

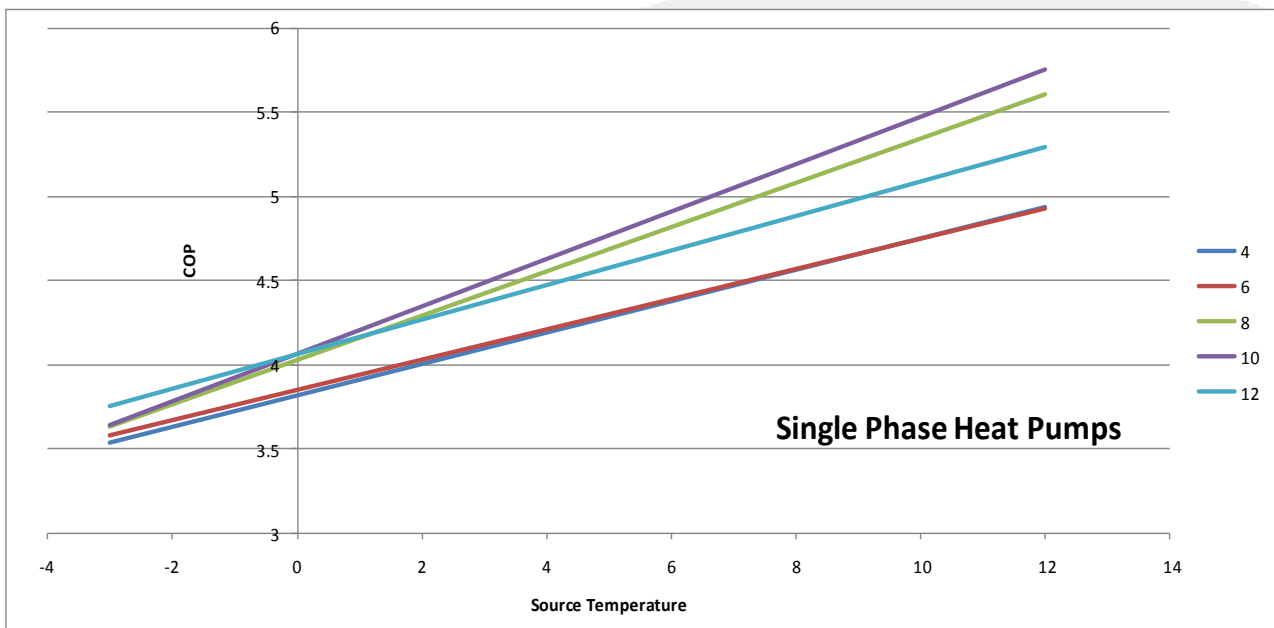
How COP varies with Inlet and Outlet Temperature V2

The [Coefficient of Performance \(COP\)](#) of any heat pump will vary as either the inlet temperature or the heat pumps outlet temperature varies.

Inlet Temperature

As the inlet temperature increases from the ground, the COP will also increase. This is simply as the compressor does not have to work as hard, as the inlet temperature increases, to reach the required outlet temperature. The inlet temperature test condition that all heat pumps should be tested to determine the COP is 0°C as per EN14511-2.

The following graph gives an indication how for different kW rating the COP changes with a change in ground temperature.



The graph above has been generated using the methodology laid down in EN14511 and is as a guide only.

It can be seen from above that an increase in ground temperature is beneficial to the efficiency of the heat pump. In reality although all heat pumps should be tested at 0°C inlet, the ground temperature rarely falls this low and source temperatures of around 2 to 4°C can be expected depending on the time of year.

