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ALLTEC
SOLUTION PROVIDERS FOR AN ENERGIZED WORLD™

Teksai

LSG PROTECT®

QUOTATION

Project Name: ALLTEC ESE PKG
Quote #: 1712121ALLTECESEQ
Company: Residential-Total Protection

These are Residential Packages for Houses at Kerala State only, ALL KERALA FREE DELIVERY, NO HIDDEN CHARGES, FIXED RATE

Revision:
Terms: ***
Ship via: Land Cargo
FOB: Landed
Weight: *** As applicable

TERRA STREAMER
Lightning Protection System
Make : ALLTEC, USA

Supply of External Lightning Protection System ALLTEC – Terra Streamer® ESEs are made of non-corrosive materials, utilize advance and sustainable technologies, maintain a 15-year replacement warranty, are independently tested certified to NFC 17102 and UNE 21186 standards. TerraStreamer® products complete the ALLTEC Protection Pyramid- protetion radius in Level IV 60 mtrs by capturing dangerous lightning discharges and safely channelling it to earth. All mouting mast connected with FRP mast for Protection of Side Flash Lightning Current and Test link Joint Kit IP 55/65 weather proof enclosure for testing the earth pit.
Insulation material should be used to electrically isolate the panels, The lightning air terminal shall be maintenance free type & frequent testing should not be necessary for ensuring the working of it. The central finial shall be elevated above the spheroid and it should be sharp pointed & made-up of stainless steel material for long and reliable operations. An air gap shall be provided between the individual electrically isolated 4 panels and the finial tip of the central rod.

Number	Item	Description	Qty.	Unit	Unit Cost	Total Cost
		Lightning Protection System			**(in INR)**	**(in INR)**
1	Terrastreamer 20	ALLTEC USA Terrastreamer 20 Lightning Arrester with SS ADAPTOR	1	No	INR 70,000	INR 70,000
2	Earthing	Maintenance free Earthing For Lightning Arrestor: Using 2 no's of 2 Mtr long / 250 micron, 14.2mm Dia DOLPHIN UL Listed Copper bonded Steel Rod & TEKSO ELECTRON Fill , a low resistivity ,RoHS certified & Maintenance free Grounding Enhancement backfill Compound Model:-TEKSO ULTRA FILL(8Kg Bag 4No's) with tester clamp fixings As per ALLTEC USA Standards	1	Set	INR 11,500	INR 11,500
3	Elevation Mast	Specially designed 3 mtrs GI mast Setting , and 1 mtr FRP insulation mast Specially desiged As per ALLTEC USA Standards; Roof top/Tower side mounting arrangement & fixing accessories (anchoring rope & anchoring plate, Base -for roof top installation). The mast coated with paint for additional protection,Cable connector Adaptor	1	Set	INR 12,000	INR 12,000
4	Down Conductor	70 Sq MM **V Guard** HRFR Insulated Copper Cable with tester cables for ESE Lightnig Arrester tester	20	Mtrs	INR 700	INR 14,000
5	SPD	Imported Class B+C Combicontrol LSG/Phoenix	1	No	Complementory	Complementory
6	Installation	**Installation of** ESE Lightning Protection System, tester system, SPDs with Down conductor routing from the LA terminal to the earth pit. Earth termination, fixing & Backfilling	1	Job	INR 10,000	INR 10,000
		Quotation Valid For 20 days			**GRAND TOTAL**	INR 117,500.00

Terms & Conditions

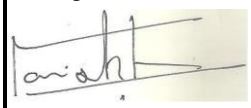
1 Price Landed at site

2 Customers Scope: Material safety will be customer scope after delivery

3 Approvals /Permission of work/storage of tools & equipment/safety etc : At customers scope

Thank you,

Best Regards



ELSAFE PROTECTION & CONTROL SYSTEMS

Ph No 0484-2575199, Toll free 1800-121-9092

6583 3254

Doc. No. : ES19200407

Rev. No. :

Rev. Date :


Grounding and Bonding Solutions • Surge Suppression • Lightning Protection
ALLTEC®
SOLUTION PROVIDERS FOR AN ENERGIZED WORLD™

LIGHTNING PROTECTION TIER THREE:

Securing investments, operations, and personnel against direct lightning strikes is critical for any organization. ALLTEC's TerraStat® Charge Dissipation Terminals, TerraStreamer® Early Streamer Emission Terminals, and traditional lightning protection components each have their own unique methods of effectively protecting your people and facility from lightning damages and injury. You can learn more at www.alltecglobal.com/lightningprotection.

Early Streamer Emission Terminal (ESE)

TerraStreamer®

Extensive research has allowed ALLTEC to create a lightweight, low wind loading ESE system to provide a safe and efficient manner of controlling dangerous lightning energy before it damages a structure or its important contents, including human occupants. The TerraStreamer® ESE air terminal initiates the upward connecting streamer earlier in time than a traditional lightning air terminal, thus extending the effective range of protection over and above that of conventional lightning air terminals. By utilizing this advanced technology, TerraStreamer® ESEs provide lightning protection to facilities that would otherwise be difficult or cost prohibitive to protect by conventional means.

FEATURES & BENEFITS

- Patented Technology
- NF C 17 – 102 and UNE 21 186 tested and certified
- Lightweight and low wind loading
- Reliable performance in all weather conditions
- Suitable for corrosive environments
- Available in five models for numerous applications
- Economical and easy to install
- No internal electronics or power supply

TYPICAL APPLICATIONS

- Distribution Warehouses
- Industrial Plants
- Apartment Buildings
- Shopping Malls
- Shipping Terminals
- Other Large Area Structures

You can learn more at www.alltecglobal.com/terrastreamer

The ESE Principle

The principle of operation for ESE terminals is to create an upward propagating streamer earlier than conventional air terminals or other objects on the earth. TerraStreamer® does this by collecting and storing ground charge during the initial phase of a thunderstorm development.

1. Thunderstorm begins creating downward step leaders
2. Ambient electric field intensity in the area of the ESE terminal increases
3. Terminal is triggered to release the stored ground charge
4. Upward streamer is formed microseconds earlier than other objects in the immediate area
5. The TerraStreamer® ESE terminal becomes the target of the developing lightning strike

The selection of the TerraStreamer® model, placement, and mounting height above the protected area all factor into formulas calculating the dimensions of the protection area.

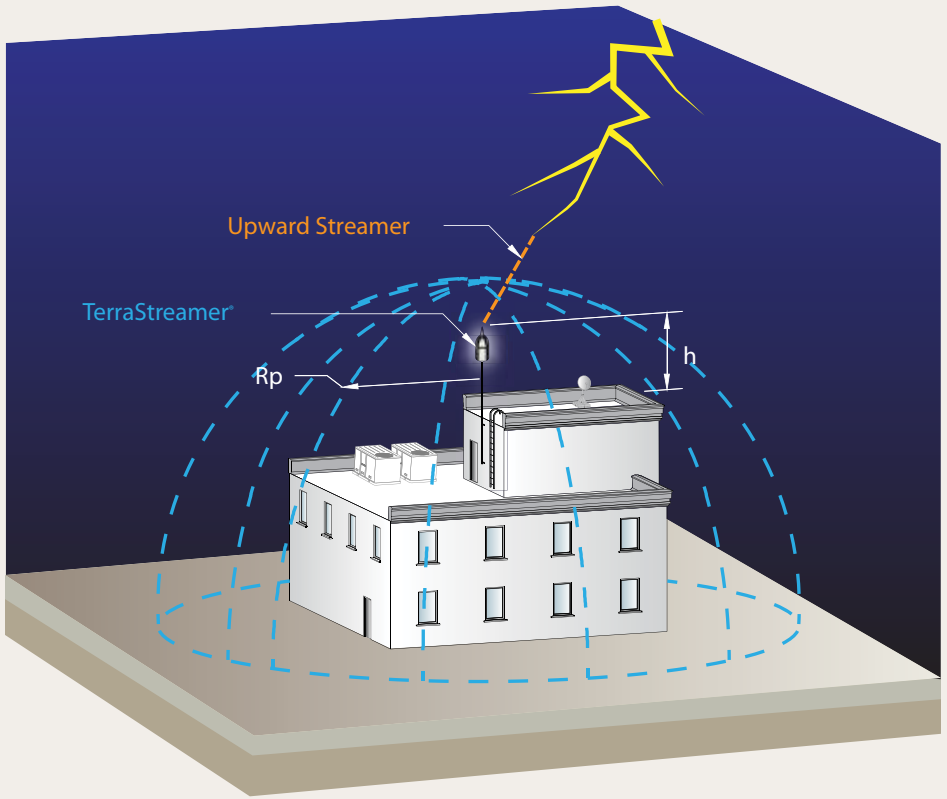
Advantages

The installation of a TerraStreamer® ESE Terminal combines the best advantages of two systems: the direct path to ground of a conventional lightning protection system, and state-of-the-art ESE technology employed in the TerraStreamer®'s patented design. TerraStreamer® terminals are:

