

## CONSTRUCTION SPECIFICATIONS, IWT Models CBT x.xKF

### SECTION 1 - GENERAL

#### 1.01 DESCRIPTION

Provide and install the following system components:

- A. Blower and Appurtenances
- B. Control Panel
- C. Effluent Pump
- D. Pretreatment Tank
- E. Wastewater Treatment Plant

#### 1.02 SUBMITTALS

- A. Submit complete shop drawings for the wastewater treatment plant, including arrangement and erection drawings of the equipment and control equipment, schematic control diagrams, electrical connection diagrams, and complete description of the control systems, and equipment operating characteristics.
- B. Submit complete, dimensioned shop drawings including performance curves for blowers and effluent pumps, wiring diagrams and assembly instructions.
- C. Submit five (5) copies of operation and maintenance manuals for blowers, effluent pump, wastewater treatment plant and chlorinator. Manual shall include, but not be limited to, the following: System layout showing piping, valves and controls; wiring and control diagrams with data to explain detailed operation and control of each component, a control sequence describing start-up, operation and shut-down; detailed description of the function of each principal component of the system; procedure for in-line starting; procedure for operating; shut-down instruction; installation instructions; maintenance and overhaul instructions; lubrication schedule including type, grade and temperature range, and frequency; safety precautions, diagrams and illustrations; test procedures; performance data; warranties, and parts list. It is intended that the manual shall be complete in all respects for all equipment, controls, accessories and associated appurtenances provided. Manual shall be securely bound along the left edge.
- D. Submit structural calculations and drawings for fiberglass reinforced plastic (FRP) pretreatment tank and treatment plant vessel, stamped by a Hawaii licensed structural engineer. Stamped drawings and calculations for non-traffic loading conditions shall be submitted, but not limited to the following:

1. Plan View showing dimensions of tank and the size and location of any openings in the tank.
2. Elevation view showing dimensions and thickness of structure and overlays.
3. Guarantee in writing by the tank manufacturer for a period of two (2) years from the date of delivery that tanks are structurally sound and 100% watertight. This warranty shall be furnished at the time of submittal.
4. Each tank shall include an impermeable label stating: serial number, date of manufacture and tank load rating.

### 1.03 QUALITY ASSURANCE

It is the intent of these specifications that a single supplier engaged in the manufacture, assembly and production of the system specified, shall be responsible for the furnishing, coordination, assembly and installation supervision of the wastewater treatment plant, including the blowers, effluent pumps, and controls. It is also intended that such supplier make all adjustments, alterations, replacements, and tests specified and required, for a complete installation in accordance with the Specifications.

## SECTION 2 - PRODUCTS

### 2.01 MATERIALS

#### A. Asbestos Prohibition

No asbestos containing materials or equipment shall be used under this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos free.

#### B. Pretreatment Tank

All fiberglass tanks & appurtenances shall conform to ASTM D 3299, 4097. The pretreatment tank shall be of fiberglass reinforced plastic (FRP) designed for burial at the depth indicated on the drawings. Tank shall be a one-chamber device complete with inlet and outlet stubs, manholes with extension pieces and secured covers and provisions for a vent connection. Fabrication shall conform to the National Bureau of Standards, Product Standard Code: DS15-69. A heavy gel coat shall thoroughly cover all fiberglass fibers and provide a smooth; "non-wicking" finish free from visible defects of any kind. Tank shall be coated in accordance with State Department of Health regulations.

### C. Wastewater Treatment Plant

The wastewater treatment plant shall incorporate continuous feed activated sludge technology, Velocity Reduction and Distribution technology (VRD), with intermittent automatic controlled decanting operation. The wastewater treatment system shall use a single FRP vessel or concrete vessel, having multiple manholes with extension pieces and secured covers, and shall be designed for burial at the depth indicated on the drawings. The activated sludge should be alternately aerated and mixed over a number of pre-determined cycles within this single vessel. Solids and liquid separation shall occur during the air-off phases of the operation cycle. After the settling phase, treated effluent shall be withdrawn from a minimum of six to ten inches below the liquid surface, so as not to collect floatable materials. Systems withdrawing effluent from the surface or from a fixed submerged point shall not be acceptable. Systems that utilize continuous activated sludge technology shall not be acceptable.

