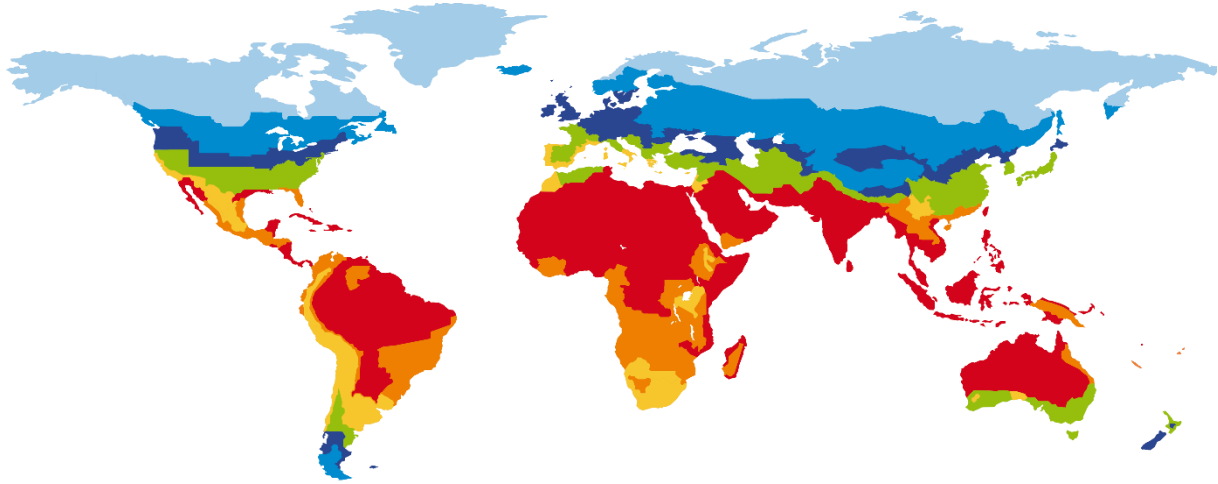


CERTIFICATE

Certified Passive House Component

Component-ID 2268ch00 valid until 31st December 2025

Passive House Institute
Dr. Wolfgang Feist
64283 Darmstadt
Germany



Category: **Compact unit**
Manufacturer: **Panasonic Marketing Europe GmbH**
Germany
Product name: **Aquarea K series** ¹⁾

Type of heat pump: Air to water
Heat exchanger: Regenerative

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

Ventilation unit

Heat recovery rate	η_{HR}	\geq	75 %
Specific electric power	$P_{el,spec}$	\leq	0.45 Wh/m ³
Leakage		$<$	3 %
Comfort			Supply air temperature \geq 16.5 °C at outdoor air temperature of -10 °C

Heat pump ²⁾

Space heating	9 kWh/(m ² a)
Space cooling (humid climate):	13 kWh/(m ² a)
Space cooling (dry climate):	11 kWh/(m ² a)

¹⁾ all certified units listed in Appendix of this certificate

²⁾ limit values for final energy consumption.

³⁾ the unit is not directly equipped with ventilation unit. Producer offers certified heat pump in combination with ventilation unit PAW-A2W-VENTA (certificate number: 1661vs02) as modular casing

Ventilation unit's performance: ³⁾

Airflow range
90-200 m ³ /h
Heat recovery rate
$\eta_{HR} = 80 \%$
Specific electric power
$P_{el,spec} = 0.42 \text{ Wh/m}^3$
Humidity recovery rate
$\eta_x = 35 \%$

Heat pump's performance:

Heating (35°)
4.4 – 4.7 kWh/(m ² a)
Heating (55°)
6.4 – 7.0 kWh/(m ² a)
Cooling DRY
10.6 – 11.3 kWh/(m ² a)
Cooling HUMID
10.1 – 12.2 kWh/(m ² a)



**CERTIFIED
COMPONENT**

Passive House Institute

Heat pump performance

Cooling

Unit	Operation			
	HUMID		DRY	
	kWh/(m ² a)	m ² (*)	kWh/(m ² a)	m ² (*)
3kW	10.1	100-250	11.3	50-150
5kW	11.2	150-400	10.8	150-300
7kW	11.2	200-550	10.6	200-400
9kW	12.2	250-550	11.3	250-500

