

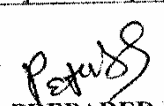


# ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

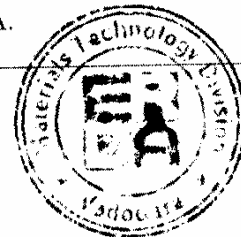
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tdc@erda.org, ene@erda.org



## TEST REPORT

SHEET 01 OF 02

<b>NAME &amp; ADDRESS OF CUSTOMER:</b> M/s. Comfort Insta -Power Ltd., Plot No.275 -276,GIDC Estate, Anjar-Kutch-Gujarat.	<b>REPORT NO:</b> MNDTTR0061599 <b>DATE:</b> 24/07/2008					
	<b>CUSTOMER REF. NO. &amp; DATE:</b> CIPL/ERDA/TFR TEST/05072008/05 Dated: 05/07/2008					
	<b>DATE OF SAMPLE RECEIPT</b> 08/07/2008	<b>DATE OF TESTING</b> 19/07/2008				
<b>SAMPLE DESCRIPTION:</b> Oil Cooled Distribution Transformer [1 No] Details as mentioned by the customer's letter Power Rating: 25 kVA, Voltage Rating : 11/0.433 kV Sr. No.: 001	<b>SAMPLE IDENTIFICATION:</b> <table><tr><td><b>Serial No</b></td><td><b>ERDA Sample Code No.</b></td></tr><tr><td>001</td><td>HCCTWO0062637</td></tr></table>		<b>Serial No</b>	<b>ERDA Sample Code No.</b>	001	HCCTWO0062637
<b>Serial No</b>	<b>ERDA Sample Code No.</b>					
001	HCCTWO0062637					
<b>TEST DETAILS:</b> Audible Sound Level Measurement	<b>TEST SPECIFICATION:</b> 1] For requirement: NEMA Pub.No.TR-1. 1980 2] For procedure: IEC 551-1987 3] As per Customer's Requirement					
<b>REMARKS:</b> 1] Corrected average audible sound level of the sample was 40.2 dB(A). 2] The sample conforms to the requirement of the above-mentioned test specification.						
 <b>PREPARED BY</b>	 <b>CHECKED BY</b>	 <b>APPROVED BY</b>				
<b>NOTE:</b> 1] This report relates only to the particular sample(s) received for testing in good condition at ERDA. 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.						



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 tdc@erda.org , ene@erda.org



REPORT NO: MNDTTR0061599

DATE: 24/07/2008

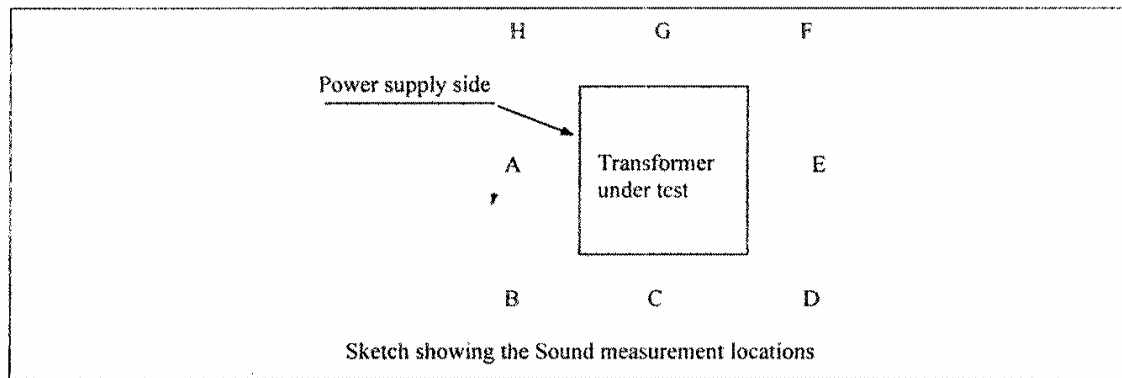
SHEET 02 OF 02

Transformer under test	: Oil Cooled Distribution Transformer Power Rating: 25 kVA, Voltage Rating : 11/0.433 kV Sr. No.: 001
Particulars of Test	: Audible Sound Level Measurement
Test Details	: Distance of measurement from test equipment: 0.3 m, Measurement was made at half the height of the transformer
Requirement	: Permissible Average Audible Sound Level: 48 dB(A) [Maximum] as per table 0-2 of NEMA Pub. No. TR-1- 1980

**Test Result:**

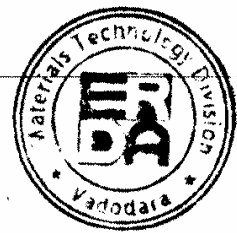
Sr. No.	Measurement Locations (Refer Sketch Below)	Ambient audible sound level before measurement of audible sound level of Transformer	Audible sound level from "Transformer at rated voltage & no load condition"	Ambient audible sound level after measurement of audible sound level of Transformer
		dB(A)	dB(A)	dB(A)
1	A	40.4	43.7	40.4
2	B	40.1	43.2	40.2
3	C	40.4	43.2	40.2
4	D	40.4	43.1	40.4
5	E	40.2	43.1	40.4
6	F	40.2	43.1	40.2
7	G	40.2	43.2	40.4
8	H	40.2	43.1	40.2

- 1) Average sound level of ambient: 40.3 dB(A)
- 2) Average sound level of combined transformer & ambient: 43.2 dB(A)
- 3) Corrected average sound level of transformer: **40.2 dB(A)**



