

**PERMA-PIPE®**

**PERMA-PIPE**  
**Prefabricated Manholes**  
**Installation Manual**

**ISSUE 1**  
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## **NOTICE**

This installation manual and the recommendations it contains are reasonably believed to be accurate and reliable. However, due to variations in environment, application or installation, and because the conditions of use are beyond our control, the user of this manual assumes all risk connected with the use thereof. The installer of these piping products is ultimately responsible for his own work and, thus, the integrity of the system. PERMA-PIPE assumes no responsibility for the use of information presented herein and, hereby, expressly disclaims all liability in regard to such use.

Any technical suggestions or advice with respect to storage, handling, installation or use of Seller's materials by or on behalf of Seller is an accommodation to Purchaser for which Seller shall have no responsibility unless responsibility, therefore, has been expressly assumed in writing by the President or a Vice-President of Seller.

## PREFACE

The consulting engineer has been provided with information on what to expect from a PERMA-PIPE prefabricated manhole once it is installed. However, the true operating success of the manhole is greatly dependent upon proper installation. PERMA-PIPE is committed to supporting the installation. This support includes clear and concise installation recommendations and expert field technical assistance.

The objective of this manual is to aid the installer on recommended installation procedures of a PERMA-PIPE prefabricated manhole. This booklet contains information on all aspects of the installation process, from initial receiving and storage through final backfill.

The manual has been divided into sections, one section for each phase of the installation process. Each section contains an explanation and illustrations on proper installation procedures.

By following these step by step instructions, the installing contractor should achieve a successful installation.

## GENERAL PRECAUTIONS

These instructions are for general applicability. If they conflict with contract, specifications or drawings specific to the job, the job-specific documents take precedence. If in doubt, check with your project engineer or PERMA-PIPE field technical representative.

Carefully observe job work sequence to avoid errors and expensive mistakes. DO NOT skip steps.

DO NOT complete backfilling until all testing and inspection is completed and accepted by the appropriate authority.

### 1.0 INTRODUCTION

PERMA-PIPE prefabricated manholes are delivered to the job site ready to install, complete with factory pre-tested valves, fittings, insulation and other specified equipment in place.

PERMA-PIPE manholes are constructed of ¼ inch minimum smoothwall black steel. To protect against corrosion, outer surfaces are coated with spray applied urethane to a minimum thickness of 30 mils. A phenolic paint is used to protect interior surfaces from corrosion. An expert project design staff tailors each manhole to meet the needs of the customer. Also, an experienced technical service staff is available to provide assistance that will assure a quick and smooth installation.

A series of factors contribute to a reliable, high quality manhole, such as design, construction, delivery, installation and testing, with stringent quality control procedures applied at every step. The importance of proper installation practices and adherence to this procedure, in particular, cannot be overstated. When installed according to the recommended practices presented in this manual and from our technical service, PERMA-PIPE manholes will provide excellent service, meeting or exceeding expectations.

### 2.0 SCOPE AND APPLICATION

The scope of this procedure is limited to PERMA-PIPE manholes.

This procedure applies to the customer-designated contractor who will perform the installation. A factory-trained, experienced field installation instructor will be present at critical periods during the installation, when required by the specifications, and/or where the furnishing of such service is included as a part of the customer's purchase order.

Trouble-free, efficient operation will result from close cooperation between the installing contractor and the field installation instructor. PERMA-PIPE is committed to supporting proper manhole installation. Nevertheless, ultimate responsibility for proper installation rests with the installing contractor.

## 3.0 EQUIPMENT AND MATERIAL

### 3.01 Equipment and Material.

In order to install PERMA-PIPE manholes, PERMA-PIPE has furnished the following:

1. Pipe assemblies, fittings and accessories

2. Field joint closure materials (see applicable chapters of Section 7.0)

Installing contractor must furnish the following:

1. Crane and excavation equipment

2. Other materials as described in applicable chapters of Section 7.0.

### 3.02 Receiving, Handling and Storage.

#### 3.02.1 Receiving.

PERMA-PIPE manholes were inspected and loaded with due care at the factory. It is the carrier's responsibility to deliver the shipment in good condition. It is the responsibility of the receiver to ensure there has been no damage. The following procedures are suggested to minimize problems:

- It is recommended that the PERMA-PIPE field representative be present during receipt of the shipment.

- Obtain the following items from the carrier:

1. Packing slip
2. Bill of Lading
3. MSDS Sheets

**NOTE:** Material Safety Data Sheets (MSDS) for each of the components described in this manual should be reviewed for safety precautions and protective equipment requirements.

- Check all shipped materials against the packing slip for shortages.

