



BULLETIN

MADISON CHEMICAL INDUSTRIES INC.

InfoTech Bulletin # 20

GALVACLAD[®] *The Evolution Of Galvanized Steel Coatings*

April 2008



Madison Chemical Industries Inc.

"The World Leader For Infrastructural Coatings"[™]

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GALVACLAD® - THE EVOLUTION OF GALVANIZED STEEL COATINGS

Galvanizing has been a primary means of protecting steel surfaces from corrosion since the process was patented in Great Britain in 1837. In essence, a well adhered layer of zinc (the galvanizing) acts sacrificially to protect the more inert parent steel.

In routine atmospheric service, the zinc ages to form what is commonly called a "patina" and lasts for many years. In more aggressive environments, the zinc will not form the desired patina and will deplete at an accelerated rate. This has led to a common practice known as "Duplex Painting", the application of a barrier coat to protect the sacrificial one and, in turn, the underlying substrate.

A basic shortcoming with Duplex Painting is that it has always involved thin film coatings and therefore has limited longevity. Madison was a pioneer in the mid 1980's in the use of high build coatings for galvanized structures where a service life measured in decades was desired. Commercially to date, this newfound knowledge has been used primarily in the power pole industry where the embedded portion of transmission and distribution poles needs heavy duty protection. Today, Madison offers a variety of coatings used for the protection of galvanized structures above and below ground and in hostile environments involving chemicals, oceanic exposure or unremitting UV radiation. Research has been ongoing, some of which is proprietary and some of which has been published in corrosion industry journals.

In the last twenty years, more and more has been learned about the art and science of high build coatings over zinc. Quality steadily improved as Madison trained and partnered with its customers. However, one intransigent technical problem remained. Blasting of the zinc was the only way to get a long term result but the blasting process, by its very nature, was removing some of the newly applied zinc and potentially fracturing what remained. Also, blasting is impractical for field work on either new or existing structures.

The illusive search for a less invasive form of surface preparation met with two unexpected successes in 2007. Firstly, it was discovered that a relatively simple formula modification increased adhesion significantly, on the order of 50%, especially where conditions were less than ideal and the bond might otherwise be marginal. Secondly, and even more surprisingly, our research team developed an acid-based liquid pre-treatment blend that worked synergistically with the coating, thus enabling the user to eliminate blasting altogether! The structure is simply sprayed at low pressure with the acid blend, then the surface is power washed with warm water and allowed to dry prior to application of the coating. It's that simple. Besides being cost effective, the new process is much easier to control because there are so few variables compared to blasting. Capital costs are 80 to 90% lower than building a blast facility of comparable capacity. The results are comparable to a white metal blast with steel grit (which has always been regarded as the "gold standard" of surface preparation.

Realizing that the new discovery has implications for virtually every industry that works with galvanized parts or structures, Madison expanded the product offering and released it in early 2008 under the newly-coined Trade Mark GalvaClad®. The line comprises four unique, yet complementary products:

GalvaPrep®: A proprietary water dispersible acid etch mixture

GalvaClad® Aromatic: A multi-purpose 100% solids, 1:1 fast set polyurethane protective coating

GalvaClad® Aliphatic: Similar to GalvaClad Aromatic, with premium resins for color and gloss stability

GalvaClad® Liquid Zinc: A versatile, user friendly, surface tolerant primer/repair coating

Target markets include water/wastewater pipelines and infrastructure, mining, pulp and paper, petrochemicals, agriculture, construction, energy and communications, among others.

Figure I shows the 'evolution' of GalvaClad® Aromatic. Note the significant improvement compared to the traditional coating (denoted as "Regular") with slag, shot and grit blasting. The comparison between GalvaClad® utilizing grit blasting side by side with GalvaPrep® is truly remarkable and shows the full benefit of this unique coating system. For specific product details, refer to the GalvaClad® Product Profiles, Technical Data Sheets and Application Instruction Bulletins.

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Fig.I Comparison of Coatings and Surface Preparation
Galvanized Steel