8169078  
 PREPARED BY: *P. K. S.*  
 No: 1769078

CHECKED BY: *S. K.*





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Certificate No. : T-0071

## TEST REPORT

SHEET : 1 OF 2

<b>NAME &amp; ADDRESS OF CUSTOMER</b>  COMFORT INSTA-POWER LTD. PLOT NO.275-276,GIDC ESTATE, ANJAR-KUTCH, GUJARAT	<b>REPORT NO. :</b> PHV/03/707 <b>DATE :</b> 16.07.2008	
	<b>CUSTOMER REF.NO.</b>	<b>DATE</b>
	CIPL/ERDA/TFR TEST/05072008/03	05.07.2008
	<b>DATE OF SAMPLE RECEIPT</b>	<b>DATE OF TESTING</b>
	08.07.2008	14.07.2008
<b>SAMPLE DESCRIPTION</b>  <b>OIL COOLED DIST. TRANSFORMER</b> MFD. BY : Comfort Insta-Power Ltd. RATING : 25 KVA VOLTS : 11000/433 V (at no-load) CURRENT : 1.31/33.33 Amps PHASES : 3 %IMPEDANCE : 4.50 % VECTOR GROUP : Dyn 11 FREQUENCY: 50 Hz WINDING : Aluminium GUAR.MAX.TEMP. RISE IN OIL : 35°C	<b>SAMPLE IDENTIFICATION</b>  <b>ERDA IDENT. NO.:</b> HCCTWO 0062637 SERIAL NO. : 001 COOLING : ONAN YEAR OF MFG. : 2008 ENCLOSED DRG. NO.: 1. CIPL-0804 2. CIPL-0801 CUSTOMER : PASCHIM GUJARAT VIJ CO.LTD.	
<b>TEST DETAILS</b>  TEMPERATURE RISE TEST	<b>TEST SPECIFICATION</b>  As per IS : 2026.1977-1981 and Customer's Requirement	
<b>TEST RESULTS :</b> As per sheet 2 of 2.		
<b>REMARKS :</b> The Transformer <b>CONFORMS</b> to the guaranteed requirements as per above mention specification and customer's requirement for the above mentioned test.		
 <b>PREPARED BY</b>	 <b>CHECKED BY</b>	 <b>APPROVED BY</b>
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TEST REPORT NO.: PHV/03/707

SHEET : 2 OF 2

DATE : 16.07.2008

## TEST RESULTS:

### TEMPERATURE RISE TEST

( As per CL. No. 16.8 of IS:2026 – 1977 & Customer's requirement )

**NOTE :** Before starting the test, the external dimensions of Tank were measured & recorded as below.

- (A) SIZE OF TANK : L-705 mm , W-275 mm , H- 735 mm (Avg.)
- (B) FIN'S SIZE : L-500 mm, B-300 mm
- (C) NO. OF RADIATOR : 02
- (D) NO. OF FINS : 04

### GUARANTEED LOSSES TO BE FED FOR TEMPERATURE RISE TEST: 695

(As specified by the Customer 80 Watts No Load Loss + 615 Watts Load Loss at 75°C )

Total specified losses was fed to the transformer till steady state temperature was attained. Top oil temperature was recorded. After steady state condition. The losses brought down in reference to the rated current one hour prior to shut down.

At the shut down, the hot winding resistance were measured and temperature rise calculated.

[ Obtained results are recorded below ]

- a) Top oil Temperature Rise : 23.94°C
- b) Winding Temperature Rise (Resistance method)
  - i) HV Winding : 28.29°C
  - ii) LV Winding : 25.79°C
- c) Ambient temperature : 33.96°C

### GUARANTEED MAXIMUM TEMPERATURE RISE IN OIL / WINDING: 35°C / 40°C.

(As specified by the Customer)

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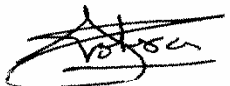


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Certificate No. : T-0071

## TEST REPORT

SHEET NO.: 1 OF 8

<b>NAME &amp; ADDRESS OF CUSTOMER</b>  <b>M/s. Comfort Insta-Power Ltd.</b> Plot no. 275-276, GIDC Estate, Anjar-Kutch-Gujarat-India.	<b>TEST REPORT NO.:</b> PHV/01/685 <b>DATE</b> : 14/07/2008	
	<b>CUSTOMER REF. NO.</b>	<b>DATE</b>
	CIPL/ERDA/TFR TEST/05072008/02	05/07/2008
	<b>DATE OF SAMPLE RECEIPT</b>	<b>DATE OF TESTING</b>
	08/07/2008	14/07/2008
<b>SAMPLE DESCRIPTION</b>  <b>DISTRIBUTION TRANSFORMER</b> RATING : 25 kVA VOLTS : 11000/433 Volts CURRENT : 1.31/33.33 Amps. PHASES : 03 COOLING : ONAN FREQUENCY : 50 Hz % IMPEDANCE : 4.50 % VECTOR GROUP : Dyn 11 CUSTOMER : Paschim Gujarat Vij Company Limited	<b>SAMPLE IDENTIFICATION</b>  SR. NO.: 001 YEAR OF MFG. : 2008 MFD. BY : Comfort Insta-Power Ltd. ERDA ID. NO. : LSCLWO 0062558/01 <b>ENCLOSURE</b> Drg. No. : i) CIPL-0801 Rev. : 00 & ii) CIPL-0804 Rev. : 00 <b>TEST SPECIFICATION</b> IS : 2026 – 1981 (Part – III), Cl. No. 13 & Test voltage was specified by customer.	
		
	<b>TEST CONDUCTED :</b> <b>Lightning Impulse Voltage Withstand Test</b> chopped on the tail on all the three Phases of HV side at <b>95 kVp</b> .	
	<b>WITNESSED BY :</b> Mr. Rajab Diwan – Comfort Insta-Power Ltd.	
<b>REMARKS :</b> From the observation of enclosed oscillographic records, it is concluded that the transformer <b>CONFORMS</b> to the requirements of the above mentioned standard with respect to the test carried out.		
 <b>PREPARED BY</b>	 <b>CHECKED BY</b>	 <b>APPROVED BY</b>
<b>Note :</b> 1. This report relates only to the particular sample received in good condition for testing by E.R.D.A. 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.		

