SPECTRASHIELD

Total System for Manholes (Brick/Concrete)

PART I – GENERAL

1.01 DESCRIPTION

The work described within details a complete program for manholes. This section details the methods, procedures, materials and equipment as required to produce "A Total System for Manholes". The completed system will provide a corrosion resistant liner to rehabilitate deteriorated manholes and prevent any further deterioration from hydrogen sulfide and other corrosive gases/acids within the wastewater stream.

1.02 SUBMITTALS

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

1. Descriptive literature, bulletins and or catalogs of materials.
2. Work procedures including flow diversion plan, method of repair, etc.
3. Material and method for repair of leaks or cracks in manholes.
4. Final installation report on completed manholes.

1.03 10-YEAR LIMITED WARRANTY

SpectraTech, LLC (ST) warrants its SPECTRASHIELD manhole liner against failure for a period of 10 years. "Failure" will be deemed to have occurred if the protective lining fails to (a) prevent the internal damage or corrosion of the structure (b) protect the substrate and environment from contamination by effluent. If any such failure within 10 years of initial completion of work by ST on a structure, ST will repair the damage and restore the lining at no cost to the Owner within 60 days after written notification of the failure. "Failure" does not include damage resulting from mechanical or chemical abuse or act of God. Mechanical or chemical abuse means exposing the lined surfaces of the structure to any mechanical force or chemical substance not customarily present or used in connection with structures of the type involved. ST makes no warranties express or implied other than those specifically stated in this section 1.03. Any liability for consequential and incidental damages is expressly disclaimed. ST's liability is limited to and shall not exceed the purchase price paid.

1.04 QUALITY ASSURANCE

A. The manufacturer and/or installer of the total liner system of manholes shall be a company that specializes in the design, manufacture or installation of corrosion protection systems for manholes. Installer shall be completely trained in leak repair, surface preparation and corrosion materials application on manholes. Corrosion materials/products shall be suitable for installation in a severe hydrogen sulfide environment without any deterioration to the liner.

B. To ensure total unit responsibility, all materials and installation thereof shall be furnished and coordinated with/by one supplier/installer who turnkeys the work and assumes full responsibility for the entire operation.

PART II - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. The materials to be utilized in the lining of manholes shall be designed and manufactured to withstand the severe effects of hydrogen sulfide in a wastewater environment. Manufacturer of corrosion protection products shall have long proven experience in the production of the lining products utilized and shall have satisfactory installation record.

B. 3000 psi hydro blasting equipment shall be suited to remove corroded materials from the existing concrete/brick structure.

C. Equipment for installation of lining materials shall be high quality grade and be as recommended by the manufacturer.

D. The lining system to be utilized for manhole structures shall be a multi-component stress skin panel liner system as described below:

1. Liner.

Installation	Liner
Moisture barrier	Modified Polymer
Surfacer	Polyurethane/Polymeric blend foam
Final corrosion barrier	Modified polymer

2. Modified polymer shall be sprayable, solvent free, two-component polymeric, moisture/chemical barrier specifically developed for the corrosive wastewater environment.

TYPICAL CHEMICAL ANALYSIS

"A" Component

Viscosity, 77° F, cps., ASTM D-1638	300-400
Physical State	Liquid
Color	Clear to amber
Hygroscopicity	Reacts with water

"B" Component

Viscosity, 160° F, cps., ASTM D-1638	400-600
Physical State	Liquid
Color	Flamingo Pink
Non-Volatile	100%

Reaction Profile (100 grams, 175° F sample)

Gel Time, seconds	1-2
Tack Free Time, seconds	15
Cure Time, seconds	30

Processing

A System / B System, volume ratio	1.00 / 1.00

Typical Physical Properties

Tensile Strength, PSI	>1500
Elongation, %	>125
Tear Strength, PSI	350
Shore D Hardness	55-65
100% Modulus, PSI	>1500

3. Polyurethane Rigid Structure Foam, low viscosity two-component, containing flame retardants.

TYPICAL CHEMICAL ANALYSIS

"A" Component

Viscosity, 77° F, cps., ASTM D-1638	200
Physical State	Liquid
Color	Dark Brown
Hygroscopicity	Reacts with water and evolves CO2 gas

"B" Component

Viscosity, 77° F, cps., ASTM D-1638	600-1000
Physical State	Liquid
Color	Tan
Hygroscopicity	Absorbs water rapidly thus changing ratio

Reaction Profile (100 grams, 77° F sample)

Cream Time, seconds	1-4
Tack Free time, seconds	5-8
Rise Time, seconds	6-10

Processing

A System / B System, volume ratio	1.00 / 1.00

Typical Physical Properties

Density, nominal, core, lbs/ft3 ASTM D-1622 @ 74° F	4-10
Compression Strength, ASTM D-1621 @74° F parallel rise; PSI	90-150
Closed Cell Content, % - ASTM 1940 @ 74° F	Over 90
Shear Strength, PSI - ASTM C-273 @ 74° F	225-250

4. Total thickness of multi-component stress skin panel liner shall be a minimum of 500 mils.

Product shall be SPECTRASHIELD, by CCI Spectrum, Inc.

PART III - EXECUTION

3.01 INSPECTION

Prior to conducting any work, perform inspection of structure to determine need for protection against hazardous gases or oxygen depleted atmosphere and the need for flow control or flow diversion.

Submit plan for flow control or bypass to owner/engineer for approval prior to conducting the work.

3.02 SURFACE PREPARATION

A. Conduct surface preparation program to include monitoring of atmosphere for hydrogen sulfide, methane, low oxygen or other gases, approved flow control equipment, and hydro blasting equipment.

