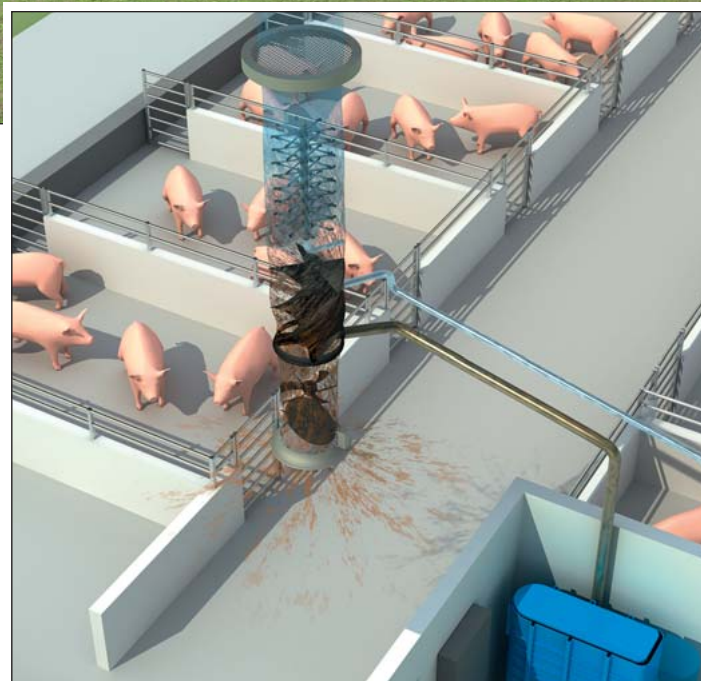




Big Dutchman®



MagixX & HelixX

Exhaust air treatment systems
for the effective reduction of emissions from pig houses

MagixX and HelixX – the effective pollution abatement facility

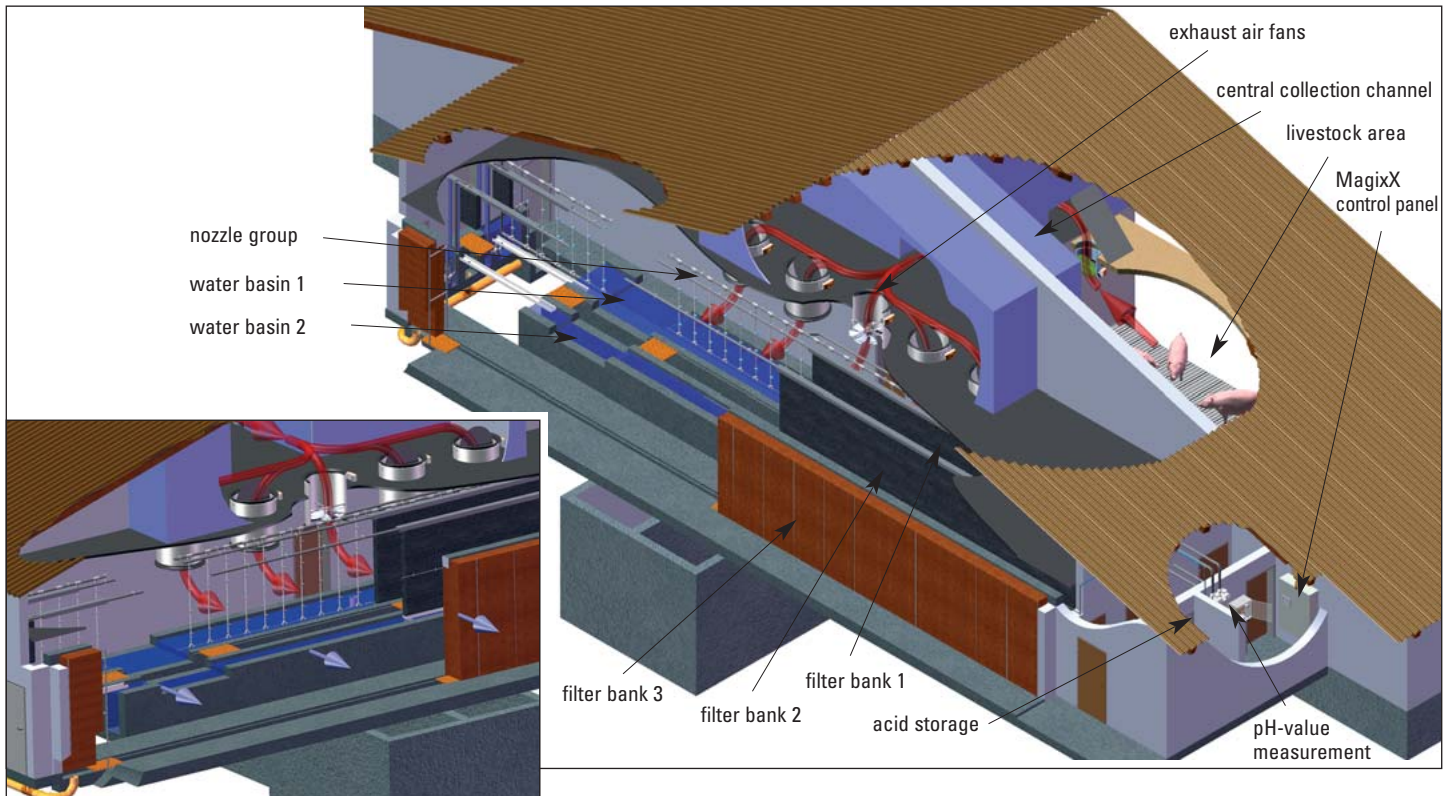
The reduction of emissions from livestock production facilities is becoming more and more important. In order to get a licence to build a pig barn, public authorities, more often than not, require a pollution abatement facility. If the barn is to be built