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<b>TEST REPORT NO.:</b> PHV/01/685	<b>SHEET NO.:</b> 2 OF 8
<b>DATE</b> : 14/07/2008	
<b><u>HV - SIDE</u></b>	
<b><u>TEST PARAMETERS :</u></b>	
RATED VOLTAGE	: 11 kV
TEST VOLTAGE	: 95 kVp ( $\pm 3\%$ )
WAVE SHAPE	: 1.35/45.90 $\mu$ S
NOS. OF PHASE TESTED	: 3



### HV-SIDE

Sr. No.	Test Application Detail	Peak Magnitude (kVp)		
		1U-Phase	1V-Phase	1W-Phase
1.	Reduced Full Impulse Wave	58.18	59.05	58.35
2.	100 % Full Impulse Wave	92.95	95.28	94.92
3.	Reduced Chopped Impulse Wave	60.24	60.23	58.84
4.	100 % Chopped Impulse Wave	94.00	94.98	95.01
5.	100 % Chopped Impulse Wave	93.91	95.58	95.24
6.	100 % Full Impulse Wave	94.83	94.89	95.05
7.	100 % Full Impulse Wave	95.55	95.05	94.54

 <b>PREPARED BY</b>	 <b>CHECKED BY</b>
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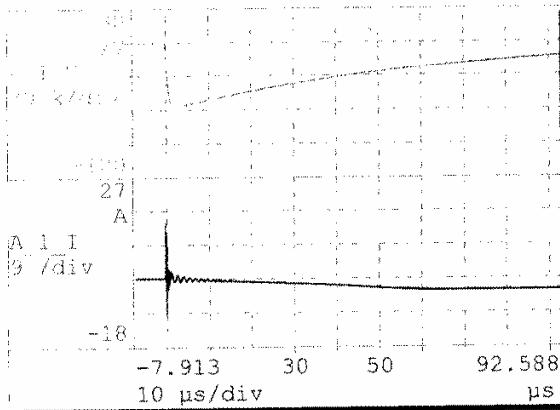


TEST REPORT NO. : PHV/01/685

SHEET NO. : 3 OF 8

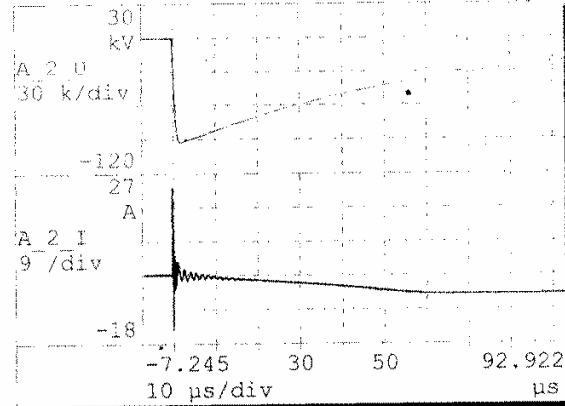
DATE : 14/07/2008

## LIGHTNING IMPULSE VOLTAGE WITHSTAND TEST ON DISTRIBUTION TRANSFORMER 1U-PHASE



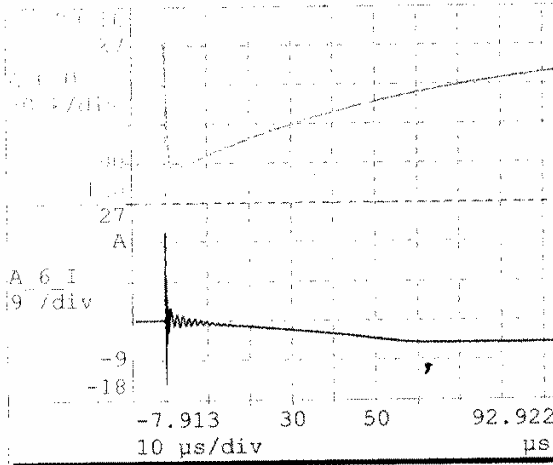
T1 1.3525 μS  
 T2 45.906 μS  
 kVp : -58.181 kVp

1. REDUCED FULL IMPULSE WAVE



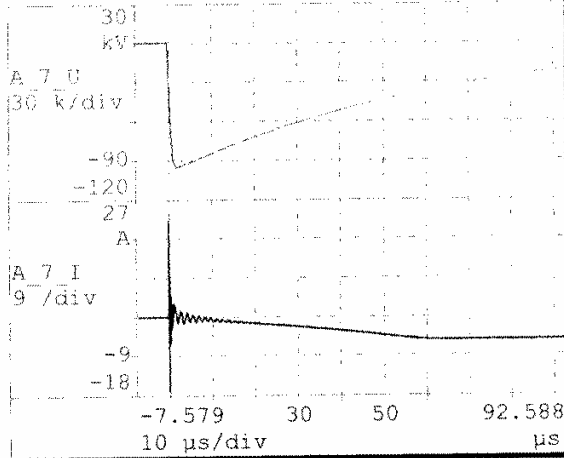
T1 1.3655 μS  
 T2 45.891 μS  
 kVp : -92.958 kVp

2. 100 % FULL IMPULSE WAVE



T1 1.3803 μS  
 T2 46.041 μS  
 kVp : -94.831 kVp

6. 100 % FULL IMPULSE WAVE

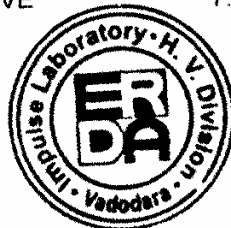


T1 1.3829 μS  
 T2 45.889 μS  
 kVp : -95.553 kVp

7. 100 % FULL IMPULSE WAVE

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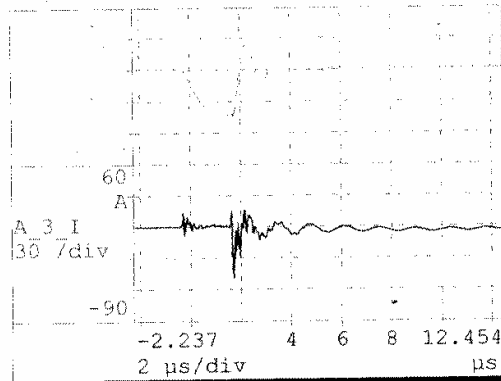


