

UniEarth

Earthing and Lightning Protection Solutions



Protecting Man & Machine

As per IS/IEC 62305 & NBC guidelines

Introduction

About Us

UniEarth is an associate concern of Unistone and is founded by professionals from the electrical and chemical engineering industry who have developed many innovative and cost effective products for the construction industry since 1977. Our competence in this area has helped us at all times in adding and upgrading our product range to meet the increasing demand of the Indian industry. The Company is supported by experienced industry experts. The Company has its head office in Delhi and a branch office in Kolkata and manufacturing units in Delhi and Kolkata. The Company is now a complete products and solution provider for Grounding Systems and Lightning Protection System and successfully serving sectors like Power , IT, Infrastructure, Industries, Solar , Oil , Telecom etc.

Our Strengths :

- 30+ years of manufacturing experience
- Leadership team with 100+ years of corporate and technical experience
- Expertise in Earthing and Lightning Protection
- End to end solutions from design , manufacturing , installation and commissioning of earthing and lightning protection systems
- 15+ years of project execution experience

Services :

- Site Survey
- Risk Assessment
- Design of Lightning Protection System
- Audit of existing earthing and lightning protection system.

Why Lightning Protection?

The function of an external lightning protection system is to intercept, conduct and disperse a lightning strike safely to earth. Without such a system a building's structure, electronic systems and the people working around or within it are all at risk.

Lightning strikes, or even electrical discharges due to nearby lightning, can cause fires, explosions, chemical release or mechanical disruption within or around a building. Step and touch voltages generated from a lightning strike can cause injury, or even loss of life, to humans (and animals) in the close vicinity.

Critical services, such as mains power, telecoms etc, can be heavily disrupted by lightning strikes, resulting in major potential losses to a business. Offices risk physical damage to servers and PCs, as well as loss of key data; factories risk machinery downtime and repair costs along with health and safety hazard to personnel. Such examples make clear that lightning inflicted damage can have enormous financial implications. In the worst case scenario a company might go out of business as a result of lightning damage.

At Uniearth, we are fully aware that all these risks need to be considered and protected against when developing a lightning protection system. With over 30 years of experience, our support and expertise has assisted thousands of businesses, both large and small, to achieve effective protection against lightning.

Contents



Lightning Protection As Per IS/IEC 62305

Design Methodology

Establishments with flat roof

Establishments with Angled roof

Structure Integrated LPS

LPS Components

Project Execution



Lightning Protection as per IS/IEC 62305

Damage and loss

IS/IEC 62305 identifies four main sources of damage:

- S1 Flashes to the structure
- S2 Flashes near to the structure
- S3 Flashes to a service
- S4 Flashes near to a service

