BERQUE SAFE EARTHING ELECTRODE LIMITED

Presents

Patented Maintenance Free Earthing System

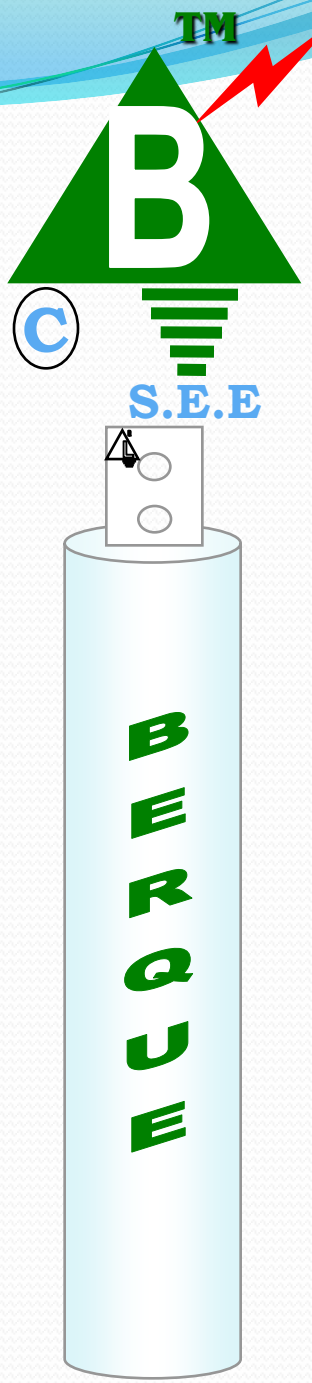
What is the solution ?

SAFE EARTHING ELECTRODE (SEE)

- **Latest Patented & Copyright Technology**
- **Scientifically Developed**
- **Pipe In Pipe**
- **Life In Pipe**
- **Ideal Back Fill Compound (BFC)**

BERQUE make
Safe Earthing System

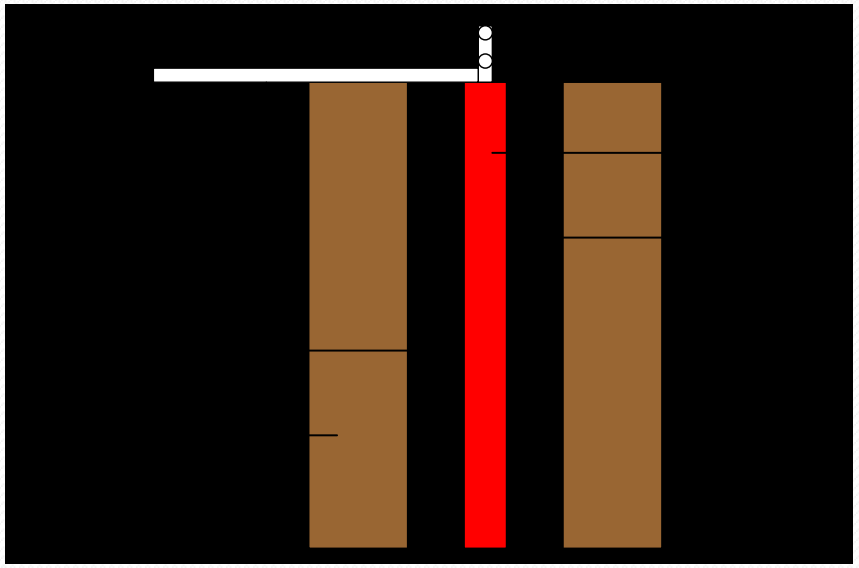
- Launched in 2009 after a 5-year R&D work carried out in consultation with qualified electrical engineers, chemical engineers, scientists, and professors from I.I.T.
- Pipe-in-Pipe Technology
- Manufactured as per IS 3043:1987.
- Patented for its Design & Technology



