



## **1.0 GENERAL**

- 1.1** The contractor shall furnish and install one factory built Wastewater Treatment System, complete and ready for operation in accordance with the plans and specifications stated herein.
- 1.2** The treatment plant shall be a model prefabricated steel package as manufactured by AEROMIX Systems, Inc., Minneapolis, Minnesota. The wastewater treatment system shall be of the activated sludge type, specifically know as "Complete Mix/ Extended Aeration Activated Sludge ", the system shall be designed for treating a total of gallons per day of 240 mg/l-BOD5; 240mg/l TSS domestic sewage based on composite sewage samples of the average daily flow. No substances shall be introduced in quantities, which are toxic to biological organisms. The plant shall be designed to handle average daily flows fluctuating over the range of 60% to 100% of design flow and peak hourly flow rates not to exceed 200% of design flow, with an effluent quality of 30 mg/lBOD5; 30 mg/l TSS. The complete system shall include all necessary equipment for efficient plant operation.
- 1.3** The system shall be factory assembled, so far as possible, with all piping and controls. All surfaces shall be factory painted.

## **2.0 TANK CONSTRUCTION**

- 2.1** All structural plates associated with the outer and inner vertical tanks walls and all partitions walls shall be carbon steel plate not less than one-fourth inch thick inch ¼” structural grade steel plated; ASTM A-36 minimum thickness joined by arc welding with fillets of adequate section for the joint involved. All walls shall be continuous and watertight and shall be supported by structural reinforcing members where required. Fabrication and erection shall conform to the appropriate requirements of "AISC Specification for Buildings". Connection shall conform to the requirements of the American Welding Society's Code and shall develop the full strength of the member. Aeration tank will have reinforcing members on 6'-0" maximum spacing and H-frame reinforcing will be provided on end walls and partition walls.
- 2.2** All tank piping shall be schedule 40 PVC unless specified otherwise.
- 2.3** The systems shall be transported to the job site in section(s). The contractor shall be responsible for field assembly, including bolting or welding when required.

## **3.0 COATING AND CORROSION CONTROL**

- 3.1** All vessel surfaces to be painted shall be properly prepared in a workmanlike manner to obtain a smooth, clean and dry surface. All rust, dust, and mill scale as well as other extraneous matter shall be removed by means sandblast, interior (immersion) surfaces will receive near white blast cleaning SSPC-SP10. All interior vessel surfaces shall be painted with one (1) coat of Tnemec series 66 High Build Epoxy, 7-11 mils total dry film thickness. All Exterior (non-immersion) vessel surfaces will receive commercial blast cleaning SSPC-SP6, and will be painted with one (1) coat of Tnemec series 66 High Build Epoxy, 7-11 mils total dry film thickness.
- 3.2** Below Grade installation shall require cathodic corrosion protection, and shall be provided using magnesium anodes, weighing seventeen pounds each. These shall be buried by the contractor adjacent to the tank sides and provided with good electrical contact with the tank.



**3.3** The anodes shall come packed in its own low resistant back fill material with the copper lead wire brazed to the core and insulated with coal tar at that point. The anodes shall be attached to the tank vessel with a similar connector. This connection will also be coated with coal tar insulation. The anodes shall be located at least 5 feet from the tank structure and be at least ½ the distance between the grade level and the bottom of the tank.

**3.4** Each of the anodes shall be located equidistant from the other anode. Each anode is to be then doused with 5 gallons of water.

#### **4.0 FOUNDATION**

**4.1** A poured concrete foundation slab shall be constructed and provided by the installing contractor as foundation for the steel tanks, the slab must be level within tolerances of 1/2" per each 10'-0" of width and within 1/4" per each 10'-0" of length. Legacy does not accept any responsibility for anchoring the tank to the slab unless expressed in writing.

#### **5.0 INLET CONNECTION**

**5.1** The influent connection shall be one, \_" diameter 150# standard flange. The inlet shall be located at the flow equalization endwall of the system.

#### **6.0 COMMINUTOR (OPTIONAL)**

**6.1** The comminutor will be a Model P-\_\_-C unit as manufactured by Dynatech Machine, Inc., Florence, Kentucky and will be a motor driven comminuting mechanism that reduces the organic solids in sewage to 1/4" size or smaller. These solids pass through 1/4" slots in the rotating cylindrical sewage screen to the outlet. This comminutor is designed to pass maximum flow of gallons per minute of clear water.

**6.2** The comminutor is machined out of the finest grade cast aluminum and primarily composed of a gear motor, vertical aluminum shell rotating sewage screen cast in #535 alloy with four (4) hardened A2 tool steel cutter teeth, aluminum shell assembly cast in #535 alloy with drive shaft and bearings, a fixed hardened A2 tool steel stationary cutter bar mounted on shell and aluminum inlet flow trough cast in #319 alloy.

**6.3** The rotating cutter teeth and stationary cutter bar are mounted on each web of the screen and the shell assembly so when the entire screen assembly revolves, the teeth on the screen pass through the slots in the stationary cutter, creating a cutting and shearing action between the teeth and stationary bar.

**6.4** The gear drive unit is a right angle gear motor integral type with single reduction worm gearing Class No.3. This unit is designed and applied in complete accordance with applicable practices of the American Gear Manufacturers Association. The worm gear materials comply with all mechanical ratings allowed by the AGMA Rating Standard. The motor size is 1/2 horsepower, for operation on volt, \_\_\_ phase service. All equipment is designed for outdoor service.

**6.5** The flow through the comminutor is such that the influent enters the comminutor trough (a 6" diameter open top type) where it passes through the rotating sewage screen and discharges out of the bottom of the trough. To prevent damage to the rotating sewage screen it will be



required that the rotating sewage screen be located in the center of the sewage trough. Screens located off center will be disapproved.

- 6.6** The control circuitry for this unit is an integral part and includes a solid state current monitor and reversing motor starter to automatically reverse the cutting drum of the comminutor in a jam situation; stop and restart it in forward position. The unit will continue this mode until it either unclogs itself or until the overload relay device in the control panel stops this sequence. The controls are mounted in a NEMA 3R painted steel enclosure.

#### **ENGINEERING DATA:**

<b>6.7</b>	<b>Model No.</b>	P-___-C
<b>6.8</b>	<b>Capacity</b>	0 to ___ gallons per minute
<b>6.9</b>	<b>Voltage Requirements</b>	___ volts
<b>6.10</b>	<b>Phase Requirements</b>	___ Phase
<b>6.11</b>	<b>Service Factor</b>	1.00
<b>6.12</b>	<b>Horsepower Rating</b>	1/2 intermittent, 1/3 continuous duty
<b>6.13</b>	<b>Torque</b>	826 inch/pounds
<b>6.14</b>	<b>Normal Ratio</b>	___:1
<b>6.15</b>	<b>Cutting Teeth</b>	___
<b>6.16</b>	<b>Tooth Width</b>	3/16"
<b>6.17</b>	<b>Shipping Weight</b>	___ pounds

#### **7.0 INLET BAR SCREEN**

- 7.1** A bar screen shall be provided at the influent port, to remove any unusually large solids from the incoming raw sewage. The bar screen shall be fabricated from one-half inch diameter bars spaced one-inch apart and arranged as shown on the drawings. The bars shall be sloped to permit easy cleaning of accumulating debris. A drying deck shall be furnished for drying this debris.

