

BIO-WASTE SYSTEMS

Thermal & Chemical Effluent Kill Systems



- Batch Process Systems
- Continuous Process Systems
- Sump Collection Systems
- Heat Inactivation
- Chemical Inactivation
- Neutralization Systems
- Stainless Steel or FRP

Turn-Key Modular Systems Inc. offers a modular approach for the supply of Waste Treatment Systems.

Traditionally, Biological Waste Decontamination & Kill Treatment Systems are constructed by on-site construction crews. This stick-built approach has resulted in many delays & project complications.

The use of modular construction has been employed extensively in chemical & various other industries for some time. It's application in the Pharmaceutical & Biotechnology Industries offers many economic advantages. Most notably, is the impact on project management as it relates to the schedules & on-time delivery.

Each batch process system uses a Sump Collection Tank & one or more Decontamination Vessels. The final configuration will depend on your cycle time requirements & the volume of waste.

Once your Waste Treatment Tank has been configured, the Sump Tank collects its set amount of waste. The waste is transferred to the Waste Treatment Tank and once it reaches the pre-configured level, the Kill or Inactivation Cycle is activated.



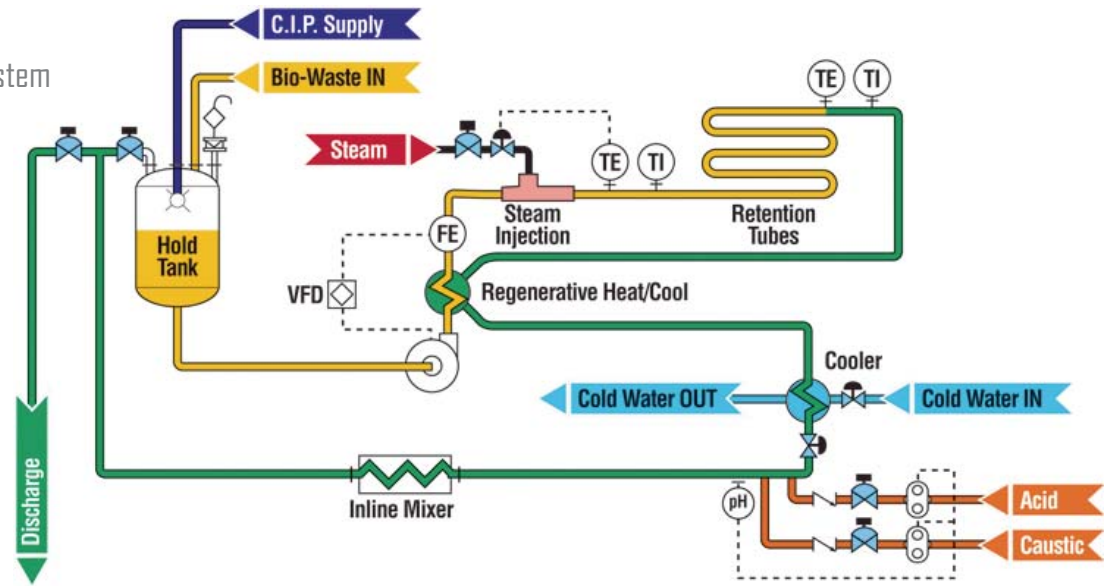
Batch Bio-Waste Systems

The Kill Cycle begins with the addition of a chemical or a direct steam injection into the product. If deactivation is done thermally then both the sterilization time & temperature must be controlled prior to activating the cooling. In some cases indirect heating is used by means of recirculation externally of the tank. A special Steam Injection Process takes place during the heat up cycle to control reasonable Decibel Levels during the Steam Injection Cycle. Additionally, the pH of the waste can be adjusted in the vessel prior to releasing the batch to drain. Mixing is accomplished with an external mixer or by using a unique injection approach to achieve faster heat-up & cool-down times.

As with all TKMS Modular Systems, various alarms give the operating personnel warning of process variables.



Continuous Decontamination System



Continuous Kill Systems

TKMS Continuous Decontamination Systems use the same design principals as sterilizers for media or other fluid products. TKMS designs meet cGMP guidelines & are supplied with control & instrumentation to monitor for process variables.

All Continuous Systems have a water feed tank allowing for the system to be started in the water mode & then replaced by the waste stream. This design allows for the water to be reintroduced into the system at any time, maintaining the process system sterile. Should there be any alarms during the sterilization process, the waste will be recycled back to the hold tank. Once these alarms are acknowledged & proper operating conditions met, cooled sterilized waste will be discharged to the drain.

**Continuous Process Systems are available from 5 USGPM & larger.*





Whether the Decontamination System is Batch or Continuous, it is necessary for each facility to first collect the waste stream in a Sump Collection System. TKMS offers a stainless steel Sump Tank, designed to collect the waste & transfer it to the process system. For maintenance, the Sump Tank & associated lines to & from the Waste Treatment System can be safely sterilized.

Each Sump System includes:

- Vent Filter, Rupture Disc & Level Control System
- Waste Transfer Pump
- Autoclavable Condensate Collection System for use during Sterilization of the Sump System

Neutralization

Each system constructed by TKMS is designed for the addition of both Acid and/or Caustic. This is achieved by means of peristaltic pumps, controlled by pH probes located in the vessels, or in the piping system of the Continuous Sterilization System.

In addition we can provide a stand-alone neutralization system for treatment of waste streams prior to discharge from your facility. These systems can be constructed in stainless steel, FRP or other exotic materials selected for each application.

Each system is operated at our factory prior to shipment, assuring our customers they will receive a system that has been pre-tested prior to arrival at their plant.

Sump Collection Systems



Modular Features

Instrumentation & Controls

The modular systems built by TKMS utilize stand alone PLC control & system monitoring. Data Logging is by printer or strip chart recorder. The following instrumentation is included, or optional with every modular Decontamination System:

- Temperature Control of the Heating & Cooling Loops
- Pressure Monitoring & Alarming of the Tanks & Piping System
- Level Monitoring & Control of the Sump & Kill Tank
- pH control in the Kill Tank for Acid or Base Addition prior to discharge to drain

Manufacturing Standards

All modular systems are manufactured using the latest technology & regulations for high purity piping systems. The following procedures are used:

- Automatic Orbital Welding
- All tubing cuts are made by non-abrasive cutoff saws
- Each Module is cleaned & passivated prior to shipment
- All Module welds are boroscoped & can be video documented prior to shipment

Standard Documentation

TKMS follows a critical path method in preparing all documentation to assist clients during their validation. Each modular system shipped from our factory includes:

- Weld Logs & MTR's
- Sequence of Operations
- As Built, P & ID Drawings
- Instructional Manuals
- Parts & Maintenance Manuals
- Control & Wiring details
- Software Configuration



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