

# Lightning Protection



FOREND-EU

EARLY STREAMER EMISSION (ESE)  
LIGHTNING CONDUCTORS

NFC 17-102 STANDARD TEST



## Certificates and Standard Test



ISO 14001 : 2004  
OHSAS 18001 : 2007

**QS Zurich AG**  
**Switzerland**



Accredited  
Laboratory  
in the world for  
NF C 17 - 102  
standard tests.

**ICMET CRAIOVA**  
**Romania**



Lightning current  
withstand  
Test and Active  
lightning protection  
component

**Blitzschutz & Emv**  
**Technologiezentrum**  
**Germany**



ISO9001 : 2008

**AJA Registrars**  
**United Kingdom**

## FOREND E.S.E. Lightning Conductors

FOREND E.S.E. Lightning Conductor consists of 3 parts ; Air Terminals, Ion Generator and Roof Connection Mast. Air terminals produced of stainless steel or chromium plated copper and it has qualified diameter to resist high values of lightning currents. Ion Generator is located in a special section which is inside of stainless body and covered special resin from outer effects. As the atmospheric electric field increases during lightning storm, generator becomes active and ionizes surrounding air. The starting of ionization before lightning discharges is an important factor to keep the lightning stroke under control. All the lightning conductors of FOREND have ion accelerator structures to support ion generators. To increase the yield even more, supportive atmospheric electrodes are used during product design. Roof Connection Mast is made of stainless steel or chromium plated copper aswell. Mast size can be adjusted according to Client's demands.

### FOREND

**Product : FOREND-EU ( FA-00 )**

**Weight : 4.6 kg**

**Height : 58 cm**

**Packaging (Cylindrical)**

Diameter : 21 cm

Height : 66 cm

Weight : 1.7 kg

**Material : Stainless Steel**

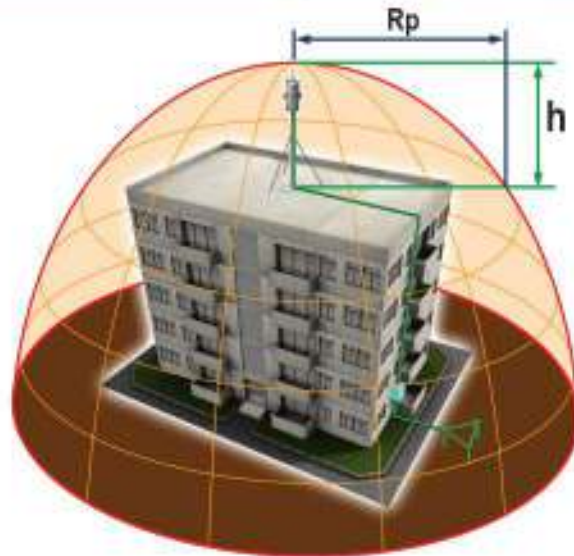
$\Delta T$  : Acc.to NFC 17-102 :  $\Delta T=60$

$\Delta T$  : Test Result :  $\Delta T=61, 64$  s



FOREND-EU

## Protection Capacity Volume



NEW FOREND  
2014

The following formula is given in the French Standard NFC 17-102 concerning the protection radius ( $R_p$ ) for Active Lightning Conductors:

$$R_p = [h(2D-h) + \Delta L (2D + \Delta L)]^{1/2}$$

$\Delta L$ : Ion transmission path with ionization upon interaction of Active Lightning Conductor and lightning.

$$\Delta L(m) = V(m/s) \cdot \Delta T(s)$$

$\Delta T$ : Initiation advance time

D: Lightning impulse step according to the level of protection or globe radius according to rolling globe model. For different levels ;

For Protection Level I; D = 20 m

For Protection Level II; D = 30 m

For Protection Level III; D = 45 m

For Protection Level IV; D = 60 m

H: Distance between the end of Active Lightning Conductor and any lower point.

**Note:** The most effective h is the distance up to 6 m as shown in the table and figure.

		FOREND-EU ( FA-00 ) ( $\Delta L=60m$ )			
$R_p(m)$	( $\Delta L=60\mu s$ )				
h(m)	LEVEL I	LEVEL II	LEVEL III	LEVEL IV	
2	31	35	39	43	
4	63	69	78	85	
5	79	86	97	107	
<b>6</b>	<b>79</b>	<b>87</b>	<b>97</b>	<b>107</b>	
8	79	87	98	108	
10	79	88	99	109	
20	80	89	102	113	
30	80	90	104	116	
60	80	90	105	120	

## FOREND LSC (Lightning Strike Counter)



Discharge Counter

The Lightning Strikes are detected and monitored by FOREND LSC, which is able to give some information about the service necessity of the Lightning Protection System. By using an inductive record, the counter is able accurately count all lightning events for a later reference.

FOREND LSC works with an inductive effect of the lightning strike current. The events are monitored by a mechanical counter display. The counter included a high frequency transformer.

- \* Produced according to IP 65
- \* Easy mountable
- \* Nonresetable
- \* Does not require any external power supply
- \* Currents detected from 2 to 100 kA
- \* Serial Counter
- \* Mechanical Counter with 6 digits
- \* Dimensions : 11.3 x 7 x 4.8 cm

## Installation

1. FOREND ESE Lightning Conductors
2. Extension Mast
3. Down Conductor
4. Discharge Counter with Test Box
5. Earthing System





## FOREND EU-M

Model: FOREND EU-M  
 Product: Early Streamer Emission  
 Lightning Conductors  
 Material: Stainless Steel  
 Acc.to NFC-17 102  $\Delta T: 45\mu s$   
 Weight = 3.2 kg  
 Height = 63 cm



## FOREND EU

Model: FOREND EU  
 Product: Early Streamer Emission  
 Lightning Conductors  
 Material: Stainless Steel  
 Acc.to NFC-17 102  $\Delta T: 60\mu s$   
 Weight = 4.4 kg  
 Height = 63 cm

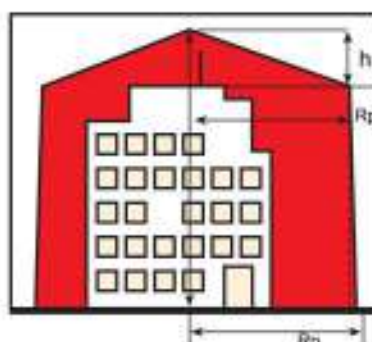
As FOREND all E.S.E lightning conductors operate within the temperature range of ( $^{\circ}C$ )= - 40 $^{\circ}$  to + 120 $^{\circ}$  and they are manufactured according IP 65



**E.S.E**  
 Early Streamer Emission  
 Lightning Conductors

# FOREND EU

### PROTECTION PERFORMANCE



### PROTECTION RADIUS

Rp(m)	FOREND EU-M ( $\Delta L=45m$ )				FOREND EU ( $\Delta L=60m$ )			
	( $\Delta T=45\mu s$ )				( $\Delta T=60\mu s$ )			
h(m)	Level I	Level II	Level III	Level IV	Level I	Level II	Level III	Level IV
2	25	28	32	36	31	35	39	43
4	51	57	64	72	63	69	78	85
5	63	71	81	89	79	86	97	107
6	63	71	81	90	79	87	97	107
8	64	72	82	91	79	87	98	108
10	64	72	83	92	79	88	99	109
20	65	74	86	97	80	89	102	113
30	65	75	89	101	80	90	104	116
60	65	75	90	105	80	90	105	120