- Externally mounted, proactive, structural lightning protection devices
- Designed to activate in the moments directly preceding an imminent, direct strike
- Tested to certify gain in triggering time (ΔT) as per NF C 17-102 and UNE 21 186
- Designed to ensure that the system provides a secure zone of protection

Protection Radius

The standard protection radius Rp of the TerraStreamer® is linked (according to NF C 17-102 standard) to T, to the protection levels I, II, III, or IV and to the height of the TerraStreamer® above the protected structure (h, defined by NF C 17-102 as a minimum of 2 m). The NF C 17-102 standard includes four levels of protection.



Grounding and Bonding Solutions • Surge Suppression • Lightning Protection

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64 Catalyst Drive, Canton, North Carolina 28716 USA
TEL: +1.828.646.9290 | **FAX:** +1.828.646.9527
EMAIL: info@alltecglobal.com

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D.Rathish IFS
Divisional Forest Officer

Office of the
Divisional Forest Officer

Thiruvananthapuram
Pin - 695 014
Email-dfo.tvm.for@kerala.gov.in
dfotrivandrum@gmail.com

Phone : 0471-2320637
Dated: 13.11.2018

No. **G2-3890/2018**

To

Elsafe Protection & Control System
D10, 4/60, Densons Building
Edappally, Cochin
Kerala - 681024

Sir,

Sub : Thiruvananthapuram Forest Division - Providing lightning arresters in different sensitive areas of Ponmudi Eco-tourism at Ponmudi Upper Sanitorium in Kallar Section of Palode Range - reg.

Ref : E-Tender Notification No.D/6060/2010 dtd 03.10.2018.

Please refer to the reference cited. I would like to inform you that the e-tender quoted by your firm is accepted at the estimate arrived as per the negotiation between Divisional Forest Officer, Thiruvananthapuram and your firm. Hence you are requested to supply and install lighting arrester in different sensitive at Ponmudi Upper Sanitorium of Ponmudi Eco-tourism area.

Yours Faithfully

Divisional Forest Officer
Thiruvananthapuram

Copy to: Range Forest Officer, Palode for further necessary action.

CENTRAL POWER RESEARCH INSTITUTE

CPRI

TEST REPORT

Test Report Number	:	HV/1(ICG)/11/9439/GENIUS **Dated** : 19-08-2011.
Name & Address of the customer	:	M/s. Genius Protection System Pvt. Ltd., 613A, Ansal Chamber - II Bikhaji Cama Place, New Delhi – 110 066. Ref: Nil Dated:08-08-2011
Name & Address of the Manufacturer	:	M/s. Alltec Corporation, 64, Catalyst Drive, Canton, North arolina 28716, USA.
Particulars of Samples tested		
Condition of the sample on Receipt	:	New.
Type	:	Nil.
Designation	:	Early Streamer Emission Terminal TSP.
Serial Number	:	11216960.
Number of samples tested	:	One.
Date(s) of Test(s)	:	11-08-2011.
CPRI Sample Code Number	:	HVML 2011 S0512.
Particulars of tests conducted	:	Lightning Impulse Current Withstand Test.
Test in accordance with standard/ Specification.	:	As per Customer's Procedure.
Sampling Plan	:	Not Applicable.
Customer's requirement	:	Current wave shape as per 60094-4.
Deviations if any	:	Nil.
Name of the witnessing persons		
Customer's representatives	:	Sri. Praveen.
Other than customer's representatives	:	Sri. George, M/s. Alltec Corporation.
Test subcontracted with Address of the laboratory	:	None.

Documents constituting this report(in words)

Number of sheets	:	Three.
Number of oscillogram/s	:	Ten.
Number of graphs	:	Nil.
Number of photo/s	:	Nil.
Number of Test Circuit Diagrams	:	Nil.
Number of drawings	:	One. (Drawing No. ALLTEC/TSP).

(M. KANYAKUMARI)
Test Engineer

(Dr. R.S. SHIVAKUMARA ARADHYA) 23/8/11
Additional Director

AUTHORISED SIGNATORIES

HIGH VOLTAGE DIVISION
CENTRAL POWER RESEARCH INSTITUTE
P.B. NO.8066, SADHASHIVANAGAR SUB P.O.
PROF. SIR. C.V.RAMAN ROAD, BANGALORE - 560 080, INDIA.
Phone: +91 (0) 080-23601917 Fax: +91 (0) 080 - 23601213, 23601917
MEMBER STL

CENTRAL POWER RESEARCH INSTITUTE

TEST REPORT

CPRI Test Report No. HV/1(ICG)/11/9439/GENIUS Dated : 19-08-2011.

TEST PROCEDURE

The test Procedure as declared by the customer is given below.
Five Positive & five negative current impulse shots of 8/20μS wave shape as per IEC 60099-4 with a magnitude of 40KA shall be applied to the sample.. The sample shall be checked for physical deformation and degradation. The Current shall be applied between the terminals L&N marked in the drawing.
The test was conducted as per the above procedure and the results are tabulated below.

CURRENT WITHSTAND TEST

Current (8/20μS) withstand test on ESE Terminal TSP:

Sample No.	Polarity	Current Applied (kA)	Osc. No
1	+ Ve	40.3	4659
		40.3	4660
		40.3	4661
		40.3	4662
		40.3	4663
	- Ve	40.3	4664
		40.4	4665
		40.4	4666
		40.4	4667
		40.5	4669

Observations:

No visual deformation/mechanical degradation of the external parts of the Early Streamer Emission Terminal TSP system was observed.

Laboratory Atmospheric conditions during the above tests.

Temperature in Degree Celsius			Atmospheric Pressure in mm of Hg.
Date	Dry Bulb	Wet Bulb	
11-08-2011	25.0	20.0	681.0

M. Kanya

(M.KANYA KUMARI)
Test Engineer

HIGH VOLTAGE DIVISION
CENTRAL POWER RESEARCH INSTITUTE
P.B. NO.8066, SADHASHIVANAGAR SUB P O
PROF. SIR C.V.RAMAN ROAD, BANGALORE - 560 080, INDIA.
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TEST REPORT

CPRI

Test Report No. HV/1(ICG)/11/9439/GENIUS

Dated : 19-08-2011.

NOTE

a) The Test results relate only to the item(s) tested.

b) Publication or reproduction of the test report /Certificate in any form other than by complete set of the whole test report /Certificate and in the language written is not permitted without the written consent of CPRI.

c) Any Corrections/erasure invalidates the test Report/Certificate

d) Any anomaly/discrepancy in the test report /Certificate should be brought to the notice of CPRI within 45 days from the date of issue.

e) The verification of the sample drawings by CPRI is limited to dimensional checks only wherever possible.

