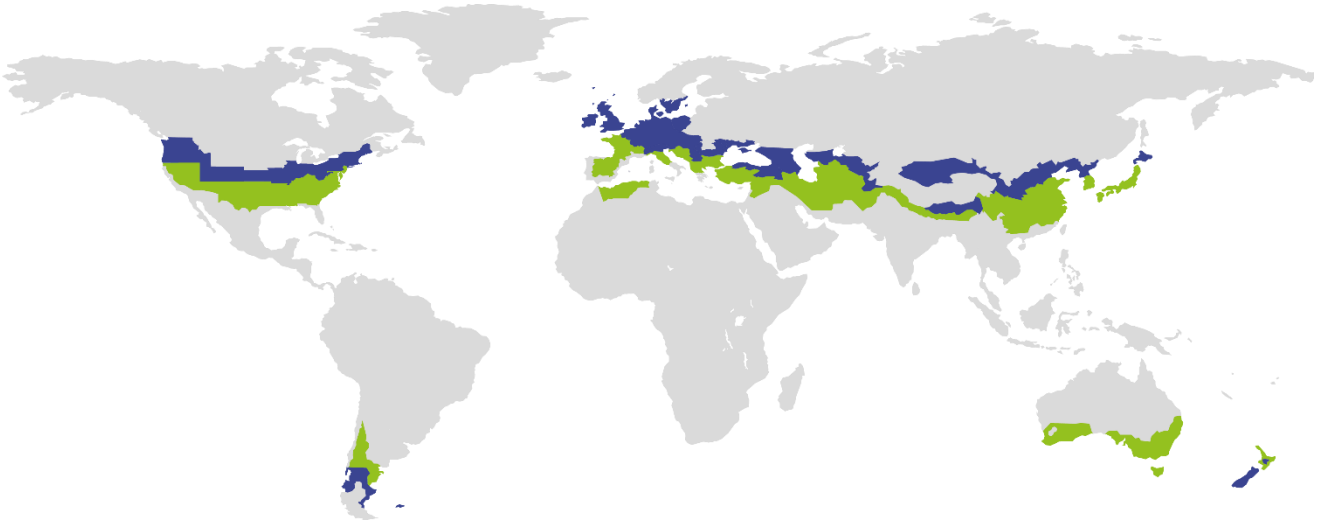
CERTIFICATE

Certified Passive House Component

Valid until 31st December 2025

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany



Category:	**Air handling unit with heat recovery**
Manufacturer:	**FläktGroup Deutschland GmbH Germany**
Product name:	**Ventilation unit series COM4plus CL10-70**
Specification:	Airflow rate > 600 m³/h
Heat exchanger:	Regenerative

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

Heat recovery rate	η_{HR}	≥	75 %
Specific electric power	$P_{el,spec}$	≤	0.45 Wh/m³
Leakage		<	3 %
Performance number		≥	10
Comfort	Supply air temperature ≥ 16.5 °C at outdoor air temperature of -10 °C [2]		

Airflow range

1400-9900 m³/h

at an external pressure of

274-364 Pa [1]

Requirements non-residential buildings (Therefore also applicable for residential buildings)

Heat recovery rate

η_{HR} ≥ 78 %

Specific electric power

$P_{el,spec}$ ≤ 0.45 Wh/m³ [3]

Performance number

> 9 [4]

[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.

[2] Installation of an additional post heater is necessary.

[3] At the lower airflow rate may be exceeded.

[4] The recommended value of 10.0 was not achieved.

cool, temperate climate

CERTIFIED COMPONENT

Passive House Institute

FläktGroup Deutschland GmbH
Bahnhofstraße 65-71, 44623 Herne, Germany
☎ +49 (0)2325 - 468 00 | ✉ sales.de@flaktgroup.com | http://www.dencohappel.com |

Component ID	Unit model	Testing requirements	Airflow range		External pressure	Actual available external pressure [1]	Specific electric power	Heat recovery rate	Performance number
			Min	Max					
			m³/h	m³/h	Pa	Pa	Wh/m³	%	-
0998vl03	CL10	Non-residential	1700	2300	274	224	0.44	79	9.3
0999vl03	CL20	Non-residential	1400	2900	288	238	0.45	80	9.1
1000vl03	CL30	Non-residential	2300	3700	304	272	0.45	82	9.2
1001vl03	CL40	Non-residential	2600	6500	338	296	0.45	78	9.0
1002vl03	CL50	Non-residential	5900	6600	339	304	0.45	80	9.2
1003vl03	CL60	Non-residential	6490	9000	359	310	0.45	80	9.1
1004vl03	CL70	Non-residential	6450	9900	364	328	0.45	81	9.3

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 post-heating element.

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 m^3/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 274-364 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 kKh, 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). Availeable operation modes are explained in detail in the operation manual.

- Balancing of the airflow rates of the unit is possilbe.
  - ✓ The airflow volumes can be held steady automatically (by measurement of pressure differences at the fan inlet nozzle, only available if pressure gauges are installed and the control system is equipped with the additional mode).
- The standby power consumption of these devices makes 32 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 m³/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.

Unit model	Testing requirements	Airflow range		Total acoustic power level				
					Duct			
		Min	Max	Casing	ODA	SUP	ETA	EHA
		m³/h	m³/h	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
CL10	Non-residential	1700	2300	55	62	71	62	76
CL20	Non-residential	1400	2900	51	70	81	69	81
CL30	Non-residential	2300	3700	51	67	78	67	78
CL40	Non-residential	2600	6500	55	69	80	68	79
CL50	Non-residential	5900	6600	59	66	81	64	81
CL60	Non-residential	6490	9000	57	74	85	73	85
CL70	Non-residential	6450	9900	55	69	80	69	80

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
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 or on the ventilation site system.

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:
  - ✓ 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 °C.
- Frost protection of downstream hydraulic heater coils:
  - ✓ As default, this series of ventilation units is not equipped with frost protection for downstream hydraulic heater coils. In order to achieve this function, the unit has to be additionally equipped with a thermostat in a supply air stream which ensures that both fans are switched off in case the outdoor temperature drops below 5 °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 ruled out if the air duct is closed (by means of a shut-off flap).

Bypass of the heat recovery

The heat recovery can be interrupted by suspending the rotation of the heat exchanger.