Trial of Daikin R22 air cooled pre and post TXR Restore coating

An air cooled Daikin condensing unit has been tested before and after coating with TXR Restore. The tests results have been provided to Connected IoT for analysis by Promek Technologies as raw ClimaCheck workbooks using their own portable test equipment. Connected IoT are the ClimaCheck distributor for Australia and New Zealand and have over 20 years' experience of using the test tool for before and after testing. For further information on the ClimaCheck internal method refer to https://home.climacheck.com/method/ for further details.

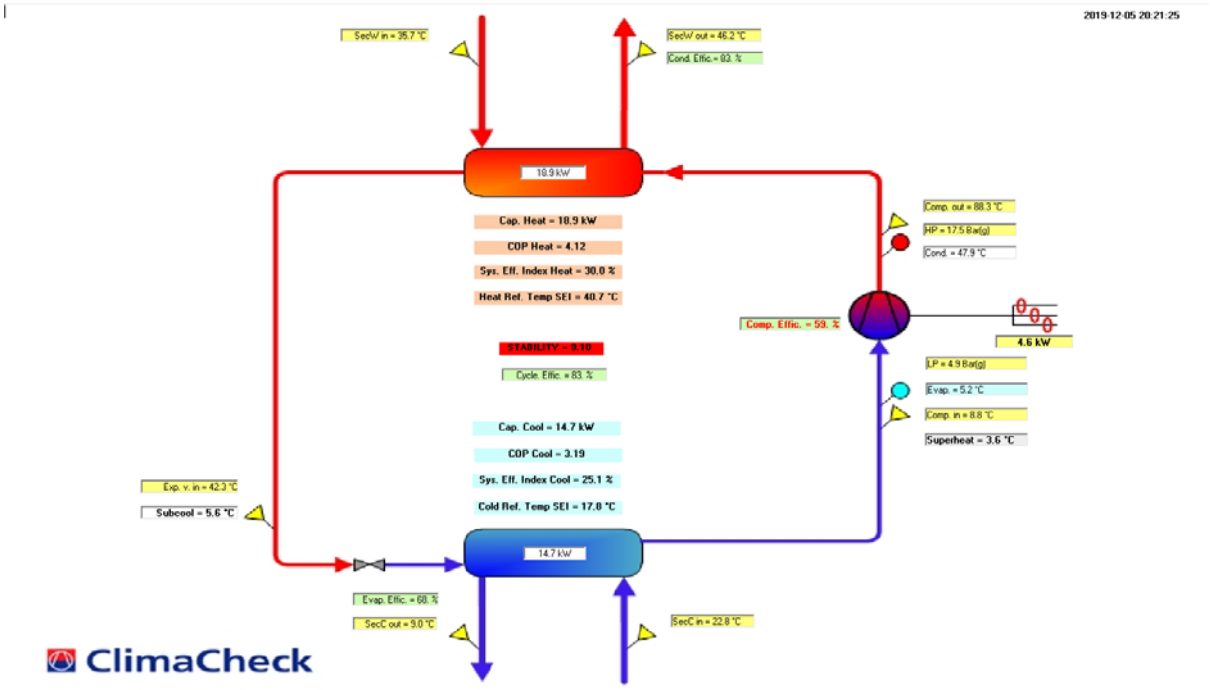
Figure 1 The tested Daikin condensing unit

The flow charts below are snap shots of the operating conditions at each test condition, during as stable operating conditions as possible, for at least 15 minutes. ClimaCheck use only refrigerant pressures and temperatures for the calculations of the Isentropic Compressor Efficiency, Coefficient of Performance (COPc), Subcooling and Superheat. Air temperatures measured are only used for reference for the comparison of similar operating conditions. The air flow is not measured or used in any of the calculations of the performance data.

