



OFICINA DE PRUEBAS MECÁNICAS A SISTEMAS DE TRANSMISIÓN Y DISTRIBUCIÓN

REPORT No.	K3404-094D/2011
CLIENT:	PPC INSULATORS Wienerbergstrasse 11, Tower A, 5th floor. 1100 Vienna, Austria. +43 (1) 982 58 50 1544 F. +43 (1) 982 58 50 1540 Contact: Peter Tichy e-mail: peter.tichy@ppcinsulators.com
TITLE:	MECHANICAL TESTS IN PORCELAIN INSULATORS

SUMMARY

Object under test:

BIL 1175 kV, 245 kV rated voltage post insulator, type CP6-1175-III, manufactured by PPC Insulators.

Standard applied :

- NRF-007-CFE-2005.
- NMX-J-250/1-ANCE-2004

Test performed:

- Dimensional verification
- Torsion test
- Bending test.

Results expressed in this report relate only to the object tested. Restricted

Con fecha 30 de mayo de 2011 el presente documento que consta de 6 fojas, así como la información que de él se genere, se clasifica como reservado por parte del titular del Laboratorio de Pruebas de Equipos y Materiales de la Comisión Federal de Electricidad, con fundamento en los Artículo 3 Fracción III, IV, V, VI y XV, Artículo 14 Fracción I y II, Artículo 15, 16 y 21 de la Ley de Federal de Transparencia y Acceso a la Información Pública Gubernamental, Artículo 26, 27, 30 y 34 Fracción I y II del Reglamento de la Ley Federal de Transparencia y Acceso a la Información Pública Gubernamental; Lineamiento Primero, Cuarto, Quinto, Sexto, Décimo Quinto y Vigésimo Quinto de los Lineamientos Generales para la Clasificación y Desclasificación de la Información de las Dependencias y Entidades de la Administración Pública Federal. Asimismo, esta información permanecerá con este carácter durante el periodo de 10 años a partir de la fecha de su clasificación, o bien al momento en que se actualice alguno de los supuestos previstos en el Artículo 34 de dicho Reglamento. Así lo proveyó y rubrica el Ing. Luis Javier Freyre Rizo, encargado de la Gerencia del Laboratorio de Pruebas de Equipos y Materiales de la Comisión Federal de Electricidad.

Date: May 30 2011	FILE: SBW	CHECKED BY: ING. J. ANTONIO URBINA SOTO Office manager	APPROVED BY: ING. MANUEL BUZMAN VILLAGÓMEZ SUB MANAGER OF SERVES TO T.Y.D
Prepared: ING. ROMMEL HERNÁNDEZ CADENA			

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Apartado. Postal 612 Tel. (462) 623-94-00 Fax. (462) 623-94-94
<http://www.cfe.gob.mx/lapem>

NO SE DEBE REPRODUCIR EL INFORME, EXCEPTO EN SU TOTALIDAD, SIN LA APROBACIÓN ESCRITA DEL LABORATORIO.



Summary (continuation):

Result:

Dimensional verification:

Insulators had dimensions within appropriate tolerances agree to the plane manufacturer supplied then no. B-10071

Torsion Test:

The specimens showed a greater resistance to torsional required by the document, so the result is **Satisfactory**

Bending Test:

The specimens showed a greater bending resistance than required by the document, so the result is **Satisfactory**

ADVERTENCY: THE TESTER DOESN'T HAVE PARTICIPATION IN THE SELECTION OR PROCESS OF THE PRODUCT, THEREFORE THE RESULTS PRESENTED HERE DON'T ACCEPT ANY PRODUCTION LOT, EVEN WHEN THEY CAN USE FOR THAT. THE RESULTS HAVE EFFECT AND HAVE VALIDITY ONLY FOR THE SAMPLES PROBED SUCH IDENTIFICATION IS SHOWED IN THE PRESENT INFORM.

Date: May 30 2011	FILE: SBW	CHECKED BY: ING. J. ANTONIO URBINA SOTO Office manager	APPROVED BY: ING. MANUEL GUZMAN VILLAGÓMEZ SUB MANAGER OF SERVES TO T.Y D
Prepared: ING. ROMMEL HERNANDEZ CADENA			



**AREA: Transmission Department
Transmission Systems Office**

REPORT No: K3411-075/11	
Client:	PPC INSULATORS
Address:	Wienerbergstrasse 11, Tower A, 5th floor. 1100 Vienna, Austria. +43 (1) 982 58 50 1544, F. +43 (1) 982 58 50 1540 Contact: Peter Tichy e-mail: peter.tichy@ppcinsulators.com
Title:	RADIO-INFLUENCE VOLTAGE MEASUREMENT TO A 1175 kV BIL, 230 kV RATED VOLTAGE POST INSULATOR, TYPE CP6-1175-III, MANUFACTURED BY PPC INSULATORS, OVERALL CREEPAGE DISTANCE 7822 mm

SUMMARY:

Object under test: 1175 kV BIL, 230 kV rated voltage post insulator, type CP6-1175-III, manufactured by PPC Insulators, overall creepage distance 7822 mm

Standards applied:

- NRF-007-CFE-2005
- NMX-J-250/1-ANCE-2004
- IEC 60437 (1997-09)

Tests performed:

- Radio-influence voltage measurement

Result: Satisfactory, the tested sample comply clause 7.3.1.1, article e) of standard NRF-007-CFE-2005.

Place and date of the tests: Extra High Voltage laboratory of LAPEM, located in Irapuato, Gto. At 1710 m.a.s.l., on April 28th, 2011.

Measurements uncertainty The uncertainty value is mentioned inside of this document.

