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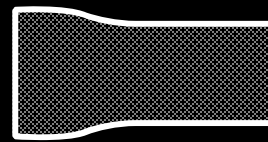
ZINC COATING

Jay Cermenaro

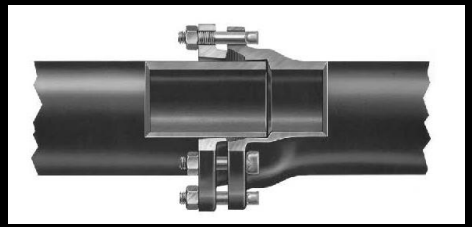
100 YEARS OF INNOVATION



Cement Mortar Lining
(1922)

1920

Mechanical Joint
Patented by AMERICAN
(1921)



Centrifugal Casting
Introduced thru 12”
pipe (1926)

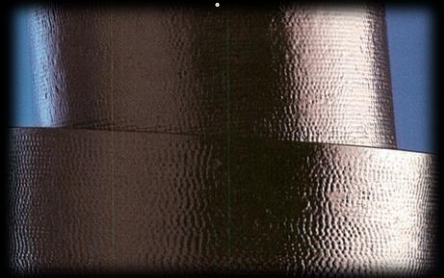
1930

1950

Ductile Iron Pipe (1955)

Polyethylene Encasement (1958)

54” Diameter Iron Pipe Introduced (1965)



Fastite Push-on Joint (1956)

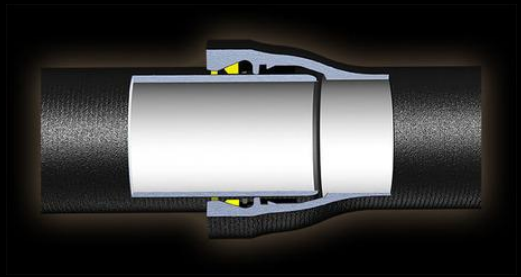
1960

1970

20 Foot Lengths
Introduced (1972)

1980

Flex-Ring Restrained Pipe
Introduced (1982)

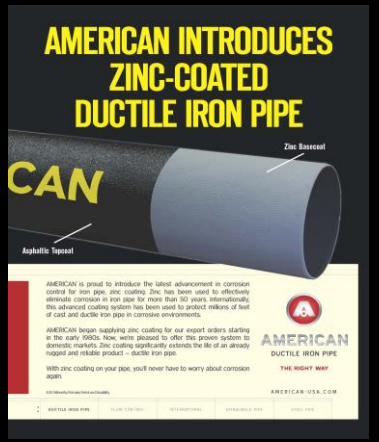


60” and 64” Pipe
Introduced
(1988)

2010

V-Bio Enhanced Poly (2013)

AMERICAN Earthquake Joint System (2015)



Zinc Coating for Domestic Pipe (2015)

Amarillo Fast-Grip (2015)

Zinc C n Pipe

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 effectively eliminate corrosion in 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.

With zinc coating on your pipe, you'll never have to worry about corrosion again.

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EOE/Minority/Female/Veteran/Disability

AMERICAN-USA.COM

DUCTILE IRON PIPE | FLOW CONTROL | INTERNATIONAL | SPIRALWELD PIPE | STEEL PIPE

Brief History of Zinc Coatings

- 1837 – Zinc dust added to paint to preserve metals
- 1955 - Zinc coating was first applied to cast iron pipe in Europe
- 1972 – Germany and Austria standardized on zinc coatings on iron pipe

Brief History of Zinc Coatings

- 1982 – AMERICAN supplied first ductile iron international order with zinc

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Brief History of Zinc Coatings

- 1984 – UK supplying all new DI pipe (80-800mm) with zinc coatings
- 1984 – Zinc spray of 130g/m^2 under bitumen paint became common in Europe
- 1985 – ISO 8179 Standard created
- 1995 – Zinc spray of 200 g/m^2 becomes standard in Europe
- 2015 – Zinc furnished to USA market

