



Big Dutchman®



MagixX & StuffNix

Exhaust air treatment
for pig and poultry houses

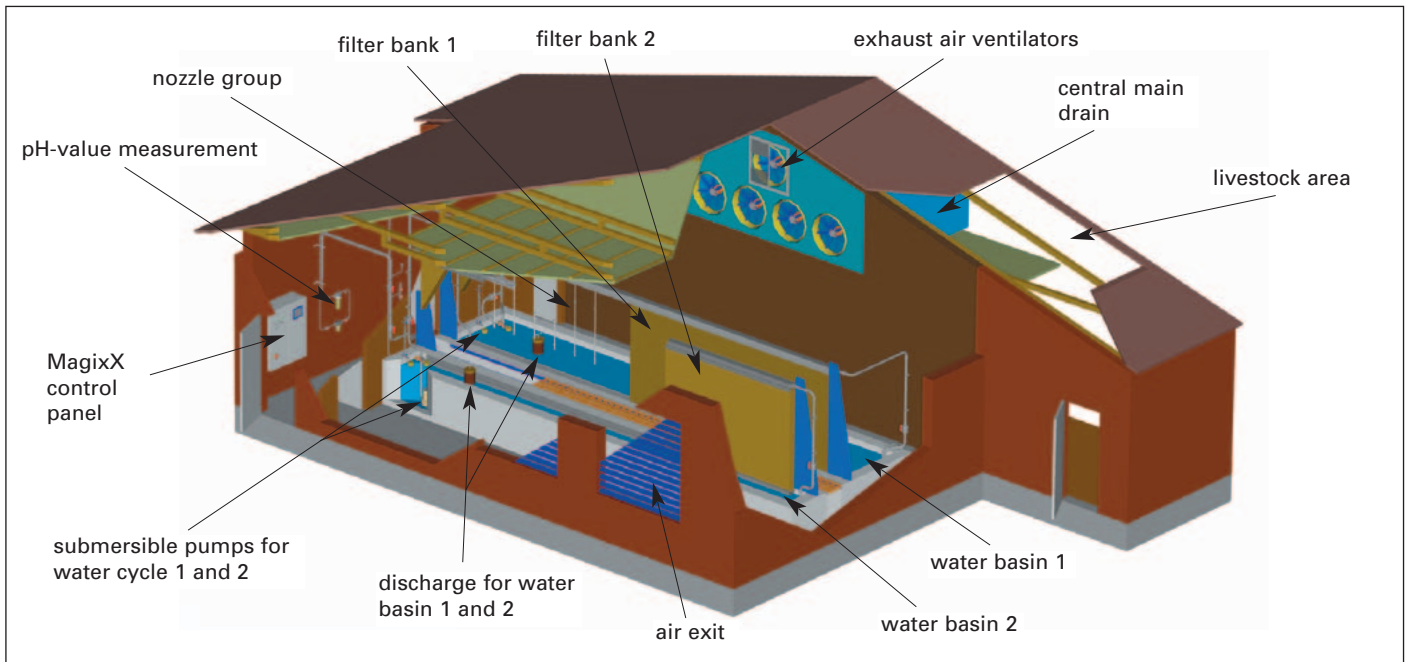
MagixX – the effective pollution abatement facility for the separation of dust, ammonia, germs and odour-carrying agents from house air

Clean air is becoming more and more important – not only in the industrial sector but also in the agricultural sector. To get a licence to build pig and poultry houses close to a small town or near to woods, public authorities require an exhaust air pollution abatement facility. Its main purpose is to reduce ammonia, dust and odour emissions to a

minimum.

With **MagixX**, Big Dutchman offers a solution to these emission problems. After several years of intensive research work we are able to present you with an exhaust air cleaning system that fulfils all the requirements mentioned above and facilitates the licence procedure for your house.

Basic construction of the MagixX exhaust air washer



How MagixX works

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. Using MagixX the house air is sucked or pushed into an exhaust air washer before exiting the house. The system consists of one or more treatment processes – depending on the application.

