

Description of BBK biofilter for odour reduction at Marine Harvest Poland

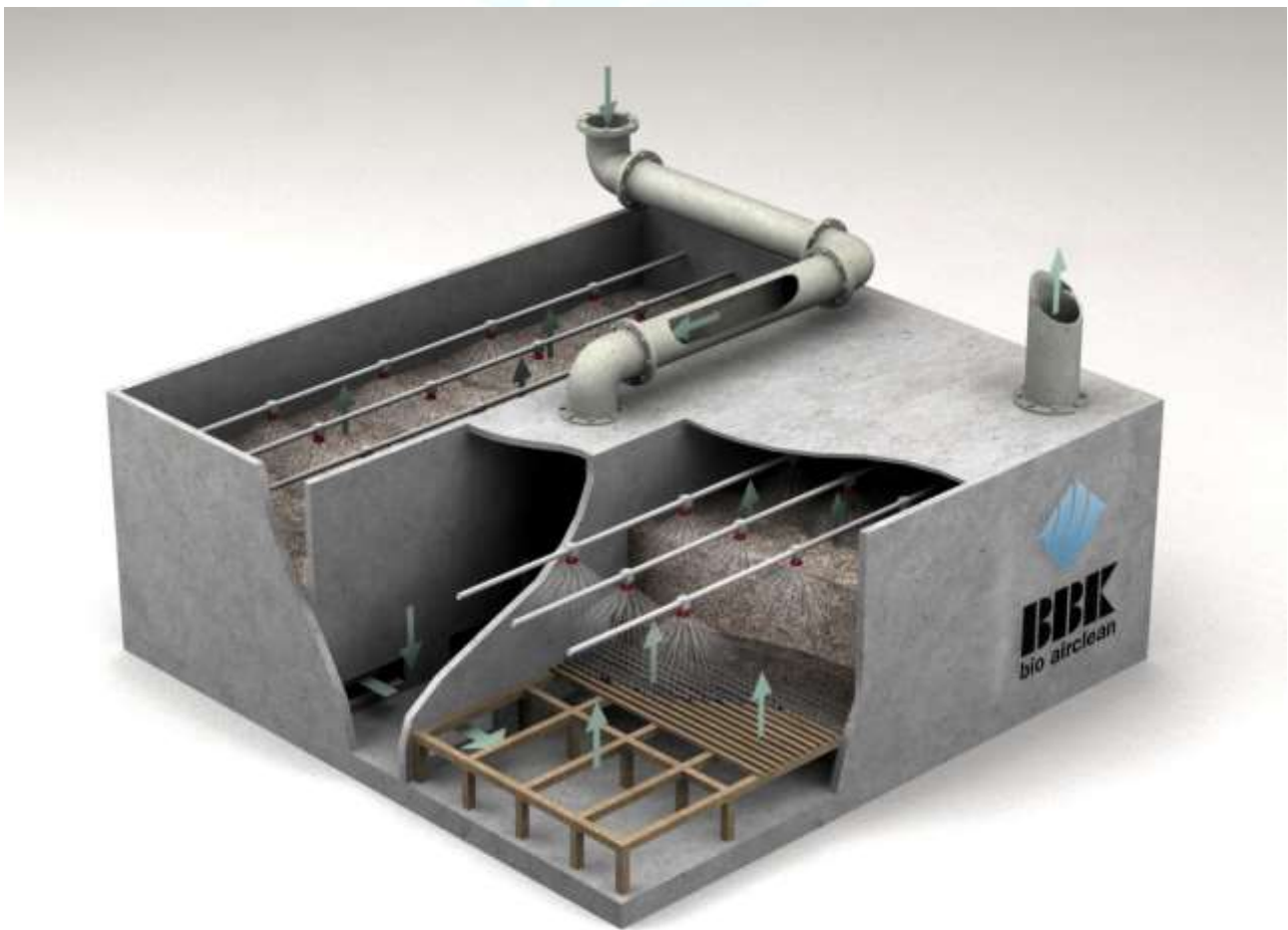


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Company profile BBK biofilter

BBK bio airclean A/S was founded in 1992, with the purpose of developing and producing an environmental friendly and biological aircleaning system, which effectively converts smelly and unpleasant compounds into water and CO₂.

