

## SECTION 464311 - CHAIN-AND-FLIGHT CLARIFIER EQUIPMENT

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Chain-and-flight clarifier collectors.
2. Scum-removal equipment.
3. Effluent troughs and weir assembly.
4. Weirs and baffles.

#### 1.2 DEFINITIONS

- A. FRP: Fiberglass-reinforced plastic.
- B. UHMW PE: Ultra-high-molecular-weight polyethylene.

#### 1.3 REFERENCE STANDARDS

A. American Society of Mechanical Engineers:

1. ASME B17.1 - Keys and Keyseats.
2. ASME B29.100 - Double-Pitch Roller Chains, Attachments, and Sprockets.

B. ASTM International:

1. ASTM D4020 - Standard Specification for Ultra-High-Molecular-Weight Polyethylene Molding and Extrusion Materials.

C. National Electrical Manufacturers Association:

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

#### 1.4 PREINSTALLATION MEETINGS

- A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.
- B. Convene minimum one week prior to commencing Work of this Section.

#### 1.5 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.

- B. Product Data: Submit manufacturer's product data for system materials and component equipment, including electrical characteristics.
- C. Shop Drawings:
  - 1. Indicate system materials and component equipment.
  - 2. Submit wiring and control diagrams, installation and anchoring requirements, fasteners, and other details.
- D. Manufacturer's Certificate:
  - 1. Certify that products meet or exceed specified requirements
  - 2. Certify installation is completed according to manufacturer's instructions.
- E. Manufacturer's Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.
- F. Source Quality-Control Submittals: Indicate results of shop tests and inspections.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- H. Manufacturer Reports: Attest that equipment has been installed according to manufacturer's instructions.
- I. Qualifications Statement:
  - 1. Submit qualifications for manufacturer.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of installed chain-and-flight clarifier equipment.
- B. Operation and Maintenance Data: Submit maintenance instructions for equipment and accessories.

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.
- B. Spare Parts:
  - 1. Furnish one set of manufacturer's recommended spare parts.
- C. Tools: Furnish special wrenches and other devices required for Owner to maintain and calibrate equipment.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' experience.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver materials in manufacturer's packaging including installation instructions.
- C. Inspection: Accept clarifier equipment on Site in original packaging and inspect for damage.
- D. Store materials according to manufacturer's instructions.

1.10 EXISTING CONDITIONS

- A. Field Measurements:
  - 1. Verify field measurements prior to fabrication.
  - 2. Indicate field measurements on Shop Drawings.

1.11 WARRANTY

- A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.
- B. Furnish five year manufacturer's warranty for chain-and-flight clarifier equipment and accessories.

PART 2 - PRODUCTS

2.1 CHAIN-AND-FLIGHT GRIT-REMOVAL EQUIPMENT

- A. Flights:
  - 1. Material: FRP Glass-Fiber-Reinforced Plastic Fabrications
  - 2. Size: 8 inches high by 3 inches thick.
  - 3. Length: As appropriate to tank width
  - 4. Spacing: 10 feet
  - 5. Sweeps: Provide lip on leading edge of each flight to sweep tank floor.
- B. Return Tracks and Brackets:
  - 1. Return Tracks:
    - a. Material: FRP, same as flight, 3/8 inch thick.

- b. Size: 3 inches by 3 inches .
  - 2. Brackets:
    - a. Description: Support rails on 1/4-inch -thick, Type 316 stainless-steel brackets.
    - b. Minimum Distance between Rail and Tank Wall: 9 inches.
    - c. Maximum Spacing: 10 feet .
  - 3. Wearing Strips:
    - a. Material: Polyethylene (PE).
    - b. Size: 3 inches by 3/8 inch thick.
    - c. Attach with Type 316 stainless-steel washers welded to top of return track angle, maximum 30 inches o.c.
- C. Collector Chain:
  - 1. Material: High-strength polymer
  - 2. Load Rating: 4,500 lbf .
  - 3. Pin:
    - a. Minimum 1-inch -diameter fiberglass rod in polymeric sleeve.
    - b. Attachment: Type 316 stainless-steel cotters.
    - c. Attach to return tracks with 316 stainless steel washers and stainless-steel self-drilling and tapping pan head screw.
  - 4. Attachment:
    - a. Bolt flights to brackets to mount on extended chain pins, secured with Type 316 stainless-steel cotters.
    - b. Mounting Hole Spacing: Comply with ASME B29.100.
- D. Sprockets:
  - 1. Driven Sprockets:
    - a. Description: Nonmetallic, segmental PE teeth mounted on a split polymeric hub.
    - b. Attachment: Bolt each rim segment to hub with not less than four stainless-steel bolts.
  - 2. Headshaft Sprockets:
    - a. Material: Same as idler sprockets.
    - b. Seating: Keyed; comply with ASME B17.1.
  - 3. Idler Sprockets:
    - a. Material: UHMW PE, ASTM D4020. Polyurethane or nylon sprockets are acceptable
    - b. Construction: Split.
  - 4. Drive Chain Tensioner Sprockets: Solid polyurethane.

