

# OMEGA-x<sup>®</sup> 45 lightning conductor

## Characteristics and application

OMEGA-x<sup>®</sup> - a lightning conductor with the early streamer emission ESE is the main element of a lightning protection installation protecting a structure from shocks arising from lightning discharges which is to assume the discharge from a stormy cloud.

The main feature characterizing this product is the manner of acting relying on an earlier, in comparison to other elements of the protected structure, performance of ionization of the lightning directly on the lightning rod and then a wire towards grounding.

OMEGA-x<sup>®</sup> may be applied in protecting people and premises from the results of a direct strike of a lightning within the structures: public and industrial facilities, residing buildings and open spaces.

## Properties

- Greater effectiveness in action towards the classical Franklin lightning rod confirmed by laboratory research
- Checked, solid structure using multiple lightning hits
- Total reliability in various weather conditions
- Easy manner of installation and maintenance - slight integration in roofing
- Lower costs in comparison to the conventional installation
- Applied technical solution is protected with a patent in many countries of the world
- Production process meets requirements of ISO 9001:2008 standard and Qualifoudre INERIS principles.
- Product tested pursuant to the standard NF C 17-102:2011 and EN 50164-1:2010 in high voltage laboratories: in the Institute of Plasma Physics and Laser Microfusion in Warsaw, SIAME Pau University (France) and Laboratory of Construction Materials ITB in Warsaw

## Structure

1. Lightning conductor tip
2. Stainless steel outer casing
3. High-voltage system
4. Initiating system
5. External spark gap
6. Connection with a mast, M16 screw thread



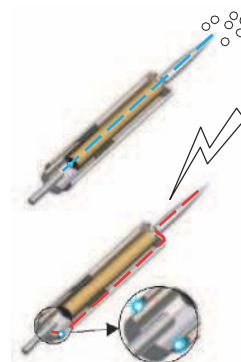
## Principle of operation

In stormy conditions, when the streamer of the lightning discharge comes down from the cloud towards the earth, there is a sudden increase of the electric field around the face of the streamer.

Tips of semiconductor and metal elements change into sources of bottom-up streamers that develop towards the face of the lightning discharge that is coming down.

Lightning conductor OMEGA-x<sup>®</sup> creates grass-roots streamer (process ionisation) earlier than other elements included in its protected area.

- There are electric charges gathering on the external shield and the tip of the OMEGA-x<sup>®</sup> lightning conductor and as a result of this process the electric potential of the shield with regard to the base having the potential of the earth, increases.
- The spark-over at the inner spark gap causes the flow of electric current having intensity of several A within the initiating system, which originates the bottom-up streamer at the tip.
- The bottom-up streamer, which is supported by the initiating system and supply of electric charge from the earth and metal structures that have electrical connection with the mast, moves towards the coming down streamer of the lightning discharge.
- As the ascending and descending streamers get closer and closer together there is a strong increase of electric current within the initiating system, which causes the spark-over in the external spark gap.
- The short-circuit that occurs between the shield and the base directs the electric current of the lightning discharge towards the earth in such a way that it passes round the system that initiates



# ESE lightning protection

## OMEGA-x® 45 lightning conductor

### Technical data

<b>Time advance</b>	45
<b>ΔT [μs]:</b>	
<b>Material:</b>	stainless steel (Ni)
<b>Dimension [mm]:</b>	A=150, B= 230, C=45, D=52, H=425
<b>Installation:</b>	screw with an M16 bolt to the mast, nut tighten with a 44 wrench
<b>Weight [kg]:</b>	1,8
<b>Packaging:</b>	card box 555 x 140 x 80 mm, weight 0,3 kg

### Principles of installation

The head of the OMEGA-x® lightning conductor must be screwed into the sleeve of the pipe lightning arresting mast; tighten the nut with a 44 wrench and then block with an M5 socket head screw located on the top of the mast. The head on the lightning arresting mast may be installed to the rigid structure of the building (chimney, wall, steel structure) by means of mast handles or place in a specially prepared tripod with a concrete base (flat surface of a roof). The head of the lightning located on the mast must be higher by minimum 2 m than other elements located on the building e.g. aerials, air conditioners, top floor extensions.

The design and lightning arresting installation with the use of OMEGA-x® lightning conductors must be made according to the requirements of the standards NFC17-102.

**The installation must be made by a specialist. The producer shall not bear liability for inappropriate installation.** The lightning protection installation with the application of OMEGA-x® lightning conductors protects a structure from the effects of a direct hit of a lightning. To provide complete protection of the structure, including electric installation and signal transmission against the effects of the discharge, overvoltage protection must be applied.

