Big Dutchman®

# Fresh air supply systems

Optimum fresh air supply for every type of pig house

# Fresh air supply systems – the right solution for every type of pig house!

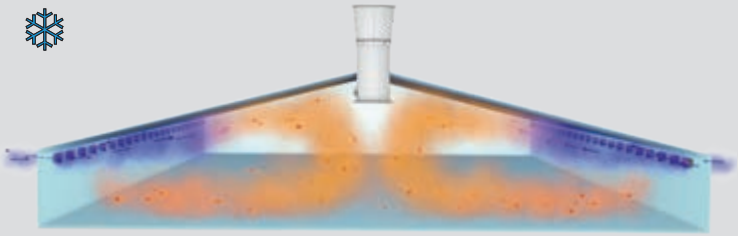
Big Dutchman offers a wide range of systems to ensure optimal provision of fresh air. Depending on building design and special requirements of your pigs, different ventilation systems are possible, including negative or balanced pressure systems, diffused fresh air distribution, natural ventilation, tunnel or CombiTunnel ventilation. Big Dutchman's product range includes the following options:

- wall inlets
- ceiling inlets
- DiffAir ceilings
- fresh air chimneys
- large air inlets for tunnel ventilation
- curtain systems

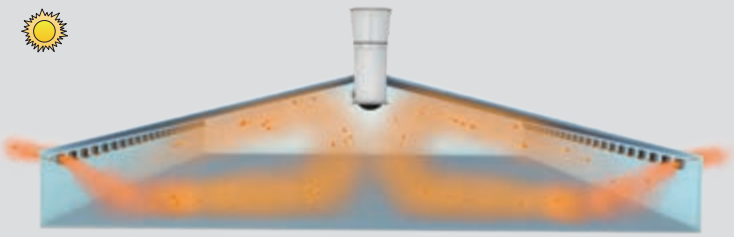
Let the Big Dutchman experts advise you with a detailed consultation to design the ventilation system that best suits your pig house.

## FRESH AIR INLETS FOR INSTALLATION INTO THE WALL

Wall inlets are very well suited for non-centralised air supply in pig houses. Whether the inlet is designed to be embedded in the wall or used as a flange inlet for walls made from sandwich panels, Big Dutchman can provide the ideal solution for every application. The objective is to create optimal air circulation inside the building at all times, delivering a consistent internal environment that meets the pigs' requirements and does not fluctuate when external temperatures rise or fall.



When outside temperatures are low, the fresh air flows along the ceiling, where it warms up before it slowly enters the animal area.



When outside temperatures are high, the wall inlets are fully opened and the pigs gain direct benefit from the fresh air.

# The new CL-3-1200 and CL-3-1911/F series

### For uniform fresh air supply in the entire pig house

CL-3-1220 fresh air inlet for installation into the wall

CL-3-1211/F Anti-Freeze flange inlet with optimal frame insulation for temperatures below -25 °C

CL-3-1211 F orange flange inlet

CL-3-1211 F black flange inlet

Big Dutchman's well-proven fresh air inlets are made from a shock-proof, recyclable, non-deformable and UV-stabilised plastic material. The insulated inlet flap is kept closed by stainless steel springs, thus sealing the building and making it airtight. The inlet flap opens through downward pull. This allows very precise regulation of the inlet opening in response to climatic temperature changes. The appropriate control set opens the fresh air inlets either all at once or individually. With the patented advanced inlet control (AIC), a single action at each inlet pre-defines which inlets open first and which open later. If the number of open inlets is reduced, particularly during the colder months of the year or while heating is necessary, the remaining inlets can be opened further, so maintaining a more stable air flow.

CL-3-1911/F orange flange inlet with high air flow rate

- The best series of fresh air inlets with the best accessories!
- Practically maintenance-free!
- A service life of 20 years or more is not unusual!

CL-3-1911/F black flange inlet with high air flow rate

CL-3-1911/Ftransparent flange inlet, developed specifically for customers who want to participate in the German Animal Welfare Initiative. The transparent area of the windows must amount to at least 3 per cent of the room's floor area. This inlet has a transparent area of 0.14 $m^2$ to let in daylight.

CL-3-1211/F flange inlet with air deflector

## Air flow rate with inlet fully open (in $m^3/h$)

| Type | CL-3-1220 | CL-3-1224 | CL-3-1229 | CL-3-1233 | CL-3-1211/F | CL-3-1911/F |
|---|---|---|---|---|---|---|
| -10 Pa | 1 200 | 1 250 | 1 280 | 1 350 | 1 000 | 1 750 |
| -20 Pa | 1 700 | 1 750 | 1 800 | 1 940 | 1 450 | 2 500 |
| -30 Pa | 2 050 | 2 120 | 2 170 | 2 300 | 1 700 | 3 050 |

## ADVANTAGES

- ✔ ideal supply of fresh air with negative pressure ventilation;
- ✔ advanced inlet control creates stable air jets, especially with minimum ventilation;
- ✔ strong tension springs close the insulated and non-deformable inlet flap (integrated profile made from aluminium) so the building is absolutely airtight;
- ✔ the inlet opening is controlled precisely by strong tension springs: stable air circulation throughout the house, uniform temperatures in the entire house while heating requirements remain low;
- ✔ the use of high-quality materials ensures a long service life of the inlets;
- ✔ very versatile application;
- ✔ a high-pressure washer can be used without any concern.