Tests results relate only to the samples tested. RESTRICTED

Con fecha 04 de mayo de 2011 el presente documento que consta de 08 fojas, así como la información que de él se genere, se clasifica como reservado por parte del titular del Laboratorio de Pruebas de Equipos y Materiales de la Comisión Federal de Electricidad, con fundamento en los Artículo 3 Fracción III, IV, V, VI y XV, Artículo 14 Fracción I y II, Artículo 15, 16 y 21 de la Ley de Federal de Transparencia y Acceso a la Información Pública Gubernamental; Artículo 26, 27, 30 y 34 Fracción I y II del Reglamento de la Ley Federal de Transparencia y Acceso a la Información Pública Gubernamental; Lineamiento Primero, Cuarto, Quinto, Sexto, Décimo Quinto y Vigésimo Quinto de los Lineamientos Generales para la Clasificación y Desclasificación de la Información de las Dependencias y Entidades de la Administración Pública Federal. Asimismo, esta información permanecerá con este carácter durante el periodo de 70 años a partir de la fecha de su clasificación, o bien al momento en que se actualice alguno de los supuestos previstos en el Artículo 34 de dicho Reglamento. Así lo proveyó y rubrica el Ing. Luis Javier Freyre Rizo, titular de la Gerencia del Laboratorio de Pruebas de Equipos y Materiales de la Comisión Federal de Electricidad.

Date: May 04 th , 2011	File: B039	CHECKED BY: Ing. José Luis Acosta E. Office Manager	APPROVED BY: Ing. Salvador González G. Department Manager
TESTED BY: Ing. José Luis Barragán Barrera Test Engineer			

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**AREA: Transmission Department
Transmission Systems Office**

Test report No.: K3411-090/11	
Client:	PPC INSULATORS
Address:	Wienerbergstrasse 11, Tower A, 5th floor. 1100 Vienna, Austria T.+43(1) 98258501544 F. +43(1)982 58 50 1540 Contact: Peter Tichy e-mail: peter.tichy@ppcinsulators.com.
TITLE:	LIGHTNING IMPULSE WITHSTAND VOLTAGE TEST AND SWITCHING IMPULSE WITHSTAND VOLTAGE TEST ON POST INSULATOR, TYPE CP6-1175-III, 245 kV RATED VOLTAGE, 1175 kV BIL, MANUFACTURED BY PPC INSULATOR, OVERALL CREEPAGE DISTANCE 7822 mm.

SUMMARY:

Object under test: BIL 1175 kV, 245 kV rated voltage, post insulator, type CP6-1175-III, manufactured by PPC INSULATOR, overall creepage distance 7822 mm.

Standards applied: IEC 60060-1 (2010), NRF-007-CFE (2005), NMX-J-250/1-ANCE 2004 Internal procedures K3411101, K3411102, K3411111.

Tests performed:

- Lightning impulse withstand voltage test.
- Switching impulse withstand voltage test.

Results:

- Lightning impulse withstand voltage test. **SATISFACTORY.** Fulfills the requirement on clause 6.2.2 of standard NMX-J-250/1-ANCE 2004.
- Switching impulse withstand voltage test. **SATISFACTORY.** Fulfills the requirement on clause 6.2.3 of standard NMX-J-250/1-ANCE 2004.

Measurements Uncertainty:

The uncertainty value is mentioned inside of this document.

Date and place of the test: Extra high voltage laboratory LAPEM, located in Irapuato, Gto. at 1710 masl, the May 6th and 9th, 2011.

Results expressed in this report relate only to the object tested. Restricted.

Con fecha 20 de Mayo del 2011 el presente documento que consta de 12 fojas, así como la información que de él se genere, se clasifica como reservado por parte del titular del Laboratorio de Pruebas de Equipos y Materiales de la Comisión Federal de Electricidad, con fundamento en los Artículo 3 Fracción III, IV, V, VI y XV, Artículo 14 Fracción I y II, Artículo 15, 16 y 21 de la Ley de Federal de Transparencia y Acceso a la Información Pública Gubernamental, Artículo 26, 27, 30 y 34 Fracción I y II del Reglamento de la Ley Federal de Transparencia y Acceso a la Información Pública Gubernamental; Lineamiento Primero, Cuarto, Quinto, Sexto, Décimo Quinto y Vigésimo Quinto de los Lineamientos Generales para la Clasificación y Desclasificación de la Información de las Dependencias y Entidades de la Administración Pública Federal. Asimismo, esta información permanecerá con este carácter durante el periodo de 10 años a partir de la fecha de su clasificación, o bien al momento en que se actualice alguno de los supuestos previstos en el Artículo 34 de dicho Reglamento. Así lo proveyó y rubrica el Ing. Luis Javier Freyre Rizo, titular de la Gerencia del Laboratorio de Pruebas de Equipos y Materiales de la Comisión Federal de Electricidad"

DATE: May, 20 th , 2011	FILE: B037	CHECKED BY: 	APPROVED BY:
TESTED BY: Ing. Fernando Elzarraraz Rivera Test engineer		Ing. José Luis Acosta Espinoza. Office manager	Ing. Salvador González González Department manager

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LAT/LEM
APROVADO





INSTITUTO DE TECNOLOGIA
PARA O DESENVOLVIMENTO

REPORT

DOCUMENT N°
UTAT – 0003 / 2002

ADDRESS:
Centro Politécnico UFPR – P.O. Box 19067 - CEP 81531-970 – Curitiba – PR - Brazil
Phone: +55 41 361-6200 Fax: +55 41 266-3582 E-mail: lactec@lactec.org.br

ISSUED
January 18, 2002

PAGE
1 of 4

TITLE: DRY LIGHTNING IMPULSE FLASHOVER VOLTAGE TEST
DRY LIGHTNING IMPULSE WITHSTAND VOLTAGE TEST
WET SWITCHING IMPULSE WITHSTAND VOLTAGE TEST
WET POWER FREQUENCY WITHSTAND VOLTAGE TEST
RADIO INFLUENCE VOLTAGE TEST

SCOPE: STATION POST INSULATOR – SOLID CORE
MANUFACTURER: SANTANA
TYPE: IEC 168 / 273 – CLASS C8-1175 -II
BIL: 1175 KV
DRAWING NUMBER: CODE 8.8112.65
NUMBER OF TEST SPECIMEN: 01




SERVICE ORDER:


