

Between Sky and Earth

*The new generation of lightning conductor with
excitation by impulse and propagation sustained*

Powerful and selective

Pre-loaded and self-contained

Saint Elmo Active



**FRANKLIN
FRANCE**

Saint Elmo Active 2D[®] lightning conductor

Excitation with Time control by impulse and sustained propagation speed

Lightning conductor with excitation device In compliance with the NFC 17-102 standard – Franklin France Patent

Saint Elmo Active 2D[®] Lightning conductor

The efforts which have been carried out until today to increase the radius of action of the lightning conductors were based mainly on the improvement of the excitation time of the upward leader. However, the effectiveness of a lightning conductor does not depend only on the excitation time of a leader to the rod but as well and above all of the capacity to propagate this leader on a large distance to capture the downward leader.

Fruit of many years of research, tests in laboratories and in situ, **FRANKLIN FRANCE** has developed a new revolutionary generation of lightning conductor and thus keeps its technology advance.

The operating principle of the **Saint Elmo Active2D[®]** consists, not only to initiate the upward leader, but moreover, provides enough energy to ensure its propagation until the junction with the downward leader.



Principle & operating

A first device, named «**impulse device**» stores the electrostatic energy present in the atmosphere at the approach of a stormy cloud and releases the excitation of the ascending discharge at the right time.

A second device, named «**power device**», collects and stores the wind and / or the solar energy in several strong power capacitors. The Saint Elmo lightning conductor is in this way permanently pre-loaded of an important energy which enables him to support the propagation of the ascendant tracer.

Close to the storm activity, an integrated sensor measuring the surrounding electric field value, releases the impulse device like most of usual Early Streamer Emission systems. Those lightning conductors almost immediately reverse the polarity of their head, creating a sudden amplification of the electrical field.

The innovation of **Saint Elmo Active2D[®]** lightning conductor comes from the use of a second integrated sensor which measures the intensity of the electric discharge current, which is formed on the lightning conductor's head.

When the downward leader enters in the protection area of the lightning conductor, the measured current strongly increases. As soon as this current is higher than the characteristic threshold,

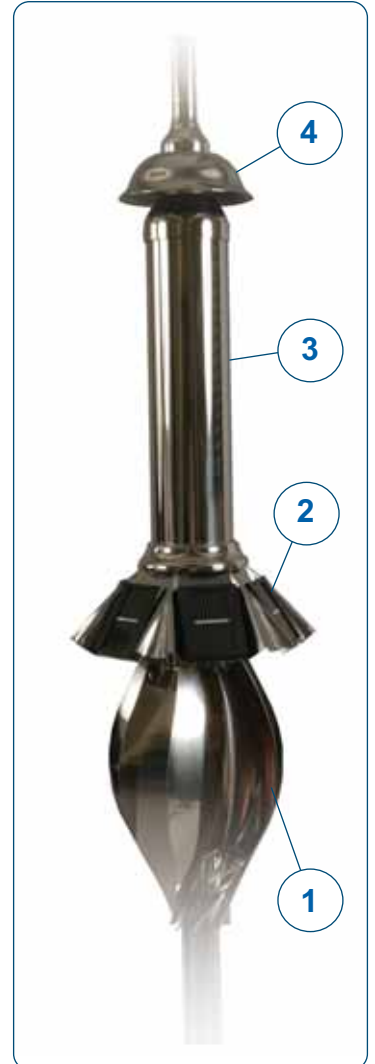
the power capacitors discharge and release the necessary energy for the propagation of the leader.

In this last device, the lightning conductor's head acts as a capture device. Therefore, the head is electrically insulated from the ground.



Characteristics of the Saint Elmo Active 2D[®] lightning conductor

- Take in account the energetic information to choose the tracer which can become an ascending tracer
- Maintain the propagation of the tracer by discharge of the power device
- Source of energy autonomous and clean
 - **Solar (2)** or **wind (1)** energy for the «**power device**»
 - Atmospheric electrical field for the «**impulse device**» (3)
- Consider the cloud polarity
- Radius of curve of the head optimize to reduce the corona effect and guarantee the excitation device
- Protection of the electrical part against the rain with a **dimensioned flange (4)**
- High quality materials, esthetical
- Use of stainless steel to resist against corrosion



Tests

The **Saint Elmo Active2D[®]** lightning conductor was tested in the high voltage laboratory BAZET (CEB) in compliance with the NFC 17 – 102 standard, and is subject of tests campaign in situ.

