White Paper

Hot-Dip Galvanized vs Mechanically Deposited Zinc

Subject:

Victaulic has adopted ASTM B695-02 *Standard Specification of Zinc Mechanically Deposited on Iron and Steel* for the zinc coating option for select Victaulic products. We have conducted testing and concluded that the ASTM B695-02 zinc coating standard demonstrates corrosion resistance characteristics equivalent to the commonly used zinc coating standard: *ASTM A 123/A 123-M Standard Specification Zinc (Hot-Dip Galvanized) Coatings for Iron and Steel Products*.

Zinc Coating:

Zinc coatings form a metallic barrier on iron or steel inhibiting moisture from reaching the substrate surface which in turn prevents corrosion of the base ferrous material. Zinc is commonly applied to iron and steel material through a process known as hot-dip galvanizing (ASTM A123) in which the fabricated iron or steel is coated by immersion into a bath of molten zinc. This method of applying zinc coating will produce a semi-gloss silvery appearance with a surface smoothness condition to that of the as-received (un-galvanized) material. Mechanically deposited zinc (ASTM B695) is a process in which the iron or steel material is tumbled at room-temperature in an automated barrel in the presence of glass bead impact media, substrate promoter material, and zinc powder. This process mechanically deposits and imbeds the zinc on the surface of the substrate forming a smooth, silvery appearance and a matte to medium-bright luster. Both forms of zinc coating, when at the same thickness, will produce an equivalent corrosive resistance surface when tested to the ASTM B117-19 Standard Practice for Operating Salt Spray (Fog) Apparatus – a standard test method for evaluating the corrosion resistance capability of zinc coatings on iron and steel.

Test:

Corrosion testing used three housings per process as the test samples addresses proving A695 is equivalent to A123 for corrosive resistant applications. One housing had not been assembled prior to being placed into the environmental chamber. The other two housings were assembled on pipe and then placed into the test to evaluate. Housings shall exhibit no signs of corrosion as defined in ASTM B117.

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Figure 1: Mechanically Deposited Zinc Coating Pre-Test

Figure 2: Hot Dip Galvanized Pre-Test

Figure 3: Mechanically Deposited Zinc Coating Post-Test

Figure 4: Hot Dip Galvanized Post-Test

Conclusions:

Based on the results of our testing, it can be concluded that our mechanically deposited zinc coating (ASTM B695) demonstrates equivalent corrosion resistance properties to that of hot dip galvanized (ASTM A123). In all coating samples, no visual corrosion was identified per ASTM B117.

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