

CUIIM CORROSION UNDER INSULATION INSPECTION METHOD

Major Benefits

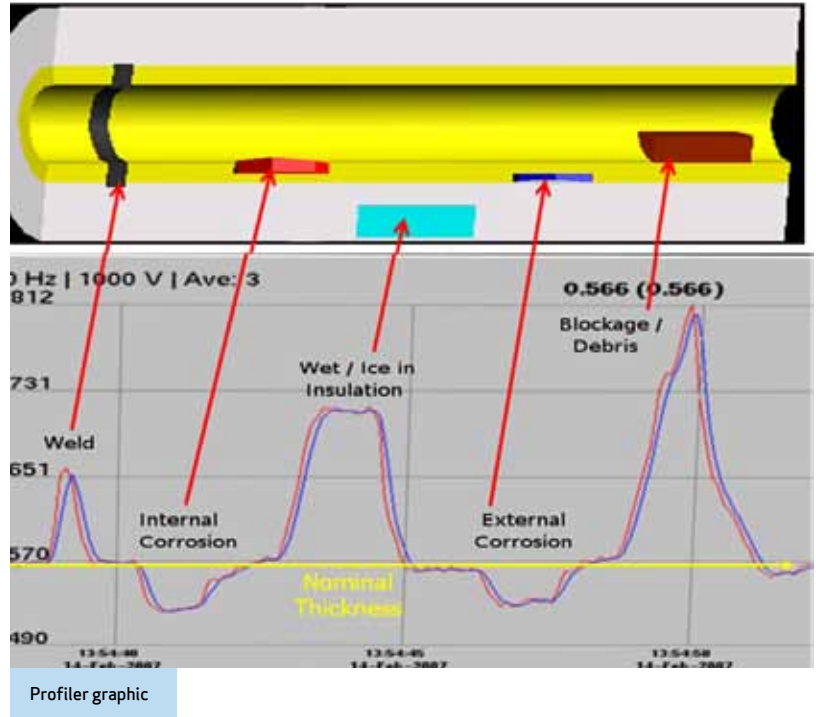
This is a small, portable, rapid and versatile screening method that can identify CUI. The method enables the inspection of piping without removing ANY insulation.

Compared to alternative screening methods for determining pipe wall thickness and condition, the Profiler has proved to be a fast and ultimately more economical than other conventional methods.

- More linear feet/meters of piping per day than many other screening methods.
- No need to remove and reinstall ANY insulation components for inspection.
- No process shutdown is required.
- No roping off or barricades are required and the inspection does not adversely affect nearby personnel or vessels.

Capabilities

The Profiler has been developed to help the customer identify ANY indication that can be manifested by a density change with or without insulation.



The Profiler can detect the most deteriorated areas of piping systems in a quick and economical manner in order to assess how much pipe wall loss is evident between two adjacent areas on the pipe. This enables the customer to quickly prioritise inspection and/or repairs in order to ensure the integrity of installed on or off-shore industrial piping.

The Profiler has proved to be a very efficient tool in finding:

- Corrosion under insulation (CUI)
- Changes in pipe schedules in process piping lines
- Wet insulation and ice in insulation
- Flow accelerated corrosion (FAC)
- Heat-affected zone (HAZ) corrosion on weld neck flanges
- Erosion, blockage, and determining liquid levels in process lines

The Profiler has been proven in independent studies to have over a 90% Probability of Detection (POD) compared to other pipe screening methods. This technology has been thoroughly designed, engineered, and tested prior to commercialization and has been verified as dependable in the field.

The Concept - Simple & Easy

The system is comprised of a very low curie gamma radiation source (Gd153), a photon detector, four interchangeable C-arms (8", 13", 18" and 24"), and a special interconnected computer/display module.

After calibration utilizing two known thickness values, a Profiler Scan will reveal the presence of density in the form of a line graph of thickness in either millimetres or inches.



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ITEM	CAPABILITY	COMMENT
Detectable Density Indications	Internal Corrosion External Corrosion Weld line identification Heat-Affected Zone (HAZ) Corrosion Blockage and Fouling Changes in Pipe Schedule Determination of product level Water or Ice in the insulation	All of these indications may be detected with the Profiler, but in order to identify the actual cause of any indication, other complimentary scans or NDE techniques may be necessary
Types of materials that can be examined	Carbon steel, stainless steel, cast iron, aluminium, plastic, and PVC pipes; wood, rubber, and composite materials	Specific material calibration standards may be required
Piping system component types that can be examined	Straight runs, elbows, tees, reducers, weld-neck flanges, and most other piping components.	Obstructions such as supports, valve boxes, etc. may prohibit complete coverage
Types of insulation that the pipe can be examined through without removal	Wool, fibre, glass, foam, etc.	Do not hinder the Profiler's ability to detect corrosion in a pipe.
Types of jacketing that the pipe can be examined through without removal	Stainless steel, aluminium, PVC, etc	Do not hinder the Profiler's ability to detect corrosion in a pipe.
Area of Coverage	The detector aperture is one inch in diameter and can be oriented in such a manner to permit density discontinuities from a number of orientations. Slices scans allow for interrogation of the entire cross-sectional area.	AGR's piping integrity expertise in corrosion dynamics can assist the customer in the accurate planning of inspection scope to determine the most likely areas to be damaged avoiding costly over-inspection.
Scan Rate (linear feet/meters per day)	Single orientation inspection for general corrosion in Sch. 40 piping is approx. 600 meters per day on ground accessible straight piping systems. Detection of wet or iced insulation alone is approx. 800 meters per day. For extensive interrogation i.e. multiple orientations and scans, tees, elbows, etc. the rate will depend on inspection scope and other factors.	This will depend on customer specified coverage requirements and physical configuration of piping systems.
Detection Sensitivity and Accuracy	As the Profiler is primarily a screening tool, this is a function of the area of coverage, scan speed, pipe schedule, calibrated sample rate and other factors.	As long as the total area of corrosion within the radiation beam is substantially the same as or larger than the effective area of the detector, the corroded area will be identified and reported with reasonable accuracy. Exact sizing can be accomplished with complementary NDE techniques.
Maximum pipe diameter	Approximately eighteen inches.	Pipe and/or product + insulation + jacketing up to 20" equalling no more than 2 inches of steel (or steel equivalent)
Personnel Requirements	Two operators/inspection specialists	"Two Person Integrity". One person operates the scanning arm, one person monitors the data acquisition process and quality
Mobility Capabilities	Single equipment case 64cmX45cmX40cm, 24kg, Transportable by land, sea and air	FAA and IATA approved under: "Radioactive Material, Excepted Package – Instruments, UN2911," Class 7.



CUIIM Equipment



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