

SECTION 11322

MECHANICAL SPECIFICATION

GRIT COLLECTION EQUIPMENT

PART 1 GENERAL

1.01 SCOPE

There shall be furnished () Grit Separator Mechanism(s) suitable for installation in (a) concrete tank(s) -ft. square x -ft. -inch side water depth with -ft. -inch freeboard. The unit shall be designed for a maximum flow of MGD, and a minimum flow of MGD.

1.02 MANUFACTURER

(The) (Each) grit collector mechanism shall be of the Type "SB" center drive type with a screw type grit washer mechanism, as manufactured by Ovivo USA, LLC Salt Lake City, Utah.

1.03 DESCRIPTION

The (Each) grit collector shall be supported on stationary beams spanning the tank. The influent shall enter along one side of the collector basin, flow across the tank and over a fixed weir into the effluent channel. Grit settled in the collector shall be raked outward to a trough where it shall be removed by an inclined screw conveyor type grit washer. The grit washer mechanism shall wash and dewater the grit while lifting it to a point of discharge from the grit separator.

1.04 DESIGN

The (Each) grit collector shall be capable of removing a minimum of 95% of the material with a specific gravity of 2.65 or greater and a size of mesh and larger, at a maximum flow of MGD.

PART 2 PRODUCTS

2.01 GENERAL

The equipment furnished for the (each) grit collector shall include the influent distributing deflectors, effluent weir, collector mechanism support with walkway, platform, grating and handrailing, center assembly with drive unit, drive control, rotating center shaft, collecting arms with blades, assembly and anchor bolts.

The equipment furnished for the (each) grit washer mechanism shall include a washer screw, steel trough and drive assembly.

2.02 FABRICATION

All fabricated structural steel used shall conform to the requirements of "Standard Specifications for Steel for Bridges and Buildings", ASTM Designation A36. All shop welding shall conform to the latest standards of the American Welding Society (AWS).

Fabricated assemblies shall be shipped in the largest sections permitted by carrier regulations and properly match-marked for ease of field erection.

2.03 GRIT COLLECTOR MECHANISM(S)

A. Influent Deflectors

There shall be furnished (for each collector) _____ (____) adjustable 11 gauge steel deflectors for installation in the influent channel. Each deflector shall be attached to an adjustable shaft and mounted in a sleeve-type support embedded in the concrete influent channel cover and floor.

The deflectors shall serve to uniformly distribute the influent flow across the collector compartment and be of such design as to preclude the entanglement of debris.

The deflector shall be fabricated of 11 gauge minimum mild steel. The shaft shall be a minimum of 1 ¼-inch schedule 80 pipe with the adjustment shaft of 1 1/8-inch cold rolled steel bolted to the pipe shaft. The embedded upper support and lower support shall be hot dip galvanized steel.

The deflectors shall be filled with class C concrete by the on-site contractor.

B. Effluent Weir

A _____-inch wide x _____-inch thick _____ weir with (galvanized steel) (304 stainless steel) anchor bolts shall be provided for installation across the effluent side of the collector compartment. After setting at proper elevation for minimum water level, the weir shall be grouted in place.

C. Mechanisms Support

The 36" wide mechanism support shall span the tank and be supported by the tank walls. The mechanism support beams shall be properly designed for all dead loads and a life load of 50 pounds per square foot with a maximum deflection of less than L/360 of the span.

The walkway shall consist of two (2) parallel steel beams with the walkway surface of 1 1/2" x 3/16" aluminum I-Bar grating extending the full width of the support from one end of the structure to the center platform. The center platform shall be 8-ft 4-inch x 7-ft 6-inch allowing 30-inch clearance around the drive and shall have a walking surface of 1 1/2" x 3/16" aluminum I-Bar grating.

Handrailing shall be 42 inch high of 1½-inch double row horizontal aluminum pipe of the mechanical field assembled type with 1/4-inch x 4-inch aluminum toe plate included.

D. Center Assembly

The center assembly shall consist of the drive unit with main bearing, suitable lubrication fittings, support points for mounting to the mechanism support, and adapter shaft to bolt to the lower shaft.

The drive unit shall consist of a main worm gear and worm driven by a _____ (____) HP, (TEFC) (Explosion Proof) enclosed constant speed motor-drive, through roller chain and sprockets enclosed in a fabricated steel/galvanized guard.

The drive unit main gear shall be designed for a Momentary Peak Torque of _____ ft.-lbs. Mechanism Design Strength shall be _____ ft.-lbs. with the Mechanism Design Strength defined as the output torque of the main gear at which the drive control indicator will register 100% load.

The drive shall be rated to operate at a minimum of _____ ft.-lbs. continuous for 24 hours per day for twenty (20) years at the specified output speed of _____ rpm.

Worm gearing shall be designed and rated to equal or exceed the specified continuous torque and life. The basis for rating shall be ANSI/AGMA 6034-A87 (March 1988) standards for durability rating and design of worm gear reducers.

The output torque rating of the drive shall be based on the lowest values determined.

Calculations verifying that the drive meets these specifications shall be submitted with the shop drawings for review and approval.

The worm assembly shall be totally enclosed in a housing and provided with adequate seals to protect the interior of the housing. The housings shall be designed so all gears and bearings are oil bath lubricated.

The housings shall be provided with oil level sight gauges, oil fill and drain connections and condensate drain connections from the low points of the oil reservoir.

The worm gear shall be supported by and rotated on the main bearing. The rotating center shaft to which the rake arms are attached shall be bolted to the adapter shaft.

Main bearing shall be a four-point contact precision integral bearing and shall assure stability without the necessity of underwater guide shoes. Bearing balls shall be chrome alloy steel balls.

