

THE TECHNOLOGY IONIFLASH MACH®

Our liability is your first insurance

LIGHTNING NATURAL PHENOMENON
Lightning is a natural phenomenon which occurs in a violent and unpredictable way and is very recurrent in some areas of the planet. Although it contributes to the electric stability of the earth, its effects are devastating.

CONSEQUENCES
It causes billions euros of loss to the economy of a country, and lightning creates thousands of deaths and serious injuries.

SOLUTION - The IONIFLASH
Research efforts at France Paratonnerres have led to the development of the E.S.E. (Early Streamer Transition) IONIFLASH MACH®, which technology has demonstrated its performance of activation and protection, even after numerous lightning occurred on the installation (patented).



Mach 30 Mach 45 Mach 60

A technology with proven results

WHAT IS THE PRINCIPLE?
IONIFLASH MACH® protects against all lightning strikes, positive or negative, by activation of the internal system released by atmospheric induction.

The ionization created at the conical space gap top by generation of electric arcs, in a fraction of a second, increases the conductivity of the air and the speed of the propagation of the upward leader.

Being propagated towards the clouds this discharge generates an electric field which deflects the effect of the downward lightning stream leader, until the lightning strikes with neutralization by the IONIFLASH MACH® device.

GUARANTEED 5 YEARS

CONFORM TO THE NATIONAL NORMS NFC 17-102, UNE 21186 - CAPTURE SYSTEM CONFORM TO THE NORMS EN 50-164, AS PRESCRIBED IN THE NORM EN 62305.

100% RECYCLABLE, EXCELLENT CARBON IMPACT

NO FRAGILE COMPONENT, EXCELLENT RESISTANCE TO CORROSION EVEN IN EXTREME CLIMATIC CONDITIONS (SEALED, SOLID, NON-CONDUCTIVE)

EASY TO INSTALL

OPTION OF TESTABILITY AT DISTANCE ON THE IONIFLASH MACH®60

LABORATORY TESTS

Historic of laboratory tests



1996 Laboratory of Very High Voltage of University of Pau : Fundamental research carried out over 3 months, focusing on different ESE air terminal systems.

2004 SHANGHAI JIAO TONG University/China : Tests of performances of IONIFLASH according to the NF C 17-102 standard. Results validated by High Voltage Laboratory of University under Report N°00.4003 did:10.08.04

2009 Laboratory of Very High Voltage of University of Pau : Homologation of the IONIFLASH MACH® 30, IONIFLASH MACH®45, IONIFLASH MACH® 60, in conformity with the NF C 17-102 standard of 01/2009.

2009 Laboratory Ampere CNRS (*) of LYON (Physical Scientific Research Center)
The tests on IONIFLASH MACH® have demonstrated a early streamer emission superior to 60 us, and a constancy of reaction to the choes with no equal.

The IONIFLASH MACH® accelerates in a significant and controls way beside other ESE, the generation of the pre-electron, precursor of the upward leader. The lightning strokes in waves 10-350 µs at 100 kA, have shown an essential mechanic and electric behavior of the IONIFLASH MACH®, with a perfect flow of lightning current.

PERFORMANCES REGISTERED IN SITU



1988 - FRANCE TELECOM : An on-site comparative test, during one year, has been carried out between our IONIFLASH and a simple rod, on a FRANCE TELECOM pylon.

In one year, 7 lightning strikes occurred on our IONIFLASH, and none on the simple rod, of the same height.

M. Durieux, *Compte Rendu de l'Etat de l'art sur l'efficacité de l'ionisation des paratonnerres*, Electricité Générale Revue N°77-79, pp.11-15.

2009 - Test in situ under process



France Paratonnerres, strong of its 30 years of experience and know-how acquired, offers you a totally integrated solution :

SKILL :
On basis of its softwares of Lightning Risk Assessment Survey (Environmentally Sensitive Classified Industries - E.S.C. Sites ...)

- Technical Survey
- Control of installations according to NF C 17-102, NF C 15-100 and EN 62305 standards.

PRODUCTION AND COMMERCIALISATION
Of protection devices

- Air Terminals, lightning counters, earth rods...
- Surge arresters...

INSTALLATION OF PROTECTION DEVICES

- Lightning protection of all building sites - E.S.C.L., historic monuments, administrations...

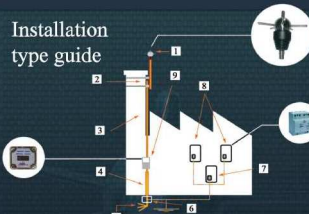
- Storage and packaging of radioactive air Terminals

TRAINING
P.F.F. Center registered :

- Lightning Risk Analysis
- Standards and regulations of installations
- Technical assistance

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Installation type guide



- 1 E.S.E. Air Terminal IONIFLASH MACH®
- 2 Termination of Air Terminal
- 3 Down conductor and lightning
- 4 Insulation joint and protection sheath
- 5 Main cable system
- 6 Disconnection connection between cables (Electric with and Air Terminal earth) in impedance point
- 7 Surge arrester, Type F40 Multi-Power supply network (protected by Air Terminal)
- 8 Surge arrester, Type F40 Secondary Power supply network
- 9 Single lightning counter

Radius of protection

The radius of protection (Rp) of an E.S.E. air-terminal depends on its height (h) in relation to the surface to be protected, its early streamer emission time (Δt) and the level of protection (Lp) chosen.

$$R_p = \sqrt{h^2 - \frac{h \cdot \Delta t \cdot V}{100}} \text{ for } h \leq 5m$$

For h > 5m, the graphic method in text, with the abscissas of the NF C 17-102 standard.

Rp = protection radius
h = height of the tip of the E.S.E. air-terminal in relation to the horizontal point passing through the top of the element to be protected.

D = 20m for protection level I
50m for protection level II
45m for protection level III
60m for protection level IV

V = Average velocity of propagation of the streamer (1 m/µs)
 $\Delta L(m) = V(m/\mu s) \cdot \Delta T(\mu s)$
 ΔT = early streamer time from the evaluation tests of the E.S.E. air-terminal.

High (h) (m)	RADIUS OF PROTECTION OF THE AIR TERMINALS IONIFLASH MACH® 30 / 45 / 60 (m) ⁽¹⁾			
	Level I ⁽²⁾	Level II ⁽²⁾	Level III ⁽²⁾	Level IV ⁽²⁾
5	28	34	40	44
6	31	37	43	47
7	34	40	46	50
8	37	43	49	53
9	40	46	52	56
10	43	49	55	59
15	53	59	65	70
20	60	67	73	78
25	67	74	80	85
30	73	80	86	91
35	79	86	92	97
40	85	92	98	103
45	90	97	103	108
50	95	102	108	113
55	100	107	113	118
60	105	112	118	123

(1) For those high, an additional graphical study enables to determine the protection volume of the air-terminal.
(2) If there is a risk for environment, the radius of protection must be reduced to 80% according to the interpretation of E.S.2004 of the NF C 17-102 standard.
(3) The protection level is determined up to UTE C 17-108 guide according to interpretation sheet F4 of the NF C 17-102 standard, or up to NF EN 62305-2 standard.