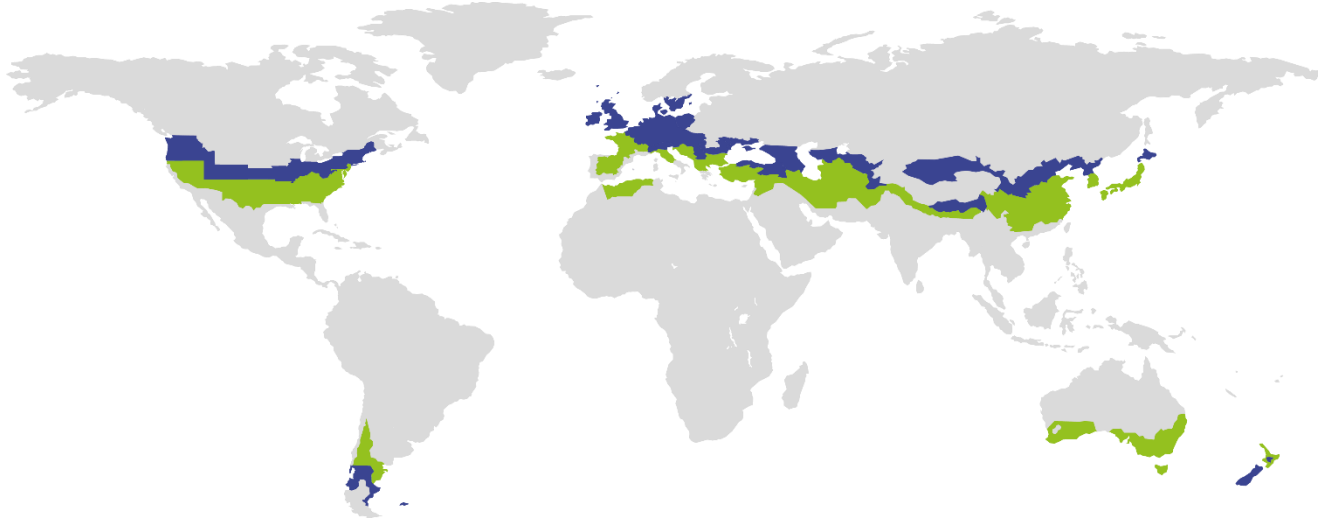


CERTIFICATE

Certified Passive House Component

Component-ID 1191s03 valid until 31st December 2021

Passive House Institute
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Category: **Air handling unit with heat recovery**
Manufacturer: **Drexel und Weissenergieeffiziente Haustechniksysteme GmbH**
Austria
Product name: **aeroschool 600**
Specification: Decentralised school room ventilation system
Heat exchanger: Recuperative

| |
|-------------------------------------|
| Airflow range |
| 229-524 m ³ /h |
| Heat recovery rate |
| $\eta_{HR} = 82 \%$ |
| Specific electric power |
| $P_{el,spec} = 0.24 \text{ Wh/m}^3$ |

This certificate was awarded based on the product meeting the following main criteria

Heat recovery rate $\eta_{HR} \geq 75 \%$
Specific electric power $P_{el,spec} \leq 0.45 \text{ Wh/m}^3$
Leakage $< 3 \%$
Comfort Supply air temperature $\geq 16.5 \text{ }^\circ\text{C}$
at outdoor air temperature of $-10 \text{ }^\circ\text{C}$

cool, temperate climate



**CERTIFIED
COMPONENT**

Passive House Institute

Passive House comfort criterion

A minimum supply air temperature of 16.5 °C is maintained at an outdoor air temperature of -10 °C by using of the integrated electrical post-heater. The measurements in the occupied area have proven that no air drafts are to be expected, due to the distribution of the supply air (draft risk < 10 %). The installation recommendations of the manufacturer must be followed. (Exposed occupied area: horizontal distance from the ventilation unit up to 6 m, measuring heights: 0.1 m / 1.2 m / 1.7 m).

