CORROSION UNDER INSULATION TESTING (CUI)

MINIMIZE DAMAGE, AVOID OPERATION INEFFICIENCIES AND IN-SERVICE FAILURES

Corrosion under insulation (CUI) occurs as a result of moisture infiltration on insulated low alloy and carbon steel equipment operating at high temperatures with cyclic service in the CUI temperature range. Moisture trapped under or within the insulation can create an extremely aggressive environment, accelerating the rate of corrosion.

OUR SERVICES

Element supports clients from a wide range of industries to assist in evaluating solutions to try and mitigate corrosion under insulation. Our coatings specialists have several years' experience of working in the field of CUI products and testing and as such can provide expertise to help you with your requirements.

CUI can often go undetected for long periods, subsequently causing damage to the infrastructure, which can become hazardous and costly to repair. In severe cases, the damage caused is followed by costly site remediation, long downtimes, and legal issues.

Protective coatings are often utilized in conjunction with aspects such as installation design, insulation choice, and inspection regimes as part of a systems approach to CUI prevention. In such cases, the selection of a coating requires an understanding of its performance characteristics when subject to both high temperature cyclic and CUI conditions.

TESTING IN ACCORDANCE WITH ISO 19277:2018

Several industry bodies have published documents and standards related to the mitigation of CUI, including standards specifically relating to coatings. ISO 19277: 2018 "Petroleum, Petrochemical and natural gas Industries – Qualification testing and acceptance criteria for protective coating systems under insulation" outlines methodologies which seek to test various coating performance characteristics and assess their suitability for use under insulation. This includes several classification environments upon which coatings are evaluated against dependent upon the temperature at which they are intended to operate including cryogenic service.

VARIOUS TESTING METHODS

Element supports clients from a wide range of industries to assist in evaluating solutions to try and mitigate CUI. Tests are conducted on both standard cured and heat conditioned samples for CUI 1, 2 and 3 categories. Element offers a variety of testing to verify performance for suitability under insulation in accordance with ISO19277:2018 which include:

- **Heat Conditioning:** Cyclic heat conditioning of coatings based upon the CUI category of choice.
- **Adhesion:** Evaluation of heat conditioned and standard cured materials both pre and post exposure.
- **Artificial Aging:** Exposure to neutral salt spray and water immersion.
- **Thermal Cycling:** Repeated heating and cooling over multiple cycles.
- **Multi-Phase CUI cyclic corrosion test:** A horizontal square pipe test to simulate a typical environment including dry heat, thermal shock, immersion in boiling water, steam interface and shut down time.
- **Cryogenic exposure:** Optional cryogenic cyclic testing.
- **Vertical Pipe Test (Houston Pipe Test):** Optional testing of coatings resistance to accelerated CUI conditions with wet/dry/heat/cool cycling of an insulated coated pipe for a total of 30 cycles.

In addition to standardised test protocols our engaged experts can provide bespoke testing programs for R&D including testing of alternative materials and modified test regimes.

Send your inquiries to: contact.us@element.com

Europe: **+44 (0) 808 234 1667** Germany: **+49 800 000 5137** Americas: **+1 888 786 7555** Middle East: **+971 800 353 6368**

ELEMENT MATERIALS TECHNOLOGY

WWW.ELEMENT.COM

June 2021