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Industrial Member Report Summary – Key Findings for Industry

Corrosion Under Insulation: An Overview of Causes, Prevention and Test Methodologies

TWI Core Research Programme

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Industrial need

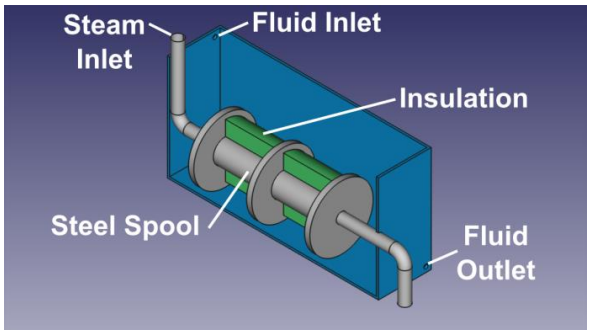
Thermal insulation applied to process piping and vessels to maintain temperatures and minimise energy loss can result in unexpected corrosion and, in the most severe cases, lead to dangerous plant equipment failure. Much data concerning corrosion under insulation (CUI) come from field and in—plant measurements, where corrosive conditions are not necessarily known in any detail, making fundamental study of corrosion processes difficult.

There is therefore a requirement for laboratory studies where expected CUI conditions can be simulated in a controlled manner and corrosion characterised or quantified. This report provides an introduction to the causes and primary CUI prevention strategies before surveying the technical literature surrounding the laboratory simulation of CUI.

Key Findings

All test methods reviewed in the present work either recreate expected conditions well, but provide no quantitative data or are able to provide quantitative data, but at the expense of no longer accurately simulating service conditions. They are broadly categorised as:

- Hot plate testing;
- Accelerated test rigs;
- Tests incorporating electrical resistance probes;
- Tests based on ASTM G189 that provide electrochemical corrosion monitoring, but do not accurately simulate CUI conditions.



Design of CUI test rig that simulates service conditions well, but provides no quantitative data.

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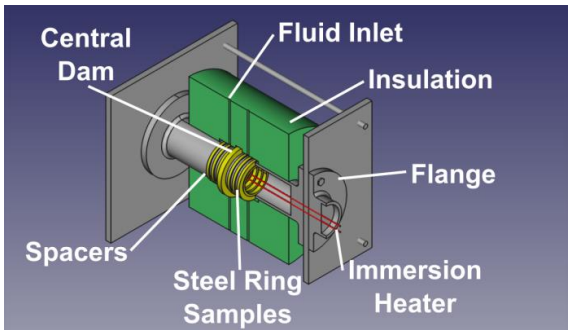

Design of CUI test rig that provides quantitative data, but does not simulate CUI service conditions.

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