PRODUCTS AND SERVICES . 2021

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ACTIVE RODS:
PDC (ESE) LIGHTNING RODS

standards

Implementing rules for an effective person and property protection system:

- **UNE 21186:2011:** Lightning protection - Lightning rods with priming device.
- **NF C 17-102:2011:** Early streamer emission lightning protection systems.
- **NP 4426:2013:** Lightning protection - systems with non-radioactive ionization device.

In addition to these, there may be legislation or rules of each country that must be taken into account.

risk index calculation

Annex A (risk analysis) of the UNE 21186: 2011 determines the need or not to install external lightning protection and the level of protection applied to reduce the risk of damage caused by lightning.

INGESCO has an online tool which allows the calculation of risk and the implementation of protective measures quickly and easily. Introducing the characteristics of the structure to be protected, geographical location, activity, etc ..., provides protection levels to be applied, and generates a report of the information provided.

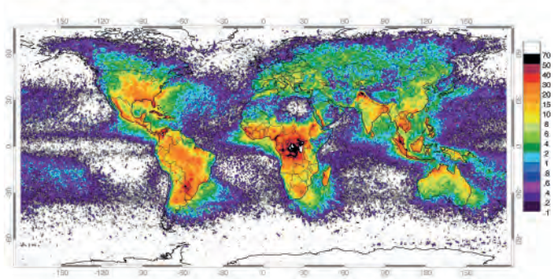


Fig. 1 – Lightning distribution map.

Fig. 2 – https://calculus.ingesco.com/

protection radius calculation

Lightning rods with an early steamer emission priming device (ESE), have a protection radius depending on the necessary protective level to be obtained by performing tests in accordance with UNE 21186: 2011 or NF C 17102: 2011, and must be certified by an accredited high voltage laboratory.

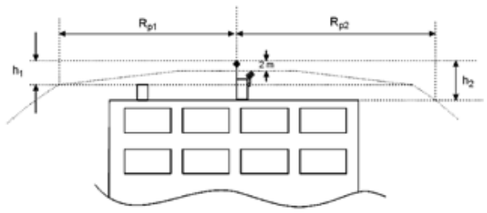
Model	PDC 3.1	PDC 3.3	PDC 4.3	PDC 5.3	PDC 6.3	PDC 6.4
Ref.	101000	101001	101003	101005	101008	101009
Δt	15µs	25µs	34µs	43µs	54µs	60µs

Tabla 1 – Early streamer ΔT(µs) INGESCO ESE lightning rods.

UNE 21186: 2011 (paragraph C.2.2) indicates that a ESE lightning rod must obtain an early steamer emission ΔT > 10 µs minimum.

Also, the maximum permissible value is 60µs although tests were obtained with superior results.

The area to be protected by a ESE arrester is delimited by a surface of revolution that is defined by the radius of the corresponding protection to different heights (h) considered, whose axis is the same ESE arrester.



Protection Level	Notional sphere radius (r)
I	20 m
II	30 m
III	45 m
IV	60 m

Table 2 – The rolling sphere radius r based on the level of protection.

a) If **2m**≤ **h** ≤ **5m**: $Rp=\frac{h*Rp(5)}{5}$

b)If **h** ≥ **5m**: $Rp=\sqrt{[(2*r*h)-(h^2)]+[\Delta*(2*r+\Delta)]}$

Whereas:

Rp: Resulting protection radius.

r: The radius of the rolling sphere. Predetermined standard value according to the applicable security level (see Table 2).

h: The height from the tip of the ESE to the point where we want to calculate the radius of protection.

Δ: Advance arrester priming considered (ΔT) in meters.

example radius protection calculation Rp (model INGESCO PDC 3.1):

To calculate the different radii of protection of a ESE lightning rod, we must know the variables involved in the formulation:

- INGESCO PDC 3.1 model has ΔT=15 µs and thus **Δ=15 m**.
- Apply level II protection, the notional sphere radius corresponds to **r = 30m**.
- Consider the height **h = 20m**.

Each Rp_n radii are calculated, for each reference point, using the formula:

$Rp_n = \sqrt{[(2*r*h_n)-(h_n^2)]+[\Delta*(2*r+\Delta)]}$

For the given model the radii are shown in table 3:

h (m)	Radius (m) Level II
2	15
4	30
6	38
10	40
20	43

Table 3 protection radii for an ESE 3.1

The total volume of protection can be represented graphically (See Fig.3).

Once each radius is calculated Rp, verify that the building remains within the lightning rod protection radius (see Fig.4).

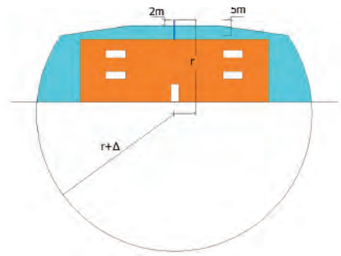


Fig. 3 – Volume protected with ESE lightning rod.

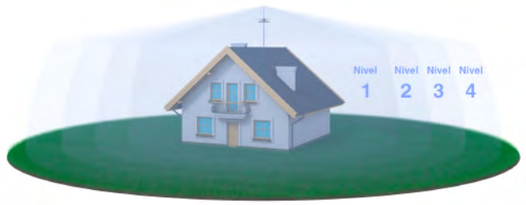


Fig. 4 – ESE protection volume.

PASSIVE SYSTEMS: FRANKLIN RODS – CAPTURE MESHES

standards

In order to design an effective lightning protection system with Franklin rods or capturing meshes, the following rules shall apply:

· **IEC 62305:2010** Lightning protection (Parts 1, 2, 3 y 4).

· **UNE - EN 62305:2011** Protection against lightning (Parts 1, 2, 3 y 4).

· **NFPA 780:2020** Standard for the installation of lightning protection systems.

In addition to these rules, legislation may exist in each country to be taken into account.

risk calculation

INGESCO has an online tool that allows the risk calculation according to IEC 62305 (Part 2), which allows the calculation of risk and the implementation of protective measures quickly and easily (see Fig.2).

calculation methods of the protection zone

Accepted methods for determining the area of passive protection systems according to IEC 62305 (Part 3) are:

• Protective angle method

It is best suited method for buildings with simple shapes, although it is limited to a maximum height to the level of protection applied (Fig.5).

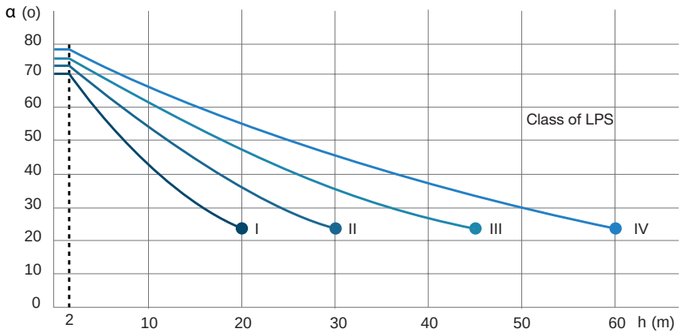


Fig. 5 – Angles corresponding to protection classes of IEC 62305-3 LPS.

The volume of protection resulting from the application of the protection angle method in a termination rod is shown in Fig.6.

Once calculated, the different angles of protection of the termination rods that make up the system verifies that the building is fully protected (Fig 7).

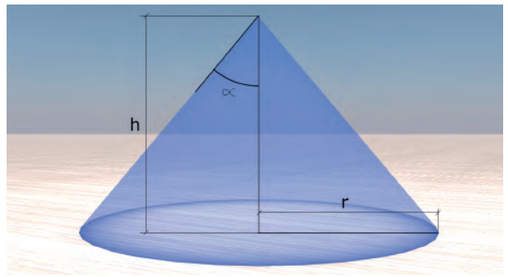


Fig. 6 – Protected volume by a vertical point. IEC 62305-3.

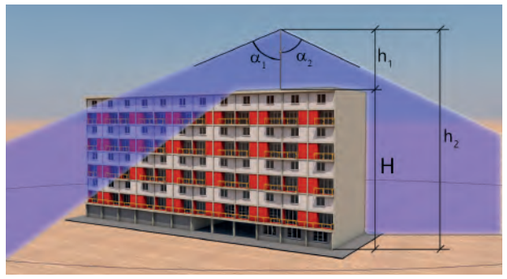


Fig. 7 – Protection volume angles α_1 and α_2 depending on heights h_1 and h_2.

• Rolling sphere method and the mesh method

When a structure has a height higher than indicated in Figure 5, the protection angle method is not applicable. For these cases, IEC 62305-3 indicates to use: **rolling sphere method** (valid for all types of buildings), or **mesh method** (indicated when flat surfaces are protected) (see Fig.9).

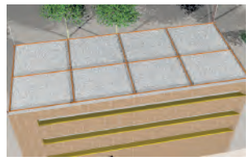
Protection method		
Class of LPS	**Radius of rolling sphere r (m)**	**Size of the mesh W_m (m)**
I	**20**	**5x5**
II	**30**	**10x10**
III	**45**	**15x15**
IV	**60**	**20x20**

Table 4 – Maximum values of rolling sphere and mesh size for each class of LPS.

Fig. 8 – Protected volume by the rolling sphere method.

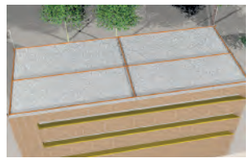
Applying the rolling sphere method. The location of the capture system (point or mesh) is adequate if any point of the protected structure comes into contact with a rolling sphere of radius r (see Table 4).

Taller structures remaining above the Faraday cage should be protected with lightning rods (see Fig. 10).

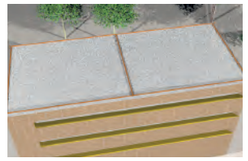


LEVEL I

LEVEL II



LEVEL III



LEVEL IV

Fig. 9 – Protection grids based on the levels of protection.

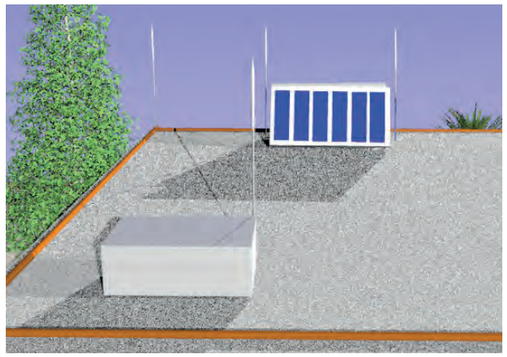


Fig. 10 – Protection of protruding structures with a capture mesh system by lightning rods.

DOWN CONDUCTORS

ESE down conductors

The down conductors are intended to conduct lightning current from the collection devices to the grounding.

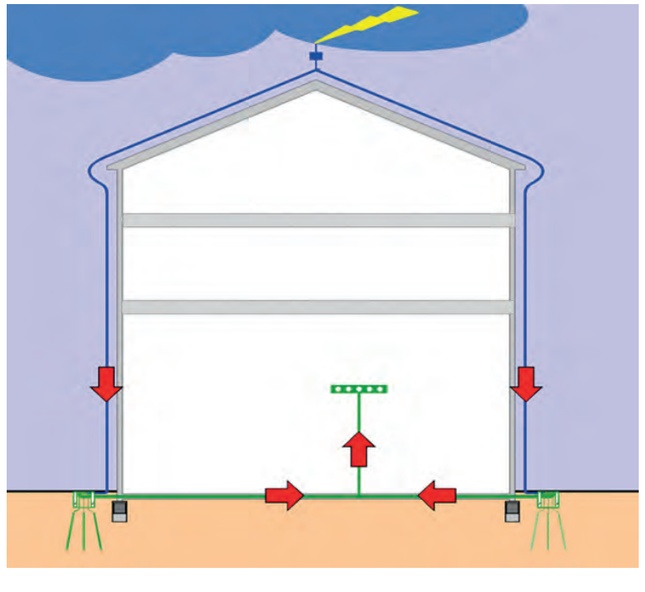


Fig. 11 – Down conductors of LPS by ESE.

The lightning rod is connected to ground with at least two down conductors located on opposite facades whenever possible (Fig.11).

The down conductors must be installed outside the building, avoiding the proximity of electrical cables and gas.

Its path must be as straight as possible, using the shortest path to earth, avoiding any sharp bend or lift.

When several ESEs are installed on the same building they can share down conductors.

Due to the nature of the lightning strike, down conductors should respect the materials and dimensions specified in **IEC 62561-2**. Those indicated in table 5 are the most recommended materials.

Material	Format	Minimum section mm²
Copper	**Cable**	**50 (Ø1,7 mm per cable)**
Copper	**Round**	**50 (Ø8 mm)**
Copper	**Tape**	**50 (Minimum thickness 2 mm)**

Table 5 – Material Table IEC 62561-2.

The down conductor ground shall be properly secured and tightened, with reference driver three clips per meter.

Protect the bottom of the down conductor by a protective tube of at least 2 m.

The installation of a lightning counter above the protective tube is recommended to perform the verification and maintenance of the facility.

