Cool and Clear Under Pressure (an extract from an industry acclaimed publication) :

A major producer of DVDs experienced problems with a cooling water system in one of its UK plants, which it solved with contamination-proof Lowara pumps from ITT Industries Groups.

One of the world's largest manufacturers of pre-recorded media, including DVDs, VHS video cassettes, CD-audio, CD-ROM and audio cassettes, has facilities in the US, Europe and Latin America. In 1997 the company acquired a VHS videocassette manufacturing plant in the UK, and in 2002 decided to initiate DVD production at the facility. Initially, two production lines were set up, followed by four more about 10 months later. The target was to produce 1,000 discs per hour from each of the lines.

The key element in these production lines is the German-built Singulus machines that form the discs from the polycarbonate raw material. The machines contain a hot mould that needs to be kept at a constant temperature of 95ºC. Part of the temperature control system for these moulds is the circulation of cooling water through channels in the moulds.

"The pumping set-up that was installed for the first two lines resulted in quite a significant amount of downtime – out of 14 months o operation, total downtime has amounted to around a month," Stewart said. "The main problem has been contamination of the water by ferrous oxide".

Advanced Design

Clearly seen as a brownish discoloration in the transparent monitoring pipes on the side of the machines, the contamination caused two problems: it accumulated on the inner walls of the pipe work, thereby reducing flow and cooling efficiency; and deposits clogged the water channels in the moulds, which had to be cleaned out periodically.

When installing the four new lines the company turned to Essex-based Air Options Limited, which, in turn, brought in Lowara UK to provide both design advice and equipment for the new cooling-water pumping system. "I believe that the new pumping set along the other system components provided has really succeeded in eliminating the contamination and other problems with its first system", says Wayne Longman of Air Options.

"The new system consist of four closed-loop circuits separating the client and chiller processes via means of a series of plate heat exchangers", he explains. "There are three identical water chillers, each containing a 700-litre buffer tank and pump set engineered to offer duty rotation and 100% redundancy via interface with the Lowara hydrovar assemblies."

"To minimise contamination, the cooling water serves the process via 6 inch (150mm) diameter ABS, class 'E' piped services, reducing down to 2 inch (50mm) at each line of Singulus plant. To ensure the return water temperature is correct and uniform at the pump sets, we installed a 2,500 litre mixing tank into the system along with water purification pant to meet the criteria laid down by Singulus."

Contamination Control

"As regards to pumping requirements at this site, there were two obvious issues: first, the previous contamination problems, and second, a high-tech application that demands very tight control of pressure and flow," says Lowara's UK southern area manager.

To eliminate the contamination problems the company selected, three Lowara SV4604N150TSR 15kW stainless steel pumps. These are equipped with seals composed of silicon carbide faces, which again minimise the risk of contamination. In order to meet the precise control demands, each of these pumps were equipped with a Lowara UK Hydrovar control unit.

"Hydrovar is a variable speed drive whose software has been pre-programmed for the sole purpose of centrifugal pump operation," the company explains. "It's this dedicated software that differentiates the Hydrovar from other Variable Frequency Drives (VFD) available in the market today: its single purpose programming resulting in simplified installation and set-up, while at the same time providing greater pump control capabilities which enable improved pumping system reliability."

Hydrovar also eliminates the need for pump throttling by regulating pump speed and output to match demand, thereby eliminating wasted energy traditionally "burnt-off" across the control valve. Typically a 30-50% energy reduction can be realised, Lowara claims, which in many cases will pay for the cost of the Hydrovar unit in less than a year.

Furthermore, because the Hydrovar software can be set up to protect the pump from operating under unfavourable conditions, other realised benefits will include increased pump reliability and decreased maintenance costs.

Safety Controls
Minimum and maximum set points are used to maintain pump performance within the recommended operating range of the pump.

If conditions prevail where demand requires pump operation outside these limits, Hydrovar will automatically shut down the pump and send an alarm.

This capability prevents the pump from "dead heading" or being run off the curve; both conditions are known to reduce seal and bearing life, which can sometimes result in catastrophic failure.

Similarly if changes in suction conditions (eg, draining of a vessel) were to result in cavitation or dry running, Hydrovar will again shut down and alarm, thereby protecting both the pump and its shaft seal from failure.

The advantages to the plant in equipping these pumps with Hydrovar technology is that we gain more precise pressure control in the cooling water system: "In the old system pressure varied between 4 and 6 bar. With the Hydrovar control we're now maintaining a very stable 5.75 bar."

"The system has been running with our continuous production for 3 to 4 months and we've had zero downtime".

Whatever your need large or small , Air Options is the only option . Please call 0800 0188423for a competitive quotation .