

Model AC-10

Portable AC Current Density Coupon/Probe Operating Instructions

Introduction

Used much like a portable reference electrode and similar to a soil pin, the AC-10 Current Density Coupon/Probe is driven into the soil and functions in the same way as a permanent AC current density coupon. Since it's portable, the **AC-10** coupon/probe allows the CP technician a method of measuring AC current density on demand or during a normal pipeline corrosion survey.

Provided Equipment

The model **AC-10** (Farwest Item #04-32150) comes complete with:

- **AC-10** coupon/probe assembly with 10cm² conical tip and multiple options for test lead connections
- Spare 10cm² conical tip
- Hardened steel drive-pin for creating a “pilot hole” in hard soil conditions

Operational Overview

Similar to a permanent AC current density coupon, it is imperative that the AC-10 conical tip be in good/intimate contact with the soil to obtain an accurate measurement. If there are voids between the tip-to-soil interface, it will result in a smaller area of contact to the soil. The consequence of this will be a lower than actual current density reading. To achieve the most accurate current density reading, please review the following recommendations.

Instructions

Before proceeding, you should evaluate how hard the surface soil is. In firm or soft soil conditions, the AC-10 can be driven directly into the soil. In hard or rocky soil conditions, it is recommended that a “pilot” hole be created with the use of the provided steel drive-pin. The following instructions addresses both conditions:

FOR USE IN SOFT OR SEMI-SOFT SOIL CONDITIONS

1. Before driving the AC-10 probe into the ground, ensure that the conical tip is properly tightened and in good condition. See “Care and Maintenance” section below for more information.
2. Using a hammer (recommend 2 lb. maximum), drive the AC-10 probe into the ground. The conical tip only needs to be driven into the soil between 3 to 6 inches in depth.
3. Remove the AC-10 probe from the soil and add a few ounces of regular tap water. The water will improve the contact to earth of the 10cm² conical tip. Use of distilled water is NOT necessary and **NOT recommended**.
 - a. **Note: Distilled water is essentially an insulator and its use in this application will yield a false low reading.**
4. Replace the AC-10 probe into the soil and drive the tip back to the bottom of the hole.
5. Using a standard Digital Multimeter (DMM), place the meter function on AC milliamperes.



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Operating Instructions Continued

6. Connect one test lead wire to the AC-10. Use either an alligator clip on the threaded stud or a male banana plug in the hole opposite the threaded stud.
7. Connect the other test lead wire to the pipeline under test. This can be accomplished by direct connect or through an existing test station terminal connected to the pipeline.
8. Read the DMM display and not the reading provided in milliamperes (mA). Because the conical tip coupon is 10 cm² in surface area, the conversion from measured mA to Amperes/Meter² is a direct numeric conversion. Record this measurement.
 - a. Example: 25.0 mA (measured) = 25 A/m² AC current density.
9. It is recommended that at least three (3) measurements, at each test location, at a space of approximately 12" apart, be taken. The highest measured reading shall be considered the most accurate for the site tested.
10. If there is a large difference (greater than 50%) between the measurements, it is likely that contact between the conical tip and the soil was inconsistent. Consider obtaining additional measurements ensuring proper contact with the conical tip.

FOR USE IN HARD OR ROCKY SOIL CONDITIONS

1. Before driving the AC-10 probe into the ground, ensure that the conical tip is properly tightened and in good condition. See "Care and Maintenance" section below for more information. Select the locations to be tested.
2. Using the provided hardened steel drive-pin, drive the pin into the soil approximately 3" to 4" deep to create a "pilot hole" for the AC-10 probe.
3. Pour tap water into the pilot hole.
4. Drive the AC-10 probe into the pilot hole until it bottoms out.
5. Using the same procedure described above (#5 thru #10) measure and record the AC current density.

CARE AND MAINTENANCE

- During a survey, it is important to periodically check to ensure that the conical tip is tightly seated against the drive rod. Keep in mind that "hand tight" is all that is necessary for this purpose.
 - If the tip is not seated properly, two issues can occur.
 - The current density readings will read lower than actual.
 - The driving impact will be directed through the threaded stud rather than to the bottom of the steel rod. This can damage the internal threads of the AC-10 shaft and or the conical tip.
- If the conical tip becomes worn or damaged, the effective surface area will be reduced. This will result in lower than actual current density readings. Replacing the conical tip is simply a matter of unscrewing the worn tip in and installing a new tip.

**FOR QUESTIONS OR ASSISTANCE, CALL THE FARWEST CORROSION
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