

SCOPE

- I ↗ 1.1 This practice covers the procurement and installation of corrosion monitoring facilities using electrical resistance corrosion probes.
- I 1.2 An asterisk (*) indicates that a decision by the Purchaser is required or that additional information is furnished by the Purchaser.

SUMMARY OF ADDITIONAL REQUIREMENTS

- I 2.1 Table 1 lists the practices and standard which shall be used with this International Practice for the installation of corrosion probes.

TABLE 1

PRACTICES	
IP 15-10-1	Instrument Transmission Systems
IP 15-12-1	Instrument Wire and Cable
STANDARD	
ASME B16.5	Pipe Flanges and Flanged Fittings

- I * 2.2 The Owner's Engineer shall select and specify the probes to be installed, the location where the probes are to be installed and the system requirements.
- I * 2.3 The contractor(s) responsible for installing the probe system shall obtain all fittings, valves, probes and other necessary items. The contractor(s) shall install the probes after hydrostatic testing or line flushing, and then field test the wiring and connections.

DEFINITIONS

- I 3.1 An electrical resistance corrosion probe includes a corrosion sensing element, a probe body with appropriate fittings for insertion into the system and an end connector for attachment to a meter, or wiring to a multiplexor, which electronically monitors the progress of corrosion.
- I 3.2 Probe retractor tools are special devices which provide mechanical advantage to the onstream installation or retraction of corrosion probes or hydrogen probes. Generally, they are suitable for use with pipe and pressure vessels up to 1000 psi (68 bar).
- I 3.3 The term Inspector, as used in this practice, refers to the Owner's Representative.
- I 3.4 "Meggers" are clip-on devices for checking the integrity of wire insulation, and can generate voltages beyond what is required to test the integrity of the wire's electrical insulation.

DESIGN

- I * 4.1 The type of corrosion monitoring equipment and the system requirements shall be specified by the Owner's Engineer.
- I * 4.2 Final layout details of the installation shall be reviewed with the Owner's Engineer. Arrangement drawings shall be prepared detailing connection locations and orientation, location of monitoring equipment, and routing of wiring.
- S 4.3 Intrinsically safe apparatus is required for automated corrosion monitoring systems.
- * Additionally, an intrinsic safety barrier is required where the probe measuring element may be exposed to an ignitable gas mixture during startup or shutdown operations.
- R ↗ * 4.4 All wire type electrical resistance probes shall be furnished with a shield to protect the measuring element. The stem shall be a specific grade of austenitic stainless steel when specified by the Owner's Engineer. All other corrosion probes shall be furnished with a shield only when specified by the Owner's Engineer.

IP 19-6-1		Facilities for Corrosion Monitoring in Process Equipment	
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S,R 4.5 All probe assembly components shall be suitable for the **line service classification** when installed in piping systems, or for the **specified pressure-temperature requirements** when installed in pressure vessels. Also, any polymeric sealants or adhesive resins in the probe assembly should be resistant to the process environment in the pipe or pressure vessel.

I 4.6 **Flanged connections.** Flange rating and type of facing will be specified by the Owner's Engineer. Flange facing finish shall be per **ASME B16.5**. Bolting shall be of the same material specification as that used for connections to the piping (or vessel). Flange fitting assemblies shall be supplied with mating flanges.

RETRACTABLE CORROSION PROBES

I 4.7 **Connections for installation of retractable corrosion probes and coupons** shall be per **Figures 1, 2, or 3**, as applicable.

S,O 4.8 **The design of retractable type probes and coupons** shall incorporate **features to:**

- Prevent accidental blowout** of the assembly from a pressurized system, as shown in **Figure 4**.
- Indicate probe assembly withdrawal limits** (i.e., when the probe has cleared the access valve).
- Minimize the risk of accidental closure** of the access valve while the probe is inserted.

The corrosion probe body shall include a velocity shield or stop ring that is sized to prevent the probe from being accidentally withdrawn through the packing gland. The velocity shield or stop ring shall be welded to the probe body as determined by the Owner's Engineer. See **Figure 4**.

M 4.9 The installation of retractable-type probes and coupons shall be such that retraction of the corrosion probe is not in the vertically downwards direction.

M 4.10 Consideration should be given to ease of handling of the retracting tool (i.e., the pressure rating of the probe system should not be disproportionately high).

O,R 4.11 A probe retractor device shall be used for temperatures greater than 150°F (66°C) or pressures greater than 150 psi (10.2 bar).

NONRETRACTABLE PROBES

M 4.12 Nonretractable probes should only be installed when the operating pressure of the pipe or pressure vessel is greater than 1000 psi (68 bar), or when specified by the Owner's Engineer.

I 4.13

- Connections for installation of nonretractable probes, including hydrogen finger probes, shall be with flanged fittings unless otherwise specified.
- Flange fitting assemblies shall be supplied with mating flanges.

ACCESS

M *4.14 **Where probe retractor tools** are required, the layout of adjacent equipment and piping, and platform clearances (clear width and length) shall take into account the **space to use these devices**.

M *4.15 **Corrosion probe assemblies** shall be **accessible from grade or permanent platforms**. The location of the assembly above grade or platform shall not be less than 1 ft (300 mm) and not more than 6 ft (1800 mm) unless otherwise approved by the Owner's Engineer. The exact locations (positions, orientation and penetration) of the probe assemblies will be specified by, or shall be determined in conjunction with, the Owner's Engineer.

FIELD WIRING PRACTICE

I 4.16 **Installation of signal wire** for probe installations shall conform to field wiring practices for instrumentation except as follows:

- The type of instrument cable between probes and junction boxes and multiplexors shall be as specified by the probe supplier.
- If probe wiring is run in rigid steel conduit, 4 ft (1200 mm) of PVC covered flexible metallic tubing shall be supplied between the probe and the conduit.
- For electrical readout corrosion monitoring probes, wiring shall be brought to grade or permanent platforms to junction boxes or multiplexors, as specified.
- Junction boxes and multiplexors shall be installed in areas which are classified as Class I Division 2 locations, unless instructed otherwise by the Owner.