



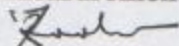
RESEARCH , DEVELOPMENT AND TESTING NATIONAL
INSTITUTE FOR ELECTRICAL ENGINEERING

ICMET CRAIOVA
ROMANIA

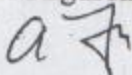
LIT

HIGH VOLTAGE LABORATORY - LIT
200515 Craiova, Calea Bucuresti 144
Phone :0251-436866,437795,438380,Fax:0251-415482

TEST REPORT
No.40050 / 14.05.2004

1. **Product:** Early Streamer Emission Lightning Conductor – ESELC type Petex
2. **Test:** Evaluation of the initiation advance
3. **Producer:** FOREND ELEKTRIC MALZEMELERI ve DIŞ TICARET ANONİM ŞİRKETİ
4. **Customer:** FOREND ELEKTRIC MALZEMELERI ve DIŞ TICARET ANONİM ŞİRKETİ
5. **Customer's adress:** Perpa is Merkezi A Blok K:10 No:1531 Okmeydani – ISTANBUL Turkey
6. **Test result:** They are presented the measurements results
7. **Test responsible:** Eng. I.Badea 

Test Supervisor
Eng.A.Ungureanu



Q.A. Responsible:
Eng. Gh. Macovei



APPROVED
LABORATORY HEAD
Eng. Dorin Popa
LABORATORUL DE ÎNALTĂ TENSIUNE
CRAIOVA

8. The test report contains 12 pages.
 9. The test report was edited in 4 ex.; 1 ex to LIT and 3 ex to customer.
- CAUTION:**
- a. The test result makes reference only to tested product .
 - b. Integral reproduction of the test report is forbidden.
 - c. Any part of this test report may be reproduced only with the accord of LIT and RENAR.
 - d. Reports without original signatures are not valid.



1. Tested material

Early Streamer Emission Lightning Conductor (ESEL) type Petex

See photo on page 10

See drawing on page 9

Lightning Conductor supplied by FOREND – TURKEY

2. Type of tests

A switching impulse wave negative polarity and a DC voltage of negative polarity are applied on the upper metallic plane.

3. Specification

NFC 17 – 102 / 1995 Appendix C

4. Test equipment

Laboratory inner dimensions: 48 m x 32 m x 27 m (height)

Altitude: 100 m above sea level

4200 kV High Voltage Impulse Generator type SPF 340; 340 kWs, TUR
Dresden - Germany

1000 kV Rectifier cascade type GS 1000 / 30; 30 mA; TUR Dresden –
Germany

1400 kV Damped capacitive divider, ICMET Craiova, Romania;

TR – AS transient – recorder, Dr. Strauss System Elektronik, GmbH - Germany

Impulse calibrator type KAL – 1000, 0.84 / 60 μ s and 20 / 3000 μ s Dr. Strauss
System Elektronik, GmbH – Germany

Fluke calibrator type 5500 A.

5. Test circuit

See the test circuit diagram on page 11

The 1400 kV damped capacitive divider was calibrated by official Accredited Laboratory DKD – K – 18702, Romania with certificate 0060 of 14th January 2004 and checked before beginning of measurement with the impulse calibrator KAL 1000, calibrated by PTB – Braunschweig – Germany, calibration certificate 2727 PTB 02, and Fluke 5500 A calibrator calibrated by Metrology National Institute of Romania, order calibration certificate No.3.1 – 112 / 26.02.2004

A handwritten signature in black ink, located in the bottom right corner of the page.



9. TEST ON ESELC TYPE Petex

9.1. Atmospheric conditions

BEFORE TEST	Beginning of the test: 10h10 p = 1001 mbari t = 16.1 °C hr = 59.7 %
AFTER TEST	End of the test: 12h45 p = 1001 mbari t = 16.0 °C hr = 58.5 %

9.2. Results

See tables on page 7

Number of significant impulses: 100

Average of significant T_B :

- calculated from the experimental wave $T'_{PDA} = 251.29 \mu s$
- transferred on the reference waveform: $T_{PDA} = 308.65 \mu s$

See curves on page 8

Triggering advance: $\Delta T = T_{PTS} - T_{PDA} = 373.78 - 308.65 = 65.13 \mu s$