Effective Date: <u>01-01-2025</u> **Section O: Structures** O1 Fiberglass Wet Well L.P.S. O2 (Deleted) O3 (Deleted) O4 Multi-Component Stress Panel Liner System/ Sanitary Sewer O5 (Deleted) O6 Precast Manholes O 6.1 Precast Wet Well O 6.2 Precast Valve Vaults O 6.3 Polymer Concrete Manholes



O 1 - FIBERGLASS WET WELL - LOW PRESSURE SEWER:

Effective Date: 01-01-2025

SPECIFICATION:

Fiberglass manholes shall meet or exceed the performance specifications of:

- Shall be manufactured from commercial grade polyester resin or other suitable polyester or vinyl ester resins with fiberglass reinforcements specifically manufactured for use with sewage.
- Shall be a one-piece unit.
- Shall have no vertical seams.
- Shall meet ASTM Standards D 3753, Fiberglass Reinforced Polyester Manholes and Wet Wells.
- Shall be sized per construction drawings.
- The wall thickness shall be sufficient to withstand a water saturated sand load of 120 lbs. per cubic foot (1.9 gms/cu. cm with a 1.5 safety factor.
- The Ballast support flange shall extend a minimum of three inches (76mm) on the radius of the basin. The flange is fiberglassed to the bottom of the basin.
 When secured properly to a concrete pad or pouring concrete over and around the flange. It shall prevent the basin from rising or floating out of the ground when empty as a result of static ground pressure.
- The basin shall withstand a maximum temperature of 150°F (66°C).

SPECIFICATION (CONT.)

- Aluminum Basin covers shall have hinged access door, lifting handle, locking provisions, stainless steel hinges and hardware and provisions for 2" NPT vent.
- Covers available for basin diameters 36" through 60" (914 through 1524mm) and are .38" (6.4mm) thick.
- ALL covers have a service rating of 150 lbs/sq. ft. (732kgs/sq. meter) minimum.

RESTRICTIONS:

For low pressure sewer only.

MANUFACTURER:

- Barnes Pressure Systems
- Open





O 4 - MULTI-COMPONENT STRESS PANEL LINER SYSTEM/ SANITARY SEWER:

Effective Date: 01-01-2025

SPECIFICATION:

Multi-layered poly resin composite protective manhole and wet well liner system shall meet or exceed the performance specifications of:

- Shall provide a waterproof, corrosion resistant liner to prevent any deterioration of concrete surfaces from hydrogen sulfide and other corrosive gases/acids produced by wastewater.
- Manufacture shall warrant material and workmanship for a minimum period of ten (10) years.
- Shall be a non load-bearing component.
- To ensure total unit responsibility, all material and installation shall be furnished by, and coordinated with, one supplier/ manufacturer.
- The interior surfaces to be protected shall include the walls, ceiling, benches and pipe entries.
- Total thickness of multi-component stress panel liner shall be a minimum of 500 mils and shall sustain a 300 PSI pull test.
- Use of this system is restricted to rehabilitation of existing structures.

PHYSICAL/ MATERIAL PROPERTIES:

1. Liner.

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

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 Physical State Color 300-400 Liquid Clear to amber Reacts with water Hygroscopicity

"B" Component

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

Reaction Profile (100 grams, 175° F sample)

Gel Time, seconds Tack Free Time, seconds Cure Time, seconds

A System / B System, volume ratio 1.00 / 1.00

PHYSICAL/ MATERIAL PROPERTIES (continued):

Typical Physical Properties

Tensile Strength, PSI >1500 Elongation, % Tear Strength, PSI Shore D Hardness 100% Modulus, PSI >125 350 55-65 >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 Physical State Color Liquid Dark Brown Hygroscopicity Reacts with water and evolves CO2 gas

"B" Component

"B" (
Viscosity, 77° F, cps., ASTM D-1638
Physical State
Color 600-1000 Liquid Tan Hygroscopicity

Tan Absorbs water rapidly thus changing ratio

Reaction Profile (100 grams, 77° F sample)

Cream Time, seconds Tack Free time, seconds Rise Time, seconds

Processing 1.00 / 1.00

Typical Physical Properties

Density, nominal, core, lbs/ft3 ASTM D-1622 @ 74° F 4-10

υ- 16∠2 @ /4° F Compression Strength, ASTM D-1621 @74° F parallel rise; PSI Closed Cell Content, %- ASTM 1940 @ 74° F Shear Strength, PSI - ASTM C-273 @ 74° F 90-150 Over 90 225-250



A System / B System, volume ratio



MANUFACTURER:

- CONCRETE CONSERVATION, INC.-
- SPECTRA-SHIELD
- OPEN



O 6 - PRECAST MANHOLES:

Effective Date: 01-01-2025

SPECIFICATION:

- Precast manhole shall meet or exceed the performance specifications of ASTM C478 & C913 for round structures.
- Openings shall be manufactured per ASTM C76, coring shall be specified per plans.
- Structure to be watertight and resist buoyant force.
- Standard manhole precast riser sections shall not exceed 4-feet; larger pump station wet well sections may be approved.
- Concrete shall conform to:
 - Compressive strength 4,000 psi @ 28-days
 - Air content 4% min.
 - Aggregate: ASTM C33
 - Cementitious materials: minimum of 564 lbs./yd3.
 - · Free of organic impurities.
- Manholes 4-feet deep or less shall have an eccentric cone or a flat top.
- Manholes over 4-feet deep shall have an eccentric cone.
- Manholes shall have a minimum inside diameter of 4feet for sewer mains 12-inches and smaller.
- Manholes shall be 5-feet for sewer mains larger than 12-inches.
- 5-foot manholes shall have an 8" extended base.
- 4-foot manholes shall have a 6" extended base.
- Extended bases shall have a minimum thickness of 6-inches.
- Manholes at ground level and located in traffic areas shall have anti-inflow inserts per Section K.
- Lift and handling devices shall have safety factor of 4 or greater.
- Corrosion linings as specified and indicated on design drawings.

