



Big Dutchman®



Exhaust air treatment systems

for the effective reduction of emissions from pig houses

Efficient exhaust air treatment

Separation of ammonia, dust and odorous substances from the house air

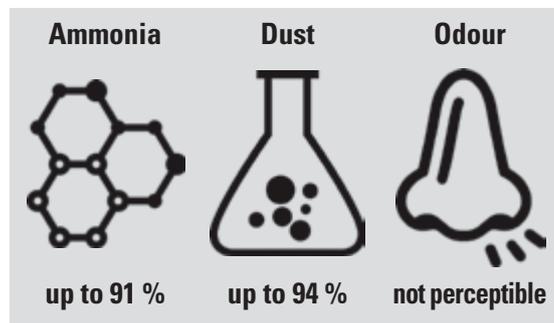
Big Dutchman is your competent partner for expert planning and implementation of exhaust air treatment systems. Many years of experience with hundreds of realised projects

and the use of proven and certified exhaust air washers enable us to make your pig production ready for the future. Our job does not end with completion of the project. The

washer remains functionally reliable in the long term only when it is serviced correctly and regularly.



Permits for pig barns often require the installation of an exhaust air treatment system. Where the planned barn is located near a town or biospheres that are worth conserving, the importance of reducing ammonia, odour and dust emissions is ever-increasing.



We have two different exhaust air washers available to meet your individual requirements:

- ✓ IUS-P
- ✓ MagixX-P+

We recommend deciding together with our experts which system is the best choice for you.

Parameter	IUS-P	MagixX-P+
Area of use	Pig production / slurry	Pig production / slurry
Air distribution	centralised	centralised
Separation of ammonia, dust and odour	yes	yes
Use of acids	lower	higher
Water consumption	higher	lower
Type of construction	building annexe / modular design	building annexe / modular design

Your advantages at a glance

- ✓ individual planning with an expert;
- ✓ use of proven and certified exhaust air washers;
- ✓ permanently high separation rates;
- ✓ easy handling;
- ✓ high functional and operational reliability;
- ✓ reliable monitoring up to and including remote maintenance;
- ✓ cost-efficient operation;
- ✓ qualified maintenance service;
- ✓ expert support during construction planning possible.

IUS-P

Two-stage biological-chemical exhaust air treatment system

IUS-P has been certified by the German Agricultural Society (DLG, test report no. 6220). The washer achieved the following separation rates:

- ✓ up to 91 % of ammonia
- ✓ up to 89 % of total dust
- ✓ odour concentration in clean gas ≤ 300 OU/m³
- ✓ no untreated gas perceptible in the clean gas



Our IUS-P exhaust air treatment system is also available with an intelligent modular design. This has the following advantages:

- ✓ easy-to-plan assembly times
- ✓ lower construction costs
- ✓ easier to assemble
- ✓ single-part plastic housing for reliable and long-term tightness
- ✓ high resistance to acids, alkalis and process water
- ✓ checked functionality



IUS-P consists of two cleaning stages. The first stage is a plastic filter wall that is permanently sprayed with water from above. The addition of sulphuric acid creates a slightly acid environment (pH value 6.5 to 6.8). Fans press the exhaust air that requires

cleaning through the filter wall, thus separating ammonia and dust from the untreated gas. The special structure of the filter wall ensures high separation rates with continuous self-cleaning. The second cleaning stage, a biological filter wall with brushwood filling,

significantly reduces odours. Regular humidification guarantees a permanent and good functionality.



Fans press the exhaust air into the first pressure chamber and then through the plastic filter



Filter wall (left) and droplet separator (right)



View into the second pressure chamber: droplet separator (left), biological filter wall (right)



Advantages of IUS-P

- ✓ permanently high separation rates;
- ✓ easy handling;
- ✓ reduced water consumption due to cleaning of the wash water and return to the circuit;
- ✓ very little counter-pressure thanks to pH-neutral, automatic desludging;
- ✓ small amounts of acids and alkalis used;
- ✓ easy-to-understand process monitoring;
- ✓ low construction and operating costs.

Control and monitoring of the IUS-P exhaust air treatment system

An important advantage of IUS-P's modular design is the technical room with perfect dimensions. This room is pre-installed by the manufacturer. All necessary components, such as the pH value sensor, the conductivity sensor, the meters for measuring fresh water and sludge water, pumps, piping and the control box are cleverly installed for a good overview. The practical arrangement of the technology also makes maintenance easier. The compact technical room is tightly closable and resistant to acids and alkalis.



Pre-installed technical room with control box

For smooth operation, the following parameters must be controlled and monitored:

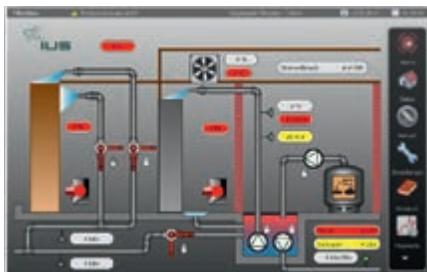
- ✓ pH value
- ✓ conductivity of the wash water
- ✓ runtimes of the pumps
- ✓ pressure in both chambers
- ✓ air flow rate
- ✓ temperature of untreated and clean gas
- ✓ spray pattern

The parameters below are also recorded automatically and thus help keep track of the operating costs:

- ✓ waste water consumption
- ✓ fresh water consumption
- ✓ acid/alkali consumption
- ✓ power consumption

The electronic operation records are a central part of the certification procedure

and an important instrument for proving stable operation of the system. Additionally, the operator should keep manual records to document the system's condition.



