

Movement by Perfection



The Royal League in **ventilation**, control and drive technology



Fans for agriculture

Durable, efficient, well designed

Achieving the best result with optimal ventilation

Problems in agriculture

Regular air exchange in stables, warehouse, silo or other agricultural buildings is indispensable for achieving optimal conditions for people, animals and stored products. Fans have to withstand the toughest ambient conditions in some cases.

In order to meet these challenges and at the same time achieve the best possible result of the respective system for the operator, ZIEHL-ABEGG fans have been specially designed for agriculture.

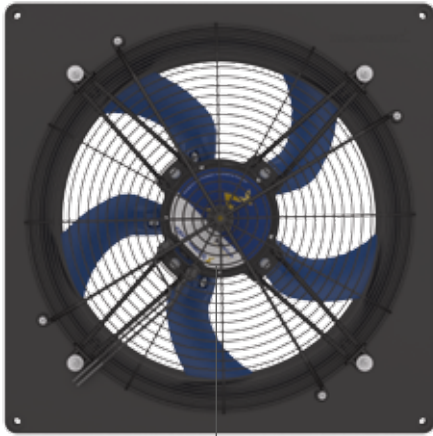
Challenges posed by ambient conditions

- High chemical exposure (including ammonia, hydrogen sulphide)
- Dirt particles in the air
- High air humidity
- High or low air movement

Apart from the robustness and its associated long durability, providing positive economic benefits is one of the key issues of ZIEHL-ABEGG products. The system concept rounds off the entire package.



Selection from the range of fans for agriculture



Fully encapsulated IP55 ECblue motor with integrated electronics



Robust aluminium die-cast blade

Chimney
Chimney suspension



ZAplus fan for maximum efficiency

Frame size:	350 – 1,250 mm
Volume flow rate:	up to 53,700 m ³ /h
Pressure:	up to 450 Pa
Motor technology:	choice of efficient ECblue or proved AC technology
Installation location:	Chimney, wall, ceiling, free-hanging
Supply voltage:	ECblue 1~ 200-277V, 3~ 380-480V; AC 1~ 230V; 3~ 400V; other voltages on request
Ambient temperature:	at least 40°C, up to 70°C possible
System components:	Screen protection against accidental contact, wall ring plate, guide vane, diffusor
Control technology:	Frequency inverters, air-con control modules, voltage controllers, motor contactors, main switches, sensors

The agricultural fans of ZIEHL-ABEGG cover a wide range of different frame sizes, volume flow rates, and also pressure ranges. Whether it be a recirculation fan in stables, a single exhaust air system, a central exhaust air system or a fan for filter systems, ZIEHL-ABEGG has custom-fit fans for all areas in its range.

ZIEHL-ABEGG fans are based on the example of the owl, which as a bird of prey is able to fly and hunt almost noiselessly. Using bionic insights, efficiency was increased and

the acoustics significantly reduced at the same time, making it much more pleasant for people working in stables and for the animals living there.

Faced with a variety of motor technologies, you can decide to reduce investment or operating costs to a minimum.

A wide range of system and control technology components round off the product portfolio.

Advantages:

- Durability: Being free of worries in the long term thanks to high corrosion protection, fully encapsulated ECblue motors and extensive laboratory and field trials
- Savings: Low operating costs thanks to high efficiency
- System concept: Optimum interaction between controllers and fans

The Number 1 under extreme conditions

Optimally tested for all loads

In agriculture, fans are exposed to difficult ambient conditions. These include high chemical exposure to ammonia, hydrogen sulphide, dirt particles and high air humidity. That is why the agricultural fans of ZIEHL-ABEGG have been specially developed and designed for this application.

