Hot Pumps for a Pressing Situation

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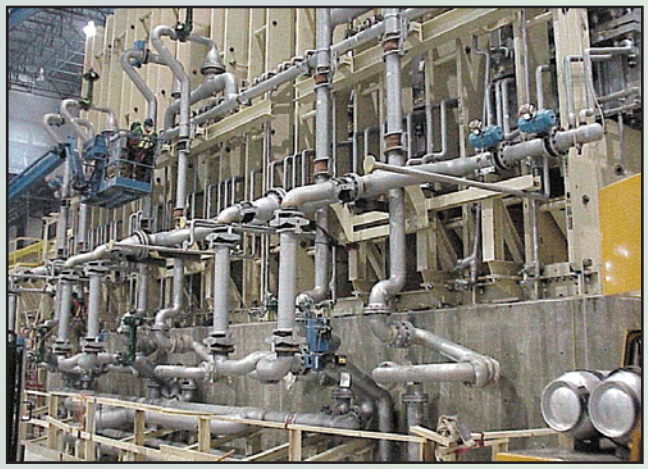
Forest products companies find new ways of meeting demands from the construction industry while reducing environmental impact. Innovative solutions like engineered wood products are filling the bill – produced with the help of tough, reliable high-temperature process pumps from KSB.

With a steady demand for lumber – and a dwindling stock of large mature trees from old-growth, forest product companies have a strong incentive to find innovative ways to make the best possible use of the wood they cut. One of the most important developments has been the introduction of engineered wood products. These are composite materials made from a mix of wood particles and adhesives, formed into planks and sheet materials that can be substituted for traditional saw-cut lumber in many applications. Engineered wood products are strong, durable, easy to work with using conventional tools and – an important advantage – they can be made from smaller second-growth or fast growing trees (such as poplar) that would not normally be useable for construction-grade lumber.

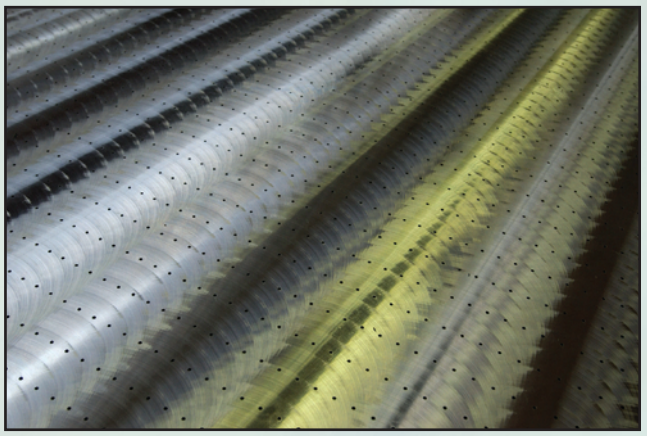


View of Siempelkamp press for iLevel.
Photo courtesy of Siempelkamp

One of world's largest manufacturing facilities for engineered wood products is located in Kenora, Ontario. This mill, owned by the iLevel division of the Weyerhaeuser Company, manufactures structural products marketed under the Timberstrand® brand.

The Process and the Pumps

The Timberstrand product is manufactured in an enormous press plant that applies heat and pressure to a mix of wood chips and adhesive to produce the laminated strand lumber (LSL) in the form of large slabs. These slabs are then sawn into pieces that can be used as beams, joists and columns in construction. Because the slabs are relatively thick (up to 90 mm), special processes are needed to ensure that the "strand mat" is heated through its full thickness so that the adhesive will cure evenly. Highly specialized presses were developed specifically for large-scale production of LSL in thick slabs. In order to ensure quick and thorough heating of the strand mat, two complementary heating systems are used. The first heating system features a thermal oil system that heats the press platens to the required temperature. In order to ensure that the strand mat is heated to an adequate temperature through its full thickness, a second system injects high temperature steam into

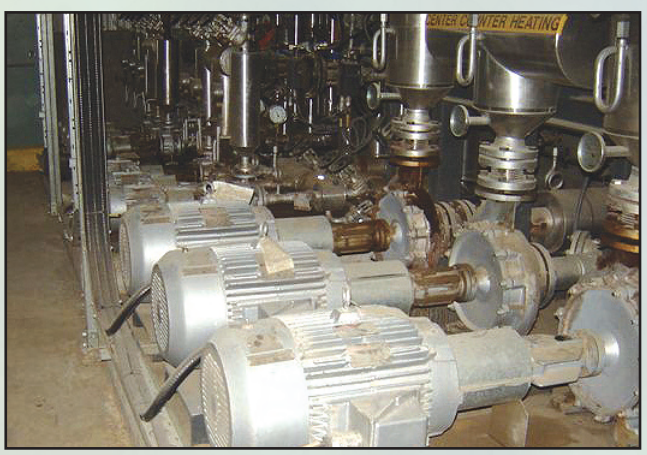


Detail of the Siempelkamp press showing holes for steam injection.
Photo courtesy of Siempelkamp

the mat through an array of tiny holes in the surface of the press platens. Once the mass of the material has been heated enough to ensure complete curing of the adhesive, a vacuum system draws the residual moisture out of the slab. These presses were built by Siempelkamp, a world leader in wood processing equipment.

