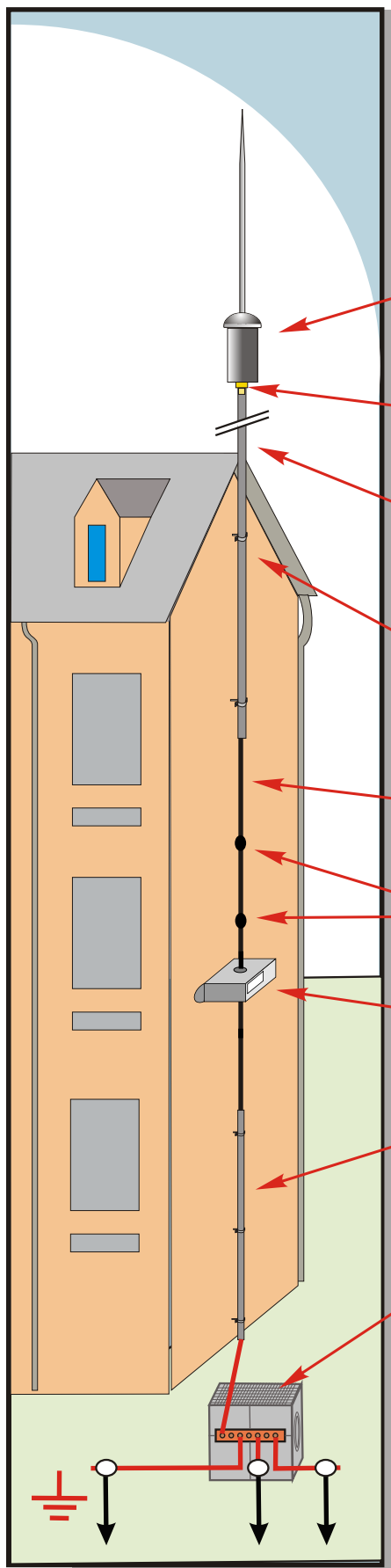


NLP-2200 is manufactured according to standards UNE 21186 and NFC 17-102.

**ANTICIPATION EMISSION TIME = 72  $\mu$ s**

## SELECTION GUIDE

In order to install a lightning rod, it is necessary to select all the components the system consists of. The following is a guide line which indicates the points to consider when selecting a lightning rod and its accessories.



### 1 CAPTURING HEAD

Ref. 77 901 010

The lightning rods NLP-2200 with feeding device release high voltage signals in order to anticipate the upgoing path, increasing this way the radius of the protected zone compared to a standard lightning rod.

### 2 ADAPTER ELEMENT

Ref. 77 902 610

The adapter element is used for the connection of the lightning rod to the mast.

### 3 MAST

Ref. 77 903 110

Extensible element which is adapted to the required height of the capturing head of the lightning rod in order to provide the desired protection radius.

### 4 MAST FIXATION

Ref. 77 904 900

Its function is the fixing of the mast. Different types of fixations exist such as fixing with screws or embedded.

### 5 DOWN-CONDUCTOR

Ref. 77 908 100

This element directs the current of the lightning strike from the head of the lightning rod to the earth termination system.

### 6 CONDUCTOR HOLDING FIXTURE

Ref. 77 601 10172

It provides the fixing of the down-conductor.

### 8 DISCHARGE COUNTER

Ref. 77 920 100

The counter indicates the lightning strikes received by the protection system. Recommended in the standard UNE 21186 1996.

### 7 PROTECTION PIPE

Ref. 77 920 200

Pipe of galvanized sheet of 2 m length in order to avoid mechanical forces against the down-conductor.

### INSPECTION PIT

**Earth termination:** there are various configurations depending on the construction and employed materials for earth termination systems.

**Equipotentiality:** it is recommended to connect the earth electrode of the lightning rod with the existing earth termination system and with close metal parts, in order to assure an appropriate equipotentiality and to avoid sparking when a lightning strike is absorbed.

See also on Earth Termination Systems.

## INSTALLATION GUIDE

**1 CAPTURING HEAD:** the peak has to be located 2 m. above the highest parts of the area to be protected.

**2 ADAPTOR ELEMENT:** it has to provide the electrical contact between the capturing point and the downgoing conductor. It is put on the mast, on light poles, pillars, etc...

**3-4 MAST- MAST FIXATION:** the mast provides the appropriate height corresponding to the area to be protected by the lightning rod and is usually mounted with 2 or 3 fixings depending on its length.

