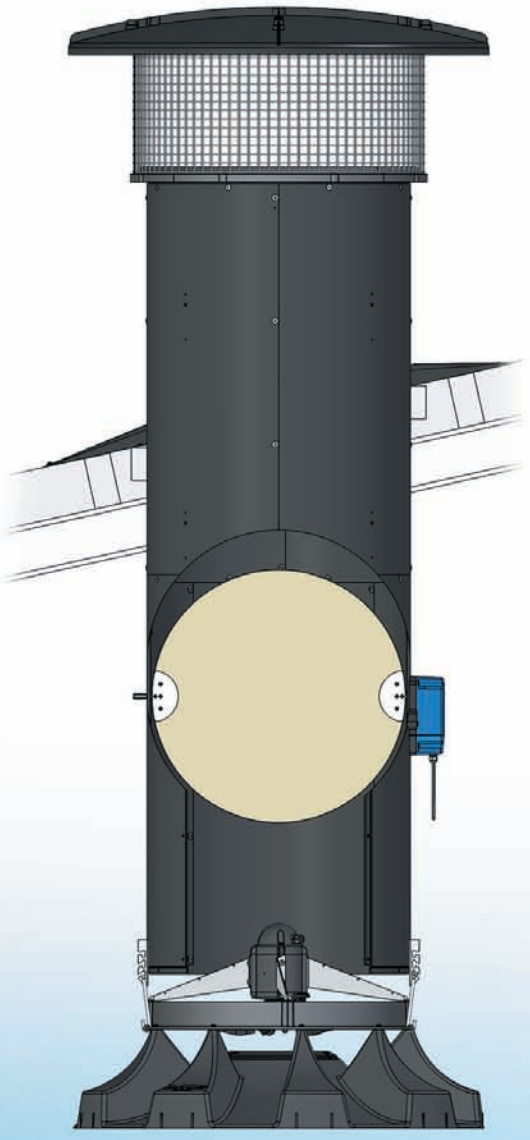
Inlet fan

Corona

DACS

INNOVATION IN VENTILATION

The Corona air inlet



Proper distribution of air in a house for animals can be a challenging task. The ventilation system should be able to maintain a perfect climate throughout the production cycle. Therefore the functionality of the ventilation system is essential in order to maintain an airflow that at all times ensures a perfect in-house climate.

The background

Studies show that animals need a constant flow of temperate oxygen rich air from day one in order to exploit their full genetic potential. Studies also show that uncontrolled air entering a house via passive air inlets quite often causes issues that affect the in-house climate. Being a part of the ventilation industry, we realized that there was a need for a new and better air inlet unit in order to improve in-house climate. Therefore we developed the Corona air inlet.

The idea

The idea behind the development of the Corona air inlet was to design a ventilation unit that could ensure a perfect in-house climate. The unit should provide a constant flow of temperate air in the house from day one, and throughout the growth period. Also the unit should be able to utilize the warm room air trapped under the roof. This because we knew that the ability to mix incoming air with room air would eliminate issues affecting the in-house climate. Also savings on heating would be possible if we could utilize the warm room air trapped under the roof construction.

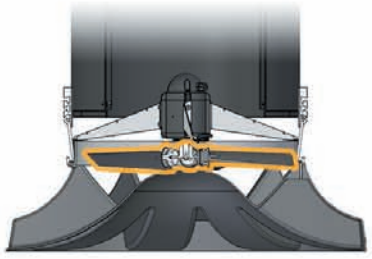
The task

Based on studies, own observations and inputs from farmers we found that the Corona air inlet should be with a fan to actively distribute air in the house. The unit should also be able to mix incoming air with room air directly over the fan blade when needed. To get this right, we needed a turning baffle in the chimney in order to control the percentage between incoming air and room air. We knew that only this way we would be able to achieve the desired flexibility and thereby maintain optimum in-house climate.

TECHNICAL SPECIFICATIONS	
Motor 3x230V / 3x400 V	1.6 A / 0.95 A
Shaft output power	0.3 kW
Volume flow	12000 m^3/h @ 0 Pa
Chimney diameter	760 / 740 mm
Damper	Turning
Materials	ABS / stainless steel

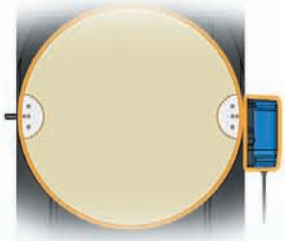
Essential elements needed

The combination of a fan, carefully designed diffuser ducts, a baffle in the chimney, and the ability to mix room air with incoming air were essential elements in order to ensure the functionality we saw was needed.



