SECTION 440601 - SLUDGE COLLECTORS

1. GENERAL
   * + 1. RELATED WORK SPECIFIED ELSEWHERE
          1. Wiring for Motors and Motor Controllers: Section 260523.
          2. Motors and Motor Controllers: Section 260221.
       2. DESCRIPTION OF SYSTEM
          1. The equipment shall be complete with drive mechanism, rotating scraper arms, skimmer with scum trough and skimmer blade ramp when required, bridges, overload device and anchor bolts, all amply proportioned for all stresses that may occur.
       3. QUALITY ASSURANCE
          1. The manufacturer furnishing the equipment shall be experienced in the design and construction of such equipment and shall have furnished collectors which have been in successful operation for a period of not less than five years.
       4. SUBMITTALS
          1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
          2. Manufacturer’s installation instructions shall be provided along with product data.
          3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
          4. Submit copies of detailed drawings of the equipment and all appurtenances.
       5. TOOLS
          1. Furnish the institution a set of tools required for maintenance and operation of the equipment.

Delete article below if circular collectors.

* + - 1. GROUTING
         1. A radius screen shall be furnished by the equipment manufacturer to enable the Contractor to accurately grout the curved end of the tank.

Delete below if not environmental engineering project.

* + - 1. PAYMENT
         1. Payment for the Work of this Section will be made at the lump sum contract price.
         2. Painting as specified under section 099613 – Painting Wastewater Treatment Plants shall be included under this section.

1. PRODUCT
   * + 1. COLLECTING EQUIPMENT

Edit paragraph below and add additional manufacturers.

* + - * 1. Sludge collecting equipment shall be similar to that manufactured by Rex Chainbelt Inc., Link-Belt Company, or World Ecology Systems Co.
        2. Shop coat all exposed metal Work except chains and sliding or rolling contact surfaces with one coat of fume and chemical resistant paint.
        3. Painting for the Work of this section shall be in accordance with Section 099613 – Painting Wastewater Treatment Plants.
      1. CIRCULAR TYPE EQUIPMENT

Select type of equipment below and delete one.

* + - * 1. Bridge:

The all welded structural steel bridge, installed as shown shall be properly supported and braced to assure rigidity. The bridge shall be designed to support, in addition to the necessary dead load, a live load of 150 pounds per lineal foot with a deflection not to exceed 1/360 of the span.

The walkway shall be a 3/16” steel checkered floor plate 3’ wide with railings on both sides.

* + - * 1. Scum Trough:

The scum trough and beach shall be welded, 1/4” steel plate, adequately supported and braced. A 6” standard pipe flange for the scum discharge pipe shall be provided.

* + - * 1. Sludge Collecting Arms:

The sludge collecting arms, equipped with scraper blades (and adjustable brass squeegees projecting 1-1/2” below the bottom of the blade shall be of 1/4” structural steel of the design shown. Counter weights required to compensate for unbalance created by staggering shall be supplied as required.

* + - * 1. Anchor Bolts:

Plated steel anchor bolts, of ample size and strength for the purpose intended, shall be furnished and installed.

* + - * 1. Drive Mechanism:

The drive mechanism shall consist of primary, intermediate and/or final gear reduction units as may be required.

Equip drives with overload protection.

Ball bearings shall be high quality high carbon chrome alloy steel, on hardened steel races, mounted as required for the type of equipment furnished. Seal the housing with a felt strip and dust seal, and have an oil filling and level pipe as well as a drain plug.

* + - * 1. Center Pier Type:

The mechanism shall be of the center pier, siphon feed, type with peripheral overflow. The cylindrical steel center pier shall support the drive, bridge and scraper mechanism, in addition to serving as an influent pipe. The center pier, of 1/4” steel plate unless otherwise shown, shall be equipped with ports to direct the flow into the tank at a low velocity.

Baffles, skimmers, deflector and wiper blades shall be as shown or required.

Delete above or below for type of support.

* + - * 1. Bridge Supported Type:

The mechanism shall be of the bridge supported, side feed type with peripheral overflow. A bridge spanning the tank shall support a central driving mechanism, which, in turn, shall support and rotate a torque tube and rake arms.

Baffles, port openings, influent wells, deflector and wiper blades and pipe connections shall be as shown or required.

* + - * 1. Motor and Controls: The motor shall be a constant speed, totally enclosed, ball bearing unit, for operation under normal operating conditions without overloading. Motor and controls shall conform to the requirements of the Section 260221.

Edit below as required.

* + - 1. RECTANGULAR COLLECTORS
         1. Collectors:

The collecting equipment consists of collector shafting, sprockets, bearings, bearing seats, idlers, chains, flights, return run tracks and brackets, drive chain, drive units, floor rails in floor, motor, starting equipment and all other necessary items required for a complete installation.

To assure proper alignment, sprockets and bearings shall be accurately located on shafts at the factory. Flights shall be factory notched and drilled to receive wearing shoes and chain attachments. All parts of the collector shall be amply proportioned.

The large tanks shall be larger than 10’ x 60’ or 12’ x 50’ but no larger than 16’ x 115’.

Small tanks shall have no more than 600 square feet in surface area (not larger than 10’ x 60’ or 12’ x 50’).

Floor rails for the large tanks shall be 20#, and 16# for the small tanks.