Efficiency criterion (heat recovery rate)

The effective heat recovery rate is measured at a test facility using balanced mass flows of the outdoor and exhaust air. The boundary conditions for the measurement are documented in the testing procedure.

$$\eta_{HR} = \frac{(\theta_{ETA} - \theta_{EHA}) + \frac{P_{el}}{\dot{m} \cdot c_p}}{(\theta_{ETA} - \theta_{ODA})}$$

With

- η_{HR} Heat recovery rate in %
- θ_{ETA} Extract air temperature in °C
- θ_{EHA} Exhaust air temperature in °C
- θ_{ODA} Outdoor air temperature in °C
- P_{el} Electric power in W
- \dot{m} Mass flow in kg/h
- c_p Specific heat capacity in Wh/(kg.K)

Heat recovery rate

$$\eta_{HR} = 82 \%$$

Efficiency criterion (electric power)

The unit was examined with the following conditions, which correspond to the standard installation situation of the unit: Free outdoor/exhaust air intake and exhaust, sound silencer on supply/extract air side installed, free supply/extract air intake and exhaust after the silencer.

Specific electric power

$$P_{el,spec} = 0.24 \text{ Wh/m}^3$$

Efficiency ratio

The efficiency ratio provides information about the overall energy performance of the respective ventilation unit. It specifies the achieved reduction in ventilation heat losses by using a ventilation unit with heat recovery rather than without.

| Efficiency ratio |
|------------------------|
| $\varepsilon_L = 0.65$ |

Leakage

The leakage airflow must not exceed 3 % of the average airflow of the unit's operating range.

| Internal leakage | External leakage |
|------------------|------------------|
| 1.38 % | 1.61 % |

Settings and airflow balance

It must be possible to adjust the balance between the exhaust airflow rate and the outdoor airflow rate for all units.

- This unit is certified for airflow rates of 229-524 m³/h.
- Balancing of the airflow rates of the unit is possible.
 - ✓ The airflow volumes can be held steady automatically (by measurement of pressure differences inside of the unit).
- The users should have at least following possibilities for adjustment:
 - ✓ Switching the system on and off
 - ✓ Synchronized adjustment of the supply air and extract airflow to basic ventilation (70-80 %), standard ventilation (100 %) and increased ventilation (130 %) with a clear indication of the current setting.
- The standby power consumption of this device makes 7.8 W. The target value of 1 W was exceeded. The device should be equipped with an additional external switch so that it can be disconnected from the mains, if required.
- After a power failure, the device will automatically resume operation.

Acoustical testing

Since it can be assumed that the unit will be installed in a classroom or meeting room, the sound pressure level in installation room should be restricted to 30 dB(A). The sound pressure level has been determined for a reference room with a volume of 200 m³ and a reverberation time of 0.7 s.

| Airflow rate | Sound power level L_W | A-weighted sound power level L_{WA} |
|-----------------------|-------------------------|---------------------------------------|
| 524 m ³ /h | 48.3 dB | 38.5 dB(A) |

- The limiting sound pressure level value of 30 dB(A) was complied with in a reference room at the upper limit of the airflow range of 524 m³/h, by way of the additional sound silencer module. (Room absorption area ca. 46 m²).

Indoor air quality

This unit is to be equipped with following filter qualities:

| Outdoor air filter | Extract air filter |
|--------------------|--------------------|
| ISO ePM1 50% | ISO Coarse 60% |

On the outdoor air side, the filter efficiency of ISO ePM1 50% (F7 according to EN 779) or better is recommended. For the extract air side, a filter efficiency of at least ISO Coarse 60% (G4 according to EN 779) is recommended. If not in standard configuration, the recommended filter is available as an accessory part.

Frosts protection

Appropriate measures should be taken to prevent the heat exchanger and optional downstream hydraulic heater coil from getting damaged by frost during extreme winter temperatures (-15 °C). It must be ensured that the unit's ventilation performance is not affected during frost protection cycles.

- Frosts protection of the heat exchanger:
 - ✓ In order to prevent the heat exchanger from freezing a regular time-limited defrost cycle is used. This defrost cycle is based on interruption of the outdoor and exhaust air streams and simultaneous opening of the air recirculation damper and the bypass damper in order to defrost the heat exchanger by means of the warm extract air.
 - ✓ The laboratory measurement has proved, that this frost protection at an upper airflow rate and an outdoor air temperature of -15 °C is sufficient. By the laboratory testing, the defrost cycle was first activated at an outdoor air temperature of -9.5 °C .
- Frost protection of downstream hydraulic heater coils:
 - ✓ According to the manufacturer, the unit will not be operated with a downstream hydraulic heater coil. The laboratory testing of this frost protection was therefore not performed.