



Wastewater Treatment

Package Wastewater Treatment Plants Using the Complete Mix Activated Sludge Process



Many of Layne's Package Wastewater Treatment Plants use the Complete Mix Activated Sludge process, which stimulates microorganisms through aeration to reduce (digest) organic material. This process can be used wherever high quality effluent is required. Layne's package treatment plants are configured to each client's specific needs, and typically include Aeration Basin, Clarifier, Digester and Chlorine Basin. The design is modular and expandable for future growth.

For clients with stringent discharge criteria, tertiary treatment can be provided through the addition of gravity, pressure or membrane filters. Conditional to local and state permits, the resulting treated effluent is suitable for surface discharge, land application or non-potable re-use.

The Activated Sludge Process is an aerobic biological process in which microorganisms grow by digesting the oxidizable material in the wastewater. The microorganisms are recycled (return activated sludge) back through

the treatment phase in order to increase the rate of their action. The concentration of mixed liquor solids attained for optimum treatment is maintained by wasting (waste activated sludge) the unwanted solids to the Digester compartment for later disposal.

The Complete Mix Process
A modified Activated Sludge Process, the Complete Mix Process achieves a smaller footprint and accommodates fluctuations in organic and solids loads at varying flow rates. The plants are individually designed to meet client needs and to achieve permit compliance. Proper operation typically achieves a 95% removal rate.

Layne Christensen Company delivers and installs plants with relatively minor field assembly. Two basic designs are offered—rectangle tankage, or a circular design (bull's-eye) that allows for a smaller footprint. Layne is not restricted to size, as larger plants can be field erected to suit the client's needs. In addition, Layne offers design/build and financing options.



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Tertiary Treatment

Some permits require an effluent which must meet more stringent parameters. Tertiary treatment (filtration) can be added to these systems by adding one of several types of filters, either gravity or pressure, usually with dual media, or a pressure/vacuum disk filter. The systems are of modular design, easily transportable and expandable for future growth.

Wastewater Plant Components

Layne Christensen's wastewater treatment plants consist of the following components sized for the desired flows:

1. Aeration Basin
2. Clarifier
3. Digester
4. Chlorine Basin

Aeration Basin

Using either centrifugal or positive displacement blowers, the aeration basin is designed to handle peak flows and maintain proper hydraulics, and provides the necessary number of diffusers to assure proper mixing.

The Aeration Basin accommodates peak flows with eighteen inches of freeboard. Treatment plants in general operate better when receiving a more constant flow. Therefore, a surge basin can be added without difficulty to enhance the operation, if needed.

Clarifier

The clarifier is a circular design unless otherwise specified, and mechanically driven by a SEW Eurodrive unit sized to the clarifier diameter. The clarifier is equipped with shear pin, controls and alarm. The drive unit includes a surface scum collector with scum box and sludge rakes to collect settled sludge to be returned. Adjustable weirs and grease baffles control short circuiting.

Digester

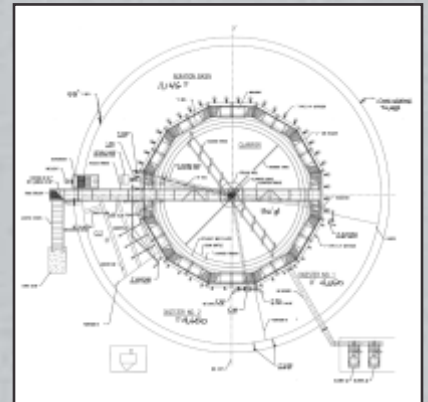
The Digester, along with being sized properly, must sometimes utilize multiple compartments for redundancy. The Digester utilizes the same catwalk as the aeration basin for air distribution along with a wasting line from the Clarifier, and an adjustable supernating line back to the head of the plant. All piping is galvanized Sch. 40 steel or epoxy coated for corrosion control.

Chlorine Basin

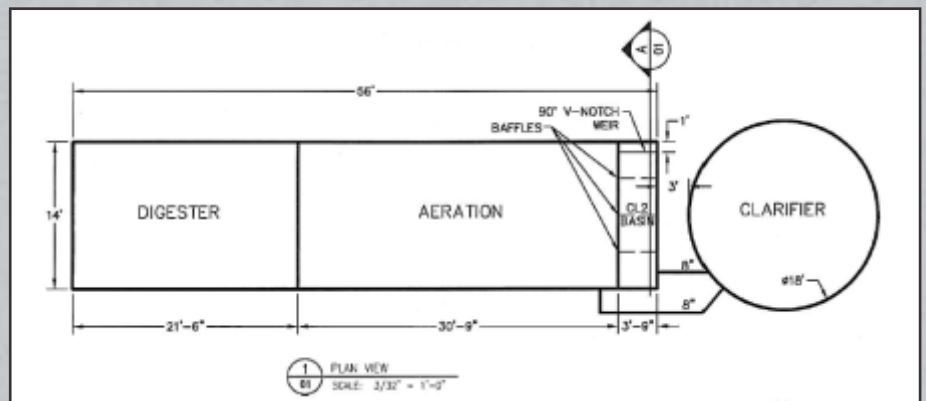
The Chlorine basin is sized to achieve the minimum detention time required by the permit at peak flows. Air drops are furnished to comply with DO requirements at the effluent, along with a staff gauge and flow measuring device (weir), baffles, and a process water pump for operating disinfection systems and for washing the plant.

Standard Equipment

1. Blowers 2 (one for standby with controls)
2. Chlorine – gas or liquid
3. Fiberglass Building
4. Lights on plant
5. Process water pump
6. Control panels – Blowers/Clarifier
7. Mechanical Clarifier



Space-saving Circular "Bulls-eye" Design



Rectangular Tankage Design