



▶ INGESCO® PDC LIGHTNING ROD with ESE

INGESCO® PDC Lightning rod with ESE (Early Streamer Emission) system, standardized according 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 pointed to clouds that will channel the eventual electrical discharge from its origin.

There is a different 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 stroke.

Knowing the value of this difference Δt allows us to relate time and velocity of electrical discharge spread and, consequently, to calculate the lightning impact distance and the protection radius that offers each lightning rod model (see table below).

The knowledge of this value allows finally to select 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
Δt	15 μs	25 μs	34 μs	43 μs	54 μs	60 μs
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 21.186:2011 & NFC17.102:2011 (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	387	16	M 20	95	2350
PDC 3.3	101001	Inox	598	16	M 20	156	3200
PDC 4.3	101003	Inox	598	16	M 20	156	3400
PDC 5.3	101005	Inox	598	16	M 20	156	3600
PDC 6.3	101008	Inox	598	16	M 20	156	3800
PDC 6.4	101009	Inox	598	16	M 20	186	4150

► characteristics & benefits

- 100% of efficacy in discharge capture.
- High level of protection.
- Electric continuity guaranteed. The device doesn't offer any resistance to discharge conduction.
- Lightning rod without electrical components. Maxim durability guaranteed.
- **INGESCO® PDC** preserves its initial properties after each discharge.
- Because it contains non electronic elements, there are no replaceable parts.
- It doesn't need external power supply.
- Operation guaranteed in any atmospheric condition.
- Maintenance free

► technical specifications

The capture terminal of **INGESCO® PDC** fits 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 21.186:2011) and EN 62.305:2011, and should take into account the following:

- The tip of the lightning rod should be situated, at least two meters above the highest building to be protected.
- For its installation on a mast, the corresponding head-mast adapter is needed for the lightning rod.
- The cabling on the roofs should be screened protected against surges and connect to ground the metallic structures present within the safety zone.
- 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 straight possible trajectory.
- The earth termination systems, whose resistance should be the lowest possible (less than 10 ohms), should guarantee the most rapid possible dispersion of the lightning current discharge.

► norms | tests | certificates

INGESCO® PDC, fulfils the requirements contained in norms:

- UNE 21.186:2011
- EN 62.305
- NFC 17-102:2011
- IEC 62561/1
- NP4426:2013

In addition to all the specifications outlined for this type of components in the High Voltage Regulation by the Spanish Ministry of Industry and Energy. Industrial registration num. 150.032 (Spanish Ministry of Industry and Energy). Manufactured from 1984, it is the first lightning rod provided with a non electronical ESE system that fulfils the requirements contained in the norms UNE 21.186:2011, NFC 17.102:2011 and NP4426:2013.

INGESCO® PDC Lightning rods have successfully passed the following certification tests and trials:

- Supported current test in the BET, Blitzschutz & EMV Technologiezentrum (Menden, RFA) Laboratory and in the ISKRA ZASCITE Laboratory - Surge Voltage Protection Systems, Engineering and Cooperation.
- Evaluation test of the upward leader initiation time emitted by the lightning rods with ESE system (annex C NFC17.102:2011), at the LABELEEC High Voltage Laboratory.
- Test of insulation resistance, at the General Testing & Research Laboratory (LGAI) of the Generalitat of Catalunya.
- Certificate of fulfillment of the particular regulation of brand AENOR, issued by LABELEEC High Voltage Laboratory.
- Certificate of supported current, issued by LABELEEC High Voltage Laboratory.
- Certificate of insulation in rainy conditions, issued by LABELEEC High Voltage Laboratory.
- Product certificate issued by the Bureau Veritas Certification entity.



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