

SECTION 44 42 41
GRIT WASHING AND DEWATERING UNIT

EQUIPMENT AND COMPONENT NUMBER(S)

CLS-2012: Grit Washing and Dewatering Unit.

PART 1 GENERAL

1.01 SUMMARY

- A. Contractor shall furnish one grit washing and dewatering unit. Primary washing shall occur through a hydraulic vortex and gravity settling allowing separation of grit from organic material. Additional washing and dewatering shall occur with spray water on an inclined belt or screw conveyor. Organic material shall be returned to the process flow stream. If unit includes a mechanical stirrer it shall include separate piping connections for continuous overflow and intermittent organic material removal and Contractor shall provide connecting piping and electrically actuated valve for organic material removal from unit to upstream of fine screens as shown. The washed and dewatered grit shall be bagged and discharged into a roll off container as shown on the Drawings. Odor control covers and connections shall be included to contain and withdraw odorous air from the equipment.
- 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.
- D. Grit Washing and Dewatering Unit will be installed in an indoor unconditioned space and vendor control panel will be installed in an indoor conditioned space and exposed to temperatures and humidity per Section 01 67 00, Product Requirements.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Institute of Steel Construction (AISC).
 - 2. American National Standards Institute (ANSI).

3. American Welding Society (AWS), European Welding Federation. (EWF), and International Institute of Welding (IIW) Publications.
4. ASTM International (ASTM):
 - a. A322, Carbon and Alloy Steel Bar Specifications.
 - b. A507-10, Standard Specification for Drawing Alloy Steel, Sheet and Strip, Hot Rolled and Cold Rolled.
5. International Organization for Standardization (ISO): 281:2007, Calculation Method for Fatigue Life for Roller Bearings.
6. National Electrical Manufacturers' Association (NEMA): MG 1, Motors and Generators.
7. UL: 674, Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
 - a. Make, model, weight, and horsepower of each equipment assembly.
 - b. Manufacturer's catalog information, descriptive literature, specifications, and identification of materials of construction.
 - c. Detailed structural, mechanical, and electrical 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. External utility requirements such as air, water, power, drain, for each component.
 - e. Power and control wiring diagrams, including terminals and numbers.
 - f. Shop and Field Painting Systems Proposed: Include Manufacturer's descriptive technical catalog literature and specifications.
 - 1) Where system proposed is different from that specified or where, in the manufacturer's opinion, the coating system(s) exceed(s) requirements specified, submit complete technical literature of the proposed system(s) to Contracting Officer for review.
 - g. Seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

1. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
2. Factory Test Reports.

3. Special shipping, storage and protection, and handling instructions.
4. Manufacturer's written/printed installation instructions.
5. Manufacturer's Certificate of Compliance.
6. Certification that factory-applied coating system(s) is identical to requirements specified.
7. Routine maintenance requirements prior to plant startup.
8. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.
9. 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. Hydro International, Ltd., OpTeaCup/Snail.
 2. Or equal.

2.02 PHYSICAL CHARACTERISTICS

- A. Number of Units: One.
- B. Maximum Overall Length: 13 feet 1 inch.
- C. Maximum Overall Width: 6 feet.
- D. Maximum Overall Height: 9 feet 9 inches.
- E. System Description:
 1. The grit classification unit shall receive the pumped underflow from the grit concentrator. The degritted overflow shall be discharged back to the process. Washed and dewatered grit shall discharge into a roll off container via a bagger.
 2. The grit dewatering escalator shall receive the underflow from the grit classification unit. A slow moving belt or screw conveyor shall carry the grit to the point of discharge allowing it to dewater during transport. The dewatered grit shall be discharged to a roll off container.
- F. Wetted components shall be Type 304 stainless steel.
- G. Connections shall be 125-pound, ANSI FF cast-iron flanges.

- H. Provide odor control enclosure necessary to contain odorous air inside equipment with connections to plant foul air ductwork, sized and located as shown.

2.03 FUNCTIONAL CHARACTERISTICS

- A. Service Conditions:
 - 1. Grit Slurry Flow, Total: 150 gpm.
 - 2. Inlet Pressure at Cyclone (psig): 1 psi.
- B. Feed Slurry Concentration Range: 1 percent.