CUSTOMER: ISOLADORES SANTANA S. A.
RUA ANTONIO PEDRO, 645
13920-000 – PEDREIRA – SP - BRAZIL

NUMBER OF ANNEXES: 06

REPORT BY:
Carlos Y. Nakaguishi
Electrical Engineer - CREA 8547-D(PR)

CHECKED BY:


Carlos Y. Nakaguishi
Electrical Engineer - CREA 8547-D(PR)

APPROVED BY:


PI Electrical Area Manager

"The results of this test report apply only to the items tested/analysed"

THIS DOCUMENT AND THE CONTENTS HEREIN MAY NOT BE REPRODUCED OTHER THAN IN FULL EXCEPT WITH THE PERMISSION OF LACTEC

ADDRESS:

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ISSUED

January 18, 2002

PAGE

2 of 4

1. INTRODUCTION

1.1- Test(s) / Analysis(es) performed:

- DRY LIGHTNING IMPULSE FLASHOVER VOLTAGE TEST
- DRY LIGHTNING IMPULSE WITHSTAND VOLTAGE TEST
- WET SWITCHING IMPULSE WITHSTAND VOLTAGE TEST
- WET POWER FREQUENCY WITHSTAND VOLTAGE TEST
- RADIO INFLUENCE VOLTAGE TEST

1.2- Test Equipment:

- VOLTAGE IMPULSE GENERATOR, HAEFELY, TYPE V3200/160
- DAMPED CAPACITIVE VOLTAGE DIVIDER, HAEFELY, TYPE CR 3200
- PEAK VOLTMETER, HAEFELY, TYPE SV64M, N° 080255-31-80
- TIME TO BREAKDOWN METER, HAEFELY, TYPE 66
- DIGITAL OSCILLOSCOPE, TEKTRONIX, MODEL 744A, N° B040680
- MOTOR GENERATOR, 60 HZ, 6900 V, N° 57222
- TEST TRANSFORMER, ASEA, TYPE TMZ-17, N° 7219634
- SERIES RESONANT SYSTEM, HIPOTRONICS, TYPE 7300-750SR
- PEAK VOLTMETER, HAEFELY, TYPE SV64M, N° 080255-31-80
- ARTIFICIAL RAIN EQUIPMENT, MWB, TYPE R200, N° 772797
- COUPLING CAPACITOR, MICAFIL, 1000 PF, N° 0026119
- FIELD INTENSITY METER, SINGER, TYPE NM 17/27, N° 04072

1.3- Date of Test: December, 02-13, 2001.

1.4- Place:

- LACTEC/AELE -High Voltage Laboratory

1.5- Tested by:

- Edson Pasqualim
- Carlos Eduardo Ribas
- Nilson de Oliveira

1.6- Witnessed / Inspected by:

- Marcelo Arcosi (SANTANA)



2. REFERENCES

IEC 168/94 "Test on Indoor and Outdoor Post Insulators of Ceramic Material or Glass for Systems with Nominal Voltages Greater than 1000V", Geneve

ADDRESS:

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3. TEST DESCRIPTION

3.1- Dry Lightning Impulse Flashover Voltage Test

In the test specimen, the voltage corresponding to a 50 percent disruptive discharge probability V50%, both polarity, was determined by the up-and-down method, with 30 applications.

The following results were obtained:

Test Specimen	V50% (+)	V50% (-)
# 01	1520.6 KV	1739.6 KV

A complete set of test results is enclosed in Annex 01.



3.2- Dry Lightning Impulse Withstand Voltage Test

Fifteen consecutive impulses of both polarity and peak voltage of 1175 kV, with appropriate atmospheric corrections were applied to the test specimen.

No puncture or flashover was observed during the test.

A complete set of test results is enclosed in Annex 02.

3.3- Wet Switching Impulse Withstand Voltage Test

Fifteen consecutive impulses of positive polarity and peak voltage of 950 kV, with appropriate atmospheric corrections were applied to the test specimen.

No puncture or flashover was observed during the test.

A complete set of test results is enclosed in Annex 03.

3.4- Wet Power Frequency Withstand Voltage Test

The rated wet power frequency withstand voltage of 525 kV, with appropriate atmospheric corrections was applied to the test specimen during 60 seconds.

A complete set of test results is enclosed in Annex 04.

No puncture or flashover was observed during the test.

3.5- Radio Influence Voltage Test

The test specimen was tested using a Field Intensity Meter at 1000 kHz, with a measuring impedance of 150 Ω .

The radio interference voltage measured at 244 kV (phase-ground) test voltage was the following:

Test Specimen	RIV @ 244 kV (Zm=150 Ω , fm= 1000 kHz)
# 01	354.8 μ V

A complete set of test results is enclosed in Annex 05.

4. DRAWING

Drawing number **CODE 8.8112.65**, furnished by the customer, is enclosed in this report as Annex 06.

