SECTION 402550 - LIQUID BASES 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 plant process piping systems transporting bases and basic solutions 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 (e.g., sanitary, raw water, drainage) may be defined on Drawings by using a pipe schedule that describes the piping components required for that system and provides other relevant data such as pressure testing requirements and applicable valve types.

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

Consult with piping manufacturer and select materials based on type and strength of base solution and specific application.

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

Pipes and tubes for conveying liquid bases.

Requirements of Section 400523 - Stainless Steel Process Pipe and Tubing as applied to this Section.

* + - * 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: Pipe and tubing for process systems.

Section 400561 - Gate Valves: Execution requirements for gate valves as specified by this Section.

Section 400562 - Plug Valves: Execution requirements for plug valves as specified by this Section.

Section 400563 - Ball Valves: Execution requirements for ball valves as specified by this Section.

Section 400564 - Butterfly Valves: Execution requirements for butterfly 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 B1.20.1 - Pipe Threads, General Purpose (Inch).

ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.

ASME B16.20 - Metallic Gaskets for Pipe Flanges: Ring-Joint, Spiral-Wound, and Jacketed.

ASME B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges.

ASME B31.3 - Process Piping.

* + - * 1. ASTM International:

ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

ASTM D2310 - Standard Classification for Machine-Made "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.

ASTM D2464 - Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

ASTM D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.

ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.

ASTM D2992 - Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings.

ASTM D3308 - Standard Specification for PTFE Resin Skived Tape.

ASTM D3754 - Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer and Industrial Pressure Pipe.

ASTM D4024 - Standard Specification for Machine Made "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Flanges.

ASTM D4161 - Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.

ASTM D5421 - Standard Specification for Contact Molded "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Flanges.

ASTM D5685 - Standard Specification for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pressure Pipe Fittings.

ASTM F437 - Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.

ASTM F438 - Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.

ASTM F439 - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.

ASTM F441 - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.

ASTM F441M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.

ASTM F442 - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR).

ASTM F442M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR).

ASTM F1545 - Standard Specification for Plastic-Lined Ferrous Metal Pipe, Fittings, and Flanges.

1. PRODUCTS
	* + 1. FIBERGLASS PIPING
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=12105&mf=04&src=wd):

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

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

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

* + - * 1. Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

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

Potential applications of fiberglass-reinforced plastic (FRP) piping include sodium hydroxide and other chemical processing materials. Consult with piping manufacturer and select materials based on specific application.

* + - * 1. Fiberglass-Reinforced Plastic (FRP) Pressure Pipe and Fittings:

Pipe: Comply with ASTM D3754, Type [**1**] [**2**] [**3**] [**4**], Pressure Class <**\_\_\_\_\_\_\_\_**>.

Pressure Rating:

[**<\_\_\_\_\_\_\_\_> psig**] [**As indicated in pipe schedule**] <**\_\_\_\_\_\_\_\_**>.

Comply with [**ASTM D2310**] [**and**] [**ASTM D2992**].

Fittings:

Non-flanged: Comply with ASTM D5685.

Flanged: Comply with ASTM D5421.

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

Flanged: Comply with ASTM D4024, Type [**A**] [**B**], Grade <**\_\_\_\_\_\_\_\_**>, Class [**I**] [**II**].

Joints: [**Bell and spigot, ASTM D3754**] [**Bell and spigot, ASTM D4161**] [**Butt, ASTM D3754**] [**Flanged**] <**\_\_\_\_\_\_\_\_**>.

* + - 1. PVC PIPING AND TUBING
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=12106&mf=04&src=wd):

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

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

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

* + - * 1. Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

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

Potential applications of PVC piping and tubing include sodium hydroxide and other chemical processing materials. Consult with piping manufacturer and select materials based on specific application.

* + - * 1. Piping:

Pipe: Comply with ASTM D1785, Schedule [**40**] [**80**] <**\_\_\_\_\_\_\_\_**>.

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

Pipe: Comply with ASTM D2241, [**SDR-26 for 160-psig pressure rating, calculated according to ASTM D2837**] [**SDR-41 for 100-psig rating, calculated according to ASTM D2837**] [**SDR-21 for 200-psig rating, calculated according to ASTM D2837**] [**as indicated on pipe schedule**].

Fittings:

[**Schedule 40, ASTM D2466**] [**Schedule 80, ASTM D2467**].

[**Socket, solvent-welded, ASTM D2855**] [**Threaded, ASTM D2464**] <**\_\_\_\_\_\_\_\_**>.