M. Kanya

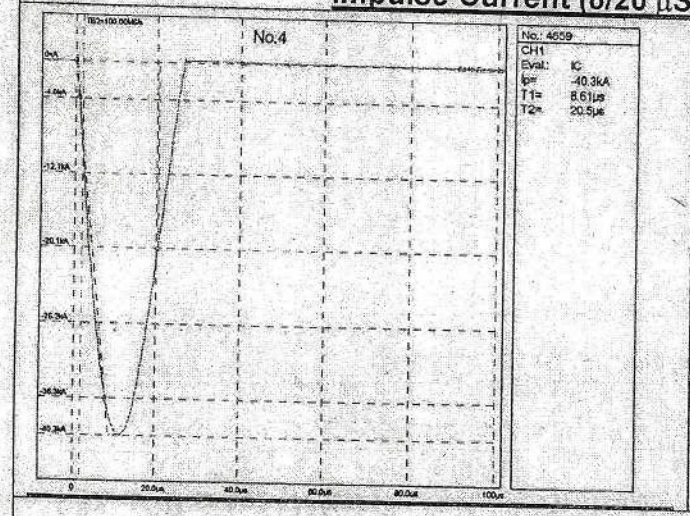
(M.KANYA KUMARI)
Test Engineer

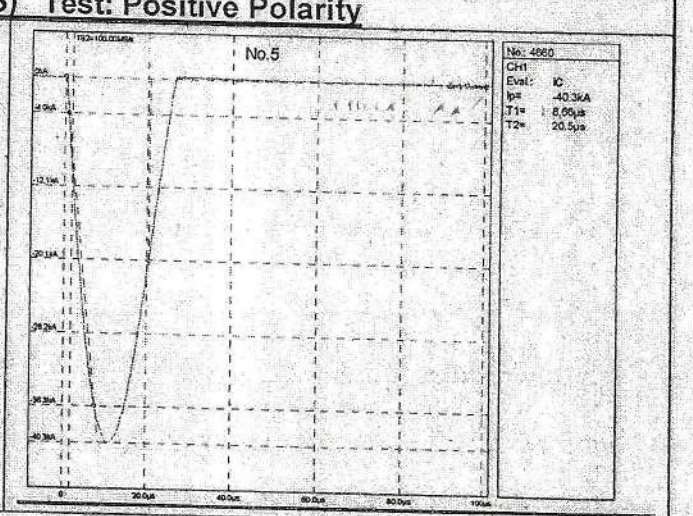
HIGH VOLTAGE DIVISION
CENTRAL POWER RESEARCH INSTITUTE
P.B. NO.8066, SADHASHIVANAGAR SUB P.O
PROF. SIR. C.V.RAMAN ROAD BANGALORE - 560 080, INDIA
Phone +91 (0) 080-23601917 Fax: +91 (0) 080 – 23601213, 23601917
MEMBER STL

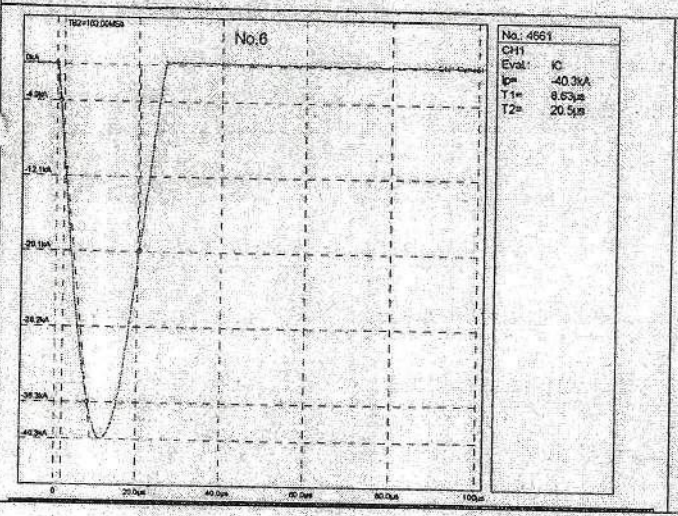
TEST REPORT NO.HV/1(ICG)/9439/GENIUS

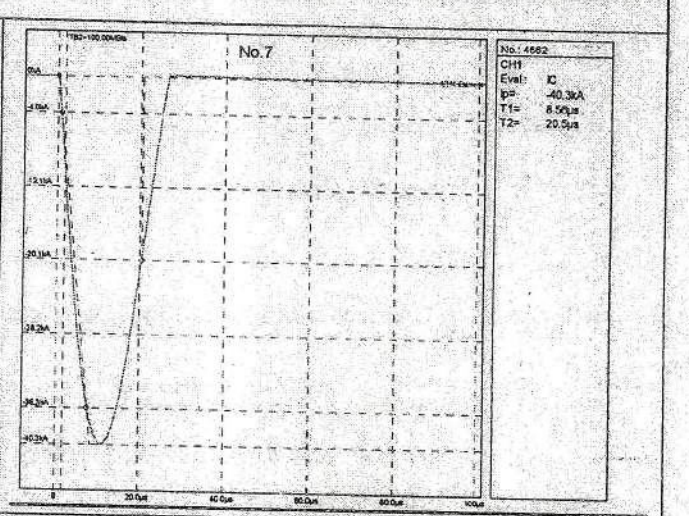
Dt: 19-08-2011

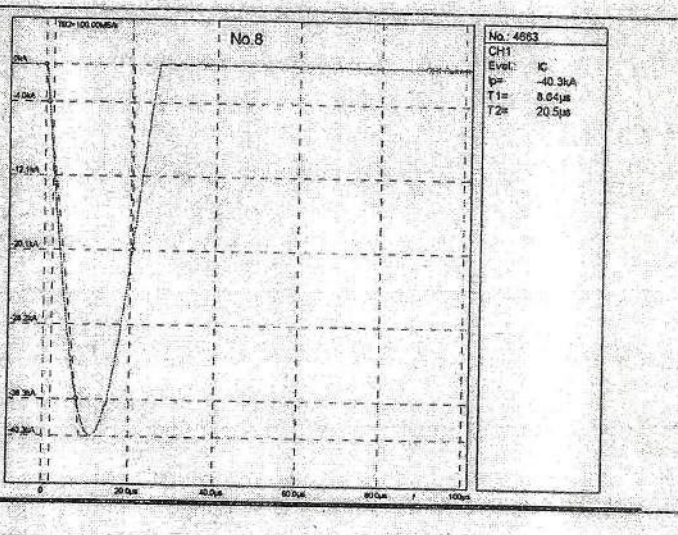
Impulse Current (8/20 μS) Test: Positive Polarity











