LIGHTNING, GROUNDING
& BOUNDING SYSTEMS

APS

ARIISE POWER SERVICES
NAGPUR I RAIPUR I AHMEDABAD
ISO 9001 : 2015 305022042810Q

Maintenance Free Earthing System

Since - 1997

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Importance of Earthing

An effective earthing system is a fundamental requirement of any structure / system for operation and safety reasons. Without earthing, safety of any structure, equipments within it and its occupants are compromised. A well designed earthing system is must for any electrical installation to avoid danger of fault currents as mentioned in various standards as below :

- India : IS 3043:1987 - Code of Practice for Earthing
- Great Britain : BS 7430 - Code of Practice for Earthing
- USA : UL 467 - Grounding and Bonding Equipment
- Germany : DIN VDE 0100 - Earthing arrangements, protective conductors, equipotential bonding conductors
- France : NFC 15-100 - Low voltage electrical installations

The object of an earthing system is to provide as nearly as possible a surface under and around a station which shall be at a uniform potential and as nearly zero or absolute earth potential as possible. The purpose om this is to ensure that all equipments other than live parts shall be at earth potential and also to ensure that operator or qttendant or any person shall be at earth potential at all times to avoid shock in case of short circuit or fault current. Hence, low earth resistance is must for obtaining an efficient earthing.

Conductors of suitable section shuold be used in order to carry expected current. Earthing associated with current carrying conductor is essential for safety of the system and is known as system earthing while earthing associated with non-cureent carrying conductor or metal is essential for safety of human, animal or property is known as equipment earthing.

Characteristics of good Earthing system

- Excellent electrical conductivity
- Low resistance and electrical impedance
- Conductors of the sufficient dimensions capable with standing high fault currents with no evidence of the fusing or mechanical deterioration.
- Lower earth resistance ensures that energy is dissipated into the ground in the safest possible manner.
- Lower earth circuit impedance, the more likely that high frequency lightning impulses will flow through the ground electrode path, in preference to any other path.
- High corrosion resistance
- The choice of the material for grounding conductors, electrodes and connections is vital as most of the grounding system will be buried in the earth mass for many years. High hot dipped galvanised electrodes should be used to for this purpose.
- Mechanically robust and reliable.
- Should be maintenance free.

Location for Earth

- Low lying areas close to the building or equipment are good for locating Earth Electrodes.
- The location can be close to any existing water bodies or water points but not naturally well drained.
- Dry sand, lime stone, granite and any stony ground should be avoided.
- Earthing electrode should not be installed on high bank or made-up soil.

Acceptable Earth Resistance value

The acceptable Earth Resistance at equipment level shall not be more than > 10 Ohm for any electrical installation. However lesser earth resistance values will more efficiently dissipate the fault currents. Also, there are many equipments specially of communications where low earth resistance values upto <0.5Ohm is required.

Earth Conductor & Earthing Conductor

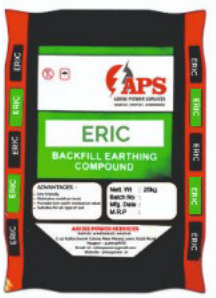
Most important component of earthing is earth conductor size to be used for earthing. Conductors used are flat type/solid round & stranded cable type. Different countries uses different colour codes, it is preferred GREEN in India.

Copper & steel joints should not be made as it is highly corrosive.
Where copper conductor is joined to Aluminum, the copper should be tinned.
Buried copper conductor should be minimum 25mm & buried steel conductor of 50mm.
Aluminum conductors are not used for underground connections to earth electrode.
Connections of earthing conductor to earth electrode or other means of earthing should be accessible & joints should be made through non ferrous metal clamps or soldered or exothermic welded.

