

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

PERFORMANCE CERTIFICATE

Super-Treat NZ12 On-site Domestic Wastewater Treatment System, OSET NTP Trial 8, 2012/2013

System Tested

The **Super-Treat NZ12** on-site wastewater treatment system is a submerged aerated filter treatment unit with venture aeration. Rated design capacity is 1,500 litres/day. Total liquid volume is 6,630 litres (primary treatment 3,315 litres; secondary treatment 2,502 litres; clarification: 263 litres; pump chamber 550 litres) with aeration via a Super-Treat Model A1 venturi air injection system operating 7-10 hours/day. Emergency storage is 1,000 litres. No tertiary treatment (such as UV disinfection) is incorporated. It is a two tank system with primary treatment in the first tank and secondary treatment in a second chamber tank.

Test Flow Rate

The **Super-Treat NZ12** 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 2012 to June 2013 followed by a 1 month (4 week) high load effects test in July 2013 involving 5 days at 2,000 litres per day then 1,000 litres/day over the following 3 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. During the Pre-Benchmarking period it was found that part of the contents of the Super-Treat sample collection vessel was back siphoning to the Super-Treat discharge pump station after each pump event. As a consequence settlement within the sampling vessel concentrated samples. Following review by the Management and Audit Committee it was agreed that seven test results in weeks 19-24 were impacted and thus deleted from the AS/NZS evaluation and to remedy this two further results were collected after the normal test period was completed (weeks 41-43) and included in the evaluation, also one anonymously high TSS result recorded soon after the back siphoning issue was to be discounted from evaluation. In all, 33 results were evaluated as compared to the standard 37.

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 benchmarked and rated on their median values. The Management and Audit Committee also agreed that the three results in weeks 23-24 which had been impacted by back siphoning were to be deleted and substituted for three additional results undertaken in week 29. 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 $>45 \text{ g/m}^3$. The **Super-Treat NZ12 system achieved** a performance level of **100%** for BOD₅ and **97%** for TSS based on the set of 34 test results evaluated, with no results exceeding the maximums. The **Super-Treat NZ12 system thus meets** the secondary effluent quality requirements of AS/NZS 1547:2012.

Benchmark Ratings

The **Super-Treat NZ12 system achieved** the following effluent quality ratings for the sixteen benchmarking results evaluated.

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	A	B	C	D
BOD ₅ (mg/L)	4.0	1.7	A+	<5	<10	<20	<30	≥30
TSS (mg/L)	19	4.6	C	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	23.8	2.5	B	<5	<15	<25	<30	≥30
NH ₄ - Nitrogen (mg/L)	6.0	4.5	B	<1	<5	<10	<20	≥20
Total phosphorus (mg/L)	3.9	0.3	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	91,000	30,600	C	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)**	9.6	1.6	D	0	<1	<2	<5	≥5

**** Note:** Overall energy rating reflects conditions at the test facility – power consumption for effluent pumping under field conditions will be specific to the distribution system as installed.

This Performance Certificate is specific to the **Super-Treat NZ12 system** model as specified above when operated at a flow rate of 1,000 litres/day and operational power usage of 9 kWh/day and is valid for 5 years from the date below. For the full OSET NTP report on the performance of the **Super-Treat NZ12 system** Super-Treat Systems Pty Ltd, NSW, Australia P: +61 02 4421 7287 or Northland Waster Treatment and Tanks, KeriKeri P: 0011 649 407 4989 E: supertreatnz@xtra.co.nz

Authorised By:

Ray Hedgland, Technical Manager, OSET NTP

23 March 2014

**On-site Effluent Treatment National Testing Programme, c/- Technical Manager, 10/20 Selwyn Rd, Howick
AUCKLAND 2014 Ph: (09) 534 9247 Mob: 021 626 772 E-mail: ray@hedgland.co.nz**