HEAT TRANSFER PUMPS –
THE HEART OF EVERY WOOD PRESS SYSTEM

ContiRoll double belt press: on the left side you can see the insulated pipes of the press heating with the thermal oil pumps.

CHALLENGE

Precise control of heating plate temperature; pumps with a wide performance range for both petroleum-based and synthetic thermal oils from a single supplier, thereby ensuring an optimally dimensioned pump for every system; high pump capacity at low speeds; maintenance intervals longer than one year; competitive prices.

SOLUTION

Allweiler-brand heat carrier pumps from Colfax Fluid Handling

RESULTS

No major failures nor customer complaints since 1984. Many pumps have been running for 20 years or more without disturbance. Approximately 10 new wood presses with 50 Allweiler® pumps are installed every year.

COLFAX Fluid Handling

German company Siempelkamp GmbH & Co. KG has been manufacturing presses for industrial plywood production since about 1900. In 1940 they added presses for the production of particleboard and then for Medium Density Fiberboard (MDF) and Oriented Strand Boards (OSB). Today, the company offers systems that cover the entire process chain for production of wood-based boards and is among the industry's global leaders.

Heat is essential for the production of wood-based boards like laminate floors and furniture panels. Through the application of pressure and heat, loosely adhered wood chips are transformed into a variety of wood-based boards. A portion of these boards are then laminated with various coatings – once again through the use of heat and pressure – for use as flooring or kitchen work surfaces, for example. (pictures from page 10 of "Siempelkamp inside") Since 1994, Siempelkamp has been manufacturing precise continuous double-belt presses under the name ContiRoll and these have established themselves as the best selling system in the world for the production of wood-based boards.

PRECISE CONTROL OF HEATING-PLATE TEMPERATURES

The heating plates are the most important element of any press. They apply heat and pressure to the wood boards and must do it with with precision and most importantly uniformity. Uniform application of heat depends on pumps that reliably move petroleum-based or synthetic thermal oil to the heating plates at a uniform temperature of approximately 280°C. Pumps that are specially designed to work at these high temperatures move the thermal oil past hot flue gas in a pipeline-mounted heater, bringing the oil up to temperature. Oil temperature is still at about 255°C when it passes through the lateral channels in the heating plates. By the time the oil flows back into the boiler after losing heat in the press, it is about 20°C cooler. Maintaining a precise temperature at the heating plates is essential for achieving high product quality. Allweiler-brand heat-transfer pumps from Colfax Fluid Handling have proven their suitability from day one, with neither significant failures nor customer complaints.

INTERNAL DEVELOPMENT AND OPTIMIZED DIMENSIONS SAVE ENERGY.

Up until 2010, Siempelkamp procured the entire heating loop for the secondary loops from specialized suppliers. But in an effort to control more of the manufacturing process, they decided to develop their own secondary heating stations internally. In doing so, they also optimized the dimensioning of the heating system. As a result, power consumption was reduced significantly. For example, depending on system output, power needs dropped from about 300 kW to 100-120 kW. However, in order to supply various size systems with heating power, Siempelkamp needed to have pumps with a very wide performance spectrum. At most, flow rates of up to 800 m^3/h with a delivery head of 60 m are needed. At speeds of 1450 1/min, the pumps are also considered to be slow-running, which makes them generally less susceptible to disturbances and fires and therefore less costly to insure. By optimizing dimensioning of the system and pumps according to actual needs, Siempelkamp can save several thousand euros on each press.

Graduate physicist Klaus-Peter Schletz

What's more, the pumps are extremely reliable. According to physicist Klaus-Peter Schletz, who is responsible for secondary heating of the wood presses: "When the pumps are properly aligned at start-up in a warm condition and the bearings are regularly maintained, they are completely reliable and run without any disturbances whatsoever. We have systems that have been in operation for 20 years without even minor problems." Since the manufacturer was able to provide the required wide performance range, Allweiler® Allheat® pumps were a natural choice for the internally designed secondary heating stations.

