



Pragati Electrocom Pvt. Ltd.

MAINTENANCE FREE EARTHING

INTRODUCTION

Good earth pits as per BIS / IEC specifications are made, using Copper Plates / Rods or GI Plates / Pipes, dug deep in the ground in different configurations. Use of EARTH CONDUCTIVITY ENHANCEMENT COMPOUND not only makes the pits maintenance free, but also improves the soil conductivity by 3 – 20 times.

Low resistance earth pits, ≤ 5 ohms for lightning and < 1 ohm for equipment are normally recommended. Rocks have high resistance and digging for placement of Plates is a difficult proposition. In order to facilitate the same, three pure Copper Rods, each 3 Meters long, & greater than 12 mm in diameter, deep driven in an equilateral triangle configuration, duly interconnected at the site, provide good earthing with support of Special Soil Mix and Vegetable Soil filling in the pit holes. Soil conductivity enhancement compound poured in the three holes along the electrodes makes the pit maintenance free and also improves its conductivity.



MATERIAL

In order to achieve this, 95% pure, three copper Rods, with appropriate length of Copper cable 70 mm² or Copper Strip 25 mm x 3 mm are taken with necessary clamps to be placed on electrodes for interconnection. One drum of EARTH CONDUCTIVITY ENHANCEMENT COMPOUND is adequate for one Earth Pit. Special Soil mix is used with one bag of Vegetable Soil to fill the pit holes. One Manhole Cover and Inspection Joint with lead is required for each earth pit for protection and inspection.

SPECIAL FEATURES

- (a) Instead of a single copper plate, three copper rods are used in tripod positioning duly connected to each other. This ensures a better pit resistance and reliable earthing.
- (b) Each rod is packed with graphite powder in its surrounding instead of common salt thus saving the electrodes from any corrosion even with long usage. The graphite powder also provides better conductivity to the electrodes for high currents.
- (c) The tri-element equilateral triangle configuration pits are recommended for better noise reduction and phase difference in the power circuits.
- (d) The pits with use of Soil Conductivity Improving Gel shall remain totally maintenance free for all time.
- (e) Each electrode, though inter connected, still has the provision of terminals for direct earth termination of any installation to independent electrode.

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(f) Additional redundancy is available in the earthing system.

EARTHING GEL

EARTHING GEL is composed of a basic electrolyte, which along with other ingredients produces a gel mixture having high conductivity in the electrode-ground contact area and improves earth's absorbing power and humidity retention capability. The result obtained due to formation of the product, are non-corrosive in nature having low solubility (0.2% max) but high hygroscopy. Possible increase from 3-20 times in earth's conductivity can thus be achieved. The basic components of EARTHING GEL produce a complex chemical compound, which is water insoluble, has high conductivity and is not eliminated by continuous treatments with water. Laboratory tests have proved that there are no changes in results even after the soil being subjected to strong water washes. The gel so produced is thermo stable between -60° to +60°C temperatures.

The main advantage of EARTHING GEL comparing to other chemical methods of ground treatment is that its elements interact in homogeneous way when applied to the earth.

EARTHING GEL can be used on any kind of electrode through the simple spill of the proper solution to the ground, which surrounds the electrode. In the same way, it is possible to apply it on all kind of grounds, of different sensitivity. The choice of the components has been made according to ecological parameters, choosing those non-polluting and non corrosive products, as well as taking into account the solubility factor of the reacting species as well as the resultant products of insoluble elements, which ensure an ionic reserve capable of maintaining such conductivity increase.

COMPOSITION The components, which help the basic electrolytic action, are highly soluble electrolytes that ensure a very quick effect of increased conductivity. The addition of the components has to be done separately. Since the formation of the basic electrolyte, with low solubility, is produced within the earth, it ensures the maximum performance. When the products employed react, they produce compounds with high conductive power and decrease the resistance of the earth, mainly in the areas having salts deficiency.

DOSAGE It is recommended to apply at least one pack of EARTHING GEL at each earthing element. Higher doses may be necessary for optimum results in high resistance soil or rocky areas. Repeat application may be required after 5 years to maintain best soil conditions.

ADVANTAGES

- Capacity of creating electrolytes partially ionized, of high charge, with high capacity of water retention and Gel formation.

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- High permanence in the ground as a result of the formation of links with its particles.
- Increases the conductivity (approx 200%) of the ground during the five years period even in the rain condition of 700 Ltrs./sq. m.
- It prevents corrosion of earth's electrodes.
- Totally ecological and Thermo-stable (-60° to 60°C).

EQUIPOTENTIAL BONDING:

In order to achieve a common earth base at any installation, Equipotential bonding is done in which all earth pits are connected with a ring earth through the 70 square mm copper rope. It creates the redundancy and at no stage the system is exposed to any kind of surges. The ring earth is normally of copper tape 25mm x 3mm put either ½ meter deep in Ground or around the wall depending on the prevailing situation. It should be able to activate during a lightning strike or a surge /transient disturbance condition.

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