

# ANLAGER

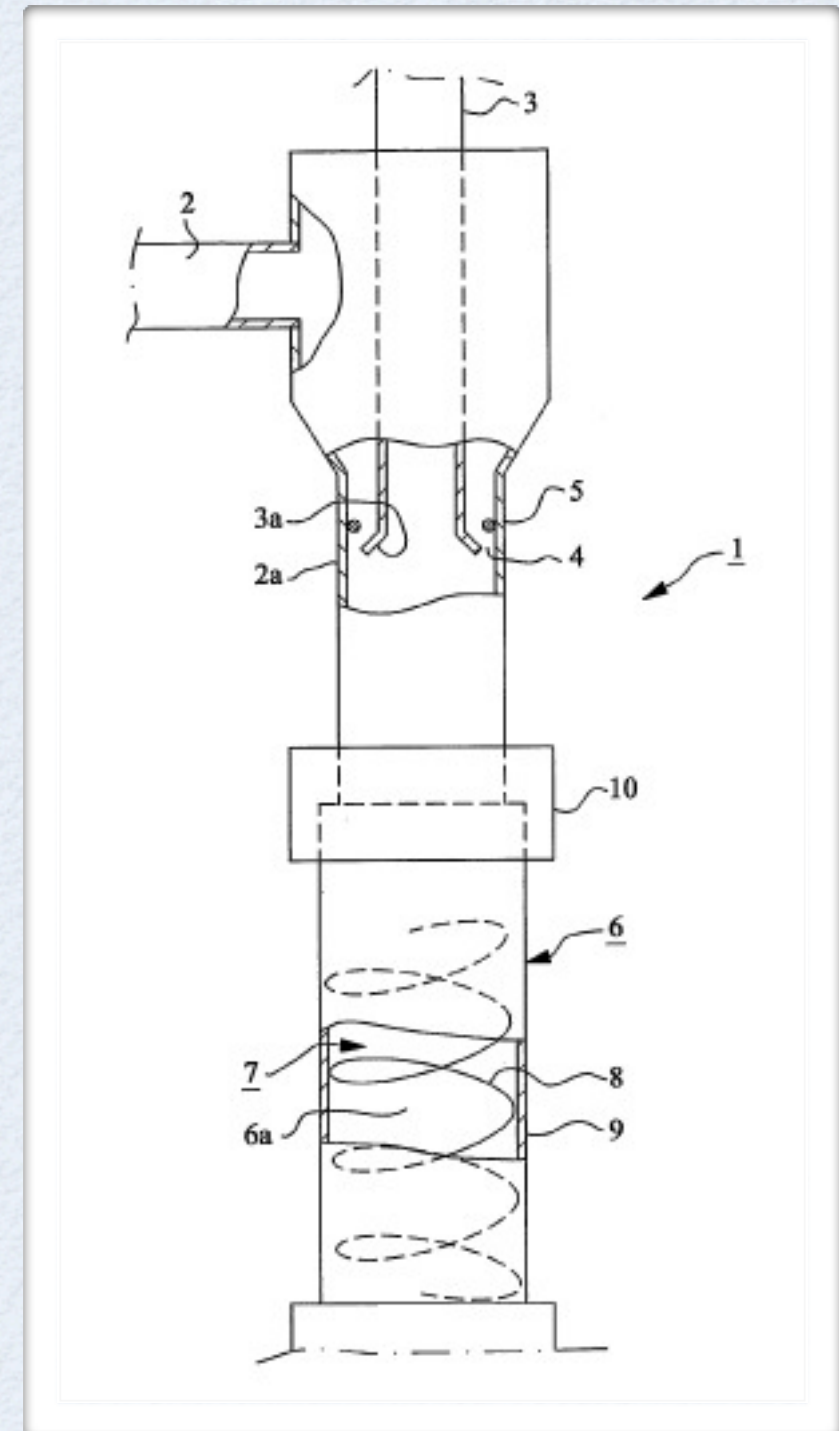
The outstanding aeration method for oxygenation of water

