

TECHNICAL LETTER N°6



THE EVOLUTION OF THE STANDARD NFC 17-102 IN 2014

■ Introduction

In November 2014, the AFNOR (French standard Association) published a new interpretation form for the standard NFC 17-102 : Protection against lightning – Protection of the structures and open zones with Early Streamer Emission lightning protection systems.

This interpretation form F10 is directly accessible on the website of AFNOR:

www.boutique.afnor.org/normes

This interpretation form deals with the problem of pylons of electrical transport close to an installation of lightning protection using early streamer emission air terminal.

■ Interpretation form F10

Question :

What is the minimum distance between a High Voltage line and an ESEAT (Early Streamer Emission Air Terminal)?

Answer:

For security reasons, the minimum distances HV lines / ESEAT are:

HVA : 5m

HVB : 20m

Regarding the effectiveness of the ESEAT, please consult the additional indications of the manufacturer.

It is necessary to define the safety rules to respect for the installation of an ESEAT near a High Voltage line.

Indeed, the magnetic field radiated by the lines and/or the metallic pylon which supports the high voltage lines and the ground wires, can modify the behavior of the ESEAT.

To address these issues, the security rules defined by RTE (Réseau de Transport de l'Énergie), Energy Transport Network, have been accepted by AFNOR.

Reminder concerning the High Voltages lines:

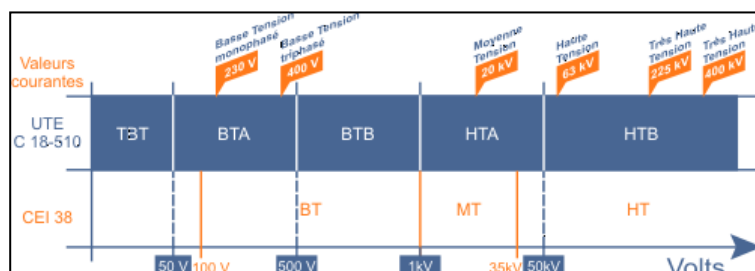
The High Voltage overhead lines are composed of conductor cables, in general in aluminium alloy, suspended to supports, pylons or poles.

These supports can be made of wood, steel, concrete, aluminium and also sometimes in plastic reinforced.



We can classify the electrical lines according to their functioning voltage (taken between two of their three conductors):

- Low Voltage (LV) – less than 1 000 volts,
- Middle Voltage (MV) - between 1 000 volts (1 kV) and 33 kV, used for the distribution in the urban and rural areas.
- High Voltage (HV) - between 33 kV and 230 kV used for the transport of large quantities of electrical energy.
- Very High Voltage (VHV) – from 230 kV to 800 kV used for long distances, very large quantities of electrical energy.
- Ultra High Voltage (UHV) – up to 800 kV.



In 2009 in Europe, these categories are officially gathered in: LV, HVA and HVB.

The transport networks HV/VHV present systematically ground wires above the active conductors. Their function is as lightning conductor above the line, by capturing the lightning strike impacts in order to avoid a possible overvoltage on the conductors. They are usually made in almelec-steel.

In the case of a HV line close to an ESEAT (above or below), can the leader (upward leader) of the ESEAT get connected to the metallic pylon?

As the ESEAT and the HV pylon are both linked to the earth ($R < 10 \text{ Ohms}$), their polarity is the same. So there is no attraction between the leader and the metallic pylon.

Nevertheless, it is possible that a metallic pylon located much higher than an ESEAT enter in competition with it searching the downward leader coming from the cloud.

Can the radiation of a HV line close to an ESEAT disturb its effectiveness, the well functioning of the early streamer emission system?

All the IONIFLASH MACH NG ESEAT are not sensitive to the electric field radiated by a HV line.

Indeed, the IONIFLASH MACH NG ESEATs, with no electronic components which can be disturbed by an electrical field, have a total reliability even close to HV line.



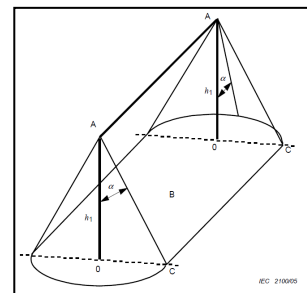
How to install a system of protection against lightning using ESEAT on a building closed to a HVB pylon higher than the building?

It is possible to use the ground wire of the line to complete the protection of the building.

The angle of protection given by the pylon but also the ground wires will act as catenary wires lightning conductors.

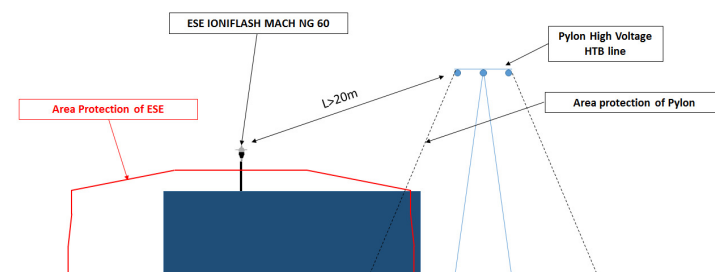
The method of the angle of protection of the standard IEC 62305-3 can be used.

The protection is corridor type and will depend on the height as well as on the Level of protection required.



By taking into account the rules of security of the interpretation form F10, the ESEAT will have to be installed at more than 20 meters from the HVB line.

In this example, the pylon allows to complete the lightning protection of the building protected by an ESEAT type IONIFLASH MACH NG 60 ($\Delta t = 60 \mu\text{s}$).



France PARATONNERRES wish you nice Celebrations for the end of the year.

All our best wishes for the year 2015!

