COOLING TOWERS REDEFINED FOR UK CHEMICAL MANUFACTURER

GRUNDFOS iSOLUTIONS

PUMP CLOUD SERVICES

DISCOVER HOW GRUNDFOS PUMPS WITH INTELLIGENT CONTROLS SIGNIFICANTLY IMPROVED COOLING TOWER EFFICIENCY FOR A GLOBAL CHEMICAL COMPANY

The situation

A UK chemical company needed to upgrade its existing cooling system to improve the reliability of its manufacturing processes. Since cooling is such a critical element of this company's processes and product output, control and reliability of that process was critical.

The company had a 1500 kW industrial cooling tower system with a 22 kW cooling fan and two 75 kW end-suction pumps from another pump company. The pumps were run at fixed speed 24/7 continuously, with no control. The cooling tower fan also ran at 100% speed 24/7. The cooling tower, pumps and fan motor were not only too big for actual needs, but the pump motors were also below the international efficiency IE3 standard. There was cavitation in the pumps, as well. Furthermore, although the manufacturer followed a planned maintenance program, there was a good deal of costly, extra system inspection and reactive maintenance due to failures.

The company contacted Vistech Cooling Systems, a UK-based OEM contractor, to remedy the situation. Vistech, in turn, brought Grundfos to the task as its preferred pump supplier. While the initial plan was to simply replace the pumps with newer, more efficient models from Grundfos, the end customer got something much better.

"We knew we were able to fully maximise the process, because we have the capability to start and stop the cooling tower fan through our pump controls. We've gone outside the usual pump box, as we're actually controlling the cooling fan when demand requires," says Luke Gardener, National Business Development Manager for Grundfos Pumps Ltd. in the UK. "In the UK and colder countries, you'll see most cooling tower fans running in winter months when they don't need to be. We've remedied that."

50%
ENERGY SAVINGS

LESS
DOWNTIME

ONE STOP
SHOP

Screen shot of the MPC controller, showing all the different parameters monitored and sent to the customer's SCADA system.

The solution

Grundfos UK's Adam Howe did a site survey to determine the possible energy savings potential on different setup scenarios. The end customer chose the full Grundfos iSOLUTIONS package with intelligent pumps and controls, showing a potential savings of more than 50%.

First, Vistech supplied a smaller cooling tower at 1200 kW to fit the actual system need, along with an 18.5 kW motor fan. At the heart of the system are two Grundfos 75 kW variable speed, NB 100/250 pumps in a duty assist set-up. Both pumps are rated at IE3 premium efficiency.

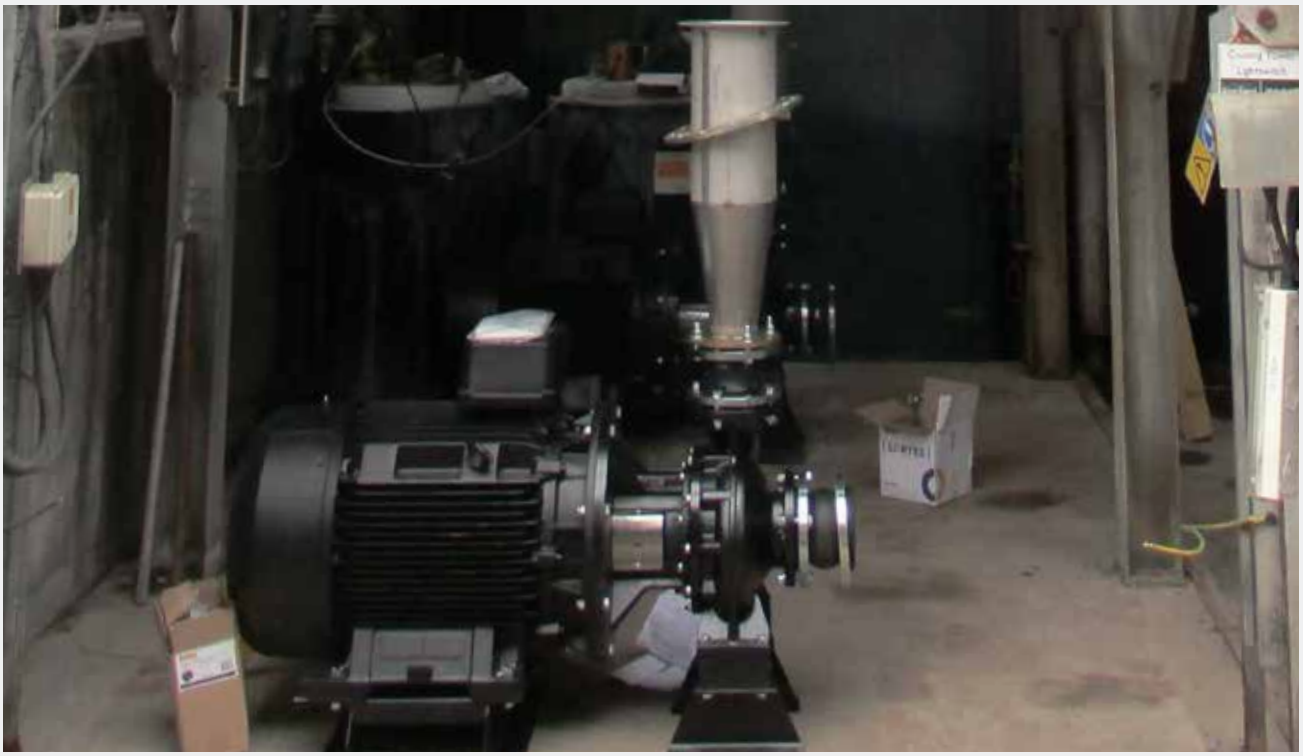
A Grundfos MPC controller runs a constant pressure in the system. Furthermore, Grundfos supplied a variable frequency drive to the cooling tower fan. The MPC controller sends a signal to the fan's motor to start only when the extra cooling is needed.