Pipe in Pipe/Life in Pipe

Safe Earthing Electrode

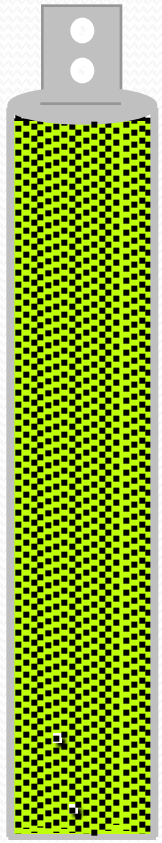
- There are two pipes, one inside the other i.e., pipe- in- pipe technology
- Safe earthing electrode is not in direct contact with the soil.
- Absence of corrosion
- Least fluctuation of Ohmic value.
- Since SEE is surrounded by highly conductive soil so the charge dissipation through the electrode is very high , sufficient to trip the fault relays



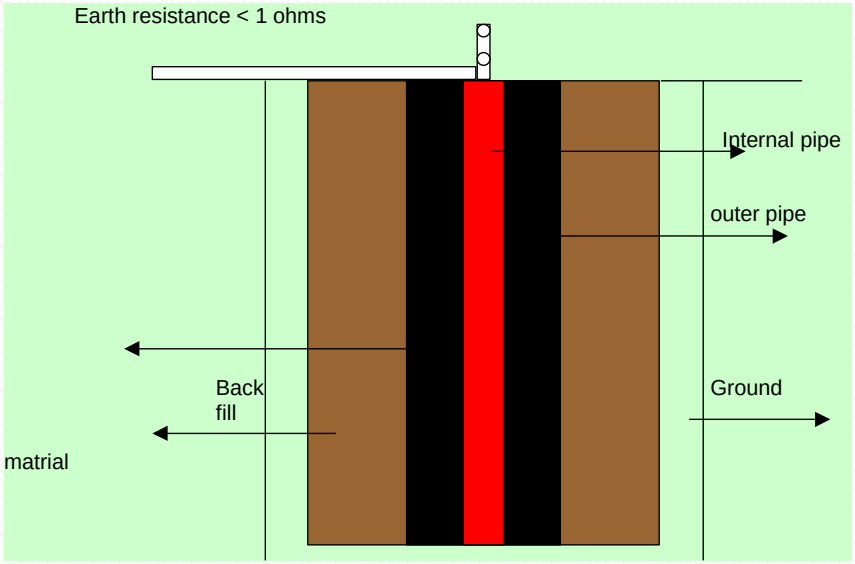
Pipe in Pipe/Life in Pipe

Safe Earthing Electrode

Two 'B' class mild steel pipes, one inside the other, are subjected to Hot Dip Galvanization : 80 -100 micron on secondary electrode and 80 – 300 micron on the primary electrode. Empty space inside the primary electrode and the secondary electrode is filled with CRYSTALLINE CONDUCTIVE MIXTURE and then sealed.



Description of the unit



- Red color pipe - main earthing pipe
- Outer pipe - G.I pipe
- Black color - Conductive Material (CCM)
- Earth color- Back Fill Compound (BFC)
- Surrounding - Ground
- Top- Connecting Terminal

Constructional features

- One G. I. Pipe placed in side outer G.I. Pipe
- Outer G.I. PIPE galvanized to 80 - 100 microns for better corrosion protection and conductivity
- Highly conductive , anticorrosive Crystalline Conductive Material filled in the annular space between two pipes & inner pipe.
- The electrode while installation surrounded by special backfill material .

Crystalline Conductive Mixture (CCM)

- Contains metal alloys and natural compounds
- High conductive, Anticorrosive
- Does not disintegrate or collapse even when outer electrode becomes inactive.

The Backfill Material

Back Fill Material is a specially developed compound, which is capable of absorbing and retaining the moisture for a long time, it reduces the soil resistivity, it helps in faster dissipation of fault current, least fluctuation of Ohmic value and it eliminates the use of Salt, Charcoal etc. around the Earthing Electrode.

It has low solubility, hence is not easily washed away, and has a low resistivity (approximately 5-10 Ohm-meters in a saturated solution).

It is virtually neutral, having a pH value of between 6.2 and 6.9. It is naturally occurring, so should not generally cause environmental difficulties in use.

It assists in maintaining a relatively low resistivity over a long period of time, where salts in the vicinity are dissolved away by water movements (rainfall etc.). However, the fact that the material is not easily dissolved will moderate the benefits achieved, since it will not permeate far into the ground. This means that the beneficial effect will be localized for say an area excavated around a buried electrode. This in turn means that the reduction in the resistance value of the electrode will not be dramatic but will be reasonably sustainable.

