



Installation Guide

Hybrid PVC Manhole System



*Fiberglass Reinforced Plastic (FRP) Lined
Concrete Base and Lid with C-900, DR51
PVC Riser Section and FRP Telescopic
Access Collar*

Contents

- 1. General Introduction**
- 2. Receiving and Inspection of Materials**
- 3. Onsite Storage and Handling**
- 4. Manhole Installation**
 - a. FRP Lined Concrete Base
 - b. C-900 PVC Riser Section
 - c. FRP Lined Concrete Lid
 - d. Concrete Encasement (if required)
 - e. Backfill Structure
- 5. Installation of Grade Rings and Telescopic Access Collar (TAC)**
- 6. Warranty and Design Life Information**

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Hybrid PVC Manhole System

1. GENERAL INTRODUCTION

The hybrid PVC manhole system was developed to provide a superior economical solution in protecting concrete surfaces operating in corrosive wastewater environments with improved performance against abrasion and hydraulic erosion and to eliminate infiltration and exfiltration occurrences.

The base and riser components are assembled with ASTM C900 Butyl Rubber sealant (mastic) set between them, creating a watertight seal as the components nest together. Because the PVC riser is installed as a single piece, the system eliminates almost all secondary joints produced when stacking conventional precast riser. The structure is closed off by setting the FRP lined lid on top of the PVC riser and completed with an FRP transition collar providing the isolation protection for the grade rings.

The PVC riser is supplied with the ladder pre-installed, when required, and inside drop structures can also be pre-installed, or shipped loose. This system minimizes, and in some cases eliminates, the need for work within a confined space. With fewer joints, the risk of future infiltration of groundwater is significantly reduced.

This system meets and exceeds all precast concrete specifications.

2. RECEIVING AND INSPECTION OF MATERIALS

All materials shipped by NWPX Geneva will have a material information tag affixed to the exterior of the product. Ensure the equipment being used to offload the materials is appropriately sized to make the pick. Off-loading of, and/or on-site relocation of, materials shall be completed utilizing forks when the materials were supplied on a shipping pallet, or by connecting to the 3 cast-in lift points on each of the structures with certified 3 point chain or cable slings.

When the lid structure is offloaded, or moved on-site, care must be taken to ensure the FRP liner is not set directly on the ground. Always set and store the components on an elevated, even surface, such as a shipping pallet or wooden dunnage.

Prior to installation of any NWPX Geneva materials, inspect all components for shipping damage, specifically the FRP surfaces on the precast base and lid (pipe bells, bench platform, joint and riser interface surface).

If the FRP Liner has been compromised, contact NWPX Geneva immediately for assistance.

3. ON-SITE STORAGE AND HANDLING

Lay-down of the precast components is best achieved by placing/storing each component individually. When space is limited, stacking of the components is acceptable; however, wood dunnage must be placed between the components. Prior to stacking, check the wood materials to ensure there are no protruding nails, rocks or other debris embedded in the wood surface that will directly impact the FRP liner surfaces. Always set and store the components on an elevated, even surface to avoid the possibility that the components could slide from their stacked position.



4. INSTALLATION OF PVC MAINTENANCE HOLE

A. FRP-Lined Concrete Base

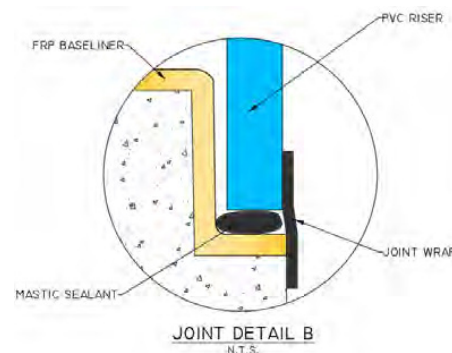
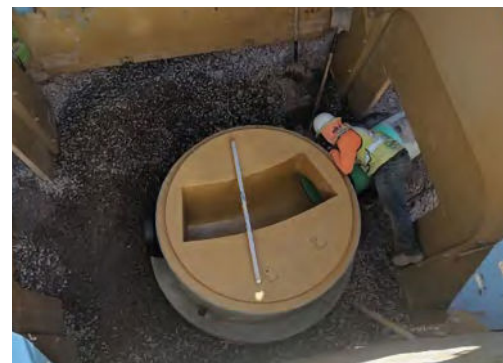
PVC manhole installation shall strictly follow NWPX Geneva's recommended installation procedures. In addition to these recommendations, local codes and specifications may apply and must be followed as applicable. Failure to adhere to these guidelines may impact the long term corrosion resistant properties and/or void the product warranty.

