

A well designed system is basic for any electrical installation to avoid the danger associated with fault currents, as established in the main earthing standards:

- Spain: RBT2002 “Low Voltage Electrotechnical Regulation” ITC-18 “Earthing Systems”.
- Great Britain: BS 7430 “Code of practice for earthing”.
- France: NF C15-100 “Low Voltage Electrical Installations”.
- Germany: DIN VDE 0100 “Earthing arrangements, protective conductors, equipotential bonding conductors”.
- USA: UL 467 “Grounding and bonding equipment”.

A Low Voltage Earth Termination System is aimed:

- To provide security for persons by limiting the touch voltage.
- To protect installations and equipment by providing a low impedance path.
- To improve the quality of the signal by minimizing the electromagnetic noise.
- To fix the reference voltage for the system equipotentialisation.



A low Herat Resistance is essential for obtaining an efficient Earthing.

Conductors with an accurate section should be used in order to carry the expected current. Besides, they must be durable against corrosion.

The value of the electrical resistance must be measured, isolated from any other conductive element. Therefore, it is necessary to use disconnectors in order to separate the Earthing from the rest of the installation during the measurements.

Other determining factors for designing the Earth Termination System are the following:

- The resistance should be measured regularly so it is necessary to place an inspection pit.
- The soil humidity will reduce the earthing resistance.
- Earthing enhancing compounds reduce the soil resistivity.
- Buried electricity and gas installations should be known in order to respect the security distances for each case.
- Buried pipes and water tanks should be known in order to bond them equipontetially with the earth termination.

In low-conductivity soils, enhanced electrodes, deep electrodes or ring conductors should be used in order to obtain a suitable earth resistance.

Specifics considerations for Lightning Protection

Particularly, the Earth Termination System is essential for Lightning Protection, since the lightning current should disperse there. Each down-conductor must have an Earth Termination System, formed by conductive elements in contact with the soil and able to disperse the lightning current in it.

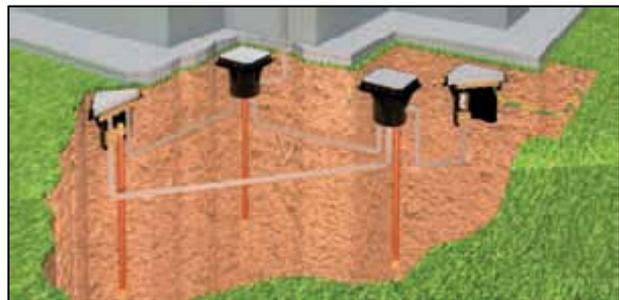
Good earthings of Lightning Protection Systems shall be able to withstand lightning currents and to disperse them quick and safe.

In order to accomplish with these requirements, standards set as a first specification that the resistance of the LPS earthing should be lower than 10 Ohms. On another side, it should be noticed that lightning current is an impulse and therefore it is not advisable to use a single, very long element.

The employ of deep electrodes is interesting if the resistivity is very high at surface but there are lower layers with much more humidity. Configurations in triangle or "goose-foot" are suitable for a good lightning current dispersion.

These considerations for improving the impedance should be taken into account when the earthing is made, since normally the measures are made afterwards with a conventional Earth Meter which does not register the impedance but only the earthing resistance, that is, its performance in case the current were continuous. A high inductance would not be measured by this type of Earth Meters and however it is a big obstacle for the current flowing when its waveshape is, such as lightning, an impulse.

In general it is recommended to bond the lightning Protection Earth System with the earthings of the installation in order to avoid surges and dangerous step voltages.



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