

TEST REPORT

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300-KLAB-22-034



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Customer: Company: Panasonic Marketing Europe GmbH
Address: Hagenauer Str. 43
City: D-65203 Wiesbaden
Tel.: +49 1724 141441

Component: Brand: Panasonic
Type: Air to water heat pump (mono bloc)
Model: Outdoor unit: WH-WDG05LE5 Indoor unit: WH-ADC0509L3E5
Series no.: Outdoor unit: 5624600003 Indoor unit: 5707200003
Prod. year: Outdoor unit: 2023.01 Indoor unit: N/A

Dates: Component tested: August 2023 – October 2023

Procedure: See objective (page 2) for list of standards.

Remarks: The unit was delivered by the customer. The installation and test settings were done according to the manufacturer's instructions. All tests are done with enabled defrost mode.

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Test Rep. nr.



Objective

The objective of this report is to document the following:

The Seasonal Coefficient of Performance (SCOP) at low and medium temperature application for average climate according to EN 14825:2018.

In order to calculate the SCOP, tests were carried out at the part load conditions stated in the tables on pages 5 and 6.

COP test conditions (heating mode) according to EN 14511:2018, chosen by the manufacturer.

SEER test conditions at fan cooling application for space cooling according to EN 14825:2018, chosen by the manufacturer.

SEER test conditions at floor cooling application for space cooling according to EN 14825:2018, chosen by the manufacturer.

Operating requirements according to EN 14511-4:2018

- 4.2.1 Starting and operating tests
- 4.5 Shutting of the heat transfer medium flows
- 4.6 Complete power supply failure

Power consumption of liquid pump for COP and SCOP test points.

Pre-running and post-running time of liquid pump when the heat pump starts and stops.

Sound power measurements according to EN 12102-1:2017, chosen by manufacturer.





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Test conditions

SCOP test conditions for low temperature – EN 14825

Part load conditions for reference SCOP and reference SCOP_{on} calculation of air to water units for low temperature application for the reference heating season;

“A” = average, “W” = warmer, and “C” = colder.

| Condition ^a | Part Load Ratio in % | | | | Outdoor heat exchanger | | Indoor heat exchanger | | | |
|------------------------|--|-----|-----|----|-------------------------------------|-------------|-----------------------|---------------------------------|-------------------|-------------------|
| | | | | | Inlet dry (wet) bulb temperature °C | | Fixed outlet °C | Variable outlet ^d °C | | |
| | Formula | A | W | C | Outdoor air | Exhaust air | All climates | A | W | C |
| A | $\frac{(-7 - 16)}{(T_{\text{designh}} - 16)}$ | 88 | n/a | 61 | -7(-8) | 20(12) | ^a / 35 | ^a / 34 | n/a | ^a / 30 |
| B | $\frac{(+2 - 16)}{(T_{\text{designh}} - 16)}$ | 54 | 100 | 37 | 2(1) | 20(12) | ^a / 35 | ^a / 30 | ^a / 35 | ^a / 27 |
| C | $\frac{(+7 - 16)}{(T_{\text{designh}} - 16)}$ | 35 | 64 | 24 | 7(6) | 20(12) | ^a / 35 | ^a / 27 | ^a / 31 | ^a / 25 |
| D | $\frac{(+12 - 16)}{(T_{\text{designh}} - 16)}$ | 15 | 29 | 11 | 12(11) | 20(12) | ^a / 35 | ^a / 24 | ^a / 26 | ^a / 24 |
| E | $(TOL - 16) / (T_{\text{designh}} - 16)$ | | | | TOL | 20(12) | ^a / 35 | ^a / b | ^a / b | ^a / b |
| F | $(T_{\text{bivalent}} - 16) / (T_{\text{designh}} - 16)$ | | | | T _{bivalent} | 20(12) | ^a / 35 | ^a / c | ^a / c | ^a / c |
| G | $\frac{(-15 - 16)}{(T_{\text{designh}} - 16)}$ | n/a | n/a | 82 | -15 | 20(12) | ^a / 35 | n/a | n/a | ^a / 32 |

^a With the water flow rate as determined at the standard rating conditions given in EN 14511-2 at 30/35 conditions for units with a fixed water flow rate, and with a fixed delta T of 5 K for units with a variable flow rate. If the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the outlet temperature.

^b Variable outlet shall be calculated by interpolation from T_{designh} and the temperature which is closest to the TOL.

^c Variable outlet shall be calculated by interpolation between the upper and lower temperatures which are closest to the bivalent temperature.

^d If the variable outlet temperature is below the minimum of the operation range of the unit, this minimum should be considered.

Additional information

| Climate | T _{designh} [°C] | T _{bivalent} [°C] | TOL [°C] | Outlet temperature | Flow rate |
|---------|---------------------------|----------------------------|----------|--------------------|-----------|
| Average | -10 | -10 | -10 | Variable | Variable |



SCOP test conditions for medium temperature – EN 14825

Part load conditions for reference SCOP and reference SCOPon calculation of air to water units for medium temperature application for the reference heating season;

"A" = average, "W" = warmer, and "C" = colder.

| Condition | Part Load Ratio | | | | Outdoor heat exchanger | | Indoor heat exchanger | | | |
|-----------|--|-----|-----|----|-------------------------------------|-------------|-----------------------|---------------------------------|-----------------------------|-----------------------------|
| | | | | | Inlet dry (wet) bulb temperature °C | | Fixed outlet °C | Variable outlet ^d °C | | |
| | Formula | A | W | C | Outdoor air | Exhaust air | All climates | A | W | C |
| A | $(-7 - 16) / (T_{\text{designh}} - 16)$ | 88 | n/a | 61 | -7(-8) | 20(12) | ^a / 55 | ^a / 52 | n/a | ^a / 44 |
| B | $(+2 - 16) / (T_{\text{designh}} - 16)$ | 54 | 100 | 37 | 2(1) | 20(12) | ^a / 55 | ^a / 42 | ^a / 55 | ^a / 37 |
| C | $(+7 - 16) / (T_{\text{designh}} - 16)$ | 35 | 64 | 24 | 7(6) | 20(12) | ^a / 55 | ^a / 36 | ^a / 46 | ^a / 32 |
| D | $(+12 - 16) / (T_{\text{designh}} - 16)$ | 15 | 29 | 11 | 12(11) | 20(12) | ^a / 55 | ^a / 30 | ^a / 34 | ^a / 28 |
| E | $(\text{TOL} - 16) / (T_{\text{designh}} - 16)$ | | | | TOL | 20(12) | ^a / 55 | ^a / ^b | ^a / ^b | ^a / ^b |
| F | $(T_{\text{bivalent}} - 16) / (T_{\text{designh}} - 16)$ | | | | T_{bivalent} | 20(12) | ^a / 55 | ^a / ^c | ^a / ^c | ^a / ^c |
| G | $(-15 - 16) / (T_{\text{designh}} - 16)$ | n/a | n/a | 82 | -15 | 20(12) | ^a / 55 | n/a | n/a | ^a / 49 |

^a With the water flow rate as determined at the standard rating conditions given in EN 14511-2 at 47/55 conditions for units with a fixed water flow rate, and with a fixed delta T of 8 K for units with a variable flow rate. If the resulting flow rate is below the minimum flow rate then this minimum flow rate is used with the outlet temperature.

^b Variable outlet shall be calculated by interpolation T_{designh} and the temperature which is closest to the TOL.

^c Variable outlet shall be calculated by interpolation between the upper and lower temperatures which are closest to the bivalent temperature.

^d If the variable outlet temperature is below the minimum of the operation range of the unit, this minimum should be considered.

Additional information

| Climate | T_{designh} [°C] | T_{bivalent} [°C] | TOL [°C] | Outlet temperature | Flow rate |
|---------|---------------------------|----------------------------|----------|--------------------|-----------|
| Average | -10 | -10 | -10 | Variable | Variable |



COP test conditions - low temperature – EN 14511

| N# | Heat source | | Heat sink | | Heat pump settings |
|----------------|---------------------------------|---------------------------------|------------------------|-------------------------|--------------------|
| | Inlet dry bulb temperature (°C) | Inlet wet bulb temperature (°C) | Inlet temperature (°C) | Outlet temperature (°C) | |
| 1 ^S | 7 | 6 | 30 | 35 | |
| 2 ^A | 2 | 1 | 30 | 35 | |
| 3 ^A | -7 | -8 | 30 | 35 | |
| 4 ^A | 2 | 1 | 30 | 35 | Quiet mode 3 |

S: Standard rating condition
A: Application rating condition

COP test conditions - medium temperature – EN 14511

| N# | Heat source | | Heat sink | | Heat pump settings |
|----------------|---------------------------------|---------------------------------|------------------------|-------------------------|--------------------|
| | Inlet dry bulb temperature (°C) | Inlet wet bulb temperature (°C) | Inlet temperature (°C) | Outlet temperature (°C) | |
| 1 ^S | 7 | 6 | 47 | 55 | |
| 2 ^A | 2 | 1 | 47 | 55 | |
| 3 ^A | -7 | -8 | 47 | 55 | |

S: Standard rating condition
A: Application rating condition





COP test conditions - high temperature – EN 14511

| N# | Heat source | | Heat sink | | Heat pump settings |
|----------------|---------------------------------|---------------------------------|------------------------|-------------------------|--------------------|
| | Inlet dry bulb temperature (°C) | Inlet wet bulb temperature (°C) | Inlet temperature (°C) | Outlet temperature (°C) | |
| 1 ^S | 7 | 6 | 55 | 65 | |
| 2 | 7 | 6 | 50 | 60 | |
| 3 ^A | 2 | 1 | 55 | 65 | |
| 4 | 2 | 1 | 50 | 60 | |
| 5 ^A | -7 | -8 | 55 | 65 | |
| 6 | -7 | -8 | 50 | 60 | |

S: Standard rating condition

A: Application rating condition

Test conditions for SEER test points at fan cooling application for space cooling - EN 14825

| N# | Heat source | | Heat sink | | Test point |
|----|---------------------------------|---------------------------------|------------------------|-------------------------|------------|
| | Inlet dry bulb temperature (°C) | Inlet wet bulb temperature (°C) | Inlet temperature (°C) | Outlet temperature (°C) | |
| 1 | 35 | - | 12 | 7 | A |
| 2 | 25 | - | 15 | 10 | C |



Test conditions for SEER test points at floor cooling application for space cooling - EN 14825

| N# | Heat source | | Heat sink | | Test point |
|----|---------------------------------|---------------------------------|------------------------|-------------------------|------------|
| | Inlet dry bulb temperature (°C) | Inlet wet bulb temperature (°C) | Inlet temperature (°C) | Outlet temperature (°C) | |
| 1 | 35 | - | 23 | 18 | A |
| 2 | 25 | - | 23 | 18 | C |

Test conditions for operating requirements – EN 14511-4

| N# | Heat source | | Heat sink | Water flow rate at indoor heat exchanger | Test |
|----|---------------------------------|---------------------------------|------------------------|--|-----------|
| | Inlet dry bulb temperature (°C) | Inlet wet bulb temperature (°C) | Inlet temperature (°C) | | |
| 1 | -25 | - | 15 | Minimum | Starting |
| 2 | -25 | - | 47 | Minimum | Operating |

Test conditions for shutting off the heat transfer medium – EN 14511-4

| N# | Heat source | | Heat sink | | Heat exchanger |
|----|---------------------------------|---------------------------------|------------------------|-------------------------|----------------|
| | Inlet dry bulb temperature (°C) | Inlet wet bulb temperature (°C) | Inlet temperature (°C) | Outlet temperature (°C) | |
| 1 | 7 | 6 | 47 | 55 | Indoor |
| 2 | 7 | 6 | 47 | 55 | Outdoor |



Test conditions for complete power supply failure – EN 14511-4

| N# | Heat source | | Heat sink | |
|----|--|--|------------------------------|-------------------------------|
| | Inlet dry bulb temperature (°C) | Inlet wet bulb temperature (°C) | Inlet temperature (°C) | Outlet temperature (°C) |
| 1 | 7 | 6 | 47 | 55 |





Test conditions for sound power measurements – EN 12102-1

| N [#] | Test condition | | Heat pump setting | | | |
|-----------------|--|--|-----------------------|-------------------------|-----------------------|------------------|
| | Outdoor heat exchanger (dry bulb/ wet bulb) (°C) | Indoor heat exchanger (inlet/ outlet) (°C) | Compressor speed (Hz) | Fan speed Outdoor (rpm) | Heating capacity (kW) | Power input (kW) |
| 1 ^R | 7/6 | 47/55 | 39 | 420 | 4.80 | 1.60 |
| 2 ^E | 7/6 | 47/55 | 21 | 360 | 2.40 | 0.86 |
| 3 ^Q | 7/6 | 47/55 | 21 | 260 | 2.00 | 0.9 |
| 4 ^R | 7/6 | 30/35 | 35 | 430 | 4.93 | 0.97 |
| 5 ^Q | 7/6 | 30/35 | 18 | 250 | 2.53 | 0.50 |
| 6 ^R | -7/-8 | 47/55 | 58 | 670 | 5.10 | 2.16 |
| 7 ^Q | -7/-8 | 47/55 | 30 | 470 | 2.00 | 1.20 |
| 8 ^R | -7/-8 | 30/35 | 52 | 670 | 5.10 | 1.59 |
| 9 ^Q | -7/-8 | 30/35 | 26 | 430 | 2.00 | 0.79 |
| 10 ^Q | 2/1 | 30/35 | 25 | 390 | 2.80 | 0.68 |

R) Rating capacity, Q) Quiet mode 3, E) ErP labelling





Test results

Test results of SCOP test at low temperature - heating season average – EN 14825

| | |
|---|-------------|
| Model (Outdoor) | WH-WDG05LE5 |
| Air-to-water heat pump mono bloc | Y |
| Low-temperature heat pump | N |
| Equipped with supplementary heater | Y |
| Heat pump combination heater | Y |

| | | |
|---|-------------|------------------|
| Rated heat output¹⁾ | P_{rated} | 5 [kW] |
| Seasonal space heating energy efficiency | η_{ls} | 206.2 [%] |
| | SCOP | 5.23 [-] |

| | | | | |
|--|---|-------------------------------------|----------|-----------|
| Measured capacity for heating for part load at outdoor temperature T_j | Average Climate - Low temperature application | $T_j = -15\text{ °C}$ | P_{dh} | - [kW] |
| | | $T_j = -7\text{ °C}$ | P_{dh} | 4.34 [kW] |
| | | $T_j = 2\text{ °C}$ | P_{dh} | 2.61 [kW] |
| | | $T_j = 7\text{ °C}$ | P_{dh} | 2.59 [kW] |
| | | $T_j = 12\text{ °C}$ | P_{dh} | 2.93 [kW] |
| | | $T_j = \text{bivalent temperature}$ | P_{dh} | 4.97 [kW] |
| | | $T_j = \text{operation limit}$ | P_{dh} | 4.97 [kW] |

| | | | | |
|--|---|-------------------------------------|------|----------|
| Measured coefficient of performance at outdoor temperature T_j | Average Climate - Low temperature application | $T_j = -15\text{ °C}$ | COPd | - [-] |
| | | $T_j = -7\text{ °C}$ | COPd | 3.38 [-] |
| | | $T_j = 2\text{ °C}$ | COPd | 5.03 [-] |
| | | $T_j = 7\text{ °C}$ | COPd | 6.85 [-] |
| | | $T_j = 12\text{ °C}$ | COPd | 8.81 [-] |
| | | $T_j = \text{bivalent temperature}$ | COPd | 2.96 [-] |
| | | $T_j = \text{operation limit}$ | COPd | 2.96 [-] |

| | | |
|-------------------------------------|----------------|----------|
| Bivalent temperature | $T_{bivalent}$ | -10 [°C] |
| Operation limit temperatures | TOL | -10 [°C] |
| Degradation coefficient | WTOL | - [°C] |
| | C_{dh} | 0.98 [-] |

| | | | |
|--|-----------------------|-----------|------------|
| Power consumption in modes other than active mode | Off mode | P_{OFF} | 0.005 [kW] |
| | Thermostat-off mode | P_{TO} | 0.008 [kW] |
| | Standby mode | P_{SB} | 0.005 [kW] |
| | Crankcase heater mode | P_{CK} | 0.005 [kW] |
| Supplementary heater¹⁾ | Rated heat output | P_{SUP} | 0.00 [kW] |
| | Type of energy input | | Electrical |

| | | | |
|--------------------|---------------------------|----------|------------|
| Other items | Capacity control | | Variable |
| | Water flow control | | Variable |
| | Water flow rate | | - |
| | Annual energy consumption | Q_{HE} | 1975 [kWh] |

¹⁾For heat pump space heaters and heat pump combination heaters, the rated heat output, P_{rated} , is equal to the design load for heating, $P_{designh}$, and the rated heat output of a supplementary heater, P_{sup} , is equal to the supplementary capacity for heating, $sup(T_j)$.



