SECTION 400551 - COMMON REQUIREMENTS FOR PROCESS VALVES

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 specifies basic materials and methods related to valves commonly used for process systems. This Section is segregated to permit rapid editing and to eliminate repetition of text within other valve Sections in Division 40.

This Section includes purpose process piping valves. Refer to Section 220523 for general-purpose plumbing valves.

For water and wastewater treatment projects, valving is typically defined via a valve schedule, which describes the valve type and characteristics required for that system. A sample valve schedule is provided following END OF SECTION.

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

Valves.

Valve actuators.

<**\_\_\_\_\_\_\_\_**>.

* + - * 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 033000 - Cast-in-Place Concrete: Execution requirements for placement of concrete as required by this Section.

Section 055000 - Metal Fabrications: Miscellaneous metalwork and fasteners specified by this Section.

Section 220523 - General-Duty Valves for Plumbing Piping: Miscellaneous plumbing valves as required by Project.

Section 260503 - Equipment Wiring Connections: Electrical connections for equipment specified in this Section.

Section 400593 - Common Motor Requirements for Process Equipment: Single- and three-phase motor requirements for equipment specified in this Section.

Section 404213 - Process Piping Insulation: Valve insulation as required by this Section.

* + - 1. REFERENCE STANDARDS

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

LEED requires compliance with specific editions of referenced standards.

* + - * 1. American Water Works Association:

AWWA C541 - Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.

AWWA C542 - Electric Motor Actuators for Valves and Slide Gates.

AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

* + - * 1. ASTM International:

ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.

ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.

* + - * 1. Manufacturers Standardization Society:

MSS SP-25 - Standard Marking System for Valves, Fittings, Flanges, and Unions.

* + - * 1. National Electrical Manufacturers Association:

NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

* + - * 1. NFPA:

NFPA 70 - National Electrical Code (NEC).

* + - * 1. NSF International:

NSF 61 - Drinking Water System Components - Health Effects.

NSF 372 - Drinking Water System Components - Lead Content.

* + - * 1. UL:

Equipment Directory.

* + - 1. COORDINATION
         1. Coordinate Work of this Section with piping, equipment, and appurtenances.
      2. PREINSTALLATION MEETINGS
         1. Convene minimum [**one week**] [**<\_\_\_\_\_\_\_\_> weeks**] prior to commencing Work of this Section.
      3. SUBMITTALS

Only request submittals needed to verify compliance with Project requirements.

* + - * 1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
        2. Manufacturer’s installation instructions shall be provided along with product data.
        3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
        4. Product Data:

Submit manufacturer information for actuator with model number and size indicated.

Submit valve cavitation limits.

* + - * 1. Shop Drawings: Indicate parts list, materials, sizes, position indicators, limit switches, [**control system,**] actuator mounting, wiring diagrams, control system schematics[**, and**] <**\_\_\_\_\_\_\_\_**>.
        2. Valve-Labeling Schedule: Indicate valve locations and nametag text.
        3. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
        4. Certification of Valves Larger Than 12 Inches: Furnish certified copies of hydrostatic factory tests, indicating compliance with applicable standards.

Include separate Paragraphs for additional certifications.

Include following Paragraph when Contractor is responsible for designing products or assemblies. List affected products when Section specifies more than one product.

* + - * 1. Delegated Design Submittals: Submit signed and sealed Shop Drawings with design calculations and assumptions for sizing of control valves.
        2. Manufacturer Instructions: Submit installation instructions and special requirements.
        3. Source Quality-Control Submittals: Indicate results of [**shop**] [**factory**] tests and inspections.
        4. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections, including factory-applied coatings.
        5. Manufacturer Reports: Certify that [**equipment has been installed according to manufacturer instructions**] <**\_\_\_\_\_\_\_\_**>.
        6. Qualifications Statement:

Coordinate following Subparagraph with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer and licensed professional.

* + - 1. SUSTAINABLE DESIGN SUBMITTALS
         1. Manufacturer's Certificate: Certify that following products meet or exceed specified sustainable design requirements:

Insert material certifications list below to suit products specified in this Section and Project sustainable design requirements. Specific certificate submittal and supporting data requirements are specified in Section 018113.

Materials Resources Certificates:

Certify source and origin for [**salvaged**] [**and**] [**reused**] products.

Certify recycled material content for recycled content products.

Certify source for regional materials and distance from Project Site.

* + - * 1. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.

Provide cost data for following products:

Edit list of material cost data below to suit products specified in this Section and Project sustainable design requirements. Specific cost data requirements are specified in Section 018113.

Products with recycled material content.

Regional products.

<**\_\_\_\_\_\_\_\_**>.

* + - 1. CLOSEOUT SUBMITTALS
         1. Project Record Documents: Record actual locations of valves and actuators.
      2. QUALITY ASSURANCE

Include this Article to specify compliance with overall reference standards affecting products and installation included in this Section.

* + - * 1. Maintain clearances as indicated on [**Drawings**] [**and**] [**Shop Drawings**].
        2. Ensure that materials of construction of wetted parts are compatible with process liquid.
        3. Materials in Contact with Potable Water: Certified to NSF 61 and NSF 372.

