



**lightning
protection
system**

Ω -x OMEGA-x



π iorteh
PIORTEH

The OMEGA-x lightning conductor with early leader emission is an essential element of modern lightning protection

The efficiency of lightning protection is determined by location, which is struck by the thunder during an atmospheric discharge. OMEGA-x fully meets this demand.

OMEGA-x, developed by Piorteh and ORW-ELS is an innovative solution based on the latest scientific achievements in lightning protection of people and property. The technology used in this solution is under the protection of international patents.

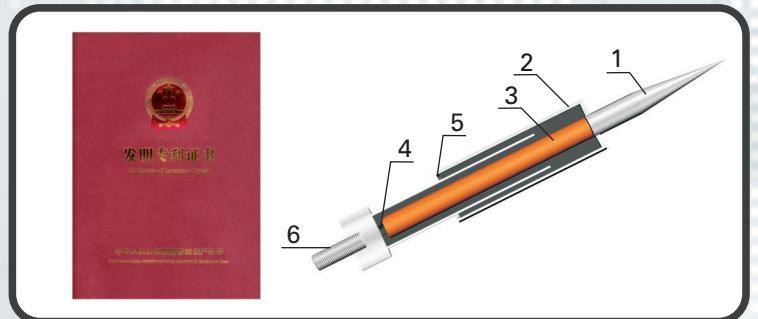
Key Features:

- does not require external power supply, the device is completely autonomous
- reliable and efficient in all climatic conditions
- resistant to lightning strikes in any part of the device (not only the tip)
- stable, lasting operation efficiency
- easy installation and maintenance
- product meets the standards of ISO 9001.

Head Structure

(patented solution)

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



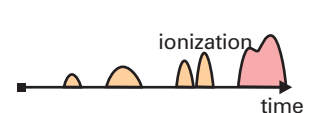
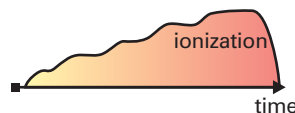
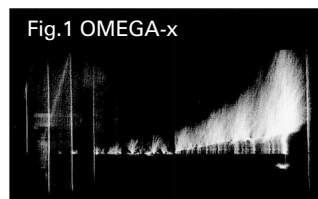
Operating Principle

A major increase in electrical field can be observed in storm conditions. The tips of metal and semiconducting elements become sources of upward leaders, which go toward the oncoming atmospheric discharge. The OMEGA-x lightning conductor with early leader emission creates an upward leader earlier than any other elements within the protected area.

PHASE ONE

As soon as the cloud sends the downward leader towards the ground, a rapid increase in the electrical field occurs, which causes the flow of current through the initiating system, triggering the upward leader. The upward leader is sustained by the high-voltage system and the flow of electric current from the ground as well as from the metal structures combined electrically with the mast. It is carried toward the downward leader of the atmospheric discharge. (Fig.1)

LGE Pau France



In Franklin's traditional faint, the triggering of the upward leader occurs later than in the OMEGA-x. This is caused by a longer than in OMEGA-x initial transient state, during which leaders are generated and instantly fade away as a result of forming of the electrical discharge around the tip (Fig.2).

PHASE TWO

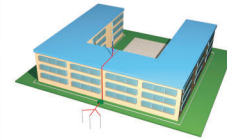
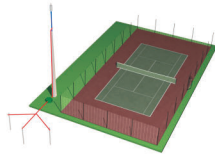
After merging the two leaders, the discharge current flows to the ground through the circuit made between the casing and the base, passing by the internal initiating systems.




X60
NFC 17 102
CE
Ps 10 000
PIORTEH
Made in FRANCE

Commercial Offer

A wide variety of lightning conductors with diversified electrical parameters and sizes allows for a proper assortment selection depending on the protected building. Adequate choice will provide an efficient protection and optimize the cost of installation. **The selection of adequate lightning conductor should be made by a professional company dealing with installation setup.**



OMEGA x25

time lead: 25 μ s
material:
 stainless steel 304, 316
fixing: M16x45
maximum dimensions:
 length 409 mm,
 diameter 50,8 mm
mass: up to 1,5 kg