5. TEST OBJECT





**INSTITUTO DE TECNOLOGIA
PARA O DESENVOLVIMENTO**

REPORT

UTAT - 0003/02

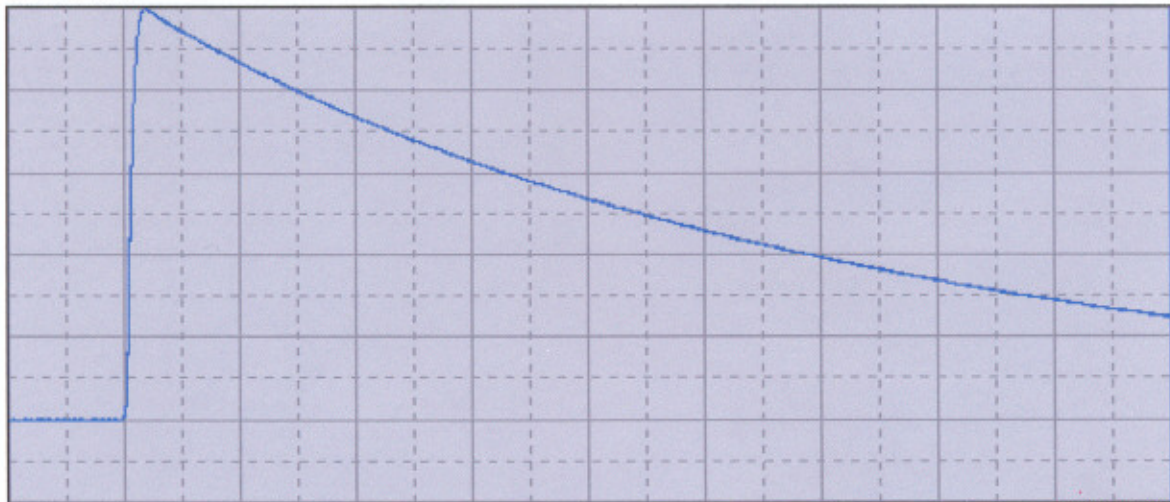
ANNEX / PAGE

Annex 01 / Page 01 of 02

DRY LIGHTNING IMPULSE FLASHOVER VOLTAGE TEST

CUSTOMER SANTANA	MANUFACTURER SANTANA	TYPE C8-1175-II	NOMINAL VOLTAGE kV
SPECIMEN	POLARITY (+)	TEST TYPE <input checked="" type="checkbox"/> DRY <input type="checkbox"/> WET	DRY ARCING DISTANCE 2.500 m
NUMBER OF STAGES (IMP. GEN.) 16s/1p	VOLTAGE DIVIDER CR 3200	SCALE FACTOR 2167	WAVE FORM 1.21 / 44.6
DRY-BULB THERMOMETER 18.5 °C	WET-BULB THERMOMETER 15.6 °C	ATMOSPHERIC PRESSURE 686.2 mmHg	CORRECTION FACTOR 0.925

VOLTAGE WAVE FORM



HORIZONTAL: 10 µs/div

APPLIC.	CHARGING VOLTAGE (kV)	CREST VOLTAGE (kV)	PROSPEC. VOLTAGE (kV)	CORRECTED VOLTAGE (kV)	TIME TO CHOPPING (µs)	APPLIC.	CHARGING VOLTAGE (kV)	CREST VOLTAGE (kV)	PROSPEC. VOLTAGE (kV)	CORRECTED VOLTAGE (kV)	TIME TO CHOPPING (µs)
1	97.6	1422.7	1422.7	1538.1	16.9	21	97.6	1425.7	1425.7	1541.3	18.1
2	94.7	1380.7	1380.7	1492.6	-	22	94.7	1383.6	1383.6	1495.8	-
3	97.6	1422.3	1422.3	1537.6	-	23	97.6	1424.5	1424.5	1540.0	13.8
4	100.5	1462.5	1462.5	1581.1	11.6	24	94.7	1386.0	1386.0	1498.4	-
5	97.6	1423.0	1423.0	1538.4	14.0	25	97.6	1424.7	1424.7	1540.2	20.2
6	94.7	1380.5	1380.5	1492.4	-	26	94.7	1387.7	1387.7	1500.2	-
7	97.6	1425.8	1425.8	1541.4	16.5	27	97.6	1427.0	1427.0	1542.7	21.6
8	94.7	1382.8	1382.8	1494.9	-	28	94.7	1387.0	1387.0	1499.5	-
9	97.6	1422.6	1422.6	1537.9	18.1	29	97.6	1427.2	1427.2	1542.9	23.3
10	94.7	1380.4	1380.4	1492.3	-	30	94.7	1385.4	1385.4	1497.7	-
11	97.6	1427.0	1427.0	1542.7	16.5						
12	94.7	1380.5	1380.5	1492.4	-						
13	97.6	1423.8	1423.8	1539.2	17.6						
14	94.7	1381.3	1381.3	1493.3	-						
15	97.6	1423.5	1423.5	1538.9	15.4						
16	94.7	1382.4	1382.4	1494.5	-						
17	97.6	1424.9	1424.9	1540.4	19.7						
18	94.7	1381.2	1381.2	1493.2	-						
19	97.6	1425.5	1425.5	1541.1	16.7						
20	94.7	1383.2	1383.2	1495.4	-						



50% DISRUPTIVE DISCHARGE VOLTAGE (V50 %) **1520.6 kV** WITHSTAND VOLTAGE EVALUATED FROM V50% **1461.3 kV**

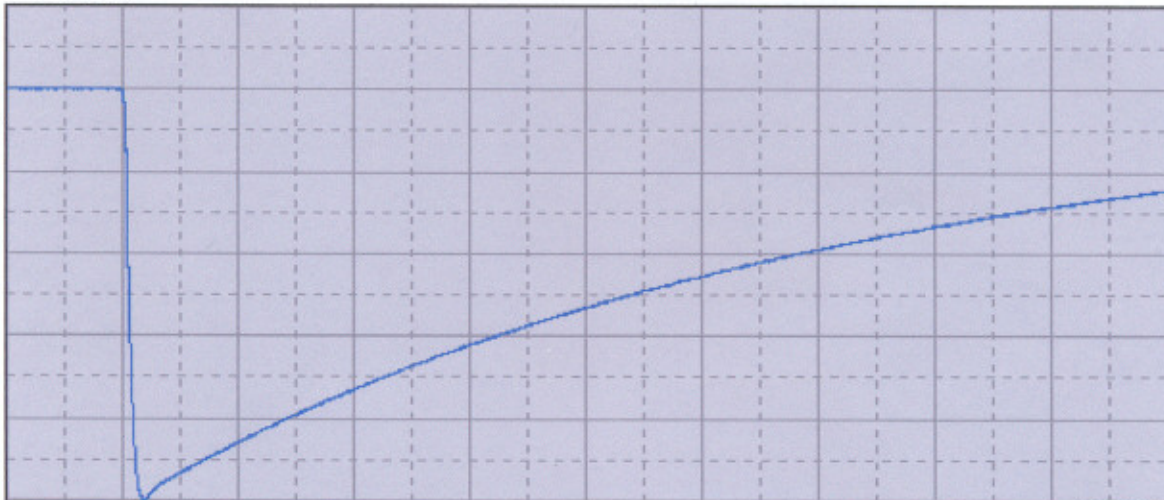
REMARKS
Curitiba, December 4, 2001
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DRY LIGHTNING IMPULSE FLASHOVER VOLTAGE TEST