# The ideal accessories for Big Dutchman wall inlets

## Useful, effective and sometimes indispensable!

### 1 Protective grille against birds

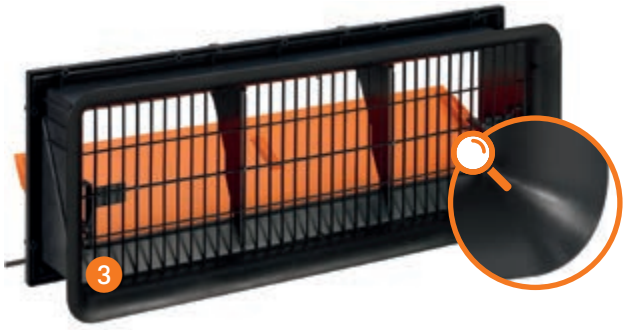
This pest guard prevents birds and small animals from entering the building through the inlet. For the CL-3-1200 series, Big Dutchman offers a self-supporting plastic grille that is available with two different mesh sizes. The grille is attached to the outside of the inlet by a simple locking mechanism.

### 2 Air deflector

With the air deflector (also available for the CL-3-1200 and CL-3-1900 series), the direction of the air flow can be adjusted individually for each building, simply by changing the angle between deflector and wall. This enables the precise distribution of fresh air. The deflector also controls the angle at which fresh air enters the building, thus preventing cold air from dropping directly onto the pigs. The air deflector is easy to mount at the upper edge of the inlet. Big Dutchman offers a short version along with a 15 cm long version for ceilings that are not smooth.

### 3 Intake nozzle with protective grille against birds for CL-3-1911/F

This nozzle significantly reduces the turbulence when the air flows into the inlet, thus ensuring more stable air jets, even with a small inlet opening. When the inlet is opened fully, air flow rates will increase by approx. 20 per cent! This means that it may be possible to reduce the number of wall inlets to be installed. The nozzle can be used up to a wall thickness of 10 cm and can be retrofitted.



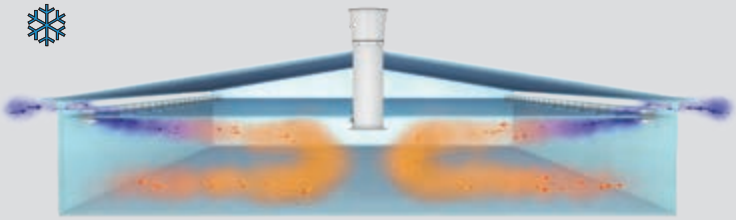

### 4 Fly protection

To stop flies and other insects from entering the building, thus reducing the transmission of pathogens through incoming fresh air, Big Dutchman offers a fine-meshed fly screen for the CL-3-1200 inlet series. The screen is mounted using a light protection cowl. When cleaned regularly, the fly screen hardly affects the air flow rate of the CL-3-1200 wall inlets.

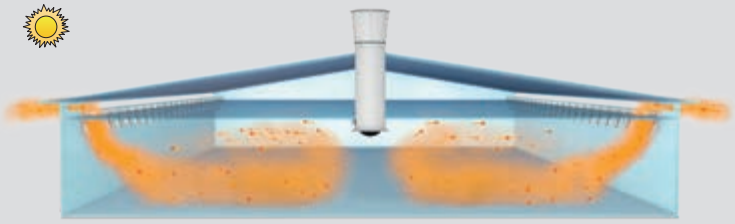
The Big Dutchman product range also includes a second, very cost-efficient fly protection solution. Irrespective of the wall inlet type, this fly screen can be installed along the entire length of the house. If the side wall has openings such as doors, the fly screen must be divided into several parts.

# FRESH AIR INLETS FOR INSTALLATION INTO THE CEILING

Ceiling inlets are well suited for non-centralised fresh air supply in houses with a ceiling below the roof space. The objective is to create optimal air circulation inside the building at all times, delivering a consistent internal environment that meets the pigs' requirements and does not fluctuate when external temperatures rise or fall.



When outside temperatures are low, the fresh air flows along the ceiling, where it warms up before it enters the animal area.