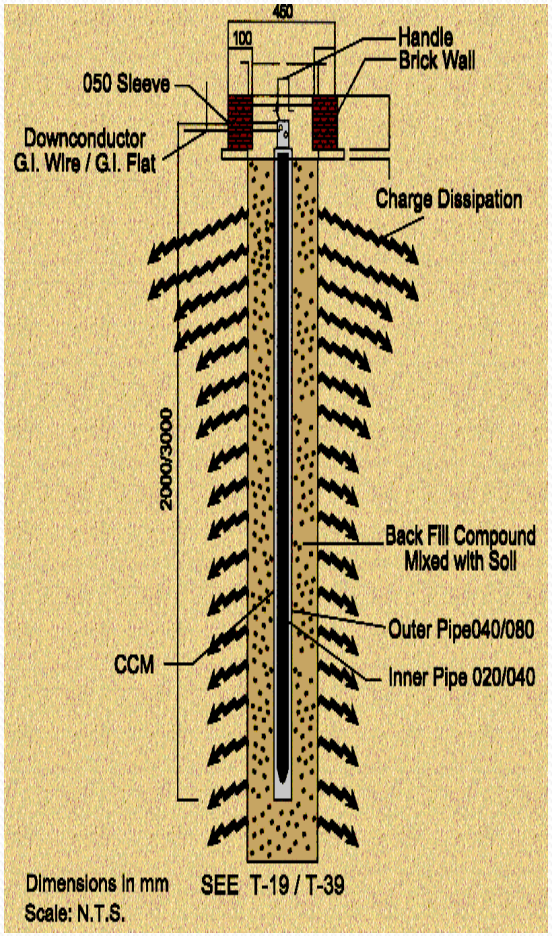
Back Fill Compound (BFC)

- Contains eco-friendly materials.
- Maintains moisture and enhances conductivity around the electrode.
- Does not mix with or leach in to the normal soil.
- Reduces soil resistivity around the electrode.
- No need to recharge pit. Except in sandy/rocky areas.
- As the moisture mixes with the BFC, an electrolytic solution is formed which improves electrode performance

Installation

- Make a bore of 8 - 10 inch dia up to the suitable depth to install electrode of required length. Fill the space between electrode and soil with specially developed BFC mixed with dug out soil in small quantities along with water. Continue till pit is filled up to the neck of electrode as shown in the illustration. After installation pour a few buckets of water around electrode for few days. About 8 electrodes can be installed in a day in normal soil conditions.

- Detailed step by step installation method is given in the leaflet pasted on each electrode.



In Safe Earthing Electrode (SEE)

- We fight corrosion by utilizing pipe in pipe technology .
- The consistency in soil strata for better and constant earth value is obtained by development & use of a special back fill material with improved properties .
- The moisture content of soil is kept adequate by the backfill material .

Earth Resistance Value

- Electricity takes the least path of resistance

- Earth Resistance Value (Ohmic value)

of an earth pit depends solely on soil resistivity at the location

What is Soil Resistivity?

- It is the resistance of soil to the passage of electric current
- It varies from **soil** to soil
- In depends on the composition of soil,
  Moisture content, Dissolved salts, grain size and its distribution, seasonal variation, current magnitude.

SOIL

1) Different soil conditions give different soil resistivity.

2) Most of the soils are very poor conductors of electricity when they are completely dry.

3) Soil resistivity is measured in ohm-meters or ohm-cms

4) Soil plays a significant role in determining the performance of Electrode.

5) Soil with low resistivity is highly corrosive.

6) If soil resistivity is high, earth resistance of electrode will also be high.

MOISTURE

1) Moisture significantly influences soil resistivity

2) Conduction of electricity in soil is through moisture.

3) Soil resistivity drops significantly in soil with high moisture content.

4) In many locations water table goes down in dry weather conditions. Therefore it is essential to pour water in and around earth pits to maintain moisture in dry weather conditions.

Dissolved Salts

1) Pure water is poor conductor of electricity.

2) Resistivity of soil depends on resistivity of water which in turn depends on the amount and nature of salts dissolved in it.

3) Small quantity of salts in water reduces soil resistivity by 80%.

4) Common salt is most effective in improving conductivity of soil. But it corrodes the metal and hence discouraged.

