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TEST REPORT

TC538918000000614F

Sheet: 1 of 15

NAME AND ADDRESS OF CUSTOMER	REPORT NO.: RP-1819-026833			
e rest to the	DATE : 10.10.2018			
Rajasthan Powergen Transformer Pvt. Ltd.	CUSTOMER REF.	DATE		
Khasra No. 911-914, Karola-Bhinmal Road,	NO.			
Karola, Sanchore,	Letter	27.09.2018		
Rajasthan DATE OF SA		DATE OF TESTING		
343041	RECEIPT	DATE OF TESTING		
1.000s 00s4 8xx 700 xx	27.09.2018	29.09.2018 to 04.10.2018		

SAMPLE DESCRIPTION
DISTRIBUTION TRANSFORMER
(NON-SEALED TYPE)

Manufactured by: RAJASTHAN POWERGEN

TRANSFORMER PVT. LTD.

Rating : 315 kVA

Volts : 11000/433 V (at no-load)

Current : 16.53/420 Amps

Phases: 3/3 Vector group: Dyn11 Energy efficiency level:3

Further details as per sheet no.2 of 15

SAMPLE IDENTIFICATION

ERDA sample code number : ERDA-00278711

Manufacturer serial no.: RPTPL-001

Year of manufacture: 2018 Enclosed drawing numbers:

1) RPTPL-RP-315KVA-01/02-2018 01 of 02

2) RPTPL-RP-315KVA-02/02-2018 02 of 02

3) RPTPL-OL-315KVA-02-2018

TEST DETAILS

As per sheet 3 of 15.

TEST SPECIFICATION

As per sheet 3 of 15.

TEST RESULTS: As per sheets from 4 of 15 to 14 of 15.

ENCLOSURE: Photographs of test sample - As per sheet 15 of 15

REMARKS: 1) The transformer **conforms** to the guaranteed requirement as per above mentioned test specification for above mentioned test nos. 2,5,6,7,11 to 17.

2) Criteria limit has not been specified for test nos. 1,3,4,8,9 & 10.

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CHECKED BY

APPROVED BY
(Kapil J. Sharma)

Note: 1. This report relates only to the particular sample received for testing in good condition at E.R.D.A., Makarpura.

2. This report cannot be reproduced in part under any circumstances.

3. Publication of this report requires prior permission in writing from Director , E.R.D.A.

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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1.	Name of Manufacturer	RAJASTHAN POWERGEN TRANSFORMER PVT. LTD.
2.	Sr.No.	RPTPL-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
8.	Number of phases	3
9.	Energy Efficiency level	3
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)	955
16.	Total losses at 100 % load (Watts)	2750
17.	Guaranteed temperature rise of oil/Winding	40/45°C
18.	Year of Manufacture	2018
19.	Standard no.	IS 1180 (PART-1) 2014 with amendment no 1 & 2. & CBIP manual

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REPC	REPORT NO.: RP-1819-026833 Sheet: 3 of 15				
DATE					
SR.	TEST DETAILS	TEST SPECIFICATION			
NO.					
1.	Measurement of winding resistance.	As per cl.no.21.2.a of IS 1180 (Part 1):2014			
2.	Measurement of voltage ratio and check of phase displacement	As per cl.no.21.2.b of IS 1180 (Part 1):2014			
3.	Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load.(At tap no.3)	As per cl.no.21.2.c of IS 1180 (Part 1):2014			
4.	Measurement of no-load loss and current.	As per cl.no.21.2.d of IS 1180 (Part 1):2014			
5.	Total losses at 50 % load	As per cl.no.7.8 of IS 1180 (Part 1):2014			
6.	Total losses at 100 % load	As per cl.no.7.8 of IS 1180 (Part 1):2014			
7.	No load current at 112.5 percent voltage	As per cl.no.21.4.c of IS 1180 (Part 1):2014			
8.	Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load. (At tap no.1)	As per cl.no.21.2.c of IS 1180 (Part 1):2014			
9.	Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load.(At tap no.7)	As per cl.no.21.2.c of IS 1180 (Part 1):2014			
10.	Measurement of insulation resistance.	As per cl.no.21.2.e of IS 1180 (Part 1):2014			
11.	Induced overvoltage withstand test.	As per cl.no.21.2.f of IS 1180 (Part 1):2014			
12.	Separate-source voltage withstand test	As per cl.no.21.2.g of IS 1180 (Part 1):2014			
13.	Temperature rise test	As per cl.no.21.3.b of IS 1180 (Part 1):2014			
14.	Magnetic balance test	As per CBIP manual; Publication no.317-2013			
15.	Oil leakage test	As per cl.no.21.2.j of IS 1180 (Part 1):2014			
16.	Pressure test (routine test)	As per cl.no.21.2.h of IS 1180 (Part 1):2014			
17.	Pressure test (type test)	As per cl.no.21.3.d of IS 1180 (Part 1):2014			

