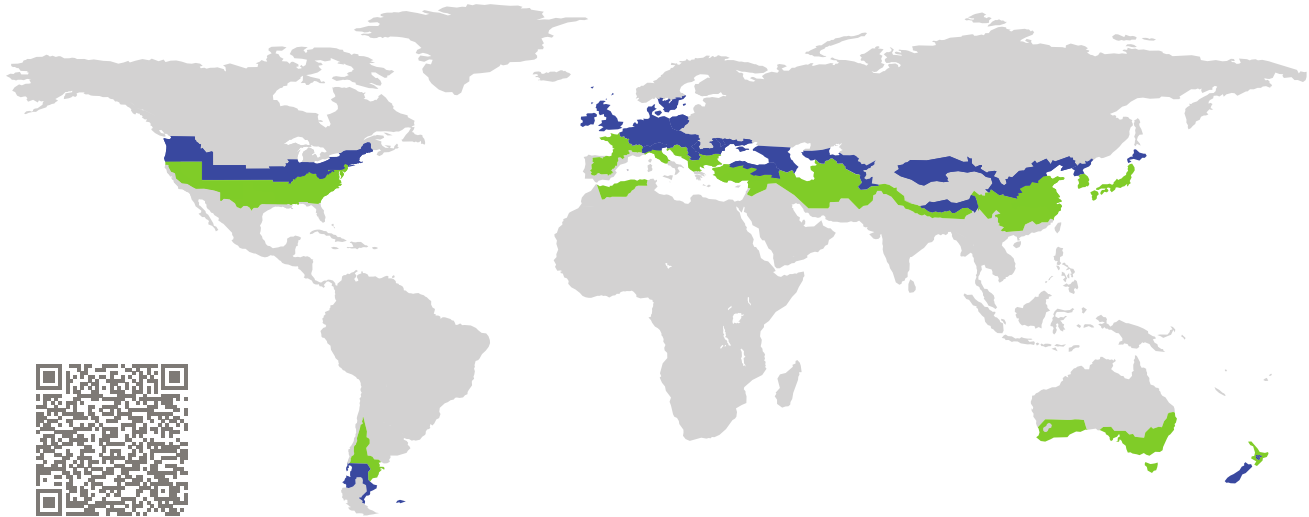


CERTIFICATE

Certified Passive House Component

Component-ID 2070vs03 valid until 31st December 2024

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany



Category: **Air handling unit with heat recovery**

Manufacturer: **Sodeca S.L.U**
Spain

Product name: **Airhome-350/V**

Specification: Airflow rate < 600 m³/h

Heat exchanger: Recuperative

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 $-10 \text{ }^\circ\text{C}$

Airflow range

170–273 m³/h

Heat recovery rate

$\eta_{HR} = 80\%$

Specific electric power

$P_{el,spec} = 0.39 \text{ Wh/m}^3$

cool, temperate climate



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Passive House comfort criterion

To ensure the comfort temperature of supply air, the unit is equipped with second electric heat register (first being the one for frost protection) positioned on supply air opening. The power capacity of this heater is 1 000 W. The temperature of supply air was 21.5 °C during measurements with -10 °C outside.

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

$$\eta_{HR} = 80 \%$$

Efficiency criterion (electric power)

The overall electrical power consumption of the device is measured at the test facility at an external pressure of 100 Pa (50 Pa, respectively, for the intake and outlet). This includes the general electrical power consumption for operation and control but not for frost protection.

Specific electric power

$$P_{el,spec} = 0.39 \text{ Wh/m}^3$$

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

$$\epsilon_L = 0.63$$

Leakage

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

Internal leakage	External leakage
3.00 %	2.00 %

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).