TEST REPORT NO. : PHV/01/685

SHEET NO. : 4 OF 8

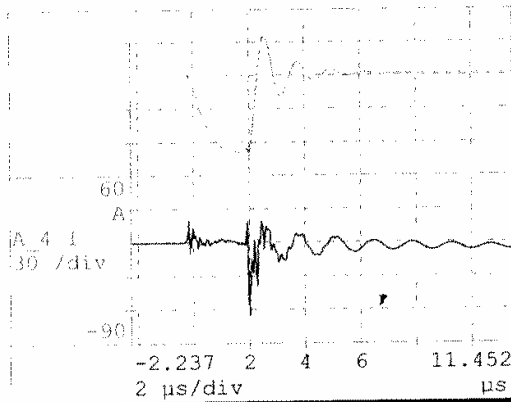
DATE : 14/07/2008

## LIGHTNING IMPULSE VOLTAGE WITHSTAND TEST ON DISTRIBUTION TRANSFORMER 1U-PHASE

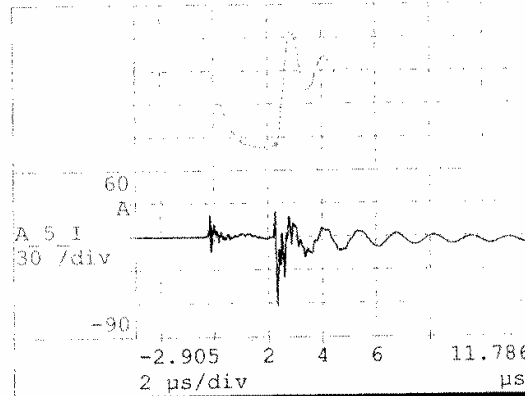


Tc : 2.1227 μS  
kVp : -60.247 kVp

### 3. REDUCED CHOPPED IMPULSE WAVE



Tc : 2.3153 μS  
kVp : -94.007 kVp

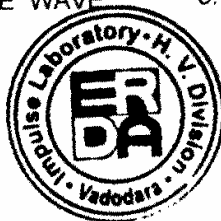


Tc : 2.6633 μS  
kVp : -93.918 kVp

### 4. 100 % CHOPPED IMPULSE WAVE

### 5. 100 % CHOPPED IMPULSE WAVE

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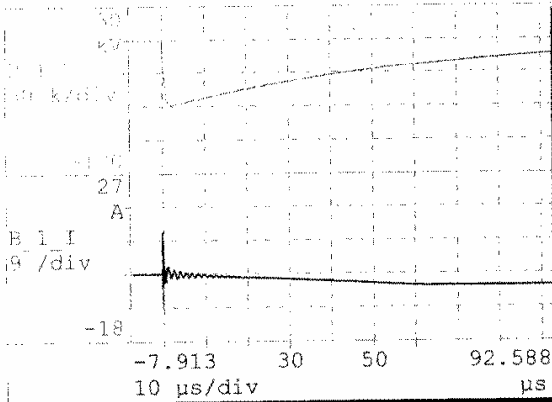
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TEST REPORT NO. : PHV/01/685  
DATE : 14/07/2008

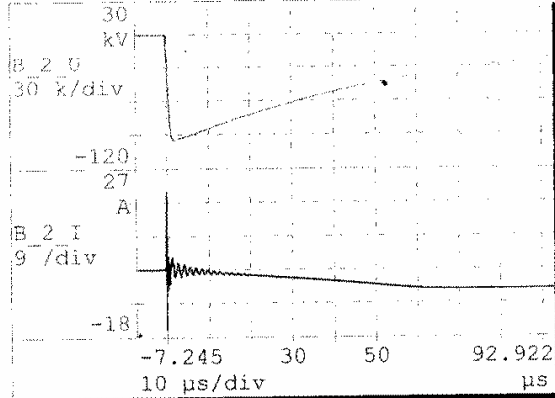
SHEET NO. : 5 OF 8

## LIGHTNING IMPULSE VOLTAGE WITHSTAND TEST ON DISTRIBUTION TRANSFORMER 1V-PHASE



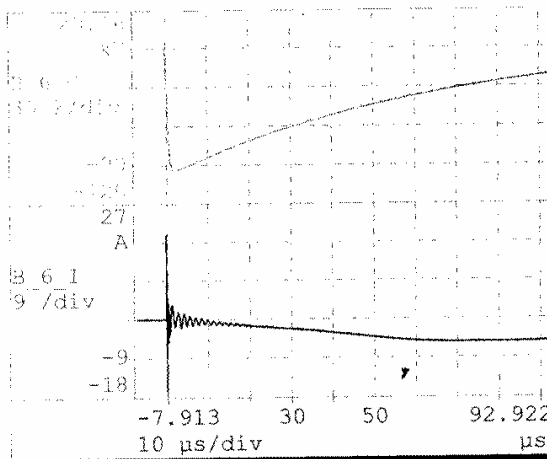
T1 : 1.3671 μS  
T2 : 46.085 μS  
kVp : -59.052 kVp

### 1. REDUCED FULL IMPULSE WAVE



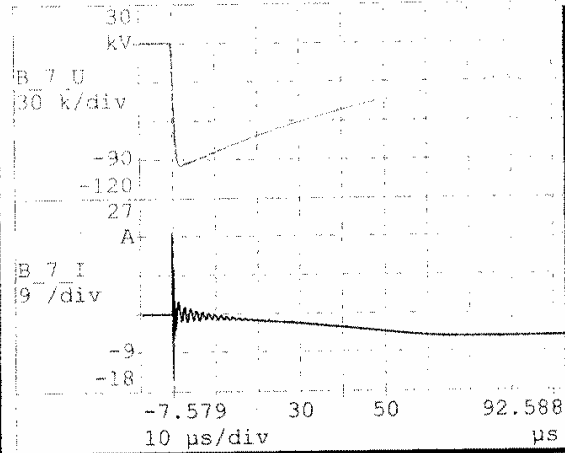
T1 : 1.3881 μS  
T2 : 45.975 μS  
kVp : -95.281 kVp

