

TERMOTECNICA PERICOLI Axialventilator

TERMOTECNICA PERICOLI EOS 30

DLG Test Report 5198



**Manufacturer and
registering company**

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Short description

- Axial ventilator in a square casing out of steel plates with an integrated suction nozzle;
- Lamella-like shutter flaps arranged on the pressure side;
- three-phase alternating current motor; the six-winged blower wheel is driven by a V-belt.



Deutsche Landwirtschafts-
Gesellschaft e.V.
Prüfstelle für Landmaschinen

(Description and technical data cf. Page 5).

Evaluation – short version

Test criterion	Test result
Suitability	
	for the ventilation of greenhouses and (under certain conditions) the ventilation of closed stalls in facilities characterized by little flow resistance or for air circulation or recirculating air operation
Pressure increase and volume flow	
– at a pressure increase of 0 Pa	volume flow 13,700 m ³ /h
– at a pressure increase of 30 and 70 Pa	volume flow 12,200 m ³ /h and 9,200 m ³ /h respectively
Electric power input	
– at rated tension and a pressure increase of 0 Pa and 70 Pa	750 and 820 W respectively
– specific power input at a pressure increase of 0 Pa	medium, 54.6 W/(1000 m ³ /h)
Engine	
	sufficiently dimensioned
Noise	
	dependent on the direction
sound pressure level at a distance of 7 m in the flow direction	62 dB(A)
Service life	
according to present knowledge and experience with greenhouse ventilation	good
Maintenance	
Requirements	very low
Instructions of installation and operation	
	detailed
Planning data for ventilation systems	not included
List of spare parts	included
Work safety	
	certified by DPLF

Test results

Suitability

The axial ventilator TERMOTECNICA PERICOLI EOS 30 is suitable for the ventilation of greenhouses and under certain conditions for the ventilation of closed stalls in facilities characterized by little flow resistance or for air circulation or recirculating air operation.

Pressure increase and volume flow

At rated tension (400 V), the measured pressure/volume flow curve which is important for ventilation ranges between a pressure increase of approximately $\Delta p_{fa} = 0$ Pa and $\Delta p_{fa} = 30$ Pa (facilities characterized by little flow resistance). At these operating points, the corresponding volume flow is $\dot{V} = 13,700$ m³/h and 12,200 m³/h respectively. If pressure increase grows to 50 Pa and 70 Pa, the volume flow decreases to 10,800 m³/h and 9,200 m³/h (cf. Table and Figure 1).

Electric power input

At rated tension and a pressure increase of 0 Pa and 30 Pa, electric power input is 750 W and 785 W respectively and grows to 820 W at a pressure increase of 70 Pa (cf. Table and Figure 1). Specific power input (power input per 1,000 m³/h volume flow) is low¹⁾ and amounts to 54.6 W/(1,000 m³/h) in freely impelling and expelling operation (pressure increase 0 Pa). At a pressure increase of 30 Pa and 70 Pa, specific power input grows to 64.6 and 89.0 W/(1,000 m³/h) (cf. Table).

Engine

The engine is sufficiently dimensioned. Current input ranges between 1.56 A (at a pressure increase of 0 Pa) and 1.64 A (at a pressure increase of 70 Pa).

At the greatest current input and during continuous operation, the temperature of the motor winding was approximately 20 K²⁾ above

the ambient temperature (permissible maximum value 115 K). The motor features a star connection and can be switched directly. The motor should be equipped with a protective switch. The electrical installation may only be carried out by a trained electrician.

The motor is not designed for the control of the rotational speed through tension reduction. If a frequency converter is used for control, the manufacturer's instructions must be observed.

Noise

In normal operation, the noise caused by the ventilator is dependent on the direction and is influenced only slightly by the operating point.

¹⁾ grading: low (≤ 45 W/(1000 m³/h)), medium ($> 45 \leq 55$ W/(1000 m³/h)), high (> 55 W/(1000 m³/h))

²⁾ Temperature differences are given in Kelvin (K). 1 K corresponds to 1°C.

Table 1:

Performance values of the axial ventilator TERMOTECNICA PERICOLI EOS 30

measured at an electric tension of 400 V (the values apply to air having a density of 1.2 kg/m³)

Pressure increase ⁴⁾ Δp_{fa} Pa ⁵⁾	Total pressure increase Δp_t Pa	Volume-flow \dot{V} m ³ /h	Electric power input P W	Specific power input P_{spez} W 1000 m ³ /h	Elektric current-input I A	Impeller rpm n_L min ⁻¹	Efficiency ⁶⁾	
							η_{fa} %	η_t %
0	39	13700	750	54,6	1,56	690	0	19,8
10	46	13200	760	57,5	1,57	689	4,8	22,3
20	53	12700	770	60,6	1,59	688	9,2	24,5
30	61	12200	785	64,6	1,61	688	12,9	26,1
40	68	11500	795	69,0	1,62	687	16,1	27,2
50	74	10800	805	74,5	1,63	686	18,6	27,6
60	81	10000	815	81,5	1,64	686	20,5	27,5
70	88	9200	820	89,0	1,64	685	21,8	27,3
80	94	8300	820	98,4	1,64	685	22,6	26,6
90	100	6900	810	117,4	1,62	686	21,3	23,6
100	107	5800	800	138,2	1,61	686	20,1	21,5

