▶▶▶ Early Streamer Emission Lightning Protection (ESE)

Manufacturer Head Office:

LYTECH

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Ver : LYT-1-2

bsi.

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Lytech Technologies Pte Ltd
51 Ubi Avenue 1
#05-22 Paya Ubi Industrial Building
Singapore 408933

Holds Certificate No: **FM 665172**

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

The design, manufacture & sales of lightning and earthing materials

For and on behalf of BSI:

Chris Cheung, Head of Compliance & Risk - Asia Pacific

Original Registration Date: 2017-01-14
Latest Revision Date: 2020-11-03

Effective Date: 2020-01-14
Expiry Date: 2023-01-13

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▶▶▶ Early Streamer Emission Lightning Protection

LYTECH E.S.E. Lightning Protection System

LYTECH E.S.E. (Early Streamer Emission) Lightning Air Terminal meets the requirements under NFC 17-102 standards and is tested by International Accredited laboratory. The terminal is made from stainless steel which provides protection against corrosion and it does not require any power supply for its operation and is non-radioactive.

The product consist of 3 parts; Air Terminal, Ion Generator and Roof Connection Pipe. The Ion Generator is located in a special section inside the stainless steel body and as the atmospheric electric field rises during lightning storm, the generator becomes active and ionizes surrounding air by generating an upward leader.

It produces early streamers to capture lightning at an earlier stage thus creating a preferred strike point for lightning. This process provide a safe and efficient method for controlling dangerous lightning energy by capturing it at a preferred point.

Early Streamer Emission Principles

The LYTECH E.S.E. Air Terminal uses the occurring electrical field to release a timely upward leader. This process is a safe and efficient method of capturing dangerous lightning energy at a preferred point.

As a thunder storm gather above the ambient electrical field surroundings, the terminal begins to rise in voltage. As the down leader approaches towards the protected area, there is a rapid increase in the electric field which initiates the triggering of an upward streamer from the terminal.

The use of an E.S.E. Air Terminal protects a larger or enhanced area compared to a conventional rod. With the release of the upward streamer from the finial tip earlier than other competing structural points, the terminal becomes a preferred point for the capture of the lightning discharge within the protected area.

Combination of Principles

Direct Strike protection

Transient Surge & Overvoltages Protection

Grounding & Earth Grid Systems

We combine the Early Streamer Emission system with conventional lightning protection system to achieve maximum protection especially for areas that are unable to be protected theoretically by the conventional system.

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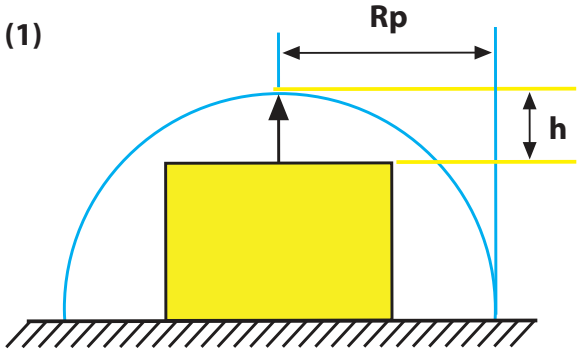
Protection Principles

The protection radius (Rp) of the LYTECH E.S.E. Air Terminal is calculated using the following formula as shown in the French National Standard NF C 17-102.

$$Rp(h) = \sqrt{2rh - h^2 + \Delta T(2r + \Delta T)} \quad \text{for } h \geq 5m \quad (1)$$

and

$$Rp = h \times Rp_5 / 5 \quad \text{for } 2m \leq h \leq 5m$$



where

ΔT as established in our model
LYTECH E.S.E. 15, ΔT (µs) = 15
LYTECH E.S.E. 30, ΔT (µs) = 30
LYTECH E.S.E. 60, ΔT (µs) = 60

Rp_5 = value of Rp from **(1)**

h (in meters) = height of the E.S.E. Air Terminal above the subject or area to be protected

r (in meters) = the chosen level of protection

r = 20m for Level I Protection (Very High Protection)
r = 30m for Level II Protection (High Protection)
r = 45m for Level III Protection (Medium Protection)
r = 60m for Level IV Protection (Standard Protection)

Protecting Area

Rp(m)	LYTECH E.S.E.15 ΔT (µs) = 15 Level of Protection				LYTECH E.S.E. 30 ΔT (µs) = 30 Level of Protection				LYTECH E.S.E. 60 ΔT (µs) = 60 Level of Protection			
h(m)	I	II	III	IV	I	II	III	IV	I	II	III	IV
2	12	14	17	19	19	21	25	28	31	34	38	42
3	18	22	26	29	28	32	37	42	47	52	58	63
4	25	29	35	40	39	43	50	56	63	69	77	85
5	32	37	45	51	48	55	63	71	79	86	97	107
6	32	38	46	52	48	55	64	72	79	87	97	107
8	33	39	47	54	49	56	65	73	79	87	98	108
10	34	40	49	56	49	57	66	75	79	88	99	109
15	35	42	52	60	50	58	69	78	80	89	101	111
20	35	44	55	63	50	59	71	81	80	89	102	113
45	35	44	60	73	50	59	75	89	80	89	105	119
60	35	44	60	75	50	59	75	90	80	89	105	120

We are pleased to offer our no-obligatory design services to our clients. Just email to us your drawings at **sales@lytech.uk** and we will do the rest.