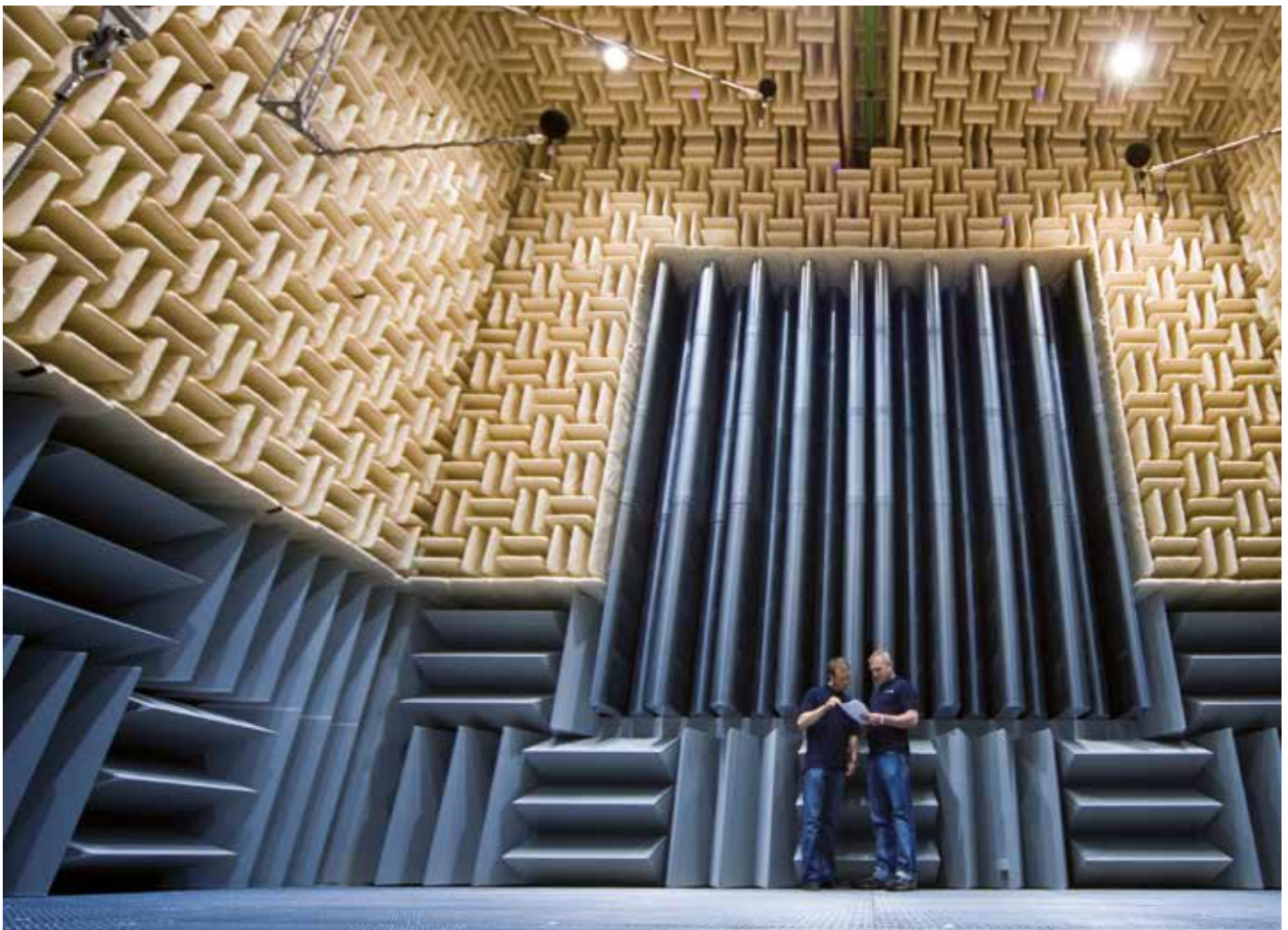
Over 100 engineers work in our cutting-edge development and laboratory building, which houses the world's largest combined fan test bench. This is where the relevant data such as acoustics, air handling capacity, power consumption and other parameters are precisely measured and recorded.

Using professional programs, new products are designed, simulated, constructed and verified with prototypes. Only once the product meets ZIEHL-ABEGG's requirements, does it go into series production. By means of motor test benches, the motors are examined down to the last detail in relation to efficiency, energy consumption, output and thermal strength.

By means of fan vibration measurements, vibrations can be and are reduced, thus increasing service life and also keeping noise to a minimum. The calculated strength is realistically checked by means of overspeed tests. Climate tests which include temperature changes are used to exert stress on components. Standardised salt spray tests are performed to test the high corrosion protection. As a last point, numerous long-term laboratory, free field and field tests have been performed for years to test the high protective measures of the agricultural fans of ZIEHL-ABEGG.

All these measures guarantee the verification of durability of ZIEHL-ABEGG fans, thus enabling the fans to also operate smoothly under extreme conditions.

The world's largest combined acoustics and noise test bench.



