



ESE LIGHTNING CONDUCTOR



Protector



Lightning Arrested !.

Feel Yourself Safe With 40 Years Of Experience.

The Definition Of The Lightning

The vocabulary definition of the lightning is as follows: The electrical discharge that occurs between earth and air, is felt by thunder and a strong light. The electric load cells are formed in the clouds. As soon as load cells pass over the low air resistance, the electrical discharge occurs and the loop is completed. Hence lightning is safely earthed.

The Lightning Protection Methods

Due to the statistics, every minute, more than 1,900 lightning flashes fall out over the earth's surface. Besides the prevention methods against lightning, there are also methods to safeguard public and industrial places. The external protection system are used for this purpose and there are 3 major application types. The type of application is determined due to the controls made on the area to be protected. These major 3 application types are:

1. Lightning Conductor Systems (ESE conductors, Radioactive conductors, etc)
2. Faraday Cage Systems
3. Franklin Rod Systems

Radius of Protection

The **Protector** provides a wide range of zonal protection and meets the norms for various levels of protection as defined in the standard NF C 17 102 (Chapter 2.2.3.2 and Appendix B Table 10).

Height of the Conductor Tip (m)	Radius of Protection (m)					
	2	3	4	5	7	10
Level-I (Lightning intensity 2.8 kAmp and above)	32	48	64	79	79	79
Level-II (Lightning intensity 9.5 kAmp and above)	40	59	78	97	98	99
Level-III (Lightning intensity 14.7 kAmp and above)	44	65	87	107	108	109

The Working Principle Of Dmsgi, Early Streamer Emmission Lighting Conductor - Protector

The **Protector** is an active lightning conductor designed to conform to the French standard NF C 17 102 (July 1995) for ESE lightning conductors. Its working principle evolves from local electrostatic field that develops naturally around the system as a thunderstorm begins to gather. In the event of a descending lightning, an inbuilt triggering device generates high-tension pulses at the conductor tip, causing a 'corona effect'.

As the downward leader approaches the ground, powerful upward streamers get triggered off, aided by a strong venturi effect that is built in the system. The early synchronization between the downward and upward leaders thus achieved by the **Protector**, easily meets the triggering advance timing (Delta T) as laid down in the French standard NF C 17 102.

PERFORMANCE TESTS

The **Protector** has been tested and certified by the OTDU University Laboratories in Turkey (Europe).

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
ELEKTRİK VE ELEKTRONİK MÜHÜRİNGERİ BÖLÜMÜ
MIDDLE EAST TECHNICAL UNIVERSITY
ELECTRICAL AND ELECTRONICS ENGINEERING DEPT.

NO. : 06-02-085B
SGI ENGINEERS PVT. LTD.
ESEL (Early Streamer Emission Lightning Conductor) Evaluation of the Streamer Initiation Advance

TEST REPORT

07-11-2006

4. RESULT

The measurement and the analysis of the results indicated that ESEL sample provided a significant advance in the triggering time with respect to SRLC.

Prof. Dr. Mirzahan HIZAL
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Firm / Institution Applied : SGI Engineers Pvt. Ltd.
862, 9th Main, 7th Cross, Srinagar, Bangalore 560 050, India.

Tests Required : ESEL (Early Streamer Emission Lightning Conductor) Evaluation of the Streamer Initiation Advance

Date of the Test : 07.11.2006

Tests Conducted in Laboratory, Ankara : Middle East Technical University, High Voltage Laboratory, Ankara

Ambient Conditions : 19°C, 689 mmHg, % 61 Relative Humidity (No significant variation has been observed in these values during the tests.)

Altitude : 900 m

Impulse Generator : HAEPELY 2.4 MV, 120 kV

Equipment Tested :

Model Dmgl ESE Lightning Conductor, (Series No. 60001)

2. TEST STANDARD
NEC17-102 (Appendix C)

3. DESCRIPTION OF THE TESTS

A 4500 x 4500 mm plane high voltage electrode with rounded edges (Rp 200 mm) was positioned 109 mm above the test sample. 100 negative polarity impulse of 200/2000 µs (Rise time 170µs) with 300 kA +/- 5 kV magnitude are applied and the time lags to flashover are recorded. A time interval of 1 minute was allowed between consecutive impulses. The measurements are repeated using a SRLC (Simple rod lightning conductor) of the same tip geometry and height. The results are given in Table 2 and 3.

The Calculation Of The Protection Radius (NF C 17-102 S 2.2.3.2)

$$R_p = \sqrt{h(2D-h) + \Delta L(2D + \Delta L)} \text{ for } > 5m.$$

R_p : ESE protected radius

h : Height of Protector tip above the area to be protected.