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

* + - * 1. Perform Work according to <**\_\_\_\_\_\_\_\_**> standards.

Include following Paragraph only when cost of acquiring specified standards is justified.

* + - * 1. Maintain <**\_\_\_\_\_\_\_\_**> [**copy**] [**copies**] of each standard affecting Work of this Section on Site.
      1. QUALIFICATIONS

Coordinate following Paragraphs with requirements specified in SUBMITTALS Article.

* + - * 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
        2. Licensed Professional: [**Professional engineer**] <**\_\_\_\_\_\_\_\_**> experienced in design of specified Work and licensed [**at Project location**] [**in State of <\_\_\_\_\_\_\_\_>**].
      1. DELIVERY, STORAGE, AND HANDLING
         1. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
         2. Store materials according to manufacturer instructions.
         3. Protection:

Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

Protect valve ends from entry of foreign materials by providing temporary covers and plugs.

Provide additional protection according to manufacturer instructions.

* + - 1. EXISTING CONDITIONS
         1. Field Measurements:

Verify field measurements prior to fabrication.

Indicate field measurements on Shop Drawings.

* + - 1. WARRANTY

This Article extends warranty period beyond one year. Extended warranties may increase construction costs and Owner enforcement responsibilities. Specify warranties with caution.

* + - * 1. Furnish [**five**] <**\_\_\_\_\_\_\_\_**>-year manufacturer's warranty for valves and actuators.

1. PRODUCTS
   * + 1. VALVES
          1. Description: Valves, operator, actuator, handwheel, chainwheel, extension stem, floor stand, worm and gear operator, operating nut, chain, wrench, and other accessories as required.
          2. Valve Ends: Compatible with adjacent piping system.
          3. Operation:

Open by turning [**counterclockwise**] <**\_\_\_\_\_\_\_\_**>; close by turning [**clockwise**] <**\_\_\_\_\_\_\_\_**>.

Cast directional arrow on valve or actuator with OPEN and CLOSE cast on valve in appropriate location.

* + - * 1. Valve Marking [**and Labeling**]:

Marking: Comply with MSS SP-25.

[**Labeling: As specified in valve schedule.**]

Provide buried valves with valve boxes, covers, and extensions as specified in Section 331116 - Site Water Utility Distribution Piping.

* + - * 1. Valve Construction:

Bodies: Rated for maximum temperature and pressure to which valve will be subjected as specified in valve Sections.

Bonnets:

[**Clamped,**] [**screwed,**] [**or**] [**flanged**] to body and of same material and pressure rating as body.

Furnish glands, packing nuts, or yokes as specified in valve Sections.

Stems and Stem Guides:

Materials and Seals: As specified in valve Sections.

If subject to dezincification, consider specifying bronze valve stems to conform to ASTM B62. Where dezincification is not a problem, bronze conforming to ASTM B584 may be considered.

Bronze Valve Stems: According to ASTM [**B62**] [**B584**].

Space stem guides 10 feet o.c.

Submerged Stem Guides: Type 304 stainless steel.

Nuts and Bolts: As specified in Section 055000 - Metal Fabrications.

* + - 1. VALVE ACTUATORS
         1. Provide actuators with position indicators for shutoff valves 6 inches and larger.
         2. Comply with AWWA [**C541**] [**C542**].
         3. Provide chain actuators for shutoff valves mounted 8 feet above [**operating**] floor level.
         4. Provide gear and power actuators with position indicators.
         5. Gear-Assisted Manual Actuators:

Provide totally enclosed gears.

Maximum Operating Force: 60 lbf

Bearings: Permanently lubricated bronze.

Packing: Accessible for adjustment without requiring removal of actuator from valve.

* + - * 1. Chain Actuator:

Description: Chain guides and hot-dip galvanized operating chain extending to 5-1/2 feet above [**operating**] floor level.

Chain Wheels: Sprocket-rim type.

Furnish chain storage if chains may interfere with pedestrian traffic.

* + - * 1. Valve Actuators in NEC Class I, Group D, Division 1 or 2 Hazardous Locations: UL approved.
        2. Pneumatic Actuators:

Furnish [**oil lubricators,**] isolating valves, filter regulators, pressure gages, and condensate drains.

[**Provide local control to override automatic operation.**]

* + - * 1. Electric Motor Actuators:

Motors: As specified in Section 400593 - Common Motor Requirements for Process Equipment.

Control Panel:

Factory mounted.

NEMA 250 Type [**1**] [**4**] <**\_\_\_\_\_\_\_\_**>.

Single-point power connection and grounding lug.

Controls: <**\_\_\_\_\_\_\_\_**>.

Disconnect Switch: Factory mounted in control panel.

Operation Sequences: <**\_\_\_\_\_\_\_\_**>.

Gearing:

Single- or double-reduction unit.

Spur or helical gears and worm gearing.

Lubrication: [**Grease**] [**or**] [**oil**] in sealed housing.

* + - * 1. Accessories:

Handwheel:

Furnish permanently attached handwheel for emergency manual operation.