Test results of SCOP test at medium temperature - heating season average – EN 14825

| | | | |
|--|--------------------------------|-------------------------------------|--------------------|
| Model (Outdoor) | | WH-WDG05LE5 | |
| Air-to-water heat pump mono bloc | | Y | |
| Low-temperature heat pump | | N | |
| Equipped with supplementary heater | | Y | |
| Heat pump combination heater | | Y | |
| Rated heat output¹⁾ | P_{rated} | 5 [kW] | |
| Seasonal space heating energy efficiency | η_s | 148.1 [%] | |
| | SCOP | 3.78 [-] | |
| Measured capacity for heating for part load at outdoor temperature T_j | Average Climate | $T_j = -15\text{ °C}$ | P_{dh} - [kW] |
| | - | $T_j = -7\text{ °C}$ | P_{dh} 4.32 [kW] |
| | Medium temperature application | $T_j = 2\text{ °C}$ | P_{dh} 2.78 [kW] |
| | | $T_j = 7\text{ °C}$ | P_{dh} 2.37 [kW] |
| | | $T_j = 12\text{ °C}$ | P_{dh} 2.84 [kW] |
| | | $T_j = \text{bivalent temperature}$ | P_{dh} 4.91 [kW] |
| | | $T_j = \text{operation limit}$ | P_{dh} 4.91 [kW] |
| Measured coefficient of performance at outdoor temperature T_j | Average Climate | $T_j = -15\text{ °C}$ | COPd - [-] |
| | - | $T_j = -7\text{ °C}$ | COPd 2.30 [-] |
| | Medium temperature application | $T_j = 2\text{ °C}$ | COPd 3.63 [-] |
| | | $T_j = 7\text{ °C}$ | COPd 5.01 [-] |
| | | $T_j = 12\text{ °C}$ | COPd 6.94 [-] |
| | | $T_j = \text{bivalent temperature}$ | COPd 2.13 [-] |
| | | $T_j = \text{operation limit}$ | COPd 2.13 [-] |
| Bivalent temperature | $T_{bivalent}$ | -10 [°C] | |
| Operation limit temperatures | TOL | -10 [°C] | |
| | WTOL | - [°C] | |
| Degradation coefficient | C_{dh} | 0.98 [-] | |
| Power consumption in modes other than active mode | Off mode | P_{OFF} | 0.005 [kW] |
| | Thermostat-off mode | P_{TO} | 0.008 [kW] |
| | Standby mode | P_{SB} | 0.005 [kW] |
| | Crankcase heater mode | P_{CK} | 0.005 [kW] |
| Supplementary heater¹⁾ | Rated heat output | P_{SUP} | 0.00 [kW] |
| | Type of energy input | Electrical | |
| Other items | Capacity control | Variable | |
| | Water flow control | Variable | |
| | Water flow rate | - | |
| | Annual energy consumption | Q_{HE} | 2735 [kWh] |

¹⁾For heat pump space heaters and heat pump combination heaters, the rated heat output, P_{rated} , is equal to the design load for heating, $P_{design,h}$, and the rated heat output of a supplementary heater, P_{sup} , is equal to the supplementary capacity for heating, $sup(T_j)$.



COP test results - low temperature – EN 14511

| N# | Test conditions | Heating capacity [kW] | COP |
|----------------|------------------------|------------------------------|------------|
| 1 | A7/W35 | 4.901 | 5.275 |
| 2 | A2/W35 | 5.585 | 4.066 |
| 3 | A-7/W35 | 5.006 | 3.234 |
| 4 ^Q | A2/W35 | 2.789 | 4.134 |

Q) Quiet mode 3

COP test results - medium temperature – EN 14511

| N# | Test conditions | Heating capacity [kW] | COP |
|-----------|------------------------|------------------------------|------------|
| 1 | A7/W55 | 4.809 | 3.085 |
| 2 | A2/W55 | 5.946 | 2.782 |
| 3 | A-7/W55 | 5.019 | 2.258 |



COP test results - high temperature – EN 14511

| N# | Test conditions | Heating capacity [kW] | COP |
|-----------|------------------------|------------------------------|------------|
| 1 | A7/W65 | 4.720 | 2.342 |
| 2 | A7/W60 | 4.842 | 2.743 |
| 3 | A2/W65 | 5.758 | 2.180 |
| 4 | A2/W60 | 5.765 | 2.431 |
| 5 | A-7/W65 | 4.672 | 1.761 |
| 6 | A-7/W60 | 4.878 | 2.032 |

Test results for SEER test points at fan cooling application for space cooling - EN 14825

| N° | Test conditions | Heating capacity [kW] | COP |
|-----------|------------------------|------------------------------|------------|
| 1 | A35/W7 | 4.981 | 3.656 |
| 2 | A25/W10 | 2.595 | 7.341 |



Test results for SEER test points at floor cooling application for space cooling - EN 14825

| N° | Test conditions | Heating capacity [kW] | COP |
|----|-----------------|-----------------------|--------|
| 1 | A35/W18 | 5.374 | 5.853 |
| 2 | A25/W18 | 2.968 | 10.408 |

Test results for starting and operating test - EN 14511-4:2018

| N# | Test conditions air/water inlet [°C] | Test validation |
|-----------|--|-----------------|
| Starting | A-25/W15 | Passed |
| Operating | A-25/W47 | Passed |

Test results for shutting off the heat transfer medium – EN 14511-4

| N# | Heat exchanger | Test validation |
|----|----------------|-----------------|
| 1 | Indoor | Passed |
| 2 | Outdoor | Passed |

Test results for complete power supply failure – EN 14511-4

| N# | Test validation |
|----|-----------------|
| 1 | Passed |



Power consumption of liquid pump for SCOP test points – low temperature application - Average climate

| N# | Test condition | Measured power consumption (W) | Test mode n° |
|-----------|-----------------------|---------------------------------------|---------------------|
| A | A-7/W34 | 46 | 6 |
| B | A2/W30 | 41 | 5 |
| C | A7/W27 | 41 | 4 |
| D | A12/W24 | 41 | 3 |
| E&F | A-10/W35 | 48 | 7 |

The power consumptions of the liquid pump have been measured separately.





Power consumption of liquid pump for SCOP test points – medium temperature application - Average climate

| N# | Test condition | Measured power consumption (W) | Test mode n° |
|-----------|-----------------------|---------------------------------------|---------------------|
| A&F | A-7/W52 | 41 | 11 |
| B | A2/W42 | 41 | 10 |
| C | A7/W36 | 41 | 9 |
| D | A12/W30 | 41 | 8 |
| E | A-10/W55 | 42 | 12 |

The power consumptions of the liquid pump have been measured separately.

Power consumption of liquid pump for EN14511 - low temperature application

| N# | Test condition | Measured power consumption (W) | Test mode n° |
|-----------|-----------------------|---------------------------------------|---------------------|
| 1 | A7/W35 | 48 | 1 |
| 2 | A2/W35 | 52 | 1 |
| 3 | A-7/W35 | 48 | 1 |

The power consumptions of the liquid pump have been measured separately.



Power consumption of liquid pump for EN14511 - medium temperature application

| N# | Test condition | Measured power consumption (W) | Test mode n° |
|----|----------------|--------------------------------|--------------|
| 1 | A7/W55 | 42 | 1 |
| 2 | A2/W55 | 44 | 1 |
| 3 | A-7/W55 | 12 | 1 |

The power consumptions of the liquid pump have been measured separately.

Pre and post run time for liquid pump

| N# | Time (sec) |
|----------|------------|
| Pre-run | 180 |
| Post-run | 15 |



Test results of sound power measurements – EN 12102

| N# | Test conditions | Sound power level LW(A) [dB re 1pW] | Uncertainty (dB) (weighted value) |
|------------------|------------------------|--|--|
| 1 ^R | A7/W55 | 56.2 | 0.5 |
| 2 ^{E-K} | A7/W55 | 49.7 | 0.5 |
| 3 ^Q | A7/W55 | 48.9 | 0.5 |
| 4 ^R | A7/W35 | 53.6 | 0.5 |
| 5 ^Q | A7/W35 | 43.3 | 0.5 |
| 6 ^R | A-7/W55 | 65.9 | 0.5 |
| 7 ^Q | A-7/W55 | 55.6 | 0.5 |
| 8 ^R | A-7/W35 | 65.1 | 0.5 |
| 9 ^Q | A-7/W35 | 54.1 | 0.5 |
| 10 ^Q | A2/W35 | 50.6 | 0.5 |

R) Rating capacity, Q) Quiet mode 3, E) ERP labelling K) Keymark

The uncertainty value is a weighted value using the level and frequency dependant influence for each 1/1-octave level on the final A-weighted sound power level.

The A-weighted total sound power level is determined for the measured frequency range from 100 Hz to 10 kHz.

The sound power measurements are carried out by Kamalathan Arumugam (KAMA) and co-read by Birger Bech Jessen (BBJN), Danish Technological Institute.



Test Rep. nr.



Photo

Rating plate (outdoor unit)

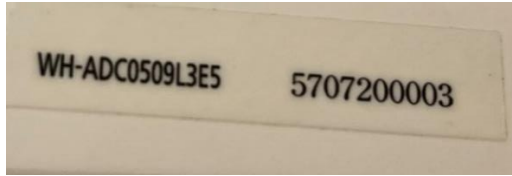


Outdoor unit

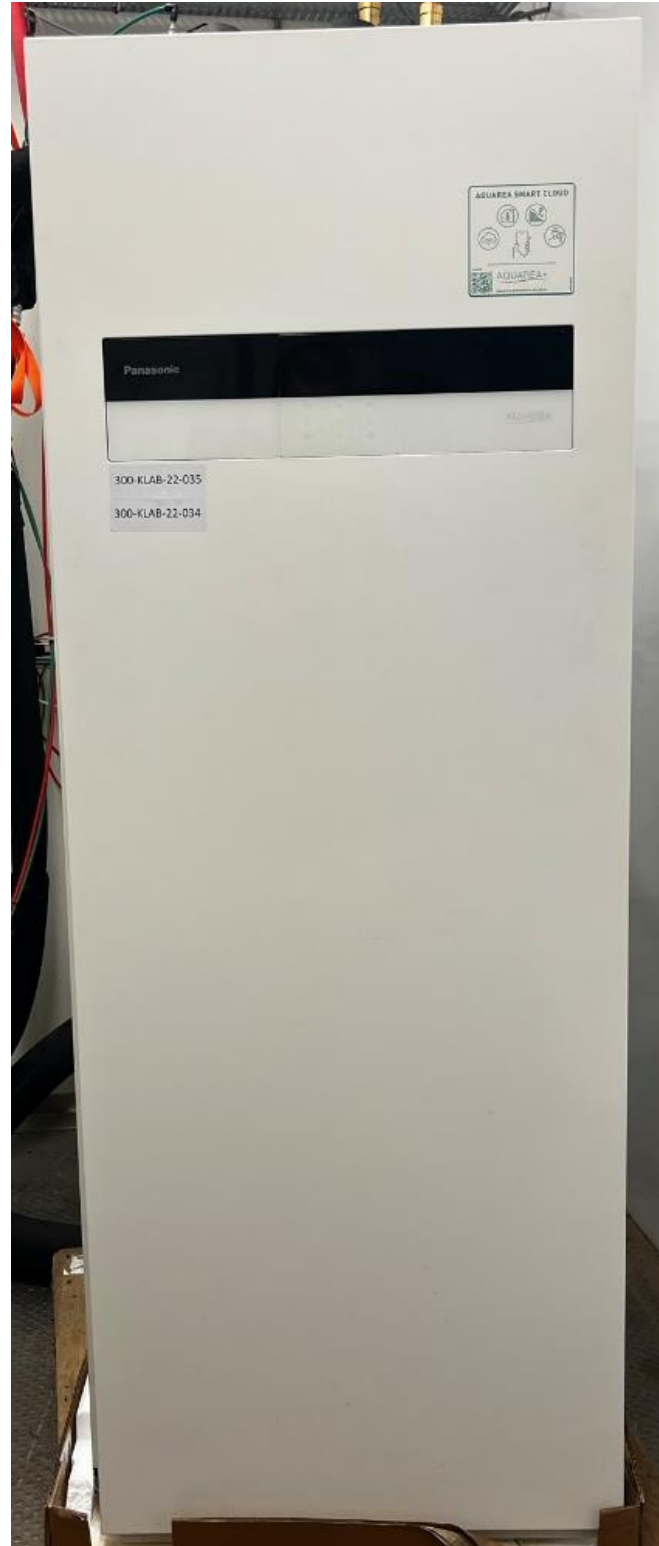




Rating plate (indoor unit)



Indoor unit





SCOP - detailed calculation

Detailed SCOP calculation of low temperature and average climate conditions – EN 14825

Calculation of reference SCOP

$$SCOP = \frac{P_{designh} \times H_{he}}{\frac{P_{designh} \times H_{he}}{SCOP_{on}} + H_{TO} \times P_{TO} + H_{SB} \times P_{SB} + H_{CK} \times P_{CK} + H_{OFF} \times P_{OFF}}$$

Where

| | |
|-------------------------------------|--|
| P_{design} = | Heating load of the building at design temperature, kW |
| H_{he} = | Number of equivalent heating hours, 2066 h |
| $H_{TO}, H_{SB}, H_{CK}, H_{OFF}$ = | Number of hours for which the unit is considered to work in thermostat off mode, standby mode, crankcase heater mode and off mode, h, respectively |
| $P_{TO}, P_{SB}, P_{CK}, P_{OFF}$ = | Electricity consumption during thermostat off mode, standby mode, crankcase heater mode and off mode, kW, respectively |

Data for SCOP

| | Outdoor temperature [°C] | Part load ratio [%] | Part load [kW] | Declared capacity [kW] | Declared COP [-] | cdh [-] | CR [-] | COP _{bin} [-] |
|---------|--------------------------|---------------------|----------------|------------------------|------------------|---------|--------|------------------------|
| A | -7 | 88 | 4.42 | 4.34 | 3.38 | 0.99 | 1.00 | 3.38 |
| B | 2 | 54 | 2.69 | 2.61 | 5.03 | 0.98 | 1.00 | 5.03 |
| C | 7 | 35 | 1.73 | 2.59 | 6.85 | 0.98 | 0.67 | 6.78 |
| D | 12 | 15 | 0.77 | 2.93 | 8.81 | 0.98 | 0.26 | 8.23 |
| E | -10 | 100 | 5.00 | 4.97 | 2.96 | 1.00 | 1.00 | 2.96 |
| F - BIV | -10 | 100 | 5.00 | 4.97 | 2.96 | 1.00 | 1.00 | 2.96 |

Energy consumption for thermostat off, standby, off mode, crankcase heater mode

| | Hours [h] | Power input [kW] | Applied to SCOP calculation [kW] | Energy consumption [kWh] |
|------------------|-----------|------------------|----------------------------------|--------------------------|
| Off mode | 0 | 0.0054 | 0.0054 | 0 |
| Thermostat off | 178 | 0.0083 | 0.0083 | 1.4774 |
| Standby | 0 | 0.0054 | 0.0054 | 0 |
| Crankcase heater | 178 | 0.0054 | 0 | 0 |