### 2. 100 % FULL IMPULSE WAVE



T1 : 1.3805 μS  
T2 : 46.096 μS  
kVp : -94.890 kVp

### 6. 100 % FULL IMPULSE WAVE



T1 : 1.3764 μS  
T2 : 46.078 μS  
kVp : -95.052 kVp

### 7. 100 % FULL IMPULSE WAVE

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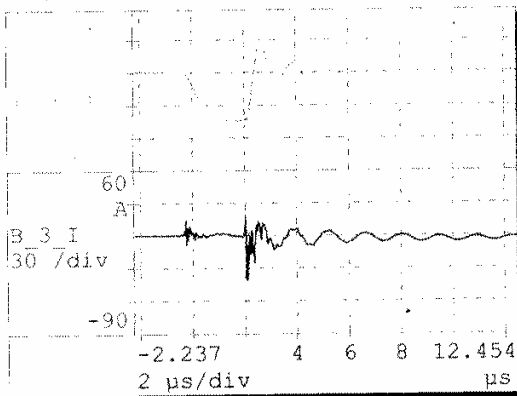
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TEST REPORT NO. : PHV/01/685  
DATE : 14/07/2008

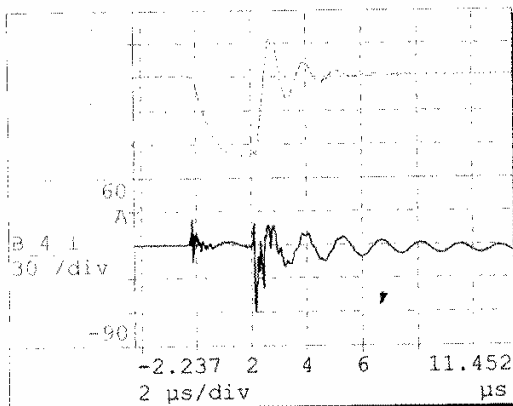
SHEET NO. : 6 OF 8

## LIGHTNING IMPULSE VOLTAGE WITHSTAND TEST ON DISTRIBUTION TRANSFORMER 1V-PHASE



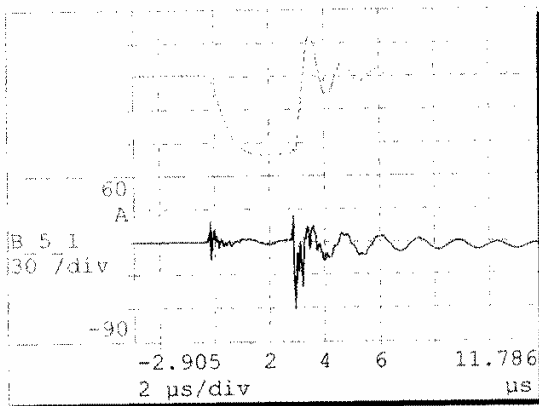
Tc : 2.5122 μs  
kVp : -60.231 kVp

### 3. REDUCED CHOPPED IMPULSE WAVE



Tc : 2.4919 μs  
kVp : -94.983 kVp

### 4. 100 % CHOPPED IMPULSE WAVE

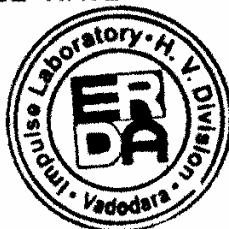


Tc : 3.2604 μs  
kVp : -95.580 kVp

### 5. 100% CHOPPED IMPULSE WAVE

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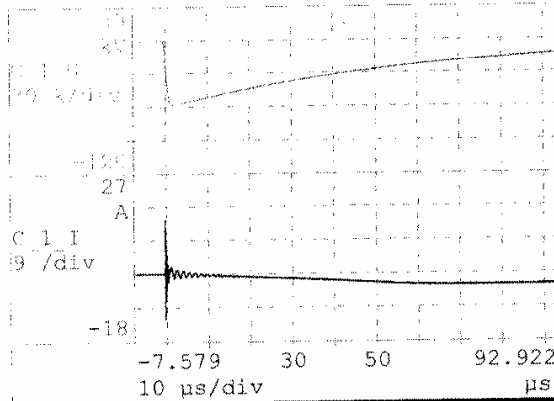


TEST REPORT NO. : PHV/01/685

SHEET NO. : 7 OF 8

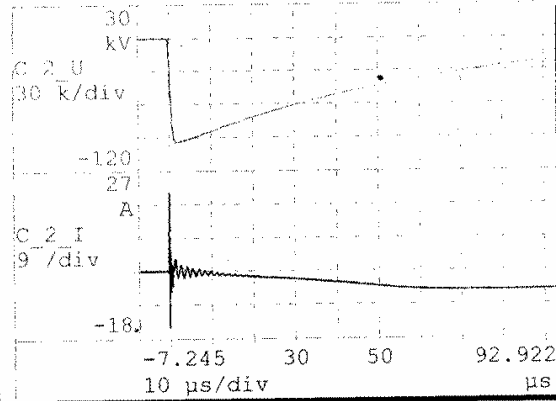
DATE : 14/07/2008

## LIGHTNING IMPULSE VOLTAGE WITHSTAND TEST ON DISTRIBUTION TRANSFORMER 1W- PHASE



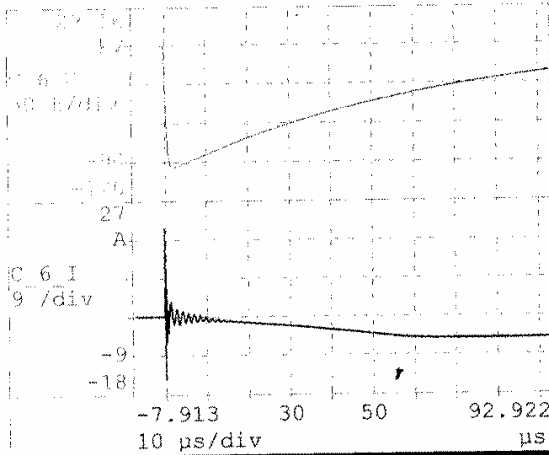
T1 1.3649 μS  
 T2 46.030 μS  
 kVp: -58.354 kVp

