



SIGMA Z-COAT

The Fitting Choice for Corrosion Protection



Author: Stuart Box
Vice President, Engineering, Production and Quality
SIGMA Corporation
sb2@sigmaco.com
1-800-999-2550 x 4422
www.sigmaco.com

Overview

Corrosion creates a significant problem in water and sewer systems. Ninety percent of the 240,000 pipe failures that occur in the US each year are caused by corrosion. These failures result in health risks, flooding, service disruptions, and an annual cost of \$36 billion. This paper will seek to explain how the application of zinc can prevent corrosion and mitigate the problems associated with it.

Corrosion Explained

Corrosion is a natural process that causes the gradual destruction of material (usually a metal) through a chemical and/or electrochemical reaction with its environment. Corrosion converts a refined metal into an oxide, hydroxide, or sulfide, which destroys the physical properties of the metal and causes it to degrade and disintegrate. This is a significant problem in “hot zones,” or areas with corrosive soils, which includes much of the United States. Better manufacturing process has allowed the wall thickness of pipe and fittings to be reduced significantly without compromising performance requirements, but the thinner walls increase the need for better corrosion protection features.

Zinc Explained

Zinc coating is one of several methods of corrosion protection available on the market today, and it has been shown to have significant advantages over other options. Zinc functions as both a physical barrier and a sacrificial anode when paired with ductile iron. Because zinc is less noble than iron, the zinc will corrode before the iron on a DI pipe or fitting, or “sacrifice” itself, thus preserving and protecting the DI material over time.

Zinc delivers superior galvanic protection, particularly in highly corrosive “hot zones”. Its advanced coating protection delivers extremely effective galvanic protective properties, tenacious bonding, and abrasion resistance. Unlike rust on steel or cast-iron surfaces, which slowly eats through the material, the zinc layer is capable of “self-healing” by way of oxidizing over a “holiday” or flaw, repairing itself and creating a new protective barrier.

SIGMA Z-COAT: Features and Applications

The right tools are essential in any activity, whether it be eating, hunting, or installing properly protected fittings. Just as one would not use a fork to consume soup, or aim a fishing rod at a buck, one would not choose a coating process designed for smooth, uniform surfaces like sticks of pipe for protecting irregularly-shaped products with rougher surfaces, like pipe fittings. Because the zinc-rich paint is sprayed on as a liquid, SIGMA Z-COAT permeates all surfaces and fills the peaks and valleys that naturally occur in the manufacturing process on the surface of fittings and other components. This avoids uneven coating and fills any voids in coverage, which can result in corrosion and ultimately, failure. The zinc-rich paint, or SIGMA Z-COAT method, is considered superior for use on fittings and other products with non-uniform shapes. The arc zinc process that sprays molten zinc is not as efficient on fittings as it is on pipe.

The benefits of SIGMA Z-COAT include:

- J Adherence to ISO-8179-2 requirement for liquid inorganic zinc-rich coating
- J Mean mass of zinc-rich coating not less than 235 g/m²
- J Mean mass of zinc-rich coating 300 g/m² can be provided for especially hot soil
- J Minimum coating thickness of 3.5 mils
- J Asphaltic topcoat paint applied as per ISO 8179-2
- J Requires a lighter spray gun that is easier to operate, reduces worker fatigue, improves control, and results in more even coating
- J Safer for workers as it is non-vaporized; minimal risk of inhaled aerosols, requires less PPE

Conclusion

When considering corrosion protection for water and sewer systems, zinc is an optimal solution. It can extend the life of the installation for up to a century, and its cost is generally just 1-2% of the overall project.

DIPRA advises: “In discussions with our member companies, while all provide metallized zinc to pipe, each one has preferences for the application of zinc to fittings. Our advice in specifying a zinc coating for ductile iron fittings would be to allow either.” SIGMA Z-COAT is the ideal choice for corrosion protection of fittings and other irregularly-shaped, rough-surfaced components.