Calculation Bin for SCOP_{on}

| | Bin | Outdoor temperature [°C] | Hours [h] | Heat load [kW] | Heat load covered by heat pump [kW] | Electrical back up heater [kW] | backup heater energy input [kWh] | COP _{bin} [-] | Annual heating demand [kWh] | Annual energy input [kWh] | Net annual heating capacity [kWh] | Net annual power input [kWh] |
|--------------------|-----|--------------------------------|--------------|-------------------|--|---|---|---------------------------|--------------------------------------|------------------------------------|--|---------------------------------------|
| | [-] | | | | | | | | | | | |
| E / F - BIV | 21 | -10 | 1 | 5.00 | 4.97 | 0.00 | 0.00 | 2.96 | 5.00 | 1.69 | 5.00 | 1.69 |
| | 22 | -9 | 25 | 4.81 | 4.76 | 0.00 | 0.00 | 3.10 | 120.19 | 38.77 | 120.19 | 38.77 |
| | 23 | -8 | 23 | 4.62 | 4.55 | 0.00 | 0.00 | 3.24 | 106.15 | 32.75 | 106.15 | 32.75 |
| A | 24 | -7 | 24 | 4.42 | 4.34 | 0.00 | 0.00 | 3.38 | 106.15 | 31.39 | 106.15 | 31.39 |
| | 25 | -6 | 27 | 4.23 | 4.14 | 0.00 | 0.00 | 3.56 | 114.23 | 32.05 | 114.23 | 32.05 |
| | 26 | -5 | 68 | 4.04 | 3.95 | 0.00 | 0.00 | 3.75 | 274.62 | 73.29 | 274.62 | 73.29 |
| | 27 | -4 | 91 | 3.85 | 3.76 | 0.00 | 0.00 | 3.93 | 350.00 | 89.06 | 350.00 | 89.06 |
| | 28 | -3 | 89 | 3.65 | 3.57 | 0.00 | 0.00 | 4.11 | 325.19 | 79.07 | 325.19 | 79.07 |
| | 29 | -2 | 165 | 3.46 | 3.38 | 0.00 | 0.00 | 4.30 | 571.15 | 132.97 | 571.15 | 132.97 |
| | 30 | -1 | 173 | 3.27 | 3.19 | 0.00 | 0.00 | 4.48 | 565.58 | 126.30 | 565.58 | 126.30 |
| | 31 | 0 | 240 | 3.08 | 2.99 | 0.00 | 0.00 | 4.66 | 738.46 | 158.44 | 738.46 | 158.44 |
| | 32 | 1 | 280 | 2.88 | 2.80 | 0.00 | 0.00 | 4.84 | 807.69 | 166.76 | 807.69 | 166.76 |
| B | 33 | 2 | 320 | 2.69 | 2.61 | 0.00 | 0.00 | 5.03 | 861.54 | 171.41 | 861.54 | 171.41 |
| | 34 | 3 | 357 | 2.50 | 2.43 | 0.00 | 0.00 | 5.38 | 892.50 | 165.99 | 892.50 | 165.99 |
| | 35 | 4 | 356 | 2.31 | 2.26 | 0.00 | 0.00 | 5.73 | 821.54 | 143.44 | 821.54 | 143.44 |
| | 36 | 5 | 303 | 2.12 | 2.08 | 0.00 | 0.00 | 6.08 | 640.96 | 105.45 | 640.96 | 105.45 |
| | 37 | 6 | 330 | 1.92 | 1.91 | 0.00 | 0.00 | 6.43 | 634.62 | 98.72 | 634.62 | 98.72 |
| C | 38 | 7 | 326 | 1.73 | 1.73 | 0.00 | 0.00 | 6.78 | 564.23 | 83.23 | 564.23 | 83.23 |
| | 39 | 8 | 348 | 1.54 | 1.54 | 0.00 | 0.00 | 7.07 | 535.38 | 75.73 | 535.38 | 75.73 |
| | 40 | 9 | 335 | 1.35 | 1.35 | 0.00 | 0.00 | 7.36 | 450.96 | 61.27 | 450.96 | 61.27 |
| | 41 | 10 | 315 | 1.15 | 1.15 | 0.00 | 0.00 | 7.65 | 363.46 | 47.50 | 363.46 | 47.50 |
| | 42 | 11 | 215 | 0.96 | 0.96 | 0.00 | 0.00 | 7.94 | 206.73 | 26.03 | 206.73 | 26.03 |
| D | 43 | 12 | 169 | 0.77 | 0.77 | 0.00 | 0.00 | 8.23 | 130.00 | 15.79 | 130.00 | 15.79 |
| | 44 | 13 | 151 | 0.58 | 0.58 | 0.00 | 0.00 | 8.52 | 87.12 | 10.22 | 87.12 | 10.22 |
| | 45 | 14 | 105 | 0.38 | 0.38 | 0.00 | 0.00 | 8.81 | 40.38 | 4.58 | 40.38 | 4.58 |
| | 46 | 15 | 74 | 0.19 | 0.19 | 0.00 | 0.00 | 9.11 | 14.23 | 1.56 | 14.23 | 1.56 |

| | | | | |
|--------------------------|----------|---------|---------------------------|---------|
| SUM | 10328.08 | 1973.46 | 10328.08 | 1973.46 |
| SCOP_{on} | | 5.23 | SCOP_{net} | 5.23 |



Detailed SCOP calculation of medium temperature and average climate conditions – EN 14825

Calculation of reference SCOP

$$SCOP = \frac{P_{designh} \times H_{he}}{\frac{P_{designh} \times H_{he}}{SCOP_{on}} + H_{TO} \times P_{TO} + H_{SB} \times P_{SB} + H_{CK} \times P_{CK} + H_{OFF} \times P_{OFF}}$$

Where

P_{design} =

Heating load of the building at design temperature, kW

H_{he} =

Number of equivalent heating hours, 2066 h

H_{TO} , H_{SB} , H_{CK} , H_{OFF} =

Number of hours for which the unit is considered to work in thermostat off mode, standby mode, crankcase heater mode and off mode, h, respectively

P_{TO} , P_{SB} , P_{CK} , P_{OFF} =

Electricity consumption during thermostat off mode, standby mode, crankcase heater mode and off mode, kW, respectively

Data for SCOP

| | Outdoor temperature [°C] | Part load ratio [%] | Part load [kW] | Declared capacity [kW] | Declared COP [-] | cdh [-] | CR [-] | COPbin [-] |
|---------|-----------------------------|------------------------|-------------------|---------------------------|---------------------|------------|-----------|---------------|
| A | -7 | 88 | 4.42 | 4.32 | 2.30 | 1.00 | 1.00 | 2.30 |
| B | 2 | 54 | 2.69 | 2.78 | 3.63 | 0.99 | 1.00 | 3.63 |
| C | 7 | 35 | 1.73 | 2.37 | 5.01 | 0.98 | 0.73 | 4.98 |
| D | 12 | 15 | 0.77 | 2.84 | 6.94 | 0.98 | 0.27 | 6.58 |
| E | -10 | 100 | 5.00 | 4.91 | 2.13 | 1.00 | 1.00 | 2.13 |
| F - BIV | -10 | 100 | 5.00 | 4.91 | 2.13 | 1.00 | 1.00 | 2.13 |

Energy consumption for thermostat off, standby, off mode, crankcase heater mode

| | Hours [h] | Power input [kW] | Applied to SCOP calculation [kW] | Energy consumption [kWh] |
|------------------|--------------|---------------------|-------------------------------------|--------------------------|
| Off mode | 0 | 0.0054 | 0.0054 | 0 |
| Thermostat off | 178 | 0.0083 | 0.0083 | 1.4774 |
| Standby | 0 | 0.0054 | 0.0054 | 0 |
| Crankcase heater | 178 | 0.0054 | 0 | 0 |



Calculation Bin for SCOP_{on}

| | Bin | Outdoor temperature [°C] | Hours [h] | Heat load [kW] | Heat load covered by heat pump [kW] | Electrical back up heater [kW] | backup heater energy input [kWh] | COP _{bin} [-] | Annual heating demand [kWh] | Annual energy input [kWh] | Net annual heating capacity [kWh] | Net annual power input [kWh] |
|--------------------|-----|--------------------------------|--------------|-------------------|--|---|---|---------------------------|--------------------------------------|------------------------------------|--|---------------------------------------|
| E / F - BIV | 21 | -10 | 1 | 5.00 | 4.91 | 0.00 | 0.00 | 2.13 | 5.00 | 2.35 | 5.00 | 2.35 |
| | 22 | -9 | 25 | 4.81 | 4.71 | 0.00 | 0.00 | 2.19 | 120.19 | 54.98 | 120.19 | 54.98 |
| | 23 | -8 | 23 | 4.62 | 4.51 | 0.00 | 0.00 | 2.24 | 106.15 | 47.33 | 106.15 | 47.33 |
| A | 24 | -7 | 24 | 4.42 | 4.32 | 0.00 | 0.00 | 2.30 | 106.15 | 46.16 | 106.15 | 46.16 |
| | 25 | -6 | 27 | 4.23 | 4.14 | 0.00 | 0.00 | 2.45 | 114.23 | 46.67 | 114.23 | 46.67 |
| | 26 | -5 | 68 | 4.04 | 3.96 | 0.00 | 0.00 | 2.60 | 274.62 | 105.82 | 274.62 | 105.82 |
| | 27 | -4 | 91 | 3.85 | 3.78 | 0.00 | 0.00 | 2.74 | 350.00 | 127.60 | 350.00 | 127.60 |
| | 28 | -3 | 89 | 3.65 | 3.59 | 0.00 | 0.00 | 2.89 | 325.19 | 112.50 | 325.19 | 112.50 |
| | 29 | -2 | 165 | 3.46 | 3.41 | 0.00 | 0.00 | 3.04 | 571.15 | 187.98 | 571.15 | 187.98 |
| | 30 | -1 | 173 | 3.27 | 3.23 | 0.00 | 0.00 | 3.19 | 565.58 | 177.51 | 565.58 | 177.51 |
| | 31 | 0 | 240 | 3.08 | 3.05 | 0.00 | 0.00 | 3.33 | 738.46 | 221.50 | 738.46 | 221.50 |
| | 32 | 1 | 280 | 2.88 | 2.87 | 0.00 | 0.00 | 3.48 | 807.69 | 231.99 | 807.69 | 231.99 |
| B | 33 | 2 | 320 | 2.69 | 2.69 | 0.00 | 0.00 | 3.63 | 861.54 | 237.38 | 861.54 | 237.38 |
| | 34 | 3 | 357 | 2.50 | 2.50 | 0.00 | 0.00 | 3.90 | 892.50 | 228.85 | 892.50 | 228.85 |
| | 35 | 4 | 356 | 2.31 | 2.31 | 0.00 | 0.00 | 4.17 | 821.54 | 196.99 | 821.54 | 196.99 |
| | 36 | 5 | 303 | 2.12 | 2.12 | 0.00 | 0.00 | 4.44 | 640.96 | 144.33 | 640.96 | 144.33 |
| | 37 | 6 | 330 | 1.92 | 1.92 | 0.00 | 0.00 | 4.71 | 634.62 | 134.70 | 634.62 | 134.70 |
| C | 38 | 7 | 326 | 1.73 | 1.73 | 0.00 | 0.00 | 4.98 | 564.23 | 113.26 | 564.23 | 113.26 |
| | 39 | 8 | 348 | 1.54 | 1.54 | 0.00 | 0.00 | 5.30 | 535.38 | 100.99 | 535.38 | 100.99 |
| | 40 | 9 | 335 | 1.35 | 1.35 | 0.00 | 0.00 | 5.62 | 450.96 | 80.22 | 450.96 | 80.22 |
| | 41 | 10 | 315 | 1.15 | 1.15 | 0.00 | 0.00 | 5.94 | 363.46 | 61.18 | 363.46 | 61.18 |
| | 42 | 11 | 215 | 0.96 | 0.96 | 0.00 | 0.00 | 6.26 | 206.73 | 33.02 | 206.73 | 33.02 |
| D | 43 | 12 | 169 | 0.77 | 0.77 | 0.00 | 0.00 | 6.58 | 130.00 | 19.76 | 130.00 | 19.76 |
| | 44 | 13 | 151 | 0.58 | 0.58 | 0.00 | 0.00 | 6.90 | 87.12 | 12.63 | 87.12 | 12.63 |
| | 45 | 14 | 105 | 0.38 | 0.38 | 0.00 | 0.00 | 7.22 | 40.38 | 5.59 | 40.38 | 5.59 |
| | 46 | 15 | 74 | 0.19 | 0.19 | 0.00 | 0.00 | 7.54 | 14.23 | 1.89 | 14.23 | 1.89 |

| | | | | |
|--------------------------|----------|---------|---------------------------|---------|
| SUM | 10328.08 | 2733.16 | 10328.08 | 2733.16 |
| SCOP_{on} | | 3.78 | SCOP_{net} | 3.78 |



Detailed test results

Detailed SCOP test results - low temperature application - average climate – EN 14825

| Detailed result for 'EN14825:2018' Average Low (A) A -7 /W34 | | |
|--|-------------------------------|----------|
| Tested according to: | EN14511:2018 and EN14825:2018 | |
| Climate zone: | Average | |
| Temperature application: | Low | |
| Condition name: | A | |
| Condition temperature: | °C | -7 |
| Part load: | % | 88% |
| Chosen Tbivalent | °C | -10 |
| Tdesign | °C | -10 |
| Pdesign | kW | 5.00 |
| Heating demand: | kW | 4.42 |
| CR: | - | 1.0 |
| Minimum flow reached: | - | No |
| Measurement type: | Steady State | |
| Integrated circulation pump: | Yes | |
| Included corrections (Final result) | | |
| Heating capacity | kW | 4.336 |
| COP | - | 3.381 |
| Power consumption | kW | 1.282 |
| Measured | | |
| Heating capacity | kW | 4.371 |
| COP | - | 3.288 |
| Power consumption | kW | 1.330 |
| During heating | | |
| Air temperature dry bulb | °C | -7.00 |
| Air temperature wet bulb | °C | -7.98 |
| Air temperature dry bulb outlet | °C | -9.22 |
| Inlet temperature | °C | 29.02 |
| Outlet temperature | °C | 34.00 |
| Outlet temperature (Time averaged) | °C | 34.00 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 54926 |
| Calculated Hydraulic power | W | 12 |
| Calculated global efficiency | η | 0.24 |
| Calculated Capacity correction | W | 36 |
| Calculated Power correction | W | 47 |
| Water Flow | m³/s | 0.000211 |





Detailed result for 'EN14825:2018' Average Low (B) A 2 /W30

| | | |
|---|-------------------------------|--------------|
| Tested according to: | EN14511:2018 and EN14825:2018 | |
| Climate zone: | Average | |
| Temperature application: | Low | |
| Condition name: | B | |
| Condition temperature: | °C | 2 |
| Part load: | % | 54% |
| Chosen Tbivalent | °C | -10 |
| Tdesign | °C | -10 |
| Pdesign | kW | 5.00 |
| Heating demand: | kW | 2.69 |
| CR: | - | 1.0 |
| Minimum flow reached: | - | Yes |
| Measurement type: | Steady State | |
| Integrated circulation pump: | Yes | |
| Included corrections (Final result) | | |
| Heating capacity | kW | 2.610 |
| COP | - | 5.026 |
| Power consumption | kW | 0.519 |
| Measured | | |
| Heating capacity | kW | 2.640 |
| COP | - | 4.740 |
| Power consumption | kW | 0.557 |
| During heating | | |
| Air temperature dry bulb | °C | 2.02 |
| Air temperature wet bulb | °C | 1.12 |
| Air temperature dry bulb outlet | °C | -0.08 |
| Inlet temperature | °C | 25.09 |
| Outlet temperature | °C | 29.85 |
| Outlet temperature (Time averaged) | °C | 29.85 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 58676 |
| Calculated Hydraulic power | W | 8 |
| Calculated global efficiency | η | 0.21 |
| Calculated Capacity correction | W | 30 |
| Calculated Power correction | W | 38 |
| Water Flow | m ³ /s | 0.000133 |



Detailed result for 'EN14825:2018' Average Low (C) A 7 /W27

| | | |
|---|-------------------------------|--------------|
| Tested according to: | EN14511:2018 and EN14825:2018 | |
| Climate zone: | Average | |
| Temperature application: | Low | |
| Condition name: | C | |
| Condition temperature: | °C | 7 |
| Part load: | % | 35% |
| Chosen Tbivalent | °C | -10 |
| Tdesign | °C | -10 |
| Pdesign | kW | 5.00 |
| Heating demand: | kW | 1.73 |
| CR: | - | 0.7 |
| Minimum flow reached: | - | Yes |
| Measurement type: | Steady State | |
| Integrated circulation pump: | Yes | |
| Included corrections (Final result) | | |
| Heating capacity | kW | 2.587 |
| COP | - | 6.853 |
| Power consumption | kW | 0.378 |
| Measured | | |
| Heating capacity | kW | 2.617 |
| COP | - | 6.303 |
| Power consumption | kW | 0.415 |
| During heating | | |
| Air temperature dry bulb | °C | 7.00 |
| Air temperature wet bulb | °C | 5.93 |
| Air temperature dry bulb outlet | °C | 4.18 |
| Inlet temperature | °C | 23.90 |
| Outlet temperature | °C | 28.61 |
| Outlet temperature (Time averaged) | °C | 27.05 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 58845 |
| Calculated Hydraulic power | W | 8 |
| Calculated global efficiency | η | 0.21 |
| Calculated Capacity correction | W | 30 |
| Calculated Power correction | W | 38 |
| Water Flow | m³/s | 0.000133 |



