SECTION 11330
SCREENING EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES: Furnish, install and make ready to operate, one (1) mechanically cleaned filter screen (IS-I), complete with all necessary accessories in compliance with the following specifications and as shown on the Drawings.

1.02 RELATED SECTIONS

A. The specification sections listed below are an integral part of this equipment specification and the Contractor shall be responsible for providing these sections to the equipment suppliers:

1. Section 01300 - SUBMITTALS
2. Section 01600 - MATERIAL AND EQUIPMENT
3. Section 01640 - EQUIPMENT-GENERAL
4. Section 09900 - PAINTING
5. Section 15170 - MOTORS
6. Section 17500 – DESCRIPTION OF OPERATION

B. All electrical equipment and wiring shall be in full conformance with Division 16, Electrical Specifications.

1.03 REFERENCES: The current editions of the following, or their replacements if applicable.

A. AFBMA - Anti-friction Bearing Manufacturers Association Standards
B. AGMA - American Gear Manufacturers Association Standards
C. AISI - American Iron and Steel Institute

1.04 PERFORMANCE REQUIREMENTS

A. The heavy-duty, fully automatic mechanical self-cleaning, filter screen shall be suitable for installation and operation in a flow channel measuring 2.5 ft. wide x 4.5 ft. deep, as measured from the base of the screen to the level at which it is supported.

1. The angle-of-inclination shall be 75 degrees from horizontal. There shall be a 0.29 ft. recess in the channel floor to accommodate low flow periods.
2. The point at which all collected material will fall off the discharge chute shall be as shown on the Drawings.

B. The screen shall be capable of passing a maximum of 4.0 MGD of wastewater with a downstream water depth of 1.35 ft. in a channel 2.5 ft. wide.

1. The normal flow rate shall be 1.0 MGD.
2. The loss of head at maximum flow shall not exceed 9” of water.
3. The screen shall be capable of presenting a clean filtration surface to the oncoming liquid stream at all times during continuous operation.
4. The screen shall be capable of intermittent operation in order to form a mat for maximum trash removal.

C. The screening equipment shall be capable of handling (screening, removing, and discharging) a minimum of 12.0 cubic feet of debris per hour at a minimum total dry solids concentration of 8.0 to 10.0 percent by weight.

1.05 SUBMITTALS

A. Submit shop drawings in accordance with Sections 01300 and 01640.

B. Submit a performance affidavit for all equipment furnished under this section in accordance with Sections 01300 and 01640.

C. Manufacturer’s instructions in accordance with Section 01300.

1.06 SPARE PARTS: Furnish the following spare parts in clearly identified containers.

1. Filter plate element (15mm): 30
2. Side Plate: 4
3. Snap rings (63/64” diameter): 8
4. Snap rings (3/4” diameter): 18
5. Front seal brush: 1
6. Rotating brush core replacement assembly: 1
7. Washer (1/8” thick): 6

1.07 EXPERIENCE AND QUALIFICATION REQUIREMENTS

A. Due to the special importance of proper functioning of the equipment specified in this section to the satisfactory operation of the entire treatment system, the Contractor shall demonstrate in writing, to the satisfaction of the Owner at the time of the shop drawing submittal that the manufacturer has produced the specified type and size of equipment for sanitary wastewater service that has been in successful operation for a minimum period of five years prior to the bid date.

B. In the event the Contractor elects to install equipment whose manufacturer cannot comply with the above experience requirement, then the Contractor shall submit with shop drawings, appropriate bonds or deposits guaranteeing replacement of the equipment in event of failure for a period of three years after warranty: Such three-year period shall start upon the termination of the Contractor’s basic warranty and guarantee obligations under the Contract.

C. During such three-year period the Contractor shall repair, modify, or replace the equipment in a manner acceptable to the Owner, if in the opinion of the Owner, the operation of the equipment is unsatisfactory.

1. Normal wear or malfunctions due to neglect or abuse will not be considered justifiable reasons for unsatisfactory operation.

