

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

PERFORMANCE CERTIFICATE Hydrozone Pureflow On-site Domestic Wastewater Treatment System, OSET NTP Trial 11, 2015/2016

System Tested

The **Hydrozone Pureflow system** is a Packed Bed Recirculating Biofilter Wastewater Treatment Plant using Coconut fibre as recirculating biofilter growth media [60,000 m²]. The manufacturers rated design capacity is 2,000 litres/day. Total operational liquid volume is 7,500 litres (Primary Chamber 4,500 litres; Pump Chamber 1,200 litres; Emergency storage 2,000 litres). No tertiary treatment (such as UV disinfection) is incorporated. It comprises a single 4 chamber tank. There is a 100mm Biotube effluent filter in the Primary Chamber and a Filtermaster 130 micron final effluent filter. The discharge pump was a Wallace AD32-750 3kW. The manufacturers stated service frequency is 6 monthly.

Test Flow Rate

The **Hydrozone Pureflow 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 2015 to July 2016 followed by a 1 month (4 week) high load effects test involving 3 days at 1,500 litres/day followed by 2 days at 2,000 litres/day then 1,000 litres/day over the following 2 weeks. The test flow rate was only 50% of the rated plant design capacity.

Testing and Evaluation Procedures

A total of 37 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. In addition, the energy used by the treatment system was assessed on the mean of consumption levels over the 16 sample days.

General Performance

The **Hydrozone Pureflow** plant had a number of issues during the testing period requiring operator attendance including: a failed discharge pump float, a leak between the primary and pumpout chamber in December, clogging of the recirculating valve and final discharge filter by coconut media fines. **This number of structural, plant and operational errors is considered by the Audit Group to be unsatisfactory.**

AS/NZS 1547:2012 Secondary Effluent Quality Requirements

These requirements are that 90% of all test samples must achieve a BOD₅ of ≤ 20 g/m³ and TSS of ≤ 30 g/m³ with no one result for BOD₅ being >30 g/m³ and no one result for TSS being >45 g/m³. The **Hydrozone Pureflow system** tested at 1000 L/day had poor BOD₅ removal with concentrations exceeding both the 90 percentile and maximum required by AS/NZS 1547. Therefore secondary effluent quality performance standards were not met. 97% of TSS results were within the requirements for the 90 percentile limits and 100% within the maximum limits, i.e. it complied with the TSS requirements. **Overall the Hydrozone Pureflow plant failed to comply with AS/NZS 1547 secondary effluent quality performance.**

Benchmark Ratings

The **Hydrozone Pureflow 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)	24	10.5	C	<5	<10	<20	<30	≥30
TSS (mg/L)	13.5	4.4	B	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	35.4	2.5	D	<5	<15	<25	<30	≥30
NH ₄ - Nitrogen (mg/L)	29.7	6.4	D	<1	<5	<10	<20	≥20
Total phosphorus (mg/L)	4.5	1.2	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	1,100,000	951,120	D	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)	0.41	0.06	A	0	<1	<2	<5	≥5

(The above Ratings relate to the plant being operated at 1,000 L/day, which is 50% of the advised plant design capacity)

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This Performance Certificate is specific to the **Hydrozone Pureflow** model as specified above when operated at a flow rate of 1,000 litres/day (50% of advised plants design capacity), and is valid for 5 years from the date below.

Authorised By:



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