Opportunity Profile: Condensate Pumps

The application
Condensate pumps provide an opportunity for Vespel® CR-6100 in nearly all industries, particularly the power industry. Condensate pumps are typically multi-stage, vertical pumps pumping condensed steam from a "hot well," after the steam has been used to drive a steam turbine. One thing to note about the application is that the condensate was steam, just a few minutes before entering the pump. Therefore, if the pump pulls a vacuum in the hot well, or there is an off-design process condition, it is fairly easy for the pump to experience run-dry conditions. Being vertical pumps, they are also subjected to potential low levels in the hot well or debris blocking the pump inlet that could cause run-dry conditions. The combination of low-lubricity hot water, the potential for product vaporization, and potential for the pump to run dry make Vespel® CR-6100 an excellent choice for condensate pump line shaft bearings, bushings, and wear rings.

Common Problems
Condensate presents the same reliability challenges as many other ideal applications of Vespel® CR-6100. Hot water provides poor lubricity, plus it is a flashing medium creating the risk of cavitation or dry-running. In the vertical condensate pump exposed to these conditions, customers report that line shaft bearings often wear prematurely, causing high vibration and eventual pump failure.

In extreme cases, the condensate can flash into steam because the hot well is under vacuum conditions. Alternatively, the hot well level can drop below the suction inlet to the pump, or the inlet could become blocked by debris. In these situations, the pump will run dry, creating the potential for pump seizure and excessive damage to the pump shaft, impellers, and bowl assemblies.

The Solution
Vespel® CR-6100 can help your customers make their condensate pumps more reliable. The low wear rate, low coefficient of friction, low coefficient of thermal expansion, resistance to thermal shock, and durability of Vespel® CR-6100 are all positive attributes in condensate pump line shaft bearings and wear rings. These characteristics help your customer avoid premature wear, high vibration, and poor reliability in their condensate pumps. Furthermore, the non-seizing qualities of Vespel® CR-6100 also prevent seizure during run dry situations or off-design operation, reducing repair costs and improving the safety of the pump installation.

Again, it should be noted that customers will receive the full benefit of Vespel® CR-6100 by converting the line shaft bearings along with the wear rings in their bowl assemblies. The wear rings will provide additional rotor stability, and add to the pump efficiency. In addition, Vespel® CR-6100 wear rings in the bowl assemblies will eliminate the potential of metal-to-metal contact and seizure in this area.

The conversion to Vespel® CR-6100 in these pumps can help your customer improve their pump reliability and save money. A customer having problems in this application has a relatively simple choice: they can accept repeated pump seizures or premature overhauls because the line shaft bearings are worn, or they can pay the adder for Vespel® CR-6100 and avoid future overhaul costs.