

SECTION 02232 PIPE INSTALLATION

A. General

The pipe shall be Ductile Iron pipe with Tyton™ or Fast Tite push-on joints and cement lined as described and manufactured in accordance with ANSI/AWWA C151/A21.51. Gaskets must properly match bell configuration. Pipe shall be installed in accordance with manufacturers' recommendations and AWWA C600.

Pipe shall be minimum Pressure Classes as follows: sizes 12-inch and smaller 350, 14-20-inch Pressure Class 250, 24-inch Pressure Class 200 and 30-inch and larger Pressure Class 150. Pipe thickness design shall include a minimum 100 psi for surge allowance.

Proper implements, tools and facilities shall be provided and used for the safe and convenient performance of the work. All pipes, fittings, and valves shall be carefully lowered into the trench in such a manner as to prevent damage to water main materials and protective coatings and linings. The trench shall be dewatered prior to installation of the pipe.

B. Inspection of Material

All pipe fittings, valve, and other appurtenances shall be carefully examined for damage and other defects immediately before installation. Defective materials shall be marked and held for repairs or rejected for replacement by manufacturer.

All lumps, blisters, and excess coating shall be removed from the socket and plain ends of each pipe, and the outside of the plain end and the inside of the bell shall be wiped clean and dry and be free from dirt, sand, grit, or any foreign material before the pipe is installed.

Foreign material including trench water shall be prevented from entering the pipe while it is being placed in the trench. During laying operations, no debris, tools, clothing, or other materials shall be placed in the pipe.

C. Obstructions and Clearances

When an obstruction is encountered, the obstructions shall be removed to provide a clearance of at least 6-inches below and on each side of all pipes, valves and fittings for pipe sizes 24-inches or smaller, and 9-inches for sizes 30-inches and larger. When excavation is completed, a bed of crushed stone or earth free from stones, large clods or frozen earth, shall be placed on the bottom of the trench to the above mentioned depths and leveled and consolidated.

These clearances and bedding procedures shall also be observed for pieces of concrete or masonry and other debris or subterranean structures, such as masonry walls, piers or foundations which may be encountered during excavation.

In all cases, the specified clearances shall be maintained between the bottom of all pipe and appurtenances and any part, projection or point of rock, boulder or stone of sufficient size and placement which could cause a fulcrum point.

Should the trench pass over a sewer or other previous excavation, the trench bottom shall be sufficiently compacted in a manner that will prevent damage to the existing installation.

Underground and surface structures, drains, sewers and other obstructions encountered shall be temporarily supported, adequately protected, and maintained during the progress of the work.

D. Laying Conditions

The specified laying condition for ductile iron pipe shall be completed in accordance with AWWA C600, Pipe Installation, Figure 4, Type 2, unless otherwise noted on the plans.

As each length of pipe is placed in the trench, the joint shall be assembled and the pipe brought to correct line and grade. The pipe shall be secured in place with approved backfill material.

Push-on Joints shall be assembled as described and illustrated in Figure 5 — "Push-on Joint Assembly" of the Specification.

E. Pipe Deflection

Where it is necessary to deflect pipe from a straight line in either the vertical or horizontal plane, or where long radius curves are permitted, the amount of deflection shall not exceed that shown in Table 4 of AWWA C600 for push-on joint pipe. Trenches shall be made wider on curves as referenced in Section W-2.02-AWWA Standard installation specifications Table 5 of these Specifications.

F. Pipe Cutting

Cutting pipe for the insertion of valves, fitting or closure pieces shall be done in as neat, workmanlike manner without damage to the pipe or cement-mortar lining.

Ductile iron pipe shall be cut using an abrasive pipe saw or approved device.

Cut ends and rough edges shall be ground smooth and tapered, and for push-on joint connections, the cut end shall be beveled.

G. Bulkhead and Plugs

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the Department Representative. The plug

shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe flotation should the trench fill with water.

At the ends of the sections where adjoining pipeline have not been completed, and in connection built into pipelines where adjoining pipeline or structures have not been completed and are not ready to be connected shall be built. Such bulkheads encountered in connecting sewers or structures included in the Contract, or pipelines or structures previously built, shall be removed when they are no longer needed.

H. Corrosion Protection

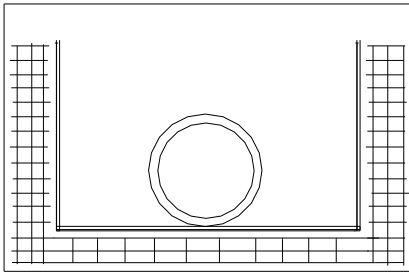
Tie rods, clamps or other components of dissimilar metal shall be protected against corrosion by encasement of the entire assembly with a double layer of 8-mil thick, loose polyethylene film in accordance with AWWA C105.

All pipe, fittings and valves shall have polyethylene encasement installed in accordance with AWWA C105.

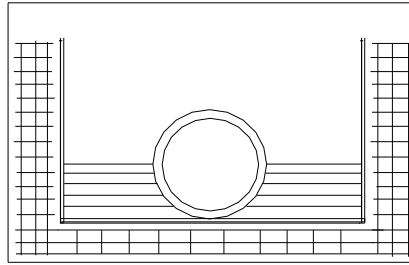
All bolted sleeves and other bolted materials to be installed underground shall have a double layer of loose polyethylene encasement.