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. In this way, 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 already filtered out of the air. The solids precipitate

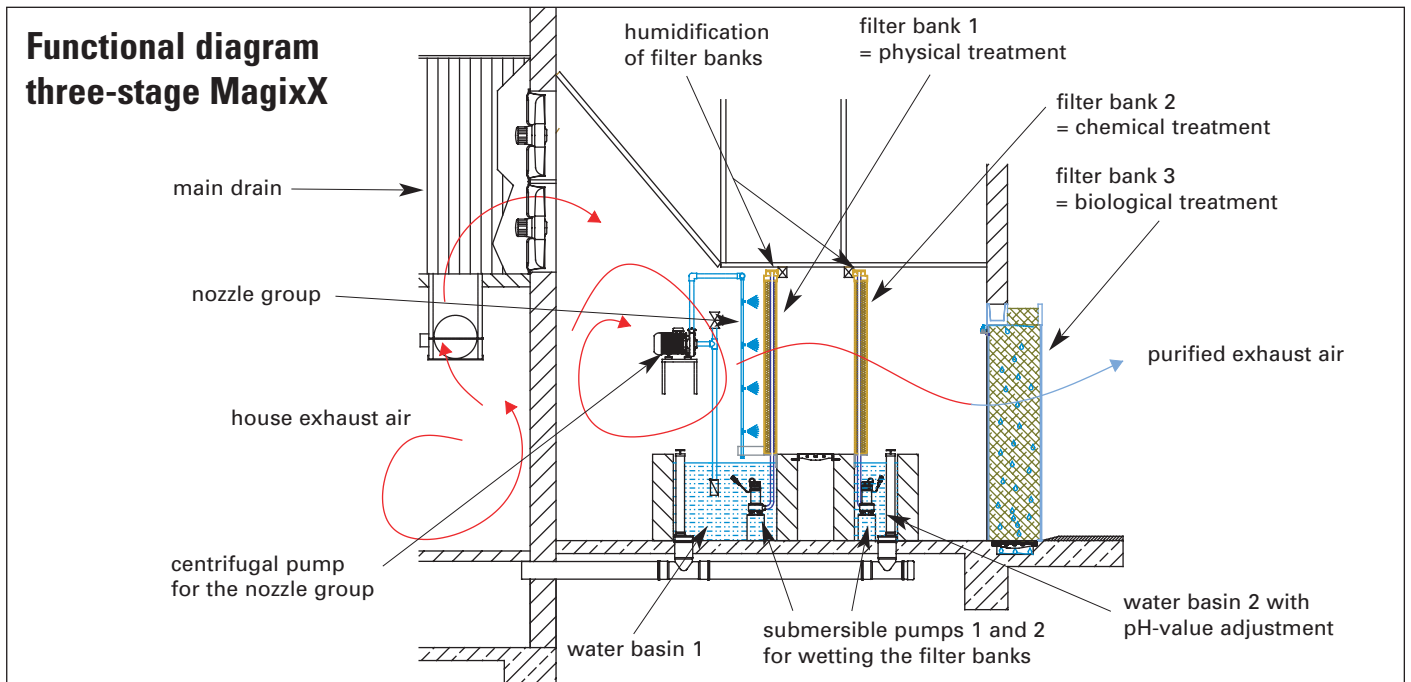
in the basin, which has to be emptied at regular intervals.

If a higher degree of NH_3 precipitation is necessary, the air moves into the second filter bank, which is used mainly to separate ammonia, fine dust and odorous substances.

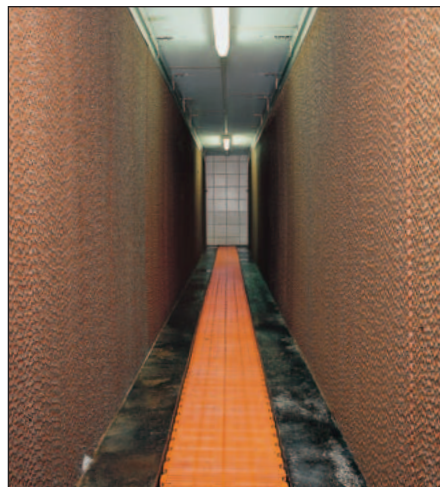
With acid added (e.g. sulphuric acid) the separation of ammonia is increased significantly. In the wash water the ammonia combines chemically as ammonium sulphate. Thus the evolution of ammonia gas is prevented by this chemical treatment. Dependent on the pH-value of the wash water, the addition of acid is accomplished by an automatic dosing pump. The chemical substances should be stored in a separate service room.