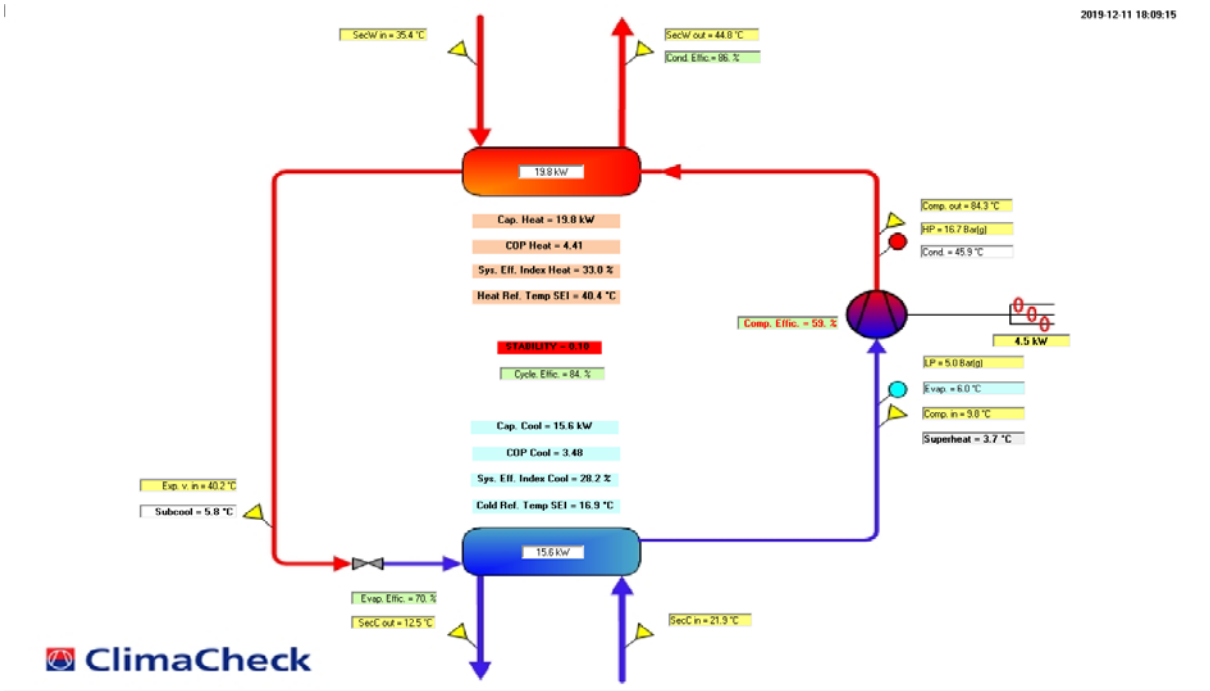
There were no changes of pressure transmitters, temperature sensors, sensor locations or other modifications to the system. This improve overall reliability of the method in a before and after test.

Two different operating conditions were compared pre coat and post coat of the condenser coil. Air on the condenser at 35 °C and 39 °C.

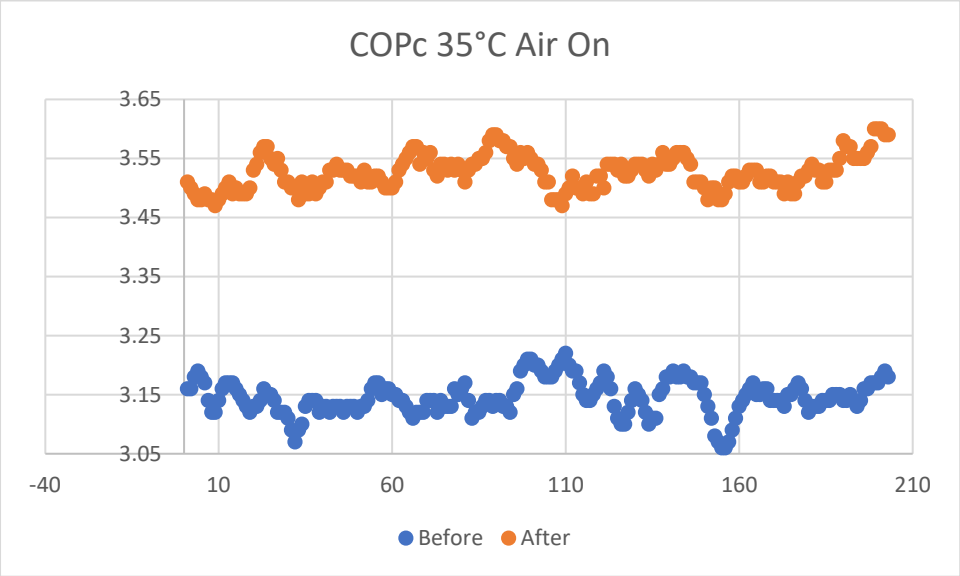
The expansion valve and refrigerant charge, R22, was not changed between the different test conditions.



Test condition 1 - Before applying the coating at 35 °C air on



Test condition 1 - After applying the coating, 35 °C air on



Graph 1 COPc variations at 35 °C during the test periods.

Head pressure down from 17.5 to 16.7 Bar (g) (47.9 °C to 45.9 °C).

