

SECTION 44 42 40
GRIT CONCENTRATOR

PART 1 GENERAL

1.01 SUMMARY

- A. Contractor shall furnish a stacked tray hydraulic, vortex grit concentrator to efficiently capture and settle fine grit via large tray surface area and short settling distances.
- B. All equipment called for under this section shall be provided by a single supplier.
- C. Contractor shall coordinate all details of the equipment with other related parts of the Work. Contractor shall verify that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alterations required to accommodate equipment differing in dimensions or other characteristics from these Specifications and Drawings.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. Hydraulic Institute (HI) Standards.

1.03 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Make, model, and weight of each equipment assembly.
 - b. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction.
 - c. Detailed structural and mechanical, drawings showing the equipment fabrications and interface with other items. Include dimensions, size, and locations of connections to other work, and weights of associated equipment.
 - d. Head loss across unit at average and peak flow rates.
 - e. Computational fluid dynamic simulations and calculations to illustrate ability of proposed unit to meet the performance requirements, grit removal requirements and system head loss.
 - f. External utility requirements such as air, water, power, and drain for each component.

- g. Modifications to facilities design necessary to accommodate submitted manufacturer's system.
- h. Anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

- 1. Manufacturer's reference listing of previous installations as specified herein.
- 2. Anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
- 3. Manufacturer's Certificate of Compliance.
- 4. Special shipping, storage and protection, and handling instructions.
- 5. Manufacturer's written/printed installation instructions.
- 6. Routine maintenance requirements prior to plant startup.
- 7. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.
- 8. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.

PART 2 PRODUCTS

2.01 SUPPLIERS

- A. Materials, equipment, and accessories specified in this section shall be products of:
 - 1. Oldcastle, Hydro International Ltd.
 - 2. Or equal.
- B. The structure and appurtenant facilities have been designed around the first named supplier. Equipment by other named suppliers may require adjustments to the facility design and configuration to accommodate their system. Contractor shall be responsible for additional costs to accommodate other manufacturer's systems, and shall clearly identify such changes to Contracting Officer in the submittals for this section.

2.02 PHYSICAL CHARACTERISTICS

- A. System Description:
 - 1. Number of Trays: 10.
 - 2. Diameter of Trays: 4 feet.
 - 3. Total Surface Area: 126 square feet.

B. Equipment Description:

1. The grit concentrator unit shall be placed in a concrete tank and receive the incoming screened flow. The grit concentrator shall provide sufficient surface area to remove the specified grit particles to meet the specified performance requirements and concentrate the grit in a sump at the bottom of the unit. The degritted effluent from the grit concentrator shall discharge over a weir as shown on the Drawings.
2. The grit concentrator shall be all-hydraulic, self-activating and shall not require internal moving parts. The grit concentrator technology shall be designed utilizing Computational Fluid Dynamics (CFD) and field data to verify its flow regime, headloss, and grit removal characteristics.
3. Units using a piped upflow influent distribution design to feed the grit concentrator shall not be accepted.
4. Designs with hydraulic turns greater than 45 degrees shall not be allowed.
5. Multiple flexible connections to the trays shall not be allowed.
6. Units using apex valves shall not be accepted.
7. Equipment using paddles or air to supplement or induce a vortex shall not be accepted.

C. Construction:

1. Grit concentrator trays shall be molded thermoplastic with a minimum 1/4-inch thick LDPE on the pans and sidewalls. Formed and welded stainless steel trays shall not be allowed.
2. Tray support structure shall be constructed of Type 304 stainless steel.
3. The inlet flume shall be constructed of minimum 14-gauge formed stainless steel sheet with minimum 3-inch clear openings.
4. No gap in the grit concentrator shall be less than 3 inches.
5. A stainless steel grit collector shall be provided with the grit concentrator for collection and removal of settled solids. A 4-inch flanged grit slurry pipe connection shall be provided at concentrator sump for grit pump suction routed down center of trays. Fluidizing plant nonpotable water shall be continuously supplied to the solids underflow sump.
6. All flow passages shall be self-cleaning and free of sharp projections or fittings that may snag stringy or fibrous materials.
7. All pipe flanges shall conform to ANSI B16.1 bolt patterns.