Visualisation of the entire system



Overview of all relevant values



Easy input of operating parameters

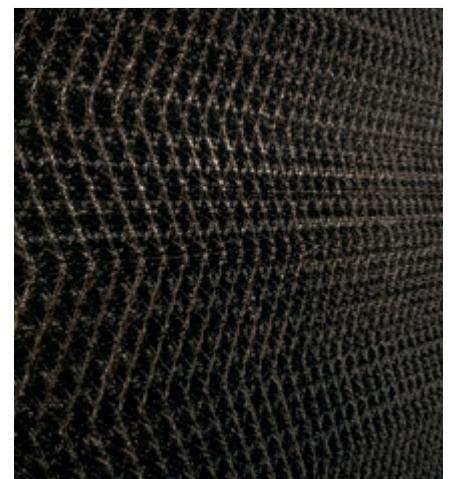


Acid and alkali dosing

For secure storage of sulphuric acid or sodium hydroxide, we recommend using double-wall IBC plastic containers. They are available for lease and easy to handle and to exchange.

Acid and alkali are added by two automatic dosing pumps based on the pH value of the wash water. This ensures that the added quantities of acids and alkalis are always correct.

In line with current safety technology for risk-free acid and alkali dosing, we recommend installing a safety storage cabinet.



Filter wall made of high-quality plastic material

MagixX-P+

Three-stage chemical-biological exhaust air treatment system

MagixX-P+ has been certified by the DLG (test report no. 6224) and is listed under the Dutch BWL number 2006.15.V3. The washer achieved the following separation rates:

- ✓ up to 87 % of ammonia
- ✓ up to 94 % of total dust
- ✓ up to 90 % PM 10 (< 10 µm)
- ✓ up to 97 % PM 2.5 (< 2.5 µm)
- ✓ odour concentration in the clean gas ≤ 300 OU/m³
- ✓ no untreated gas perceptible in the clean gas



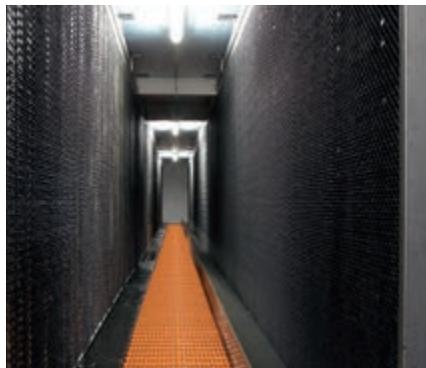
Using MagixX-P+ requires the centralised extraction of exhaust air. MagixX-P+ has three cleaning stages. A group of nozzles sprays water onto the front of the first filter wall (cleaning stage 1). The wall is thus kept from drying out; dust cannot adhere to the filter. Moreover, the air humidity increases and improves the absorptive properties of the moistened wall surface. The exhaust air flows into the filter wall through which water flows constantly from top to bottom. Dust and ammonia are

washed out into the first basin. Since odorous substances are partially attached to dust, a large proportion of these emissions is effectively filtered out of the air. The addition of sulphuric acid causes the ammonia absorbed in the wash water to react to ammonium sulphate. The second filter wall (cleaning stage 2) also separates dust and ammonia. The addition of sulphuric acid increases the ammonia separation rate significantly. An automatic dosing pump adds the acid based

on the pH value of the process water. All process water must be replaced after no more than three months. As an alternative, measuring the electrical conductivity allows automatic desludging at a value of < 130 mS/cm (option). The third cleaning stage features a brushwood filling and is used for microbial transformation of the odorous substances.



Cleaning stage 1: the filter wall is sprayed with water to prevent dust from adhering



Inspection aisle between the first and second cleaning stages



Cleaning stage 3: brushwood filling to transform odorous substances

Advantages of MagixX-P+

- ✓ permanently high separation rates;
- ✓ good buffering qualities due to the large water store of the basin;
- ✓ very little water consumption;
- ✓ stable packing made of high-quality plastic material;
- ✓ high operational reliability;
- ✓ easy-to-understand process monitoring;
- ✓ low pH value of < 4 for higher absorptive properties of NH₃;
- ✓ advantages of IUS-P+'s modular design also apply for MagixX-P+.

Control and monitoring of the MagixX-P⁺ exhaust air treatment system

The control computer ensures the functional and operational reliability of the entire system. A colour display enables viewing and checking the operating data. 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. Remote monitoring is thus very convenient. All recorded data can be saved on a long-term basis. An operating report can also be created, either as .pdf or .xls file. The following parameters can be determined:

- ✓ pH value and conductivity of the wash water in the first two cleaning stages
- ✓ runtimes of the pumps and flow rates
- ✓ pressure in both chambers
- ✓ air flow rate
- ✓ temperature of the untreated and clean gas

The following parameters are also recorded automatically, helping to keep an eye on operating costs:

- ✓ total desludging amount (optional)
- ✓ fresh water consumption

- ✓ acid consumption
- ✓ power consumption

The electronic operation records are a central part of the certification procedure and an important instrument for proving stable operation of the system. Additionally, the operator should keep manual records to document the system's condition.



Acid store



Acid dosing



MagixX-P⁺ control computer

Qualified and reliable maintenance service for a high functional reliability and a long working life of your exhaust air treatment system

A qualified maintenance service is important to ensure that you use your exhaust air treatment system safely, that you achieve high separation rates and that your system has a long working life.

Technical advice, on-site checks if necessary and software updates improve management and reduce the risk of unexpected failures. Within Germany, we are available under the

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