Test Reports

PROLIFIC SYSTEMS & TECHNOLOGIES PVT. LTD.

Transformer Test Group

Ultra High Voltage Laboratory

Ref :CG/2011/2012/3/883

Reactor Test Certificate

Customer	:	M/s PGCIL Shunt Reactor
Object	:	50 MVAr , 3 phase , 420 kV , Shunt Reactor
Work Order No.	:	66110-P-517-01
Transformer Serial No.	:	6006528
LOA Ref. No.	:	C-14005-S119A-7/LOA-I/2250 DATED 22 /12 /2006

PERFORMANCE : The Reactor meets the contractual / guaranteed performance satisfactorily

Test Duration : 16 th 22 nd August 2008

Date of Issue : 23/06/2008

Customer Representatives :

Customer 1 — **Designation**

Customer 2 — **Designation**

Customer 3 — **Designation**

Customer 4 — **Designation**

Prepared By : **A.K.Singh**

Checked & Approved By : **(P M Hathal), Manager TTG**

Note 1: The test certificate relates only to the item tested.

Ref :	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS: 2026		

List Of Tests

Ref ::	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

Electrical Parameters of the Transformer

VOLTAGE CLASS	:	420 kV
PHASE	:	Three
WINDING DESIGNATION	:	HV
TERMINAL NOTATIONS	:	U,V,W,N
RATED CAPACITY [MVA]	:	
ONAN	:	50
RATED VOLTAGE[KV]	:	420
RATED CURRENT[A]	:	68.73
RATED FREQUENCY[HZ]	:	50
CONNECTIONS	:	Three Phase

INSULATION LEVELS	LINE TERMINALS		NEUTRAL TERMINALS
HV	LI - 1300kVp SI : 1050kVp	AC - 230kVrms	LI - 550kVp

TYPE OF TAP CHANGER : NONE

Ref :	CQ/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

MEASUREMENT OF WINDING RESISTANCE

Date : 05-May-2012

Top Oil temp:- 35°C **Bot Oil temp:-** 35°C **Avg Oil temp:-** 35°C

HV (420 kV) Winding Resistance in Ohms

Phase	Terminal	At Test Temperature	At 75 °C
'U' Phase	V-N	3.0020	3.4467
'V' Phase	V-N	3.0040	3.4490
'W' Phase	W-N	2.9090	3.3400

Prolific Systems & Technologies Pvt. Ltd.

Transformer Test Group

Ref :	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

MEASUREMENT OF INSULATION RESISTANCE

Date : 22-Aug-2008

Insulation Resistance in MegaOhms (5 kV Megger)	
Measured Between	**HV / Tank + E**

Bottom Oil Temp. :36°C Top Oil Temp. :36°C Average Temp. :36°C

15 Seconds	374
60 Seconds	776
600 Seconds	1640
PI Ratio 600/60	2.11

Ref :	CQ/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

SEPARATE SOURCE VOLTAGE WITHSTAND TEST

Date : 18-Aug-2008

Between	Frequency (Hz.)	KV(RMS)	Test Time [secs.]	Remarks
HV\Tank + E	50	230	60	Withstood

Ref :	CQ/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

SWITCHING IMPULSE VOLTAGE WITHSTAND TEST

Date : 04-May-2012

Switching Impulse Voltage Withstand Test

Ref: TTG/SIM/SR/235308-08

Terminal Tested : HV(Phase - U;Phase - V;Phase - W)

Test Level : HV(SI:1050 kVp)

Polarity : [-] Negative

Tap Position : HV(no tap;no tap;no tap)

