



VĮ STATYBOS PRODUKCIJOS SERTIFIKAVIMO CENTRAS
 Linkmenų str. 28, LT-08217 Vilnius, Lithuania
Waste water treatment plant laboratory

TEST REPORT No. LAB-01/B
 Treatment efficiency test
 2013-06-28

1. CLIENT: BIONOR SP. Z O.O. Zbigniew Dyk ul. Ściegiennego 26 25 – 114 Kielce, Poland, contract No. NVI-32_2013;
2. MANUFACTURER: BIONOR SP. Z O.O. Zbigniew Dyk ul. Ściegiennego 26 25 – 114 Kielce, Poland;
3. SAMPLE: Small wastewater treatment plant (WWTP) BIONOR B-5, nominal hydraulic load 1,0 m³/d. Material – Polyethylene. Biological waste water treatment process with activated sludge. Detailed WWTP description and technical information provided in the Annex 1: Manual of operation and maintenance of biological wastewater treatment plant BIONOR B-5/B-10, 12 pages and Manual of control unit for wastewater treatment plant BIONOR-B5, 6 pages.
4. SAMPLE DELIVERY DATE: 2012-04-24.
5. TESTING LOCATION, ADDRESS AND DATE:
 - Wastewater treatment plant laboratory Maišiagala, Vilnius district;
 - The date presented at table 2;
6. SAMPLING: Sampling was made by the Client. Sampling report No 021-ARD.
THE TEST MADE ACCORDING TO:
 CLIENT's specified conditions
7. TEST SPECIFICATIONS:

During the test inlet and outlet samples were taken flow-bases composites over 24 hours.

During the test at the aeration chamber were measured temperature, pH and dissolved oxygen concentration. The following parameters were measured at Table 1.

Table 1 During the test parameters measured*

	Parameter	Abbreviation	Measurement method	Units
1	Biochemical oxygen demand	BOD ₅	EN 1899-1:2000	mg/l
2	Chemical oxygen demand	COD	ISO 6060	mg/l
3	Suspended solids	SS	EN 872	mg/l
4	Kjeldahl Nitrogen	N _{ki}	EN 25663:2000	mg/l
5	Phosphorus	P	EN ISO 6878	mg/l
6	Ammonium nitrogen	NH ₄ -N	ISO 7150-1	mg/l
7	Nitrate	NO ₃ -N	ISO 7890-3:1998	mg/l
8	Nitrite	NO ₂ -N	EN 26777:1999	mg/l
9	Total nitrogen	N _{tot}	N _{tot} = N _{ki} + NO ₃ -N + NO ₂ -N	mg/l

*Work made by subcontractor. Reports are kept at Waste water treatment plant laboratory.

WWTP BIONOR B-5 test was started after biomass establishment sequence. The test was performed with 1,0 m³/d hydraulic flow.

The test schedules are listed in Table 2:

Table 2. The test schedules

Sequence	Sequence name	Time elapsed, weeks
	Start after biomass establishment	2013.04.24
2	NOMINAL. Nominal daily flow	7
	End of test	2013.06.12

The daily flow pattern used for testing:

Table 3 Daily flow pattern

Period h	Percentage of daily volume %
3	30
3	15
6	0
2	40
3	15
7	0

9. TEST RESULTS.

The tested organic daily load 0,324 kg/d (mean value of the 6 organic daily loads measured during the nominal sequences.

Efficiency ratios and mean values for each parameter obtained during nominal sequences is listed at Table 4. All measured values during the test are listed at Table 5.

Table 4. Efficiency ratios and mean values for each parameter obtained during nominal sequences

Parameter	Unit	Value
BOD ₅	%	98,3
COD	%	95,9
SS	%	96,7
N _{kj}	%	93,2
N _{tot}	%	71,7
P	%	95,0
NH ₄ -N	%	99,9
BOD ₅	mg/l	5,3
COD	mg/l	24,2
SS	mg/l	9,4
N _{kj}	mg/l	5,1
NO ₂ -N	mg/l	0,04
NO ₃ -N	mg/l	13,4
N _{tot}	mg/l	15,9
P	mg/l	0,31
NH ₄ -N	mg/l	0,03

Table 5. Measured values

Sequence No.	2	2	2	2	2	2	2	2	2
Flow rate	100%	100%	100%	100%	100%	100%	100%	100%	100%
Date	2013-04-30	2013-05-15	2013-05-22	2013-05-29	2013-06-05	2013-06-12			
Inlet									
Outdoor temperatur.	13	20	22	22	24	22			22
Temperature	7,5	9,7	10,6	11	11,8	12,1			
BOD ₅	306	300	406	342	291	296			
COD	394	638	616	597	782	629			
SS	208	400	328	324	348	284			
N _{ki}	43,1	71,7	54,3	70,6	91,3	95,2			
P	4,81	5,79	6,88	6,15	8,25	6,61			
NH ₄ -N	38,9	46,9	46,8	54	64,1	68,7			
pH	7,87	7,74	7,65	7,86	7,82	7,81			
Outlet									
Temperature	10	13,4	14,5	15,6	16,8	16			
BOD ₅	6,3	3,3	2,8	2,6	3,8	13,0			
COD	24	23	28	19	23	28			
SS	14,0	6,8	5,6	6,6	8,5	15,0			
N _{ki}	2,24	4,20	2,24	7,00	7,84	7,00			
NO ₂ -N	0,009	0,044	0,033	0,054	0,056	0,034			
NO ₃ -N	19,3	18,9	9,92	13,7	9,63	8,9			
N _{tot}	21,55	23,14	12,19	20,75	17,53	15,93			
P	0,441	0,143	0,37	0,017	0,391	0,512			
NH ₄ -N	0,029	0,035	0,018	0,026	0,022	0,045			
pH	7,76	7,67	7,76	7,75	7,63	7,73			
Aeration chamber									
pH	7,66	7,60	7,76	7,61	7,71	7,48			
Dissolved oxygen	5,75	0,30	8,66	0,65	7,85	3,15			
Temperature	11,80	14,60	16,30	16,00	17,9	17,5			

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10. MAINTENANCE AND REPAIRS MADE DURING THE TEST PERIOD.

Maintenance cared out by client and laboratory.
Maintenance work made during test period at Table 6.

Table 6. Maintenance work made during test period.

	Date	Maintenance work description
	2013-04-24	Start after biomass establishment
1	2013-05-15	Dewatered (partly dried) sludge removing from sludge vessel. Sludge weight - 38,0 kg;
2	2013-06-12	End of the test Dewatered and dewatered(partly dried) sludge removing from the both sludge vessels – all removed sludge weighted. Sludge weight - 65,0 kg;

There were installed air blower model LA-100, 100l/min, 0,18 bar, 100W controlled by processor for periodical (non-continued) operation.

Chemical coagulant (PAX 18, Polyaluminum Chloride) measured consumption: 6550 ml per 50 days.
Average - 131 ml/day.
(Manufacturers set dosage was 120 ml/day (per1m³ of waste water).

11. INFORMATION ON THE CONFORMITY OF THE PLANT TESTED WITH INFORMATION PROVIDED PRIOR TO TESTING.

There are not any contradictions or deviations from information provided before tests.

12. ANNEXES. Annex 1: Manual of operation and maintenance of biological wastewater treatment plant BIONOR B-5/B-10, 12 pages and Manual of control unit for wastewater treatment plant BIONOR-B5, 6 pages.

This test report only certifies the characteristics of the sample submitted for testing.

Head of laboratory

Arnas Danila

Director

Robertas Encius



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