DUVAL MESSIEN

Lightning control

A know how famous since more than one century

January 2019

TEREC+

Grounding Improving Material

Certified ISO 9001 QUALIFOUDRE MASE QUALIFELEC

Duval Messien: Specialist in earthing systems

Since 1835, our company built his image with products and services of quality, especially in earthing systems improvement.

The diffusion in the ground

The aim of an earthing system is to flow into the ground an electrical current. It can act properly only if its environment and itself are designed in a way to accept a high mobility of electrons and ions.

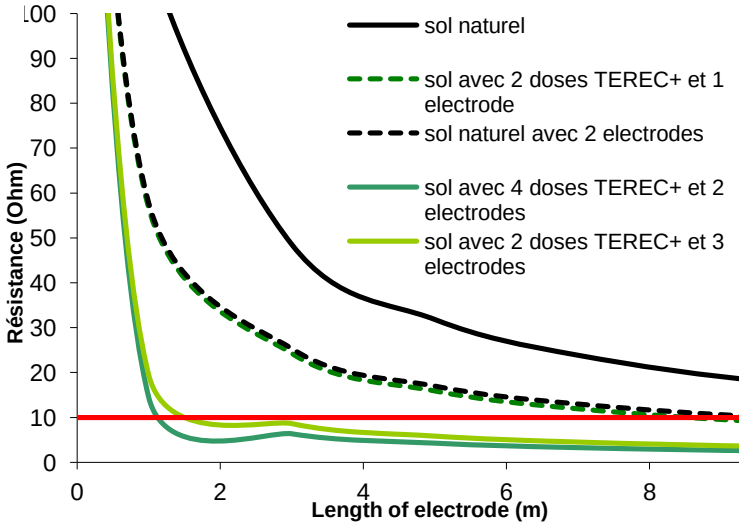
A better efficiency and a long-life time of the earthing systems can be brought by T**EREC+,** a compound which accelerates the ionic circulation in the ground.

In a conductor, the current is characterized by the electrical charge's movement.

In the ground, it is ions movement which allows its diffusion. This current generates an anion-cation exchange which contributes to the energy absorption diffusion.

All the grounds, according to their nature, contain more or less mobile ions, in variable quantities.
A very resistive ground contains very few mobile ions.

To obtain low resistance values, Duval Messien advises to use drilling methods for electrodes installation, which have been subjects of patents by Georges Messien.

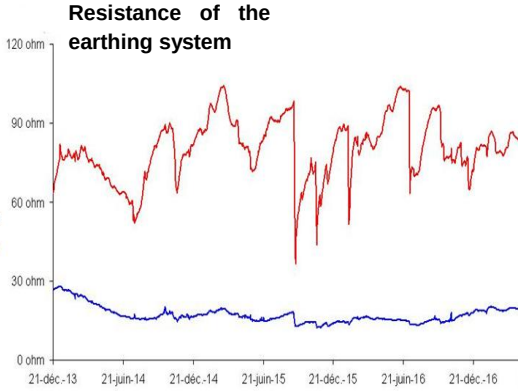


Why to use TEREC+ ?

TEREC+ process gathers several compounds which accelerate the ionic circulation. It generates an energy absorption in a volume more important than the theoretical flow zone situated around the electrode.
TEREC+ allows to achieve low resistance earthing systems, with less long electrodes. It reduces sensibly their cost and that of their installation (trench or drilling). It also makes the realization of earthing systems possible in unusable grounds without it.

TEREC+ advantages ?

After the reaction following its realization, T**EREC+** gets fixed and cannot be damaged, neither by the bases, neither by the acids. **TEREC+** is reactive under energy: more the earthing system is solicited, more it will be efficient and longer will be its lifetime.
TEREC+ in the ground, protects the earthing system from freezing until a temperature of -10°C. For another dimension, an earthing system realized with **TEREC+** will have an impedance until five times inferior to an earthing system realized without it. It will be then more efficient, especially for high frequency current flowing like lightning.



Without TEREC With TEREC+

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Its implementation

The product should be hydrated before using. It is necessary to fill a containing (bucket, big can,) of 10 liters of water per bag and add the dose of TEREC+. Before all treatment, ensure a complete mixing during few minutes.