Heating

Unit	Operation			
	35°C(**)		55°C(**)	
	kWh/m ²	m ² (*)	kWh/m ²	m ² (*)
3kW	4.4	300	6.4	300
5kW	4.6	500	6.9	500
7kW	4.7	550	7.0	500
9kW	4.7	600	6.8	550

Domestic hot water

Unit	Cooling		Heating
	HUMID	DRY	
	kWh/(m ² a)	kWh/(m ² a)	kWh/(m ² a)
3kW	4.3	4.2	4.8
5kW	4.0	3.9	4.4
7kW	4.0	3.9	4.4
9kW	4.0	3.9	4.4

*) approximate maximum floor area (or range) the certified heat pump can serve; calculation carried out in steps of 50 m²; result presented is mean value

***) water outlet temperature; values for cooling 7/12°

Seasonal performance of the tested unit is evaluated by Passive House Institute for representative climates. This is based on the key characteristics determined for space heating, cooling and dehumidification operating modes at all test points specified in the testing regulations.

Passive House Institute uses three reference climates, first for heating (cool, temperate-Frankfurt am Main- Germany), second for sensible cooling (hot and dry-Las Vegas-USA), and third for sensible cooling and dehumidification (hot and humid- Shanghai, China). This forms the basis for the calculation of energy balance. Evaluation is based on final energy consumption. The limiting values for final energy consumption are 13 kWh/(m²a) for sensible/latent cooling (humid climate) and 9 kWh/(m²a) for heating. For cooling in dry climate, the limit for final energy is 11 kWh/(m²a).

Verification is based on a model Passive House with a heating demand of 15 kWh/(m²a), cooling demand for humid climate 23 kWh/(m²a) and cooling demand for dry climate 22 kWh/(m²a). All calculations are based on hourly method. The calculation is done in steps of 50m² of size of reference house. The resulting values (as depicted on the main page) are derived as average value for all certifiable floor areas. The approximate maximum floor area (or range) of reference house the unit can serve is mentioned on the main page (this will deviate for each and particular project depending on climate. The values mentioned in this certificate are just for orientation. HVAC designer is responsible for sizing of the unit in each project). This is relevant for space heating/cooling. Concerning the DHW, this depends on the size of the tank being used and must be assessed individually for each project.

In case the unit being certified does not cover the whole latent cooling demand, it is assumed that the room is equipped with additional stand-alone dehumidifier for purposes of certification. Dehumidifier works with COP of 1 and waste heat goes into the occupied space (and must therefore be covered by certified unit itself).

If the unit is to be used in flats with too small floor area it can result in worse performance (it very much depends on control/regulation system of the particular unit. The performance of control system was not evaluated during the certification).

The type of refrigerant used: R32 in amount of 0.9kg (3kW, pre-charged) and 1.3kg (5kW/7kW/9kW, pre-charged).

For calculation of DHW consumption, the value of 25l/(person.day) of water at 60°C has been used (cold water temperature of 10°C). The volume of the DHW tank is 185l. The heat losses of DHW storage tank are included in calculation

Trade name of certified units

3kW: WH-ADC0309K3E5 + WH-UDZ03KE5 (KIT- ADC0309K3E5) with DHW tank integrated

5kW: WH-ADC0309K3E5 + WH-UDZ05KE5 (KIT- ADC0309K3E5) with DHW tank integrated

7kW: WH-ADC0309K3E5 + WH-UDZ07KE5 (KIT- ADC0309K3E5) with DHW tank integrated

9kW: WH-ADC0309K3E5 + WH-UDZ09KE5 (KIT- ADC0309K3E5) with DHW tank integrated

3kW: WH-SDC0309K3E5/WH-SDC0309K6E5 + WH-UDZ03KE5 without DHW tank

5kW: WH-SDC0309K3E5/ WH-SDC0309K6E5 + WH-UDZ05KE5 without DHW tank

7kW: WH-SDC0309K3E5/ WH-SDC0309K6E5 + WH-UDZ07KE5 without DHW tank

9kW: WH-SDC0309K3E5/ WH-SDC0309K6E5 + WH-UDZ09KE5 without DHW tank