



Environmental Compliance Equipment

Clear Flow Systems Process Description

The following is a step by step description of the Clear Flow process. This will explain how the Clear Flow System operates to batch treat waste water. Read this document while using the CAD drawings to view the various components listed.

The Clear Flow units are batch treatment systems, meaning that they will treat a volume of water and then treat additional volumes one after another until the entire volume is treated. There are several unique technologies incorporated that provide value added service when using this equipment.

The system will sense that a “batch” volume has been accumulated in the storage tank or pre-tank via a level switch. The system will initiate by turning on the **Peristaltic Feed/Sludge Pump** and begin transferring waste water to the **Process Tank**. The unique feature of the pump is that it is a peristaltic sludge pump and can pass a large volume of solids. It is designed to pump human solid waste, slurries and sludge. These pumps have a 1 ½” ID tube in the pump head that is squeezed by a roller system creating suction through positive displacement. Other systems use air diaphragm pumps that can clog with sludge and typically have smaller suction and discharge orifices in comparable sizes. A/D pumps can be cumbersome to take apart and rebuild. Another unique feature is that the pump is a dual purpose pump. It is used to fill the **Process Tank** with untreated waste water and as well remove the treated water after the batch is complete. This is accomplished by using **three-way motorized ball valves** to direct suction and discharge of the pump. After the **Process Tank** is filled with waste water the **Peristaltic Feed/Sludge Pump** and associated piping is flushed with fresh water to remove excess waste water from the piping. The “flush” is directed to the **Process Tank**.

The system then begins to mix the waste water using the **Mixer Motor** to turn the paddle blades to mix the waste water. The system will have also determined if the solutions pH needs to be adjusted and if the **Optional pH Controller** was installed the pH of the waste water will be adjusted according to set parameters in the controller.

Upon completion of the mix and pH control the system will then add Clayfloc to the **Process Tank** using the **Flexible Auger Dosing System**. This dosing system is made up of the **Clayfloc Hopper**, **Flexible Auger** enclosed in a rigid pipe, **Dosing Motor** that turns the auger and the **Dosing Outlet** that directs the discharge of the clayfloc to the **Process Tank**. The mixing then continues for a pre-determined time period to mix the Clayfloc with the waste water allowing the Clayfloc to encapsulate the components in the water that make it waste. An explanation on how the Clayfloc works is attached.



Environmental Compliance Equipment

After the pre-determined mixing is complete the **Mixer Motor** will shut down and the system will allow the now encapsulated waste solids settle to the cone bottom of the **Process Tank**. Once the settling time is complete, the **Three-Way Motorized Ball Valves** will switch to the opposite position and the **Peristaltic Feed/Sludge Pump** will begin to pump the sludge and water out of the **Process Tank** and up to the **Deep Bed Filter**. The **Deep Bed Filter** incorporates a tray, stainless steel chain driven belt, motor and sprocket assembly, **Belt Water Level Probes** that sense water level on top of the **Filter Paper**, a the **Clear Water Discharge** pipe. The now clean water and sludge are pumped to the **Deep Bed Filter** where the sludge is separated from the clean water using the **Filter Paper**. The **Filter Paper** is 50 micron in size. The clean water is release from the system via the **Clean Water Discharge** pipe to either sanitary sewer or to a tank for further treatment or re-use. During the filtration the **Filter Paper** may become blinded. When this happens the water level on the belt will rise and eventually come in contact with the **Belt Level Probes** that initiate the **Belt Motor** to index fresh **Filter Paper** over the belt furthering filtration. This continues until the Process Tank is completely empty. A rinse is initiated using fresh water to flush the **Process Tank** of accumulated sludge and is pumped up to the **Deep Bed Filter**.

The process now complete the system looks for the signal that there is more waste water to treat and initiates a new batch. The systems are designed to treat two batches per hour as long as waste stream characteristics allow for this 30 minute batch. This is a fully automated process