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“Glass Lining Specification”
US Pipe Fabrication SG-14[®]
ASTM B1000-15 Compliant

This specification is for the glass lining as applied to pipe and fittings using accepted industry standards and is tested per US Pipe Fabrication procedures referencing applicable ASTM, NACE, SSPC and NAPF standards, and is fully compliant with ASTM B1000-15, the latest national standard specific to glass lined pipe and fittings.

Lining Material:

The glass lining applied to pipe and fittings shall be hard, smooth, continuous vitreous material which is formulated to prevent the adherence of grease in sludge and scum lines, and to resist the adherence of crystalline metal salt deposits (Struvite and Vivionite) to sludge and centrate lines in sewage and wastewater treatment plants.

The glass portion of the lining, the frit(s) used in the formulation, as supplied from the manufacturer, shall have a density of 2.5 to 3.0 grams per cubic centimeter as measured by ASTM D-792.

Lining Characteristics:

The lining shall be of a light, bright color to allow visual detection of defects more easily prior to electronic holiday detection testing. Glass linings are not intended to be Holiday free, but to prevent the build-up of grease, scum, and crystalline metal salt deposits.

The entire finished coating shall be a minimum of 10 mils (0.010 inch) as tested with an acceptable Type I or Type II dry film thickness gage as described in ASTM D7091.

The finished lining shall be able to withstand a strain of 0.001 inch/inch of the base metal without visible damage to the glass.

The glass lining shall have a minimum hardness of 5 on the Moh's hardness scale.

The lining shall be capable of withstanding an instantaneous thermal shock from ambient + 350°F to ambient without visible crazing, blistering or spalling.

The lining shall be resistant to corrosion by an HCl solution adjusted to a PH of 3 at 125°F and a NaOH solution adjusted to a PH of 10 at 125°F. Demonstration of this shall be by a weight loss of not more than 3 milligrams per square inch when exposed for 30 minutes.

There shall be negligible visible loss of surface gloss to the lining after immersing a cut production sample in an 8% by weight sulfuric acid solution at 148°F for a period of 10 minutes.

Testing and Certification:

Qualification Testing

Laboratory Testing Results of representative production samples shall be available for review. These include:

- a. Strain testing of the base material to 0.001 inch/inch.
- b. Hardness of the lining using the Moh's scratch hardness scale.
- c. Thermal shock testing of a 350°F differential from ambient.
- d. Weight loss when exposed to a solution of HCl adjusted to PH of 3 at 125°F for 30 minutes.
- e. Weight loss when exposed to a solution of NaOH adjusted to PH of 10 at 125°F for 30 minutes.
- f. Surface gloss condition when a cut piece is exposed to an 8% by weight solution of H₂SO₄ at 148°F for 10 minutes.

Routine Quality Testing

Each pipe/fitting shall be inspected prior to shipment. Inspection shall include:

- a. A minimum of 10 mil Lining thickness as tested with a Type I or Type II dry film thickness gage as described in ASTM D7091.
- b. Allowable holiday indications using the low voltage wet sponge testing apparatus described in ASTM D5162 are given in the Table below.

Fittings	Maximum Number of Holidays	Pipe	Maximum Number of Holidays*
-	-	3 inch diameter up to 10 foot long	6
4 inch through 8 inch diameter	5	4 inch through 8 inch diameter	12
10 inch through 18 inch diameter	8	10 inch through 18 inch diameter	20
20 inch diameter and larger	10	20 inch diameter and larger	28

*NOTE: Except as noted, these are for 20 foot lengths. For shorter lengths the maximum is proportional to the 20 foot length.

- c. The finished glass lined pipe straightness shall comply with the following:

Fabricated (Flanged and Grooved Ends)	Bell X Spigot Pipe
3/8 inch in 20 feet	5/8 inch in 20 feet
0.01875 in per foot	0.03125 in per foot

- d. Complete factory test results shall be supplied with all shipments of glass lined product.