#### **8.0 FLOW EQUALIZATION CHAMBER**

- 8.1** There shall be supplied, an aerated flow equalization chamber to work in conjunction with the secondary treatment system to enable the incoming sewage flow rate to be flow equalized so as to reduce the plant surges. The influent shall enter the flow equalization tank by connection of a 6" diameter 150# flanged pipe connection.
- 8.2** The flow equalization chamber shall be provided as an integral part of the wastewater treatment system. Volume of this chamber shall not be less than gallons. A duplex set of pumps shall be furnished and installed in the chamber for pumping the influent to the flow control box.
- 8.3** The flow proportioning facilities shall be provided at the top inside of the flow equalization chamber at the flow equalization pump discharge to reduce the pumping rate proportional to the system design flow. The chamber shall be equipped with an adjustable flat weir so that the excess pump surges shall overflow this chamber directly to the flow equalization tank. The corrected pumping flow shall pass over the "V" notch weir into the aeration chamber.
- 8.4** A duplex set of flow equalization pumps shall be provided within the flow equalization chamber and attached by piping and valving to the flow-proportioning chamber. The pumps shall be



of the 2" solids handling submersible type; Model as manufactured by. Each pump shall be furnished with a slide rail system for ease of removal from the flow equalization chamber. The slide rail system shall be complete with rail base and upper guide assembly. The pump motor shall be HP for operation on Volt, Phase, Hz. service. The capacity of the flow equalization pumps shall be GPM at a TDH.

**8.5** A duplex set of flow equalization pumps shall be provided within the flow equalization chamber and attached by piping and valving to the flow-proportioning chamber. The pumps shall be of the grinder submersible type; Model 6840 as manufactured by Zoeller. Each pump shall be furnished with a slide rail system for ease of removal from the flow equalization chamber. The slide rail system shall be complete with rail base and upper guide assembly. The pump motor shall be 2 HP for operation on 240 Volt, 1 Phase, 60 Hz. service. The capacity of the flow equalization pumps shall be GPM at a \_\_\_\_\_' TDH.

**8.6** The grinder pumps cutter mechanism and impeller will be automatically reversible should the pump become obstructed, while discharging 100% of the pumps rated flow (\_ GPM) running in either direction.

**9.0 FLOW EQUALIZATION AIR SUPPLY BLOWER MOTOR UNIT**

**9.1** For supplying the air requirement of the flow equalization chamber, blower motor units shall be furnished and installed at the location shown on the drawings. The units shall be completely factory built and tested before shipping to the project site. The blower shall be of the two-lobe involute type design complete with the accessories described below.

**9.2** The blower motor unit, Model \_\_\_\_\_, shall be furnished for supplying the air requirements of the flow equalization chamber.

**9.3** The unit shall be capable of delivering \_\_\_\_\_ CFM when operating at 4 PSI. The blower shall be manufactured by Roots Division of Dresser Industries, Inc., Connersville, Indiana; or Sutorbilt Blower, Gardner-Denver, Peachtree City, Georgia; or approved equal. The model number of the blower shall be Sutorbilt size \_\_\_\_\_ Legend series.

**9.4** Impeller case shall be strongly ribbed to prevent distortion when operating at rated pressure.

**9.5** The unit shall be equipped with 4 heavy-duty anti-friction bearings. Impellers shall be close grain cast-iron. Impellers shall be machined on all exterior surfaces. Impellers shall be dynamically balanced. One piece machined steel shafts shall pass completely through the impellers for proper support.

**9.6** The unit shall have 2 timing gears accurately machined to position the impellers in the impeller housing. Gears shall be enclosed in an oil tight housing and shall be lubricated by a splash oiling system from oil maintained in the gear housing. Gear end bearings shall be splash lubricated from the same reservoir. Drive end bearings shall be grease lubricated through grease fittings located in each bearing housing. Grease vents shall be located in the bearing housing to prevent rupture of grease seals from over greasing.

**9.7** Air vents shall be located between the seals and the impeller chamber to relieve excessive pressure on the seals.

**9.8** The motor shall be \_\_\_\_\_ HP for operation on \_\_\_\_\_ Volt, \_\_\_\_\_ Phase, 60 Cycle Service, 1750



RPM. It shall be of the open drip proof type.

- 9.9** The blower shall be mounted on a fiberglass base. The base structure shall be adequately reinforced to support the blower and motor unit.
- 9.10** For easy adjustment of the "V" belt drive connection between the blower and motor, the motor will be furnished with an adjustable motor mounting base.
- 9.11** The blower shall be fitted with a dry type wire mesh filter-silencer at the air intake. Furthermore, the blower discharge shall be fitted with a check valve when required, and a flexible rubber discharge coupling.
- 9.12** Each blower and motor shall be enclosed within a fiberglass weatherproof enclosure. The fiberglass hood is designed for easy access to service the unit. It shall be equipped with a latching handle.
- 9.13** To help reduce blower vibration and noise, the blower motor enclosure shall be mounted on vibration dampeners. For purposes of determining the blower performance, and/or diffuser condition, a pressure relief valve and pressure gauge shall be mounted in the air manifold.
- 9.14** (Optional) Belt Guard for the "V" belt drive unit shall be supplied attached to the blower-mounting base. The belt guard shall be designed for easy access to the sheaves of both the motor and blower. The belt guard shall be fabricated of metal and shall be painted OSHA yellow.
- 9.15** (Optional) An inlet silencer shall be installed on the inlet end of the blower. The silencer shall be a model as manufactured by Universal Silencer.
- 9.16** (Optional) A discharge muffler shall be installed on the discharge end of the blower. The muffler shall be a model \_\_\_\_\_ as manufactured by Universal Silencer, Stoughton, Wisconsin; or approved equal.

**10.0 FLOW EQUALIZATION AIR SUPPLY REGENERATIVE BLOWER MOTOR UNIT (OPTIONAL)**

- 10.1** For supplying the air requirement of the flow equalization chamber, \_\_\_\_\_ integral regenerative blowers with motor mounted directly onto the blower housing as one unit and as manufactured by Rietschle-Thomas or equal. Rotary, PD, positive displacement, lobe-style or multi-stage centrifugal blowers are unacceptable. The blower motor unit shall be furnished and installed at the location shown on the drawings. The unit shall be completely factory built and tested before shipping to the project site.
- 10.2** The unit shall be capable of delivering \_\_\_\_\_ scfm when operating at 5.23 psig. The blower shall be manufactured by Rietschle-Thomas; or approved equal. The model number of the blower shall be a \_\_\_\_\_.
- 10.3** Regenerative blowers are to provide oil-free, odor-free, non-pulsating air pressure and operate at a design rating not to exceed 90% of the aeration system normal operating conditions.
- 10.4** The blower shall be of aluminum construction, including cast aluminum, dynamically balanced impeller, directly mounted to the motor shaft. The impeller shall be straddle mounted and include



