

REHABILITATION MANHOLES

SANITARY SEWER LINES



CONTAINMENT
SOLUTIONS®

When concrete manholes or wetwells need to be rehabilitated, the most common option is replacement. However sometimes the logistics of a complete replacement are too expensive or require road closures, excavations, and extending the amount of time the sanitary sewer line is offline. In these circumstances, municipalities look for alternatives to replacement. There are two general types of rehab options:

- 1) Coatings
- 2) Rehabilitation Manhole (inserts)



CSI rehabilitation manholes require less manpower.

COATINGS

Coatings, typically spray-on, are an inexpensive alternative to manhole or wetwell replacement and require good surface preparation and flawless application to achieve complete adhesion to the existing substrate. Humidity, surface moisture, and the structural integrity of the deteriorating manhole can all affect the coating's effectiveness. If the existing structure is unsound it must first be refurbished before applying the coating which increases cost and delays the installation. Even if installed properly the average life expectancy for a coating is only 5-10 years, and significantly lower in areas of high concentrations of hydrogen sulfide gas. Many times this inferior rehabilitation option will lead to never ending, repeat repairs.

REHABILITATION MANHOLES

CSI fiberglass manholes were developed in 1972. Since then, tens - of - thousands of our manholes have been installed throughout the US, in many different types of soil, and in many different effluents, without a single failure. Our manholes have stood the test of time.

EASE OF INSTALLATION

CSI rehabilitation manholes are lightweight fiberglass inserts that facilitate fast, easy rehabilitation of deteriorated manholes and minimize disruption of street traffic. Rehabilitation can often be accomplished without sewage bypassing or diversion. CSI manholes are designed to withstand the rigid requirements of ASTM D3753 and must withstand a minimum eccentric load of 40,000 pounds. This exceeds the AASHTO H-20 Axle Load rating by two and a half times.

Unlike coatings, rehab manholes are complete structures independent from the corroded existing manhole. They simply slide into place and do not require the removal of the deteriorating concrete. Most installations can be completed from grade without confined space safety concerns.



REDUCE INFILTRATION/EXFILTRATION

Inherent corrosion, structural inefficiency, and infiltration are making concrete and brick and mortar manholes obsolete. Infiltration increases water treatment costs. Exfiltration through corroded manholes contaminates the environment. Joints in concrete and brick manholes are a major source of these problems. CSI manholes have no joints. They are available in one-piece lengths from 3' to 50'. This prevents infiltration or exfiltration. The monolithic design also makes installation easier by reducing the time necessary to complete joints between sections.

With no sidewall joints, seams, or sections to let groundwater in or wastewater out, CSI Rehabilitation Manholes provide a virtually leak-proof answer to deteriorated brick or concrete manholes.

ELIMINATE CORROSION AND COSTLY MAINTENANCE/REHABILITATION

CSI rehab manholes are fabricated using high quality resin, and glass specifically designed to improve corrosion resistance and overall performance. This laminate matrix is then centrifugally fused through a computer automated process from the inside-out using rotating mandrels. This manufacturing process produces a smooth, high gloss inner surface that is maintenance free and resistant to the damaging effects of hydrogen sulfide gas for a truly permanent solution to manhole repair. Even decades of attack by hydrogen sulfide has no effect on CSI fiberglass manholes. As a result, you avoid the street closings, service disruption and costly repairs and maintenance associated with ordinary manholes.

FEATURES

- Corrosion Resistance
- Exceeds H-20 Load Rating
- Lightweight
- Ease of Installation
- Reduce Infiltration/Exfiltration
- Watertight
- 20-year corrosion and structural warranty

REPAIRING AGAIN AND AGAIN

A concrete manhole with multiple visible layers of failed rehab coatings will be replaced with a CSI rehabilitation manhole. Especially in warm, humid climates, coatings do not last and municipalities are forced to repeat repairs far too frequently. Don't just repair, fix the problem with fiberglass rehab manholes.