⁴⁾ Here, pressure increase Δp_{fa} corresponds to the older term static pressure difference Δp_{st}

⁵⁾ 1 Pa (Pascal) = 1 N/m²

⁶⁾ Ventilator including the motor; efficiency $\eta_{fa} = \Delta p_{fa} \dot{V} / P$ resp. $\eta_t = \Delta p_t \dot{V} / P$ ($\Delta p_t = \Delta p_{fa} + p_d$; p_d = dynamic pressure)

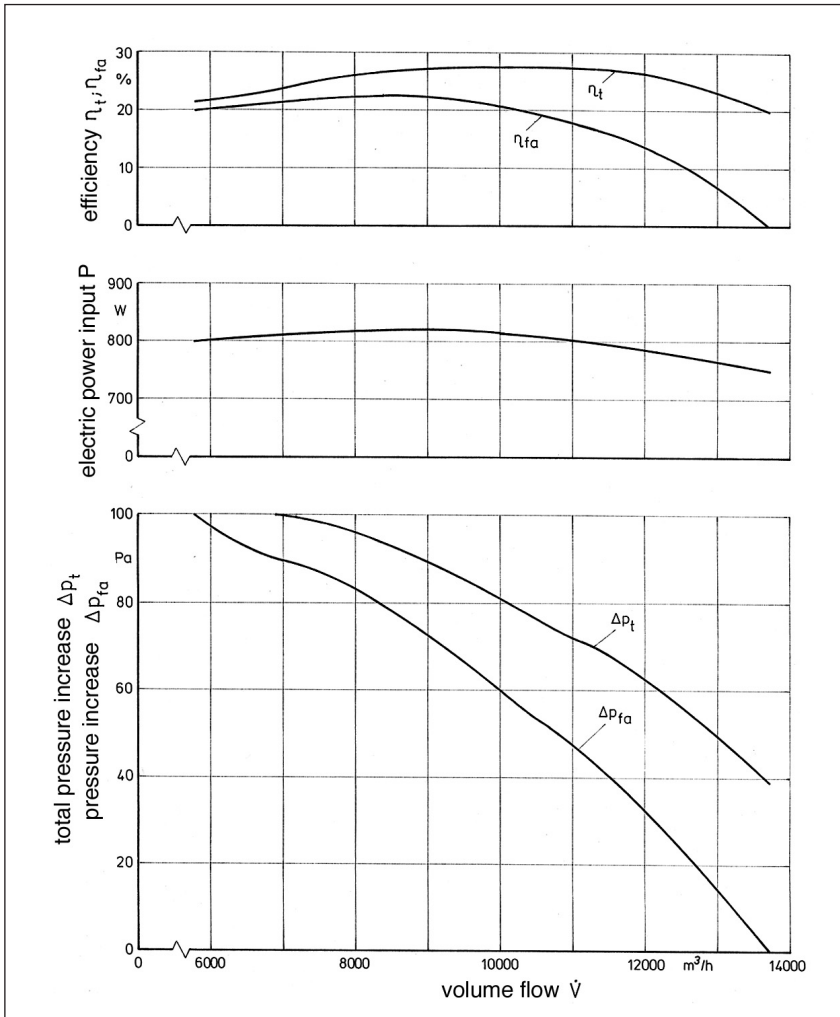


Figure 1:
Characteristic curves as a function of the volume flow at rated tension (400 V)
Above: efficiency in relation to pressure increase Δp_{fa} and total pressure increase Δp_t ;
Middle: electric power input;
Below: pressure increase Δp_{fa} and total pressure increase Δp_t

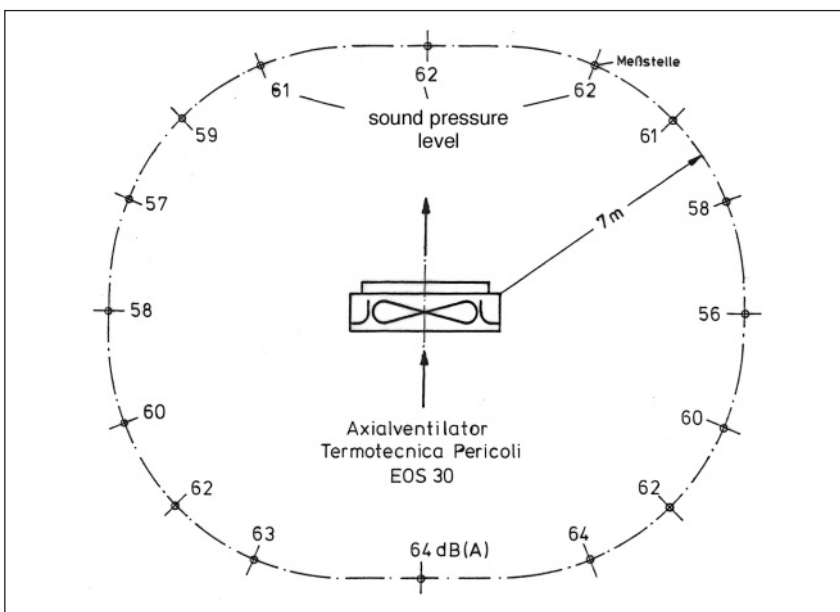


Figure 2:
 Sound pressure level at a distance of 7 m from the ventilator
 (freely impelling and expelling operation)