LPS passive down conductors

In order to reduce the likelihood of damage due to lightning currents circulating in the LPS, down conductors must be arranged so that from the point of impact grounding is:

Protection Level	Distance between conductors
I	**10 m**
II	**10 m**
III	**15 m**
IV	**20 m**

Table 6 – Distance between down conductors IEC 62305-3.

It is also advisable to place the down conductors on exposed corners of the building whenever constructively possible.

The dimensions and materials of the ground down conductors, must meet the requirements contained in **IEC 62561-2** (Table 5).

The conductors that form the mesh must be properly set, taking as reference 1 conductor clamp per meter.

Protect the bottom of the down conductor with a protective tube of at least 2 m.

Install section elements in each of the down conductors to allow for measurement of the ground (see Fig. 12).

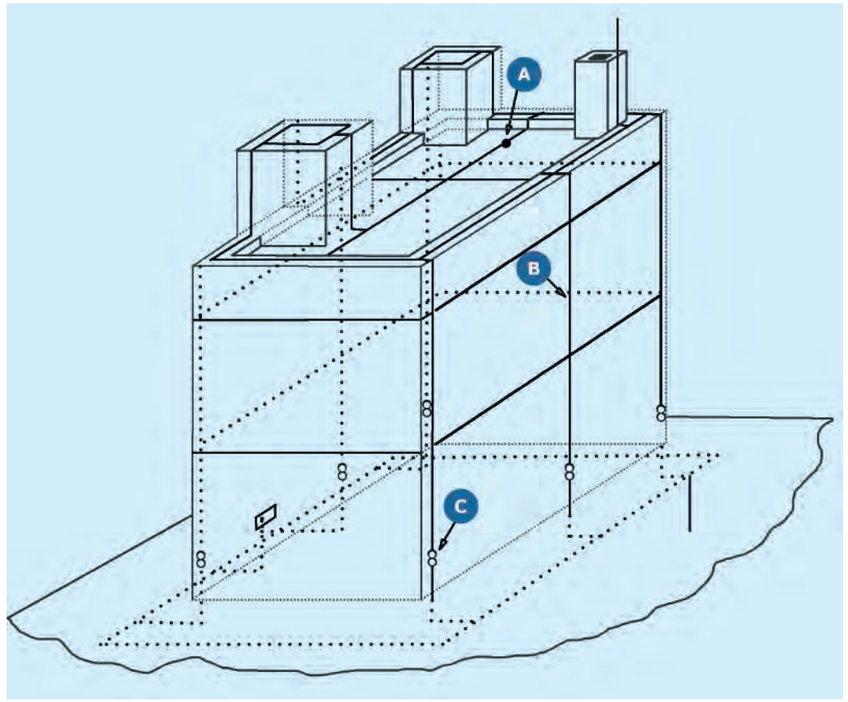
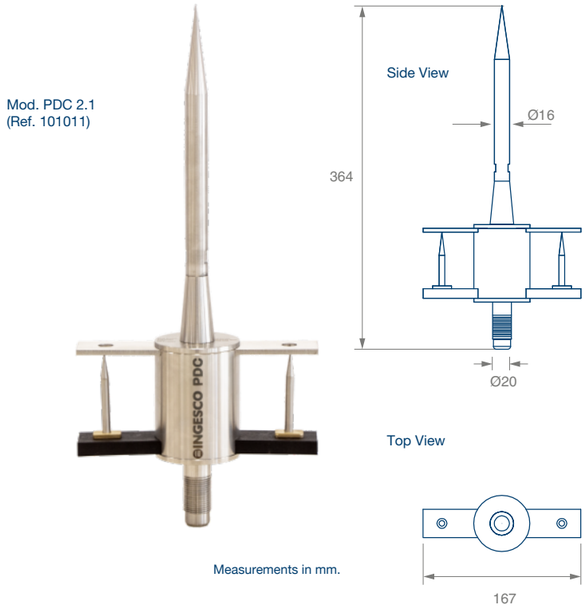


Fig. 12 – LPS passive scheme:
A: Horizontal conductor cover
B: Grounded conductor
C: Down conductor isolator



INGESCO® PDC 2.1 LIGHTNING ROD with ESE

INGESCO® PDC 2.1
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 radium 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 2.1

Reference	Weight	Δt	LEVEL I (r=20m)	LEVEL II (r=30m)	LEVEL III (r=45m)	LEVEL IV (r=60m)
101011	1.780 g	10 µs	30 m	38 m	49 m	57 m

Protection radii calculated according to: Norm UNE 21.186:2011 & 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).
r= rolling sphere radius according NFC 17.102:2011

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.

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: 125ºC.
- High resistance to wheather 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 UL 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**.

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LIGHTNING ROD
INGESCO® PDC

INGESCO® PDC (ESE) LIGHTNING RODS

Non-expendable

5 year warranty

Natural field trials

UL test

Max. current 200kA

No maintenance

Stainless steel 316 L

UNE 21186:2011

NFC 17-102:2011

NP 4426:2013

Modelo PDC6.4

technical specifications

Lightning rod with **non-electronic** streaming.

Suitable for external lightning protection of all types of structures and open areas.

- **Level of protection rated very high.**
- **100% effective in discharge.**
- Guaranteed **electrical continuity.**
- **Retains all its initial properties after each discharge so does not require specific maintenance.**
- No batteries or external power. No electronic. **Not fungible.**
- **Operation guaranteed** in any atmospheric condition.
- Made of **AISI 316L** stainless steel and polyamide (PA66).

standards | tests | specifications

INGESCO® PDC, meets the requirements in the following standards:

- CTE SUA 8
- UNE 21.186:2011
- NFC 17-102:2011
- IEC 62305
- IEC 62.561/1
- NP 4426:2013

Evaluation tests of ESE (Annex C UNE 21186: 2011) in the LABELEC High Voltage Laboratory.

Certificate of current supported IEC 62561/1, issued by the LABELEC High Voltage Laboratory.

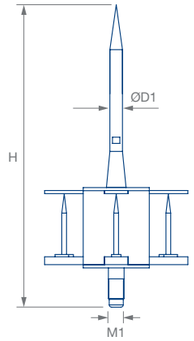
Certificate product issued by the international certification organization Bureau Veritas.

Tested by UL test report number: 4789563988.1.

coverage radius by protection level

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	15µs	25µs	34µs	43µs	54µs	60µs
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 radius calculated according to UNE 21.186: 2011, NFC 17.102: 2011 and NP 4426: 2013. (Calculated as a difference in height between the tip of the lightning rods and the considered horizontal plane 20 m.).



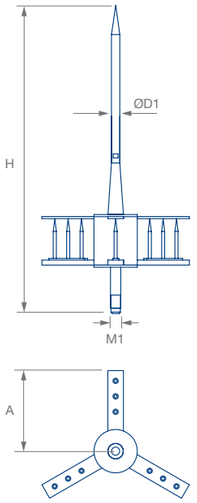
INGESCO® PDC 3.1 LIGHTNING ROD

Coverage radius (m) INGESCO® PDC 3.1 according to protection level and height (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

Ref.	Material	H (mm)	D1 (mm)	M1 (mm)	A (mm)	Weight (g)
101000	SST	387	16	M20	95	2350

h (m)	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
2	13	15	18	20
4	25	30	36	41
6	32	38	46	52
10	34	40	49	56
20	35	43	54	63

Δt : 15µs
r: Radius of the rolling sphere
L-I : r = 20 m
L-II : r = 30 m
L-III : r = 45 m
L-IV : r = 60 m



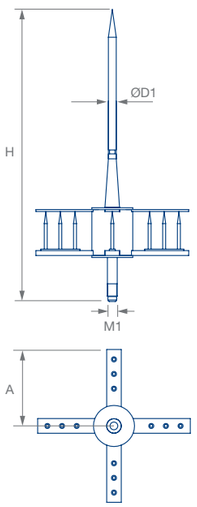
INGESCO® PDC 3.3 LIGHTNING ROD

Coverage radius (m) INGESCO® PDC 3.3 according to protection level and height (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

Ref.	Material	H (mm)	D1 (mm)	M1 (mm)	A (mm)	Weight (g)
101001	SST	598	16	M20	156	3200

h (m)	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
2	17	20	23	26
4	34	39	46	52
6	43	49	58	66
10	44	51	61	69
20	45	54	65	75

Δt : 25µs
r: Radius of the rolling sphere
L-I : r = 20 m
L-II : r = 30 m
L-III : r = 45 m
L-IV : r = 60 m



INGESCO® PDC 4.3 LIGHTNING ROD

Coverage radius (m) INGESCO® PDC 4.3 according to protection level and height (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

Ref.	Material	H (mm)	D1 (mm)	M1 (mm)	A (mm)	Weight (g)
101003	SST	598	16	M20	156	3400

h (m)	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
2	21	24	27	30
4	41	47	54	61
6	52	59	69	77
10	53	61	71	80
20	54	63	74	85

Δt : 34µs
r: Radius of the rolling sphere
L-I : r = 20 m
L-II : r = 30 m
L-III : r = 45 m
L-IV : r = 60 m

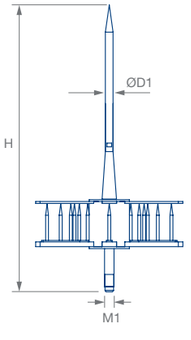
INGESCO® PDC 5.3 LIGHTNING ROD

Coverage radius (m) INGESCO® PDC 5.3 according to protection level and height (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

Ref.	Material	H (mm)	D1 (mm)	M1 (mm)	A (mm)	Weight (g)
101005	SST	598	16	M20	156	3600

h (m)	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
2	24	27	31	35
4	49	55	63	70
6	61	69	79	88
10	62	70	81	90
20	63	72	84	95

Δt : 43µs
r: Radius of the rolling sphere
L-I : r = 20 m
L-II : r = 30 m
L-III : r = 45 m
L-IV : r = 60 m



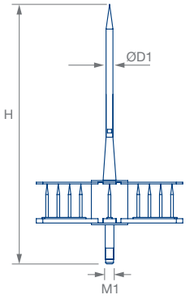
INGESCO® PDC 6.3 LIGHTNING ROD

Coverage radius (m) INGESCO® PDC 6.3 according to protection level and height (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

Ref.	Material	H (mm)	D1 (mm)	M1 (mm)	A (mm)	Weight (g)
101008	SST	598	16	M20	156	3800

h (m)	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
2	29	32	36	40
4	58	64	72	80
6	73	80	91	100
10	73	82	93	102
20	74	83	95	106

Δt : 54µs
r: Radius of the rolling sphere
L-I : r = 20 m
L-II : r = 30 m
L-III : r = 45 m
L-IV : r = 60 m



INGESCO® PDC 6.4 LIGHTNING ROD

Coverage radius (m) INGESCO® PDC 6.4 according to protection level and height (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

Ref.	Material	H (mm)	D1 (mm)	M1 (mm)	A (mm)	Weight (g)
101009	SST	598	16	M20	186	4150

h (m)	NIVEL I	NIVEL II	NIVEL III	NIVEL IV
2	31	35	39	43
4	63	69	78	85
6	79	87	97	107
10	79	88	99	109
20	80	89	102	113

Δt : 60µs
r: Radius of the rolling sphere
L-I : r = 20 m
L-II : r = 30 m
L-III : r = 45 m
L-IV : r = 60 m

INGESCO® PDC.E LIGHTNING ROD

5 year warranty

Natural field trials

UL Test

Testable

Stainless steel 316 L

UNE 21186:2011

NFC 17-102:2011

NP 4426:2013

Modelo PDC.E 60

technical specifications

Lightning rod with **ELECTRONIC** streaming.

Suitable for external lightning protection of all types of structures and open areas.

- **Level of protection rated very high.**
- **100% effective in discharge. Maximum durability.**
- Requires no external power source.
- **Guaranteed operation** after lightning strike and in any weather condition.
- Made of **AISI 316L** stainless steel.

standards | tests | specifications

INGESCO® PDC.E, meets the requirements in the following standards:

- CTE SUA 8
- UNE 21.186:2011
- NFC 17-102:2011
- IEC 62305
- IEC 62.561/1
- IEC 62.561/3
- NP 4426:2013

Evaluation tests of ESE (Annex C UNE 21186: 2011) in the LABELEC High Voltage Laboratory.

Mechanical test (traction and flexing until breakage).

Certificate of current supported IEC 62561/1, issued by the LABELEC High Voltage Laboratory.

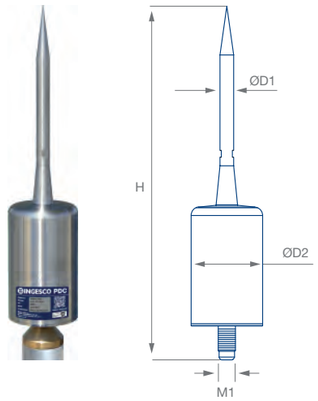
Certificate product issued by the international certification organization Bureau Veritas.

