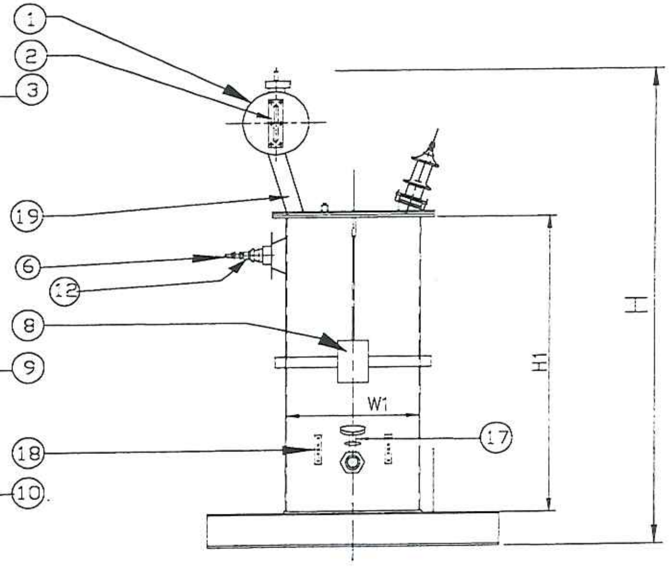
RAJASTHAN POWERGEN TRANSFORMER PVT.LTD
BHINMAL–KAROLA ROAD KAROLA SANCHORE
RAJASTHAN. (INDIA)

DRN BY		RATING & TERMINAL MARKING PLATE FOR
CHD BY	S.G.M.	16 KVA ,11/0.433 KV DISTRIBUTION TRANSFORMER
APPD BY	J.P.C.	3 PHASE, ENERGY EFFICIENCY LEVEL–2
		DRG. NO.RPTPL/RP16/02/02/18 REV. NO.

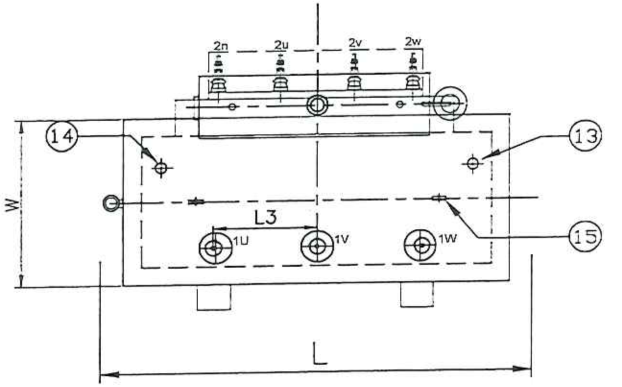
REV. NO.	DATE SIGN	BRIEF DESCRIPTION
		02 of 02



ELEVATION



SIDE VIEW



PLAN

SR.NO.	ACCESSORIES	QTY.	TECHNICAL DETAILS AS PER SPEC.	TECHNICAL DETAILS AS PER OFFER
1	CONSERVATOR (ø130) WITH OIL FILLING HOLE (32mm) WITH CAP & DRAIN PLUG (12 mm)	1	M.S.	M.S.
2	OIL LEVEL GAUGE WITH 3 POSITION (-5°, -30° & 98°C)	1	---	AL.
# 3	SILICAGEL BREATHER (500 Grams.)	1	AL. DYE CAST	AL. DYE CAST
4	H.V. TERMINAL 12m.m. DIA.WITH NUT	3	BRASS	BRASS
5	H.V. BUSHING	3	PORCELAIN	PORCELAIN
6	L.V. TERMINAL 12 m.m. DIA.	4	BRASS TINNED	BRASS TINNED
7	COOLING RADIATOR m.m. THICK	0	---	NA.
8	RATING & TERMINAL MARKING PLATE	1	ANODISED	ANODISED
9	REIN-FORCING ANGLE SIZE (40x40x6 mm.)	4	M.S.	M.S.
10	EARTHING TERMINAL WITH LUGS SIZE (16 Amp.)	2	M.S.	M.S.
11	BASE CHANNELS 75x40x460mm. LONG.	2	M.S.	M.S.
12	L.T. BUSHING 1.1KV/250A	4	PORCELAIN	PORCELAIN
13	THERMOMETER POCKET	1	M.S.	M.S.
14	AIR RELEASE PLUG	1	M.S.	M.S.
15	LIFTING LUGS FOR COVER (8 m.m.)	2	.	N.A.
16	LIFTING LUGS FOR TANK WITH FLAT (8 m.m.)	2	M.S.	M.S.
17	DRAIN VALVE	1	M.S.	M.S.
18	PULLING LUG (8 m.m.)	4	M.S.	M.S.
19	CONSERVATOR PIPE (ø30mm MIN)	2	M.S.	M.S.

COOLING DETAILS

1	TOTAL SURFACE AREA :1.239 mm2.	
2	TOTAL NUMBER OF COOLING TUBES	N. A.
3	LX B X H OF TUBE	N. A.

1	WEIGHTS IN KGS.		DIMENSIONS IN m.m.
	CORE	70	TRANSFORMER OVERALL
	WINDINGS	35	L = 860
	TANK&FITTINGS with all accesso	128	W = 570
	OIL	70	H = 1270
	TOTAL WEIGHT	303	TRANSFORMER TANK
2	THICKNESS IN m.m.		L1 = 635
	TANK SIDE PLATES (MIN.)	3.15	W1 = 250
	TOP & BOTTOM PLATES (MIN.)	5	H1 = (AVG.) 700
3	TOLERANCE		BUSHING CLEARANCES WITH ANGLE
	T/F OIL QUANTITY	as.per spec	L3 (H.V.) 255 PHASE TO PHASE
	MAIN TANK DIMENSIONS	as per spec	L4 (L.V.) 75 PHASE TO PHASE
	OVERALL DIMENSIONS	+/- 5 %	L5 (H.V.) 140 PHASE TO EARTH
4	DIMENSIONS OF CONSERVATOR		L6 (L.V.) 40 PHASE TO EARTH
	d) INSIDE DIAMETER IN mm.	130	BUSHING HEIGHT IN mm
	l) LENGTH IN mm.	600	
	c) CAPACITY IN LTRS.	7	

ALL DIMENSIONS ARE IN MM. UNLESS OTHERWISE STATED.

Test Report No.: RP-1708-058543
Date: 22-2-18
Product: 16 KVA xmer
Verified By:
Verification of this drawing by ERDA is limited to relevant dimensions checks only. Verified dimensions are marked with

NOTE
1 SHAPE OF TANK: RECTANGULAR SHAPE
2 PAINT: AS PER IS
3 ALL DIMENSIONS ARE IM mm UNLESS OTHERWISE STATED.
NOT PROVIDED DURING TESTING

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

DRN BY		GENERAL ARRANGEMENT OF TRANSFORMER OF 16 KVA 11/ 0.433 KV DISTRIBUTION TRANSFORMER Energy Efficiency Level – 2
CHD BY	S.G.M.	
APPD BY	J.P.C.	
DATE	01.01.2018	
SCALE		DRG. NO. RPTPL-GA-16-02-18

REV. NO. 00

REV. NO.	DATE & SIGN	BRIEF DESCRIPTION

SIGNATURE OF AUTHORISED PERSON & STAMP OF THE FIRM