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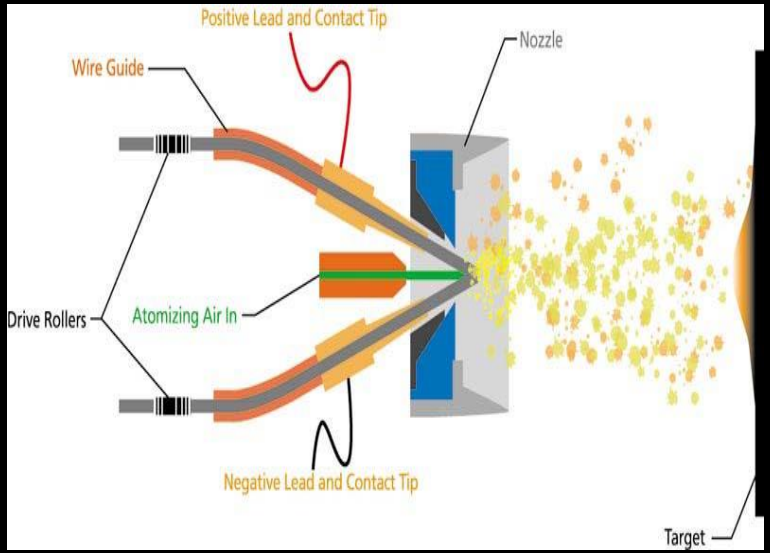
Why Zinc?

- Zinc is an anode to iron
- Zinc is abundant, readily available, and inexpensive
- Light weight
- Zinc bonds exceptionally well to iron
- Over 60 year history of external corrosion protection of iron pipe

How is zinc applied?

- Zinc arc-spray process
- Pipe is preheated to 120 F
- High purity zinc wire charged at nozzle end
- Compressed air propels zinc droplets onto rotating pipe surface
- Feed rate and pipe rotation are controlled to make zinc coverage consistent and to desired thickness



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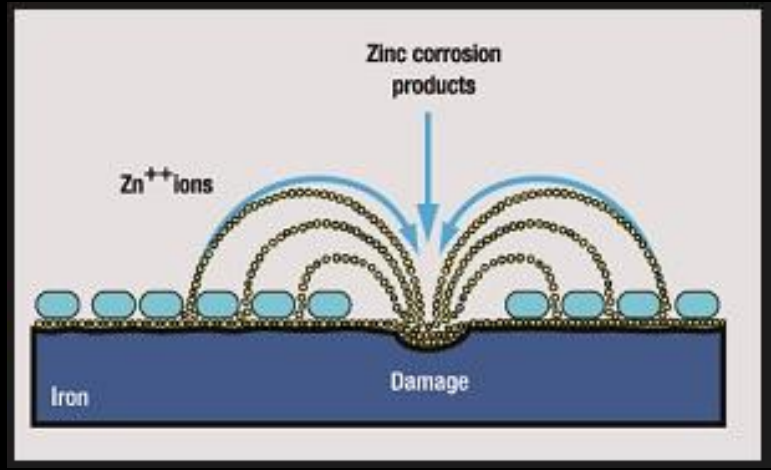
How It’s Applied

How Does Zinc Work

- Zinc bonds exceptionally well to the annealing oxide layer of iron pipe (13 - 14 mils)
- Zinc is anodic to iron. It protects iron by forming a galvanic couple between Zn and Fe and acts like an anode by sacrificing itself
- Bituminous asphalt layer provides a passivating layer of protection



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DIPRA Testing Data

- Soil Category (<10 Points on DIPRA Scale)
  - Asphalt Coated – 0.000667” per year (373 year life)
  - Asphalt + Polywrap – 0.000 per year (infinite life)
- Soil Category (≥ 10 Points on DIPRA Scale)
  - Asphalt Coated – 0.0105” per year (24 yr life)
  - Asphalt + Polywrap – 0.000453” per year (550+ estimated yr life)
- Soil Category (Uniquely Severe)
  - Asphalt Coated – 0.0287” per year (9 estimated yr life)
  - Asphalt + Polywrap – 0.0068 per year (37 estimated yr life)