In freely impelling and freely expelling operation (0 Pa pressure increase and outdoor installation of the ventilator), a sound pressure level of 62 dB(A) was measured at a distance of 7 m from the ventilator in the flow direction. At right angles to the flow direction, the measured sound pressure level was 58 dB (A) (cf. Figure 2).

With regard to the impact of noise on the neighbourhood, the reader is referred to the VDI Guideline 2058 leaf 1 "Evaluation of Work-Related Noise in the Neighbourhood" and the "Technical Regulations regarding Noise Protection" (TA Lärm).

Service life

According to current knowledge and experience (based on greenhouse ventilation), service life is long.

When the ventilator is used for stall ventilation, the evaluation of surface protection is less satisfactory because the cutting edges of the steel casing are not galvanized and, hence, not protected against corrosion.

Maintenance

Maintenance requirements are very low. They are limited to checks of V-belt tension and V-belt wear.

V-belt tensioning is easy: unscrew the protective grid on the suction side, loosen and shift the motor holder.

Instructions of installation and operation

The instructions of installation and operation are detailed. They contain information regarding installation, commissioning, maintenance, and safety. The instructions do not comprise planning data for ventilation systems. A list of spare parts is included.

Planning aids

When the ventilator is used for greenhouse ventilation, the AEL³⁾ publication Report 13 "Planning

Aids for the Use of Electric Consumers in Greenhouse Horticulture" should be observed as well as DIN 18910 "Heat Protection of Closed Stalls" and (if applicable) the VDI Guideline 3472 "Emission Reduction; Animal Housing – Chickens" for use in stalls.

Survey result

A survey among the owners of ventilators of the same type could not be carried out because the sale of the ventilators is just beginning in Germany.

Work safety

The axial ventilator TERMOTECNICA PERICOLI EOS 30 was evaluated by the German Test Station for Agricultural and Forestry Machinery (DPLF). From the viewpoint of work safety technology, there are no reservations about the use of the ventilator (equipped with a protective grid on both the suction- and the pressure side).

³⁾ AEL-Arbeitsgemeinschaft für Elektrizitätsanwendung in der Landwirtschaft e.V., Am Hauptbahnhof 12, D-60329 Frankfurt/Main

Description and technical data (measured values)

Casing

- Square casing consisting of several riveted parts with a centrally installed suction nozzle;
- Casing and suction nozzle out of galvanized steel plates (1 mm thick);
- Protective grid bolted on the suction side (wire thickness 3 mm, mesh width 63x16 mm);
- Protective grid on the pressure (or expelling) side available on request;
- Motor holder on the upper left side;
- A vertical steel tube brace bolted to the casing carries the blower wheel axle;
- Five shutter lamellas (aluminium plate) arranged on the expelling side and opened automatically by the air flow.

Blower wheel

- six-winged; formed single wings out of aluminium plates (1.6 mm thick) riveted to a star hub;
- Star hub and blower wheel hub (V-belt pulley) out of diecast aluminium, bolted together;
- Blower wheel hub on ball bearings (encapsulated, maintenance-free axial angular ball bearing, acting on two sides)
- Blower wheel hub placed on the blower wheel axle (socket pin bolt) and bolted to the steel tube brace.

Drive

- Three-phase alternating current motor, manufacturer ABB Motors, type B3 with a 1-fold V-belt pulley, rated power 0.55 kW, power input between 750 W

(0 Pa) and 820 W (70 Pa), tension 400 V (star connection), current input 1.56 to 1.64 A, rated rpm 1390 min⁻¹, type of protection IP 55, insulation class F,

- V-belt pulley on the motor side, effective diameter 144 mm
- V-belt pulley on the blower wheel side, effective diameter 300 mm
- transmission ratio 1 : 0,48;
- V-belt type name A67 13x1700 LI.

Fitting position

- Vertically standing or suspended on chains
- Clamping nuts in the side walls of the casing

Main measurements and weight

Casing	– width	923 mm
	– height	923 mm
	– depth	400 mm
Suction nozzle, inside diameter		776 mm
Blower wheel diameter		778 mm
Weight		46,8 kg

Performance measurements were carried out on the ventilator test stand of the DLG Test Station according to DIN 24163. The measurements were performed at the rated tension of 400 V, 50 Hz.

For reasons of work safety technology, a protective grid on the expelling side was also required. The performance measurements were carried out without this grid. The resulting volume flow reduction which must be expected is very small (below 2% according to experience).

Realization of the tests

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