IP55 ECblue - the new fully encapsulated motor generation

The new ZIEHL-ABEGG fully encapsulated IP55 motor is specially designed for use in an agricultural context setting a new standard for reliable, modern and highly efficient fan technology on farms and in stables. Apart from the highest efficiency levels, the advantages of the new ECblue motor are an extraordinarily low noise level and a top-quality, compact external rotor motor design in aluminium die-cast. With an impressive additional power reserve, the new fully encapsulated ECblue motor meets all the requirements imposed on a fan drive.

With little installation effort – the control electronics already integrated into the motor – and very low operating costs, the motor provides an attractive cost situation that adds up economically. With its innovative design, the new motor generation is based on years of experience in fan and motor construction.

With the fully encapsulated winding and electronics, the ECblue motor meets the required guidelines of protection rating IP55.

Approvals/tests

- FEM calculations: Strength of blades
- Continuous centrifuge tests for verification
- Climate change tests
- Endurance tests in switching mode
- Vibration test
- Shock test
- Test against aggressive materials
- Free field endurance tests
- Numerous field trials



Stator encapsulation



Electronics encapsulation

Advantages:

Full encapsulation of the ECblue

- Stator winding
- Electronics

Specially adapted corrosion protection

- Coating of all metal parts
- Stainless-steel screws

Extensive laboratory and field trial tests

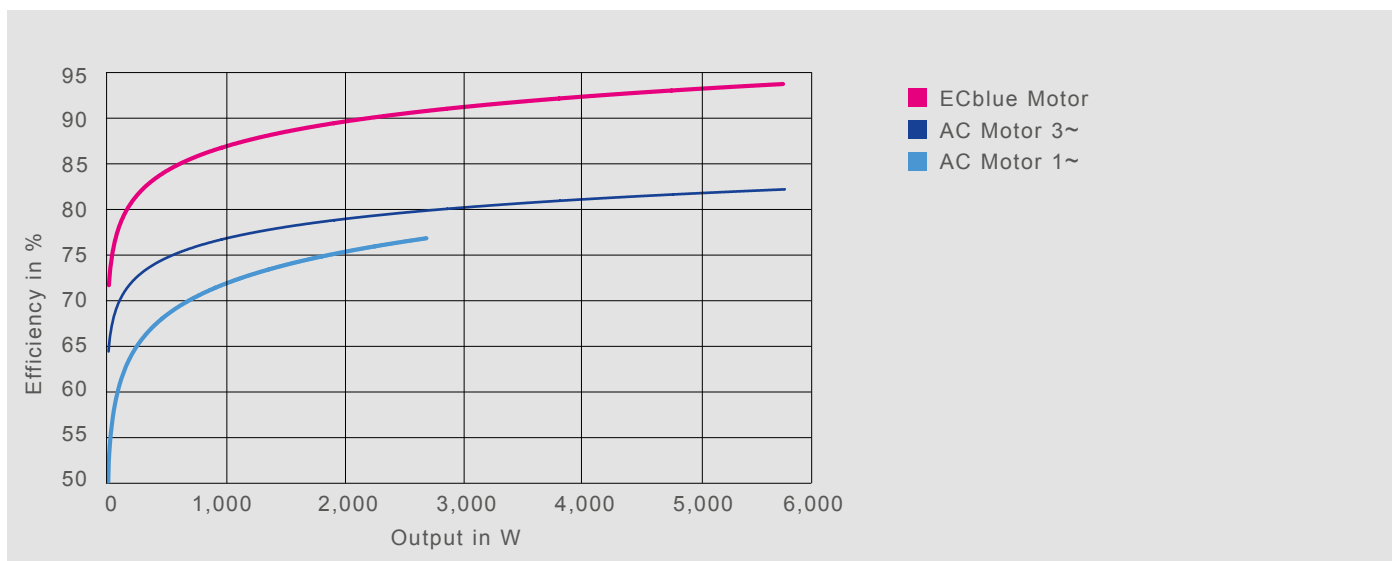
- Components tested in the laboratory and under real operating conditions
- Fans in continuous use for up to 40 years
- Specialist in agriculture, 40 years' experience

Savings

Efficiency

The fan efficiency is made up of motor, blade (aerodynamics) and electronics. In particular in the drive area, a highly efficient motor can dramatically increase overall efficiency. The ECblue external rotor motor is ideal here, being 15% more efficient over the typical output range.

With the highly efficient ECblue drive, energy consumption and thus operating costs can be considerably reduced. The following diagrams show the difference.



