INSTRUMENTS AND EQUIPMENT FOR THE CORROSION ENGINEER

More than 75 Years of Support to the Cathodic Protection Industry

RE-375 COPPER SULFATE ELECTRODE

SIMPLE TO USE:

- Unscrew hexagonal cap
- Add distilled water or anti-freeze
- Bring liquid level to 1/4" below label
- Avoid CuSO4 crystals on threads
- Tighten hex cap until flush with tube
- Shake vigorously for five minutes to dissolve crystals
- A few crystals must remain, indicating a saturated solution

MAKING CONNECTION:

- Banana plug, insert into hole at top of RE-375
- Hippo clip, grip groove with teeth
- Alligator clip, grip inside hole and side

VOLTAGE MEASUREMENTS:

- Connect electrode test lead to voltmeter (Normally Negative)
- Connect structure test lead to voltmeter (Normally Positive)
- Remove black protective cap from electrode
- Press ceramic tip into soil (if dry, add water to soil)
- Read and record (Normally Negative) Voltage

MAINTENANCE:

- Add solution crystals after 50% loss
- Must have saturated solution, undissolved CuSO4 crystals
- Keep tip covered with cap to prevent leakage
- Clean and recharge every three months

ERROR CHECKING:

Maintenance of the electrode consists principally of adding distilled water or anti-freeze solution to make up for evaporation loss. Enough copper sulfate ($CuSO_4$) crystals should be added so that there is always an excess of crystals at the bottom of the tube. After prolonged use, the copper sulfate solution may become contaminated which will result in errors. To check for this type of error, it is suggested that one of the electrodes be prepared as a standard. This electrode should not be used in the field but reserved for calibration purposes only. To check the copper sulfate against another electrode, place the two electrodes together end-to-end (with the porous plugs in contact), and measure the potential between the electrodes, using a voltmeter having an input resistance of at least 10MΩ. Set the meter on a low voltage range, preferably 100mV or 200mV. Normally, the difference between the "standard" electrode and the working electrode should not exceed 20mV, provided that both electrodes are the same temperature. When it is found that an electrode varies 20mV or more as compared to the "standard" electrode, the solution should be discarded, the tube rinsed out with distilled water and refilled with fresh solution and copper sulfate crystals. The copper rod may also be cleaned with a 3M green abrasive pad until it is bright and clean. All traces of sanding grit should be removed with distilled water.

CALIBRATION STANDRD:

By definition, the copper sulfate half-cell is standard. When a saturate solution of $CuSO_4$ is in contact with pure copper, an electrochemical reaction occurs that is in the equilibrium and therefore constant. Consequently, to make copper sulfate standard, a pure copper 99.99% rod is immersed in a saturated solution of distilled water and high purity $CuSO_4$. These are the materials which the M.C.Miller Co., Inc. uses in the manufacturing of its electrodes.

ACCESSORIES AND PARTS:

RE-375 Electrode with 0.2oz (6 ml) Distilled Water	15210
RE-375 Electrode with 0.2oz (6 ml) Anti-freeze	15104
Hex Copper Rod Assembly	SUB147
RE-375 Tube & Plug Assembly	SUB15609
0.2oz (6 ml) Distilled Water Dropper Bottle	17230
0.2oz (6 ml) Anti-Freeze Dropper Bottle	17225
Black Protective Cap	MIS415
15" Extendible Extension RE-375	15105
15" Intermediate Extension RE-375	16225
30" Intermediate Extension RE-375	16230

NOTE: For Safety Data Sheet (SDS) call 1-772-794-9448 or visit http://www.mcmiller.com

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