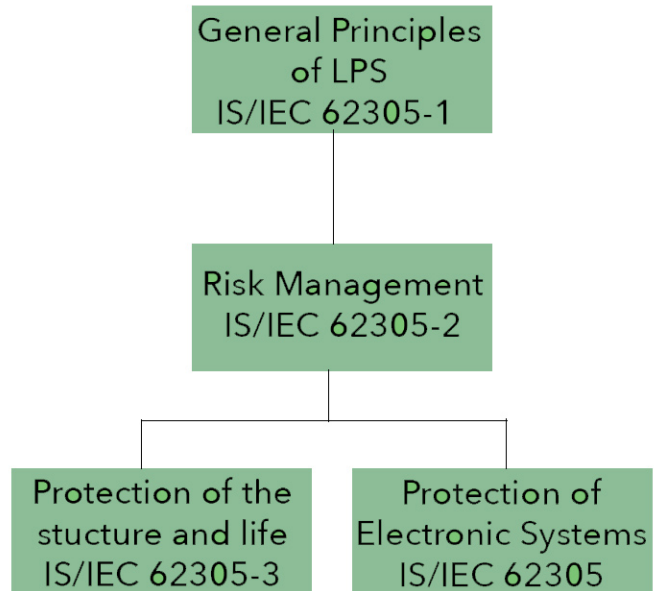
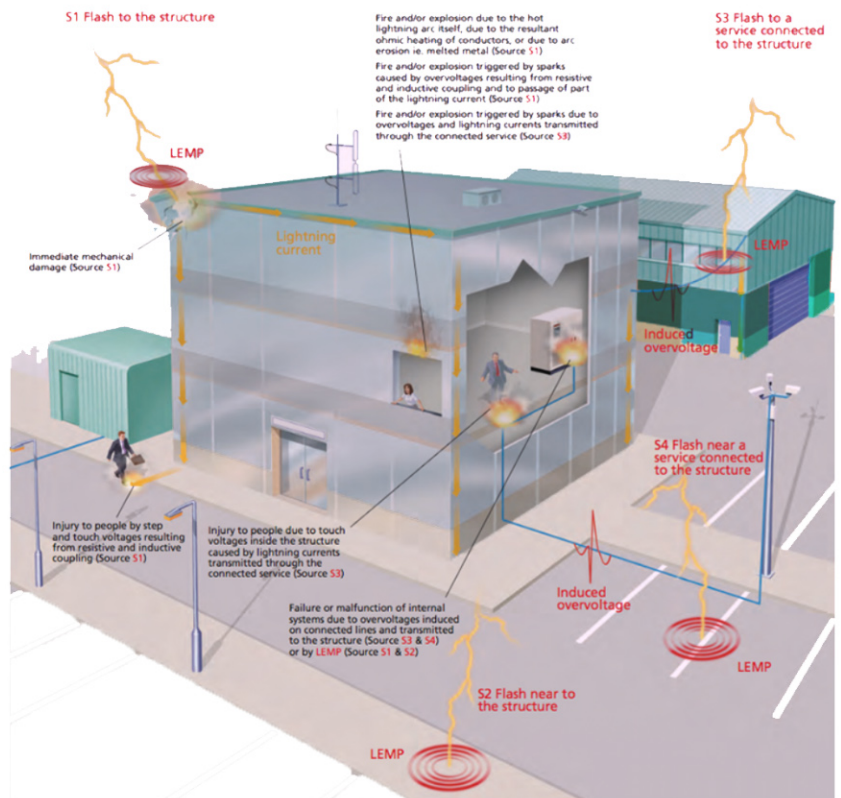
Each source of damage may result in one or more of three types of damage:

- D1 Injury to living beings due to step and touch voltages
- D2 Physical damage (fire, explosion, mechanical destruction, chemical release) due to lightning current effect including sparking
- D3 Failure of internal systems due to Lightning Electromagnetic Impulse (LEMP)

The following types of loss may result from damage due to lightning:

- L1 Loss of human life
- L2 Loss of service to the public
- L3 Loss of cultural heritage
- L4 Loss of economic value

Point of Strike	Source of Damage	Type of Damage
Structure	S1	D1,D2,D3
Near a Structure	S2	D3
Service Connected to the Structure	S3	D1,D2,D3
Near a Service	S4	D3

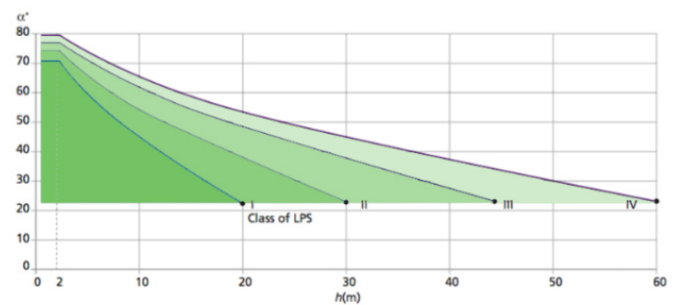
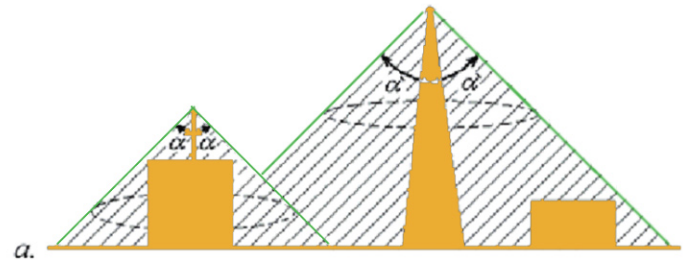


