SECTION 401813 - LOW-VACUUM SYSTEMS PROCESS PIPING

Note that this section has only been edited for NYSOGS standardization and has not been technically edited. The designer shall make all technical edits specific to the project for this section.

This Section includes requirements for aboveground process piping systems for low-vacuum applications in a water or wastewater treatment plant.

Piping for Site utilities is specified in Division 33, plumbing piping and appurtenances are specified in Division 22, and process piping and valves are specified in Division 40.

In process industries such as water and wastewater treatment, piping is typically specified by pipe material. Individual piping systems (such as sanitary, raw water, and drainage) may be defined on Drawings via a pipe schedule, which describes piping components required for that system and provides other relevant data such as pressure testing requirements and applicable valve types.

Piping, as well as fittings, joints, accessories, and other appurtenances, should be indicated on the pipe schedule and specified by pipe material based on service in Division 40 - Process Interconnections.

Valving, including appurtenances and accessories, should be indicated on valve schedule and specified by valve type in Division 40.

Consult piping manufacturer and select materials based on specific application.

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes:

Pipes and tubes for low-vacuum applications.

* + - * 1. Related Requirements:

List other Sections directly related to or affecting Work of this Section. Include Sections specifying information expected to be found in this Section as well as Sections required to describe complete system or assembly requirements.

Section 400523 - Stainless Steel Process Pipe and Tubing: Piping and tubing for process systems.

Section 400564 - Butterfly Valves: Requirements for butterfly valves as specified by this Section.

Section 400565.11 - Angle Valves: Requirements for angle valves as specified by this Section.

Section 400565.16 - Globe Valves: Requirements for globe valves as specified by this Section.

* + - 1. REFERENCE STANDARDS

List reference standards included within text of this Section, with designations, numbers, and complete document titles.

* + - * 1. American Society of Mechanical Engineers:

ASME B31.3 - Process Piping.

ASME B40.100 - Pressure Gauges and Gauge Attachments.

* + - * 1. ASTM International:

ASTM A216 - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.

ASTM A351 - Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.

ASTM A436 - Standard Specification for Austenitic Gray Iron Castings.

ASTM B148 - Standard Specification for Aluminum-Bronze Sand Castings.

ASTM B164 - Standard Specification for Nickel-Copper Alloy Rod, Bar, and Wire.

* + - * 1. Manufacturers Standardization Society of The Valve and Fittings Industry Inc.:

MSS SP-67 - Butterfly Valves.

MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service.

MSS SP-86 - Guidelines for Metric Data in Standards for Valves, Flanges, Fittings and Actuators.

1. PRODUCTS
   * + 1. PERFORMANCE AND DESIGN CRITERIA
          1. Applications: Vacuum systems to 29-1/2 inches of mercury vacuum.
       2. INSTRUMENT AND CONTROL TUBING
          1. Description:

As specified in Section 400517 - Copper Process Pipe and Tubing.

Minimum Size: 1/4 inch

* + - 1. VALVES
         1. Ball Type:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=12477&mf=04&src=wd):

designer to provide two manufacturers and approved equivalent for all listed products.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Subparagraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Description:

Comply with MSS SP-72.

Suitable for flow from either direction.

Certified leak-tight under vacuum of 0.08 inch of mercury, absolute.

Minimum Pressure Rating: 175 psig at 200 degrees F

2-Inch Valves and Smaller:

End Connections: Screwed.

Balls and Stems: [**Copper alloy**] [**Chrome-plated steel**].

2-1/2-Inch Valves and Larger:

End Connections: Flanged.

Balls and Stems: Chrome-plated steel.

Flow Area: Full pipe size.

Seats and Seals: [**PTFE**] [**Manufacturer's standard for indicated service**].

* + - * 1. Butterfly Type:

Description:

As specified in Section 400564 - Butterfly Valves.

Comply with MSS SP-67.

Certified leak-tight under vacuum of 0.08 inch of mercury, absolute.

20-Inch Valves and Smaller:

Type: Wafer.

Laying Length: Comply with MSS SP-67.

Larger than 20-Inch Valves:

Type: Flanged.

Laying Length: Comply with [**AWWA C504**] [**MSS SP-86**].