If there is any extra-high need to reduce odorous substances, a third treatment can be employed. This treatment consists of root timber and is used for microbial transformation of the odour-carrying agents.

Using Magix in a pig house



Nozzle groups spray water onto the front of the filter bank so that dust cannot cling to the filter bank. The individual filter chamber doors



have to be closed during operation of the filter. A filter inspection isle lies between filter banks 1 and 2.

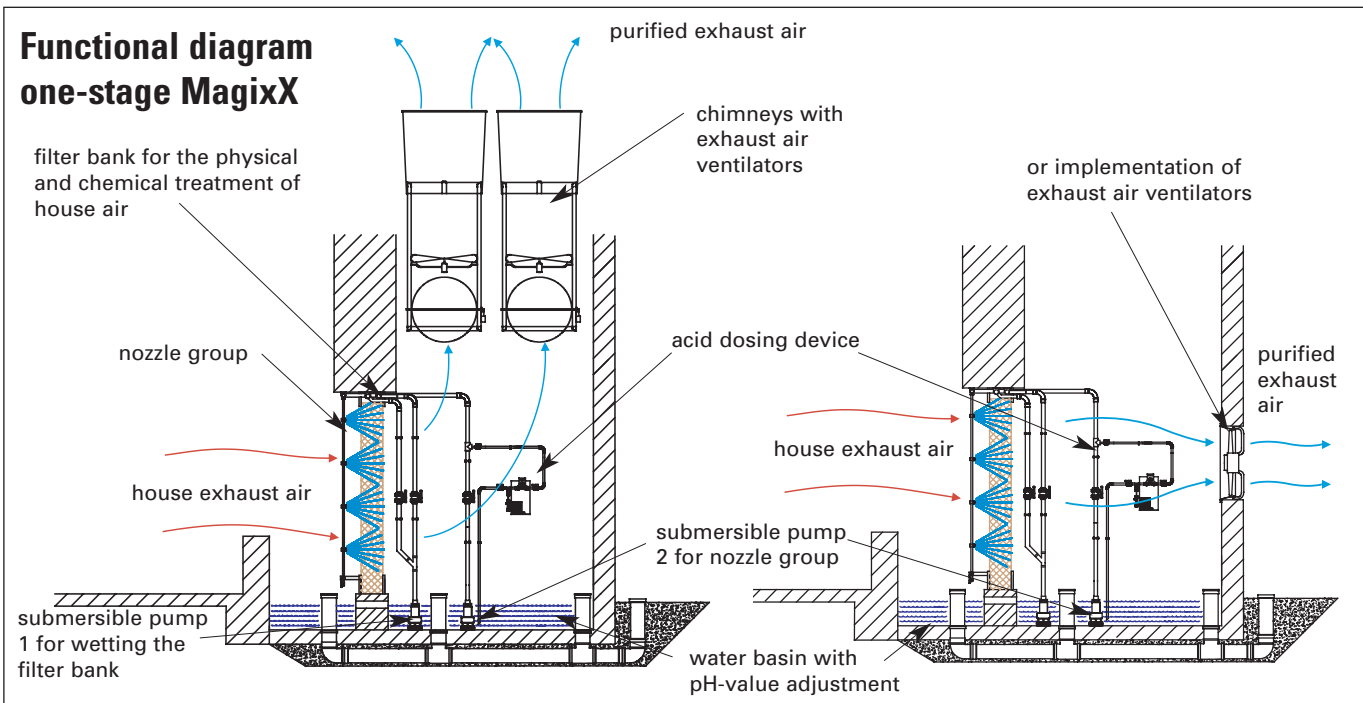


The third treatment step consists of root timber and is used for the microbial transformation of odour-carrying agents.

In this example, fresh air enters via door ventilation (1) and is directed into the central main drain via exhaust air valves (2). Ventilators installed in the main drain push the house air through the filter banks. The purified air is then released to the outside.



