EARTHING

- **What is the term Earthing?**

  In electrical terms, earthing, commonly known as grounding, refers to a system designed to protect electrical wires and components from damage caused by sudden electrical power surges. Its main purpose is to reduce the risk of dangerous electrical shocks from uninsulated metal parts of an appliance or electrical device. Earthing systems also prevent end users from electrical shocks in the event of a short circuit.

- **Basic Needs of Earthing:**

  - To protect human lives as well as provide safety to electrical devices and appliances from leakage current.
  - To keep voltage as constant in the healthy phase (If fault occurs on any one phase).
  - To Protect Electric system and buildings form lighting.
  - To serve as a return conductor in electric traction system and communication.
  - To avoid the risk of fire in electrical installation systems

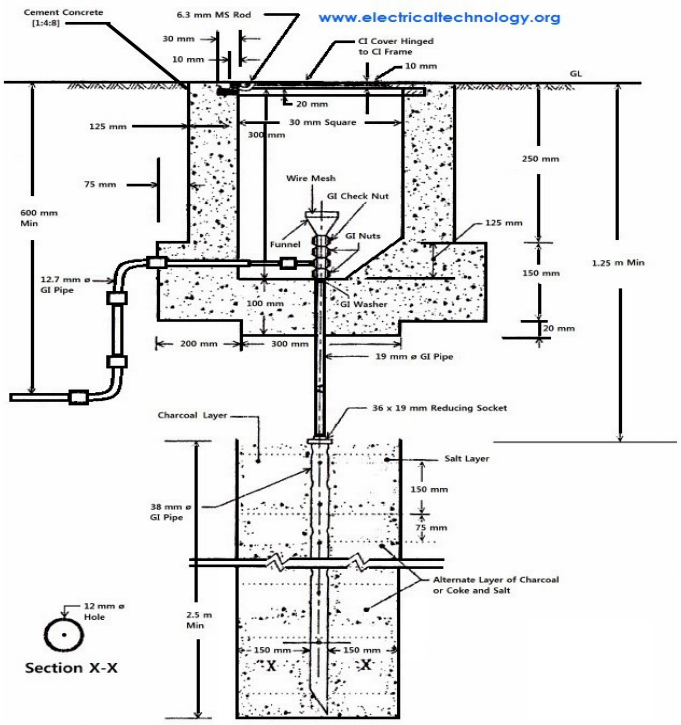
- **Type of Earthing:**

  1. Pipe Earthing
  2. Plate Earthing
  3. Copper Bonded Earthing

- **Pipe Earthing:**

  - A galvanized steel and a perforated pipe of approved length and diameter is placed vertically in a wet soil in this kind of system of earthing. It is the most common system of earthing.

- The size of pipe to use depends on the magnitude of current and the type of soil. The dimension of the pipe is usually 40mm (1.5in) in diameter and 2.75m (9ft) in length for ordinary soil or greater for dry and rocky soil. The moisture of the soil will determine the length of the pipe to be buried but usually it should be 4.75m (15.5ft).



Pipe Earthing

- In grounding system they have certain steps to follow the procedure, there are 3 layers have to follow in Earthing under the ground .They are: Salt layer, Sand layer and Charcoal layer. The layers which helps to contact Good conductivity from the earth. These ground layers method used for all the kind of Earthing.

- **Application:** It is mostly used for Body Earthing.

  - Residential areas
  - Commercial areas

- **Merits:**
    - ✓ Simple design
    - ✓ Easy to install in good soils
    - ✓ Hardware readily available
- **Demerits:**
    - ✓ High impedance
    - ✓ Hard to install in rocky soil
    - ✓ Step voltage on earth surface can be high under large fault currents or during a direct lightning strike.

❖ Plate Earthing:

- Plate earthing is making provision of earth potential in ground soil to drop fault current or excess current to prevent from electrical damages. It is the assembly of metal (hot dipped galvanize iron or copper) square plate of few mm thickness as per require application with hole provided on which earth strip is connected and a funnel attached for maintenance of earthing to keep low ground potential.

- In plate earthing system, a plate made up of either copper with dimensions 60cm x 60cm x 3.18mm (i.e. 2ft x 2ft x 1/8 in) or galvanized iron (GI) of dimensions 60cm x 60cm x 6.35 mm (2ft x 2ft x ¼ in) is buried vertical in the earth (earth pit) which should not be less than 3m (10ft) from the ground level.

