

LIGHTNING RODS



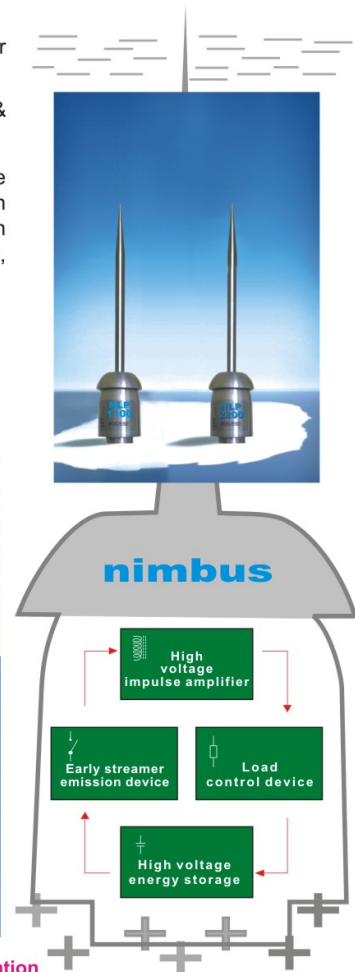
Jef Techno Solutions Private Limited.

nimbus, the safest and most effective Early Streamer Emission (ESE) system for lightning protection.

The **nimbus** is manufactured according to standard NFC 17-102 version 2011 & UNE 21186

The **nimbus** system has been specially designed to reduce the actual time associated with the upward streamer emission created when lightning strike occurs. In other words, compared to the traditional method used by a Franklin rod, the built-in electronic device allows a much bigger radius of Protection / coverage. Therefore, **nimbus** offers the following major Benefits.

- ✔ High Level of Safety
- ✔ Excellent Protection
- ✔ Absolute Reliability
- ✔ Savings on Installation



Nimbus is fully autonomous and does not require an external Power supply for operation

1 Creation of the electric field

When atmospheric conditions lead to formation of thunderstorm clouds, an electrical charge gradient of thousands of V/m occurs between the cloud and the ground.

2 Energy storage

When such a voltage gradient appears on the tip of the Nimbus Lightning rod, the Nimbus ESE system captures and stores part of the energy induced by the atmosphere. The polarity of the stored charge will always be opposite to that of the clouds, since, it is the result of charge induction from cloud to earth.

3 Charge control and leader emission

When the NIMBUS ESE system detects a voltage gradient above the threshold value, indicating an imminent lightning strike, the stored energy is released in the form of high frequency pulses leading to an upward leader. Since the polarity of the stored charges is always opposite to that of the cloud, the upward leader from the NIMBUS will be an opposite charge to that of the downward streamer from the cloud.

4 Energy discharge

When the upward & downward streamers meet, they provide a low / zero impedance path for the energy of the cloud to discharge to the ground through the NIMBUS, its' ground conductor and earthing system.

DISCHARGE COUNTER (optional)

When the lightning rod conducts the lightning discharge to the earth, the counter detects this pulse and records. The equipment does not need an electrical power supply or maintenance and the operation life cycle is practically unlimited.



| NP Lightning rod model | Level - I | | | Level - II | | | Level - III | | | Level - IV | | |
|------------------------------|-----------------|--------------------|--------------------|-----------------|--------------------|--------------------|-----------------|--------------------|--------------------|-----------------|--------------------|--------------------|
| | Nimbus CPT-L | Nimbus NLP 1100 | Nimbus NLP 2200 | Nimbus CPT-L | Nimbus NLP 1100 | Nimbus NLP 2200 | Nimbus CPT-L | Nimbus NLP 1100 | Nimbus NLP 2200 | Nimbus CPT-L | Nimbus NLP 1100 | Nimbus NLP 2200 |
| Rp (m) | | | | | | | | | | | | |
| h (m) | | | | | | | | | | | | |
| 2 | 9 | 24 | 32 | 12 | 27 | 35 | 14 | 30 | 40 | 20 | 33 | 44 |
| 3 | 15 | 35 | 48 | 18 | 41 | 52 | 23 | 45 | 59 | 31 | 50 | 65 |
| 4 | 20 | 46 | 64 | 24 | 55 | 69 | 30 | 60 | 78 | 40 | 67 | 87 |
| 5 | 30 | 58 | 79 | 36 | 65 | 86 | 43 | 75 | 97 | 49 | 84 | 107 |
| 6 | 31 | 58 | 79 | 37 | 65 | 87 | 44 | 76 | 97 | 50 | 84 | 107 |
| 8 | 32 | 59 | 79 | 38 | 66 | 87 | 46 | 77 | 98 | 53 | 85 | 108 |
| 10 | 32 | 59 | 79 | 39 | 67 | 88 | 47 | 77 | 99 | 54 | 87 | 109 |
| 15 | 33 | 59 | 80 | 41 | 68 | 89 | 50 | 79 | 101 | 58 | 89 | 111 |

