

EEC GLOBAL OPERATION LLC

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Bio Plants For Industrial Applications

FEATURES

Self-Cleaning
non-clogging
media with 20
years warranty

10 Times the
Loading in less
than 1/5 the
time

Easy to
Relocate
And Install

Water can be
used for
Irrigation

Fully Automatic
And easy to
Operate

Global
Production and
Service

"High-Speed Bio Tec" Biological treatment plants for Industrial Applications. Advantages; extremely compact and efficient compared to regular systems, clog free, handles shock loading, extremely compact, ready to be operated, fully automatic, skid mounted, and up front central control. Please find "General Description" below, or visit our web site at: www.eecusa.com



GENERAL DESCRIPTION OF THE EEC HS BIO-TEC INDUSTRIAL WASTE WATER TREATMENT PLANT

The EEC Industrial WWTP systems are based on the EEC High-Speed Bio-Tec biodegradation and sedimentation technology which is unique due to its compactness and performance in respect of volumetric efficiency. These technologies are combined in a prefabricated, skid mounted or containerized tank system with variable length, suitable for overseas transportation inside or as ISO freight containers.

The skid mounted system is designed for indoor location with draft ventilation. The machinery is placed uncovered on the skid at one end. The units may also be placed outdoor under shelter with natural ventilation. These units are transported inside ISO freight containers and are made in lengths from 9 to 40 feet.

The containerized systems are made as ISO containers designed for unprotected, outdoor location with all machinery well covered inside the container door. They are made in 20, 30, and 40 feet length and are transported as is. Once in place, the container corners are used to fix the units to the foundation. Consequently, they can easily be shifted around to new locations or demobilized.

The EEC ISO HS Bio Tec systems comes as complete systems with one or two bioreactors and one clarification tank. They are best suited for medium organic loads and strict effluent requirements, for direct discharge to the environment. Any combination of hydraulic and organic load can be accommodated by using multiple container plants with standard containers in parallel or customized containers in series.

1. DIMENSIONAL CRITERIA

Any treatment plant must be based on actual measurements of the waste stream with respect to hydraulic and organic load. The critical parameter is daily average flow, peak flow and influent/effluent BOD₅ and TSS.

For common applications such as pulp and paper, dairies and other applications in the food processing industry, there is sufficient experience at hand in order to design a system and guarantee the effluent, based on such information.

Designs for new applications should be based on a full waste water analysis and followed up by a test program in order to verify the design and guarantee the effluent. Such tests may range from biodegradability testing in lab to pilot testing on site.

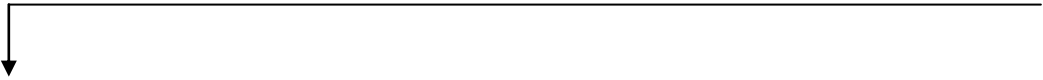
2. CAPACITIES – SEE NOTE BELOW

The ISO 3 compartment system has the following nominal capacities at an influent of BOD 1000 ppm, TSS 500 ppm and 95% cleaning efficiency in terms of BOD:

Model	: 20ISO3	30ISO3	40ISO3
Flow	: 80 m³/day	120 m³/day	160 m³/day
BOD load	: 80 kg/day	120 kg/day	160 kg/day

The ISO 2 compartment system has the following nominal capacities at an influent of BOD 1000 ppm, TSS 500 ppm and 80% cleaning efficiency in terms of BOD:

Model	: 20ISO2	30ISO2	40ISO2
Flow	: 120 m³/day	180 m³/day	240 m³/day
BOD load	: 120 kg/day	180 kg/day	240 kg/day



NOTE: Above are example BOD handling loads only. In most cases the EEC ISO Bio systems are customized to handle exact load. EEC Bioengineers are carefully calculating the BOD loads and once quoted, systems are designed to meet and handle the exact influent / effluent requirements.

3. EQUALIZATION AND HOLDING SYSTEM

It is assumed that the waste water piping system ends in a customer provided three-chamber combined buffer/pumpwell/ sludge storage tank system prior to the HS BioTec system. The buffer capacity must be sufficient to level out the daily peak flows and hold sufficient water for preservation of the bioculture during week ends. The holding capacity of the system should be at least 24 hours, depending of the weekly flow profile. Dairy applications should have aerated holding tank system to avoid anaerobic conditions causing bad smell.

