

AMERICAN INTRODUCES ZINC-COATED DUCTILE IRON PIPE



AMERICAN is proud to introduce the latest advancement in corrosion control for iron pipe, zinc coating. Zinc has been used to extend the life of iron pipe for more than 50 years. Internationally, this advanced coating system has been used to protect millions of feet of cast and ductile iron pipe in corrosive environments.

AMERICAN began supplying zinc coating for our export orders starting in the early 1980s. Now, we're pleased to offer this proven system to domestic markets. Zinc coating significantly extends the life of an already rugged and reliable product – ductile iron pipe.



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DUCTILE IRON PIPE

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EOE/Minority/Female/Veteran/Disability

AMERICAN-USA.COM

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DUCTILE IRON PIPE

FLOW CONTROL

INTERNATIONAL

SPIRALWELD PIPE

STEEL PIPE



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A Brief History of Zinc Coatings

Zinc dust was first added to paints for corrosion control as early as 1837. Since then, zinc-rich paints have received widespread acceptance for metallic corrosion control around the world.

The water industry first began using zinc coatings on iron pipe in Europe in 1955. As a result of zinc's widespread use there, the ISO standards 8179 and BSEN 545/598 were both developed and widely adopted.

Beginning in the early 1980s, the mass of zinc applied to iron pipe was increased from the original 130 grams per square meter (g/m^2) to the current 200 g/m^2 . This amount, with a protective topcoat, has proven optimal for life extension of iron pipe. Also, in the early 1980s, AMERICAN began supplying the zinc-rich ISO coatings on ductile iron pipe for our international orders.

Key Dates in the Development of Zinc Coatings for Iron Pipe

1958	Zinc coating was first applied to cast iron pipe in Europe for corrosion protection.
1963	Standard bitumen/coal-tar paint was applied for normal environments in Europe.
1963	Polyethylene sleeve was recommended for soil resistivities of less than 4,000 ohm-cm by French pipe maker Pont-à-Mousson.
1972	Germany and Austria began to standardize the use of zinc coatings on iron pipe.
1982	AMERICAN supplied its first international order with a zinc coating.
1984	All ductile iron manufacturers in the United Kingdom started supplying all new ductile iron pipe in the diameter range 80 - 800mm with a zinc coating.
1984	Zinc spray of 130 g/m^2 under bitumen paint became common in Europe.
1995	Zinc spray of 200 g/m^2 under bitumen paint became the standard in Europe.

Zinc Coatings for Iron Pipe Today

The advances in zinc coatings over the past 60 years have resulted in a highly effective corrosion inhibiting product. According to the International Zinc Association, products coated with zinc *“are slow to enter the recycling circuit due to the very nature of their durability. The life of zinc-containing products is variable and can range from 10-15 years for cars or household appliances, to over 100 years for zinc sheet used for roofing.”* With a projected lifespan of well over 100 years, zinc coating on ductile iron pipe is the most effective and dependable way to further extend the lifespan of an already rugged and durable product.



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A Specification for **Zinc Coating** on Ductile Iron Pipe

- A. Standards:** Ductile iron pipe shall conform to AWWA C150 and C151, subject to the following supplemental requirements. The pipe shall be of the diameter and class shown, shall be furnished complete with rubber gaskets as indicated in the Contract Documents, and all specials and fittings shall be provided as required under the Contract Documents. The ductile iron pipe, specials, and fittings shall be manufactured or supplied by AMERICAN Ductile Iron Pipe (a division of AMERICAN Cast Iron Pipe Company, Birmingham, Alabama) or pre-approved equal. Joints shall conform to AWWA C111, cement linings to AWWA C104, fittings to AWWA C153 or C110.
- B. Markings:** Upon request, the CONTRACTOR shall require the MANUFACTURER to legibly mark specials in accordance with the laying schedule and marking diagram. All other cast marks and other marks shall be in accordance with applicable Standards.
- C. Laying Lengths:** Pipe laying lengths shall be provided in 20 foot nominal lengths with allowable trim pipe lengths in accordance with AWWA C151 and special shorter lengths provided as required by the Drawings.
- D. Joint Design:** Ductile iron pipe and fittings shall be furnished with push-on joints or push-on restrained joints. Restrained joints shall be AMERICAN Fast-Grip, Flex-Ring, or Lok-Ring.
- E. Lining:** Except otherwise provided herein, interior surfaces of all ductile iron pipe, fittings, and specials shall be cleaned and lined at the pipe casting facility with a standard thickness cement-mortar lining applied in conformity with AWWA C104. A seal coat shall not be applied to the surface of the cement-mortar lining.
- F. Coating:** The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 g/m² of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The coating system shall conform in every respect to ISO 8179-1 "Ductile iron pipes - External zinc-based coating - Part 1: Metallic zinc with finishing layer. Second edition 2004-06-01."
- G. Installation:** Ductile iron pipe shall be loaded, transported, unloaded, installed, and tested in accordance with AWWA C600.



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Zinc Coating Q&A

How does zinc work?

Zinc is anodic to iron. That means iron is the more stable, more noble, of the two elements. Zinc will cathodically protect the iron pipe as long as zinc is present and over time will convert to zinc compounds that provide an enduring passivating layer under the topcoat which protects the pipe against further corrosive attack. Zinc is an anode, uniformly adhered to the surface of the pipe.

Previous studies done with Corpro showed the annealing scale on iron pipe provides a protective layer. Zinc adheres exceptionally well to that annealing scale and the two work together to form a tighter and better shield against corrosion than either one separately.

What about when the zinc is scratched and the iron is exposed?