OMEGA x25a (with testing system*)

time lead: 25 μ s
material:
 stainless steel 304, 316
fixing: M16x45
maximum dimensions:
 length 474 mm,
 diameter 50,8 mm
mass: up to 2,2 kg



OMEGA x35

time lead: 35 μ s
material:
 stainless steel 304, 316
fixing: M16x45
maximum dimensions:
 length 424 mm,
 diameter=50,8 mm
mass: up to 1,6 kg

OMEGA x35a (with testing system*)

time lead: 35 μ s
material:
 stainless steel 304, 316
fixing: M16x45
maximum dimensions:
 length 489 mm,
 diameter=50,8 mm
mass: up to 2,3 kg



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Lightning Conductor with Self-Testing System

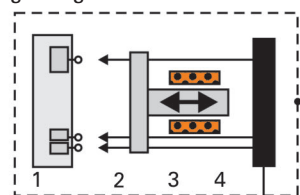
OMEGA-xa is an enhanced version of **OMEGA-x** lightning conductor, equipped with a self-testing system, which checks the condition of the device without having to dismantle it (**patented solution**).

The self-testing system is placed inside the metal base of the conductor and is electrically isolated from the initiating system, which triggers the leader. The self-testing system is activated with an external remote control device, called tester, and occurs only during tests. Thanks to this, the testing system remains electrically neutral and does not disturb the operation of the lightning conductor.

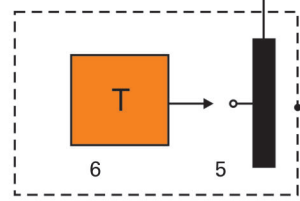
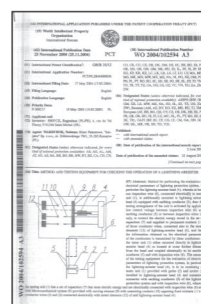
Diagram

1. initiating system
2. measuring electrodes
3. electromechanical system
4. electrical connection
5. measuring joint
6. test apparatus (TESTER)

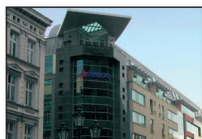
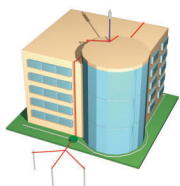
lightning conductor



Patents



tester

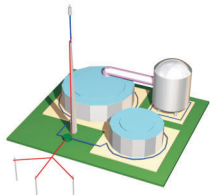


OMEGA x45

time lead: 45 μ s
material:
 stainless steel 304, 316
fixing: M16x45
maximum dimensions:
 length 414 mm,
 diameter 52 mm
mass: up to 1,8 kg

OMEGA x45a (with testing system*)

time lead: 45 μ s
material:
 stainless steel 304, 316
fixing: M16x45
maximum dimensions:
 length 479 mm,
 diameter 52 mm
mass: up to 2,5 kg

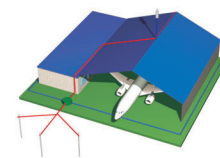


OMEGA x60

time lead: 60 μ s
material:
 stainless steel 304, 316
fixing: M16x45
maximum dimensions:
 length 429 mm,
 diameter 52 mm
mass: up to 1,85 kg

OMEGA x60a (with testing system*)

time lead: 60 μ s
material:
 stainless steel 304, 316
fixing: M16x45
maximum dimensions:
 length 494 mm,
 diameter 52 mm
mass: up to 2,6 kg



OMEGA x60/A380

time lead: 60 μ s
material:
 stainless steel 304, 316
fixing: M16x45
maximum dimensions:
 length 440 mm,
 diameter 70 mm
mass: up to 3,2 kg

OMEGA x60/A380a (with testing system*)

time lead: 60 μ s
material:
 stainless steel 304, 316
fixing: M16x45
maximum dimensions:
 length 505 mm,
 diameter 70 mm
mass: up to 3,4 kg



Real-Time Monitoring of the Discharges

Information of an atmospheric discharge and the condition of the lightning protection equipment is crucial to the functioning of the conductor and the safety of the buildings. A hasty intervention and removal of the anomalies may ward off large losses.