Excavation to grade and installation of appropriate ground control shoring at the manhole location shall be completed to provide sufficient room for worker access around the manhole. Excavation depth shall allow for a minimum of 150mm (6 -inches) of clear crush aggregate directly below the Manhole base for the purpose of adequate leveling. Prepare the base aggregate pad to the required regional specification and ensure the aggregate pad is sound and well compacted.

Set the precast manhole base on line and grade, ensuring the benching is correctly oriented to the direction of flow. Should adjustment be required to achieve final invert, or leveling of the precast base, **DO NOT apply pressure directly to any of the FRP surfaces** with any excavation equipment. Remove the precast base from the trench, level the base aggregates by hand and then re-set the base. Confirm the base is set level with a 4' carpenter's level, and then connect sewer lines to the manhole base.

Once the base is installed and connections completed, clean the FRP contact surfaces of any aggregate or debris with a clean cloth. Remove any substance that may affect riser mastic's ability to seal to the FRP baseliner surface. This may require washing and wiping clean the contact surfaces

Set butyl mastic sealant around the joint surface where the riser will contact. Ensure ends of mastic are placed firmly together, but do not overlap.



B. C-900 PVC Riser

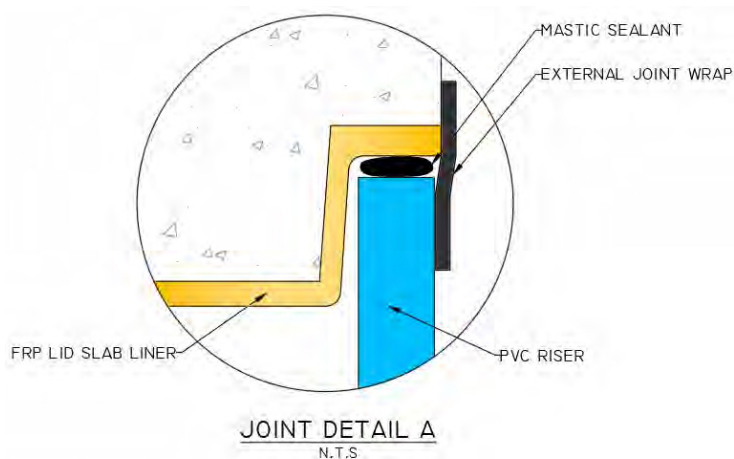
Ensure the overall cut height of the PVC riser for the manhole is sufficient to accommodate for at least two concrete grade rings and a maximum of four grade rings or 12" (300mm); this will allow for adjustment of ring and cover at top of final grade. For cutting and PVC Riser handling refer to "PVC Riser - Handling and Care" document.

Lift PVC riser in place using the recommended "Crosby" style vertical lifting clamps. Check the bottom of the PVC riser spigot where the riser will contact the manhole base. Remove any substance that may affect riser mastic's ability to seal to the PVC riser surface. This may require washing and wiping clean the contact surfaces. Lower and nest the PVC riser onto the manhole base and ensure the riser is set plumb and level. Confirm that a positive seal is established between the manhole base and the PVC riser. Check to ensure mastic has not been displaced and is effectively engaging riser and FRP joint surface. Apply external primer and joint wrap to PVC/ Precast Base Joint, following manufacturer's specifications.

C. FRP-Lined Lid

Lift the FRP-lined manhole lid section with a 3-point lift chain or cable sling, check that the lid is suspended reasonably level to reduce the risk of dislodging the mastic as it is lowered into position. Clean the FRP contact surfaces of any aggregate or debris with a clean cloth. Remove any substance that may affect riser mastic's ability to seal to the FRP base liner or PVC riser surface. This may require washing and wiping clean the contact surfaces. Position the lid above the PVC riser. Slowly lower the lid onto the riser.

To confirm that a positive seal is achieved between the manhole base, lid and the PVC riser, place wood dunnage across the top of the manhole lid and apply perpendicular downward force directly to the centre of the lid. If required, apply external joint primer and joint wrap to PVC/precast lid joint, following manufacturer's specifications.