### 1. REDUCED FULL IMPULSE WAVE



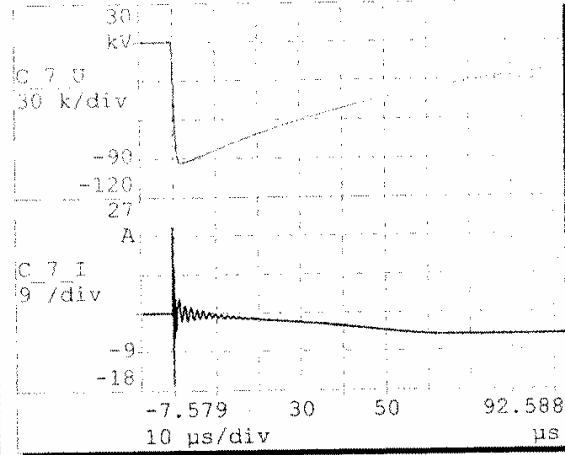
T1 1.3802 μS  
 T2 46.021 μS  
 kVp: -94.925 kVp

### 2. 100 % FULL IMPULSE WAVE



T1 1.3783 μS  
 T2 46.015 μS  
 kVp: -95.050 kVp

### 6. 100 % FULL IMPULSE WAVE



T1 1.3788 μS  
 T2 46.034 μS  
 kVp: -94.546 kVp

### 7. 100 % FULL IMPULSE WAVE

TE0042428

PREPARED BY



CHECKED BY



Certificate No. : T-0071

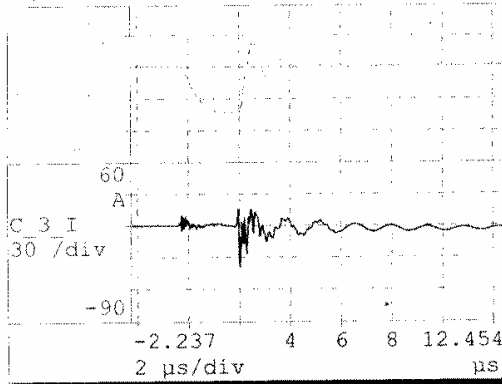
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 E-mail : erda@erd.org, dir@erd.org



**TEST REPORT NO. : PHV/01/685**  
**DATE : 14/07/2008**

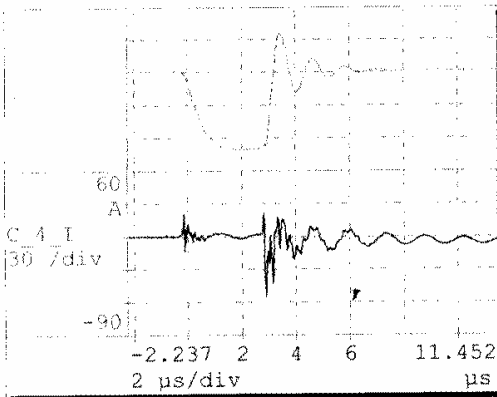
**SHEET NO. : 8 OF 8**

**LIGHTNING IMPULSE VOLTAGE WITHSTAND TEST ON DISTRIBUTION TRANSFORMER**  
**1W - PHASE**

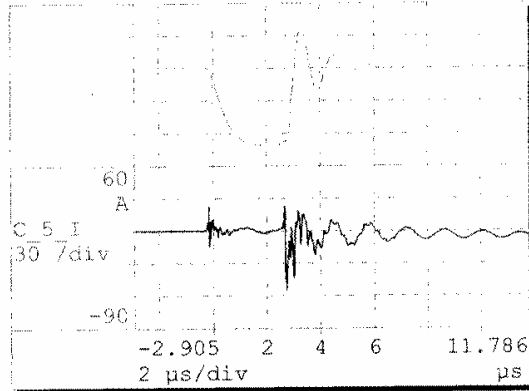


Tc : 2.1787 μS  
 kVp : -58.844 kVp

**3. REDUCED CHOPPED IMPULSE WAVE**



Tc : 3.2090 μS  
 kVp : -95.016 kVp

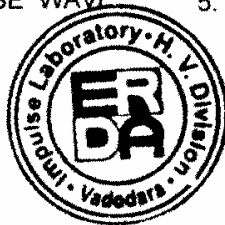


Tc : 3.0602 μS  
 kVp : -95.241 kVp

**4. 100 % CHOPPED IMPULSE WAVE**

**5. 100 % CHOPPED IMPULSE WAVE**

**PREPARED BY**



**CHECKED BY**

TE0042429

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tdc@erda.org , ene@erda.org



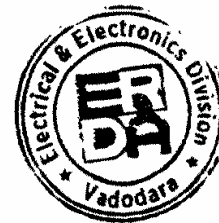
## TEST REPORT

Sheet no. 1 of 5

<b>NAME AND ADDRESS OF CUSTOMER</b>  Comfort Insta-Power Ltd. Plot No.275-276, GIDC Estate, Anjar, Kutch-370110 Gujarat.	<b>REPORT NO : EPEI/01/08-09/1234</b> <b>DATED : 16/07/2008</b>	
	<b>CUSTOMER REF.: CIPL / ERDA / TFR</b> <b>TEST/05072008/04 dated: 05/07/2008</b>	
	<b>DATE OF TESTING</b>  16/07/2008	
<b>SAMPLE DESCRIPTION</b>  Transformer Rated kVA: 25 Voltage ratio: 11 kV / 0.433 kV. Current ratio: 1.31 / 33.33 A Phases: 3 Vector group: Dyn-11	<b>SAMPLE IDENTIFICATION</b>  Serial No.: 001 ERDA ID No.: LSCLWO62558/01	
<b>TEST DETAILS</b>  Harmonic measurements in the no load voltage and current of the transformer manufactured by Comfort Insta-Power Ltd, Anjar, Kutch.	<b>TEST SPECIFICATION</b>  As per customer's requirement.	
<b>RESULTS:</b> As per enclosures <b>Note:</b> Measurements were carried out at the ERDA's premises. Only the measurements asked for by the customer have been carried out.		
<b>PREPARED BY</b> <i>As Patel</i>	<b>CHECKED BY</b> <i>VP Gupta</i>	<b>APPROVED BY</b> <i>[Signature]</i>

- Note : 1. This report relates only to the particular sample received in good condition for testing at ERDA's premises.  
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 measurements asked for by the customer have been carried out.

