

STANDARD SPECIFICATION FOR GLASS LINING DUCTILE IRON PIPE AND FITTINGS

I. LINING MATERIAL

The standard of quality for glass lining shall be CF-58. The glass powder shall be specifically formulated and shall be vitreous and inorganic. The lining must be proven to be successful in conveying sludge, scum, and grease in sewage service and wastewater treatment plant applications.

Any request for substitution of material must be accompanied by a successful history of lining ductile iron pipe and fittings which are used in these applications. The lining Applicator must be able to provide recent third party, independent test reports verifying the following results.

A. These physical and chemical tests must have been performed on coupons from the applicators regular production lined ductile iron pipe and/or fittings.

1. ASTM D-792 test for density in the range of 2.5 to 3.0 grams per cubic centimeter.
2. Immersion testing using ASTM C-283-97 (2002) in a solution of 8% sulfuric acid at a temperature of 148 degrees F. (64 degrees C) for a period of 10 minutes minimum. The glass shall have a minimum loss of surface gloss and a weight loss of no more than 2 milligrams per square inch (.31 mg per square centimeter).
3. Glass shall have no observed evidence of corrosion when exposed to an HCl solution of 3pH and separately to a NaOH solution of 10pH; both elevated in temperature to 125 degrees F. (52 degrees C) for 10 minutes minimum.
4. Glass shall be capable of withstanding an instantaneous thermal shock of 350 degrees F. (176 degrees C) without cracking, crazing, blistering or spalling.
5. Glass lining should have a minimum hardness of 6 on the MOHS scale.

II. APPLICATION

A. Surface Preparation

The entire surface area to receive the glass compound shall be inspected for the presence of oil, grease, or any other soluble substances. Any areas found with contamination shall be solvent cleaned to completely remove these substances. After cleaning, all surface areas shall be mechanically ground so as to remove any casting imperfections leaving only a smooth surface with no raised projections. Finally, the entire surface area to be lined shall be struck with a blast media so that all remaining impurities from the cleaning operations are removed. Only tightly adhering cast-in oxides may be left on the surface.

B. Lining

After surface preparation, the interior of the pipe or fitting shall receive an application of base glass compound which has been suspended in a water carrier. After the water has evaporated, the pipe or fitting shall be oven-fired at a temperature of 1375 degrees F. (746 degrees C) in order to fuse the glass to the metal surface. The subsequent finish coats are similarly processed with a resultant lining thickness of 10 mils (.25mm) minimum.

III. INSPECTION AND CERTIFICATION

A. Inspection

1. All ductile iron pipe and fittings shall be checked for thickness using a magnetic film thickness gage by the method outlined in SSPC-PA2 Film Thickness Rating.

2. The lining shall be in accordance with the Applicator's, industry standard tolerance for coverage and continuity. All pipe and fittings shall be visually inspected after lining at the Applicator's facility. Each and every pipe or fitting shall be tested with a 67.5 volt electronic device with a wetted sponge to determine the presence of pinholes or voids. Excessive pinholes shall be cause for rejection at the Applicator's facility.

3. Each and every pipe or fitting shall be marked on the interior glass surface using a permanent marker; the date of application and tests, the facility location and the number of acceptable pinholes detected. Quality Assurance reports will be maintained at the Applicator's facility evidencing all work performed and data recorded.

4. The Owner/or his Representative may witness at the Applicator's facility; the glass application process, review the Quality Assurance Reports and witness the actual tests conducted upon his product, all prior to the product leaving the facility. This may be done by written Specification or by sufficient notice to the Applicator to allow coordination of the visit.

B. Certification

The Applicator must be able to supply a notarized Certificate of Compliance attesting to the fact that the glass lining has met all of the requirements of this specification and that the material lined has met the applicable standards of AWWA and ANSI where noted.

C. Handling

Glass lined pipe and fittings must be handled only from the exterior surfaces; no forks, straps, hooks, etc; shall come into contact with the interior surface of glass. Pipe and fittings that have been altered after it left the Applicator's facility, such as field cuts or further fabrication, may not exhibit the same tested results as was documented at the Applicator's facility.

**D. Field Repair**

CF-58 Glass repair Epoxy shall be used for touch-up or repair in accordance with the Manufacturer's recommendation contained within PROCEDURES FOR SEALING CUT ENDS AND REPAIRING FIELD DAMAGED AREAS OF CF-58 GLASS LINED PIPE AND FITTINGS.