Motor efficiency depending on electrical power

The stables fan with direct drive by means of ECblue external rotor and integrated EC controller

- High efficiency over the entire speed range, thus low operating costs
- Low-noise operation
- Very easy installation
- Large output density, thus very compact
- Compliance with valid EMC specifications for household and industry
- Integration of all radio interference suppression components into the device
- Maximum speed independent of the power frequency
- Universal control (PWM or analogue signal)
- Wide voltage range 3~ 380-480V or 1~200-277, others on request

Energy saving

The ECblue is a fan control system with extremely low energy requirements. The EC controller integrated into the fan enables new control options compared to existing systems.



Example of use

In ventilation systems, the maximum possible air handling capacity is only required for temperature control when the outdoor temperature is high. Speed-controlled fans used here are mostly operated along the system characteristic at reduced speed. The minimum speed is predefined by the fresh air requirements of the animals.

What is crucial for the cost-efficiency of the system is low power consumption and thus high efficiency at partial load (Diagram 1). Consumption of electric energy in EC drives, particularly in the often-used medium speed range, is much lower than in the 1~ asynchronous, phase-controlled drives commonly used in stables ventilation (Diagram 2). The higher investment costs associated with EC drives have usually been recouped after 2 to 3 years due to significantly lower operating costs. Over the entire service life of the fan, there is a cost advantage of over 40% (Diagram 3).

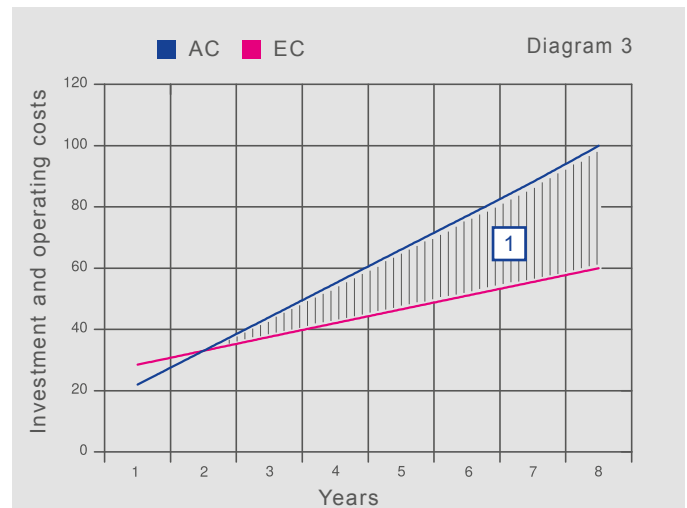
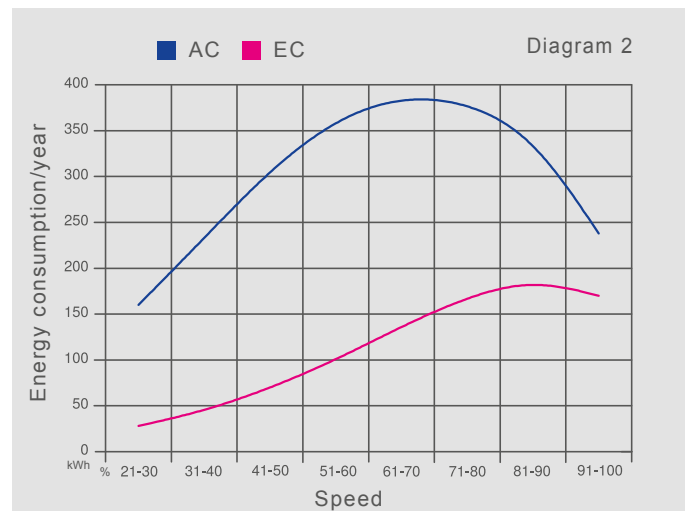
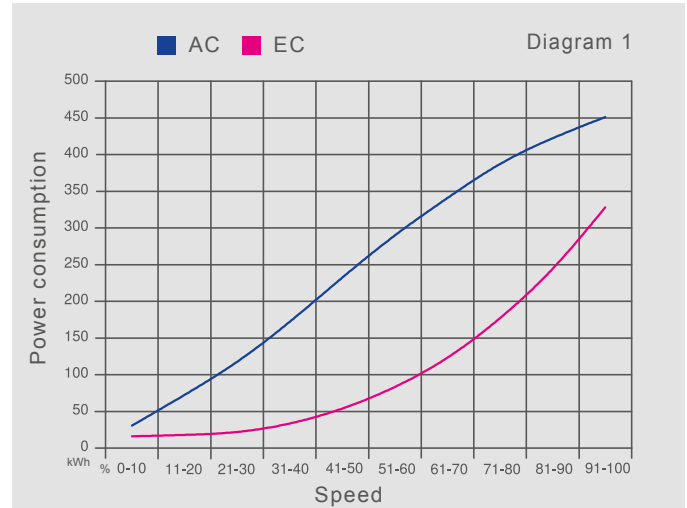
With EC drives the specified temperature value can be complied with far more exactly since the speed is set in proportion to the control level. Phase-controlled 1~ asynchronous drives have a non-linear behaviour here.