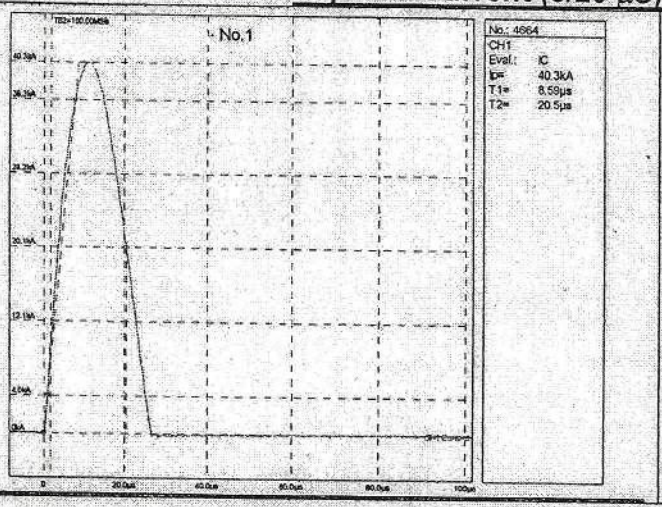
M. Kanya

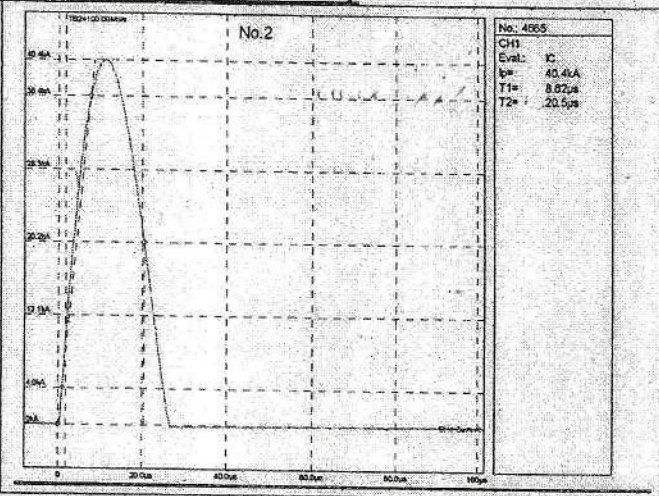
(M.KANYA KUMARI)
TEST ENGINEER

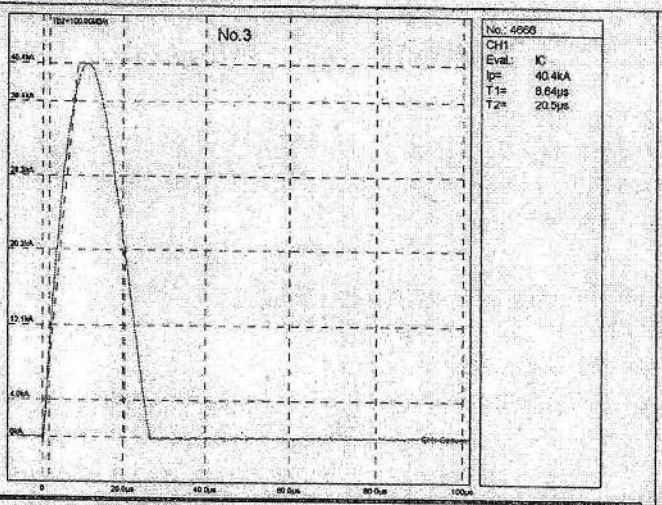
TEST REPORT NO.HV/1(ICG)/9439/GENIUS

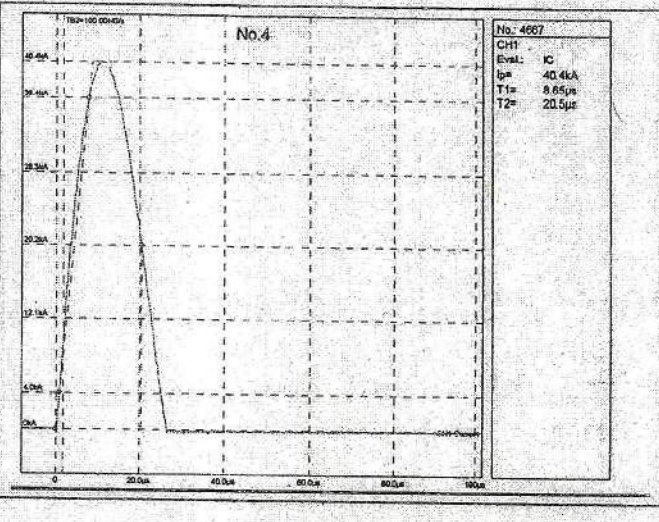
Dt: 19-08-2011

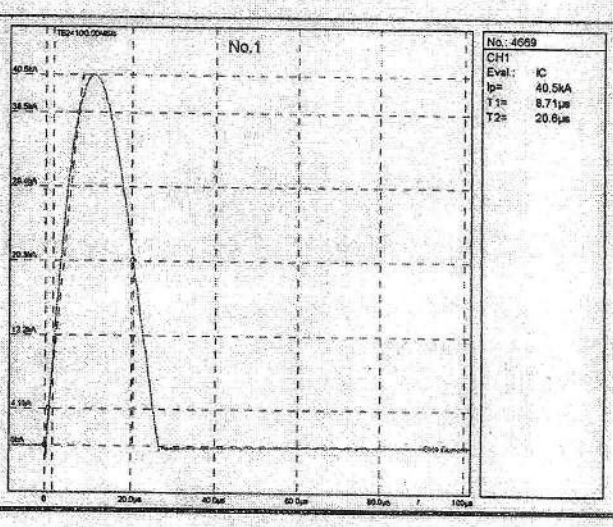
Impulse Current (8/20 μS) Test: Negative Polarity





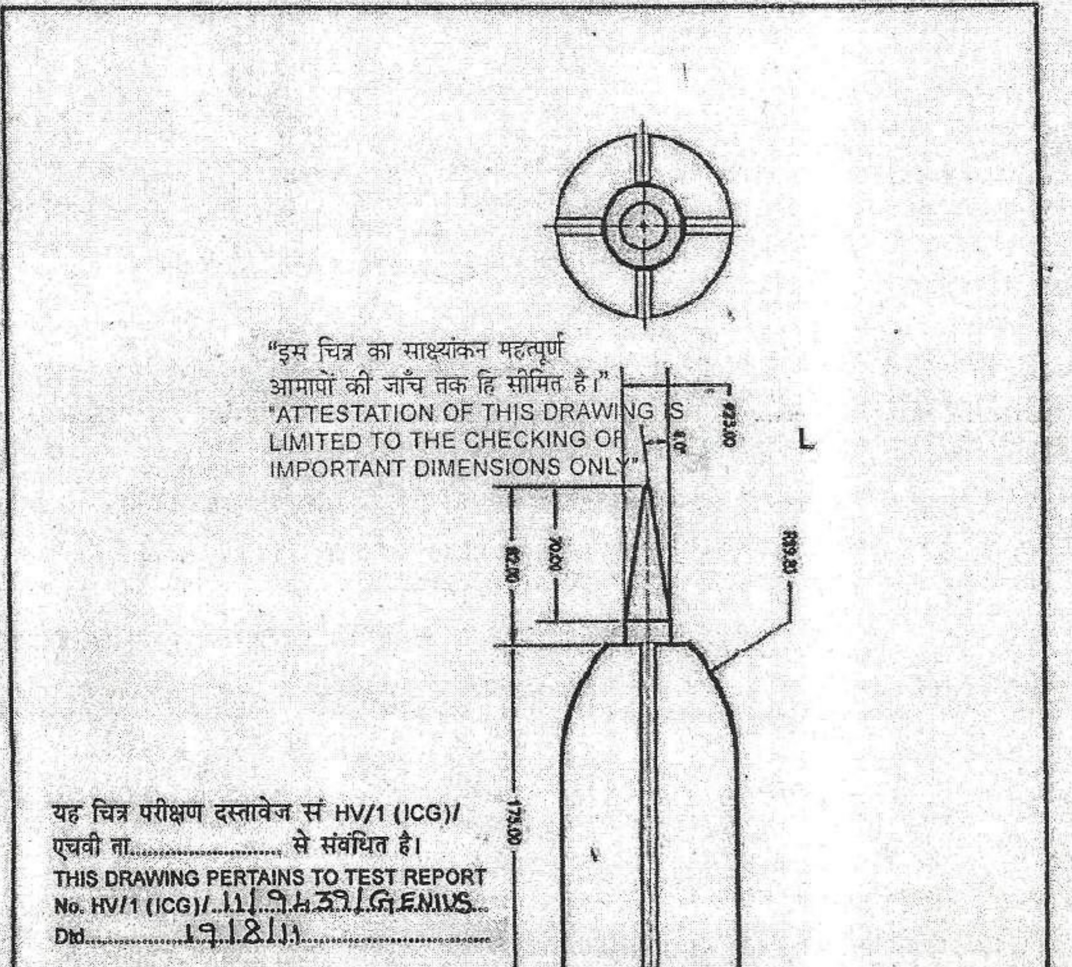






M. Kanya

(M.KANYA KUMARI)
TEST ENGINEER



"इस चित्र का साक्ष्यांकन महत्पूर्ण आमापों की जाँच तक हि सीमित है।"
"ATTESTATION OF THIS DRAWING IS LIMITED TO THE CHECKING OF IMPORTANT DIMENSIONS ONLY"

यह चित्र परीक्षण दस्तावेज सं HV/1 (ICG)/ एचवी ता.................... से संबंधित है।
THIS DRAWING PERTAINS TO TEST REPORT No. HV/1 (ICG)/ 11/ 9439/GENIUS
Dtd. 19/8/11

M. Kumar

संयुक्त निदेशक
Joint Director
उच्च वोलटज प्रभग
High Voltage Division
केन्द्रीय विदयुत अनुसंधान संस्थान
Central Power Research Institute
पो. बा. सं. 8066
P.B. No. 8066
बेंगलूर - 560 080
Bangalore-560 080

Ministry of Science and Education of Ukraine
National Technical University "Kharkiv Polytechnic Institute"
Research & Design Institute "Molniya"
47, Shevchenko Street, Kharkiv, 61013, Ukraine

Director R&D Institute "Molniya"
Professor
V.I. Kravchenko
28 November 2008

TEST REPORT No. 26-2

RESULTS OF TEST OF THE LIGHTNING TERMINALS: EARLY STREAMER TERMINAL TSP-60

Head of the Researches
Department No. 2
V.V. Kniaziev
28 November 2008

Total pages 8 plus 2 Appendix

- Tests results refer only to the tested sample.
- The tested sample is described in this report, and corresponds to that originally received.
- Partial reproduction of this document if forbidden.
- Should this test report present any correction, it must be considered void.

