CERTIFICATE

Certified Passive House Component

Component-ID 0906vl03 valid until 31st December 2025

Passive House Institute
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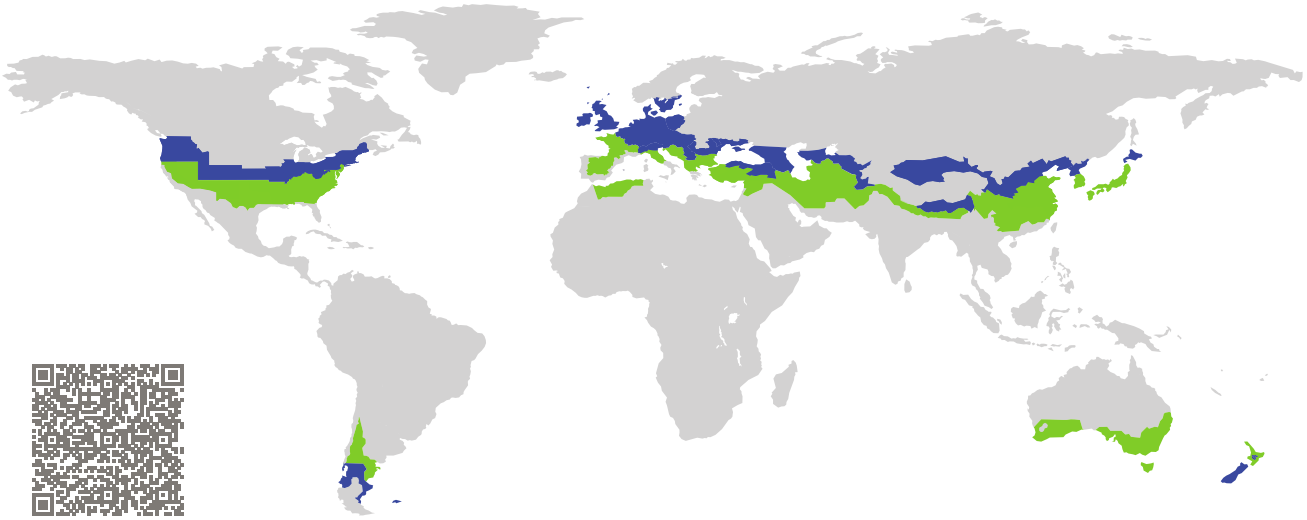

Category:	**Air handling unit with heat recovery**
Manufacturer:	**Helios Ventilatoren GmbH & Co KG Germany**
Product name:	**KWL EC 1200S PRO**
Specification:	Airflow rate > 600 m^3/h
Heat exchanger:	Recuperative

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

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

Airflow range

400–890 m^3/h
at an external pressure of
215 Pa [1)]
Requirements non-residential buildings (Therefore also applicable for residential building)

Heat recovery rate

η_{HR} = 81 %

Specific electric power

$P_{el,spec}$ = 0.43 Wh/m^3

Performance number

10.0

cool, temperate climate

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[1)] Available pressure difference with installed filters makes **183 Pa**. Additional components (e.g. heater coil) decrease the available pressure difference accordingly.

Passive House comfort criterion

A minimum supply air temperature of 16.5 °C is maintained at an external air temperature of -10 °C.

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 W h/(kg K)

Heat recovery rate
η_{HR} = 81 %

Airflow range and external pressure difference

The operational range of the device results from the efficiency criterion (see below). As per the certification criteria for ventilation units > 600 m³/h the applicable pressure differences vary with the nominal range of operation (as declared by the producer) and the application (residential or non - residential building).
The external pressure difference includes all pressure losses of the ventilation system caused by components apart from the tested unit (consisting of casing, heat exchanger and fans). If filters are installed inside of the unit, their pressure losses are to be reduced accordingly. The average filter pressure drop of an operational filter is assumed to be 30% higher than that of the clean filter.

- This device was tested according to the requirement of non-residential building with an airflow range of \textbf{400-890 m³/h} at an external pressure difference of \textbf{215 Pa}. The available pressure difference with installed filters is about \textbf{183 Pa}.

Efficiency criterion (electric power)

The overall electrical power consumption of the device including controllers was measured at the test facility as per the requirements for non-residential buildings at an external pressure difference of 215 Pa.

Specific electric power
$P_{el,spec}$ = 0.43 Wh/m^3

Performance number

Based on the measured values for the calculation of heat recovery efficiency and power consumption and on the climatic data of central Europe (Gt: 84 kKh, heating time: 5400 h/a), an average performance number at the airflow range was determined:

Performance number
10.0

Leakage

The airtightness of the unit is tested for under pressure and over pressure before the thermodynamic test is conducted. As per the certification criteria the leakage airflows must not exceed 3 % of the average airflow of the device's operating range.

Internal leakage	External leakage
0.80 %	0.40 %

Settings and airflow balance

It must be possible to adjust the balance of airflows at the unit itself (either between the exhaust and the outdoor airflows or between the supply and the extract airflows, if the unit is respectively placed inside or outside of the insulated thermal envelope of the building). Available operation modes are explained in detail in the operation manual.

- Balancing the airflow rates of the unit is possible.
  - ✓ The airflow volumes can be held steady automatically (by measurement of pressure differences at the fan inlet nozzle).
- The standby power consumption of this device makes 16.00 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

A ventilation unit > 600 m^3/h is assumed to be operated in an installation room, for which sound limits are defined in the applicable regulations. For this device, the following sound level values have been derived from the measurements at an airflow rate of **1200 m^3/h**:

Device	Duct			
	Outdoor	Supply air	Extract air	Exhaust air
67.7 dB(A)	62.1 dB(A)	76.7 dB(A)	62.6 dB(A)	76.3 dB(A)

- For complying with the required sound level in the supply are and extract air rooms, dimensioning of a suitable silencer is required for the specific project on the basis of the measured sound level.

Indoor air quality

Instructions for changing of the air filters are documented in the operation manual. This device is equipped with following filter qualities:

Outdoor air filter	Extract air filter
F7	M5

If the device is not operated during summer, the filter should be replaced before the next operation. The producer of the device has to ensure that based on the latest findings, room air hygiene can be maintained by means of integrated or obligatory components.

For the operation of ventilation systems a strategy for avoiding permanent moisture penetration of the outdoor air filter needs to be considered. The strategies are mentioned in the full report and can be implemented through installation of either an additional component of the ventilation device in the factory, or retrofitted to the system on-site.

Frost 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.

- Frost protection of the heat exchanger:
  - ✓ The manufacturer has included an internal, electric pre-heater in the ventilation unit. This preheater has a power of 5.7 kW and is appropriate for use in the frost-protection strategy of the unit. The said strategy is outdoor and exhaust air regulated. For ventilation units with an airflow range greater than 600 m³/h, the Passive House Institute recommends the selection of an energetically frugal frost protection strategy (e.g. hydraulic post-heater with frost protection circuit).
- Frost protection of downstream hydraulic heater coils:
  - ✓ This appliance shuts down both the fans if the supply air temperature drops below +5 °C behind the heater coil.

  It should be noted that, due to free circulation, cold air can also lead to freezing - even when the fans are stationary. This can only be ruled out if the air duct is closed (by means of a shut-off flap).

Bypass of the heat recovery

An automatically controlled bypass of the heat exchanger is part of this device. The effectiveness of bypass for night cooling of buildings has not been investigated within the scope of this testing.