

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

PERFORMANCE CERTIFICATE Biocycle 8000 On-site Domestic Wastewater Treatment System, OSET NTP Trial 9, 2013/2014

System Tested

The **Biocycle 8000 system** is a submerged aerated filter wastewater treatment unit. The manufacturer's rated design capacity is 1,400 litres/day. Total liquid volume is 7,900 litres (2 chamber primary treatment 3400 litres; primary clarifier 600 litres; aeration tank 3,300 litres; secondary clarifier; 300 litres.; pump chamber 300 litres). Emergency storage is 1,600 litres. No tertiary treatment (such as UV disinfection) is incorporated. It is a single tank system with 5 chambers. The manufacturer's nominated service frequency is 6 monthly.

Test Flow Rate

The **Biocycle 8000 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 November 2013 to July 2014 followed by a 1 month (4 week) high load effects test involving 5 days at 2,000 litres per day then 1,000 litres/day over the following 3 weeks.

Testing and Evaluation Procedures

High BOD occurred between 4 February to 13 March. The manufacturer found the blower was operating at a reduced output compromising aeration and replaced it with an identical model on 11 March. Ten test results were compromised in this period. With the manufacturer's agreement nine substitute tests were undertaken between 22 March and 15 April on similar week days as the compromised results. These replacement results were adopted for the AS/NZS technical performance evaluation with the approval of SWANS-MAG.

A total of 37 treated effluent samples of organic matter (BOD₅) and 36 treated effluent samples of 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. In addition, the energy used by the treatment system was assessed on the mean of consumption levels over the benchmarking period.

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 **Biocycle 8000** plant tested **did not satisfy the AS/NZS 1547 secondary effluent quality performance requirements**. Whilst it had 100% of BOD₅ results within the AS/NZS 1547 secondary effluent quality performance requirements, and satisfied the maximum TSS requirement level it did not satisfy the requirement for 90% of TSS results to be less than 30mg/L, so did not meet the TSS requirements of AS/NZS 1547:2012.

Benchmark Ratings

The **Biocycle 8000 system** achieved the following effluent quality ratings for the sixteen benchmarking results in weeks 20-35.

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	A	B	C	D
BOD (mg/L)	12.5	3.6	B	<5	<10	<20	<30	≥30
TSS (mg/L)	24.5	5.2	C	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	38.4	5	D	<5	<15	<25	<30	≥30
NH ₄ - Nitrogen (mg/L)	29.9	3.9	D	<1	<5	<10	<20	≥20
Total phosphorus (mg/L)	4.7	0.6	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	316,000	341,000	D	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)	1.4	0.02	B	0	<1	<2	<5	≥5

This Performance Certificate is specific to the **Biocycle 8000** model as specified above when operated at a flow rate of 1,000 litres/day, and is valid for 5 years from the date below. For the full OSET NTP report on the performance of the **Biocycle 8000 system** contact Biocycle Systems, Hamilton, Phone: 07 856 2880, Email: biocyclesystems@xtra.co.nz

Biocycle changed ownership during the trial, the new owners elected to withdraw the **Biocycle 8000 model** from the market and contracted Opus to review and upgrade the plant.

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