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TEST REPORT

SHEET No. 1 of 11

NAME & ADDRESS OF CUSTOMER	REPORT NO.: RP-1718-051918	3	
Rajasthan Powergen Transformer Pvt.	DATE : 19 Jan 2018	0	
Ltd.	CUSTOMER REF NO.	DATE	
Khasra No. 911-914, Karola-Bhinmal	NP/ERDA/TT/39/2017-18	29 Nov 2017	
Road, Sanchore - 343041 RJ	DATE OF SAMPLE RECEIPT	DATE OF TESTING	
	05 Dec 2017	28 Dec 2017 to	

SAMPLE DESCRIPTION DISTRIBUTION TRANSFORMER (NON-SEALED TYPE)

Make: RAJASTHAN POWERGEN TRANSFORMER PVT. LTD.

Rating: 315 kVA 11000 / 433 Volts 16.53 / 420.02 Amp. Vector Group: Dyn11 Energy efficiency level: 2

Further details as per sheet No. 2.

SAMPLE IDENTIFICATION

ERDA sample code number: ERDA-00229815 Manufacturer serial number: RPTPL/315KVA/2017-

18/001

Year of manufacture: 2017

Enclosed drawing 1) RPTPL/315KVA/003 2) RPTPL/315KVA/002 numbers:

TEST DETAILS

As per sheet 3.

TEST SPECIFICATION

As per sheet 3.

TEST RESULTS: As per sheets from 4 to 9

ENCLOSURE: Photographs of test sample - As per sheets from 10 to 11

REMARKS: 1) The transformer **conforms** to the guaranteed requirement as per above mentioned test specification for above mentioned test nos. 1, 3, 5, 6, 7, 8.

2) Criteria limit has not been specified for test nos. 2, 4, 9

PREPARED BY

HECKED BY

APPROVED BY (Kapil J. Sharma)

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REPO	RT NO.: RP-1718-051918	Date: 19 Jan 2018					
TECH	TECHNICAL SPECIFICATIONS OF TEST OBJECT ASSIGNED BY CUSTOMER						
1	Name of manufacturer	RAJASTHAN POWERGEN TRANSFORMER PVT. LTD.					
2	Serial No.	RPTPL/315KVA/2017-18/001					
3	kVA rating	315					
4	Rated voltage H.V. (Volts)	11000					
5	Rated voltage L.V. (Volts)	433					
6	Rated current H.V. (Amp.)	16.53					
7	Rated current L.V. (Amp.)	420.02					
8	Number of phases	3					
9	Energy efficiency level	2					
10	Vector group	Dyn11					
11	Winding material	Copper					
12	Type of cooling	ONAN					
13	Frequency (Hz.)	50					
14	Guaranteed percentage impedance(%)	4.5					
15	Total losses at 50% load (Watts)	1025					
16	Total losses at 100% load (Watts)	3100					
17	Guaranteed temperature rise of oil/winding	40°C /45°C					
18	Year of manufacture	2017					
19	Standard No.	IS: 1180 PART 1-2014 WITH AMENDMENT NO. 1 & 2, as per customer`s requirement, CBIP manual, IS 2026					
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).: RP-1718-051918	Date: 19 Jan 2018
TEST DETAILS	TEST SPECIFICATION
No load current at 112.5 percent voltage:	As per cl.no.21.4.c of IS: 1180 PART 1-2014
Measurement of unbalance current	As per customer`s requirement
Magnetic balance test	As per CBIP manual; Publication no.317 - 2013
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
Temperature-rise test	As per customer`s requirement testing procedure followed as per cl.no.21.3.b of IS: 1180 PART 1-2014
Oil leakage test	As per cl.no.21.2.j of IS: 1180 PART 1-2014
Pressure test (routine test)	As per cl.no.21.2.h of IS: 1180 PART 1-2014
Pressure test (type test)	As per cl.no.21.3.d of IS: 1180 PART 1-2014
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
	TEST DETAILS No load current at 112.5 percent voltage: Measurement of unbalance current Magnetic balance test Measurement of zero-sequence impedance (s) on three-phase transformers Temperature-rise test Oil leakage test Pressure test (routine test) Pressure test (type test) Measurement of the Harmonics of the