- Visually inspect the materials of shipment as they are unloaded.

- List all damages and/or shortages on the packing slip and the bill of lading. **DO NOT dispose of any damaged material.** The carrier will notify you of the necessary procedure to be followed.

- Submit claims to the carrier. Failure to do so will result in loss of compensation for missing or damaged material.

- Notify your PERMA-PIPE field representative of these claims if assistance is required. PERMA-PIPE terms are F.O.B. our plant, full freight allowed to project site, unless specified differently by contract or purchase order.

- Shortages and damaged materials are normally not reshipped, unless requested to do so. If replacement material is needed, contact a PERMA-PIPE sales representative.

#### 3.02.2 Material Handling.

The means by which PERMA-PIPE manholes are unloaded and handled in the field is the decision and responsibility of the receiver. PERMA-PIPE manholes are equipped with a minimum of 2 lifting eyes for handling. Lifting eyes are used for loading and can be used with confidence for unloading. They are shop positioned for balance and number. The following procedures are suggested to minimize problems:

- Unload manholes by cranes using care to protect the coating. Ensure the crane is of ample capacity and reach.

- **DO NOT drop the manhole at any time during installation.** If an accident occurs, inspect for damage and contact the PERMA-PIPE representative if necessary.

#### 3.02.3 Pipe Storage.

PERMA-PIPE manholes can sustain damage if not stored properly. Proper storage of the product is the responsibility of the receiver. The following procedures are suggested to minimize problems:

- Stockpile manholes on blocks until ready for installation. Manholes must be stored in the shipping position. Ensure that blocking does not damage any protruding accessories.

- Prevent dirt from entering pipe outlets.

- Leave protective caps or bags in place until manhole is installed.

- Close all accesses after inspection to prevent rain or water damage.

#### 4.0 PREPARATION AND SET UP

PERMA-PIPE cannot anticipate every circumstance that might involve hazard. The warnings in this procedure are, therefore, not all inclusive. The installing contractor must satisfy himself that each procedure, tool, work method or operating technique is safe.

PERMA-PIPE recommends that only qualified personnel perform all steps of the installation procedure.

Proper implements, tools and equipment should be used for placement of the pipe in the trench to prevent damage. In no case should manholes or accessories be dropped into the excavation. Additional handling and joining procedures are covered elsewhere in this manual.

Pipe laying generally should commence at the lowest elevation and terminate at manholes, service branches or clean outs.

**NOTE:** Any obstructions or other utilities should be checked to make certain line elevations can be maintained.

#### 5.0 EXCAVATION

**NOTE:** All federal, state and local regulations concerning jobsite safety should be observed.

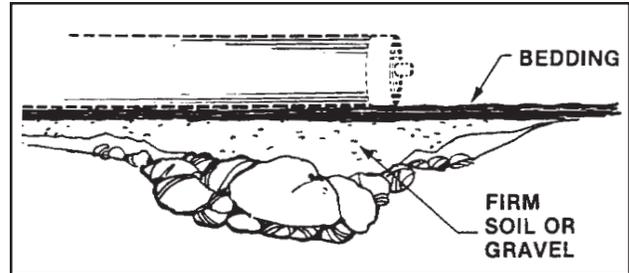
The excavation for the manhole should be at least 3 feet larger in diameter than the manhole shell diameter to allow room for pouring a proper concrete anti-flotation pad. The excavation should also be dug deep enough to allow for the depth of concrete pad. Actual dimensions of the anti-flotation pad are predicated on the size of the manhole and are shown on the PERMA-PIPE drawings.

Bottom of excavation should be a bedding of compacted virgin backfill.

#### 5.01 Special Trench Conditions.

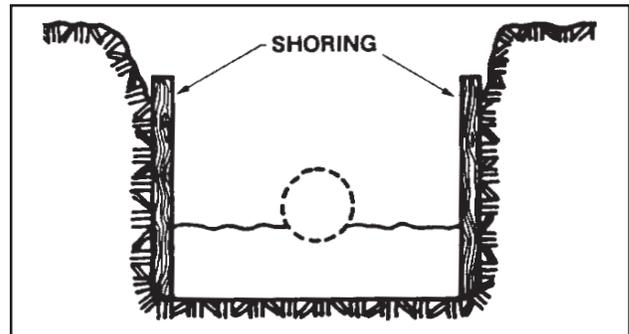
##### 5.01.1 Rock Bottom Trench.

- A rocky or uneven trench foundation should be covered with a firm soil or gravel before bedding is constructed.