2. In the event the Owner determines the operation of the equipment to be unsatisfactory during this three year period and the Contractor fails to correct the deficiencies within six months from the time the Contractor is first notified in writing that such deficiencies exist, the Owner will make the necessary repair or replacement and deduct such costs from the aforementioned bonds or deposits of the Contractor.
PART 2 PRODUCTS

2.01 MANUFACTURERS
A. The mechanical filter screen equipment manufacturer and model shall be the following or equal:
   1. Parkson Corporation, Aquaguard, Fort Lauderdale, Florida

2.02 EQUIPMENT DESIGN: Filter Screen
   1. General Description
      a. The screen shall provide dual filtration of all materials by recessing the horizontal fine filtration opening in the face of the screen.
      b. The coarse horizontal openings shall be 34 mm and shall be the first opening the flow stream contacts as it passes through the screen.
      c. The screen shall be operated intermittently on a timer. The screen filtration belt shall be provided with a two dimensional grid which limits the maximum vertical opening to 29 mm.
      d. This, coupled with the fine horizontal opening of 15 mm, shall form the grid profile.
      e. The screen shall have 0.57 square feet of contact surface per square foot of wetted filtration belt.
      f. The unit shall be designed to withstand 36” of differential head.
   2. Screen Belt Cleaning
      a. The screen shall be automatically self-cleaning through the interaction of the filter elements without requiring water or rigid external or internal mechanical devices to remove the captured materials from the screen surface.
      b. The drive mechanism shall be protected from the trash stream in order to ensure that the screen runs smoothly without jamming.
      c. The driving force must be transmitted to clean, trash-free components to avoid mistracking or binding.
      d. No auxiliary cleaning devices shall be allowed.
   3. Screen Mounting
      a. The screen shall not require mounting or fastening to the side walls or bottom of the channel.
      b. It shall be possible to pivot or remove the screen from the channel without dewatering the channel when the stop plate is removed.
      c. Routine service shall be possible with the screen in the channel.
4. Materials of Construction

All moving wetted parts, all wetted parts on which the moving parts ride, or all filter belt components under guiding, bearing, or driving loads including, but not limited to, the shafts, links and guide rails, shall be fully corrosion-resistant and shall be made of 304 stainless steel or wear resistant heat treated 400 series stainless steel.

a. The screening elements shall be suitable high impact plastic which will not shred trash or cause jamming because of the self relieving nature of the materials.
b. The rollers and brushings shall be of 400 series heat treated stainless steel with a minimum Rockwell of 39C hardness.
c. The side plates shall be phenolic or suitable high impact plastic.
d. The frame, which is stationary, shall be 3/16" thick 304 stainless steel.
e. The main drive shaft and sprockets shall be constructed of 304 stainless steel.
f. The take-up screws shall be constructed of 316 stainless steel.
g. The front seal brush shall have nylon bristles to prevent trash from passing under the filter belt.
h. The side seals shall be made of neoprene rubber with stainless steel backing plates.
i. The discharge chute shall be constructed of minimum 14 gauge 304 stainless steel.
j. The screening rollers shall be 1-3/4" diameter and shall ride on 1/2" thick 304 stainless steel rails.
   1) A submerged curved 1/2" thick stainless steel rail shall be provided at the foot of the screen.
   2) No submerged bearings or sprockets are allowed in order to eliminate maintenance required on submerged components.
k. To prevent deflection, the filter shafts shall have a minimum thickness of 3/4" diameter and spaced on 4" centers in the travel direction of the belt; and shall be made of 304 stainless steel in order to withstand 36" of head loss across a span of 2.5' at a maximum deflection at the shaft center of 0.079".
l. This is required to insure structural integrity and smooth operation without jamming or binding.

2.03 ACCESSORIES

A. Screen manufacture shall provide a stainless steel chute connecting the mechanical filter screen discharge to the inlet trough of the screenings dumpster as shown on the Contract Drawings. This chute shall channel screenings vertically from one unit to the other without clogging or spilling.
B. All anchor bolts, nuts, fasteners and supports shall be of 316 stainless steel unless specified otherwise.

1. Anchor bolts shall be of ample size and strength to securely fasten the equipment to the floor.

2. Anchor bolts shall be furnished by the screen manufacturer and set by the Contractor in accordance with the manufacturer’s recommendations.