Tested by UL test report number: 4789563988.1.

coverage radius by protection level

Model	PDC.E 15	PDC.E 30	PDC.E 45	PDC.E 60
Ref.	102004	102005	102006	102007
Δt	15µs	30µs	45µs	60µs
LEVEL I	35 m	50 m	65 m	80 m
LEVEL II	43 m	59 m	74 m	89 m
LEVEL III	54 m	70 m	86 m	102 m
LEVEL IV	63 m	81 m	97 m	113 m

Protection radius calculated according to UNE 21.186: 2011, NFC 17.102: 2011 and NP 4426: 2013. (Calculated as a difference in height between the tip of the lightning rods and the considered horizontal plane 20 m.).



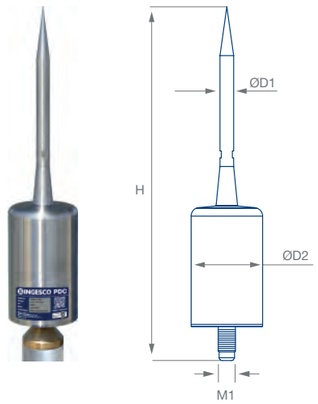
INGESCO® PDC.E 15 LIGHTNING ROD

Coverage radius (m) INGESCO® PDC.E 15 according to protection level and height (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

Ref.	Material	H (mm)	D1 (mm)	D2 (mm)	M1 (mm)	Weight (g)
102004	SST	412	16	83	M20	3775

h (m)	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
2	13	15	18	20
4	25	30	36	41
6	32	38	46	52
10	34	40	49	56
20	35	43	54	63

Δt : 15µs
r: Radius of the rolling sphere
L-I : r = 20 m
L-II : r = 30 m
L-III : r = 45 m
L-IV : r = 60 m



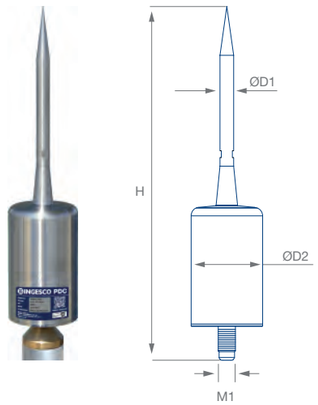
INGESCO® PDC.E 30 LIGHTNING ROD

Coverage radius (m) INGESCO® PDC.E 30 according to protection level and height (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

Ref.	Material	H (mm)	D1 (mm)	D2 (mm)	M1 (mm)	Weight (g)
102005	SST	412	16	83	M20	3770

h (m)	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
2	19	22	25	28
4	38	44	51	57
6	48	55	64	72
10	49	57	66	75
20	50	59	70	81

Δt : 30µs
r: Radius of the rolling sphere
L-I : r = 20 m
L-II : r = 30 m
L-III : r = 45 m
L-IV : r = 60 m



INGESCO® PDC.E 45 LIGHTNING ROD

Coverage radius (m) INGESCO® PDC.E 45 according to protection level and height (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

Ref.	Material	H (mm)	D1 (mm)	D2 (mm)	M1 (mm)	Weight (g)
102006	SST	412	16	83	M20	3765

h (m)	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
2	25	28	32	36
4	51	57	64	72
6	63	71	81	90
10	64	72	83	92
20	65	74	86	97

Δt : 45µs
r: Radius of the rolling sphere
L-I : r = 20 m
L-II : r = 30 m
L-III : r = 45 m
L-IV : r = 60 m

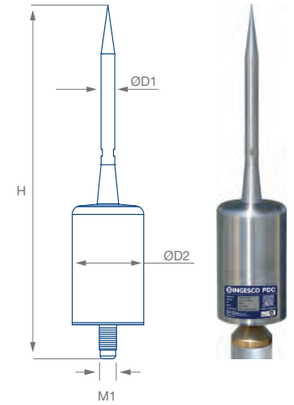
INGESCO® PDC.E 60 LIGHTNING ROD

Coverage radius (m) INGESCO® PDC.E 60 according to protection level and height (UNE 21.186:2011, NFC 17.102:2011 and NP 4426:2013)

Ref.	Material	H (mm)	D1 (mm)	D2 (mm)	M1 (mm)	Weight (g)
102007	SST	412	16	83	M20	3760

h (m)	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
2	31	35	39	43
4	63	69	78	85
6	79	87	97	107
10	79	88	99	109
20	80	89	102	113

Δt : 60µs
r: Radius of the rolling sphere
L-I : r = 20 m
L-II : r = 30 m
L-III : r = 45 m
L-IV : r = 60 m



INGESCO ADVANCED ESE TESTER

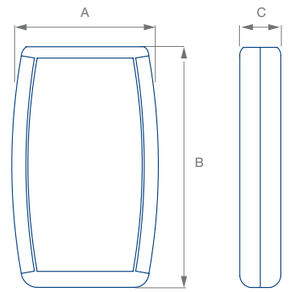
Ref.	Material	A (mm)	B (mm)	C (mm)	Weight (g)
102051	ABS	89	147	25	320

The INGESCO Advanced ESE Tester is a portable device for testing electronic lightning rods for ohmic contact.

The INGESCO Advanced ESE Tester is designed exclusively for evaluating INGESCO electronic ESE arrester. ESE future electronic models INGESCO and lightning rods from other manufacturers may not be compatible with the technology of the INGESCO Advanced ESE Tester.

technical specifications

- Temperature range: -10°C to 40°C
- Power consumption: 30mA
- Power: Battery 9V IEC6LR61/IEC6F22/USA PP3
- Test terminals 1m long and 9V battery



LIGHTNING RODS

Termination rods suitable for external lightning protection. It can be used as single sensor element or part of passive protection, complementing the protection conductive mesh (Faraday cages).

Made of AISI 316L stainless steel or copper.

Tested by UL test report number: 4789563988.1.

Please consult for other materials or dimensions.

Simple rods

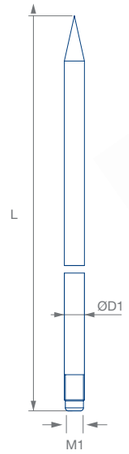
Multiple rods

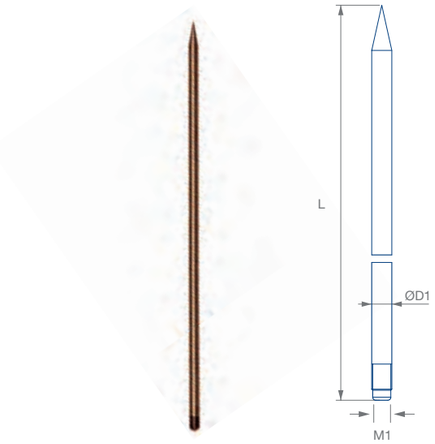
IEC 62305

SIMPLE RODS

ALUMINIUM simple lightning rods

Model	Ref.	Material	L (mm)	D1 (mm)	M1 (mm)	Peso (g)
AL300-16	110245	Al	300	16	M16	170
AL500-16	110291	Al	500	16	M16	280
AL1000-16	110037	Al	1000	16	M16	560
AL1500-16	110292	Al	1500	16	M16	850
AL2000-16	110293	Al	2000	16	M16	1100
AL3000-16	110284	Al	3000	16	M16	1600

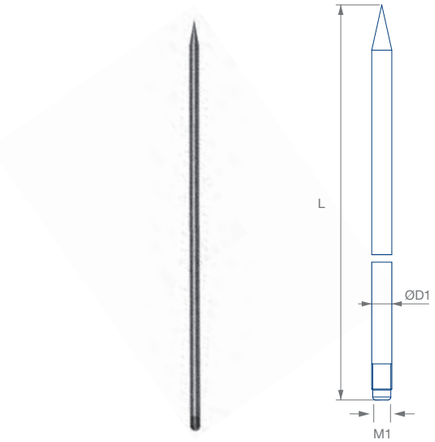




SIMPLE RODS

COPPER simple lightning rods

Model	Ref.	Material	L (mm)	D1 (mm)	M1 (mm)	Weight (g)
CU300-16	110081	Cu	300	16	M16	440
CU500-16	110083	Cu	500	16	M16	800
CU600-16	110028	Cu	600	16	M16	980
CU1000-16	110035	Cu	1000	16	M16	1700
CU1500-16	110224	Cu	1500	16	M16	2600
CU2000-16	110034	Cu	2000	16	M16	3500
CU300-20	110089	Cu	300	20	M20	740
CU500-20	110091	Cu	500	20	M20	1310
CU1000-20	110093	Cu	1000	20	M20	2710
CU2000-20	110095	Cu	2000	20	M20	5530



STAINLESS STEEL simple lightning rods

Modelo	Ref.	Material	L (mm)	D1 (mm)	M1 (mm)	Weight (g)
IN300-16	110080	SST	300	16	M16	420
IN500-16	110082	SST	500	16	M16	740
IN600-16	110032	SST	600	16	M16	900
IN1000-16	110084	SST	1000	16	M16	1530
IN1500-16	110215	SST	1500	16	M16	2370
IN2000-16	110086	SST	2000	16	M16	3110
IN300-20	110088	SST	300	20	M20	690
IN500-20	110090	SST	500	20	M20	1180
IN1000-20	110092	SST	1000	20	M20	2420
IN2000-20	110031	SST	2000	20	M20	4880

MULTIPLE RODS

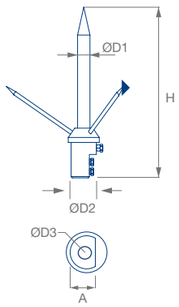
Multiple lightning rod

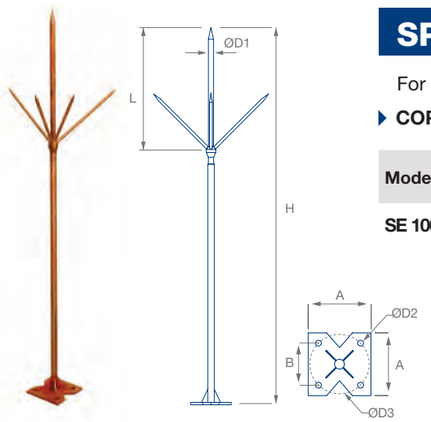
Modelo	Ref.	Material	H (mm)	D1 (mm)	M1 (mm)	Weight (g)
Multiple CU	110002	Cu	384	20	M20	855
Multiple IN	110001	SST	384	20	M20	795

MULTIPLE RODS WITH MAST ADAPTOR

Multiple lightning rods with ROUND - FLAT conductor mast adaptor

Modelo	Ref.	Material	H (mm)	D1 (mm)	D2 (mm)	D3 (mm)	A (mm)	Weight (g)
Multiple CU 1’1/4”	110226	Cu	344	20	35,5	12	19	1200
Multiple CU 1’1/2”	110227	Cu	344	20	41	12	19	1350
Multiple IN 1’1/4”	110228	SST	344	20	35,5	12	19	1100
Multiple IN 1’1/2”	110229	SST	344	20	41	12	19	1300



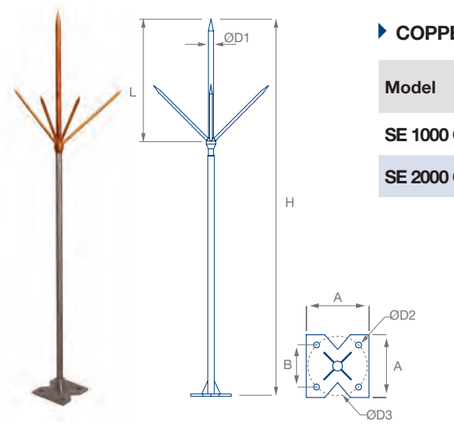


SPECIAL LIGHTNING RODS

For application in electrical substations and others.

COPPER lightning rods with COPPER-PLATED STEEL horizontal support

Model	Ref.	Mat.	H (mm)	L (mm)	D1 (mm)	D2 (mm)	D3 (mm)	A (mm)	B (mm)	Weight (g)
SE 1000 CU	110003	CCS	1600	480	20	18	160	170	113	5500



COPPER lightning rods with GALVANIZED STEEL horizontal support

Model	Ref.	Mat.	H (mm)	L (mm)	D1 (mm)	D2 (mm)	D3 (mm)	A (mm)	B (mm)	Weight (g)
SE 1000 CU/AZ	110096	Cu/GST	1600	480	20	18	160	170	113	5600
SE 2000 CU/AZ	110100	Cu/GST	2600	480	20	18	160	170	113	8600

CAPTURE SYSTEM ACCESSORIES

Adaptor parts

Masts

Fastening

CTE SUA 8

IEC 62305

IEC 62561

Accessories for installing the capture system. Adaptor parts, masts and anchoring systems.

Adjustment parts for lightning rods made by INGESCO (simple tips, multiple and ESE) of Ø16mm or 20mm. It facilitates the connection of the lightning rod to the conductive network.

Masts for fastening and support for termination rods to structures by anchors or baseplates.