"But we went even further than that," says Luke Gardener. "Another challenge for the end customer and Vistech is usually dealing with multiple suppliers for control panels and processes. We simplify that as a one-stop shop. From the cost side, the customer does not need to go out and buy another controller to run the cooling tower. They can just run everything from the pump controller."

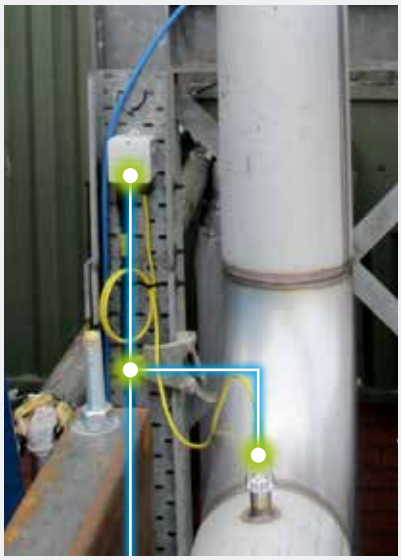
Luke says that for example, in winter months, the water in the bottom of the cooling tower can freeze. ("And we've not yet made a pump that can pump ice – just yet," Luke says.) The immersion heaters that Vistech supplies would usually be controlled by a separate unit. Grundfos powers and monitors these from the MPC.

The cooling tower MPC controller measures not only the overall system pressure but several other parameters, including outlet pressure, external pressure, flow rate, return-pipe temperature, power consumption, energy consumption, flow-pipe temperature and total volume. "We're projecting all of that information into the customer's overall SCADA operating-monitoring system via a protocol called ProfiNET," says Luke Gardener.

"We also educate the end user in how to monitor these critical operating points in order to detect any potential failures and take action before any unexpected downtime," he says.



