



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

### PERFORMANCE CERTIFICATE GRAF Plastics EClean20 OSET NTP Trial 12, 2016/2017

#### **System Tested**

The Graf Plastics EClean 20 Sequencing Batch Reactor wastewater treatment system participated in Trial 12 of the On-site Effluent Treatment National Testing Programme (OSET NTP). This commenced on 24 October 2016 and ran over nine months (39 weeks) during which the treated effluent discharge was monitored generally every six days. The Graf Plastics EClean 20 SBR wastewater treatment system tested had a rated capacity of 2000 L/day and was constructed from a 6500L treatment tank with operating volume varying from 4510L to 6010L, plus a separate 1200L pump chamber. The SBR is timer controlled with 2 batches/day. The air blower is a Nitto LA 80, 86W operated intermittently and there is an airlift discharge pump with 3000L/h capacity. The minimum emergency storage comprised 1090L. The service requirement is 6 monthly.

#### **Test Flow Rate**

The Graf Plastics EClean 20 SBR wastewater treatment system was tested at 1,000 L/day (equivalent to servicing a 3-bedroom 5 to 6 person household) over an 8 month (35 week) period October 2016 to June 2017 followed by a 1 month (4 week) high load effects test involving 5 days at 2,000 L/day then 1,000 L/day over the following 3 weeks. Note that the manufacturer's advised design capacity for this plant is 2,000 L/day.

#### **Testing and Evaluation Procedures**

A total of 39 treated effluent samples of organic matter (BOD<sub>5</sub>) 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<sub>5</sub>), total suspended solids (TSS), total nitrogen (TN), ammonia nitrogen (NH<sub>4</sub>-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.

#### **General Performance**

Apart from a discharge pump failure during the plant commissioning/media development phase the Graf Plastics EClean 20 SBR wastewater treatment system operated unattended throughout the trial. The plant performed well overall, with very low and stable BOD results, low but less stable TSS results, very low levels of NH<sub>4</sub>-N but only moderate reduction of TOXN and Total Nitrogen, indicating a high level of nitrification but only a moderate level of denitrification occurred. Its energy use was also low (0.88 kWh/d) and bacteria removal was good with a 3.2 log reduction overall. The plant handled the high flow test well with respect to BOD, TSS and NH<sub>4</sub>.

#### **AS/NZS 1547:2012 Secondary Effluent Quality Requirements**

These requirements are that 90% of all test samples must achieve a BOD<sub>5</sub> of  $\leq 20 \text{ g/m}^3$  and TSS of  $\leq 30 \text{ g/m}^3$  with no one result for BOD<sub>5</sub> being  $>30 \text{ g/m}^3$  and no one result for TSS being  $>45 \text{ g/m}^3$ . The Biolytix MultiPod plant had **100% of BOD<sub>5</sub>** results and **100% of TSS** results within the **Secondary Effluent Quality** requirements for both the 90%ile and maximum limits above. The GRAF EClean 20 SBR plant had **100% of BOD<sub>5</sub>** results and **100% of TSS** results within the **Secondary Effluent Quality** requirements for both the 90%ile and maximum limits above. **The GRAF EClean 20 SBR plant thus achieved AS/NZS 1547 secondary effluent quality performance requirements** when operated at 1,000 L/day, which is only 50% of the manufacturer's advised design capacity of 2,000 L/day, and coped with the high flow of 2,000L/d with little impact upon performance.



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### Benchmark Ratings

The Graf Plastics EClean 20 SBR plant achieved the following effluent quality ratings over the sixteen benchmarking results in weeks 20 to 35 (when operated at 1,000 L/day or 50% of the advised plants design capacity):

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	A	B	C	D
BOD (mg/L)	2	0.2	A+	<5	<10	<20	<30	≥30
TSS (mg/L)	8	2.9	A	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	26.35	4.7	C	<5	<15	<25	<30	≥30
NH <sub>4</sub> - Nitrogen (mg/L)	0.17	0.2	A+	<1	<5	<10	<20	≥20
Total phosphorus (mg/L)	2.38	0.4	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	14,000	15,500	C	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)	0.9	0.06	A	0	<1	<2	<5	≥5

This Certificate of Performance applies to the Graf Plastics EClean 20 Sequencing Batch Reactor wastewater treatment system with a rated capacity of 2000 L/day as described in the 'System Tested' above.

This certificate is valid for 5 years from the date below. For the full OSET NTP report on the performance of the Graf Plastics EClean 20 Sequencing Batch Reactor wastewater treatment system contact the Graf NZ Business Development Engineer, Bernard Robinson,  
Mobile 027 285 9522 or Email: [b.robinson@grafaustalia.com.au](mailto:b.robinson@grafaustalia.com.au)

### Authorised By:

Ray Hedgland, Technical Manager, OSET NTP  
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