RESEARCH , DEVELOPMENT AND TESTING NATIONAL
INSTITUTE FOR ELECTRICAL ENGINEERING

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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.

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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 see 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
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 μs and 20 / 3000 μs 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 ESELC 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 $T'_{PDA} = 260$ µs
- transferred on the reference waveform: $T_{PDA} = 320.3$ µs

See curves on page 8

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