SECTION 400559.26 - FIBERGLASS-REINFORCED PLASTIC SLIDE 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 self-contained and non-self-contained fiberglass-reinforced plastic (FRP) slide gates for water and wastewater treatment facilities.

A self-contained slide gate includes an extended frame and yoke on which stem is mounted. Self-contained slide gates are not typically recommended if frame length exceeds 10 feet. A non-self-contained slide gate includes a frame without a yoke. Non-self-contained slide gates are typically used if frame length exceeds 10 feet, or if there is a floor slab over gate.

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes: Fiberglass-reinforced plastic (FRP) slide gates.
				2. 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 400557 - Actuators for Process Valves and Gates: Powered lifting devices.

* + - 1. DEFINITIONS

Limit list of definitions to terms unique to this Section and not provided elsewhere.

* + - * 1. FRP: Fiberglass-reinforced plastic.
				2. Operating Head: Distance from centerline of gate to maximum water level of channel.
				3. UHMW: Ultra-high molecular weight.
			1. REFERENCE STANDARDS

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

* + - * 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 C563 - Fabricated Composite Slide Gates.

* + - * 1. ASTM International:

ASTM D638 - Standard Test Method for Tensile Properties of Plastics.

ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

* + - * 1. NSF International:

NSF Standard 61 - Drinking Water System Components - Health Effects.

NSF Standard 372 - Drinking Water System Components - Lead Content.

* + - 1. PREINSTALLATION MEETINGS
				1. Convene minimum [**one week**] [**<\_\_\_\_\_\_\_\_> weeks**] prior to commencing Work of this Section.
			2. 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 system materials and component equipment.
				5. Shop Drawings:

Indicate system materials and component equipment.

Submit installation and anchoring requirements, fasteners, and other details.

Indicate gate identification number, location, service, type, size, design pressure, operator details, stem details, and loads.

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

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 [**seating**] [**unseating**] pressure.
				2. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
				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.
				5. Manufacturer Reports:

Certify that equipment has been installed according to manufacturer instructions.

Indicate activities on Site, adverse findings, and recommendations.

* + - * 1. Qualifications Statements:

Coordinate following Subparagraphs with requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer, installer, and licensed professional.

Submit manufacturer's approval of installer.

* + - 1. CLOSEOUT SUBMITTALS
				1. Project Record Documents: Record actual locations of installed slide gates and components.
			2. QUALITY ASSURANCE

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

* + - * 1. Materials in Contact with Potable Water: Certified to NSF Standard 61 and NSF Standard 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. Installer: Company specializing in performing Work of this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience [**and approved by manufacturer**].
				3. Licensed Professional: [**Professional engineer**] <**\_\_\_\_\_\_\_\_**> experienced in design of specified Work and licensed in New York State.
			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.

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 [**three**] <**\_\_\_\_\_\_\_\_**>-year manufacturer's warranty for slide gates.
				2. Furnish [**five**] <**\_\_\_\_\_\_\_\_**>-year manufacturer's warranty that clear plastic stem covers will not crack, discolor, or become opaque.
1. PRODUCTS
	* + 1. PERFORMANCE AND DESIGN CRITERIA

Insert performance requirements and criteria in this Article when design is assigned to Contractor.

* + - * 1. [**Seating**] [**Unseating**] Pressure:

<**\_\_\_\_\_\_\_\_**> feet of water.

Measurement: From maximum water surface to centerline of gate.

* + - * 1. Minimum Vertical Loading: 50 percent of force on gate from operating head acting on horizontal centerline of gate, multiplied by effective gate area, plus weight of slide and stem.
				2. Gate Reinforcement: As required for deflection not greater than [**1/360**] [**1/720**] of span.
				3. Operating Head:

Safety Factor: Design gate to operate under specified operating head with safety factor of [**five**] <**\_\_\_\_\_\_\_\_**>.

* + - 1. FRP SLIDE GATES
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=11944&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.