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Independent National	DRT NO.: RP-1819-026833		Sheet	t: 4 OF 15
DATE	: 10.10.2018			
Sr. No.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
1.	Measurement of winding resistance :			
	(As per cl.no.21.2.a of IS 1180 (Part 1):	*		
	2014)			
	Average oil temperature: 28.5°C	W W		
	HV Winding			×
-1	Tap number:1			
	1U - 1V:		2.1432 Ω	
	1V - 1W:		2.1450 Ω	
	1U - 1W:		2.1438 Ω	-
	Average:		2.1440 Ω	
	Tap number:2			
	1U - 1V:		2.0946 Ω	2
	1V - 1W:		2.0850Ω	
	1U - 1W:		2.0896Ω	
	Average:		2.0897 Ω	
	Tap number:3			
	1U - 1V:		2.0486 Ω	
	1V - 1W:		2.0392 Ω	
	1U - 1W:		2.0468 Ω	
A	Average:		2.0449 Ω	
	Tap number:4			
	1U - 1V:		1.9998 Ω	
	1V - 1W:		1.9941 Ω	
	1U - 1W:	1	1.9998 Ω	
	Average:		1.9979 Ω	
	Tap number:5			
	1U - 1V:		1.9532 Ω	

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1V - 1W:

1U - 1W:

Average:



1.9473 Ω

 1.9535Ω

 1.9513Ω

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REPORT	NO.: RP-1819-026833		Sheet: 5 OF 15
DATE	: 10.10.2018	2 () 2 () 20 (

Sr. No.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
	Tap number:6			
	1U - 1V:		1.9084 Ω	
	1V - 1W:	==	1.9014 Ω	
	1U - 1W:	". 	1.9056 Ω	
)	Average:		1.9051 Ω	
	Tap number:7			
	1U - 1V:		1.8627 Ω	
	1V - 1W:		1.8556Ω	
	1U - 1W:		1.8658 Ω	
1	Average:		1.8614 Ω	
	LV Winding		-	
	2u - 2v:	17 1 <u>22</u>	$2.5006~\mathrm{m}\Omega$	
	2v - 2w:	II.	2.4424 mΩ	
	2u – 2w:		2.4678 mΩ	
	Average:		2.4703 mΩ	<u> </u>





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REPORT NO.: RP-1819-026833 Sheet: 6 OF 15

DATE : 10.10.2018

Sr.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
No.	Moneyways of valtage vatic and	per specification	value	Conforms
2.	Measurement of voltage ratio and			Comornis
	check of phase displacement:			
	(As per cl.no.21.2.b of IS 1180 (Part 1): 2014)			
	Measurement of voltage ratio			
	Tap number:1			
	1U-1V and 2u-2n:	46.200 (±0.5%)	46.210	
	1V-1W and 2v-2n:	46.200 (±0.5%)	46.219	
	1W-1U and 2w-2n:	46.200 (±0.5%)	46.218	
	Tap number:2			
	1U-1V and 2u-2n:	45.100 (±0.5%)	45.110	
	1V-1W and 2v-2n:	45.100 (±0.5%)	45.119	_
	1W-1U and 2w-2n:	45.100 (±0.5%)	45.118	
	Tap number:3			
	1U-1V and 2u-2n:	44.000 (±0.5%)	44.011	
	1V-1W and 2v-2n:	44.000 (±0.5%)	44.020	
	1W-1U and 2w-2n:	44.000 (±0.5%)	44.018	
	Tap number:4	,		e
	1U-1V and 2u-2n:	42.900 (±0.5%)	42.917	
	1V-1W and 2v-2n:	42.900 (±0.5%)	42.924	
	1W-1U and 2w-2n:	42.900 (±0.5%)	42.922	
	Tap number:5			D (40)
	1U-1V and 2u-2n:	41.800 (±0.5%)	41.813	
	1V-1W and 2v-2n:	41.800 (±0.5%)	41.821	
	1W-1U and 2w-2n:	41.800 (±0.5%)	41.820	
	Tap number:6			
	1U-1V and 2u-2n:	40.700 (±0.5%)	40.717	
	1V-1W and 2v-2n:		40.725	
	1W-1U and 2w-2n:	40.700 (±0.5%)	40.724	
	Tap number:7	(,		
	1U-1V and 2u-2n:	39.600 (±0.5%)	39.618	
	1V-1W and 2v-2n:	1 5	39.624	
	1W-1U and 2w-2n:		39.622	
	*	=		
	Vector Group:	Dyn11	Dyn11	

