CERAMAPURE™ PL90

CERAMIC EPOXY

TECHNICALDATA

WATER

or

SEWER

STANDARD SPECIFICATION FOR LINING DUCTILE IRON PIPE: WATER OR SEWER SERVICE

I. CONDITION OF DUCTILE IRON PRIOR TO SURFACE PREPARATION

All ductile pipe and fittings shall be delivered to the application facility without asphalt, cement lining, or any other lining on the interior surface. Because removal of old linings may not be possible, the intent of this specification is that the entire interior of the ductile iron pipe and fittings shall not have been lined with any substance prior to the application of the specified lining material and no coating shall have been applied to the first six inches of the exterior of the spigot ends.

II. LINING MATERIAL

Ceramapure™ PL 90 Ceramic Epoxy. The material shall be an amine cured epoxy containing at least 20% by volume of ceramic quartz pigment. Any request for substitution must be accompanied by a successful history of lining ductile iron pipe and fittings, a test report verifying the following properties, and a certification of the test results.

A. The following test must be run on coupons from factory lined ductile iron pipe:

* Immersion testing rated using ASTM D-714
  -- 20% Sulfuric Acid Immersion-- no effect after 5500 hrs
  -- 5% Sodium Chloride Solution (Salt Water) Immersion--Unscribed panel--no effect after 2 years
  -- 5% Sodium Chloride Solution (Salt Water) Immersion--Panel Scribed to Metal--no effect after 2 years

*Distilled Water Immersion-- per AWWA C-550--- passed

*ASTM B-117 Salt Fog (Scribed Panel)-- Passed one year no undercutting

*Undercutting Resistance: Alternate Wet /Dry Immersion(5% NaCl, flowing, aerated, 120°F, Wet 1 hour followed by dry one hour- 12 Cycles daily)--Passed one year when rated using ASTM D-714--No undercutting at exposed edges.

*Weathering--Coupons with cut edges Exposure exposed to ambient weathering conditions in Birmingham, AL-- passed one year-- no undercutting at edges

B. ASTM G-22 Standard practice for determining resistance of Synthetic Polymeric materials to bacteria. The test should determine the resistance to growth of Acidithiobacillus Bacteria and should be conducted at 30 degrees centigrade for a period of 7 days on a minimum of 4 panels. The growth must be limited only to trace amounts of bacteria.

C. An abrasion resistance of no more than 3 mils (.075 mm) loss after one million cycles using European Standard EN 598

D. ASTM G-95 Standard Test Method for “Cathodic Disbondment Test of Pipeline Coatings (Attached Cell Method)”. Resulting cathodic disbondment must average less than 2 mm and be qualified by independent lab testing.

III. APPLICATION

Applicator

The lining shall be applied by a certified firm with a successful history of applying linings to the interior of ductile iron pipe and fittings. All applicators must be independently inspected at least two times per year to insure compliance with the requirements of this specification. This inspection must be coordinated and reviewed by the manufacturer of the lining material and any deviation from the application and/or quality requirements shall be corrected by the applicator. All inspections shall be in writing and a permanent record maintained.

Surface Preparation

Prior to abrasive blasting, the entire area to receive the protective compound shall be inspected for oil, grease, etc. Any areas with oil, grease, or any substance that can be removed by solvent, shall be solvent cleaned to remove those substances. 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 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 oxide may be left on the surface. Any area where rust reappears before lining must be reblasted.

Lining

After surface preparation and within 12 hours of surface preparation, the interior of the pipe shall receive 40 mils nominal dry film thickness of Ceramapure™ PL90. No lining shall take place when the substrate or ambient temperature is below 40° F. The surface also must be dry and dust free. If flange pipe or fittings are included in the project, the lining shall not be used on the face of the flange.

Coating of Bell Sockets and Spigot Ends

Due to the tolerances involved, the gasket area and spigot end up to 6 inches back from the end of the spigot end must be coated with 6 mils nominal, 10 mils maximum using Ceramapure Joint Compound. The Joint Compound shall be applied by brush to ensure coverage. Care should be taken that the Joint Compound is smooth without excess buildup in the gasket seat or on the spigot ends. Coating of the gasket seat and spigot ends shall be done after the application of the lining.