PETROLEUM-BASED AND SYNTHETIC THERMAL OIL

Depending on the type of heat-transfer oil that is used, either pumps of the NTT or NTWH series are chosen. The NTT series is ideal for use with petroleum-based thermal oils. Their mechanical seals are located behind a heat barrier that protects the seals from the high temperatures. As a result, the simple standardized antimony-carbon/SiC seals used in the pumps have an exceptionally long service life. The pumps are also available in two-stage versions (with the same external dimensions) for smaller flow rates with a higher delivery head. They are installed with a foot-type bracket on a base

plate with a separately coupled standard motor and volute casing. The pump-side anti-friction bearing is liquid-lubricated, while the drive-side bearing is grease-lubricated. If the mechanical seal is not working properly, additional safety elements ensure that only a small amount of liquid can escape. Thanks to these design details, the pumps exceed the requirements of DIN 4754. Any pumped liquid that does escape is completely collected and diverted without causing harm. The special design of the insert unit drops the temperature so effectively that the bearing and shaft seal work with virtually no wear. Maximum capacity is 1250 m^3/h; maximum delivery head is 145 m at 16 bar, and oil can reach up to 350°C.

Secondary heating circuit with Allweiler® thermal oil pumps.

INNOVATIVE DESIGN FOR A UNIVERSAL SOLUTION

Allweiler® NTWH pumps have special bearing brackets and plain bearings that are designed for high-temperature use with low-viscosity heat carriers like synthetic thermal oils and hot water. The pumps are highly versatile, without external cooling and durable in continuous operation. Relative to the system's heat output, heat loss is minimal and maintenance intervals are normally longer than 12 months in continuous operation, even under difficult conditions. Design details ensure high uptime and safety. The Allweiler® pumps are extraordinarily robust mechanically. Both the seals and the bearings are cooled efficiently and protected from dry running. With a special bearing geometry and a tilting mount, the plain bearings stay in service for extended periods and are able to handle high loads. A safety gland packing, minimized axial thrust, an anti-friction bearing with a long service life, and a double cardanic coupling for special applications provide additional safety for heat-carrier applications that frequently enter the critical range. Available bearing/seal combinations include an unbalanced all-round mechanical seal with a carbon antimony bearing and a balanced heavy-duty seal with a silicon carbide plain bearing. Maximum capacity is 1250 m^3/h; maximum delivery head is 10 m at 16 bar, and oil can reach up to 350°C.

NUMEROUS BENEFITS OF ALLWEILER® PUMPS

Experience has shown that surprisingly few system operators use synthetic oils although they pay for themselves over the long term. Only one out of ten to twenty new systems have been operated with synthetic oils. Since the operator specifies which type of oil it will use, Siempelkamp must be able to offer both varieties. The fact that Colfax Fluid Handling has pumps for both types of thermal oils in its product line means that Siempelkamp needs only one supplier, which has turned out to be a clear benefit.

Aside from the positive experiences, the broad performance spectrum, and the ability to obtain both pumps types from a single supplier, obviously purchase price is not an insignificant factor. With systems costing between 10 and 100 million euros, costs for heating (and pumps) account for only a small percentage of the total costs. But a competitive price is still an important criterion, which is why Siempelkamp uses German-made Allweiler® pumps from Colfax Fluid Handling as the default choice in all of its systems. According to Mr. Schletz, there is yet another characteristic of Allweiler® pumps that make them the right choice for Siempelkamp: "Allweiler® pumps can handle heavier loads and are more stable than comparable pumps from other manufacturers. This affects the permissible flange loads and bearing forces coming from the pipes." Siempelkamp installs Allweiler® pumps into the secondary heating systems of an average of 10 wood presses per year, each with five heating loops (50 pumps total).

Graduate physicist Klaus-Peter Schletz with sales engineer Uwe Holzheier from Allweiler® in front of a press installation.