If a scratch or area of damage occurs in the coating, a galvanic couple is created between the iron and the zinc, and the exposed iron is protected. Studies have shown that in most soils, once the zinc sacrifices itself, it leaves behind a protective matrix of zinc compounds at the damaged area and keeps on providing protection to the pipe surface even though the zinc itself is expended.

How was 200 grams per square meter (g/m²) determined to be an effective mass of zinc to protect iron?

ISO 8179 calls for not less than 130 g/m² and standard practice in Europe has arrived at 200 g/m². More than 60 years of use there has proven this is a good practice.

Why put a topcoat over the zinc?

The finishing layer reduces the exposed area of the zinc. This extends its life and traps the zinc oxides that form next to the pipe surface when zinc initially does its job. This provides a passivating layer of protection.

Why should I specify zinc now?

Iron pipe has been the standard for strength, durability and longevity in our nation's water infrastructure for over 170 years. However, not merely satisfied with past performance, AMERICAN has consistently driven innovation to increase the useful service life of iron pipe with cement lining, new and better joints, polywrap, ductile iron, V-Bio wrap, and now zinc. Today with much of our nation's water infrastructure in need of replacement and purchasers looking for new ways to increase value to their customers, AMERICAN is once again leading the way with the introduction of zinc-coated ductile iron. AMERICAN firmly believes that zinc-coated iron pipe will add years of service life to pipe in any environment.



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Zinc Coating Q&A Continued

How long will zinc coated-iron pipe last?

Zinc-coated iron pipe will last longer than iron pipe not coated with zinc. How much longer will depend on many project variables. There are more than 600 utilities with unwrapped iron pipe in continuous service for more than 100 years. Those same utilities can expect zinc-coated iron pipe to last even longer. Utilities using wrap can expect even longer service, since wrap inhibits corrosion even beyond the topcoat's inhibiting role. Those utilities that use zinc with V-Bio wrap can reasonably expect a service life of hundreds of years or longer.

We have 60 years of data from Europe to support that. We can tell you that 200 g/m² of zinc provides a tremendous anode for iron pipe.

Is there evidence of that?

Yes. An 8-year test in the Florida Everglades, one of North America's most corrosive areas, showed no measurable corrosion of zinc-coated and polywrapped pipe; the same for a 9-year test in Watsonville, California; and a separate 10.7-year test in the Everglades, one of America's most corrosive areas. These results were all verified through physical inspection and through weight and strength tests.

Is zinc-coating better to use than thicker walls for extra service life?

You should design for the greater of internal pressure or external load; that's flexible design principles. More often than not, such a practice will result in the use of minimum pressure class 350 for small diameters and class 150 to 250 in larger diameters. We've never advocated adding thickness for life extension. If there are corrosive soils, we have recommended wrap to simply stop the corrosion. If you use additional thickness for life extension, we recommend you drop it and replace it with zinc. You'll get better life extension that way and may even save some money.

How much does the zinc cost?

It depends on many factors, but the value certainly exceeds the cost.



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Zinc Coating Q&A Continued

How does 200 g/m² compare to traditional bags of sacrificial anode buried and connected to lengths of pipeline?

The zinc coating functions in the same manner, by acting as an anode to the pipe. How long either lasts will depend on the environment.

Two hundred grams per square meter? What is that in ounces per square foot?

0.6554 oz/ft²

Is it available on all pipe diameters?

Yes, but it will be special for sizes larger than 16-inch.

What about the end of the spigot that will be exposed to the waterway inside the bell? Does this affect NSF certification?

Our zinc coating has a topcoat that is NSF61 approved.

Will zinc work with Megalugs?

Yes

Will zinc work with Fast-Grip gaskets?

We have completed a series of tests that indicate that the presence of zinc and its topcoat will have no effect on Fast Grip's restraining ability, nor will the Fast-Grip affect the performance of zinc.

How does V-Bio polywrap further enhance the benefits of zinc?

Just as with bare iron, polywrap isolates the iron from the fresh supply of oxygen, thus halting or greatly inhibiting the corrosion cell. V-Bio prevents microbiological cells from forming that would attack the iron and deplete the zinc. Since the use of wrap halts the corrosion cell, the use of V-Bio with the presence of zinc as an anode to iron will further slow the process. In addition, V-Bio will provide an extra degree of protection from corrosion due to stray currents. Having said that, zinc with our topcoat may be used without V-Bio or without traditional wrap. The wrap simply adds additional protection.



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Zinc Coated Ductile Iron Pipe for Corrosion Control

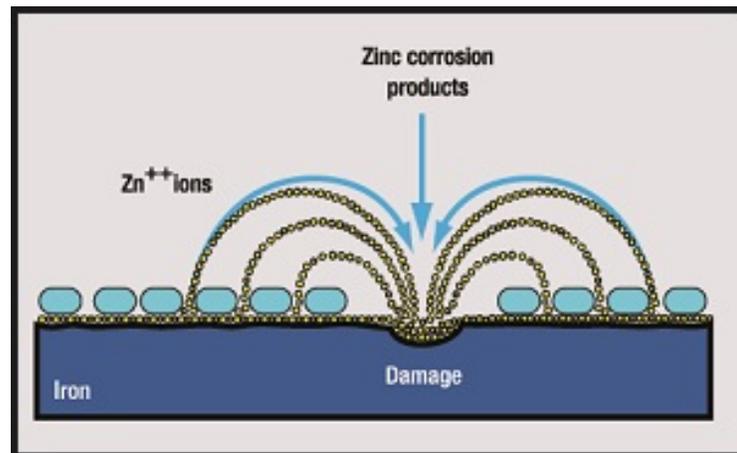


V-Bio Polyethylene
Encasement

Zinc Basecoat



Asphaltic Topcoat



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