



## ▶▶▶ ***Early Streamer Emission Lightning Protection (ESE)***



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Ver : LYT-1-4



# Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Lytech Technologies Pte Ltd  
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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:

Michael Lam - Managing Director Assurance, APAC

Original Registration Date: 2017-01-14

Latest Revision Date: 2022-12-15

Effective Date: 2023-01-14

Expiry Date: 2026-01-13

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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 final 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 (  $R_p$  ) 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.

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

and

$$R_p = h \times R_{p5} / 5 \quad \text{for } 2m \leq h \leq 5m$$

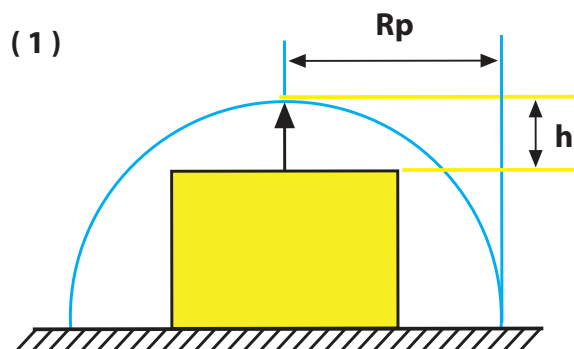
where

$\Delta T$  as established in our model

**LYTECH E.S.E. 15,  $\Delta T (\mu s) = 15$**

**LYTECH E.S.E. 30,  $\Delta T (\mu s) = 30$**

**LYTECH E.S.E. 60,  $\Delta T (\mu s) = 60$**



$R_{p5}$  = value of  $R_p$  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

$R_p$ ( m )	LYTECH E.S.E.15 $\Delta T (\mu s) = 15$ Level of Protection				LYTECH E.S.E. 30 $\Delta T (\mu s) = 30$ Level of Protection				LYTECH E.S.E. 60 $\Delta T (\mu s) = 60$ Level of Protection			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
h ( m )												
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

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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.	$\Delta T$ : Acc.to NFC - 17 102	$\Delta T$ : Test Result	Material
L - ES15	$\Delta T$ : 15 $\mu$ s	$\Delta T$ : 18.13 $\mu$ s	Stainless Steel
L - ES30	$\Delta T$ : 30 $\mu$ s	$\Delta T$ : 30.13 $\mu$ s	Stainless Steel
L - ES60	$\Delta T$ : 60 $\mu$ s	$\Delta T$ : 63.13 $\mu$ s	Stainless Steel

## Test Report

RESEARCH, DEVELOPMENT AND  
TESTING NATIONAL  
INSTITUTE FOR ELECTRICAL ENGINEERING

LIT

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**TEST REPORT**  
No.40726 / 24.05.2006

1. Product: Early Streamer Emission Lightning Conductor-ESEL type FOREND EU-M N/I  
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 ANONİM ŞİRKETİ  
5. Customer's address: 19 Mayıs Mh. Dışöğütözü Cd. Basmam Han No:4 Kat: 4 Sıh / İstanbul TURKEY  
6. Test result: There are presented the measurements results.  
7. Test responsible: Eng. LBudac

Test Supervisor  
Eng. A. Ungureanu

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  $\Delta T$  is calculated. Safety margins are applied to the measured values in order to provide a conservative measured result.

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## Lightning Strike Counter



The product combines lightning strike counting, surge counting status monitoring and breaker status monitoring functions. LCD displays the data of lightning strike or surge events including the number, hour, minute and date.

### FEATURES

- Lightning sensor collects multiple wave forms of lightning or surge events.
- Internal lithium replaceable battery, with up to **10-years of life**.
- Buttons enable **TIME and DATE** setting and log viewing.
- Counting reset and preset.

### Technical Data

Part No.	LSC-500H
Size	110 x 80 x 80
Order Code	995001
Standard	IEC / EN 62561-6
Data Collecting Mode	Internal actuator and sensor
Internal Battery Lifetime	Up to 10 years
Internal Replaceable Lithium Battery	ER 14505 * 2   5400mA / H
Maximum Events Logged	9999
Minimum Detectable Current	500A ( 8 / 20 $\mu$ s ) 1kA ( 10 / 350 $\mu$ s )
Maximum Detectable Current	120kA ( 8 / 20 $\mu$ s ) 100kA ( 10 / 350 $\mu$ s )
Additional Function	Time set, log reset
Counter Mounting Method	Installed at copper bar, cable, down conductor
Cross Section Area Of Cable	2.5 - 50mm <sup>2</sup>
Down Conductor / Steel Flat	≤4 * 40mm
Temperature, Relative Humidity	-25°C...+ 75°C, ≤95%
Enclosure Grade	IP67
Enclosure Materials	ABS + PC
Dimension	H110 * W80 * L80 ( including rack mounting )
Weight	520g
Warranty	2 years

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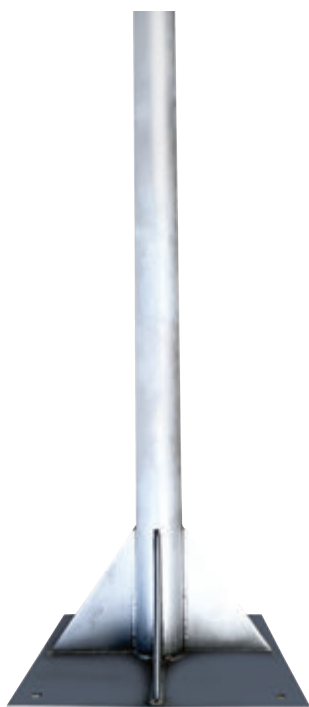
## Lightning Event Counter



Lightning strikes count are monitored by LYTECH LEC, which is able to give some information about the intensity of the lightning occurrence 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*

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## 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 H x W x L ( mm )	Description
L-ESE-Tester	113 x 7 x 4.8	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*



### ***Authorised Distributor:***



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