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Kharkiv 2008

1 General provisions

1.1. Name of organization conducting the researches:
Research & Design Institute "Molniya"
National Technical University "Kharkiv Polytechnical Institute"
Address: 47 Shevchenko Str., Kharkiv, 61013, Ukraine
1.2. Name of products, type, mark:
Active lightning terminals Early Streamer Terminal TSP-60
1.3. Manufacturer:
Alltec Corporation
Address: 64 Catalyst Drive, Canton, NC 28716, USA
1.4. Organization submitting samples for research:
Terra-AVT Ltd.
Address: 47 Shevchenko Str., Kharkiv, 61013, Ukraine

2. Description of products under test

2.1. Lightning terminals:
Tests were conducted on single samples of the following products:
– Early Streamer Terminal TSP-60
Prototype without number (see drawings in Appendix B).

2.2. Franklin lightning rod (FLR) with 10 mm in diameter, long 1,0 m, made of aluminum alloy D16 with a sharp top identical to the top of the TSP-60.

3. Research objectives

3.1. Determination of the time of puncture of discharge gap between a high-voltage electrode and each of the devices in accordance with the procedure of standard of France NFC 17-102 (Appendix C).

Applied Standards:

- French Standard NF C 17-102, July 1995, "Protection des structures et des zones ouvertes contre la foudre para paratonnerre a dispositif d'amorgage", appendix C, "Procedure devaluation d'un PDA".

4. Research procedures, test equipment and measuring instruments

4.1. Procedure for determining advance time, test equipment

The procedure for determining advance time is regulated by NF C 17-102: 1995 standard of France. The main points of the procedure are briefly given below in italics (the sequence and content are given close to the text of Annex C of the original).

The passive sharp-pointed lightning rod and ESE lightning terminal are tested one after the other under the same electrical and geometrical conditions realized in the laboratory and simulating natural conditions of initiating the upward leader (positive upward leader). The natural electric field created by a thundercloud and existing before the lightning strike influences the conditions under which corona and existing space charges are formed. Therefore a natural field must be simulated under laboratory conditions: its values are chosen in the range of 10 kV/m to 25 kV/m.

The simulation of a natural phenomenon is closest to reality if the pulse waveform has the rise time in the range of 100 μs to 1000 μs. The wave rise rate must be between $2 \cdot 10^8$ and $2 \cdot 10^9$ V/m/s. To create constant and pulse electric fields a plane capacitor is used in the form of two metal plates, the distance H between which must be more than 2 m. The tested lightning terminal sample is placed on the grounded plate. The distance (d) from the end of the lightning terminal to the upper potential plate must be more than 1 m. The value of d/H ratio must lie in the range of 0.25 to 0.5. The smaller horizontal dimension of the upper plate must be less than the value of H. The lightning terminals to be compared must be installed in the inter electrode space identically.

When conducting tests the triggering time is fixed; this time is calculated from the moment the pulse electric field begins to build up. The same number of discharges (from 50 to 100) is made for each sample. The criterion for assessing the effectiveness of the ESE lightning terminal is the mean value ΔT referred to the basic form of the pulse field given in the standard as a graph and having its peak value at 650 μs.

The diagram of the test setup of R&D Institute "Molniya" of NTU "KhPI" is shown in Fig.4.1, and its photo is given in Fig.4.2.

The test setup consists of the following main parts:

- high-voltage pulse generator of the GIN-1.0 type in the switching wave generating mode;
- constant electric field assembly (CEFA), the voltage on the potential electrode being 100 kV;
- scheme for measuring test voltage pulses – full and chopped;
- metal plates (with dimensions of 4x4 m; the distance between the plates varies from 2 m to 4 m);
- Franklin lightning rod with 20 mm in diameter (see item 2.2).

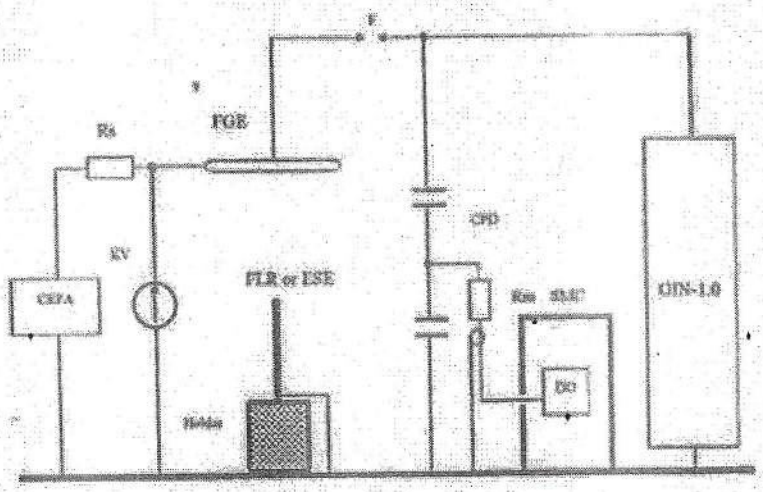
The setup makes it possible to generate voltage pulse up to 1 MV with the variation of time parameters (time-to-peak, half-decay period) in a wide range of values.

When conducting the researches the parameters of voltage pulses, electric field strength, dimensions of the plates, and distances between the plates and the top of the lightning terminals fully corresponded to the requirements of the standard [1] (see Table 4.1).

4.2. Measuring instruments

For measuring test voltage pulses (full and chopped) was used the follow measuring instruments:

- capacitive potential divider with division factor of 43000, CPD type, No. 200801 reference to 2009 May;
- storage digital oscilloscope of TEKTRONIX TDS 2024 type, No.C035168, reference to 2008 December;
- high voltage meter C-196 type, No. 103974, reference to 2008 September;
- temperature and humidity meter Center 315, No. 04030763, reference to 2008 November;
- atmospheric pressure meter, B-2 type, reference to 2009 March.



CEFA – constant electric field assembly; KV – kilovoltmeter;
GIN-1.0 – 1 MV voltage pulse generator; FGE – field generating electrode; SMC – screened measuring cabin; FLR – Franklin lightning rod; ESE – ESE sample under test; CPD – capacitive potential divider with division factor of 43000; DO – storage digital oscilloscope of TEKTRONIX TDS 2024 type; F – cutoff switchboard; Rs – separating resistor; Rm – matching resistor.

Fig. 4.1. Diagram of the test setup for advance time measurements

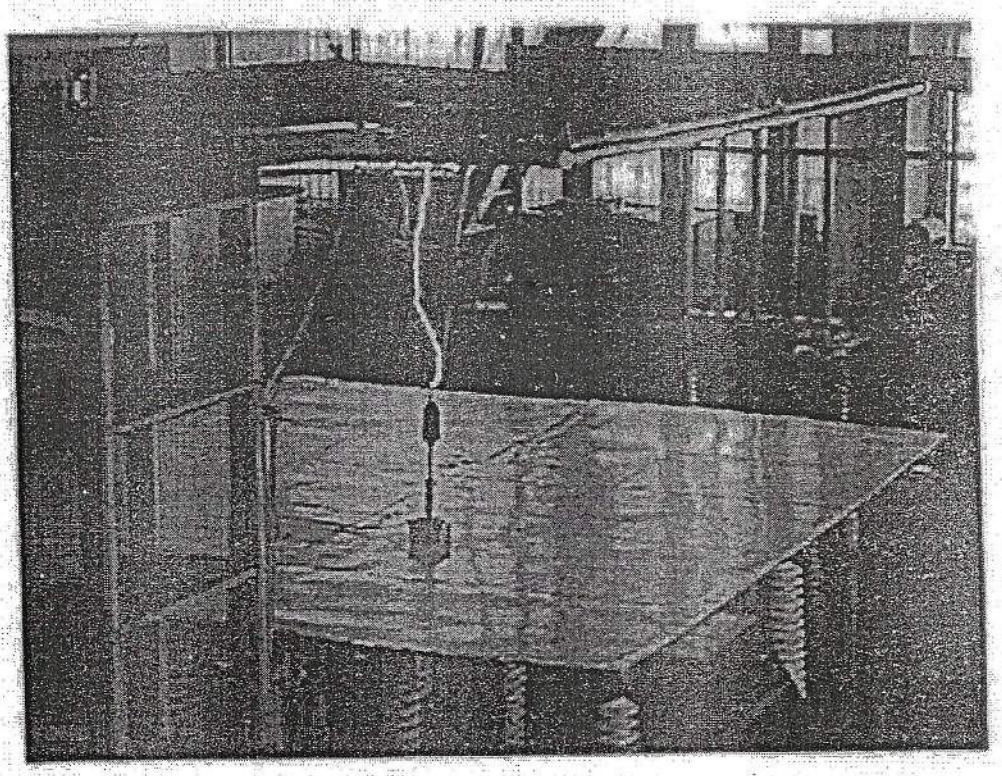


Fig.4.2. Photo of the test setup (air gap puncture)