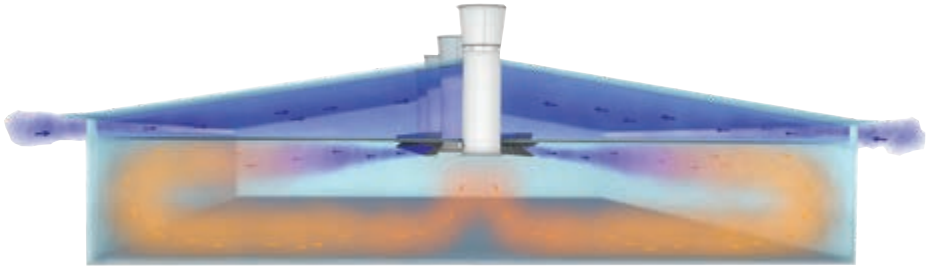


When outside temperatures are high, the inlet flap is fully opened and the pigs benefit directly from the fresh air.

# CL 1540

## Fresh air inlet for installation in a ceiling below the roof space

The CL 1540 ceiling inlet is made from a recyclable, shock-proof, non-deformable and UV-stabilised plastic material. Where possible, it should be installed into a ceiling that has been insulated. Even with a ceiling inclination of up to 15 degrees, CL 1540 will seal securely, due to the strong, corrosion-resistant steel springs that keep the insulated inlet flap firmly closed. Fresh air enters the house through the roof space. The roof itself should also be insulated to prevent heat building up during warm weather. The inlet flap opens through downward pull, which controls the amount of air moving into the building. The air always flows along the ceiling, which should be as barrier-free as possible. With the appropriate control set, the ceiling inlets are either opened all at once or individually.



If the centre of the house is the warmest place, the inlets can also be installed here.

CL 1540 multi-purpose ceiling inlet

## ADVANTAGES

- ✔ ideal supply of fresh air from the roof space with negative pressure ventilation;
- ✔ very versatile;
- ✔ advanced inlet control creates stable air jets, especially with minimum ventilation;
- ✔ strong tension springs close the ***insulated*** inlet flap so the building is airtight;
- ✔ the inlet opening is controlled precisely by tension springs: stable air circulation throughout the house, uniform temperatures while heating requirements remain low;
- ✔ fresh air remains at ceiling height for longer: a lower negative pressure is sufficient to ventilate the house efficiently;
- ✔ the use of high-quality materials ensures a long service life of the inlets;
- ✔ operation is virtually maintenance-free;
- ✔ a high-pressure washer can be used without any concern.

## Air flow rate with inlet fully open (in m³/h)

| Type | CL 1540 | |
|---|---|---|
| -10 Pa | 1 250 | 1 450* |
| -20 Pa | 1 750 | 2 100* |
| -30 Pa | 2 100 | 2 550* |

* with intake funnel, code no. 60-40-1323

CL 1540: wide open inlet flap in the summer

One of the main characteristics of the CL 1540 inlet is the inlet flap, which is shaped like a large shovel. This unique feature ensures that even when the inlet flap is wide open, the air flows along the ceiling, where it mixes with the warm house air.

For regions that are very warm and humid, the flap can be opened even further than the standard 100 per cent position (i.e. parallel to the floor). The air can then flow vertically into the animal area, at a high speed, creating the windchill the pigs need to cool down.

CL 1540: use in the nursery

In houses with a sloped ceiling, the CL 1540 inlet from Big Dutchman can be used without issues up to an inclination of 15 degrees. Strong return springs ensure that the ceiling inlet closes reliably even in this installation position.

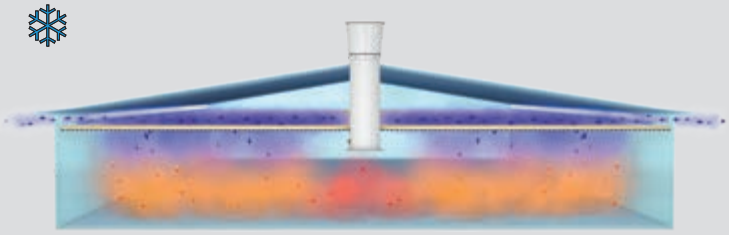
Heating is necessary in many regions, especially for piglet rearing. Based on experience, the Big Dutchman recommendation is a combination of ceiling inlet with fin heater, which has proved to be very successful.