Terminal Tested : Phase - U Tap No :no tap					
Percent Level	Voltage Applied (kV)	Graphic Records			Result
		File Reference	Voltage	Current	
RFW	788.4	TEST/POWERGRD/SU50R_12.528	Channel-1	Channel-2	Withstood
100FW	1046	TEST/POWERGRD/SU50R_13.528	Channel-1	Channel-2	Withstood
100FW	1050	TEST/POWERGRD/SU50R_14.528	Channel-1	Channel-2	Withstood
100FW	1050	TEST/POWERGRD/SU50R_15.528	Channel-1	Channel-2	Withstood
Terminal Tested : Phase - V Tap No :no tap					
Percent Level	Voltage Applied (kV)	Graphic Records			Result
		File Reference	Voltage	Current	
RFW	786.80	TEST/POWERGRD/SV50R_07.528	Channel-1	Channel-2	Withstood
100FW	1050	TEST/POWERGRD/SV50R_08.528	Channel-1	Channel-2	Withstood
100FW	1050	TEST/POWERGRD/SV50R_09.528	Channel-1	Channel-2	Withstood
100FW	1050	TEST/POWERGRD/SV50R_10.528	Channel-1	Channel-2	Withstood
Terminal Tested : Phase - W Tap No :no tap					
Percent Level	Voltage Applied (kV)	Graphic Records			Result
		File Reference	Voltage	Current	
RFW	786.8	TEST/POWERGRD/SV50R_02.528	Channel-1	Channel-2	Withstood
100FW	1050	TEST/POWERGRD/SV50R_03.528	Channel-1	Channel-2	Withstood
100FW	1050	TEST/POWERGRD/SV50R_04.528	Channel-1	Channel-2	Withstood
100FW	1050	TEST/POWERGRD/SV50R_05.528	Channel-1	Channel-2	Withstood

Ref :	CQ/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

LIGHTINING IMPULSE VOLTAGE WITHSTAND TEST

Date : 11-May-2012

Lightning Impulse Voltage Withstand Test

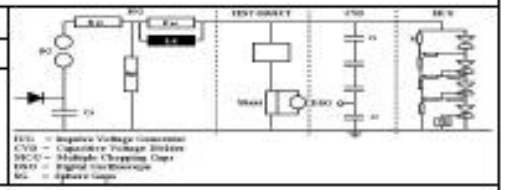
Ref: TTG/LIMPSR/2354/08-08

Terminal Tested : HV(Phase - U;Phase - V;Phase - W)

Test Level : HV(FW:1300 kVp)

Polarity : [-] Negative

Tap Position : HV(no tap;no tap;no tap)

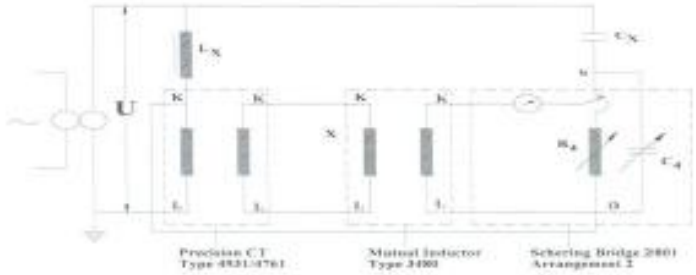


Terminal Tested : Phase - U Tap No :no tap					
Percent Level	**Voltage Applied (kV)**	**Graphic Records**			**Result**
		File Reference	**Voltage**	**Current**	
RFW	975	TEST/POWERGRD/1U50R_17.528	Channel-1	Channel-2	Withstood
FW	1306	TEST/POWERGRD/1U50R_19.528	Channel-1	Channel-2	Withstood
FW	1308	TEST/POWERGRD/1U50R_20.528	Channel-1	Channel-2	Withstood
FW	1306	TEST/POWERGRD/1U50R_18.528	Channel-1	Channel-2	Withstood
Terminal Tested : Phase - V Tap No :no tap					
Percent Level	**Voltage Applied (kV)**	**Graphic Records**			**Result**
		File Reference	**Voltage**	**Current**	
RFW	973.90	TEST/POWERGRD/1V50R_22.528	Channel-1	Channel-2	Withstood
FW	1303	TEST/POWERGRD/1V50R_24.528	Channel-1	Channel-2	Withstood
FW	1303	TEST/POWERGRD/1V50R_25.528	Channel-1	Channel-2	Withstood
FW	1303	TEST/POWERGRD/1V50R_23.528	Channel-1	Channel-2	Withstood
Terminal Tested : Phase - W Tap No :no tap					
Percent Level	**Voltage Applied (kV)**	**Graphic Records**			**Result**
		File Reference	**Voltage**	**Current**	
RFW	973.90	TEST/POWERGRD/1W50R_27.528	Channel-1	Channel-2	Withstood
FW	1301	TEST/POWERGRD/1W50R_29.528	Channel-1	Channel-2	Withstood
FW	1303	TEST/POWERGRD/1W50R_30.528	Channel-1	Channel-2	Withstood
FW	1301	TEST/POWERGRD/1W50R_28.528	Channel-1	Channel-2	Withstood