D. Valves and Accessories:

1. The grit concentrator shall be provided with the following accessories:
 - a. One 1-inch bronze globe valve to regulate the system water flow rate to the grit collector.
 - b. One 1-inch bronze ball valve for shut off.

- c. One 1-inch, 2 gpm to 20 gpm acrylic rotameter.
 - d. Unions or quick disconnects are to be incorporated into the piping on either side of the flow meter for ease of removal and cleaning. The quick disconnects or couplings are to be supplied and installed by the Contractor.
- E. Welding: Welded connections subjected to submerged conditions shall be seal welded.

2.03 FUNCTIONAL CHARACTERISTICS

- A. Loading Rate at Peak Flow: 11.1 gpm/square foot.
- B. Total Wastewater Flow per Unit:
 - 1. Average: 0.4 mgd.
 - 2. Peak: 2 mgd.
- C. Grit Characteristics:
 - 1. Type: Typical municipal wastewater grit characteristics and quantities.

2.04 PERFORMANCE CHARACTERISTICS

- A. Grit Removal and Head Loss:
 - 1. 95 percent removal of all grit (SG 2.65) greater than or equal to 30 microns at average flow of 0.4 mgd with 1-inch head loss from effluent weir to concentrator inlet.
 - 2. 95 percent removal of all grit (SG 2.65) greater than or equal to 106 microns at peak flow of 2 mgd with 12-inch head loss from effluent weir to concentrator inlet.

2.05 ACCESSORIES

- A. General: Furnish lifting lugs for equipment assemblies and components weighing over 100 pounds.
- B. Nuts, Bolts, and Other Fasteners:
 - 1. Physical Characteristics: Type 316 stainless steel.
 - 2. Functional Characteristics: None.
 - 3. Performance Characteristics: None.

C. Equipment Identification Plates:

1. Physical Characteristics:
 - a. 16-gauge, Type 16 stainless steel securely mounted on main structural frame and control panel in readily visible location.
 - b. Plate shall bear 1/4-inch-high engraved block type black enamel filled equipment identification number and letters.
2. Functional Characteristics: None.
3. Performance Characteristics: None.

D. Anchor Bolts:

1. Physical Characteristics: Type 316 stainless steel, sized by equipment manufacturer and as specified in Section 05 50 00, Metal Fabrications.
2. Functional Characteristics: See Section 05 50 00, Metal Fabrications.
3. Performance Characteristics: See Section 05 50 00, Metal Fabrications.

PART 3 EXECUTION

3.01 INSTALLATION

- A. In accordance with manufacturer's written instructions.
- B. Anchor Bolts: Accurately place using templates furnished by vortex grit equipment manufacturer and as specified in Section 05 50 00, Metal Fabrications.

3.02 FIELD TESTING AND FACILITY STARTUP

- A. Field Testing and Facility Startup shall be in accordance with the requirements of Section 01 91 14, Equipment Testing and Facility Startup.
- B. Facility startup specifies the order and prerequisites for the following tests of the equipment:
 1. Field functional testing.
 2. Software operational testing.
 3. Performance testing.
 4. Demonstration testing.
- C. All Field Testing and Facility Startup shall be performed using a qualified representative provided by the Manufacturer as specified in Section 01 91 14, Equipment Testing and Facility Startup, Section 01 42 33, Manufacturers' Field Services, and as elaborated upon in this section.

3.03 MANUFACTURER'S SERVICES

A. Manufacturer's Representative:

1. Present at Site or classroom designated by Contracting Officer, for minimum person-days listed below, travel time excluded:
 - a. 1 person-day for installation assistance and inspection.
 - b. 1/2 person-day for prestartup classroom or Site training.
 - c. 1 person-day for facility startup.

END OF SECTION