Fastening systems for masts 1 ¼" , 1 ½" and 2" in diameter. Different solutions according to the construction needs.

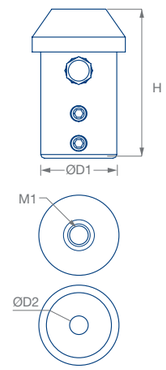
Made of resistant materials such as brass, copper, galvanized iron and stainless steel.

Please consult for custom manufacturing and other construction.

LIGHTNING ROD ADAPTER PIECES

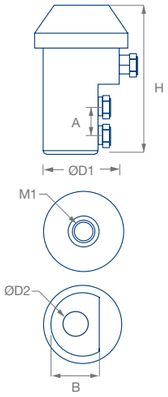
Adapter parts for lightning rod to ROUND conductor mast

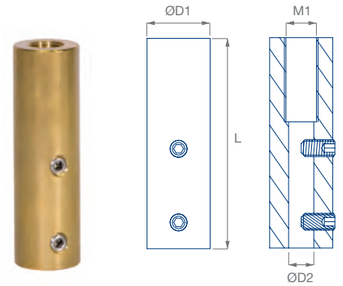
Model	Ref.	Mat.	H (mm)	D1 (mm)	D2 (mm)	M1 (mm)	Weight (g)
1" Ø16 RD	111033	Cu/Zn	80	26	12	M16	316
1'1/4" Ø16 RD IN	111062	SST	80	35,5	12	M16	623
1'1/4" Ø16 RD	111032	Cu/Zn	80	35,5	12	M16	664
1'1/2" Ø16 RD IN	111031	SST	80	41	12	M16	770
1'1/2" Ø16 RD	111022	Cu/Zn	80	41	12	M16	815
2" Ø16 RD	111025	Cu/Zn	80	53	12	M16	1341
1" Ø20 RD	111019	Cu/Zn	80	26	12	M20	286
1'1/4" Ø20 RD	111011	Cu/Zn	80	35,5	12	M20	628
1'1/4" Ø20 RD IN	111073	SST	80	35,5	12	M20	600
1'1/2" Ø20 RD IN	111052	SST	80	41	12	M20	736
1'1/2" Ø20 RD	111012	Cu/Zn	80	41	12	M20	777
2" Ø20 RD	111013	Cu/Zn	80	53	12	M20	1306



Adapter parts for lightning rod to ROUND and FLAT conductor mast

Model	Ref.	Mat.	H (mm)	D1 (mm)	D2 (mm)	M1 (mm)	A (mm)	B (mm)	Peso (g)
1'1/4" Ø16 RD-PL	111053	Cu/Zn	80	35,5	12	M16	19	25	645
1'1/2" Ø16 RD-PL	111054	Cu/Zn	80	41	12	M16	19	30	765
2" Ø16 RD-PL	111055	Cu/Zn	80	53	12	M16	19	45	1295
1'1/4" Ø20 RD-PL	111051	Cu/Zn	80	35,5	12	M20	19	25	630
1'1/4" Ø20 RD-PL	111069	SST	80	35,5	12	M20	19	25	530
1'1/2" Ø20 RD-PL	111070	SST	80	41	12	M20	19	30	715
1'1/2" Ø20 RD-PL	111056	Cu/Zn	80	41	12	M20	19	30	750
2" Ø20 RD-PL	111057	Cu/Zn	80	53	12	M20	19	45	1280

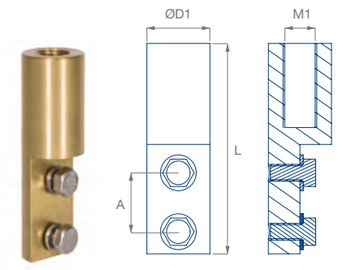




LIGHTNING ROD-CONDUCTOR CONNECTOR

Lightning rod - ROUND conductor connector

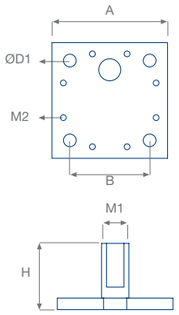
Model	Ref.	Mat.	L (mm)	D1 (mm)	D2 (mm)	M1 (mm)	Weight (g)
Ø16 round cond. 50-70 mm	111024	Cu/Zn	100	30	12	M16	480
Ø20 round cond. 50-70 mm	111038	Cu/Zn	100	30	12	M20	450



Lightning rod - FLAT conductor connector

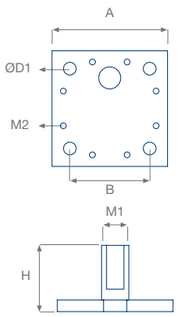
Model	Ref.	Mat.	L (mm)	D1 (mm)	A (mm)	M1 (mm)	Weight (g)
Ø16 flat cond. 30x2-4 mm	111039	Cu/Zn	100	30	28	M16	390
Ø20 flat cond. 30x2-4 mm	111040	Cu/Zn	100	30	28	M20	350

LIGHTNING ROD SUPPORTS

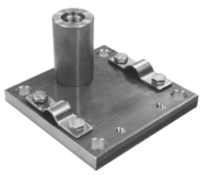


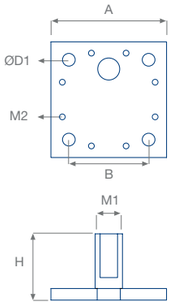
Horizontal supports Ø16mm or Ø20mm lightning rods

Model	Ref.	Mat.	H (mm)	M1 (mm)	D1 (mm)	M2 (mm)	A (mm)	B (mm)	Weight (g)
CU16	110268	Cu	60	M16	11	M6	100	80	1150
CU20	110069	Cu	60	M20	11	M6	100	80	1145



Model	Ref.	Mat.	H (mm)	M1 (mm)	D1 (mm)	M2 (mm)	A (mm)	B (mm)	Weight (g)
CU/ZN16	110266	Cu/Zn	60	M16	11	M6	100	80	1095
CU/ZN20	110267	Cu/Zn	60	M20	11	M6	100	80	1090



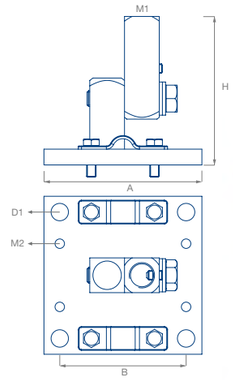


Model	Ref.	Mat.	H (mm)	M1 (mm)	D1 (mm)	M2 (mm)	A (mm)	B (mm)	Weight (g)
IN16	110271	SST	60	M16	11	M6	100	80	1040
IN20	110272	SST	60	M20	11	M6	100	80	1030

LIGHTNING ROD SUPPORTS

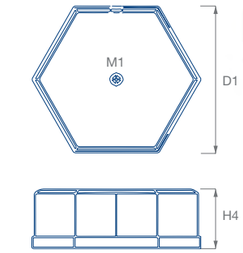
Tilting support for lightning rods Ø16mm or Ø20mm , up to 500 mm high

Model	Ref.	Mat.	H (mm)	M1 (mm)	D1 (mm)	M2 (mm)	A (mm)	B (mm)	Weight (g)
CU/ZN16	110283	Cu/Zn	94	M16	11	M6	100	80	1235
CU/ZN20	110212	Cu/Zn	94	M20	11	M6	100	80	1325



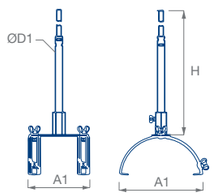
Concrete block support for air terminal

Mod.	Ref.	Mat.	H (mm)	M1 (mm)	D1 (mm)	Weight (g)
6.9kg base M16 for lightning rods up to 1m	110298	Hormigón	81	M16	203	6900
16kg base M16 for lightning rods up to 3m	110297	Hormigón	80	M16	364	16000



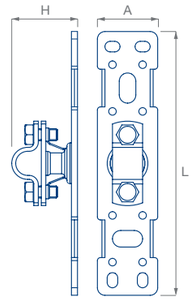
Support for lightning rod on tile roof

Model	Ref.	Mat.	H (mm)	A1 (mm)	D1 (mm)	L (mm)	Weight (g)
Roof ridge support	110202	Al / SST	1000	180-260	203	110	620



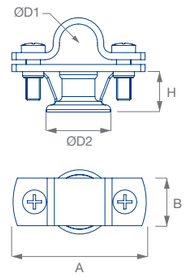
Vertical supports Ø16mm or Ø20mm lightning rods

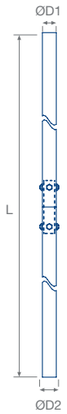
Model	Ref.	Mat.	No. pieces	L (mm)	A (mm)	H (mm)	Weight (g)
Stainless steel rods Ø16 - Ø20	112078	SST	1	175	40	42	212



Simple supports Ø16mm or Ø20mm lightning rods

Model	Ref.	Mat.	No. pieces	A (mm)	B (mm)	H (mm)	D1 (mm)	D2 (mm)	Weight (g)
Simple fastening rods Ø16	112110	Zn	1	56	20	20	16	27	60
Simple fastening rods Ø20	112111	Zn	1	56	20	20	20	27	82





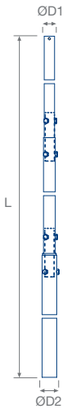
MASTS

Stainless Steel masts

Model	Ref.	Mat.	L (mm)	No. parts	D1 (mm)	D2 (mm)	Weight (kg)
3m Ø1'1/2" IN	114045	SST	3000	1	48	48	9
6m Ø1'1/2" inner union IN	114042	SST	6000	2	48	48	22

Telescopic hot dip galvanized steel masts

Model	Ref.	Mat.	L (mm)	No. parts	D1 (mm)	D2 (mm)	Weight (kg)
1 m Ø1'1/4"	114079	HDG	1000	1	42,5	42,5	2,6
2 m Ø1'1/4"	114061	HDG	2000	1	42,5	42,5	5,2
3 m Ø1'1/4"	114052	HDG	3000	1	42,5	42,5	7,75
1 m Ø1'1/2"	114063	HDG	1000	1	48	48	3,3
2 m Ø1'1/2"	114056	HDG	2000	1	48	48	6,6
3 m Ø1'1/2"	114043	HDG	3000	1	48	48	10
4 m Ø 1'1/2"+ Ø 1'1/4	114097	HDG	4000	2	42,5	48	12,2
5,8 m Ø1'1/2"+ Ø1'1/4	114065	HDG	5800	2	42,5	48	18
7,6 m Ø2+Ø1'1/2"+ Ø1'1/4	114066	HDG	7600	3	42,5	60	30,2
8,6 m Ø2+Ø1'1/2"+ Ø1'1/4	114067	HDG	8600	3	42,5	60	33,8



Hot dip galvanized steel masts with internal junction

Model	Ref	Mat.	L (m)	No. parts	D1 (mm)	D2 (mm)	Weight (kg)
4 m Ø 1'1/2" u. int.	114053	HDG	4	2	48	48	16,3
6 m Ø1'1/4" inner union	114048	HDG	6	2	42,5	42,5	16,8
6 m Ø1'1/2" inner union	114041	HDG	6	2	48	48	23
8 m Ø2+Ø1'1/2"+ Ø1'1/4 inner union	114068	HDG	8	3	42,5	60	33,8
9 m Ø2+Ø1'1/2"+ Ø1'1/4 inner union	114069	HDG	9	3	42,5	60	36,9

MASTS

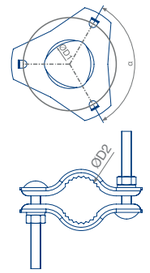
6m telescopic aluminum mast with adaption piece

Model	Ref.	Mat.	L (mm)	No. parts	D1 (mm)	D2 (mm)	Weight (kg)
6m extendable mast with P.A.	114245	Al/SST	Up to 6000	4	40	80	22

WIND KIT

Wind kit for fastening masts

Model	Ref.	Mat.	D1 (mm)	D2 (mm)	α	Steel cable (m)	No. tighteners	No. cable ties	Weight (g)
Wind kit fastening masts	114197	HDG	40	45	120°	25	3	6	500

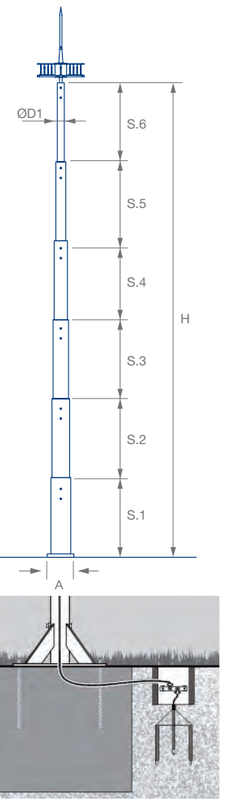


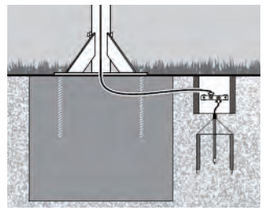
FREE-STANDING FOLDING MASTS

Free-standing hot dip galvanized steel masts

Self-supporting folding mast. Attachable sections, folding hinged baseplate. Easy transport and assembly. Dimensioned to withstand winds up to 144 Km / h.

