



Layers of quality, years of protection.

Total Lining System for Wastewater Structures (rehabilitation and new construction)

PART I – GENERAL

1.01 DESCRIPTION:

The work described within details a complete program for wastewater structure lining and rehabilitation. This specification details the methods, procedures, materials and equipment required to produce “A Total Lining System for Wastewater Structures”. The completed system will provide a corrosion resistant liner that restores the surface profile and eliminates water infiltration and exfiltration.

1.02 REFERENCES:

- A. ASTM D7234 - Adhesion
- B. ASTM D412 - Tensile Strength (PSI)
- C. ASTM D412 - Elongation (%)
- D. ASTM D624 - Tear Strength (PLI)
- E. ASTM D2240 - Hardness
- F. ASTM D522 - Flexibility (1/8” mandrel)
- G. ASTM D4060 - Taber Abrasion (mg loss)

1.03 SUBMITTALS

All materials and procedures required to establish compliance with the specifications shall be submitted upon request to the owner/engineer for review/approval. Submittals shall include at least the following:

1. Technical Data Sheet on each product used.
2. Safety Data Sheet (SDS) for each product used.
3. Manufacturer’s Certification of Applicator.
4. Certified Applicator Minimum Qualifications (Section 1.04 D).
5. Descriptive literature, bulletins and or catalogs of materials.
6. Work procedures including flow diversion plan, method of repair, etc.
7. Material and method for repair of leaks or cracks in the structure.
8. Applicator and Manufacturer warranty forms (Section 4.01)

1.04 QUALITY ASSURANCE

- A. The manufacturer of the total lining system for wastewater structures shall be a company that specializes in the design and manufacture of corrosion protection materials / systems for wastewater structures.
- B. The applicator (company performing the installation) shall be completely trained in leak repair, surface preparation and application of the lining system.
- C. The materials/products shall be suitable for installation in a wastewater environment without any deterioration of the liner.
- D. The applicator shall be trained and provide a letter of certification from the manufacturer for the handling, mixing, application, and inspection of the liner system as described herein.
- E. To ensure total unit responsibility, all materials and installation thereof shall be furnished and coordinated by manufacturer/certified applicator.

PART II - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. The materials to be utilized in the lining of wastewater structures shall be designed and manufactured to withstand the severe effects a wastewater environment. The manufacturer of the corrosion protection products shall have at least 10 years of experience in the production of the lining products utilized, and the products shall have satisfactory installation record.
- B. Equipment for installation of lining materials shall be of high quality and as recommended by the manufacturer.
- C. The lining system to be utilized for wastewater structures shall be a multi-layer 'stress skin panel' liner system as described below:
 - 1. Liner.

<u>Installation</u>	<u>Liner</u>
Moisture barrier	Modified Polymer (Silicone modified polyurea)
Surfacer	Polyurethane/Polymeric blend foam
Final corrosion barrier	Modified polymer (Silicone modified Polyurea)
 - 2. The Modified polymer (silicone modified polyurea) shall be sprayable, solvent free, two-component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment.
 - 3. The Polyurethane Rigid Structure Foam, shall be low viscosity two-component, containing flame retardants.
 - 4. Total thickness of multi-layer liner system shall be a minimum of 500 mils.
- D. The product shall be SPECTRASHIELD, manufactured by CCI Spectrum, Inc.

PART III - EXECUTION

3.01 INITIAL INSPECTION

- A. Applicator shall take appropriate action to comply with all local, state, and federal regulations including those set forth by OSHA, EPA, the Owner and any other applicable authorities.
- B. Prior to conducting any work, an initial inspection of the structure shall be performed to determine need for protection against hazardous gases or oxygen depleted atmosphere and the need for flow control or flow diversion.
- C. If required, submit a plan for flow control or bypass to the owner/engineer for approval prior to conducting the work.
- D. New Portland cement structures shall have endured a minimum of 28 days since manufacture prior to commencing installation of the liner system.

3.02 SURFACE PREPARATION

- A. The surface preparation program will include checking the atmosphere for hydrogen sulfide, methane, low oxygen, or other gases, approved flow control equipment, and surface preparation equipment.
- B. Surface preparation for standard manhole structures shall be in accordance with the manufacturer's recommendations, and may include high pressure water cleaning and shall provide a surface compatible for installation of the liner system.
- C. Surface preparation and methods for other structures shall be in accordance with the manufacturer's recommendations, and may include high pressure water cleaning, hydro blasting, abrasive blasting, grinding, or detergent water cleaning, and shall be suited to provide a surface compatible for installation of the liner system.
- D. The surface preparation method shall produce a cleaned, abraded and sound surface with no evidence of laitance, loose concrete, loose brick, loose mortar, contaminants or debris, and shall display a surface profile suitable for application of the liner system in accordance with the manufacturer's recommendations.
- E. After completion of surface preparation, perform the seven point check list, inspecting for:
 - 1. Leaks
 - 2. Cracks
 - 3. Holes
 - 4. Exposed Rebar
 - 5. Ring and Cover condition
 - 6. Invert Condition
 - 7. Inlet and Outlet Pipe Condition
- F. After the defects in the structure are identified, repair all leaks and severe cracks with Spectra-Grout, or other methods approved by the manufacturer.
- G. Upon completion of leak and crack repair, the surface shall be primed in accordance with the manufacturer's recommendations.

3.03 MATERIAL INSTALLATION

- A. Application procedures shall conform to recommendations of the manufacturer, including materials handling, mixing, environmental controls during application, safety and spray equipment.
- B. Spray equipment shall be specifically designed to accurately ratio and apply the liner system.
- C. Application of multi-component liner system shall be in strict accordance with manufacturer's recommendation. Final installation minimum total thickness shall be 500 mils. A permanent identification and date of work performed shall be affixed to the structure in a readily visible location.
- D. If requested a final written report may be provided to the owner/engineer detailing the location, date of work and description of the work.

3.04 FINAL INSPECTION

- A. Final liner system shall be completely free of pinholes or voids. Liner thickness shall be the minimum value as described herein.
- B. Visual inspection may be made by the Owner/Engineer. Any deficiencies in the finished liner system shall be marked and repaired according to the procedures set forth by the manufacturer.

4.01 WARRANTY

Applicator and Manufacturer must warrant the liner system installation against failure for a period of 10 years from the installation date. Applicator shall correct failures any time prior to 10 years after the installation date. Failure will be deemed to have occurred if the protective liner fails to: (a) prevent the internal corrosion of the structure or (b) prevent groundwater infiltration. Failure does not include damage resulting from mechanical force or the presence of chemical substances not customarily present or used in Wastewater Structures, defects in the workmanship or devices of others upon which the Wastewater Structure functions or act of God. The liner must be installed in accordance with Manufacturer's instructions by Applicators certified by Manufacturer. Executed 10-year Applicator and Manufacturer warranties are to be provided upon completion of work.