

Specification for Composite Manhole Rehabilitation Barrel, Cones and Adjustment Rings

Product Description:

Composite manhole inserts comprised of barrels, cones and adjustment rings shall be constructed and installed in a manner consistent with acceptable manufacturing techniques and practices, which shall be described in the following specification. The purpose for this specification is to provide a chemically inert product that will prevent further deterioration and provide structural support to failing sanitary sewer manhole structures with consistent material selection designed for this purpose.

Material and Design:

This section is to provide minimum design calculations and testing requirements for a barrel section and cone together. There are some specifications that will differ between the cone and the barrel that will be described in separate sections.

1. The structure shall be designed for H-20 loading traffic and applicable earth loads per ASTM D 3753-99 paragraph 6.4.1 and D 3753-99 paragraph 8.4.1.2 and verified by third party testing.
2. Material shall be consistent throughout structure consisting of epoxy materials including reinforcement inert to corrosion from sewer gasses. Epoxy shall be 100% solids, solvent free, low odor emitting, environmentally friendly, and impervious to a variety of chemicals. Reinforcement shall be made with fiberglass. Acceptable manufacturers are listed.
3. The minimum compressive strength shall be:
 - a. Hoop compressive strength, psi
 - i. Mat Woven Roving 18,700
 - ii. Filament Wound 22,450
 - b. Axial compressive strength, psi
 - i. Mat Woven Roving 18,700
 - ii. Filament Wound 8,400
4. Material properties at 75 degrees shall be: Density, lb/in³ .054, Flexural Strength, psi 32,000, Tensile Strength, psi 18,700, Poisson's Ratio 0.22, Shear Modulus 0.362×10^6 , Tensile Modulus 1.57×10^6
5. The design of the composite manhole shall be prepared by a Professional Engineer that meets ASME design and construction standards for composite structures. Composite structures must meet or exceed the requirements of buried manholes up to 40 ft. deep. The design shall not allow infiltration of ground water.
6. Installation shall be in accordance to approved manufacturers techniques subject to pre-certification and shall be described further in this specification.
7. Joints shall be consisting of bell and spigot configuration or tongue and groove. Joint every 5' shall be sealed with a material consistent with the chemical resistance of the composite manhole sections and shall not affect the warranty. All joints shall be water proofed and shall not allow infiltration.

8. All Composite Manholes must resist 1% to 98% Sulfuric Acid and provide a chemical resistant chart which shows a list of chemicals composites are resistant to.

Barrel Design Specifications:

1. Must meet general design specifications as noted in “Material and Design” section.
2. The minimum wall thickness shall be $\frac{3}{4}$ ”.
3. Weight per vertical foot shall not be more than 150 lbs.
4. Dimensions shall be 42” and 54” in diameter and 5’ in height.

Cone Design Specifications:

1. Must meet general design specifications as noted in “Material and Design” section.
2. The minimum wall thickness shall be $1\frac{1}{4}$ ”.
3. Weight per vertical foot shall not be more than 220 lbs.
4. Dimensions shall be a minimum of 24” at man way, 42” or 54” in diameter at spigot and 26” in height.

Installation:

1. Shall be in accordance to approved manufacturers techniques subject to pre-certification
2. Shall be done with minimal traffic disruption per manhole and be completed within 24 hours.
3. Manhole preparation shall consist of High pressure water blasting to remove loose concrete.
4. Rebuild the invert & bench if needed.
5. Apply Sewer Shield 100 around circumference at bench and lower first section into place.
6. Apply hydrophobic grout into annular space between old manhole and new composite manhole.
7. Apply Sewer Shield 100 to bell and lower second section and repeat process until at the top cone section.
8. Install the cone section after grouting the top bell section.
9. Backfill and compact as you fill until you are at proper height for asphalt adding the adjustment rings, as you need them.
10. Pour a concrete collar after setting the ring and cover at the proper height.
11. Asphalt to City, County, or State requirements.

Grouting:

Grouting shall be done in accordance with manufacturer’s requirements and as described in “Installation” procedures.

Laterals and connections:

Laterals and connections to the manholes shall be made with a carbide drill bit and sealed in accordance to approved manufactures training procedures.

Preparation of Bench:

1. Invert and Bench shall be rebuilt as necessary to meet City, County or State Requirements.
2. The Invert and Bench shall be sandblasted to create a profile, followed by water blasting to remove any loose debris.
3. Sewer Shield 100 should then be applied to the circumference of the bench to create an adhesion for the first barrel.
4. After the composite manhole has been installed the bench and invert should be coated with Sewer Shield 100 to ensure the base has the same acid resistance as the rehabilitated manhole.

Packaging:

1. The composite cone will come in 26" sections.
2. The composite barrel will come in 5' sections
3. The hydrophobic grout will be packaged in 1 to 5 gal containers with an activator that will be packaged separately.
4. The Sewer Shield 100 will be shipped in a 5 gal container that will contain all components necessary for proper mixing per manufacturer requirements.

Adjustment rings shall be manufactured from chemically inert HDPE by Ladtech Inc and shall be used exclusively to adjust the composite manhole inserts.

Warranty shall be provided in writing by the manufacturer of the composite structures and shall be no less than 25 years if installed in accordance to this specification

Acceptable Manufacturer: Entire system, including Ladtech adjustment rings, grout and coating can be purchased from Sewer Shield Composites at 4702 E. Virginia Street Mesa, AZ 85215-9101 phone 480-830 - 9537 fax 480-380-4461
www.sewershieldcomposites.com or approved equal.