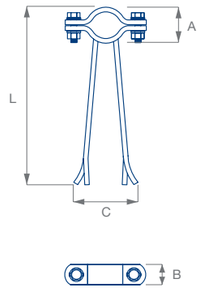
Model	Ref.	Mat.	Secc.	Øtubes (inches)	L parts (m)	H (m)	D1 (mm)	A (mm)	Weight (kg)
6 m	114201	HDG	S.1 S.2 S.3	3" 2'1/2" 1'1/2"	3 2,5 0,5	6	48	500	85
8 m	114200	HDG	S.1 S.2 S.3	3" 2'1/2" 1'1/2"	3 2,5 2,5	8	48	500	92
10 m	114075	HDG	S.1 S.2 S.3 S.4	4" 3" 2'1/2" 1'1/2"	3 2,5 2,5 2	10	48	500	125
12 m	114076	HDG	S.1 S.2 S.3 S.4 S.5	5" 4" 3" 2'1/2" 1'1/2"	3 2,5 2,5 2,5 1,5	12	48	500	160
14 m	114078	HDG	S.1 S.2 S.3 S.4 S.5 S.6	6" 5" 4" 3" 2'1/2" 1'1/2"	3 2,5 2,5 2,5 2,5 1	14	48	500	212



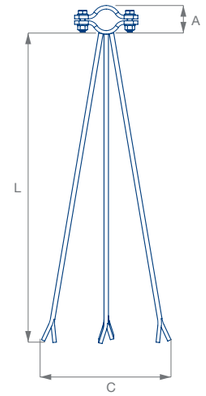


ANCHORS AND SUPPORTS FOR MASTS

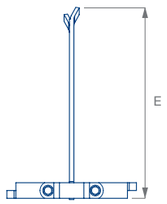
Anchors for vertically embedded wall mounting



Model	Ref.	Mat.	Nº pieces	L (mm)	A (mm)	B (mm)	C (mm)	Weight (kg)
work anchor 15 mast Ø1'1/4"	112087/1		1					1,8
	112087	HDG	2	240	46	35	110	3,6
	112087/3		3					5,4
work anchor 15 mast Ø1'1/2	112071/1		1					1,9
	112071	HDG	2	240	60	35	110	3,8
	112071/3		3					5,7
work anchor 15 mast Ø2"	112096/1		1					2
	112096	HDG	2	240	72	35	110	4
	112096/3		3					6



Model	Ref.	Mat.	Nº pieces	L (mm)	A (mm)	B (mm)	C (mm)	Weight (kg)
work anchor 30 mast Ø1'1/4"	112088/1		1					2,5
	112088	HDG	2	395	46	35	100	5
	112088/3		3					7,5
work anchor 30 mast Ø1'1/2"	112021/1		1					2,6
	112021	HDG	2	395	60	35	100	5,2
	112021/3		3					7,8
work anchor 30 mast Ø2"	112038/1		1					2,7
	112038	HDG	2	395	72	35	100	5,4
	112038/3		3					8,1



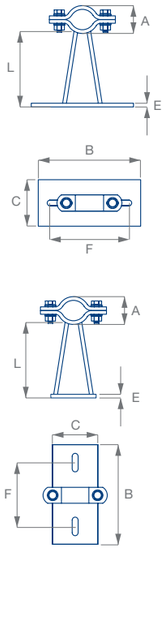
Model	Ref.	Mat.	Nº pieces	L (mm)	A (mm)	B (mm)	C (mm)	E (mm)	Weight (kg)
work anchor 60 mast Ø1'1/4"	112089/1		1						7,1
	112089	HDG	2	700	46	35	270	395	11,6
	112089/3		3						16,1
work anchor 60 mast Ø1'1/2"	112022/1		1						7,2
	112022	HDG	2	700	60	35	270	395	11,8
	112022/3		3						16,4
work anchor 60 mast Ø2"	112040/1		1						7,4
	112040	HDG	2	700	72	35	270	395	12,2
	112040/3		3						17,0

Model	Ref.	Mat.	Nº pieces	L (mm)	A (mm)	B (mm)	C (mm)	E (mm)	Weight (kg)
work anchor 100 mast Ø1'1/4"	112090/1		1						11,7
	112090	HDG	2	1095	46	35	365	460	23,4
	112090/3		3						35,1
work anchor 100 mast Ø1'1/2"	112023/1		1						11,8
	112023	HDG	2	1095	60	35	365	460	23,6
	112023/3		3						35,4
work anchor 100 mast Ø2"	112042/1		1						11,9
	112042	HDG	2	1095	72	35	365	460	23,8
	112042/3		3						35,7

ANCHORS AND SUPPORTS FOR MASTS

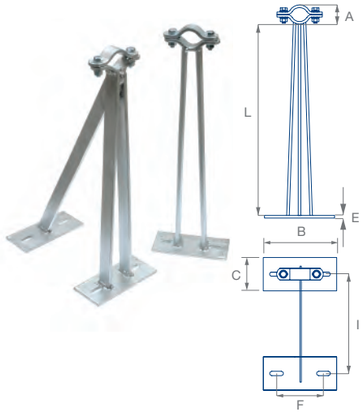
Anchor plate for vertical wall mounting

Model	Ref.	Mat.	No. pieces	L (mm)	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	Weight (kg)
plate anchor 15 mast Ø1'1/4"	112086/1		1							2,8
	112086	HDG	2	153	46	220	100	8	141	5,6
	112086/3		3							8,4
plate anchor 15 mast Ø1'1/2"	112024/1		1							2,9
	112024	HDG	2	153	60	220	100	8	141	5,8
	112024/3		3							8,7
plate anchor 15 mast Ø2"	112037/1		1							3
	112037	HDG	2	153	72	220	100	8	141	6
	112037/3		3							9
plate anchor 15 inv. mast Ø1'1/4"	112091/1		1							2,8
	112091	HDG	2	153	46	220	100	8	141	5,6
	112091/3		3							8,4
plate anchor 15 inv. mast Ø1'1/2"	112070/1		1							2,9
	112070	HDG	2	153	60	220	100	8	141	5,8
	112070/3		3							8,7
plate anchor 15 inv. mast Ø2"	112095/1		1							3
	112095	HDG	2	153	72	220	100	8	141	6
	112095/3		3							9



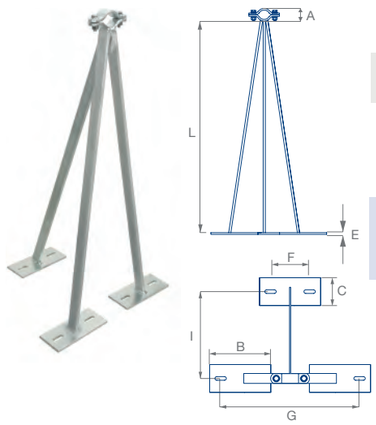
Model	Ref.	Mat.	No pieces	L (mm)	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	Weight (kg)
plate anchor 30 mast Ø1'1/4"	112092/1		1							3,5
	112092	HDG	2	302	46	220	100	8	141	7
	112092/3		3							10,5
plate anchor 30 mast Ø1'1/2"	112025/1		1							3,6
	112025	HDG	2	302	60	220	100	8	141	7,2
	112025/3		3							10,8
plate anchor 30 mast Ø2"	112039/1		1							3,7
	112039	HDG	2	302	72	220	100	8	141	7,4
	112039/3		3							11,1
plate anchor 30 inv. mast Ø1'1/4"	112099/1		1							3,5
	112099	HDG	2	302	46	220	100	8	141	7
	112099/3		3							10,5
plate anchor 30 inv. mast Ø1'1/2"	112100/1		1							3,6
	112100	HDG	2	302	60	220	100	8	141	7,2
	112100/3		3							10,8
plate anchor 30 inv. mast Ø2"	112101/1		1							3,7
	112101	HDG	2	302	72	220	100	8	141	7,4
	112101/3		3							11,1

ANCHORS AND SUPPORTS FOR MASTS



Anchor plate for vertical wall mounting

Model	Ref.	Mat.	No. pieces	L (mm)	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	I (mm)	Weight (kg)
plate anchor 60 mast Ø1'1/4"	112093/1		1								7,75
	112093	HDG	2	603	46	220	100	8	141	340	15,50
	112093/3		3								23,25
plate anchor 60 mast Ø1'1/2"	112027/1		1								7,85
	112027	HDG	2	603	60	220	100	8	141	340	15,70
	112027/3		3								23,55
plate anchor 60 mast Ø2"	112041/1		1								7,95
	112041	HDG	2	603	72	220	100	8	141	340	15,90
	112041/3		3								23,85



Model	Ref.	Mat.	No. pieces	L (mm)	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	G (mm)	I (mm)	Weight (kg)
plate anchor 100 mast Ø1'1/4"	112094/1		1									15,3
	112094	HDG	2	991	46	220	100	8	141	506	460	30,6
	112094/3		3									45,9
plate anchor 100 mast Ø1'1/2"	112030/1		1									15,4
	112030	HDG	2	991	60	220	100	8	141	506	460	30,8
	112030/3		3									46,2
plate anchor 100 mast Ø2"	112043/1		1									15,3
	112043	HDG	2	991	72	220	100	8	141	506	460	30,6
	112043/3		3									45,9

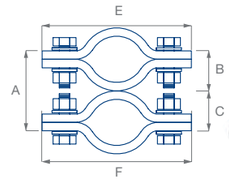
Accessory anchor plate for snap fastening

Model	Ref.	Mat.	No. pieces	B (mm)	C (mm)	E (mm)	F (mm)	Weight (kg)
fastening plate for plate anchor	112044/1		1					1,3
	112044	HDG	2	220	100	8	141	2,7
	112044/3		3					3,9

ANCHORS AND SUPPORTS FOR MASTS

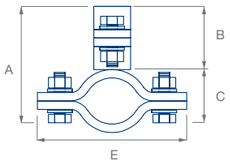
Anchoring double clamp for round profile attachment

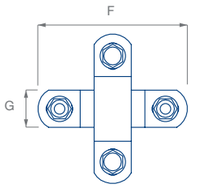
Model	Ref.	Mat.	No. pieces	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	G (mm)	Weight (kg)
double clamp 1'1/4"-1'1/4"	112102/1		1							1,3
	112102	HDG	2	92	46	46	147	147	35	2,6
	112102/3		3							3,9
double clamp 1'1/4"-1'1/2"	112036/1		1							1,4
	112036	HDG	2	106	46	60	147	142	35	2,8
	112036/3		3							4,2
double clamp 1'1/4"-2"	112104/1		1							1,5
	112104	HDG	2	118	46	72	147	160	35	3
	112104/3		3							4,5
double clamp 1'1/2"-1'1/2"	112026/1		1							1,5
	112026	HDG	2	120	60	60	142	142	35	3
	112026/3		3							4,5
double clamp 1'1/2"-2"	112035/1		1							1,6
	112035	HDG	2	132	60	72	142	160	35	3,2
	112035/3		3							4,8
double clamp 2"-2"	112034/1		1							1,7
	112034	HDG	2	144	72	72	160	160	35	3,4
	112034/3		3							5,1

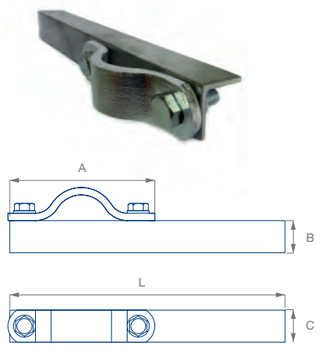


Anchoring double inverted clamp for round profile attachment

Model	Ref.	Mat.	No. pieces	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	G (mm)	Weight (kg)
double cross clamp 1'1/4"-1'1/4"	112105/1		1							1,3
	112105	HDG	2	92	46	46	147	147	35	2,6
	112105/3		3							3,9
double cross clamp 1'1/4"-1'1/2"	112106/1		1							1,4
	112106	HDG	2	106	46	60	147	142	35	2,8
	112106/3		3							4,2
double cross clamp 1'1/4"-2"	112107/1		1							1,5
	112107	HDG	2	118	46	72	147	160	35	3
	112107/3		3							4,5
double cross clamp 1'1/2"-1'1/2"	112032/1		1							1,5
	112032	HDG	2	120	60	60	142	142	35	3
	112032/3		3							4,5
double cross clamp 1'1/2"-2"	112108/1		1							1,6
	112108	HDG	2	132	60	72	142	160	35	3,2
	112108/3		3							4,8
double cross clamp 2"-2"	112109/1		1							1,7
	112109	HDG	2	144	72	72	160	160	35	3,4
	112109/3		3							5,1