The fan

The positioning of the fan in the diffuser is very precisely done in order to produce the right air speed and to ensure the unit's ability to mix room air with incoming air when needed. Therefore the fan is positioned in a short pipe section (orifice). This in order to produce pressure, air speed and eliminate tip flow vortex. Only this way the fan will be able to create the correct air speed and thereby to maintain the air flow pattern needed in the house.

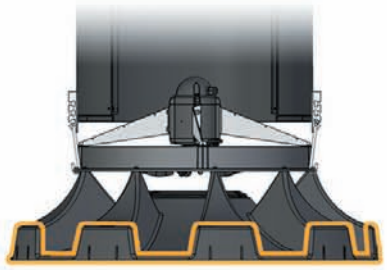


The turning baffle

The chimney section of the Corona air inlet is equipped with a turning baffle in order to be able to precisely control the percentage between incoming air and room air. The baffle positioning motor opens and closes the baffle via a 0-10 volt signal from a climate controller. Depending on the baffle position in the chimney, the mixing percentage between room air and incoming air varies. Thereby a very precise temperature and flow control of the air distributed in the house is possible.

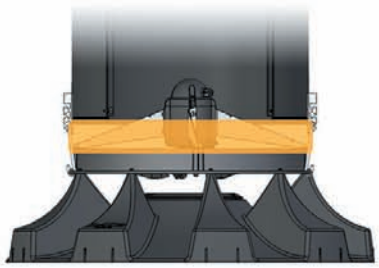
More about DACS ventilation on vimeo

Essential elements needed



The diffuser

The shape of the diffuser was a study of its own. We needed the right profile of the diffuser to be able to create the right air speed during the production cycle. We ended up with nine identical ducts which size and shape are carefully calculated in relation to the air velocity and the air flow pattern needed in the house.



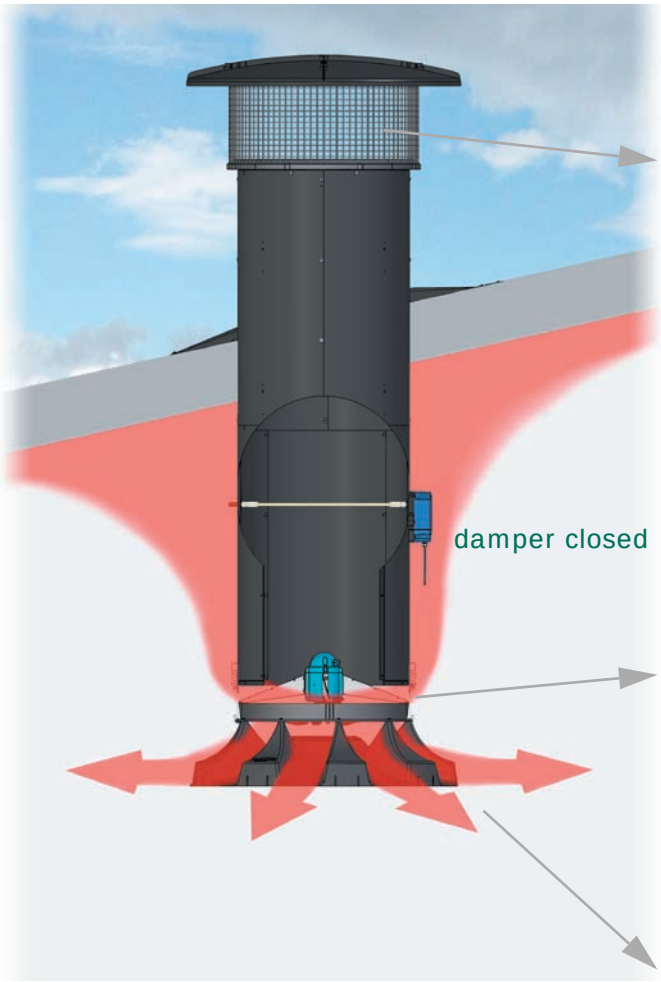
The recirculation opening

To be able to mix incoming air with room air, the diffuser is hanging in handles just under the chimney. This mechanism provides an opening between diffuser and chimney and through this “recirculation opening” room air passes, and mixes, with cooler incoming air. The mixing percentage between room air and incoming air depends on the baffle position in the chimney.

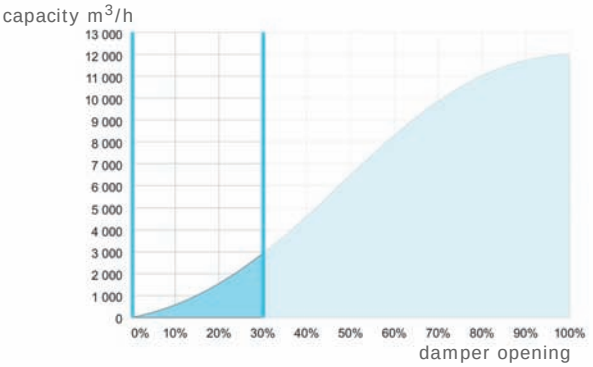
The functionality

The interaction between the damper in the chimney, the fan in the diffuser and the shape of the diffuser is what makes the Corona air inlet outperform all other air inlets when it comes to air handling, air distribution and air flow uniformity. The very precise control of the air entering the house and the mixing of the air directly over the fan blade, in interaction with the baffle in the chimney, ensures a perfect in-house climate throughout the entire production period - regardless of the external climatic conditions.