Number of Coats

The number of coats of lining material applied shall be as recommended by the lining manufacturer. However, in no case shall this material be applied above the dry thickness per coat recommended by the lining manufacturer in printed literature. The maximum or minimum time between coats shall be that time recommended by the lining material manufacturer. **To prevent delamination between coats, no material shall be used for lining beyond the recoat limitations published by the lining manufacturer without roughening of the surface of the lining prior to recoating.**

Touch-Up and Repair

Ceramapure™ PL 90 repair kits shall be used for touch-up or repair in accordance with manufacturer's recommendations. Refer to Ceramapure™ PL 90 repair procedure.

IV. INSPECTION AND CERTIFICATION

Inspection

- All ductile iron pipe and fitting linings shall be checked for thickness using a magnetic film thickness gauge. The thickness testing shall be done using the method outlined in SSPC PA-2 Film Thickness Rating.
- The interior lining of all pipe barrels and fittings shall be tested for pinholes with a non-destructive 2,500 volt test. Any defects found shall be repaired prior to shipment.
- Each pipe joint and fitting shall be marked with the date of application of the lining system along with its numerical sequence of application on that date and records maintained by the applicator of his work.

Certification

The pipe or fitting manufacturer must supply a certificate attesting to the fact that the applicator met the requirements of this specification, and that the material used was as specified.

V. HANDLING

Ceramapure ™ PL90 lined pipe and fittings must be handled only from the outside of the pipe and fittings. No forks, chains, straps, hooks, etc. shall be placed inside the pipe and fittings for lifting, positioning, or laying. The pipe shall not be dropped or unloaded by rolling.

Care should be taken not to let the pipe strike sharp objects while swinging or being off loaded. Ductile iron pipe should never be placed on grade by use of hydraulic pressure from an excavator bucket or by banging with heavy hammers.

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TECHNICAL DATA

CERAMAPURE™ PL90 CERAMIC EPOXY

COATING DATA

DESCRIPTION:

A two-component, high solids, chemically cured epoxy coating. Ceramapure™ PL90 Ceramic Epoxy is a unique and outstanding barrier coating formulated for the protection of ductile iron or steel pipe and fittings.

Ceramapure PL90 may be used for service in wastewater or water with excellent abrasion and corrosion resistance.

This product has been certified by the Water Quality Association to meet the requirements of **NSF/ANSI International Standard 61** for potable water immersion service for pipe diameters of 4" and up. Ceramapure PL90 meets or exceeds the compliance standard for AWWA C-210.

PERFORMANCE

TEST	METHOD/CONDITIONS	DURATION	RESULTS
25% Sodium Hydroxide Immersion		6000 hours	No effect when rated using ASTM D-714
20% Sulfuric Acid Immersion		5500 hours	No effect when rated using ASTM D-714.
Adhesion	ASTM D-4541		Direct to Steel: 3300 psi – glue failure
5% Sodium Chloride Solution (Salt Water) Immersion Panel Scribed to Metal		2 Years	No effect when rated using ASTM D-714.
Distilled Water Immersion	AWWA C-550 @ 150°F	Per AWWA C-550	Passed
Salt Fog (Scribed Panel)	ASTM B-117	1 Year	No effect when rated using ASTM D-714.
Impact Resistance	ASTM 2794		Passed - 60 in./lbs.
Approval for contact with Potable water 4" and larger piping	NSF 61		Approved
Cathodic Disbondment "attached cell" method	ASTM G-95		Less than 2 mm disbondment
Weathering Exposure	Coupons with cut edges exposed to ambient weathering conditions in Birmingham, AL	1 Year	Passed No undercutting at exposed edges.
Bactericide Properties	ASTM G22-90	Per ASTM G22-90	Stops the growth and formation of Acidithiobacillus Bacteria

LIMITATIONS:
Do not use for immersion service above 120°F (49°C) or dry heat above 200°F (93°C).