5. Idler Shaft Support Brackets:
    - a. Material: Type 316 stainless steel.
    - b. Design: Two piece.
    - c. Attachment: Bolt to Type 316 stainless-steel wall support bracket anchored to tank wall.
  6. Connection Hardware: Type 316 stainless steel.
- E. Shafts:
1. Material: Full-width, cold-rolled solid steel.
  2. Stub shafts are not permitted.
  3. Minimum Shaft Diameter:
    - a. Longitudinal Collector Head (Driving) Shaft: 4 inches.
    - b. Longitudinal Collector Turn Shaft: 3 inches.
- F. Bearings:
1. Submerged Bearings:
    - a. Type: Split, self-aligning.
    - b. Linings: PE
    - c. Housing Bracket: Split type
    - d. Provide required supports for attachment to concrete surfaces.
    - e. Polyurethane is acceptable
  2. Nonsubmerged Bearings:
    - a. Type: Self-aligning, split pillow block.
    - b. Provide lubrication fittings.
- G. Drive Assemblies:
1. Description: Common drive assembly for each pair of collectors, including motor, , output shaft speed reducer, drive sprockets, and other equipment required for independent operation of collectors.
  2. Speed Reducers:
    - a. Design: Right angle, dual output.
    - b. Type: Helical reduction gear.
    - c. Housing:
      - 1) Oil filled.
      - 2) Case: Cast iron, moisture proof.
      - 3) Provide accessible oil fill and drain plugs.
    - d. Drive Sprockets:

- 1) Polyurethane plate section bolted to steel shear plate and mounted on cast-iron driving hub.
  - 2) Shear Pins: Aluminum.
  - 3) Cast nylon drive and drive hubs are not permitted.
  - 4) Polyurethane plate sections mounted to a Type 316 stainless steel driving hub is also acceptable.
3. Drive Chains:
- a. Design: Nonmetallic, low friction.
  - b. Material: Cast nylon or acetal
  - c. Chain Pins: Stainless steel.
  - d. Chain Links: One-piece construction.
  - e. Load Rating: 1,750 lbf
  - f. Chain Tightener: Provide for drive chain tension adjustment.

H. Operation:

1. Electrical Characteristics: As specified in Section 260503 - Equipment Wiring Connections and following:
  - a. 0.5 hp
  - b. Voltage: 230 V, three phase, 60 Hz.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
- B. Verify that clarifier basin is installed and ready to receive chain-and-flight clarifier equipment.

### 3.2 INSTALLATION

- A. Install chain-and-flight clarifier equipment according to manufacturer's instructions.
- B. Weir Plates: Mount weir plates against double bead of sealant.

### 3.3 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.
- B. Dry Startup: Run equipment without liquid in basins and inspect for:
  1. Alignment of sprockets, chain, flights, and wearing surfaces.
  2. Binding and excessive heat buildup in drive units.

- C. Wet Startup: Run equipment with wastewater in basins and verify proper operation.
- D. Equipment Acceptance:
  - 1. Adjust, repair, modify, or replace components failing to perform as specified, and rerun tests.
  - 2. Make final adjustments to equipment under direction of manufacturer's representative.
- E. Furnish installation certificate from equipment manufacturer's representative attesting equipment has been properly installed and is ready for startup and testing.

END OF SECTION 464311