

SPECIFICATIONS

Biolytix[®] MultiPod (BF8) Wastewater Treatment System

The Biolytix MultiPod (BF8) is an onsite treatment system designed to treat wastewater from domestic sources. It uses a double tank configuration and is based on an enhanced trickling filter process which mimics a natural soil habitat. The (BF8) is designed to comply with AS/NZS 1546.3:2008 and must be operated in accordance with this standard.

Effluent Quality

The BF8 wastewater treatment system generates secondary treated effluent of the following quality:

- 5-day Biochemical Oxygen Demand (BOD₅) <20 mg/L
- Suspended solids <30 mg/L

The treated wastewater will usually be disposed of via a land application system. AS/NZS 1547:2012 describes various land application disposal options for secondary-treated effluent. Disposal systems must comply with the relevant Regional Authority rules and these should be consulted.

Maximum Loading

- Flow rate: 2,400 L per day
- Organic loading as BOD₅: 1,000g per day
- Suspended solids loading: 1,000g per day

Important: The actual maximum loading of an installed BF8 is limited by the capacity of the dispersal system it discharges to. For example, if the BF8 is connected to a land dispersal system with a capacity of 2,000 L/day, then the BF8 must not be loaded at more than 2,000 L/day.

Operation

- Emergency Storage Capacity: 3,100 L
- Temperature and Humidity:
Operates under normal temperature and humidity conditions experienced in Australia, New Zealand and the South Pacific.
(If required, systems installed in cold and hot climates use insulation.)

- Noise: < 40 dB L_{Aeq} at a distance of 1m
- Electricity Consumption (per year):
Treatment process .45 kWh/d; effluent pump typically 165 kWh (per year); transfer pump 135 kWh (per year). Power consumption are typical and can vary significantly depending on the size and location of the dispersal system and the actual household water usage.
- Maintenance:
Requires at least an annual service (Note: Some Regional Authorities require at least two services per year regardless of the type of on-site wastewater system)
- Minimum Serviceable Life: 15 years

Treatment Process

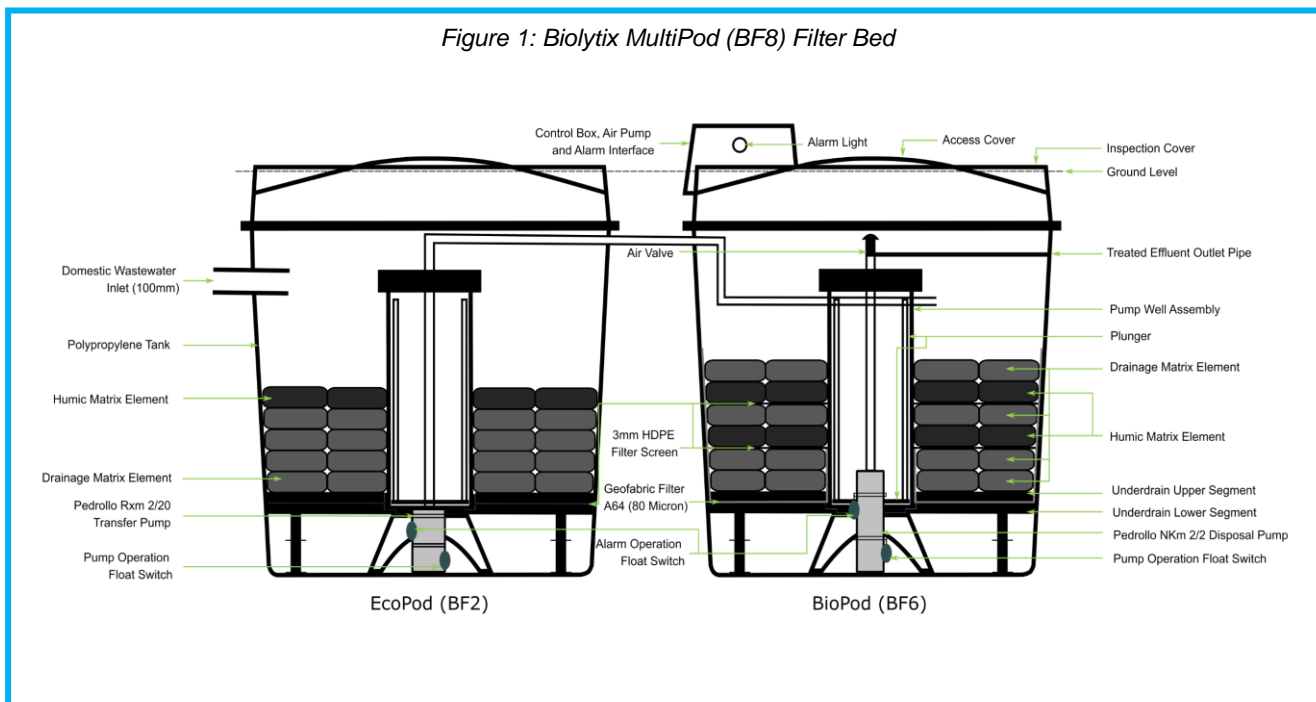
The BF8 filter process (Figure 1) is contained in two Reln injection moulded high grade polypropylene tanks in series.

