

WehoPuts®

Small wastewater treatment plants WehoPuts 12-70 – Purification results

KWH Pipe's small wastewater treatment plants for several properties are biochemical, package treatment plants for year-round use. The plants are designed and manufactured in Finland to meet the requirements set by the Government Decree on Treating Domestic Wastewater in Areas Outside Sewer Networks (542/2003).

Substance	Decree's purification requirement
BOD ₇	> 90%
P	> 85%
N	> 40%

BOD₇ = Biological oxygen demand; measurement period: 7 days

P = total phosphorus

N = total nitrogen

The larger treatment plants are usually installed in village communities, terraced houses, golf courses, camp resorts, small businesses, schools, etc. The number following the name of a WehoPuts treatment plant indicates the size of the plant (number of residents in the installation site). For example, the WehoPuts 30 is a small, wastewater treatment plant for 30 residents.

In addition to being able to handle fluctuating loads better than the smaller models, the larger treatment plants make it possible to divide the acquisition and maintenance costs between the properties using the unit. Furthermore, grants can be obtained to cover the costs incurred by the larger treatment plants.

All of the samples in this report were analysed in laboratories approved by the Finnish Centre for Metrology and Accreditation (FINAS accredited laboratories).

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Installation site: Seikelä School

The Seikelä School, which is located in the municipality of Masku, was expanded, and the wastewater management was among the issues that needed to be resolved before building permission could be granted. The fact that, in a few years, the school is to be connected to the municipal sewer network was given due consideration when selecting the size of the system. The wastewater treatment system was installed in the summer of 2005, and it was taken into use in August at the beginning of the school year.



The site is being monitored by Agenda 21 for Southwest Finland project, which also collects the samples of purified wastewater. Agenda 21 is a collaborative project between 27 municipalities that aims to promote sustainable development. It was initiated in 1997.

Table 1. Efficiency of wastewater purification, in %. The waste concentration for the water was assumed to correspond to normal domestic wastewater, and the purification level has been calculated based on a ratio of 120 litres/person/day.

Sample date	BOD ₇	P	N
Requirement level (must be exceeded)	90%	85%	40%
24/4/2007	3 mg/l = 99%	0.28 mg/l = 98%	39 mg/l = 67%
26/2/2007	3.6 mg/l = 99%	0.43 mg/l = 98%	21 mg/l = 82%
12/12/06*	6.2 mg/l = 96%	0.25 mg/l = 97%	15 mg/l = 78%
12/9/2006**	17 mg/l = 96%	13 mg/l = 29%	150 mg/l = -29%
27/4/2006	0.9 mg/l = 98%	1 mg/l = 95%	41 mg/l = 65%

*A sample of incoming water was also collected and the percentages calculated

** The school does not host summertime activities, and the plant is not drained for the summer. The sample from 12 September 2006 was collected after less than a month after being taken back into use.

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Installation site: Berny's Cafe

Berny's Cafe is perched on the seashore flanking the Raippaluoto Bridge. Before the WehoPuts small wastewater treatment plant was installed, this 600-square metre restaurant used a septic tank. The establishment's owners wanted to switch to the new solution in good time, before the end of the transition period stipulated in the Government Decree 542/2003, as the tank had to be drained as frequently as twice a week during peak seasons. Due to the frequent draining, the total annual price for waste management amounted to a staggering EUR 7,000 + transport.



In summer 2006, a WehoPuts 30 system was installed at the base of the longest bridge in Finland. The first sample from the plant was collected after only 3 months of use.

Substance	Decree's requirement	Sample 20/9/2006	Sample 30/3/2007
BOD ₇	> 90%	9.7 mg/l = 97%	10 mg/l = 97%
P	> 85%	1.7 mg/l = 88%	0.75 mg/l = 95%
N	> 40%	6.0 mg/l = 94 %	4.6 mg/l = 95%

Installation site: Kortteinen School

A WehoPuts 30 wastewater treatment plant was installed at the Kortteinen School in July 2006. The plant processes the domestic waste from a five-person household as well as the community waste from the school. The system discharges the water into a rock pit.



