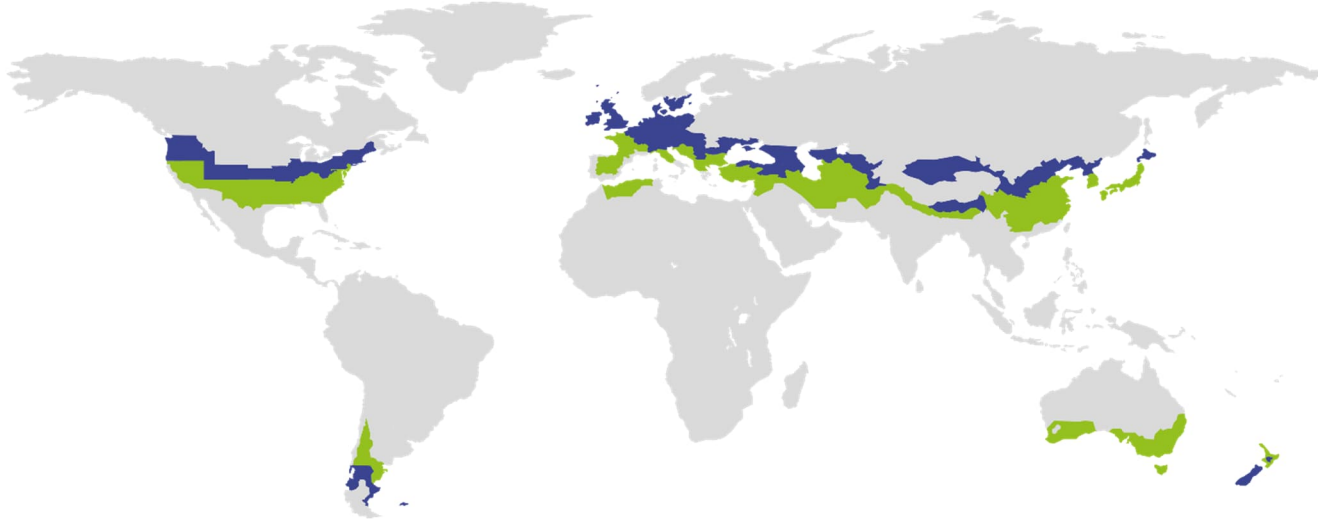


# CERTIFICATE

Certified Passive House Component

Valid until 31st December 2025

Passive House Institute  
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Germany



Category: **Air handling unit with heat recovery**  
Manufacturer: **Systemair A/S**  
**Denmark**  
Product name: **Ventilation unit series**  
**Geniox**

Specification: Airflow rate > 600 m<sup>3</sup>/h  
Heat exchanger: Regenerative

**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  $-10 \text{ }^\circ\text{C}$  <sup>2)</sup>

Airflow range
800-17000 m <sup>3</sup> /h at an external pressure of 236-398 Pa <sup>1)</sup>
Heat recovery rate
$\eta_{HR} \geq 82\%$
Specific electric power
$P_{el,spec} \leq 0.45 \text{ Wh/m}^3$
Performance number
> 10

<sup>1)</sup> The pressure drop of filters is covered in the listed external pressure. Additional components decrease the available pressure difference accordingly.

<sup>2)</sup> Installation of an additional post heater is necessary.

cool, temperate climate



**CERTIFIED  
COMPONENT**

Passive House Institute

Component ID	Unit model	Airflow range		External pressure Pa	Actual available external pressure <sup>1)</sup> Pa	Specific electric power Wh/m <sup>3</sup>	$\eta_{HR}$ %	Performance number -
		Min m <sup>3</sup> /h	Max m <sup>3</sup> /h					
2329vI03	Geniox 10	800	2200	236	183	0.34	83	13.4
2330vI03	Geniox 11	1200	2800	286	241	0.41	83	10.4
2331vI03	Geniox 12	1600	3600	302	252	0.38	82	11.5
2095vI03	Geniox 14	2300	4700	320	286	0.44	85	10.7
2333vI03	Geniox 16	3000	6400	338	283	0.43	85	11.4
2334vI03	Geniox 18	3700	8800	358	308	0.40	85	11.0
2335vI03	Geniox 20	4680	10000	365	318	0.45	86	10.6
2336vI03	Geniox 22	6500	12000	376	329	0.45	86	10.3
2337vI03	Geniox 24	7500	14000	386	342	0.45	86	10.2
2377vI03	Geniox 27	8300	17000	398	358	0.45	86	10.3

Table 1: Certified values for each unit model.