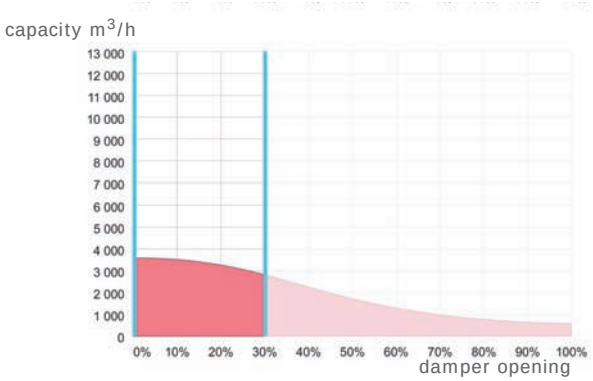
Recirculation



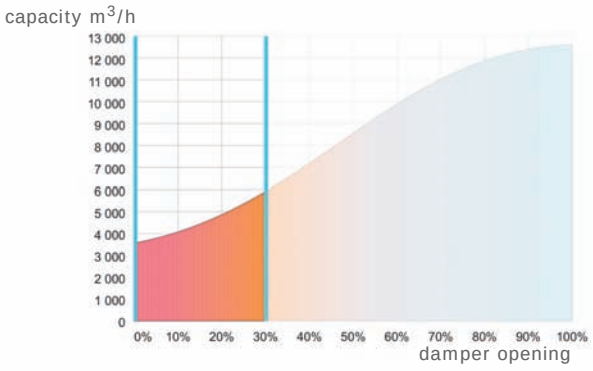
During the first weeks of production the Corona air inlet runes with only slightly open baffle (5% - 25%). During this period the Corona air inlet mixes a minor portion of incoming air with warm room air, in order to supply oxygen to the animals and to ensure the air is properly tempered relative to the desired temperature in the stable.



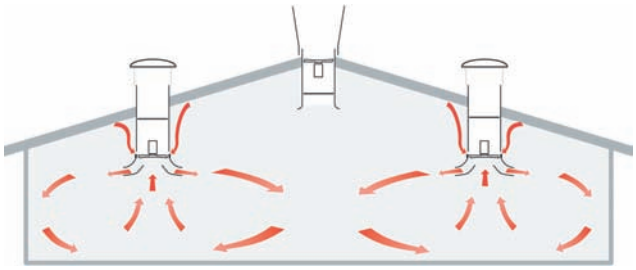
Air entering the house with baffle operating between 0% and 30% opening vary between 0 and 2900 cubic meter/hour. The constant supply of incoming air to the house ensures plenty of oxygen to the animals.



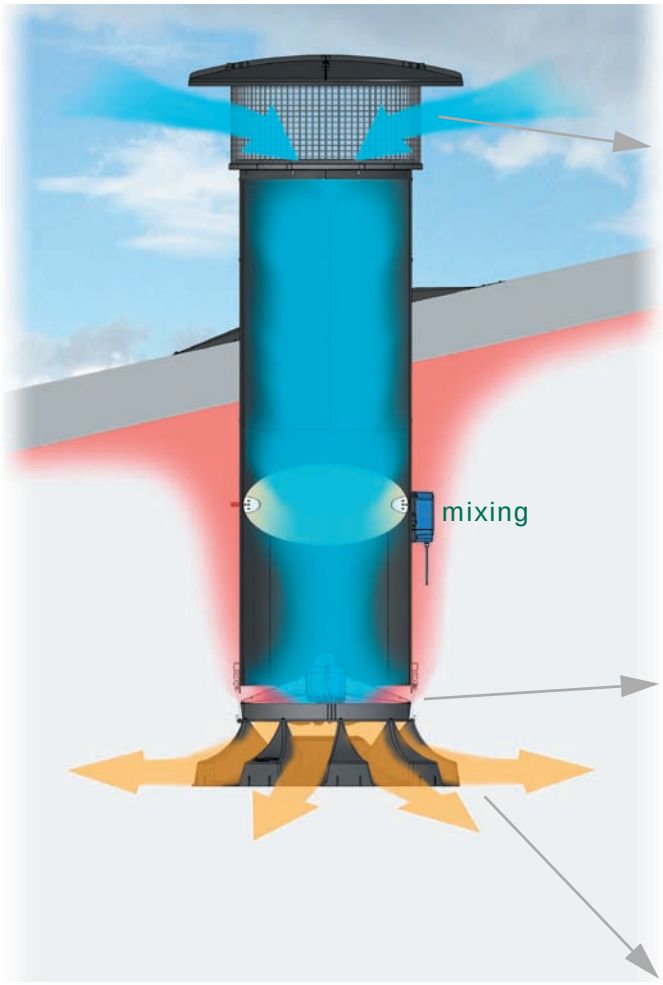
The utilization of the warm room air and the constant flow of this warm room air during recirculation mode ensure uniform temperatures throughout the house and a cut in heating cost by 50% compared to other systems.