☐ MULTIPLE LAYERS OF FAILED REHAB COATINGS



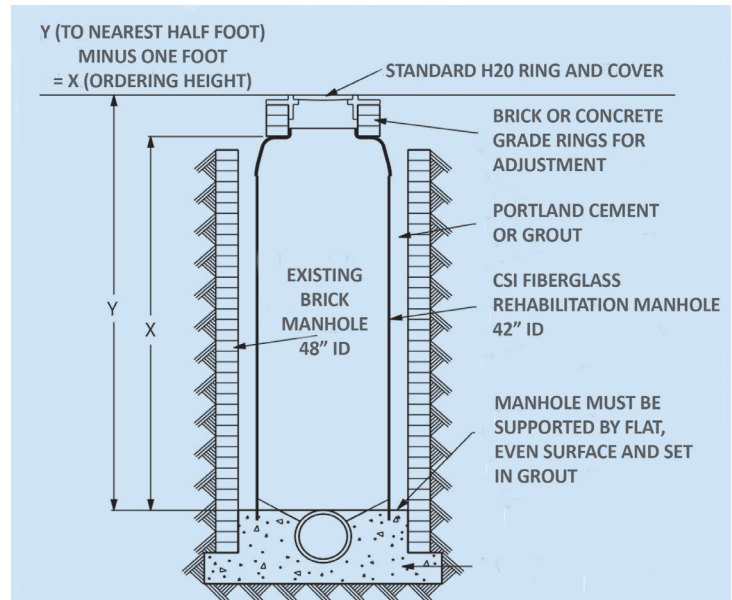
CSI rehabilitation manholes are highly corrosion resistant and offer a long, economic life. Our manholes have been proven resistant to a variety of chemical solutions as well as salt water, corrosive soil conditions, sewer gases (such as hydrogen sulfide), and stray electrical currents that can destroy steel-reinforced concrete in a few years.

REHABILITATION MANHOLE SIZING

LENGTH SELECTION

Length of rehabilitation manhole required is one foot less than nearest half foot distance from the bench to finish grade. This will allow sufficient clearance for at least one grade ring to adjust ring and cover to finish grade. (See Figure A-1).

Figure A-1



Wide range of diameters and lengths available.

Rehabilitation manholes are available in lengths from 3' to 50', in half foot increments and are manufactured as one integral piece with a 42" internal diameter. Rehab manholes in other diameters, (36", 48", 54", 60", 66", 72"), can be made upon request.

CSI also offers rehab wetwell inserts up to 20' in diameter in varying lengths to fit standard concrete wetwell diameters.

SPECIFICATION COMPLIANCE

The CSI Rehabilitation Manhole meets all the requirements of ASTM specification D3753 for Glass Fiber-Reinforced Polyester Manholes. The rehabilitation manhole is a complete structural unit which can be used as a manhole where local code requirements permit.

HANDLING

Do not drop or impact rehabilitation manhole. If it must be rolled, ensure that ground is smooth and free of rock, debris, etc. Lift manhole with two slings on spreader bar in horizontal position or by use of an appropriately sized timber or steel beam inserted through to access hole, (See Figure B-1) for vertical positioning. The timber must be 8" longer than the manway diameter.

EXCAVATION

Excavate an area around the top of the existing manhole sufficiently wide and deep for removal of old castings (ring and cover) and reducer (cone) section.

REHABILITATION MANHOLE PREPARATION

The bottom of the rehabilitation manhole must be cut to fit existing manhole invert as closely as possible — this procedure is absolutely essential when it must support H-20 wheel loads. Make cutouts in rehabilitation manhole wall to accommodate existing inlets, drops and clean-outs. Cuts should be precisely made with an electric or gasoline saw fitted with a masonry-type blade or with a jigsaw using carborundum or tungsten carbide blade. Application of grout on the existing bench to form a flat surface on which the manhole will sit is allowed.