High oxygen levels  
Reduced energy consumption



# Executive Summary

- Swedish cleantech firm with a patented aeration technology for improved oxygen levels in water processes
- We achieve “optimal-sized” air bubbles through aeration, resulting in more bubble surface per unit volume and greater oxygen transfer efficiency
- Very energy efficient
- Easy to install as new construction and retrofit as part of existing plants
- Our product sold to more than 20 water treatment plants in Sweden and Finland
- Patented in Sweden, the US and an Eppo-patent pending



EffectiveNew™



# Background

- Drinking water - the only aerator that reduces iron and manganese from all types of groundwater
- Lakes/ponds - the only aerator that manage to deal with algae bloom
- Wastewater - used in LPS system, landfill leachate, industrial wastewater, pumping stations and sewage treatment plants



EffectiveNew™ at Fredrick County Maryland, US



# Key milestones

- 1998 -2005  
Product development
- 2005  
Commercialisation starts. First customer Skurup water purification plant. Swedish patent granted
- 2007  
First customer in Finland
- 2008  
Development of the technology to other areas than drinking water
- 2009  
First “pond customers” - two golf clubs, the town of Malmö and a customer of aeration in LPS system. US patent granted
- 2010  
Test in landfill leachate water, pump stations and sewage treatment plants. First US customer
- 2011  
First wastewater customers. Expansion in to the UK and an Epo-patent pending



# Oxygen saturation

- |                          | Oxygen saturation in % |
|--------------------------|------------------------|
| • Drinking water         | 100                    |
| • Lake / pond            | 100                    |
| • Leachate water         | 80-100                 |
| • Pump station           | 70-100                 |
| • Sewage treatment plant | 60-80                  |
| • LPS system             | 50-60                  |
- The high oxygen level makes our technology a strong alternative to chemicals in treatment of drinking water, lakes / ponds, pump stations and LPS system
  - Additionally, since our product is very energy efficient we provide a most attractive alternative in energy intensive processes, such as aeration in sewage treatment plants



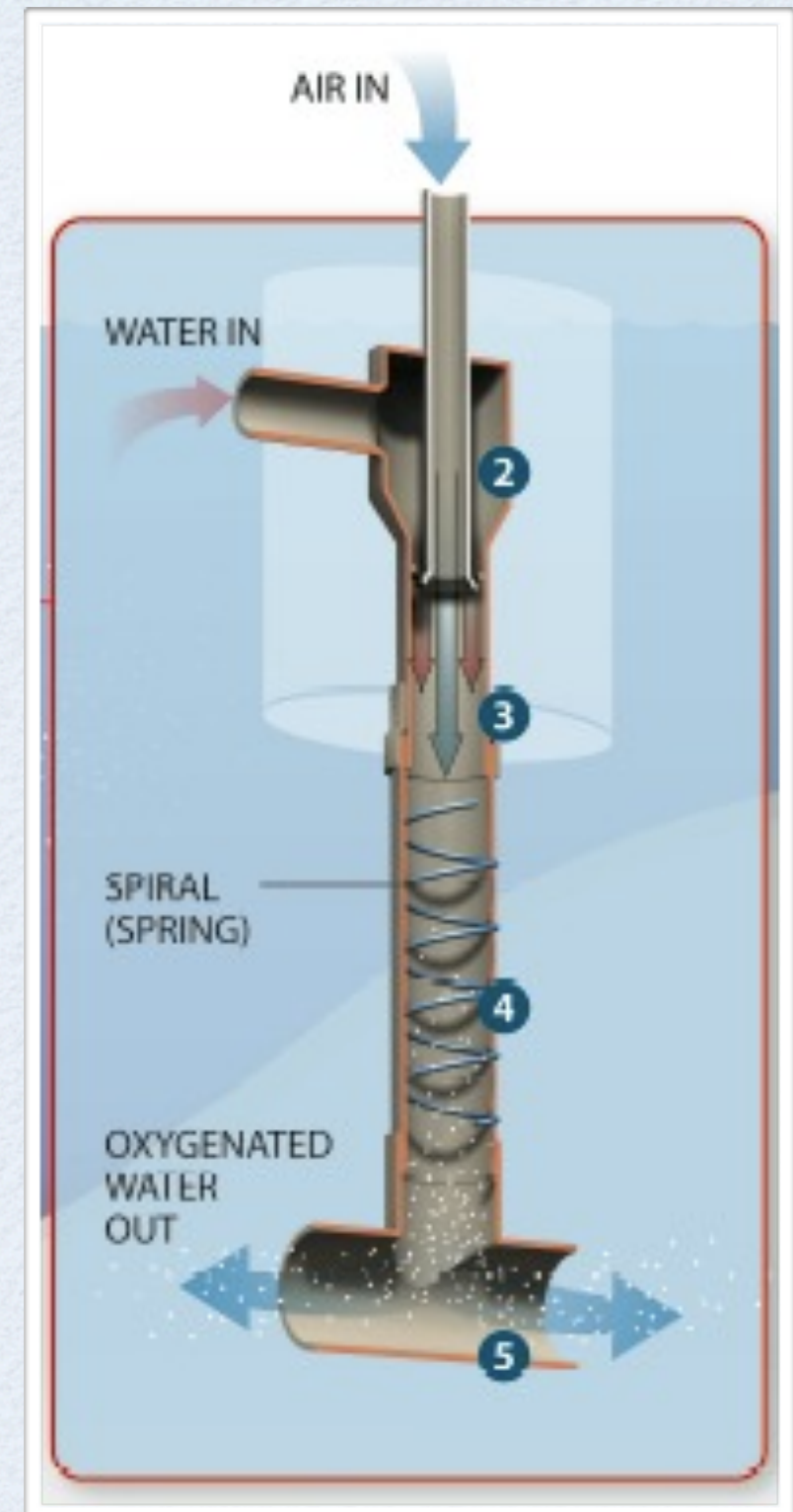
# How oxygen levels can be so high?