Ref :	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

MEASUREMENT OF LOAD LOSS AND IMPEDANCE VOLTAGE

Date : 30-Mar-2012



Test Circuit for reactance and loss measurement

Where , Lx =Reactnace of shunt reactor under test

U1 = CT Ratio	20	
M3 = Mutual Inductance	1.0032	mH
Cn=Capacitance of Standard Capacitor	50.915	pF

C4 = Bridge Capacitnace

R4 = Bridge Resistance

Calculation of Lx ,Impedance Z, Tan Delta & Loss

Lx = M3/U1 x C4 /Cn H ,Impedance Z =X=wLx =2¶ fLx Ohms

Tan delta = 1/w C4R4 ; Loss at rated voltage P = U^2/Z x tan δ x 10^{-3} KW

Loss at rated current = (Rated current/ Test current) ^{2} x P KW

Reactance and loss measurement was carried out using Tettx Schering bridge type 2801 as per above figure

Bridge arrangement

CT Ratio	U1	20	
Mutual Inductance	M3	1.0032	mH
Capacitance of standard Capacitor	Cn	50.915	pF

Ref :	CQ/2011/2012/3/683	**Customer :**	M/s PGCIL
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Applicable Standard :	IS:2026		

MEASUREMENT OF LOAD LOSS AND IMPEDANCE VOLTAGE

Date : 30-Mar-2012

Loss and Impedance Measurement

Phase	Temp:	Test Voltage	Resis tance	Capaci tance	Impe dance	Test Current	Tan Delta	Loss at rated Voltage
U	33.50	242.77	138.92	11.308	3499.63	69.37	0.002026	34.12
V	33.50	242.77	159.92	11.336	3509.06	69.18	0.0017556	29.49
W	33.50	242.77	301.92	11.322	3502.77	69.31	0.0009311	15.67

Calculation of loss at 75 ° C and at rated current

Phase	Temp Coef	Losses at rated voltage and at 75° C KW	Losses at rated current and at 75 °C, KW
U	0.0465	35.39	35.39
V	0.0402	30.76	30.76
W	0.0319	16.71	16.71

Total Loss at rated current	83.0000	[kW]	Average Impedance	3504	Ohm
Guranteed Loss	85	[kW]	Guranteed Impedance	3528	Ohm

Note : Temp. co-efficient taken from similar Shunt Reactor W.O.No 64053-A -517-01 , Sl no 6006245 for PGCIL

Prolific Systems & Technologies Pvt. Ltd.

Transformer Test Group

Ref : CG/2011/2012/3/683 **Customer :** M/s PGCIL

W.O.No : 66110-P-517-01 **Serial No :** 6006528

Applicable Standard : IS:2026

TEMPRATURE RISE TEST

Date : 11-May-2012

Measured no-load loss [kW][Po]	:	0
Measured load loss [kW] [Pk]	:	35.39
Total losses to be fed [kW] [Po + Pk]	:	35.39
Supply side.: HV Short side.: RE Tap position .	:	-
Rated Current	:	A
Type of cooling	:	ONAN [50 MVA]

