



Document Title**Equipment Specification Heat Pumps**

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Client Johnson & Johnson

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Revision Changes

The following is a summary of the main changes that have occurred in this document from the last revision and should be used as a guide only.

(Use this section to highlight main changes from previous revision)

| REVISION CHANGES | |
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| Section | Remark |
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1. SCOPE

- 1.1 This specification covers the minimum requirements for the selection, fabrication, supply, delivery, testing, commissioning, and setting to work of heat pumps and dry cooler for the chilled water and low temperature hot water generation applicable to the Pollux Project in Sassenheim, The Netherlands.
- 1.2 The following systems are described in this specification:
- One water-cooled heat pump, with associated dry cooler(s);
 - Three packaged air-cooled heat pumps.

2. GENERAL

The selected units, outlined hereunder, shall (as a minimum) comply to the following directives:

- CE / Ecodesign / Eurovent;
- Richtlijn Drukapparatuur (PED) 2014/68/EU;
- Machinerichtlijn (MD) 2006/42/CE;
- Laagspanningsrichtlijn (LV) 2014/35/EU;
- Richtlijn Elektromagnetische Compatibiliteit (EMC) 2014/30/EU;
- Norm Veiligheid van machines - Elektrische uitrusting van machines EN 60204-1;
- Norm Elektromagnetische emissie en immuniteit EN 61800-3 categorie C3.

Each specified unit shall be equipped with its own dedicated control panel, based on Modbus (RTU) protocol. Each specified unit shall be commissioned by the supplier / vendor as part of their scope.

Refrigerants in preferred priority:

- R1234ze (GWP<1).
- R513A (GWP = 631).
- R454B (GWP = 467).

The applicable noise levels for the outdoor units shall be according specified levels. All indoor (compressor) units shall all be $\leq 75\text{dB(A)}$ @ 1 meter. If required to achieve this noise level per unit, the supplier / vendor shall include a noise enclosure as part of the package. The required noise enclosure for the indoor water/water heat pump shall comprise:

- Single control panel, type MPU2C
- Two sensor, type MP-DS-HFC-4000

for installation of a sensor on low extract ductwork and a sensor inside the enclosure.

Note that all listed water design temperatures shall be freely adjustable (controlled via the Building Management System (Dutch: GBS)) outside peak summer / winter period.

Each heat pump shall be supplied with:

- Electrical device for energy monitoring (kWh-meter)
- Leak detection
- Main water strainer / filter
- Flow switch
- Tracing (applicable for installed outdoor heat pump)
- Support frame for horizontal / vertical transport and to spread the floor load on the floor
- Vibration dampers to be installed underneath the equipment / support frame
- Insulation on pipework
- Modbus RTU protocol for the control panel
- Pressure relief

as part of the skid, delivered by the supplier / vendor.

3. WATER-WATER HEAT PUMP

3.1 Heat pump

This heat pump shall simultaneously generate chilled water (CHW) and low temperature hot water (LTHW) that shall be distributed to the CHW and LTHW headers for the HVAC and process equipment.

| | Cooling mode | Heating mode |
|------------------------------|--------------|--------------|
| Cooling mode [kW] | 238 kW | 243 kW |
| Heating mode [kW] | 307 kW | 309 kW |
| EER / COP [-] | 3.42 / 4.41 | 3.59 / 4.59 |
| SEER / SCOP [-] | 5.30 / 4.15 | 5.30 / 4.15 |
| CHW temperature in/out [°C] | 16/10°C | 16/10°C |
| LTHW temperature in/out [°C] | 42/47°C | 40/45°C |

- Type: Water / water heat pump
- Refrigerant type: R513A
- Number of heat pumps: 1
- Number of circuits: 1
- Minimum nr. of compressors: 1 (screw)
- Maximum noise power level: ≤91dB(A) excluding noise enclosure
- Noise enclosure: 16 dB noise reduction
- Situated: Indoors
- Power connection: 400-3-50 V-Ph-Hz

3.2 Associated dry cooler(s)

- Number of dry coolers: 1
- Ventilators: EC fans (frequency controlled)
- Heat dumping capacity: 309 kW (see specification here-over)
- Heat exchanger design:
 - Design temperatures: 42/47°C primary
 - Content: Water primary
 - Design temperatures: 41/46°C secondary
 - Content: Water/glycol 70%/30% secondary
- Outside conditions summer: 35°C
- No. of ventilators: 8
- Maximum noise power level: ≤78dB(A) in total (super low noise)
- Situated: Outdoors
- Additional requirement: Alu AlMg3, 0.2 mm coating
- Power connection: 400-3-50 V-Ph-Hz

4. PACKAGED AIR-WATER HEAT PUMP

This heat pump shall generate chilled water (CHW) or low temperature hot water (LTHW). The heat pump(s) shall be able to generate LTHW under winter conditions (-18°C) or CHW under summer conditions (+35°C) that shall be distributed to the CHW or LTHW headers for the HVAC and process equipment, based on the control strategy requirement via the BMS.

| | Cooling | Heating |
|---|-------------|-------------|
| Cooling / heating capacity [kW] | 226 kW | 145 kW |
| EER / COP [-] | 3.31 (EER) | 2.33 (COP) |
| SEER / SCOP [-] | 4.96 (SEER) | 3.58 (SCOP) |
| Water Temperature in/out winter mode [°C] | 16/10°C | 40/45°C |
| Outdoor condition [°C] | 35°C | -10°C |

- Type: Air / water heat pump
- Refrigerant type: R454B
- Number of heat pumps: 3
- Number of circuits: 4
- Minimum nr. of compressors: 7 (1 DC inverter scroll and 6 standard scrolls)
- Maximum noise power level: ≤81dB(A) per selected unit
- Ventilators: 4 EC (frequency controlled)
- Situated: Outdoors
- Additional requirement: Anti-corrosion and hygroscopic coatings for condensers
- Power connection: 400-3-50 V-Ph-Hz