B. Hydro blasting equipment shall remove all corrosion from structure. Final product shall be a cleaned, dry surface ready for liner application.

C. After completion of surface preparation, blasting phase, perform the seven point check list, which is the inspection for:

1. Leaks
2. Cracks
3. Holes
4. Exposed Rebar
5. Ring and Cover condition
6. Invert Condition
7. Inlet and Outlet Pipe Condition

D. After the defects in the structure are identified, repair all leaks with a chemical or hydraulic sealant designed for use in field sealing of ground water. Severe cracks shall be “repaired with a urethane based chemical” sealant. Product to be utilized shall be as approved by owner/engineer prior to installation. Repairs to exposed rebar, defective pipe penetrations or inverts, etc. shall be repaired utilizing non-shrink grout or approved alternative method.

3.03 MATERIAL INSTALLATION

A. The limits of the corrosion protection system shall be all exposed concrete/brick surfaces including walls, tap sections, risers, etc., unless otherwise directed by the owner/engineer.

B. Application of multi-component system shall be in strict accordance with manufacturer’s recommendation. Final installation shall be a minimum of 500 mils. A permanent identification number and date of work performed shall be affixed to the structure in a readily visible location.

C. Provide final written report to owner/engineer detailing the location, date of report, and description of repair.

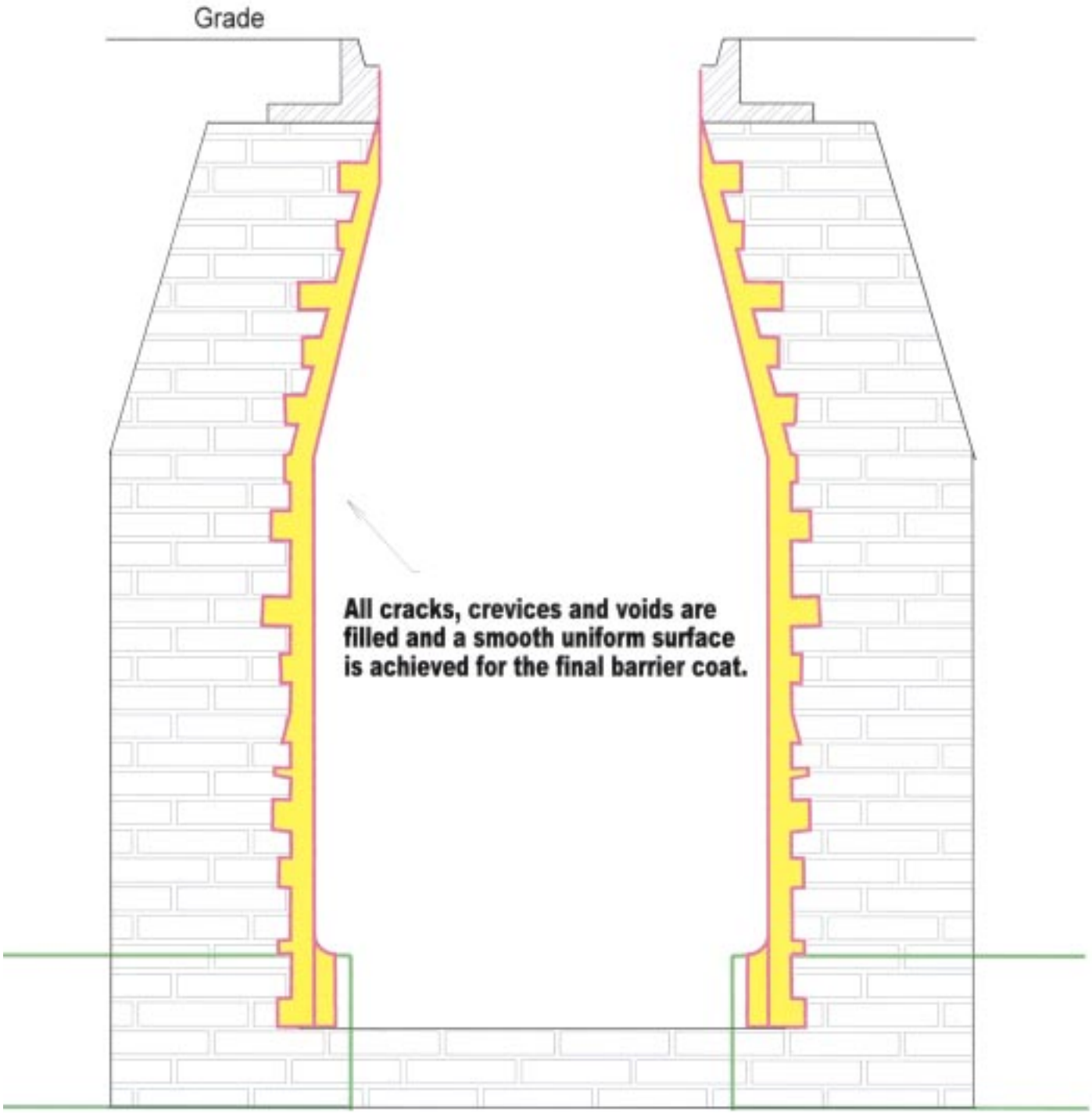
3.04 INSPECTION

Final concrete/brick structure corrosion protection system shall be completely free of pinholes or voids. Entire exposed concrete/brick surface shall be protected with corrosion protection system. Liner thickness shall be the minimum value as described here.

3.05 REPAIR OF DEFECTS

All defects identified during inspection such as pinholes, low film millage, etc. shall be repaired with same material.

TYPICAL BRICK MANHOLE



TYPICAL PRECAST MANHOLE