INPUT				TEMPERATURES [°C]										
Hour	kW	kV	A	t1	t2	t3	TAvg	I/L1	O/L1	ty	dty			
10:00		420		24.93	24.93	24.93	24.93	27.70	25.70	28.00	3.07			
11:00		420		25.60	25.60	25.60	25.60	28.40	26.30	29.00	3.40			
12:00		420		26.53	26.53	26.53	26.53	31.10	27.10	33.50	6.97			
13:00		420		27.23	27.23	27.23	27.23	35.30	29.10	37.50	10.27			
14:00		420		28.10	28.10	28.10	28.10	38.10	31.50	40.50	12.40			
15:00		420		28.67	28.67	28.67	28.67	40.80	33.30	43.50	14.83			
16:00		420		29.03	29.03	29.03	29.03	43.20	35.20	46.00	16.97			
17:00		420		28.90	28.90	28.90	28.90	45.00	36.20	47.50	18.60			
18:00		420		29.03	29.03	29.03	29.03	43.20	35.20	46.00	16.97			
19:00		420		29.00	29.00	29.00	29.00	47.90	38.30	52.00	23.00			
20:00		420		28.67	28.67	28.67	28.67	50.40	39.80	55.00	26.33			
21:00		420		28.53	28.53	28.53	28.53	50.50	40.00	55.00	26.47			
22:00		420		28.57	28.57	28.57	28.57	50.70	39.50	55.00	26.43			
23:00		420		28.63	28.63	28.63	28.63	50.90	40.30	55.00	26.37			
00:00		420		28.27	28.27	28.27	28.27	51.80	40.80	57.00	28.73			
01:00		420		27.87	27.87	27.87	27.87	52.30	41.20	57.50	29.63			
02:00		420		27.87	27.87	27.87	27.87	53.20	42.50	58.50	30.63			
03:00		420		27.53	27.53	27.53	27.53	53.50	42.60	59.00	31.47			
04:00		420		27.03	27.03	27.03	27.03	54.60	43.20	59.00	31.97			
05:00		420		26.90	26.90	26.90	26.90	54.60	43.60	59.50	32.60			
06:00		420		26.63	26.63	26.63	26.63	55.00	43.40	60.00	33.37			

t1..... t3 : Ambient Temperature
t [Avg] : Avg. Ambient Temp.

I/L1....I/L2 : Cooler Inlet Temp.
O/L1..O/L2:Cooler Outlet Temp.

ty : Top Oil Temperaure
D ty : Top Oil Temp. Rise

Ref :	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

TEMPRATURE RISE TEST

Date : 11-May-2012

Measured no-load loss [kW][Po]	:	0
Measured load loss [kW] [Pk]	:	35.39
Total losses to be fed [kW] [Po + Pk]	:	35.39
Supply side.: HV Short side.: RE Tap position .	:	-
Rated Current	:	A
Type of cooling	:	**ONAN [50 MVA]**

INPUT				TEMPERATURES [°C]										
Hour	**kW**	**kV**	**A**	**t1**	**t2**	**t3**	**TAvg**	**I/L1**	**O/L1**	**ty**	**dty**			
07:00		420		26.30	26.30	26.30	26.30	55.30	43.70	60.50	34.20			
08:00		420		27.27	27.27	27.27	27.27	56.40	44.50	62.00	34.73			
09:00		420		27.80	27.80	27.80	27.80	56.80	44.90	62.50	34.70			
10:00	45	420		28.33	28.33	28.33	28.33	57.60	45.90	63.00	34.67			

HV Winding ShutDown Phase 1

t1..... t3 : Ambient Temperature t [Avg] : Avg. Ambient Temp.	I/L1....I/L2 : Cooler Inlet Temp. O/L1..O/L2:Cooler Outlet Temp.	ty : Top Oil Temperaure D ty : Top Oil Temp. Rise

Ref :	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
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TEMPRATURE RISE TEST

