



# **TINKER & RASOR**

CORROSION MITIGATION INSTRUMENTATION

P. O. Box 1667 SAN BERNARDINO, CA 92402

TEL: (909) 890-0700

FAX: (909) 890-0736

## **PRODUCT INSTRUCTIONS**

# **Portable Reference Electrodes (CuCu/SO<sub>4</sub>) and W-7 Waterproof Adapter-**

**IMPORTANT NOTE: Do not use this instrument in an explosive environment.**

UPDATE: Beginning in January 2010, Tinker & Rasor Models 6-A, 6-B, 8-A and 8-B will begin using a new, tougher body tube. This tube does not include a viewing window. A small, add on clear tube is available on request that will provide a view inside the half cell body.

## **1. PREPARATION**

1. Remove either end of the electrode and fill with water. (Distilled water recommended) Half-Cell Electrodes are shipped dry. However, they do contain the initial charge of high purity copper sulfate crystals. MSDS available upon request.
2. Replace the end piece, making sure both ends are firmly screwed down on the o-rings for proper sealing. Do not over tighten.
3. Shake electrode to obtain proper solution saturation.

*Note: All Tinker & Rasor Half Cell ceramic tips are pretreated with Copper Sulfate solution for rapid wetting on initial preparation for first time usage.*

### **Replacing Copper Sulfate Crystals:**

Using the Tinker & Rasor replacement Copper Sulfate Crystals, remove the tip end and fill half cell between 1/3 and 1/2 full. (Tinker & Rasor part no. 049-011)

Fill with distilled water (recommended), leaving enough room at the top to screw the tip assembly back on. (Approximately half inch, 13mm, from top)

Store half cell horizontally, or vertically with tip assembly down, for approximately 10 minutes to saturate tip prior to use, or set tip assembly in container of distilled water for 10 minutes.

**Web: [www.tinker-rasor.com](http://www.tinker-rasor.com)**

**E-mail: [Info@tinker-rasor.com](mailto:Info@tinker-rasor.com)**

QMF-570 101-120



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### **2. OPERATION**

1. Remove the vinyl protective cap from the ceramic porous plug.
2. Place ceramic plug in contact with moist soil or water and connect copper rod assembly terminal (Knurled nut, hex nut) of the electrode to appropriate voltmeter.

*NOTE: When using cell with extension or pole, it is advisable to remove both the knurled nut and the hex nut to avoid possible damage to the rod holder.*

3. Make connection from the voltmeter to structure under test.
4. Observe polarity and voltage that is usually below two-volt range.
5. Always replace the vinyl cover on the electrode after each usage to prevent moisture loss in the ceramic plug.

### **3. SERVICE**

Service to your reference electrode is recommended based upon use. If the reference electrode is used frequently, more than once per week, the instrument should be serviced on a bi-monthly basis. With less frequent use, service to the half cell on a bi-annual basis might be more appropriate. If the cell is used only once or twice per year, it is recommended that the cell be stored dry, with no water.

1. Removed the porous tip by unscrewing the tip assembly, and set aside.
2. Drain the water from the cell. It is not recommended to save the crystals during service, unless the cell is being emptied only for storage.

NOTE: Disposal of cupric sulfate crystals varies by locale. Contact your local sanitation district for disposal information.

3. Unscrew rod holder end, and remove copper rod assembly.
4. Using a common non-metallic abrasive cleaning pad (for use on dishes), softly buff the copper rod to remove any contaminants and oxidation residue.
5. Soak all parts in clean, distilled water for 24 hours.
6. Re-assemble, using new crystals and fresh, distilled water.