### Radius of protection zone

According to the standard NF C 17 102 the radius of protection R of OMEGA-x® lightning is connected with the value of time advance ΔT, levels of protection I, II, III, IV and height H of the lightning conductor OMEGA-x®.

The amount of the height H equals the difference between the height of the head blade on the highest point of the protected structure, minimally 2m.

ΔT [μs]	Typ	Level of protection (efficiency)	H [m]							
			2	3	4	5	7	10	20	
45	OMEGA 45	I (98%)	26	39	51	63	63	64	65	
		II (95%)	30	44	58	72	72	73	75	
		III (90%)	33	49	65	80	81	83	86	
		IV (80%)	36	54	71	89	90	92	97	

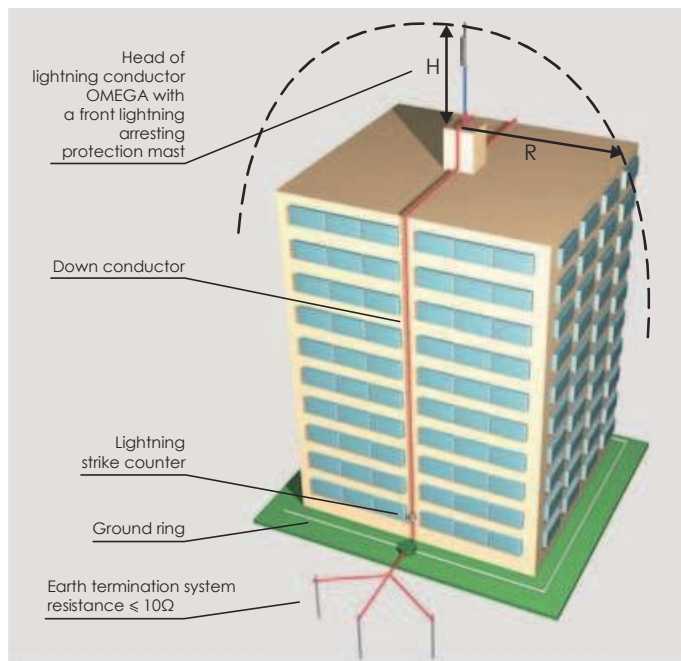
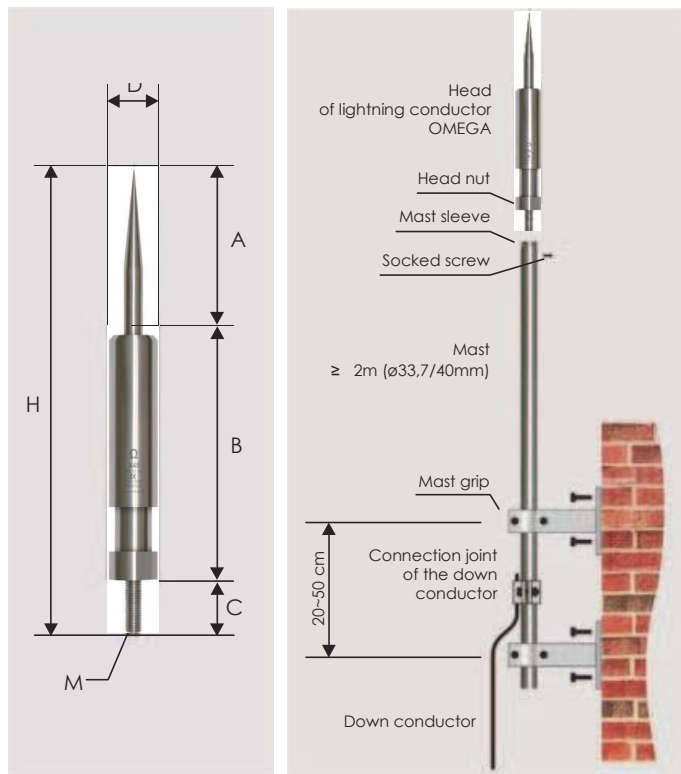
For the structures requiring protection at the level of 1++(99.9%) and for the structures constituting the threat to the environment (the threat coefficient h=2, EN 62305-2) or may cause environment contamination (the threat coefficient h=2, EN 62305-2) the value of the radius of protection may be decreased by 40%.

### Standards met by the product:

French standard NF C 17-102(09-2011)  
European Standard EN 50164-1:2010

### Warranty period:

10 years



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