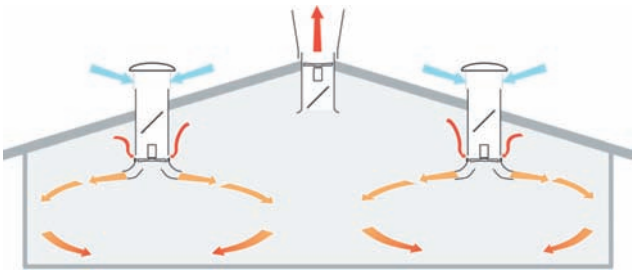
The constant mix of warm room air with air entering the house brings a constant flow of temperate and oxygen-rich air to the animals. This ensures a perfect in-house climate no matter outside weather conditions.

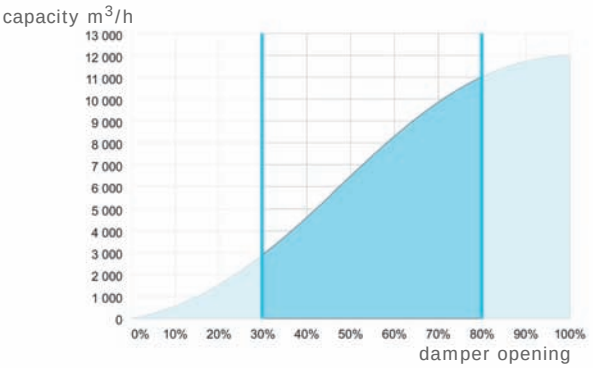


Mixing

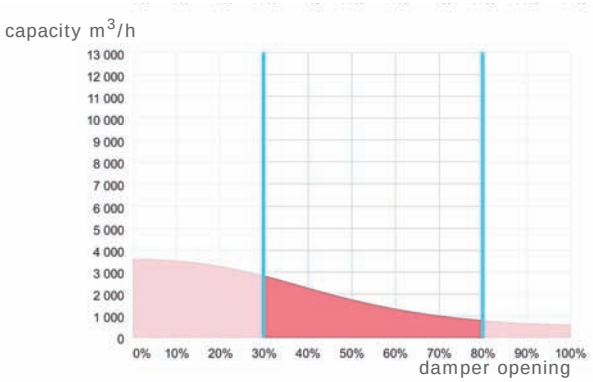


Further into the growth period and/or if outside temperatures increase the ventilation system accelerates in order to keep set-point on temperature and humidity. The baffle in the chimney gradually opens more (30% - 80%) and the Corona air inlet introduces more incoming air to the house but still mixes in a small percentage of room air to ensure that only temperate air leaves the unit.

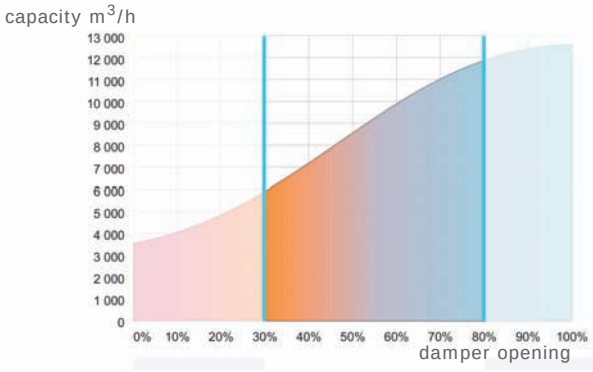




Air entering the house with baffle operating between 30% and 80% opening varies between 2900 and 11000 cubic meter/hour. This brings plenty of oxygen to the animals and increase the air exchange in the house.