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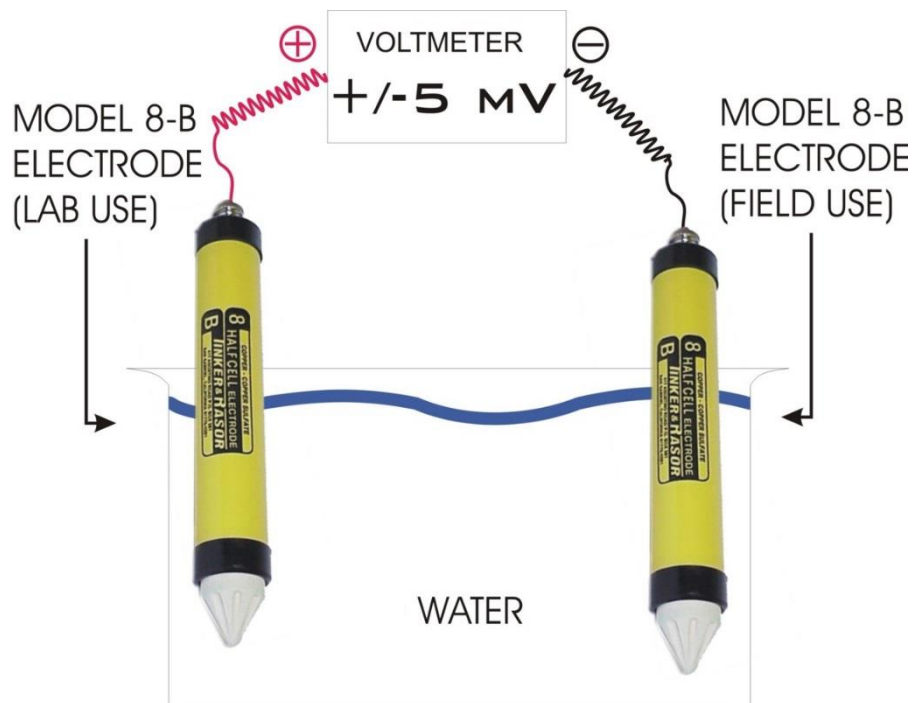
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7. Let reference electrode stand tip down (or lie horizontally) for at least 15 minutes prior to use to saturate porous tip.
8. To check that the reference cell has been effectively cleaned, connect two recently cleaned reference cells to a voltmeter and submerge both into a bath of water. The voltmeter should show a potential difference of less than  $\pm 5$  mV. This would indicate that both reference electrodes are working well. It is recommended that for further control of the reference cells, a "Lab Use Only" cell be maintained and kept up for the purpose of proving the servicing of field use half cells.

An example of this test using Model 8-B Reference Electrodes is shown below. When each cell is connected to a voltmeter, a potential difference of less than 5 mV (0.005v) should be observed. If a potential difference greater than 5 mV is shown, it is recommended that the field use cell be broken down and serviced, as described above.





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### **4. W-7 WATERPROOF ADAPTER**

1. Observe the drawing supplied with each Half-Cell and screw the adapter onto the Half-Cell electrode leaving approximately 1/2 turn before compressing the large "O" ring to seal.
2. Strip 1/4" of insulation from end of #18 Ga. stranded test lead wire and insert stripped end into the brass hex fitting, making sure small "O" ring is in place over the insulated part of test lead. Push test lead into the brass fitting as far as possible. Tighten hex nut firmly.
3. After hex nut is secured, hand tighten adapter to Half Cell firmly seal the "O" ring between adapter and electrode.
4. Test lead wire insulation should have no discontinuities in the portion that will be submerged and the Half Cell should be filled completely so pressure will not force water into the electrode and contaminate the copper sulfate solution.
5. The Model W-7 can be used with most reference electrodes utilizing 1/4-20 threads.

### **4. SHIPPING INSTRUCTIONS**

All instruments being returned for repair should be sent PREPAID to either address below:

Tinker & Rasor  
791 S. Waterman Ave.  
San Bernardino, CA 92408

Tinker & Rasor  
P.O. Box 1667  
San Bernardino, CA 92402

Include with shipment information regarding the nature of the problem, purchase order or other payment methods, fax number or other contact method and return delivery address. Immediate service is guaranteed!

105-308

**Web: [www.tinker-rasor.com](http://www.tinker-rasor.com)**

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