



Big Dutchman®



HelixX & MagixX

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

HelixX and MagixX – efficient pollution abatement facilities

Reducing emissions from livestock housing facilities will become more and more important in the future. In order to get a building permit for a pig barn, public authorities more often than not require the installation of an exhaust air cleaning system. If the barn is to be built close to a

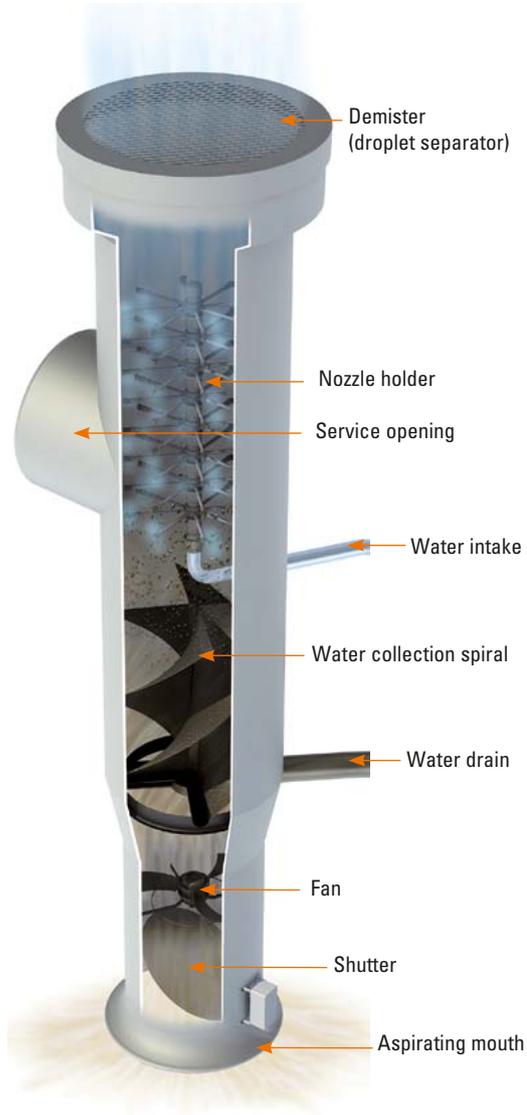
town, it is mainly odour and dust that have to be reduced. If the barn is to be built somewhere close to a biosphere worthy of protection, the main concern is to reduce ammonia emissions.

With **HelixX** and **MagixX-P**, Big Dutchman can actually offer you two exhaust air

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

HelixX

single-stage exhaust air cleaning system for the reduction of dust and ammonia emissions



HelixX is a newly-developed compact exhaust air cleaning system for pig houses from Big Dutchman. It removes ammonia and dust from the house air. HelixX basically consists of a nozzle holder in the exhaust air channel installed on top of a water collection spiral, a fan and a central water treatment device.

Through the nozzles acidified wash 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. The collected wash water is then processed to be reused for another cycle. All processes take place fully automatically.

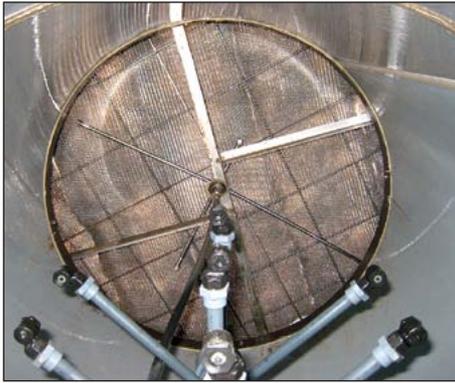


The advantages at a glance:

- ✓ high cleaning capacity → up to 88 % of ammonia;
- ✓ HelixX operates without filling or filter material;
- ✓ no additional building required → no extra building costs;
- ✓ extremely low maintenance requirements;
- ✓ emergency ventilation characteristics → approx. 20 % thermal output of the chimney in case of power failure;
- ✓ simple process control, ready for operation, no start-up phase;
- ✓ low elutriation rates → comparatively small tank for discharge water storage;
- ✓ low fire protection requirements;
- ✓ German utility patent DE 202010009560.3.

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

Technical solution with many advantages for the user



View of the demister

The stainless steel demister (fine-meshed, 10 cm strong wire netting) ensures that no aerosol leaves the exhaust air washer. The 64 nozzles of the attached nozzle holder below are arranged in such a way that the large drops collide with each other to burst into finer drops. The thus produced very fine so-called secondary mist creates a significantly larger contact surface which naturally binds more ammonia and dust.

