

Modular Water Treatment System



Envirogen's TIMBR™ system (two-container configuration)

Envirogen Technologies, Inc.'s (Envirogen's) modular, transportable process alternative for the treatment of high-strength organic waste streams at the source combines low cost with high performance removal of contaminants. Called TIMBR™ (Transportable Internal Membrane Biological Reactor), the system combines features that include the following:

- Low capital and operating costs.
- Small footprint, allowing the system to be installed at the source of the waste generation.
- Tolerant of influent variations, making it ideal for treating wastewater from either continuous or batch processes.

- Modular, transportable, pre-fabricated design minimizes installation cost and time of installation. Additional modules are available for separate metals precipitation, nutrient removal, biosolids treatment and disinfection.

MEMBRANE BIOLOGICAL REACTORS

TIMBR is a modular configuration of Envirogen's Membrane Biological Reactor (MBR) technology. An MBR system consists of a suspended-growth bioreactor combined with a membrane liquids/solids separation unit. In an MBR, contaminated water is first fed to the suspended growth reactor for degradation of the organics in the stream. The TIMBR system maintains a high biomass concentration (typically 10,000 to 30,000 mg/l), which yields unusually high destruction efficiencies, even for recalcitrant compounds. The membrane is the key to maintaining high biomass, allowing treated water to pass from the reactor, while keeping solids in the reactor for a longer, controlled length of time.

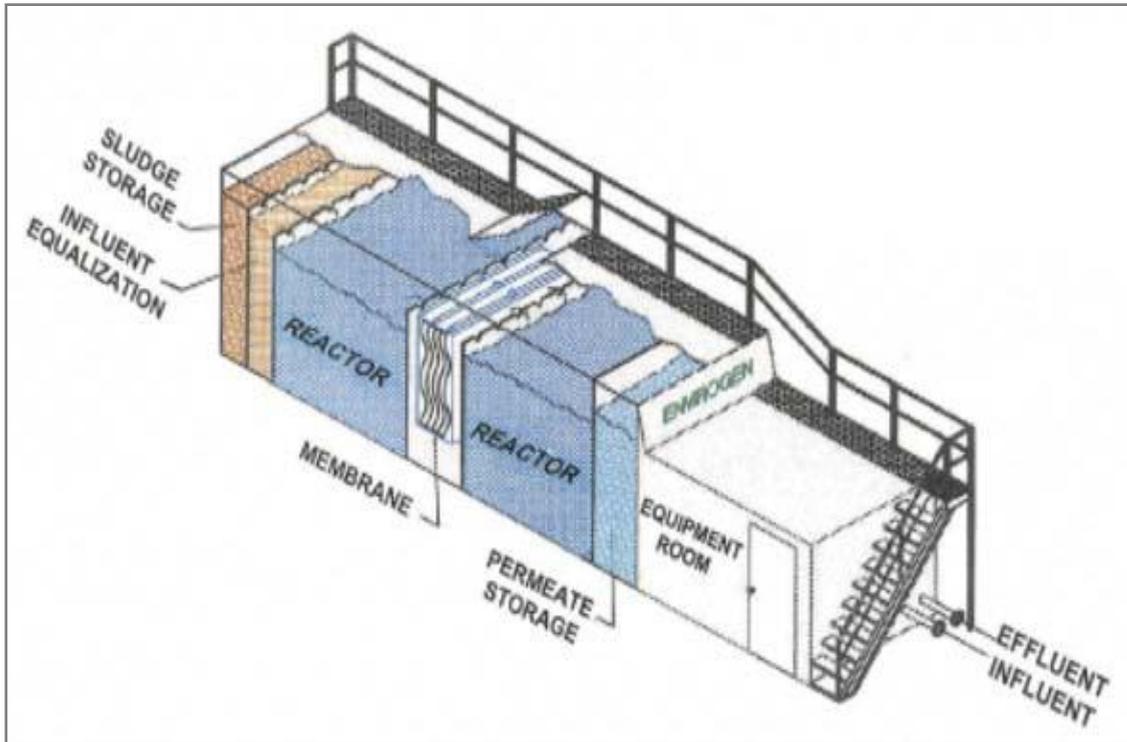
TIMBR was developed in response to a need by the industry for compact, easily relocated, on-site wastewater treatment systems. In the TIMBR configuration of the MBR technology, Envirogen uses a membrane that is internal to the reactor; a proprietary feature that allows for cleaning the membrane without removing it from the bioreactor.

The first TIMBR system was an 80,000-gallon-per-day plant designed to treat a combined municipal and industrial waste stream. The system was designed for the removal of high-strength organics, nutrients and metals. It was equipped with UV disinfection, allowing it to discharge to either surface water or groundwater.

The TIMBR system is the treatment of choice regardless of whether the discharge will be a receiving body of water or to a treatment facility.

The bioreactor includes a chamber that contains one or more internal membranes as required to meet plant conditions. Water from the bioreactor is drawn through the membranes separating the permeate from the MLVSS. Compressed air is injected into the bioreactor to not only treat the organics, but to continuously flex the membranes and prevent them from becoming fouled. Fitted with a modem and an automated control system, the TIMBR system can be operated from a remote location, ensuring safe, reliable disposal of the treated wastewater, leachate or groundwater stream.

The system can be fitted with additional modules for the treatment of nutrients (phosphorous and nitrogen). Metals can be removed with the biosolids, or if it is necessary to have metal-free biosolids, a pre-treatment module can be provided. The basic system, shown below, will treat 10,000 gallons per day of leachate containing 3,000 ppm organics. It consists of a self-contained 40' x 8' x 10' container requiring minimal site preparation and includes all tanks, pumps, blowers and controls.



Envirogen's Transportable Internal Membrane Biological Reactor System (TIMBR) is covered by U.S. Patent No. 6,331,251 and/or other patents pending.