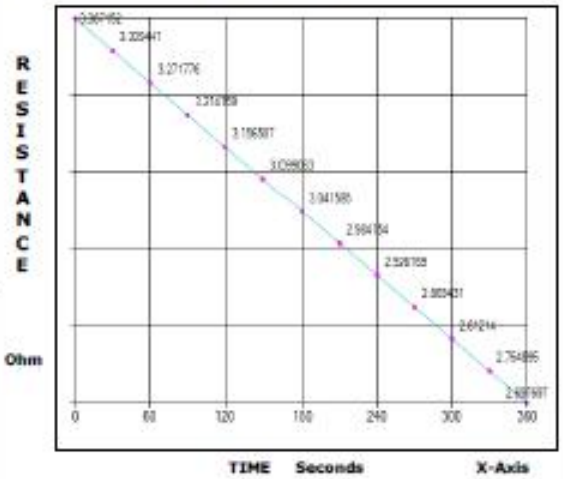
Date : 11-May-2012

RESISTANCE - TIME CURVE

Time [Sec]	HV R [Ohm]	Ext.Pol. R[Ohm]
0		3.387152
30	3.32	3.329441
60	3.27	3.271776
90	3.21	3.214159
120	3.18	3.156587
150	3.14	3.099063
180	3.00	3.041585
210	2.97	2.984154
240	2.93	2.926769
270	2.86	2.869431
300	2.82	2.812140
330	2.76	2.754895
360	2.70	2.697697

COOLING TYPE : ONAN/50 **MVA**

Y-Axis **WINDING -- HV**



TIME **Seconds** **X-Axis**

Ref : CG/2011/2012/3/683 **Customer :** M/s PGCIL

W.O.No : 66110-P-517-01 **Serial No :** 6006528

Applicable Standard : IS:2026

TEMPRATURE RISE TEST

Date : 11-May-2012

Temperatur Rise Test					
DETERMINATION OF TOP OIL TEMP. RISE			HV		
Reference Power		MVA			
Top Oil Temp. Rise at Total Losses		°C	34.67		
Cooler Inlet Temp. [1st group]		°C	57.60		
Cooler Outlet Temp.[1st group]		°C	45.90		
Avg.Top Oil Temp. Rise at steady state condn.		°C	28.82		
Corrected Top Oil Temp. Rise to the Input Rated Loss		°C	34.67		
DETERMINATION OF WINDING TEMP. RISE			HV		
Reference Power		MVA	ONAN/50		
Top Oil Temp. Rated Current		°C	34.67		
Cooler Inlet Temp.[1st group]		°C	57.60		
Cooler Outlet Temp.[1st group]		°C	45.90		
Avg. Top Oil Temp. at Time of Shutoff		°C	28.82		
Reference Cold Resistance at :00.0°C		Ohms	3.002		
Winding Resis. at Switchoff From (Cooling Curve)		Ohms	3.387152		
Winding Temp. at Switchoff		°C	41.31		
Gradiant		°C	12.49		
RESULTS			HV		
Top Oil Temp. Rise		°C	34.67		
Winding Temp. Rise		°C	41.31		
GUAR. VALUE	Top Oil Temperature Rise	MVA	40		
	Mean Winding Temp. Rise	MVA	45		

Ref :	CQ/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

MEASUREMENT OF CAPACITANCE AND DISSIPATION FACTOR

Date : 22-Aug-2008

Average Oil Temperature: 36.0 °C

Bushing under	Measured	Test voltage [kV]	Capacitance pF	P. F. (Tan)%	
				36.0 °C	20 °C
UST	U+V+W+N/Tank	10	8678.0000	0.003400	0.002378

Ref :	CQ/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

9) MEASUREMENT OF ACOUSTIC NOISE LEVEL

Date : 05-May-2012

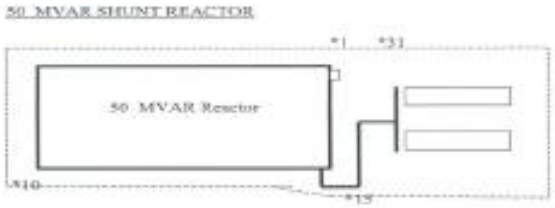


FIGURE : 1

Noise level measured in accordance with specification : **NEMA-TR1**

when viewed from above at a distance of 0.3 **meter from the periphery of the principal radiating surface and distance between two points is** 0.9 **meter.**