The solution was to re-develop the wellknown principle of biological filters, but in a highly upgraded version in order to fulfill following demands:

- High cleaning efficiency
- Long lifetime
- Homogenous biomedica
- Optimum biological growth
- High tolerance towards changes of pH value and temperature
- Possibility of adjusting pH value
- Possibility of adjusting water content in biomedica
- Good survival capacity in shut-down periods

Where to use a BBK biofilter

BBK bio airclean A/S markets, produces and maintain biological biofilters for odour removal in industries such as:

- Sewage treatment plants
- Biogas plants
- Composting facilities
- Animal rendering plants
- Fish industry
- Slaughterhouses

Manufacturing BBK biomedica

- Consists of non-degradable compounds
- No decomposing of biomedica
- Porous and homogenous structure
- Filtermedia is pasteurized to 80°C for 30 min.
- All natural occurring microorganisms and weed seeds are eliminated
- Inoculated with specific odour removing microorganisms.
- High cleaning efficiency from start-up for many years
- Delivered in big bags just before start-up of plant.

Design of BBK-filter at Marine Harvest Poland:

Expected air flow 25.000 m³/h

The content of hydrogen sulphide, mercaptanes and ammonia in the air are important factors in the dimensioning of the filter, and the concentrations are assumed to be approximately. Compared to our experience with similar installations we recommend a load of 130 m³ air/m³ filter media ~ 192 m² filter area.

Description of the bio-filter and the filter media:

The proposed BBK bio-filter is designed as an up-flow system (see drawing on the front page), where the odour-polluted air is led upwards through the filter media.

The filter media consists of a mixture of organic and inorganic materials. The organic part is a special type of totally decomposed compost, which is specially produced for BBK. The inorganic part consists of different types of burnt clay with different characteristics such as a high water capacity and a high porosity.

After the blending the filter media is pasteurised at 80°C for at least 20 minutes to remove bacteria, fungi, weed seed etc. Subsequently the filter media is inoculated with specific, naturally occurring micro-organisms, which are produced and controlled by a Biotechnological Institute in DK. The micro-organisms in use are specifically selected in order to achieve a high cleaning efficiency. The filter media itself is non-biodegradable, so it will stay porous and homogenous for many years and also the efficiency of the micro-organisms will remain at a high level.

Leca (0,15 m³/m²), and filter media (1 m³/m²) is placed on a plastic net (Expo-net), which is laid on top of the slatted floor to prevent the leca and the filter media from falling through the floor. Total installation height of leca and filter media is about 107 cm, which gives the microorganism enough time to remove the bad smell. The slatted floor and the floor support are made of plastic. An air stop is mounted along the filter side to prevent the air from passing untreated along the walls.

The BBK biofilter is always installed under a cover or a roof, so we can control the watering and secure the correct water content in the filtermedia, a dry biofilter is not efficient.

Guaranteed cleaning efficiency:

Bio-filter:

Cleaning efficiency guarantee according to Gastec-tubes for the compounds hydrogen sulphide, ammonia and mercaptanes:

When the inlet air concentrations are between 0 and 20 ppm on average and up to 50 ppm in peaks at 30 minutes max. , BBK will guarantee a cleaning efficiency of 95%.

When the inlet air concentrations are below 10 ppm, BBK will guarantee an outlet air concentration of maximum 0,25 ppm.

Bio-filter:

