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

PERFORMANCE CERTIFICATE
Ecocycle Fusion On-site Domestic Wastewater Treatment System,
OSET NTP Trial 10, 2014/2015

System Tested
The **Ecocycle Fusion system** is a Recirculating Packed Bed Biofilter Wastewater Treatment Plant using Standard Grade Coir Dust as the biofilter system. The manufacturers rated design capacity is 2,000 litres/day. Total liquid volume is 8,200 litres (Primary Chamber 4,500 litres; Packed Bed Biofilter 1,000 litres; Clarifier 1,000 litres; Recirculation and Pump Chamber 500 litres, Emergency storage 1,200 litres). No tertiary treatment (such as UV disinfection) is incorporated. It comprises a single concrete tank (2.9mL x 2.4mW x 1.9mH). The recirculation/discharge pump has a capacity of 24.4 Lpm and a recycle ratio of 0.75:1. The recirculation line is located prior to a final discharge filter comprising a 40mm 130 micron Amiad Tagline Disc Filter. The manufacturers stated service frequency is 6 monthly.

Test Flow Rate
The **Ecocycle Fusion 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 2014 to July 2015 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 2 weeks.

Testing and Evaluation Procedures
A total of 37 treated effluent samples of organic matter (BOD_5) 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 (BOD_5), total suspended solids (TSS), total nitrogen (TN), ammonia nitrogen (NH_4-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 16 sample days.

AS/NZS 1547:2012 Secondary Effluent Quality Requirements
These requirements are that 90% of all test samples must achieve a BOD_5 of $\leq$ 20 g/m^3 and TSS of $\leq$ 30 g/m^3 with no one result for BOD_5 being >30 g/m^3 and no one result for TSS being >45 g/m^3. The **Ecocycle Fusion system achieved** a performance level of **97%** for BOD_5 and **95%** for TSS based on the full set of 37 test results in weeks 9 to 35, with no results exceeding the maximums. The **Ecocycle Fusion system** thus **meets** the secondary effluent quality requirements of AS/NZS 1547:2012 at the test flow rate of 1,000 L/day (ie at 50% of the plants advised design capacity).

Benchmark Ratings
The **Ecocycle Fusion system achieved** the following effluent quality ratings for the sixteen benchmarking results in weeks 20 to 35.

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	*A*	*B*	*C*	*D*
BOD (mg/L)	*5*	*3.5*	A	*<5*	*<10*	*<20*	*<30*	*≥30*
TSS (mg/L)	*8*	*4.6*	A	*<5*	*<10*	*<20*	*<30*	*≥30*
Total Nitrogen (mg/L)	*40.7*	*2.5*	D	*<5*	*<15*	*<25*	*<30*	*≥30*
NH_4- Nitrogen (mg/L)	*17*	*3.7*	C	*<1*	*<5*	*<10*	*<20*	*≥20*
Total phosphorus (mg/L)	*4.2*	*0.4*	B	*<1*	*<2*	*<5*	*<7*	*≥7*
Faecal Coliforms (cfu/100mL)	*163,000*	*80,900*	D	*<10*	*<200*	*<10,000*	*<100,000*	*≥100,000*
Energy (kWh/d) (mean)	*0.2*	*0.05*	A	*0*	*<1*	*<2*	*<5*	*≥5*

This Performance Certificate is specific to the **Ecocycle Fusion** 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 **Ecocycle Fusion system** contact **Ecocycle Ltd**, Tauranga, P: +64 7 543 1594, or E: sales@ecocycle.co.nz .

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