SURFACE PREPARATION:
See suggested standard specification for ductile iron or steel (www.Ceramapure.com).

COVERAGE:
Theoretical— 1,476 ft^2 per gallon at 1.0 mil dry film thickness.

DRY FILM THICKNESS:
15-40 mils per coat. Multiple coats may be used if necessary.

WET FILM THICKNESS:
18-45 mils

APPLICATION DATA

BLEND RATIO:
One part Ceramapure™ PL90 Ceramic Epoxy Activator to one part Ceramapure® PL90 Ceramic Epoxy Base by volume. Power agitate until components are thoroughly mixed.

APPLICATION:
Certified Application Required.

THINNING:
None required. Clean equipment with K-1034 Reducer.

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 dew point for a period of at least two hours after application to avoid condensation occurring on wet paint.

DRY TIME:
NON POTABLE IMMERSION SERVICE—50°F or higher, 7 days with proper ventilation;
40°F-50°F, 14 days with proper ventilation.
POTABLE WATER IMMERSION—Allow 30 days cure.

SAFETY DATA:
See individual product label for safety and health data information. Individual Material Safety Data Sheets are available upon request.

PROCEDURES FOR REPAIRING FIELD DAMAGED AREAS AND COATING CUT ENDS OF CERAMAPURE™ PL90 CERAMIC EPOXY LINED PIPE AND FITTINGS

1. Remove burrs caused by field cutting of ends or handling damage and smooth out the edge of the lining if rough.

2. Remove all traces of oil, grease, asphalt, dust, dirt, chalking, etc.

3. Remove any damaged lining caused by field cutting operations or 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 lining be removed by chiseling, cutting, or scraping into well-adhered coated area before patching. Be sure to roughen and overlap at least 1" of lining in the area to be repaired.

4. With the area to be sealed or repaired cleaned and suitably roughened, apply a coat of Ceramapure™PL90 Ceramic Epoxy using the following procedure:

5. It is important to coat the entire freshly cut exposed metal surface of the cut pipe end. To ensure proper sealing, overlap at least one inch of the lining with this repair material.

Mixing Procedure - Ceramapure™PL90 Ceramic Epoxy is a two-component epoxy consisting of two cans labeled Part A Base and Part B Activator. Add the contents of Part B Activator into the contents of Part A Base. Immediately mix thoroughly. Mixed material must be used within one hour of mixing at 80°F decreasing with higher temperature. For smaller quantities, mix components at a 1:1 blend ratio.

Application of Material - After the material has been thoroughly mixed, it can be applied to the prepared surface by brush. Brushing is usually best due to the fact that the areas to be repaired are usually small .No Repair shall take place when the substrate or ambient temperature is below 40° F. The surface also must be dry and dust free. Practices conducive to a good lining are contained in the technical data sheet for Ceramapure™PL 90 Ceramic Epoxy.

CERAMAPURE™ PL 90 REPAIR EPOXY TECHNICAL DATA

DESCRIPTION: A brushable epoxy designed for sealing cut ends and repairs when pipes are lined with Ceramapure™PL90 Ceramic Epoxy.

LIMITATIONS: This material should be used on spigots and in bell sockets only after the pipe or fitting is lined with Ceramapure™PL90 Ceramic Epoxy. Ceramapure™PL 90 Repair Epoxy can be used over Ceramapure™PL90 Ceramic Epoxy or on bare substrate after proper surface preparation.

SURFACE PREPARATION: The surface preparation shall be equal to the specifications for the project or as outlined in the repair procedure.
NOTE: Do not apply Ceramapure™PL90 Repair Epoxy over wet or frozen surfaces.

DRY FILM THICKNESS: As outlined in specifications.

APPLICATION DATA:

APPLICATION: Brush or Roll

THINNING: Thin or clean up with acetone.

PHYSICAL DATA:
VOLATILE ORGANIC CONTENTS
0.8 lbs/gallon mixed unthinned; 95 grams/liter mixed unthinned.

SAFETY DATA: See individual product label for safety and health data information. Individual Material Safety data Sheets are available upon request.