- According to most experts, the size of the oxygen bubbles are of great importance. A size between 1-1,5mm is optimal
- We achieve the best result with an ingoing aerator pressure of 1.8-2.2 kilos. A pressure lower than 1.8 kilos results in too large bubbles and pressure exceeding 2.2 kilos creates too small bubbles
- We guarantee “optimal-sized” bubbles. For an illustration how we accomplish this see next slide, “How it works?”



# How it works?

1. A pump sucks in water
2. When water is sucked in, it creates a vacuum that sucks air through the pipe
3. A mix of water and air rushes down the pipe
4. When the stream of water reaches the steel spiral, which is pressed against the pipe-wall, the water bounces off the wall into the center and blends with the oxygen
5. As a last step in our process, the oxygenated water is pushed out.





# Sewage treatment plant

You should consider EffectiveNew™:

- When oxygen levels being too low
- When energy savings could be made
- When looking for a faster water treatment process
- Oxygenation in basin with or without mixer
- Oxygenation of the whole volume through EffectiveNew™ - poured down the basin



# Sewage treatment plant

Below follows a test conducted at the municipal of Habo in Sweden

- *Before:*  
Flow,  $60\text{m}^3/\text{h}$ , oxygenated with 2 compressors each on  $7,5\text{kW}$
- *Replaced by:*  
2 EffectiveNew™  $28\text{m}^3/\text{h}$ , 2 pumps on  $2\text{kW}$  and  $64\text{dB}$  was installed and tested
- Oxygenation of the whole flow was  $7,1\text{-}7,4\text{mg/l}$   $17,3\text{C} < 70\%$  saturation
- Oxygen content in the basin with a mixer was  $3,8\text{mg/l}$





# Oxygenation of sewage system

- Pump stations  
In order to prevent hydrogen sulphide to develop. Test has given us the answer that we can handle up to 10 hours before hydrogen sulphide will develop again
- LPS system  
To get hydrogen sulphide out of the water and to prevent that it will develop again



# To better visualise - EffectiveNew™

- The pipe is manufactured in sizes of 5.5m<sup>3</sup>/h for drinking water and in sizes of 16, 28 and 50m<sup>3</sup>/h for the additional areas of use
- EffectiveNew™ is able to treat infinite flows of water and can be placed in different settings for different purposes
- For instance, it works in tanks with or without sand for treatment of drinking water; in a tank for pump stations and sewage treatment plants, on a raft in landfill leachate or directly placed in a basin at the plant