Control variants

Speed controller with 0-10 V- or PWM input.

Via a 0-10V or PWM input signal, the ECblue fans can be operated speed-controlled. The fan speed is then 0 – 100% accordingly. It is monitored and readjusted, which e.g. in the case of dirt also ensures start-up and by means of proportionality (e.g. a nominal value of 5 V corresponds to exactly half the speed) ensures very good temperature stability in the stables.

Fan and speed disturbances are returned via a potential-free relay (break contact). Via a control line (100% function), you can switch between controlled mode and maximum speed to ensure ventilation if there is a controller failure. If you would like to retrofit an existing system with ECblue, the easiest way is to only replace the fans. The existing controllers can control the ECblue via a 0-10 V or PWM (pulse-width modulated) signal to set the speed.



1 High cost savings in a minimum of time

System concept

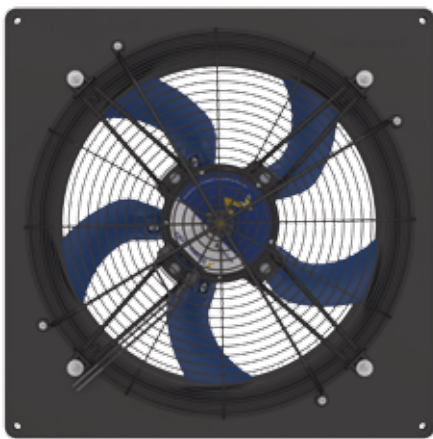
Optimized and matched from one source

ZIEHL-ABEGG is the only fan manufacturer that develops processes for changing fan speed itself and produces the corresponding controllers. These include voltage controllers, frequency inverters and EC controllers.

At ZIEHL-ABEGG, you can get everything relating to fans from one source. The components are developed, designed and selected so that the overall system is in harmony. Perfect

interaction means durability, reliability, simple operation and energy efficiency.

Resulting in individual solutions which offer crucial benefits in a special application. It is far more the criteria related to a system which are to be considered and which therefore lead to the best result. ZIEHL-ABEGG gives you neutral advice.



FFowlet ECblue with square wall ring plate



FFowlet ECblue with chimney suspension



FE2owlet ECblue with ZAplus



*Fcontrol
Frequency inverter*



*UNIcon universal
control module*



Guide vane

Advantages:

- Highest total efficiency thanks to optimum interaction between controllers, sensors and fans
- Reduced installation effort thanks to the cables designed
- Status display of the ECblue fan with the help of the LED status lamp
- Simple control of air-con control modules