CUSTOMER SANTANA	MANUFACTURER SANTANA	TYPE C8-1175-II	NOMINAL VOLTAGE kV
SPECIMEN	POLARITY (-)	TEST TYPE <input checked="" type="checkbox"/> DRY <input type="checkbox"/> WET	DRY ARCING DISTANCE 2.500 m
NUMBER OF STAGES (IMP. GEN.) 16s/1p	VOLTAGE DIVIDER CR 3200	SCALE FACTOR 2167	WAVE FORM 1.19 / 43.7
DRY-BULB THERMOMETER 18.4 °C	WET-BULB THERMOMETER 15.0 °C	ATMOSPHERIC PRESSURE 686.2 mmHg	CORRECTION FACTOR 0.914

VOLTAGE WAVE FORM



HORIZONTAL: 10 µs/div

APPLIC.	CHARGING VOLTAGE (kV)	CREST VOLTAGE (kV)	PROSPEC. VOLTAGE (kV)	CORRECTED VOLTAGE (kV)	TIME TO CHOPPING (µs)	APPLIC.	CHARGING VOLTAGE (kV)	CREST VOLTAGE (kV)	PROSPEC. VOLTAGE (kV)	CORRECTED VOLTAGE (kV)	TIME TO CHOPPING (µs)
1	102.4	1530.6	1530.6	1674.6	-	21	108.6	1621.3	1621.3	1773.9	10.1
2	105.5	1574.5	1574.5	1722.6	14.4	22	105.5	1572.2	1572.2	1720.1	-
3	102.4	1528.2	1528.2	1672.0	-	23	108.6	1618.7	1618.7	1771.0	14.9
4	105.5	1573.5	1573.5	1721.6	-	24	105.5	1572.7	1572.7	1720.7	-
5	108.6	1614.3	1614.3	1766.2	25.5	25	108.6	1620.0	1620.0	1772.4	17.0
6	105.5	1569.6	1569.6	1717.3	-	26	105.5	1572.0	1572.0	1719.9	26.1
7	108.6	1617.0	1617.0	1769.1	23.9	27	102.4	1531.1	1531.1	1675.2	-
8	105.5	1571.5	1571.5	1719.4	-	28	105.5	1574.5	1574.5	1722.6	-
9	108.6	1615.9	1615.9	1767.9	26.8	29	108.6	1618.4	1618.4	1770.7	-
10	105.5	1568.2	1568.2	1715.8	-	30	111.7	1666.2	1666.2	1823.0	10.0
11	108.6	1615.1	1615.1	1767.1	12.1						
12	105.5	1575.2	1575.2	1723.4	-						
13	108.6	1623.3	1623.3	1776.0	17.5						
14	105.5	1571.7	1571.7	1719.6	-						
15	108.6	1621.5	1621.5	1774.1	29.7						
16	105.5	1575.7	1575.7	1724.0	-						
17	108.6	1621.1	1621.1	1773.6	13.9						
18	105.5	1574.5	1574.5	1722.6	-						
19	108.6	1621.8	1621.8	1774.4	22.2						
20	105.5	1570.9	1570.9	1718.7	-						



50% DISRUPTIVE DISCHARGE VOLTAGE (V50 %)

1739.6 kV

WITHSTAND VOLTAGE EVALUATED FROM V50%

1671.8 kV

REMARKS

Curitiba, December 4, 2001

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PARA O DESENVOLVIMENTO**

REPORT

UTAT - 0003/02

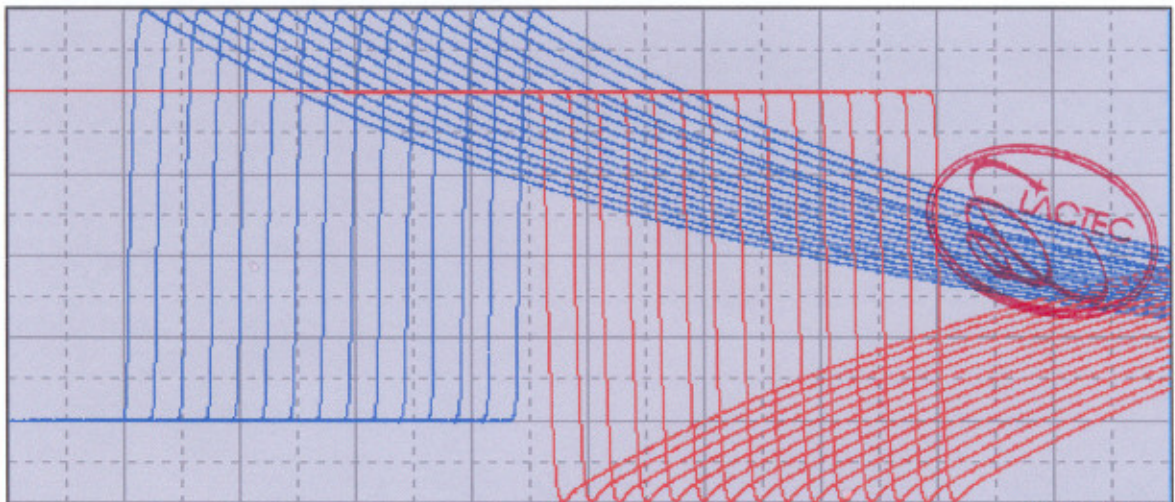
ANNEX / PAGE

Annex 02 / Page 01 of 01

DRY LIGHTNING IMPULSE WITHSTAND VOLTAGE TEST

CUSTOMER SANTANA	MANUFACTURER SANTANA	TYPE C8-1175-II	NOMINAL VOLTAGE kV
SPECIMEN	WITHSTAND VOLTAGE 1175 kV	TEST TYPE <input checked="" type="checkbox"/> DRY <input type="checkbox"/> WET	DRY ARCING DISTANCE 2.650 m
NUMBER OF STAGES (IMP. GEN.) 16s/1p	VOLTAGE DIVIDER CR 3200	SCALE FACTOR 2167	WAVE FORM 1.21 / 44.1
DRY-BULB THERMOMETER 18.8 °C	WET-BULB THERMOMETER 15.8 °C	ATMOSPHERIC PRESSURE 686.2 mmHg	CORRECTION FACTOR 0.926

