

Aquatron International AB
Norrängsgatan 10
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Test of Sewage Separator (1 appendix)

Assignment

On December 28th 2012, SP witnessed a test of an Aquatron sewage separator according to CUAP 07.04/22. The test was performed at Avloppscenter in Västerås. The test rig, which had been prepared in advance by Aquatron International, was checked by SP and found to be conforming with the requirements in the CUAP, see figure 1. The test was performed using a closed-couple WC, model Gustavsberg Nautic 5500.

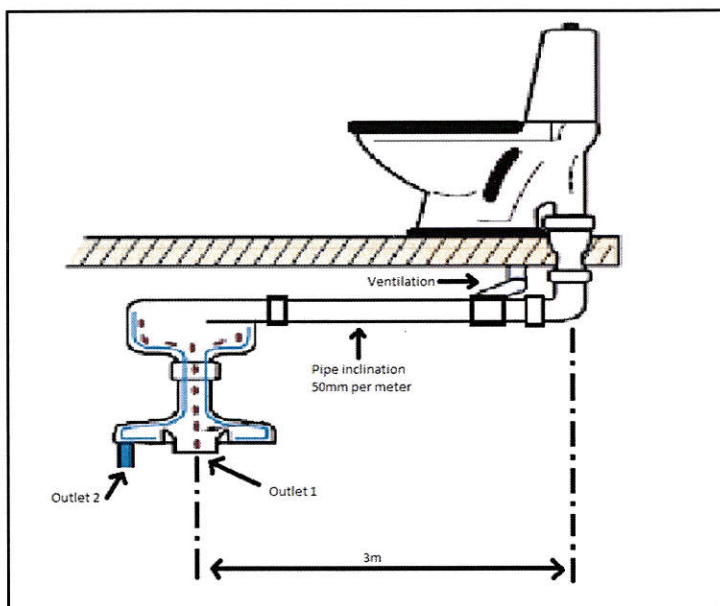


Figure 1 Test rig

Test method and equipment

Testing according to sections 2.1, 2.2 and 2.3 was performed under supervision of SP, and the measurement results were noted mutually in the test journal, see appendix 1. For weighing of water volumes, a calibrated scale from SP was used, inventory no. 201 368. The measurement accuracy for this equipment is better than $\pm 0.1\%$.

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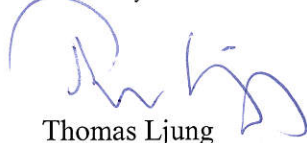
Miscellaneous

When testing the separator with toilet paper according to item 2.2, it was noted that, at some flushes, one or more pieces of paper were stuck on the metal threads in the separator. However, these pieces were normally flushed out (through outlet 1) at the next flush with toilet papers.

After testing the separator with the pipe inclination 50 mm/meter, as prescribed in the CUAP, the tests were repeated with the inclination described in Aquatron's installation instructions; 10mm/meter, except for the last meter of pipe, where the inclination is 50mm/meter. The results from these tests can also be found in the test journal in appendix 1 (test no. 2). With this inclination, no pieces of paper were stuck on the metal threads in the separator.

SP Technical Research Institute of Sweden Energy Technology - Building Services Engineering

Performed by


Thomas Ljung

Examined by


Caroline Haglund Stignor

Appendix

Test journal

Appendix 1

Test Journal - Test for CUAP 07.04/22 Annex 1

Date 28th of December 2012
 Test Item Aquatron Sewage Separator
 Representative from Aquatron International AB Daniel Larson
 Representative from SP Sveriges Tekniska Forskningsinstitut Thomas Ljung
 Calibrated balance from SP, inventory no. 201 368

Test no. 1 – test rig according to CUAP

Pipe length: 3,03 m
 Inclination: 50 mm/meter

2.1 Water test

| Cycle no. | Water amount (grams) | | Expressed in % | | Total flush amount (g) |
|-----------|----------------------|----------|----------------|----------|------------------------|
| | Outlet 1 | Outlet 2 | Outlet 1 | Outlet 2 | |
| 1 | 244 | 5868 | 3.99% | 96.01% | 6.112 |
| 2 | 247 | 5837 | 4.06% | 95.94% | 6.084 |
| 3 | 192 | 5938 | 3.13% | 96.87% | 6.130 |
| 4 | 234 | 5868 | 3.83% | 96.17% | 6.102 |
| 5 | 219 | 5950 | 3.55% | 96.45% | 6.169 |
| Average | 227 | 5892 | 3.71% | 96.29% | 6.119 |