1. Horizontal implementation

1. Realize the necessary trenches for the creation of the crow's foot on a depth of 1m (level without freezing of the earthing system).
2. Install the earth electrode at the bottom of the trench (for this case, we can use a flat conductor type tinned copper tape, an earth grid,..).
3. Make with the hydrated product a cordon of 1m on the electrode (foresee 2 doses of TEREC+) and if this one exceeds 5m, treat on 1m every 3m (see figure 1).
4. Backfill the trench on a height of 0,20m, water the treated parts with around 20 liters of water, compact and fill the rest of the height compacting again in order to reconstruct the apparent density of the ground.
5. Measure the resistance: this one will represent only 70% of the optimal value, which will be obtained within a time limit of 2 months when TEREC+ will have acted.

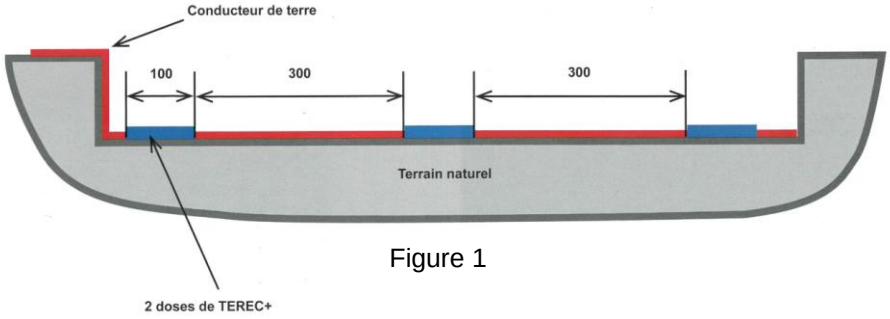


Figure 1

2. Vertical implementation with tubular electrode

1. Fill the drilling with TEREC+ up to the third of its height, introduce the electrode then fill the residual gap (see figure 2).
2. Shake slowly the installed electrode in order to lift up all the air pockets and fill then the void between the electrode and the ground.
3. Wait for 1 hour, fill again if necessary the inside of the electrode, and measure the treated earth resistance. Like for horizontal implementation, the value will represent only 70%.

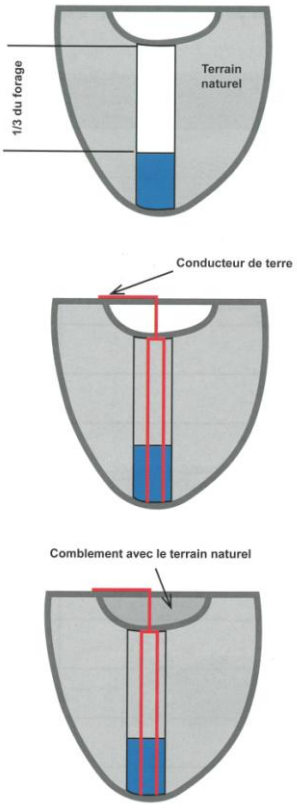


Figure 2

3. Vertical implementation with copper coated earth rods

1. Realize a hole of 0,80m x 0,80m x 0,80m (see hereunder figure).
2. Pour in this hole, a dose of 10kg of TEREC+ hydrated.
3. Install the first earth rod at the center of the hole and drive in. Add the additional earth rods until the expected depth. Water with 20 liters of water.
4. Fill the ground up to 0,40m from the surface, and compact the ground to reconstruct the apparent density of the ground.
5. Install the inspection pit
   And measure the treated ground resistance. As previously, the value will represent only 70% of the optimal value, which will be obtained within a time limit of 2 months.

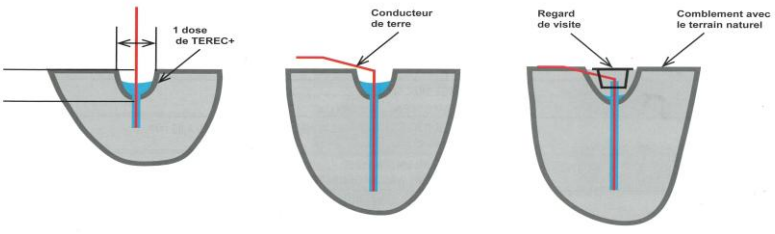


Figure 3

Some France references

Central Commission of Nuclear Energy
- Fontenay aux Roses (92)
- Saclay (91) Bruyère le Chatel (91)
- Marcoule (30)

