

CERTIFICATE

Certified Passive House Component

Valid until 31st December 2019

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Category: **Air handling unit with heat recovery**
Manufacturer: **Vallox GmbH**
Germany
Product name: **Ventilation unit series**
Vario 1100 CC – Vario 3500 CC

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	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
250-2800 m ³ /h at an external pressure of 200-286 Pa ¹⁾ Requirements non-residential buildings (Therefore also applic- able for residential buildings)
Heat recovery rate
$\eta_{HR} \geq 85 \%$
Specific electric power
$P_{el,spec} \leq 0.43 \text{ Wh/m}^3$
Performance number
> 10

¹⁾ The pressure drop of filters is covered in the listed external pressure. Additional components (e.g. heating coil) decrease the available external pressure accordingly.



Component ID	Unit model	Testing requirements	Airflow range		External pressure Pa	Actual available external pressure ¹⁾ Pa	Specific electric power Wh/m ³	Heat recovery rate %	Performance number -
			Min m ³ /h	Max m ³ /h					
0115vI03	Vario 1000	Non-residential	250	700	200	144	0.40	89	12.0
0235vI03	Vario 1500	Non-residential	300	1400	243	178	0.40	86	11.4
0236vI03	Vario 2500	Non-residential	500	1800	259	202	0.41	85	10.8
0116vI03	Vario 3500	Non-residential	800	2800	286	225	0.43	85	10.7

Table 1: Certified values for each unit model. ¹⁾ Pressure drop of filters were taken into account.

Passive House comfort criterion

A supply air temperature of 16.5 °C is maintained at an outdoor air temperature of about -10.0 °C by use of a suitable supply air heater.

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)

- 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 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.

- 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 for non-residential buildings at an external pressure difference of 200-286 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 airflow volumes can be held steady automatically (by measurement of pressure differences in extract and supply air duct, only available if pressure gauges are installed and the control system is equipped with an additional mode).
- The standby power consumption of this device makes 9.3 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.