Disk: [**Cast iron, ASTM A436**] [**Cast steel, ASTM A216**] [**Steel, ASTM A351]** [**Aluminum-bronze, ASTM B148**].

Shaft: [**Steel, ASTM A351]** [**Nickel-copper alloy, ASTM B164**].

Seats and Seals: Resilient elastomer.

Seats:

Type: Bonded.

Material: [**Steel**] [**Gray cast iron**] [**Bronze**].

Bearings:

Type: Sleeve.

Material: [**Steel**] [**Bronze**] [**Nickel-copper alloy**] [**PTFE**].

Larger than 20-Inch Valves: Furnish thrust bearings.

* + - * 1. Globe and Angle Valve Types:

Globe Valves: As specified in Section 400565.16 - Globe Valves.

Angle Valves: As specified in Section 400565.11 - Angle Valves.

* + - 1. ACCESSORIES
         1. Pressure Gauges:

[Manufacturers](http://www.specagent.com/LookUp/?ulid=12478&mf=04&src=wd):

designer to provide two manufacturers and approved equivalent for all listed products.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Subparagraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

Insert descriptive specifications below to identify Project requirements and to eliminate conflicts with products specified above.

Description:

Comply with ASME B40.100.

Furnish adjustable red marking pointer and damper screw adjustment in inlet connection.

Type: [**Pressure**] [**Vacuum**] [**Pressure-vacuum**].

Nominal Diameter: 3-1/2 inches

1. EXECUTION
   * + 1. EXAMINATION
          1. Verify that conditions are as specified in Section 400523 - Stainless Steel Process Pipe and Tubing.
       2. INSTALLATION
          1. As indicated on [**Drawings**] [**Shop Drawings**] and according to manufacturer instructions and ASME B31.3.
          2. Use minimum number of joints.
          3. In locations where pipe expansion joints are indicated, install pipe alignment guides adjacent to and within [**four**] <**\_\_\_\_\_\_\_\_**> pipe diameters of joint.
          4. Field Fabrication: Fabricate fittings according to manufacturer instructions.
          5. Provide flexible couplings and expansion joints at connections to equipment and where indicated on [**Drawings**] [**Shop Drawings**].
          6. Install couplings, service saddles, and anchors according to manufacturer instructions.
          7. Provide upstream and downstream clearances [**as indicated on Drawings**] [**according to component manufacturer instructions**].
          8. Local Indicators:

Install direct-reading indicator devices, such as thermometers and pressure gauges, to be read from floor level and accessible for maintenance and service.

Install according to manufacturer instructions.

* + - * 1. Orientate valves to permit operation and maintenance access to valve operator and to avoid interference with other equipment.

\*\*\*\*\*\* [OR] \*\*\*\*\*\*

In following Paragraph insert "State of New York Department of Transportation," "Municipality of \_\_\_\_\_\_\_\_ Department of Public Works," or other agency as appropriate.

* + - * 1. Installation Standards: Install Work according to <**\_\_\_\_\_\_\_\_**> standards.
      1. FIELD QUALITY CONTROL
         1. Testing:

Pressure Testing:

Pneumatic, using dry, oil-free compressed [**air**] [**carbon dioxide**] [**nitrogen**].

Preliminary Testing:

Apply pressure not exceeding 5 psig , swab joints with soap solution, and observe for bubbles.

If testing reveals leakage, replace or repair defective materials and retest.

Duration of Test: [**As indicated on pipe schedule**] <**\_\_\_\_\_\_\_\_**>.

Acceptance Testing:

Apply pressure not exceeding 25 psig and maintain for not less than two hours with no pressure drop.

Instrumentation and Control Tubing: Apply pressure not exceeding 30 psig, and maintain for not less than 24 hours with no pressure drop.

If testing reveals leakage, replace or repair defective materials and retest.

Vacuum Testing:

Acceptance Testing:

Evacuate piping system to 0.13 inch of mercury, absolute.

Acceptable Rate of Pressure Rise: Not exceeding 0.03 inch of mercury per hour.

If testing reveals leakage, replace or repair defective materials and retest.

* + - 1. ADJUSTING
         1. Field-calibrate local indicators at time of piping installation.
      2. CLEANING
         1. Flushing: Purge lines with dry, oil-free compressed air after installation.

END OF SECTION 401813