Background Noise[dB] : 45

Point No	Ambient	
	1/3 rd	2/3 rd
1	69.7	71.5
1	69.7	71.5
1	69.7	71.5
1	69.7	71.5
2	73.5	71.6
2	73.5	71.6
2	73.5	71.6
2	73.5	71.6
3	73.7	75.7
3	73.7	75.7
3	73.7	75.7
3	73.7	75.7
4	76	75
4	76	75
4	76	75
4	76	75
5	73.1	72.2
5	73.1	72.2
5	73.1	72.2

Ref :	CQ/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

9) MEASUREMENT OF ACOUSTIC NOISE LEVEL

Date : 05-May-2012

5	73.1	72.2
6	76.8	74.1
6	76.8	74.1
6	76.8	74.1
6	76.8	74.1
Mean:-	**74**	**74**

Ref :	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

DGA TEST ON OIL

Date : 07-Apr-2012

DGA Test[Before Heat Run Test/After Heat Run Test]

Test Conducted	Before Heat Run Test	After Heat Run test
Total Gas Contents ml Gas/100 ml oil	1.0	1.0
Gas Constituents [ppm]		
Methane [CH4]	Nil	Traces
Ethylene [C2H4]	Nil	Nil
Ethane [C2H6]	Nil	Nil
Acetylene [C2H2]	Nil	Nil
Hydrogen [H2]	0.17	0.62
Carbon monoxide [CO]		
Carbon dioxide [CO2]		

Ref :	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

MEASUREMENT OF ZERO PHASE SEQUENCE IMPEDANCE

Date : 04-May-2012

Zero Sequence Reactance

Base : 50 MVA

Between	Tap Position	Rated Voltage kV	Rated Current Amps	Test Voltage kV	Test Current Amps	Test Frequency Hz	Xo Ohms
U+V+W+N	-	420	68.73	63.9	56.25	49.7	3,428.57

Ref :	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

ISOLATION TEST

Date : 22-Aug-2008

Isolation Test

3.5 KV DC applied for 60 seconds , between core to end frame , core to tank and end frame to tank.The reactor withstood the test satisfactorily.

Prolific Systems & Technologies Pvt. Ltd.

Transformer Test Group

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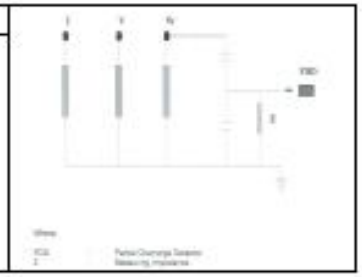
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

INDUCED OVER VOLTAGE WITHSTAND TEST WITH PARTIAL DISCHARGE MEASUREMENT (WITHOUT LINE CURRENT)

Date : 09-May-2012

Induced Over Voltage Withstand test with Partial Discharge measurement.

The test was performed in a single phase connection as shown below.The voltage of line terminal of each voltage winding was raised phase by phase to 364 kv above earth using a high voltage testing transformer.Each time the voltage was held constant for a duration of 30 minutes during which the partial discharge were monitored.The supply frequency during the test was 160 Hz.



PD Calibration

Before the application of test voltage,the measuring channel from each terminal under test was calliberated with repetitive pulses of 500 pC between the terminal & earth.The calliberation factor (s) K ,established for each channel as tabulated below , were used for the evaluation of the results during the test

Terminals	Charge Injected pC	Charge Measured pC	Calibratio Factor k*
HV	HV	HV	HV
U	500	50	10.0
V	500	50	10.0
W	500	50	10.0

Test Result					Remark
Test Voltage kV	Time after start Min	Partial Discharge Level pC on			
		U Phase	V Phase	W Phase	Measured PD values are within the specified limit
		HV	HV	HV	
		Back Ground Noise			
364	0	60	40	40	
364	5	50	40	40	
364	10	40	40	40	
364	15	40	40	40	
364	20	40	40	40	
364	25	40	40	40	
364	30	40	30	40	
		Back Ground PD Level <=10 PC			

K* = Calibration Charge Injected (pC) / Measured Charge at Test Tap (pC)

Prolific Systems & Technologies Pvt. Ltd.

