



## Installation Instructions - Pipe & Fittings

### INSTALLATION INSTRUCTIONS FOR CAST IRON SOIL PIPE AND FITTINGS

The installation of cast iron soil pipe and fittings shall be made according to local plumbing codes or engineering specifications. Care taken during installation will assure the plumbing drainage system will perform properly.

**Warning: Failure to follow proper installation instructions and procedures may result in system failure, property loss or personal injury.**

### JOINING METHODS

There are three basic methods for joining cast iron soil pipe and fittings.

1. A hubless coupling is used to join hubless pipe and fittings. Numerous coupling designs are available either shielded or non-shielded. Each unique coupling should be installed per its manufacturer's installation instructions.
2. A one piece elastomeric compression gasket used to join hub and spigot pipe and fittings. Service weight pipe and fittings (SV) must be joined with service weight (SV) gaskets and extra-heavy pipe and fittings must be joined with extra-heavy gaskets.
3. Lead and Oakum caulked method to join hub and spigot cast iron soil pipe and fittings.

### GENERAL INSTALLATION INSTRUCTIONS

1. Hubless Coupling per ASTM 1277, ASTM C1540 or CISPI 310
  - A. Clean the outside surface of the pipe/fitting ends to be joined of dirt, mud or any other foreign material.
  - B. Pipe ends should be square, and if cut, sharp edges must be removed. Insert the gasket on one end of the pipe/fitting and the stainless steel coupling loosely fitted on the other pipe/fitting.
  - C. Firmly seat the pipe/fitting ends against the internally molded gasket shoulder.
  - D. Slide the loose stainless steel coupling into position by centering it over the gasket then tighten (torque) the clamp per the procedure recommended by the coupling manufacturer.
2. Compression Gasket (Service Weight)
  - A. Clean the hub and spigot of the pipe/fitting ends to be joined of dirt, mud or any other foreign material.
  - B. Pipe ends should be square, and if cut, sharp edges must be removed.
  - C. Fold and insert the gasket into the hub completely. Only the gasket flange that contains identification markings remains exposed outside the hub.
  - D. Lubricate following the gasket and lubricant manufacturer's application and safety instructions. For sizes 2"-4", lubricate only the inside surfaces of the gasket and the outside surfaces of the spigot. **Do not apply regular lubricant to the inside surfaces of the hub or to the outside surfaces of the gasket.** For sizes 5"-15", we recommend the use of an appropriate adhesive lubricant applied to the inside surfaces of the gasket and to the hub and spigot surfaces. **The use of adhesive lubricant does not take the place of proper joint restraint when required.**

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## Installation Instructions - Pipe & Fittings

E. Align the hub and spigot to be joined so that it is straight. By using any commercial available tool, push or pull the spigot completely through the gasket. When you feel the spigot bottom out in the hub, the joint is complete. Most fittings may be installed either by driving them into place with a lead maul or a mallet, jolting them into place or forcing together using a pry-bar. **To make cold weather installations easy, keep gaskets warm until ready for use. Cold stiff gaskets may be made pliable by immersing in warm water or storing in a heated space.**

### 3. Lead and Oakum Caulked

- A. Clean the hub and spigot of the pipe/fitting ends to be joined of dirt, mud or any other foreign material.
- B. Insert the spigot end of one pipe/fitting completely into the hub of another pipe/fitting and align correctly.
- C. Place oakum into the joint with a yarning iron then solidly and evenly pack to the proper depth using a packing tool and hammer.
- D. Pour molten lead into the joint filling it to the top of the hub.
- E. After the lead has solidified and cooled, the joint is ready to be caulked. Caulk the joint using inside and outside caulking irons to set the lead and make a leak-free joint.

## INSTALLATION METHODS

### 1. Underground

- A. The inherent physical properties of cast iron soil pipe and fittings make it the best choice of DWV materials for buried service.
- B. Trench design should be wide enough to allow adequate room for joint assembly. Total load on the pipe includes both earth load and truck load. Trenching safety procedures shall be followed including provisions to avoid trench wall collapse. The trench bottom should be stable enough to support the complete barrel of the pipe. Ideally, the pipe should rest on even, undisturbed soil. If trench is to be excavated deeper than the final depth of the drainage pipe, place and tamp backfill material to provide uniform pipe support. Cavities should be provided at each hub or coupling joint to allow continuous support of the pipe barrel along the trench bottom. Cast iron soil pipe joints allow for angular deflection when needed. The maximum deflection of a joint should not exceed ½ inch per foot of pipe. This allows 5 inches of deflection for each 10 foot pipe length. If needed deflection is greater than what a joint allows, appropriate fittings should be used.
- C. Once installation is complete; the underground section is ready for testing. After testing is completed, the trench may now be properly backfilled. Care should be taken not to damage the pipe/fittings during backfilling. Installers shall always consider local conditions, codes, manufacturer's instructions and engineer/architect instructions on any installation.
- D. When it is determined that soil environment is corrosive to cast iron, adequate precautionary polythene encasement practices are required. Detailed instructions maybe referred from appendices of ASTM A-74 and ASTM A-888 standards.