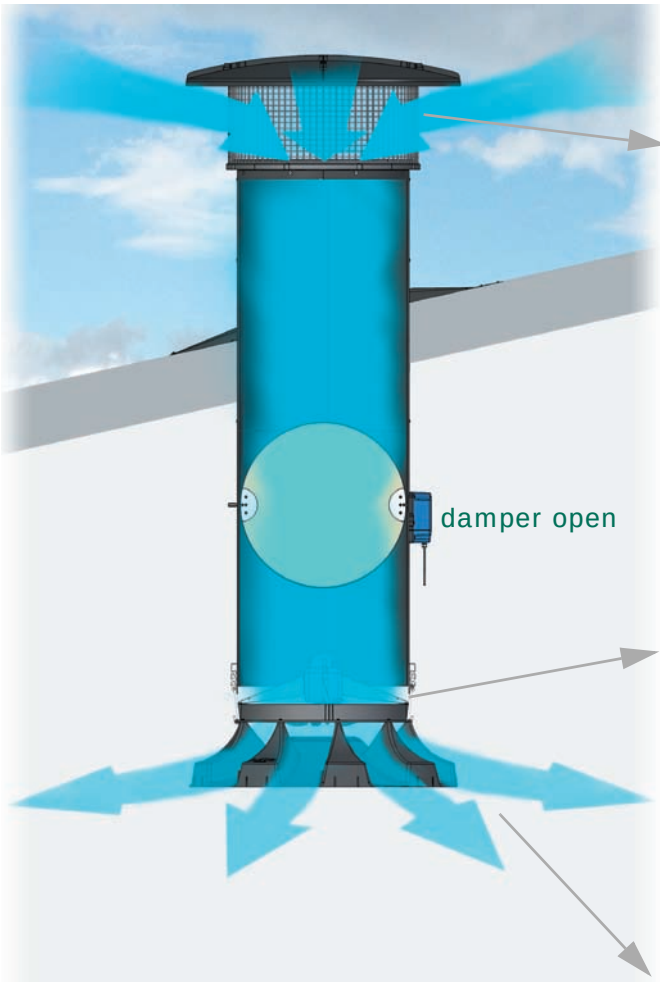


The mix of room air with incoming air ensures that only temperate air leaves the unit. Still the utilization of room air cuts heating cost by 50% compared to other systems.

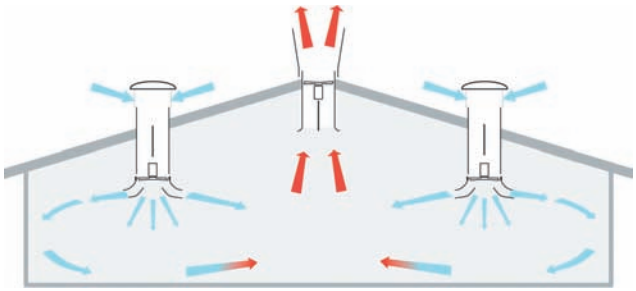


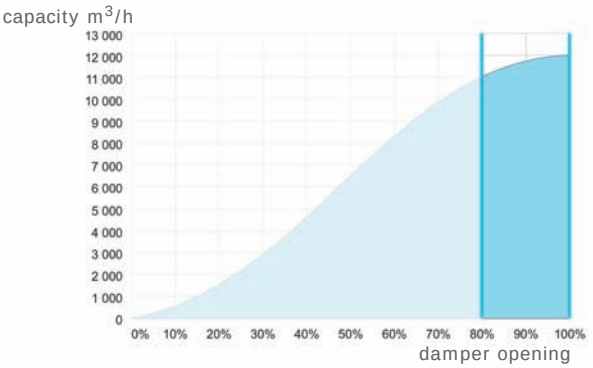
The mixing of incoming air with room air brings a constant flow of temperate and oxygen-rich air to the animals. This flow of temperate air ensures a perfect in-house climate no matter outside weather conditions.

Full flow

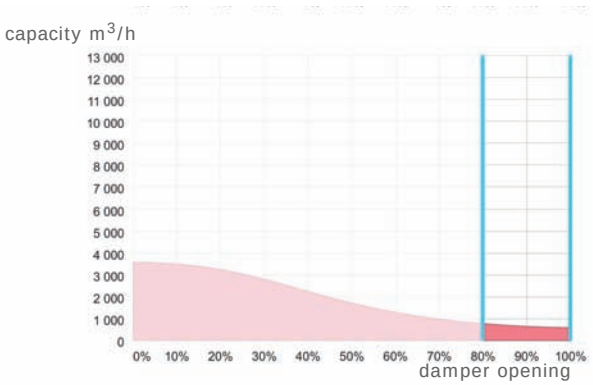


During the last weeks of production, or when outside temperatures are close to set-point, the baffle in the chimney gradually opens more (80% - 100%) to increase air flow in the house in order to expel moisture and heat from the animals but also to cool the animals. At this stage very little mixing is needed, but often during night the baffle will fall back and mixing will be maintained.