- This unit is certified for airflow rates of 170–273 m³/h.
- Balancing the airflow rates of the unit is possible.
- The user should have at least all the following setting options:
 - ✓ Switching the system on and off.
 - ✓ Synchronized adjustment of the supply and extract airflows to basic ventilation (70–80 %), standard ventilation (100 %) and increased ventilation (130 %) with a clear indication of the current setting.
- The device has a standby power consumption of 6.00 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

The required limit for the sound power level of the device is 35 dB(A) in order to limit the sound pressure level in the installation room. The sound level target value of less than 25 dB(A) in living spaces and less than 30 dB(A) in functional spaces must be ensured by installing commercial silencers. The following sound power levels are met at an airflow rate of 273 m³/h:

Device	Duct			
	Outdoor	Supply air	Extract air	Exhaust air
52.6 dB(A)	98.8 dB(A)	53.8 dB(A)	78.2 dB(A)	99.2 dB(A)

- The unit does not fulfil the requirements for the sound power level. The unit must therefore be installed acoustically separated from living areas.
- One example of suitable silencers for supply and extract air ducts is mentioned in the detailed test report or can be obtained from the manufacturer. It is recommended to identify suitable silencers for each individual project.

Indoor air quality

This unit is to be equipped with the 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.

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 ($-15\text{ }^{\circ}\text{C}$). It must be ensured that the unit's ventilation performance is not affected during frost protection cycles.

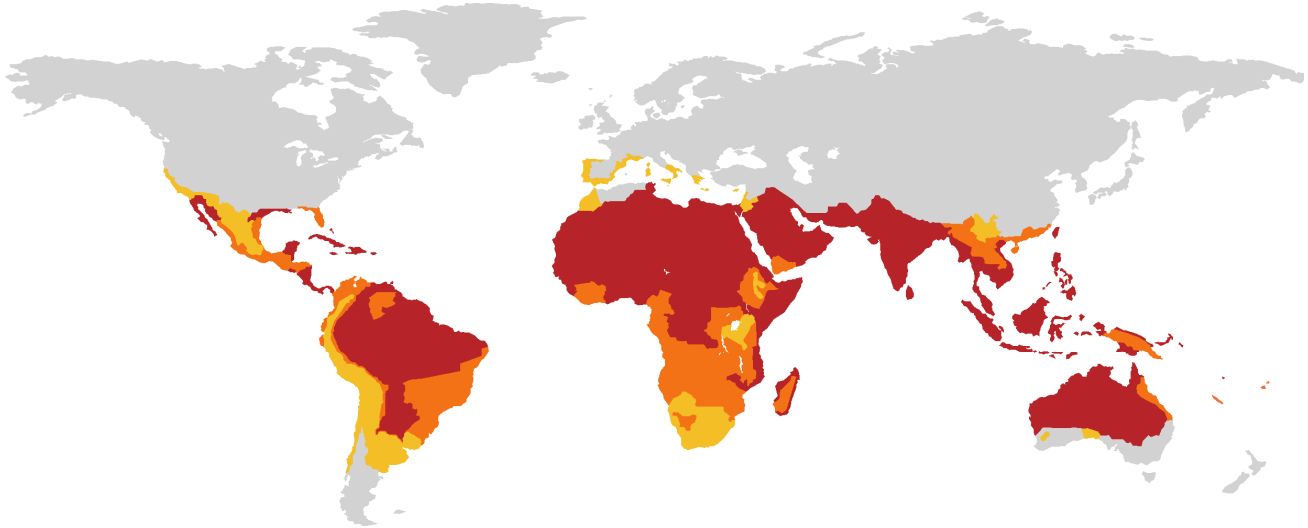
- Frost protection of the heat exchanger:
 - ✓ The frost protection is ensured by use of electric heater positioned on outside air opening. The frost protection starts by outdoor air temperature of $-4\text{ }^{\circ}\text{C}$. The power capacity of heater for frost protection is 2 000 W. The measured temperature of exhaust air during testing of frost protection was $2.4\text{ }^{\circ}\text{C}$.
- Frost protection of downstream hydraulic heater coils:
 - ✓ The unit shuts down when supply air temperature drops below $7\text{ }^{\circ}\text{C}$. (this is according to producers statements, it was not checked in laboratory)