1) Filter pressure losses have been deducted.

### Passive House comfort criterion

The device is not equipped with either a preheater coil or post heater. In order to maintain comfortable supply air temperatures at outdoor temperatures of -10°C, the installation of an additional post heater is required. Pre and Post heaters are available as standard ancillary items.

### 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

$\eta_{HR}$	Heat recovery rate in %
$\theta_{ETA}$	Extract air temperature in °C
$\theta_{EHA}$	Exhaust air temperature in °C
$\theta_{ODA}$	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)

- The heat recovery rates for each model of the unit are listed in Table 1.

### **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 m<sup>3</sup>/h the applicable pressure differences vary with the nominal range of operation (as declared by the producer).

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.

- The airflow ranges and available external pressures for each model of the unit are listed in Table 1.

### **Efficiency criterion (electric power)**

The overall electrical power consumption of the device including controllers was measured at the test facility as per the requirements at an external pressure difference of 236-398 Pa.

- The specific electric powers for each model of the unit are listed in Table 1.

### **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 kWh, heating time: 5400 h/a), an average performance number at the airflow range was determined.

- The performance numbers for each model of the unit are listed in Table 1.

### **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.

- These appliances meet the airtightness requirements.

### **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 of the airflow rates of the unit is possible.
- The standby power consumption of these devices makes 27 W.
- After a power failure, the device will automatically resume operation.

### Acoustical testing

A ventilation unit > 600 m<sup>3</sup>/h is assumed to be operated in an installation room, for which sound limits are defined in the applicable regulations. The total acoustic power levels were determined by producer for each model of the units at an upper limit of the airflow range. The provided values have been verified by an exemplary measurement.

Unit model	Airflow range		Total acoustic power level				
	Min	Max	Casing	Duct			
	m <sup>3</sup> /h	m <sup>3</sup> /h		ODA	SUP	ETA	EHA
			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Geniox 10	800	2200	50	59	73	59	73
Geniox 11	1200	2800	51	59	72	59	72
Geniox 12	1600	3600	55	61	75	60	74
Geniox 14	2300	4700	56	63	78	62	75
Geniox 16	3000	6400	55	64	77	64	77
Geniox 18	3700	8800	57	63	77	63	76
Geniox 20	4680	10000	57	65	78	66	77
Geniox 22	6500	12000	61	66	79	65	79
Geniox 24	7500	14000	60	66	79	65	79
Geniox 27	8300	17000	60	66	78	66	79

Tabele 2: Acoustic power levels at an upper limit of the airflow range.

- For complying with the required sound level in the supply air 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
ISO ePM1 50%	ISO ePM10 60%

If the device is not operated during summer, the filter should be replaced before the next operation. 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 or on the ventilation site system.

## **Frost protection**

Appropriate measures should be taken to prevent the heat exchanger and optional downstream hydraulic heating coil from freezing damage 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:
  - ✓ This series of ventilation units is equipped with rotor heat exchangers. There is no need for any additional frost protection strategy down to an outdoor air temperature of  $-15\text{ }^{\circ}\text{C}$ .
- Frost protection of downstream hydraulic heater coils:
  - ✓ In order to protect a downstream hydraulic heater coil, the device switches off as soon as the supply air temperature reaches  $5^{\circ}\text{C}$ .

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 avoided if the air duct is closed (by means of a shutoff damper).

## **Bypass of the heat recovery**

The units are equipped with a 100% summer bypass facility (the bypass is achieved by stopping rotation of the thermal wheel). The effectiveness of bypass for night cooling of buildings has not been investigated within the scope of this testing.