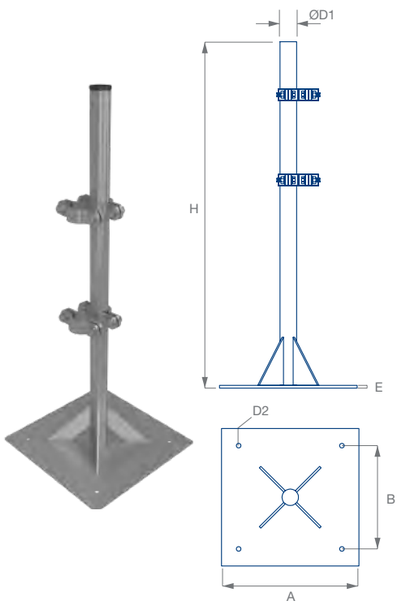




ANCHORS AND SUPPORTS FOR MASTS

Angle anchors for welding on metal structures

Model	Ref.	Mat.	No. pieces	A (mm)	B (mm)	C (mm)	L (mm)	Weight (kg)
attachment angle 30 Ø1”-1’1/4” - 1’1/2”-2”	112080/1	HDG	1	160	35	35	300	1,2
	112080		2					2,4
	112080/3		3					3,6
attachment angle 60 Ø1”-1’1/4” - 1’1/2”-2”	112103/1	HDG	1	160	35	35	600	2,4
	112103		2					4,8
	112103/3		3					6,2



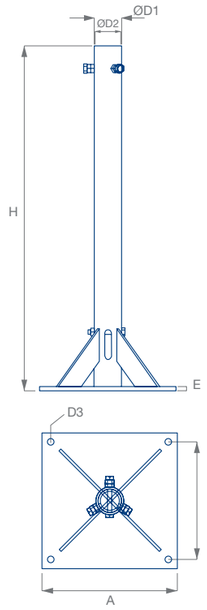
Horizontal surfaces baseplate support for fastening mast via brackets

Model	Ref.	Mat.	H (mm)	D1 (mm)	D2 (mm)	A (mm)	B (mm)	E (mm)	Weight (kg)
Ø1’1/2” double clamps Ø1’1/2”-Ø1’1/4”	113034	HDG	1015	48	14	400	300	8	17,5
Ø1’1/2” double clamps Ø1’1/2”-Ø1’1/2”	113031	HDG	1015	48	14	400	300	8	17,7
Ø1’1/2” double clamps Ø1’1/2”-Ø2”	113033	HDG	1015	48	14	400	300	8	17,9
Ø2” double clamps Ø2”-Ø1’1/4”	113043	HDG	1015	60	14	400	300	8	18,1
Ø2” double clamps Ø2”-Ø1’1/2”	113035	HDG	1015	60	14	400	300	8	18,3
Ø2” double clamps Ø2”-Ø2”	113032	HDG	1015	60	14	400	300	8	18,5

ANCHORS AND SUPPORTS FOR MASTS

Horizontal surfaces baseplate support for fastening mast up to 3m in length

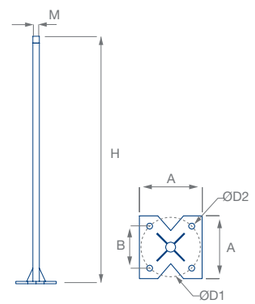
Model	Ref.	Mat.	H (mm)	D1 (mm)	D2 (mm)	D3 (mm)	A (mm)	B (mm)	E (mm)	Weight (kg)
Simple base plate support Ø1’1/2”	113037	HDG	758	60	53	14	300	260	8	12,5



SPECIAL SUPPORTS FOR SUBSTATION GANTRY

Base plate suport with M20 thread adaptor for application in electrical substations and others

Model	Ref.	Mat.	H (mm)	M	D1 (mm)	D2 (mm)	A (mm)	B (mm)	Weight (g)
Sup. base plate for tip	110241	GST	2000	M20	160	18	170	113	4800



CONDUCTORS

Among its many applications as a conductive element, it is used to build capture meshes, down conductor connections in lightning protection systems and for building grounding systems.

Made of different materials and dimensions for all types of installations.

UNE 21.186

NFC 17-102

IEC 62.305

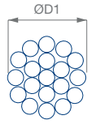
CTE SUA 8

R.E.B.T

IEC 62.561-2

NP 4426

VDE 0185-305

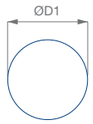


CONDUCTORS

Copper braided cable

Model	Ref.	Mat.	D1 (mm)	Weight (g/m)
35 mm² section	117071	Cu	7,5	315
50 mm² section	117072	Cu	8,5	500
70 mm² section	117073	Cu	9,5	600
95 mm² section	117074	Cu	11,5	830

* Coil approx. 50m. Other mesures consult.



Round steel conductor

Model	Ref.	Mat.	L (m)	D1 (mm)	Weight (g/m)
Spool Rd 8 galvanized steel (125m)	117081	HDG	125	8	312

Tinned copper flat conductor

Model	Ref.	Mat.	L (m)	A (mm)	B (mm)	Weight (g/m)
Spool 30x2 mm Cu tinned tape coil (50 m) **consult for other lengths*	117082	Tinned copper	50	30	2	537

FASTENING AND CONNECTING ACCESSORIES

Clamps

Connectors

IEC 62.305

IEC 62.561-4

UNE 21.186

NFC 17-102

Accessories for the installation of conductive meshes and down-conductors in external lightning protection systems.

Clamps for fastening round conductors 35 to 95 mm² sections, or flat conductors of 30x2 mm.

Connection elements for round conductors of 35-95 mm² sections or flat conductor 30x2-4 mm. Facilitates installation and connection to external lightning protection and grounding systems.

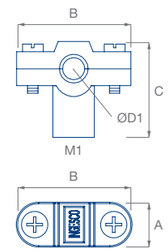
Made of different materials and dimensions for all types of facilities.

Consulting for other custom manufacturing and construction solutions.

CONDUCTOR FASTENING BRACKETS IEC62561-4

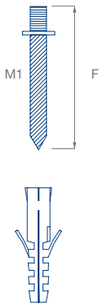
Cu / Zn (brass) alloy cable clamp

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	D1 (mm)	Weight (g)
M6 clamp for 35 mm² cable	118187	Cu/Zn	M6	17	44	36	7,1	104
M6 clamp for 50 mm² cable	118185	Cu/Zn	M6	17	44	36	9	101,5
M6 clamp for 70 mm² cable	118188	Cu/Zn	M6	17	44	36	10,4	97,6
M6 clamp for 95 mm² cable	118189	Cu/Zn	M6	17	44	36	11	93,9
M8 clamp for 35 mm² cable	118152	Cu/Zn	M8	17	44	36	7,1	101,2
M8 clamp for 50 mm² cable	118153	Cu/Zn	M8	17	44	36	9	99,6
M8 clamp for 70 mm² cable	118154	Cu/Zn	M8	17	44	36	10,4	94,8
M8 clamp for 95 mm² cable	118155	Cu/Zn	M8	17	44	36	11	91

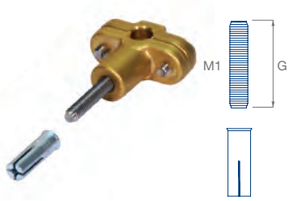


Cu / Zn (brass) alloy cable clamp with lag screw

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	F (mm)	D1 (mm)	Weight (g)
Lag screw M6 35 mm² cable	118150	Cu/Zn	M6	17	44	36	37,5	7,1	106,6
Lag screw M6 50 mm² cable	118099	Cu/Zn	M6	17	44	36	37,5	9	105
Lag screw M6 70 mm² cable	118000	Cu/Zn	M6	17	44	36	37,5	10,4	102
Lag screw M6 95 mm² cable	118100	Cu/Zn	M6	17	44	36	37,5	11	96
Lag screw M8 35 mm² cable	118151	Cu/Zn	M8	17	44	36	80	7,1	121,2
Lag screw M8 50 mm² cable	118083	Cu/Zn	M8	17	44	36	80	9	119
Lag screw M8 70 mm² cable	118093	Cu/Zn	M8	17	44	36	80	10,4	116
Lag screw M8 95 mm² cable	118092	Cu/Zn	M8	17	44	36	80	11	110

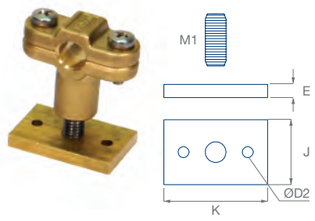


CONDUCTOR FASTENING BRACKETS IEC62561-4



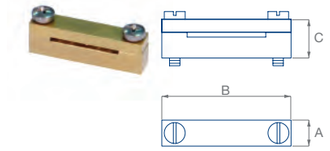
Cu / Zn (brass) alloy cable clamp with spike

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	G (mm)	D1 (mm)	Weight (g)
Spike M6 35 mm² cable	118148	Cu/Zn	M6	17	44	36	40	7,1	115,6
Spike M6 50 mm² cable	118082	Cu/Zn	M6	17	44	36	40	9	114
Spike M6 70 mm² cable	118091	Cu/Zn	M6	17	44	36	40	10,4	111
Spike M6 95 mm² cable	118090	Cu/Zn	M6	17	44	36	40	11	105
Spike M8 35 mm² cable	118149	Cu/Zn	M8	17	44	36	40	7,1	123,6
Spike M8 50 mm² cable	118081	Cu/Zn	M8	17	44	36	40	9	122
Spike M8 70 mm² cable	118089	Cu/Zn	M8	17	44	36	40	10,4	119
Spike M8 95 mm² cable	118088	Cu/Zn	M8	17	44	36	40	11	113



Cu / Zn (brass) alloy cable clamp with leg

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	E (mm)	I (mm)	J (mm)	K (mm)	D1 (mm)	D2 (mm)	Weight (g)
W/leg 35 mm² cable	118130	Cu/Zn	M8	17	44	36	5	20	25	40	7,1	4	146,6
W/leg 50 mm² cable	118084	Cu/Zn	M8	17	44	36	5	20	25	40	9	4	145
W/leg 70 mm² cable	118095	Cu/Zn	M8	17	44	36	5	20	25	40	10,4	4	142
W/leg 95 mm² cable	118094	Cu/Zn	M8	17	44	36	5	20	25	40	11	4	136



Cu / Zn (brass) alloy tape clamp

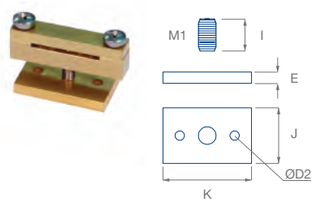
Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	Weight (g)
M6 for 30x2mm tape	118156	Cu/Zn	M6	10	50	15	60

Cu / Zn (brass) alloy tape clamp with lag screw

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	F (mm)	Weight (g)
Lag screw M6 for 30x2 mm tape	118103	Cu/Zn	M6	10	50	15	37,5	63

Cu / Zn (brass) alloy tape clamp with spike

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	G (mm)	Weight (g)
Spike M6 for 30x2 mm tape	118104	Cu/Zn	M6	10	50	15	40	72



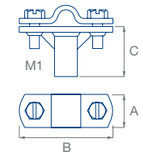
Cu / Zn (brass) alloy tape clamp with leg

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	E (mm)	I (mm)	J (mm)	K (mm)	D2 (mm)	Weight (g)
W/leg for 30x2 mm tape	118105	Cu/Zn	M6	10	50	15	5	12	25	40	4	101

CONDUCTOR FASTENING BRACKETS

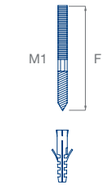
Zn folding clamp for round conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	Weight (g)
Folding clamp M8 50-70mm² cable	118109	Zn	M8	20	56	30	77



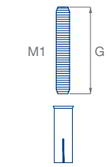
Zn folding clamp w/lag screw for round conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	F (mm)	Weight (g)
Folding clamp w/lag screw M8 50-70mm² cable	118113	Zn	M8	20	56	30	80	93



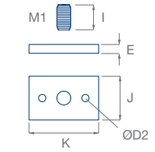
Zn folding clamp w/spike for round conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	G (mm)	Weight (g)
Folding clamp w/spike M8 50-70 mm² cable	118114	Zn	M8	20	56	30	40	97



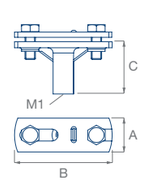
Zn folding clamp w/leg for round conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	E (mm)	I (mm)	J (mm)	K (mm)	D2 (mm)	Weight (g)
Folding clamp w/leg 50-70 mm² cable	118136	Zn	M8	20	56	30	5	20	25	40	4	117



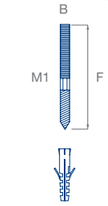
Zn folding clamp for flat conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	Weight (g)
Folding clamp M8 30 mm tape	118118	Zn	M8	20	56	30	77



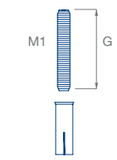
Zn folding clamp w/lag screw for flat conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	F (mm)	Weight (g)
Folding clamp w/lag screw M8 30 mm tape	118119	Zn	M8	20	56	30	80	93



