



**KALRE**  
ACTIVE LIGHTNING RODS

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## What is PDA/PDC (E.S.E) System?

An ESE lightning rod with an Early Streamer Emission system has as a target anticipate it to the lightning strike, in order to protect all the rest of the area. The operating principle is the same as a simple rod, but an additional ionization system getting cover a greater protection radius.

Creates an upward leader farther away thanks to the extra ionization of the ESE lightning rod, which is activated by the electromagnetic field produced by the storm. The ESE attracts the lightning to its tip, then the down-conductors conduct the current discharge to the grounding system keeping the entire installation protected.

This ionization, allows to the active protection, to have a greater protection radius. With this methodology we managed to cover not only the structure but also its surroundings or open areas.

## KALRE ACTIVE LIGHTNING ROD

### TYPE : ALR01



Length	: 40 cm
Material	: Stainless steel
Diameter of the ionic cell	: 130 mm
Diameter of lightning conductor	: 20 mm (monolith)
Trigger	: Neomidium
Principle of operation	: PDC / PDA (E.S.E)
Standard	: NF C 17-102 (2011) latest version

$$\Delta T = 30 \mu s$$

$$R_p \text{ (Radius protection)} = 36 \text{ meter}$$

## KALRE ACTIVE LIGHTNING ROD

### TYPE : ALR-02




Length	: 40 cm
Material	: Stainless steel
Diameter of the ionic cell	: 130 mm
Diameter of lightning conductor	: 20 mm (monolith)
Trigger	: Neomidium
Principle of operation	: PDC / PDA (E.S.E)
Standard	: NF C 17-102 (2011) latest version

$$\Delta T = 40 \mu s$$

$$R_p \text{ (Radius protection)} = 75 \text{ meter}$$

## KALRE ACTIVE LIGHTNING ROD


### TYPE : ALR03



Length	: 60 cm
Material	: Stainless steel
Diameter of the ionic cell	: 200 mm
Diameter of lightning conductor	: 20 mm (monolith)
Trigger	: Neomidium
Principle of operation	: PDC / PDA (E.S.E)
Standard	: NF C 17-102 (2011) latest version
$\Delta T$	= 50 $\mu s$
Rp (Radius protection)	= 86 meter

## KALRE ACTIVE LIGHTNING ROD

### TYPE : ALR04



Length	: 60 cm
Material	: Stainless steel
Diameter of the ionic cell	: 200 mm
Diameter of lightning conductor	: 20 mm (monolith)
Trigger	: Neomidium
Principle of operation	: PDC / PDA (E.S.E)
Standard	: NF C 17-102 (2011) latest version
$\Delta T$	= 60 $\mu s$
Rp (Radius protection)	= 107 meter

## KALRE ACTIVE LIGHTNING RODS PROTECTION RADIUS TABLE

<b>LEVEL 1</b>				
<b>D = 20 m</b>				
$\Delta T$ ( $\mu s$ )	60	50	40	30
h (m)				
2	78	68	57	47
3	78	68	58	47
4	78	68	58	47
5	79	68	58	48
6	79	69	58	48
10	79	69	59	49
20	80	70	60	50

<b>LEVEL 2</b>				
<b>D = 30 m</b>				
$\Delta T$ ( $\mu s$ )	60	50	40	30
h (m)				
2	86	75	64	53
3	86	75	65	54
4	86	76	65	54
5	86	76	65	55
6	87	76	66	55
10	88	77	67	57
20	89	79	69	59

<b>LEVEL 3</b>				
<b>D = 45 m</b>				
$\Delta T$ ( $\mu s$ )	60	50	40	30
h (m)				
2	96	85	73	61
3	96	85	74	62
4	97	86	74	63
5	97	86	75	63
6	97	87	76	64
10	99	88	77	66
20	102	92	81	71

<b>LEVEL 4</b>				
<b>D = 60 m</b>				
$\Delta T$ ( $\mu s$ )	60	50	40	30
h (m)				
2	105	93	81	69
3	106	94	82	70
4	106	95	83	70
5	107	95	84	71
6	107	96	84	72
10	109	98	87	75
20	113	102	92	81

## LIGHTNING COUNTER



: 170 x 82 x 60 mm

Material

: Stainless chrome (304) / PVC

Discharge measurement Power

: 150 kA

Installation location

: Lightning Protection Systems.

Testability

: Mechanical

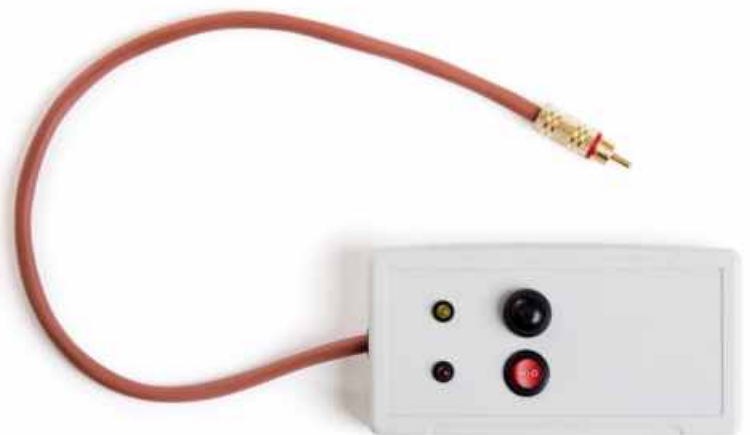
Standard

: NF C 17-102 (2011) latest version

## KALRETEST EQUIPMENTS



ACTIVE LIGHTNING ROD TESTER



LIGHTNING COUNTER TESTER