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REPO	RT NO.: RP-1819-026833		Sheet	7 of 15
DATE	: 10.10.2018			
Sr. No.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
3.	Measurement of short-circuit		25	
	impedance and load loss at 50			
	percent and 100 percent load:			
	(At tap number : 3)			
	(As per cl.no.21.2.c of IS 1180 (Part 1):			
	2014)			
	At 50% load :	la la		
	Tested with 8.611 Amps (on HV side)			
	Frequency: 49.989 Hz			
	Average oil temperature : 31.8°C			
	Test current (Amps)		8.611	,
	Impedance voltage (Volts)		243.59	
	Measured load loss (Watts)		470.2	
	Impedance voltage (%)			
	(Computed to 50% load)			÷ ,
	At 31.8°C		2.13	
	At 75°C		2.14	
	Load loss (Watts)			1
	(Computed to 50% load)			
	At 31.8°Ć		433.38	
	At 75°C		486.78	=
	\$ 1956 B FB 197			
	At 100% load :			
	Tested with 16.556 Amps (on HV side)			
	Frequency: 50.014 Hz			
	Average oil temperature : 31.8°C			
	Test current (Amps)		16.556	
	Impedance voltage (Volts)		469.20	
	Measured load loss (Watts)		1745.20	
	Impedance voltage (%)			
	(Computed to 100% load)		1.26	
	At 31.8°C	4 = (1400()	4.26	Conform
	At 75°C	4.5 (±10%)	4.27	Conform
	Load loss (Watts)			-
	(Computed to 100% load)		1720 72	
	At 31.8°C		1739.72	2,2
	At 75°C		1952.36	

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DAT			Silee	6 01 13		
Sr.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks		
4.	Measurement of no-load loss and					
10000	current :	(2)				
	(As per cl.no.21.2.d of IS 1180 (Part 1): 2014)			7		
	Tested with average 433.02 volts (on LV side)					
	Frequency : 49.990 Hz					
	RMS voltage (Volts)		432.84			
	No-load current (Amps)		0.8587			
	Measured no-load loss (Watts)		428.80			
	Corrected no-load loss (Watts)		428.97			
5.	Total losses at 50 % load (Watts):	Max. 955	915.75	Conforms		
	(As per cl.no.7.8 of IS 1180 (Part 1):					
	2014)					
6.	Total losses at 100 % load (Watts):	Max. 2750	2381.33	Conforms		
	(As per cl.no.7.8 of IS 1180 (Part 1):					
-	2014)			Conforms		
7.	No load current at 112.5 percent voltage:			Conforms		
	(As per cl.no.21.4.c of IS 1180 (Part 1):					
	(As per chilo.21.4.c of 15 1100 (Fart 1) .					
4	Test voltage of 112.5 percent of					
ì	rated voltage at rated frequency was	1				
	applied to the L.V. winding terminals and					
	H.V. winding terminals were kept open		8			
	circuited. No load current was recorded.	9				
	Test voltage (Volts)		487.14	20		
	No load current (Amps)		1.1770			
	No load current (%)	Max. 5.0	0.28			

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	PRT NO.: RP-1819-026833		Sheet	: 9 of 15
DATE	: 10.10.2018	9		
Sr. No.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
8.	Measurement of short-circuit			
	impedance and load loss at 50			
	percent and 100 percent load:			
	(At tap number: 1)			
	(As per cl.no.21.2.c of IS 1180 (Part 1):			
	2014)			
	At 50% load :			
	Tested with 7.868 Amps (on HV side)			
	Frequency: 49.995 Hz	8		
	Average oil temperature :31.8 °C		Valued Table of Contract	
	Test current (Amps)		7.868	
	Impedance voltage (Volts)		237.60	
	Measured load loss (Watts)		422.1	
	Impedance voltage (%)			
	(Computed to 50% load)			
	At 31.8°C		2.06	
	At 75°C	1	2.07	
	Load loss (Watts)	1		
	(Computed to 50% load)		424.64	
	At 31.8°C		421.64	
	At 75°C		474.41	
	At 100% load :			
	Tested with 15.7316 Amps (on HV side)			
	Frequency: 50.004 Hz			
	Average oil temperature : 31.8°C		15 7216	
	Test current (Amps)		15.7316	
	Impedance voltage (Volts)	7.16	475.88	
	Measured load loss (Watts)	III	1694.40	
	Impedance voltage (%)			
	(Computed to 100% load)		1 12	
	At 31.8°C		4.13	
	At 75°C		4.13	A commence of the second
	Load loss (Watts)			
2 0 0	(Computed to 100% load)		1698.37	
	At 31.8°C At 75°C		1904.46	
	At /5 C		1204.40	

