Factsheet

Demosite afvalwaterzuiveringstechnologie Leeuwarden

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Influent	CZV	BZV	KjN-N	NH4-N	P	BEZ	Cl	pH	Debiet
	mg/l	mg/l	mg/l	mg/l	mg/l	ml/l	mg/l	-	m³/d
Gewogen gemiddelde	505,6	212,4	44,4	28,5	8,4	8,7	219		35.227
Maximum	870,0	420,0	73,0	49,9	16,0	20,0	580	8,6	138.090
Minimum	140,0	58,0	11,8	7,9	2,2	1,6	92	7,3	15.550

Effluent	CZV	BZV	KjN-N	NH4-N	NO2-N	NO3-N	N	P	ZS
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Gewogen gemiddelde	39,2	2,6	2,8	1,2	0,08	1,0	3,9	0,82	5,4
Maximum	55,0	11,0	6,7	4,6	0,37	2,6	8,7	2,60	29,0
Minimum	24,0	1,0	1,1	0,1	0,15	0,2	1,6	0,10	2,0

Effluent	BEZ	Cl	pH	Debiet
	ml/l	mg/l	-	m3/d
Gewogen gemiddelde	0,1	199		
Maximum	0,2	360	8,3	138.090
Minimum	0,1	86	7,2	15.550

Actief slib	Tempera-tuur	Zwevende stof	Gloeirest	SVI	N-Kj	Ptot	CZV
	°C	g/l	%	ml/g	mg/kg	mg/kg	g/kg
Rekenkundig gemiddelde	14,9	4,0	27	130	63382	30176	61
Maximum	23,4	5,1	32	171	80800	40000	75
Minimum	6,6	2,9	20	79	49300	27000	24

Uitgegist slib	gNEN-EN 12880	gNEN-EN 12879	NEN 6964	NEN 6966	NEN 6966	NEN 6966	NEN-ISO 16772	NEN 6966
	DS (%)	Gl.Rest (%)	As (mg/kg ds)	Cd (mg/kg ds)	Cr (mg/kg ds)	Cu (mg/kg ds)	Hg (mg/kg ds)	Pb (mg/kg ds)
Gemiddelde	4,7	44,0	20,8	1,0	42,0	288	0,3	90
Standaarddeviatie	0,2	1,1	5,7	0,2	2,4	15,0	0,0	14,7
Minimum	4,3	42,6	14,0	0,8	40,0	270	0,3	75
Maximum	4,9	45,3	26,0	1,2	45,0	300	0,4	110

Uitgegist slib	NEN 6966	NEN 6966	NEN 6966	NEN 6966	NEN 6966	NEN 6966	NEN 6966
	Ni (mg/kg ds)	Zn (mg/kg ds)	Fe (mg/kg ds)	Al (mg/kg ds)	Ba (mg/kg ds)	Co (mg/kg ds)	Mn (mg/kg ds)
Gemiddelde	25,8	638	58.000	6.200	172,5	4,3	1.550
Standaarddeviatie	2,5	38,6	6.683	542	15,0	0,4	614
Minimum	23,0	600	52.000	5.800	160	3,8	800
Maximum	29,0	680	67.000	7.000	190	4,7	2.100

Uitgegist slib	NEN 6966	NEN 6966	SPV A019	SPV A019	SPV A005	SPV A009	SPV A028
	Mo (mg/kg ds)	V (mg/kg ds)	7 PCB's (ug/kg ds)	20 OCB's (ug/kg ds)	VROM10 (mg/kg ds)	N-Kj (mg/kg ds)	P (mg/kg ds)
Gemiddelde	3,3	19,8	13,2	26,3	0,5	80.225	39.750
Standaarddeviatie		1,3	7,5	7,4		9.395	2.363
Minimum	3,3	18,0	5,9	19,0	0,5	69.700	38.000
Maximum	3,3	21,0	23,0	34,0	0,5	88.300	43.000

Lavatoren influent	H_2S	NH^3	Vochtigheid	Temperatuur	Vochtigheid	Snelheid
	ppm	ppm	%	°C	[g/m³]	m/s
Gemiddelde	2,8	6,2	99,3	14,4	12,6	6,8
Maximum	9	11	99,9	20	17,1	7,1
Minimum	0	0	97	11,7	10,6	6,2