The bearing life shall be based on the life to initial pitting of the liner element and shall be a minimum of twenty (20) years (B10 life) based on the specified mechanism speed and uniformly distributed load due to the rotating mechanism.

Drive design shall be such that there shall be no chains, sprockets or bearings below the liquid surface or in contact with the liquid.

To ensure drive integrity and quality, the complete center assembly shall be manufactured and assembled in the equipment manufacturer's own shop and shall be available for inspection by the Engineer as determined by the Engineer/Owner.

E. Overload Device

The drive unit shall be equipped with an electrical-mechanical overload control device. The device shall be activated by thrust from the worm shaft.

A calibrated spring will react to the worm thrust and allow axial movement of the worm shaft to activate a pointer. The pointer shall provide a visual reading of the relative main gear output torque on a 0 to 100 percent graduated scale. The device shall also activate an alarm switch and a motor cut-out switch.

The alarm and motor cut-out switches in the control device shall be factory calibrated and set to the required torque and the manufacturer shall provide certification of the factory settings. The settings shall be as follows:

- Alarm Torque Set at 40% of Mechanism Design Strength
- Motor Cutout Set at 60% of Mechanism Design Strength

The entire control device shall be mounted in a separate NEMA Type 4/7 corrosion resistant aluminum housing with an integral conduit box and terminals.

F. Center Shaft

The rotating center shaft shall be _____-inch diameter schedule 80 with the upper flanged end bolted to the main gear adapter shaft. At the lower end of the

shaft there shall be furnished a steel spider for supporting and driving the collector arms.

G. Collector Arms

There shall be included two (2) collector arms of welded steel construction with 1/4" steel raking blades arranged to move the settled grit to the tank periphery, and accumulator blades arranged to discharge the collection material into the trough.

2.04 Grit Washer Mechanism

The grit washer mechanism shall be of the screw type. The grit washer shall be comprised of a _____-inch diameter removable washing screw inclined at a slope of 6-inch in 12-inch and mounted in a steel trough fabricated of 1/4" steel plate. The flights on the screw shall be of the sectional type and shall be of not less than 1/4" thickness welded to not less than a 3 1/2" diameter heavy steel pipe with solid stub shafts.

The submerged bearing shall be of such design as to preclude the entry of grit and arranged to allow for lubricant flushing of the bearing surfaces. The speed of the screw shall be _____ RPM.

The washing screw shall remove grit from the collector and raise it to a point of discharge from the grit separator. The washing screw shall be arranged with full pitch flights below low water level and half pitch flights above low water level.

Two (2) lubricated bearings shall be provided for the washing screw. The bottom replaceable bronze bearing shall be mounted inside the screw pipe shaft and rotate on a replacement hardened wear sleeve mounted on a stationary spindle.

Lubrication piping shall extend upward from the bottom bearing to a point on the collector mechanism support.

The upper lubricated ball bearing shall be mounted on the steel trough and shall carry the full thrust load of the washer screw.

The drive assembly shall consist of a constant speed reducer directly driven by a _____ HP TEFC electrical motor and driving the washer screw through chain and sprockets attached to the reducer output shaft and the extension of the washer screw shaft.

2.05 Anchor Bolts

(Galvanized steel) (304 stainless steel) anchor bolts with necessary hex nuts and washers shall be provided for all parts of the Grit Separator(s) and Grit Washer Mechanism(s) to be secured to the concrete tank.

2.06 Electrical Characteristics

The Grit Separator drive motors shall be designed for operation on 230/460 volt, 60 Hertz, 3-phase electric service. The drive control and alarm unit shall be wired for operation on 110 volt/60 cycle/single-phase current.

2.07 Lubrication

All gears and bearings shall run in an oil bath. Readily accessible lubricant fill and drain pipe with necessary fittings shall be provided.

2.08 Shop Painting

1. All submerged steel surfaces will receive the following:

Surface Preparation - SSPC-SP 10 (Near White Blast)

Finish - Tnemec 46-413, Tnemec-Tar at 16 mils MDFT (black)

2. All non-submerged surfaces will receive the following:

Surface Preparation - SSPC-SP 6 (Commercial Blast)

Prime - Tnemec 66 Epoxoline at 3 mils MDFT (66-1211-red)

Finish – Tnemec Series 66 Hi-Build Epoxoline at 4 mils MDFT (Color-Purchaser's Choice)

3. (The) (Each) center drive assembly shall be shop coated as follows:

Surface Preparation – SSPC SP-6 (Commercial Blast)

Finish – Tnemec Series 161-Tneme-Fascure at 8 mils MDFT (EN17-Sky Blue)

4. Gearmotor(s) shall receive manufacturer's standard finish.

PART 3 EXECUTION

3.01 Submittals

A. The manufacturer shall submit approval drawings on the equipment proposed to be furnished. Approval drawings shall be submitted to the engineer for approval prior to fabrication of the equipment.

3.02 Installation

The equipment shall be installed in strict accordance with the manufacturer's recommendations.

3.03 Service

The equipment manufacturer shall provide a service technician, properly trained in inspection and operation of the mechanism, to approve the installation, test equipment operation and instruct owner personnel on maintenance and operation.

This service shall be performed in the form of _____ (____) trip(s) to the site and _____ (____) eight (8) hour day(s) of service.

Any additional service shall be provided by the Contractor at his expense for improper installation, delayed check-out or operator training.

3.04 Operation and Maintenance Manuals

Prior to, or with the delivery of equipment, the manufacturer shall provide four (4) copies of an Operation and Maintenance Manual including storage, installation, startup, operation and maintenance instructions, a complete parts list and recommended spare parts list.

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