Joints: [**Socket, solvent-welded, ASTM D2855**] [**Threaded, ASTM D2464**] <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Tubing:

Tube:

[**Clear**] <**\_\_\_\_\_\_\_\_**>.

Size and Wall Thickness: [**As indicated on pipe schedule**] <**\_\_\_\_\_\_\_\_**>.

Pressure Rating: As indicated on [**Drawings**] [**pipe schedule**].

Fittings: Compression type; materials suitable for application.

Threads: Straight; ASME B1.20.1.

* + - 1. CPVC PIPING
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=12107&mf=04&src=wd):

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

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

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

* + - * 1. Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

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

Potential applications of CPVC piping include sodium hydroxide and other chemical processing materials. Consult with piping manufacturer and select materials based on specific application.

* + - * 1. Piping:

Pipe: Comply with ASTM F441, Schedule [**40**] [**80**].

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

Pipe: Comply with ASTM F442, SDR <**\_\_\_\_\_\_\_\_**>.

Fittings:

Flanged: Comply with ASME B16.5, Class [**125**] <**\_\_\_\_\_\_\_\_**>.

Socket Welded: [**Schedule 40, ASTM F438**] [**Schedule 80, ASTM F439**].

Threaded:

Schedule 80, ASTM F437.

Threads: ASME B1.20.1

Joints: [**Socket welded**] [**Flanged**] [**Push-on**] [**Threaded**].

* + - 1. LINED STEEL PIPING
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=12108&mf=04&src=wd):

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

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

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

* + - * 1. Furnish materials according to <**\_\_\_\_\_\_\_\_**> standards.

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

PTFE-lined piping offers a relatively high maximum operating temperature. This liner material is virtually inert. Potential applications include sodium hydroxide and other chemical processing materials. Consult with piping manufacturer and select materials based on specific application.

Operating temperature limitations may be encountered depending on specific chemical environments.

* + - * 1. PTFE-Lined Steel Piping:

Furnish as indicated on [**Drawings**] [**pipe schedule**].

Maximum Design Pressure: <**\_\_\_\_\_\_\_\_**> psig at <**\_\_\_\_\_\_\_\_**> degrees F

Maximum Operating Temperature: 450 degrees F

Minimum Liner Thickness: <**\_\_\_\_\_\_\_\_**> mil

Lock liner to shell.

Gaskets: [**Rubber**] [**As indicated on pipe schedule**] <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Flanges:

Pipes 1 inch through 8 inches: Forged steel, Class [**150**] [**300**], ASTM A105 , [**ASME B16.5**] [**ASME B16.42**].

Pipes 10 inches through 12 inches : Flared steel, lap jointed, Class [**150**] <**\_\_\_\_\_\_\_\_**>, ASTM A105 , [**ASME B16.5**] [**ASME B16.42**].

* + - 1. ACCESSORIES
				1. Pipe-Thread Tape:

Material: PTFE.

Comply with ASTM D3308.

* + - * 1. Flange Gaskets:

ASME B16.5, to suit application.

Nonmetallic Gaskets: ASME B16.21, to suit application.

Metallic Ring Joint Gaskets: ASME B16.20, to suit application.

Raised-Face Flanges: Flat ring type.

Flat-Face Flanges: Full-face type.

* + - * 1. Dielectric Fittings: Furnish between dissimilar metals.
1. EXECUTION
	* + 1. EXAMINATION
				1. Verify conditions as specified in Section 400523 - Stainless Steel Process Pipe and Tubing.
			2. PREPARATION
				1. Protect equipment and materials from damage and intrusion of water.
			3. INSTALLATION
				1. Piping and Appurtenances:

As indicated on [**Drawings**] [**Shop Drawings**].

Use minimum number of joints.

According to manufacturer instructions.

According to ASME B31.3.

* + - * 1. In locations where pipe expansion joints are indicated, install pipe alignment guides adjacent to and within [**four**] <**\_\_\_\_\_\_\_\_**> pipe diameters of joint.
				2. Field Fabrication: Fabricate fittings according to manufacturer instructions.
				3. Provide thrust restraints as required.
				4. Provide flexible couplings and expansion joints at connections to equipment and where indicated on [**Drawings**] [**Shop Drawings**].
				5. Install couplings, service saddles, and anchors according to manufacturer instructions.
				6. Provide upstream and downstream clearances [**as indicated on Drawings**] [**according to component manufacturer's recommendations**].
				7. Local Indicators:

Install direct-reading indicator devices, such as thermometers and pressure gages, to be read at 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 interferences 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. ADJUSTING
				1. Field-calibrate local indicators at time of piping installation.

END OF SECTION 402550