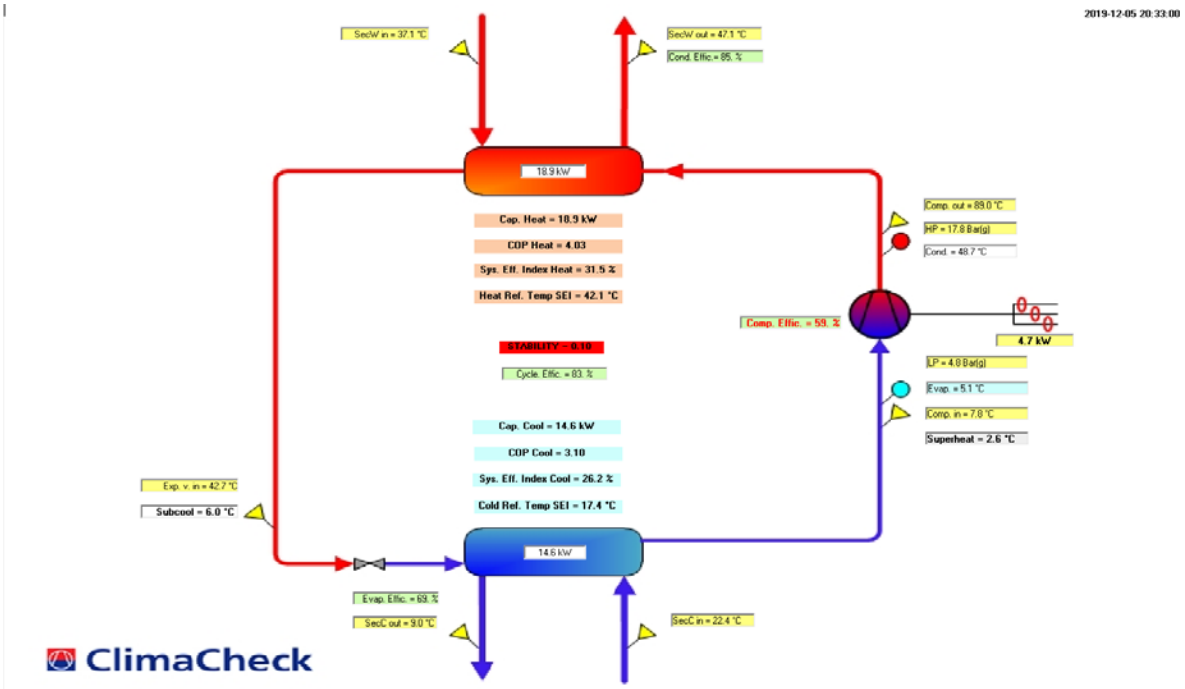
Subcooling up from 5.6 to 5.8 K.

COPc up on average over the sampling period from 3.2 to 3.5.

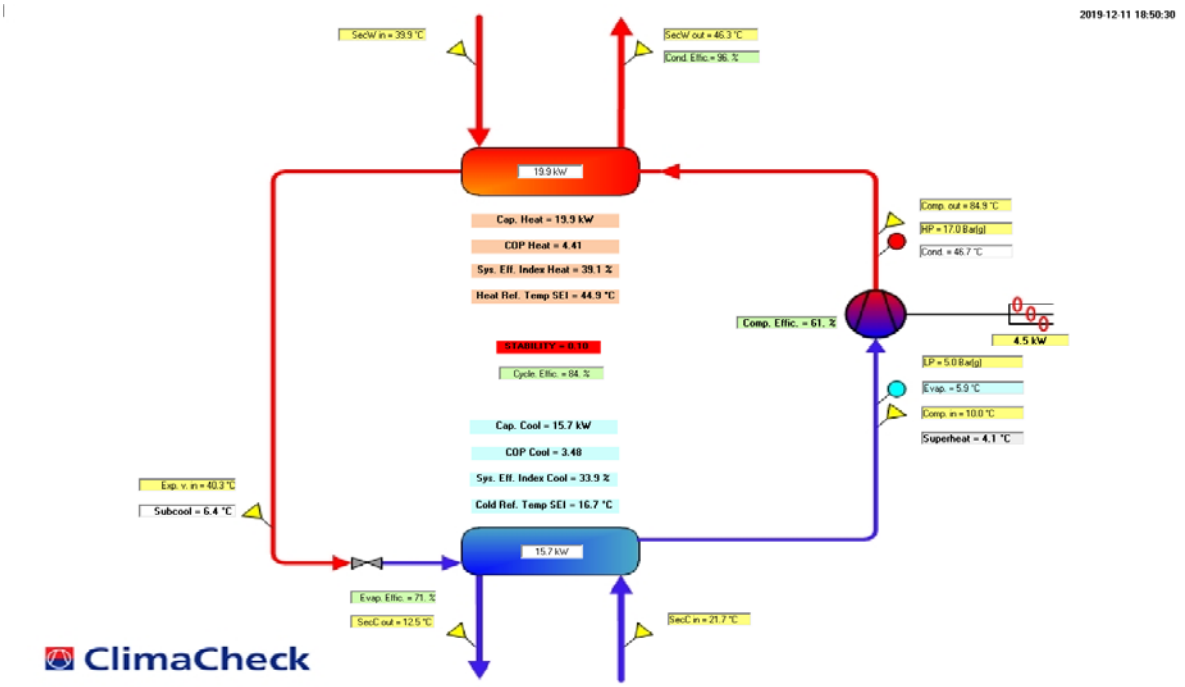
Figure 2 The Condenser after cleaning and treatment