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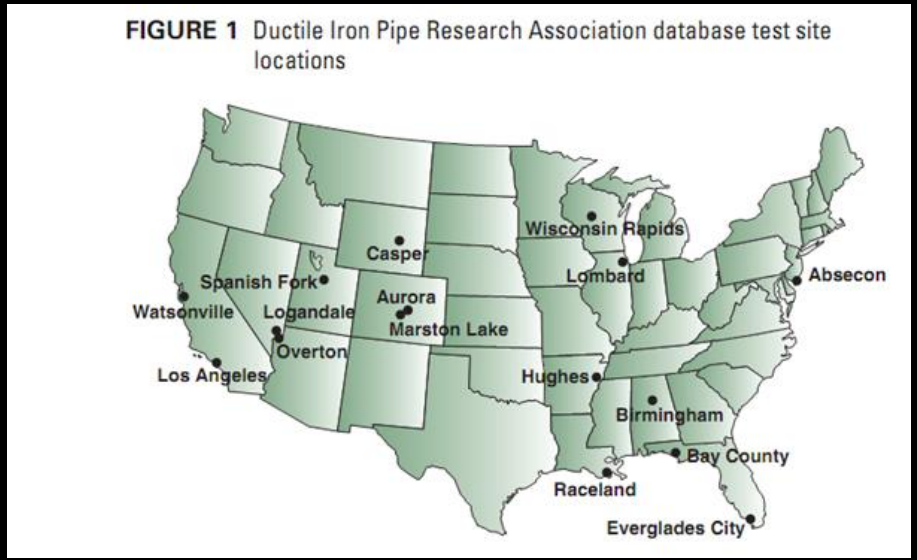
Testing Data

- DIPRA Test Environments
  - Uniquely Severe Example
  - Everglades, FL
    - Resistivity = 110-200 Ohm-cm
    - Fluctuating tidal brackish waters
    - Anaerobic Conditions (sulfate reducing bacteria)
    - Wet, highly corrosive muck
    - Redox Potential = -100mV
    - Sulfides - Positive
    - DIPRA 10 Point Evaluation= 23.5 Pts



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Zinc Testing Data (Everglades, FL)

1991 Installation

- Asphalt Coating (PW)
  - 10.7 Years (0.0068” per/yr), 37 yr estimated life
- Zinc (200 g/m²)+ Asphalt (Damaged PW)
  - 10.7 years (0.00252” per year at damage), 100 yr estimated life
- Zinc (200 g/m²)+ Asphalt (PW)
  - 10.7 years (Zero Corrosion), Life > 100 years

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VBio Polywrap and Zinc Coating

- Polywrap isolates iron from fresh supply of oxygen thus inhibiting corrosion.
- Zinc coating can be a secondary sacrificial protection in areas of damaged encasement
- Very powerful, cost effective combination for aggressive soil conditions