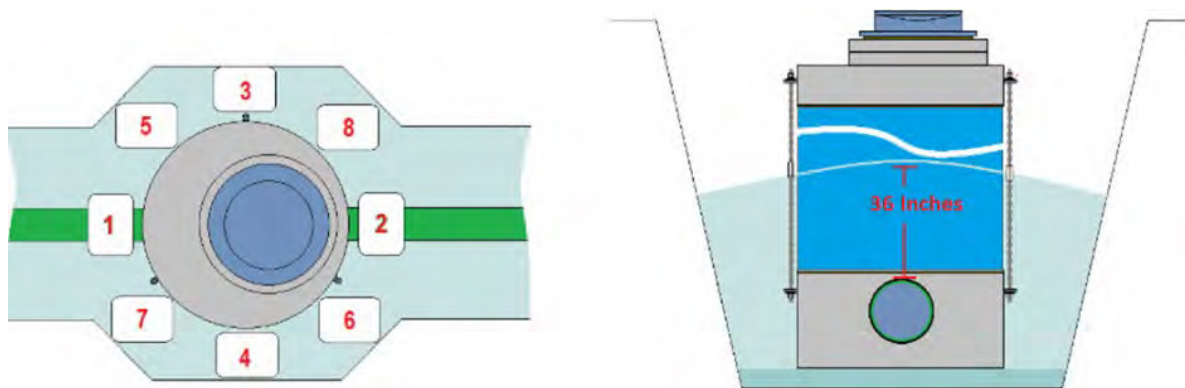
D. Concrete Encasement (as required)

The PVC manhole is designed with the PVC riser as the primary structural member rated for H20 traffic loading. However, some jurisdictions require additional structural concrete for the riser section. If required, concrete and reinforcing shall be installed in accordance with local requirements and best practices. Concrete shall be placed in lifts not exceeding 3ft (914mm).

5. BACKFILL OF STRUCTURE

Place a minimum of 600mm (24-inches) of loose measured backfill aggregate, measured from top of outflow pipe, around the entire manhole structure. Apply mechanical compaction to pipe bedding aggregate, to 95% Standard Proctor Density, unless otherwise approved by engineer. Uniform compaction of the aggregate shall be completed; changing between opposite sides to ensure even pressure is applied from all directions.

Below is a suggested compaction sequence to avoid potential wedging action against the PVC manhole structure.



Once this initial material has been placed, and compacted, place a cover over the lid access opening. This will assist in preventing aggregate material spillage into the sewer and manhole structure during placement and compaction of subsequent backfill layers. Backfill and compact trench to approximately 50mm (2 –inches) below top of lid slab surface in lifts heights permitted by the local specification. Ensure that compaction next to the PVC Riser follows the suggested compaction sequence to avoid potential wedging action against the PVC manhole structure.

6. INSTALLATION OF GRADE RINGS AND TELESCOPIC ACCESS COLLAR (TAC)

To finish the manhole structure, and to bring the access opening to grade, install the TAC gasket into the notch built into the lid's FRP liner, as shown below. Once installed, apply a light coating of pipe lubricant to the contact surface of the TAC rubber gasket.

The top of the PVC manhole can now be brought to proper grade, for receiving manhole frame and lid. No more than four courses precast concrete grade rings, to a maximum of 300mm (12 –inches) from the top of the lid, shall be used. Once the grade rings are stacked, insert the telescopic FRP collar through the grade rings until the TAC's top flange sits flush with the top grade ring surface.

Apply a coil of rubber butyl sealant (recommended product: Conseal CS-102) to the inner radius of the TAC and set casting frame and lid onto the top of the structure.

Place ready-mix concrete around the grade rings and over the casting's flange. Allow the concrete to flash, then backfill and compact the remaining trench surrounding the manhole to underside of final surface treatment invert.

7. WARRANTY AND DESIGN LIFE INFORMATION

The information above must be taken into consideration while installing hybrid PVC manhole structures.

NWPX Geneva's liability is limited to the replacement or the repair of defective parts, excluding the cost of removal, installation or execution of any unauthorized repairs. NWPX Geneva will not be responsible for incidental or consequential damages, or for products improperly installed or modified.

No representative of NWPX Geneva or any other persons has authority to waive, alter or add to this warranty or to assume for NWPX Geneva any obligation or liability connected with the sale or installation of NWPX Geneva products. NWPX Geneva accepts no liability for any delays caused by deficiencies in our product, other than replacement or repair of our product.

This warranty is in lieu of all other warranties, expressed or implied. NWPX Geneva warrants 10 years on hybrid PVC manholes from invoice date against corrosion. Warranty does not extend to malfunctions or damage arising from improper installation, normal wear and tear, improper maintenance, alteration, misuse or negligence arising from defects of material or workmanship.

