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.

$$P = P_{50}\left(\left(\frac{t_i - t_r}{ln\left(\frac{t_i - t_a}{t_r - t_a}\right)}\right)\frac{1}{49.83}\right)^n$$

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^{o}C)

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 radiators built into Heatpunk are **Stelrad Classic Compacts with Bottom Opposite End connection**. If you are using radiators where the outputs differ significantly, you should add them in as a custom radiator. If you are using other varieties of connections for pipework, you must also account for this to ensure the outputs are calculated correctly.

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