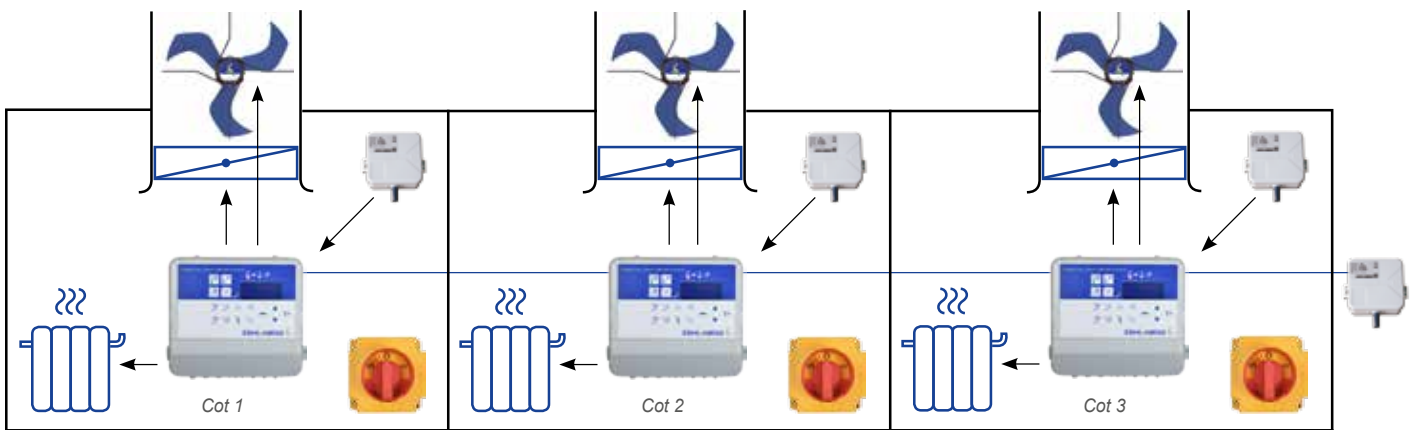


Control in the stables

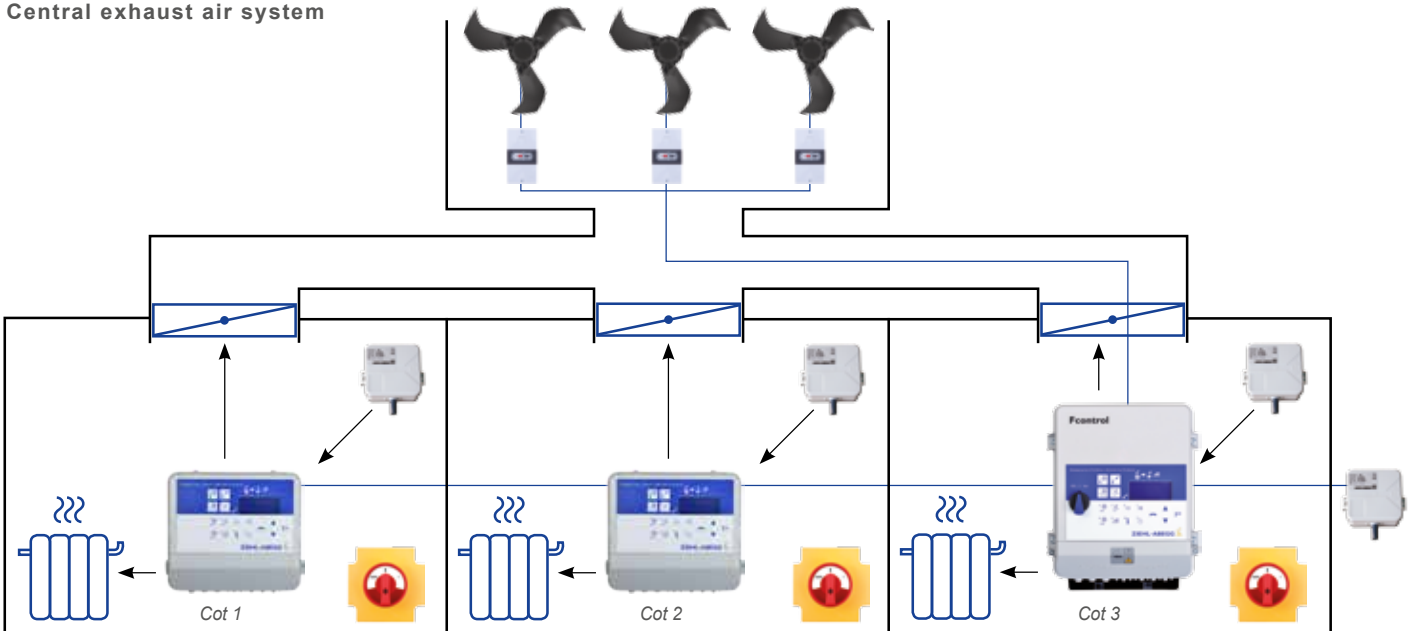
In the stables there is a wide variety of control solutions. Depending on the prevailing demands, wishes and structural conditions, different alternatives can be chosen from in most cases. The ZIEHL-ABEGG specialists will find the right solution for you for your respective requirements in on-site talks.

The following are examples of two different fan control options for producing an optimum indoor climate in the various stalls or cots.

Single exhaust air system with ECblue



Central exhaust air system



Application areas

Fans in agriculture are usually divided into two application areas.