Design Methodology

The tracing of optimum location of Air termination system is determined by 3 methods:

1. **Rolling sphere Method** : The rolling sphere method is a simple means of identifying areas of a structure that need protection, taking into account the possibility of side strikes to the structure. The basic concept of applying the rolling sphere to a structure is illustrated in Figure

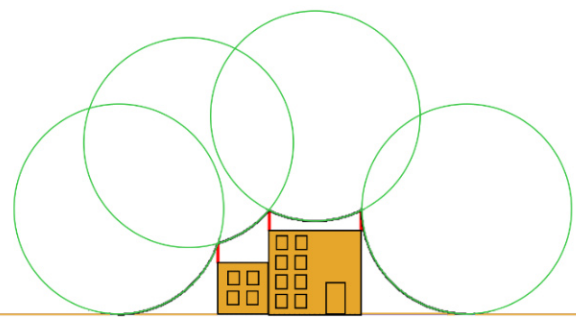
This method is suitable for defining zones of protection for all types of structures, particularly those of complex geometry



3. **Mesh Method** : This method is used for the protection of plane or flat surfaces. The mesh conductors are positioned on the edge of the surface.

No metallic structure should protrude outside the volume.

Mesh sizing is done as per the table



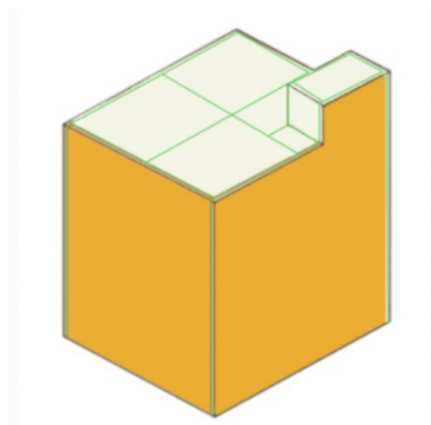
Class of LPS	Rolling sphere radius (m)
I	20
II	30
III	45
IV	60

2. **Protective Angle Method** : This method is a mathematical simplification of the rolling sphere method

The protective angle varies with the height of the air termination & thus class of the LPS.

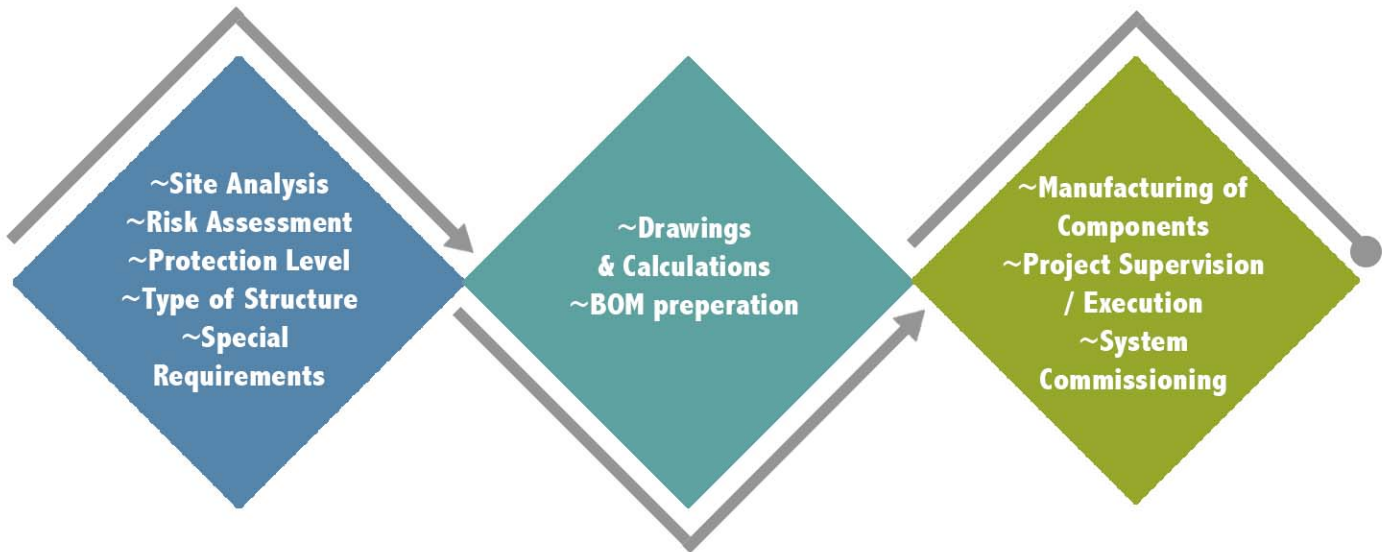
The protective angle is the angle created between the tip of the vertical rod and a line projected down to the surface on which the rod sits