VOLTAGE WAVE FORM



HORIZONTAL: 10 µs/div

POSITIVE POLARITY						NEGATIVE POLARITY					
APPLIC.	CHARGING VOLTAGE (kV)	CREST VOLTAGE (kV)	PROSPEC. VOLTAGE (kV)	CORRECTED VOLTAGE (kV)	TIME TO CHOPPING (µs)	APPLIC.	CHARGING VOLTAGE (kV)	CREST VOLTAGE (kV)	PROSPEC. VOLTAGE (kV)	CORRECTED VOLTAGE (kV)	TIME TO CHOPPING (µs)
1	73.2	1081.0	1081.0	1167.4	-	1	74.0	1105.8	1105.8	1194.2	-
2	73.5	1084.3	1084.3	1171.0	-	2	73.5	1102.9	1102.9	1191.0	-
3	74.0	1091.2	1091.2	1178.4	-	3	73.5	1102.5	1102.5	1190.6	-
4	74.0	1092.0	1092.0	1179.3	-	4	73.5	1101.5	1101.5	1189.5	-
5	74.0	1091.6	1091.6	1178.8	-	5	73.5	1102.2	1102.2	1190.3	-
6	74.0	1091.4	1091.4	1178.6	-	6	73.5	1104.7	1104.7	1193.0	-
7	74.0	1092.2	1092.2	1179.5	-	7	73.5	1102.4	1102.4	1190.5	-
8	74.0	1092.4	1092.4	1179.7	-	8	73.5	1102.4	1102.4	1190.5	-
9	74.0	1092.0	1092.0	1179.3	-	9	73.5	1104.3	1104.3	1192.5	-
10	74.0	1090.8	1090.8	1178.0	-	10	73.5	1104.1	1104.1	1192.3	-
11	74.0	1090.9	1090.9	1178.1	-	11	73.5	1103.3	1103.3	1191.5	-
12	74.0	1099.5	1099.5	1187.4	-	12	73.5	1100.9	1100.9	1188.9	-
13	74.0	1092.7	1092.7	1180.0	-	13	73.5	1104.3	1104.3	1192.5	-
14	74.0	1090.9	1090.9	1178.1	-	14	73.5	1098.1	1098.1	1185.9	-
15	74.0	1090.4	1090.4	1177.5	-	15	73.5	1100.3	1100.3	1188.2	-

REMARKS

Curitiba, December 4, 2001

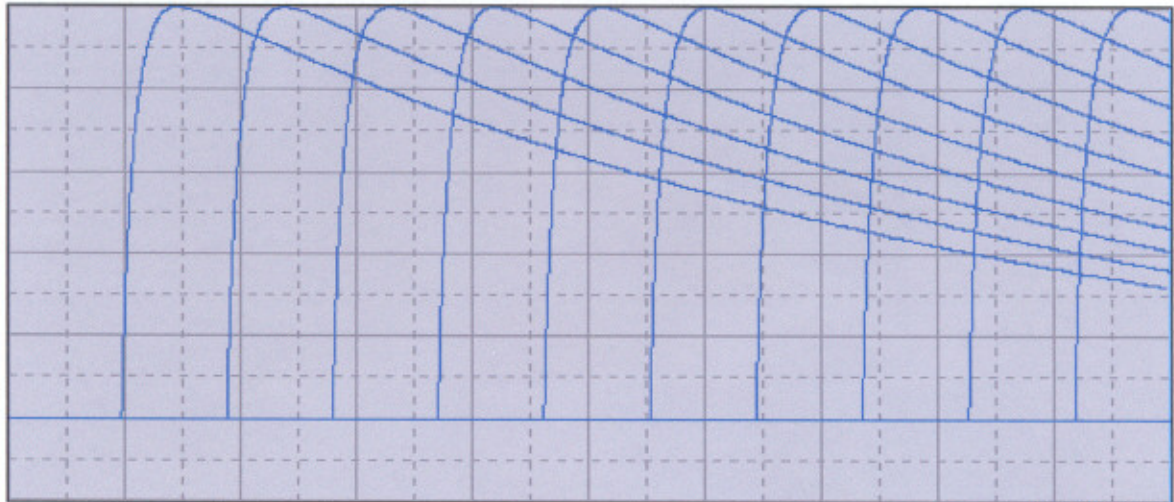
CHECKED BY



WET SWITCHING IMPULSE WITHSTAND VOLTAGE TEST

CUSTOMER SANTANA	MANUFACTURER SANTANA	TYPE C8-1175-II	NOMINAL VOLTAGE kV
SPECIMEN	WITHSTAND VOLTAGE 950 kV	TEST TYPE <input type="checkbox"/> DRY <input checked="" type="checkbox"/> WET	DRY ARCING DISTANCE 2.650 m
NUMBER OF STAGES (IMP. GEN.) 16s/1p	VOLTAGE DIVIDER CR 3200	SCALE FACTOR 2167	WAVE FORM 227.77/ 2840.3
DRY-BULB THERMOMETER 22.8 °C	WET-BULB THERMOMETER 19.9 °C	ATMOSPHERIC PRESSURE 683.8 mmHg	CORRECTION FACTOR 0.969