Grain Size & Distribution

- The grain size, distribution and closeness of packing also contribute to retention of moisture in the soil.
- Sandy & Rocky soil has poor moisture retention capacity.

Seasonal Variation

- Increase or decrease of moisture content determines the increase or decrease of soil resistivity.

- Thus in dry whether resistivity will be very high, and in monsoon months the resistivity will be low.

Current Magnitude

A current of significant magnitude and duration will cause significant drying condition in soil and thus increase the soil resistivity.

Technical Comparison

Conventional System	BERQUE S.E.E
a) Single G.I. Pipe is used as earth pipe. The pipe is galvanized from out side only. Some time additional plate is also attached with the pipe.	Pipe-in-Pipe Technology. Two B class M.S. Pipes one inside the other, Hot Dip galvanized, inside space filled with Corrosion Resistant, high conductive crystalline mixture.

Technical Comparison

Conventional System	BERQUE S.E.E
b) GI Pipe Earthing : Corrosion starts and with in 2 - 3 years (depending on the soil condition), complete pipe is corroded	GI Pipe Earthing based on Pipe in Pipe Technology: Average active life 20 years.
c) Charcoal and Salt used corrode the metal.	No charcoal and salt. Own compound used as backfill material.

Technical Comparison

	Conventional System	BERQUE S.E.E
d)	Regular watering of pit to enhance conductivity.	Normally watering of pit is not required. However during peak summer few buckets of water in and around earth pits is required.
e)	Earth resistance value fluctuates	Least fluctuation in Earth resistance value.
f)	More space is required for installation.	Very less space is required for installation

Technical Comparison

Conventional System	BERQUE S.E.E
g) Some times fails to activate fault protection relays, due to corrosion.	Enough low impedance to activate safety devices.
h) Some times fails to provide safe discharge path for fault current, due to corrosion.	Always provides safe discharge path to fault / surge / lightening currents.
i) Not cost effective in the long run	Highly cost effective in the long run

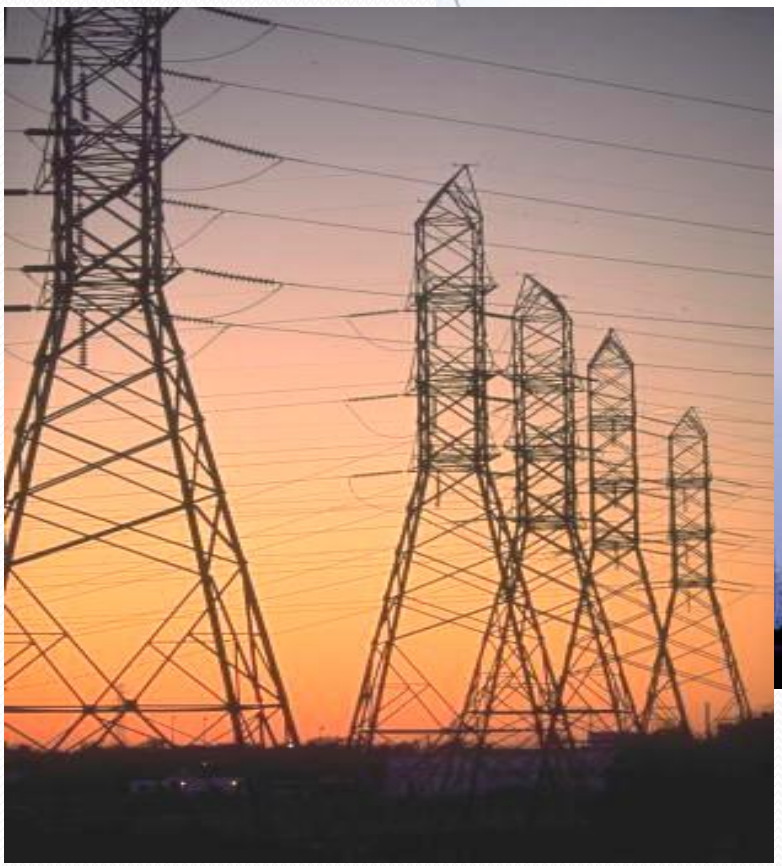
Applications

- Telecommunication Towers
  & Microwave Antennas
- Transmission & Distribution Systems
- Substation & Power Generators
- Computers & Data processing Centers
- Manufacturing Facilities & Refineries
- Generators
- Transformers
- Lightning Protection System

Telecommunication Tower

Microwave Antennas

Transmission Lines



Sub - Stations

Manufacturing Facilities

Heavy Industries

Power Plants

Refineries

Oil Storage Tanks

Transformers

Electrical Panels & UPS

High Rise Buildings

Tidel Park, Chennai & Residential Building

And...