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SHEET No. 4

1							-
REP	ORT NO.: RP-17	18-051918			Date: 19 J	an 2018	
Sr. No.	l Particula	ar of Tests &	Cl.No.	Requirement as per Specification	Obtained Value	Remarks	
1	No load curre	nt at 112.5 p	ercent			Conforms	
	voltage: (As per cl.no.2: 2014)	1.4.c of IS: 11	80 PART 1-	a		9	
	Test voltage of voltage at rate the L.V. windin winding termin circuited. No lo	d frequency wa g terminals an als were kept ad current was	as applied to d H.V. open s recorded.	2	407.125		
			oltage (Volts)		487.125 1.0698		
W			rr ent (Amps) Current (%)	SAPERAY AND THE	0.255		١
2	Measurement		` -	Max. 5.0	0.233		١
	(As per custom All the three to (LV) winding somewhere terminal of ambetween short windings and romeasurement phase voltage (HV) winding fin both the winding for both the windin	ner's requirement of the horted together al. Current me meter was concircuited seconcular applied to for circulating rent. Idary (LV) wind abalance current all the current all the meter was applied to for circulating rent. Idary (LV) wind abalance current abalance current all the meters and meters all the meters all the current abalance current abalance current abalance current all the meters all the current abalance current abalance current all the current abalance current all the curre	secondary er, except asuring nected ndary (LV) al for the primary rated current asured ling current nt (Amps):		420.02 0.2 0.048	Conforms	
3	(As per CBIP r 2013)	manual; Public		-		Conforms	5
	Voltage Applied Between	Applied Voltage (Volts)	Measured Voltage Between				
	2u & 2n	100.01	2v & 2n	50 to 90 %	74.48 V		
57			2w & 2n		25.45 V		
-	2v & 2n	100.04	2u & 2n	30 to 70 %	49.45 V		0

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REPO	RT NO.: RP-1	Date: 19 J	lan 2018					
Sr. No.		Particular of Tests & Cl.No.			Obtained Value	Remarks		
	2w & 2n			30 to 70 %	50.45 V			
P0	2w & 2n	100.05	2u & 2n		25.78 V			
			2v & 2n	50 to 90 %	74.45 V			
4	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) 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: Test current (Amps) Measured Voltage (Volts) Z ps = 3V/I (Ω/Phase) (3V * kVA)				140.22 1.235 0.026			
	4	Z ps = (I * 1	(%) 0 (kV)2)		4.439	3 B		
5	procedure follof IS: 1180 P Before startin	e-rise test mer`s require lowed as per c	ment testing I.no.21.3.b nensions of			Conforms		
1276	H2-955 mm Size of fins: L-700 mm, W radiators-4, N	Size of tank: L1-1165 mm, W1-450 mm, H1-940 mm, H2-955 mm Size of fins: L-700 mm, W-300 mm, No. of radiators-4, No. of fins per radiator-6 Losses fed for temperature-rise test						



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REPO	RT NO.: RP-1718-051918		Date: 19 J	an 2018
Sr. No.	Particular of Tests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks
a a	(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. At the shut down, the hot winding resistances were measured and temperature rise calculated.			
	A) Top oil temperature-rise B) Winding temperature-rise	Max. 40°C	28.8°C	
	(Resistance method)	NA 450C	42.400	
	1) HV winding	Max. 45°C	42.4°C	
	2) LV winding	Max. 45°C	40.7°C	=
	C) Ambient temperature at shutdown		23.5°C	
(1)	D) Time of shutdown (Hrs)		01:30	
6 	Oil leakage test (As per cl.no.21.2.j of IS: 1180 PART 1-2014)		-	Conforms
	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.	point	No leakage observed	
7	Pressure test (routine test) (As per cl.no.21.2.h of IS: 1180 PART 1-2014)			Conforms
.155	The transformer tank was tested at an air pressure of 35 kPa above atmosphere pressure maintained inside the tank for 10 min.	leakage at any point	observed	
7	13	//	Se Producis	

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SHEET No.



REPO	RT NO.: RP-1718-051	.918		Date: 19 J	an 2018
Sr. No.	Particular of T	ests & Cl.No.	Requirement as per Specification	Obtained Value	Remarks
8	Pressure test (type (As per cl.no.21.3.d of 2014)				Conforms
40 N	The transformer tank pressure of 80 kPa for permanent deflection recorded, after pressureleased.	30 minutes. The of flat plates was			
ĺ	Deflection	Length of plate			
	measured at HV side	(mm) 1165	Max. 6.5 mm	0.3 mm	
	LV side	1165	Max. 6.5 mm	0.3 mm	
	Side A	450	Max. 5.0 mm	0.2 mm	5.4
	Side B	450	Max. 5.0 mm	0.1 mm	
	The transformer tank vacuum of 500 mm o minutes. The perman flat plates was record had been released.	f Mercury for 30 ent deflections of			-
	Deflection	Length of plate			
	measured at HV side	(mm) 1165	Max. 6.5 mm	0.2 mm	
el _a	LV side	1165	Max. 6.5 mm	0.1 mm	
	Side A	450	Max. 5.0 mm	0.1 mm	
	Side B	450	Max. 5.0 mm	0.1 mm	
	HV S	Side Side B	There should be no leakage at any point	No leakage observed	
	LVS	iide			