# To better visualise



Test in sewage treatment plant



Test in pump station



# To better visualise



Production line: EffectiveNew™ 50m³/h placed on a raft



# References

## Drinking water

- Carlsberg, Ramlösa Hälsobrunn
- Finland, Övermark

## *Municipalities in Sweden*

- Karlskrona, Fågelmara\*  
*Before:* aeration with compressor and nozzles which was not enough so they had to add chemicals ( $\text{KMnO}_4$ ). The chemicals did shorten the lifetime of the membrane filters, which was used for reduction of fluoride  
*Today:* the compressor and chemicals are replaced with EffectiveNew™, 12 pipes
- Kinna, Öxabäck\*  
*Before:* problem with the ozone unit  
*Today:* EffectiveNew™, one pipe

\* See image following pages



# References

- Vetlanda, Farstorp  
Vetlanda, Hultånäs  
Vetlanda Nye

*Before:* aeration with compressor and nozzles, together with chemicals. “If there is a technology that reduces iron and manganese without use of chemicals, we will have it” said Göran Nilsson, head of water unit, Vetlanda municipality

*Today:* only EffectiveNew™ in all 3 of the water plants

- Vimmerby, Locknevi
- Värnamo
- Ronneby, Sjöarp

- Östersund, Tandsbyn\*

*Before:* problem with manganese which got stuck to the inside of the pipes and was causing a lot of problem when it come off several times a year

*Today:* EffectiveNew™ was the only product that could eliminate of the manganese, without the use of chemicals

\* See image following pages



# References

## Lakes/ponds

All of the customers below, except for Troxhammar who solely wanted improved oxygenated water, had problems with algae bloom.

The best example of our ability is the town of Malmö. Without any success, they had for several years tested many different technologies. The last, before they bought EffectiveNew™, was a product that uses the Vortex technology

- City of Malmö, Sweden\*

The clip shows EffectiveNew™ 16m³ with a cutting pump and a timer for the purpose of algae bloom and improved water quality

Link: <http://www.youtube.com/watch?v=Ndmuy6BwcY4>

- Djursholms Golf Club, outside Stockholm\*

Link: <http://www.youtube.com/watch?v=pVp71tQlpso&feature=related>

- Troxhammars Golf Club, outside Stockholm
- Bar-T Mountainside Summar Camp, Maryland, USA

\* See image following pages



# References

## Wastewater

- Simrishamn, Hammenhög LPS system
- Finland, mould industry\*

## Leachate

- Karlskrona, Bubbetorp\*  
Link: <http://www.youtube.com/watch?v=3Yx5M4B0mUs&feature=related>

\* See image following pages



# Karlskrona, Fågelmara



Karlskrona, Fågelmara



# Kinna, Öxabäck



Kinna, Öxabäck



# Östersund, Tandsbyn



Östersund, Tandsbyn



# City of Malmö, Sweden



“Our invisible product” - shows the part that is under water. Malmö Stad, Sweden



# Djursholms Golf Club, Sweden



EffectiveNew™ 16m<sup>3</sup>/h with a cutting pump and a timer for the purpose of algae bloom and improved water quality. Two weeks after the installation the water was well oxygenated, clear and you could see the bottom of the pond



# Mould industry, Finland

The rows indicate, from the top BOD, phosphorus, total nitrogen and suspended solids. The columns indicate, from left to right, untreated water, levels after test with our product, (29/7 2011 and 22/8 2011) realised % reduction and requisite % levels

Oxygenation with 16m<sup>3</sup>/h aerator with a 1,5 kWh pump from ITT. The pond is 5,000m<sup>3</sup>. The customer installed EffectiveNew™ in the end of June.

	Taul. 4	Näyte	Näyte	Toteutunut	Vaadittu
		3317	3765	Reduktio %	Reduktio %
		29.7.2011	22.8.2011		
BHK-ATU mg/l	270	35	11	96	77
Fosfori mg/l	4,9	1,70	0,72	85	85
Typpi mg/l	66	40	33	50	33
K-aine mg/l	330	81	13	96	67



# Karlskrona, Bubbetorp



50m<sup>3</sup>/h aerator with a 4 kWh pump from ITT. The pond is 50,000m<sup>3</sup>.