**5 DOWN-CONDUCTOR:** it leads the current of the lightning strike from the capturing head to the earth electrode. The conductors can be of sheet, plain twist, twisted or round cable, and the minimum area has to be 50 mm<sup>2</sup>.

Each lightning rod should have at least a down-conductor, except in the following cases, where two down-conductors are needed:

- structures higher than 28 m.
- the horizontal projection is larger than the vertical projection

The path has to be the most rectilinear possible with the shortest distance, avoiding curves. The covering radius should not be less than 20 cm. The down-conductor should avoid crossing or the proximity of electrical or telecommunication networks.

When the crossing cannot be avoided, then the line has to be inside of a metallic shield which needs to be extended 1 m on each side of the crossing.

Cornices or elevations should be avoided. A maximum height of 40 cm is allowed with an angle of up to 45°.

**6 CONDUCTOR HOLDING FIXTURES:** Independent of the fixture type, three fixtures per meter are used for the down-conductor. The fixtures must not be in direct contact with inflammable material.

**8 DISCHARGE COUNTER:** This counter is installed above the control joint, and in all cases 2 m. above the ground. It is mounted on the down-conductor.

**TEST JOINT:** Each down-conductor has to incorporate a test joint, which allows to disconnect the earth electrode and thus allows to measure the resistivity. The test joint is mounted two meters above the ground.

**7 PROTECTION PIPE:** It is put between the ground and the control joint in order to protect the down-conductor against mechanical forces. The pipe is of metallic material and has a length of 2 m. It is mounted with three fixtures.

## LEVEL OF PROTECTION

The protection level is a parameter to be determined according to the established standard. We use UNE 21186-96 based on NF C 17-102 standard. These standards establish three protection levels.

The protection level depends on:

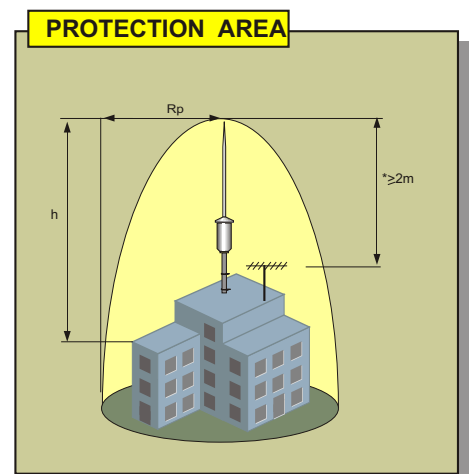
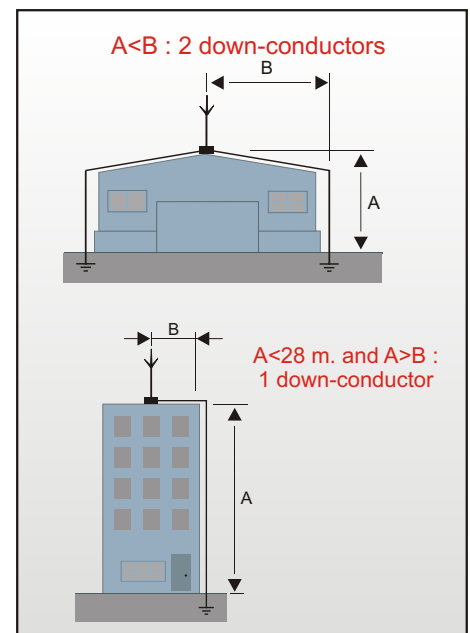
- Lightning strikes density in the area.
- Situation of the structure to be protected (urban or rural zone, high buildings near the installation, ...)
- Type of structure.
- Building's location.
- Cost valuation of period of the installation due to damages because of the lightning strikes.

Sometimes this last item is the cause of selecting a protection level I (Maximum security), as the losses because of non-operation the installation could be important.

## RADIUS OF PROTECTION

Model	NLP-2200		
	Nivel I	Nivel II	Nivel III
NP			
Rp (m)			
h (m)			
2	32	40	44
3	48	59	65
4	64	78	87
5	79	97	107
6	79	97	107
8	79	98	108
10	79	99	109
15	79	101	111
20	80	102	113
45	80	105	119
60	80	105	120

From now on the results of early streamer emission air terminals are limited to 60 μs for calculation protection radius, according to NFC 17-102 from December 2001



- NP: Protection Level
- Rp: Protection Radius
- H: Height of the top of the Nimbus on the surface to be protected.