* + - * 1. Description:

Self-contained FRP slide gate with extended frame, yoke, lifting stem attached to yoke, lift and lift support, stem, stem guide, and stem block.

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

Non-self-contained FRP slide gate with limited frame, lifting stem, lift and lift support, stem, stem guide, and stem block.

Comply with AWWA C563.

Size: [**<\_\_\_\_\_\_\_\_> by <\_\_\_\_\_\_\_\_> feet** ] [**As indicated on Drawings**] [**As indicated in schedule following END OF SECTION**].

Operating Head: [**<\_\_\_\_\_\_\_\_> feet**] [**As indicated on Drawings**] [**As indicated in schedule following END OF SECTION**].

Closure: [**Conventional**] [**Bottom flush**] [**As indicated on Drawings**] [**As indicated in schedule following END OF SECTION**].

Opening: [**Upward**] [**Downward**] [**As indicated on Drawings**] [**As indicated in schedule following END OF SECTION**].

* + - * 1. Gates:

Material:

Fiberglass-reinforced polyester resin with resin-rich surface.

Laminate: Nominal glass content of 30 percent.

Performance and Design Criteria:

Tensile Strength: 14,000 psi ; ASTM D638.

Flexural Strength: 25,000 psi ; ASTM D790.

Flexural Modulus: 1,000,000 psi ; ASTM D790.

Thickness:

Up to 24 Inches Wide by 36 Inches High: Minimum 1/4 inch .

Between 24 and 72 Inches Wide and between 36 and 96 Inches High: Minimum 3/8 inch .

Ribs:

As required based on operating head.

Molded into gate; bolted or bonded ribs are not acceptable.

Furnish reinforcing rib around gate perimeter.

Configuration: Removable.

* + - * 1. Yokes:

Material: [**Cast iron**] [**Structural steel**].

Mounting: Bolted to gate frame.

* + - * 1. Seats:

Impacted into dovetail slots and held in position without use of screws or other fasteners.

Maximum Clearance between Seating Faces: 0.004 inch when gate is fully closed.

* + - * 1. Wedges:

Description: Machined brass blocks with angled faces and secured with a stud bolt to prevent slippage during operation.

Furnish side, top, and bottom wedges.

* + - * 1. Frames:

Configuration: One piece.

Material: Type [**304**] [**316**] stainless steel.

Minimum Thickness: 1/4 inch

Mounting: [**Embedded**] [**Channel wall**] [**Flange**] [**As indicated on Drawings**].

Guide Frames: Pultruded fiberglass-reinforced polyester resin with resin-rich surface.

One-piece molded construction, with mitered corners adequately bonded and laminated together.

Seats: [**UHMW polyethylene**] <**\_\_\_\_\_\_\_\_**>.

Bottom Flush Closure: Resilient seal securely attached to frame along invert.

* + - * 1. Lifting Devices:

Description: Stem, lifting nut, supports, bushings, stem cover, position indicator, and [**gear-assisted handwheel**] [**handwheel**] [**gear-assisted crank**] [**crank**] [**pneumatic actuator**] [**hydraulic actuator**] [**electric-motor actuator**] <**\_\_\_\_\_\_\_\_**>.

Mounting: [**Cast-iron**] [**Fabricated-steel**] pedestal.

Powered Lift Devices:

As specified in Section 400557 - Actuators for Process Valves and Gates.

Comply with [**AWWA C541**] [**and**] [**AWWA C542**].

Hand-Lifted Gates: Furnish [**PVC grip for handhole**] [**stainless steel lifting handle**] <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Handwheels:

Material: [**Cast aluminum**] [**FRP**] <**\_\_\_\_\_\_\_\_**>.

Diameter: [**16**] <**\_\_\_\_\_\_\_\_**> inches.

Fully lubricated.

Configuration: Removable.

Mounting: Locate center 36 inches above operating floor.

* + - * 1. Lifting Nut:

Material: Brass.

Furnish grease fitting.