close to a town, odour and dust have to be reduced; if the barn is to be built close to a forest, the main concern lies in the reduction of ammonia emissions. With **MagixX-P** and **HelixX**, Big Dutchman offers you two solutions that fulfil the

above mentioned requirements and will therefore facilitate the licence procedure for your house or will make it possible.

MagixX-P

Central exhaust air treatment – basic layout and mode of operation



Ventilation in most houses works on the principle of negative pressure: fresh air streams into the house via wall inlets, or the ceiling in the case of spray cooling. Exhaust air ventilators remove the used air.

With MagixX-P, the exhaust air has to be directed through the centrally installed exhaust air washer so that it is cleaned before it leaves the house. To ensure an ideal distribution of the exhaust air on the entire filter bank, the entire ventilation concept should be designed from Big Dutchman components as these are well-coordinated.

MagixX-P consists of three cleaning stages. Water is sprayed through a group of nozzles on to the front of the first filter

bank. In this way the bank is kept from drying-out and dust is prevented from being deposited. Furthermore, the air humidity increases and improves the absorptive properties of the moistened bank surface. The humidified air flows into the first filter bank, through which water flows constantly from top to bottom. Any dust is washed out into the first water basin. Since ammonia and odorous substances are attached to dust, a large proportion of these emissions are effectively filtered out of the air. The solids precipitate in the basin, which has to be emptied at regular intervals (every 3 months).