SPECIFICATION (continued):

- Vents in remote or outfall areas shall be constructed of aluminum or 316 SST and shall extend a minimum of 2-feet above 100-year flood with integral non-corrosive insect screen.
- Vents in residential neighborhoods and commercial areas require special approval on a case-by-case basis.
- Watertight joints using ASTM C990 preformed flexible sealants.
- Pipe to manhole connections shall conform to ASTM C923 per Section H.
- Cylindrical wall seals per Section K.
- The location of the pipe connectors shall vary from the plans no more than ½-inch vertically and 5-degrees horizontally.



MANUFACTURES:

- OLD CASTLE
- TINDALL
- STAY-RIGHT
- ALCRETE
- OPEN



O 6.1 - PRECAST WET WELL:

Effective Date: 01-01-2025

SPECIFICATION:

Precast wet wells for pump stations shall meet or exceed the preceding performance specifications of precast manhole with supplemental requirements as indicated below:

- Concrete 5,000 psi compressive strength @ 28-days.
- Minimum wall thickness shall be 5" for 5'-0", 6" for 6'-0" and 8" for 8'-0".
- Provide 1-inch cover all reinforcing steel.
- Base section shall include a 1'-0" extended base unless otherwise specified.
- All fasteners, wedge anchors, bolts, and hooks shall be 316 stainless steel.
- Support grip for each float and dower cord shall be "Hubbell" closed mesh series 024-17-xxx.
- Raintight aluminum hatch per design drawings, lockable with matching eye and padlock per Section I.
- Top shall be set as minimum of 2' above 100-year flood EL.
- Subject to leakage testing requirements per specifications.



• MANUFACTURES:

- OLD CASTLE
- TINDALL
- STAY-RIGHT
- ALCRETE
- OPEN



O 6.2 - PRECAST VAULTS:

Effective Date: 01-01-2025

SPECIFICATION:

Precast concrete valve vaults shall meet or exceed the preceding requirements for precast manholes and with supplement requirements as indicated below:

- Conform to ASTM C913 & C890 for rectangular/square structures.
- Minimum 4' x 4' x 4' with a minimum base thickness of 6" and minimum wall thickness of 5".
- Live load rating of AASHTO HS20-44.
- Access hatches shall be pad lockable frame and cover, with a ½" watertight aluminum plate and 1/8" thick x 3" wide 316 stainless steel hinges per Section
- Step to be installed 18" below hatch on a non-hinged side.
- Shall be watertight structure. Subject to leakage testing requirements per specifications.



MANUFACTURES:

- OLD CASTLE
- TINDALL
- STAY-RIGHT
- ALCRETE
- OPEN



O 6.3 - Polymer Concrete Manholes

Effective Date: 01-01-2025

SPECIFICATION:

- Shall meet or exceed the performance specification of ASTM D 6783, standard specification for polymer concrete.
- Shall utilize FRP or steel reinforcement.
- Shall meet or exceed the performance specification of ASTM C 478 for round structures.
- Shall meet or exceed the performance specification of ASTM C 443 Standard Specification for Joints for Concrete Pipe and Manholes Using Rubber Gaskets.
- Shall meet or exceed the performance specification of ASTM C 923 Standard Specifications for Resilient Connectors between Concrete Manholes Structures and Pipe per section H.
- Shall meet or exceed the performance specification of ASTM C 497Test Methods for Concrete Pipe, Manhole Sections, or Tile.
- Structure to be watertight and resist buoyant force.
- Standard manhole precast riser sections shall not exceed 4-feet; larger pump station wet well sections may be approved.
- Manholes 4-feet deep or less shall have an eccentric cone or a flat top.
- Manholes over 4-feet deep shall have an eccentric cone.
- Manholes greater than 12' in depth shall be 5' in diameter.
- Manholes shall have a minimum inside diameter of 4-feet for sewer mains 12-inches and smaller.
- Manholes shall be 5-feet for sewer mains larger than 12-inches.

SPECIFICATION (continued):

- \bullet Manholes shall have anti-inflow inserts per Section κ
- Lift and handling devices shall have safety factor of 4 or greater.
- Vents in remote or outfall areas shall be constructed of aluminum or 316 SST and shall extend a minimum of 2-feet above 100-year flood with integral non-corrosive insect screen.
- Vents in residential neighborhoods and commercial areas require special approval on a case-by-case basis.
- Cylindrical wall seals per Section K.
- The location of the pipe connectors shall vary from the plans no more than ½-inch vertically and 5-degrees horizontally.
- All joint seams shall utilize gasket and mastic joint sealant rope.
- Exterior manhole seams shall utilize exterior wrap or manufacturers grout product.
- Annular voids shall be filled with grout product as follows:
 - o Armorock Polywurx Grout
 - US Composite Pipe A Series Cold Fusion (CFC) or Sikadur 42 Grout



RESTRICTIONS:

EOR to determine core locations meet state regulatory minimum design requirements.

MANUFACTURER:

- ARMOROCK
- U.S. COMPOSITE PIPE -USCP

