Heat pump task

- How are radiator outputs calculated?
- How do you select underfloor heating?
- Are cascaded heat pumps available in Heatpunk?
- How do I add hot water storage?
- How is the outdoor design temperature (ODT) set and can I change it?

How are radiator outputs calculated?

Heatpunk calculates actual radiator outputs with the below formula. This allows us to easily consider differences in flow, return and room temperatures.

$$P = P_{50}\left(\left(\frac{t_i - t_r}{ln\left(\frac{t_i - t_a}{t_r - t_a}\right)}\right)\frac{1}{49.32}\right)^n$$

where

P = heat emission from radiator (W, J/s)

P_{50} = heat emission from radiator with temperature difference 50 ^{o}C between the radiator and room(W)

t_i = water temperature inlet (^{o}C)

t_r = water temperature outlet (^{o}C)

t_a = surrounding air temperature (^{o}C)

n = n coefficient

The other way you can calculate radiator outputs is by calculating the correction factor based on temperature differences and the specific radiator being used. **This can then be multiplied by the power output given on the datasheet to give the radiator output.** To calculate the correction factor you should use the below formula.

$$Correction\ factor = \left(\frac{t_{rad} - t_{room}}{d_T}\right)^n$$

where

n = n-coefficient (from radiator datasheet)

t_{rad} = mean radiator temperature

t_{room} = room temperature

d_T = delta temperature used on the datasheet for the relevant radiator (this is usually 50^oC)

In the room breakdown of Heatpunk it should give you the total heat loss of the room and then radiator outputs will be calculated based on the flow temp you have used. The rads built into the software are based on Stelrad classic compact, so if you are using heat emitters where the outputs differ significantly you should add them in as a custom radiator to ensure the outputs are calculated correctly.

How do you select underfloor heating?

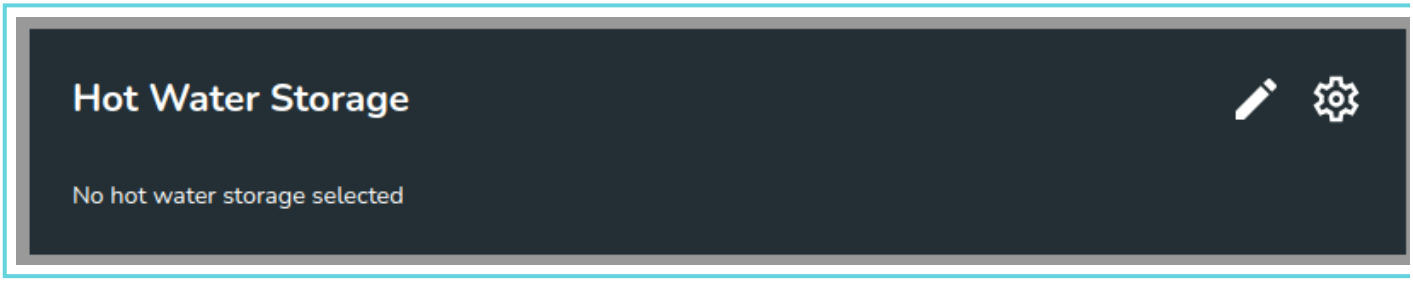
Underfloor heating can only be implemented in the *Heat Pump* design stage. To do this, select *Add Heat Emitter* and choose *Underfloor* which will prompt you to input the floor area covered by the underfloor heating elements and their outputs in W/m^2.

Are cascaded heat pumps available in Heatpunk?