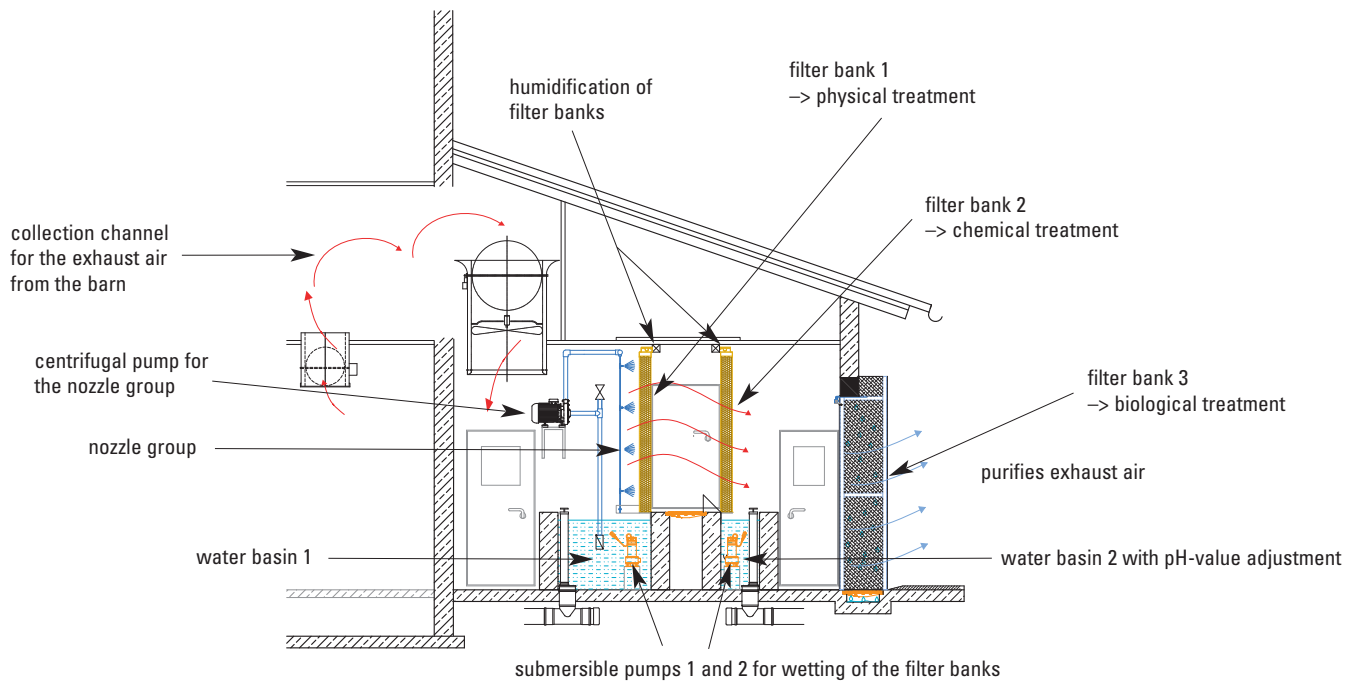
The second filter bank (2nd cleaning stage) is mainly used to separate ammonia. With

sulphuric acid added, the separation of ammonia is increased significantly. In the wash water the ammonia combines chemically as ammonium sulphate. This means a subsequent emission of ammonia gas is prevented. The addition of acid is accomplished by an automatic dosing pump based on the pH-value of the wash water. The chemical substances have to be stored in a lockable separate service room.

The third cleaning stage consists of root timber and is used for microbial transformation of the odour-carrying agents.

Facilities for the separation of dust, ammonia, germs and odour-carrying agents

Functional diagram of the three-stage MagixX-P exhaust air washer



Nozzle groups spray water on to the front of the filter bank so that dust cannot cling to the filter.



A filter inspection aisle lies between filter bank 1 and 2.



The third cleaning stage consists of root timber and is used for the microbial transformation of odour-carrying agents.



The exhaust air collection channels are located on the left and on the right above the compartments



View into a finishing pen

Carrying from house air

Control of the MagixX-P exhaust air washer

The MagixX-P control system provides operational reliability and working safety of the whole facility. The operational data can be accessed and monitored via the full-graphic display. Data can be transferred via USB at any time. Optionally, all data can also be transferred to an external PC via a network. Thus a convenient remote inquiry is always possible.

