

SECTION 11332
SCREENINGS COMPACTOR

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope

1. Furnish and install two (2) fully automatic, heavy duty screenings washer/compactors with appurtenances for receiving and washing wastewater screenings, as well as reducing its volume and water content by means of a pressing action, SW-1 and SW-2
 - a. Provide electric motors, gear reducing drive units, control components, non-potable water system connections and equipment for washing and flushing systems, inlet chute, discharge piping and all other appurtenances as specified herein and shown on drawings
2. Screenings will be received from the in-channel mechanical screen and compacted screenings will be discharged to a shaftless screw conveyor, distributed in a screenings container and ultimately removed from the site by truck
3. Location: Preliminary Treatment Area of the Headworks Building

B. Additional Requirements Specified Elsewhere

1. Section 01340: Shop Drawings, Product Data and Samples
2. Section 01400: Quality Control
3. Section 01600: Materials and Equipment
4. Section 01730: Operating and Maintenance Data

C. Related Requirements Specified Elsewhere

1. Section 03300: Cast-in-Place Concrete
2. Section 03600: Grout
3. Section 05500: Metal Fabrications
4. Section 05501: Anchor Bolts and Drilled-In Anchors
5. Section 09900: Painting
6. Section 11331: Screening Equipment
7. Division 13: Controls and Control Systems
8. Division 14: Conveying Systems
9. Division 16: Electrical

1.2 QUALITY ASSURANCE

A. Suppliers Qualifications

1. All equipment and accessories supplied by or through a single manufacturer or supplier experienced in the design and manufacture of the specified equipment

- a. Equipment to be the standard product of the manufacturer with specified optional equipment and components
 - b. Experienced in the manufacture of automatic washer and screw press type screenings compactor for a minimum of 5 years
 - c. Provide list of installations where washer/compactors are in operation
2. Design basis
- a. Parkson Corporation, Aqua WashPress, Model AWP8-3.5
 - b. Equivalent products of other manufacturers may be accepted subject to compliance with design, function, materials and performance of the specified items and acceptance by Owner and Engineer

1.3 SUBMITTALS

A. In Accordance with Section 01340

B. Manufacturer's Specifications and Illustrations

- 1. Sufficient data to verify compliance with specifications and to illustrate construction and assembly of products
 - a. Press body, frame, supports, spiral, piping, chute and drain pan
 - 1) Manufacturer
 - 2) Type, model and size
 - 3) Material fabrication standards
 - 4) Design speed
 - 5) Bearing type
 - 6) Bushings, seals, bearing/wear components
 - 7) Size and type of discharge pipe connection
 - 8) Size and type of drain pipe connection
 - 9) Size and type of wash and flush water connections
 - 10) Non-potable water supply requirements, pressure, flow rate and volume requirements
 - 11) Non-potable water delivery control system requirements
 - 12) Dimensions
 - 13) Weight
 - b. Electric motor
 - 1) Manufacturer
 - 2) Type and model including class
 - 3) Rated horsepower
 - 4) Voltage, phase and frequency
 - 5) Design rotative speed
 - 6) Efficiency
 - 7) Temperature rating and service factor
 - 8) Rating for maximum number of starts per hour
 - 9) Full load and locked rotor current draws
 - 10) Dimensions
 - 11) Weight
 - c. Drive and appurtenances
 - 1) Manufacturer
 - 2) Type and model
 - 3) Input and output speeds

- 4) Gear ratios
- 5) Service factor
- 6) Attachment to motor
- 7) Fluid and other maintenance requirements
- d. Trough, chutes and pans
 - 1) Materials of construction
 - 2) Dimensions
 - 3) Connections
 - 4) Supports
 - 5) Fabrication
- 2. General
 - a. Materials
 - b. Parts
 - c. Devices
 - d. Accessories
 - e. Dimensions
 - f. Net weights
 - g. Electrical wiring diagrams
 - h. Monitoring and control systems and devices
 - i. Control descriptions and diagrams
 - j. Data on shop painting
 - k. Spare parts list