BACKFILL EARTHING COMPOUND

We are engaged in offering a wide range of Back Filling Earthing Compound to our clients. These products are used to improve the conductivity of the earth electrode and ground electrode. The products that we offer to our clients are manufactured using high grade raw material using high technology machines. Our professionals manufacture these products keeping in mind the needs and requirements of our clients as per the set international standards. The product that we offer in this category is Earth Resistance Enhancement Compound. These products are in huge demand across the globe.

BACK FILL COMPOUND (APS-ERIC)

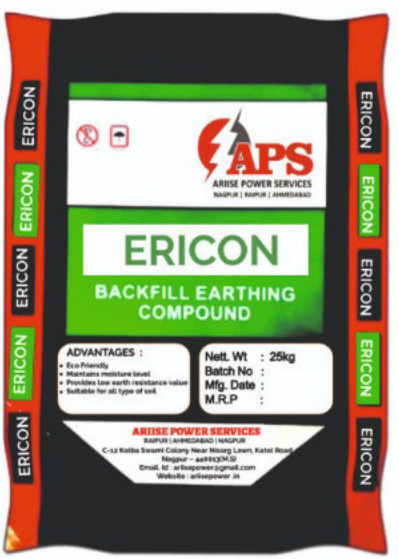


Features:

- high conductivity, improves earth's absorbing power and humidity retention capability.
- non-corrosive in nature having low water solubility but highly hygroscopic.
- suitable for installation in dry form or in a slurry form.
- does not depend on presence of water to maintain its conductivity.
- permanent & maintenance free and in its"set form", maintains constant earth resistance with time.
- thermally stable between -100 C to +600 C ambient temperatures.
- does not require periodic charging treatment nor replacement and maintanance,
- suitable for any kind of electrode and all kinds of soils of different resistivitry.
- does not pollute the soil or local water table and meets environmental friendly requirements for landfill.
- non explosive.
- does not cause burns, irritation to eye, skin etc.

Ground Resistivity Improver Compound (ERICON)

This is non corrosive, has capacity to absorb & retain moisture from the surrounding. Being non soluble in water, it stays at the place and in not washed out by the rain water/underground water. This mineral filling compound is highly conductive. Back fill compound : Back fill compound is a conductivity improver compound. It is a specially developed compound for having quality of highly conduciveness, non corrosive, absorbing & retaining the moisture for a long time.



Features

High conductive
Non corrosive
Reduce soil resistivity
Retain moisture for a long time

Gel Earthing

APS earthing electrode consists of primary earthing electrode (outer pipe) of 99.9% pure copper pipe. The hollow space of the electrode is dully filled with a highly conductive and non-corrosive compound which safeguards the electrode against any corrosion and helps in faster dissipation of the fault or leakage current flowing through the earthing electrode.

Both the ends of the earthing electrode are permanently sealed and the top portion of the copper pipe electrode is compressed under a hydraulic machine to form a lead terminal provided at the top with the 2 holes for connecting to the load/equipment. Since there is no joint on the top portion of the copper pipe earth electrode, the dissipation of the current is ensured to the maximum level and the ohmic value is maintained precisely. Depending upon the soil conditions, back fill compounds are selected to install along with the earthing electrode. Reslow grounding minerals are selected for normal soil conditions & Carbofill grounding minerals is selected for rocky / sandy soil conditions.

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Factors effecting earth resistance
- Resistivity & Compaction of soil
- Salt content
- Moisture content
- Temperature

ONE SET OF EARTHING PROTECTION SYSTEM CONSISTS OF:

1. Copper bonded rod/GI/Cu electrode-1 no.
   Length - 3000mm / 2000mm / 1800mm...
   Dia - 17.2 mm / 50mm / 80 mm
2. Backfill compound -
   25Kg/50Kg as per lenght & dia of pit.
3. FRP Earth pit cover - 1 no.
   APS-PC1 size - 260*345*255mm

APS / GI / Copper / Copper bonded Pipe Earth Electrodes

These are made of dual pipe / flat in pipe / single pipe technology. Inner space is filled with highly conductive, corrosion resistant crystalline mixture (CCM) which provides low earth resistance during all seasons.