Counter/Recorder CC F- PiY/03

It records atmospheric discharges striking the lightning protection of the protected building; it also serves as an automated tester that allows for testing the conductor immediately after the strike (applies for models equipped with a self-testing system). The device records the date of the discharge and its amplitude as well as the result of an automated test of the OMEGA-x lightning conductor.

Minimal registered electric current: $I_d = 1\text{kA}$
Maximal registered electric current: $I_{max} = 200\text{kA}$
Tightness: IP 54
Operational temperature range: -40°C to $+85^\circ\text{C}$
Feeding: battery, replacement every 3 y.
Conformity with the UTC 17-106
maximum dimensions: 60x80x160 mm
mass: 0,3 kg
available colour of case: white, black, blue, grey



* The testing system that is build-in in the base of the head does not impact the electric field distribution around the lightning conductor. Time leads in both versions are the same.

Example references:

Aviation infrastructure (France):

Air France – CDG Roissy
Air France – ORLY
Air-Bus /A380 – CDG Roissy

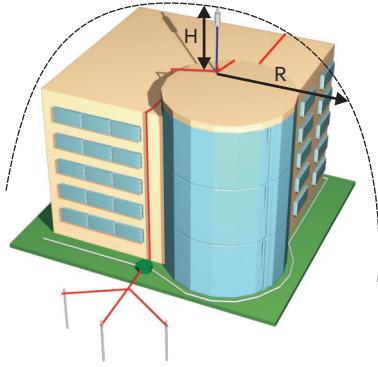
Chemical infrastructure (France):

SECO – Fertilizers – Ribecourt Dreslincourt
Ets DISTRICHIMIE – Fertilizers – Haubourdin
ELF ANTARGAZ – Gas tanks – Thiant
SEG L'OREAL – Cosmetics – Gauchy
LAFARGE – Cement works – Dunkerque
CRAY VALLEY TOTAL – Gas Pump Station – Drocourt
ASTRAZENECA – Pharmaceutical industries – Dunkerque
GREAT LAKES – Chemical industries – Catenoy
GENERAL ELECTRIC – GE Healthcare

Historic and public buildings (France, Poland):

PANTEON – Paris
Archive de France – Paris
Palac Invalidow (Napoleon's Palace) – Paris
Kopernik's Muzeum – Toruń (Poland)
Sport's Stadium – Toruń (Poland)

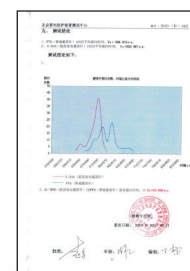
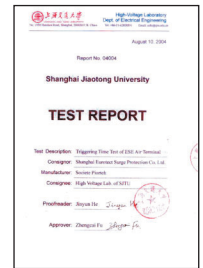
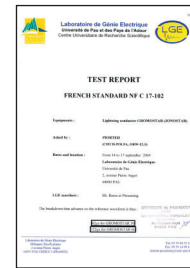
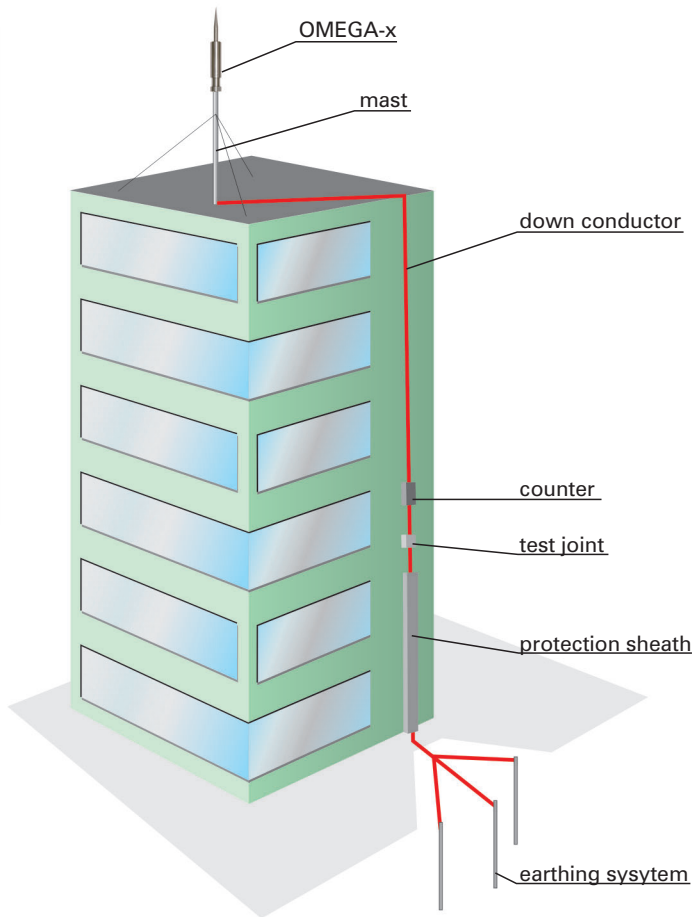
Protection radius



