



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

PERFORMANCE CERTIFICATE Bor Plastika BP EUROTREAT SBR 10 OSET NTP Trial 13, 2017/2018

System Tested

The Bor-Plastika BP EUROTREAT SBR 10 treatment plant, comprising a sequencing batch reactor (SBR), participated in Trial 13 of the On-site Effluent Treatment National Testing Programme (OSET NTP). The trial commenced on 23 October 2017 and ran over ten months (44 weeks) during which the treated effluent discharge was monitored generally every six days. The Bor-Plastika BP EUROTREAT SBR 10 treatment plant tested had a normal operational capacity of 1,000L/day and maximum capacity of 2,000L/day. The plant comprised a single 6740L polypropylene treatment tank which receives direct wastewater influent without a septic tank or pre-filter, followed by a separate final effluent pump station in a 100L plastic tank. There is a SECOH JDK-S-120 95W Air Blower located in an external wall-mounted console with 3 x 300mm diam Supratec concrete socket plate air diffusers located on the bottom of the treatment tank. The total aeration time is 7.73 hours/day. There is no final effluent filter.

The emergency storage at normal operational flow is 1,700L, reducing to 700L at maximum capacity.

The service requirement is 6 monthly

Test Flow Rate

The Bor-Plastika BP EUROTREAT SBR 10 treatment plant was tested at 1,000L/day (equivalent to servicing a 3-bedroom 5 to 6 person household) over an 10 month (40 week) period November 2017 to August 2018 including a 1 month (4 week) high load effects test involving 5 days at 2,000L/day then 1,000L/day over the following 3 weeks.

Testing and Evaluation Procedures

A two-month (8 week) media development and settling-in period was initially proposed, but this was extended to 12 weeks due to an unscheduled geothermal waste influent flow on 23 November, followed by extreme weather events in Rotorua, resulting in widespread flooding and high infiltration into the sewerage system, along with an electrical storm impacting on the testing facility control system in early December. Ten samples were taken during this period (Weeks 4 to 12). The Bor-Plastika BP EUROTREAT SBR 10 treatment plant was installed after the geothermal influent and weather events, so they had no impact upon plant performance.

The performance evaluation testing programme followed involving a three-month pre-benchmarking period (20 samples over Weeks 13 to 28), and a three-month benchmarking period (19 samples over Weeks 29 to 40). Within each block, a five-day consecutive sample period occurred (Weeks 25 and 34). A one-month high load assessment period followed in Weeks 42 to 44 (three samples).

The 39 samples taken through the pre-benchmarking and benchmarking periods were used to assess treatment performance against the **Secondary Effluent Quality** requirements for biochemical oxygen demand (BOD₅) and total suspended solids (TSS) defined by AS/NZS 1547:2012 as set out in AS/NZS 1546.3:2008

A total of 19 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 28 through 40 were tested and the results benchmarked and rated on their median values.

General Performance

The Bor-Plastika BP EUROTREAT SBR 10 treatment plant was not installed until 30 November 2017 (Week 6) due to delayed departure from Bosnia, but had good BOD₅ and TSS results by Week 9. In January, at the start of the trial, the plant's control panel failed and had to be replaced. There were no other equipment



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failures, although attendance was required late in the trial to reconnect a discharge PVC pipeline that had separated from the plant. Overall, the plant performed well throughout the study, except for TSS which exceeded the allowable AS/NZS 1547 maximum limit.

In terms of effluent quality, the Bor-Plastika BP EUROTREAT SBR 10 plant produced low and stable BOD₅ results (90% <4.6mg/L), and a high level of nitrification (NH₄-N overall mean 3.5mg/L). There was little denitrification, however, and TN was high. TSS was the only issue. Bacteria removal was moderately good throughout, and the plant's power usage was low, averaging 0.94kWh/day, for a package secondary treatment plant.

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 Bor-Plastika BP EUROTREAT SBR 10 plant achieved the BOD₅ requirements, but **failed both the maximum and 90 percentile TSS requirements** therefore **FAILED the requirements for compliance with AS/NZS 1547 Secondary Effluent Quality standards** when operated at the manufacturer's advised normal flow design capacity of 1,000L/day.

Benchmark Ratings

The Bor-Plastika BP EUROTREAT SBR 10 system achieved the following effluent quality ratings over the benchmarking period (when operated at 1,000L/day, which is the manufacturer's advised normal flow design capacity):

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	A	B	C	D
BOD ₅ (mg/L)	2.3	2.4	A+	<5	<10	<20	<30	≥30
TSS (mg/L)	15.5	9.6	B	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	36	3.4	D	<5	<15	<25	<30	≥30
NH ₄ -Nitrogen (mg/L)	2.1	1.1	A	<1	<5	<10	<20	≥20
Total Phosphorus (mg/L)	4.3	0.7	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	8,500	51,400	B	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)	0.94	0.05	A	0	<1	<2	<5	≥5

This Certificate of Performance only applies to the Bor-Plastika BP EUROTREAT SBR 10 treatment plant as described in the 'System Tested' above when operated at 1,000 L/day, which is the manufacturer's advised normal flow design capacity.

The certificate is valid for 5 years from the date below. For the full OSET NTP report on the performance of the Bor-Plastika BP EUROTREAT SBR 10 treatment plant contact Armin Ficza, Mobile: 021 193-1777 or Email: z11kmn@xtra.co.nz

Authorised By:

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