HOW THERMAL INSULATION COATINGS ARE USED TO COMBAT CORROSION UNDER INSULATION (CUI)

We have all seen it. No matter what plant, process facility or industrial complex, there is CUI somewhere. Corrosion Under Insulation (CUI) is a term that causes your face to cringe, and your wallet to open. CUI can be defined as corrosion of a surface due to entrapment of moisture within the insulation blanket promoting an advanced state of corrosion of the surface underneath. Normally, CUI is found when inspecting a surface and can be catastrophic in nature. Its promotion is hard to detect, as the conventional type insulation covers the cancerous type growth and is only viewable when the insulation is removed. CUI is the major headache of any plant maintenance manager, difficult to stop, and expensive.

Standard practice years ago was to protect the substrate from corrosion and insulation combinations with standard off the shelf coating materials that were highly tolerant of corrosive type atmospheres, or to use sacrificial type coatings. Zinc primers worked well initially, but lost their ability to protect after the sacrificial elements had been depleted. Conversely, epoxies were used and performing well initially, they became brittle and cracked over time. Both coatings allowed moisture were bombarded by gases, salt and chemicals held within the insulation causing premature corrosion.

Thus engineers determined that they must study the problem and find an effective solution. Testing programs were initiated to identify primers, coatings and topcoats that would for longer periods of time in this severe environment.

Glass-flake epoxies and glass-flake novolacs (for chemical exposure and temperatures less than 325°F) were identified as good performers as well as high-bred zinc systems or acrylic -silicones (for temperatures over 325°F). However the next component of the system was the insulation and the cancer causing element. These insulators created a perfect corrosive environment for corrosion propagation due to their construction or applications with seams and voids.

What was needed was a new approach to an old problem of insulation and protection. This meant finding a different way to block the heat/cold path with direct attachment to the substrate leaving no room for CUI to develop. The answer came in a coating format call a Thermal Insulation Coating (TIC). Both laboratory and field tests were initiated and showed that the combination of a good primer with a TIC would produce not only dramatic temperature

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differentials but also protected the surface. The combination method offered a successful long term approach to the CUI problem.

As a side benefit, the initial cost of installing TIC's was found to be dramatically less than conventional type insulation with metal jacketing. While the long term savings of TIC's include lack of removal and replacement from having a fragile insulation with an equally fragile "protective jacketing" that requires removal and replacement for inspection. TIC's also allowed for total inspect-ability of a surface at all times. This meant that the surface was not hidden from view. Thermal Insulation Coatings could also be applied to working surfaces without shutdown. Surfaces now can be repaired easily, inspected efficiently, and now do not have to be continuously replaced due to substrate corrosion.

TIC's are an effective solution to many corrosion under insulation problems with a coating format. The system is now being accepted by majors such as Shell, BP, ConocoPhillips, Valero, ExxonMobil, Equistar, Chevron, Tyson Foods, DelMonte, ADM, and many others.

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