##### 5.01.2 Unstable Soil.

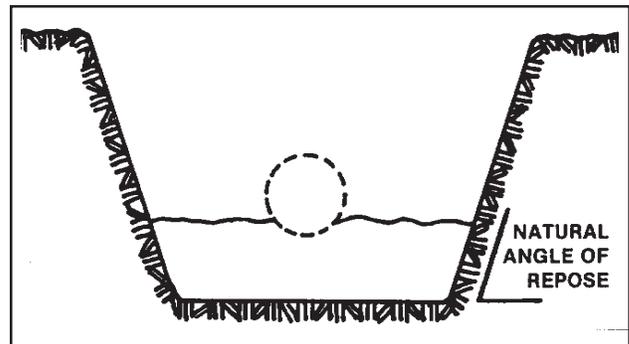
- When trenching in unstable soil, **DO NOT permit any personnel in the trench until the walls are stabilized with staybracing or shoring.**



- Replace and compact the soil as the shoring is removed.

##### 5.01.3 Granular Soil.

- In granular soil, the trench wall should be sloped at the natural angle of repose.



##### 5.01.4 Over-excavation.

- Any accidental over-excavation should be filled with bedding material and compacted to 90-95% modified proctor.

## 6.0 MANHOLE INSTALLATION

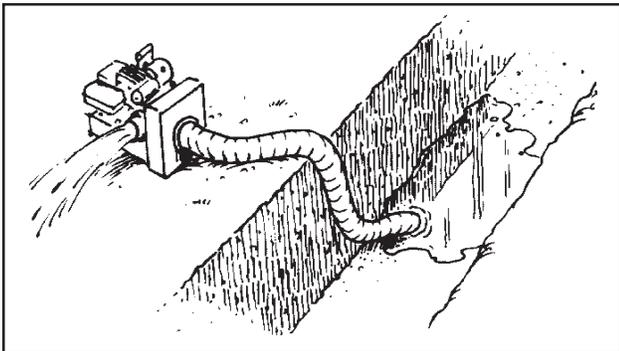
**NOTE:** When installing manholes in ambient temperatures below 60°F, contact your PERMA-PIPE field representative for special cold weather procedures.

### 6.01 Layout.

Manholes may be installed at anytime during the piping installation, in accordance with the installation drawing to the proper elevation. Depending on job conditions, it is usually best to locate the manholes prior to trenching for the accompanying pipe and conduit assemblies. This not necessary but can save survey and trenching time.

### 6.02 Lowering of the Manhole.

- Remove free-standing water in the manhole excavation before lowering the manhole.

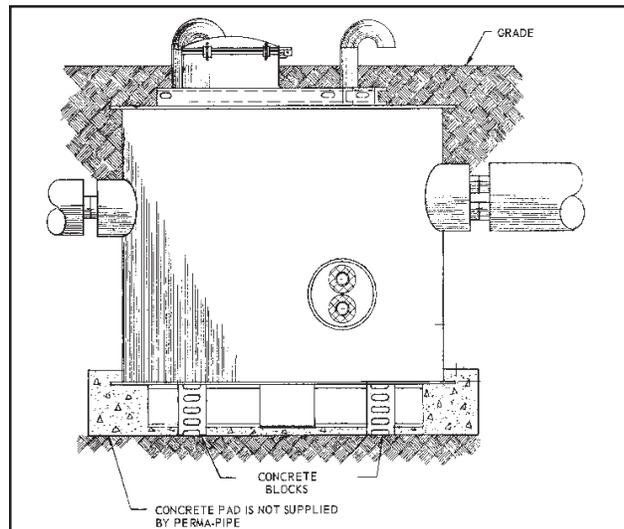


- **DO NOT** remove the protective end covers until the carrier pipes are to be joined.

- Lower the manhole by crane into the trench. **DO NOT** drop the manhole.
- Set the manhole to the required elevation, and align the conduit stubouts with the rest of the piping distribution system.

### 6.03 Anti-flotation Pad.

- Set the manhole to the required elevation and align the conduit stubouts with the distribution system.
- The concrete anti-flotation pad is then formed and keyed with the stabilizing supports on the manhole.

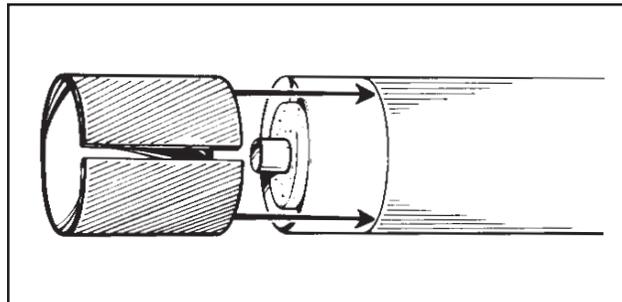


- The manhole may be set on concrete blocks for a monolithic poured pad or on a base pad formed for the sump. Anchor bolts or rebar must be used for double-pour pads.