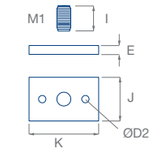
Zn folding clamp w/spike for flat conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	G (mm)	Weight (g)
Folding clamp w/spike M8 30 mm tape	118120	Zn	M8	20	56	30	40	97

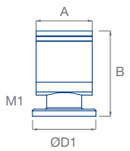


Zn folding clamp w/leg for flat conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	C (mm)	E (mm)	I (mm)	J (mm)	K (mm)	D2 (mm)	Weight (g)
Folding clamp w/ leg M8 30 mm tape	118157	Zn	M8	20	56	30	5	20	25	40	4	117

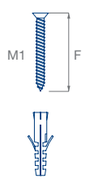


CONDUCTOR FASTENING BRACKETS



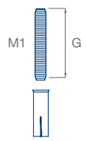
Insulate clamping bracket for round conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	D1 (mm)	Weight (g)
PA M8 50 mm² cable	118106	PA	M8	22	30	24	7,2



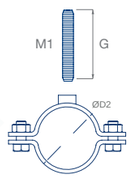
Insulate clamping bracket w/lag screw for round conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	D1 (mm)	F (mm)	Weight (g)
PA w/lag screw M8 50 mm² cable	118117	PA	M8	22	30	24	80	10,4



Insulate clamping bracket w/spike for round conductors

Model	Ref.	Mat.	M1	A (mm)	B (mm)	D1 (mm)	G (mm)	Weight (g)
PA w/spike M8 50 mm² cable	118158	PA	M8	22	30	24	40	27,2



Insulate clamping bracket for fixing to tube

Model	Ref.	Mat.	A (mm)	B (mm)	D1 (mm)	D2 (mm)	G (mm)	Weight (g)
PA 50mm² tube	118177	PA	22	30	24	30	30	26,8

Insultating clamp for cable and flat conductor

Model	Ref.	Mat.	D1 (mm)	H (mm)	Weight (g/m)
Insulating clamp round/flat	118179	Nylon	82,25	23	22
Insulating clamp with M8 screw	118193	Nylon	82,25	23	40
Insulating clamp with leg	118212	Nylon	82,25	23	63

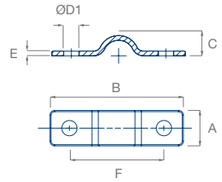
Strap clamp for round profiles

Model	Ref.	Mat.	A (mm)	B (mm)	C (mm)	Weight (g)
Strap clamp SST 127x4.6mm up to Ø25	118218	SST	0.25	4.6	127	25
Strap clamp SST 300x12mm up to Ø90	118176	SST	0.25	12	300	130
Strap clamp SST 998x8mm up to Ø304	118245	SST	0.25	7,9	998	260

CONDUCTOR FASTENING BRACKETS

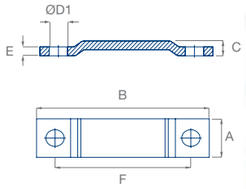
Light clamps for round conductors

Model			A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	D1 (mm)	Weight (g)
Light clamp Cu Ø8-10 mm	118125	Cu	15	56,5	8,6	2	40	6,5	21
Light clamp CuSn Ø8-10 mm	118129	CuSn	15	56,5	8,6	2	40	6,5	21,1
Light clamp SST Ø8-10 mm	118146	SST	15	56,5	8,6	2	40	6,5	20



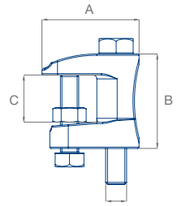
Light clamps for flat conductors

Model	Ref.	Mat.	A (mm)	B (mm)	C (mm)	E (mm)	F (mm)	D1 (mm)	Weight (g)
Light clamp Cu 30x2 mm	118122	Cu	15	61,5	5	3	49	6,5	27,5
Light clamp CuSn 30x2 mm	118128	CuSn	15	61,5	5	3	49	6,5	27,6
Light clamp SST 30x2 mm	118167	SST	15	61,5	5	3	49	6,5	26



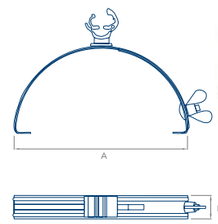
Profile clamping bracket

Model	Ref.	Mat.	A (mm)	B (mm)	C (mm)	M1	Weight (g)
Profile clamping bracket	118108	Zn	37	36	18	M8	80



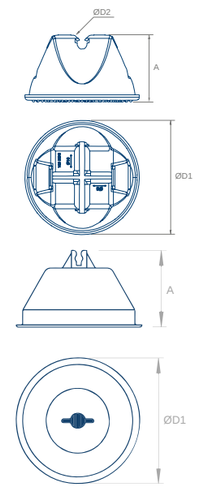
Roof file support bracket

Model	Ref.	Mat.	A (min-max) (mm)	B (mm)	Weight (g)
With clamp PA round conductor Ø8 mm	118242	SST/PA	185-260	25	109



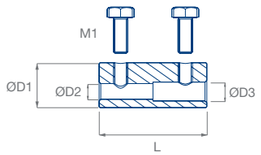
Concrete support for flat roofs

Model	Ref.	Mat.	Conductor (mm)	A (mm)	D1 (mm)	Weight (g)
Concrete support Ø8-10 mm round cond.	800237	PP/PE	8-10	78	133	1000
Support for self-filling with concrete Ø8 mm	800168	PE	8-10	85	140	55
Concrete support + 30mm flat bar adapter	800270	PP/PE	30x2-3,5	88	133	1007
Support for self-filling conductive plate	800274	PE	30x2-3,5	95	140	62



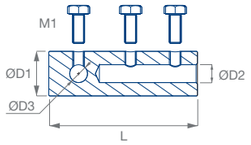
CONNECTORS

Linear sleeve connectors



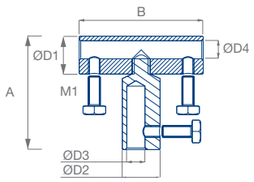
Model	Ref.	Mat.	D1 (mm)	D2 (mm)	D3 (mm)	L (mm)	M1	Weight (g)
Linear 35 x 35 mm²	115067	Cu/Zn	25	8,5	8,5	60	M8	230
Linear 35 x 50 mm²	115070	Cu/Zn	25	8,5	10,5	60	M8	220
Linear 35 x 70 mm²	115141	Cu/Zn	25	8,5	12,5	60	M8	210
Linear 35 x 95 mm²	115142	Cu/Zn	30	8,5	15,5	60	M8	310
Linear 50 x 50 mm²	115051	Cu/Zn	25	10,5	10,5	60	M8	220
Linear 50 x 70 mm²	115072	Cu/Zn	25	10,5	12,5	60	M8	200
Linear 50 x 95 mm²	115076	Cu/Zn	30	10,5	15,5	60	M8	300
Linear 70 x 70 mm²	115074	Cu/Zn	25	12,5	12,5	60	M8	200
Linear 70 x 95 mm²	115078	Cu/Zn	30	12,5	15,5	60	M8	290
Linear 95 x 95 mm²	115080	Cu/Zn	30	15,5	15,5	60	M8	270

"T" sleeve connectors (1 piece)



Model	Ref.	Mat.	D1 (mm)	D2 (mm)	D3 (mm)	L (mm)	M1	Weight (g)
"T" 1 piece 35 x 35 mm²	115143	Cu/Zn	25	8,5	8,5	100	M8	385
"T" 1 piece 35 x 50-70 mm²	115144	Cu/Zn	25	8,5	12,5	100	M8	380
"T" piece 35 x 95 mm²	115145	Cu/Zn	30	8,5	15,5	100	M8	365
"T" 1 piece 50 x 35 mm²	115146	Cu/Zn	25	10,5	8,5	100	M8	360
"T" 1 piece 50 x 50-70 mm²	115052	Cu/Zn	25	10,5	12,5	100	M8	355
"T" 1 piece 50 x 95 mm²	115147	Cu/Zn	30	10,5	15,5	100	M8	545
"T" 1 piece 70 x 35 mm²	115148	Cu/Zn	25	12,5	8,5	100	M8	325
"T" 1 piece 70 x 50-70 mm²	115081	Cu/Zn	25	12,5	12,5	100	M8	320
"T" 1 piece 70 x 95 mm²	115149	Cu/Zn	30	12,5	15,5	100	M8	515
"T" 1 piece 95 x 35 mm²	115150	Cu/Zn	30	15,5	8,5	100	M8	455
"T" 1 piece 95 x 50-70 mm²	115151	Cu/Zn	30	15,5	12,5	100	M8	450
"T" 1 piece 95 x 95 mm²	115082	Cu/Zn	30	15,5	15,5	100	M8	440

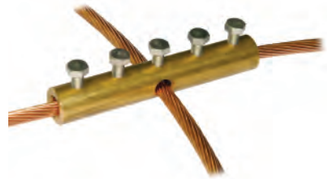
"T" sleeve connectors (2 pieces)

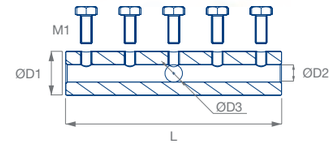


Model	Ref.	Mat.	D1 (mm)	D2 (mm)	D3 (mm)	D4 (mm)	A (mm)	B (mm)	M1	Weight (g)
"T" 2 pieces 35 x 35 mm²	115152	Cu/Zn	25	25	8,5	8,5	75	82	M8	495
"T" 2 pieces 35 x 50-70 mm²	115153	Cu/Zn	25	25	8,5	12,5	75	82	M8	455
"T" 2 pieces 35 x 95 mm²	115154	Cu/Zn	25	30	8,5	15,5	75	82	M8	555
"T" 2 pieces 50 x 35 mm²	115155	Cu/Zn	25	25	10,5	8,5	75	82	M8	485
"T" 2 pieces 50 x 50-70 mm²	115056	Cu/Zn	25	25	10,5	12,5	75	82	M8	445
"T" 2 pieces 50 x 95 mm²	115156	Cu/Zn	25	30	10,5	15,5	75	82	M8	545
"T" 2 pieces 70 x 35 mm²	115157	Cu/Zn	25	25	12,5	8,5	75	82	M8	475
"T" 2 pieces 70 x 50-70 mm²	115083	Cu/Zn	25	25	12,5	12,5	75	82	M8	435
"T" 2 pieces 70 x 95 mm²	115158	Cu/Zn	25	30	12,5	15,5	75	82	M8	535
"T" 2 pieces 95 x 35 mm²	115159	Cu/Zn	30	25	15,5	8,5	80	82	M8	535
"T" 2 pieces 95 x 50-70 mm²	115160	Cu/Zn	30	25	15,5	12,5	80	82	M8	495
"T" 2 pieces 95 x 95 mm²	115084	Cu/Zn	30	30	15,5	15,5	80	82	M8	595

CONNECTORS

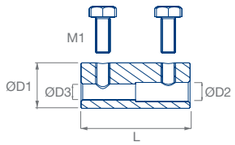
Cross sleeve connectors





Model	Ref.	Mat.	D1 (mm)	D2 (mm)	D3 (mm)	L (mm)	M1 (mm)	Weight (g)
Cross 35 x 35 mm²	115161	Cu/Zn	25	8,5	8,5	148	M8	566
Cross 35 x 50-70 mm²	115162	Cu/Zn	25	8,5	12,5	148	M8	546
Cross 35 x 95 mm²	115163	Cu/Zn	30	8,5	15,5	148	M8	801
Cross 50 x 35 mm²	115164	Cu/Zn	25	10,5	8,5	148	M8	526
Cross 50 x 50-70 mm²	115053	Cu/Zn	25	10,5	12,5	148	M8	450
Cross 50 x 95 mm²	115165	Cu/Zn	30	10,5	15,5	148	M8	761
Cross 70 x 35 mm²	115166	Cu/Zn	25	12,5	8,5	148	M8	476
Cross 70 x 50-70 mm²	115085	Cu/Zn	25	12,5	12,5	148	M8	456
Cross 70 x 95 mm²	115167	Cu/Zn	30	12,5	15,5	148	M8	711
Cross 95 x 35 mm²	115168	Cu/Zn	30	15,5	8,5	148	M8	665
Cross 95 x 50-70 mm²	115169	Cu/Zn	30	15,5	12,5	148	M8	646
Cross 95 x 95 mm²	115086	Cu/Zn	30	15,5	15,5	148	M8	631

Round conductors - grounding rod connectors

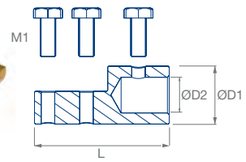


Model	Ref.	Mat.	D1 (mm)	D2 (mm)	D3 (mm)	L (mm)	M1	Weight (g)
Ø14 mm rod-35 mm² cable	115170	Cu/Zn	25	14,5	8,5	60	M8	200
Ø14 mm rod-50-70 mm² cable	115055	Cu/Zn	25	14,5	12,5	60	M8	180
Ø14 mm rod-95 mm² cable	115171	Cu/Zn	30	14,5	15,5	60	M8	220
Ø18 mm rod-35 mm² cable	115172	Cu/Zn	30	18,5	8,5	60	M8	290
Ø18 mm rod-50-70 mm² cable	115095	Cu/Zn	30	18,5	12,5	60	M8	270
Ø18 mm rod-95 mm² cable	115173	Cu/Zn	30	18,5	15,5	60	M8	250