C. Shop Drawings

- 1. Fabrication
- 2. Assembly
- 3. Foundation, structural components and supports
- 4. Installation
- 5. Anchor bolt setting template

D. Certification of Compliance

- 1. Manufacturer's affidavit of compliance certifying
 - a. All equipment and materials comply with these specifications
 - b. Equipment has been properly installed and is operating within specification tolerances
 - c. All tests have been performed with satisfactory results

E. Operating and Maintenance Manuals in Accordance with Section 01730

1.4 JOB CONDITIONS

A. Application

- 1. Raw municipal wastewater screenings
- 2. Installed at discharge of automatic mechanical screen
- 3. Screen opening size of automatic mechanical screen: 3 millimeters or 0.118 inches

B. Installation Conditions

1. Upper operating floor of Preliminary Treatment Area in Headworks Building
2. Interior, heated location
3. Site elevation: 5425.00 feet above mean sea level
4. Floor-mounted unit to sit above screen channel and below mechanical screen discharge
 - a. Inlet opening to be centered over 3'-6" wide concrete channel
 - b. Inlet opening will be off-center to active channel width and mechanical screen
 - 1) Active channel width of 2'-6" achieved by the installation of a channel baffle on one side of the concrete channel to reduce the active width
 - c. Mechanical screen width: 2'-6"
 - d. Mechanical screen will be centered and fit within the active channel width
 - e. Provide two support legs extending to floor, one at each end of the unit
 - f. Provide all support leg bracing and stiffeners to properly and rigidly support the unit through its full range of operation
 - g. Allow for 1-inch grout pad or high density polyethylene leveling shims beneath support legs
 - h. Distance between support legs to be verified prior to construction of concrete channels and integral pedestals
5. Physical characteristics
 - a. Finish floor elevation for unit support legs: 5421.33
 - b. Bottom of mechanical screen discharge chute: 5425.33
 - c. Centerline of unit discharge piping connection: 5422.33
 - d. Discharge piping routed so discharge is above screw conveyor trough
 - 1) Minimum diameter: 8 inches
 - 2) Minimum centerline of discharge pipe end: 5426.62
 - 3) Horizontal run from unit discharge piping connection to discharge pipe end
 - a) SW-1: 13'-0"
 - b) SW-2: 7'-8"
 - 4) Bends in discharge piping
 - a) SW-1: One 19° vertical bend
 - b) SW-2: One 90° vertical bend, one 32° vertical bend rotated horizontally 45°
 - e. Maximum elevation of screw conveyor trough: 5426.00
 - f. Motor orientation: Horizontal
 - 1) Coordinate with mechanical screen equipment to ensure no interferences with screen and its appurtenances when screen is positioned in channel for service or rotated out of channel for maintenance

- C. Electrical equipment, components and work in the Preliminary Treatment Area of the Headworks Building shall conform to NEC Class 1, Division 2, Groups C and D

PART 2 - PRODUCTS

2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Number of units: Two

- B. Minimum processing capacity: 30 cubic feet per hour
- C. Solids content of screenings: Minimum 8%
- D. Maximum size of drain holes or slots: 3/16"
- E. Stainless steel construction
- F. Shafted spiral design with washing and flushing zones

2.2 FABRICATION AND MANUFACTURE

A. Press Body

1. Material: Type 304 stainless steel
2. Minimum thickness: 12 gauge
3. Nominal inlet area: 11"x45"
4. Inlet area provided with prepared flange to accept inlet chute panels and fasteners
5. Press area constructed of stainless steel
 - a. Minimum 1/4" thickness
 - b. Drainage openings no larger than 3/16" at inner surface
 - c. Drainage openings of non-clog design with size increasing toward outer surface
 - d. Drainage collected within unit and directed to minimum 4" drain pipe connection
6. Stainless steel support legs
 - a. Provide all gussets, stiffeners and bracing required for installation elevations previously listed
7. Wear bars for press spiral
 - a. Bars designed to be easily replaceable
 - b. Bars to provide a low friction sliding surface
 - c. Secure with stainless steel removable fasteners
8. Discharge pipe connection
 - a. Minimum diameter: 8 inches
 - b. Compatible with ANSI B16 125 lb. drilling pattern