END OF SECTION

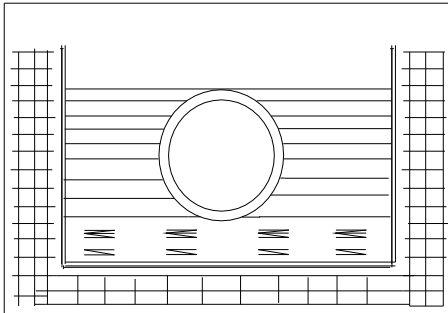
LAYING CONDITIONS FOR DUCTILE IRON PIPE



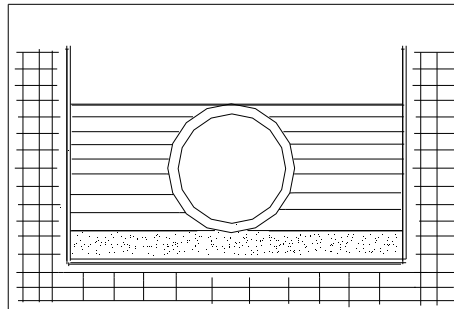
Type 1*
Flat-bottom trench.*
Loose backfill.



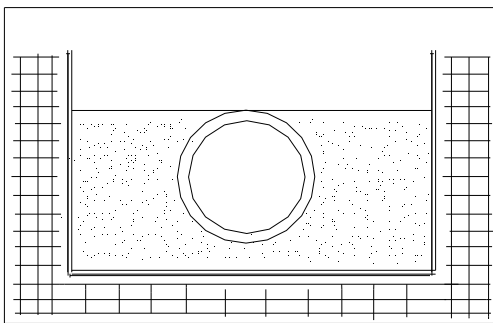
Type 2
Flat-bottom trench.* Backfill lightly
consolidated to centerline of pipe.



Type 3
Pipe bedded in 4 in. minimum of loose
soil. ♦ Backfill lightly consolidated to
top of pipe.



Type 4
Pipe bedded in sand, gravel, or crushed stone to
depth of 1/8 pipe diameter, 4 in. minimum. Backfill
compacted to top of pipe (Approximately 80 percent
Standard Proctor, AASHTO T-99).



Type 5
Pipe bedded in compacted granular material to
centerline of pipe. Compacted granular or select
material to top of pipe (Approximately 90 percent
Standard Proctor, AASHTO T-99).

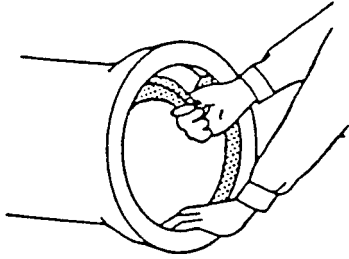
* For 30-in. and larger pipe, consideration should be given to the use of laying conditions other than type 1.

♦ “Flat-bottom” is defined as undisturbed earth.

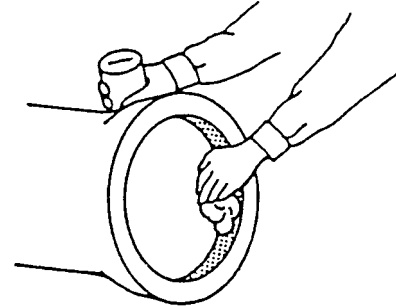
♦ “Loose soil” or “select material” is defined as native soil excavated from the trench, free of rocks, foreign materials, and frozen earth

FIGURE 4

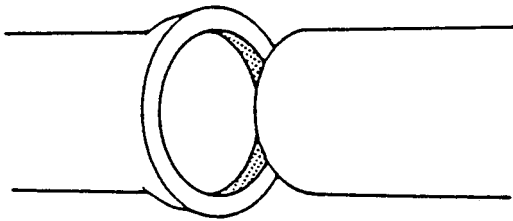
PUSH-ON-JOINT ASSEMBLY



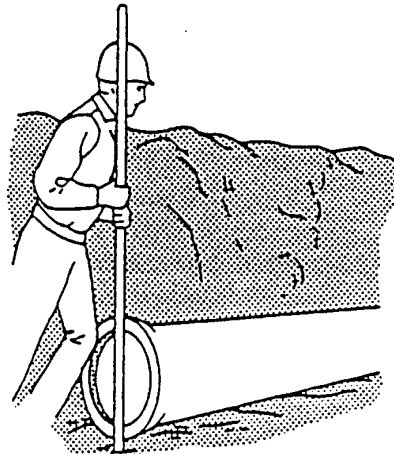
1. Thoroughly clean the groove and the bell socket of the pipe or fitting; also clean the plain end of the mating pipe. Using a gasket of the proper design for the joint to be assembled, make a small loop in the gasket and insert it in the socket, making sure the gasket faces the correct direction and that it is properly seated. Note: In cold weather, it is necessary to warm the gasket to facilitate insertion.



2. Apply lubricant to the gasket and plain end of the pipe in accordance with the pipe manufacturer's recommendations. Lubricant is furnished in sterile cans, and every effort should be made to keep it sterile. In some cases, manufacturer's recommendations on joint lubrication require that the gasket groove not be lubricated; in others, lubrication of the groove is necessary. It is important to follow the pipe manufacturer's instructions in either case.



3. Be sure that the plain end is beveled; square or sharp edges may damage or dislodge the gasket and cause a leak. When pipe is cut in the field, bevel the plain end with a heavy file or grinder to remove all sharp edges. Push the plain end into the bell socket of the mating pipe. Keep the joint straight while pushing. Make deflection after the joint is assembled.



4. Small pipe can be pushed into the bell socket with a long bar. Large pipe requires additional power, such as a jack, lever puller, or backhoe. The supplier may provide a jack or lever puller on a rental basis. A timber header should be used between the pipe and the jack or backhoe bucket to avoid damage to the pipe.

FIGURE 5