Table 4.1. Comparison of the parameters of the test equipment of R&DI "Molniya" with the requirements of the standard of France [1]

Parameter, dimension	Requirements of the standard [1]	Realized during tests	Conformity assessment
Electrostatic field intensity, kV/m	from 10 ÷ 25	25 ± 0.5	Yes
Voltage pulse rise time, μs	100 ÷ 1000	436 ± 5	Yes
Pulse rise rate, V/m/s	$2 \cdot 10^8 \div 2 \cdot 10^9$.	$(0.82 \pm 0.05)\ 10^6$	Yes
Distance between plates (H), m	≥2.0 m	2.0 ÷ 0.01	Yes
Distance from the end of ESE to the upper plate (d), m	≥1.0 m	1.2 ± 0.01	Yes
d/H ratio	0.25 ÷ 0.5	0.4 ± 0.02	Yes
Dimensions of plates, m	≥2.0	4.0	Yes

The tests of the lightning terminals were conducted at the value of time to peak voltage pulse of 436 μs (see Fig. 4.3), half-decay period of 1920 μs. The pulse amplitude varied depending on the atmospheric pressure at the moment of the researches. Typical oscilloscope patterns of the chopped voltage (when breaking down into an air gap) have the form shown in Fig.4.4.

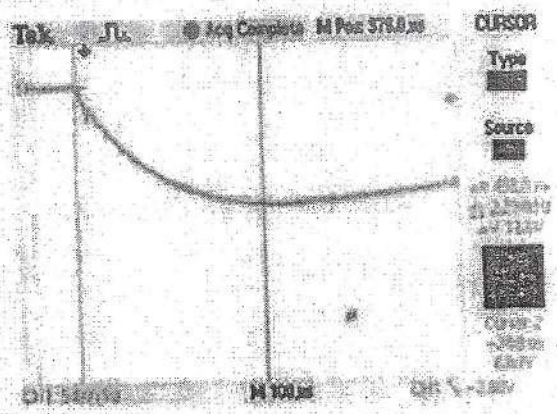
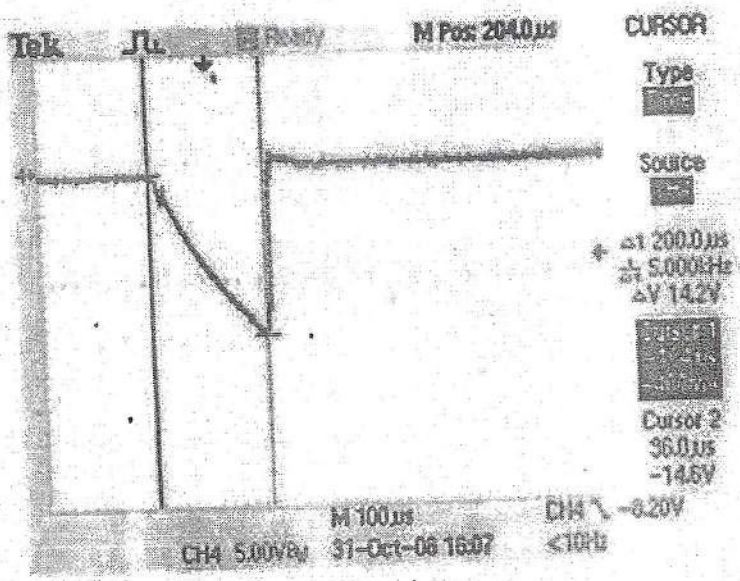
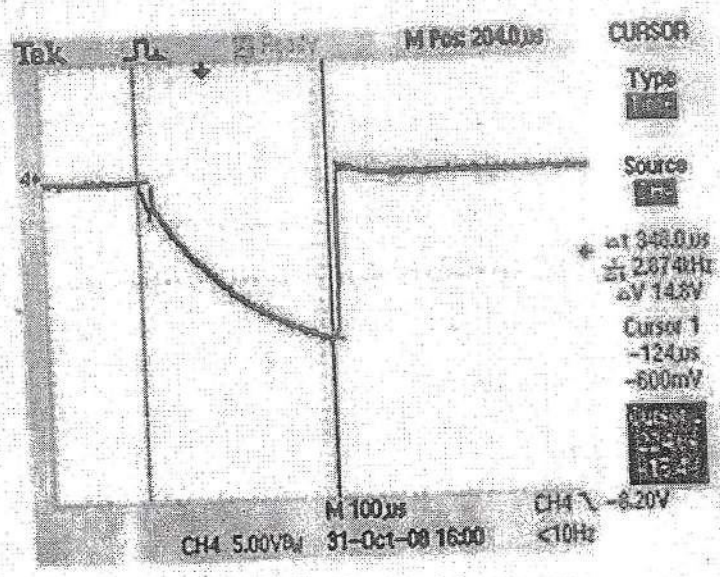


Fig. 4.3. Test pulse form
(time-to-peak is 436 μs)



a)



b)

Fig. 4.4. Examples of chopped voltage determining the time of air gap puncture (a) 200 µs; b) 348 µs)

5. Research results

5.1. Advance time research results

The tests of the lightning terminals were conducted with the value of time to peak voltage pulse of 436 μs (see Fig. 4.3), half-decay period of 1920 μs. The pulse amplitude varied within 10% depending on the atmospheric pressure at the moment of conducting researches. This fact was not taken into account during the analysis as the tests were of comparative character, and all devices were tested under the same conditions. The values of other important parameters of the process are given in Table 4.1.

For tests aim, 100 consecutive impulses have been applied to the each lightning terminal equipped with triggering device and also 100 impulses have been applied to the reference Franklin lightning rod. Impulse rate was one each minute.

The pulses, with negative polarity, have been applied to the circle shaped upper electrode, in order to produce the disruptive discharge to earth through the tested arrester, located near the electrode axis and perpendicular to it, in its vertical position and under the electrode, as shown schematically in figure 4.1. During the impulses application, the electrode was kept polarized by means of a negative polarity direct voltage of 50 kV value.

Main test parameters were as follows:

- Top electrode-floor distance:	2 meters
- Top of terminal-top electrode distance:	1,2 meters
- Polarization level:	- 50 kV
- Time to peak voltage pulse:	436 ± 25 μs
- Top electrode dimension:	4,0 x 4,0 meters

Ambient conditions during the tests were as follows:

a) At the beginning of the impulses series applied to the tested terminal:

Atmospheric pressure:	760 mmHg
Ambient temperature:	13,6 °C
Relative humidity:	11 г/м^3

b) At the beginning of the impulses series applied to the reference FRL:

Atmospheric pressure:	760 mmHg
Ambient temperature:	14,2 °C
Relative humidity:	11 г/м^3

c) At the end of the test series

Atmospheric pressure:	739 mmHg
Ambient temperature:	14,5 °C
Relative humidity:	11 г/м^3

Appendix A to this test report shows the list of the results obtained for the time to breakdown for each impulse.

The values of pulse edge time were fixed for each device at the specified number of discharges. Using them the arithmetic average (T_{TSP}) was determined. Similarly the arithmetic average of the edge time for the Franklin lightning rod (T_{FLR}) was determined. These values were transferred to the basic curve as specified in paragraph C.4.2. in the standard [1], using which ΔT was determined.

