

# **Bacteria and Fungi test in air at Lindholmens Sewage treatment plant**

# Introduction

Sorbonite® has a pH of 11-12 and reduces odors very effective. That is because the bacteria that in many cases causes the odor is eliminated by the high pH. But to verify that Sorbonite® reduces bacteria and fungi in air we conducted the tests at Lindholmen Sewage treatment plant (Sweden) under supervision of Rickard Grähs from Norrtälje municipality.

Previously test had been conducted with sewage water where Sorbonite® showed a reduction of >99% of coliform- and e-coli bacteria.

Test equipment and all analyses was provided by Eurofins Pegasuslab AB, Uppsala, Sweden.

In total two tests were provided. The first test a 2-6 mm fraction was used and the second 0,5-1 mm.

The test that was performed is called airborne spore measurement and includes both bacteria and fungus.

Thanks to Lindholmens Sewage Treatment Plant (Norrtälje, Sweden) for test and supervision.

# Test 1

Three pumps with detecting filter on the inlet. The pumps were placed beside each other as in picture 1 and air was taken above the sewage stream on the intake to the plant.

Pump capacity was approx. 1,6 L/min.

*Sorbonite® fraction:* 2-6 mm

*Test period:* 8 h

*Date:* 2023-05-22

*Pump 1:* inlet air

*Pump 2:* Reference inlet air

*Pump 3:* Inlet air with Sorbonite® filter

Sorbonite®: 156 g

## Result\*:

*Pump 1:* 6,1x10<sup>5</sup> no of bacteria

7,0x10<sup>3</sup> no of fungi

*Pump 2:* 1,2x10<sup>6</sup> no of bacteria

3,4x10<sup>4</sup> no of fungi

*Pump 3:* 1,1x10<sup>5</sup> no of bacteria

6,8x10<sup>3</sup> no of fungi (Laboratory minimum value – no fungi found)

90,8 % reduction of bacteria

80,0 % reduction of fungi

Comment: During the first hours the hose to pump 1 came loose. Air was pumped from above the pump instead of from above the water. This result is not used for result.

\*see attachment 1

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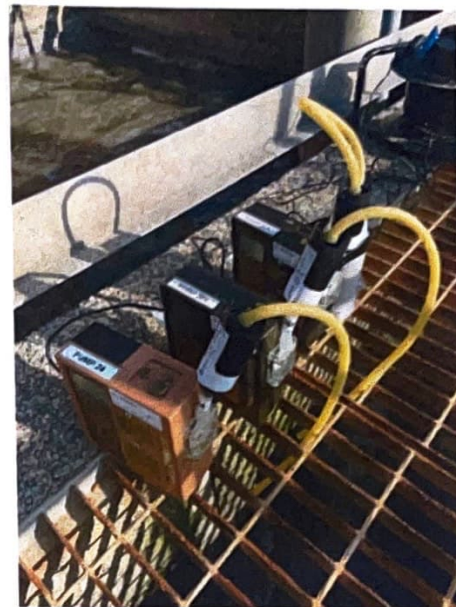


Figure 1: Test 1 at start

**SORBECO**

# Test 2

Three pumps with detecting filter on the inlet. The pumps were placed beside each other as in picture 1 and air was taken above the sewage stream on the intake to the plant.

Pump capacity was approx. 1,8 L/min.

Sorbonite® fraction: 0,5-1 mm

Test period: 8 h

Date: 2023-06-20

Pump 1: inlet air

Pump 2: Reference inlet air

Pump 3: Inlet air with Sorbonite® filter

Sorbonite®: 139 g

## Result\*\*:

Pump 1: 2,5x10<sup>6</sup> no of bacteria

2,1x10<sup>4</sup> no of fungi

Pump 2: 1,8x10<sup>6</sup> no of bacteria

4,8x10<sup>4</sup> no of fungi

Pump 3: 7,0x10<sup>3</sup> no of bacteria (Laboratory minimum value – no bacteria found)

7,0x10<sup>3</sup> no of fungi (Laboratory minimum value – no fungi found)

>99 % reduction of bacteria (Average values from pump 1 and 2)

79,7 % reduction of fungi (Average values from pump 1 and 2)

\*\*See attachment 2

## Conclusion

When using smaller fraction of Sorbonite® the total surface of high pH increases that is more effective to reduce bacteria and fungi. We know by experience that a larger fraction has good odor reduction even if all bacteria is not reduced.

