

Which Zinc Coating is Best for Ductile Iron Fittings?

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Why Zinc?

Municipalities and water distributors are taking a hard look at the Total Cost of Ownership (TCO) of their waterworks infrastructure. As the number of pipe leaks in the U.S has gone up, organizations are reviewing how they can extend the life of their systems. Most leaks are a result of corrosion. While it may prove more expensive to choose superior corrosion-resistant coatings at the front end of a job, water companies now recognize that zinc is the optimal coating to guard against corrosion and protect the life of their infrastructure.

Where is Zinc Gaining a Foothold?

Over the last decade, zinc has gained market share in regions with aggressive hot soils. However, with population density increasing along with new construction and its associated utility expansion, stray currents are on the rise. Consequently, zinc is being rolled out across the U.S. to extend the life of systems. In test sites, the case for zinc-coated ductile iron is very encouraging; zinc has been shown to protect the ductile iron components used in waterworks infrastructure.

Which Type of Zinc Coating Does SIGMA Prefer for Fittings?

The U.S. has adopted two European standards for zinc: ISO 8179–1 and ISO 8179–2. Both standards are readily accepted worldwide.

- –1 is the arc or molten zinc application
- –2 is the zinc barrier coating paint system

There is no difference in the amount of zinc required in either specification. The difference resides in the application process; how the zinc is applied to the surface.

- In the –1 process, the zinc is melted and sprayed on to the surface in molten form and it then solidifies on the ductile iron surface.
- In –2, the zinc is added to the paint pigments, bonding agents, and solvents, which are then sprayed on in a traditional manner.

Note that DIPRA (The Ductile Iron Pipe Research Association) is agnostic when it comes to which zinc coating specification is best for fittings.

SIGMA holds that –2 is the fitting choice for ductile iron for three reasons:

1. A Thicker Barrier Coating

- To meet the ISO specification, a defined amount of zinc needs to be applied to the surface. For both –1 and –2, this standard is 200gms of zinc applied per square meter of coated surface area. This translates to 235gms of paint per square meter because the paint is required to have 85% zinc in the dry film (.85x235 = 200 gms).
- To achieve 200 gms of zinc on a ductile iron surface with an arc-applied (–1) process, around 1 to 1.25ml or .001 inches of material needs to be applied. In contrast, for –2 coatings, to meet the same specification, the product will end up with approximately 3.5-4mls of coating thickness. Due to the characteristics of a fitting’s surface finish versus that of a pipe, it is our strong opinion that a –2 coating is the optimal choice because it provides a thicker barrier coating. Laboratory studies indicate that the additional thickness and the additional barrier provided by the thickness created through the –2 zinc paint process enhances the performance of the coating.

2. Preferable for Employees and the Environment

- SIGMA’s experience suggests that while the arc or molten zinc coating works best for pipe, it does not lend itself to coating a fitting. The process is cumbersome, the equipment is heavy and requires that the employee use PPE because the by-products of coating with zinc can be harmful. In contrast, working with –2 (paint-on zinc) requires no more PPE than if you were painting your house. Furthermore, the paint-on –2 process is also much more environmentally friendly and SIGMA believes because it’s a paint, it does a better job covering the surface of a fitting and therefore creates a more robust barrier coating.

3. Optimal for Field Repairs

- In both standards, the zinc-rich paint is recommended for field repairs. The equipment to apply the metallized zinc (–1) is very specialized, it’s cumbersome and it would not be practical to transport it for field repairs on site. Since the –2 materials are consistent and approved, it is sensible to use the easy-to-apply, paint-on coating if metallized zinc surface is damaged.

The Case for –2 for Fittings

	ISO81079–1 (arc spray)	ISO81709–2 (paint-on)
ISO Specification	200 mgs	200 mgs
Application process	Molten zinc solidifies on surface	Zinc barrier coating applied as a paint or primer
Thickness of coating	1 to 1.25 mls barrier coating	Thicker barrier coating of 3.5-4mls zinc
Repairs in the field	Not recommended	Recommended for both –1 and –2 repairs

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