SECTION 400557 - ACTUATORS FOR PROCESS VALVES AND GATES

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 manual, pneumatic, and electric motor actuators for use with valves and gates in water and wastewater treatment plants.

Piping for site utilities is specified in Division 33, plumbing piping is specified in Division 22, and process piping is specified in Division 40.

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

Manual actuators.

Pneumatic actuators.

Electric motor 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 055000 - Metal Fabrications: Miscellaneous metalwork and fasteners as required by this Section.

Section 400551 - Common Requirements for Process Valves: Common product requirements for valves for placement by this Section.

Section 400593 - Common Motor Requirements for Process Equipment: Motors for electric actuators.

Section 407313 - Pressure and Differential Pressure Gauges: Pressure gages for pneumatic actuators.

* + - 1. REFERENCE STANDARDS

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

* + - * 1. American Bearing Manufacturers Association:

ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.

ABMA 11 - Load Ratings and Fatigue Life for Roller Bearings.

* + - * 1. American Water Works Association:

AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.

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.

* + - * 1. NFPA:

NFPA 70 - National Electrical Code.

* + - 1. COORDINATION
         1. Coordinate Work of this Section with installation of valves and accessories.
      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.
        5. Shop Drawings:

Indicate parts list, materials, sizes, position indicators, limit switches, [**control system,**] actuator mounting, wiring diagrams, control system schematics[**, and**] <**\_\_\_\_\_\_\_\_**> on assembly drawings.

Submit actuator Shop Drawings with [**valve**] [**and**] [**gate**] submittal.

* + - * 1. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

Include separate Paragraphs for additional certifications.

* + - * 1. Manufacturer Instructions: Submit special procedures and placement requirements.
        2. Source Quality-Control Submittals: Indicate results of [**shop**] [**factory**] tests and inspections.
        3. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
        4. Qualifications Statements:

Coordinate following Subparagraphs with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer and installer.

Submit manufacturer's approval of installer.

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

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

* + - * 1. Valve Actuators in NEC [**Class I, Group D, Division 1 or 2 Hazardous**] <**\_\_\_\_\_\_\_\_**> Locations: Comply with NFPA 70.

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. Installer: Company specializing in performing Work of this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience [**and approved by manufacturer**].
      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.

Furnish temporary end caps and closures on piping and fittings and maintain in place until installation.

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 [**manual**] [**pneumatic**] [**electric-motor**] actuators.

1. PRODUCTS
   * + 1. DESCRIPTION
          1. Furnish gear and power actuators with position indicators.

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

* + - * 1. Provide actuators with position indicators for shutoff valves 6 inches and larger.
      1. MANUAL ACTUATORS
         1. Valves Smaller than 8 Inches: [**Ten-position lever handle**] [**Infinite-position lever handle with memory stop**] [**Handwheel**] [**Pneumatically actuated**] [**Electrically actuated**].
         2. Valves 8 Inches to 30 Inches: Comply with AWWA C500.
         3. Valves 30 Inches and Larger:

Drive Type: Worm gear.

Handwheel: Minimum 12-inch diameter.

Bearings:

Type: Ball; comply with ABMA 9.

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

Type: Roller; comply with ABMA 11.

Bearing life is percent failure at rated hours; for example, L10 life at 50,000 hours means 10 percent of bearings may be expected to fail at 50,000 hours.

Minimum L10 Life: [**100,000**] <**\_\_\_\_\_\_\_\_**> hours.

Gearing: Designed for 100 percent overload.

* + - * 1. Provide gear and power actuators with position indicators.
        2. 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 Actuators:

Description:

Chain actuators for shutoff valves mounted 7 feet and greater above [**operating**] floor level.

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. Buried Valves:

Comply with AWWA C500.

Floors:

Furnish extension stems to grade, and square nuts or floor stands with position indicators.

[**Cast-iron**] [**Steel**] pipe extensions with valve boxes, covers, and operating keys.

Floor Boxes: Hot-dip galvanized cast iron or steel, with bronze cover.

Lid Inscription: <**\_\_\_\_\_\_\_\_**>.

Outdoors:

Material: Cast iron.

12 Inch Diameter Valves and Smaller: Two-piece, screw type.

Valves Larger than 12 Inch Diameter: Three-piece, screw type.

Lid Inscription: <**\_\_\_\_\_\_\_\_**>.

* + - 1. PNEUMATIC ACTUATORS
         1. Description: Comply with AWWA C541.
         2. Air Supply:

Regulators: Adjustable.

Pressure Gages: As specified in Section 407313 - Pressure and Differential Pressure Gauges.

Filter: Replaceable; 40 microns.

Accessories:

Isolating valves.

Condensate drains.

Lubricators.

* + - * 1. Manual Override:

Description: Permanently attached handwheel which does not rotate during electrical operation.

Maximum Operating Force: 60 lbf.

Operation: Cast or permanently affix an arrow and word [**OPEN**] [**or**] [**CLOSE**] on handwheel to indicate appropriate direction.

* + - 1. ELECTRIC MOTOR ACTUATORS
         1. Description:

Motor, reduction gearing, limit switches[**, and**] <**\_\_\_\_\_\_\_\_**>.

Comply with AWWA C542.

* + - * 1. Enclosure:

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

Mounting: Attached actuator housing using flanged motor adapter.

* + - * 1. Motors:

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

Type:

[**Reversing**] [**Modulating**].

Totally enclosed, non-ventilated, high starting torque, low starting current.

Full-voltage starting.

Electrical Characteristics:

[**<\_\_\_\_\_\_\_\_> hp**] [<\_\_\_\_\_\_\_\_> RLA].

Voltage: <**\_\_\_\_\_\_\_\_**> V, [**single**] [**three**] phase, 60 Hz.

Maximum [**Fuse Size**] [**Circuit-Breaker Size**] [**Overcurrent Protection**]: <**\_\_\_\_\_\_\_\_**> A.

Minimum Circuit Ampacity: <**\_\_\_\_\_\_\_\_**>.

Minimum Power Factor: <**\_\_\_\_\_\_\_\_**> percent at rated load.

* + - * 1. Reduction Gearing:

Description: Single- or double-reduction unit of spur or helical gears and worm-gearing.

Lubrication: [**Grease**] [**or**] [**oil**].

Bearings:

Type: Ball; comply with ABMA 9.

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

Type: Roller; comply with ABMA 11.

Bearing life is percent failure at rated hours; for example, L10 life at 50,000 hours means 10 percent of bearings may be expected to fail at 50,000 hours.

Minimum L10 Life: [**100,000**] <**\_\_\_\_\_\_\_\_**> hours.

* + - * 1. Limit Switches:

Type: Heavy duty, open contact.

Actuation: Rotor cam.

* + - 1. SOURCE QUALITY CONTROL
         1. Provide shop inspection and testing of completed assemblies.

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 field dimensions are as indicated on [**Shop**] Drawings.
       2. INSTALLATION
          1. Securely mount actuators using brackets or hardware specifically designed for attachment to valves.
          2. Extend chain actuators to 5-1/2 feet above [**operating**] floor level.
       3. FIELD QUALITY CONTROL
          1. After installation, inspect for proper supports and interferences.

END OF SECTION 400557