B. Spiral

1. Material: High strength carbon steel
2. Shafted design with integral flights
3. Replaceable nylon brush secured to edge of flight to clean drainage openings

C. Drive Unit

1. Constant speed, gear reducer motor drive
 - a. Single or double reduction, helical gear unit
 - b. Equipped with high capacity roller bearings with AFBMA B-10 life of 30,000 hours, minimum

- c. Shaft-mounted directly on spiral drive shaft
- 2. Minimum AGMA Class 2
- 3. Enclosure: TEFC
- 4. Motor to be sized for the site elevation previously stated
 - a. Sized so that under maximum, continuous design load imposed by driven equipment, motor nameplate horsepower will not be exceeded
- 5. Motor size: 5 hp, maximum
- 6. Power supply: 480V, 60 Hz, 3-phase
- 7. Motor to be rated for severe duty
- 8. Motor to be NEMA Class B design with Class F insulation or better
- 9. Motor service factor: 1.15 minimum
- 10. Gear reducer service factor: 1.4 minimum

D. Non-Potable Water Spray Systems

- 1. Provide spray system for washing collected screenings and flushing unit suitable for use with non-potable plant effluent
 - a. Non-potable water supply available for each unit
 - 1) 25 gallons per minute (gpm)
 - 2) 60 pounds per square inch (psi)
- 2. System and component materials and construction
 - a. Suitable for installation and operation in an NEC Class 1, Division 2, Group C and D environment
 - b. Suitable for use in an environment containing hydrogen sulfide
- 3. Minimum ½" diameter pipe, valves and fittings for all system components
 - a. Pipe and fitting material: PVC or stainless steel
 - b. Valve materials: See automated flow control valves below
- 4. Minimum ½" diameter NPT pipe connection for external non-potable water source
- 5. All automated flow control valves shall be solenoid operated ball valves
 - a. NEMA 7 rated electrical components
 - b. Bronze bodies
 - c. Stainless steel components
 - d. Buna-N seals
- 6. Non-potable water demand per unit shall not exceed 25 gpm

E. Compacted Screenings Discharge Piping

- 1. Piping
 - a. Minimum size: 8" diameter
 - b. Thickness: Schedule 5S
 - c. Material: Type 304 stainless steel
 - d. Smooth interior
 - e. Inside diameter to uniformly increase along length of run toward discharge end to aid in clog prevention
- 2. Elbows and bends
 - a. Minimum size: 8" diameter
 - b. Thickness: Schedule 10S
 - c. Material: Type 304 stainless steel
 - d. Smooth interior

- e. Inside diameter to uniformly increase along length of run toward discharge end to aid in clog prevention
 - f. Nonstandard angle bends may be fabricated from standard angle bends cut to the required angle and/or lay length
3. Flange connections
- a. Minimum flange thickness: ¼"
 - b. ANSI B16 125 lb. drilling pattern
 - c. Minimum bolt diameter: 5/8"
 - d. Bolts and hardware material: Stainless steel
 - e. Provide minimum 1/8" thick neoprene gasket, 60 durometer hardness

F. Inlet Chute

- 1. Material: 304 stainless steel
- 2. Minimum thickness: 1/8"
- 3. Flange connection with bolt pattern and dimensions to match press inlet opening
- 4. 1/8" thick neoprene gasket at flange connection with inlet opening, minimum 60 durometer hardness
- 5. Provide hem or lip along top edge for the appropriate stiffness and rigidity
- 6. Refer to drawings for dimensional information

2.3 PAINTING AND COATINGS

A. All surfaces to be painted or coated except

- 1. Stainless steel
- 2. Aluminum
- 3. Galvanized
- 4. Nickel or chromium
- 5. Rubber and plastic