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	RT NO.: RP-1819-026833		Sneet	:: 10 of 15
DATE Sr. No.	: 10.10.2018 Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
9.	Measurement of short-circuit impedance and load loss at 50 percent and 100 percent load: (At tap number: 7) (As per cl.no.21.2.c of IS 1180 (Part 1): 2014)		а	
	At 50% load: Tested with 9.165 Amps (on HV side) Frequency: 50.030 Hz	r		
	Average oil temperature : 31.8 °C Test current (Amps) Impedance voltage (Volts) Measured load loss (Watts) Impedance voltage (%) (Computed to 50% load)		9.165 225.44 461.5	
	At 31.8°C At 75°C Load loss (Watts)		2.28 2.29	
	(Computed to 50% load) At 31.8°C At 75°C		463.52 520.63	1
	At 100% load: Tested with 18.3880 Amps (on HV side) Frequency: 50.000 Hz			
	Average oil temperature : 31.8 °C Test current (Amps) Impedance voltage (Volts) Measured load loss (Watts) Impedance voltage (%)		18.3880 452.64 1863.60	
	(Computed to 100% load) At 31.8°C At 75°C Load loss (Watts)		4.57 4.58	
	(Computed to 100% load) At 31.8°C		1859.95	N .

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At 75°C



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DAT			0110001	
Sr. No.	Particulars of test and Cl. No.	Requirement as per specification	Obtained Value	Remarks
10.	Measurement of insulation resistance: (As per cl.no.21.2.e of IS 1180 (Part 1): 2014)			
	Average oil temperature : 32.0°C IR value measured between HV winding Earth at 2500 V DC LV winding Earth at 500 V DC HV winding LV winding at 2500 V DC	 	2.61 GΩ 1.439 GΩ 2.67 GΩ	
11.	Induced overvoltage withstand test: (As per cl.no.21.2.f of IS 1180 (Part 1): 2014)			Conforms
	The test voltage of 866 Volts, 3 – phase was applied to the LV winding of the transformer. The supply frequency was maintained at 150 Hz. The test voltage was applied for 40 seconds.	Transformer shall withstand 866 volts at 150 Hz frequency for 40 seconds.	Withstood	
12.	Separate-source voltage withstand Test: (As per cl.no.21.2.g of IS 1180 (Part 1): 2014) on HV winding: The test voltage of 28 kV ac, rms was applied between the HV winding and earth. The tank and LV winding were shorted together and earthed. The test voltage was applied for 60 seconds.	withstand power frequency voltage	Withstood	Conforms
40-	on LV winding: The test voltage of 3 kV ac, rms was applied between the LV winding and earth. The tank and HV winding were shorted together and earthed. The test voltage was applied for 60 seconds.	withstand power frequency voltage	Withstood	

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S	r.		Requirement as	Obtained	Remarks
N	0.	Particulars of test and Cl. No.	per specification	value	Kelliaiks
1	3.	Temperature-rise test:			Conforms
		(As per Cl.no.21.3.b of IS 1180 (Part 1)			
		:2014)			
		(At Tap No. 7)			
		Before starting test, the dimensions of tank			
		with radiators were measured & recorded.			
		Size of tank:		1	
		L-1120 mm,W-470 mm,			
1		H1-1080 mm, H2-1060 mm			
		Size of fins:			
		L-800 mm, W-230 mm			
		No. of radiators-04			
		No. of fins per radiator-03			
		Total losses fed for temperature-rise			
		test were 2516.55 Watts.		ŀ	
		(Measured no- load loss: 428.97 Watts &			
		load loss at 75°C at tap no. 7: 2087.58			
		Watts)			
		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	1		
		was attained. Top oil temperature was			
1		recorded hourly. After steady state			
		condition, the losses were brought down in reference to the rated current one hour			
		prior to shut down.			14
		At the shutdown, the hot windings			
		resistance were measured and	*		
		temperature-rise calculated.			
		A) Top oil temperature-Rise :	Max. 40°C	28.6°C	
		B) Winding Temperature Rise	HILLIAN DO PRIMA CONTROL VIOLENT SHAREN		
		(Resistance method)			
		1) HV Winding :	Max. 45°C	35.8°C	*:
		2) LV Winding	Max. 45°C	30.7°C	
		C) Ambient temperature at shutdown :		29.0°C	-
		D)Time of Shutdown(HRS)		01:30	