Furnish polymer bearing pads above and below lifting nut.

* + - * 1. Lifting Stem:

Material: Type [**304**] [**316**] stainless steel.

Configuration:

[**Rising**] [**Nonrising**].

Removable.

Thread:

Type: Acme, double lead.

Cut threads are not acceptable.

Diameter: [**1-1/8**] <**\_\_\_\_\_\_\_\_**> inch.

Maximum Number of Turns: 16 per foot of travel.

Stem Covers:

Material: Clear [**polycarbonate**] [**methacrylate plastic**] <**\_\_\_\_\_\_\_\_**>.

Configuration: Capped and vented.

Length: As required to allow full travel of gate.

* + - 1. FINISHES
				1. Stainless Steel Surfaces: Mill finish.
			2. ACCESSORIES
				1. Hardware: Type [**304**] [**316**] stainless steel.
			3. SOURCE QUALITY CONTROL
				1. Inspection and Testing:

Provide shop inspection and testing of completed assemblies.

Comply with AWWA C563.

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

* + - * 1. Director’s Inspection:

Make completed slide-gate assembly 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 manufacturer'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 facilities are ready to receive slide gates.
			2. PREPARATION
				1. Clean surfaces according to manufacturer instructions.
			3. INSTALLATION
				1. According to manufacturer instructions.
				2. Ensure that products are installed plumb, true, and free of warp or twist.
				3. Locate operators to avoid interference with handrails and other Work.
				4. Guides:

Surface and Flange Mounting:

Install guides with expansion anchors.

Position guides at elevation as indicated on Drawings.

Recess Mounting:

Cut slot in concrete to receive guides.

Position guides at elevation as indicated on Drawings.

Grout guides in place according to manufacturer instructions.

* + - * 1. Sealant:

Apply 1/8-inch -thick layer of elastomeric sealant to back of frame.

Tighten nuts snug until sealant begins to flow beyond frame.

Remove excess sealant.

Cure sealant for minimum seven days.

Tighten nuts to their final positions.

* + - * 1. Lubricants: Provide oil and grease as required for initial operation.

\*\*\*\*\*\* [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. Inspection:

Verify alignment of gate and components.

Verify that gate operates smoothly and does not bind or scrape.

* + - * 1. Testing:

Comply with AWWA C563.

Leakage: Not exceeding 0.1 gpm/ft. of seating perimeter under 20 feet of seating head and not exceeding 0.21 gpm/ft. under 20 feet of unseating head.

* + - * 1. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for not less than <**\_\_\_\_\_\_\_\_**> days on Site for installation, inspection, field testing, and instructing Director’s Representative in maintenance of equipment.
				2. Equipment Acceptance:

Adjust, repair, modify, or replace components failing to perform as specified and re-inspect.

Make final adjustments to equipment under direction of manufacturer's representative.

* + - * 1. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.
			1. ADJUSTING
				1. Adjust slide gates to provide smooth operation.
			2. DEMONSTRATION
				1. Demonstrate equipment operation, routine maintenance, and emergency repair procedures to Director’s Representative.
			3. 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. Slide Gate Schedule:

SG-1:

Description: Influent Channel, Gate No. 1.

Material: FRP.

Size: <**\_\_\_\_\_\_\_\_**> by <**\_\_\_\_\_\_\_\_**> feet

Operating Head: <**\_\_\_\_\_\_\_\_**> feet

Stem Configuration: Nonrising.

Closure: Bottom flush.

Opening: Upward.

Operator: Handwheel.

SG-4:

Description: Basin Influent, Gate No. 2.

Material: FRP.

Size: <**\_\_\_\_\_\_\_\_**> by <**\_\_\_\_\_\_\_\_**> feet

Operating Head: <**\_\_\_\_\_\_\_\_**> feet

Stem Configuration: Rising.

Closure: Bottom flush.

Opening: Upward.

Operator: Electric actuator.

END OF SECTION 400559.26