The results obtained in the test are shown in table 5.1

Table 5.1. Results of determining triggering advance time

Sample	Average time-to-breakdown for the TSP arrester, T_{TSP} µs	Average time-to-breakdown for the reference arrester FLR, T_{FLR} µs	Difference between the average times obtained experimentally, µs	Triggering advance of the TSP, µs	Uncertainty associated to results (*) µs
TSP-60	216	270	54	61	±5

Note*): Uncertainty calculated on the basis of the metrological viability study performed in R&D Institute "Molniya".

The tests made by:

Heard of the test laboratory No.2.1 Ivan Lasnoy

Senior researcher Boris Lantushko

Senior Engineer Sergey Somhiiev

NO TEST UNDER THIS LINE

FORM NO : NTH/CHN/F5

347218

भारत सरकार Government of India
राष्ट्रीय परीक्षण शाला (द.क्षे.)
NATIONAL TEST HOUSE (SR)
तरमणी, चेन्नई - 600 113. Taramani, Chennai - 600 113.
Phone : 22432374, 22431157 Fax : 22433158 email : nthsr@tn.nic.in

परीक्षण प्रमाण पत्र

TEST CERTIFICATE

INTERIM/FINAL REPORT

परीक्षण प्रमाण पत्र सं Test Certificate No	जारी होने की तिथि Date of Issue	कोड नं Code No	पृष्ठ Page	पृष्ठों की संख्या No of Pages
NTH(SR)/EL(C)/2014/00176A	23/04/2014	1396938243840	1	2

जिसे जारी करना है
Issued To : TEKSAI POWER SECURE SOLUTION PVT.LTD.

पता
Address : 3/860,BLUE STAR INDUSTRIES COMPOUND,
PUDUSSERY,KANJIKODE, PALLAKKAD,KERALA-678623

ग्राहक का सन्दर्भ सं एवं दिनांक
Customer's Ref. No. : TPSS/2014 Date: 25/01/2014

पंजिका सं एवं दिनांक
Register No & Date : 00176/NTH(SR)/EL(C)/08/04/2014

परीक्षण सामग्री का विवरण
Description of Test Item : Earthing material

परीक्षण सामग्री का पहचान
Identification of Test Item : Printing marking on the bag:"Teksai-Ultra"

नमूना का विशिष्टि (यदि हों)
Product Specification (If any) : Electrical Resistivity test as per customer's specification

नमूना प्राप्ति की तिथि
Date of Receipt of the Test Item : 08/04/2014

कार्य सम्पादन की तिथि
Date(s) of Performance of Tests : From: 08/04/2014 To: 23/04/2014

व्यावहृत प्रणाली का पहचान
Method(s) used for Test : Electrical Resistivity test as per customer's specification

नमूना प्रकिया जहाँ प्रासंगिक हों
Sampling Procedure where relevant : NA

Tested By	Checked By	Approved By
N. Joseph Kalai SE	K. Jeyaraj	
Natarajan Joseph kalaiselvan	K. Jeyaraj	S.B. Nanda Kumar
SO Electrical	SO Electrical	Scientist-SC(Electrical)

ARBRO™
PHARMACEUTICALS LIMITED
(ANALYTICAL DIVISION)
ISO 9001 : 2008 Certified
Govt. Approved Test House
4/9, Kirti Nagar Industrial Area, New Delhi-110 015
Tele : 011-45754575 Fax : 011-45754545
e-mail : arbrolab@arbropharma.com, Website : www.arbropharmaindia.com

CERTIFICATE OF ANALYSIS

P

ISO 9001 : 2008
DNV
Certified Company

Sample :**EARTHING BACKFILL COMPOUND**

Report No. :NR-11060906
Received On :09/06/2011
Mfg.Lic.No. :N.S.
Ref. No. :N.S.

Supplied By :N.S.
Submitted By :GENIUS PROTECTION SYSTEM.(P) LTD.
Address :248A, RATI COMPLEX, RAMA MKT., MUNIRKA, N DELHI.

Batch No.	Mfg. Date	Expiry Date	Batch Size	Sample Qty
N.S.	N.S.	N.S.	N.S.	100GM.

RESULTS OF ANALYSIS

Date of start of analysis 10-06-11 Date of Completion of analysis 13-06-11.

Description :- Black powder.

<Sl.No.>	<Parameters>	<Results>	<Limit (MAX)>
B - TOXIC METALS		:	
1.	Mercury(as Hg)	:- 0.251ppm	1000.0ppm
2.	Lead(as Pb)	:- 8.225ppm	1000.0ppm
3.	Cadmium(as Cd)	:- 0.128ppm	100.0ppm
4.	Hexa-Chromium(as Cr)	:- Less than 1.0ppm	1000.0ppm

Remark :- Observed value for Pb,Cd,Hg & Cr+6 are very low from the max limit, Hence sample complies the ROHS.

REMARKS : PARTY ASKED FOR THE ABOVE TESTS ONLY

Date : Monday, June 13, 2011

Person In Charge

CPRI

CENTRAL POWER RESEARCH INSTITUTE

(Member of STL)

TEST REPORT

Test Report Number	SC11376A	**Dated**: 29th August, 2011
Name & Address of the Customer	M/s. Teksai Power Secure Solution Pvt. Ltd., 3/860, Blue Star Industrial Compound, Pudussery, Kanjikodu, Palaghat, Kerala - 678 029.	
Name & Address of the Manufacturer	M/s. Teksai Power Secure Solution Pvt. Ltd., 3/860, Blue Star Industrial Compound, Pudussery, Kanjikodu, Palaghat, Kerala - 678 029.	
Particulars of sample tested	GI Earthing Electrode	
Condition of the sample on Receipt	New	
Type	---	
Designation	Teksai	
Serial Number(s)	---	
Number of samples tested	One	
Date (s) of test (s)	10th August, 2011	
CPRI sample code no(s).	SC11S1323	
Particulars of tests conducted	Short-Time current	
Test in accordance with Standard / specification	Customer's instruction	
Sampling plan	Not applicable	
Customer's requirement	20 kA rms for 1.0 s	
Deviations if any	---	

Name of the witnessing persons

Customer's representative	Mr. Praveen.P.V
Other than customer's representative	Mr. Jacob George
Test subcontracted with address of the laboratory	None

Documents constituting this report (in words)

Number of sheets	Four
Number of oscillograms	One
Number of graphs	Nil
Number of photos	Two
Number of test circuit diagrams	One
Number of drawings	One

(N. Maheswara Rao)
Test Engineer

(Swaraj Kumar Das)
Joint Director

AUTHORISED SIGNATORIES

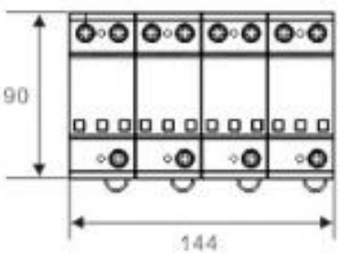
LSG PROTECT®

Surge Protection Devices

Made in France, EU

ALTERNATE CURRENT

LSGBC50



Dimensions

APPLICATIONS

- B+C class Surge Protective Device for AC Power System.
- Sensitive electronic equipment
- Telecom centers
- Automatic control centers
- Intelligent buildings
- Industrial enterprises
- Medical institutes

FEATURES:

- DIN rail mounting for easy installation
- Plug connectors for quick and easy connection or rewiring
- 50kA lightning impulse current Iimp
- Thermal disconnect device
- Status indicators visually verify protection level

TECHNICAL PARAMETER:

Model	LSGBC50
Electrical Parameter	
Nominal working voltage Un	50/60Hz 220/380V,
Max. continuous operating voltage Uc	385V
Nominal discharge current（8/20μs）In	50kA
Lightning impulse current(10/350μs）Iimp	15kA
Protection level @20kA , 8/20μs Up	2000V
Response time tA	100ns
Protection model	L1/L2/L3-N,N-PE
Mechanical characteristics	
Dimension	90 (H)×144 (W)×68(L)mm
Weight per unit	1200g
Mounting	35mm DIN rail
Connecting diameter	⩾10mm^2
IP code	IP20
Working conditions	Temperature: -40 to 80℃, Relative humidity: ≤95%
Approval	FCC, CE, ROHS