Rotation: None during powered operation.

Permanently affix directional arrow and cast [**OPEN**] [**and**] [**or**] [**CLOSE**] on handwheel to indicate appropriate direction to turn handwheel.

Maximum Operating Force: 60 lbf

* + - 1. INSULATION
         1. As specified in Section 404213 - Process Piping Insulation.

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

* + - * 1. As indicated [**on Drawings**] [**on Shop Drawings**] [**in pipe schedule**].
      1. SUSTAINABILITY CHARACTERISTICS

Insert sustainable design characteristics in this Article to suit content of this Section and Project sustainable design requirements as specified in Section 018113.

* + - * 1. Material and Resource Characteristics:

Recycled Content Materials: Furnish materials with maximum available recycled content [**including:**] [**.**]

Insert list of materials specified in this Section required to have recycled content.

<**\_\_\_\_\_\_\_\_**>.

Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project Site [**including:**] [**.**]

Insert list of materials specified in this Section required to be regional materials.

<**\_\_\_\_\_\_\_\_**>.

* + - 1. FINISHES
         1. Valve [**Lining and**] Coating: Comply with AWWA C550.
         2. Do not coat flange faces of valves unless otherwise specified.
      2. SOURCE QUALITY CONTROL
         1. Testing: Test valves according to manufacturer's standard testing protocol, including hydrostatic, seal, and performance testing.

Include one or both of following Paragraphs to require Director's inspection or witnessing of test at factory.

* + - * 1. Director’s Inspection:

Make completed <**\_\_\_\_\_\_\_\_**> available for inspection at manufacturer's factory prior to packaging for shipment.

Notify Director’s Representative at least [**seven**] <**\_\_\_\_\_\_\_\_**> days before inspection is allowed.

* + - * 1. Director’s Witnessing:

Allow witnessing of factory inspections and test at manufacturer's test facility.

Notify Director’s Representative at least [**seven**] <**\_\_\_\_\_\_\_\_**> days before inspections and tests are scheduled.

Include following Paragraph if reliance on fabricator's approved quality-control program is sufficient for Project requirements.

* + - * 1. Certificate of Compliance:

If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.

Specified shop tests are not required for Work performed by approved manufacturer.

1. EXECUTION
   * + 1. EXAMINATION
          1. Verify that piping system is ready for valve installation.
       2. INSTALLATION
          1. Install valves, actuators, extensions, valve boxes, and accessories according to manufacturer instructions.
          2. Firmly support valves to avoid undue stresses on piping.
          3. Coat studs, bolts and nuts with anti-seizing lubricant.
          4. Clean field welds of slag and splatter to provide a smooth surface.
          5. Install valves with stems upright or horizontal, not inverted.
          6. Install brass male adapters on each side of valves in copper-piped system and solder adapters to pipe.
          7. Install 3/4-inch [**gate**] [**ball**] valves with cap for drains at main shutoff valves, low points of piping, bases of vertical risers, and equipment.
          8. Install valves with clearance for installation of insulation and to allow access.
          9. Provide access where valves and fittings are not accessible.
          10. Comply with Division 40 - Process Interconnections for piping materials applying to various system types.
          11. Install insulation as specified in Section 404213 - Process Piping Insulation.

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

* + - * 1. Install insulation as indicated [**on Drawings**] [**on Shop Drawings**] [**in pipe schedule**].
        2. Valve Applications:

Install [**shutoff**] [**and**] [**drain**] valves at locations as indicated on Drawings and as specified in this Section.

Install shutoff and isolation valves.

Isolate equipment, part of systems, or vertical risers as indicated on Drawings.

Install valves for throttling, bypass, or manual flow control services as indicated on Drawings.

Install [**ball**] [**, butterfly**] [**, and**] [**gate**] valves in water systems for shutoff service.

Install [**ball**] [**, butterfly**] [**, and**] [**gate**] valves in sanitary systems for shutoff service.

\*\*\*\*\*\* [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. Valve Field Testing:

Test for proper alignment.

If specified by valve Section, field test equipment to demonstrate operation without undue noise, vibration, or overheating.

Director’s Representative will witness field testing.

* + - 1. ATTACHMENTS

When relying on separate schedules, tables, illustrations, or forms to specify product requirements, include list of each attachment. Include identical list of attachments in Project Manual table of contents.

Insert attachments following END OF SECTION. Consider following example when developing Project schedule.

* + - * 1. Valve Schedule:

V-121:

Description: Pump P-110 discharge.

[**Manufacturer: <\_\_\_\_\_\_\_\_>.**]

[**Model: <\_\_\_\_\_\_\_\_>.**]

Location: Pump Room.

Type: Check.

Size: 16 inches

V-122:

Description: Pump P-110 discharge; low-pressure shutoff.

[**Manufacturer: <\_\_\_\_\_\_\_\_>.**]

[**Model: <\_\_\_\_\_\_\_\_>.**]

Location: Pump Room.

Type: Butterfly.

Size: 16 inches

Operator: Electric motor.

Operation: OPEN-CLOSE.

END OF SECTION 400551