# SECTION 400500 GENERAL PIPING REQUIREMENTS

## PART 1 - GENERAL

A. Description

This section describes the general requirements for selecting piping materials; selecting the associated bolts, nuts, and gaskets for flanges for the various piping services in the project; and miscellaneous piping items.

B. Submittals

1. Submit shop drawings in accordance with the General Conditions and Section 013300.

2. Submit affidavit of compliance with referenced standards (e.g., AWWA, ANSI, ASTM, etc.).

3. Submit certified copies of mill test reports for bolts and nuts, including coatings if specified. Provide recertification by an independent domestic testing laboratory for materials originating outside of the United States.

4. Submit manufacturer's data sheet for gaskets supplied showing dimensions and bolting recommendations.

C. Definitions of Buried and Exposed Piping

1. Buried piping is piping buried in the soil, commencing at the wall or beneath the slab of a structure. Where a coating is specified, provide the coating up to the structure wall. Unless detailed otherwise, coating shall penetrate wall no less than 1 inch. Piping encased in concrete is considered to be buried. Do not coat encased pipe.

2. Exposed piping is piping in any of the following conditions or locations:

   a. Above ground.

   b. Inside buildings, vaults, or other structures.

   c. In underground concrete trenches or galleries.

PART 2 - MATERIALS

A. Materials Selection and Alternative Materials

1. The drawings may show alternative piping materials for certain services. In such cases, the same pipe material shall be used for all pipe sizes in all locations for the given piping service. Do not intermix piping materials.

B. Thread Forming for Stainless Steel Bolts

Form threads by means of rolling, not cutting or grinding.

C. Bolts and Nuts for Flanges for Ductile-Iron Piping

1. Bolts and nuts for Class 125 or 150 flanges (including AWWA C207, Class D) located indoors, outdoors above ground, and in vaults and structures shall be carbon steel, ASTM A307, Grade B, hot-dipped galvanized per ASTM F2329.

2. Bolts and nuts for buried Class 125 or 150 flanges shall be Type 304 stainless steel conforming to ASTM A193 (Grade B8) for bolts and ASTM A194 (Grade 8) for nuts.

3. Fit shall be Classes 2A and 2B per ASME B1.1 when connecting to cast-iron valves having body bolt holes.

4. Bolts used in flange insulation kits shall conform to ASTM A193 (Grade B7). Nuts shall conform to ASTM A194 (Grade 2H).

5. Provide washers for each nut. Washers shall be of the same material as the nuts.

D. Lubricant for Stainless Steel Bolts and Nuts

Lubricant shall be chloride free and shall be RAMCO TG-50, Anti-Seize by RAMCO, Specialty Lubricants Corporation Husky™ Lube O'Seal, or equal.

E. Gaskets for Flanges for Ductile-Iron Piping and Fittings in Water Service

Gaskets shall be full face, 1/8-inch thick, cloth-inserted rubber, with a Shore "A" hardness of 75 to 85. Gaskets shall be suitable for a water pressure of 200 psi at a temperature of 180°F. Gaskets shall have "nominal" pipe size inside diameters not the inside diameters per ASME B16.21. Products: Garlock Style 19 or equal.

F. Moldable Filler Tape for Pipe Surface Transition Areas

1. Filler tape shall be a 100% solids mastic-like butyl-rubber filler designed to fill and smooth the transition areas between adjacent coating surfaces such

as step-down weld areas, surface irregularities beneath heat-shrink sleeves, pipefittings, and exothermic welds for cathodic protection bonding wire connections. Characteristics:

a. Thickness per ASTM D1000: 1/8 inch minimum.

b. Peel adhesion to primed pipe: 300 ounces per inch minimum.

c. Elongation: 600% minimum.

2. Products: Tapecoat “Moldable Sealant,” Polyken No. 939 Filler Tape, or equal.

PART 3 - EXECUTION

A. Raised Face and Flat Face Flanges

Where a raised face flange connects to a flat-faced flange, remove the raised face of the flange.

B. Installing Aboveground or Exposed Piping

1. Provide pipe hangers and supports as detailed in the drawings.

2. Install pipe without springing, forcing, or stressing the pipe or any adjacent connecting valves or equipment.

C. Installing Flanged Piping

1. Set pipe with the flange bolt holes straddling the pipe horizontal and vertical centerline. Install pipe without springing, forcing, or stressing the pipe or any adjacent connecting valves or equipment. Before bolting up, align flange faces to the design plane within 1/16 inch per foot measured across any diameter. Align flange bolt holes within 1/8-inch maximum offset.

2. Inspect each gasket to verify that it is the correct size, material, and type for the specified service and that it is clean and undamaged. Examine bolts or studs, nuts, and washers for defects such as burrs or cracks and rust and replace as needed.

3. Clean flanges by wire brushing before installing flanged fittings. Clean flange bolts and nuts by wire brushing, lubricate carbon steel bolts with oil and graphite, and tighten nuts uniformly and progressively.

4. Bolt lengths shall extend completely through their nuts. Any that fail to do so shall be considered acceptably engaged if the lack of complete engagement is not more than one thread.

5. Do not use more than one gasket between contact faces in assembling a flanged joint.

6. Tighten the bolts to the manufacturer's specifications, using the recommended cross bolt pattern in multiple steps of increasing torque, until the final torque requirements are achieved. Do not over torque.

7. If flanges leak under pressure testing, loosen or remove the nuts and bolts, reset or replace the gasket, reinstall or retighten the bolts and nuts, and retest the joints. Joints shall be watertight.

D. Installing Blind Flanges

1. At outlets not indicated to be connected to valves or to other pipes and to complete the installed pipeline hydrostatic test, provide blind flanges with bolts, nuts, and gaskets.

2. Coat the inside face of blind flanges per Section 099000, System No. 7.

E. Installation of Stainless Steel Bolts and Nuts

Prior to assembly, coat threaded portions of stainless steel bolts and nuts with lubricant.

END OF SECTION