

# portable Cu/CuSO<sub>4</sub> reference cell

Datasheet DS 0016  
Rev.00

## Cathodic protection reference electrodes:

Corrosion of steel structures buried or immersed in conductive electrolytes like soils and salt water is an electrochemical process that can be understood, measured and even controlled in terms of electric values.



It is a well-known fact that, when buried underground or immersed in sea water, steel rapidly reach an electrochemical equilibrium with the surrounding environment which results in an electric voltage, commonly referred as “pipe to soil potential”, or “Cathodic potential”.



Cathodic protection, using both sacrificial anodes or impressed current systems, shift this potential at a pre-determined value low enough to inhibit all those processes related to galvanic corrosion, and thus protecting the structures over time.

Measuring the Cathodic potential is the key to monitor and keep under continuous control the corrosion state of the steel structures. These measures must be made with a high impedance voltmeter between the metal part of the structure (pipe) and a reference electrode, a special kind of electrochemical half-cell (often called simply “cell”).

Cathodic protection Reference electrodes use the redox reaction between a metal, in this case copper, Cu, and a saturated aqueous solution of its salt Copper sulfate CuSO<sub>4</sub> to give a stable potential reading and avoid electrode's polarization.

While some reference electrode is usually buried near the structures to be monitored and intended for permanent use, during site surveys is always necessary to have a portable reference electrode to check the potentials in all the different areas of the plant.

## Standard Cu/CuSO<sub>4</sub> portable reference electrode:



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Our standard portable reference electrode is composed by a transparent tubular casing filled with a saturated solution of distilled water and Cu/CuSO<sub>4</sub> crystals. The casing is transparent to allow visual check of the electrolyte level, which can be refilled through the sealed threaded cap. The internal pure copper rod is connected with a 4 mm banana plug for easy connection with voltmeter terminals.

The other end is made of a porous ceramic plug to allow electric flow from the soil to the internal Cu/CuSO<sub>4</sub> solution avoiding its contamination.

A protective cap prevent the ceramic plug from damages and dirt accumulation.

Every electrode will come with a refill kit composed of distilled water and high purity copper sulfate grains.



Our portable reference electrode has a fully field-prove, solid and sturdy construction, and will be a long lasting and reliable instrument for Cathodic protection measurements.

Other portable reference electrodes:

Our company can supply different portable reference electrodes depending on the electrolyte type (humid soil, hard soil or sand, concrete).

For Cathodic potential measures of sea water immersed

structures, Cu/CuSO<sub>4</sub> reference electrodes may suffer from chloride contamination. In these cases, we suggest you an Ag/AgCl electrode. You may find more about these products on our website

For any additional information on our portable reference electrodes and any concern about their use and maintenance, please contact our technical department.