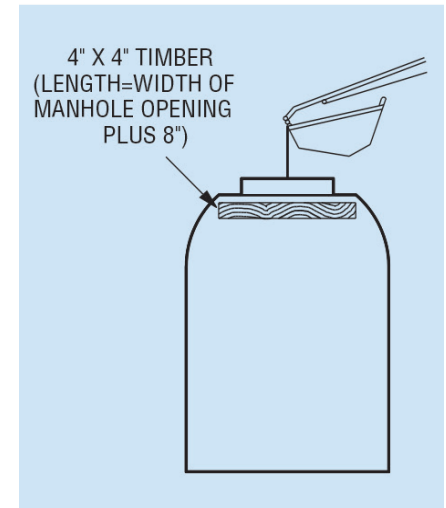
BOTTOM SEAL

Lower the rehabilitation manhole into existing brick or concrete manhole and set rehabilitation manhole bottom into quick-setting grout mixture or non-shrink epoxy grout. A good bottom seal must be obtained in order to prevent loss of grout from the annular space between the outside of the rehabilitation manhole and the interior surface of the old manhole. The installer should place a 6" height of quick-setting grout above the initial bottom seal in the annular void area between the rehabilitation manhole and existing brick or concrete manhole to ensure the adequacy of the bottom plug or seal.

GROUTING

Fill the annular void between the rehabilitation manhole and existing brick or concrete manhole with an economical Portland Cement and sand grout. The use of Modified Portland Cement (Type II) is desirable since it possesses moderate sulfate resistance characteristics.

Figure B-1



BACKFILLING

Using select sand material, backfill evenly a non-grouted upper segment of the rehabilitation manhole (any part of the rehabilitation manhole which may protrude above the old manhole). Be sure rocks or other debris are not adjacent to and do not impact or point-load the rehabilitation manhole. Care should be taken to compact the backfill in order to prevent uneven settling.