2.04 MOTORS AND DRIVES: Mechanical Filter Screen

1. Motor
   a. The electric motor shall conform to Section 15170, and shall operate on 230/460 volts, 3 phase, 60 Hertz ac power.
   b. The motor shall be explosion-proof and shall not be more than 1.0 HP.
   c. The motor shall provide the starting torque required to move the mechanism from a dead stop when the channel is dewatered as well as the torque required to clean the screens under the maximum loading.
   d. The motor shall be provided with overload protection which senses motor current draw.
   e. The motor shall be constant speed.
      1) Motor shall have anti-friction bearings throughout.
      2) The motor shall have a minimum service factor of 1.0.

2. Speed Reduction Unit
   a. The drive unit shall be a hollow shaft type reducer with a 750:1 reduction equipped with anti-friction bearings and designed in accordance with AGMA recommendations for 24 hours, Class II service.
   b. The speed reducer shall have a minimum AGMA service factor of 1.5.
   c. The reducer case shall be made of cast iron or carbon steel.
   d. The reducer case shall be provided with oil and duct seals.
   e. Speed reduction unit shall be Sumitomo or equal.

3. Bearings
   a. All bearings incorporated within the motor and drive assembly shall be of the antifriction type, shall run in oil and grease, and shall have an L-10 life of 100,000 hours at full load based on the Anti-friction Bearing Manufacturers Association Standards (AFBMA) when operating at the normal continuous torque rating of the screening unit.
   b. Speed reducer case shall be equipped with oil fill port, oil drain line, and an oil level indicator.
2.05 CONTROLS
A. The Contractor shall furnish and install controls for the mechanical filter screen as shown on the Contract Drawings.
B. All electrical equipment and wiring shall be in conformance with Division 16, Electrical Specifications.
C. The controls will be provided by the Process Control System (PCS) Supplier. Refer to Section 17500 - Description of Operation for a description of the controls. Coordinate any special control requirements with the PCS supplier.

2.06 SOURCE QUALITY CONTROL: The screen shall be factory assembled and tested for a minimum of 8 hours prior to delivery, and shall be delivered to the site fully assembled (other than the motor/reducer unit, discharge chute and support legs).
1. It shall be capable of being set in place and field erected by the Contractor with minimal field assembly.
2. The Engineer reserves the right to witness the shop test before delivery of the screen of the site. A minimum of 4 weeks written notice of this test shall be given to the Engineer so the Engineer can make arrangements to witness the test if desired.

2.07 FABRICATION REQUIREMENTS
A. All stainless steel shall be AISI Type 316 stainless steel unless otherwise specified.
   1. All stainless steel members shall have a minimum thickness of 3/16-inch.
   2. All cast iron shall conform to ASTI4 Specification A48, Grade 30.
   3. All cast steel shall conform to ASTM Specification A27.
B. All rotating parts shall be fully enclosed or properly guarded in accordance with ANSI Standard B15.1.
C. Painting: Surface preparations shop painting, field painting, and other pertinent detailed painting specifications shall be in accordance with Section 09900.
D. Standardization of Grease Fittings: Grease fittings shall be standardized in accordance with Section 01640.

PART 3 EXECUTION
3.01 PREPARATION: To minimize field erection and installation problems, the unit shall be completely factory assembled to ensure a good fit of all components.
3.02 EQUIPMENT INSTALLATION: All equipment furnished under this section shall be installed and tested in compliance with Section 01640.
A. The Contractor shall be required to satisfactorily perform both a preliminary field test and a final acceptance test on the filter screen equipment.

1. After the equipment has been installed, operated, and initial adjustments have been made, a preliminary field test shall be performed.

2. The preliminary test shall be performed without water in the channel and the filter screen equipment shall operate without excess noise, vibration, overheating, overloading.

3. A qualified manufacturer’s representative shall supervise and the Engineer shall be present at the test.

B. After the preliminary field test has been performed satisfactorily and there is wastewater flow available, a final acceptance test shall be performed.

1. Screenings from wastewater shall be allowed to accumulate until at least one-half of the submerged filter screen area is plugged with debris.

2. The filter screen shall then be started and shall perform effectively to remove, convey and discharge the screenings.

3. The filter screen equipment shall operate during the final acceptance test without excess noise, vibration, overheating, overloading, and the Contractor shall demonstrate that all performance requirements have been met.

3.03 SERVICES OF MANUFACTURER’S REPRESENTATIVE: Provide manufacturer’s (or supplier’s) services according to Section 01640.

END OF SECTION