All recorded data can be saved on a long-term basis. Weekly, monthly, etc. creation of a management report in PDF or XLS format is also possible. Thanks to the simple menu navigation, daily monitoring of the recorded operational data can be carried out easily at the touch screen.

- individual filter stages;
- ✓ filling level of the water basins;
- ✓ flow-rate of purified exhaust air;
- ✓ water and power consumption data.

The addition of acid is accomplished by an automatic dosing pump based on the pH-value of the wash water. This always ensures that the correct amount of acid is added.



Control computer



Touch screen

The following parameters can be displayed in detail:

- ✓ pH-value of the circulating water;
- ✓ static pressure difference of the



Correct acid dosing thanks to pH-value measurements

Results of the approval measurements for MagixX-P

Our three-stage MagixX-P exhaust air washer has been certified in Germany according to the "Cloppenburg guideline" (*Leitfaden Cloppenburg*) which was an approved testing method until 2004 and was transformed into an approved certification method by the German Agricultural Society (DLG) in 2005. With a separation performance for ammonia,

dust and odour of 70 % and more, MagixX-P has more than fulfilled the requirements of certification. In the Netherlands, MagixX-P is listed under BWL-number 2006.15.V3. During different long-term tests the system achieved the following separation results:

- ✓ up to 90 % of ammonia
- ✓ up to 95 % of total dust

- ✓ up to 93 % of PM 10 (particle size < 10 µm)
- ✓ up to 90 % of PM 2.5 (particle size < 2,5 µm)
- ✓ up to 80 % of odour (no waste air odour is perceptible in the clean gas!)
- ✓ bis zu 90 % of germs and endotoxins.

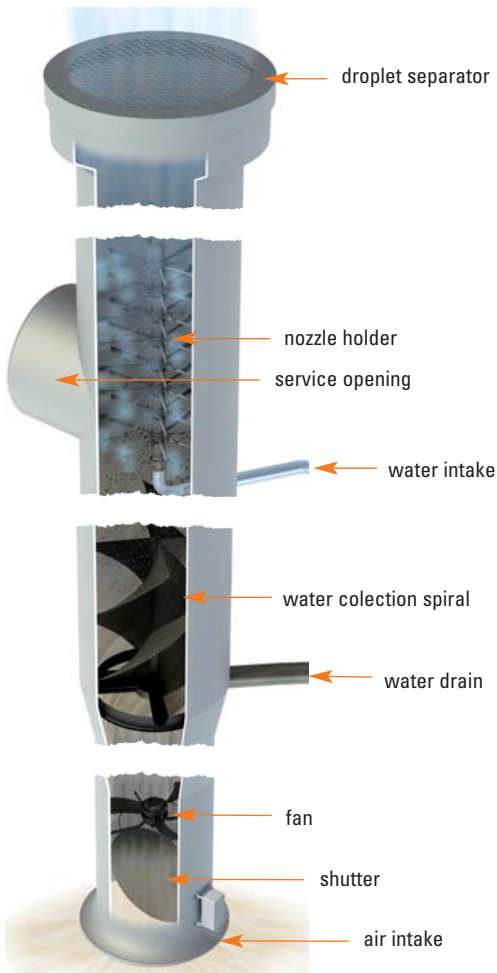
The advantages at a glance

- ✓ high separation rate of ammonia, dust and odour;
- ✓ good buffering qualities due to the large water seal;
- ✓ filling material of the filter bank consists of high-quality plastic for easy cleaning and a long service life;
- ✓ high operational reliability;
- ✓ MagixX-P is completely accessible for easy cleaning and easy maintenance;
- ✓ good process monitoring conditions;
- ✓ very low water consumption per pig per year;
- ✓ moderate acid consumption.



HelixX

Local exhaust air treatment – basic layout and mode of operation



HelixX from Big Dutchman is a newly-developed exhaust air washer which can be used as local exhaust air cleaning system in pig houses. HelixX removes ammonia and dust from the house air.