Sorbeco AB



Claes Thilander

Lindholmens Sewage Treatment plant



Rickard Grähs



Figure 2: 0,5-1 mm fraction in test 2

## Attachment 1



Pegasuslab



### Test results to

Sorbeco AB  
Claes Thilander  
Pilsbovägen 17 B  
19334 SIGTUNA

### Send invoice to

Sorbeco AB  
Faktura  
Pilsbovägen 17 B  
19334 SIGTUNA

## MICROBIOLOGICAL RESULTS

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*Results in this report refer only to the samples analyzed.*

<b>Object #</b>	Lindholmens reningsverk, Norrtälje
<b>Our reference (3 st)</b>	177-2023-05231524 - 177-2023-05231526
<b>Responsible sampler #</b>	Claes Thilander
<b>Date of sampling #</b>	2023-05-22
<b>Arrived at the laboratory</b>	2023-05-23
<b>Analysis Date</b>	2023-05-23
<b>Analysis Manager</b>	Eurofins Pegasuslab AB
<b>Batch Code</b>	EUSEUP-00162743

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[www.sorbeco.se](http://www.sorbeco.se)  
[info@soebeco.se](mailto:info@soebeco.se)

**SORBEKO**



## Summary of results

Result interpretations and indicator organisms are not covered by the accreditation.

**Object #:** Lindholmens reningsverk, Norrtälje

The result interpretations of your test series is summarised in the table below. The following ranges apply:

Normal levels

Slightly elevated levels

Elevated levels

Highly elevated levels

**177-2023-05231524. 1. Intag avloppsvatten, endast filter i pump. Luft, intag uppe i atmosfären, delvis utan slang. Pumpflöde 1,565 l/min.**

Bacteria - Total Number Normal levels

Fungi - Total Number Normal levels

**177-2023-05231525. 2. Intag avloppsvatten, endast filter i pump. Luft, intag ner mot avloppsvattnet. Pumpflöde 1,62 l/min.**

Bacteria - Total Number Normal levels

Fungi - Total Number Normal levels

**177-2023-05231526. 3. Intag avloppsvatten, Sorbonite innan filter i pump. Luft, intag ner mot avloppsvattnet. Pumpflöde 1,61 l/min.**

Bacteria - Total Number Normal levels

Fungi - Total Number Normal levels

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**Analysis results 177-2023-05231524****Airborne spore measurement:**

Total Biomass in Air (Internal Method PSMB13) (LU')

**Object #** Lindholmens reningsverk, Norrtälje  
**Sample Label #** 1. Intag avloppsvatten, endast filter i pump  
**Type of sample** Luft, intag uppe i atmosfären, delvis utan slang. Pumpflöde 1,565 l/min.

**Analysis results**

**Bacteria - Total Number**  $6.1 \times 10^5$  /m<sup>3</sup>  
**Fungi - Total Number**  $7.0 \times 10^3$  /m<sup>3</sup>

**Result interpretation \***

The air contains normal levels of mould spores and bacteria.

The evaluation is based upon an industrial environment

\* Not accredited.

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**Analysis results 177-2023-05231525****Airborne spore measurement:**Total Biomass in Air (Internal Method PSMB13) (LU<sup>3</sup>)

**Object #** Lindholmens reningsverk, Norrtälje  
**Sample Label #** 2. Intag avloppsvattnen, endast filter i pump  
**Type of sample** Luft, intag ner mot avloppsvattnet. Pumpflöde 1,62 l/min.

**Analysis results**

Bacteria - Total Number 1.2x10<sup>6</sup> /m<sup>3</sup>  
Fungi - Total Number 3.4x10<sup>4</sup> /m<sup>3</sup>

**Result interpretation \***

The air contains normal levels of mould spores and bacteria.

The evaluation is based upon an industrial environment

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**Analysis results 177-2023-05231526****Airborne spore measurement:**Total Biomass in Air (Internal Method PSMB13) (LU<sup>3</sup>)

**Object #** Lindholmens reningsverk, Norrtälje  
**Sample Label #** 3. Intag avloppsvatten, Sorbonite innan filter i pump  
**Type of sample** Luft, intag ner mot avloppsvattnet. Pumpflöde 1,61 l/min.