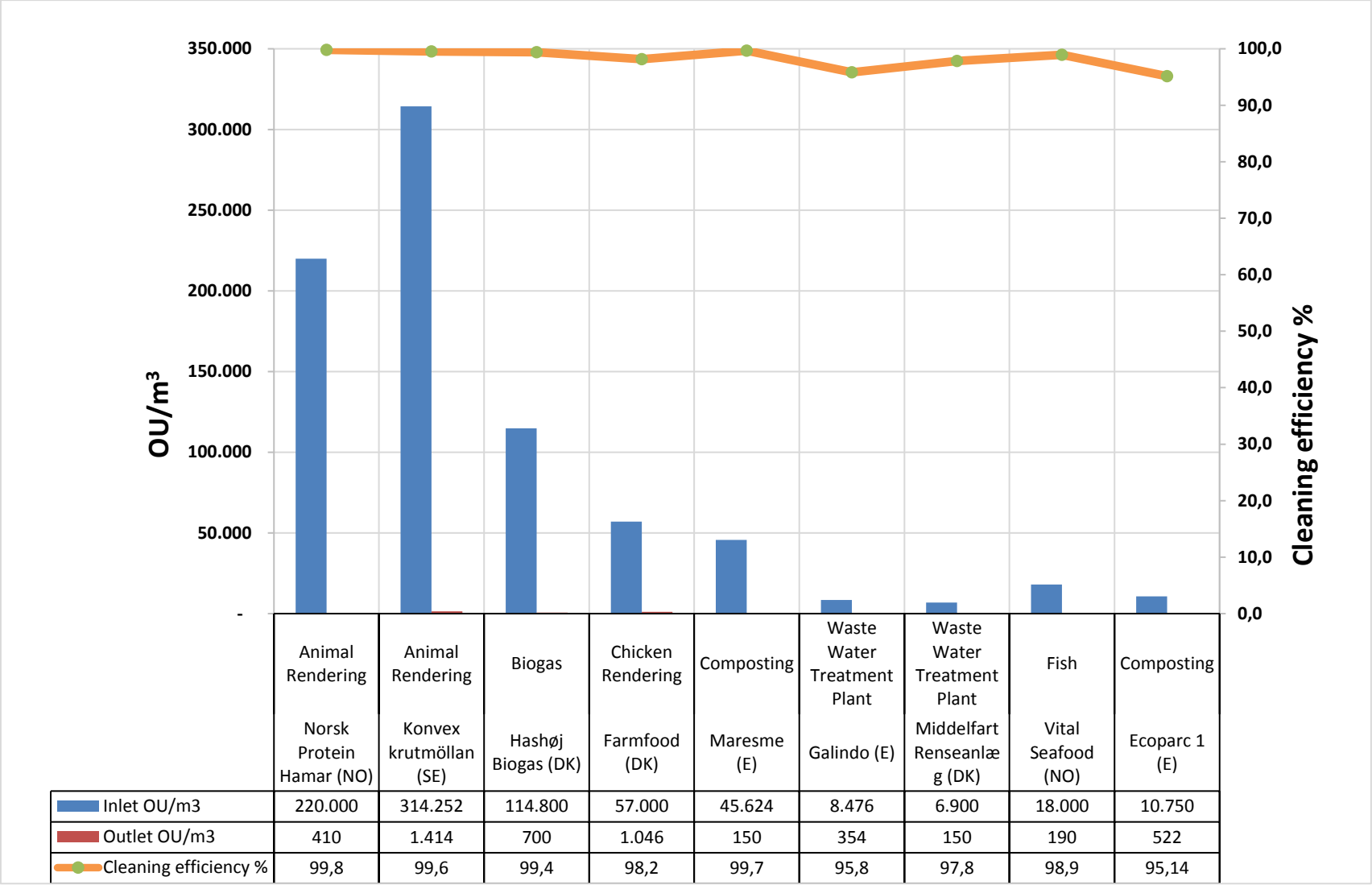
Cleaning efficiency guarantee according to odour units.

< 2.000 OU in the outlet from the biofilter +/- uncertainty factor.

If the temperature in the inlet air is lower than 10°C, a fluctuation of the cleaning efficiency can occur.



Cleaning efficiency BBK biofilter



Operation and maintenance of the bio-filter:

The customer has to check the watering system once a week.

Service inspection performed every quarter (performed by a BBK employee):

4 times a year BBK will visit the installation to perform measurements and control the operation of the biofilter. Together with an employee at the plant, the BBK employee will check all conditions concerning the operation of the biofilter, and they will discuss the work and efficiency of the filter, and the measurement results.

BBK will take out a filter sample, which is sent to analysis on Biotechnological Institute. They will examine the number and the composition of the micro-organisms in the filter media.

After the visit BBK will prepare a report, which includes measurements from the visit and the results from the microbial analysis. This report can be a part of the documentation towards the supervising authorities.

List of references Fish industri:

Company	Location	Size m ²	Capacity: m ³ air/h	Year
Vital Seafood AS Fishfood industry	Stranda, Norway	220	38.000	2011
Åsen Settefisk Fish breeding center	Åsen, Norway	Cassette	3.000	2011
Vital Seafood AS Fishfood industry	Rørvik, Norway	227	30.000	2012
Marine Harvest Fish Feed	Valsneset Bjugn, Norway	1.500	200.000	2014