### 6.04 Carrier Pipe Joining Procedure.

PERMA-PIPE prefabricated manholes are manufactured and shipped to the job site with proper stubouts having factory applied insulation in accordance with the specifications of the associated piping systems. The stubouts contain the proper terminal fittings and are to be connected to the pipe distribution system using approved weld/solder/braze or other procedure appropriate to the particular piping application.

- Arrange the piping sections so that pipe and stubout are in proper alignment before carrier pipe is joined.
- If applicable, position conduit closure sleeves around conduit casing before joining carrier pipe.



- In general, all carrier pipe connections are made outside the manhole by joining the pipe ends at the appropriate stubout location. Join carrier pipe to stubout using the joining procedure applicable to the carrier pipe material.

**NOTE:** For manholes designed to accommodate fiberglass reinforced plastic (FRP) carrier pipe, FRP/metal flange joints are manufactured inside the manhole, and the FRP stub protrudes through the manhole wall. Join the FRP stub to FRP carrier pipe using the appropriate solvent weld procedure.

- Where a manhole is designed with entries rather than stubouts, all manhole entries are sleeved, and the annular space between the pipe jacket and manhole sleeve must be sealed with either a mechanical rubber seal or waterproof sealant. Wall seals are available from PERMA-PIPE.

- Anchor piping in manholes outside the wall at a maximum of 5 feet from the point of connection.

## 7.0 FIELD JOINT CLOSURE

**NOTE:** Hydrostatically test the carrier pipe system in accordance with the pipe manufacturer's specifications before proceeding with closure of the field joint.

### 7.01 Joint Closure.

- Refer to the field joint closure procedure described in the applicable installation manual for each piping system.

- When all joint closures are completed, assemble materials and make all preparations to conduct an air test of the manhole.

### 7.02 Air Test.

**NOTE:** Ensure all conduit vent and drain plugs are closed prior to pressurizing the manhole with air.

- Attach a test gauge at a point where internal pressure of the manhole can be accurately ascertained.

- Ensure all manhole shell vents are shut or otherwise closed to the atmosphere.

- Close and secure manhole access hatch.

Build up the test pressure in the system. Maintain test pressure of 3-5 psig during soap testing of all welds, stubouts and sleeved entry seals.

Mark and repair any leaks and re-test.

Release air pressure before removing the test gauge.

### 7.03 Holiday Test.

The PERMA-PIPE field representative will supply a holiday testing kit and demonstrate its operation. Consult your field representative if you have questions.

**NOTE:** Care should be taken to ensure the holiday testing equipment is in good working order. All safety precautions should be taken to protect the person performing the holiday test.

- Ensure that holiday detector "on-off" switch is in the "off" position.

- Using battery tester, insert battery tester test plug into holiday detector "charge plug" receptacle. Observe LED light--if "on", battery has sufficient charge to operate the detector.

**NOTE:** Use the battery tester only to test battery in case holiday detector does not operate properly. It is not designed to test the true condition nor the amount of charge left in the battery.

- Turn output voltage selection switch (on detector) to desired voltage. Voltages are listed on the individual powerpaks in ascending order, left to right.

- Insert leather belt into slide loops on back of detector if belt mounted method is to be used.

- Uncoil ground wire and plug connector end into detector port marked "ground." (The ground wire will trail on bare earth.)

- Attach wand to threaded, male end of the powerpak. Insert powerpak cable (male connector) into female connector of powerpak. Insert other end of powerpak cable into "high voltage" port on detector.

- Assemble the desired electrode to the wand assembly and apply to the pipe, tank or other structure to be inspected. An in-

spection electrode should always make intimate contact with the surface to be inspected.

- Turn “on-off” switch to “on” position.

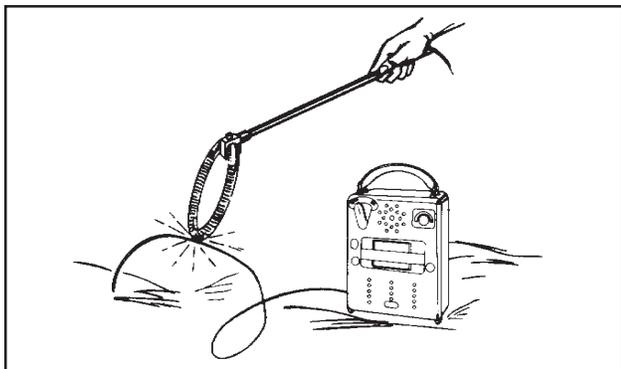
**NOTE:** When the switch is “on”, a buzzing sound may be heard coming from the detector.