The low pressure application area is characterised by low pressure losses, e.g. in chimney installation, wall fans, stable air circulation. The application area usually varies between 30-50 Pa. The high pressure application area is characterised by much higher pressure losses caused by long pipe lines or

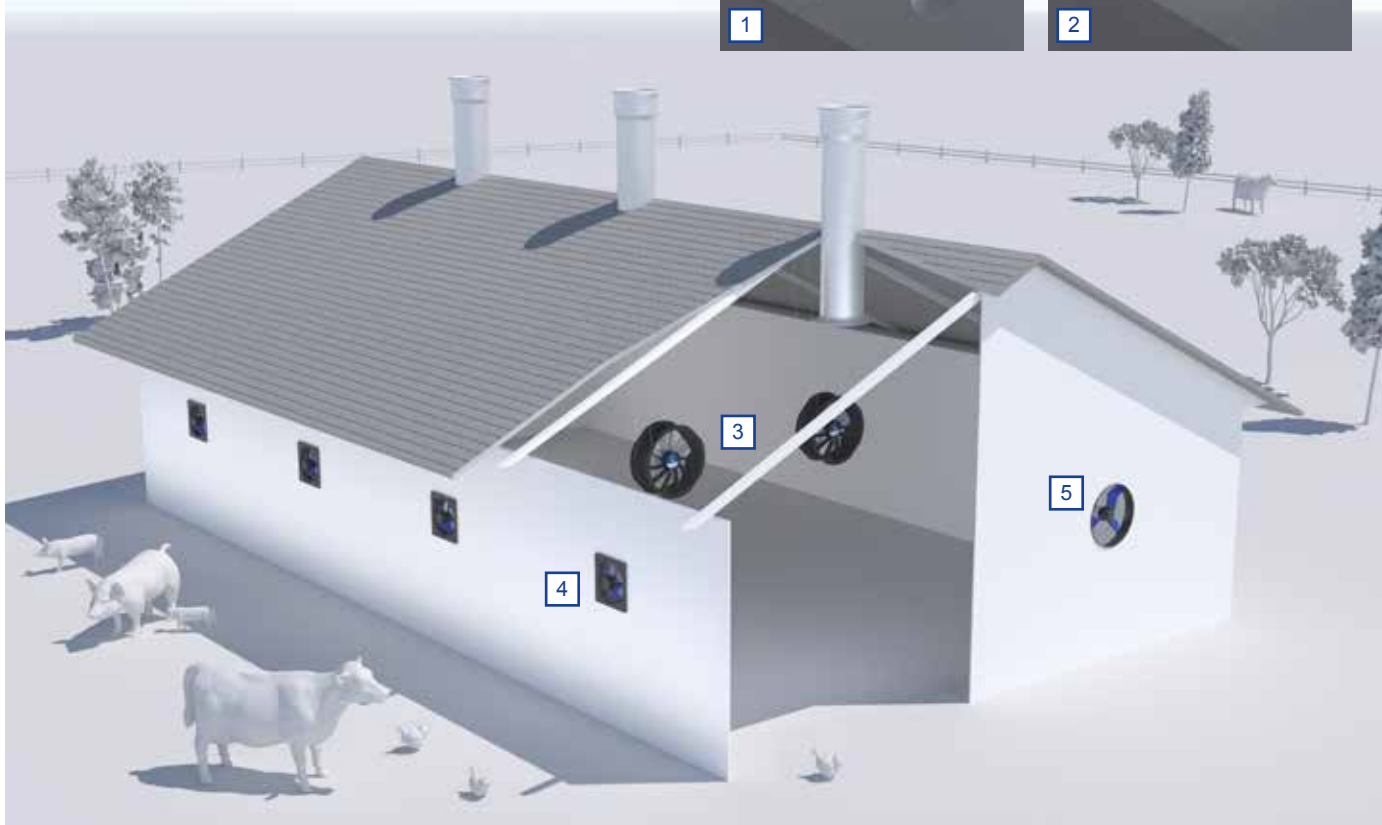
heat exchanger. The typical application area is at 150-200 Pa, which above all occurs in central waste air flow or waste air purification.

For both areas, ZIEHL-ABEGG offers different fans optimized for the corresponding areas of work. For cases between both application areas, ZIEHL-ABEGG specialists will check which fans are best suited from the wide product range.