2.04 PERFORMANCE CHARACTERISTICS

- A. Remove 90 percent of the grit having a specific gravity of 2.65 or greater, greater than or equal to 75 microns from the grit slurry underflow from the grit basin.
- B. Maximum Water Content in Washed Grit Product: 10 percent.
- C. Maximum Volatile Solids Content in Dewatered Grit Product: 5 percent.

2.05 CONTROLS AND INSTRUMENTATION

- A. Control Panel:
 - 1. Physical Characteristics:
 - a. One control panel shall be furnished, completely pre-wired and tested.
 - b. The control panel shall adhere to the following specifications:
 - 1) Enclosure Rating: NEMA 4X.
 - 2) Material: Type 304 stainless steel.
 - 3) Voltage: 480 volt.
 - 4) Phase: Three-phase.
 - 5) Frequency: 60 Hz.
 - 6) Logic: Programmable relay.
 - c. The control panel shall contain all timers, VFDs, switches, indicator lights, and other components necessary to operate the following equipment:
 - 1) One grit dewatering escalator.
 - d. The control panel shall be supplied with applicable control relays and time delay relays with a minimum one extra normally closed and one extra normally opened contact is provided for each relay.
 - e. Where remote monitoring is required, the panel shall be provided with all dry contacts necessary.

- f. The panel door layout shall include the following items:
 - 1) Front panel mounted combination main disconnect switch and circuit breaker.
 - 2) Back lit, push-to-test POWER ON indicating light.
 - 3) System three position HOA switch.
 - 4) System EMERGENCY STOP pushbutton.
 - 5) System ALARM RESET pushbutton.
 - 6) Grit dewatering escalator running light.
 - 7) Grit dewatering escalator three position HOA switch.
 - 8) Grit dewatering escalator FAIL indicating light.
 - 9) Grit dewatering escalator manual STOP pushbutton.
 - 10) Grit dewatering escalator manual START pushbutton.
 - 11) Grit dewatering escalator manual speed potentiometer.
 - a) Grit dewatering escalator FAIL RESET pushbutton.
 - 12) Grit dewatering escalator LOCAL/REMOTE switch for escalator speed control.
 - 13) Grit dewatering escalator CONTINUOUS/INTERMITTENT switch.
- 2. Functional Characteristics: In accordance with Section 40 99 90, Package Control Systems.
- 3. Performance Characteristics: In accordance with Section 40 99 90, Package Control Systems.

2.06 ELECTRICAL

- A. All components except the control panel shall be rated to be installed in a Class 1, Division 2 space hazardous location per NFPA 820.
- B. All electrical components shall meet Division 26, Electrical requirements.

2.07 APPURTENANCES

- 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 16stainless 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.

2.08 ACCESSORIES

- A. If unit includes a mechanical stirrer it shall include separate piping connections for continuous overflow and intermittent organic material removal and Contractor shall provide connecting piping and 480V electrically actuated V405 eccentric plug valve for organic material removal from unit to upstream of Fine Screens as shown. Valve and actuator shall meet requirements of Section 40 27 02, Process Valves and Operators.

2.09 FACTORY FINISHING

A. Physical Requirements:

- 1. For ferrous metal surfaces, prepare, prime, and finish coat in accordance with Section 09 90 00, Painting and Coating, System No. 4.
- 2. Stainless steel shall be cleaned and passivated following fabrication in accordance with ASTM A380.

B. Functional Characteristics: None.

C. Performance Characteristics: None.

2.10 FACTORY TESTING

- A. General: Test all components including instrumentation, controls and safety features to verify their functionality.

PART 3 EXECUTION

3.01 INSTALLATION

- A. In accordance with manufacturer's written instructions.
- B. Anchor Bolts: Accurately place using templates furnished by 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 43 33, Manufacturers' Field Services, and as elaborated upon in this section.

3.03 FIELD FINISHING

- A. Touchup damaged areas of painted ferrous metal in accordance with and as specified in Section 09 90 00, Painting and Coating.

3.04 FIELD QUALITY CONTROL

- A. Functional Tests: Operate all components including instrumentation, controls, automated sequences and safety features to verify functionality.
- B. Performance Test:
 - 1. With treatment plant receiving raw sewage operate grit washer unit receiving underflow grit slurry from grit concentrator.
 - 2. Duration: 4 hours.
 - 3. Take hourly samples of washed, dewatered grit to verify specified performance is met.

3.05 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 functional testing and completion of Manufacturer's Certificate of Proper Installation.
 - c. 1/2 person-day for prestartup classroom or Site training.

END OF SECTION