- The detector is now ready to operate.

### 7.03.2 Operating methods.

**NOTE:** A good ground system will always give the best and most reliable inspection. The structure to be inspected must be grounded at some point. If individual joints of pipe are to be inspected which are not electrically connected, each joint must be grounded.

- Perform holiday testing at the voltage recommended by the PERMA-PIPE field representative.
- Check the detector by passing it over the bare metal at the end of the conduit or by touching the coil or the rake directly to the ground wire.



- Keep the coil moving along the surface of the manhole at a steady pace. If the rake is used, keep the rake moving across the manhole surface in smooth circular motions. Stay close to the surface. **DO NOT rest the rake on the manhole surface as this can damage the coating.**

**NOTE:** Speed of the electrode travel over the inspection surface should be moderate. Moving the electrode at an excessive speed can result in a faulty inspection.

- Test the entire surface of the manhole before backfilling. Areas failing the test

should be repaired and retested, but only the repaired areas should be re-tested.

**NOTE: DO NOT retest the entire assembly.**

Occasional checks of the detector can be made if no holidays are being found.

- Move the inspection electrode to the coating's edge (where the bare conductive surface is). Note that spark and signal will both occur. If the signal does not sound when the spark jumps, the “ground return” resistance is exceptionally high.

- To improve the “ground”, make a direct connection between the structure under inspection and the detector's ground wire.

**NOTE:** Before disassembly of components, turn “on-off” switch to “off” position.

### 7.04 Cathodic Protection.

For manholes equipped with cathodic protection, refer to separate cathodic protection installation procedure for guidance.

## 8.0 ALTERATIONS AND REPAIRS

### 8.01 Alterations.

Some manhole installations require alterations of the piping entries or the cutting of new piping entries. Contact your PERMA-PIPE field representative before making any alteration to the manhole.

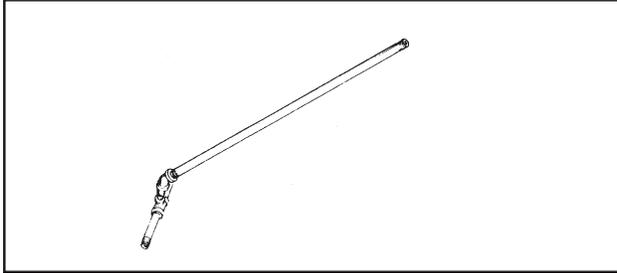
### 8.02 Non-corrosive Coating Repair.

The holiday test or a weld repair pursuant to the air test may result in the need to repair the manhole's non-corrosive coating. Use the bitumastic coating provided by PERMA-PIPE.

## 9.0 BACKFILL PROCEDURES

### 9.01 Materials.

The most crucial part of the backfill process is the compaction of soil underneath and alongside the manhole. A hand tamping device can be constructed easily and economically by joining small diameter pipe. This tool will compact the soil firmly along the wall of the manhole and should be used instead of mechanical tampers.



### 9.02 Backfill Description.

1. Sand or a sand-gravel mixture in which the gravel is either pea gravel or crushed stone without sharp edges.
2. Particles not larger than a half-inch in diameter.
3. 90% of the soil passing a No. 4 sieve.
4. 90% of the remainder retained by a No. 200 sieve.
5. Separate all unsuitable soil from the backfill soil.

### 9.03 Initial Backfill.

- Prior to backfilling, remove any foreign materials, such as shoring, braces and support blocks.

**NOTE: DO NOT use frozen fill, sod, cinders or stones greater than a quarter inch in diameter as primary backfill.**

- Backfill the area directly around the manhole. Hand tamp intermittently.

**NOTE: DO NOT machine backfill until the entire system has been tested and approved.**

- Take care to backfill from all sides of the manhole to eliminate side pressure.

### 9.04 Final Backfill (85%) Compaction.

The backfill operation can now be completed by any convenient means. Remainder of backfill should be free of large boulders, and rocks larger than 6 inches in diameter, frozen earth, or foreign matter.

**NOTE: DO NOT use heavy wheeled or tracked vehicles for tamping.**

The balance of backfill materials may be machine placed. Provide compaction to required soil densities. Use of mechanical compaction equipment to complete the final backfill is suggested, but **DO NOT use heavy wheeled or tracked vehicles for tamping.**

Depth of grade over manholes will vary from job to job. Consult the PERMA-PIPE drawings. Compact to 85% proctor.