CERTIFICATE

Certified Passive House Component

Component-ID 2071vs04 valid until 31st December 2024

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany



Category: **Air handling unit with heat recovery**
Manufacturer: **Sodeca S.L.U.**
Spain
Product name: **Airhome-350/V**

Specification: Airflow rate < 600 m³/h
Heat exchanger: Recuperative

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

Cooling recovery	η_{HR}	\geq	70 %
Specific electric power	$P_{el,spec}$	\leq	0.45 Wh/m ³
Leakage		$<$	3 %

Airflow range

170-273 m³/h

Cooling recovery

$\eta_{HR,C} = 73 \%$

Specific electric power

$P_{el,spec} = 0.36 \text{ Wh/m}^3$

Humidity recovery

$\eta_x = 0\%$

very hot climate



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Humidity recovery

In warm and humid climates, moisture recovery can significantly reduce the energy demand for active dehumidification and active cooling. In warm and humid or hot and humid climates therefore a humidity recovery of at least 60% is recommended together with active dehumidification. As an orientation, PHPP refers to moisture recovery if required.

Humidity recovery

$$\eta_x = 0\%$$

Efficiency criterion (cooling recovery)

The cooling recovery rate is determined on the basis of laboratory measurements of the entire ventilation device with balanced mass flows on the outdoor air and exhaust air side according to following formula:

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

With

$\eta_{HR,C}$ Cooling recovery 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)

Cooling recovery

$$\eta_{HR} = 73\%$$

Efficiency criterion (electric power)

The overall electric power consumption of the device is measured at the test facility at an external pressure of 100 Pa (50 Pa, respectively, for the intake and outlet). This includes the general electric power consumption for operation and control.

Specific electric power

$$P_{el,spec} = 0.36 \text{ Wh/m}^3$$

Leakage

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

Internal leakage

3.00 %

External leakage

2.0 %

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). Balancing of the airflow rates of the unit is possible.

- This unit is certified for airflow rates of 170-273 m³/h.
- Balancing the air flow rates of the unit is possible.
 - ✓ The airflow volumes can be held steady automatically.
- The user should have at least following setting options:
 - ✓ Switching the system on and off.
 - ✓ Synchronized adjustment of the supply and extract airflows to basic ventilation (70-80%), standard ventilation (100%) and increased ventilation (130%) with a clear indication of the current setting.
- The device has a standby power consumption of 6.0 W. The target value of 1 W was slightly 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

The required limit for the sound power level of the device is 35 dB(A) in order to limit the sound pressure level in the installation room. The sound level target value of less than 25 dB(A) in living spaces and less than 30 dB(A) in functional spaces must be ensured by installing commercial silencers. The following sound power levels are met at an airflow rate of 273 m³/h.

Casing	Duct			
	Outdoor	Supply	Extract	Exhaust
52.6 dB(A)	98.8 dB(A)	53.8 dB(A)	78.2 dB(A)	99.2 dB(A)

- The unit does not fulfil the requirements for the sound power level. The unit must therefore be installed acoustically separated from living areas.
- One example of suitable silencers for supply and extract air ducts is mentioned in the detailed test report or can be obtained from the manufacturer. It is recommended to identify suitable silencers for each individual project.

Indoor air quality

The device must be equipped with following filter qualities:

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

On the outdoor air / supply air side, a fine filter of efficiency ISO ePM1 50% (F7 according to EN 779) or better is recommended. For the exhaust air side, a filter with at least ISO Coarse 60% efficiency (G4 according to EN 779) is recommended. If no standard configuration, a filter with recommended efficiency is offered as optional equipment or accessories by the manufacturer.

Condensate drain

Under certain circumstances condensate may occur on the supply air side. A condensate drain on the supply air side is therefore recommended, especially if exhaust air temperatures $< 25^{\circ}\text{C}$ are to be expected during the cooling period. If no condensate occurs, the condensate drain must be tightly closed.

The unit is equipped with condensate drain and can be equipped with ball type siphon as accessories.

Bypass of the heat recovery

A summer bypass is part of the unit and can optionally be controlled automatically. The effectiveness of the bypass for night cooling purpose of buildings was not tested.