Model AC-10

NEW

Portable AC Current Density Coupon/Probe

by Farwest Corrosion Control Company

Induced AC (Alternating Current) on pipelines is a potential shock hazard to personnel as well as a source of corrosion damage. Current technology to detect and monitor induced AC current include the use of portable or permanent reference electrodes to measure voltage, and/or buried "current density coupons" to measure levels of AC current density.

Monitoring the current density, rather than just AC voltages, is a key factor in assessing the AC current related corrosion risk. A simple and effective method of determining current densities is to install a steel coupon, of a known surface area, in the soil adjacent to the structure. By connecting the coupon to the pipeline through a current measurement shunt or meter, the induced AC current density can be easily calculated.

Until now, only permanently installed AC current density coupons have been available. Unfortunately, the cost to install these permanent coupons can be thousands of dollars per site when considering the materials, planning, permitting, mobilization, equipment and labor.

The Farwest model AC-10 portable steel coupon/probe is the answer to this issue. Used much like a portable reference electrode and similar to a soil pin, the coupon is driven into the soil and functions like 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.

Product Features:

- Durable steel construction.
- Multiple cable connection options
- Replaceable 10 cm^2 conical tip for soil contact
- Simple to use. AC current density readings are achieved within seconds.

Operation:

The conical tip of the **AC-10** coupon/probe must be in good contact with the soil to obtain an accurate measurement. Once this is done, the current density measurement is taken via a digital multimeter (DMM) and wire connections to the coupon/probe and the pipeline. As the coupon/probe is 10 cm^2 in size, the conversion from milliamps (mA) to Amperes/$Meter^2$ is a direct numeric conversion.
Example: 25.0 mA (measured) = 25 A/m^2 AC current density.

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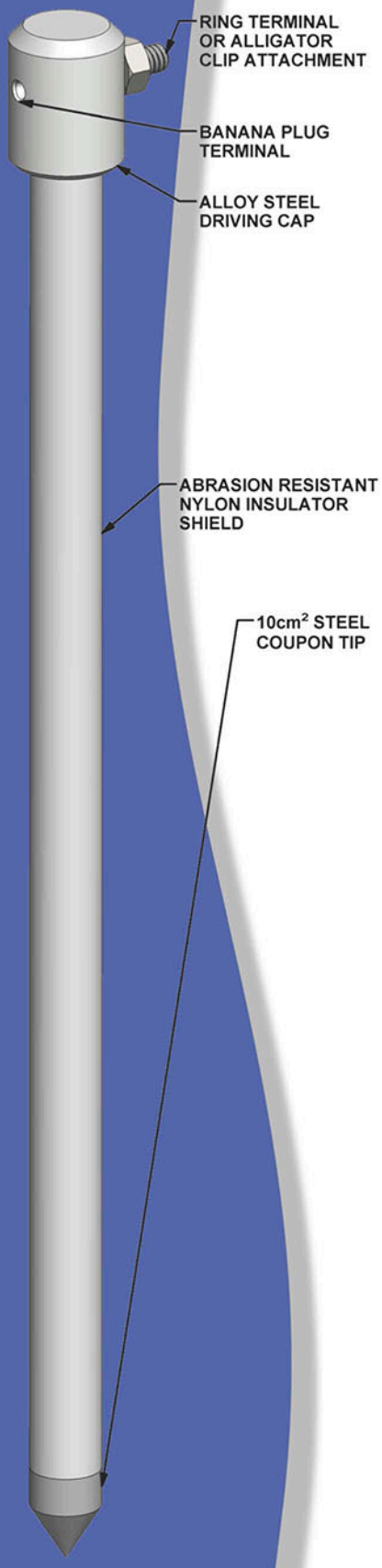

Provided Equipment

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

- **AC10** coupon probe with cable connection points
- Spare 10cm^2 conical tip
- Hardened steel drive-pin for creating a "pilot hole" in hard soil conditions
- Operating instructions

Induced AC Current Overview

Induced AC is a common problem that occurs when buried metallic structures are in a common corridor or near energized power lines. The electromagnetic fields associated with high power AC transmission lines can cause unwanted voltage to "appear" on the structure, potentially damaging the structure or creating a safety hazard to personnel.

There are two primary concerns with induced AC on metallic structures:

1. Induced voltages can present a shock hazard to personnel that physically touch the structure or metallic devices connected to the structure.
2. AC is known to be the direct cause of soil side corrosion on buried and submerged structures in a similar manner as DC corrosion.

Understanding the corrosion mechanisms caused by induced AC continues to be a challenge in the industry but it has been demonstrated that AC current can absolutely cause corrosion on even cathodically protected steel structures. The corrosion that can occur from induced AC is not necessarily proportional to the induced voltage. Many factors must be considered by knowing the magnitude of the induced AC current density is a key factor in evaluating the probability of induced AC corrosion.

AC corrosion is similar to DC corrosion in that the AC discharges at the coating flaws (holidays). The better the coating yields smaller areas of bare metal in contact with the earth, which results in higher current densities per unit area of the steel structure.

NACE International publication 35110 indicates what effects AC current density levels can have on the corrosion rates of buried steel structures:

- Less than 20 A/m^2 = No induced AC corrosion issues.
- Greater than 20 A/m^2 but less than 100 A/m^2 = Corrosion is unpredictable and influenced by many environmental factors.
- Greater than 100 A/m^2 = AC corrosion is likely to occur on the structure.

Reducing the AC voltage potential to 15 volts or lower, as recommended by NACE International and OSHA for personnel safety reasons, is not necessarily sufficient to mitigate AC corrosion on the structure. Therefore, it is important to determine AC current density and the **AC-10** can provide this information quickly and efficiently.

While you're in the field, get AC current readings in seconds with Farwest Corrosion's Model AC-10 portable coupon probe

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