VOLTAGE WAVE FORM



HORIZONTAL: 10 μs/div

POSITIVE POLARITY						NEGATIVE POLARITY					
APPLIC.	CHARGING VOLTAGE (kV)	CREST VOLTAGE (kV)	PROSPEC. VOLTAGE (kV)	CORRECTED VOLTAGE (kV)	TIME TO CHOPPING (μs)	APPLIC.	CHARGING VOLTAGE (kV)	CREST VOLTAGE (kV)	PROSPEC. VOLTAGE (kV)	CORRECTED VOLTAGE (kV)	TIME TO CHOPPING (μs)
1	72.8	923.6	923.6	953.1	-						
2	72.6	919.1	919.1	948.5	-						
3	72.6	920.1	920.1	949.5	-						
4	72.7	922.3	922.3	951.8	-						
5	72.7	921.2	921.2	950.7	-						
6	72.7	922.6	922.6	952.1	-						
7	72.7	922.3	922.3	951.8	-						
8	72.7	922.6	922.6	952.1	-						
9	72.7	922.5	922.5	952.0	-						
10	72.7	922.0	922.0	951.5	-						
11	72.7	922.3	922.3	951.8	-						
12	72.7	922.7	922.7	952.2	-						
13	72.7	922.7	922.7	952.2	-						
14	72.7	922.7	922.7	952.2	-						
15	72.7	922.7	922.7	952.2	-						



REMARKS

Precipitation Rate = 1 mm/min
Water Resistivity = 103.3 Ωm

Curitiba, December 12, 2001

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RADIO INFLUENCE VOLTAGE TEST

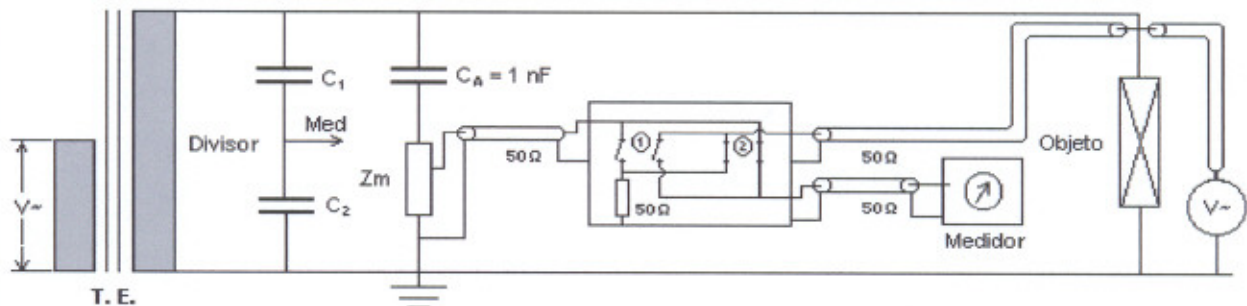
CUSTOMER SANTANA	TEST OBJECT INSULATOR	TYPE CB-1175-II	MANUFACTURER SANTANA
DRAWING	MEASUREMENT FREQUENCY 1000 kHz	DRY-BULB THERMOMETER 21.3 °C	RELATIVE HUMIDITY 75.0 %
SPECIMEN TEST #1	MEASUREMENT IMPEDANCE - Zm 150 Ω	ATMOSPHERIC PRESSURE 682.0 mmHg	

CHARACTERISTICS OF THE RIV METER

MANUFACTURER: SINGER STODDART TYPE: NM-17/27 N° 0146-04072
 FREQUENCY RANGE: FROM 10 KHz TO 32 MHz INSTRUMENT FACTOR 0dB = 1 μV
 MEASUR. RANGE: FROM 0 TO 160 dB ABOVE 1μV PRECISION: 3 dB (IMPULSIVE SIGNALS)
 BANDWIDTH (6 dB): 10 KHz
 INTERNAL IMPEDANCE: 50 Ω
 DETECTOR ACCORDING ANSI C 63-2-1980 - QUASI-PEAK (tc = 1 ms and td = 600 ms)

DETERMINATION OF THE CORRECTION FACTOR

DIAGRAM



ARRANGEMENT	APPLIED V (A)		MEASURED V (B)		CORRECTION FACTOR dB (A - B)	REMARKS
	Sw.1- clos.	Sw.2- open	Sw1-open	Sw2- closed		
	120		105		15	Average = 13 dB @ 1 MHz
	110		89		11	
	100		88		12	

REMARKS

Curitiba, December 05, 2001

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REPORT

UTAT - 0003/02

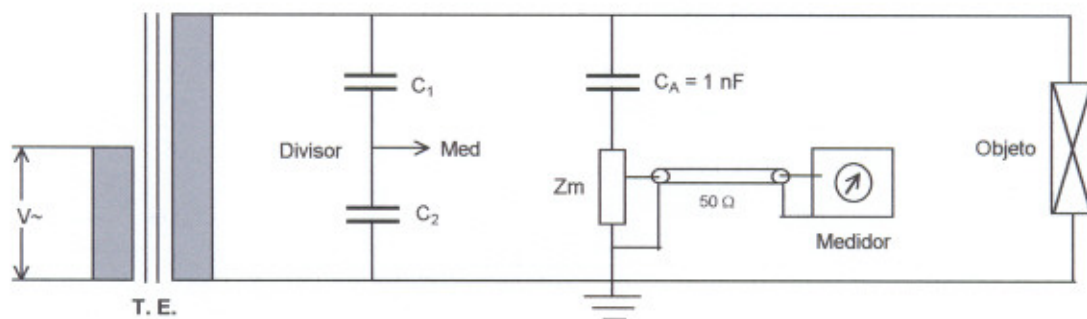
ANNEX / PAGE

Annex 05 / Page 02 of 02

RADIO INTERFERENCE VOLTAGE TEST

CUSTOMER SANTANA	TEST OBJECT INSULATOR	TYPE C8-1175-II	MANUFACTURER SANTANA
DRAWING	MEASUREMENT FREQUENCY 1000 kHz	DRY-BULB THERMOMETER 21.3 °C	RELATIVE HUMIDITY 75.0 %
SPECIMEN TEST #1		MEASUREMENT IMPEDANCE - Zm 150 Ω	ATMOSPHERIC PRESSURE 682.0 mmHg

TEST CIRCUIT



VOLTAGE (kV)	TEST SPECIMEN #1				II				III			
	MEAS. dB	C.F.	COR. dB	μV	MEAS. dB	C.F.	COR. dB	μV	MEAS. dB	C.F.	COR. dB	μV
0	-3	13	10	3.2								
244	31	13	44	158.5								
220	30	13	43	141.3								
198	20	13	33	44.7								
176	14	13	27	22.4								
154	10	13	23	14.1								
176	17	13	30	31.6								
198	28	13	41	112.2								
220	33	13	46	199.5								
244	38	13	51	354.8								
0	-3	13	10	3.2								