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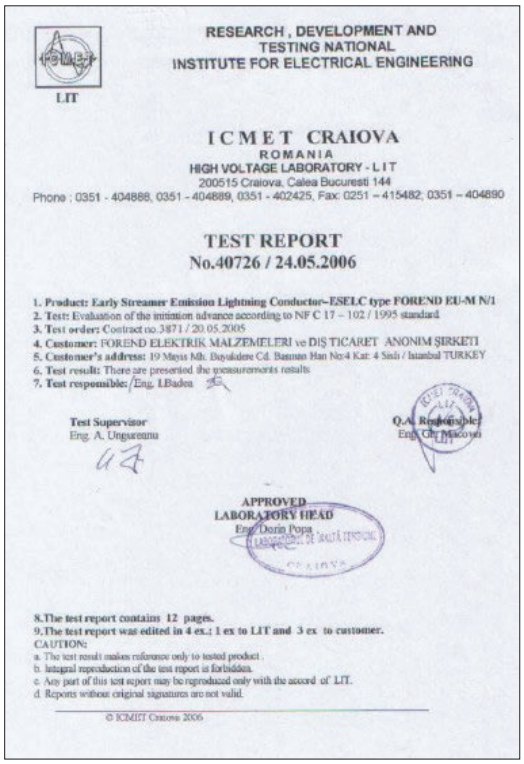
E.S.E. Air Terminals

The Air terminal is made from stainless steel which provides protection against corrosion. E.S.E. Lightning Air Terminal meets the requirements under NFC 17-102 standards.

L-ES Air Terminals

Part No.	ΔT : Acc.to NFC - 17 102	ΔT : Test Result	Material
L - ES15	ΔT : 15µs	ΔT : 18.13µs	Stainless Steel
L - ES30	ΔT : 30µs	ΔT : 30.13µs	Stainless Steel
L - ES60	ΔT : 60µs	ΔT : 63.13µs	Stainless Steel

Test Report



RESEARCH , DEVELOPMENT AND TESTING NATIONAL INSTITUTE FOR ELECTRICAL ENGINEERING

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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. Bamsan Han No:4 Kat: 4 Sisli / Istanbul TURKEY
6. Test result: There are presented the measurements results
7. Test responsible: Eng. LBadea

Test Supervisor
Eng. A. Ungureanu

Q.A. Responsible
Eng. Gh. Macovei

APPROVED
LABORATORY HEAD
Eng. Dorin Popa

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.
d. Reports without original signatures are not valid.

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The LYTECH ESE range of terminals have been fully tested in accordance with NF C 17-102 in a high voltage laboratory.

Certified Performance

The objective of the testing under **French National Standard NF C 17-102** is to obtain a statistical result between a single reference rod and the ESE terminal whereby a time difference is obtained between the two and by definition, a triggering time advance ΔT is calculated. Safety margins are applied to the measured values in order to provide a conservative measured result.

Lightning Event Counter

Lightning strikes count are monitored by LYTECH LEC, which is able to give some information about the intensity of the lightning occurence in the area.

Part No.	Dimension H x W x L (mm)	Description
LY-LEC	185 x 57 x 64	LYTECH Lightning Event Counter - Enclosure Rating - IP67 - Detect Current from 2 to 200kA - 6 Digits Mechanical Counter

Masts and Bases

Made from Hot Dipped Galvanised or Aluminium. It is commonly used for mounting E.S.E. air terminal.

Part No.	Height (mm)	Material	Description
LY-PHG-2M	2000	Hot Dipped Galvanised	HDG Pole With Base
LY-PAL-2M	2000	Aluminium	Aluminium Pole With Base

Other materials (eg. Stainless Steel) available upon request.
Other lengths (3m, 5m etc.) available.

E.S.E. Tester

E.S.E Terminal can be tested using our E.S.E tester. The tester is used during our regular maintenance cycle to ensure that the E.S.E terminal is functioning properly.

Part No.	Dimension HxWxL (mm)	Description
L-ESE-Tester	113x7x4.8	The tester will indicate OK or FAULT with the help of red or green LED

Guy Wire Kit

SS316 guy wire kit is suitable for use in installation of pole mast.

Part No.	Dimension (m)	Material
GUY-WIRE-7M-SS	7	SS316

**Other length are available upon request.*

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