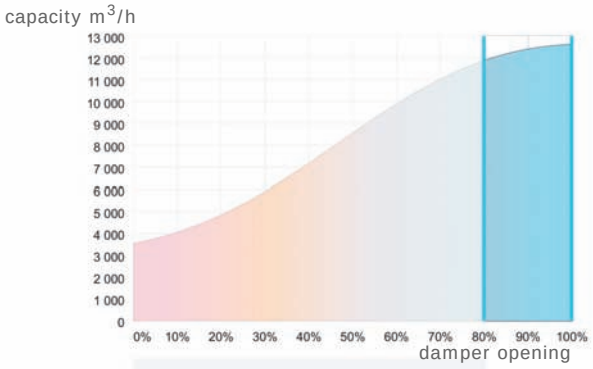




Air entering the house with baffle operating between 80% and 100% varies between 11000 and 12500 cubic meter/hour. This brings plenty of oxygen to the animals and increases the air exchange in the house.



The mixing of room air with incoming air is at a minimum and will only slightly affects the temperature leaving the unit.

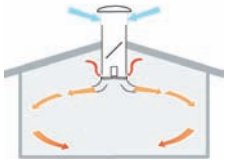


The constant flow of cool oxygen-rich air ensures that the animals are very well ventilated and therefore thrive during this period.

Basic installation rules

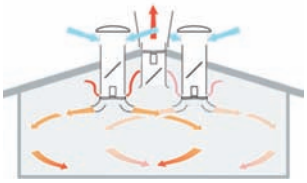
The Corona air inlet is a very versatile unit and will work well in all types of buildings if basic rules are followed. As long as the unit is positioned so that the air distributed from it can be spread evenly in the house the system will be able to establish the air flow pattern in the house needed to maintain a stable climate in the house. The Corona air inlet will work independently from height, width and length of house as long as the below references are followed.

6-16m

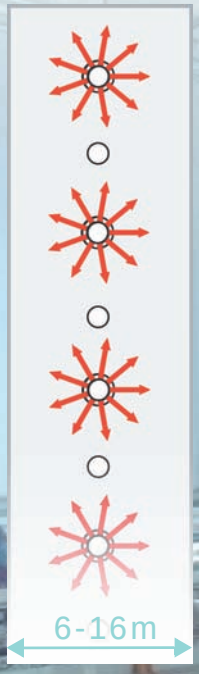


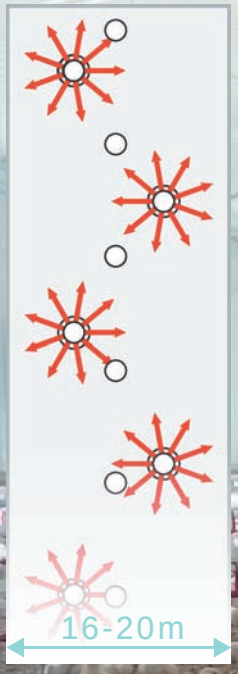
In houses 6 - 12 meter in width, Corona air inlets should be positioned in one row. Corona air inlets should be operated via variable frequency drives (VFD) in order to ensure the air speed and air flow pattern iare as needed in the house. All Corona air inlets should be in operation from day one. In houses 12 -16 meter in width Corona air inlets should be operated either via variable frequency drives (VFD), or in groups (via on/off signal) in order to ensure the air speed and air flow pattern are as needed in the house.

16-20m



In houses 16 - 20 meter in width the Corona air inlets must be positioned offset in relation to the roof ridge. This in order to maintain the air flow pattern needed in the house. Corona air inlets should be operated either via variable frequency drives (VFD), or in groups (via on/off signal) in order to ensure the air speed and air flow pattern are as needed in the house.

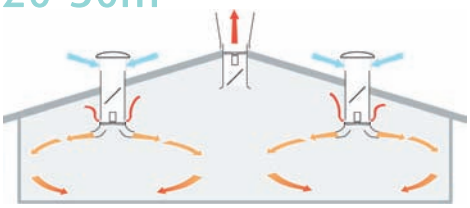




Need to know

The fan in the diffuser can be either on/off operated or run via variable frequency drives. The fan should never be running at speeds less than 70% of maximum and at this speed with no more than 10% opening of the baffle. At 100% speed the baffle should be 100% open. This to ensure the best possible air distribution and best possible mixing of incoming air with room air when needed.

20-30m



In houses from 20 - 30 meter in width the Corona air inlets must be positioned in two rows. Also here the positioning of the Corona air inlet is closely related to the air flow pattern needed. Corona air inlets should be operated either via variable frequency drives (VFD), or in groups (via on/off signal) in order to ensure the air speed and air flow pattern are as needed in the house.