Your Sweet Home Too…

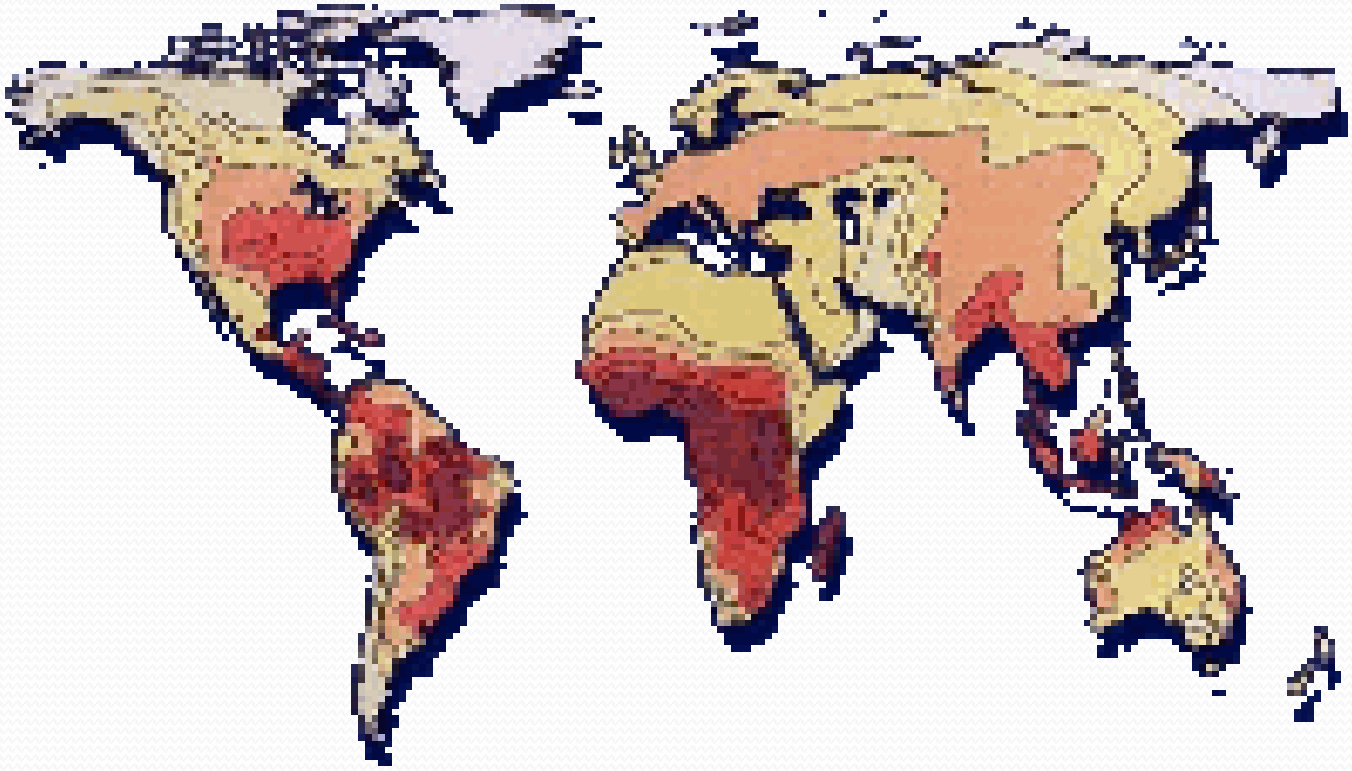
The Decision is Yours

Traditional GI pipe earthing and copper plate earthing or cast iron earthing cannot cope with the demands of the present generation sophisticated electronic equipments and appliances in offices, factories and in residences.

BERQUE Safe Earthing Electrode is the only electrode which can protect personnel and equipment from electrical hazards in this electronic age.

Choose the best. The decision is yours.

For us, Earth is the LIMIT ©



WE

Thank You

for

Your Attention