### 2. Above Ground\*

- A. Vertical piping: Shall be secured at sufficient intervals to maintain correct pipe alignment and support the weight of pipe and its contents.

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## Installation Instructions - Pipe & Fittings

Support stacks at their bases and at sufficient floor intervals to meet local code requirements. Approved clamps shall be used for this purpose. If vertical piping is to be free of any support or if no structure is available for support and stability during construction, secure the piping in position using metal stakes or braces fastened to the pipe.

B. Horizontal piping: According to most authority and plumbing code requirements, 5 foot pipe is to be supported at 5 foot intervals and 10 foot pipe be supported at 10 foot intervals. Support each pipe properly to maintain pipe alignment, prevent sagging and prevent grade reversal. Support each length of pipe with an approved pipe hanger as close to the joint as possible but not more the 18 inches from the joint. For 12" and 15" hubless pipe, hangers should be placed on both sides of the coupling when using full 10 foot pipe lengths. Each terminal end, branch and change of direction or alignment shall be supported. When installing piping 5" or larger, sway brace the system to prevent horizontal movement.

\* The above procedures are general guidelines. Specific installation instructions and techniques may be applicable if required by local plumbing or building codes and regulations or engineering specifications or instructions support and bracing should be done in accordance with local and state codes.

### PIPE CUTTING METHODS

There were several methods of cutting pipe and they may be divided into two categories, those that require external power for their operation and those methods that only require hand operation. External powered cutters are primarily used in high production fabrication shops.

#### 1. External Powered

- A. Abrasive chop saws have been found to be very effective tools for cutting cast iron soil pipe.
- B. Power reciprocating hack saw.
- C. An electrically actuated hydraulic snap cutter.

#### 2. Hand Operated

- A. Standard steel pipe cutter equipped with special cutter wheels for use with cast iron soil pipe.
- B. Snap cutters are the primary tool used for cutting cast iron soil pipe in the field. Good consistent square cuts may be obtained when following the tool manufacturer's operation instructions.

Always use proper safety gear when cutting pipe.

### TESTING AND INSPECTION

Cast iron soil pipe and fittings are designed for low pressure and gravity fed systems. Testing of these products with air, liquid or compressed gas under pressure higher than recommended, may cause product to explode or system failure. After roughing-in has been completed, it is important to test and inspect the system for leaks. The installer will usually notify the plumbing inspector or administrative authority having jurisdiction over plumbing installations before tests are performed. Concealed work should remain uncovered until required tests are performed and approved. Several test methods are used to test cast iron soil pipe systems. They include water (hydrostatic), air and smoke.

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**Installation Instructions - Pipe & Fittings****1. Water Test**

A. This is the most common type of test used to inspect a completed system and should be made before the system is concealed and before fixtures are in place. Its purpose is to check the system for leaks at the joints and to correct them prior to enclosing above ground systems or backfilling underground systems.

B. Isolate each section or floor being tested by inserting plugs into the test tees in the stacks and tightly closing all other openings except for the highest opening. The system should be properly restrained at all bends, changes of direction and at ends of runs. If not restrained, the trust force created by internal pressure will result in joint movement or separation causing failure of the test.

C. Fill the system slowly with water at its highest opening allowing any trapped air to expel. As water fills a vertical pipe it creates hydrostatic pressure. The pressure increases as the height of water rises in the vertical pipe. The system should be subjected to 10 feet of head pressure (4.3 psi).

D. Once the stack is filled, visually inspect the system for leaks around the joints. 15 minutes is a suitable time for a water test. Where leaks are detected, make corrections as needed and retest the system. Once a successful test has been made, drain the system and prepare the next section for testing.

**2. Air Test (Not Recommended)**

A. Sometimes an air test is required instead of water tests. Cast Iron Soil Pipe & Fittings subjected to air and gas pressure can explode and cause serious injuries and property damages. We do not recommend air testing and will not be responsible or liable for injury or property loss due to alleged failures of our products when tested with compressed air or gas.

