

PACKAGE PLANT DESCRIPTION

POLYPROPYLENE PANEL CONSTRUCTION

I INTRODUCTION

The design utilizes award winning ECOfluid USBF™ process technology. In awarding the process the 2006 Technology Leadership Award, Frost & Sullivan included the following in their press release:

“The company’s advanced plants based on the USBF™ process address the constant demand to produce high quality effluents. This single-sludge denitrification process incorporates all the processes required for biological treatment in a single reactor and circulation loop, using very little energy and no chemicals. While conventional processes such as SBR and extended aeration rely on the slow and inefficient sedimentation process, ECOfluid’s USBF™ technology utilizes a fluidized bed or ‘counter current’ movement. This is a dynamic method that continually removes pollutants. In this process, the sewage that enters an anoxic compartment is drawn by gravity into an aeration compartment, and then to the bottom of the upflow sludge blanket filtration clarifier, from where it overflows. The remainder is then recycled from the bottom using airlift pumps, which require no power due to the internal loop configuration.



This way, the mixture is exposed to anoxic aeration three or four times a day, resulting in superior biological nutrient removal, even without the use of added chemicals. Phosphorous removal, through a process known as “biological luxury uptake”, is another cost-free benefit. “USBF™ does not require primary clarification prior to biological treatment and offers hydraulic flexibility because it easily accommodates high peak flows,” says Frost & Sullivan Research Analyst Shilpa Tiku. “In fact, as the flow becomes greater, the sludge blanket rises higher and the filtration area expands simultaneously.”

ECOfluid’s USBF™ technology is, therefore, ideal for use in municipal and domestic wastewater treatment, water reclamation, industrial wastewater, and existing plant retrofits. Industrial wastewater is highly organic by nature, and biological packaged wastewater treatment offers an attractive option for treatment plants that are looking at viable and low-cost options. The USBF™ process is a self regulated system and very little, operator attention is required.”

The unit itself is a factory built USBF advanced secondary wastewater treatment system with equipment and components as specified below. The package treatment plant consists of one or more rectangular structures, with all necessary partition walls, reinforcement and internal components factory installed. All side walls, end walls, and bottom are fabricated from polypropylene panels (1 m x 1 m x 0.08 m or 3.3’ x 3.3’ x 3”) by hot plate or electrical tape heat fusion welding. Internal structures are fabricated from polypropylene with stainless steel trim. The tanks are installed underground (or partially underground) on concrete pad(s) or fine sand bed(s).

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2 STANDARD EQUIPMENT AND COMPONENTS SCOPE OF SUPPLY

Standard equipment and component items supplied with the packaged plant include the following:

2.1 Packaged Plant Tank(s)

The package is comprised of one or more tanks containing the following:

- Anoxic compartment(s)
- Aeration compartment(s) provided with air header, aeration valves manifold, diffuser drops and fine bubble aeration diffusers.
- USBF clarifier(s) provided with airlift pump(s). The prism or conical shaped clarifier is hydraulically self-regulating, and its function is to separate the sludge floc from the treated water. Located at the clarifier water surface is an adjustable effluent trough provided with v-notches and scum baffle(s). Effluent from the trough flows by gravity to effluent pump tank (if provided), or to disposal or to further treatment.

2.2 Air Blowers

The unit is provided with 2 blowers. The blowers are V-belt driven positive displacement blowers equipped with an inlet filter-silencer, pressure relief valve, discharge silencer, check valve and flexible connector on the discharge. The blower/motor assembly is factory mounted on a steel base plate within a weatherproof and sound attenuating enclosure.



2.3 Controls and Control Panel

Circuit breakers and all control equipment listed below are mounted within a separate NEMA 4X rated enclosure, fabricated from heavy gauge steel or fiberglass, and provided with a rigid lockable door. Wiring and conduit from power supply to the control panel and from the control panel to the blower(s) and accessory equipment is by others.

Item	Equipment	Control	Function	Alarm
I	Blowers	Pressure switch Motor overload	Low Pressure	Yes Yes

Alarm is annunciated by a strobe light located on top of the control panel
Additional controls can be incorporated into the panel by request.

3 OPTIONAL EQUIPMENT AND COMPONENTS

Optional equipment and component items supplied on request include the following:

3.1 Equalization Tank and Pumps

The tank can be either integral with or separate from the main treatment plant.

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- 3.2 Influent Screen Device or complete Headworks
Where the packaged plant is to receive unscreened wastewater, an influent screen device is provided. For small plants, it typically consists of a manually cleaned coarse bar screen located within the equalization tank or the anoxic compartment. For larger plants mechanical screen can be provided.
- 3.3 Anoxic Compartment Mixer
Where reduction of Total Nitrogen is desired, anoxic compartment mixer(s) can be provided to enhance mixing and facilitate denitrification.
- 3.4 Post Treatment Equipment and Components
Where 'tertiary' treatment is desired, microscreen and/or sand filters, and UV or chlorination disinfection can be provided.
- 3.5 Effluent Pump Tank and Pumps
The tank can be integral with or separate from the main treatment plant.
- 3.6 Sludge Holding Tank
The tank can be integral with or separate from the main treatment plant. The tank is typically provided with coarse bubble air sparger and a decant system with the supernatant returned by gravity to the anoxic compartment or to the equalization tank.
- 3.7 Sludge Pre-Thickener
Sludge pre-thickener increases dry solids content of the excess sludge prior to its transfer from the aeration compartment to the sludge storage tank. Pre-thickened sludge is periodically pumped to the sludge storage where it further thickens by gravity to as high as 4 % (thickening is subject to the plant biological maturity and the sludge quality).
- 3.8 Tank Covers
The tanks are provided with lockable reinforced plastic covers or wooden planks cover as shown below.



- 3.9 SCADA System
Remote access SCADA monitoring and alarms system can be provided
- 3.10 Miscellaneous Other Components such as flow splitter box, flow measurement, etc.
- 3.11 Installation supervision assistance, start-up assistance and operator's training

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4 INSTALLATION

The polypropylene package plants are strong but light and easily shippable. Installation is undemanding. After setting the tanks on concrete or compacted, leveled fine sand bed, the pipes are connected and the tanks backfilled.

The tanks are installed underground, or partially underground, and covered with lockable reinforced plastics covers or wooden planks.

