SECTION 464133 - HORIZONTAL REEL FLOCCULATION EQUIPMENT

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 horizontal reel flocculators for water treatment systems.

The most common type of flocculator is the paddle mixer, which is specified in this Section. Paddle wheels may be mounted on horizontal (this Section) or vertical drive shafts (see Section 464131); for a series of units, fewer drive units are required if a horizontal-shaft paddle wheel is used. Other flocculator designs are available (diffused air, baffling, vertical turbine mixers, and pipe "plug flow" flocculators); if desired, these unit processes may be incorporated into this Section or specified elsewhere.

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes: Horizontal reel flocculators.
				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 055000 - Metal Fabrications: Miscellaneous metalwork and fasteners as required by this Section.

Section 262923 - Variable-Frequency Motor Controllers: Three-phase variable frequency motor controllers of pulse-width-modulated design, for variable-speed drives.

* + - 1. DEFINITIONS

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

* + - * 1. Floc: A tuft-like mass that forms in a liquid as a result of precipitation or the aggregation of suspended particles. Coagulation chemicals are generally added to the water being treated in order to enhance the development of floc.
				2. Flocculator: Slow-rotating, paddle wheel mixers used to induce flocculation, the process to enhance agglomeration of smaller floc particles into larger, more easily settleable or filterable particles (floc).
			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. National Electrical Manufacturers Association:

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

* + - * 1. National Sanitation Foundation:

NSF 61 - Drinking Water System Components - Health Effects.

* + - 1. COORDINATION
				1. Coordinate Work of this Section with construction of flocculation tank.
			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 data for system materials and component equipment, including electrical characteristics and connection requirements.

* + - * 1. Shop Drawings:

Indicate system materials and component equipment.

Submit wiring and control diagrams, installation and anchoring requirements, fasteners, and other details.

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

Include separate Paragraphs for additional certifications.

* + - * 1. Test and Evaluation Reports: Submit certified factory test results.
				2. Manufacturer's 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: Indicate that equipment has been installed according to manufacturer's instructions.
				6. Qualifications Statements:

Coordinate following Subparagraphs with the 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 final orientation of equipment and accessories.
				2. Operation and Maintenance Data: Submit maintenance instructions for equipment and accessories.
			2. MAINTENANCE MATERIAL SUBMITTALS
				1. Spare Parts:

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

* + - * 1. Tools: Furnish special [**wrenches**] <**\_\_\_\_\_\_\_\_**> and other devices required for Director’s Representative to maintain flocculation system.
			1. QUALITY ASSURANCE

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

* + - * 1. Provide piping, tubes, equipment, and appurtenances in contact with potable water complying with NSF 61.

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 the Work of this Section on-Site.
			1. QUALIFICATIONS

Coordinate following Paragraphs with the 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. Deliver materials in manufacturer's packaging including installation instructions.
				2. Inspection: Accept equipment on-Site in manufacturer's original packaging. Inspect for damage.
				3. Store products [**according to manufacturer's instructions**] [**and**] [**in areas protected from weather, moisture, or possible damage**].
				4. Protect systems from entry of foreign materials by using temporary covers.
			2. 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 flocculation system.
1. PRODUCTS
	* + 1. HORIZONTAL REEL FLOCCULATORS
				1. [Manufacturers](http://www.specagent.com/LookUp/?ulid=11000&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. Description: Motorized paddle wheel with variable-speed drive and horizontal drive shaft.

Drive: [**Chain and sprocket**] [**Gear reducer**] [**Direct**] <**\_\_\_\_\_\_\_\_**>.

A stuffing box is required when using a dry well to house the motor and drive equipment.

Stuffing Box: Centering and shouldering bushing; lantern ring; rope packing; grease lubricated.

Shaft Connection: Flanged.

Bearing life is percent failure at rated hours; e.g., L-10 life at 100,000 hours means 10 percent of bearings may be expected to fail at 100,000 hours.

Bearings: Minimum L-10 life of [**100,000 hours**] <**\_\_\_\_\_\_\_\_**>, according to ABMA [**9**] [**11**].

Impeller Configuration:

Number of Blades: [**Two**] [**Three**] [**Four**] <**\_\_\_\_\_\_\_\_**>.

Flat.

Constant Attack Angle: <**\_\_\_\_\_\_\_\_**> degrees.

Variable Attack Angle: <**\_\_\_\_\_\_\_\_**> degrees.

Outer Diameter: <**\_\_\_\_\_\_\_\_**> inches

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

Rotational Speed: <**\_\_\_\_\_\_\_\_**> rpm.

* + - * 1. Performance and Design Criteria:

Maximum G-value Range: [**10 to 75**] [**<\_\_\_\_\_\_\_\_> to <\_\_\_\_\_\_\_\_>**]/s.

Maximum Impeller Tip Speed: [**3 fps**] [**<\_\_\_\_\_\_\_\_> fps**].

Ratio of Impeller Diameter to Tank Diameter: [**0.35**] [**0.40**] <**\_\_\_\_\_\_\_\_**>.

* + - * 1. Operation:

Electrical Characteristics: According to Section [**262923 - Variable-Frequency Motor Controllers**] and following:

[**<\_\_\_\_\_\_\_\_> hp**] [**<\_\_\_\_\_\_\_\_> rated load amperes**].

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.

Electrical Enclosure: NEMA [**4X**] [**7**] <**\_\_\_\_\_\_\_\_**>; [**fiberglass**] [**sheet steel**] <**\_\_\_\_\_\_\_\_**>.

Motors:

Disconnect Switch: Factory-mounted disconnect switch [**in control panel**] [**on equipment].**

* + - * 1. Materials:

Drive Housing: [**Cast iron**] <**\_\_\_\_\_\_\_\_**>.

Shaft: [**Carbon steel**] [**Type 304 stainless steel**] [**Type 316 stainless steel**] <**\_\_\_\_\_\_\_\_**>.

Paddles: [**Redwood**] [**Fiberglass-reinforced plastic**].

Paddle Arms: [**Carbon steel**] [**Stainless steel**].

Base: [**Epoxy-coated carbon steel**] <**\_\_\_\_\_\_\_\_**>.

Chain: [**Cast iron**] [**Nylon**].

* + - * 1. Accessories:

Impeller peripheral blades to reduce shear.

Split bearings to facilitate shaft removal.

* + - 1. SOURCE QUALITY CONTROL

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

* + - * 1. Director’s Inspection: Make completed horizontal reel flocculator 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 when reliance on fabricator's approved quality-control program is sufficient for Project requirements.

* + - * 1. Certificate of Compliance: When 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 layout and orientation of equipment and accessories.
				2. Verify that tankage and peripheral equipment are ready for installation of flocculators.
			2. INSTALLATION
				1. Install equipment and accessories as recommended by manufacturer and as indicated on [**Shop Drawings**] [**Drawings**].

\*\*\*\*\*\* [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. 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 rerun tests.

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

* + - * 1. Furnish installation certificate from equipment manufacturer's representative attesting 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 464133