The protective angle method is suitable for simple shaped buildings. However this method is only valid up to a height equal to the rolling sphere radius of the appropriate LPL.



Class of LPS	Mesh size (m)
I	5 x 5
II	10 x 10
III	15 x 15
IV	20 x 20

Design Process & Systems



Systems



Establishments with Flat Roof

- ~For high rise buildings with RCC walls and terraces.
- ~Highly conductive Aluminium air terminals and supports of different lengths.
- ~Conductor seamlessly integrated with building facade with the help of SS304 clamps and conductor holders.
- ~Air terminals and conductors insulated from the building structure.
- ~Low resistance earthing system.



Establishments with Angled roof

- ~For industrial manufacturing units with corrugated metal sheets
- ~Highly conductive Aluminium air terminals of different lengths
- ~Conductor seamlessly integrated with round and flat shed structures with the help of SS304 clamps and metal bonders.
- ~Air terminals and conductors equipotentially bonded to the metal framework.
- ~Low resistance earthing system.



Structure Integrated LPS

- ~For all types of buildings if incorporated in the initial design stage
- ~Especially for Glass buildings prioritising both protection and aesthetics.
- ~Highly advantageous for data centers and buildings with sensitive electronic equipment.
- ~Provides shielding against Lightning Electromagnetic Pulse.
- ~Low resistance earthing system

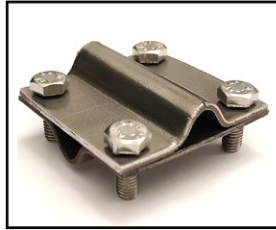
LPS Components



Connection Clamp
For Corrugated Steel Sheet



Rod to Flat Clamp



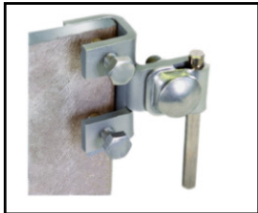
Cross Connector



Rebar Clamp



Conductor Holder



Connection Clamp
For Flat Steel Structure



Universal Parallel Connector



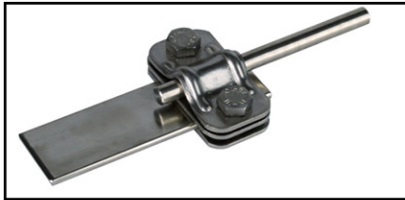
Connection Clamps
For Circular Steel Structure



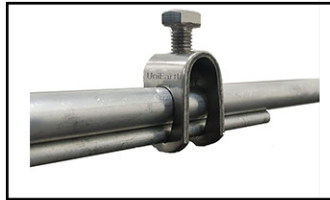
Parallel Connector Rebar



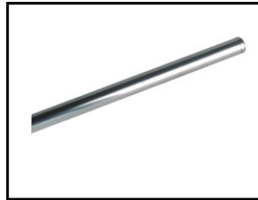
Circular Conductor
Holder For Flat Roofs