The **Saint Elmo Active2D[®]** lightning conductor's

excitation advance device has been determined comparing to a rod of reference obtained in short-circuiting the double device of this lightning conductor.

The **Saint Elmo Active2D[®]** lightning conductor can be tested on site with his remote control tester.

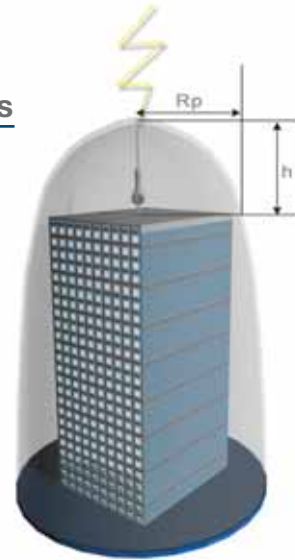
Protection's performances of the Saint Elmo Active 2D[®] lightning conductor

Protection offered by Saint Elmo Active2D[®] lightning conductors

Preferential capture

The ability to favour excitation at lower values of the electrostatic field (hence earlier), enhances «the capture probability» of conductor.

This capacity gives them greater efficiency in the role of «preferential capture points» compare to any other point of the building they protect. Therefore, these lightning conductors offer superior guarantees during low intensity discharges (2 to 5 kA) compared with simple rod – type lightning conductors, which can only intercept them over short distances. ($D=101 I^{2/3}$, D in meters, I in KA)



Larger zone of protection

The zones of protection of lightning conductors are obtained theoretically by plotting the electro-geometric model.

French standard **NF C 17-100** describes the calculation method applicable to Franklin and meshed cages rods.

French standard **NF C 17-100** defines the radius of protection Rp (m)

depending on the average excitation advance ΔL (m) and on the level of protection Np of the Early Streamer Emission (ESE) lightning conductors (determinate previously by an assessment of the lightning risk using «The lightning risk[®]» program, developed by **FRANKLIN FRANCE** according to the standard).

Rp (m)		SE2D30, $\Delta T = 30 \mu s$				SE2D60, $\Delta T = 60 \mu s$			
h(m)	Np	40%*	I	II	III	40%*	I	II	III
2		11	19	25	28	19	31	39	43
4		23	38	51	57	38	63	78	85
6		29	48	64	72	48	79	97	107
8		29	49	65	73	48	79	98	108
10		29	49	66	75	48	79	99	109
20		29	50	71	81	48	80	102	113
30		29	50	73	85	48	80	104	116
60		29	50	75	90	48	80	105	120

(*) According to the explanation card NFC 17 102 –01 of the standard NFC 17 102, and if the lightning constitutes a risk for the environment (C5=10) a security coefficient of 40% is applicable in France in the radius of protection concerning the protected sites for the environment protection (ICPE, law of the 28/01/93, JO 26/02/93 P3035) it

means the silo (law of the 15/06/00 JO 19/07/00 pl 11092), nuclear installation of base (INB, law of the 31/12/99 JO 15/02/00 p 2263)

Applications **Saint Elmo** Active **2D**[®]

Lightning is a natural, universal and permanent phenomenon. It occurs daily and strongly in tropical areas. Lightning causes considerable damages and expenses to a country's economy, it also represents a significant and constant threat for the population. Every year some people are killed, mainly while being in open-areas.

Industries

Refineries, pump stations



Open-air installations

Stadiums, golf courses, leisure parks



Telecommunications

Hertzian relays, antennas



Buildings

Warehouses, churches, monuments



Saint Elmo Active **2D**[®] range

Pattern	Solar	wind+solar	Counter*
SE2D30	AFB 1030 2D	AFB 1032 2D	Not included
SE2D60	AFB 1060 2D	AFB 1062 2D	Not included
SE2D30	AFB 1730 2D	AFB 1732 2D	Included
SE2D60	AFB 1760 2D	AFB 1762 2D	Included

*Counter



Packaging

Lightning conductor complete conditioned in carton box.

- Weight : 7Kg
- Dimensions : 800 x 260 x 240 mm



Dimensions