Detailed result for 'EN14825:2018' Average Low (D) A 12 /W24

| | | |
|---|-------------------------------|--------------|
| Tested according to: | EN14511:2018 and EN14825:2018 | |
| Climate zone: | Average | |
| Temperature application: | Low | |
| Condition name: | D | |
| Condition temperature: | °C | 12 |
| Part load: | % | 15% |
| Chosen Tbivalent | °C | -10 |
| Tdesign | °C | -10 |
| Pdesign | kW | 5.00 |
| Heating demand: | kW | 0.77 |
| CR: | - | 0.3 |
| Minimum flow reached: | - | No |
| Measurement type: | Steady State | |
| Integrated circulation pump: | Yes | |
| Included corrections (Final result) | | |
| Heating capacity | kW | 2.933 |
| COP | - | 8.810 |
| Power consumption | kW | 0.333 |
| Measured | | |
| Heating capacity | kW | 2.964 |
| COP | - | 7.972 |
| Power consumption | kW | 0.372 |
| During heating | | |
| Air temperature dry bulb | °C | 12.03 |
| Air temperature wet bulb | °C | 11.05 |
| Air temperature dry bulb outlet | °C | 8.87 |
| Inlet temperature | °C | 22.70 |
| Outlet temperature | °C | 27.72 |
| Outlet temperature (Time averaged) | °C | 24.02 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 58277 |
| Calculated Hydraulic power | W | 8 |
| Calculated global efficiency | η | 0.21 |
| Calculated Capacity correction | W | 31 |
| Calculated Power correction | W | 39 |
| Water Flow | m ³ /s | 0.000142 |



Detailed result for 'EN14825:2018' Average Low (E and F) A -10 /W35

| | | | |
|---|------|-------------------------------|--------------|
| Tested according to: | | EN14511:2018 and EN14825:2018 | |
| Climate zone: | | Average | |
| Temperature application: | | Low | |
| Condition name: | | E and F | |
| Condition temperature: | °C | | -10 |
| Part load: | % | | 100% |
| Chosen Tbivalent | °C | | -10 |
| Tdesign | °C | | -10 |
| Pdesign | kW | | 5.00 |
| Heating demand: | kW | | 5.00 |
| CR: | - | | 1.0 |
| Minimum flow reached: | - | | No |
| Measurement type: | | Steady State | |
| Integrated circulation pump: | | Yes | |
| Included corrections (Final result) | | | |
| Heating capacity | kW | | 4.974 |
| COP | - | | 2.960 |
| Power consumption | kW | | 1.680 |
| Measured | | | |
| Heating capacity | kW | | 5.011 |
| COP | - | | 2.895 |
| Power consumption | kW | | 1.731 |
| During heating | | | |
| Air temperature dry bulb | °C | | -10.03 |
| Air temperature wet bulb | °C | | -10.90 |
| Air temperature dry bulb outlet | °C | | -12.63 |
| Inlet temperature | °C | | 30.00 |
| Outlet temperature | °C | | 35.05 |
| Outlet temperature (Time averaged) | °C | | 35.05 |
| Circulation pump | | | |
| Measured: Static differential pressure, liquid pump | Pa | | 53837 |
| Calculated Hydraulic power | W | | 13 |
| Calculated global efficiency | η | | 0.25 |
| Calculated Capacity correction | W | | 38 |
| Calculated Power correction | W | | 50 |
| Water Flow | m³/s | | 0.000239 |



Detailed SCOP test results - medium temperature application - average climate – EN 14825

| Detailed result for 'EN14825:2018' Average Medium (A) A -7 /W52 | | |
|--|-------------------------------|--------------|
| Tested according to: | EN14511:2018 and EN14825:2018 | |
| Climate zone: | | Average |
| Temperature application: | | Medium |
| Condition name: | | A |
| Condition temperature: | °C | -7 |
| Part load: | % | 88% |
| Chosen Tbivalent | °C | -10 |
| Tdesign | °C | -10 |
| Pdesign | kW | 5.00 |
| Heating demand: | kW | 4.42 |
| CR: | - | 1.0 |
| Minimum flow reached: | - | Yes |
| Measurement type: | | Steady State |
| Integrated circulation pump: | | Yes |
| Included corrections (Final result) | | |
| Heating capacity | kW | 4.317 |
| COP | - | 2.300 |
| Power consumption | kW | 1.877 |
| Measured | | |
| Heating capacity | kW | 4.347 |
| COP | - | 2.270 |
| Power consumption | kW | 1.915 |
| During heating | | |
| Air temperature dry bulb | °C | -6.99 |
| Air temperature wet bulb | °C | -7.91 |
| Air temperature dry bulb outlet | °C | -8.96 |
| Inlet temperature | °C | 44.13 |
| Outlet temperature | °C | 52.03 |
| Outlet temperature (Time averaged) | °C | 52.03 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 59330 |
| Calculated Hydraulic power | W | 8 |
| Calculated global efficiency | η | 0.21 |
| Calculated Capacity correction | W | 30 |
| Calculated Power correction | W | 38 |
| Water Flow | m ³ /s | 0.000133 |



Detailed result for 'EN14825:2018' Average Medium (B) A 2 /W42

| | | | |
|---|------|-------------------------------|--|
| Tested according to: | | EN14511:2018 and EN14825:2018 | |
| Climate zone: | | Average | |
| Temperature application: | | Medium | |
| Condition name: | | B | |
| Condition temperature: | °C | 2 | |
| Part load: | % | 54% | |
| Chosen Tbivalent | °C | -10 | |
| Tdesign | °C | -10 | |
| Pdesign | kW | 5.00 | |
| Heating demand: | kW | 2.69 | |
| CR: | - | 1.0 | |
| Minimum flow reached: | - | Yes | |
| Measurement type: | | Steady State | |
| Integrated circulation pump: | | Yes | |
| Included corrections (Final result) | | | |
| Heating capacity | kW | 2.775 | |
| COP | - | 3.629 | |
| Power consumption | kW | 0.765 | |
| Measured | | | |
| Heating capacity | kW | 2.805 | |
| COP | - | 3.495 | |
| Power consumption | kW | 0.803 | |
| During heating | | | |
| Air temperature dry bulb | °C | 2.13 | |
| Air temperature wet bulb | °C | 1.26 | |
| Air temperature dry bulb outlet | °C | 0.14 | |
| Inlet temperature | °C | 37.10 | |
| Outlet temperature | °C | 42.18 | |
| Outlet temperature (Time averaged) | °C | 42.18 | |
| Circulation pump | | | |
| Measured: Static differential pressure, liquid pump | Pa | 59618 | |
| Calculated Hydraulic power | W | 8 | |
| Calculated global efficiency | η | 0.21 | |
| Calculated Capacity correction | W | 30 | |
| Calculated Power correction | W | 38 | |
| Water Flow | m³/s | 0.000133 | |



| Detailed result for 'EN14825:2018' Average Medium (C) A 7 /W36 | | |
|--|-------------------------------|----------|
| Tested according to: | EN14511:2018 and EN14825:2018 | |
| Climate zone: | Average | |
| Temperature application: | Medium | |
| Condition name: | C | |
| Condition temperature: | °C | 7 |
| Part load: | % | 35% |
| Chosen Tbivalent | °C | -10 |
| Tdesign | °C | -10 |
| Pdesign | kW | 5.00 |
| Heating demand: | kW | 1.73 |
| CR: | - | 0.7 |
| Minimum flow reached: | - | Yes |
| Measurement type: | Steady State | |
| Integrated circulation pump: | Yes | |
| Included corrections (Final result) | | |
| Heating capacity | kW | 2.373 |
| COP | - | 5.014 |
| Power consumption | kW | 0.473 |
| Measured | | |
| Heating capacity | kW | 2.403 |
| COP | - | 4.702 |
| Power consumption | kW | 0.511 |
| During heating | | |
| Air temperature dry bulb | °C | 6.98 |
| Air temperature wet bulb | °C | 6.04 |
| Air temperature dry bulb outlet | °C | 4.45 |
| Inlet temperature | °C | 32.90 |
| Outlet temperature | °C | 37.23 |
| Outlet temperature (Time averaged) | °C | 36.06 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 59155 |
| Calculated Hydraulic power | W | 8 |
| Calculated global efficiency | η | 0.21 |
| Calculated Capacity correction | W | 30 |
| Calculated Power correction | W | 38 |
| Water Flow | m³/s | 0.000133 |



Detailed result for 'EN14825:2018' Average Medium (D) A 12 /W30

| | | | |
|---|-------------------|-------------------------------|--------------|
| Tested according to: | | EN14511:2018 and EN14825:2018 | |
| Climate zone: | | Average | |
| Temperature application: | | Medium | |
| Condition name: | | D | |
| Condition temperature: | °C | | 12 |
| Part load: | % | | 15% |
| Chosen Tbivalent | °C | | -10 |
| Tdesign | °C | | -10 |
| Pdesign | kW | | 5.00 |
| Heating demand: | kW | | 0.77 |
| CR: | - | | 0.3 |
| Minimum flow reached: | - | | Yes |
| Measurement type: | | Steady State | |
| Integrated circulation pump: | | Yes | |
| Included corrections (Final result) | | | |
| Heating capacity | kW | | 2.836 |
| COP | - | | 6.939 |
| Power consumption | kW | | 0.409 |
| Measured | | | |
| Heating capacity | kW | | 2.866 |
| COP | - | | 6.421 |
| Power consumption | kW | | 0.446 |
| During heating | | | |
| Air temperature dry bulb | °C | | 12.01 |
| Air temperature wet bulb | °C | | 10.94 |
| Air temperature dry bulb outlet | °C | | 8.91 |
| Inlet temperature | °C | | 28.60 |
| Outlet temperature | °C | | 33.77 |
| Outlet temperature (Time averaged) | °C | | 30.00 |
| Circulation pump | | | |
| Measured: Static differential pressure, liquid pump | Pa | | 58837 |
| Calculated Hydraulic power | W | | 8 |
| Calculated global efficiency | η | | 0.21 |
| Calculated Capacity correction | W | | 30 |
| Calculated Power correction | W | | 38 |
| Water Flow | m ³ /s | | 0.000133 |



Detailed result for 'EN14825:2018' Average Medium (E and F) A -10 /W55

| | | |
|---|-------------------------------|--------------|
| Tested according to: | EN14511:2018 and EN14825:2018 | |
| Climate zone: | | Average |
| Temperature application: | | Medium |
| Condition name: | | E and F |
| Condition temperature: | °C | -10 |
| Part load: | % | 100% |
| Chosen Tbivalent | °C | -10 |
| Tdesign | °C | -10 |
| Pdesign | kW | 5.00 |
| Heating demand: | kW | 5.00 |
| CR: | - | 1.0 |
| Minimum flow reached: | - | No |
| Measurement type: | | Steady State |
| Integrated circulation pump: | | Yes |
| Included corrections (Final result) | | |
| Heating capacity | kW | 4.910 |
| COP | - | 2.129 |
| Power consumption | kW | 2.306 |
| Measured | | |
| Heating capacity | kW | 4.942 |
| COP | - | 2.106 |
| Power consumption | kW | 2.347 |
| During heating | | |
| Air temperature dry bulb | °C | -10.00 |
| Air temperature wet bulb | °C | -10.90 |
| Air temperature dry bulb outlet | °C | -12.21 |
| Inlet temperature | °C | 46.99 |
| Outlet temperature | °C | 54.97 |
| Outlet temperature (Time averaged) | °C | 54.97 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 59683 |
| Calculated Hydraulic power | W | 9 |
| Calculated global efficiency | η | 0.22 |
| Calculated Capacity correction | W | 32 |
| Calculated Power correction | W | 41 |
| Water Flow | m³/s | 0.000150 |



Detailed COP test results - low temperature – EN 14511

| Detailed result for 'EN14511:2018' A7/W35 | | |
|---|-------------------|--------------|
| Tested according to: | | EN14511:2018 |
| Minimum flow reached: | | No |
| Measurement type: | | Steady State |
| Integrated circulation pump: | | Yes |
| Included corrections (Final result) | | |
| Heating capacity | kW | 4.901 |
| COP | - | 5.275 |
| Power consumption | kW | 0.929 |
| Measured | | |
| Heating capacity | kW | 4.938 |
| COP | - | 5.047 |
| Power consumption | kW | 0.978 |
| During heating | | |
| Air temperature dry bulb | °C | 6.99 |
| Air temperature wet bulb | °C | 6.05 |
| Air temperature dry bulb outlet | °C | 3.79 |
| Inlet temperature | °C | 30.03 |
| Outlet temperature | °C | 35.01 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 51980 |
| Calculated Hydraulic power | W | 12 |
| Calculated global efficiency | η | 0.25 |
| Calculated Capacity correction | W | 37 |
| Calculated Power correction | W | 49 |
| Water Flow | m ³ /s | 0.000238 |



Detailed result for 'EN14511:2018' A2/W35

| | | |
|---|-------------------|--------------|
| Tested according to: | EN14511:2018 | |
| Minimum flow reached: | No | |
| Measurement type: | Transient | |
| Integrated circulation pump: | Yes | |
| Included corrections (Final result) | | |
| Heating capacity | kW | 5.585 |
| COP | - | 4.066 |
| Power consumption | kW | 1.374 |
| Measured | | |
| Heating capacity | kW | 5.625 |
| COP | - | 3.941 |
| Power consumption | kW | 1.427 |
| During heating | | |
| Air temperature dry bulb | °C | 2.06 |
| Air temperature wet bulb | °C | 0.97 |
| Air temperature dry bulb outlet | °C | -1.70 |
| Inlet temperature | °C | 30.00 |
| Outlet temperature | °C | 35.02 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 49255 |
| Calculated Hydraulic power | W | 14 |
| Calculated global efficiency | η | 0.27 |
| Calculated Capacity correction | W | 40 |
| Calculated Power correction | W | 54 |
| Water Flow | m ³ /s | 0.000291 |



Detailed result for 'EN14511:2018' A-7/W35

| | | |
|---|-------------------|--------------|
| Tested according to: | EN14511:2018 | |
| Minimum flow reached: | No | |
| Measurement type: | Steady State | |
| Integrated circulation pump: | Yes | |
| Included corrections (Final result) | | |
| Heating capacity | kW | 5.006 |
| COP | - | 3.234 |
| Power consumption | kW | 1.548 |
| Measured | | |
| Heating capacity | kW | 5.043 |
| COP | - | 3.156 |
| Power consumption | kW | 1.598 |
| During heating | | |
| Air temperature dry bulb | °C | -6.99 |
| Air temperature wet bulb | °C | -7.81 |
| Air temperature dry bulb outlet | °C | -9.57 |
| Inlet temperature | °C | 30.00 |
| Outlet temperature | °C | 35.13 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 53566 |
| Calculated Hydraulic power | W | 13 |
| Calculated global efficiency | η | 0.25 |
| Calculated Capacity correction | W | 37 |
| Calculated Power correction | W | 50 |
| Water Flow | m ³ /s | 0.000236 |



Quiet mode 3:

| Detailed result for 'EN14511:2018' A2/W35 | | | |
|---|-------------------|--------------|--|
| Tested according to: | | EN14511:2018 | |
| Minimum flow reached: | | Yes | |
| Measurement type: | | Steady State | |
| Integrated circulation pump: | | Yes | |
| Included corrections (Final result) | | | |
| Heating capacity | kW | 2.789 | |
| COP | - | 4.134 | |
| Power consumption | kW | 0.675 | |
| Measured | | | |
| Heating capacity | kW | 2.819 | |
| COP | - | 3.958 | |
| Power consumption | kW | 0.712 | |
| During heating | | | |
| Air temperature dry bulb | °C | 1.99 | |
| Air temperature wet bulb | °C | 0.96 | |
| Air temperature dry bulb outlet | °C | -0.68 | |
| Inlet temperature | °C | 29.99 | |
| Outlet temperature | °C | 35.08 | |
| Circulation pump | | | |
| Measured: Static differential pressure, liquid pump | Pa | 58365 | |
| Calculated Hydraulic power | W | 8 | |
| Calculated global efficiency | η | 0.21 | |
| Calculated Capacity correction | W | 30 | |
| Calculated Power correction | W | 37 | |
| Water Flow | m ³ /s | 0.000133 | |