- a bearing support on both sides of the impeller. Overhung impeller designs are unacceptable.
- 10.5** The blower motor shall be direct connected to the blower impeller and rated for a 40 Deg F ambient, TEFC (IP54) enclosure, 1.15 SF, Class H insulation and rated for service on the specified plant voltage supply.
- 10.6** The motor shall be \_\_\_\_\_ HP for operation on \_\_\_\_\_ Volt, \_\_\_\_\_ Phase, 60 Cycle Service.
- 10.7** The blower and motor noise level shall not exceed OSHA's maximum exposure level for an eight (8) hour day level of 85 db (A) at one (1) meter distance.
- 10.8** The blower bearings shall be rated for a minimum of 25,000 hours, average life.
- 10.9** An inlet filter shall be installed with the blower. The filter shall be of heavy duty steel construction, with a polyester filter media rated 5 micron at 99.5% efficiency.
- 10.10** A filter restriction gauge shall be mounted on the filter to indicate the condition of the filter media.
- 10.11** A pressure relief valve shall be installed and shall be of brass construction, field adjustable and set to release at a maximum of 90% of the blower and motor maximum rating.
- 10.12** A check valve of the split flapper design shall be installed, with an aluminum body, EPDM seals, suitable for continuous duty up to 300 Deg F. Manufacturer shall be US Valve or equal.
- 11.0 FLOW EQUALIZATION ELECTRICAL CONTROL CONSOLE**
- 11.1** An electrical control panel shall be installed within a NEMA \_\_\_\_\_ weatherproof enclosure with a locking hasp. The control console shall be provided for mounting as indicated on the plans. Any exterior mounting hardware shall be stainless steel or other corrosion resistant material.
- 11.2** The control console shall be a model \_\_\_\_\_ and shall be completely factory assembled and tested prior to shipment. The control console shall be furnished with all necessary controls for each pump and blower motor unit and associated plant equipment. Control voltage shall be 120 VAC, 1 Phase.
- 11.3** Controls shall be mounted to a removable sub-panel within the enclosure and shall be wired and spaced in accordance with the latest National Electrical Code. The control console shall be supplied with a properly sized magnetic-circuit breaker to act as the main disconnects for the control console. Magnetic starters with overload protection shall be supplied for all blower motor units. An electrical alternator shall be furnished to alternate the operation of each pump. The alternator shall be provided with a manual selector switch to allow manual selection of the lead pump if desired.
- 11.4** All wiring conductors within the control console shall be U.L. type THHN, stranded #14 AWG minimum, rated at 600 volts. Control wiring shall be numbered on each end.
- 11.5** Control panel and the electrical power service shall be furnished and installed by the purchaser. Wiring and conduit between the control panel and plant equipment shall be furnished by the manufacturer of the wastewater treatment plant. The panel may be detached for shipping. The main power supply shall be \_\_\_\_\_ Volt, \_\_\_\_\_ Phase, 60 Cycle. The control voltage shall be 120



Volt, 1 Phase.

- 11.6** Pump controls shall be of the direct acting mercury float type for complete automatic operation as follows:
- 11.7** Turns off both pumps and activates the electrical alternator for the next cycle 11.8 Energizes the lead pump on.
- 11.9** Turns flow equalization blower on & off.
- 11.10** Activates the lag pump on.
- 11.11** Activates the high level alarm.
- 11.12** The mercury switch consists of a steel tube that houses mercury and contacts. Contact is through mercury to mercury. No mechanical contacts.
- 11.13** The power cord will consist of a type SJOW-A cord rated for 300 maximum capacity.
- 11.14** The mercury tube switch and cord are sealed in a vinyl ball with leak proof polyurethane resin.
- 12.0 ANOXIC CHAMBER**
- 12.1** There shall be supplied an anoxic zone to denitrify the wastewater. The tank shall be \_\_\_\_\_ gallons, and have a continuous duty mixer mounted within. Wastewater shall be introduced into the tank from the flow control box outlet trough, from the return activated sludge from the clarifiers, and from a recycle pump located in the aeration tank.
- 12.2** The anoxic zone shall feed the aeration tank by means of an adjustable flat weir, to maintain the same weir setting as that of the clarifier outlet trough.
- 12.3** The mixer shall be rigidly mounted at a 20 angle near the center of the tank. It shall have a diameter stainless steel shaft, powered by a \_\_\_\_\_ hp, \_\_\_\_\_ volt, 60 Hz, phase TEFC motor. The mixer shall operate continuously, and be controlled from the blower control panel.
- 12.4** The recycle pump shall be mounted in the aeration tank. The pump shall be capable of returning between 200% and 400% of the system design flow back to the anoxic zone. It shall be hard piped with diversion valving back into the aeration tank to allow adjustment of the return from above the tank. The discharge of the recycle pump's piping shall be below the normal water level in the anoxic zone to reduce splashing and turbulence. The pump shall be a \_\_\_\_\_ model submersible pump designed for continuous operation, powered by a \_\_\_\_\_ hp, \_\_\_\_\_ volt, 60 Hz, phase motor, capable of pumping \_\_\_\_\_ gpm at \_\_\_\_\_' TDH. The pump shall operate continuously, and be powered from the blower control panel.
- 13.0 AEROBIC DIGESTER / SLUDGE HOLDING CHAMBER**
- 13.1** An aerated aerobic digester chamber shall be provided as specified and shown on the plans. It shall be designed to hold a minimum of \_\_\_\_\_ gallons of sludge.
- 13.2** The digester chamber shall be constructed as an integral part of the wastewater treatment system



and fabricated out of one-fourth inch steel plate. The chamber shall have the same protective coating as specified for the treatment plant. It shall also have the same structural requirements as the wastewater treatment plant.

- 13.3** The chamber shall be of the aerated type with Diffusers placed longitudinally along one side of the chamber so as to, in conjunction with the flow control baffles, enhance the spiral rotation of the chamber contents to maintain solids suspension. All piping and valves within the chamber shall be factory installed.
- 13.4** Diffused air shall be supplied by the main treatment plant blower of sufficient size to provide a minimum of 2100 cubic feet of air per pound of B.O.D. (5-day, 20°C) applied and an airflow of two CFM (minimum) spaced evenly the entire length of the aeration tank. The diffuser spacing and air velocity shall assure that adequate mixing velocities are maintained within the aeration tank to prevent dead spots and maintain cleansing velocities. The diffusers shall be parallel to the fillet and at an elevation which provides optimum diffusion and mixing of the tank contents. The diffuser assembly shall be easily removable from the tank and shall be equipped with an air regulating valve to permit either adjustment of the air flow or complete shut off. The oxygen transfer capacity of each diffuser shall be such that an adequate supply of oxygen will be maintained in the aeration chamber to meet treatment requirements of the design sewage load.
- 13.5** The diffusers will be a Model CYCLONE™ as manufactured by AEROMIX Systems, Inc., Minneapolis, Minnesota. The diffusers will be manufactured to produce a double shear when air is released. The air is sheared as it discharges the air orifice of the air diffuser body and again as it crosses over the diaphragm baffle. The air check diaphragm located on top of the diffuser is molded directly to the diffuser body, preventing the cap from blowing off when excess CFM is delivered to the diffuser. The diffuser will be supplied with standard male pipe thread connections.
- 13.6** An airlift pump with vertically adjustable intake and air control valve shall be provided for the purpose of decanting supernatant from the aerobic digester. The airlift piping shall be schedule 40 painted steel piping, and neoprene bands shall isolate the piping from all steel surfaces. The pipe shall pivot on a swivel joint. The intake elevation adjustment shall allow the water level in the digester to be lowered a minimum of 48 inches.
- 13.7** The digester chamber shall be set on the same concrete foundation pad as the wastewater treatment plant and set at the location as shown on the plans.