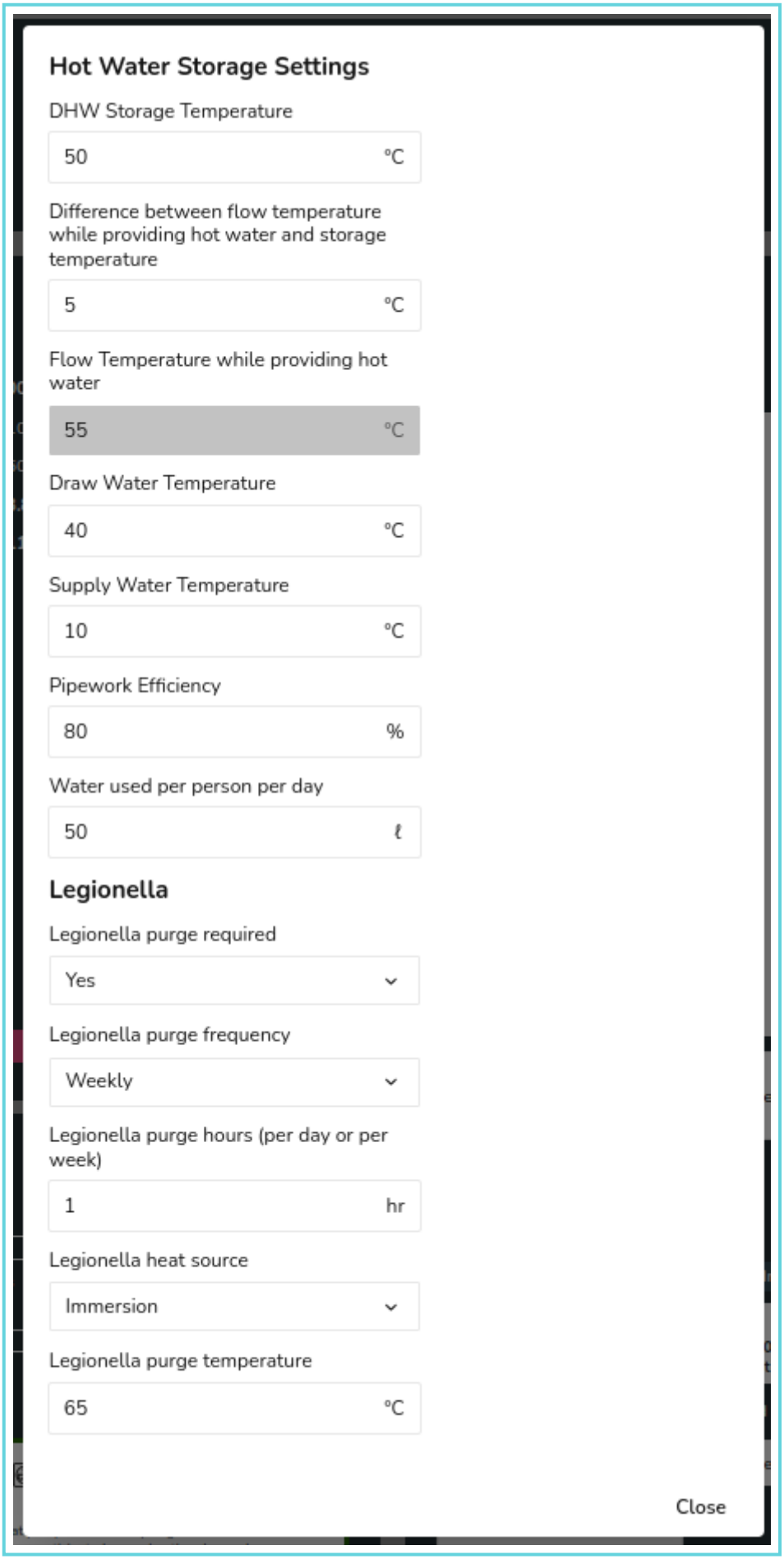
Unfortunately, cascaded systems are not currently available in Heatpunk.

How do I add hot water storage?

How water storage can be added within the Heat Pump task. Simply scroll to the Hot Water Storage section and click the *pencil* icon. Here you can choose from either Heatpump's recommendations our our full list of heat pumps. The recommendations given, are based on the number of bedrooms and occupants. These can be editted at the top of the page and new recommendations generated.



You should also review and edit the Hot Water Storage settings as necessary by click on the *cog* icon, next to the *pencil*.


Hot Water Storage Settings
DHW Storage Temperature
50 °C
Difference between flow temperature while providing hot water and storage temperature
5 °C
Flow Temperature while providing hot water
55 °C
Draw Water Temperature
40 °C
Supply Water Temperature
10 °C
Pipework Efficiency
80 %
Water used per person per day
50 ℓ
Legionella
Legionella purge required
Yes
Legionella purge frequency
Weekly
Legionella purge hours (per day or per week)
1 hr
Legionella heat source
Immersion
Legionella purge temperature
65 °C
Close

How is the outdoor design temperature (ODT) set and can I change it?

The outdoor design temperature (ODT) for your project will be automatically set using the 99th percentile temperature for the relevant project location from **CIBSE guide A**. Using the 99th percentile temperature means the temperature will only fall below the ODT for 1% of the year. You may choose to use the 99.6th percentile in which case no additional uplift is needed for intermittent heating or exposed locations (see MIS 3005-d for details. Using the project's location, Heatpunk will also automatically remove **0.3°C** from the ODT for every **50 m** above sea level.

To change the ODT used for your project:

- navigate to the **Heat pump task**
- scroll down to find the **Heat pump load** section
- **Click the pencil icon** in the top right
- Set the temperature you want to use

Note: An additional **0.3°C** will need to be removed for every **50 m** above sea level, with altitude given in the input section of the technical report & customer proposal.