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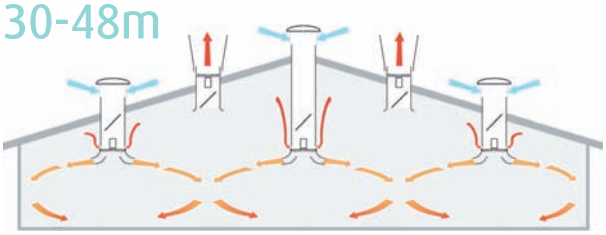
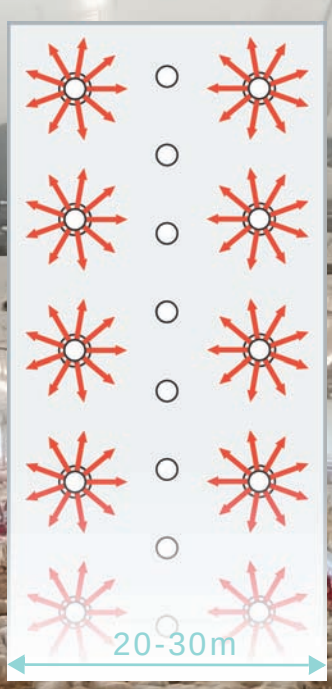
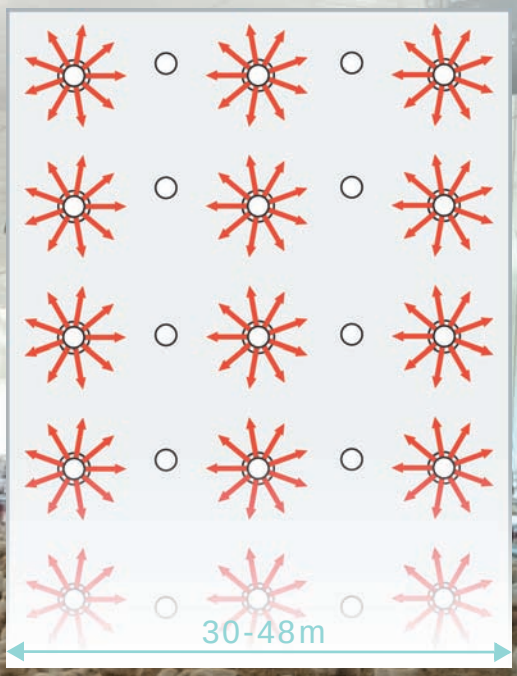
30-48m



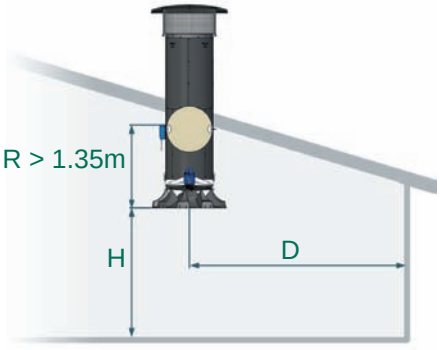
In houses from 32 - 48 meter in width the Corona air inlet must be positioned in three rows. The central row will ensure that air will be distributed correctly in order to maintain the air flow pattern. Corona air inlets should be operated either via variable frequency drives (VFD), or in groups (via on/off signal) in order to ensure the air speed and air flow pattern are as needed in the house.





General guideline for positioning

The positioning of the Corona air inlet differs depending on whether the Corona air inlet is speed controlled or on/off controlled, but also depending on whether the animals are kept on floors or in cages. Therefore the below is a general guideline. If needed we will always be able to help you with the positioning of the Corona air inlet.

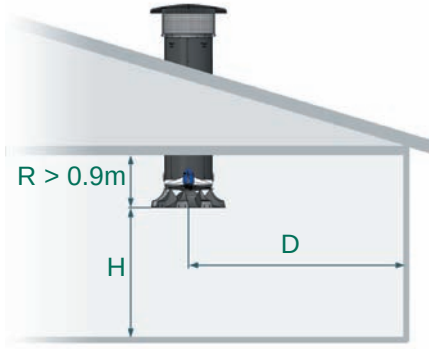


House with pitched ceiling

Speed controlled:
If the Corona air inlet is speed controlled then H+D should be nothing less than 6 meter and nothing more than 12 meter.

On/off controlled:
If the Corona air inlet is on/off controlled then H+D should be nothing less than 9 meter and nothing more than 12 meter.

R should be nothing less than 1.35 meter. This in order to have the baffle positioning motor in the room.

