Long-Term Corrosion Testing: What Happened Next?

In 2017 and 2018, Johns Manville built upon the long-term, third-party corrosion testing we started in 2016, and the new results are in. The research sought to explore how corrosion under insulation (CUI) impacts a completely insulated pipe system (pipe, insulation, and jacketing) under conditions designed to accelerate corrosion. The test program started in 2016 with two hydrophobic high-temperature blanket insulations (InsulThin™ HT microporous blanket and a silica aerogel blanket) and in 2017 was expanded to include testing on calcium silicate and expanded perlite insulation.

While traditional research and testing isolate variables to strictly explore the interaction of insulation on metal coupons, many facility operators feel that single variable laboratory testing is insufficient to capture the full spectrum of the influential variables encountered in real-world systems and applications. This led facility operators to seek out researchers to develop a test protocol that was more representative of real-world conditions. The new corrosion testing explores how the complete insulation system, as well as simulated environments, influence CUI.

The 2016 tests were conducted over the course of 6 months and explored the corrosion of carbon steel pipes insulated with two different hydrophobic, flexible blankets (InsulThin™ HT microporous blanket and a silica aerogel blanket) immersed in a chloride solution, in two different environmental conditions. In the first condition, the test apparatus was kept at temperatures ranging from 45°F to 60°F (sweating conditions), and it was not allowed to dry throughout the 6-month duration of the test. The second condition was cyclical, where the pipe assembly was cycled from ambient temperatures up to 600°F. Between each cycle, the test assembly was submerged in tap water and chloride solutions to cycle the assembly between wet and dry conditions.

The outcome demonstrated that InsulThin HT performed remarkably better than the silica aerogel blanket in terms of both corrosion resistance and long-term thermal performance. You can get a full account of that performance in the following blogs:

1. A Systems Approach To Corrosion Testing Part 1
2. A Systems Approach To Corrosion Testing Part 2: The Corrosion Results
3. A Systems Approach To Corrosion Testing Part 3: The Thermal Results

The initial research on the flexible blanket insulations has opened the door for continued exploration of long-term CUI testing. The industry's need to understand the variables of CUI has led to a concentrated effort to continue the research to determine how an environment designed to accelerate corrosion impacts the system in terms of CUI and thermal performance. As such, the second iteration of the tests, conducted in 2017, encompasses Thermo-1200™ calcium silicate and Sproule WR-1200® expanded perlite insulations.

This system-based test protocol is particularly important for these two products as they tend to have longer lifecycles when compared to other insulations with lower compressive strength. Understanding the system's long-term performance can be critical to ensuring that these types of insulation are used in the correct applications and maintenance is performed on the correct time-line.

The findings from the latest research are intriguing, and we will dive into the details in our upcoming blog, “Accelerated System Corrosion Testing with Calcium Silicate and Perlite Insulations.”

All Other Multimedia:
- 18-06-14-IND-BP-01.jpg (8.07 KB)

Language: English

Source URL: https://news.jm.com/blog/calcium-silicate-insulation/long-term-corrosion-testing-what-happened-next