PHOENIX CONTACT GERMANY

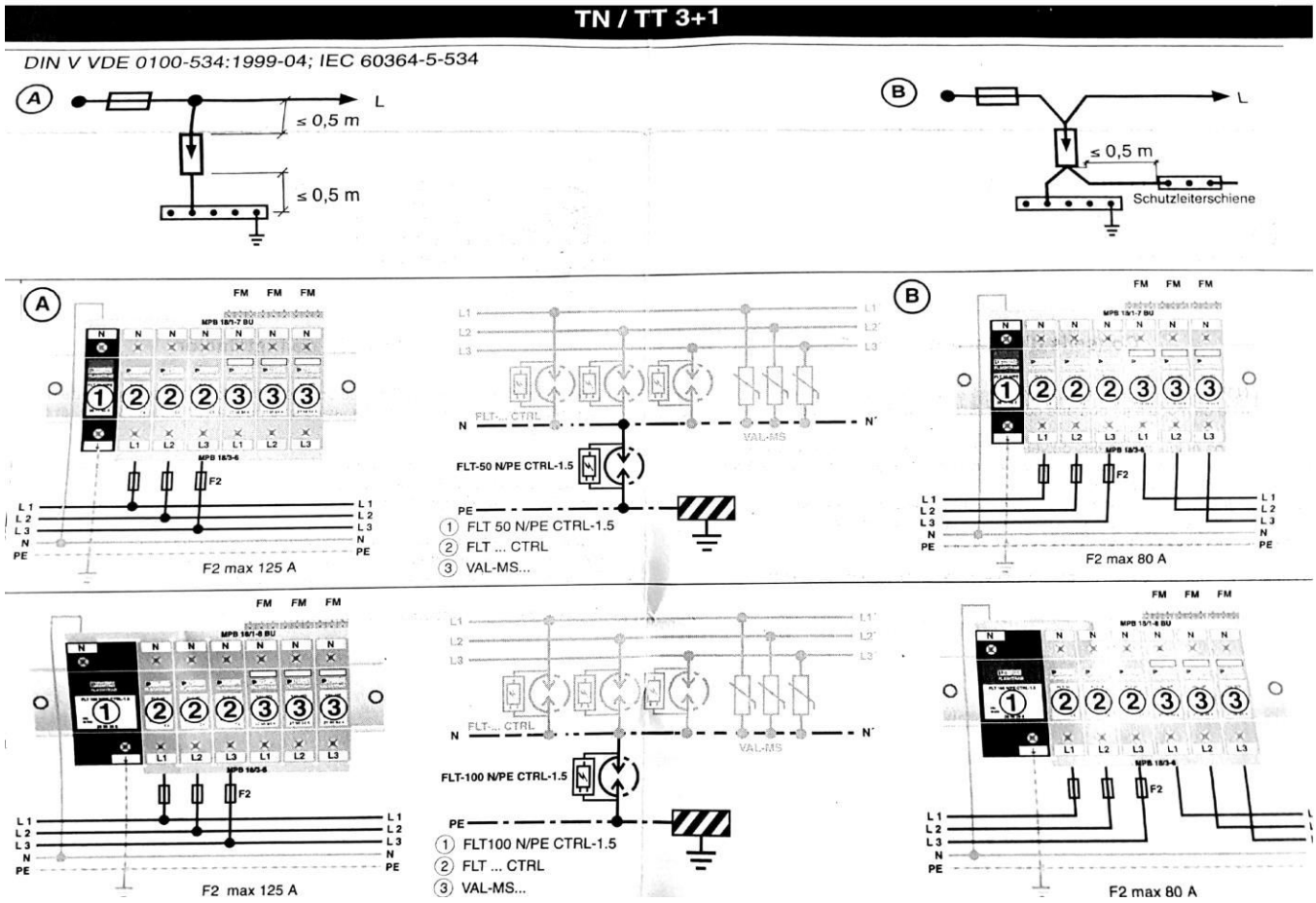
CTRL 1.5 Surge Arrester - Flashtrab FLT 35 CTRL 1.5

Features:-

- Lighting current arrester with encapsulated N-PE spark gap and ignition electronics
- 2 Channel Protection level 1.5 KV
- Housing width 40 mm (3 Div)

Specification:-

Un	**230 V**
Uc	**440 V, 260 V**
Up	**≤1.5 kV**
Imp	**100 kA**
T*C	**-40...+85**



Confirmation on quality assurance according to nuclear standard KTA 1401

On behalf of the German nuclear power plant operators, **E.ON Kernkraft GmbH** as a partner of the VGB PowerTech e.V. working group Assessment of Contractors confirms

Phoenix Contact Group

valid for the sites

Phoenix Contact GmbH & Co. KG
Flachsmarktstraße 8, D-32825 Blomberg

Phoenix Contact Electronics GmbH
Dringenauer Straße 30, D-31812 Bad Pyrmont

Phoenix Contact Deutschland GmbH
Flachsmarktstraße 8, D-32825 Blomberg

Phoenix Contact Power Supplies GmbH
Oberes Feld 1, 33106 Paderborn

and the scope of supply and services

Design, manufacturing and sale of electrical and electronic connecting elements, power supply and surge voltage protection modules, as well as electronic interface systems

the qualification for system- and product related quality assurance.

The assessment was performed on **April 20th and 21st, 2016** by

EUROCERT®
Gesellschaft zur Qualifizierung von Unternehmen mbH

based on the standard **KTA 1401** as well as on the assessment documents of the VGB PowerTech e.V. working group Assessment of Contractors in consideration of product related requirements.

Details of the assessment are given in the report Eurocert 2016/02.

This confirmation is valid until **March 08th, 2019** provided that the conditions on which the assessment was based have not been changed.

Hanover, April 29th, 2016

i.V. [signature]

E.ON Kernkraft GmbH

i.V. [signature]

VGB PowerTech

EnBW

e.on Kernkraft

RWE The energy to lead

Vattenfall Europe Nuclear Energy

VATTENFALL

DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation

The Deutsche Akkreditierungsstelle GmbH attests that the calibration laboratory

Phoenix Contact GmbH & Co. KG
Flachsmarkstraße 8, 32825 Blomberg

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out calibrations in the following fields:

Dimensional quantities
- **Length**
  - **Length measuring instruments**
  - **Diameter**
  - **Thread**

Electrical quantities
- **DC and low frequency quantities**
  - **Voltage**
    - **DC voltage**
    - **AC voltage**
  - **Current**
    - **DC current**
    - **AC current**
  - **DC resistance**
- **Time and frequency**
  - **Frequency**
  - **Time interval**

The accreditation certificate shall only apply in connection with the notice of accreditation of 24.01.2018 with the accreditation number D-K-12161-01 and is valid until 23.02.2020. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 7 pages.

Registration number of the certificate: **D-K -12161-01-00**

Braunschweig, 24.01.2018	Dr. Heike Manke Head of Division	Translation issued: 03.04.2018	Head of Division

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf.

C E R T I F I C A T E

awarded to

Phoenix Contact GmbH & Co.KG
Flachsmarktstr. 8
32825, Blomberg
Germany

DQS GmbH

confirms, as an IRIS Certification™ approved certification body, that the Management System of the above organization has been assessed and found to be in accordance with the

IRIS Certification™ rules:2017
and based on
ISO/TS 22163:2017

for the activities of Design and Development and Manufacturing
for the scopes of certification: 12 (Electrical wiring), 19 (Single railway components)
electromechanical and electrical connecting elements, plug connectors, surge voltage protection, cable assembly, tools and components for electrical engineering

Certificate valid from: 04/03/2018 Certificate valid until: 03/03/2021*

Current date: 06/03/2018
Certificate-Register-No: 239330

* Providing that the subsequent surveillance audits are successful before the validity date of the previous audit.
Certification body address: August-Schanz-Straße 21, 60433 Frankfurt am Main, Germany

Enclosure 1 of Certificate No.: 239330

Phoenix Contact GmbH & Co.KG
Flachsmarktstr. 8
32825, Blomberg
Germany

The location is supported by the following remote locations:

Address	Scope/Process
Phoenix Contact GmbH & Co. KG Bahnhofstr. 9 32816 Schieder-Schwalenberg, Germany	Logistics, Professional Education

Current date: 06/03/2018
Certificate-Register-No: 239330

* Providing that the subsequent surveillance audits are successful before the validity date of the previous audit.
Certification body address: August-Schanz-Straße 21, 60433 Frankfurt am Main, Germany