The press plant at the iLevel mill receives its heat from a heat plant that burns waste material. A system of pumps and pipes circulate hot liquid from the boilers to the giant presses. The heat transfer loop and press systems are powered by over twenty Etanorm high temperature pumps from KSB, one of world's premier pump makers. Because of the high temperatures needed for the LSL manufacturing process and the large size of the plant (10 acres under the roof), the system architects elected to use a "thermal oil" system for the heat transfer loop (see sidebar).

Used at many installations around the world, the Etanorm line of pumps is KSB's workhorse for high-temperature applications. With their large cooling fins and a design featuring an extended distance between the hot hydraulics and sensitive components such as mechanical seals, they are built to operate without external cooling. Etanorm heat transfer pumps require no special piping for cooling or lubricating the bearings or seals. The main bearing next to the impeller is lubricated by the heat transfer medium passing through the pump, while the extra-long drive shaft creates enough distance between the hottest components (impeller, volute casing) and the motor-



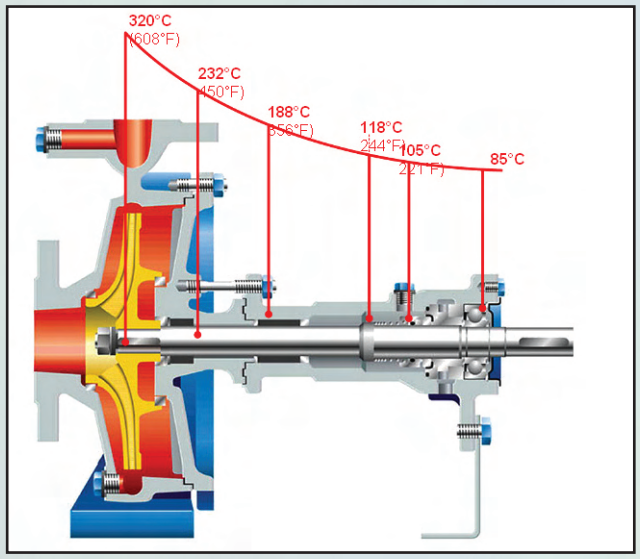
KSB Etanorm high-temperature pumps at iLevel plant.
Photo courtesy of Siempelkamp

end shaft seal and bearing to keep the temperature of the heat-sensitive components at acceptable levels.

"Avoiding extra piping for coolants or lubricants simplifies plant design and reduces operating costs," says Mike Blundell, National Sales Manager, Industry and Energy for KSB in Canada. A special back pull-out design – leaving the casing in place when the pump is dismantled – makes the single stage horizontal Etanorm pumps easy to maintain.

"What mill operators look for from pumps are reliability, maintainability and energy efficiency," reports John Lekun of Industrial Pump Systems, KSB's distributor and service agent for industrial applications in Northern Ontario. "Etanorm pumps, with their maintenance-friendly design, efficient hydraulics and ability to take the heat are a great choice". Lekun continues: "Etanorm pumps don't require external cooling water. Using less water means less environmental impact - another important consideration for our customers."

These rugged heat transfer pumps have made a significant contribution to the success of Weyerhaeuser's iLevel mill in Kenora, which started production four years ago. "We're pleased with the support we've received from KSB while Industrial Pump Systems has been a reliable on-site liaison," comments Kurtis Gessner, Maintenance Planner at iLevel. "The pumps have been solid performers that have helped us keep production on schedule."



Cross-sectional drawing of KSB Etanorm heat transfer pump – with temperature profile.

Thermal Oil for Heat Transfer Applications

Water is an excellent heat transfer medium – but there is a hitch. As temperatures increase, so does the vapour pressure (i.e. the pressure below which boiling occurs). At 300°C for example, the pressure needed to keep water in its liquid phase is 87 bar (1260 psi.). Containing this level of pressure requires heavy-duty piping and pressure vessels – clearly an expensive proposition! The alternative to building a high-pressure piping system is to use an organic heat transfer fluid, also known as 'thermal oil'. These fluids will remain in the liquid phase with little or no pressurization at temperatures as high as 350°C (662°F). There are a number of organic heat transfer fluids available, including petroleum distillates, synthetic oils and silicone-based oils. The choice of an ideal heat transfer fluid depends on the required temperature range, along with operating conditions and economic considerations.

KSB Pumps