

## ▶ INGESCO® PDC LIGHTNING ROD with ESE

INGESCO® PDC Lightning rod with ESE (Early Streamer Emission) system, standardized according to norms UNE 21.186:2011, NFC 17.102:2011 and NP4426:2013.

### ▶ operation

The specific function of INGESCO® PDC lightning rod is producing an upward stream of ionized particles that will channel the eventual electrical discharge from its origin.

There is a difference in the electrical potential between the discharger (that has the same potential than the air around it) and both the air terminal tip and the deflection ensemble (they have the same potential than earth). This difference increases as atmospheric potential becomes higher because of the imminent lightning strike.

Knowing the value of this difference  $\Delta t$  allows us to make a relation between time and propagation speed of the electrical discharge, and, consequently, to calculate the lightning impact distance and the protection radius that offers each lightning rod model (see table below).

Knowing this value allows for the selection of the most appropriate lightning rod model taking into account the characteristics of the structure we want to protect and the level of protection needed according the norms UNE 21.186:2011, NFC 17.102:2011 and NP4426:2013.

### ▶ protection levels

Model	PDC 3.1	PDC 3.3	PDC 4.3	PDC 5.3	PDC 6.3	PDC 6.4
Ref.	101000	101001	101003	101005	101008	101009
$\Delta t$	15 $\mu s$	25 $\mu s$	34 $\mu s$	43 $\mu s$	54 $\mu s$	60 $\mu s$
LEVEL I	35 m	45 m	54 m	63 m	74 m	80 m
LEVEL II	43 m	54 m	63 m	72 m	83 m	89 m
LEVEL III	54 m	65 m	74 m	84 m	95 m	102 m
LEVEL IV	63 m	75 m	85 m	95 m	106 m	113 m

Protection radii calculated according to: Norm UNE 21186:2011 & NFC 17-102:2011 (These radii of protection have been calculated according to a height difference of 20 m between the tip of the lightning rod and the considered horizontal plane).

### ▶ technical features

Mod.	Ref.	Mat.	H (mm)	D1 (mm)	M1	A (mm)	Weight (g)
PDC 3.1	101000	Inox	380	16	M 20	95	2.280
PDC 3.3	101001	Inox	554	16	M 20	156	3.060
PDC 4.3	101003	Inox	554	16	M 20	156	3.250
PDC 5.3	101005	Inox	554	16	M 20	156	3.460
PDC 6.3	101008	Inox	554	16	M 20	156	3.660
PDC 6.4	101009	Inox	554	16	M 20	186	4.030

## ► characteristics & benefits

- 100% of efficacy in discharge capture.
- High level of protection.
- Electrical continuity guaranteed. The device doesn't offer any resistance to discharge conduction.
- Lightning rod without electrical components. Maximum durability guaranteed.
- Maximum accepted current 200kA (10/350).
- **INGESCO® PDC** preserves its initial properties after each discharge.
- As it's built only with non electronic elements, it doesn't have replaceable parts
- It doesn't require external power supply.
- Operation guaranteed in any atmospheric condition.
- High resistance to temperature. Maximum temperature: 125°C.
- High resistance to weather conditions and corrosive atmospheres.
- Maintenance free
- Authentication system using QR code.

The capture system **INGESCO® PDC** meets the following technical specifications:

- It has a double ESE (Early Streamer Emission) system:
  - An early streamer device that produces the upward emission.
  - An electro atmospheric condenser.
  - An atmospheric accelerator.
- An insulation system certified by the General Testing & Research Laboratory of the Generalitat of Catalunya (LGAI).
- An external structure made from stainless steel AISI 316L.
- Early Streamer Emission system made from stainless steel AISI 316L and polyamide PA66.

Its effective operation in any atmospheric condition and environment is thus guaranteed.

## ► installation

The capture terminal of **INGESCO® PDC** should follow the prescriptions of the norms NFC 17-102:2011 (or Norm UNE 21186:2011), and should take into account the following:

- The tip of the lightning rod should be located, at least two meters above the highest building to be protected.
- A head-mast adapter piece is required in order to attach the lightning rod to the mast selected for its installation.
- Wiring on the roofs should be protected against surges and any metallic structures present within the safety zone should be connected to the down conductors of the earthing system.
- The lightning rod should be connected to a grounding point by way of one or various conducting cables which will go down, whenever possible, the exterior of the construction with the shortest and straightest possible trajectory.
- The earth termination systems, whose resistance should be the lowest possible (less than 10 ohms), should guarantee the most rapid possible dissipation of the lightning current discharge.


## ► norms | tests | certificates

**INGESCO® PDC**, fulfils the requirements stipulated in norms:

· UNE 21186:2011    · NFC 17-102:2011    · IEC 62561/1    · NP4426:2013    · IEC 62305

In addition to all the specifications described for this type of components in the High Voltage Regulations by the Ministry of Industry and Energy. Industrial Registry No. 150.032, (Ministry of Industry and Energy). Manufactured since 1984, it is the first lightning rod with non-electronic early streamer device to comply with UNE 21.186

The **INGESCO® PDC** has successfully passed the following certification tests and trials:

- PDC lightning rod streamer emission time evaluation test (Annex C UNE 21.186:2011), at **LABELEC High Voltage Laboratory**.
- Testing by  Test Report Number: 4789563988.1.
- Certificate of supported current according to IEC 62.561/1, issued by **LABELEC High Voltage Laboratory**.
- Certificate of insulation in rainy conditions, issued by **LABELEC High Voltage Laboratory**.



### DENA DESARROLLOS SL

Cardener 5 | 08223 Terrassa | Barcelona | Spain  
T 937 360 305 | T (+34) 937 360 314  
info@ingesco.com

**INGESCO® PDC**  
**LIGHTNING ROD**  
**with ESE**