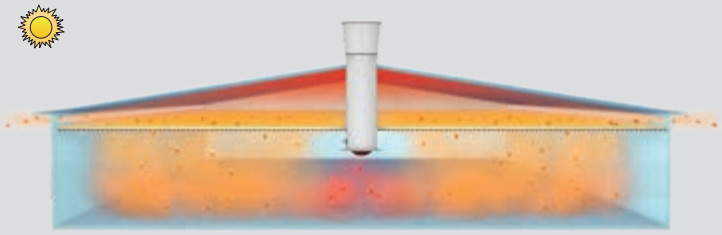
Use of a CombiDiffuse ventilation system in a service centre

**CombiDiffuse ventilation** is a combination of two ventilation systems. With low outside temperatures, fresh air is supplied through the DiffAir ceiling. The fresh air enters throughout the entire ceiling, evenly and at a low speed. With high outside temperatures, the ceiling inlets are automatically opened by the 307*pro* or 310*pro* climate computer. This effect causes the air to enter the building at a much higher speed. The animals then feel more comfortable with the perceived lower temperatures created by higher air speeds.

# DIFFUSED FRESH AIR THROUGH THE CEILING

Fresh air is supplied uniformly along the entire ceiling for an even air distribution at a very low air speed. The slow and even distribution of the fresh air is an advantage especially in the winter and in nurseries because draughts are prevented.



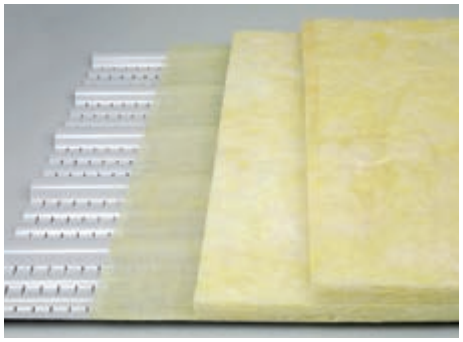


# DiffAir ceiling

## Fresh air provided through the entire ceiling

The DiffAir ceiling serves both as a diffused fresh air supply system and economical ceiling insulation. It consists of glass-reinforced plastic (GRP) trapezoidal or aluminium sheets. Aluminium sheets have the advantage of being incombustible. DiffAir ceilings are installed at a height of 2.40 m to 3 m. Their insulation consists of specially treated glass wool. Two layers of the glass wool are provided, permeable to air flow. An additional layer of fleece between the glass wool and the DiffAir plate acts as a water repellent.

Use of a DiffAir ceiling in a gestation house for sows



Structure of a DiffAir ceiling

DiffAir plate made from aluminium

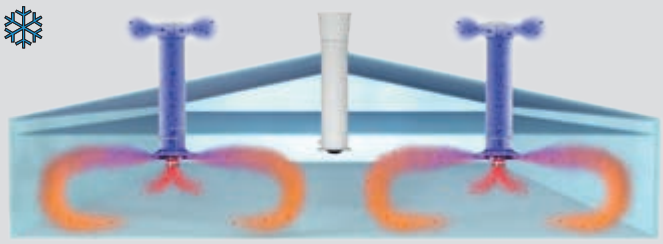
| Technical data | DiffAir plate made from GRP | DiffAir plate made from aluminium |
|---|---|---|
| Standard size: | 5.10 m x 1.05 m* | 5.10 m x 1.05 m* |
| Plate thickness: | 0.9 mm or 1.5 mm | 0.35 mm |
| Weight: | approx. 3 kg/m² (incl. glass wool) | approx. 2.7 kg/m² (incl. glass wool) |
| Perforation: | approx. 7 % | approx. 7 % |
| Insulating material: | 2 glass wool layers of 4 cm each and glass fibre non-woven | |
| Fastening material: | plumber sealing screws V2A; 4.5 x 35 mm | plumber sealing screws V2A; 4.5 x 35 mm |
| Maximum span: | 1.20 m for a plate thickness of 0.9 mm<br>2.40 m for a plate thickness of 1.5 mm | 1.20 m for a plate thickness of 0.35 mm |

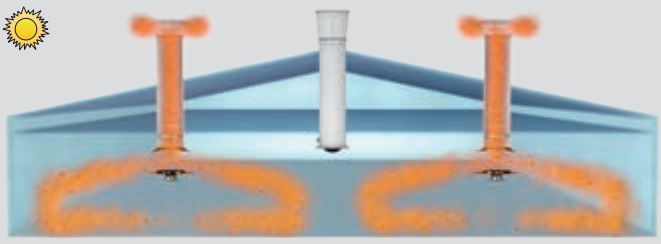
* Customised lengths upon request

# FRESH AIR CHIMNEY FOR NEGATIVE AND BALANCED PRESSURE VENTILATION

Fresh air chimneys draw fresh air from the roof and distribute it evenly throughout the house. They are particularly useful when:

- ✔ fresh air distribution along the side walls or the ceiling is not possible due to building design, or not requested;
- ✔ the building is extremely wide and low and cannot achieve good air circulation from wall inlets alone;
- ✔ a balanced or negative pressure system is to be used, e.g. due to leakage of the building.