#### **14.0 AERATION CHAMBER**

- 14.1** There shall be supplied, an aeration chamber to work in conjunction with the clarifier chamber. The aeration chamber shall conform to the following specifications:
- 14.2** The aeration chamber shall be of sufficient capacity to provide a minimum of \_\_\_\_ hours retention of the average daily flow, and/or a minimum chamber volume of \_\_\_\_ gallons. The vessel shall be so shaped on each side to prevent sludge accumulation, to enhance rotation of the vessel contents, and to prevent scum and froth accumulation. To insure maximum retention and eliminate short circuiting of raw sewage particles, the aeration chamber shall be constructed with air diffusers, placed longitudinally along one side of the chamber so as to, in conjunction with the flow control baffles, enhance the spiral rotation of the chamber contents. To ensure adequate circulation velocity, the proportion of the chamber width to depth, in the direction



of rotation, shall not exceed 1.33 to 1. The velocity of rotation shall be sufficient to scour the bottom and prevent sludge filleting as well as to prevent the escape to the surface of minuscule air diffusion bubbles and by so causing their entrapment to provide maximum oxygenation efficiency.

- 14.3** An air distribution manifold shall be installed longitudinally on one side of the tank with diffuser drop assemblies connected thereto.
- 14.4** Each diffuser drop assembly shall be equipped with an air regulating and/or shutoff valve, a disconnecting union and a diffuser bar with non-clog air diffuser nozzles mounted thereon. The airflow per diffuser shall range from 1 to 30 SCFM. This minimum air velocity shall be maintained to insure sufficient velocity for self-cleaning. The diffusers shall be parallel to and near the base of the vessel sidewall and at an elevation, which will provide the optimum diffusion and mixing of the vessel contents. The oxygen transfer capacity of each diffuser shall be such that an adequate supply of oxygen will be maintained in the aeration chamber to meet treatment requirements of the design sewage load.
- 14.5** The diffusers will be a Model CYCLONE™ as manufactured by AEROMIX Systems, Inc., Minneapolis, Minnesota. The diffusers will be manufactured to produce a double shear when air is released. The air is sheared as it discharges the air orifice of the air diffuser body and again as it crosses over the diaphragm baffle. The air check diaphragm located on top of the diffuser is molded directly to the diffuser body, preventing the cap from blowing off when excess CFM is delivered to the diffuser. The diffuser will be supplied with standard male pipe thread connections.

## **15.0 CLARIFIER CHAMBER**

- 15.1** There shall be furnished a clarifier chamber to work in conjunction with the aeration chamber of that system. The clarifier shall conform to the following specifications:
- 15.2** The clarifier chamber shall be of such size as to provide a minimum of four (4) hours retention, based upon the same design flow rate governing the aeration chamber, and shall have proper baffling to prevent short circuiting and to provide maximum uniform retention. The clarifier inlet shall be baffled to prevent short-circuiting and provide maximum uniform solids settling area. The bottom of the chamber shall be formed into an inverted pyramidal hopper or hoppers. The flat bottom area of each hopper shall not exceed one square foot. The slope of the hopper walls shall not be less than 1.7 vertical to 1.0 horizontal. Settled sludge shall be returned from the clarifier sludge hopper to the aeration chamber by the positive sludge return system, consisting of an airlift pump. The clarifier effluent shall pass over the edge of the baffled adjustable effluent weir into the effluent trough and then out of the chamber. The weir plate will be constructed of 1/8" galvanized steel and will be gasketed with 1/4" neoprene.

## **16.0 SLUDGE RECIRCULATION SYSTEM**

- 16.1** There shall be installed within the clarifier chamber, a positive sludge recirculation system, consisting of \_\_\_\_\_, \_\_\_\_\_ diameter airlift sludge return assembly, meeting the following specifications: The airlift pump system shall have the recirculation capacity ranging from 0% to 150% of the design flow. The airline supplying air to the pump shall be equipped with a needle valve varying the capacity of the pump. The airlift pump shall be firmly supported and shall be equipped with a clean-out plug to allow for easy cleaning and maintenance.

## **17.0 SCUM RECIRCULATION SYSTEM**

**17.1** There shall be installed within the clarifier chamber a positive scum and skimming recirculation system consisting of \_\_\_\_\_, \_\_\_\_\_ diameter airlift skimming device(s) meeting the following specifications: The skimming device shall be of the positive airlift pump type, located in a position to skim and return floating material to the aeration chamber. The airline supplying air to the skimming device shall be equipped with a needle valve to regulate the rate of return.

**17.2** The scum intake shall be equipped with an adjustable assembly, which will enable exact positioning of the skimmer at water level without placing a hand under the water.

## **18.0 CIRCULAR MECHANICAL CLARIFIER (OPTIONAL)**

**18.1** There shall be furnished and erected mechanical clarifier complete with all components, equipment and appurtenances that are necessary to accomplish sedimentation as required by these specifications. The clarifier shall be of the bridge supported, center feed, peripheral overflow type, with a center drive mechanism which shall support and rotate a drive shaft with two rake arms attached. All submerged steel shall have a minimum thickness of 1/4" except for the influent feed pipe. The drive mechanism shall be of sufficient structural and mechanical strength to sweep in 2" of grout on the tank bottom. Scraper blades or flights shall be bolted to the scraper arms and arranged to move settled sludge to a sludge well near the center of the tank floor. The speed of the mechanism shall be five to ten feet per minute at the periphery. All required anchor bolts shall be supplied by the manufacturer.

## **19.0 SUPPORT BRIDGE**

**19.1** The drive unit support and bridge shall consist of two beams spanning the top of the tank including cross-supporting members, handrails, and grating walkway. The 1-1/2" handrails shall be anchored to the structural beams.

## **20.0 INLET CONNECTION**

**20.1** The \_\_\_ inch diameter clarifier loading pipe shall be installed from a point near the bottom of the loading well in the center of the clarifier. It shall be designed to minimize deposition of solids and slow down the flow to improve settlements of solids.

## **21.0 INLET STILLING WELL**

**21.1** An influent well of \_\_\_ feet in diameter by 3'-0" feet depth shall be provided to cut down the influent velocity and prevent short circuiting. The stilling well shall be a rotating type supported off the torque tube.

**21.2** The inlet stilling well shall be fabricated of 1/4" steel plate and painted the same as the main vessel.

## **22.0 SLUDGE SCRAPER ASSEMBLY (RAKE ARMS)**

**22.1** The sludge scraper assembly shall consist of two scraping arms fabricated of steel angles and a \_\_\_\_\_" diameter torque tube.



- 22.2** The scraper arm assembly shall be adjusted vertically and horizontally by means of threaded rods attached to the torque tube.
- 22.3** Each scraper arm shall be fabricated from steel angle and have a neoprene squeegee blade attached to each angle to allow for sufficient movement of sludge into the center sludge collector pit.
- 22.4** The bottom of the clarifier shall be grouted concrete which conforms to the dimensions shown on the manufacturer's plans. Design and installation of the concrete shall be the responsibility of the installing contractor. All concrete and reinforcing steel shall also be furnished by the field contractor.
- 22.5** There shall be installed within the clarifier chamber, a positive sludge recirculation system, consisting of \_\_\_\_\_, \_\_\_\_\_ diameter airlift sludge return assembly, meeting the following specifications: The airlift pump system shall have the recirculation capacity ranging from 0% to 150% of the design flow. The airline supplying air to the pump shall be equipped with a needle valve varying the capacity of the pump. The airlift pump shall be firmly supported and shall be equipped with a clean-out plug to allow for easy cleaning and maintenance.

