

Bacteria and Fungi test in air at Lindholmens Sewage treatment plant

Introduction

Sorbonite® has a pH of 11-12 and reduces odors very effectively. 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: 6,1x10⁵ no of bacteria

7,0x10³ no of fungi

Pump 2: 1,2x10⁶ no of bacteria

3,4x10⁴ no of fungi

Pump 3: 1,1x10⁵ no of bacteria

6,8x10³ 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



Figure 1: Test 1 at start

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: 2,5x10⁶ no of bacteria

2,1x10⁴ no of fungi

Pump 2: 1,8x10⁶ no of bacteria

4,8x10⁴ no of fungi

Pump 3: 7,0x10³ no of bacteria (Laboratory minimum value – no bacteria found)

7,0x10³ 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



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

Lindholmens Sewage Treatment plant

Claes Thilander

Rickard Grähs

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.

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

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Sofia Särd, Laboratory Engineer I 2023-06-07

Report code: AR-23-LU-007009-01

Eurofins Pegasuslab AB

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Box 97, SE 751 03 Uppsala, Sweden * Tel. +46 (0)10 - 490 82 50 * Org. nr. 556896-4224
Visiting address: Rapskatan 21, Uppsala * www.eurofins.se

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 avloppsvattten, 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 avloppsvattten, 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 avloppsvattten, 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) (LU¹)

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 6.1×10^5 /m³
Fungi - Total Number 7.0×10^3 /m³

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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Report code: AR-23-LU-007009-01

Analysis results 177-2023-05231525**Airborne spore measurement:**Total Biomass in Air (Internal Method PSMB13) (LU¹)

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 1.2x10⁶ /m³
Fungi - Total Number 3.4x10⁴ /m³

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) (LU¹)

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 1.1x10⁵ /m³
Fungi - Total Number 6.8x10³ /m³

Result interpretation *

Luften innehåller normala mängder mögelsporer och bakterier.

Bedömningen är baserad på industrimiljö.

* Not accredited.

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RESPONSIBILITY

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The Result Interpretation assumes that the samples are representative of the test material and the area around the sampled point. Note that the test result relates only to the submitted sample. Measures should always be planned in conjunction with an architectonically knowledgeable person who can put the material damage in its proper context.

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](#).

¹Performing laboratory LU=Eurofins Pegasuslab AB

Customer information / based on information from customer.

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Attachment 2



Pegasuslab



Test results to

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Claes Thilander
Pilsbovägen 17 B
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MICROBIOLOGICAL RESULTS

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

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Report code: AR-23-LU-008263-01

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Summary of results

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Object #: Lindholmens 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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Report code: AR-23-LU-008263-01

Analysis results 177-2023-06221090**Airborne spore measurement:**Total Biomass in Air (Internal Method PSMB13) (LU¹)

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 | 2.5x10 ⁶ /m ³ |
| Fungi - Total Number | 2.1x10 ⁴ /m ³ |

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) (LU¹)

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 1.8x10⁶ /m³
Fungi - Total Number 4.8x10⁴ /m³

Result interpretation *

The air contains normal levels of mould spores and bacteria.

The evaluation is based on an industrial environment.

* Not accredited.

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Report code: AR-23-LU-008263-01

Analysis results 177-2023-06221092**Airborne spore measurement:**Total Biomass in Air (Internal Method PSMB13) (LU¹)

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.

The evaluation is based on an industrial environment.

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Link [assessment documentation](#).

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