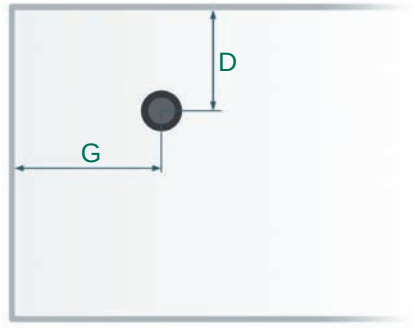


House with flat inner ceiling

Speed controlled:
If the Corona air inlet is speed controlled then H+D should be nothing less than 6 meter and nothing more than 12 meter.

On/off controlled:
If the Corona air inlet is on/off controlled then H+D should be nothing less than 9 meter and nothing more than 12 meter.

R should be nothing less than 0.9 meter. This in order to ensure proper recirculation of the warm room air trapped under the roof space.



Top view

Speed controlled:
If the Corona air inlet is speed controlled then G+D should be nothing less than 6 meter and nothing more than 12 meter.

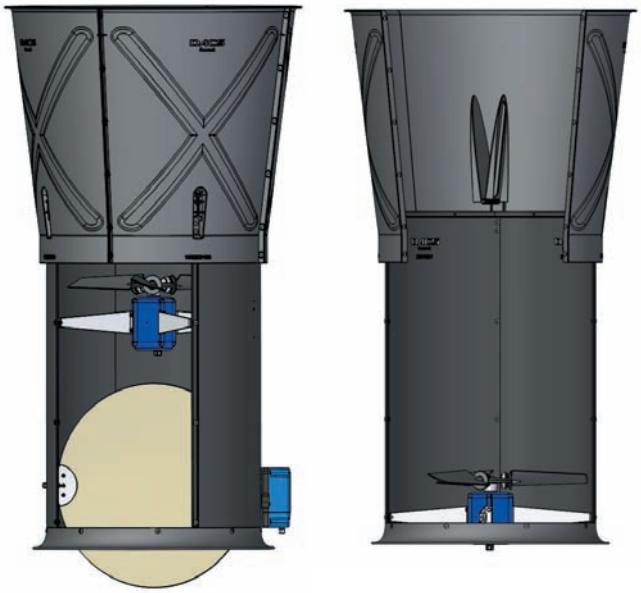
On/off controlled:
If the Corona air inlet is on/off controlled then G+D should be nothing less than 9 meter and nothing more than 12 meter.

Exhaust fans

We offer three types of exhaust units that can all work in conjunction with the Corona Air inlet. Two roof mounted units and a wall mount fan.

Roof mounted exhaust fan

HE740



The HE740 exhaust unit is made of expanded ABS plastics and stainless steel. With a specific consumption of 25.5 W/1000 m³/hour at full flow it is the most efficient roof mount fan available. The HE740 comes in two versions. One with turning baffle in the chimney and one with butterfly valve on top of the chimney. The one with turning baffle can be operated via variable frequency drive (VFD) or via on/off signal where the one with butterfly baffle should be operated via an on/off signal.

TECHNICAL SPECIFICATIONS	
Motor 3x230V / 3x400 V	1.6 A / 0.95 A
Shaft output power	0.3 kW
Volume flow	17471 m^3/h @ 0 Pa
Specific consumption	25.5W / 1000m^3/h
Fan RPM	945-960 @ 50 Hz
Materials	ABS / stainless steel

Wall mount fan

MagFan

The MagFan is a high capacity, ultra-efficient direct drive wall-mount fan. With a capacity of up to 80000m³/hour and a specific consumption of 9.72 W/1000m³/hour at full flow it is the most powerful yet most efficient wall-mount fan available. MagFan comes with a dedicated variable frequency drive (VFD). The unit can be applied with two different shutter systems.

TECHNICAL SPECIFICATIONS	
Drive	Water proof speed drive cos (phi) / power factor at full load: 0.99 In-built drive and motor protection
Motor	Permanent Magnet Synchronous 3-phase Output (continuous duty): 1.2kW @ 660RPM / 2.2kW @ 750RPM Insulation class F, 170°C magnets In-built double Klixon thermal protection
Power supply	Single phase, 100-265VAC, 50/60Hz Three phase, 360-440VAC, 50/60Hz
Volume flow / Specific consumption	Please refer to separate performance charts and technical specifications for MagFan

Innovative solutions for livestock production

DACS is a family-owned company with more than 30 years experience in developing, producing and servicing ventilation and control systems for livestock production.

We have used our comprehensive knowledge on both livestock production and ventilation in the development of among others our award winning wall fan, MagFan.

Our ventilation system is simply the most energy efficient system you can get on the market.

We run tests in our own wind tunnel, and we develop our products in close cooperation with farmers and the best researchers in the field.

Our overall focus is on optimum animal welfare and on maximum energy efficiency.

DACS bring you:

- **Energy efficient ventilation systems**
- **Total production and climate control**
- **Improved animal welfare**

DACS a/s on Vimeo

DACS
INNOVATION IN VENTILATION

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