

APPLICATION OF THE ARTICMASTER TO PROCESS COOLING

INTRODUCTION:

The Articmaster RMS range of products are aimed at achieving significant savings in air conditioning and refrigeration equipment. As this type of equipment is widely used, our objective was to demonstrate the improvement in energy efficiency available from installing an Articmaster unit on a process cooling system. This case study was carried out on a process chiller at the Linpac Packaging factory in Wakefield Road, Featherstone, United Kingdom.



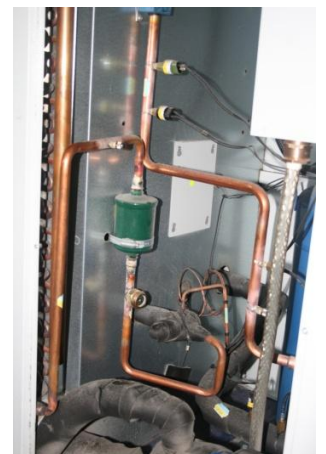
DESCRIPTION OF PROCESS COOLING PLANT:

The process cooling chiller at Linpac is that contained within line 93 which serves the cooling needs of a plastic food container pressing tool in an approximate thirty metre long manufacturing line which produces meat trays for the retail industry. During manufacture a reel of flat plastic material enters the end of the production line and is slowly moved through the machinery. At one stage the material passes through a hot pressing tool. One determinant of the pressing line is the ability to cool the pressing area such that the cycle time between presses can be minimized. The other imperative is that the chiller is simply a cost overhead and maximum efficiency is critical to maintain effective product pricing.

Adjacent to line93 are two package water chillers. One is a RHOSS air cooled unit (Model Number TCAE 123T) which cools the belt driven machinery. The other chiller, the target of this case study, is an Industrial Cooling Systems air cooled water chillers (Model Number TAE EVO 121). This is one of a range of ICS chillers that provide chilled water for a wide range of operating/.manufacturing conditions , otherwise called “process cooling”. In this production facility the chiller is required to deliver chilled water at a temperature of between 9 and 11 degree centigrade. During this study no attempt was made to change these operating parameters. As such any efficiency gains were secured as reduced operating costs.

Chiller Technical Information:-

Model	TAE EVO 121
Serial	2200115761
Compressor	One number Hermetic Scroll
Refrigerant/Charge	8.3 kg of R407C
Condenser	Aluminum Fins, Copper Tubes
Evaporator	Tube Plate Type
Cooling Capacity	47.8 kW
Fans	Two number controlled by condensing pressure
Expansion	Thermostatic with External Compensation



Efficiency Verification:

Electronic data logging equipment was installed for a period of seven days prior, and seven days after the installation of the Articmaster. Measurements were taken of:-

- Water On/Off the Evaporator (to ensure compliance with the temperature requirements)
- Ambient Temperature (to ensure uniformity of comparison), and
- Amp Draw per leg of complete system including compressor, fans and pumps (to measure efficiency gains).

Measurements were also taken of the manufacturing volumes and product types during the same period, as different products cause varying heat loading.

Instantaneous readings of head and suction pressure were taken before, during commissioning and after installation for reference.

Product Installation:

Using the designed refrigerant charge shown on the nameplate, a Standard size Articmaster was specified. Within the chiller unit alterations were made to the pipework layout such that the outlet from the condenser was made to run vertically through a filter/drier and then into the Articmaster inlet. Then from the Articmaster outlet the liquid line was positioned such that it ran smoothly into the TX valve in its existing position.

Results Verification:

Headline Results

Measurement	Before Articmaster	After Articmaster	Difference
Average kWh per Day	215.8 kWh	160.4 kWh	(25.7 %)
Average Compressor Amp Draw	17.28 A	14.34 A	(17.0 %)
Average Ambient Temperature	31.6 °C	31.1 °C	(0.5 °C)
Average Chiller Run Cycle Time	7m 28s	5m 19s	(25.5%)

Summary

The Articmaster unit decreased kWh and chiller run cycle times substantially.