## F.A.C. 2 (Fresh Air Chimney)

### Fresh air supply from the roof

F.A.C. 2 consists of a stable pipe system that is GRP coated on the inside and the outside. The pipes are well insulated with 30 mm of polyurethane. F.A.C. 2 is easy to clean, has a long service life and is available in four diameters (650 mm, 730 mm, 820 mm and 920 mm). The fresh air distributor at the lower end of the chimney ensures that the incoming air is distributed evenly inside the house. This creates a stable air flow even with minimum ventilation. F.A.C. 2 is available with central or individual control. For individual control, the CL 175 actuator is installed directly at the chimney. Central control of multiple chimneys requires a single actuator plus cables and tension rods.

As pigs are very sensitive to draughts, a recirculation unit including a fan is a standard feature of F.A.C. 2. This unit distributes cold incoming air more evenly in the house, especially in winter. The circulation fan then creates a mixture of fresh air and warm inside air. Depending on the outside temperature and the ventilation level, the circulation fans can be switched on and off by the 307*pro*/310*pro* climate computer.

As an option, F.A.C. 2 can be equipped with a fan inside the chimney. This fan pushes the fresh air drawn in by the chimney through the fresh air distributor and into the house to create a balanced pressure system.

F.A.C. 2 with recirculation unit for even distribution of the fresh air

Einsatz des F.A.C. 2 in einem Ferkelaufzuchtstall

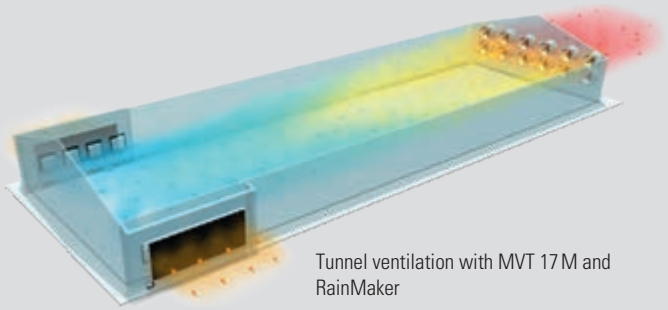
Individual control of F.A.C. 2 with CL 175

### Air flow rate with chimney fully open (in m³/h)

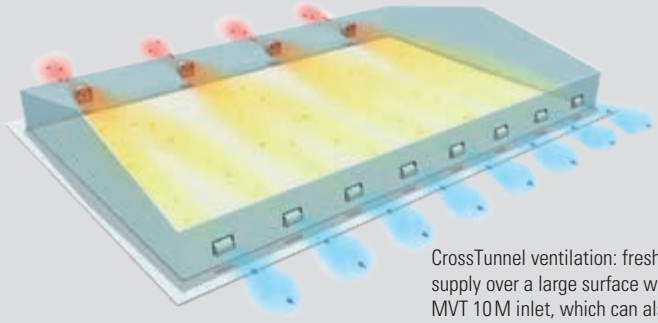
| Pa / Ø | 650 mm | 730 mm | 820 mm | 920 mm |
|---|---|---|---|---|
| -10 Pa | 4 900 | 6 100 | 6 700 | 9 500 |
| -20 Pa | 7 000 | 8 900 | 11 000 | 13 700 |
| -30 Pa | 8 600 | 11 000 | 13 500 | 16 900 |
| Balanced pressure | 13600 | 17900 | 24700 | 24600 |

# LARGE AIR INLETS FOR TUNNEL VENTILATION

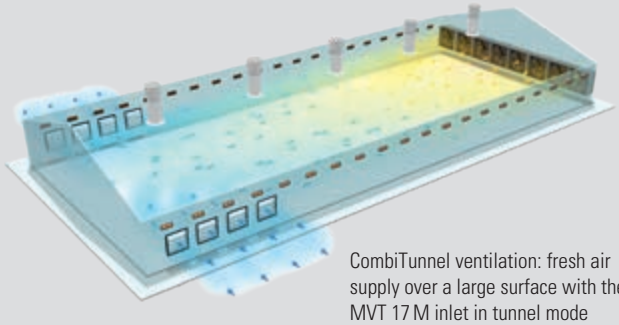
Using a tunnel, CrossTunnel or CombiTunnel ventilation system requires large air inlets. Depending on the selected system, these inlets are installed either near the gable ends at each side of the house, directly in the gable, or along one long side of the house. The inlets allow the fresh air to enter the house over a large surface, displacing the stale air without mixing with it. Constant and high air speeds at animal level reduce the temperature perceived by the pigs (windchill factor).



Tunnel ventilation with MVT 17 M and RainMaker



CrossTunnel ventilation: fresh air supply over a large surface with the MVT 10 M inlet, which can also be combined with the RainMaker cooling system



CombiTunnel ventilation: fresh air supply over a large surface with the MVT 17 M inlet in tunnel mode

# MVT 10 M, 14 M and 17 M, and SOB 50

## Inlets for fresh air supply over a large surface

The MVT inlets are characterised by a very large open area. They can be used as air inlets for tunnel ventilation or for additional summer ventilation. Air flow and air direction can be controlled easily. During colder periods, the inlet flaps close reliably. The flaps are insulated so temperature losses are minimised. For warmer regions, a non-insulated version of the inlet flap is also available.

