SECTION 464373 - TUBE SETTLERS

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 tube settlers and accessories for water or wastewater treatment facilities.

Tube settlers consist of modules of tubular channels typically sloped at a 60-degree angle and are located near the clarifier effluent channel. Larger and heavier suspended solids in the clarifier effluent settle to the clarifier floor before the water enters the tube settler modules. Smaller and lighter suspended solids are captured in the inclined tubes and slide down, settling to the clarifier floor. Settled solids may be collected and withdrawn by a variety of systems, some of them proprietary. Tube settler modules may be installed in settling tanks with existing settled solids collection and withdrawal systems in place.

The means of settled solids removal will depend on tank configuration, the kind of settled solids to be removed, and whether the Project scope includes new tanks or retrofits. Some light solids, like water treatment flocculation, might use a steeply sloped hopper bottom and would be removed by hydraulic flow rather than using mechanical solids removal. Many tube settler manufacturers have proprietary solids removal systems, which may be incorporated into this Specification.

Piping, valves, and accessories are specified in various SpecText Sections in Division 40 - Process Integration.

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes: Tube settler equipment.
				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 460548 - Vibration and Seismic Controls for Water and Wastewater Equipment: Requirements for vibration and seismic control for equipment specified in this Section.

Section 460553 - Identification for Water and Wastewater Equipment: Nameplates for equipment specified in this Section.

* + - 1. DEFINITIONS

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

* + - * 1. FRP: Fiberglass-reinforced plastic.
			1. REFERENCE STANDARDS

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

* + - * 1. National Sanitation Foundation International:

NSF 61 - Drinking Water System Components - Health Effects.

NSF 372 - Drinking Water System Components - Lead Content.

* + - 1. COORDINATION
				1. Coordinate Work of this Section with Work of other Sections.
			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's product 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.

* + - * 1. Manufacturer's Certificate: Certify that [**products**] <**\_\_\_\_\_\_\_\_**> meet or exceed [**specified requirements**] <**\_\_\_\_\_\_\_\_**>.

Certify that installation is completed according to manufacturer's instructions.

Include separate Paragraphs for additional certifications.

* + - * 1. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
				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. Manufacturer Reports:

Certify that equipment has been installed according to manufacturer's instructions.

Indicate activities on Site, adverse findings, and recommendations.

* + - * 1. Qualifications Statement:

Coordinate following Subparagraph with the requirements specified in QUALIFICATIONS Article.

Submit qualifications for manufacturer.

* + - 1. CLOSEOUT SUBMITTALS
				1. Project Record Documents: Record actual locations of installed tube settlers and components.
			2. MAINTENANCE MATERIAL SUBMITTALS
				1. Spare Parts:

Furnish [**one set**] [**two sets**] of manufacturer's recommended spare parts.

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

Furnish [**two**] <**\_\_\_\_\_\_\_\_**> of <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Tools: Furnish special [**wrenches**] <**\_\_\_\_\_\_\_\_**> and other devices required for Director’s Representative to maintain and calibrate equipment.
			1. 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 Paragraph with requirements specified in SUBMITTALS Article.

* + - * 1. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum [**three**] <**\_\_\_\_\_\_\_\_**> years' [**documented**] experience.
			1. DELIVERY, STORAGE, AND HANDLING
				1. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
				2. Store and protect materials according to manufacturer's instructions.
			2. 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 tube settler equipment and accessories.
1. PRODUCTS
	* + 1. TUBE SETTLERS
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=11975&mf=04&src=wd):

DESIGNER TO PROVIDE TWO MANUFACTURER’S 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. Performance and Design Criteria:

Vertical Height: <**\_\_\_\_\_\_\_\_**> inches

In following Subparagraph, tube length should be based on slope angle (typically 60 degrees).

Tube Length: <**\_\_\_\_\_\_\_\_**> inches

Design Application Rate: [**1.5**] [**2.5**] <**\_\_\_\_\_\_\_\_**> gpm/sf

Submergence to Top of Tube Settler: [**18 to 30**] [**<\_\_\_\_\_\_\_\_> to <\_\_\_\_\_\_\_\_>**] inches

Weir Loading Rate: [**20,000**] <**\_\_\_\_\_\_\_\_**> gpd/lf

Supports:

Live Load.

In following Subparagraph, dead load should include tube settlers, accumulated flocculation residue, troughs full of water, baffles, protective surface grating walkway, and the like.

Dead Load.

Trough Spacing: Not more than four times tube submergence.

* + - 1. MATERIALS
				1. Tube Settler Modules: Sheet PVC, solvent-welded between sheets and channels.
				2. Supports for Tube Settler Modules and Effluent Troughs: [**Stainless steel**] [**Coated carbon steel**] [**Aluminum**] <**\_\_\_\_\_\_\_\_**>.
				3. Troughs and Weirs:

Material: [**Fiberglass**] [**or**] [**stainless steel**].

UV-inhibited.

* + - * 1. Baffles:

Material: [**Fiberglass**] [**, PVC**] [**, or**] [**stainless steel**].

UV-inhibited.

* + - * 1. Hardware:

Wetted: [**Type 316 stainless steel**] <**\_\_\_\_\_\_\_\_**>.

Non-wetted: [**Zinc-plated steel**] <**\_\_\_\_\_\_\_\_**>.

* + - 1. FINISHES
				1. Coatings:

Finish Color: [**Green**]<\_\_\_\_\_\_\_\_>.

* + - 1. ACCESSORIES
				1. Access Platform:

Material: [**Raised-pattern galvanized-steel floor plate**] [**Grating**] [**PVC**] [**FRP**].

Minimum Width: 30 inches

Double Railing:

Material: [**Galvanized steel**] [**1-1/2-inch- diameter galvanized-steel pipe**] <**\_\_\_\_\_\_\_\_**>.

Minimum Height: 42 inches around outside of access platform.

It is not uncommon for a manufacturer to offer a plastic or fiberglass grid placed atop and allowing access to the tube modules.

* + - * 1. Protective Grating Walking Surface:

Material: Rigid UV-inhibited [**polypropylene**] [**FRP**].

Grating Opening Size: Approximately 2 by 2 inches.

Grating Height: Approximately 1 inch.

Grating Weight: No greater than 0.8 psf.

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

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

* + - * 1. Director’s Inspection: Make completed tube settler equipment available for inspection at manufacturer's factory prior to packaging for shipment. Notify Director’s Representative at least [**seven**] <**\_\_\_\_\_\_\_\_**> days before inspection is allowed.
				2. 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 fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.

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

1. EXECUTION
	* + 1. EXAMINATION
				1. Verify that facilities are ready to receive tube settler equipment.
			2. INSTALLATION
				1. Install tube settler equipment according to manufacturer's instructions.
				2. Weir Plates: Mount weir plates against double bead of sealant.

\*\*\*\*\*\* [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. Wet Startup: Run equipment with water or wastewater and verify proper alignment and operation.
				2. 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, startup, field testing, and instructing Director’s Representative in maintenance of equipment.
				3. Equipment Acceptance:

Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.

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. DEMONSTRATION
				1. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Director’s Representative.

END OF SECTION 464373