Selection of the nimbus model :

Protection level:
According to the standards NFC 17-102 version 2011 & UNE 21186, four protection levels are considered.
Level I : Maximum security
Level II : High security
Level III : Medium security
Level IV : Standard security

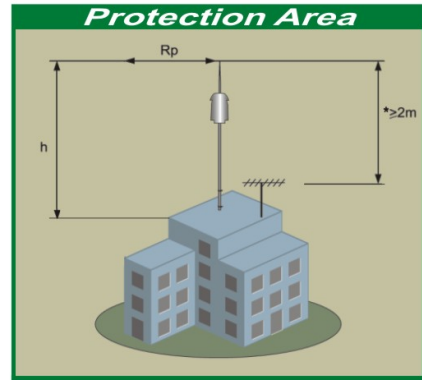
Remark : it is recommended for security reasons to consider Level 1 Protection.

◆ The **nimbus** is compatible with conventional cables / strips as down conductor and standard earth termination system as the nimbus is designed to work effectively upto an earth resistance of 10 Ohms.

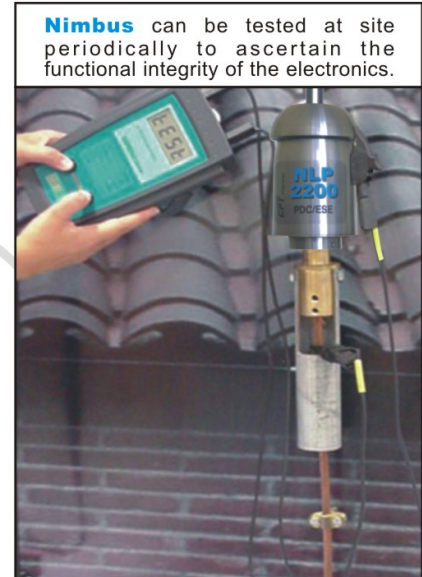
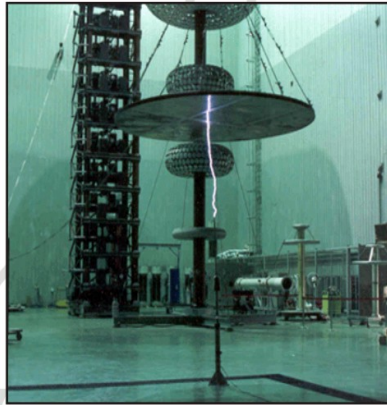
◆ Copy of Test Certificates are available on request

◆ Tested at :

- ◆ 1. LCOE, Spain
- ◆ 2. CPRI, Bangalore



NP : Protection level
Rp : Protection radius
h : Height of the top of the **nimbus** on the surface to be protected
* The tip of the lightning rod has to be atleast 2mtrs above any other point of the structure to avoid flashovers.



Nimbus can be tested at site periodically to ascertain the functional integrity of the electronics.

| Model | Capturing Head | | | Rod Weight | Anticipated Emission Time | |
|----------|----------------|---------|-----------|------------|----------------------------|---------------------|
| | Diameter | Height | Weight | | Expected as per NFC 17-102 | Measured in CPT Lab |
| CPT L | 78 mm. | 144 mm. | 2.300 kg. | 0.860 kg. | 10 μS | 14 μS |
| NLP 1100 | 78 mm. | 115 mm. | 2.100 kg | 0.860 kg | 40 μS | 44 μS |
| NLP 2200 | 78 mm. | 115 mm. | 2.100 kg. | 0.860 kg. | 60 μS | 72 μS |

JEF's other activities include :

- ✦ End to end solution from Design, audit, revamp and turnkey installation and commissioning of :
- ✦ Environment friendly and Maintenance Free Earthing Solutions
- ✦ Surge Protection for Power, Data, RF and Telephone lines.



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