Test Clamp



Wire To Air Terminal Clamp



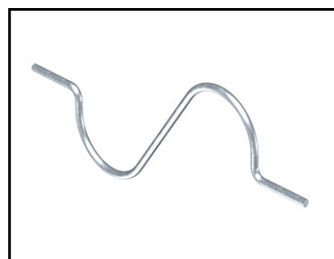
Air Terminal Rod



Flat Conductor Holder



Circular Conductor



Expansion Piece



Galvanised Iron
Flat Conductor



Copper Bonded Steel Rod



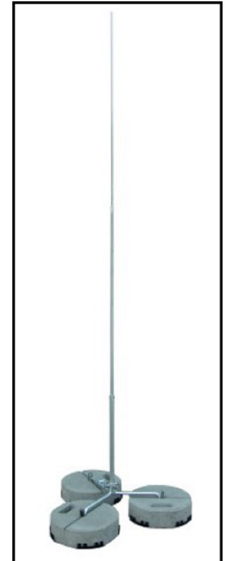
Ground Enhancing
Compound



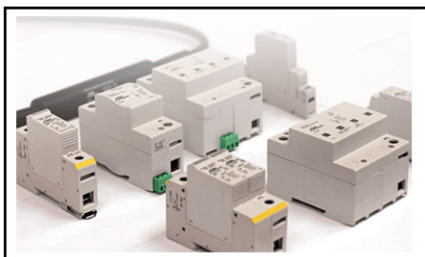
FRP Earth Pit Cover



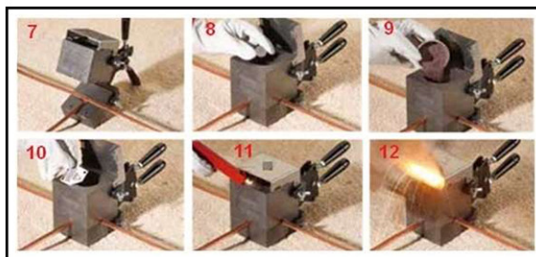
Concrete Base Support
for Air Terminal



Tripod Support for Air
Terminal Rods



Surge Protection Device



Exothermic Welding



Lightning Strike Counter

Project Execution



Establishments with Flat roof

Project Location : New Delhi

Project Area : 28000 sq. meters

Building Height : 72 meters

Protection Level : 1

Special Protection Feature : Lateral conductor protection for building structure above 60 meters of height.

Establishmemnts with Angled roof

Project Location : Sonipat , Haryana

Project Area : 40000 sq. meters

Building Height : 20 meters

Protection Level : 4

Special Protection Feature : Seamless fixing of lightning conductor with corrugated metal sheets of plant using structural adhesives maintaining high overlap shear and peel strength



Structural Integrated LPS

Project Location : New Delhi

Project Area : 40000 sq. meters

Building Height : 190 meters

Protection Level : 1

Special Protection Feature : Lightning conductor integrated with building TMT steel with SS304 connectors in RCC slabs and columns in tandem with civil construction team.

Lightning Facts

1. Loss of Life :

Statistics prove that more no. of people lose their lives due to lightning strikes than any other natural calamity in India.

3. Indirect Damages :

Electronic devices are at a high risk of failure/damage from surges due to Lightning.(Airports, Data Centres, Sensitive machinery, Hospitals)

5. Precautions in case of lightning:

Rush indoors.

Quickly get into a vehicle and roll up the windows. Do not touch any metal part of the vehicle, especially its roof.

Avoid isolated trees or isolated structures .

Avoid water bodies.

Do not use wired phones (landlines) during storms, cell phones are the safest. In case you are caught in the open, crouch as low as possible on the balls of your feet but do not lie flat on the ground.

2.Insurance: Top Insurance companies like Bajaj, Tata and others mandate LPS to be installed as per latest IS Norms for insurance of an establishment.

4. Cost of Establishment with Contents Vs Cost of LPS :

Cost of LPS is approx. 0.3-0.8 % of the cost of establishment depending on several factors like type of establishment , protection level requirement etc..In some cases of high risk structures the cost of LPS may be higher.

6. Lightning damage to structure:

Lightning can cause explosion of structures containing explosive or inflammable products (petrochemical industries, ammunition storages...):

The additional pressure due to the lightning current can reach 2,5tons/meter of metallic conductor, resulting into structural damaged to wires, pipes or sheaths.



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Protecting Man & Machine

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