Clamp for earth rod on round conductor

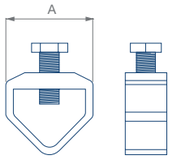
Model	Ref.	Mat.	A (mm)	B (mm)	C (mm)	M1	Weight (g)
Earth rod Ø14-20-cable 25-95mm²	115201	Cu/Zn	28	43	20	M10	110

Flat conductors - grounding rod connectors



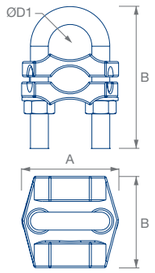
Model	Ref.	Mat.	D1 (mm)	D2 (mm)	L (mm)	M1	Weight (g)
Ø14 mm rod-30x2-4 mm tape	115174	Cu/Zn	30	14,5	70	M8	280
Ø18 mm rod-30x2-4 mm tape	115094	Cu/Zn	30	18,5	70	M8	250

Clamp for earth rod on flat conductor



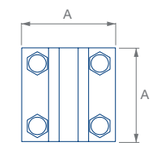
Model	Ref.	Mat.	A (mm)	B (mm)	C (mm)	H (mm)	M1	Weight (g)
Earth rod Ø14-20-tape 30x1-10mm	115198	Cu/Zn	42	34	17	40	M10	120

CONNECTORS



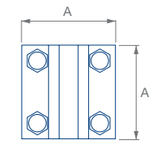
Round conductor junction clip - rod electrode

Model	Ref.	Mat.	A (mm)	B (mm)	D1 (mm)	H (mm)	Weight (g)
Rod Ø14-20 - cable 50-150mm²	115225	Cu/Zn	47,5	44,6	20,4	68.1	240



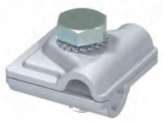
Cross connector

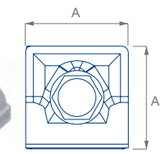
Model	Ref.	Mat.	A (mm)	Weight (g)
Cross connector Ø8-10 mm round cond. HDG	115098	HDG	60	110
Cross connector Ø8-10 mm round cond. Cu	115297	Cu	52	124



Cross connector Rd 8-10 x16mm

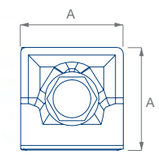
Model	Ref.	Mat.	A (mm)	Weight (g)
Cross connector Rd 8-10x16mm CU	115298	Cu	60	440
Cross connector Rd 8-10x16mm IN	115257	SST	60	390
Cross connector Rd 8-10x16mm HDG.	115299	HDG	60	388





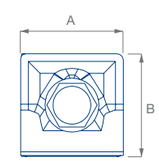
Adaptive round conductor connector

Model	Ref.	Mat.	A (mm)	Weight (g)
Adaptive round conductor connector AL	115300	Al	44	66
Adaptive round conductor connector CU	115301	Cu	40	119
Adaptive round conductor connector IN	115302	SST	40	107
Adaptive round conductor connector HDG.	115100	HDG	40	94



Connector Rd - Rd bimetallic

Model	Ref.	Mat.	A (mm)	Weight (g)
Connector Rd - Rd bimetallic	115303	Cu/SST	44	142

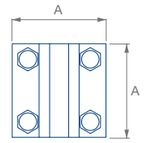


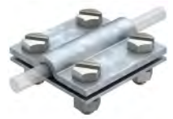
Connector Rd 8-10x16mm

Model	Ref.	Mat.	A (mm)	B (mm)	Weight (g)
Connector Universal Rd 8-10x16mm	115304	SST	40	50	163

Cross connector for round and flat conductors

Modelo	Ref.	Mat.	A (mm)	Weight (g)
Cross connector RD-Plate HDG.	115305	HDG	60	285
Cross connector RD-Plate IN	115296	SST	60	285



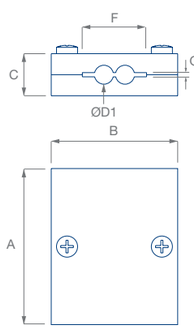


Rd connector- bimetallic plate

Model	Ref.	Mat.	A (mm)	B (mm)	Weight (g)
Rd connector- bimetallic plate	115105	Cu/SST	70	30	101

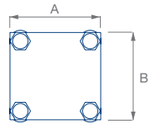
Universal switch connector

Model	Ref.	Mat.	A (mm)	B (mm)	C (mm)	F (mm)	G (mm)	D1 (mm)	Weight (g)
Universal connector	112115	Cu/Zn	74	60	20	30,5	2	9	650



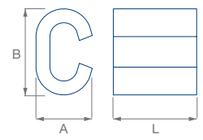
Cross-connector for tape

Model	Ref.	Mat.	A (mm)	B (mm)	Weight (g)
Cross connector tape	115093	Cu	52	50	164
Cross connector tape	115223	HDG	52	52	115
Cross connector tape	115307	SST	60	60	278



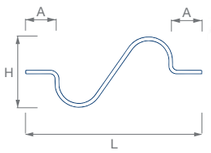
"C" pressure connection

Model	Ref.	Mat.	L (mm)	A (mm)	B (mm)	Weight (g)
"C" connector 35 - 95 mm²	115104	Cu	30	20,5	31	78



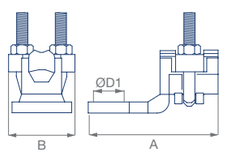
Expansion piece

Model	Ref.	Mat.	A (mm)	H (mm)	L (mm)	Weight (g)
Ø8 expansion joint	115306	Al	66	158	405	75



Flat terminal

Model	Ref.	Mat.	A (mm)	B (mm)	ØD1 (mm)	Weight (g)
Toothed flat terminal 25-120 mm² cable	115097	Cu/Zn	70	42	8	211



DOWN-CONDUCTOR PROTECTION

Mechanical protection of the lower section of down conductors of an external lightning protection system.

Fastening material includes: clamps and / or screws.

Made of galvanized steel and PVC.

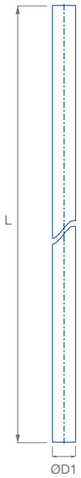
Tubes

Profiles

IEC 62.305

UNE 21.186

NFC 17-102



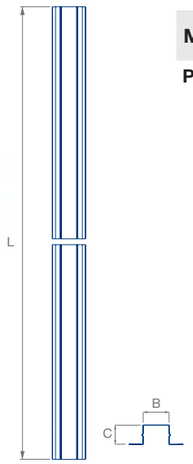
PROTECTION TUBE FOR CONDUCTORS

Protection tube for round conductors

Model	Ref.	Mat.	L (mm)	D1 (mm)	Weight (g)
Galv. steel-PVC shielded tube	119091	HDG-PVC	3000	40	5000
Reticulated polyethylene 3mm tube.	119110	PE	2500	32	625
50m PE crosslinked coil 3mm	119113	PE	50m	32	12500
Galv. Steel tube	119109	HDG.	2000	30	1900

Protection profile for flat conductor

Model	Ref.	Mat.	L (mm)	B (mm)	C (mm)	Weight (g)
Profile for flat conductor	119095	HDG	3000	40	32	2600



SPARK GAPS

IEC 62.561-3

IEC 62.305

UNE 21.186

NFC 17-102

Suitable for connecting antennas (TV, communication, etc ...) to external lightning protection systems to ensure bonding and prevent the formation of dangerous sparks between nearby metal masses.

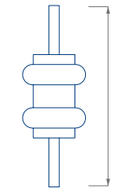
Bonding between grounding systems, operating separately under normal conditions, and ensuring their union if they suffer an overvoltage of a system.

Its use is recommended by current regulations to ensure equipotentiality of metallic structures on the roof of a building, or for interconnection between ground systems.

SPARK GAPS

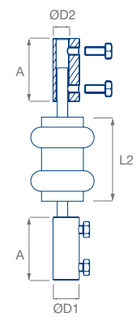
Spark gap protector

Model	Ref.	L1 (mm)	Weight (g)
VX-1 spark gap protector	116061	174	360



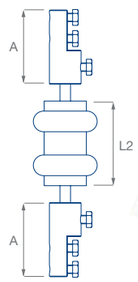
Spark gap with round conductor connection sleeves

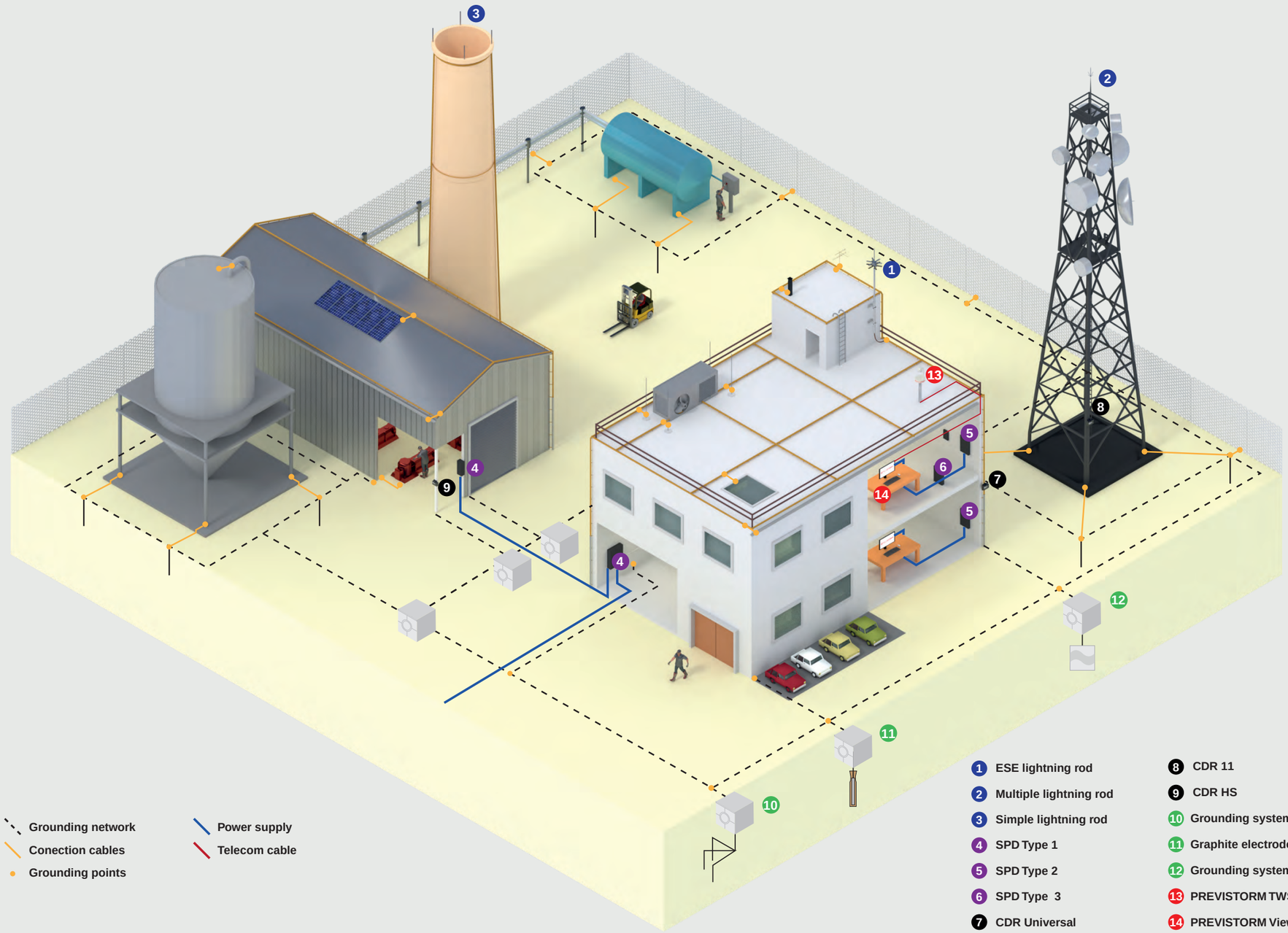
Model	Ref.	L2 (mm)	A (mm)	D1 (mm)	D2 (mm)	Weight (g)
VX-1 spark gap protector 50 mm² cable	116062	80	60	25	10,5	795
VX-1 spark gap protector 70 mm² cable	116063	80	60	25	12,5	785
VX-1 spark gap protector 95 mm² cable	116064	80	60	30	15,5	750



Spark gap with flat conductor connection sleeves

Model	Ref.	L2 (mm)	A (mm)	Weight (g)
VX-1 Spark gap protector 30x2 mm tape	116071	80	70	970





COMPREHENSIVE PROTECTION SCHEME

GROUNDING · OVERVOLTAGES · EXTERNAL PROTECTION · PREVENTION · CONTROL SYSTEMS

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