

SECTION 33 14 00**WATER UTILITY TRANSMISSION AND DISTRIBUTION****PART 1 - DESIGN DIRECTIVES****1.1 PROJECT INCLUDES**

- A. Water service system and piping, accessories, and appurtenances for domestic water and fire service.

1.2 DESIGN CRITERIA

- A. Design and construction for all domestic and fire suppression mains and services outside of a building shall comply with Town of Hanover Standard Specifications for Water Main, Valving and Appurtenances, most current version. If any discrepancies between this specification and the Town's Standard Specifications occur, the Town's Standard Specifications will govern.

PART 2 - PRODUCTS

- A. Provide products in compliance with the Town of Hanover Standard Specifications for Water Main Valving and Appurtenances.

PART 3 - EXECUTION**3.1 GENERAL**

- A. Construction shall be per Town of Hanover Standard Specifications for Water Main, Valving and Appurtenances, most current version.
- B. Pipe & fittings shall be handled with care to ensure that the pipe & fittings are in sound, undamaged condition. Particular care shall be taken to prevent damage to pipe coating and lining.
- C. The contractor shall furnish slings, straps, and/or other devices to support the pipe when lifted. Pipe and fittings shall not be dropped from trucks onto the ground or into the trench.
- D. Any pipe showing a distinct crack with no evidence of fracture beyond the limits of the visible crack may have the cracked portion cut off by, and at the expense of, the contractor before the pipe is laid so that the pipe used is sound. The cut shall be made in the sound portion of the barrel at least 12" from the visible limit of the crack.

3.2 CONTROL OF ALIGNMENT AND GRADE

- A. The use of string levels, hand levels, carpenter's levels, or other similar devices for transferring grade or setting pipe are not permitted.
- B. During construction provide the engineer, at their request, all reasonable and necessary materials, opportunities, and assistance for setting stakes and making measurements, including the furnishing of one or two rodmen as needed at intermittent times.

- C. Maintain good alignment in laying pipe. The deflection at joints shall not exceed the manufacturer's recommended limit. Provide fittings, if required, in addition to those shown on the drawings when pipe crosses utilities encountered when excavating the trench.

3.3 INSTALLING PIPE AND FITTINGS

- A. The contractor shall have on the job site, with each pipe laying crew, all the proper tools to handle and cut the pipe
- B. All pipe and fittings shall be thoroughly cleaned before laying and shall be kept clean until installed.
- C. Pipe shall be laid in the trench only during dry conditions. At no time shall water in the trench be permitted to flow into the pipe. At any time that work is not in progress, or the trench is unattended, the end of the pipe shall be suitably closed to prevent the entry of animals, earth, water, or other foreign materials using watertight expandable plugs. Lay pipe and fittings in accordance with the requirements of AWWA C600.
- D. As soon as excavation has been completed to the proper depth, the pipe bed shall be prepared as follows:
 - 1. Pipe Laid on Undisturbed Subgrade: Manually excavate for pipe bells and along the trench bottom as necessary to provide a uniform bearing surface along the entire length of the pipe barrels.
 - 2. Pipe Laid on Bedding Material: Place and compact bedding materials to the elevation necessary to bring the pipe to grade. The compacted material shall be shaped so that the bottom quadrant of the pipe rests firmly on the bedding for the entire length of the pipe barrels. Suitable holes shall be dug for bells or couplings to provide ample space for joining pipe.
- E. When ledge is encountered in the bottom of the trench, pipe shall be bedded on a layer of crushed gravel having a minimum thickness of 6". Blocking is not permitted.
- F. Joining shall conform to the manufacturer's instructions and appropriate ASTM Standards.
- G. After placement of the blanket material the pipe shall be checked for alignment and grade. If the pipe has been properly installed, the contractor may backfill the remainder of the trench.
- H. When cutting of pipe is required, the cutting shall be done by machine (power cutter) without damage to the pipe or cement lining. Cut ends shall be smooth and at right angles to the axis of the pipe. Pipe ends to be used with a rubber gasket joint shall be beveled and filed or ground smooth to conform to a manufactured spigot end.
- I. Install concrete thrust blocks at all fittings, tapping valves, and other locations, as required. Blocks shall be suitably sized to withstand the forces imposed. Joints shall be protected by felt roofing paper prior to placing concrete. Place concrete against undisturbed material, and do not cover joints, bolts, or nuts, or place concrete so as to interfere with the subsequent removal of any fitting. Provide wooden side forms for thrust blocks.
- J. Valve and hydrant tees shall be utilized at all hydrant installations. Hydrant and valve tees shall have an integrally attached, rotatable gland that, after bolting to valve or adjoining fitting, the joint is effectively restrained from separation.

- K. Copper pipe shall be installed without fittings. Where fittings must be installed under ground, the joint shall be brazed.

3.4 JOINTING DUCTILE IRON PIPE

- A. Make joints in accordance with the manufacturer's instructions. Where push-on joints are used, install two brass wedges in each joint. Where mechanical joints are used, paint all bolts after installation.

3.5 VALVE INSTALLATION

- A. Valves shall be set with the stem vertical.
- B. Valves placed within 10' of mechanical joint fittings shall be restrained to the fittings with four $\frac{3}{4}$ " steel rods. The rods shall be covered with two coats of bituminous paint.
- C. All valves and fittings shall assure electrical continuity using joint retainer glands or grounding straps.

3.6 VALVE BOX INSTALLATION

- A. Install valve boxes vertically, centered over the operating key, with the elevation of the top adjusted to conform to the finished surface. Adequately support the box during backfilling to maintain vertical alignment.

3.7 TESTING

- A. The contractor shall test all installed pipe in accordance with the requirements of AWWA C600, except as amended below. A representative from the Hanover Department of Public Works must be present to witness the test.
 - 1. The contractor shall furnish all labor, materials, and equipment necessary for any and all required pipe taps for testing.
 - 2. A pressure test and leakage test are required for all pipe.
- B. Testing requirements:
 - 1. Two-hour duration.
 - 2. Test pressure is 150% of the operating pressure or 200 psig, whichever is greater.
 - 3. Pressure loss over the duration of the test shall not vary more than $\pm 5\%$.
 - 4. Allowable leakage shall be determined by the following formula:
 - a. $L = SD\sqrt{P/133200}$
 - b. L=allowable leakage, gallons per hour
 - c. S=length of pipe tested, feet
 - d. D=nominal pipe diameter, inches
 - e. P=average test pressure, psig

3.8 DISINFECTING WATER MAINS

- A. The contractor shall provide all labor, materials, and equipment (water by owner) to complete disinfecting the mains. Include the installation of pipe taps necessary for chlorination or taking samples and paying for all bacteriological testing by an approved independent laboratory. Testing results to be sent to Town of Hanover Department of Public Works upon satisfactory test.

- B. The contractor shall disinfect all installed water mains in accordance with the requirements of AWWA C651, except as amended below:
1. Discuss the procedure with the engineer/owner and obtain approval before doing the work.
 2. all newly installed water mains shall be flushed at a minimum velocity of 2.5 ft/sec before and after disinfection.
 3. Chlorine shall be calcium hypochlorite or sodium hypochlorite solution using the continuous or slug method.

END OF SECTION 33 14 00