The new cooling tower from Vistech Cooling

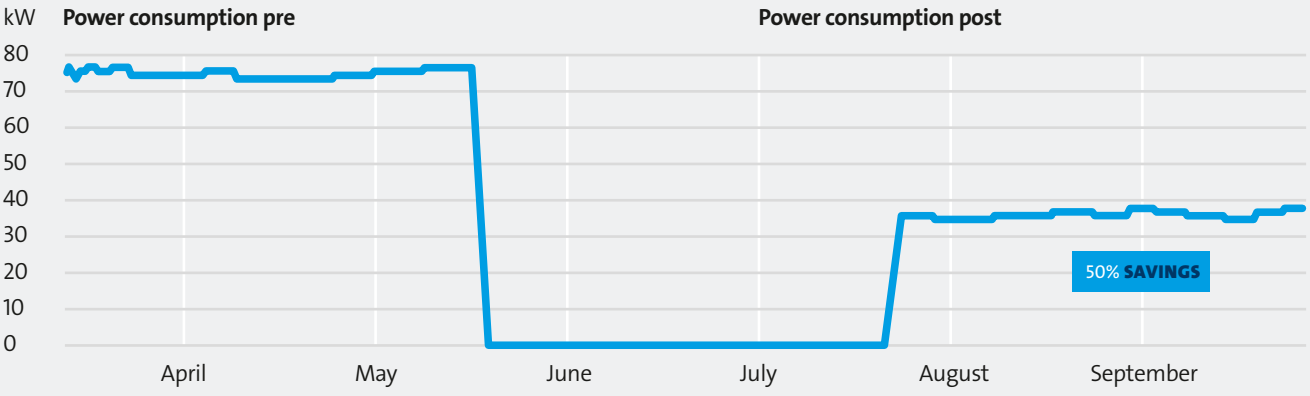


Sensors to monitor the flow temperature and pressure (top) and return temperature and pressure (below), monitored by the Grundfos MPC controller at the pumps.

The outcome

Before the new system was installed, the cooling tower pumps and cooling fan consumed 78 kW in energy. Today, after the iSOLUTIONS retrofit, the peak consumption is 35 kW – a more than 50% reduction. Operational savings for the customer are more than GBP 34,000/year (EUR 38,500/year). The fan motor alone uses around 1.5 kW today. "You've got an eighteen-and-a-half kilowatt fan, where we're only using a fraction of the power needed," Luke Gardener says.

"This can revolutionise industrial cooling," he adds, "where you're delivering the right amount of cooling to the application needed without the detriment of using too much energy. It's monitored and managed autonomously, enabling them to improve their business output as well."



A graph showing energy consumption of the whole cooling tower system before the retrofit (left) and after (right).

Grundfos supplied:

Grundfos supplied intelligent pumps and controls in the UK chemical plant's cooling tower retrofit, including NB pumps with IE3 motors, MPC-EC controls, service commissioning and more.

Bundled solutions

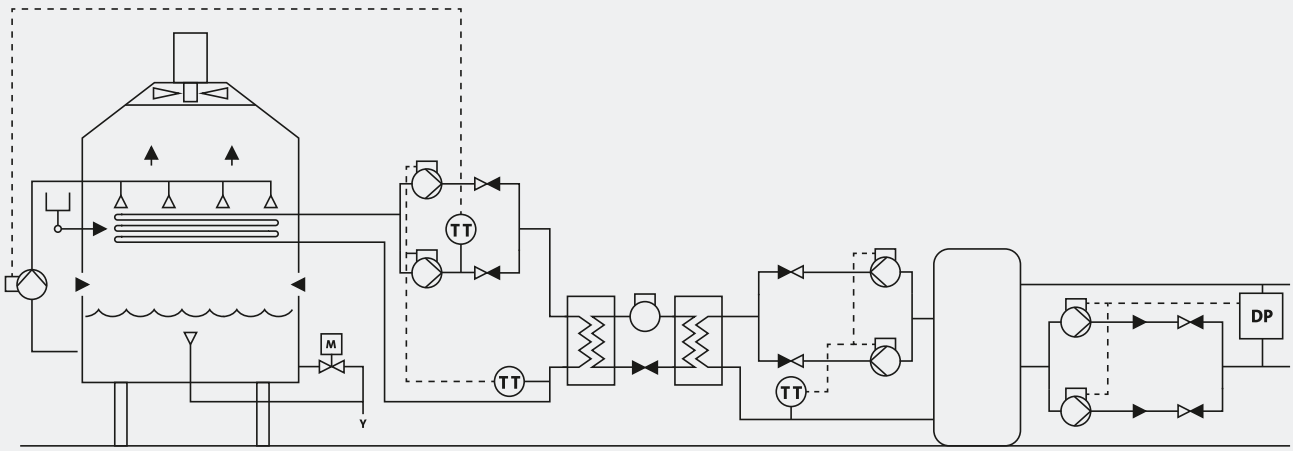
Grundfos also offers pre-packaged, bundled solutions for industrial cooling applications like this one with cooling tower pump and fan. Different packages and configurations are available with pre-selected pumps, sensors and controls that fit easily into the application. Installation is easy and they require minimum commissioning. Ask your local Grundfos sales engineer for more information.

Grundfos offers bundled solutions for cooling applications in multiple packages and configurations.

INDUSTRIAL COOLING – eliminating pain points

FAST – EASY – RELEVANT

- Lowest operation costs
- Longer maintenance intervals
- Saving water
- Saving chemicals
- Saving energy
- Sustainable



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