

Trubtel

A new building technique of central ventilation devices with an axial ventilator

Shorter, lighter, more efficient.

By Dipl.-Ing. Detlef Hagenbruch, Cologne

To save energy of ventilation devices and systems, heat recovery is an effective and economical procedure. At the moment companies do not pay lots of attention to ventilators, which have the largest energy consumption. The following article points out how ventilation devices can be optimized by using highly efficient axial ventilators and as a result can be build shorter, lighter and more efficient. Simultaneously this new procedure fulfils all given efficiency requirements by the eco-design regulation 1253/2014.



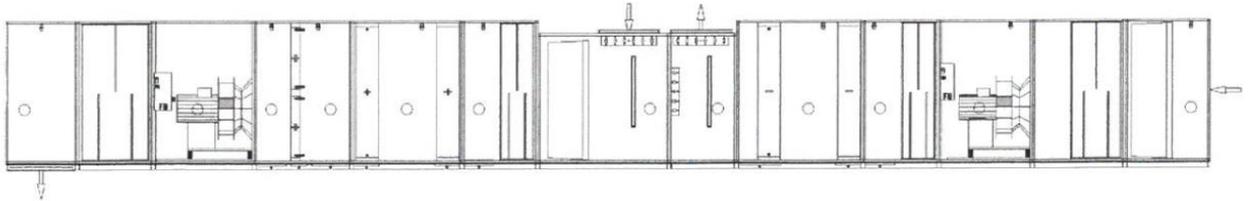
ill.1: Usage of a high performance axial ventilator (detailed right).

Key component of the new concept is the TÜV certified Novenco axial ventilator from the series „ZerAX“ (effectiveness up to 92%). These ventilators are available for air volume up to 200.000 m³/h and static pressures up to 3.000 Pa.

The downsizing process is based on changing the position of the axial ventilator and adding an acoustic diffuser, to shorten the standardised silencer or even get rid of it (illustration 1). By changing the deployment additionally, our device is up to 20% shorter compared to standard devices. In addition to that, an accomplished example.

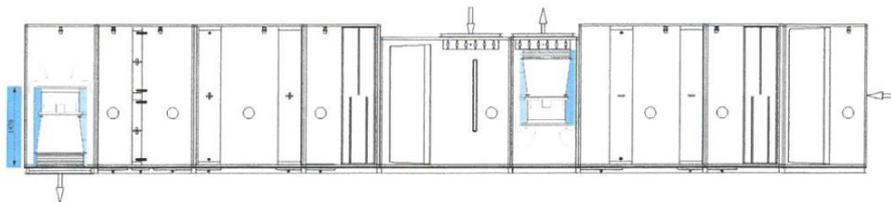
Example

The illustrations 2 and 3 show a ventilation device with a high air flow rate of 600.000 m³/h placed on the roof of an industrial warehouse. The device is composed of 17 units. Both devices have the additional air device on the left and the exhaust air device with heat recovery on the right. The following unit provides a standard ventilator and therefore the necessary silencer.



ill.2: Standard ventilation system, effort: 49.91 kW, weight: 13.0 t, length: 22.9 m

Illustration 3 shows the optimised ventilation device. Through using highly efficient axial ventilators and the elimination of two sound absorbers the following distinctions came along: 7.7 m shorter (-33%), 3.7 t lighter (-28%) and 10.5 kW less electric consumption (-21%).



ill.3: The optimized ventilation system with vertical axial ventilators, effort: 39.38 kW, weight: 9.3t, length: 15.2 m (illustrations by Trubel GmbH)

The savings of 10.5 kW and as operating time of 6500 h p.a. results in the following calculation: $10.5 \text{ kW} \times 6500 \text{ h/a} \times 0.1 \text{ EUR/kWh} = 6825 \text{ EUR}$ per year and device. By using new technology the ascertained payback period is less than a year. Other positive aspects are the reduced size and the small static load.

Technical advantages:

- Usage of dynamic energy
- Consistent air flow velocity
- lesser pressure drop
- reduction of acceleration casualties
- reduction of pressure drop
- more compact through adding an acoustic diffuser

Perspective:

This new building technique of central ventilation devices with an axial ventilator is certified in every point according to the manufacturers association Bietigheim-Bissingen, except the deviation by replacing the standard silencer through our acoustic diffuser. Whether the shorter, lighter and more efficient ventilation device will succeed, is depending on market.