### **23.0 SURFACE SKIMMER ARM AND SCUM TROUGH**

- 23.1** A surface skimmer consisting of a steel angle with neoprene blade attached shall be provided to move the surface scum to the scum trough.
- 23.2** The surface skimmer shall be attached to the torque and shall rotate with the sludge scraper assembly.
- 23.3** A scum trough shall be fabricated of 1/4" steel plate and shall be provided to collect the scum from the surface skimmer and remove the scum by means of a \_\_\_\_\_" diameter scum discharge pipe.
- 23.4** There shall be installed within the clarifier chamber a positive scum and skimming recirculation system consisting of \_\_\_\_\_, \_\_\_\_\_ diameter airlift skimming device (s) meeting the following specifications: The skimming device shall be of the positive airlift pump type, located in a position to skim and return floating material to the aeration chamber. The airline supplying air to the skimming device shall be equipped with a needle valve to regulate the rate of return.

### **24.0 EFFLUENT WEIR ASSEMBLY**

- 24.1** AEROMIX Systems, Inc., shall furnish a steel weir trough with serrated weir plates fabricated from 10 gauge galvanized steel plate allowing up to an including 2 inches of adjustment. The weir trough shall be firmly fastened to the clarifier wall.

### **25.0 DRIVE UNIT**

- 25.1** **Product:** Gear reducers or gear motors supplied shall be of such design that helical gears shall be the standard acceptable unit. Other types of gear reduction systems are acceptable provided the losses are not greater than helical gearing, which provides 98.5% efficiency up to a 200:1 gear ratio. Worm gearing, bevel gearing, and spur gearing are acceptable provided efficiencies are

equal to helical gearing at the same gear ratios.

**25.2** Gear motors are preferred and are to be manufactured by the same company and provided as an integral unit completely assembled. If c-face type of reducers and motors are supplied, they are to be connected with an external three-piece flexible coupling. Hollow shafts or quill design input shafts are not acceptable. All materials is to be of the highest quality and shall meet the intended use as described within the complete project specifications, and meet or exceed current NEMA, AGMA, and IEEE standards for material, capacity ratings, and testing procedures.

**25.3 Electrical Specifications:**

**25.4** The motors shall be squirrel cage design, NEMA design B or C, TEFC enclosures, Class F insulation 1.15 service factor suitable for 3/60/230/460 (200 or 575) operation, continuous duty. The motors shall be protected with the manufacturer's standard treatment for corrosive/moist environments and to include (a) weep holes in end brackets and conduit box for condensate drainage (b) stator bore, rotor o.d., and all interior metal surfaces are to be coated with polyurethane (c) stainless steel nameplates and attachment screw pins (d) plastic non-corrosive fan (e) cadmium plated fan cover.

**25.5 Mechanical Specifications (Gear Reducer):**

**25.6** The gear unit shall be manufactured of cast iron equal to SAE Grade #27 for rigid support and high strength. The gear material shall be SAE 4140 drop forged steel and carbonized to a 58-62 Rc hardness with a finishing grinding to meet AGMA Quality Class 10 finish for low noise, minimum backlash, and maximum efficiency. The primary gear stage shall have a 30° helix angle for low noise operation. The interior of the reducer shall be painted with a non-corrosive material for protection from oil contaminates. Twin lipped oil seals shall be provided on input and output shafts to prevent oil leakage, with one lip spring loaded to assure contact. Maximum ambient is 40° c.

**25.7** Gears are to be pressed fit and secured with keys and snap rings or shaft steps. Shrink fit gears are not acceptable. The gear reducer or gear motors shall be suitable to be mounted in any position regardless of initial mounting position without adding special parts or modifications. The unit shall utilize either roller or ball bearings as manufactured and rated in according to current AFBMA standards and with a minimum of 125,000 hours. Bearings can be either splash or grease lubricated. Lubricating as with an oil pump are not acceptable. The thermal capacity of the reducer at rated load conditions shall exceed the mechanical capacity with relying upon auxiliary means for reducer. All reducers shall be supplied with an initial oil fill for the specified mounting position.

**25.8 Service Factor:**

**25.9** All process drives shall be selected on the basis of AGMA application tables, reference AGMA 420.04 December, 1975 but with a minimum of class II or 1.41 service factor for drives operating 10 hours per day, AGMA Class III or 2.0 service factor shall be the minimum acceptable. The service factor or gear class shall be stamped on the nameplate and be based upon motor horsepower.

**25.10 Torque Limiter:**



- 25.11** Torque limiting device is to be factory set to specified torque limits for alarm and shutdown. The drive and torque unit will be designed and set for a torque of \_\_\_\_\_ inch pounds at the torque shaft, a torque of \_\_\_\_\_ inch pounds for alarm torque, and a torque of \_\_\_\_\_ inch pounds for motor cut-off. The torque control unit includes contacts for remote hook-up of an alarm light or bell for indication of an overload condition if one occurs.
- 25.12** System components for torque indication, shutdown and alarms shall operate from reactive mechanical torque. Devices which read motor load are not acceptable.
- 25.13** Torque indication is to be simple mechanical device, suitable for ambient conditions. Dial indicators, meters, etc. are not acceptable.
- 25.14** Torque limiter must be able to operate bi-directionally as required.
- 25.15** The torque limiting system must be intrinsically safe (if specified) for environments where UL (or other specified body) requirements for “Explosion Proof” are necessary.
- 25.16** Torque monitoring or limiting shall be obtained from the reactive torque and motions on a freely rotating gear housing which will vary in direct proportion to the applied load torque. The reactive motion shall be restrained by an external torque arm with compression springs. Accuracy of the torque limiting system shall be +10% of the set points.
- 25.17** The torque limiting system shall be completely external to the gear reducers. Gear housings and internal parts shall be manufacture’s standard and readily available. To ensure proper performance, sizing, selections, and warranty responsibility, the torque limiting components shall be supplied and mounted by the manufacturer of the reducer.

## **26.0 AERATION AIR SUPPLY BLOWER MOTOR UNITS**

- 26.1** For supplying the air requirement of the main treatment process, \_\_\_\_\_ blower motor units shall be furnished and installed at the location shown on the drawings. The units shall be completely factory built and tested before shipping to the project site. The blower shall be of the two-lobe involute type design complete with the accessories described below.
- 26.2** The blower motor unit, Model \_\_\_\_\_, shall be furnished for supplying the air requirements of the aeration chamber.
- 26.3** The unit shall be capable of delivering \_\_\_\_\_ CFM when operating at 5.23 PSI. The blower shall be manufactured by Roots Division of Dresser Industries, Inc., Connersville, Indiana; or Sutorbilt Blower, Gardner-Denver, Peachtree City, Georgia; or approved equal. The model number of the blower shall be Sutorbilt size \_\_\_\_\_ Legend series.
- 26.4** Impeller case shall be strongly ribbed to prevent distortion when operating at rated pressure.
- 26.5** The unit shall be equipped with 4 heavy-duty anti-friction bearings. Impellers shall be close grain cast-iron. Impellers shall be machined on all exterior surfaces. Impellers shall be dynamically balanced. One piece machined steel shafts shall pass completely through the impellers for proper support.
- 26.6** The unit shall have 2 timing gears accurately machined to position the impellers in the impeller



housing. Gears shall be enclosed in an oil tight housing and shall be lubricated by a splash oiling system from oil maintained in the gear housing. Gear end bearings shall be splash lubricated from the same reservoir. Drive end bearings shall be grease lubricated through grease fittings located in each bearing housing. Grease vents shall be located in the bearing housing to prevent rupture of grease seals from over greasing.