B. All surfaces to receive prime, intermediate and/or finish painting or coating at the factory

C. Surface Preparation

- 1. Based on service exposure to wastewater materials
- 2. Non-immersion and non-contact service: Steel Structures Painting Council (SSPC) - SP6 Commercial Blast Cleaning
- 3. Immersion and contact service: Steel Structures Painting Council (SSPC) - SP10 Near White Blast Cleaning

D. Painting or Coating System

- 1. Manufacturer's standard coating system
 - a. Provide manufacturer's standard color
 - b. Owner to select color from manufacturer's standard color chart
- 2. Use only mercury-free, lead-free, fume-proof paint or coatings
- 3. Paint or coatings must be suitable for atmosphere containing hydrogen sulfide

- E. Refer to Section 01600 for additional requirements

2.4 ANCHOR BOLTS

- A. Manufacturer to specify type, size, number required, etc.
 - 1. Refer to Section 05501 for general requirements
- B. Manufacturer to provide anchor bolt setting template, drawings and/or setting instructions
- C. Anchor bolts will be furnished by installation contractor

2.5 CONTROLS

- A. Provide one control panel for each washer/compactor unit
- B. Each washer/compactor unit shall be independently operated through its own control panel
- C. Control panels to be wall-mounted in the Electrical and Control Room of the Headworks Building
- D. The Preliminary Treatment Area of the Headworks Building will include hazardous environment monitoring devices. Should a hazardous environment condition occur, it will be indicated in the SCADA system which will in turn send a shut down signal to the equipment in the area. The washer/compactor control panels must be able to accept this signal and upon its activation immediately de-energize all equipment in the Preliminary Treatment Area
- E. Provide separate local emergency stop pushbuttons in a NEMA 7 enclosure to be installed at the motor end of each washer/compactor unit in the Preliminary Treatment Area as indicated on the Drawings. Switch must be capable of being locked in the Off position
- F. Operation of each washer/compactor unit shall be controlled through programmable timers and counters
- G. Provide washing system solenoid operated ball valve (normally closed in the de-energized state) for 120V, single phase, 60 hertz power supply with NEMA 7 rated electrical components
- H. Provide flushing system solenoid operated ball valve (normally closed in the de-energized state) for 120V, single phase, 60 hertz power supply with NEMA 7 rated electrical components
- I. Control panel
 - 1. Number required: 2

2. Panel tag designation: LCP SW-1 and LCP SW-2
3. Enclosure rating: NEMA 4
4. Control panel component rating: NEMA 4X
5. Completely prewired and factory tested prior to shipment
6. Main disconnect switch capable of being locked in the Off position
7. Accept input power of 480 VAC, 3-phase, 60 hertz
8. Include all logic devices, programmable relays, timers, counters and appurtenances for proper equipment operation
9. Include the following minimum electrical devices
 - a. FVNR motor starter and motor overload protection
 - b. Transformer for 120 VAC control system power
 - c. Main circuit breaker
10. Include the following minimum pilot and control devices
 - a. Hand/Off/Auto selector switch for the washing system
 - 1) When in Hand, system to operate continuously
 - 2) When in Auto, system to operate in intermittent cycles according to adjustable timers as described below for the drive motor
 - b. Hand/Off/Auto selector switch for the flushing system
 - 1) When in Hand, system to operate continuously
 - 2) When in Auto, system to operate in intermittent cycles according to adjustable timers as described below for the drive motor
 - c. Hand/Off/Auto selector switch for drive motor
 - 1) When in Hand, equipment to operate continuously
 - 2) When in Auto, equipment to operate as follows
 - a) The operation of the equipment is intermittent with the operating sequence of the drive motor, washing system and flushing system being initiated by an adjustable counter that tracks the accumulated run time of the washer/compactor's associated mechanical screen through the use of a run contact from the associated screen
 - b) When the operator adjustable input of accumulated screen run time is reached, this shall initiate operation of the drive motor, energize an adjustable drive motor run time timer, and energize the washing system on delay timer
 - c) When the washing system on delay timer times out, the washing system solenoid-operated valve shall be energized (opened) to initiate washing system operation and the drive motor will continue to operate
 - d) When the drive motor run time timer times out, the drive motor shall be de-energized and a drive motor off time timer shall be energized, with the washing system continuing to operate
 - e) When the drive motor off time timer times out, a drive motor cycle counter shall register one drive motor start/stop cycle
 - (1) The drive motor start/stop counter shall have an operator adjustable input for the number of times to repeat the start/stop cycle
 - (2) If that repeat input is not reached when the drive motor off time timer times out, the drive motor and its run time timer shall be energized to repeat the cycle