2.2 Toilet paper test

Paper used, ICA Skona Extra Toalet, 24g/m²

| Cycle no. | Number of sheets | | Expressed in % | |
|-----------|------------------|----------|----------------|----------|
| | Outlet 1 | Outlet 2 | Outlet 1 | Outlet 2 |
| 1 | 6 | 0 | 100.00% | 0.00% |
| 2 | 6 | 0 | 100.00% | 0.00% |
| 3 | 6 | 0 | 100.00% | 0.00% |
| 4 | 6 | 0 | 100.00% | 0.00% |
| 5 | 6 | 0 | 100.00% | 0.00% |

Note: At some flushes, one or more sheets of paper are stuck on the metal threads in the separator. These sheets are normally flushed out (through outlet 1) at the next flush with papers.

Appendix 1

2.3 Solid material test

Natural sponges

| Cycle no. | Number of Sponges | | Expressed in % | |
|-----------|-------------------|----------|----------------|----------|
| | Outlet 1 | Outlet 2 | Outlet 1 | Outlet 2 |
| 1 | 2 | 0 | 100.00% | 0.00% |
| 2 | 2 | 0 | 100.00% | 0.00% |
| 3 | 2 | 0 | 100.00% | 0.00% |
| 4 | 2 | 0 | 100.00% | 0.00% |
| 5 | 2 | 0 | 100.00% | 0.00% |

Cellulose sponges

| Cycle no. | Number of Sponges | | Expressed in % | |
|-----------|-------------------|----------|----------------|----------|
| | Outlet 1 | Outlet 2 | Outlet 1 | Outlet 2 |
| 1 | 2 | 0 | 100.00% | 0.00% |
| 2 | 2 | 0 | 100.00% | 0.00% |
| 3 | 2 | 0 | 100.00% | 0.00% |
| 4 | 2 | 0 | 100.00% | 0.00% |
| 5 | 2 | 0 | 100.00% | 0.00% |

Appendix 1

Test no. 2 – test rig according to Aquatron's installation instructions

Pipe length: 3,00 m
Inclination: 10mm/meter (first 1,71 m)
50mm/meter (last meter of pipe)

2.1 Water test

| Cycle no. | Water amount (grams) | | Expressed in % | | Total flush amount (g) |
|-----------|----------------------|----------|----------------|----------|------------------------|
| | Outlet 1 | Outlet 2 | Outlet 1 | Outlet 2 | |
| 1 | 86 | 5839 | 1.45% | 98.55% | 5925 |
| 2 | 100 | 6073 | 1.62% | 98.38% | 6173 |
| 3 | 86 | 6145 | 1.38% | 98.62% | 6231 |
| 4 | 88 | 6023 | 1.44% | 98.56% | 6111 |
| 5 | 75 | 5975 | 1.24% | 98.76% | 6050 |
| Average | 87 | 6011 | 1.43% | 98.57% | 6098 |

2.2 Toilet paper test

Paper used, ICA Skona Extra Toalet, 24g/m²

| Cycle N° | Number of Sheets | | Expressed in % | |
|----------|------------------|----------|----------------|----------|
| | Outlet 1 | Outlet 2 | Outlet 1 | Outlet 2 |
| 1 | 6 | 0 | 100.00% | 0.00% |
| 2 | 6 | 0 | 100.00% | 0.00% |
| 3 | 6 | 0 | 100.00% | 0.00% |
| 4 | 6 | 0 | 100.00% | 0.00% |
| 5 | 6 | 0 | 100.00% | 0.00% |

Note: With this inclination, no pieces of paper were stuck on the metal threads in the separator.

2.3 Solid material test

Natural sponges

| Cycle N° | Number of Sponges | | Expressed in % | |
|----------|-------------------|----------|----------------|----------|
| | Outlet 1 | Outlet 2 | Outlet 1 | Outlet 2 |
| 1 | 2 | 0 | 100.00% | 0.00% |
| 2 | 2 | 0 | 100.00% | 0.00% |
| 3 | 2 | 0 | 100.00% | 0.00% |
| 4 | 2 | 0 | 100.00% | 0.00% |
| 5 | 2 | 0 | 100.00% | 0.00% |