Detailed COP test results - medium temperature – EN 14511

| Detailed result for 'EN14511:2018' A7/W55 | | | |
|---|-------------------|---|--------------|
| Tested according to: | | | EN14511:2018 |
| Minimum flow reached: | | | No |
| Measurement type: | | | Steady State |
| Integrated circulation pump: | | | Yes |
| Included corrections (Final result) | | | |
| Heating capacity | kW | | 4.809 |
| COP | - | | 3.085 |
| Power consumption | kW | | 1.559 |
| Measured | | | |
| Heating capacity | kW | | 4.841 |
| COP | - | | 3.027 |
| Power consumption | kW | | 1.599 |
| During heating | | | |
| Air temperature dry bulb | °C | | 6.99 |
| Air temperature wet bulb | °C | | 5.91 |
| Air temperature dry bulb outlet | °C | | 3.64 |
| Inlet temperature | °C | | 46.99 |
| Outlet temperature | °C | | 54.99 |
| Circulation pump | | | |
| Measured: Static differential pressure, liquid pump | Pa | | 59804 |
| Calculated Hydraulic power | W | ✓ | 9 |
| Calculated global efficiency | η | | 0.22 |
| Calculated Capacity correction | W | | 31 |
| Calculated Power correction | W | | 40 |
| Water Flow | m ³ /s | | 0.000147 |



| Detailed result for 'EN14511:2018' A2/W55 | | | |
|---|-------------------|---|--------------|
| Tested according to: | | | EN14511:2018 |
| Minimum flow reached: | | | No |
| Measurement type: | | | Steady State |
| Integrated circulation pump: | | | Yes |
| Included corrections (Final result) | | | |
| Heating capacity | kW | | 5.946 |
| COP | - | | 2.782 |
| Power consumption | kW | | 2.138 |
| Measured | | | |
| Heating capacity | kW | | 5.980 |
| COP | - | | 2.741 |
| Power consumption | kW | | 2.182 |
| During heating | | | |
| Air temperature dry bulb | °C | | 2.02 |
| Air temperature wet bulb | °C | | 0.78 |
| Air temperature dry bulb outlet | °C | | -1.11 |
| Inlet temperature | °C | | 47.01 |
| Outlet temperature | °C | | 55.10 |
| Circulation pump | | | |
| Measured: Static differential pressure, liquid pump | Pa | | 57341 |
| Calculated Hydraulic power | W | ✓ | 10 |
| Calculated global efficiency | η | | 0.23 |
| Calculated Capacity correction | W | | 34 |
| Calculated Power correction | W | | 44 |
| Water Flow | m ³ /s | | 0.000179 |



Detailed result for 'EN14511:2018' A-7/W55

| | | |
|---|-------------------|--------------|
| Tested according to: | EN14511:2018 | |
| Minimum flow reached: | No | |
| Measurement type: | Steady State | |
| Integrated circulation pump: | Yes | |
| Included corrections (Final result) | | |
| Heating capacity | kW | 5.019 |
| COP | - | 2.258 |
| Power consumption | kW | 2.223 |
| Measured | | |
| Heating capacity | kW | 5.050 |
| COP | - | 2.231 |
| Power consumption | kW | 2.263 |
| During heating | | |
| Air temperature dry bulb | °C | -7.01 |
| Air temperature wet bulb | °C | -7.91 |
| Air temperature dry bulb outlet | °C | -9.23 |
| Inlet temperature | °C | 47.01 |
| Outlet temperature | °C | 55.09 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 58106 |
| Calculated Hydraulic power | W | 9 |
| Calculated global efficiency | η | 0.22 |
| Calculated Capacity correction | W | 32 |
| Calculated Power correction | W | 40 |
| Water Flow | m ³ /s | 0.000151 |



Detailed COP test results - high temperature – EN 14511

| Detailed result for 'EN14511:2018' A7/W65 | | | |
|---|-------------------|--|--------------|
| Tested according to: | | | EN14511:2018 |
| Minimum flow reached: | | | Yes |
| Measurement type: | | | Steady State |
| Integrated circulation pump: | | | Yes |
| Included corrections (Final result) | | | |
| Heating capacity | kW | | 4.720 |
| COP | - | | 2.342 |
| Power consumption | kW | | 2.015 |
| Measured | | | |
| Heating capacity | kW | | 4.750 |
| COP | - | | 2.314 |
| Power consumption | kW | | 2.053 |
| During heating | | | |
| Air temperature dry bulb | °C | | 7.00 |
| Air temperature wet bulb | °C | | 5.95 |
| Air temperature dry bulb outlet | °C | | 4.06 |
| Inlet temperature | °C | | 56.40 |
| Outlet temperature | °C | | 65.07 |
| Circulation pump | | | |
| Measured: Static differential pressure, liquid pump | Pa | | 59082 |
| Calculated Hydraulic power | W | | 8 |
| Calculated global efficiency | η | | 0.21 |
| Calculated Capacity correction | W | | 30 |
| Calculated Power correction | W | | 38 |
| Water Flow | m ³ /s | | 0.000133 |



| Detailed result for 'EN14511:2018' A7/W60 | | | |
|---|-------------------|--------------|--|
| Tested according to: | | EN14511:2018 | |
| Minimum flow reached: | | Yes | |
| Measurement type: | | Steady State | |
| Integrated circulation pump: | | Yes | |
| Included corrections (Final result) | | | |
| Heating capacity | kW | 4.842 | |
| COP | - | 2.743 | |
| Power consumption | kW | 1.765 | |
| Measured | | | |
| Heating capacity | kW | 4.872 | |
| COP | - | 2.702 | |
| Power consumption | kW | 1.803 | |
| During heating | | | |
| Air temperature dry bulb | °C | 7.01 | |
| Air temperature wet bulb | °C | 5.94 | |
| Air temperature dry bulb outlet | °C | 3.78 | |
| Inlet temperature | °C | 51.03 | |
| Outlet temperature | °C | 59.91 | |
| Circulation pump | | | |
| Measured: Static differential pressure, liquid pump | Pa | 58819 | |
| Calculated Hydraulic power | W | 8 | |
| Calculated global efficiency | η | 0.21 | |
| Calculated Capacity correction | W | 30 | |
| Calculated Power correction | W | 38 | |
| Water Flow | m ³ /s | 0.000133 | |

0



| Detailed result for 'EN14511:2018' A2/W65 | | | |
|---|-------------------|--------------|--|
| Tested according to: | | EN14511:2018 | |
| Minimum flow reached: | | No | |
| Measurement type: | | Steady State | |
| Integrated circulation pump: | | Yes | |
| Included corrections (Final result) | | | |
| Heating capacity | kW | 5.758 | |
| COP | - | 2.180 | |
| Power consumption | kW | 2.642 | |
| Measured | | | |
| Heating capacity | kW | 5.789 | |
| COP | - | 2.159 | |
| Power consumption | kW | 2.681 | |
| During heating | | | |
| Air temperature dry bulb | °C | 2.00 | |
| Air temperature wet bulb | °C | 1.16 | |
| Air temperature dry bulb outlet | °C | -0.56 | |
| Inlet temperature | °C | 54.98 | |
| Outlet temperature | °C | 65.01 | |
| Circulation pump | | | |
| Measured: Static differential pressure, liquid pump | Pa | 58779 | |
| Calculated Hydraulic power | W | 8 | |
| Calculated global efficiency | η | 0.21 | |
| Calculated Capacity correction | W | 31 | |
| Calculated Power correction | W | 39 | |
| Water Flow | m ³ /s | 0.000140 | |



Detailed result for 'EN14511:2018' A2/W60

| | | |
|---|-------------------|--------------|
| Tested according to: | EN14511:2018 | |
| Minimum flow reached: | No | |
| Measurement type: | Steady State | |
| Integrated circulation pump: | Yes | |
| Included corrections (Final result) | | |
| Heating capacity | kW | 5.765 |
| COP | - | 2.431 |
| Power consumption | kW | 2.371 |
| Measured | | |
| Heating capacity | kW | 5.796 |
| COP | - | 2.405 |
| Power consumption | kW | 2.410 |
| During heating | | |
| Air temperature dry bulb | °C | 2.06 |
| Air temperature wet bulb | °C | 0.86 |
| Air temperature dry bulb outlet | °C | -0.82 |
| Inlet temperature | °C | 50.01 |
| Outlet temperature | °C | 60.13 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 59353 |
| Calculated Hydraulic power | W | 8 |
| Calculated global efficiency | η | 0.21 |
| Calculated Capacity correction | W | 31 |
| Calculated Power correction | W | 39 |
| Water Flow | m ³ /s | 0.000139 |



| Detailed result for 'EN14511:2018' A-7/W65 | | | |
|---|-------------------|--------------|--|
| Tested according to: | | EN14511:2018 | |
| Minimum flow reached: | | Yes | |
| Measurement type: | | Steady State | |
| Integrated circulation pump: | | Yes | |
| Included corrections (Final result) | | | |
| Heating capacity | kW | 4.672 | |
| COP | - | 1.761 | |
| Power consumption | kW | 2.653 | |
| Measured | | | |
| Heating capacity | kW | 4.702 | |
| COP | - | 1.748 | |
| Power consumption | kW | 2.690 | |
| During heating | | | |
| Air temperature dry bulb | °C | -7.00 | |
| Air temperature wet bulb | °C | -7.92 | |
| Air temperature dry bulb outlet | °C | -8.86 | |
| Inlet temperature | °C | 56.39 | |
| Outlet temperature | °C | 64.96 | |
| Circulation pump | | | |
| Measured: Static differential pressure, liquid pump | Pa | 58776 | |
| Calculated Hydraulic power | W | 8 | |
| Calculated global efficiency | η | 0.21 | |
| Calculated Capacity correction | W | 30 | |
| Calculated Power correction | W | 38 | |
| Water Flow | m ³ /s | 0.000133 | |



Detailed result for 'EN14511:2018' A-7/W60

| | | |
|---|-------------------|--------------|
| Tested according to: | EN14511:2018 | |
| Minimum flow reached: | Yes | |
| Measurement type: | Steady State | |
| Integrated circulation pump: | Yes | |
| Included corrections (Final result) | | |
| Heating capacity | kW | 4.878 |
| COP | - | 2.032 |
| Power consumption | kW | 2.400 |
| Measured | | |
| Heating capacity | kW | 4.908 |
| COP | - | 2.013 |
| Power consumption | kW | 2.438 |
| During heating | | |
| Air temperature dry bulb | °C | -6.98 |
| Air temperature wet bulb | °C | -7.86 |
| Air temperature dry bulb outlet | °C | -9.07 |
| Inlet temperature | °C | 50.98 |
| Outlet temperature | °C | 59.91 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 59338 |
| Calculated Hydraulic power | W | 8 |
| Calculated global efficiency | η | 0.21 |
| Calculated Capacity correction | W | 30 |
| Calculated Power correction | W | 38 |
| Water Flow | m ³ /s | 0.000133 |



Test results for SEER test points at fan cooling application for space cooling - EN 14825

| Detailed result for 'EN14825:2018 Fan coil (A) A35/W7 | | |
|---|-------------------|--------------|
| Tested according to: | | EN14825:2018 |
| Climate zone: | | N/A |
| Temperature application: | | Fan coil |
| Condition name: | | A |
| Condition temperature: | °C | 35 |
| Part load: | % | 100% |
| Chosen Tbivalent | °C | N/A |
| Tdesign | °C | 35 |
| Pdesign | kW | 7.00 |
| Cooling demand: | kW | 7.00 |
| CR: | - | 1.0 |
| Minimum flow reached: | - | No |
| Measurement type: | | Steady State |
| Integrated circulation pump: | | Yes |
| Integrated liquid pump able to generate a positive ext. static pressure difference: | | Yes |
| Included corrections (Final result) | | |
| Cooling capacity | kW | 6.572 |
| EER | - | 3.213 |
| Power consumption | kW | 2.045 |
| Measured | | |
| Cooling capacity | kW | 6.536 |
| EER | - | 3.121 |
| Power consumption | kW | 2.094 |
| During cooling | | |
| Air_inter temperature dry bulb | °C | 35.06 |
| Air_outlet temperature dry bulb | °C | 42.53 |
| Water_Inlet temperature | °C | 12.03 |
| Water_outlet temperature | °C | 7.08 |
| Water_outlet temperature (Time averaged) | °C | 7.08 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 38298 |
| Calculated Hydraulic power | W | 12 |
| Calculated global efficiency | η | 0.25 |
| Calculated Capacity correction | W | 37 |
| Calculated Power correction | W | 49 |
| Water Flow | m ³ /s | 0.000315 |



| Detailed result for 'EN14825:2018 Fan coil (C) A25/W10 | | |
|---|-------------------|--------------|
| Tested according to: | EN14511:2018 and | EN14825:2018 |
| Temperature application: | | Fan coil |
| Condition name: | | C |
| Condition temperature: | °C | 25 |
| Part load: | % | 47% |
| Tdesign | °C | 35 |
| Pdesign | kW | 5.00 |
| Cooling demand: | kW | 2.35 |
| CR: | - | 1.0 |
| Minimum flow reached: | - | Yes |
| Measurement type: | | Steady State |
| Integrated circulation pump: | | Yes |
| Included corrections (Final result) | | |
| Cooling capacity | kW | 2.595 |
| EER | - | 7.341 |
| Power consumption | kW | 0.354 |
| Measured | | |
| Cooling capacity | kW | 2.568 |
| EER | - | 6.624 |
| Power consumption | kW | 0.388 |
| During heating | | |
| Air temperature dry bulb | °C | 25.01 |
| Air temperature dry bulb outlet | °C | 29.51 |
| Inlet temperature | °C | 14.62 |
| Outlet temperature | °C | 10.02 |
| Outlet temperature (Time averaged) | °C | 10.02 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 50046 |
| Calculated Hydraulic power | W | 7 |
| Calculated global efficiency | η | 0.20 |
| Calculated Capacity correction | W | 27 |
| Calculated Power correction | W | 34 |
| Water Flow | m ³ /s | 0.000133 |



Test results for SEER test points at floor cooling application for space cooling - EN 14825


| Detailed result for 'EN14825:2018 Floor Cooling (A) A35/W18 | | |
|--|-------------------|---------------|
| Tested according to: | EN14511:2018 and | EN14825:2018 |
| Temperature application: | | Floor Cooling |
| Condition name: | | A |
| Condition temperature: | °C | 35 |
| Part load: | % | 100% |
| Tdesign | °C | 35 |
| Pdesign | kW | 5.00 |
| Cooling demand: | kW | 5.00 |
| CR: | - | 1.0 |
| Minimum flow reached: | - | No |
| Measurement type: | | Steady State |
| Integrated circulation pump: | | Yes |
| Included corrections (Final result) | | |
| Cooling capacity | kW | 5.374 |
| EER | - | 5.853 |
| Power consumption | kW | 0.918 |
| Measured | | |
| Cooling capacity | kW | 5.339 |
| EER | - | 5.534 |
| Power consumption | kW | 0.965 |
| During heating | | |
| Air temperature dry bulb | °C | 35.01 |
| Air temperature dry bulb outlet | °C | 41.28 |
| Inlet temperature | °C | 23.03 |
| Outlet temperature | °C | 18.03 |
| Outlet temperature (Time averaged) | °C | 18.03 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 43926 |
| Calculated Hydraulic power | W | 11 |
| Calculated global efficiency | η | 0.24 |
| Calculated Capacity correction | W | 35 |
| Calculated Power correction | W | 47 |
| Water Flow | m ³ /s | 0.000256 |




| Detailed result for 'EN14825:2018 Floor cooling (C) A25/W18 | | |
|--|-------------------|---------------|
| Tested according to: | EN14511:2018 | EN14825:2018 |
| Temperature application: | | Floor cooling |
| Condition name: | | C |
| Condition temperature: | °C | 25 |
| Part load: | % | 47% |
| Tdesign | °C | 35 |
| Pdesign | kW | 5.00 |
| Cooling demand: | kW | 2.35 |
| CR: | - | 0.8 |
| Minimum flow reached: | - | No |
| Measurement type: | | Steady State |
| Integrated circulation pump: | | Yes |
| Included corrections (Final result) | | |
| Cooling capacity | kW | 2.968 |
| EER | - | 10.408 |
| Power consumption | kW | 0.285 |
| Measured | | |
| Cooling capacity | kW | 2.940 |
| EER | - | 9.178 |
| Power consumption | kW | 0.320 |
| During heating | | |
| Air temperature dry bulb | °C | 24.97 |
| Air temperature dry bulb outlet | °C | 29.89 |
| Inlet temperature | °C | 22.09 |
| Outlet temperature | °C | 17.01 |
| Outlet temperature (Time averaged) | °C | 18.07 |
| Circulation pump | | |
| Measured: Static differential pressure, liquid pump | Pa | 50467 |
| Calculated Hydraulic power | W | 7 |
| Calculated global efficiency | η | 0.20 |
| Calculated Capacity correction | W | 28 |
| Calculated Power correction | W | 35 |
| Water Flow | m ³ /s | 0.000139 |


Detailed test results of sound power measurement

Test N#1





Sound power levels according to ISO 3743-1:2010



Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms

Client:

Object:

Mounting conditions:

Panasonic Marketing Europe GmbH

Type: Air to water heat pump, Model: OD: WH-WDG05LE5

"The outdoor unit is mounted on the supporting metal support frame using four vibration damping insulators and placed on four pieces of concrete tiles (20x20x5 cm). The support is placed on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2.