Nº 1765482



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tdc@erda.org, ene@erda.org



Report no. EPEI/01/08-09/1234

dated 16/07/2008

Sheet no.2 of 5

## 1.0 EQUIPMENT DETAILS:

I) LMG 500 Precision Power Analyzer

## 2.0 DETAILS OF MEASUREMENT:

The arrangement for measurements is given in figure 1. Measurements were carried out to find out the harmonic content in the no-load voltage and current at 0.433 kV side of the transformer under test.

Harmonics in voltage and current were measured and analyzed using the LMG 500 power analyzer at 90%, 100% and 110% of the rated voltage. The voltage and current signals were directly fed to the recording device. The voltage and current waveforms were analyzed for different order of harmonics (upto the 25th) using the Fast Fourier Transform (FFT) algorithm. The total harmonic distortion (THD %) was then computed as given below:

$$THD = \sqrt{\sum_{n=2}^{n=25} h_n^2}$$

Where, n is the order of harmonics,

hn is the individual harmonic expressed as a percentage of fundamental.

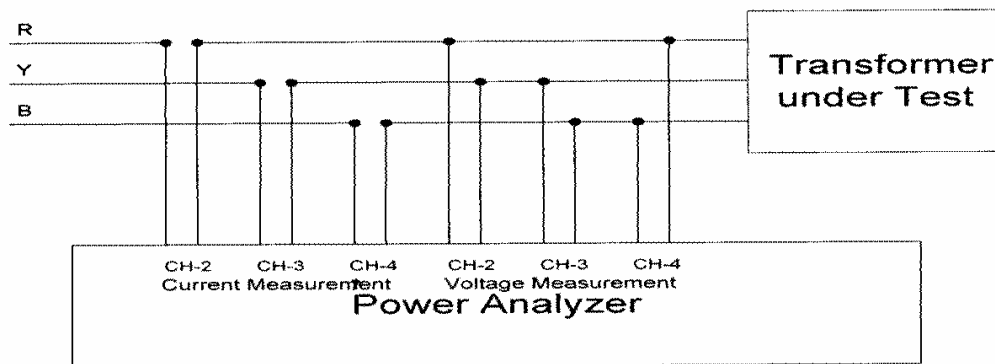


Figure 1 Arrangement for harmonic measurements

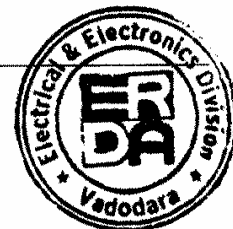
No: 1765483

Prepared by

*Arupatej*

Checked by :

*VR*



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 tdc@erda.org , ene@erda.org



Report no. EPEI/01/08-09/1234

dated 16/07/2008

Sheet no.3 of 5

Harmonics in voltage and current (as a percentage of fundamental)

Date of measurement: 16/07/2008

Location: 0.433 kV side of 25 kVA, 11 kV / 0.433 kV transformer (SR No. 001) energized at 90 % of rated voltage.

Harm No.	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	100.000	0.280	100.000	100.000	0.227	100.000	100.000	0.269	100.000
2	0.442	0.001	0.038	0.477	0.001	0.074	0.416	0.001	0.087
3	4.519	0.013	0.169	14.627	0.033	0.217	7.656	0.021	0.296
4	0.269	0.001	0.041	0.261	0.001	0.008	0.071	0.000	0.046
5	16.495	0.046	0.602	16.401	0.037	0.492	16.819	0.045	0.490
6	0.148	0.000	0.013	0.032	0.000	0.020	0.129	0.000	0.010
7	1.003	0.003	0.548	0.611	0.001	0.561	1.361	0.004	0.610
8	0.008	0.000	0.031	0.060	0.000	0.041	0.057	0.000	0.033
9	0.429	0.001	0.115	0.467	0.001	0.033	0.055	0.000	0.107
10	0.013	0.000	0.023	0.019	0.000	0.028	0.015	0.000	0.031
11	0.093	0.000	0.248	0.342	0.001	0.168	0.349	0.001	0.130
12	0.019	0.000	0.010	0.013	0.000	0.010	0.016	0.000	0.013
13	0.531	0.001	0.059	0.528	0.001	0.033	0.541	0.001	0.069
14	0.013	0.000	0.013	0.024	0.000	0.023	0.011	0.000	0.013
15	0.144	0.000	0.054	0.100	0.000	0.056	0.089	0.000	0.102
16	0.016	0.000	0.020	0.035	0.000	0.033	0.033	0.000	0.031
17	0.178	0.000	0.064	0.234	0.001	0.048	0.142	0.000	0.046
18	0.008	0.000	0.008	0.014	0.000	0.008	0.004	0.000	0.003
19	0.033	0.000	0.010	0.023	0.000	0.010	0.015	0.000	0.013
20	0.009	0.000	0.008	0.014	0.000	0.010	0.007	0.000	0.003
21	0.062	0.000	0.026	0.029	0.000	0.003	0.042	0.000	0.028
22	0.001	0.000	0.005	0.011	0.000	0.005	0.007	0.000	0.003
23	0.092	0.000	0.044	0.073	0.000	0.020	0.043	0.000	0.023
24	0.009	0.000	0.008	0.013	0.000	0.005	0.004	0.000	0.003
25	0.078	0.000	0.026	0.083	0.000	0.046	0.098	0.000	0.046
THD %	17.157		0.886	22.007		0.808	18.548		0.873
Parameter measured	0.285 A		390.545 V	0.233 A		392.373 V	0.273 A		391.955 V

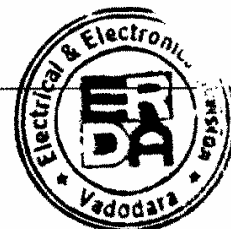
N<sup>o</sup> 1765484

Prepared by

*Aspate*

Checked by :

*VR mpts*



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 tdc@erda.org, ene@erda.org



Report no. EPEI/01/08-09/1234 dated 16/07/2008 Sheet no.4 of 5

Harmonics in voltage and current (as a percentage of fundamental)

Date of measurement: 16/07/2008

Location: 0.433 kV side of 25 kVA, 11 kV / 0.433 kV transformer (SR No. 001) energized at 100 % of rated voltage.