Army, air, navy
- BA113 (St Dizier)
- Ammunitions storages (Des Touris)
- DCN (Toulon)

Chemical Industries, reffineries
- Sanofi Aventis (Vitry / Seine)
- Kem One (Lavera)
- Total Lubriant (Rouen)
- Petroineos (Fos/mer)
- Geo gaz (Lavera)
- Shell Chimie (Rouen)

Monuments
- Grand Palais (Paris)
- Palais de Chaillot (Paris)

EDF
- Aramon thermal power plant

GDF
- Recompression station
- Storage stations
- Gas Terminal
- Metal Terminal

Research - Industry
- CNES
- CNET
- SNECMA (Corbeil)
- Aerospace

Administrations - Transports
- ADP Paris airports (Charles de Gaulle and Orly)
- Crédit Lyonnais
- RATP
- Banque de France
- General Council (Marseille)
-CHU (St Brieuc)

Some international references

Burkina Faso
- Société nationale d'hydrocarbure

Ivory Coast
-International Airport of Abidjan
- France Embassy

Dubai
- Burj Khalifa

Gabon
- French Army Base BIMAT

Guinea
- Electricity of Guinea (EDG)
- Guinea Water Company (SEG)

India
- Taj Hotel
- Air Army Kalaikunda

Indonesia
- PECGI Cikarang

Khazakstan
- Oilfields Nuraly

Iran
- Jiroft's Fruits Markets
- Boroujerd Hospital

Lebanon
- CMA CGM & Merit Warehouse
- Court Yard Beyrouth

Malaysia
- Monorail of Malaysia – Phase 1
- Gated Bungalow Saujana Selangor

Mali
- PECGI Cikarang

Morocco
- Cementery of Oudja

Nigeria
- SEPTA (oil site)

Dominican Republic
- Tower of Kesingston
- Altec Dominica
- BHD bank

Pakistan
- Lahore airport

Romania
- Biogas tank

Senegal
- SONATEL Head Office
- Cementery of SOCOCIM

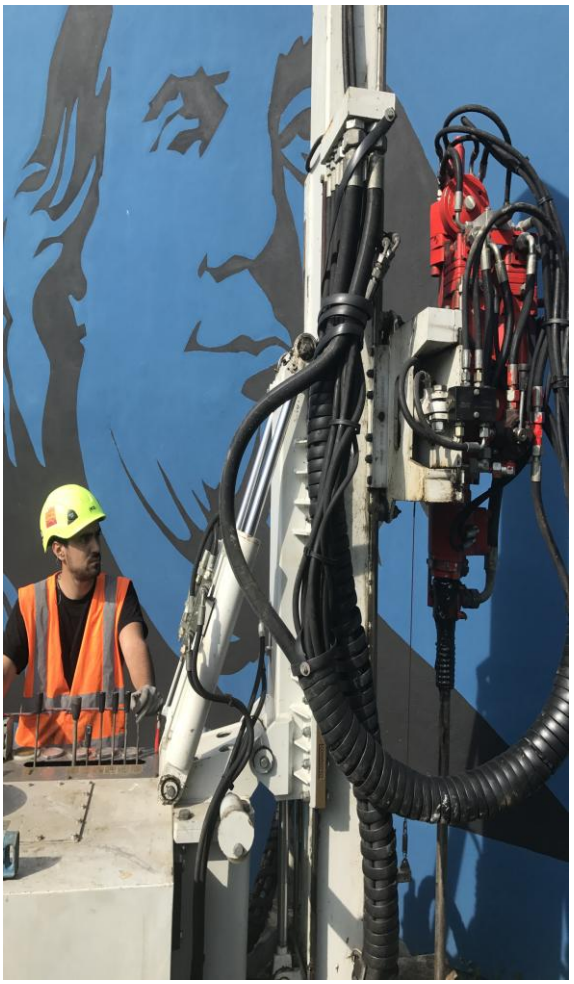
Serbia
- Hotel of « Izvor »

Sri Lanka
- Asiri Surgical hospital

Togo
-Togolese warehousing company
- MOOV Togo

Turkey
- F1 Istanbul Park
- North Black Sea highway tunnels

Vietnam
- Ben Tanh metro line
- Hydraulic central of Da Mi
- Memorial of Pac-Po



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