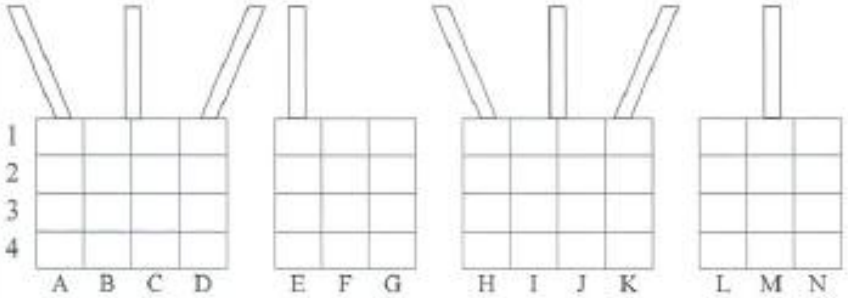
Transformer Test Group

Ref :	CQ/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

VIBRATIONS LEVEL MEASUREMENT

Date : 21-Jun-2012

Vibration level measurements were carried outon the above reactor on 17.08.2008. The locations of measurements and test results are given below. The job was energized and the rated voltage at the time of measurement. The test was conducted in presence of TTG engineers and customers representative.



Vibration Levels in Microns (Peak to Peak)

Guaranteed value 200 Microns maximum (Peak to Peak)

Average Guaranteed value 60 Microns maximum (Peak to Peak)

Location	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	6	13	16	13	5	30	8	8	5	5	10	14	32	11
2	13	9	13	5	5	28	11	5	10	5	7	14	20	15
3	8	7	17	9	10	32	10	5	5	7	13	32	40	15
4	15	6	30	8	6	27	5	7	5	10	5	20	25	10

Average Guaranteed value 12.95 Microns maximum (Peak to Peak)

Test Result : Satisfactory.

Prolific Systems & Technologies Pvt. Ltd.

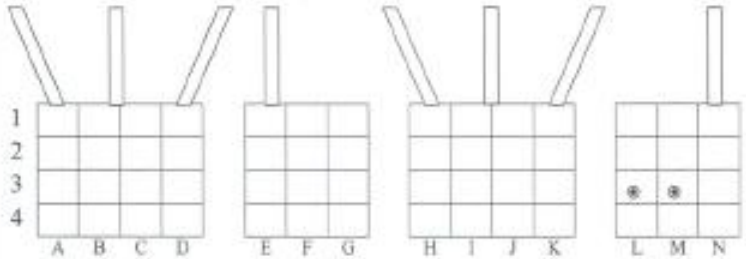
Transformer Test Group

Ref :	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

MEASUREMENT OF DYNAMIC STRESS

Date : 21-Jun-2012

Dynamic stress level measurements were carried out on the above reactor on 17.08.2008. The locations of measurements anr test results are given below. The job was energized at the rated voltage at the time of measurement. The test was conducted in presence of TTG engineers and customer representatives.



® Location of strain gauge.

(Guaranteed stress value 20 N/mm² maximum)

Location	Direction	Micro Strain	Stress
L3	Horizontal	1	0.294
L3	Vertical	2	0.588
M3	Horizontal	7	2.058
M3	Vertical	3	0.882

Test Result : Satisfactory.