Low pressure

Low pressure applications

- 1 Fan at chimney inlet
- 2 Fan in the chimney
- 3 Air circulation
- 4 Cross ventilation
- 5 Longitudinal ventilation



Properties:

- Low pressure losses, e.g. chimney installation, wall fan, air circulation in the stables
- Maximum ~ 100 Pa possible
- Application areas usually between 30-50 Pa

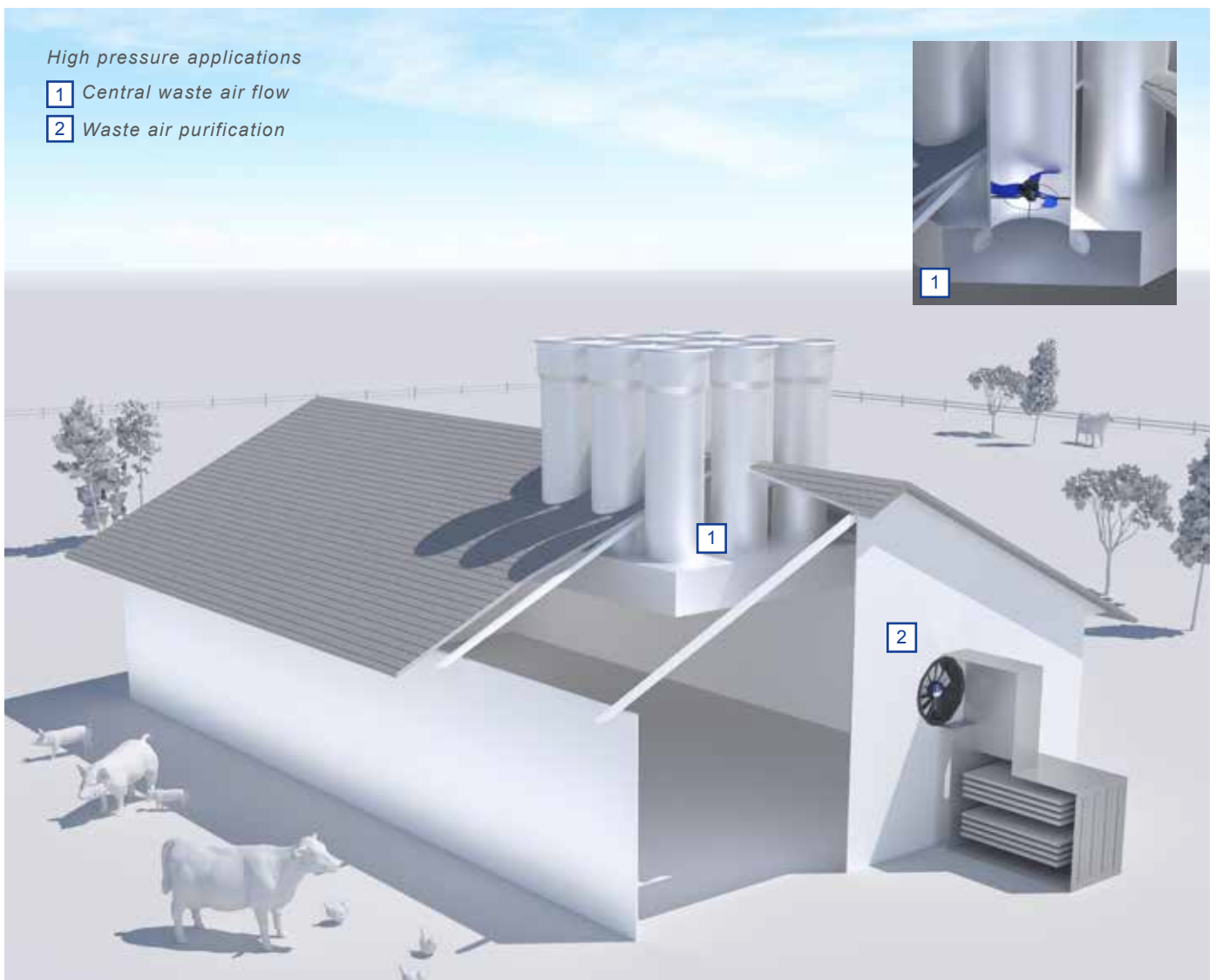
Fan selection:

- ZAenergy saver: Our easy-to-use software to show the operating costs of the various control types
- FANselect: Our online and offline selection range for fast fan selection www.fanselect.info
- Advice: Our qualified sales team will be glad to offer you advice to find the right system for the respective application.

High pressure

High pressure applications

- 1 Central waste air flow
- 2 Waste air purification



Properties:

- Higher pressure losses, e.g. in the case of pipe or duct system, heat exchangers, filters
- Maximum ~ 500 Pa possible
- Application areas usually between 150-200 Pa

The Royal League