Example Cost Adders

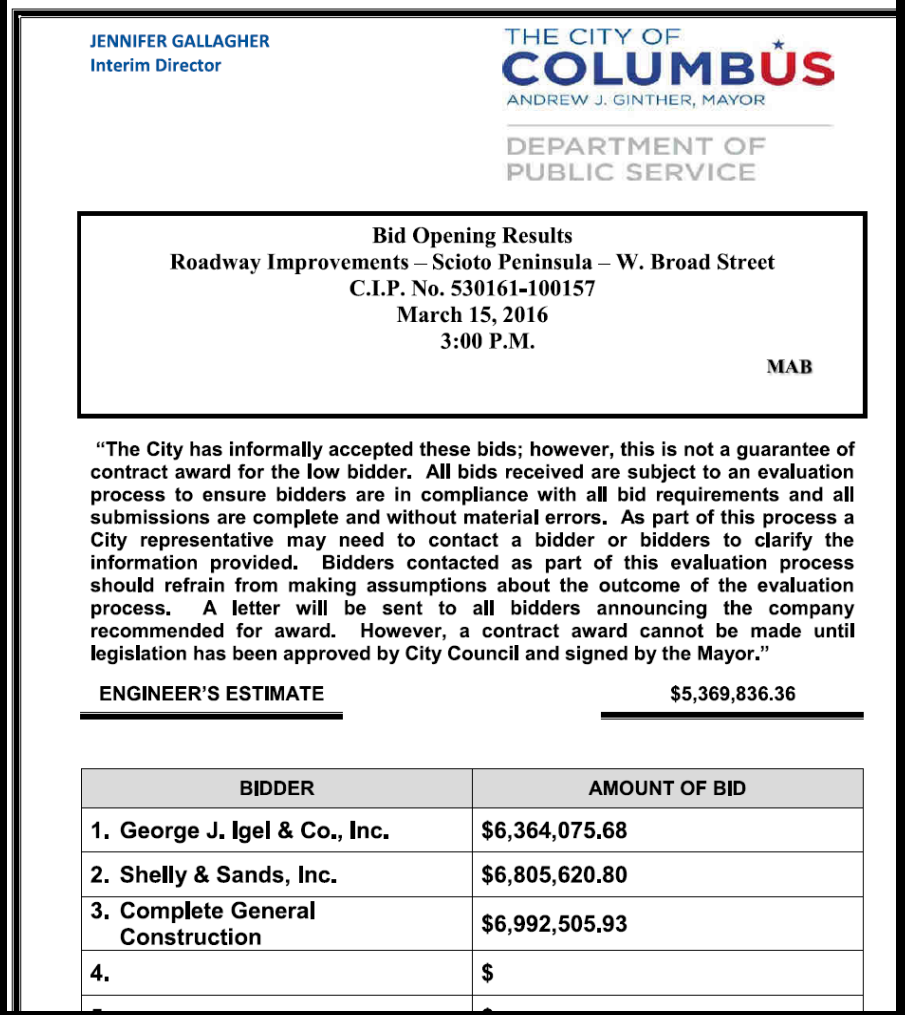
Item	DI Pipe $/ft	Vbio $/Ft	Zinc $/ft	Combo $/ft	5000 LF-Invest
6" CL52	$13	$0.73	$3.03	$3.76	$18,800.00
8" CL52	$20	$0.73	$3.03	$3.76	$18,800.00
12" CL52	$33.50	$0.97	$4.98	$5.95	$29,750.00
16" CL52	$48.50	$1.20	$7.23	$8.43	$42,150.00

Long Term Value

- $20-$40k will easily be consumed by ONE dig-up over the 100 year life of the pipe
- Install the strongest pipe rather than cheapest and protect your investment. It will pay off in the long term.
- Consider going down one or more classes of pipe to help pay for Zinc + VBio
    - 12” CL52 = $33.50/ft
    - 12” CL51 = $31.00/ft
    - Difference = $2.50/ft for 0.03” of wall thickness
    - Vbio+Zinc = $5.95/ft
    - (12” PC350 = $25.50/ft; CL50 = $28.50/ft)

- Scioto Peninsula
- 1228’ 16”
- 8’ 12”
- 247’ 8”
- 147’ 6”

- $10,112.10 Zinc adder
- $1,768.98 V-Bio whole



JENNIFER GALLAGHER
Interim Director

THE CITY OF
COLUMBUS
ANDREW J. GINTHER, MAYOR

DEPARTMENT OF
PUBLIC SERVICE

Bid Opening Results
Roadway Improvements – Scioto Peninsula – W. Broad Street
C.I.P. No. 530161-100157
March 15, 2016
3:00 P.M.

MAB

“The City has informally accepted these bids; however, this is not a guarantee of contract award for the low bidder. All bids received are subject to an evaluation process to ensure bidders are in compliance with all bid requirements and all submissions are complete and without material errors. As part of this process a City representative may need to contact a bidder or bidders to clarify the information provided. Bidders contacted as part of this evaluation process should refrain from making assumptions about the outcome of the evaluation process. A letter will be sent to all bidders announcing the company recommended for award. However, a contract award cannot be made until legislation has been approved by City Council and signed by the Mayor.”