Using MagixX in a poultry house

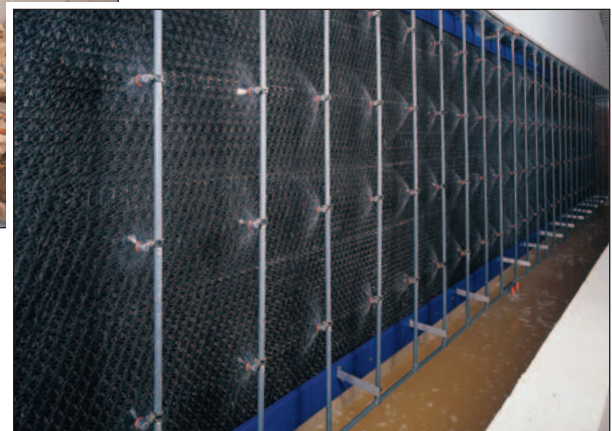


The use of MagixX is required whenever house air is not only to be purified of dust particles but when a significant reduction of ammonia and odour is equally necessary.

MagixX can be used in broiler and turkey houses, as well as for broiler breeders or in alternative layer production.



Back view of the filter – exhaust air chimneys suck the house air through the filter –



Nozzle groups spray water on to the front of the filter bank

The house air is sucked through a large-surface filter bank. Water is sprayed through nozzle groups on to the front of the filter bank, thus preventing dust from being deposited and at the same time increasing the cleaning performance. Dust and ammonia are separated and solids precipitate in the water basin. The basin has to be emptied at regular intervals (in broiler production after every grow-out). The separation of ammonia can be significantly increased by adding acid to the wash water (e.g. sulphuric acid).

StuffNix – an efficient and cost-effective dust filter for poultry houses

StuffNix is a new water-free mechanical dust filter system recently developed by Big Dutchman for use in poultry houses. It consists of a screen containing a folded paper element that forces air to suddenly change direction. By means of this simple but effective mechanical principle of centrifugal force,

the dust particles are separated from the airflow. They congregate in the V-shaped chambers outside of the airflow. Thus, the cleaned air route stays free, even though the filter fills up with dust particles. Qualified measurements have determined a **dust recovery of 70 %**.



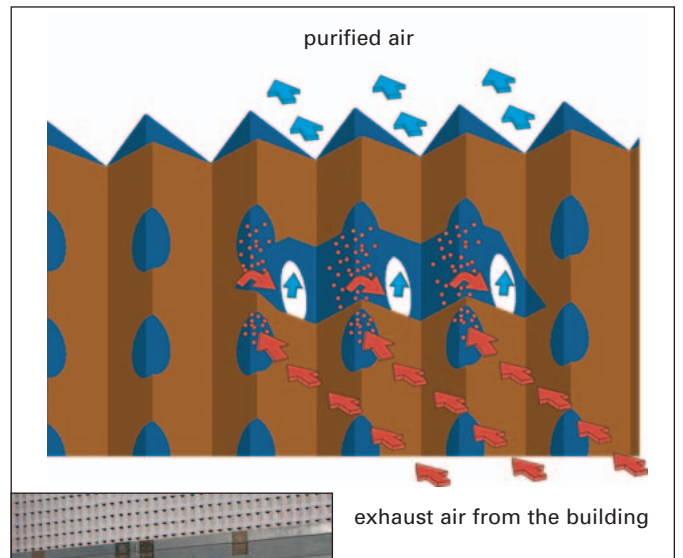
Implementation of StuffNix in a broiler-growing house



Rear side of the filter, ventilators suck the air through the wall

Advantages

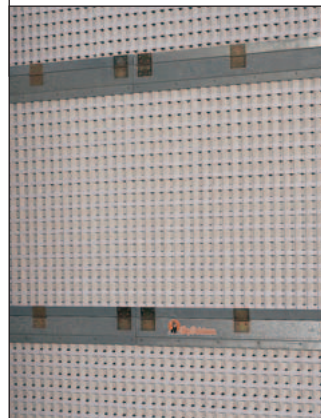
- **high storage ability** due to the V-shaped chambers outside the airflow;
- **stable flow resistance**, as the airflow route stays free;
- **high stability of shape of the filter walls** due to the geometrical structure;
- filter walls are **easy to clean** because of the dust flap that is built into the mounting profile;
- **reduction of transport costs** due to the accordion-shape of the filter walls;
- **fast assembly** by drawing the filter elements up to the required working size and attaching them;
- **StuffNix is a dry filter** – the use of water is not necessary.