- 26.7** Air vents shall be located between the seals and the impeller chamber to relieve excessive pressure on the seals.
- 26.8** The motor shall be \_\_\_\_\_ HP for operation on \_\_\_\_\_ Volt, \_\_\_\_\_ Phase, 60 Cycle Service, 1750 RPM. It shall be of the open drip proof type.
- 26.9** The blower shall be mounted on a fiberglass base. The base structure shall be adequately reinforced to support the blower and motor unit.
- 26.10** For easy adjustment of the "V" belt drive connection between the blower and motor, the motor will be furnished with an adjustable motor mounting base.
- 26.11** The blower shall be fitted with a dry type wire mesh filter-silencer at the air intake. Furthermore, the blower discharge shall be fitted with a check valve when required, and a flexible rubber discharge coupling.
- 26.12** Each blower and motor shall be enclosed within a fiberglass weatherproof enclosure. The fiberglass hood is designed for easy access to service the unit. It shall be equipped with a latching handle.
- 26.13** To help reduce blower vibration and noise, the blower motor enclosure shall be mounted on vibration dampeners. For purposes of determining the blower performance, and/or diffuser condition, a pressure relief valve and pressure gauge shall be mounted in the air manifold.
- 26.14** (Optional) Belt Guard for the "V" belt drive unit shall be supplied attached to the blower-mounting base. The belt guard shall be designed for easy access to the sheaves of both the motor and blower. The belt guard shall be fabricated of metal and shall be painted OSHA yellow.
- 26.15** (Optional) An inlet silencer shall be installed on the inlet end of the blower. The silencer shall be a model \_\_\_\_\_ as manufactured by Universal Silencer.
- 26.16** (Optional) A discharge muffler shall be installed on the discharge end of the blower. The muffler shall be a model \_\_\_\_\_ as manufactured by Universal Silencer, Stoughton, Wisconsin; or approved equal.
- 27.0** **AERATION AIR SUPPLY REGENERATIVE BLOWER MOTOR UNIT (OPTIONAL)**
- 27.1** For supplying the air requirement of the flow equalization chamber, \_\_\_\_\_ integral regenerative blowers with motor mounted directly onto the blower housing as one unit and as manufactured by Rietschle-Thomas or equal. Rotary, PD, positive displacement, lobe-style or multi-stage centrifugal blowers are unacceptable. The blower motor unit shall be furnished and installed at the location shown on the drawings. The unit shall be completely factory built and tested before shipping to the project site.



- 27.2** The unit shall be capable of delivering \_\_\_\_\_ scfm when operating at 5.23 psig. The blower shall be manufactured by Rietschle-Thomas; or approved equal. The model number of the blower shall be a \_\_\_\_\_.
- 27.3** Regenerative blowers are to provide oil-free, odor-free, non-pulsating air pressure and operate at a design rating not to exceed 90% of the aeration system normal operating conditions.
- 27.4** The blower shall be of aluminum construction, including cast aluminum, dynamically balanced impeller, directly mounted to the motor shaft. The impeller shall be straddle mounted and include a bearing support on both sides of the impeller. Overhung impeller designs are unacceptable.
- 27.5** The blower motor shall be direct connected to the blower impeller and rated for a 40 Deg F ambient, TEFC (IP54) enclosure, 1.15 SF, Class H insulation and rated for service on the specified plant voltage supply.
- 27.6** The motor shall be \_\_\_\_\_ HP for operation on \_\_\_\_\_ Volt, \_\_\_\_\_Phase, 60 Cycle Service.
- 27.7** The blower and motor noise level shall not exceed OSHA's maximum exposure level for an eight (8) hour day level of 85 db (A) at one (1) meter distance.
- 27.8** The blower bearings shall be rated for a minimum of 25,000 hours, average life.
- 27.9** An inlet filter shall be installed with the blower. The filter shall be of heavy duty steel construction, with a polyester filter media rated 5 micron at 99.5% efficiency.
- 27.10** A filter restriction gauge shall be mounted on the filter to indicate the condition of the filter media.
- 27.11** A pressure relief valve shall be installed and shall be of brass construction, field adjustable and set to release at a maximum of 90% of the blower and motor maximum rating.
- 27.12** A check valve of the split flapper design shall be installed, with an aluminum body, EPDM seals, suitable for continuous duty up to 300 Deg F. Manufacturer shall be US Valve or equal.
- 28.0 AERATION ELECTRICAL CONTROL CONSOLE**
- 28.1** An electrical control panel shall be installed within a NEMA \_\_\_\_\_ weatherproof enclosure with a locking hasp. The control console shall be provided for mounting as indicated on the plans. Any exterior mounting hardware shall be stainless steel or other corrosion resistant material.
- 28.2** The control console shall be a Model \_\_\_\_\_ and shall be completely factory assembled and tested prior to shipment. The control console shall be furnished with all necessary controls for each blower motor unit and associated plant equipment. Control voltage shall be 120 VAC, 1 Phase.
- 28.3** Controls shall be mounted to a removable sub-panel within the enclosure and shall be wired and spaced in accordance with the latest National Electrical Code. The control console shall be supplied with a properly sized magnetic-circuit breaker to act as the main disconnects for the control console. Magnetic starters with overload protection shall be supplied for all blower motor units. To vary the air supply, a program timer shall be supplied. An electrical alternator shall be furnished to alternate the operation of each blower motor unit. An electrical alternator shall be provided with a manual selector



switch to allow manual selection of the lead blower if desired.

- 28.4** The 24-hour, 7-day time clock shall be capable of being programmed to control the blower run cycle and to adjust both the start set point and the blower run time. The clock shall also include a skip-a-day feature which will allow a separate program for weekends (when required). The clock shall be by Tork, Model #8000 series.
- 28.5** All wiring conductors within the control console shall be U.L. type THHN, stranded #14 AWG minimum, rated at 600 volts. Control wiring shall be numbered on each end.
- 28.6** All wire and conduit required between the control panel and the electrical power service should be furnished and installed by the purchaser. Wiring and conduit between the control panel and plant equipment shall be furnished by the manufacturer of the wastewater treatment plant. The panel may be detached for shipping. The main power supply shall be \_\_\_\_ Volt, \_\_\_\_ Phase, 60 Cycle. The control voltage shall be 120 Volt, 1 Phase.

## **29.0 FROTH CONTROL SYSTEM (OPTIONAL)**

- 29.1** There shall be installed within the wastewater treatment system all necessary equipment for controlling the froth in the aeration chamber. This shall include the froth pump, spray nozzles, piping, water manifold and all other necessary auxiliary equipment. The froth pump shall be a horsepower, \_\_\_\_ Volt, \_\_\_\_ Phase, rated at \_\_\_\_GPM at \_\_\_\_TDH. The pump shall operate submerged with a positive suction head. It shall be installed in one corner of the clarifier chamber near the inlet, at least two (2) inches below water level. A screen of sufficient size will be located around the pump. Sufficient self-cleaning spray nozzles shall be attached to the water manifold to insure a uniform continuous sharp flat spray along the entire length of the aeration chamber, opposite the air diffusers.
- 29.2** The spray nozzles shall be that which will open automatically for self-cleaning with each pump start-up surge and then close. The spray nozzle will produce a flat spray pattern 60" wide at a distance of 18". Contaminated liquids may be used; simply lifting the cap will purge the nozzle of any blockage. The nozzle is constructed of a non-corrosive material with a 1/2" male threaded connection.
- 29.3** The froth pump piping shall have the provisions for connection of a garden hose for wash-down purposes.