- (3) If that repeat input is reached when the drive motor off time timer time out, the drive motor and a press time timer shall be energized and the washing system solenoid-operated valve shall be de-energized (closed)
- f) When the press time timer times out, the drive motor shall be de-energized, the flush system solenoid-operated valve shall be energized (opened) and the flush system run time timer shall be energized
- g) When the flush system run time timer times out, the flush system solenoid-operated valve shall be de-energized (closed) and the entire system shall reset
- d. Control system power indicator light: White
- e. Emergency stop pushbutton
- f. System reset pushbutton
- g. Drive motor run indicating light: Green
- h. General fault indicating light: Red
- i. Overtorque fault indicating light: Red
- j. Motor current monitor
 - 1) Analog or digital ammeter
- k. Hour meter/run time meter
 - 1) Nonresettable
- l. Solid state accumulated screen run time counter with a minimum adjustable range of 0 to 120 minutes at 5 minute increments
- m. Solid state washing system on delay timer with a minimum adjustable range of 0 to 10 seconds at 0.1 second increments
- n. Solid state drive motor run time timer with a minimum adjustable range of 0 to 10 seconds at 0.1 second increments
- o. Solid state drive motor off time timer with a minimum adjustable range of 0 to 10 seconds at 0.1 second increments
- p. Solid state drive motor start/stop cycle counter with a minimum adjustable range of 0 to 10 cycles at whole cycle increments
- q. Solid state press time timer with a minimum adjustable range of 0 to 120 seconds at 5 second increments
- r. Solid state flushing system run time timer with a minimum adjustable range of 0 to 60 seconds at 5 second increments
- s. Overtorque protection device
- t. Run output contact to SCADA system
- u. General fault output contact to SCADA system
- v. Input for associated screen run contact
- w. Input contact for equipment shutdown signal from SCADA system
- 11. Provide circuitry and devices to shutdown the equipment upon the following conditions
 - a. Motor overload/fault
 - b. Control panel emergency stop pushbutton activation
 - c. Local emergency stop pushbutton activation
 - d. Receipt of SCADA system shutdown signal
 - e. Overtorque condition
- 12. General fault indicator light and output contact to SCADA system shall be energized under any and all fault conditions

13. Clearly label all front panel mounted items and devices on the outside front of the panel
14. Clearly label all wires and terminal points inside the control panel
15. All power and control wiring shall be 600 Volt insulated copper and sized for the required load, 14 AWG minimum
16. All circuit breakers shall be thermal magnetic molded case units
17. All selector switches, pushbuttons and pilot lights shall be heavy-duty, water/oil tight, corrosion resistant units rated for NEMA 4X service
18. All terminal blocks shall be pressure connector type with marking strips and covers suitable for copper connectors sized for the application
19. All control relays shall be industrial plug in type rated for the appropriate application load

2.6 SPARE PARTS

- A. Manufacturer to furnish all recommended spare parts
- B. The following spare parts shall be furnished, as a minimum for each washer/compactor
 1. One complete set of all wear bars and fasteners
 2. One brush with all fasteners and hardware

PART 3 – EXECUTION

3.1 FACTORY TESTING

- A. All equipment and components shall be factory tested to ensure satisfactory assembly and operation
- B. Provide certified report of all factory testing activities, observations and findings