		Protection radius R [m] for the height of H=						
Δt	Protection level	2m	3m	4m	5m	7m	10m	20m
60	I	31	47	63	79	79	79	80
45		26	39	51	63	63	64	65
35		23	30	36	49	50	51	52
25		17	25	34	42	43	44	45
60	II	35	53	70	88	88	88	90
45		30	44	58	72	72	73	75
35		25	35	44	57	58	58	62
25		20	29	40	50	50	52	55
60	III	39	58	78	97	98	99	102
45		33	49	65	80	81	83	86
35		27	40	52	65	67	68	73
25		23	34	46	57	58	63	65
60	IV	43	64	85	107	108	109	113
45		36	54	71	89	90	92	97
35		30	47	64	73	75	77	82
25		26	39	52	65	66	69	75

The OMEGA-x protection radius is calculated according to the formula defined in the standard NF C 17-102 depending on the triggering advance time of the lightning conductor, its height and the level of protection required.

Draft of lightning protection

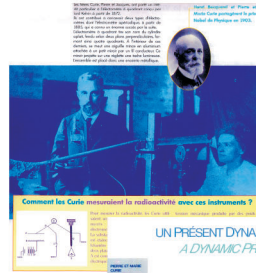


PIORTEH & ORW-ELS, a creative group!

Research

PIORTEH and ORW-ELS group, whose earliest structures were formed in the late '80s, arose on the basis of research conducted in two research facilities:

- Technical University in Wroclaw, Poland
- ESPCI - Supérieur de Physique et de Chimie Industrielle de la Ville de Paris, France (Physics and Industrial Chemistry College in Paris), where, a hundred years ago, Maria Skłodowska-Curie discovered the elements of radium and polonium.



First Products

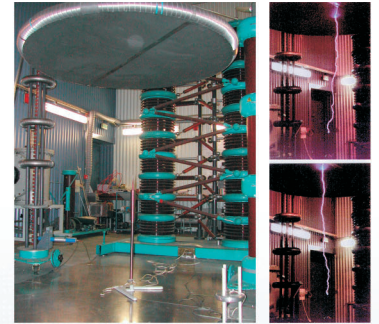
The first products in the branch of persons and property protection, based on original patented solutions invented in the research, were introduced to the French market in 1988.

Development

Thanks to perpetual research and systematic patent protection, PIORTEH and ORW-ELS group became a leading company in lightning protection and fire protection. At present, PIORTEH & ORW-ELS products are widely used for the protection of aeronautic, petrochemical and public facilities on numerous markets worldwide.

New Solutions

Our flagship product is the OMEGA-x lightning conductor with early leader emission, characterized by high efficiency, reliability of operation and resistance to lightning strikes. The system generating early leaders, an original patented solution, does not require any photosensitive components. A lightning conductor with a self-testing system, allowing for verifications of its operation without having to dismantle it is another original invention.



Research Programs

PIORTEH & ORW-ELS group actively participates in theoretical works, scientific publications, conference events and research programs in laboratory conditions and in real-life conditions.

Warranty

PIORTEH & ORW-ELS products meet the standards of ISO 9001. The group is certified with a "Qualifoudre" certificate, issued by INERIS (French Ministry of Environmental Protection Institute).

Trade

PIORTEH & ORW-ELS products can be found in over 30 countries.

Location

PIORTEH & ORW-ELS design offices and production plants are located in France and in Poland.

ORW-ELS Sp. z o.o.

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