



# Cu/CuSO<sub>4</sub> Permanent Reference Electrode

Datasheet DS 007

Rev.00

Copper Sulfate half-cell (CSE) is the most commonly used reference electrode in Cathodic Protection corrosion control systems.

CSE use the redox reaction between a pure copper coil immersed in a saturated solution of copper sulfate CuSO<sub>4</sub> to obtain a highly stable and well-known electrode potential.

For these reasons, CSE half-cells are widely used as reference electrodes for measuring the electrical potential of buried or immersed structures in respect of the surrounding electrolyte.



Our standard CSE fixed reference electrodes is manufactured in 300 x 150 mm (HxØ) dimensions and come with 5 m 1x6 mm<sup>2</sup> double insulated HEPR/PVC cable, but various size, cable's type, length and connection system can be produced according customer's requirements.



In case of highly-insulated structures to be monitored, e.g. new tri-layer polyethylene coated pipelines, our fixed CSE reference electrodes can be manufactured with included carbon steel corrosion coupon and 2 x 4 mm<sup>2</sup> HEPR/PVC cable to simulate coating defects.

Our CuCuSO<sub>4</sub> fixed reference electrodes are designed for use in soil and freshwater (max. 500 ppm chlorides), where they are buried near the structure to be monitored (30 – 50 cm max.).



Their large high-porous terracotta container allow an efficient ion current exchange with the surrounding electrolyte, minimizing the risk of electrode's polarization and allowing a stable and easy potential reading even in hard and high-resistivity soils.

Alternatively, TECNOCORR can supply a CSE electrode with a built-in bushing for the installation of a separate corrosion coupon.



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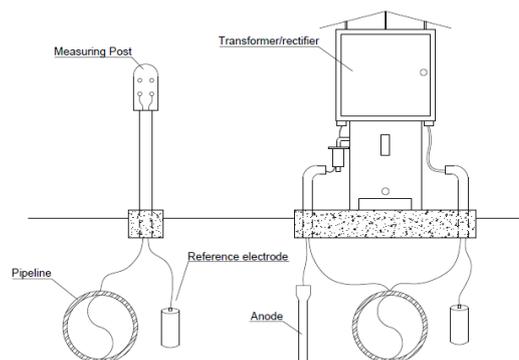
TECNOCORR is a manufacturer of a special sealed-connection electrode, approved by SNAM and constructed according GASD A7.04.03 with 1x10 mm<sup>2</sup> HEPR/PVC cable.

For installation in very dry and high resistivity soils, electrodes come pre-packaged in gypsum-bentonite backfill to ensure superior and long lasting humidity retention.



For small structures like underground gas or fuel tanks, TECNOCORR can supply a small and reliable CSE electrode that can be refilled with high purity copper sulfate to extend lifetime.

Fixed CSE reference electrodes must be installed in vertical position at a maximum distance of 30-50 cm from the structure to be monitored. Prior to installation, ensure humidity absorption by soaking the electrode in fresh water for at least 24 hours. For any clarification about electrode's installation and use, please contact TECNOCORR's technical office.



## Our standard permanent CSE:

Code	Electrode diameter		Electrode length		Cable m	Corrosion coupon		Pre-packaged in backfill	
	mm	In.	mm	In.		Yes	No	Yes	No
RE.CU.001	150	6	300	12	5 m 1x6		✓		✓
RE.CU.001S	150	6	300	12	5 m 1x10		✓		✓
RE.CU.002	150	6	300	12	5 m 2x4	✓			✓
RE.CU.003	220	8.5	400	16	5 m 1x6		✓	✓	
RE.CU.004	100	4	100	4	2.5 1x6		✓		✓