MVT and SOB 50 have the advantage of being very flexible. They use Big Dutchman actuators, which enable good control over the volume of incoming air. While each of the motor-driven SOB 50 shutters has its own small actuator, the amount of air entering through the MVT inlets is controlled by a central CL 175 or EWA actuator.

MVT 17 M in the gable wall for tunnel ventilation

MVT 10 M transparent

SOB 50: galvanised, motor-driven shutter

## Air flow rate with inlet fully open (in m³/h)

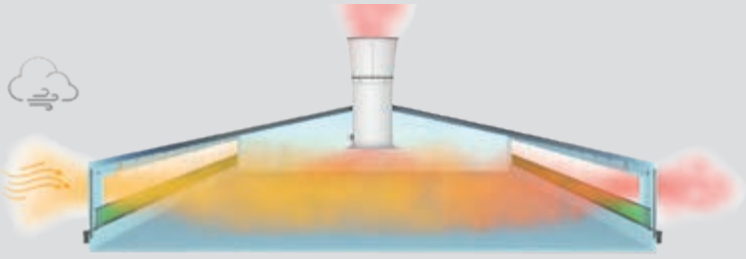
| Type | MVT 10 M | MVT 14 M | MVT 17 M | SOB 50 |
|---|---|---|---|---|
| -10 Pa | 9 530 | 12 600 | 19 450 | 17 000 |
| -20 Pa | 13 480 | 17 800 | 27 300 | 24 300 |
| -30 Pa | 16 520 | 21 700 | 34 250 | 29 300 |
| -40 Pa | 19 170 | 25 100 | 39 550 | 33 800 |

# CURTAIN SYSTEMS FOR NATURAL VENTILATION

Natural ventilation in pig housing is a good option especially in regions without frost – and is available at a reasonable price. Investment costs for natural ventilation systems are low, and they consume little energy. The air exchange depends on wind direction and wind speed. To control the air exchange, curtains with electric winches are installed along both long sides of the building. The independent control of the curtains on each side is either based on temperature only or additionally supported by a weather station.

An improved thermal flow or a slight negative pressure can be achieved by installing an adjustable roof ridge or exhaust air chimneys in the centre of the house.

Natural ventilation in houses up to 15 m wide



Natural ventilation in wide houses with exhaust air chimneys or adjustable ridge

## Drop curtain

### Cost-effective closing system for natural ventilation

Using drop curtains is a simple but very effective method for controlling the natural air exchange in pig housing. The Big Dutchman EWA actuator automatically opens and closes the curtains.