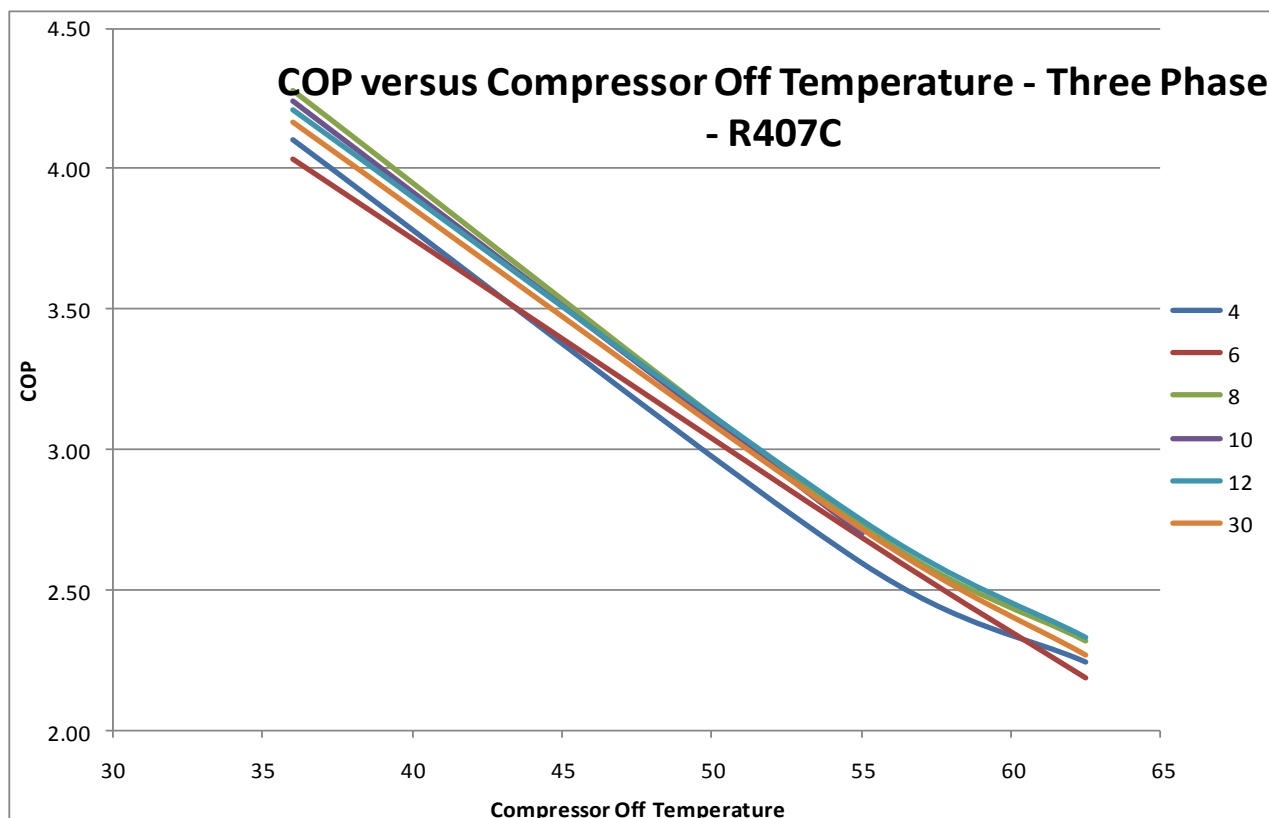


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Outlet Temperature

The higher the outlet temperature of the heat pump, the more work the compressor has to do to achieve this temperature. Therefore the more power the heat pump requires and the lower COP.

The following graph gives an indication how for different kW rating the COP changes with a change in the temperature of the refrigerant coming off the compressor. The temperature leaving the heat pump will actually be less than this 'compressor off' temperature due to losses across the heat exchanger within the heat pump.



The graph above has been generated using the methodology laid down in EN14511 and is as a guide only.

The main outlet temperature test condition that all heat pumps should be tested to determine the COP is 35°C as per EN14511-2. This (with a set inlet of 0°C) is to try and provide a common point so one heat pumps performance can be compared to another.

It can be seen that the outlet temperature from the heat pump can have a significant effect on the efficiency and hence COP of the heat pump. This is why heat pumps are ideally suited for underfloor mounted in screed which only requires a low inlet temperature of 35°C and how using radiators may result in a lower COP due to the higher flow temperatures they require.