

# CERAMAWRAP EPOXY

FOR THE EXTERIOR OF DUCTILE IRON PIPE

Ceramawrap Epoxy is a very high solids, solvent free, fast curing two-component epoxy formulated especially to coat the exterior of ductile iron pipe for aggressive atmospheres or liquids. Ceramawrap is a chemical resistant product that will protect ductile iron pipe in salt water, high pH, low pH, and aggressive liquids and atmospheres.

Applied at 20-25 mils for maximum protection on ductile iron pipe, Ceramawrap Epoxy is produced using the technology developed for Protecto 401. This proven technology results in low permeability, high impact resistance, and superior adhesion properties. Ceramawrap was designed with the installation and protection of ductile iron pipe as the foremost consideration (including handling, repairs, and superior exterior corrosion resistance).



# CERAMAWRAP EPOXY

FOR THE EXTERIOR OF DUCTILE IRON PIPE

## DESCRIPTION

An exterior protective pipe coating incorporating ceramic pigment and amine cured epoxy for maximum protection of the exterior of ductile iron pipe and fittings. Ceramawrap™ may be used in conjunction with cathodic protection. Ceramawrap™ Epoxy is NSF/ANSI 61 approved for potable water on ductile iron pipe 14" and larger and fittings of all diameters.

## USE

This product is excellent for protection of the exterior of ductile iron pipe and fittings in aggressive atmospheres and liquids, including in conjunction with cathodic protection.

## SURFACE PREPARATION

Prior to abrasive blasting, the entire area to receive the protective compound shall be inspected for oil, grease, etc. Any areas where oil, grease, or any substance that can be removed by solvent is present shall be solvent cleaned using the guidelines outlined in DIPRA-1 Solvent Cleaning. After the surface has been made free of grease, oil or other substances, all areas to receive the protective compounds shall be abrasive blasted using compressed air nozzles with sand or grit abrasive media. The entire surface to be lined shall be struck with the blast media so that all rust, loose oxides, etc. are removed from the surface. Only slight stains and tightly adhering annealing oxide may be left on the surface. Any area where rust reappears before lining must be re-blasted.

## DRY FILM THICKNESS

This product may be applied at a film thickness of 20-25 mils dry for protection of ductile iron pipe and fittings.

## CLIMATE

Use this product only if the substrate temperature and ambient air temperature is above 45°F and is expected not to decrease for at least two hours after application. Also, the substrate temperature must be 5°F above the dewpoint for a period of at least two hours after application to avoid condensation occurring on wet paint. Do not apply Ceramawrap Epoxy over wet or frozen surfaces.

## DRY TIME

To handle: 3 hours at 80°F.

## VOLUME SOLIDS

99% solids, solvent free as applied.

**INDURON**  
PROTECTIVE COATINGS  
800 324 9584 | 3333 R. ARRINGTON N. • BHAM, AL 35234

## CERAMAWRAP SPECIFICATION FOR THE EXTERIOR OF DUCTILE IRON

### Pipe Condition

All pipe shall be delivered to the coating applicator bare. Because removal of old coatings may not be possible, the intent of this specification is that the entire exterior of the ductile iron pipe or fitting shall not have been coated with any substance prior to the application of the specified coating material.

### Surface Preparation

The entire surface to be coated shall be abrasive blasted per NAPF 500 03 04 (2.1). The intent of this specification is that 100% of the surface be struck by the blast media so that all loose oxides and rust are removed.

### Coating of Pipe

After surface preparation and within 8 hours of surface preparation the entire exterior surface up to the gasket groove with the exception of the spigot end, shall receive an average of 25 mils, 20 mils minimum, of Ceramawrap Epoxy. If any rusting is apparent prior to coating the surface, the entire area must be reblasted as specified.

### Coating of the Spigot Ends

Due to the tolerances involved, the spigot end from the gasket area to the end of the spigot must be coated with 6 mils average, 10 mils maximum of Ceramawrap Epoxy. Care should be taken that the Ceramawrap Epoxy is smooth without excess buildup on the spigot end.