The system shall at all times accept influent flows without interruption or diversion. The functions of flow equalization, biological oxidation, nitrification, denitrification, sedimentation, and aerobic sludge stabilization shall all be carried out in this single vessel. Systems which require reactor by-passing during the settle and/ or decant phases; operate over a number of pre-determined cycles but in a sequential mode of operation relying on liquid levels as a primary mode of operation; discharge effluent from any basin on a continuous basis; or utilize an integral or secondary clarifier shall not be acceptable.

Influent shall be continuously and simultaneously received by all basins of the system at all times, regardless of the phase of the operation cycle of the treatment system. Influent shall be treated by an influent gate housing having a bottom portion mounted in the basin to receive the influent. The influent gate housing will have gates mounted within the housing whereby the influent flows over the gates creating a turbulent flow and aeration in the influent to reduce the velocity of the influent. The influent gate bottom mounted in the basin under the gate housing whereby influent exiting the bottom portion of the influent gate housing is directed laterally. Systems that have influent pipes that do not have gates are not acceptable.

The basin shall then enclose a pre-react zone director having a lower portion at least partially enclosing the influent gate housing and defining a main react zone inside the basin, but outside the pre-react zone director. The lower portion of the pre-react zone director is spaced apart from the bottom of the basin and defines a contact zone between the lower portion of the director and the bottom, whereby the pre-react zone director decreases influent flow velocity and directs flow of the influent in a laminar fashion through the contact zone and into the main react zone;

whereby the influent avoids disturbing any settling sludge in the main react zone and forms a supernatant by filtering through the settled sludge during the air-off phases of operation for decant. Systems that do not direct the influent flow into the settled biomass blanket during the air off phases of operation in a low velocity laminar fashion are not acceptable. Systems that incorporate a wall which defines a pre-react zone within the main react zone, and has weirs, or simple openings at the base are not acceptable.

Systems that incorporate rotating biological contactors (RBC), influent diverter valves, or trickle filters are not acceptable.

D. Effluent Pump

*<Insert Effluent Pump Specifications Here>*

E. Blowers and Appurtenances

*<Insert Blowers and Appurtenances Specifications Here>*

F. Control Panel

*<Insert Control Panel Specifications Here>*

## SECTION 3 - EXECUTION

### 3.01 PRETREATMENT AND WASTEWATER TREATMENT PLANT TANKS

Handle and install tanks in accordance with the manufacturer's printed instructions. Place sand cushion to level shown on drawings. Pack gravel bedding securely around the tank. Bring back-fill material up uniformly on each side of tank. Avoid displacing tank during back filling. Place concrete manhole cover pad (if required) in such a manner that the concrete does not bear on the plastic manhole tube.

Conduct a leakage test of pretreatment and wastewater treatment plant tanks by filling tanks to the maximum water level. Test shall be deemed successful if there is no detectable drop in water level after 72 hours. If a drop in water level is detected, contractor shall determine cause of leakage, correct the problem and retest the tank for watertightness based on the same test procedure.

### 3.02 WASTEWATER TREATMENT PLANT

The treatment plant supplier shall be responsible for the furnishing, coordination, assemblage and installation supervision of all components of the wastewater treatment plant, including the effluent pump, blowers, and control panel. Supplier shall conduct a 48-hour operating test after completion of installation,

during which time each control, each alarm and each manual and automatic function shall be actuated at least four (4) times. Contractor shall inform the Engineer a minimum of three (3) working days prior to the commencement of this cooperating test for the Engineer to witness a portion of the operating procedures. During this test period, the supplier shall conduct a training session for personnel to be involved in the operation and maintenance of the system. The test shall be considered completed if, during the 48-hour period, all functions of the system have been successfully conducted to the satisfaction of the Engineer. If any problems arise during the 48-hour period, as judged by the Engineer, the supplier shall correct such problems and conduct another 48-hour test to the satisfaction of the Engineer.