**Analysis results**

Bacteria - Total Number	1.1x10 <sup>5</sup> /m <sup>3</sup>
Fungi - Total Number	6.8x10 <sup>3</sup> /m <sup>3</sup>

**Result interpretation \***

Luften innehåller normala mängder mögelsporer och bakterier.

Bedömningen är baserad på industrimiljö.

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Due to limited storage space, we cannot store your sample material; instead it will be destroyed within 7 days from the date of the test results unless you want to have it returned for a fee of 75 SEK.

**Link** [assessment documentation](#).

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## Attachment 2



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Claes Thilander  
Pilsbovägen 17 B  
19334 SIGTUNA

### Send invoice to

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Faktura  
Pilsbovägen 17 B  
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## MICROBIOLOGICAL RESULTS

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<b>Object #</b>	Lindholmens Sewage Treatment Plant, Norrtälje, Sweden
<b>Our reference (3 st)</b>	177-2023-06221090 - 177-2023-06221092
<b>Responsible sampler #</b>	Claes Thilander
<b>Date of sampling #</b>	2023-06-20
<b>Arrived at the laboratory</b>	2023-06-21
<b>Analysis Date</b>	2023-06-21
<b>Analysis Manager</b>	Eurofins Pegasuslab AB
<b>Batch Code</b>	EUSEUP-00166037

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**SORBECO**

## Summary of results

Result interpretations and indicator organisms are not covered by the accreditation.

**Object #:** Långholmens Sewage Treatment Plant, Norrtälje, Sweden

The result interpretations of your test series is summarised in the table below. The following ranges apply:

Normal levels

Slightly elevated levels

Elevated levels

Highly elevated levels

**177-2023-06221090. 1. Inlet sewage water. Air above and towards water**

Bacteria - Total Number Normal levels

Fungi - Total Number Normal levels

**177-2023-06221091. 2. Inlet sewage water. Air above and towards water**

Bacteria - Total Number Normal levels

Fungi - Total Number Normal levels

**177-2023-06221092. 3. Inlet sewage water, Sorbonite filter - filter. Air above and towards water**

Bacteria - Total Number Normal levels

Fungi - Total Number Normal levels

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**Analysis results 177-2023-06221090****Airborne spore measurement:**

Total Biomass in Air (Internal Method PSMB13) (I.U.)

**Object #** Lindholmens Sewage Treatment Plant, Norrtälje, Sweden  
**Sample Label #** 1. Inlet sewage water  
**Type of sample** Air above and towards water

**Analysis results**

Bacteria - Total Number  $2.5 \times 10^6$  /m<sup>3</sup>  
Fungi - Total Number  $2.1 \times 10^4$  /m<sup>3</sup>

**Result interpretation \***

The air contains normal levels of mould spores and bacteria.

The evaluation is based on an industrial environment.

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**Analysis results 177-2023-06221091****Airborne spore measurement:**Total Biomass in Air (Internal Method PSMB13) (LU<sup>3</sup>)

**Object #** Lindholmens Sewage Treatment Plant, Norrtälje, Sweden  
**Sample Label #** 2. Inlet sewage-water  
**Type of sample** Air above and towards water

**Analysis results**

Bacteria - Total Number  $1.8 \times 10^6$  /m<sup>3</sup>  
Fungi - Total Number  $4.8 \times 10^3$  /m<sup>3</sup>

**Result interpretation \***

The air contains normal levels of mould spores and bacteria.

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**Analysis results 177-2023-06221092****Airborne spore measurement:**Total Biomass in Air (Internal Method PSMB13) (LU<sup>1</sup>)

**Object #** Lindholmens Sewage Treatment Plant, Norrtälje, Sweden  
**Sample Label #** 3. Inlet sewage water, Sorbonite filter - filter  
**Type of sample** Air above and towards water

**Analysis results**

Bacteria - Total Number <math><7.0 \times 10^3 / m^3</math>  
Fungi - Total Number <math><7.0 \times 10^3 / m^3</math>

**Result interpretation \***

The air contains normal levels of mould spores and bacteria.

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