ENGINEER’S ESTIMATE $5,369,836.36

BIDDER	AMOUNT OF BID
1. George J. Igel & Co., Inc.	$6,364,075.68
2. Shelly & Sands, Inc.	$6,805,620.80
3. Complete General Construction	$6,992,505.93
4.	$

- Dering Ave
- 10’ 12”
- 13,057’ 8”
- 870’ 6”

- $42,248.61 Zinc adder
- $10,176.41 V-Bio whole

DERING AVENUE AREA WATERLINE IMPROVEMENTS / COLUMBUS

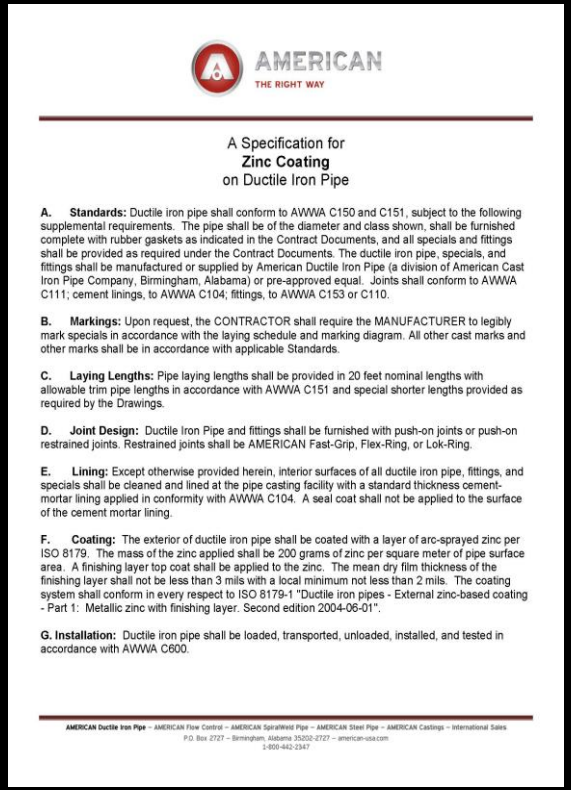
CONTRACTOR	BID AMOUNT
SHELLY & SANDS	$3,029,899.42
FIELDS EXCAVATING	$3,044,893.64
UNDERGROUND UTILITIES	$3,074,294.66
ELITE EXCAVATING CO OF OHIO	$3,133,086.16
BEHELER EXCAVATING	$3,318,454.08
NICKOLAS SAVKO	$3,791,825.20
CONIE CONSTRUCTION	$3,818,554.33

Common Questions about Zinc on DIP

- Can Megalugs be used on zinc coated pipe? YES
- Can Fast Grip RJ gaskets be used on zinc coated pipe? YES
- Can cathodic protection be added on zinc coated pipe? YES
- How much life expectancy does zinc add to the pipe? VBio + Zinc = 100 yrs Plus
- Which manufacturers can supply zinc coating? American, McWane, and US Pipe
- Is Zinc Coating system NSF 61 approved? YES
- Why is there a topcoat? It traps the zinc oxides after the zinc does its job and forms a passivating layer of protection
- Why is zinc coated ductile just now being introduced domestically? Now cost effective domestically

What will your 401(k) be worth?

Recommended Zinc Specification



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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 feet 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 grams of zinc per square meter of pipe surface area. A finishing layer top coat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a local minimum not less than 2 mils. 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.

AMERICAN Ductile Iron Pipe – AMERICAN Flow Control – AMERICAN SpiralWeld Pipe – AMERICAN Steel Pipe – AMERICAN Castings – International Sales
P.O. Box 2727 – Birmingham, Alabama 35202-2727 – american-usa.com
1-800-442-2347

<u>Zinc Coating</u>: The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc. The mass of the zinc applied shall be 200 g/m^2 of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The mean dry film thickness of the finishing layer shall not be less than 3 mils with a local minimum not less than 2 mils.

The zinc coating system shall conform to ISO 8179 standard.

All pipe shall be manufactured and coated in the United States at the manufacturer’s facility.

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