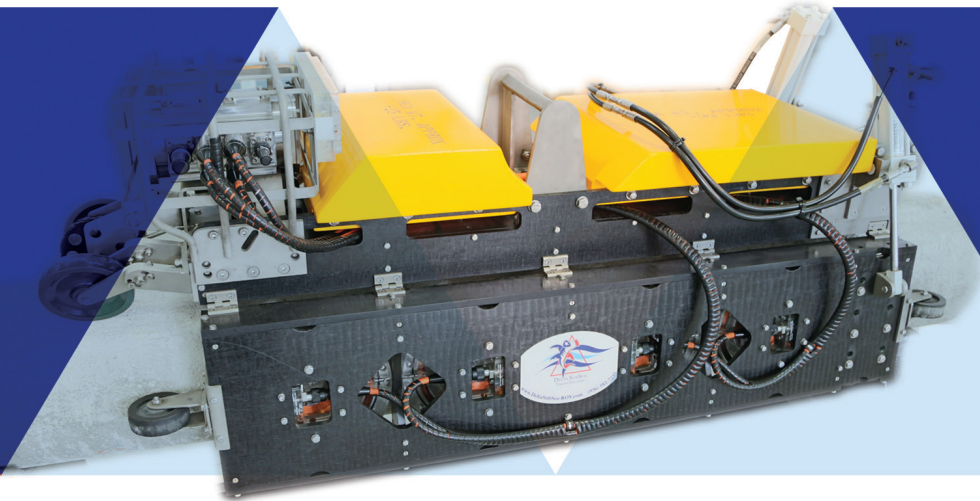


Delta SubSea

Subsea INCOTEST tool
for corrosion detection



A pioneering tool for the ROV deepwater inspection of non-piggable pipelines, called RTD INCOTEST, is proving to be a more cost-effective, faster and a safer way to detect corrosion. Through a new partnership between Delta SubSea and Applus RTD, this new one-of-a-kind deepwater tool is being introduced in the marketplace. The INCOTEST tool uses Pulsed Eddy Current testing to detect surface and subsurface corrosion in thin and thick-walled pipelines and vessels.

How RTD INCOTEST works

The DSS RTD INCOTEST (INSulated COmponent TESTING) is based on the Pulsed Eddy Current principle and is a reliable way to survey ferrous pipes and vessels through their thermal insulation and protective coatings. The detailed Pulsed Eddy Current technology is an excellent-tool for prioritizing further inspections.

The benefits of Pulsed Eddy Current Testing and DSS RTD INCOTEST are:

- ▲ Detection of surface and subsurface corrosion
- ▲ Measurements of average remaining wall thickness within the interrogated area (footprint)
- ▲ No contact needed for the measurement
- ▲ No special surface preparation needed
- ▲ Measurement through marine growth, fouling and concrete

- ▲ Measurements performed in-line and done in depths down to 3000 meters (9842 feet)
- ▲ Component evaluation at variable depths achievable through measurement at a range of frequencies or through different coil sizing
- ▲ No consumable chemicals required
- ▲ Fast: up to 1,000 measurements a day
- ▲ Operates on batteries or mains power

Technique

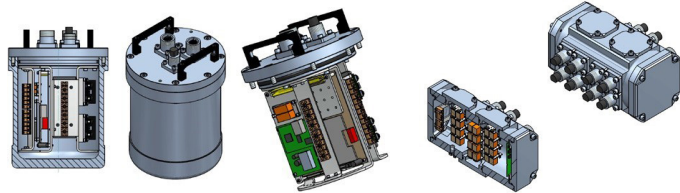
The low frequency pulsed magnetic field generates an eddy current at the surface of the material. Every time the magnetic field changes, eddy currents are generated in opposition to the changes. As they diffuse, they generate a magnetic field that is detected by the receiver coil in the probe. The average remaining wall thickness within the enclosed magnetic field can be calculated.

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The DSS RTD INCOTEST equipment is 'plug and play.' The equipment can be set up easily and be ready for inspection within minutes. The removal of marine growth such as barnacles is not required. The inspection data can predict lifetimes and ideal inspection intervals.



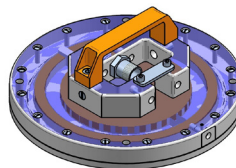
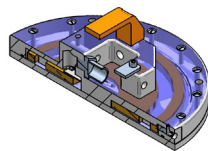
The more traditional inspection techniques are visual inspection and ultrasonic testing. There are several advantages of Applus RTD INCOTEST when compared to Ultrasonic Testing:

RTD INCOTEST

- ▲ No need for grinding /surface cleaning
- ▲ High production rate
- ▲ Average wall thickness on footprint area
- ▲ Measurement of the full material volume thickness through lamination
- ▲ Geometric influence
- ▲ Material magnetic permeability variation influence

Ultrasonic

- ▲ Clean, smooth surface
- ▲ Low production rate
- ▲ Wall thickness local value
- ▲ No geometric influence
- ▲ Measures until lamination interface, no information about total remaining wall thickness
- ▲ Material sound speed variation limited



DSS RTD INCOTEST is a cost saving alternative because there is no need for special surface cleaning and preparation and the system optimizes maintenance activities.

Characteristics of System Performance

- ▲ Nominal wall thickness to (0.236"-2.559 ")
- ▲ Insulation /coating thickness up to (7.874")
- ▲ Diameter down to (1.968 ") up to flat plates
- ▲ Temperatures: -150° centigrade to 500° centigrade (-238F – 932F)
- ▲ Accuracy +/- 5%
- ▲ Duration of one measurement between 4-10 seconds depending on wall thickness

The technology is an efficient screening method to localize corrosion areas under insulated objects and through the insulation, coating and/or fireproofing and in general through any electric non-conductive and non-magnetic material. The object under examination needs to be made of low-alloyed carbon steel. Areas of suspected corrosion would be further examined with quantitative technology, such as ultrasound technologies.

DSS RTD INCOTEST can be applied on piping and vessels, offshore platforms, risers and jacket construction piping, subsea piping, flow accelerated corrosion in liquid systems, corrosion under the installation layer on distillation columns and piping and vessels in process plants.



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