Ref :	CQ/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

MEASUREMENT OF IMPEDANCE METHOD BY V/I METHOD

Date : 21-Jun-2012

Rated Current	Measeaured Current in Amp	Measeaured Voltage in kV	Measeaured Frequency in Hz	% Impedance in Ω
10 Ampere	10	4.47	49.4	452.43
60 Ampere	60	26.1	49.3	441.18

Ref :	CG/2011/2012/3/683	**Customer :**	M/s PGCIL
W.O.No :	66110-P-517-01	**Serial No :**	6006528
Applicable Standard :	IS:2026		

SUMMARY OF TESTS

Date : 11-May-2012

Summary Of Test Results

Sr. No.	Paritcular	Guaranteed	Measured	Remarks
1	Loss at 1.0 p.u. current and voltage at 75 °C, kW	85 Max	82.78	Satisfactory
2	Impedance at rated voltage, Ω	3528 (+0% to -5% Tol.)	3504.13	Satisfactory
3	Partial Discharge level. pC	500 Max.	60.00	Satisfactory

Summary For Temperature Rise Test

Sr. No.	Paritcular		Guaranteed	Measured	Remarks
1	Top Oil Rise	[°C]	50	34.6	Satisfactory
2	Mean Winding Rise	[°C]	55	42.22	Satisfactory

AREVA

SHUNT REACTOR TEST REPORT

Reacter Details

Work Order No. :	TD002
Serial No. :	TD001
Customer :	Prolific Systems & technologies Pvt. Ltd.
Customer Referance :	PRO0001
Unit :	1
Rating :	100MVA
Referance Standard :	IS:2026
Testing Date :	24-03-2012
Inspection Date :	
Transformer Type :	Reactor Transformer
Manufacturer :	ABC Corp. Pvt. Ltd.
Note :	The Transformer tested as per Instructions.

Prepared By :	Verified and Approved By :	Witnessed By :
Admin Admin1	Testing Engineer	Customer Representative

AREVA

SHUNT REACTOR TEST REPORT

Work Order No : T0002 **Serial No :** T0001

Customer : Prolific Systems & technologies Pvt. Ltd. **Test Date :** 24-03-2012

Reactor Parameters

Power :	1,000	**Phases :**	3
Voltage :	150	**Total Rdc :**	2
Unit :	1	**Winding Connections :**	STAR
Flux :	20	**Frequency :**	50
No. Of Limbs :	3	**Power Source :**	
Plot Upper Limit :	100	**Rated Current :**	450.00
Plot Lower Limit :	10	**I nom :**	636.40
Phase Tested :	3	**I max :**	954.59
Note :	Note 1		

Prepared By :	**Verified and Approved By :**	**Witnessed By :**
Testing Engineer	Admin Admin1	Customer Representative

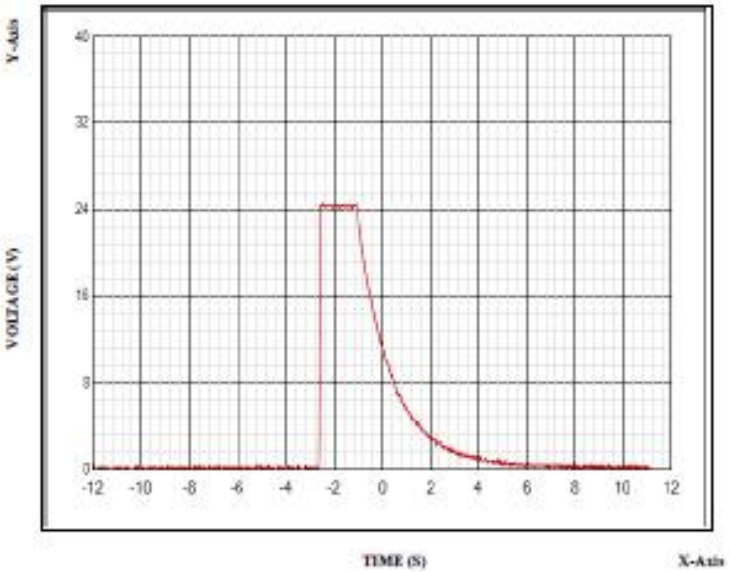
AREVA

SHUNT REACTOR TEST REPORT

Work Order No. : T0002 | Serial No. : T0001

Customer : Prolific Systems & technologies Pvt. Ltd. | Test Date : 24-05-2012

Linearity Report -Voltage V: Time Graph



Prepared By :	Verified and Approved By :	Witnessed By :
Admin Admin1	Testing Engineer	Customer Representative