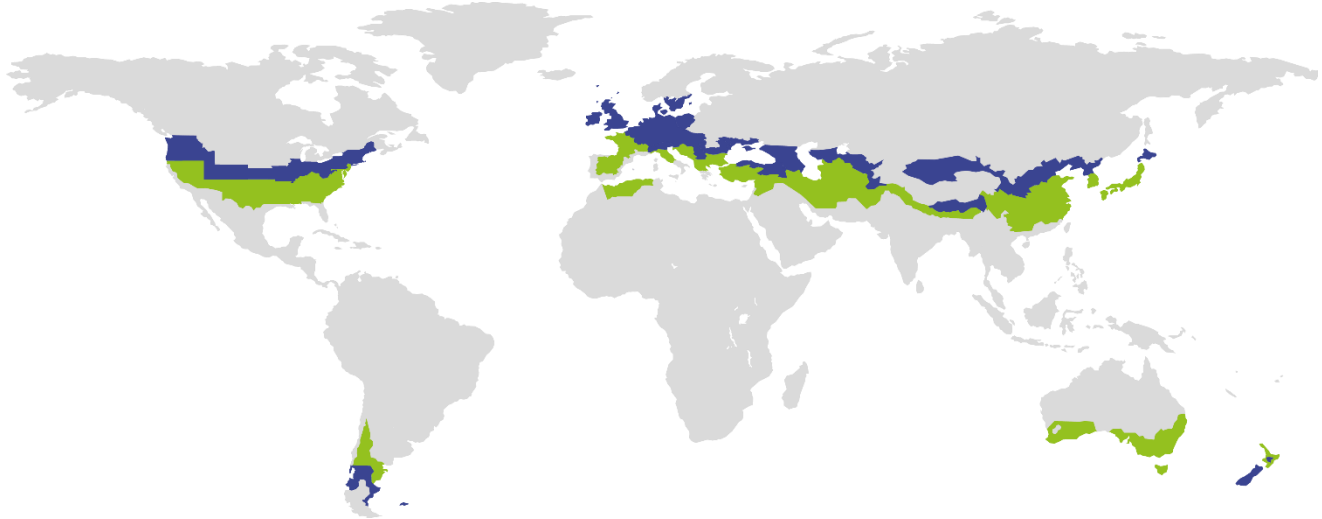


CERTIFICATE

Certified Passive House Component

Component-ID 1195vs03 valid until 31st December 2019

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany



Category: **Air handling unit with heat recovery**
Manufacturer: **Zehnder Group AG,
Paul Wärmerückgewinnung GmbH
Germany**
Product name: **ComfoSpot 50**
Specification: Decentralised single room ventilation system
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
15-25 m ³ /h (continuous operation) 15-25 m ³ /h ¹⁾ (on-demand operation for elimination of increased loads)
Heat recovery rate
$\eta_{HR} = 80 \%$
Specific electric power
$P_{el,spec} = 0.30 \text{ Wh/m}^3$
Humidity recovery
$\eta_x = 54 \%$

¹⁾ The airflow rate of 40 m³/h can be reached for the demand operation mode, the required sound pressure level in the installation room can be exceeded in demand operation mode. The heat recovery rate at the airflow rate of 40 m³/h is lower and reaches 73 %.



Humidity recovery

Indoor air humidity can be increased by using a system with moisture recovery in a cool, temperate climate, especially during the winter. These higher humidity levels will reduce evaporation from building elements and furniture during the heating period and thus have a positive effect on the building's heating demand. In order to account for this effect, the heat recovery efficiency is increased by a certain percentage, depending on the achieved level of moisture recovery.

Humidity recovery

$$\eta_x = 54 \%$$

- Adjustment of airflow by means of moisture control:
 - ✓ Since the moisture recovery of the heat exchanger exceeds a humidity ratio of 0.6, humidity controlled volume flow adjustment is required in order to avoid damage due to temporarily excessive indoor air humidity.
 - ✓ This function can be realized on this device by use of the optional accessory "Feuchte-Sensorik-Modul".
- Application of moisture recovery:
 - ✓ In cool temperate climates, heat exchangers with moisture recovery should generally only be used if the moisture load inside the building is comparatively low (e.g. in a residential building with an occupancy rate significantly below the average).
 - ✓ If moisture recovery > 60 % is to be used in a building with an average occupancy rate and typical use, the energy balance of the building is to be calculated with an increased airflow rate.
 - ✓ Adjustment of airflow by means of moisture control is required, even though that in case of low internal moisture the increased airflow rate is not needed often.

Passive House comfort criterion

Temporarily lower supply air temperatures (10 °C) might occur due to the type of heat exchanger and frost protection strategy. Once the frost protection is active, the supply air temperature increases again to more than 16.5 °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.

$$\eta_{HR} = \frac{(\theta_{ETA} - \theta_{EHA}) + \frac{P_{el}}{\dot{m} \cdot c_p}}{(\theta_{ETA} - \theta_{ODA})} + 0.08 \cdot \eta_x$$