### Testing of Coating

1. The film thickness of the coating shall be checked using a magnetic film thickness gauge. Measurements shall be taken per SSPC PA2 Section 5.1.
2. The coated areas of the pipe from the socket edge area of the spigot back to the bell face shall be tested for pinholes using a 2000 volt pinhole detection test. Any pinholes found shall be repaired prior to shipment.

### Jobsite Repair

Any areas where damage has occurred due to handling shall be repaired using Ceramawrap Epoxy prior to installation to equal the original coating.

### Handling

All pipes shall be handled with belt slings and padded forks to avoid damage. All shipping timbers and straps should be padded when shipping pipe.

*Because the specifications for application and testing of Ceramawrap Epoxy have been developed for pipe using test data and performance history, no deviations from the specification shall be permitted without prior written approval of the lining manufacturer. If required, third party inspection of Ceramawrap Epoxy shall be done only after written notice to the applicator of Ceramawrap Epoxy. Any third party inspection shall be accomplished using Standard Ceramawrap Epoxy Quality Control Procedures and shall take place at the application facility.*

"The World Famous Paint Doctor"



&  
ASSOCIATES  
INTERNATIONAL, INC.  
P.O. Box 847  
Humble, TX 77347-0847

And  
4281 Midland-Fosterville Rd  
Bell Buckle, TN 37020  
615-233-5299 - fax 615-233-5288

### Compression Testing of Pipe Coated with Induron's CERAMAWRAP



The above 12 inch diameter pipe ring sample had been internally coated with Induron's CERAMAWRAP coating to a DFT ranging from 15 - 17 mils. The pipe ring was compressed and holiday tested at intervals of about 2.5% compression using an 80,000 pound press to beyond 20% deflection. The integrity of the internal coating was monitored all about it's internal circumference after each compression using a wet sponge and a 67.5 volt holiday detector after each compression. Continuity of the holiday tester was checked at each compression by allowing the wet sponge to contact the pipe's cut edge. No holidays developed in the coated areas within the pipe. The internal coatings on the sides of the ring are experiencing compression while the upper and lower surfaces of the ring are under severe tensile as the coating follows the shape of the ring. No holidays developed during the compression test.

July 1, 2004  
Testing done by: Dr. George Mills  
George Mills & Associates International, Inc.  
Humble, TX 77347-0847

PROPRIETARY ADHESION TECHNOLOGY • PIPE COATINGS • (Internal & External) • FORMULATION • MANUFACTURE ENGINEERING • APPLICATION ENGINEERING • INSPECTION • TESTING

SPECIFICATION WRITING • FAILURE ANALYSIS • ISO 9000 QA/QC PROGRAM DEVELOPMENT • COATING FORMULATION & DE-FORMULATION ASSISTANT

## CERAMAWRAP CERAMIC EPOXY TESTING

### SIMULATED SEWER ENVIRONMENT TESTING

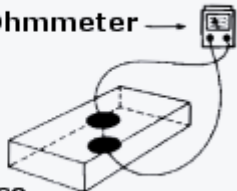
TEST	RESULTS
20% Sulfuric Acid Immersion	After <b>2 years</b> exposure No effect when rated using ASTM D-714.
25% Sodium Hydroxide Immersion	After <b>2 years</b> exposure No effect when rated using ASTM D-714.
5% Sodium Chloride Solution (Salt Water) Immersion Unscribed panel	After <b>2 years</b> exposure No effect when rated using ASTM D-714.
5% Sodium Chloride Solution (Salt Water) Immersion Panel Scribed to Metal	After <b>2 years</b> exposure None to very slight underfilm corrosion at the scribe. No effect when rated using ASTM D-714.
Distilled Water Immersion	After <b>2 years exposure</b> no effect when rated using ASTM D-714.
Salt Fog (5% Sodium Chloride Solution Mist at 95°F) Scribed Panel	After <b>2 years</b> exposure None to very slight underfilm corrosion at the scribe. No effect when rated using ASTM D-714.
Impact Resistance for Pipe Line Coatings ASTM G-14	Passed - 140 in./lbs.
Standard Test Method for Permeability ASTM D-1653	0.00 Metric Perms
Deflection Testing Resistance to Deflection from Earth Loading 10% Deflection of Lined Pipe	No effect

