



BIO PLANTS FOR SEWAGE / BLACK AND GREY WATER TREATMENT



High-Speed BioT Biological Treatment Plants.

Advantages:

- Extremely compact and efficient compared to regular systems
- Clog free
- Handles shock loading
- Extremely small footprint, supplied ready to be operated
- Fully automatic, skid – mounted or containerised
- 'Up-front' central control for ease of use



Two High-Speed CDD Systems Operating in Parallel

GENERAL DESCRIPTION

The High-Speed BioT STP system is based on "Moving Bed" (bio-film) 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 and standardized tank system with variable length, suitable for road, rail or sea transportation in ISO freight containers.

WIE Pty Ltd can offer a number of standard models ranging from 60 to 400 m³/day. These are available in two formats:

SERIES 3 incorporate high rate bioreactors for efficient Carbonaceous BOD removal (85%) in a compact packaged plant.

SERIES 4 / 5 units cover full nitrification – de-nitrification process with phosphorous removal in Series 5. Removal rates > 90% all in plants.

Both SERIES 3 and SERIES 4 / 5 can be built in MAXI FORMAT for both indoor and outdoor installations. These systems offer maximum capacity and are built within the container that provides shelter for systems if placed outdoor.

The SERIES 3 and 4 / 5 can also be constructed in CDD FORMAT, which is built to ship inside a standard ISO container and are more suitable for indoor installations. Clients can also purchase an optional container and install the system outdoors. Both systems are extensively aerated and produce no odour.



1. DIMENSIONAL CRITERIA

Any treatment plant should be based on actual measurements of the waste stream to be treated in respect of hydraulic load, suspended and dissolved organic material, and the applicable local effluent requirements. However sufficient statistical information is available for small community municipal wastewaters and can be related to the term "Person Equivalent" or PE.

As this system is specifically designed for smaller communities, these plants are based on the following data:

Wastewater flow	Q _w	200 l/PE/day
Suspended solids	TSS	70 g/PE/day
Organic matter	BOD	65 g/PE/day
Nitrogen	N	9 g/PE/day
Phosphorous	P	0.6 g/PE/day

2. CAPACITIES

The STP system is manufactured in 2m incremental sizes in order to suit any particular need. The basic 5m, 7m, 9m, 11m and 13m systems with 3 chambers have the following nominal capacities at a guaranteed effluent of < 30 ppm BOD (as a daily average).



MAXI 3 SERIES

MODELS	10ISO3	20ISO3	30ISO3	40ISO3	40MAXI3
Capacity m ³ /day	60	160	260	360	400
PE	300	800	1300	1800	2000
Tank L	5m	7m	10m	13m	13m
Tank W	2.4m	2.4m	2.4m	2.4m	2.4m
Tank H	2.5m	2.5m	2.5m	2.5m	2.6m

AMB BIO MEDIA

Shipping Weight kg	2600	4000	5400	6800	7000
Operational Weight kg	18600	26000	40400	45800	58000



CDD 3 SERIES

MODELS	15CDD3	21CDD3	27CDD3	33CDD3	39CDD3
Capacity m ³ /d	120	180	240	300	360
PE	600	900	1200	1500	1800
Tank L	4.6	6.4	8.3	10.2	12.0
Tank W	2.2	2.2	2.2	2.2	2.2
Tank H	2.5	2.5	2.5	2.5	2.5
AMB BIO MEDIA					
Shipping Weight kg	3000	3800	4600	5400	6200
Operational Weight kg	19000	27800	34600	45400	55200

Systems with additional requirement to lower COD, Ammonia, or Nutrient levels will normally require longer retention time and will consequently have lesser capacity than above. Effluent parameters such as BOD <25 ppm, TSS <30 ppm, TN <15 ppm can be achieved in the SERIES 5 systems as shown in the following table.

Other systems can be designed to suit customer's requirements.

MAXI 5 SERIES

Model	10ISO5	20ISO5	30ISO5	40ISO5	40MAXI5
Capacity m ³ /d	48	120	190	256	300
PE	240	600	950	1280	1500
Tank L	3.0	6.0	9.1	12.2	12.2
Tank W	2.4	2.4	2.4	2.4	2.4
Tank H	2.5	2.5	2.5	2.5	2.6
AMB BIO MEDIA					
Shipping Weight kg	2850	4350	5750	7150	7350
Operational Weight kg	18900	26350	40700	46150	58350





CDD 5 SERIES

Model	15CDD5	21CDD5	27CDD5	33CDD5	39CDD5
Capacity m ³ /d	77	116	174	192	230
PE	385	580	770	960	1150
Tank L	4.6	6.4	8.3	10.2	12.0
Tank W	2.2	2.2	2.2	2.2	2.2
Tank H	2.5	2.5	2.5	2.5	2.5
AMB BIO MEDIA					
Shipping Weight kg	3350	4150	4950	5750	6550
Operational Weight kg	19350	28150	34950	45750	55550

3. PRE-SEDIMENTATION SYSTEM

It is assumed that the sewage piping system will end in a customer provided three-chamber combined settling / buffer / pump well tank system, which separates paper, sanitary binds and solids. The buffer capacity must be sufficient to level out the daily peak flows. Alternatively, WIE can supply fully automated packaged Head-works combining fine screening, grit and grease removal.

4. BIOLOGICAL TREATMENT SYSTEM

The treatment plant will take influent from the tank system using its own feed pump. The pump is level controlled and has a capacity which is 2-3 times the average daily flow. The plant has 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 the required water quality. Plants with higher cleaning efficiency than 80-85 % and the need for nitrogen & ammonia reduction will require one further aerobic reactor for nitrification and an anoxic reactor for the de-nitrification. The bioreactors degrade the dissolved organic matter by oxidation into carbon dioxide, which escapes to the air, and to biomass that acts as activated sludge. The anoxic reactor is situated in the inlet of the plant where the mixed liquor is recycled and nitrates are converted to nitrogen gas with the aid of carbon from the influent. A suspended free-floating biofilm carrier medium provides a large, protected biofilm surface for the bacteria and is simultaneously accumulating the active biosludge inside the reactors.

5. SLUDGE SEPARATION SYSTEM

The biodegraded water flows 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.



The sludge pump is activated each time the feed pump stops - suction from the clarification stage. The pump discharges through a Hydrocyclone with the overflow back to the bioreactor, while the underflow is discharged to the primary sludge storage. When necessary, the sludge is emptied by a vacuum truck and hauled away for external disposal. Alternatively, WIE can supply suitable sludge handling and dewatering systems and equipment.

6. EQUIPMENT SPECIFICATION

The basic system comes with the following standard equipment:

- A mild steel tank consisting of a framework of square hollow sections and vertically stiffened sides and partitions. The tank is internally coated with tar epoxy and externally painted to the clients preferred colour. Additional FRP lining can be provided as an optional.
- A free-floating plastic biofilm carrier medium in each bioreactor. 70% filling rate as standard, with 850 m² total surface / m³ of reactor volume and 500 m² protected biofilm surface per m³ of reactor volume.
- A plate separator or tube settler system of 60 degree inclined in the settling tank to accelerate the separation procedure.
- One regenerative blower with air header in galvanized steel, and air distribution system in galvanized or stainless steel. Air filter / silencer on the blower inlet.
- A submersible sewage feed pump with an open impeller and a positive displacement pump for sludge handling, with waste water pipes in galvanized steel or PVC as required.
- A horizontal centrifugal pump for the mixed liquor recycling.
- Chemical dosing pumps of d type will be supplied wherever required.
- One main electrical switchboard / control / panel with start / stop push buttons and running lights controlled by a fully programmable PLC system.