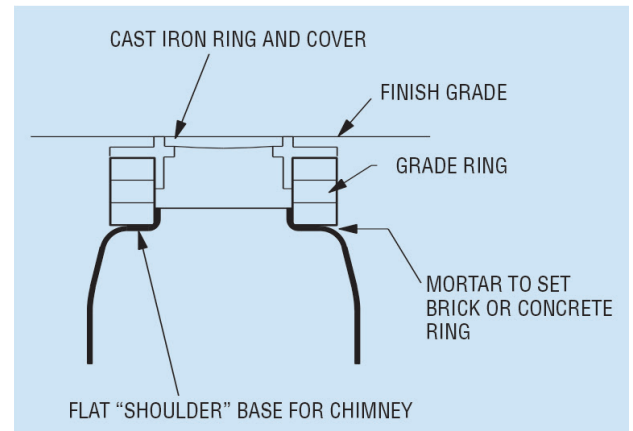
FINISHING TO GRADE

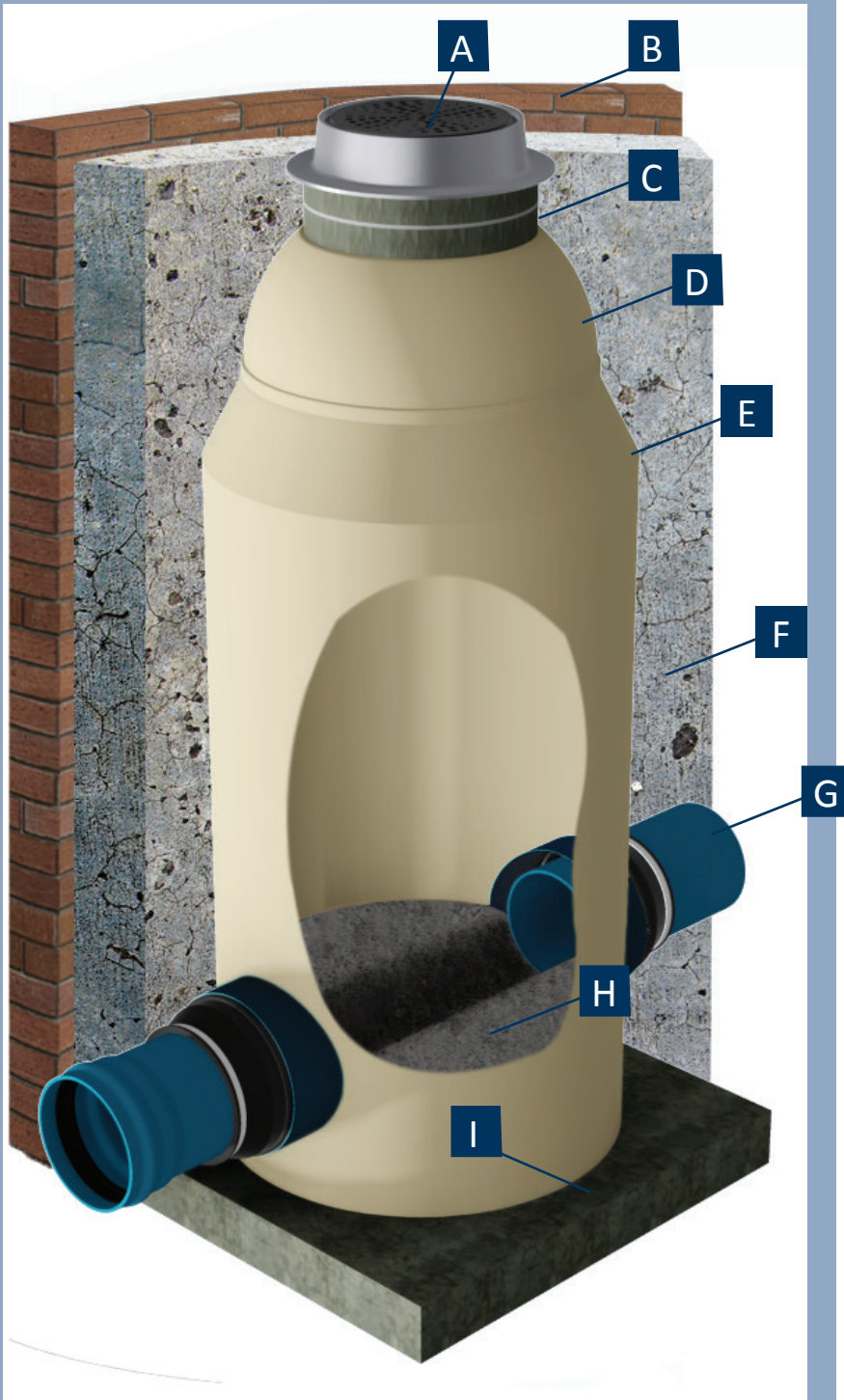
Construct a chimney on flat shoulder of manhole using brick and mortar or precast concrete rings. Use chimney for ring support. Do not in any case place cast iron ring directly on CSI rehabilitation manhole. Load manhole on flat shoulder only (See Figure C-1).

PROPERTIES OF CSI REHABILITATION MANHOLES

- Diameter: 42" typical
(other diameters: 36", 48", 54", 60", 66", 72")
- Thickness: 0.4" minimum (42")
- Lengths: 3' to 50' (longer lengths available)
- Typical Weight: approximately 65lb/ft (42")

Figure C-1





- A. Standard H2O Ring and Cover
- B. Existing Concrete or Brick Manhole
- C. Infiltration Barrier (optional)
12' High Vertical Neck
- D. Manhole Cone
Exceeds H2O Wheel Loads
- E. FRP Structural Rehab Liner
- F. Annular Space with STD
Portland II Cement
- G. Thin Wall PVC Field Installed
for bridging between liner and
existing sewer line
- H. Reform Bench and Invert with
Non-Shrink Epoxy Grout
- I. Non-Shrink Epoxy Grout