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REPO	RT NO.: RP-1718-051918		Date: 19-Jan-2018	
Sr. No.	Particulars of test and clause no.	Optained value		Remarks
9	Measurement of the Harmonics of the No-	The harmonics of the no-load current	Refer table 1 for individual current	
	load current		harmonics	
	(As per customer's	shall be measured	components &	
	request testing	and magnitude of	individual voltage	
	procedure followed as	the harmonics shall	harmonics	
8	per cl. no. 10.6 of IS 2026 (Part 1):2011)	be expressed as a percentage of the	components measured at LV side	
	2020 (Part 1).2011)	Ifundamental	at rated voltage i.e.	
		component.	433 V	
			Current THD:	T _w :
			R-ph: 11.74%	
	8		Y-ph: 16.39%	
		4	B-ph: 9.14%	
			Voltage THD:	
			R-ph: 1.59% Y-ph: 1.84%	
	T x		B-ph: 1.44%	
	*		The state of the s	19
	C PS		5 0	
Prepa	ared by:		Checked by:	





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REPORT NO.: RP-1718-051918 Date: 19-Jan-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	0.86	100.00	100.00	0.62	100.00	100.00	0.92	100.00
2	0.71	0.01	0.01	1.08	0.01	0.02	0.80	0.01	0.02
3	9.30	0.08	0.72	15.18	0.09	0.55	7.78	0.07	0.51
4	0.33	0.00	0.03	0.39	0.00	0.04	0.33	0.00	0.01
5	6.92	0.06	1.01	5.76	0.04	1.08	4.47	0.04	1.11
6	0.03	0.00	0.01	0.03	0.00	0.03	0.01	0.00	0.02
7	1.59	0.01	0.22	1.78	0.01	0.32	1.50	0.01	0.20
8	0.07	0.00	0.00	0.08	0.00	0.00	0.09	0.00	0.01
9	0.28	0.00	0.42	0.35	0.00	0.61	0.23	0.00	0.23
10	0.03	0.00	0.00	0.06	0.00	0.02	0.02	0.00	0.01
11	0.23	0.00	0.73	0.48	0.00	1.05	0.34	0.00	0.62
12	0.01	0.00	0.01	0.02	0.00	0.03	0.02	0.00	0.00
13	0.10	0.00	0.26	0.18	0.00	0.50	0.07	0.00	0.23
14	0.02	0.00	0.02	0.00	0.00	0.02	0.02	0.00	0.03
15	0.14	0.00	0.33	0.18	0.00	0.22	0.13	0.00	0.13
16	0.01	0.00	0.01	0.02	0.00	0.02	0.01	0.00	0.02
17	0.05	0.00	0.04	0.03	0.00	0.05	0.05	0.00	0.10
18	0.00	0.00	0.01	0.00	0.00	0.02	0.01	0.00	0.01
19	0.07	0.00	0.14	0.05	0.00	0.08	0.03	0.00	0.04
20	0.00	0.00	0.01	0.02	0.00	0.01	0.01	0.00	0.01
21	0.02	0.00	0.08	0.06	0.00	0.04	0.04	0.00	0.12
22	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
23	0.01	0.00	0.01	0.02	0.00	0.04	0.01	0.00	0.04
24	0.01	0.00	0.00	0.03	0.00	0.00	0.01	0.00	0.01
25	0.01	0.00	0.04	0.03	0.00	0.06	0.02	0.00	0.03
THD %	11.74		1.59	16.39		1.84	9.14		1.44
Parameter	0.86	34	431.32	0.63		433.30	0.93		438.69
measured	А		V	Α		V	Α		V

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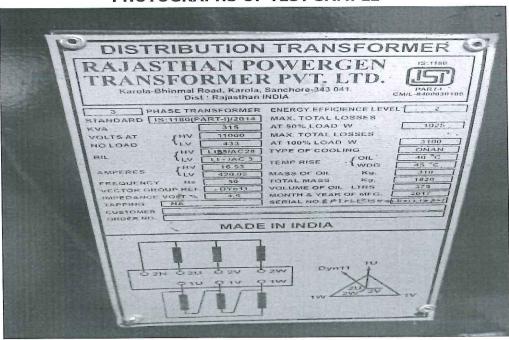
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PHOTOGRAPHS OF TEST SAMPLE





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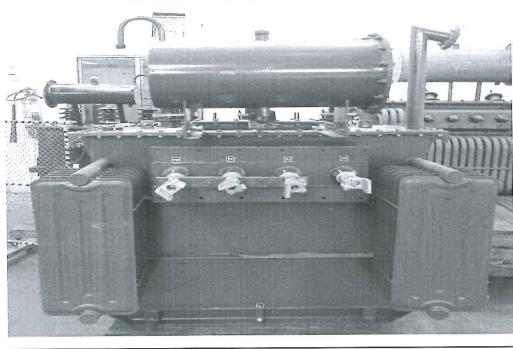
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SHEET No. 1 No. 1



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PHOTOGRAPHS OF TEST SAMPLE



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