3.2 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 01600 for requirements

3.3 INSTALLATION

- A. Inspection
 1. Inspect materials and equipment for signs of damage, pitting, rust, decay or other deleterious effects of storage, transportation, handling, etc.
 - a. Replace or repair any materials or equipment showing such effects to the satisfaction of the Engineer and Owner
 - b. Replace damaged materials or equipment with identical new materials or equipment
- B. Equipment Installation
 1. Handle, install, connect, clean, condition, level, plumb, align and adjust products and equipment in strict accordance with manufacturer's instructions and in

conformity with specification requirements and all OSHA, local, State and Federal codes and regulations

- a. Maintain one complete set of manufacturer's installation instructions at the jobsite during installation and until installation is accepted by the Engineer and Owner
 - b. Perform all work in accordance with manufacturer's instructions
 - 1) Do not omit any preparatory step or installation procedure unless specifically modified or exempted by contract documents
 - 2) Should job conditions or specification requirements conflict with manufacturer's instructions, consult with Engineer prior to proceeding
 - c. Shimming between machined surfaced is not permitted
2. Provide lubricants as recommended by the manufacturer
- a. Provide sufficient quantity to
 - 1) Fill all lubricant reservoirs
 - 2) Replace all lubricant consumed during testing, startup and operation prior to acceptance of equipment by Owner
- C. Take special care to maintain proper alignment of all components
1. Provide minor adjustments to accommodate associated equipment and field conditions
 2. Correct any misalignment, noisy operation or other indications of improper setting
- D. Provide flexible electrical field connections to drive motors conforming to NEC requirements
- E. Paint and Coatings
1. Recoat all shop coated surfaces damaged prior to product acceptance to the satisfaction of the Engineer and Owner
 - a. Use paint and/or coating materials identical to those used by manufacturer for shop priming and painting
 - b. Utilize surface preparation procedures as specified herein or as may be appropriate for repairs needed
- F. Adjustment and Cleaning
1. Perform all required adjustments, tests, operational checks, cleaning and other startup activities required
 2. Remove all grease, dirt, excess paint, etc., from equipment surfaces prior to final acceptance

3.4 FIELD TESTING

- A. Ensure all bearings, gear reducers and other rotating parts are properly lubricated in accordance with the manufacturer's recommendations
- B. Ensure drive system is properly installed and aligned

- C. Ensure all non-potable water connections are complete, tested and leak free
- D. Make all necessary initial alignments and adjustments to put equipment into operation
- E. Operate equipment for 24 hours
- F. Verify operational compatibility with associated screen, shaftless screw conveyor and other equipment
- G. Log drive motor amperages
- H. Perform all other manufacturer's standard battery of tests
- I. Equipment: No indication of binding, unusual loads, unplanned intermittent operation, or other problems

3.5 FIELD QUALITY CONTROL

- A. Provide Manufacturer's Field Service
 - 1. Minimum two trips to project site at one-half (1/2) day each
 - 2. Qualifications of manufacturer's representative
 - a. Authorized representative of the manufacturer
 - b. Experienced in the application, installation, operation and maintenance of the subject work, materials and equipment
 - 3. Services provided by representative
 - a. Provide guidance regarding proper installation
 - b. Supervise installation of equipment furnished under this section
 - c. Inspect, check, adjust and test equipment installed, as required, and approve final installation
 - d. Be present when equipment is placed in operation
 - e. Revisit site as often as required to correct all problems and until equipment installation and operation are acceptable to Engineer and Owner
 - 4. Manufacturer's representative to instruct Owner's personnel in the operation and maintenance of the equipment furnished. Minimum one-half day including classroom and field training. May be combined with startup services
- B. Furnish three (3) copies of written report to Engineer certifying that
 - 1. Equipment is properly installed and lubricated
 - 2. Equipment is in accurate alignment and balance
 - 3. Equipment is free from any undue stress imposed by adjacent equipment, connecting piping, anchor bolts, etc.
 - 4. Equipment has operated satisfactorily under full load conditions and as specified through full operating range

END OF SECTION