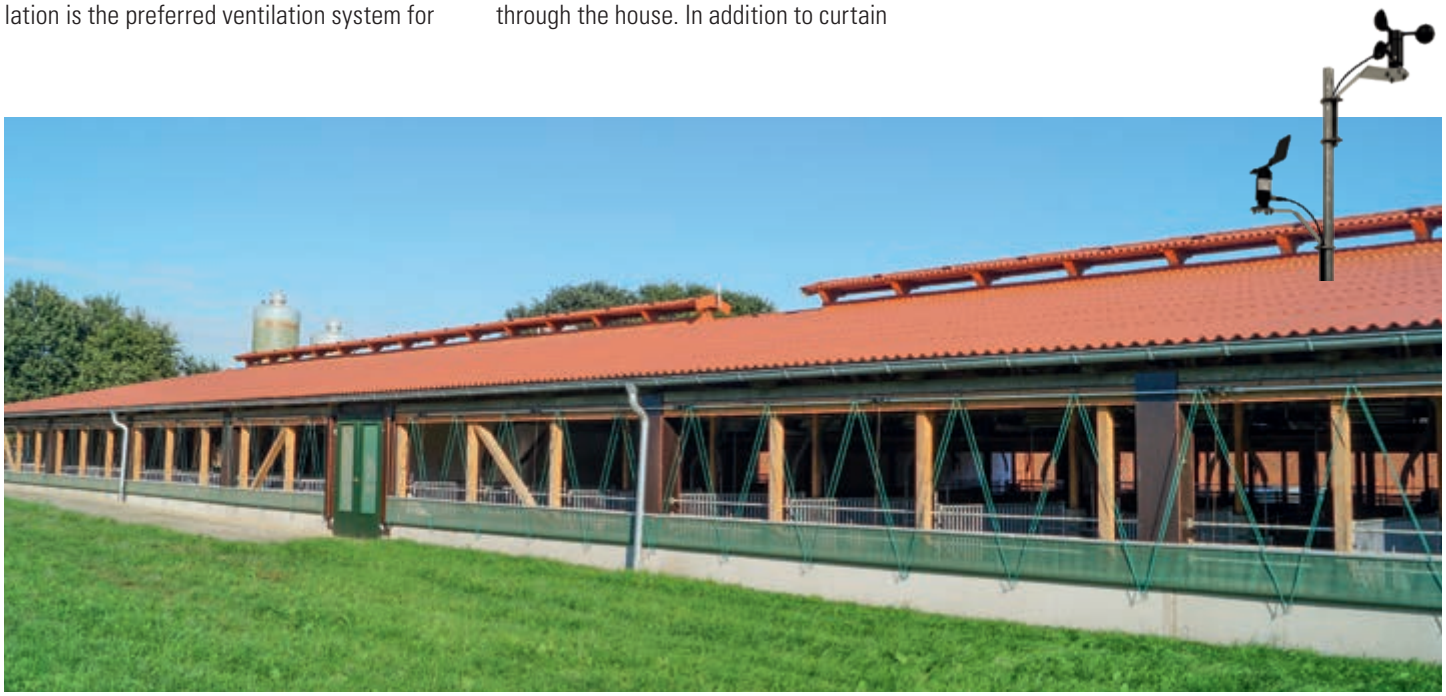
## Roller curtain

### Closing system with winding mechanism for natural ventilation

Roller curtains are a well-proven closing system. Due to the winding mechanism, the curtain is perfectly protected when fully retracted: there is no room for rodents, the curtain stays clean and its service life extends.
With lower temperatures in the mornings and to prevent draughts, especially, curtains should always open from the top to the bottom. The cooler fresh air will enter the house at the top first, without reaching the pigs. A specifically designed telescopic coupling with compensation mechanism ensures no stress is placed on the curtain. Re-adjustments are not necessary.

Roller curtain opening from the top to the bottom using the EWA actuator

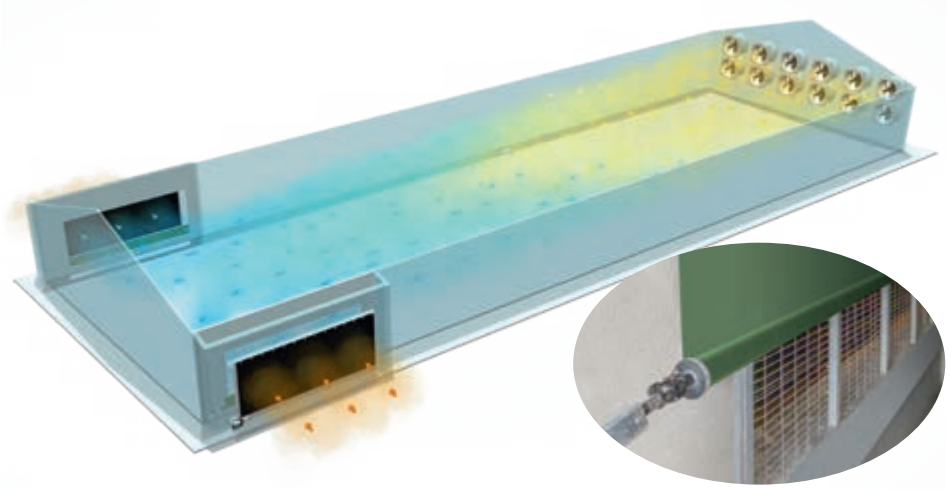
Houses with open-air runs and open houses are ideal for keeping pigs in conditions that are as similar as possible to their natural environment, and to offer them different functional and climate areas. Natural ventilation is the preferred ventilation system for such houses. To protect the pigs from bad weather (storm, rain, cold), roller curtains are a good closing system. The natural movement of the air, in combination with the thermal flow, ensures that sufficient fresh air flows through the house. In addition to curtain control based on the temperature, Big Dutchman also recommends integrating a weather station to determine wind speed and direction.



Open-air pig house with curtains as protection against the weather

For an airtight seal of large openings in houses with CombiTunnel ventilation while temperatures are low, roller curtains are the perfect solution. They fit closely to the tunnel opening because of the negative pressure in the house. When switching into tunnel mode, the curtains are opened as required for ideal fresh air supply.

