Aqua

The Temperature Control People.

Case Study | **Manufacturing**

Jacketed vessel heating and cooling solution reduces water consumption and production time

Client

Major Cosmetics Brand

Challenge

Production Hindered by
Temperature Fluctuations & Waste
Water Concerns

Solution

Isolated Heating & Cooling System
With Internalised Water System

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We were contacted by the production team of a major cosmetics brand, to discuss a heating and cooling solution for jacketed vessels, used to make 891 batches of cream at their manufacturing site in Kent.

Our Sales Engineer, Ben Newman explains how we supported the project with a water saving and precise heating and cooling solution which will reduce their production time and costs.

Situation

To produce the cream, ingredients are heated and cooled in jacketed vessels, these consist of:

- **3 x stainless steel jacketed vessels with a 1200l capacity and jacket pressure of 6 barg**
- **3 x stainless steel pre-mix jacketed vessels with a 252l capacity and jacket pressure of 3.5 barg**

To combine the ingredients into a high-quality product, process temperatures need to be met in specific timeframes.

Product in the larger vessels requires heating and cooling simultaneously. Product is heated up from 25/30°C to 78°C (but not over 80°C as the product will spoil) as quickly as possible, and then back down to 56°C in 15 to 20 mins and then down again to 40/45°C in 25 to 30 mins.

The smaller vessels require heating from 25/30°C to 75/80°C and this is achieved in 5 to 10 mins.

High volumes of wastewater

Before we were involved with the project, the jacketed vessels were cooled with towns water, which flooded through the vessel's cooling jacket – running continuously and overflowing out of the jacket for 1hr 30mins to 2 hours at a time. This resulted in 16 million litres of wastewater a year.

Fluctuating process cooling times

As well as the wastewater issue, the cooling time would fluctuate – depending on the water temperature, which was at mercy of the weather conditions.

This contributed to longer cooling times in the summer months.

The process cooling rate was averaging 30-34 minutes from 80 to 40°C and we felt that with a more efficient temperature control solution, there was good potential to reduce this, consistently.

Solution

Following the initial enquiry, we visited the production facility and carried out a survey and consultation to understand the specific production process and objectives.

We then designed an isolated heating and cooling system which connects to their existing steam supply and runs off an internalised water system, removing the requirement for added towns water.

The system included a chiller, heat exchanger, pump, tank and all connecting pipework.

Our proposal offered both a high 400kW and low 133kW duty option, so that all 3x vessels could operate either at the same time or individually, one after the other. We also showed the cooling rates of each duty option (133kW v 400kW) from one vessel in operation through to all three. After considering our proposal, the customer opted for the lower duty chiller – our ENR160 which offers 133kW with its exchanger tank and pump arrangement.

We arranged the delivery of all the equipment to the facility where the team installed the pipework and equipment, filled and pressure tested the system and commissioned the units.

To provide flexibility for the future, the system can be adapted for higher heating and cooling capabilities.

Results

We helped the production team improve the heating and cooling control on their jacketed vessels, contributing to the quality of the product with less wastage.

In addition to this, the team have the potential to significantly reduce the heating and cooling rates of the vessels – enabling them to reduce production time and increase production rates and capacity.

Without the need for towns water to cool the vessels, 16 million litres of water is being saved each year, equating to 25% of total water used on site.

For support with your next process cooling requirement talk to the team **0333 004 4433.**