The water collection spiral leads the

wash water back to a collector – the barn stays absolutely dry. The collector tank consists of three separate chambers. In the first two chambers coarse and fine particles are separated by sedimentation. In the third chamber sulphuric acid is added if the pH value is > 3 and a defoaming agent is added.



View of the nozzle holder through the large service opening



Special arrangement of the nozzles for a high separation of dust and NH_3



Collector for the circulating wash water



View of the spiral with water drain

With HelixX the exhaust air can be guided from the house either centrally or locally; however the focussed, centralised variant has more advantages. As in this case, it is possible to use the MultiStep® energy-saving exhaust air control principle. This means one HelixX is controlled steplessly from 0 to 100% and the other HelixX will be started up additionally at full capacity (on/off) as required.



Central air guidance - energy-saving and efficient

Results of the DLG certification measurements for HelixX

HelixX is the first local exhaust air cleaning system for use in pig production 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 proven:

- ✓ 87.5 % of ammonia (average result of summer and winter measurements)
- ✓ 88 % of total dust (average result of summer and winter measurements)
- ✓ up to 88 % PM 10 (particle size < 10 μm)
- ✓ up to 83 % PM 2.5 (particle size < 2.5 μm)

- ✓ 47 % of odour (average result of summer and winter measurements)
- The complete DLG test results can be viewed under: <http://www.dlg-test.de/pbdocs/6050.pdf>

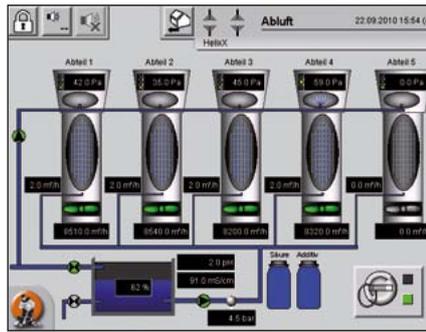
ing agents from the house air

Control of the HelixX exhaust air washer



Control computer

The HelixX control computer ensures the functional and operational reliability of the entire system. The farm manager can view and monitor the operating data on the graphic display. Data can be transferred via USB at any time. If a network has been established, all data can also optionally be transferred to an external PC. Thus a convenient remote enquiry is always possible. All recorded data can be saved on a long-term basis. A weekly or monthly creation of a farm report is also possible.



Touch-screen

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

The following parameters can be displayed in detail:

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

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.



Precise acid dosing thanks to pH-value measurement

Technical specifications

Type	HelixX 1090
Ø inside* (washing zone) mm	1090
Max. volume flow	m ³ /h 17500
Total height	m approx. 5
Power costs**	kWh 52
Waste water*	l 139

* upon request also available with Ø 820 mm

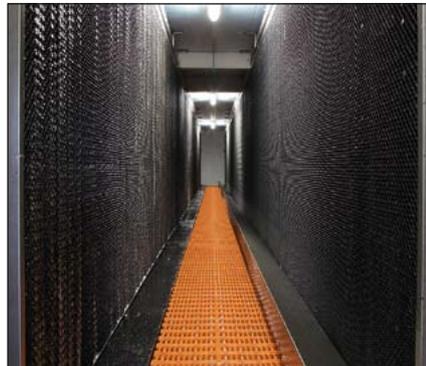
** per finishing place per year; exhaust air cleaning incl. ventilation