Service centre with roller curtain and RainMaker with CrossTunnel ventilation



Roller curtain reliably closing a tunnel opening, here in connection with the RainMaker pad cooling system

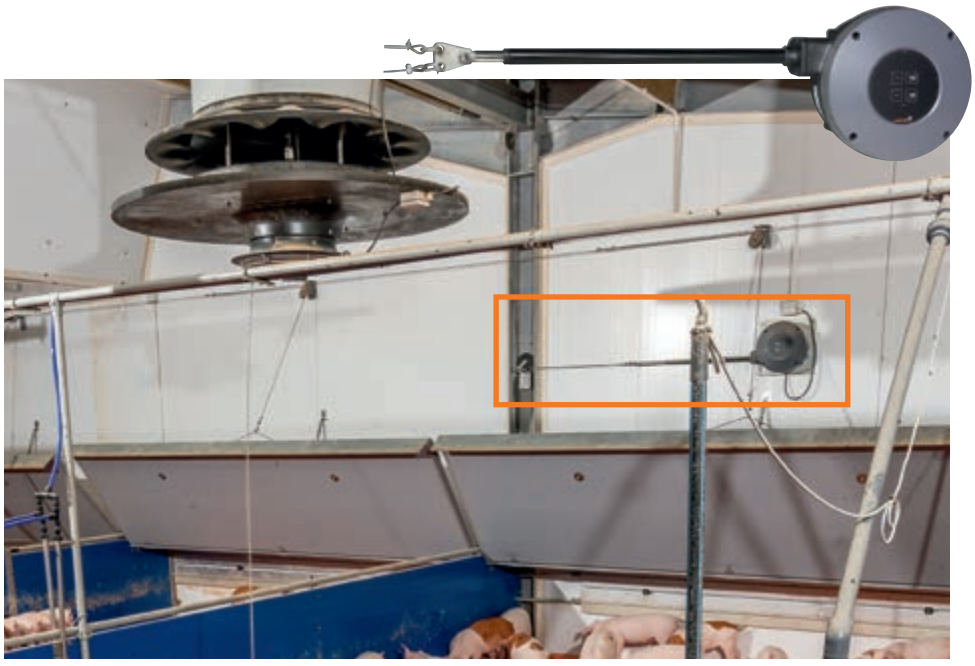
Roller curtain in a doghouse, opening from the bottom

In addition to the drop curtain that opens from the top to the bottom, Big Dutchman also offers a curtain that opens from the bottom to the top. With this system, the roller tube is not loaded with weight, but instead relies on a motorised winch to wind the curtain open and closed, also preserving the fabric. Winding systems that open from the bottom are available with a fixed drive or a climbing drive, which means a long telescopic tube is not required, even when very high curtains are used.

# Actuators

## Automatic opening and closing of any fresh air inlet

Actuators of a high quality are absolutely necessary for reliable fresh air distribution. They control the flap position of any fresh air inlets, whether these are wall or ceiling inlets, fresh air chimneys, tunnel doors or roller curtains. Essential requirements such as functional reliability and robustness are delivered by the CL 175 and EWA actuators offered by Big Dutchman.



### CL 175: the linear motor with a tractive force of up to 6000 N

- ✔ regulates how far wall inlets and ceiling inlets or the F.A.C. 2 fresh air chimney open;
- ✔ compact design, robust and maintenance-free;
- ✔ variable travel range between 60 mm and 600 mm;
- ✔ available for 24 V DC and all alternating current (AC) networks;
- ✔ electronic position feedback for highest operational reliability;
- ✔ buttons for manual operation directly on the motor;
- ✔ protection rating IP 65;
- ✔ easy installation without winding of the cable;
- ✔ speed: 1.2 mm/s.

### EWA: the winch motor that meets the highest standards

- ✔ controls wall and ceiling inlets, tunnel doors and curtain systems;
- ✔ robust winch, compact form;
- ✔ available for 24 V DC and all AC networks as well as for 3-phase;
- ✔ high speed, perfect for pulse-pause applications;
- ✔ emergency operation possible with cordless screwdriver (without emergency opening);
- ✔ automatic operation even after manual emergency operation for high reliability;
- ✔ 10-year guarantee for EWA winches with electronic limit switch.


Big Dutchman

**Europe, Middle East & Africa:**
**Big Dutchman International GmbH**
P.O. Box 1163 · 49360 Vechta, Germany
Phone +49(0)4447 801-0
big@bigdutchman.de
www.bigdutchman.de

**North America: Big Dutchman, Inc.**
Phone +1 616 582 4000 · info@bigdutchmanusa.com
www.bigdutchmanusa.com

**Brazil: Big Dutchman (Brasil) Ltda.**
Phone +55 16 2108 5300 · bdbr@bigdutchman.com.br
www.bigdutchman.com.br

**Russia: ООО "Big Dutchman"**
Phone +7 495 229 5161 · big@bigdutchman.ru · www.bigdutchman.ru

**Asia/Pacific: BD Agriculture (Malaysia) Sdn. Bhd.**
Phone +60 3 334 83 555 · bdasia@bigdutchman.com · www.bigdutchman.asia

**China: Big Dutchman (Tianjin) Livestock Equipment Co., Ltd.**
Phone +86 10 6476 1888 · bdcnsales@bigdutchman.com
www.bigdutchmanchina.com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