The system basically consists of a nozzle holder in the exhaust air channel installed on top of a water collection spiral and a central water treatment device.

Through the nozzles, water is sprayed on the exhaust air thus binding dust and ammonia. The wash water then slides down the spiral into a gutter from where it is then led into a central collector to be reused for another cycle.

HelixX can easily be integrated in existing exhaust air systems. Therefore, retrofitting is possible without problems, which makes HelixX the perfect solution for inexpensive exhaust air cleaning.



“We utilize every drop” – for a high ammonia reduction

The nozzles on the nozzle holder are arranged in a way that the large drops collide with each other. This makes them burst into finer drops which then form a so-called secondary mist. This creates a significantly larger contact surface which naturally binds more ammonia and dust.

Technical specifications

Total height:	approx. 5 m
Inside diameter of the cleaning distance:	820 mm
Max. volume flow per HelixX:	8500 m ³ /h
Max. pressure loss:	100 Pa
Water requirements nozzles:	2000 l/h
pH-value:	< 3
Conductivity:	< 100 mS
Elutriation rate: approx. 165 litres per finishing place per year*	

* based on the transported ammonia charges



Special arrangement of nozzles for a high separation of dust and NH₃

Control of the HelixX exhaust air washer

The HelixX control system provides operational reliability and working safety of the whole facility. The operational data can be accessed and monitored via the full-graphic display.

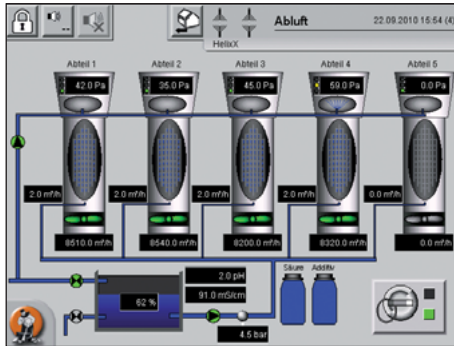
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All recorded data can be saved on a long-term basis. Weekly, monthly, etc. creation of a management report in PDF or XLS format is also possible.

Thanks to the simple menu navigation, daily monitoring of the recorded operational data can be carried out easily at the touch screen.



Control computer



Touch screen

The following parameters can be displayed in detail:

- ✓ pH-value of the circulating water;
- ✓ conductivity of the circulating water;
- ✓ pressure increase through HelixX;
- ✓ exhaust air rate per HelixX;
- ✓ pump pressure;
- ✓ filling level in the water treatment system;
- ✓ elutriation rates.

Results of the DLG certification measurements for HelixX

HelixX is the first local exhaust air washing system in pig management which fulfills the requirements of the DLG Signum Test for a separation rate of ammonia and dust of at least 70 %!

During the certification tests, the following separation rates have been proved:

- ✓ 86 % of ammonia (average result of summer and winter measurements)
- ✓ 89 % of total dust (average result of summer and winter measurements)
- ✓ up to 88 % of PM 10 (particle size < 10 µm)
- ✓ up to 83 % of PM 2.5

(particle size < 2.5 µm)

- ✓ 47 % of odour (average result of summer and winter measurements)

Detailed test results as well as the final report of the DLG can be found under www.DLG-Test.de.

The advantages at a glance

- ✓ this new, local exhaust air treatment system can be integrated into an already existing ventilation system without alterations;
- ✓ HelixX works without filling or filter material;
- ✓ high cleaning capacity; tests measuring the reduction of ammonia show an efficiency of up to 88 %;
- ✓ low-maintenance, competitive exhaust air cleaning system, well-suited to retrofitting;
- ✓ German utility patent DE 202010009560.3.



Big Dutchman®

Big Dutchman Pig Equipment GmbH
 P.O.Box 1163 • 49360 Vechta • Germany
 Tel. +49(0)4447-801-0 • Fax +49(0)4447-801-237
www.bigdutchman.de • E-Mail: big@bigdutchman.de