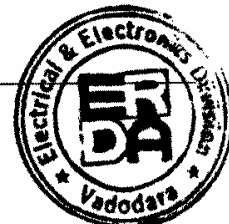
Harm No.	Current I <sub>R</sub> in %	Current I <sub>R</sub> in Amps	Voltage V <sub>RY</sub> in %	Current I <sub>Y</sub> in %	Current I <sub>Y</sub> in Amps	Voltage V <sub>YB</sub> in %	Current I <sub>B</sub> in %	Current I <sub>B</sub> in Amps	Voltage V <sub>BR</sub> in %
1	100.000	0.445	100.000	100.000	0.365	100.000	100.000	0.434	100.000
2	0.512	0.002	0.044	0.465	0.002	0.044	0.180	0.001	0.023
3	4.630	0.021	0.183	14.047	0.051	0.166	7.091	0.031	0.277
4	0.303	0.001	0.030	0.268	0.001	0.039	0.104	0.000	0.051
5	15.970	0.071	0.630	16.723	0.061	0.504	16.028	0.070	0.524
6	0.146	0.001	0.016	0.005	0.000	0.021	0.152	0.001	0.016
7	0.817	0.004	0.542	1.130	0.004	0.520	1.330	0.006	0.588
8	0.018	0.000	0.037	0.052	0.000	0.035	0.023	0.000	0.032
9	0.404	0.002	0.100	0.421	0.002	0.032	0.152	0.001	0.099
10	0.020	0.000	0.021	0.027	0.000	0.032	0.021	0.000	0.032
11	1.031	0.005	0.220	1.220	0.004	0.157	1.040	0.005	0.095
12	0.011	0.000	0.009	0.011	0.000	0.012	0.018	0.000	0.021
13	0.303	0.001	0.030	0.509	0.002	0.025	0.371	0.002	0.051
14	0.018	0.000	0.016	0.025	0.000	0.021	0.014	0.000	0.005
15	0.061	0.000	0.056	0.077	0.000	0.041	0.058	0.000	0.092
16	0.009	0.000	0.009	0.016	0.000	0.037	0.021	0.000	0.035
17	0.088	0.000	0.051	0.107	0.000	0.039	0.005	0.000	0.016
18	0.009	0.000	0.009	0.003	0.000	0.005	0.007	0.000	0.005
19	0.159	0.001	0.032	0.175	0.001	0.037	0.145	0.001	0.009
20	0.004	0.000	0.005	0.008	0.000	0.009	0.005	0.000	0.002
21	0.049	0.000	0.012	0.036	0.000	0.009	0.044	0.000	0.002
22	0.002	0.000	0.005	0.008	0.000	0.007	0.007	0.000	0.002
23	0.049	0.000	0.044	0.107	0.000	0.025	0.065	0.000	0.025
24	0.004	0.000	0.002	0.003	0.000	0.000	0.002	0.000	0.005
25	0.040	0.000	0.032	0.055	0.000	0.048	0.055	0.000	0.044
THD %	16.700		0.894	21.921		0.771	17.615		0.859
Parameter measured	0.452 A		431.557 V	0.374 A		434.303 V	0.440 A		433.346 V

N<sup>o</sup> 1765485

Prepared by  
*Anupate*

Checked by :

*VP*





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Report no. EPEI/01/08-09/1234

dated 16/07/2008

Sheet no.5 of 5

Harmonics in voltage and current (as a percentage of fundamental)

Date of measurement: 16/07/2008

Location: 0.433kV side of 25 kVA, 11 kV / 0.433 kV transformer (SR No. 001) energized at 110 % of rated voltage.

Harm No.	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	100.000	0.730	100.000	100.000	0.617	100.000	100.000	0.720	100.000
2	0.294	0.002	0.051	0.445	0.003	0.048	0.113	0.001	0.055
3	3.643	0.027	0.152	10.943	0.068	0.188	5.787	0.042	0.308
4	0.300	0.002	0.023	0.217	0.001	0.054	0.114	0.001	0.075
5	17.642	0.129	0.649	19.971	0.123	0.527	17.894	0.129	0.568
6	0.101	0.001	0.015	0.034	0.000	0.027	0.133	0.001	0.015
7	3.161	0.023	0.474	3.795	0.023	0.471	3.583	0.026	0.524
8	0.021	0.000	0.027	0.057	0.000	0.036	0.049	0.000	0.034
9	0.215	0.002	0.097	0.209	0.001	0.027	0.167	0.001	0.088
10	0.031	0.000	0.019	0.029	0.000	0.027	0.021	0.000	0.025
11	1.300	0.009	0.251	1.427	0.009	0.176	1.212	0.009	0.113
12	0.003	0.000	0.011	0.018	0.000	0.013	0.015	0.000	0.013
13	0.107	0.001	0.048	0.400	0.002	0.031	0.452	0.003	0.059
14	0.016	0.000	0.015	0.023	0.000	0.027	0.013	0.000	0.015
15	0.144	0.001	0.048	0.091	0.001	0.046	0.071	0.001	0.092
16	0.001	0.000	0.019	0.008	0.000	0.031	0.007	0.000	0.025
17	0.170	0.001	0.070	0.241	0.001	0.036	0.203	0.001	0.036
18	0.008	0.000	0.008	0.005	0.000	0.002	0.008	0.000	0.006
19	0.071	0.001	0.023	0.181	0.001	0.021	0.108	0.001	0.004
20	0.007	0.000	0.008	0.011	0.000	0.008	0.006	0.000	0.002
21	0.014	0.000	0.023	0.049	0.000	0.025	0.029	0.000	0.004
22	0.001	0.000	0.004	0.006	0.000	0.013	0.004	0.000	0.008
23	0.045	0.000	0.021	0.070	0.000	0.023	0.024	0.000	0.023
24	0.004	0.000	0.002	0.002	0.000	0.002	0.004	0.000	0.004
25	0.079	0.001	0.038	0.081	0.001	0.044	0.057	0.000	0.046
THD %	18.343		0.872	23.143		0.765	19.191		0.861
Parameter measured	0.742 A		474.368 V	0.634 A		477.864 V	0.733 A		476.908 V

No 1765486

Prepared by

*A. P. Patel*

Checked by :

*V. P. Patel*