* + - * 1. Chains:

The collector chains and drive chains shall be manufactured of a corrosion resistant processed metal, having an average tensile strength of 70,000 psi and an average hardness of 170 Brinell.

For installation in large tanks, collector chains shall be industry standard #720, heavy type, 6” pitch, have an ultimate strength of 30,000 pounds, weighing 4.2 pounds per foot with the plain and attachment links assembled with 11/16 inch diameter heat treated high carbon steel pins and rivets. Drive chains shall be type #945, 1.6301” pitch, with an ultimate strength of 7,500 pounds.

* + - * 1. Sprockets:

Sprockets shall be semi steel, cast in a chill, and having an average hardness of 450 BHN at root diameter. Chill depth shall be a minimum of 3/16 inches. Sprockets shall be accurately ground to fit chain and stress relieved before machining. Sprocket sizes shall conform to the following minimums:

| **COLLECTOR CHAIN SPROCKETS** | |
| --- | --- |
| **Large Tanks** | **Small Tanks** |
| Headshaft--19 Tooth | Minimum--12 Tooth |
| Others--13 Tooth |  |

| **DRIVE CHAIN SPROCKETS** | |
| --- | --- |
| Driver--13 Tooth | 13 Tooth |
| Driver--38 Tooth | 44 Tooth |
| The 38 tooth sprocket shall be split  to facilitate replacement. | The 44 tooth sprocket shall be split  to facilitate replacement. |

The driver sprocket shall be bronze bushed and provided with shear pin device to provide full protection of equipment in case of excessive loading.

* + - * 1. Shafting and Bearings:

Shafting shall be cold rolled steel and continuous between bearings. Bearings shall be self-aligning, babbitted, water lubricated, especially designed to prevent accumulation of settled solids on their surfaces. Take up bearings where required, shall provide not less than 10 inches horizontal travel. All anchor bolts shall be galvanized.

* + - * 1. Flights:

Flights for large tanks shall be 2 x 6 selected heart of redwood and shall be equipped with 3/8 inch thick wearing shoes; those running on the floor rail shall be case-hardened to a minimum R.C. 55.

Flights for small tanks shall be at least 1-1/2 inch x 4 inch select heart of redwood and shall be equipped with 1/4 inch wearing shoes.

Flights shall be mounted approximately 10’ on centers on two strands of chain by means of full depth attachments. Wearing shoes shall be located central to the chain attachment utilizing the same attachment bolt holes. Pivoted attachments shall be provided for at least two scrapers of each collector.

In tanks requiring cross collectors, flights shall be of select heart of redwood mounted approximately 5’ on centers on two strands of chain.

The speed of travel of the collector flights shall not exceed 2 feet per minute unless otherwise approved. The speed of travel of the cross collector lights shall not exceed 4 feet per minute.

* + - * 1. Drive Unit:

The collector drive assembly for all tanks shall consist of motor, reducer, drive sprocket, shear pin hub and guard. Reducer shall be of the worn gear type, fully housed, running in oil, and of approved make, with anti-friction bearings throughout. Reducer unit and motor shall be mounted as a common unit directly on the concrete.

Chain drive above the deck shall be covered with a removable 14 gage metal guard fabricated by the drive manufacturer and galvanized after fabrication.

* + - * 1. Motors and Controllers:

The motor and controllers furnished and installed under this Section shall meet the requirements of Section 260221. The motors shall be of not less than the H.P. shown on the drawings and shall be capable of operating equipment furnished under normal conditions, without overloading.

Motors shall be equipped with magnetic starting, push button controls, with overload and under-voltage protection, in a weatherproof enclosure. When jaw clutches are used, each drive unit shall be equipped with a jog type reversing switch in a weatherproof enclosure.

* + - * 1. Scum Troughs:

Scum troughs shall be furnished and installed in the tanks as shown on the drawings. The troughs shall be designed for intermittent removal of grease and other floating material conveyed to the troughs by the skimmers. Troughs shall be fabricated from steel pipe and shall be cut to provide 60 degree wide slots to act as weirs when the pipes are rotated. The pipes shall be manually operated by the type of device shown on the drawings.

Retain article below regardless of type collectors.

* + - 1. PAINT
         1. Paint for shop and field coats of metal shall be fume and chemical resistant paint.

1. EXECUTION
   * + 1. FIELD PAINTING & GREASING
          1. Touch up and field paint 2 coats all exposed and submerged metal.
          2. Chains and sliding or rolling contact surfaces shall be coated with an approved grease or oil.
       2. INSTALLATION
          1. Install all equipment in tanks as recommended by the equipment manufacturer.

Delete paragraph below if longitudinal type.

* + - * 1. Installation of troughs shall be in accordance with the manufacturer’s instructions, particularly with regard to pipe elevation in relation to normal water surface.
        2. Set scraper arms and spaced to scrape settled sludge from the tank bottom to the sludge pocket in the center of the tank or basin.
      1. WORKMANSHIP AND TEST
         1. Operate the equipment for 48 consecutive hours, after installation, complete with all appurtenances properly adjusted with sewage or clear water flowing through the tank or tanks. Any defects which develop during the test, in the equipment furnished under this Section, shall be corrected by the Contractor at their own expense, and the test begun again. Time of operation prior to the development of a defect shall not be counted in the specified 48 hours.

END OF SECTION 440601