

Evaluation of the reliability of IR-Free probes in presence of d.c. stray currents

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The standard NF EN ISO 15589-1 defines criteria to evaluate the effectiveness of the cathodic protection (CP) on buried pipelines which theoretically requires IR-free potential measurements. The current applied method consists in measuring OFF-potential measurements along the pipelines when it is possible or on metallic coupons simulating a coating defect. These measurements are carried out by using a reference electrode and require a synchronized switcher to periodically shut off the CP current. Thus the OFF-potential value is obtained and is assumed to be close to the IR-free potential. However, the measurements cannot be continuously monitored and are strongly dependant on environmental parameters and on the position of the reference electrode.

In recent years, the IR-free probes emerged as an interesting alternative. The principle is related to the direct vicinity between the metallic coupon and the reference electrode ceramic which is integrated into the probe, that quasi eliminates the ohmic drop and allows the direct measurement of the IR-Free potential without requiring any CP shut off. Since 2014, RICE initiated a research program to test the relevance of these probes, first in laboratory to select a reliable and fairly accurate IR-Free probe and then in field conditions to validate the reliability of these probes for longer durations and in different environments.

The present work focuses on the results obtained on-field. The ON and OFF potentials of the metallic IR-Free coupon were monitored and compared to those obtained by the CP shutting down method. Results globally showed interesting performances of the IR-Free probes which considerably reduce the ohmic drop (up to 95 %) and are less impacted by environmental variations (climate, soil composition).

Keywords: IR-Free probes, cathodic protection, corrosion, ohmic drop