REMARKS

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UTAT - 0003/02

ANNEX / PAGE

Annex 06

ANNEX 06 - DRAWING REFERENCE CODE 8.8112.65

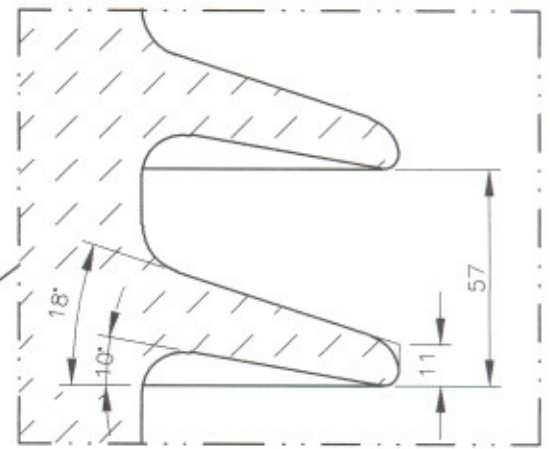
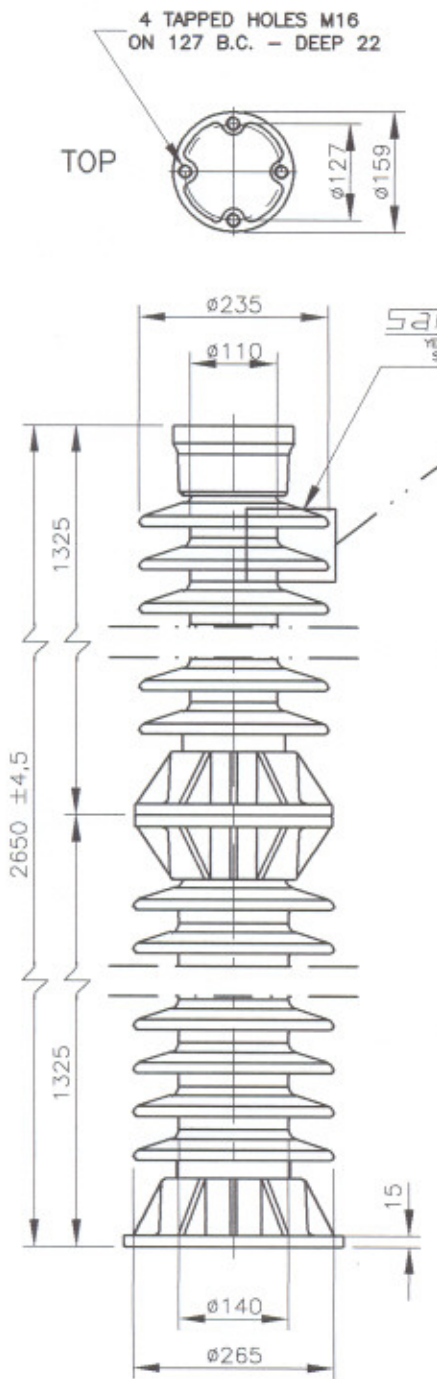


REMARKS

Curitiba, December 13, 2001

CHECKED BY

LUIS	DATE	AUT.
25/09/01		
GENERAL	REVISION	
1		
N.º		



SANTANA
YEAR-BRASIL
SERIAL No.

DIMENSIONAL CHARACTERISTICS

LEAKAGE DISTANCE	mm	6500
PROTECTED DISTANCE 90°	mm	2500
DRY ARCING DISTANCE	mm	2390

MECHANICAL CHARACTERISTICS

CANTILEVER STRENGTH	N	8000
TORSIONAL STRENGTH	N.m	4000

ELECTRICAL CHARACTERISTICS

LIGHTNING IMPULSE WITHSTAND VOLTAGE	kV	1175
POWER FREQUENCY WITHSTAND (WET)	kV	525
SWITCHING IMPULSE WITHSTAND (WET)	kV	950
RADIO INFLUENCE VOLTAGE		
-TEST VOLTAGE TO GROUND	kV	220
-MAX RIV AT 1000 kHz	µV	500

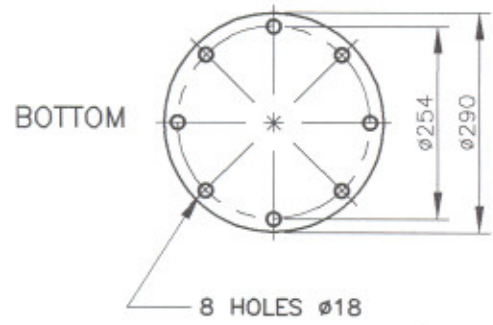
PACKING CHARACTERISTICS

UNIT NET WEIGHT	kg	200
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NOTES :

- 01 - TOLERANCES ACCORDING TO ORIGIN STANDARD
- 02 - NUMBER OF SHEDS : 40
- 03 - ALL FERROUS PARTS ARE HOT DIP GALV. PER ASTM A-153
- 04 - DIMENSIONS IN MILLIMETERS
- 05 - FOR ORDERING INFORMATION SEE TABLE BELOW.



PART No.	GLAZED COLOR
8.8112.65-70	ANSI GRAY 70
8.8112.65	BROWN



TITLE : STATION POST INSULATOR SOLID CORE - 1175 kV (BIL) NOMINAL RATING 245/362 kV			IDENTIFICATION
			DRAWING
ORIGIN: SANTANA DESIGN IEC 273/168-CLASS C8-1175-II	ELAB./DATE	VERIF./DATE	APPROV./DATE
	LUIS 31-07-95	EDINEI 31-07-95	ALDO 31-07-95
	CODE CAD	G:\PROJ\UNI-2\STATION\A072	
	CODE	8.8112.65	SCALE -
			REVISION
			1