B. If you still choose to test with air or gas, the system should only be tested to 5.1 psi utilizing a test gauge graduated no more than three times the test pressure. The gauge shall be monitored during a maximum 15 minute test period. Upon completion of the test, slowly depressurize the system and cautiously remove test balls and plugs.

**3. Smoke Test**

A. When a smoke test is required by engineers, architects or plumbing codes, it is applied to all parts of the drainage and venting systems after all fixtures have been permanently connected and all traps filled with water.

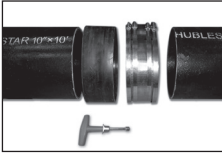
B. A thick penetrating smoke produced by one or more smoke machines is introduced into the system through a suitable opening. As smoke appears at the stack opening on the roof, the opening is closed off and the introduction of smoke is continued until a pressure equal to one inch of water is built up and maintained for 15 minutes or longer as required.

C. Under this pressure, smoke should not be visible at any point, connection or fixture. All windows in the building should be closed and any mechanical exhaust system in the building should be stopped during the test.



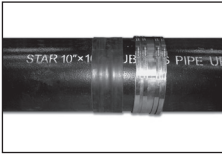
## Installation Instructions - Hubless Couplings

### INSTALLATION INSTRUCTIONS



#### STEP 1

Items for assembly includes Star's hubless pipe coupling, two lengths of pipe/fitting to be joined and a torque wrench.



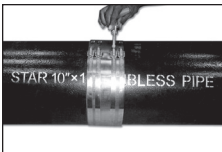
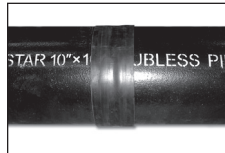
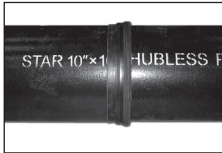
#### STEP 2

Insert the gasket on one end of the pipe/fitting making sure that the pipe/fitting is against the internally molded shoulder provided at the center of the gasket. With Star's hubless pipe coupling loosely fitted on the other pipe/fitting, insert it into the gasket such that it is against the other end of the internally molded shoulder.



#### STEP 2 (Alternative)

**Alternative:** After inserting the gasket on the first pipe/fitting, fold the gasket back until you see the internally molded shoulder against the pipe end. Insert the second pipe/fitting until it firmly contacts the internally molded shoulder. Flip the gasket back onto the pipe/fitting.



#### STEP 3

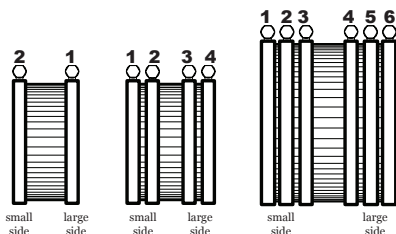
Slide the loose pipe coupling centering it over the gasket. After taking the slack out of the clamps the following tightening sequence should be followed.





## Installation Instructions - Hubless Couplings

### INSTALLATION INSTRUCTIONS



NO. OF BANDS	SEQUENCE OF TIGHTENING
2	Starting on the side of pipe/fitting having the smallest diameter, the following sequence to be torqued to required number (see table): 2,1 - 2,1
4	Starting on the side of pipe/fitting having smallest diameter, the following sequence to be torqued to required number (see table): 2,1 - 2,1 - 3,4 - 3,4 - 2,1 - 3,4
6	Starting on the side of pipe/fitting having smallest diameter, the following sequence to be torqued to required number (see table): 3,2,1 - 3,2,1 - 4,5,6 - 4,5,6 - 3,2,1 - 4,5,6

- Note:**
- Once coupling is installed and torqued in this pattern, it is not required to go back and re-torque the coupling.
  - All hubless pipes and fittings should be properly restrained if test pressure exceeds 10 feet of head.
  - Heavy 80 and Super Heavy 80 hubless pipe couplings are Factory Mutual approved to FM 1680, Class 1, at 15 PSI rated working pressure. All sizes of pipe and fitting assembly must be properly restrained.

INSTALLATION

### REQUIRED TORQUE (in-lbs)

Coupling Size (inch)	Standard 60 Screw - 5/16 inch	Heavy 80 Screw - 5/16 inch	Super Heavy 80 Screw - 3/8 inch
1 1/2	60	80	80
2	60	80	80
3	60	80	80
4	60	80	80
5	60	80	80
6	60	80	80
8	60	80	80
10	60	80	80