

Copper/Copper Sulfate Reference Electrode with Coupon

Saturated Copper/Copper Sulfate (Cu/CuSO₄) reference electrodes for cathodic protection systems, featuring a terracotta body and double-insulated copper cable, are available in the following versions:



With separate polarization coupon



With integrated polarization coupon

GENERAL INFORMATION

Dimensions	300 x 150 mm (LxØ)
Weight	Approx. 8 kg
Cable (electrode with separate coupon)	Electrode: standard FG16R16 0.6/1kV, 1x6mm ² , others on request. Coupon: standard FG16R16 0.6/1kV, 1x6mm ² , others on request.
Cable (electrode with integrated coupon)	Standard: FG16R16 0.6/1kV, 2x4mm ² , others on request.
Installation	Natural soils with low chloride content (<200 ppm)
Temperature Range	0 - 60°C
Storage Period	Indefinite if stored dry and away from light.
Operating Life	30 years from installation.

Saturated Copper/Copper Sulfate (CSE) reference electrodes with a polarization coupon ("plate") are used as sensors for reading the polarization values of buried metal structures under cathodic protection. They are especially useful for assessing the level of polarization at potential defects in the protective coating of structures or when there is a need to evaluate the magnitude of ohmic losses through the electrolyte.



INSTALLATION

Before installation, it is essential to indelibly mark the cable (in the case of separate-coupon electrodes) or the conductor (in the case of integrated-coupon electrodes) of the electrode and the coupon to easily distinguish them. For integrated coupons, it may be necessary to use a multimeter as an ohmmeter or a continuity tester.

Before installation, the user should check the terracotta casing for any damage and discard any damaged electrodes. Reference electrodes must be submerged in water for 12 to 24 hours before installation, while avoiding wetting the coupon. They should be installed within a few hours to prevent them from drying out.

For electrodes with a separate coupon, the coupon should be temporarily removed before soaking the electrode. It should be reattached right before installation by screwing the welded bolt on the coupon into the PVC bushing on the electrode's head. It is recommended to tie-wrap the coupon's cable to the electrode's cable.

Electrodes must be installed inside the trench, in the position indicated in the project design. A maximum distance of 15 meters from the outer surface of the protected structures is usually specified. The trenches for installing the reference electrodes must be free of stones and debris. The electrodes should be in contact with natural soil that has overall characteristics as similar as possible to the soil where the monitored structures are installed.

After installation, the trench must be refilled with the selected, debris-free soil. The soil should be lightly pressed and compacted. It is recommended to pour an adequate amount of drinking water into the trench in several stages during refilling to increase soil compaction.

When interpreting measurements, you must remember that once installation is complete, if cathodic protection is not active, the coupon's surface will begin to progressively oxidize! For this reason, when using electrodes with coupons, it is advisable to note the periods when the cathodic protection system remains inactive.

USE OF CSE ELECTRODES WITH COUPON

The cable of the reference electrode must be electrically insulated from the monitored structure and from any other source of direct or alternating voltage. Any electrical current passing through the reference electrode can cause significant polarization and lead to false readings. Cathodic potentials, or the potential differences between the electrode and the monitored structure, must only be measured using a high-impedance voltmeter ($Z > 10 \text{ M}\Omega$).

The measurement of potentials, net of ohmic losses, can be performed by measuring the potential difference between the electrode and the coupon immediately after interrupting the electrical continuity between the coupon and the structure being protected.