

RESEARCH, DEVELOPMENT AND TESTING NATIONAL INSTITUTE FOR ELECTRICAL ENGINEERING

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R O M A N I A
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TEST REPORT No.40726 / 24.05.2006

- 1. Product: Early Streamer Emission Lightning Conductor-ESELC type FOREND EU-M N/1
- 2. Test: Evaluation of the initiation advance according to NF C 17 102 / 1995 standard
- 3. Test order: Contract no.3871 / 20.05.2005
- 4. Customer: FOREND ELEKTRIK MALZEMELERI ve DIŞ TICARET ANONIM ŞIRKETI
- 5. Customer's address: 19 Mayis Mh. Buyukdere Cd. Basman Han No:4 Kat: 4 Sisli / Istanbul TURKEY
- 6. Test result: There are presented the measurements results
- 7. Test responsible: Eng. I.Badea

Test Supervisor Eng. A. Ungureanu



APPROVED
LABORATORY HEAD
Eng Dorin Popa
LEGGALOW DE MALTERSHINE

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.

- 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.
- d. Reports without original signatures are not valid.

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1. Tested material

Early Streamer Emission Lightning Conductor (ESELC) type FOREND EU-M N/1
See photo on pages 9, 10

Lightning Conductor supplied by FOREND ELEKTRIK MALZEMELERI ve DIS TIGARET ANONIM ŞIRKETI – 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

1400 kV Damped capacitive divider, ICMET Craiova, Romania;

TR – AS transient – recorder, Dr. Strauss System Electronik, GmbH- Germany Impulse calibrator type KAL – 1000, 0.84 / 60 μs and 20 / 3000 μs Dr. Strauss System Electronik, GmbH – Germany

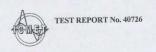
Fluke calibrator type 5500 A.

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 14thJanuary 2004 and checked before beginning of measurement with the impulse calibrator KAL 1000, calibrated by PTB – Braunschweig – Germany, calibration certificate 3080 PTB 05, and Fluke 5500 A calibrator calibrated by Metrology National Institute of Romania, calibration certificate 000256/DKD – K – 39701/06.05.





9. TEST ON ESELC TYPE FOREND EU-M N/I

9.1. Atmospheric conditions

BEFORE TEST	Beginning of the test: 13h09 p = 1004 mb t = 22 °C hr = 66 %
AFTER TEST	End of the test: 15h20 p= 1003 mb t = 22.5 °C hr = 63 %

9.2. Results

See tables on page 7

Number of significant impulses:

100

Average of significant TB:

calculated from the experimental wave T'_{PDA}= 248.39 μs
 Stdev: 33.8 %

 \bullet transferred on the reference waveform: T_{PDA} = 308.86 μs

See curves on page 8

Triggering advance: $\Delta T = T_{PTS} - T_{PDA} = 358.80 - 308.86 = 49.94~\mu s$

