CHAPTER 3.08
DUCTILE IRON PRESSURE PIPE

Sections:

3.08.005 GENERAL. This Chapter covers the requirements for Ductile Iron Pressure Pipe materials and installation.

3.08.010 MATERIALS. Ductile iron pipe shall conform to all requirements of AWWA C 151 and ANSI A-21.51, "Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water or Other Liquids." Minimum thickness shall be Class 51 for eight (8) inch diameter and smaller. Pipes in excess of eight (8) inch diameter shall be thickness Class 50.

3.08.015 JOINTS.

A. Mechanical Joints. All mechanical joints shall meet requirements of ANSI A-21.6 and ANSI 21.11. All gasket surfaces shall be smooth and free from imperfections. All mechanical joint gaskets shall be armor guard type gaskets and shall conform to tests in accordance with construction specifications and shall be less than one (1) year old.

D. Compression Joints. Compression joints shall be mechanical joint sleeve Smith Blair 441 or Flange adaptor Smith Blair Type 900 or approved equal. Bolts shall meet all requirements of the above specifications, honoring all characteristics, tolerances, and tests. All bolts shall be of the proper size and length to match the size of pipe fitting as per drawings.

B. Push-on Joints. Push-on joints will be used for main line six (6) inch and eight (8) inch ductile iron pipe. All push-on joints shall meet the requirements of ANSI 21.11. Gaskets shall be free from defects and not over one (1) year old. All push-on joints shall have a minimum of three (3) brass wedges per joint for ten (10) inch diameter and smaller. Pipe sizes in excess of ten (10) inch diameter shall have four (4) brass wedges per joint.

C. Flanged Joints. Flanged joints shall be bolted firmly with machine, stud, or cap bolts of proper size. Flanges may be cast integrally with the pipe or may be screwed on threaded pipe. Flanges shall be faced and drilled and of proper dimensions and class for size and pressure required. All flanges shall meet requirements of ANSI A 21.10, "American Standard for Cast Iron Fittings."

D. Bolts and nuts, unless otherwise specified, shall be made of the best quality refined iron or metal steel and have clean, well-fitting threads. Bolts will be provided with standard hexagonal nuts and standard hexagonal heads. Bolts shall be of the diameter required for each flange and, when installed, shall be of length so that no more than three-eighths (3/8) inch or less than one-eighth (1/8) inch extends past face of nut.

E. Gaskets shall be one-sixteenth (1/16) inch thick, made of best quality sheet gasket material or equal. A gasket for each flanged joint of proper size, ring type or full face shall be installed.

F. Lubricants shall be non-toxic and have no deteriorating effects on gasket materials. Lubricants shall not impart taste, odor or flavor to water in a pipe. It shall conform in every way to ANSI 21.11.

3.08.020 FITTINGS.

A. Mechanical Joint Fittings. Mechanical joint fittings shall conform to ANSI A 21.10, "American Standard for Cast Iron Fittings."

B. Push-on Fittings. Push-on fittings shall conform to ANSI A 21.10 with bells, sockets, and plain ends per ANSI A 21.11.

C. Flanged Fittings. Flanged fittings shall conform to ANSI A 21.10, "American Standard for Cast Iron Fittings."

D. All flanges shall be faced and drilled. Where cap screws or stud bolts are needed, flanges shall be tapped to support cap screws or stud bolts.

3.08.025 LAYING PIPE. Pipe shall be laid as specified in AWWA Standard for "Installation of Water Mains" C-600, except as modified herein and in Special Conditions.

A. Tees, elbows, crosses, and reducers shall be used for changes in direction and outlets, as shown on the Drawings. Anchors and thrust bolts shall be placed at valves, elbows, tees, etc., as shown on the Drawings and as directed by the City Engineer.

B. All ductile iron pipe installation shall proceed on a stable foundation, with joints closely and accurately fitted. Joints shall be clean and dry, and a joint lubricant, as recommended by the pipe supplier, shall be applied uniformly to the mating joint surfaces to facilitate easy, positive joint closure.

C. Pipe shall be installed with uniform bearing under the full length of the barrel, with suitable excavations being made to receive pipe bells.

D. Select material shall be compacted around the pipe to firmly bed the pipe in position. If adjustment of position of a pipe length is required after being laid, it shall be removed and rejointed as for new pipe. In addition to the above requirements, all pipe installation shall comply with the specific requirements of the pipe manufacturer.

E. Each pipe shall be laid true to line and grade and in such a manner as to form a close concentric joint with adjoining pipe and to prevent sudden offsets to the flow line. As work progresses, the interior of the pipe shall be cleared of dirt and superfluous materials of every description. Where cleaning after laying is difficult because of small pipe size, a suitable swab or drag shall be kept in the pipe and pulled forward past each joint immediately after jointing has been completed. Trenches shall be kept free from water until pipe jointing has set, and pipe shall not be laid when condition of the trench or weather is unsuitable for such work. At all times when work is not in progress, all open ends of the pipe and fittings shall be securely closed to the satisfaction of the City Engineer so that no water, earth, or other substance will enter the pipe or fittings.