D : Triggering distance defined

By NF C 17-102, $D(m) = 10.1^{2/3}$ that is:

20 m at Level 1 (high protection)

45 m at Level 2 (improved protection)

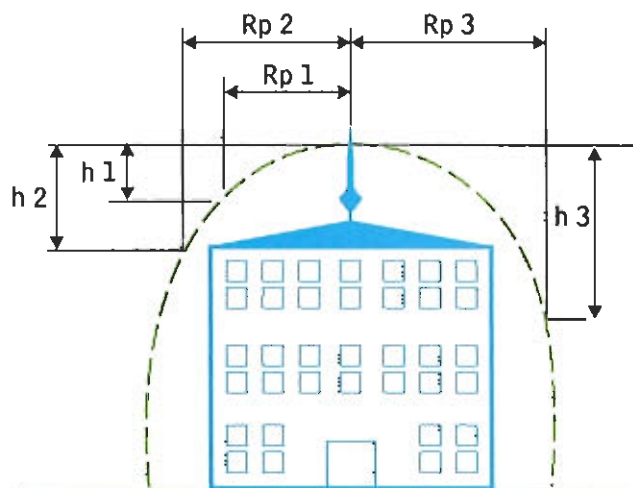
60 m at Level 3 (standard protection)

ΔL : upward leader length gain

$$\Delta L_{(m)} = V_{(m/\mu s)} \times \Delta T_{(m/\mu s)}$$

ΔT : triggering advance

Protection levels are specified in annex B of standard NF C 17-102.



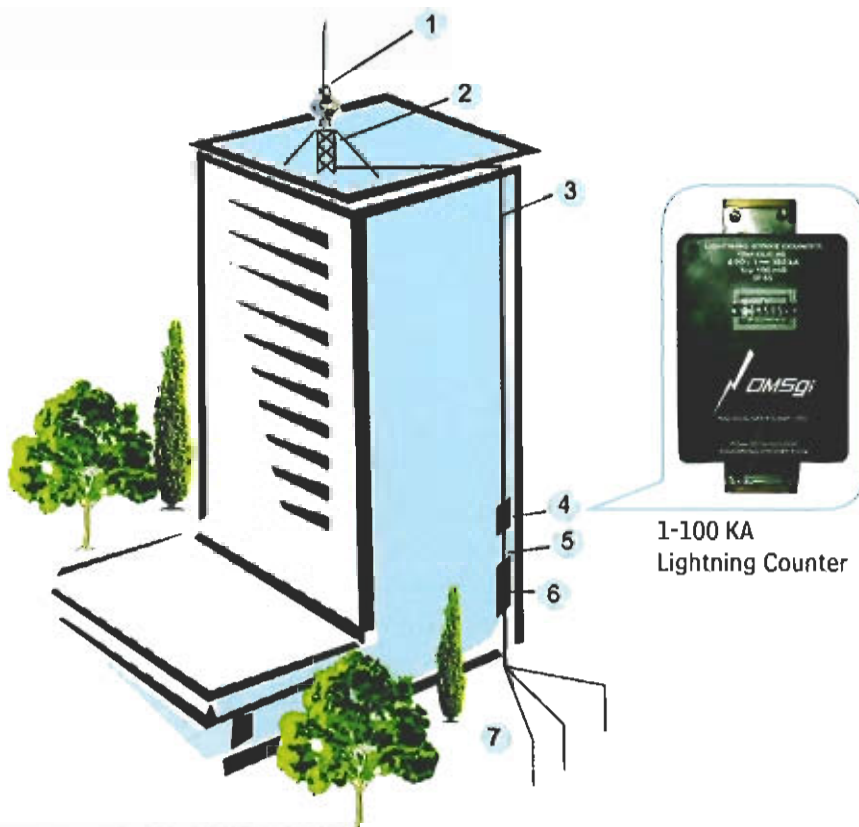
Conductor Sample	Min.	Max.	Average
SR	57	228	97
ESE Sample (Series no 60001)	43	105	65

Oscillograms recorded during the tests are given in Figure. 2 b & c

Your Safety is our Concern.

Typical Installation Scheme

1. Air Terminal - **Protector**
2. Support Mast
3. Down conductor
4. Lightning Strike Counter
5. Test Joint
6. PVC Protective Sheath
7. Earth Terminal



Salient Features

- The **Protector** is an ESE type of 'active' lightning conductor that provides zonal protection in accordance with standard NF C 17 102.
 - The PROTECTOR is a sturdy robust device made of 304 L stainless steel.
 - It is protected against corrosion and needs no maintenance.
 - Needs no external power source.
 - Compact and easy to install.
 - Warrantee for 2 years.
- Tested and certified by ODTU University Laboratories in Turkey (Europe).

Applications

- Large multistoried / high rise residential complexes and housing colonies. A single **Protector** can cover several blocks.
- Large multistoried / high-rise office complexes, multiplexes, shopping malls, etc.
- Modern buildings housing IT offices, BOP's and concentration of sensitive electronic and / or telecom equipment.
- Factories having plc based controls for critical plant and machinery
- Hospitals, cinema halls, museums, old monuments, schools etc.



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