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TC538918000000614F								
REPORT NO.: RP-1819-026833 Sheet: 13 of 15								
DATE : 10.10.2018							-	
	Sr.	Particulars of test and Cl. No.			Requirement as	Obtained Value	Remarks	
	No.			a CI. No.	per specification	value	Conforms	
	14.	Magnetic bal		ation no 317 -			Comornis	
		(As per CBIP manual; Publication no.317 - 2013)						
			Applied	Measured				
		Voltage Applied	Voltage	Voltage				
		Between	(Volts)	Between				
1		120000000000000000000000000000000000000		2v & 2n	50 to 90 V	77.87		
		2u & 2n	100.10	2w & 2n	00 00 00 0	22.81		
		· ·		2u & 2n	30 to 70 V	50.88	1	
		2v & 2n	100.25	2w & 2n	30 to 70 V	49.29		
		2 9. 25	100.00	2u & 2n		23.57		
		2w & 2n	100.00	2v & 2n	50 to 90 V	76.90		
	15.	. Oil leakage test: (As per cl.no.21.2.j of IS 1180 (Part 1): 2014) The assembled transformer with all fittings					Conforms	
							. pe 20	
					There should be	No	9	
		including bus	hinas in posit	ion was tested		leakage		
1		including bushings in position was tested at a pressure at the top equivalent to the			III was a second of the second	observed.		
				the base of the				
		tank for 8 hou						
	16.	Pressure tes	st (routine te	st):			Conforms	
		(As per cl.no.21.2.h of IS 1180 (Part 1): 2014)					5	
1								
		The transfer	mor tank wit	h holted cover	There should be	No		
	The transformer tank with bolted cover was tested at an air pressure of 35 kPa					leakage		
above atmosphere pressure mainta						observed.		
		Caratterante en estados paralles en estados en	nk for 10 min.	560X 15	P 2 3			
Ī	131) MARKHAN'							

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TC538918000000614F

TC53891800000614F								
REF	REPORT NO.: RP-1819-026833 Sheet: 14 of 15							
	DATE : 10.10.2018							
Sr.	1	F F	The Average of the		Requirement as	Obtained	30.	
No.	125.7 Page 11 Tel 1 California (125.0)	lars of test a		•	per specification	Value	Remarks	
17.	A THE PROPERTY OF THE PROPERTY	st (type test)				.0	Conforms	
	(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 were							
		after pressu		been				
	released.	arter pressu	ire rias	DCCII				
	i cicasca.					1		
	Deflection	Length	of plate					
	Measured a				1992			
	HV side	1120			Max. 6.5 mm	0.7 mm		
	LV side	1120			Max. 6.5 mm	0.4 mm		
	Side A	470			Max. 5.0 mm	0.1 mm		
	Side B	470		1	Max. 5.0 mm	0.0 mm	(C.)	
	> The transformer tank was subjected to vacuum of 500 mm of Mercury for 30 minutes. The permanent deflection of flat plates were recorded, after vacuum has been released.							
	Deflection Length of plate							
	Measured at (mm)							
	HV side 1120		Max. 6.5 mm	0.4 mm				
-1	LV side	1120			Max. 6.5 mm	0.1 mm	35.0	
	Side A	470			Max. 5.0 mm	0.0 mm		
	Side B	470			Max. 5.0 mm	0.0 mm		
				*				
	HV SIDE		There should be no	No air				
					air leakage at any	leakage		
	17				point.	observed.		
	SII	DE A	SIDE B		• One of the control			
			× 1		A . 000 - 000	-		

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LV SIDE





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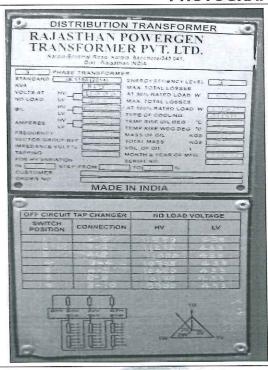


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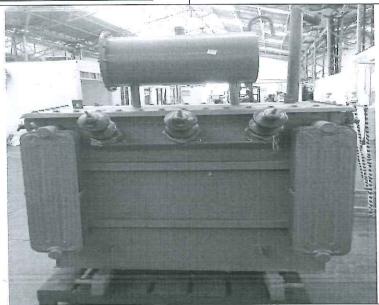
REPORT NO.: RP-1819-026833 Sheet: 15 of 15

DATE : 10.10.2018

PHOTOGRAPHS OF TEST SAMPLE







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