## PREPARATION OF SPECIMEN

PRODUCT	INDURON CERAMAWRAP
TEST METHOD	VOLUME RESISTANCE (ASTM D 257)
SAMPLE PREPARATION	<ul style="list-style-type: none"> <li>- MIX PART A / B =1/1 BY VOLUME</li> <li>- VACUUM THE MIXTURE TO DE-AIRATE UNDER 5 TORR PRESSURE</li> <li>- POUR THE MIXTURE IN A MOLD</li> </ul>
SPECIMEN	<ul style="list-style-type: none"> <li>- THICKNESS OF 2.5 MM (0.1 IN)</li> <li>- THREE SPECIMENS OF DIMENSIONS 101.6 +/- 3.2 MM X 101.6 +/- 3.2 MM</li> </ul>
CURING CONDITION	7 DAYS AT 70 °F AND 50% RH
TEST CONDITION	70 °F AND 50% RH

### EQUATION:

**Volume Resistivity Measurements**

Ohmmeter → 

$$\rho_v = R_v \frac{A}{T} \text{ ohm-cm}$$

$R_v$  = Volume Resistance  
 $A$  = Area of Electrode  
 $T$  = Thickness

## TESTED RESULTS

VOLUME RESISTANCE (ohms·cm)	
SPECIFICATION	RESULT
$1 \times 10^{13} \sim 15$	<b><math>1.2 \times 10^{14}</math></b>

## CERAMAWRAP CERAMIC EPOXY™ TESTING

### ABRASION, IMPACT AND HARDNESS TESTING

PERFORMANCE TEST		Method/ Condition	Duration	Results
Impact Resistance		ASTM D2794	7 days	140 in-lb.
Abrasion Resistance	Tabor CS17 Wheel	ASTM A4060	1000 Cycles	40 mg loss
Hardness		Shore D	7 Days	85



September 4, 2019

**TECHNICAL MEMO**

RE: Ceramawrap Testing / ASTM G8 / Weldon Labs

Ceramawrap Ceramic Epoxy was independently tested by Weldon Laboratories for cathodic disbondment per ASTM G8. The results for two panels tested resulted in an "A" rating (best rating possible). Testing results are enclosed.

induron.com

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P.O. Box 2371



Weldon Laboratories, Inc.

Project J05133

CERAMAWRAP Ceramic Epoxy

ASTM G8



Mr. John Anspach  
Induron Protective Coatings  
PO Box 2371  
Birmingham, AL 35201-2371

February 24, 2006  
Project J05133

Subject – Cathodic Disbondment Testing

Dear Mr. Anspach,

In accordance with your request, cathodic disbondment testing was performed on two 2 ¼"x6" panels received from Induron, and which had been cut from a section of pipe. Although three panels were received, because of their relatively small size, one was left untested as a control. The panels had a black coating on one side, while the opposite side and edges had been sealed with what appeared to be a different black coating. The panels were received from Induron in December of 2005.

The testing was performed in accordance with ASTM G8, modified for flat panels, using the sacrificial anode method. The electrolyte was tap water with 1 % sodium chloride, sodium sulfate, and sodium carbonate, at approximately 22°C. Test duration was 30 days.

The test procedure involves drilling an intentional holiday in the coating system, 0.250" in diameter or larger. At the end of the test, the panels are evaluated for blistering and cracking, and for any loose coating around the holiday, by subjective knife probing. The additional disbonded area is reported, both as total area and expressed as the diameter of a circle which would have an area equivalent to the total disbonded area.