3.08.030 GRAVEL FOUNDATION FOR PIPE. Wherever the subgrade material does not afford a sufficiently solid foundation to support the pipe and superimposed load, and where groundwater must be drained, the subgrade shall be excavated to such depth as may be necessary and replaced with crushed rock or gravel compacted into place. Gravel for ductile iron pipe foundations shall be clean crushed rock or gravel with one hundred (100) percent passing a one and one half (1½) inch screen and five (5) percent passing a No. 4 sieve.

3.08.035 PIPE BEDDING. All pipes shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfilling operations by being adequately bedded. A groove shall be excavated in the bottom of the trench to receive the bottom quadrant of the pipe. Before preparing the groove, the trench bottom shall be excavated or filled and compacted to an elevation sufficiently above the grade of the pipe so that, when completed, the pipe will be true to line and grade. Bell holes shall be excavated so that only the barrel of

the pipe receives bearing from the trench bottom.

A. Pipe bedding materials placed at any point below the midpoint of the pipe shall be deposited and compacted in layers not to exceed ten (10) inches in uncompacted depth. Deposition and compaction of bedding materials shall be done simultaneously and uniformly on both sides of the pipe. Compaction shall be accomplished with hand or mechanical compactors. All bedding materials shall be placed in the trench with hand tools or other approved method in such a manner that they will be scattered alongside the pipe and not dropped into the trench in compact masses. Bedding materials shall be loose earth, free from lumps; sand materials free from roots, sod, or other vegetable matter.

B. In the event trench materials are not satisfactory for pipe bedding, modified bedding will be required. Modified bedding shall consist of placing compacted granular material on each side of and to the level of twelve (12) inches above the top of the pipe. Modified bedding material shall be graded as follows:

1. One hundred (100) percent passing a one (1) inch screen and five (5) percent passing a No. 4 sieve.

3.08.040 POLYETHYLENE WRAPPING. Ductile iron pipe materials placed may be required to be wrapped, at the direction of the City Engineer, with a polyethylene plastic wrap the entire length of the pipeline materials, including all fittings and valves, in accordance with the manufacturer's specifications. This shall be completed in order to provide the necessary cathodic protection. All testing and costs to determine need for cathodic protection shall be the responsibility of the Subdivider, Developer, Contractor or Project Manager.

A. Polyethylene encasement wrap shall consist of one or more wraps of sheet polyethylene plastic to produce a minimum thickness of eight (8) mils over all surfaces. The wrap shall be sufficiently loose so that it will contact all surfaces without tension after backfilling. The wrap shall extend one foot over adjacent surfaces. The overlap at edges of the plastic shall be a minimum of one (1) foot, and the laps shall be secured in place. Ends of the wrap shall be secured by circumferential bands on one (1) inch wide polyethylene plastic tape applied under light tension. Where polyethylene wrap is specified, all compression couplings, mechanical joints, flanged joints, and valves exposed to soil shall be wrapped with eight (8)mil thick polyethylene film adhesive tape equal to Polyken No. 900 or Scotchwrap No. 50. The tape shall be installed to adhere securely to both the pipe and polyethylene. Enough film shall be used to overlap the adjoining pipe a minimum of one (1) foot.

B. Valves shall be wrapped by bringing the wrap on the adjacent pipe over the bells or flanges of the valve and sealing with the adhesive tape. The valve bodies are then wrapped with a flat sheet of the film passed under the valve bottom and brought up around the body to the stem and fastened in place with the adhesive tape.

C. All fittings that require concrete blocking shall be completely wrapped prior to pouring the concrete backing block.

D. Polyethylene wrap shall be protected from the sun and weathering prior to use. Care shall be exercised during backfilling of the protected areas to prevent puncturing the film. The bottom of the trench shall be shaped to give substantially uniform circumferential support of the lower third of each pipe.

3.08.045 PIPE SIZES. An eight (8) inch diameter pipe is the minimum permitted diameter. If the size of any piping is not clearly evident in the Drawings, the Contractor shall request instructions from the City Engineer as to the proper sizing. Any changes resulting from the Contractor's failure to request clarification shall be at his expense.

3.08.050 CLEANING AND FLUSHING. The Contractor shall take every precaution to remove dirt, grease, and all other foreign matter from each length of piping before making connections in the field. After each section of piping is installed, it shall be thoroughly cleaned to remove rocks, dirt, and other foreign matter by washing, sweeping, scraping, or other method that will not harm the lining or pipe. Water required for flushing shall be furnished by the Contractor. All temporary connections for flushing and drainage shall be furnished, installed, and

subsequently removed by the Contractor. All open ends of pipes shall be bulkheaded or plugged when workmen are not on the job or in the immediate area to prevent rocks or other foreign matter from entering the pipe.