MagixX-P

Three stage exhaust air washer for emission reduction of dust, ammonia and odour



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

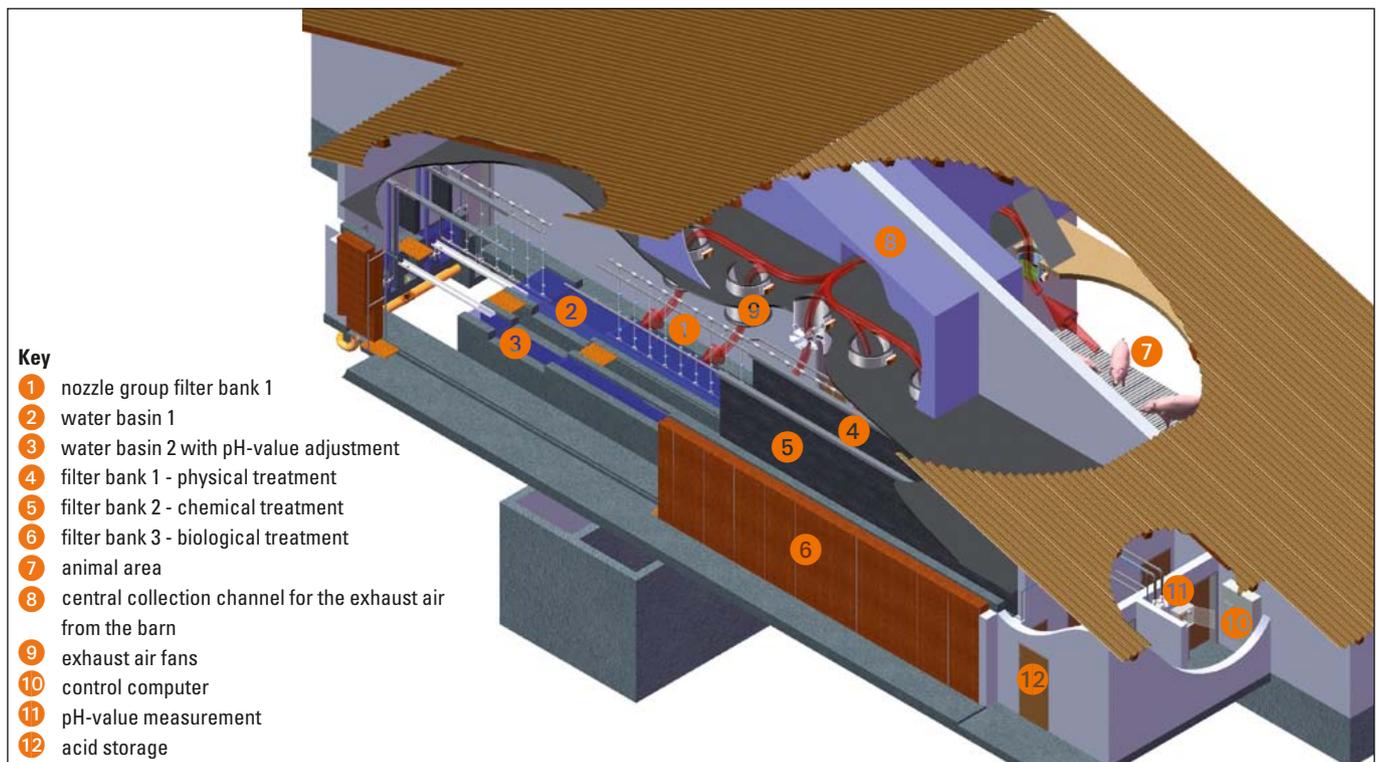


An inspection aisle lies between filter banks 1 and 2.



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

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



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

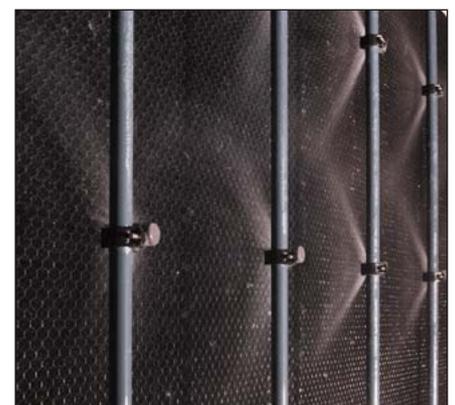
With MagixX-P, the exhaust air has to be collected centrally and directed through the centrally installed exhaust air washer where it is then cleaned. To ensure an ideal distribution of the exhaust air on the entire filter bank, the entire ventilation concept should be designed from Big Dutchman components as these are well-coordinated. MagixX-P consists of three cleaning stages. Water is sprayed through a group of nozzles (1st cleaning stage) 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 prevents a subsequent emission of NH_3 . 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 service room. The third filter bank (3rd cleaning stage) consists of root timber and is used for microbial transformation of the odour-carrying agents.

The advantages at a glance:

- ✓ high separation rate of ammonia, dust and odour;
- ✓ good buffering qualities due to the large water seal;
- ✓ the filling material of the filter wall 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;
- ✓ excellent process monitoring conditions;
- ✓ low water consumption per pig per year;
- ✓ moderate acid consumption.



Control of the MagixX-P exhaust air washer



Control computer

The MagixX control computer ensures the functional and operational reliability of the entire system. The operating data can be accessed and monitored via the full-graphic display. Data can be transferred via USB at any time. If a network has been established, all data can also optionally be transferred to an external PC. Thus a convenient remote enquiry 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.



Touch-screen

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

The following parameters can be displayed in detail:

- ✓ pH-value of the circulating water;
- ✓ static pressure difference of the individual filter stages;
- ✓ filling level of the water basins;
- ✓ purified exhaust air volume flow;
- ✓ water and power consumption.

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.



Precise acid dosing thanks to pH-value measurement

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



Big Dutchman.

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