The results for the two panels were as follows:

Test	Result, panel 1	Result, panel 2
Initial holiday diam.	0.250"	0.250"
Net disbonded area	0.000 in <sup>2</sup>	0.000 in <sup>2</sup>
Equivalent circle diameter (ECD)	0.000"	0.000"
blistering	none	none
cracking	none	none
Classification group	A (<0.50" ECD)	A (<0.50" ECD)

Both specimens fell into the lowest (best) classification group (Group A), since they had an ECD of 0.50" or less. The groups range from an A (0.50" or less) to an E (>2.00").

If you have any questions or comments, please do not hesitate to contact this office.

Sincerely,

  
Dwight G. Weldon, President

**CERAMAWRAP CERAMIC EPOXY™ ASTM D-149-09 \***  
**PERFORMANCE TESTING FOR DIELECTRIC STRENGTH**

PERFORMANCE TEST	Method/ Condition	Duration/Condition	Ceramawrap Results
Dielectric Strength	ASTM D-149-09	40 Hours Min.	Average 600 Volts per Mil (5 samples, 20 mil DFT)

*\*3<sup>rd</sup> Party Testing by Element Materials Technology*



## REPAIR PROCEDURES FOR FIELD SURFACE PREPARATION AND APPLICATION OF CERAMAWRAP™ CERAMIC EPOXY

### Procedures for preparing and coating ductile iron with Ceramawrap Ceramic Epoxy:

1. **PLEASE MAKE SURE THE SUBSTRATE IS ABOVE 55F PRIOR TO APPLICATION.**
2. Remove burrs caused by handling damage and smooth out the edge of the coating if rough.
2. Remove all traces of oil, grease, dust, dirt, chalking, etc.
3. Remove any damaged coating caused by handling, and clean any exposed metal by sanding or scraping, sandblasting or power tool cleaning roughening is also acceptable. It is recommended that any loose coating be removed by chiseling, cutting, or scraping into well-adhered coated area before patching. Be sure to overlap at least 1" of coating in the area to be repaired.
4. After the area to be coated is cleaned and suitably roughened, apply a coat of Ceramawrap Ceramic Epoxy using the following procedure:
  - a. **Mixing Procedure** — Ceramawrap is a two-component epoxy consisting of two cans labeled Part A Base and Part B Activator. Add the contents of Part B Activator and contents of Part A Base into a mixing bucket. Immediately mix thoroughly. Mixed material must be used within 15 minutes of mixing. For smaller quantities, mix components at a 1:1 blend ratio. **CERAMAWRAP SHOULD BE AT LEAST 70F WHEN MIXED FOR BEST RESULTS.**
  - b. **Application of Material** — After the material has been thoroughly mixed, it can be applied to the prepared surface by brush or roller. Please see the following technical data for parameters related to applying Ceramawrap.

### CERAMAWRAP CERAMIC EPOXY TECHNICAL DATA

#### **DESCRIPTION:**

A protective ductile iron coating incorporating ceramic pigment and amine cured epoxy for maximum protection of the ductile iron or steel substrate.

#### **USE:**

This product is excellent for protection of the ductile iron substrate in wastewater wet wells, aggressive atmospheres and for immersion in fresh and salt water.

#### **SURFACE PREPARATION:**

The surface preparation shall be equal to the specifications for the project or as outlined in the touch-up procedure.

#### **DRY FILM THICKNESS:**

This product may be applied at a film thickness of 20-25 mils dry for protection of ductile iron substrates.

#### **CLIMATE:**

Use this product only if the substrate temperature and ambient air temperature is above 55°F and is expected not to drop below 55° for at least two hours after application. Also, the substrate temperature must be 5°F above the dewpoint for a period of at least two hours after application to avoid condensation occurring on wet paint. Do not apply Ceramawrap Ceramic Epoxy over wet or frozen surfaces.

#### **DRY TIME:**

To handle: 3 hours at 80°F.

#### **PHYSICAL DATA:**

Volume Solids: 100% (Mixed)

Manufactured Under U. S. Patent No. 4171228