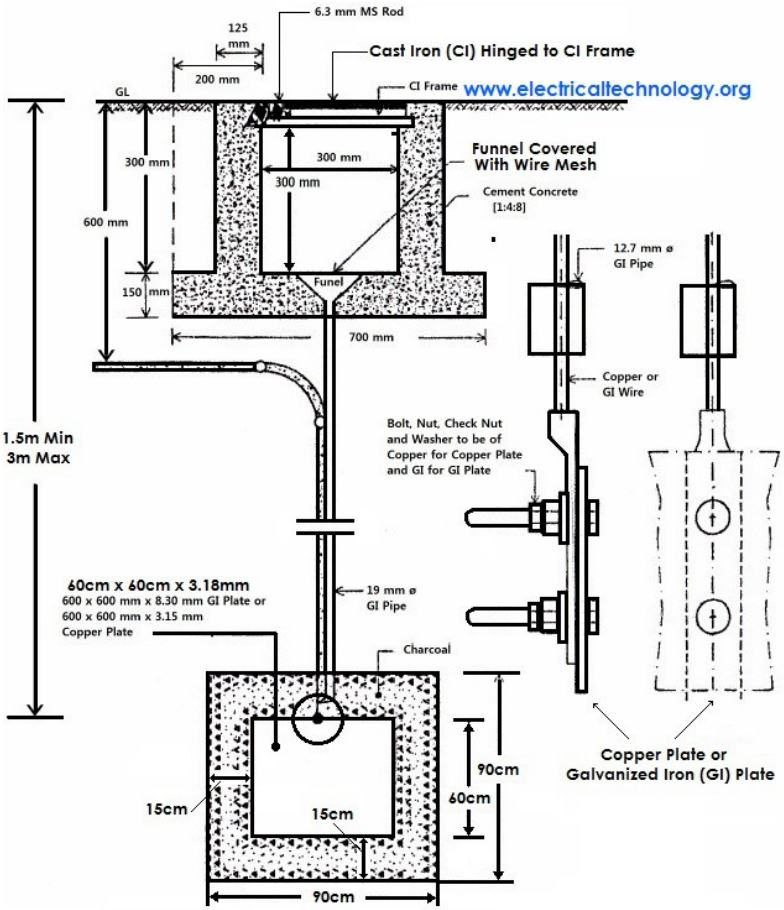


Plate Earthing

- In grounding system is same as the Pipe Earthing , there are 3 layers have to follow in Earthing under the ground. They are: Salt layer, Sand layer and Charcoal layer. The layers which helps to contact Good conductivity from the earth. These ground layers method used for all the kind of Earthing.

- **Application :** It is mostly used for Neutral Earthing.
  - Industrial areas
  - Generators
  - Transformers
  - UPS

- **Merits:**

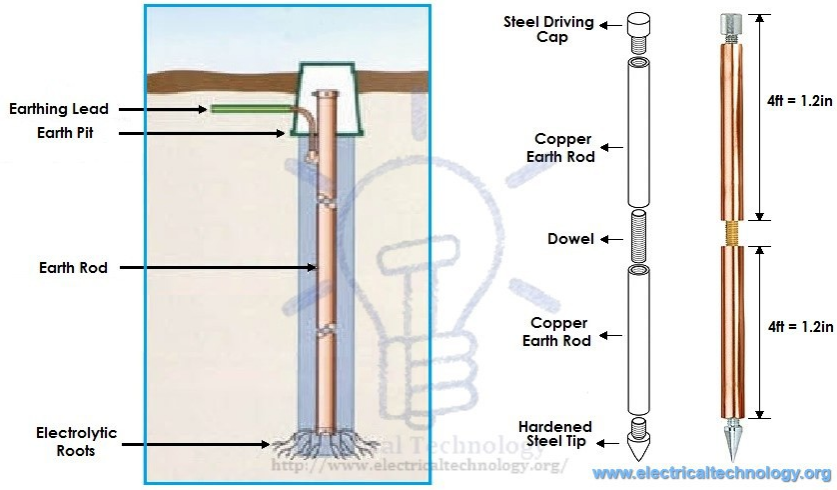
  - ✓ Can achieve low resistance contact in limited area Easy to install in good soils
  - ✓ Higher Efficiency

- **Demerits:**

  - ✓ Most difficult to install
  - ✓ Should be installed vertically

❖ Copper Bonded Earthing:

- It is the same method as pipe earthing. A copper rod of 12.5mm (1/2 inch) diameter or 16mm (0.6in) diameter of galvanized steel or hollow section 25mm (1inch) of GI pipe of length above 2.5m (8.2 ft) are buried upright in the earth manually or with the help of a pneumatic hammer. The length of embedded electrodes in the soil reduces earth resistance to a desired value.
- But in this Earthing we are not applying the normal grounding layers like salt, sand and charcoal etc..,, because the electrical drains get dogged in summer allowing electrical energy to remains in the circuit destroying the electrical goods.



