AC Coupon

Model ACC2-1 for Permanent Burial

Safe

Due to an unprecedented level of public awareness towards new and existing energy infrastructure, finding the space required to build buried pipelines and overhead power lines is becoming increasingly difficult. The logical solution is to utilize shared right of ways (ROW). However, modern pipelines buried in close proximity to high voltage overhead power lines have the potential to pick-up AC current, causing both a public safety risk due to electric shock and a corrosion risk due to AC corrosion.

This is why Corrosion Service developed a class-leading AC Coupon, which allows pipeline operators to monitor induced AC current density and install mitigation measures in areas where the risk is highest.

Simple

Suitable for use with both new build and existing structures, the ACC2-1 is buried adjacent to the target pipeline. Installation can be completed quickly and efficiently, since the ACC2-1 is small enough to be positioned within a hand excavated or hydro-vac hole. Once a connection to the pipeline is established via a shunt (typically a 10 ohm resistor) and after letting the coupon to stabalize for serveral hours, the DC and AC currents may be recorded and the average AC and DC current densities may be calculated and compare with the limits indicated in the NACE Standards SP21424-2018. These recorded values are sufficient to give operators the information they need, to determine whether AC mitigation is required and where it is required.

Our strategically placed distribution hubs can dispatch in-stock ACC2-1 probes at short notice to any project in the world.

Features & Benefits

+ Reduces owner/operator risk by allowing regular monitoring and preemptive action, to mitigate potentially hazardous AC current.
+ Validates the effectiveness of existing mitigation measures and provides regulators with historical and current operating data.
+ Cost-effective, easy hydro-vac or hand excavation installation in native backfill.
+ Compatible with remote monitoring and data recording hardware.
+ Suitable for installation with most new and existing test stations.

CORROSION SERVICE

SAM-PCP-15-0005_REV6

EXAMPLES OF CALCULATIONS

The average AC voltage recorded across a 10Ω shunt during 72 hours was 43.1 mV and the DC voltage was 1.2 mV. Using a 10Ω shunt, the current density measured in a A/m² and the voltage measured in milivolts have the same numeric value.

Therefore, the average DC current density of 1.2 A/m² exceeds the 1 A/m² limit and the AC current density of 43.1 A/m² exceeds the corresponding 30 A/m² limit. There is a risk of AC corrosion, and mitigation will be required

Data

Shunt resistance: R = 10Ω (typical)

Voltage across shunt: V = "a"mV (as measured)

Coupon surface area: A = 1 cm²

$I = 0.1 \times \text{"a" mA} = 10^{-4} \times \text{"a" A}$

Surface area $A = 1\text{cm}^2 = 10^{-4}\ \text{m}^2$

Calculation

- Current via the shunt (AC and DC):

$$I = \frac{V}{R} = \frac{\text{"a" mV}}{10\Omega} = 0.1 \times \text{"a" (mA)} = 0.1 \times 10^{-3} \times \text{"a" A} = \text{"a"} \times 10^{-4}\ \text{A}$$

- Current density (AC and DC):

$$i = \frac{I}{A} = \frac{\text{"a"} \times 10^{-4}\ \text{A}}{1\text{cm}^2} = \frac{\text{"a"} \times 10^{-4}\ \text{A}}{10^{-4}\text{m}^2} = \text{"a" A/m}^2$$

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