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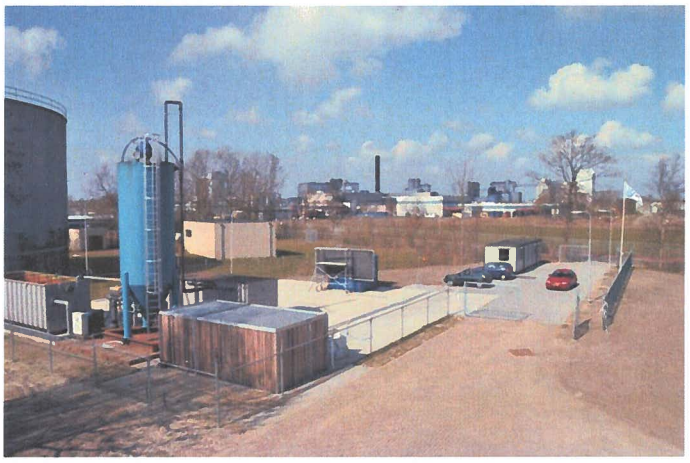
Demo site wastewater treatment technology Leeuwarden

Organisation:
The Frisian water authority Wetterskip Fryslân

Description of the site
Wetterskip Fryslân has build a demo site at the waste water treatment plant (WWTP) Leeuwarden in close collaboration with Wetsus. The demo site is a research site for wastewater treatment technology. This is unique in the Netherlands and in the world. The Demo site in Leeuwarden facilitates companies, research institutions and water authorities to do quick and efficient research in order to promote the development of innovative and sustainable wastewater purification technologies. At the demo site all the existing process flows of a WWTP, such as influent, effluent, sludge, have been made available at a central research location. In other words, 'plug & play'. The research equipment can be easily connected to the piping. There is room for at least four large containers (40 ft) for technological research. In the portacabin small experiments and analyzes can be done.



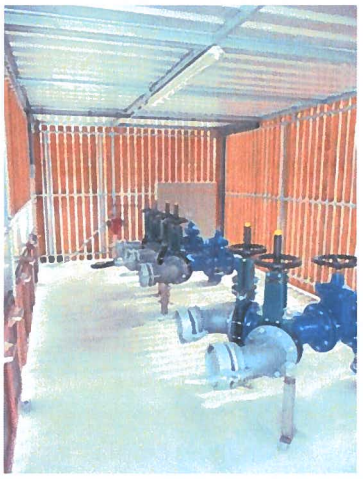


Photo 1 and 2: "Plug & Play" at the demo site wastewater treatment technology Leeuwarden

Facilitating research can eventually lead to cost savings and / or improve the functioning of the sewage treatment plants. Water Technology companies can move faster to market launch and sales of a newly developed technology. The Demo Site Leeuwarden can quickly lead an idea into a successful and profitable technology. The Demo site was funded by Wetterskip Fryslân and co funded by the European Regional Development Fund (ERDF) and the Ministry of Economic Affairs. Summurizing the benefits of the demo site for waste water and sludge:

1. To facilitate external and internal research
2. To stimulate and support innovation
3. To realize fast application of efficient and sustainable technology
4. To learn from applied research

Every year, Wetterskip Fryslân purifies hundred million cubic meters of wastewater (about 3 million trucks) in 28 wastewater treatment plants (WWTPs) in Fryslân. Leeuwarden is the largest sewage treatment plant of Friesland. Every day 40,000 m3 of waste water is being purified. The wastewater comes from homes and industries. The total waste water stream is equal to 200,000 households.

WWTP Leeuwarden is an expert in extracting energy from wastewater. Two large digesters are converting sludge into biogas. Wetterskip Fryslân is using this biogas for the generation of electricity with two gas engines. The excess residual heat released during the production of electricity supplies water board in the neighboring elderly home Greunshiem.
In December 2015 a new pilot project has been started with transporting and selling biogas to nearby organisations Fier and Wetsus on the Watercampus.

Photo 3: Biogas purification station; © Van der Wiel bv)

What is innovative about it?
The demo site Leeuwarden is an innovative research facility which allows testing of novel wastewater treatment technologies in order to identify and mitigate challenges before full-scale application. Participants will also be introduced to several innovative research and demonstration projects that have been carried out at the demo site during the visit, among others:

- tertiary treatment with algae,
- destruction of sludge by thermal treatment (thermal pressure hydrolysis)
- piloting a fine sieve to remove non-dissolved constituents from raw influent
- making bioplastics from sludge

Moreover the biogas network project is a marvelous innovative showcase and unique in the Netherlands.

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INNOVATION / PILOT.

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