4. BIOLOGICAL TREATMENT SYSTEM

The treatment plant will take suction from the pump well by its own feed pump. The pump is level controlled and has a capacity of 1-2 times the average daily flow. The plant has therefore an intermittent working mode in terms of hydraulic flow, while the air blower supplying air to the bioreactors is continuously running.

The biodegradation reactor comes in one or two stages depending on required cleaning efficiency. Plants with higher cleaning efficiency than 80-85 % need a two stage system. The bioreactors are degrading the dissolved organic matter by oxidation into carbon dioxide which escapes to the air, and to produced biomass which act as activated sludge. A proprietary, suspended, free floating biofilm carrier medium is providing a large, protected biofilm surface as host for the bacteria and is simultaneously accumulating the active biosludge inside the carrier elements. Thus, the system takes advantage of both the fixed film and the activated sludge biodegradation principle, offering unique volumetric efficiency.

The biodegraded water is flowing into a clarification stage where the suspended solid settles by gravity. The water is directed through a skim well to a plate settler system which provides the final clarification of the effluent. For systems with high cleaning efficiency, the sedimentation may be enhanced by addition of polymers.

5. SLUDGE SEPARATION SYSTEM

The sludge pump is activated each time the feed pump stops, with suction from the clarification bottom drain. The pump is discharging through a hydrocyclone with overflow back to the bioreactor, while the concentrated underflow is discharged to the sludge storage. When necessary, the sludge is emptied by a vacuum truck and hauled away for external treatment.

6. EQUIPMENT SPECIFICATION

The basic system comes with the following standard equipment:

- A mild steel tank consisting of a framework of square pipes and vertically stiffened sides and partitions. The tank is internally coated with tar epoxy and externally painted in white with EEC name and logo in one feet high letters on two sides.
- A free floating plastic biofilm carrier medium in each bioreactor. 2/3 filling rate as standard, with 100 square foot biofilm surface per cubic foot reactor volume.

- A plate separator system of 60 degree inclined PVC plates in the settling tank. Three plates per foot length, projected area 5 square foot per square foot tank surface.
- One regenerative blower or rotary lobe blowers as appropriate, air filter/silencer on the blower inlet, muffler on the outlet for flow regulation. Air header in galvanized steel and air distribution system in PVC with rubber disc air diffusers.
- Two open impeller, stainless steel, close coupled centrifugal process pumps with carbon/ceramic mechanical seal and viton elastomers. Waste water pipes in galvanized steel and/or PVC as required.
- Two chemical dosing pumps, one multifunction for foam control during start up, nutrient supply or polymer supply as required, and one dedicated pH control pump. Additional pumps to be delivered as required.
- One main electrical switchboard/control panel with start/stop buttons and running lights. Automatic start/stop of process pump on high/low level, remote pH indication and automatic control of pH agent supply. Remote indication of DO with manual control of air supply. Automatic start of spare blower if delivered as option.

7. TECHNICAL DATA

Equipment	Specification	Unit	20'ISO3	30'ISO3	40'ISO3
Tank Container	Overall Length	Inches	238 1/2	359 1/4	480
	Overall Width	Inches	96	96	96
	Overall Height	Inches	102	102	102
Bio Medium	Proprietary	m3	12	18	24
Settling Medium	88 x 40 inch plates	Nos.	12	18	24
Blower	Nominal Capacity	SCFM	120	180	280
	Back Pressure	In WG	100	100	100
	Motor effect	HP	6	9	12
Centrifugal Pumps	Nominal Capacity	GPM	30	45	60
	Back Pressure	psi	9	9	9
	Revolutions	RPM	3500	3500	3500
	Motor effect	HP	0,5	0,75	1
Hydrocyclone	Nominal Capacity	Size	20	30	45
	Press. drop	psi	11	11	11
Metering Pump	Nominal Capacity	GPH	5	5	5
	Back pressure	psi	60	60	60
	Motor effect	HP	0,2	0,2	0,2
Electrical System	Installed effect	kW	6	9	12
Shipping weight	Dry weight	kg	4400	6200	8000
Operation weight	Water filled	kg	36200	50800	65400

Larger models are available upon request. Visit EEC's Web Site for additional information on different systems and solutions for your specific needs.

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EEC's Research and Development team is continuously updating our technology and specifications