ASTM STANDARDS

Manholes shall be constructed of glass fiber-reinforced commercial grade polyester resin. Manholes shall conform to the following design criteria:

- **ASTM D-3753** - Standard Specification of Glass Fiber-Reinforced Polyester Manholes
- **ASTM C-581** - Practice for Determining Chemical Resistance of Chemical Thermosetting Resins Used in Glass Fiber-Reinforced Structures Intended for Liquid Service
- **ASTM D-2412** - Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading
- **ASTM D-695** - Test Methods for Compressive Properties of Rigid Plastics
- **ASTM D-2584** - Test Method for Ignition Loss of Cured Reinforced Resins

Nominal inside diameter of the manhole shall be 42". Thickness of the manhole shall be selected in accordance with project plans and/or engineer specifications.

REHABILITATION MANHOLE LIMITED WARRANTY

Rehabilitation manholes and wetwells carry a 20-year structural and corrosion limited warranty.



Rehabilitation manholes work independent from the corroded existing manhole.

REHABILITATION MANHOLE SHORT FORM SPECIFICATION

Glass-Fiber Reinforced Polyester Rehabilitation Manholes shall be a one-piece monolithic designed unit constructed of glass-fiber reinforcements, supplier-certified unsaturated commercial grade polyester resin. FRP manholes shall be manufactured in diameters 42" through 72" with lengths up to 50'. Manholes will be manufactured by Containment Solutions, Inc.

MANHOLES SHALL CONFORM TO THE FOLLOWING DESIGN CRITERIA:

- A. **ASTM D-3753:** Standard Specification for Glass-Fiber Reinforced Polyester Manholes.
- B. **ASTM C-581:** Practice for Determining Chemical Resistance of Chemical Thermosetting Resins Used in Glass-Fiber Reinforced Structures Intended for Liquid Service.
- C. **ASTM D-2412:** Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading.
- D. **ASTM D-695:** Test Methods for Compressive Properties of Rigid Plastics.
- E. **ASTM D-2584:** Test Method for Ignition Loss of Cured Reinforced Resins.
- F. **ASTM D-790:** Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- G. **ASTM D-2583:** Test Method for Indentation Hardness of Rigid Plastics by means of a Barcol Impressor.
- H. **AASHTO H-20:** Axle Loading

SUBMITTALS:

- A. **Catalog Data:** Submit copies of manufacturer's literature
- B. **Installation Instructions:** Submit copies of manufacturer's instructions

REHABILITATION MANHOLE PREPARATION:

The bottom of the rehabilitation manhole must be cut to fit existing manhole invert as closely as possible - this procedure is absolutely essential when it must support H-20 wheel loads. Make cutouts in rehabilitation manhole wall to accommodate existing inlets, drops and cleanouts. Cuts should be precisely made with an electric or gasoline saw fitted with a masonry-type blade or with a special jigsaw. Application of grout on the existing bench to form a flat surface on which the manhole will set is also allowed.

INSTALLATION INSTRUCTIONS:

Refer to CSI Fiberglass Rehabilitation Manhole Installation Instructions (Pub. No. MAN4046).

HANDLING AND STORAGE:

Do not drop or impact the fiberglass manhole. Lift manhole with two slings on spreader bar in horizontal position or an appropriately sized timber or steel beam, 8" longer than the cone top opening, inserted crosswise inside the manhole to the underside of the collar with a rope or chain attached to backhoe or other lifting device. Manhole may be rolled, however, ensure that ground is smooth and free of rocks, debris, etc. Use of chains or cables in contact with manhole surface is prohibited.

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CONTAINMENT SOLUTIONS MANUFACTURES:

Fiberglass Manholes and Wetwells

Underground Fiberglass Storage Tanks

Aboveground Steel Storage Tanks

Automotive Oil and Lubricant Storage Tanks

Oil/Water Separators and Interceptors

Flowtite® Water Tanks

Chemical Storage Tanks

Field Service



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