



RESEARCH , DEVELOPMENT AND TESTING NATIONAL
INSTITUTE FOR ELECTRICAL ENGINEERING

ICMET CRAIOVA
ROMANIA

LIT

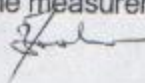
HIGH VOLTAGE LABORATORY -LIT

200763 Craiova, Calea Bucuresti 144

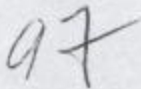
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TEST REPORT

No. 39477 / 14.07.2003

- 1.Product: **Early Streamer Emission Lightning Conductor – ESELC type FA**
- 2.Test: Evaluation of the initiation advance
- 3.Test order: Contract No.2173 / 26.05.2003
- 4.Producer: FOREND ELK. MILZ VE DIS TIC A.S.
- 5.Customer: FOREND ELK. MILZ VE DIS TIC A.S.
- 6.Customer's adress: Perpa is Merkezi A Blok K10 No.1531 Okmeydani sisli Istanbul -TURKEY
- 7.Test result: They are presented the measurements results
- 8.Test responsible: Eng.I.Badea 

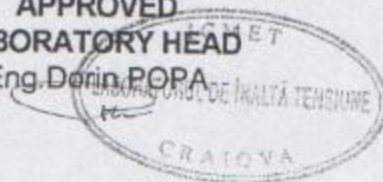
Test Supervisor
Eng.A.Ungureanu



Q.A. Responsible:
Eng.Gh.Macovei



APPROVED
LABORATORY HEAD
Eng.Dorin POPA



9.The test report contains **12** pages.

10.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. Reproduction of this test report is only allowed as the whole.
- c. Any part of this test report may be reproduced only with the accord of LIT
- d. Reports without original signatures are not valid.



LIT

1. Tested material

Early Streamer Emission Lightning Conductor (ESELC) type FA

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

N F C 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 kW, TUR Dresden – Germany

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

1600 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 1600 kV damped capacitive divider was calibrated by official Accredited Laboratory DKD – K – 18702, Romania with certificate 0026 of 3rd March 1999 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 – 482 / 2002.



9. TEST ON ESELCT TYPE FA

9.1 Atmospheric conditions

BEFORE TEST	Beginning of the test: 9h47 p = 1001 bar t = 23.3 °C hr = 50.3 %
AFTER TEST	End of the test: 11h34 p = 1001 bar t = 23.6 °C hr = 51.4 %

9.2 Results

See tables on page 7

Number of significant impulses: 100

Average of significant T_B :

- calculated from the experimental wave $T_{PDA}^* = 260 \mu s$
- transferred on the reference waveform: $T_{PDA} = 320.3 \mu s$

See curves on page 8

Triggering advance: $\Delta T = T_{PTS} - T_{PDA} = 381.9 - 320.3 = 61.6 \mu s$