

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

PERFORMANCE CERTIFICATE Wright ProTec 10000 On-site Domestic Wastewater Treatment System, OSET NTP Trial 10, 2014/2015

System Tested

The **Wright ProTec 10000 system** is a Submerged Aerated Filter Wastewater Treatment Plant using SAGM 370L growth media in the aeration tank as the submerged fixed growth filter system. The manufacturers rated design capacity is 2,100 litres/day. Total operational liquid volume is 8,400 litres (Primary Chamber 4,500 litres; Aeration Chamber 2,100 litres; Clarifier 1,200 litres; Pump Chamber 1,200 litres; Emergency storage 616 litres). No tertiary treatment (such as UV disinfection) is incorporated. It comprises a single 4 chamber tank. The air blower is HA 002/221 CEG-145 Lpm running continuously to a fine bubble air diffuser (FlexAir TO4, 250mm disc) and an airlift pump providing 3:1 recirculation for nitrogen removal. There is a GT 150 (1mm) filter in both the Primary Chamber and Aeration Chamber plus a GT 500 (300 micron) filter after the Final Clarifier. The manufacturers stated service frequency is 6 monthly.

Test Flow Rate

The **Wright ProTec 10000 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 (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.

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 $>45 \text{ g/m}^3$. Based on the full set of 37 test results in weeks 9 to 35 the **Wright ProTec 10000 system failed both the Maximum and 90%ile BOD₅ requirements and failed the 90%ile TSS requirements so did not achieve AS/NZS 1547 secondary effluent quality performance requirements.** The **Wright ProTec 10000 system thus failed** the secondary effluent quality requirements of AS/NZS 1547:2012 at the test flow rate of 1,000 L/day (ie at 48% of the plants advised design capacity). [However, it should be noted that if only the 24 results between Weeks 18-35 (subsequent to repair of the incorrectly wired aeration pump) were considered then the Wright ProTec plant would have passed all AS/NZS 1547 secondary effluent quality performance requirements at the test flow rate].

Benchmark Ratings

The **Wright ProTec 10000 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)	7	2.8	A	<5	<10	<20	<30	≥30
TSS (mg/L)	14	5.7	B	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	33.8	1.5	D	<5	<15	<25	<30	≥30
NH ₄ - Nitrogen (mg/L)	13.2	6	C	<1	<5	<10	<20	≥20
Total phosphorus (mg/L)	4	0.5	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	28,000	81,000	C	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)	1.7	0.3	B	0	<1	<2	<5	≥5

This Performance Certificate is specific to the **Wright ProTec 10000** model as specified above when operated at a flow rate of 1,000 litres/day (48% of advised plants design capacity), and is valid for 5 years from the date below. For the full OSET NTP report on the performance of the **Wright ProTec 10000 system** contact **Wright Tanks Ltd**, Palmerston North, P: 0800 253 273, or E: andrew@wrighttanks.co.nz.

Authorised By:



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