The condition of the condenser was degraded. The pre coat testing was done after cleaning the coil to ensure that any improvement was related to the treatment only and not the cleaning itself.

Test condition 2 – Before applying the coating 39 °C air on



Test condition 2 - 39 °C air on the condenser, after coating the condenser coil



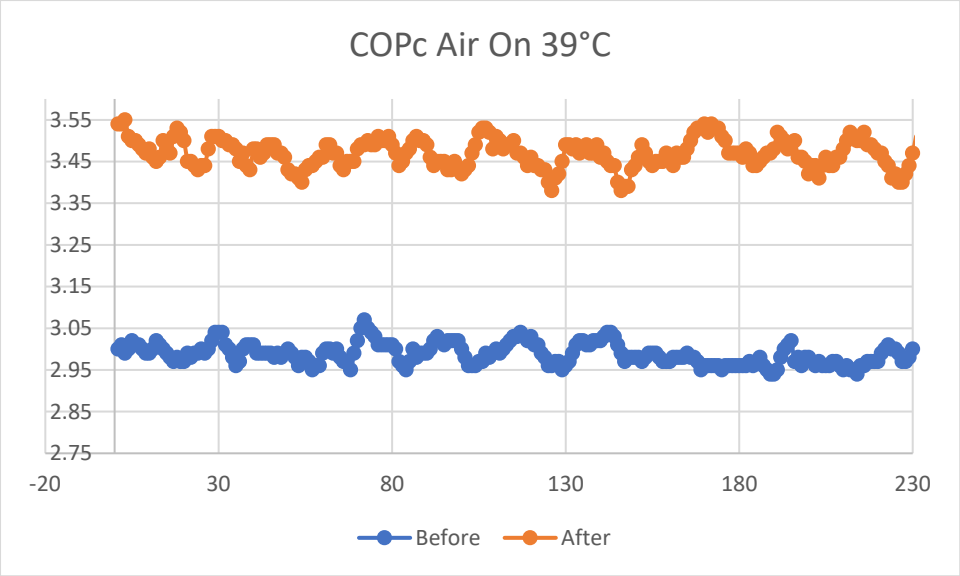
Summary of test results at 39°C air on:

Head pressure down from 17.8 to 17 Bar (g) (51.0 °C to 46.7 °C).

Subcooling up from 6.0 to 6.4 K.

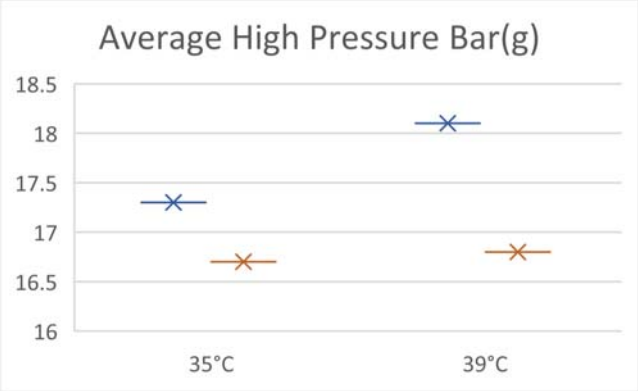
COPc up on average over the sampling period from 3.1 to 3.5.

Comparison of the COP Cooling over 200 samples at as steady state as possible. Each test on different days, the air on temperatures of evaporator and condenser maintained for not less than 15 minutes. Both the 35 °C and 39 °C Air On tests demonstrate an improvement in operating efficiency which can be translated into a reduction in operating cost at the same ambient and indoor conditions.



Graph 2 COPc variations at 39 °C during the test periods.

Both the tests at 35° C and 39° C air on to the condenser demonstrate an improved performance, COPc, of the condensing unit after coating with TXR Restore..



Graph 3 Condensing pressure Bar(g) before and after coating.

The change in condensing pressures are consistent with improved heat transfer after the condenser coil treatment with TXR Restore at higher ambient temperatures.

The improvement in COPc will result in a proportional reduction in operating costs for this system at the same ambient conditions and cooling duty.

Sydney 17th January 2020

Erik Stark – Connected IoT