

Ceramic Cover CC Systems 100 VS Conventional Insulation Systems

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ABSTRACT

Hot liquor and other process vessels including piping create an unsafe environment due to emission of radiant heat.¹ Insulating the vessel creates a potential corrosion environment under the insulation. This paper will discuss a unique coating that provides protection from corrosion, virtually eliminates radiant heat and out performs 4 inches of R20 foam with just a 20 mil application. In addition, case histories will be discussed.

INTRODUCTION

Most industries encounter corrosion under thermal insulation. Most tanks, process vessels and piping is insulated with fiberglass or foam with an aluminum or 304 stainless steel jacket. Breaches in the jacket allows permeation of liquid process chemicals and moist ambient air causing potential corrosion to the substrate. This problem is exacerbated by the wicking of the liquid along the insulation. In addition to the corrosion problem, the insulation also loses its insulating properties.

Ceramic Cover CC Systems 100 virtually eliminates the corrosion under insulation problem while providing the necessary insulating properties for the specific environment. This product is formulated with a unique acrylic polymer binder combined with a blend of pigments, most notably, a calcined amorphous silica that has extremely high absorption properties with a very low specific gravity (0.59). It is environmentally friendly, cost competitive and easy to apply.

■ Why Ceramic Cover CC Systems 100 Should Be Considered Versus Conventional Insulation

Corrosion of carbon and stainless steel under conventional insulation on process equipment requires maintenance and repair costs: with safety risks to personnel and the environment. Using the insulating coating will reduce the risk of corrosion to the substrate to which it is applied by resisting movement of moisture and contaminants to the surface which cause the substrate to corrode. This material is a monolithic film having no fasteners or joints thus eliminating the potential moisture intrusion problem.

The Issues Affecting Corrosion of Carbon Steel Under Conventional Insulation. The rate carbon steel will corrode under insulation is influenced by first, the wet exposure cycle, the duration and frequency; second, the corrosivity of the moisture and third, the lack of or failure of the barrier protection between the insulation and the carbon steel.

Although, there are many factors contributing to corrosion under conventional insulation, the seven main factors, along with how Ceramic Cover CC Systems 100 help mitigate the problem, are as follows:

1. Equipment design
2. Service temperatures
3. Insulation selection
4. Protective coatings
5. Weather barriers
6. Climate control
7. Maintenance procedures

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Mastering an understanding of these issues will help to reduce the failure of insulation systems and reduce costs in these areas. When properly used Ceramic Cover CC Systems 100 offers some fixes with lower costs and better performance. It only takes mils not inches.

■ Equipment Design

Care in equipment design and support layout is key to providing space for the insulation system used. Pipes, pressure vessels and tanks are the main items involved with process equipment. Building structures and roofs require their own special design to cope with higher levels of weather proofing require due to exposure. Simplifying the surface to be insulated makes these tasks easier, more cost effective and provides longer life.

The Ceramic Cover CC Systems 100 is more conforming to the surface than conventional systems, and it does not require studs and lagging to support and seal the insulation from moisture.

■ Service Temperatures

The warmer the insulated equipment the less effect moisture will have on the insulated surface. Corrosion rates will be increased with the number of cycles the equipment goes through and the contaminants in the moisture. The better the weatherproofing the less the corrosion rate will be. Ceramic Cover CC Systems 100 resist the movement of moisture2 more so than conventional insulation systems.

■ Insulation Selection

Corrosion under the insulation system is directly related to moisture absorbency, chemicals and insulation breaches, consequently selection of an insulating material fitting the service application is key to minimizing the risk of under insulation corrosion. Non-wicking materials rate the best choice for high exposure areas to wet service areas. Insulation is normally selected based on installed cost versus energy cost saved, unfortunately maintenance costs don't enter the picture until later. Without the lagging requirement and being a water based system, which can be applied to most surfaces while the operation is in progress, makes the insulating coating product an easily maintained system. Polyurethane foam absorbs water readily, where as Ceramic Cover CC Systems 100 does not.3 A wet insulation system does not give the energy savings and is a corrosion liability.

■ Protective Coatings

Protective coating under insulation provides corrosion protection; however, it must meet immersion service conditions. The combination of moisture and heat along with chemical concentrations requires a coating system with a high resistance to permeability. With no access to maintain the coating system it needs to perform for 15 to 20 years. With an insulation system holding moisture to the surface longer than an non-insulated surface the need for the added protection of coating reduce the corrosion rate, significantly. Zinc rich primers and/or conventional coatings do not perform well in immersion service and/or under insulation. In certain applications the coating is only done on the last four to six feet of the tank wall at the foundation, this being the zone where spills and splashing occur. Welds and insulation rings must be seal welded or caulked with material compatible with the coating system. Coating under the insulating coating would only be required in high risk areas, example a storage tank containing chilled solution. With high humidity a chilled tank will draw moisture to it like a magnet.

The insulation coating is water based, top coating may be done to meet color requirements. The product may be tinted, however, better color results will occur with top coating. The top coating must be tested for compatibility with the water based system, so it does not impact adhesion or insulation values.

Be careful!