StuffNix operates according to the principle of centrifugal force

Investment and operation costs:

- significantly-reduced investment costs
=> only 25 %, compared to a wet exhaust air treatment system;
- minimal operation and maintenance costs
=> there is no need for water and thus no additional disposal costs
=> no additional energy costs (e.g. for pumps).



The filter can be cleaned by emptying the dust collectors

Control of the MagixX exhaust air washer



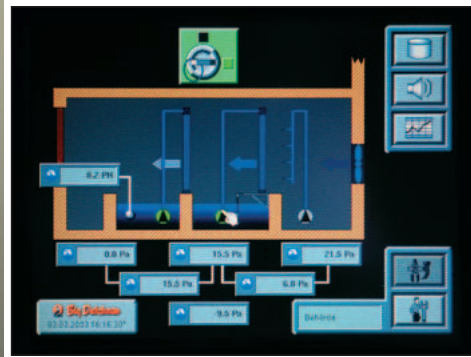
The electronic control system provides operational reliability and working safety of the whole facility. On the visual graphic screen, all operational data can be displayed and controlled.

Via a modem all data can also be transmitted to the office PC. Thus a convenient remote inquiry is always available. All recorded data can be saved on a long-term basis. Weekly or monthly creation of a management report is also possible.

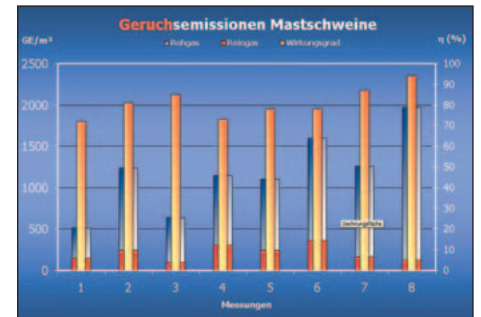
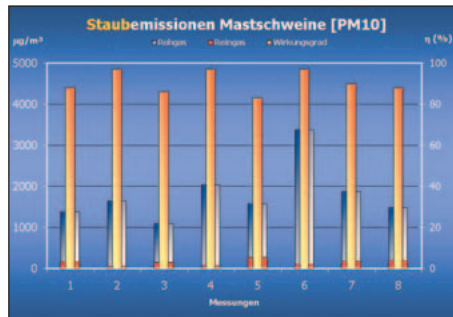
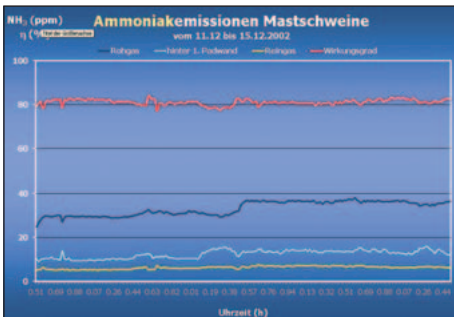
Daily monitoring of the recorded operational data can be carried out at the touch screen at any time = simple menu navigation.

The following information can be displayed in detail:

- pH-value of circulating water;
- static pressure difference of the individual filter stages;
- temperature and air humidity of crude gas and clean gas;
- volume flow of ventilators;
- water and electric power consumption.



Results of long-term measurement *



Efficiency of ammonia separation

concentration ...	winter	summer
in crude gas (ppm)	24,1	13,7
in clean gas (ppm)	7,2	3,7
efficiency (%)	70,1	72,9

Efficiency of dust separation

fraction	efficiency in %	
	winter	summer
PM 10	94,0	91,2
inhaleable particles	96,4	98,1

Efficiency of odour separation

	winter	summer
crude air (GE)	1858,5	1330,9
clean air (GE)	256,5	248,7
efficiency (%)	83,8	75,6

* An ongoing scientific study of the MagixX three-stage exhaust air cleaning system from winter 2002 up to and summer 2003 carried out by the faculty of agriculture of the University of Bonn.

Detailed results can be obtained from Big Dutchman.

Note: The annual mean of odour concentration was under 300 GE and crude gas smell was not perceivable in the clean gas!



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