Date of test:

17-10-2023

Operating conditions:

A7/W55, Compressor speed: 39[Hz], Fan speed: 420[rpm], Heating capacity: 4.80 [kW], Power_input: 1.60 [kW], Water flow rate: 530 [l/h], dp_water: 592 [mbar]

Static pressure:

1019 kPa

Air temperature:

7.0 °C

Relative air humidity:

84.0 %

Test room volume:

102.8 m³

Room:

Room 2

Area, S, of test room:

138.9 m²

Reference box:

L1:

1.2 m

L2:

0.5 m

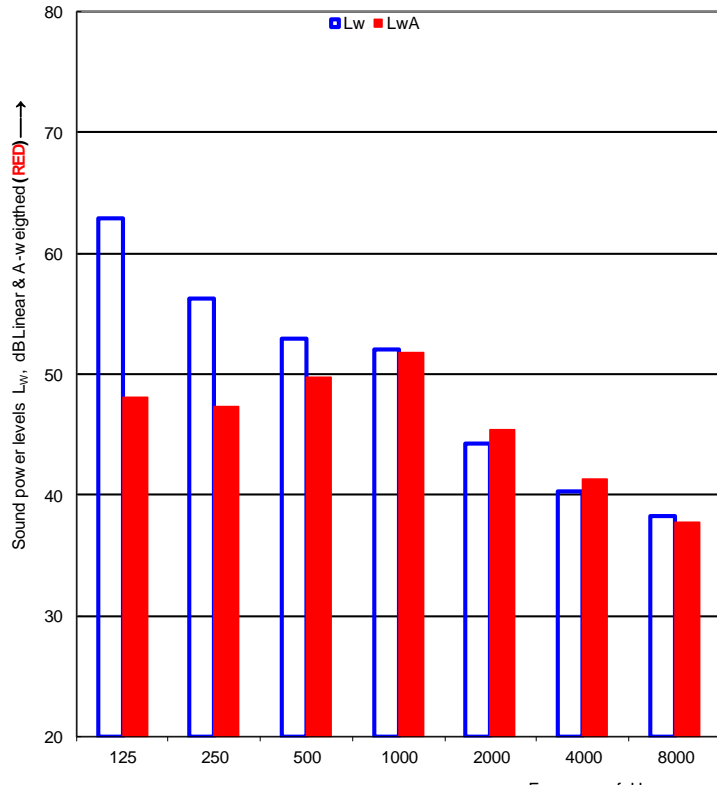
L3:

0.9 m

Volume:

0.5 m³

| Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] |
|------------------|--------------------------------|--------------|
| 100 | 55.8 | |
| 125 | 57.5 | 62.8 |
| 160 | 59.9 | |
| 200 | 52.3 | |
| 250 | 52.7 | 56.3 |
| 315 | 48.2 | |
| 400 | 48.0 | |
| 500 | 48.5 | 52.9 |
| 630 | 47.9 | |
| 800 | 47.7 | |
| 1000 | 48.5 | 52.0 |
| 1250 | 44.4 | |
| 1600 | 40.9 | |
| 2000 | 39.3 | 44.3 |
| 2500 | 37.7 | |
| 3150 | 37.6 | |
| 4000 | 34.4 | 40.3 |
| 5000 | 33.4 | |
| 6300 | 36.5 | |
| 8000 | 31.3 | 38.2 |
| 10000 | 29.1 | |



1 Diff. to backgr. noise < 6dB

Sound power level L_w(A):

56.2 dB [re 1pW]

Name of test institute:

DTI

No. of test report:




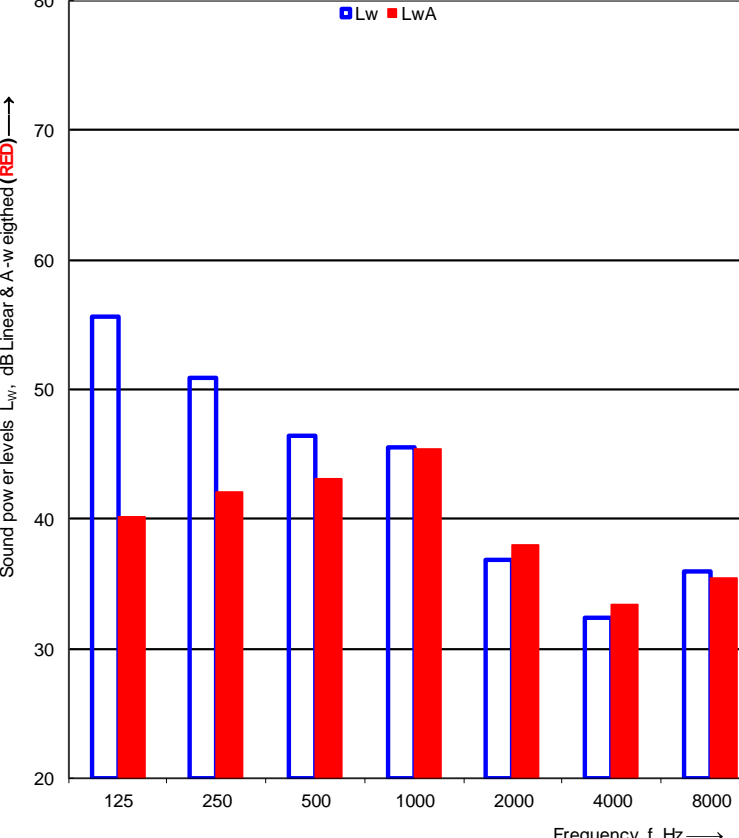
300-KLAB-22-034

Date:

17-10-2023




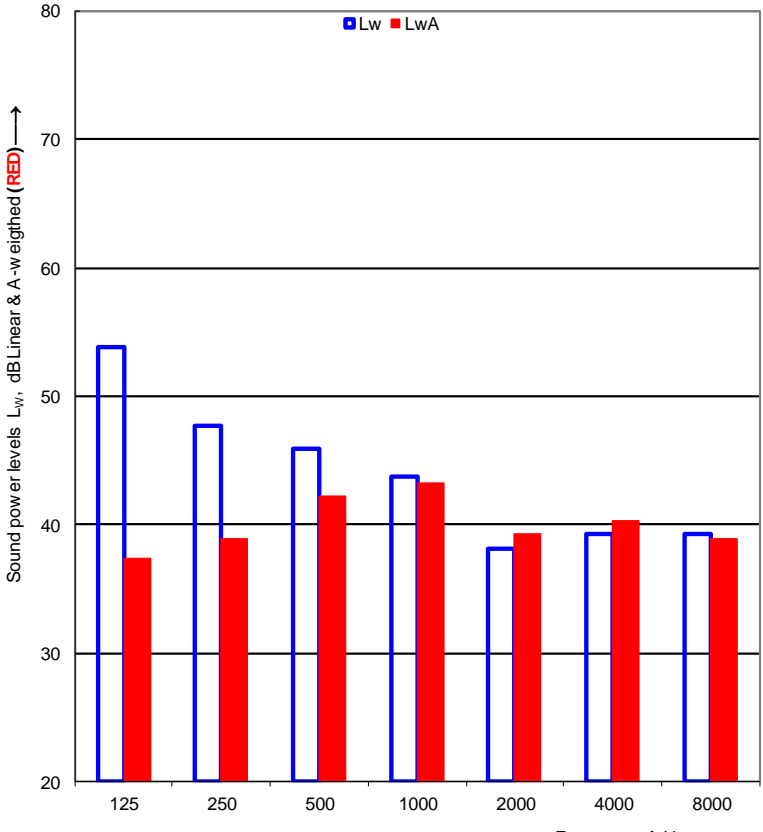
Measurements are in full conformity with ISO 3743

Test N#2

|   | <h1>Sound power levels according to ISO 3743-1:2010</h1> |  TEKNOLOGIS INSTITUT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|-----------------|-----|------|---|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|-------|------|--|---|--|
| Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Client: Object: Mounting conditions: | Panasonic Marketing Europe GmbH Type: Air to water heat pump, Model: OD: WH-WDG05LE5 "The outdoor unit is mounted on the supporting metal support frame using four vibration damping insulators and placed on four pieces of concrete tiles (20x20x5 cm). The support is placed on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2. " | Date of test: 17-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating conditions: | A7/W55, Compressor speed: 21[Hz], Fan speed: 360[rpm], Heating capacity: 2.40 [kW], Power_input: 0.86 [kW], Water flow rate: 480 [l/h], dp_water: 595 [mbar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Static pressure: Air temperature: Relative air humidity: Test room volume: Area, S, of test room: | 1019 kPa 7.0 °C 84.0 % 102.8 m³ 138.9 m² | <div>Reference box:</div> <div>L1: 1.2 m</div> <div>L2: 0.5 m</div> <div>L3: 0.9 m</div> <div>Volume: 0.5 m³</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Frequency f [Hz]</th><th>L_w 1/3 octave [dB]</th><th>1/1 oct [dB]</th></tr> </thead> <tbody> <tr><td>100</td><td>49.4</td><td>1</td></tr> <tr><td>125</td><td>51.9</td><td>55.6</td></tr> <tr><td>160</td><td>50.9</td><td></td></tr> <tr><td>200</td><td>46.7</td><td></td></tr> <tr><td>250</td><td>46.9</td><td>50.8</td></tr> <tr><td>315</td><td>44.1</td><td></td></tr> <tr><td>400</td><td>42.7</td><td></td></tr> <tr><td>500</td><td>41.7</td><td>46.4</td></tr> <tr><td>630</td><td>40.3</td><td></td></tr> <tr><td>800</td><td>40.7</td><td></td></tr> <tr><td>1000</td><td>42.7</td><td>45.5</td></tr> <tr><td>1250</td><td>37.3</td><td></td></tr> <tr><td>1600</td><td>33.8</td><td></td></tr> <tr><td>2000</td><td>31.8</td><td>36.8</td></tr> <tr><td>2500</td><td>29.4</td><td></td></tr> <tr><td>3150</td><td>27.5</td><td></td></tr> <tr><td>4000</td><td>28.9</td><td>32.4</td></tr> <tr><td>5000</td><td>26.0</td><td></td></tr> <tr><td>6300</td><td>34.6</td><td></td></tr> <tr><td>8000</td><td>27.7</td><td>35.9</td></tr> <tr><td>10000</td><td>26.5</td><td></td></tr> </tbody> </table> | Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | 100 | 49.4 | 1 | 125 | 51.9 | 55.6 | 160 | 50.9 | | 200 | 46.7 | | 250 | 46.9 | 50.8 | 315 | 44.1 | | 400 | 42.7 | | 500 | 41.7 | 46.4 | 630 | 40.3 | | 800 | 40.7 | | 1000 | 42.7 | 45.5 | 1250 | 37.3 | | 1600 | 33.8 | | 2000 | 31.8 | 36.8 | 2500 | 29.4 | | 3150 | 27.5 | | 4000 | 28.9 | 32.4 | 5000 | 26.0 | | 6300 | 34.6 | | 8000 | 27.7 | 35.9 | 10000 | 26.5 | | <div>Room: Room 2</div>  | |
| Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 49.4 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 125 | 51.9 | 55.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | 50.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 46.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 46.9 | 50.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 315 | 44.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 42.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | 41.7 | 46.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 630 | 40.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 800 | 40.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | 42.7 | 45.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1250 | 37.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1600 | 33.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2000 | 31.8 | 36.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2500 | 29.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3150 | 27.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4000 | 28.9 | 32.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5000 | 26.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6300 | 34.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8000 | 27.7 | 35.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10000 | 26.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 Diff. to backgr. noise < 6dB | <div>Sound power level L_w(A): 49.7 dB [re 1pW]</div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name of test institute: | DTI | Date: 17-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. of test report: | 300-KLAB-22-034 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurements are in full conformity with ISO 3743 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

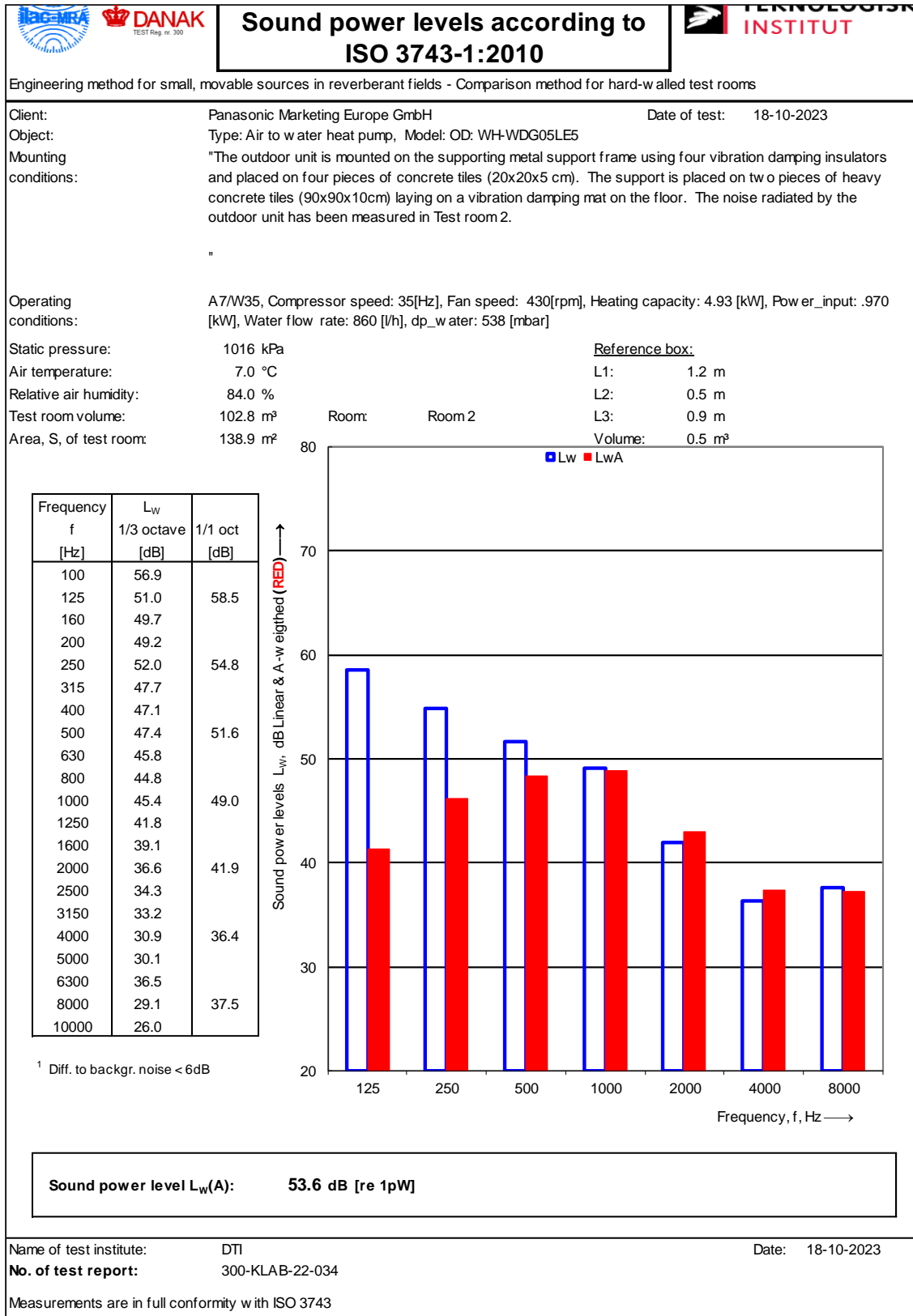


Test N#3

|   | | Sound power levels according to ISO 3743-1:2010 | |  TEKNOLOGISK INSTITUT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|---|--------------------------------------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|-------|------|--|---|--|--|--|
| Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Client: | | Panasonic Marketing Europe GmbH | | Date of test: 17-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Object: | | Type: Air to water heat pump, Model: OD: WH-WDG05LE5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mounting conditions: | | "The outdoor unit is mounted on the supporting metal support frame using four vibration damping insulators and placed on four pieces of concrete tiles (20x20x5 cm). The support is placed on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2." | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating conditions: | | A7/W55, Compressor speed: 21[Hz], Fan speed: 260[rpm], Heating capacity: 2.0 [kW], Power_input: 0.90 [kW], Water flow rate: 476 [l/h], dp_water: 595 [mbar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Static pressure: | | 1019 kPa | | <u>Reference box:</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Air temperature: | | 7.0 °C | | L1: 1.2 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Relative air humidity: | | 84.0 % | | L2: 0.5 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test room volume: | | 102.8 m³ | | L3: 0.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Area, S, of test room: | | 138.9 m² | | Volume: 0.5 m³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Room: Room 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 48.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 125 | 51.4 | 53.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | 43.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 43.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 44.5 | 47.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 315 | 40.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 43.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | 39.5 | 45.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 630 | 39.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 800 | 42.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | 35.0 | 43.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1250 | 34.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1600 | 33.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2000 | 31.3 | 38.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2500 | 34.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3150 | 34.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4000 | 35.6 | 39.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5000 | 32.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6300 | 37.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8000 | 30.8 | 39.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10000 | 30.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ¹ Diff. to backgr. noise < 6dB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound power level L_w(A): | | 48.9 dB [re 1pW] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name of test institute: | | DTI | | Date: 17-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. of test report: | | 300-KLAB-22-034 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurements are in full conformity with ISO 3743 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |




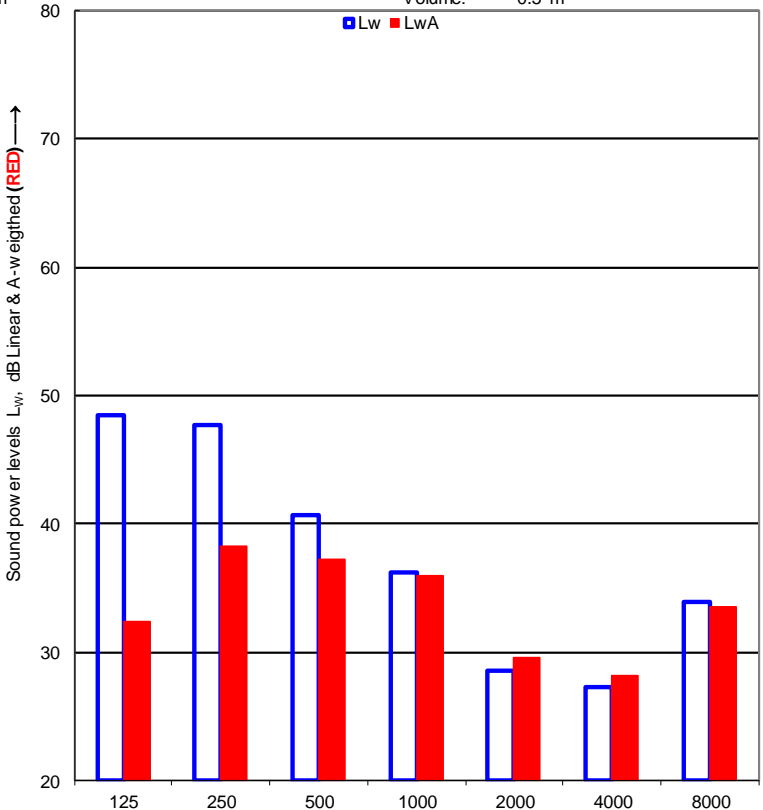


Test N#4








Test N#5

|   | | Sound power levels according to ISO 3743-1:2010 | |  TEKNOLOGISK INSTITUT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|---|--------------------------------------|--|-----|-------------------|--|-----|-------------------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|-------|------|--|---|--|--|--|
| Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Client: | | Panasonic Marketing Europe GmbH | | Date of test: 18-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Object: | | Type: Air to water heat pump, Model: OD: WH-WDG05LE5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mounting conditions: | | "The outdoor unit is mounted on the supporting metal support frame using four vibration damping insulators and placed on four pieces of concrete tiles (20x20x5 cm). The support is placed on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2." | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating conditions: | | A7/W35, Compressor speed: 18[Hz], Fan speed: 250[rpm], Heating capacity: 2.53 [kW], Power input: 0.50 [kW], Water flow rate: 480 [l/h], dp_water: 584 [mbar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Static pressure: | | 1016 kPa | | Reference box: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Air temperature: | | 7.0 °C | | L1: 1.2 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Relative air humidity: | | 84.0 % | | L2: 0.5 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test room volume: | | 102.8 m³ | | L3: 0.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Area, S, of test room: | | 138.9 m² | | Volume: 0.5 m³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Room: Room 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"><thead><tr><th>Frequency f [Hz]</th><th>L_w 1/3 octave [dB]</th><th>1/1 oct [dB]</th></tr></thead><tbody><tr><td>100</td><td>45.4¹</td><td></td></tr><tr><td>125</td><td>41.0¹</td><td>48.4</td></tr><tr><td>160</td><td>43.4</td><td></td></tr><tr><td>200</td><td>45.5</td><td></td></tr><tr><td>250</td><td>42.2</td><td>47.7</td></tr><tr><td>315</td><td>38.4</td><td></td></tr><tr><td>400</td><td>37.2</td><td></td></tr><tr><td>500</td><td>36.2</td><td>40.7</td></tr><tr><td>630</td><td>33.7</td><td></td></tr><tr><td>800</td><td>33.6</td><td></td></tr><tr><td>1000</td><td>30.6</td><td>36.2</td></tr><tr><td>1250</td><td>28.5</td><td></td></tr><tr><td>1600</td><td>25.8</td><td></td></tr><tr><td>2000</td><td>23.0</td><td>28.5</td></tr><tr><td>2500</td><td>21.0</td><td></td></tr><tr><td>3150</td><td>22.1</td><td></td></tr><tr><td>4000</td><td>22.7</td><td>27.3</td></tr><tr><td>5000</td><td>22.7</td><td></td></tr><tr><td>6300</td><td>32.7</td><td></td></tr><tr><td>8000</td><td>25.7</td><td>33.9</td></tr><tr><td>10000</td><td>23.5</td><td></td></tr></tbody></table> | | Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | 100 | 45.4 ¹ | | 125 | 41.0 ¹ | 48.4 | 160 | 43.4 | | 200 | 45.5 | | 250 | 42.2 | 47.7 | 315 | 38.4 | | 400 | 37.2 | | 500 | 36.2 | 40.7 | 630 | 33.7 | | 800 | 33.6 | | 1000 | 30.6 | 36.2 | 1250 | 28.5 | | 1600 | 25.8 | | 2000 | 23.0 | 28.5 | 2500 | 21.0 | | 3150 | 22.1 | | 4000 | 22.7 | 27.3 | 5000 | 22.7 | | 6300 | 32.7 | | 8000 | 25.7 | 33.9 | 10000 | 23.5 | |  | | | |
| Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 45.4 ¹ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 125 | 41.0 ¹ | 48.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | 43.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 45.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 42.2 | 47.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 315 | 38.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 37.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | 36.2 | 40.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 630 | 33.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 800 | 33.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | 30.6 | 36.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1250 | 28.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1600 | 25.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2000 | 23.0 | 28.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2500 | 21.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3150 | 22.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4000 | 22.7 | 27.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5000 | 22.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6300 | 32.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8000 | 25.7 | 33.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10000 | 23.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ¹ Diff. to backgr. noise < 6dB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound power level L_w(A): | | 43.3 dB [re 1pW] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name of test institute: | | DTI | | Date: 18-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. of test report: | | 300-KLAB-22-034 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurements are in full conformity with ISO 3743 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |






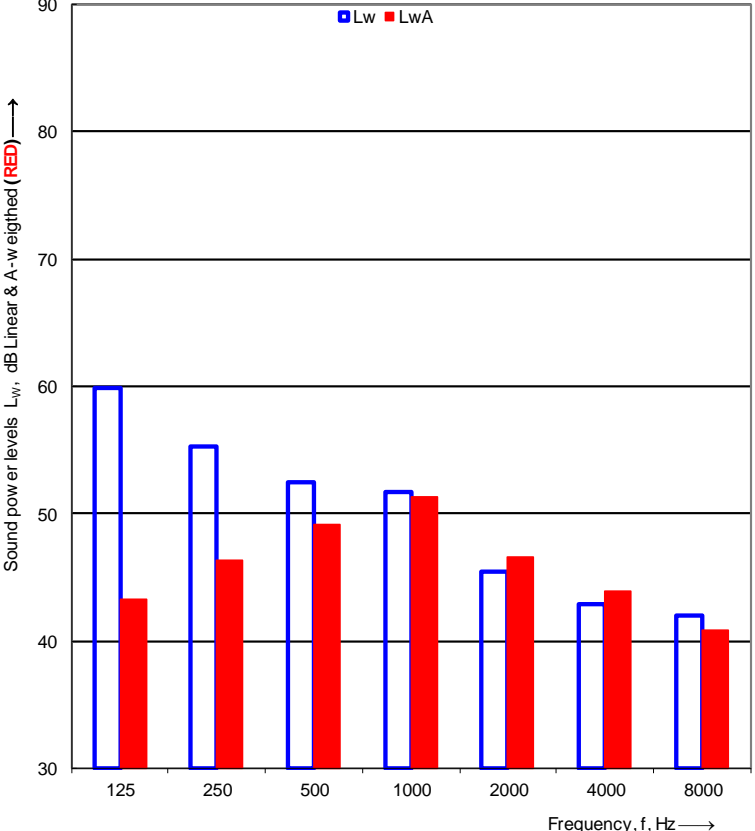
Test N#6

|   | | Sound power levels according to ISO 3743-1:2010 | |  TEKNOLOGISK INSTITUT | |
|---|--|---|--|--|--|
| Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms | | | | | |
| Client: | | Panasonic Marketing Europe GmbH | | Date of test: 17-10-2023 | |
| Object: | | Type: Air to water heat pump, Model: OD: WH-WDG05LE5 | | | |
| Mounting conditions: | | The outdoor unit is mounted on the supporting metal support frame using four vibration damping insulators and placed on four pieces of concrete tiles (20x20x5 cm). The support is placed on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2. | | | |
| Operating conditions: | | A-7/W55, Compressor speed: 58[rpm], Fan speed: 670[rpm], Heating capacity: 5.10 [kW], Power_input: 2.16 [kW], Water flow rate: 545 [l/h], dp_water: 586 [mbar] | | | |
| Static pressure: | | 1007 kPa | | Reference box: | |
| Air temperature: | | -7.0 °C | | L1: 1.2 m | |
| Relative air humidity: | | 74.0 % | | L2: 0.5 m | |
| Test room volume: | | 102.8 m³ | | L3: 0.9 m | |
| Area, S, of test room: | | 138.9 m² | | Volume: 0.5 m³ | |
| Room: | | Room 2 | | | |
| Frequency | | L _w | | L _{wA} | |
| f [Hz] | | 1/3 octave [dB] | | 1/1 oct [dB] | |
| 100 | | 69.6 | | 71.0 | |
| 125 | | 63.3 | | 68.3 | |
| 160 | | 60.8 | | 62.9 | |
| 200 | | 61.8 | | 60.8 | |
| 250 | | 66.6 | | 55.8 | |
| 315 | | 58.7 | | 50.6 | |
| 400 | | 58.4 | | 45.6 | |
| 500 | | 58.1 | | 39.4 | |
| 630 | | 57.9 | | | |
| 800 | | 57.1 | | | |
| 1000 | | 56.3 | | | |
| 1250 | | 54.2 | | | |
| 1600 | | 53.0 | | | |
| 2000 | | 50.2 | | | |
| 2500 | | 49.0 | | | |
| 3150 | | 47.4 | | | |
| 4000 | | 45.7 | | | |
| 5000 | | 43.7 | | | |
| 6300 | | 42.5 | | | |
| 8000 | | 40.1 | | | |
| 10000 | | 39.4 | | | |
| Sound power levels L _w , dB Linear & A-weighted (RED) | | Frequency, f, Hz | | | |
| Sound power level L _w (A): | | 65.9 dB [re 1pW] | | | |
| Name of test institute: | | DTI | | Date: 17-10-2023 | |
| No. of test report: | | 300-KLAB-22-034 | | | |
| Measurements are in full conformity with ISO 3743 | | | | | |






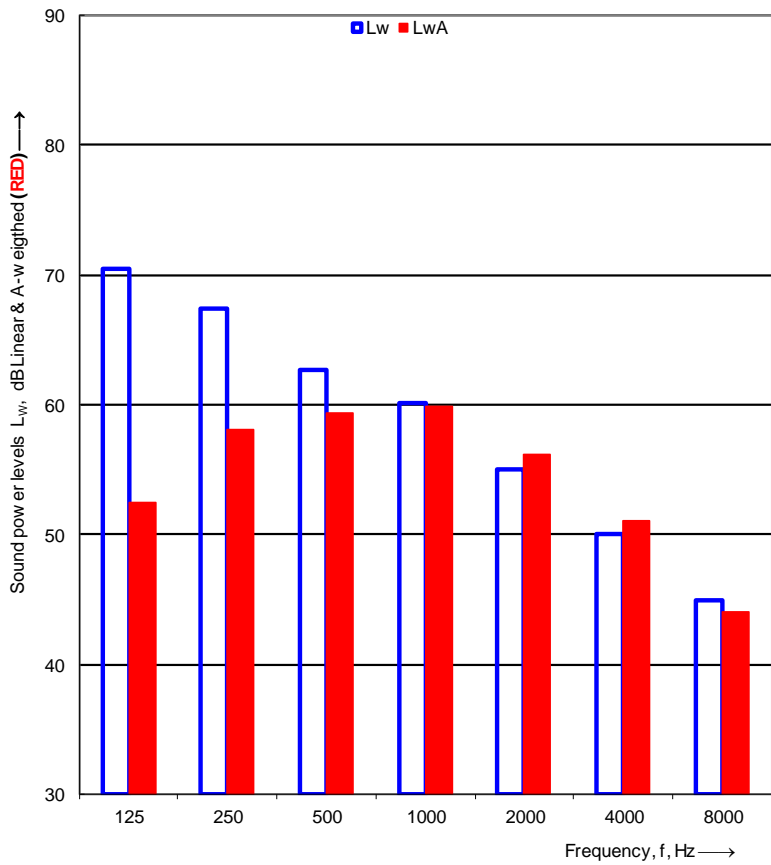


Test N#7

|   | | Sound power levels according to ISO 3743-1:2010 | |  TEKNOLOGISK INSTITUT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|---|--------------------------------------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|-------|------|--|---|--|--|--|
| Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Client: | | Panasonic Marketing Europe GmbH | | Date of test: 17-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Object: | | Type: Air to water heat pump, Model: OD: WH-WDG05LE5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mounting conditions: | | The outdoor unit is mounted on the supporting metal support frame using four vibration damping insulators and placed on four pieces of concrete tiles (20x20x5 cm). The support is placed on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating conditions: | | A-7/W55, Compressor speed: 30[Hz], Fan speed: 470[rpm], Heating capacity: 2.0 [kW], Power_input: 1.20 [kW], Water flow rate: 475 [l/h], dp_water: 592 [mbar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Static pressure: | | 1019 kPa | | Reference box: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Air temperature: | | -7.0 °C | | L1: 1.2 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Relative air humidity: | | 74.0 % | | L2: 0.5 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test room volume: | | 102.8 m³ | | L3: 0.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Area, S, of test room: | | 138.9 m² | | Volume: 0.5 m³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Room: | | Room 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 56.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 125 | 56.7 | 59.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | 49.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 51.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 50.6 | 55.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 315 | 48.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 48.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | 47.2 | 52.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 630 | 47.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 800 | 49.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | 43.9 | 51.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1250 | 44.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1600 | 41.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2000 | 39.4 | 45.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2500 | 40.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3150 | 39.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4000 | 38.9 | 42.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5000 | 34.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6300 | 37.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8000 | 35.4 | 42.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10000 | 38.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound power level L _w (A): | | 55.6 dB [re 1pW] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name of test institute: | | DTI | | Date: 17-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. of test report: | | 300-KLAB-22-034 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurements are in full conformity with ISO 3743 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |






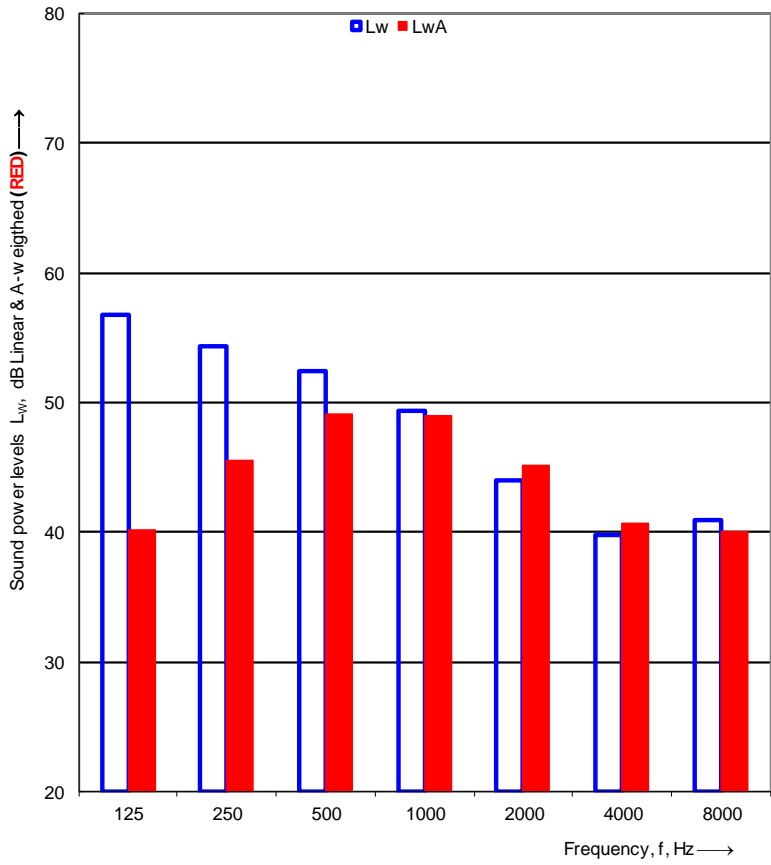
Test N#8

|   | | Sound power levels according to ISO 3743-1:2010 | |  TEKNOLOGISK INSTITUT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|---|--------------------------------------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|-------|------|--|---|--|--|--|
| Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Client: | | Panasonic Marketing Europe GmbH | | Date of test: 16-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Object: | | Type: Air to water heat pump, Model: OD: WH-WDG05LE5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mounting conditions: | | The outdoor unit is mounted on the supporting metal support frame using four vibration damping insulators and placed on four pieces of concrete tiles (20x20x5 cm). The support is placed on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating conditions: | | A-7/W35, Compressor speed: 52[Hz], Fan speed: 670[rpm], Heating capacity: 5.10 [kW], Power_input: 1.59 [kW], Water flow rate: 860 [l/h], dp_water: 535 [mbar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Static pressure: | | 1007 kPa | | <u>Reference box:</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Air temperature: | | -7.0 °C | | L1: 1.2 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Relative air humidity: | | 74.0 % | | L2: 0.5 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test room volume: | | 102.8 m³ | | Room: Room 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Area, S, of test room: | | 138.9 m² | | L3: 0.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Volume: 0.5 m³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"><thead><tr><th>Frequency f [Hz]</th><th>L_w 1/3 octave [dB]</th><th>1/1 oct [dB]</th></tr></thead><tbody><tr><td>100</td><td>69.8</td><td></td></tr><tr><td>125</td><td>59.4</td><td>70.5</td></tr><tr><td>160</td><td>58.9</td><td></td></tr><tr><td>200</td><td>65.0</td><td></td></tr><tr><td>250</td><td>61.8</td><td>67.4</td></tr><tr><td>315</td><td>58.9</td><td></td></tr><tr><td>400</td><td>58.2</td><td></td></tr><tr><td>500</td><td>57.8</td><td>62.6</td></tr><tr><td>630</td><td>57.5</td><td></td></tr><tr><td>800</td><td>56.7</td><td></td></tr><tr><td>1000</td><td>55.1</td><td>60.1</td></tr><tr><td>1250</td><td>53.5</td><td></td></tr><tr><td>1600</td><td>51.7</td><td></td></tr><tr><td>2000</td><td>49.9</td><td>55.0</td></tr><tr><td>2500</td><td>48.4</td><td></td></tr><tr><td>3150</td><td>46.7</td><td></td></tr><tr><td>4000</td><td>45.3</td><td>50.0</td></tr><tr><td>5000</td><td>43.1</td><td></td></tr><tr><td>6300</td><td>41.7</td><td></td></tr><tr><td>8000</td><td>39.6</td><td>44.9</td></tr><tr><td>10000</td><td>38.4</td><td></td></tr></tbody></table> | | Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | 100 | 69.8 | | 125 | 59.4 | 70.5 | 160 | 58.9 | | 200 | 65.0 | | 250 | 61.8 | 67.4 | 315 | 58.9 | | 400 | 58.2 | | 500 | 57.8 | 62.6 | 630 | 57.5 | | 800 | 56.7 | | 1000 | 55.1 | 60.1 | 1250 | 53.5 | | 1600 | 51.7 | | 2000 | 49.9 | 55.0 | 2500 | 48.4 | | 3150 | 46.7 | | 4000 | 45.3 | 50.0 | 5000 | 43.1 | | 6300 | 41.7 | | 8000 | 39.6 | 44.9 | 10000 | 38.4 | |  | | | |
| Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 69.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 125 | 59.4 | 70.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | 58.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 65.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 61.8 | 67.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 315 | 58.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 58.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | 57.8 | 62.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 630 | 57.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 800 | 56.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | 55.1 | 60.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1250 | 53.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1600 | 51.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2000 | 49.9 | 55.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2500 | 48.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3150 | 46.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4000 | 45.3 | 50.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5000 | 43.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6300 | 41.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8000 | 39.6 | 44.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10000 | 38.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound power level L_w(A): 65.1 dB [re 1pW] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name of test institute: | | DTI | | Date: 16-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. of test report: | | 300-KLAB-22-034 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurements are in full conformity with ISO 3743 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |








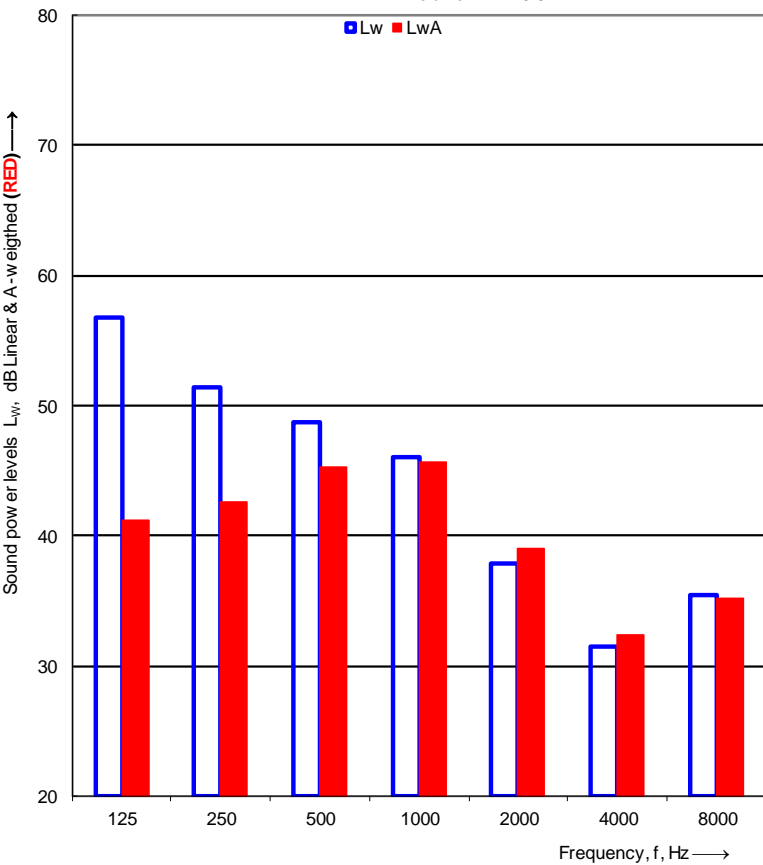
Test N#9

|   | | Sound power levels according to ISO 3743-1:2010 | |  TEKNOLOGISK INSTITUT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|---|--------------------------------------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|-------|------|--|---|--|--|--|
| Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Client: | | Panasonic Marketing Europe GmbH | | Date of test: 16-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Object: | | Type: Air to water heat pump, Model: OD: WH-WDG05LE5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mounting conditions: | | The outdoor unit is mounted on the supporting metal support frame using four vibration damping insulators and placed on four pieces of concrete tiles (20x20x5 cm). The support is placed on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating conditions: | | A-7/W35, Compressor speed: 26[Hz], Fan speed: 430[rpm], Heating capacity: 2.0 [kW], Power_input: 0.79 [kW], Water flow rate: 480 [l/h], dp_water: 592 [mbar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Static pressure: | | 1007 kPa | | <u>Reference box:</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Air temperature: | | -7.0 °C | | L1: 1.2 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Relative air humidity: | | 74.0 % | | L2: 0.5 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test room volume: | | 102.8 m³ | | Room: Room 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Area, S, of test room: | | 138.9 m² | | L3: 0.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Volume: 0.5 m³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"><thead><tr><th>Frequency f [Hz]</th><th>L_w 1/3 octave [dB]</th><th>1/1 oct [dB]</th></tr></thead><tbody><tr><td>100</td><td>54.4</td><td></td></tr><tr><td>125</td><td>49.5</td><td>56.7</td></tr><tr><td>160</td><td>50.2</td><td></td></tr><tr><td>200</td><td>50.8</td><td></td></tr><tr><td>250</td><td>49.2</td><td>54.3</td></tr><tr><td>315</td><td>48.2</td><td></td></tr><tr><td>400</td><td>48.4</td><td></td></tr><tr><td>500</td><td>47.9</td><td>52.4</td></tr><tr><td>630</td><td>46.3</td><td></td></tr><tr><td>800</td><td>46.9</td><td></td></tr><tr><td>1000</td><td>43.1</td><td>49.3</td></tr><tr><td>1250</td><td>41.9</td><td></td></tr><tr><td>1600</td><td>40.4</td><td></td></tr><tr><td>2000</td><td>38.4</td><td>44.0</td></tr><tr><td>2500</td><td>38.5</td><td></td></tr><tr><td>3150</td><td>35.1</td><td></td></tr><tr><td>4000</td><td>35.3</td><td>39.7</td></tr><tr><td>5000</td><td>34.4</td><td></td></tr><tr><td>6300</td><td>37.7</td><td></td></tr><tr><td>8000</td><td>35.4</td><td>40.9</td></tr><tr><td>10000</td><td>34.8</td><td></td></tr></tbody></table> | | Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | 100 | 54.4 | | 125 | 49.5 | 56.7 | 160 | 50.2 | | 200 | 50.8 | | 250 | 49.2 | 54.3 | 315 | 48.2 | | 400 | 48.4 | | 500 | 47.9 | 52.4 | 630 | 46.3 | | 800 | 46.9 | | 1000 | 43.1 | 49.3 | 1250 | 41.9 | | 1600 | 40.4 | | 2000 | 38.4 | 44.0 | 2500 | 38.5 | | 3150 | 35.1 | | 4000 | 35.3 | 39.7 | 5000 | 34.4 | | 6300 | 37.7 | | 8000 | 35.4 | 40.9 | 10000 | 34.8 | |  | | | |
| Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 54.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 125 | 49.5 | 56.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | 50.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 50.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 49.2 | 54.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 315 | 48.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 48.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | 47.9 | 52.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 630 | 46.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 800 | 46.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | 43.1 | 49.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1250 | 41.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1600 | 40.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2000 | 38.4 | 44.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2500 | 38.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3150 | 35.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4000 | 35.3 | 39.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5000 | 34.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6300 | 37.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8000 | 35.4 | 40.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10000 | 34.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Sound power level L_w(A): 54.1 dB [re 1pW] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name of test institute: | | DTI | | Date: 16-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. of test report: | | 300-KLAB-22-034 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurements are in full conformity with ISO 3743 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |





Test N#10

|   | | Sound power levels according to ISO 3743-1:2010 | |  TEKNOLOGISK INSTITUT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|---|--------------------------------------|---|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|--|-----|------|------|-----|------|--|-----|------|------|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|------|------|--|------|------|--|------|------|------|-------|-------------------|--|---|--|--|--|
| Client: | | Panasonic Marketing Europe GmbH | | Date of test: 18-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Object: | | Type: Air to water heat pump, Model: OD: WH-WDG05LE5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mounting conditions: | | "The outdoor unit is mounted on the supporting metal support frame using four vibration damping insulators and placed on four pieces of concrete tiles (20x20x5 cm). The support is placed on two pieces of heavy concrete tiles (90x90x10cm) laying on a vibration damping mat on the floor. The noise radiated by the outdoor unit has been measured in Test room 2." | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating conditions: | | A2/W35, Compressor speed: 25[Hz], Fan speed: 390[rpm], Heating capacity: 2.80 [kW], Power input: 0.68 [kW], Water flow rate: 480 [l/h], dp_water: 485 [mbar] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Static pressure: | | 1016 kPa | | <u>Reference box:</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Air temperature: | | 2.0 °C | | L1: 1.2 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Relative air humidity: | | 84.0 % | | L2: 0.5 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test room volume: | | 102.8 m³ | | Room: Room 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Area, S, of test room: | | 138.9 m² | | L3: 0.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Volume: 0.5 m³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Frequency f [Hz] | L _w 1/3 octave [dB] | 1/1 oct [dB] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 52.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 125 | 50.2 | 56.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | 52.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 47.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 47.1 | 51.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 315 | 44.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 45.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | 43.3 | 48.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 630 | 42.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 800 | 44.1 | 46.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | 39.2 | 46.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1250 | 37.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1600 | 35.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2000 | 32.4 | 37.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2500 | 29.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3150 | 27.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4000 | 26.7 | 31.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5000 | 26.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6300 | 34.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8000 | 26.1 | 35.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10000 | 23.1 ¹ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ¹ Diff. to backgr. noise < 6dB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sound power level L _w (A): | | 50.6 dB [re 1pW] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name of test institute: | | DTI | | Date: 18-10-2023 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. of test report: | | 300-KLAB-22-034 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurements are in full conformity with ISO 3743 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Appendix 1: Test Procedure

The measurements of the emitted sound power level from the heat pump are carried out according to the following:

- DS/EN 14511:2018
- EN 12102-1:2017
- ISO/EN 3743-1

The basic acoustic measurement standard ISO/EN 3743-1 is a comparison method using a calibrated reference sound source. Two series of sound pressure measurements are made under exactly the same acoustic conditions, e.g., the same microphone positions, temperature and air humidity. The calibrated sound power levels are known for the reference sound source at each frequency band, and they are used in the estimation of the acoustical correction factor for the calculation of the sound power emitted from the tested heat pump. The background noise levels are measured and used for relevant corrections.

The final total A-weighted sound power level is based on measurements and calculations in 1/3-octave levels, which then are summed into 1/1-octave levels. The uncertainty is estimated on the weighted standard deviations in 1/1-octave levels.

The actual microphone positions and correction values are saved in data files linked to the complete project documentation according to the DANAK-accreditation.

The complete measurement system is documented and regularly calibrated according to DANAK.

The detailed description of the measurement method is given in Danish in the quality database system "QA Web" at Danish Technological Institute, which is accessible by DANAK.