## **30.0 DISINFECTION CHAMBER**

- 30.1** A baffle type disinfection chamber shall be provided, constructed as an integral part of the wastewater treatment system. The chamber shall be installed immediately following the clarifier. The chamber shall be sized for a capacity of \_\_\_\_ gallons. Baffles shall be provided to eliminate short-circuiting and shall be designed to keep floating material from leaving the chamber.
- 30.2** The chamber shall have the same protective coating as specified for the wastewater treatment system. The chamber shall have the same structural requirements as the wastewater treatment plant. Sufficient flow baffles will be supplied to assure proper mixing of the chlorine solution with the plant effluent.
- 30.3** The chlorination equipment shall consist of solid chlorine tablet type feed, Model Norweco model 2000. The chlorinator shall have the capacity of disinfecting the effluent from the secondary treatment system. The chlorinator shall be mounted at the inlet end of the disinfection chamber at the location



- on the drawings.
- 30.4** The de-chlorination equipment shall consist of solid chlorine tablet type feed, Model Norweco model 2000. The de-chlorinator shall have the capacity of de-chlorinating the effluent from the disinfection chamber. The de-chlorinator shall be mounted at the inlet end of the de-chlorination chamber at the location on the drawings.
- 30.5** A ultra-violet type disinfection chamber shall be provided, constructed as an integral part of the tertiary treatment system. The contact chamber shall be installed immediately following the clarifier.
- 30.6** The disinfection chamber shall have the same protective coating as specified for the tertiary treatment system. The tank shall have the same structural requirements as the tertiary treatment plant.
- 30.7** The disinfection equipment shall consist of one (1) ultra-violet type disinfection unit, Model \_\_\_\_\_, as manufactured by \_\_\_\_\_. The UV unit shall have the capacity of disinfecting the effluent from the tertiary treatment system. The UV unit shall be mounted at the inlet end of the chambers at the location shown on the drawings.

### **31.0 GAS FEED CHLORINATION EQUIPMENT (OPTIONAL)**

#### ***General:***

- 31.1** This section covers furnishing, installing, testing and placing in operation all gas feed, control and alarm equipment and accessories as specified herein and indicated on the plans.

#### ***References:***

- 31.2** The applicable provisions of the following standards shall apply as written here in their entirety:

UL	Underwriters Laboratories
NEMA	National Electric Manufacturers Association
NIOSH	National Institute for Occupational Safety and Health
MSHA	Mine Safety and Health Administration
CI	Chlorine Institute
ASTM	American Society for Testing and Materials

#### ***Definitions:***

- 31.3** System supplier. For the purpose of this specification, a system supplier is hereby defined as a company which is engaged in the business of providing and installing complete and operable chemical feed and control systems (which encompasses chlorine gas feed systems) including all necessary equipment, piping, valves and any necessary appurtenances.

#### ***Systems Description:***

- 31.4** This project will require installation of a chlorine system, including all piping and appurtenances, shall be provided by a single system supplier. A separate system supplier for the work being performed is hereby strictly prohibited.
- 31.5** Performance requirements. Execution of the work specified under this section will be in accordance with, but not limited to, the following general performance specification.



1. An integrated system is to be supplied by a single system supplier to insure equipment compatibility.
2. Location and source of parts and service capabilities shall be included as part of the submittal documentation. Manufacturers recommended spare parts shall be supplied for all equipment and be included with the operation and maintenance manuals.
3. System design and layout is based on the equipment manufacturers specified herein. Proposals to install and alternate manufacturer's equipment such that the Engineer can adequately evaluate the suitability of the alternate system and equipment. Proposals which are submitted and do not satisfactorily detail and demonstrate the system will be deemed unacceptable by the Engineer.
4. Substitutions of functions specified are not allowed.

***Quality Assurance:***

**31.6** Warranty shall be included defective workmanship and labor found within twelve (12) months of substantial completion and/or initiation of daily usage of the gas feed and control equipment.

***Products:***

**31.7** The following is a list of acceptable manufacturers fro providing the alternate manufacturer shall be acceptable.

Gas Feeders:	Regal
Feeder Controllers:	Regal
Vacuum Regulators:	Regal
Cylinder Scales:	Scaletron
Gas Leak Detectors:	Analytical Technology
Fiberglass building:	Tracom

- 31.8** Gas Feeders: Regal model 216 chlorinator or approved equal.
- Vacuum Regulators: Regal or approved equal. Regulators with automatic switchover for use with gas feeder unit and two (2) 150 lb. cylinders
- Cylinder Scales: Scaletron model 2330 two-cylinder scale
- Gas Leak Detectors: Analytical Technology model A14/11-11-0010-1-1 chlorine gas detector or approved equal.
1. Provide one (1) channel chlorine gas detector with components housed in NEMA 4X polystyrene enclosure. Gas detector shall be provided as follows:
    - a. provide one (1) control unit and one (1) sensor/transmitter
  2. Each system provided shall include a central control unit with separate, remote sensor/transmitters which are capable of being separated of up to 1,000 feet.
  3. Provide sensors which are electrochemical gas diffuser type.
  4. Control units provided shall have 4 digit LED, sunlight readable display,



which indicates ppm gas present.

5. Control units provided shall have concentration output signals of 4-20 mA DC (isolated)
6. Units provided shall have detection ranges of 0 to 10 ppm with the low-level alarm set at 2 ppm and the high level alarm set at 8 ppm. Control units to include a high density LED visual alarm indicator as well as a self contained piezo-electric horn alarm with an output of 85 dB.
7. Units provided shall include three (3) assignable alarm relays: 10A @ 120 VAC, 5A @ 240 VAC, resistive, SPDT configurable for normal/fail-safe, latching/non-latching and fast/slow operation. Alarm relay and indicator reset shall be activated from the front panel of the unit.
8. Units provided shall have sensor alarm to indicate loss sensor/transmitter input.

- Fiberglass Building:** Provide one (1) 6' x 6' prefabricated one piece molded fiberglass building Tracom or approved equal.
- a.) Sloping roof with peak at center.
  - b.) Designed to with stand 135 mph wind load.
  - c.) Wall to be 1 inch polyisocyanurate in solution encapsulated between two 1/8 inch white fiberglass laminates. Outside surface to have smooth gelcoat finish.
  - d.) Provide removable lifting eyes in the roof.
  - e.) Provide 36 inch x 78 inch door typical to fiberglass construction. Door gasket to be neoprene rubber.
  - f.) Provide stainless steel hinges
  - g.) Provide "DANGER" sign on door indicating type of gas present.
  - h.) Provide stainless steel door knob.
  - i.) Provide intake fan, 10inch, 520 cfm, and 120 volt with fiberglass canopy for mounting at top of wall. Louvers and stainless steel insect screen.
  - j.) Provide 12" vent, fiberglass louvered, with stainless steel insect screen mounted at bottom of wall.
  - k.) Provide incandescent lamp, vaportite.
  - l.) Provide duplex switch box, 2 toggle exterior mounted at door weatherproof.
  - m.) Provide 750 watt, 120 volt floor mounted thermostat controlled heater, plug in type.
  - n.) Provide duplex outlet.
  - o.) Provide stainless steel anchor bolts.
  - p.) Provide electrical conduit; Rigid schedule 40 PVC.
  - q.) Gel coat shall be chlorine resistant
  - r.) Building shall not have floor. Floor mount on concrete slab.