The first tank receives all household wastewater via standard gravity drainage. The tank contains 0.45m³ of plastic treatment media which acts as a roughing filter, reducing the solids and organic loading to the second tank. Effluent percolates through the media layer and through a 3mm filter screen to the underdrain system. Larger solids are captured and broken down in the filter bed with smaller particles and soluble organic waste filtering through to the underdrain. A submersible recycle pump or air lift pump located in the bottom of the first tank distributes the primary treated effluent to the top of the second tank.

The second tank is a standard Bio-Pod and consists of alternating layers of drainage elements and organic elements. All layers contain plastic trickling filter media contained in open-mesh bags. In the filter bed there is in excess of 1.3m³ of plastic filter media with a high porosity and a high specific surface area. The organic layers additionally contain coco peat, the fibrous structure of which significantly increases the available treatment surface. The layers are separated by a 3mm coarse HDPE mesh fabric.

The resulting filter bed mimics a natural soil habitat, containing a diverse ecosystem of micro and macro-organisms. These organisms aerobically treat the wastewater as it percolates through the bed. On commissioning, the filter is inoculated with 1 kg of tiger worms (*Eisenia Fetida*). These worms

Figure 1: Biolytix MultiPod (BF8) Filter Bed



propagate and burrow through the filter bed, thereby keeping its structure open and porous. A Schego M2K3 air pump is used to provide additional air to the bed at the rate of 350L per hour. A geotextile filter layer with a nominal pore size of 80 micron separates the filter bed from the effluent storage sump. Its purpose is to remove fine solids from the treated effluent. The bed drains into the underdrain and central pump well, from where the effluent is pumped using a submersible pump to a land dispersal system (e.g. subsurface drip irrigation). The pump is controlled by a factory set float switch. The total bed depth including sump is 1050 mm.

Configuration Options

The BF8 can be installed in-ground or above ground. Local Council restrictions may apply to above-ground installations (Land Use/Building Consent conditions etc.). Available tank sizes are 3000 L and 4000 L. Both tanks have the same bed configuration and provide the same treatment capacity and performance, but use different inlet invert depths as follows:

- BF6 3000 tank: 650 mm invert
- BF6 4000 tank: 1100 mm invert

Tank Dimension:

3000 L Tank: 2m D x 1.9m H

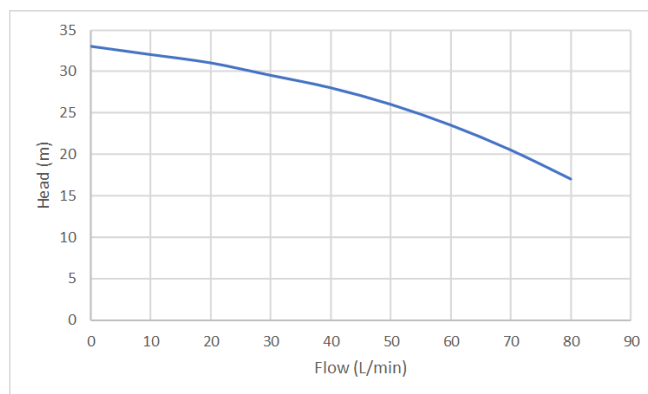
4000 L Tank: 2m D x 2.3m H

Tank Weight: 450kg

The BF8 effluent is either gravity drained or pumped to a dispersal system. The pump-out (dose) volume is 220 L per cycle. The standard pump is a high-

quality Pedrollo NK 2/2-N submersible pump, the characteristics of which are shown in Figure 2 below. Other Pedrollo pumps may be used instead to suit specific sites. Contact Biolytix to discuss your requirements and for information on the types of pumps available.

Figure 2: Pedrollo NKm 2/2 characteristic curve (power 0.45 kW)



Alarm System

The BF8 is equipped with an AS/NZS 1546.3 compliant audible and visual alarm with a mutable audible signal and an alarm light. The alarm must be mounted in a location that is readily visible from within the dwelling. Alarms are triggered by either a high-level float switch in the pump well or an air pressure switch on the air supply line.