The purification efficiency was calculated using a ratio of 150 litres of wastewater per person per day, although the wastewater per-person generated by the school is likely to be lower.

Substance	Decree's purification requirement	Kortteinen School 23 May 2007
BOD ₇	> 90%	4 mg/l = 99%
P	> 85%	0.74 mg/l = 95%
N	> 40%	48 mg/l = 49%

Installation site: Epoo School

A WehoPuts 30 wastewater treatment plant was installed at the Epoo School, in the municipality of Porvoo, in November 2005.



The plant was set up to handle a daily influx of 50-litres of wastewater per person. The purification efficiency was calculated based on this volume of water. The plant had been cleared of sediment a few weeks before the sample was taken.

Substance	Decree's purification requirement	Epoo 22 May 2007
BOD ₇	> 90%	8.6 mg/l = 99%
P	> 85%	0.86 mg/l = 98%
N	> 40%	44 mg/l = 85%

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Installation site: Keppo Manor

The Keppo Manor, which is owned by the KWH Group and used for social events and receptions, is located in Jepua, within the municipality of Uusikaarlepyy. The manor is located on an island, which is surrounded by the Lapuanjoki River. In this case, the wastewater management system had to be refurbished within a short timeframe as the old sedimentation basins discharged the water directly into the river. It was also extremely unlikely that the municipal wastewater network would expand into the area by the end of 2013. The treatment plant that was deemed suitable to the task was a WehoPuts 40, which was installed in the autumn of 2006.



In addition to the wastewater from the manor building, the plant also processes the sewage from a detached house, a training facility and two rented buildings. The wastewater treatment plant is located in the immediate vicinity of the river and discharges its output water into an absorption field. The usage ratio of the plant is currently lower than 50%. The plant was dimensioned to be able to handle future increases in processing volume.

Substance	Decree's purification requirement	Keppo 18 September 2007
BOD ₇	> 90%	6 mg/l = 99%
P	> 85%	3.1 mg/l = 86%
N	> 40%	66 mg/l = 53%

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Installation site: Ruokoniemi Camp Resort

Siilinjärvi parish's camp resort is situated on a lake amidst rocky terrain. In order to obtain a building permit, the parish needed to replace the chemical treatment plant with a system compliant with the Government Decree 542/2003. The WehoPuts 50 wastewater treatment system was selected for the job. The treatment plant was installed in November 2005.



In addition to the wastewater from the main building and kitchen, the plant processes the sewage from the chapel, lakeshore sauna and accommodation facilities. The site poses many challenges to a wastewater treatment plant, as the resort is in heavy use during the summer, whereas in winter very little water passes through the plant. According to the plant's process counter, the plant's annual usage ratio is below 50%.

Substance	Decree's purification requirement	Ruokoniemi 15 June 2006	Ruokoniemi 23 May 2006
BOD	> 90%	14 mg/l = 97%	< 3 mg/l = 99%
P	> 85%	1.4 mg/l = 92%	0.96 mg/l = 95%
N	> 40%	50 mg/l = 57%	59 mg/l = 49%

The purification efficiency has been calculated according to Government Decree 542/2003 and at a water usage ratio of 120 litres/person/day. Bearing in mind the location's purpose of use, the water usage per-person is likely to be lower.

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Installation site: KWH Freeze



KWH Freeze is Finland's leading commercial storage facility for frozen goods. Its customers include the largest wholesale retailers, the food industry and importers of frozen goods. The wastewater treatment plant also processes the sewage from the dining hall.

The challenge with this particular site is that when large scale cleaning is conducted in the storage facility, the volume of wastewater temporarily increases dramatically from the normal level. The observed amount of water used per person is 70 litres/day, based on which the purification result has been calculated. The site has been granted an environmental permit.

Substance	Decree's purification requirement	KWH Freeze 9 August 2007
BOD ₇	> 90%	31 mg/l = 96%
P	> 85%	1.2 mg/l = 96%
N	> 40%	29 mg/l = 86%