

Corrosion Under Insulation Inspection

Pulsed Eddy Current Testing (PECT)



Overview

The next generation Pulsed Eddy Current Testing (PECT) technique has been developed to provide increased defect detection capability and operational speed.

Pulsed Eddy Current Testing (PECT) is a static non-destructive testing technique that measures the average remaining wall thickness of a defined inspection area (footprint). The variation in the wall thickness is measured by the static time between the induced and returning field lines and is compared against a calibration.



PECT is capable of detecting corrosion hidden under insulation and offers the following advantages:

- Ability to measure the steel thickness through the coating with thickness up to 250mm
- Ability to inspect through non-conducting and non-magnetic materials such as insulating materials like aluminum and stainless steel, concrete, plastic as well as corrosion products like iron oxides
- PECT measurements are hardly influenced by variation in the sensor lift-off
- PECT readings are highly repeatable and its high reproducibility makes the technique well suited for wall thickness monitoring
- PECT can be applied at high temperatures



PECT Equipment

The PECT equipment comprises of a ruggedised tablet computer connected to a data acquisition unit and includes four probe types to accommodate the different coating thickness. This equipment is splash-water tight, robust and easy to operate. The new semi-automatic ring scanner helps to decrease inspection time and gives more consistency to the inspection reproducibility. Data collection is fast with up to two measurements per second, dependent on the coating thickness. The collected data is then analyzed in real-time with various quality control features.

Powered by a dedicated battery of the latest technology located inside the data acquisition unit as well as two separate batteries for the tablet computer, the PECT equipment is powerful, fast and reliable. Both types of batteries are hot-swappable and are externally charged. Three standard probes, each for a different lift-off range, are optimised for defect sensitivity. The equipment can either be operated from the probe or from the tablet computer.

Colour-coded wall thickness readings are displayed on the touch screen during the data recording. A MS-Excel file report can be produced quickly by the tablet computer. In addition, PC-based software is provided for further analysis and reporting.

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Technical Specifications

KEY ITEMS OF PECT	
Material	Carbon steel and low-alloyed steel
Lift-off Range	0 - 250 mm (0 – 10")
Wall Thickness Range	3 – 100 mm (0.12" – 4")
Insulation Covers	PECT can measure through non-metal, aluminium and stainless insulation covers, reinforcement bars and wire mesh (if firmly fitted) while the inspection performance through galvanised weather sheeting depends on its properties
Probes	<p>Four different probe types depending on the lift off thickness:</p> <ul style="list-style-type: none"> • P1 → 0-20mm (0" to 0.8") • P2 → 20-50mm (0.8" to 2") • P3 → 50-125mm (2" to 5") • P3 Subsea → 50-125mm (2" to 5") • P4 → 125-250mm (5" to 10")
Cables	<p>Standard cable length is 8m (26ft) Subsea cable length is 150m (492ft)</p>
Inspection Speed	2 seconds per single measure (i.e. 1m length of a 12" pipe with 100mm footprint and 50% overlap between each measure takes ~ 15 – 20 minutes)
Probe Footprint	1.5 x (Wall Thickness + Coating Thickness)
Minimum size detectable	i.e. → 12" OD; 0.5" WT; 2" coating → Footprint ~ 95mmØ → ~45mmØ x50% (minimum size detectable)
Transport	<p>Transported in two Explorer cases; Each 67cm x 51cm x 26cm, (26"x 20"x 10"); weighing ~ 45 lbs (~20Kg) *Additional third case for ring scanner and longer umbilical</p>

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