Copper Rod Electrode Earthing System

Chemical earthing

It is a metal electrode which goes into the ground near the building. It helps in the efficient discharge of all the fault currents/ surge currents present in the electrical system. It also helps in depending the high voltages which are passed on through the lightning arrestors atop buildings.. These are earth enhancement compounds which have different proper's depending on soil and other atmospheric conditions. Essentially, an idea l BFC has high electrical conductivity, moisture capture and rotenone abilities and anti corrosive properties. It works in tandem with the Safe Earthing Electrode. Together both form the efficient earthing system.

Lightning Arrestor

A **lightning arrester** is a device used on electrical power systems and telecommunications systems to protect the insulation and conductors of the system from the damaging effects of lightning. The typical lightning arrester has a high-voltage terminal and a ground terminal. When a lightning surge

(or switching surge, which is very similar) travels along the power line to the arrester, the current from the surge is diverted through the arrestor, in most cases to earth.

Advantages

- High discharge capacity, owning CE certificate.
- Low voltage protection level
- High speed response
- Easy for mounting ,apply in IT/TT/TN system
- Mounting with standard modularize
- Mounting with standard modularize
- Operating state indicator
- Inner over-thermal breaker
- Inner circuit over-current
- Remote control interface
- Must be connected in series in a spsce- and cost-saving way up to nominal current 125A or REP-FB-1
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ESE Lightning Arrestor for Earthing System

We offer E.S.E. lightning arrestor for earthing system, which protects structures such as high rise buildings from damage by intercepting flashes of lightning and transmitting their current to the ground. JMV ese lightning protection manufacturers offers value to client owing to their good performance in toughest conditions. The E.S.E. lightening arrestors are made from best quality material that assure not only safety and improved performance. We offer lightning protection arrestors for home, office, building etc at industry leading prices and within very less lead time.

We are engaged in manufacturing and supplying of lightning arrestor for earthing system made of supreme quality raw material.

Principle of operation: The function of the ese lightning air terminal consists of emitting an ascending electrical unloading to influence the effect of the descendant tracer.

The range of ESE Lighting Protection Systems offered by us have high efficiency and drastically reduce the risk associated with lightning. We manufacture our products ese lightning protector with the use of alloy of high quality that are acquired from trusted vendors of the market.

ESE Lightning Protector Advantages

- Very low dispersion performance, with respectively for each standard deviation:
- σ(M30)=32 µs, σ(M45)=19 µs, σ(M60)=18 µs
- Works according to lighting spectrum frequency (0 à 10MHz)
- Is not sensitive to bad weather thanks to its internal spark gap
- Tested in the Ampere laboratory at the CNRS in Lyon
- Two spark gaps devices with dimensions enabling them to be used whatever the weather conditions (rain, snow, hail,…)
- No electronic parts => No energy consumption

- Electrostatic activation of the streamer emission when the Electromagnetic earth field gets larger.
- No fragile components => Stainless steel metal parts
- Always works at optimum level after 2 series of tests with 7 lightning strikes in normalized wave 10/350 µs at100kA (in positive and negative polarity)
- The Eco-conception of ESE based Air Terminal respects the environment. Its carbon footprint established in 2009 is excellent. Patented technology
- 5-years Guarantee
- Life duration > 50 years

Advantages

- Capture, brackets and Fastening systems Conform to standard NFC 17-102 et UNE 21-186
- Capture device conform to standard EN 50164, as prescribed in the standard series EN/CEI 62305

Applications

The application of the Lightning Protection System to provide the highest levels of lightning protection for buildings from lightning. Based upon individual site parameters, such as structure dimensions, terminal type and protection level, each Lightning Protection System design is customized for the project and provides elevation, 3D and plan views resulting in specific designs optimized for your facility.