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On-site Effluent Treatment National Testing Programme (OSET NTP)

PERFORMANCE CERTIFICATE Biolytix MultiPod OSET NTP Trial 12, 2016/2017

System Tested

The Biolytix MultiPod Biological Trickling Filter with Vermicomposting wastewater treatment system participated in Trial 12 of the On-site Effluent Treatment National Testing Programme (OSET NTP). This commenced on 24 October 2016 and ran over nine months (39 weeks) during which the treated effluent discharge was monitored generally every six days. The Biolytix MultiPod Biological Trickling Filter with Vermicomposting wastewater treatment system tested had a rated capacity of 2000 L/day and was constructed from two 3200L Tanks with 1900L operating volume plus 450L growth media in Tank 1 and 460L operating volume plus 1300L growth media, a Schego M@K3 5W air blower plus an 80 micron geofabric between the growth media and the operating volume in Tank 2, together with 3,100L emergency storage capacity between both tanks.

Test Flow Rate

The Biolytix MultiPod wastewater treatment system was tested at 1,000 litres/day (equivalent to servicing a 3-bedroom 5 to 6 person household) over an 8 month (35 week) period October 2016 to June 2017 followed by a 1 month (4 week) high load effects test involving 5 days at 2,000 litres/day then 1,000 litres/day over the following 3 weeks. Note that the manufacturer's advised design capacity for this plant is 2,000 L/day (with short term peak capacity of 2,500 L/day).

Testing and Evaluation Procedures

A total of 39 treated effluent samples of organic matter (BOD₅) and suspended solids (TSS) at generally six day intervals during weeks 9 to 35 were tested and evaluated against the secondary effluent quality requirements of the joint Australia/NZ standard AS/NZS 1547:2012.

A total of 16 treated effluent samples of organic matter (BOD₅), total suspended solids (TSS), total nitrogen (TN), ammonia nitrogen (NH₄-N), total phosphorus (TP) and faecal coliforms (FC) at generally six day intervals during weeks 23 through 35 were tested and the results benchmarked and rated on their median values.

General Performance

The Biolytix MultiPod plant operated unattended throughout the trial and performed consistently well with respect to BOD and TSS removal. The plant stabilised quickly with BOD and TSS achieving 7 mg/L by Week 7 and 2 - 5 mg/L from Week 15 onwards. There was a progressive increase in nitrification through to Week 11 from when NH₄-N was <10 mg/L. However, denitrification was poor throughout, with TN varying 30 - 45 mg/L. TP removal was moderate. Bacteria removal achieved 3.2 log removal which is good for a secondary treatment plant. Power usage was low for a package secondary treatment plant at 0.45 kWh/day.

AS/NZS 1547:2012 Secondary Effluent Quality Requirements

These requirements are that 90% of all test samples must achieve a BOD₅ of $\leq 20 \text{ g/m}^3$ and TSS of $\leq 30 \text{ g/m}^3$ with no one result for BOD₅ being $>30 \text{ g/m}^3$ and no one result for TSS being $>45 \text{ g/m}^3$. The Biolytix MultiPod plant had **100% of BOD₅** results and **100% of TSS** results within the **Secondary Effluent Quality** requirements for both the 90%ile and maximum limits above. **The Biolytix MultiPod plant thus achieved AS/NZS 1547 secondary effluent quality performance requirements** when operated at 1,000 L/day, which is only 50% of the manufacturer's advised design capacity of 2,000 L/day, although both of these parameters were hardly affected by the high flow test at 2,000L/d.



On-site Effluent Treatment National Testing Programme (OSET NTP)

Benchmark Ratings

The Biolytix MultiPod system achieved the following effluent quality ratings over the sixteen benchmarking results in weeks 20 to 35 (when operated at 1,000 L/day or 50% of the advised plants design capacity):

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	A	B	C	D
BOD (mg/L)	2	0.3	A+	<5	<10	<20	<30	≥30
TSS (mg/L)	3	1	A+	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	38.7	3.7	D	<5	<15	<25	<30	≥30
NH ₄ - Nitrogen (mg/L)	8.9	2.7	B	<1	<5	<10	<20	≥20
Total phosphorus (mg/L)	3	0.5	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	18,600	30,500	C	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)	0.45	0.07	A	0	<1	<2	<5	≥5

This Certificate of Performance applies to an Biolytix MultiPod Biological Tricking Filter with Vermicomposting wastewater treatment system with a rated capacity of 2000 L/day as described in the 'System Tested' above.

This certificate is valid for 5 years from the date below. For the full OSET NTP report on the performance of the Biolytix MultiPod wastewater treatment plant contact Karl Gieseler, Phone: 0800 700 818, Mobile 021 738 242 or Email: karl@biolytix.com

Authorised By:

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