### **32.0 SERVICE WALKWAY**

- 32.1** A service walkway shall be provided for the service area only (or all tank openings) to service the plant equipment. Grating panels shall each consist of galvanized open grip safety grating. All grating panels shall be constructed of 18 gauge, galvanized sheet steel with maximum yield strength of 37,000 PSI. Each grating panel has a standard 9-inch surface width, and a 2-1/2-inch rib depth. The maximum weight of each panel shall not exceed 55 pounds.
- 32.2** A 45°-access stairway shall be provided leading to the service walkway for the service area only to service the plant equipment. 1/8" Checker plate stairs shall be provided on an 8-1/4" rise to an 8-1/4" run.
- 32.3** Hand railing system to be constructed from 1-1/2" OD schedule 40 painted steel pipe. The railing shall consist of two rails supported by posts on spans not to exceed 8'-0" O.C. the top rail shall be 42" from the walkway surface, and the middle rail to be 18" below. Construction shall be welded, with four-bolt stanchion connection to the tank surface at each post.

### **33.0 FLOW MEASUREMENTS (OPTIONAL)**

- 33.1** For measuring the flow rate through the wastewater treatment system, a flow-measuring weir shall be supplied. The weir shall be a \_\_\_\_\_ degree "V" notch weir located at the outlet end of the disinfection tank.
- 33.2** For measuring the flow rate, an ultrasonic flowmeter with a circular chart recorder shall be installed. The unit shall record, indicate, and totalize the flow through the wastewater treatment system.

### **34.0 FLOWMETER (OPTIONAL)**

- 34.1** The proposed ultra-sonic flowmeter will have a range and blanking distance to 10'-0".
- 34.2** Outputs will consist of 3 relay-SPDT contacts rated 8A/250V ac; function programmable current-isolated 0 to 20 or 4 to 20mA into 1000 ohms max.
- 34.3** The display will be a two line alphanumeric LCD type with LED backlighting.
- 34.4** User interface is via detachable IR keypad programmer.
- 34.5** Dual back-up systems memory-super capacitor and Ultralife lithium power cell.
- 34.6** The polycarbonate enclosure is type 4 IP65 rated.

### **35.0 CIRCULAR CHART RECORDER (OPTIONAL)**

- 35.1** The recorder incorporates a 10" circular chart. One box of standard charts is provided. The instrument is provided with one red disposable fiber-tip pen.
- 35.2** Chart drive will be by an AC synchronous motor; the chart rotation is counter clockwise.
- 35.3** Set-point is selected/observed by using a 3 digit pushbutton thumb-wheel potentiometer



**36.0 EFFLUENT CONNECTION**

**36.1** The effluent connection of the wastewater treatment system shall be located as shown on the plans and shall consist of one, \_" diameter 150# standard flange.

**37.0 DELIVERY INSTRUCTIONS**

**37.1** In almost every case, shipment of your treatment system is done by special lowboy trucks. When your plant is shipped by our truck, delivery will be made directly to the job site. The equipment necessary to unload the plant and set it on the foundation pad must be furnished by the field contractor.

**37.2** When the plant arrives at the job site, the owner's contractor should have available the necessary equipment to unload and set the vessel on the foundation pad. A crane of adequate size is the easiest and fastest method. Lifting lugs are provided on the vessel to simplify handling. After setting the plant in position, a check should be made to see that it is level, and in the correct position.

**37.3** Our package steel treatment systems shall be completely assembled units and are shipped as a unit where shipping height limitations permit this procedure. If a portion of the equipment must be removed to meet shipping height limitations, this equipment will be packaged separately at the factory for field assembly. This equipment and tankage should be field assembled and installed by the owner's contractor in the field.

**38.0 PLANT START-UP**

**38.1** At the time the wastewater treatment system is filled with water or sewage, and all power connections have been completed, and all equipment is approved for service, the contractor shall provide the services of a representative of the manufacturer who shall instruct the owner's representative in the proper operation and maintenance of the wastewater treatment system, including instructions in conducting all required operational tests. The manufacturer's representative shall furnish at this time, a service manual on the equipment installed within the wastewater treatment system.

**39.0 FIELD CONTRACTOR RESPONSIBILITY**

**39.1** The field contractor shall perform and/or make the following arrangements:

**39.2** Field unloading and setting of the wastewater treatment plant on its foundation pad, anchoring in position as defined by the contract specifications.

**39.3** Assemble into position, at the location shown on the plans, the ancillary equipment, which has been disconnected at the factory for shipping purposes.

**39.4** Interconnection of piping and wiring which may have been disconnected at the factory for shipping purposes.

**39.5** Tie-in of all piping, power and wiring connections to site utilities and electrical cable entries into control panels. The power required at power block or main circuit breaker is \_\_\_\_\_ Volt, \_\_\_\_\_ Phase, 60 Hz.

**39.6** Furnish foundation pad to set the system on.



- 39.7** Attach system to foundation pad by anchoring.
- 39.8** Touch-up painting of those areas damaged during installation.
- 39.9** Install drain plugs and fill tankage with water to prevent flotation. This is to be done before back filling.
- 39.10** Install the magnesium anode packages as shown on the plans.

**40.0 EQUIPMENT WARRANTY**

- 40.1** AEROMIX Systems, Inc. warrants to the original purchaser all new equipment manufactured by it to be free of defects in material and workmanship; and at the election of AEROMIX Systems, Inc. will repair or replace, f.o.b. it's factories or other locations designated and as determined by AEROMIX Systems, Inc. any part or parts returned to it, transportation/freight prepaid, which examination shall show to have failed under normal use and service by the original user within two (2) years following initial shipment by AEROMIX Systems, Inc. Such repair or replacement shall be free of charge except for freight and those parts such as media, chemicals, oil, grease, belts and like that are consumable under normal use. AEROMIX Systems, Inc. obligation under this warranty is conditioned upon it receiving prompt written notice within 30 days of claimed defects during the one year warranty period is limited to repair or replacement as aforesaid. No allowance will be made for labor, transportation, or other charges incurred in the replacement of repaired defective parts and/or equipment furnished.
- 40.2** THIS WARRANTY, INCLUDING THE STATED REMEDIES, IS EXPRESSLY MADE BY AEROMIX SYSTEMS, INC. AND IS ACCEPTED BY ORIGINAL PURCHASER IN LIEU OF ALL OTHER WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, WHETHER WRITTEN, ORAL, EXPRESS, IMPLIED OR STATUTORY. AEROMIX SYSTEMS, INC. NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME IT FOR ANY OTHER LIABILITIES WITH RESPECT TO IT'S EQUIPMENT. AEROMIX SYSTEMS, INC. SHALL NOT BE LIABLE FOR NORMAL WEAR AND TEAR, NOR FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGE DUE TO IN-OPERABILITY OF ITS EQUIPMENT FOR ANY REASON NOR ON ANY CLAIM THAT ITS EQUIPMENT WAS NEGLIGENTLY DESIGNED OR MANUFACTURED.
- 40.3** This warranty shall not apply to equipment or parts thereof which have been altered or repaired outside of an AEROMIX Systems, Inc. factory or damaged by improper installation, storage, application, erosion, or corrosion of any sort, or subjected to misuse, abuse, neglect or accident. This warranty is null and void if payment is delayed, not made, or if not in accordance with the terms and conditions of AEROMIX Systems, Inc. equipment proposal.
- 40.4** AEROMIX Systems, Inc. makes no warranty with respect to parts, accessories, or components manufactured by others. The warranty applicable to such items that is offered by their respective manufactures.