MODEL NO.	OUTER PIPE DIA (mm)	INNER PIPE DIA (mm)	INNER FLAT SIZE (mm)	TERMINAL (mm)	TERMINAL HOLE (Nos*mm)
ACE 40XYZ	40	19	32 * 6	75*32*6	2*12
ACE 50XYZ	50	19	32 * 6	75*32*6	2*12
ACE 65XYZ	65	40	50 * 6	75*50*6	2*12
ACE 80XYZ	80	40	50 * 6	75*50*6	2*12

Where
X - GI / Copper electrode / Copper bonded
Y - Type of electrode i.e. Dual pipe / Flat in pipe / Single Pipe technology
Z - Lenght of electrode, i.e. (in mm)

MODEL NO.	DIA (")	DIA (mm)
ACBR 12 XY	1/2	12.7
ACBR 14 XY	5/8	14.2
ACBR 17 XY	3/4	17.2

Where
X - Lenght of rode (in feet)
Y - Copper bonding thickness (in microns)
Threaded / Unthreaded options available
Also available in Customised dia & Lenght

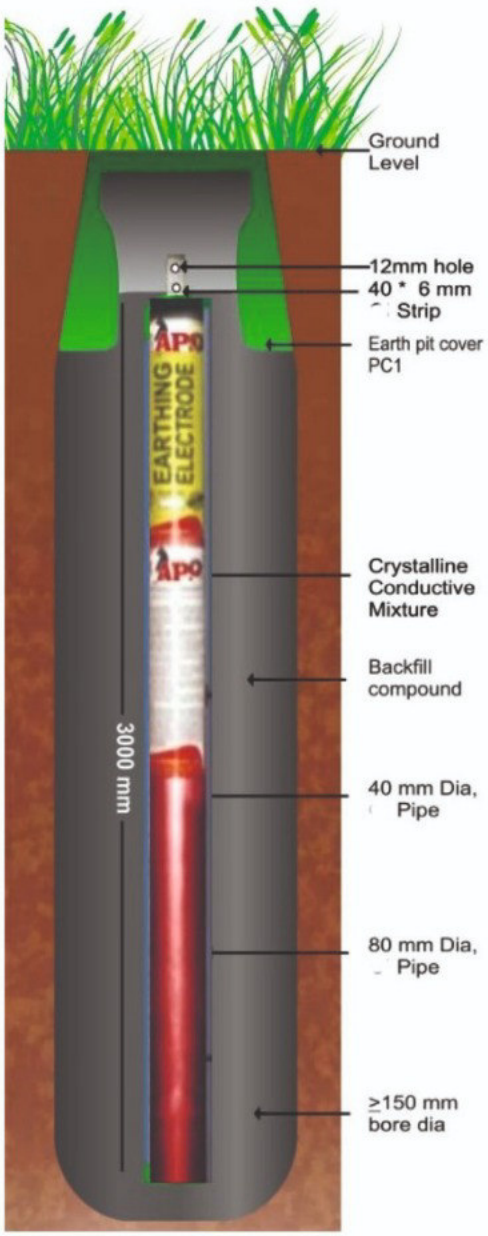
Backfill Earthing Compound

APS has developed ERIC, ERICON, ERICRETE & GEL compounds considering various terrains, soil & climatic conditions across globe. Adding above compounds in the pit surrounding the earth electrode will provide more sustained & very low earth resistance value. For 3 mtr deep bore of 200 mm dia, 50 kg compound should be used.

Exothermic Welding

Exothermic welding is a process in which one conductor is molecularly bounded to other conductor. Exothermic welded connections produce a permanent connection, superior in performance to any known mechanical or pressure type surface to surface contact connector. This connection will not loosen or increase in resistance over the lifetime of installation.

Note: 1. Earth rods/Electrodes of special sizes are available on request.



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