Executive Summary

The Valmet supplied PM 1 paper manufacturing line was successfully started up at Myllykoski’s Plattling Papier in Germany in the beginning of December, 2007. The PM 1 line, which is one of the largest in the world, represents the latest SC paper technology from Valmet’s paper and automation groups.

The paper machine, PM 1, is of the OptiConcept design and has a wire width of 11.3 m and a design speed of 2,000 m/min. Equipment supplied includes GentleBarking debarking line, OptiConcept paper machine, OptiLoad TwinLine online multi-nip calender, WinRoll winders, StreamLine roll wrapping and handling system, ventilation and heat recovery systems.

PM 1 now competes among the top SC producers in Europe. The development of the mill’s rotogravure grades has been very good, while the offset grades have been considered of very high quality from the beginning.
Only a week after its start-up on December 1, 2007, the papermaking line at Myllykoski alliance partner Plattling Papier in Germany was already running with 7 + 7 roll calendering. In less than two months, the mill was supplying high-quality SC-A paper to its customers on a regular basis. The swiftness surprised even the mill management.

**Quality among the best in Europe**

Valmet supplied Plattling Papier with a PGW line and an OptiConcept machine with a wire width of 11.3 m and a design speed of 2,000 m/min. The PM 1 line combines several new furnish and production concepts and outsources a significant part of its operations to reliable partners.

"The choice of PGW as the mechanical pulp is one of the main reasons we've reached our quality targets," says Caius Murtola, General Manager. "The paper machine concept is well-tested and proven, and includes a reasonable amount of new technology. Each component was chosen with our quality targets in mind. We wanted to be the first mill in the world to make European SC-A rotogravure quality with online calendering."

Another special feature is that the whole production, from pulp line to ready customer rolls, is controlled by online measurement. Extremely reliable results are available every ten minutes, which means that the number of laboratory tests can be reduced. This is essential for all-online papermaking, where process adjustments need to be made very quickly.

According to Murtola, PM 1 now competes among the top SC producers in Europe. The improvement in the mill’s rotogravure grades has been substantial, while the offset grades have been considered of very high quality from the beginning.

"PM 1’s runnability is very good. If we count all the breaks, their number is below the average for SC machines, including offline machines. It means that there aren’t a lot of breaks," comments Mika Kämpe, Operations Manager.
Full-scope maintenance agreement strengthens cooperation

"The cooperation between Valmet and Plattling Papier has been excellent. Our project manager, who has built several production lines, appreciated the fact that everyone aimed for the same goals and helped each other. There was a real will to solve problems," continues Murtola.

In fact, the high degree of motivation and competence among both Plattling Papier’s and Valmet’s personnel was an important factor contributing to the excellent start-up.

In addition to cooperating on the start-up curve and quality development, the parties also signed a full-scope, longterm maintenance agreement covering the entire new mill. It concerns roll maintenance and daily maintenance, with a focus on preventive and predictive activities. A team of some 40 Valmet experts takes care of mechanical and electrical maintenance and manages civil engineering maintenance.

**PGW: less energy, better quality**

In an environment dominated by high energy prices and tough competition in woodcontaining printing papers, mills have rediscovered PGW technology thanks to its low energy consumption and positive effect on paper quality. As Plattling Papier aims at producing high-quality SC-A+(+) paper with high gloss and brightness, the PGW70 process is ideal.

The logs at the PGW plant are fed to the grinders by an automatic grinder charging system. There are eight pressure grinders, which are coupled in pairs into four tandem lines. The plant capacity is 720 BDTPD. The sharpness of the grinder stones is controlled by a Water Jet Control system.

From the MC tower the pulp is pumped into two twin-wire presses to increase the pulp consistency to high bleaching consistency. It is brightened in the tower during a retention time of 2–3 hours by means of hydrogen peroxide. It is then diluted with cleaner wash water and pumped further to the washing stage, where it is thickened by twin-wire presses, gain diluted and further pumped to a storage tower.

**Proven forming and press section solutions improve runnability**

The OptiFlo II headbox on PM 1 has dilution and edge flow controls which compensate for inside wall friction and guarantee good fiber orientation profiles.
A new turbulence generator concept and slice channel wedges produce a homogenous slice flow with fewer disturbances than occur on traditional headboxes. The flat CD basis weight and fiber orientation profiles allow high machine speeds without profile-dependent runnability problems later in the papermaking process.

The forming section is an OptiFormer gap former with a forming roll and a two-zone suction unit. Formation, filler distribution and porosity can be controlled by forming roll and suction unit vacuums.

The press section is a SymPress B with a 4th press and a SymBelt shoe press in the third nip, allowing high nip loads. It has an IQSteamPro steam box for profiling, as well as the latest doctoring technology. A separate 4th nip is needed to produce highly filled SC paper with minimal surface two-sidedness. Press section ventilation improves cleanliness and temperature control for enhanced runnability.

**OptiLoad TwinLine gives superior finish**

The online OptiLoad TwinLine calender gives a superior finish to high-end, uncoated woodcontaining printing papers. It has two stacks of alternating high-temperature steel rolls and soft-covered polymer rolls in order to effectively control paper moisture, blackening, two-sidedness and printability. The two stacks, with moisturizing between them, enable individual surface moisture control on both sides of the web, providing significant advantages over one-time moisturizing. The multi-step moisturizing system results in less sheet blackening, because the incoming moisture can be kept lower than in normal SC-A paper production. The high surface moisture, together with the high steel roll temperatures, improves gloss, smoothness, porosity and oil absorption.

The calendering nip relieving and loading system makes it possible to run the same nip load – up to 450 kN/m – in all six nips on both stacks. The two-stack concept with the same framework allows operators to independently control nip load, temperature and moisturizing for either side of the sheet. The calender has two profiling steam showers for effective gloss control, a two-stage tail threading system and a top SC-A production speed of 1,650 m/min.

**Improved reeling efficiency**

PM 1’s fully automated, center-driven OptiReel Plus reel is equipped with the most advanced technology, including an iRoll reel drum, a compliant reel drum cover and parent roll oscillation.

By measuring the nip load profile online and immediately showing the quality of the parent roll, iRoll improves reeling efficiency. It enables closed loop parent roll profile control with feedback to the
calender’s profiling rolls, providing immediate response to profile-related roll quality variations and improved runnability downstream.

The reel drum has a compliant cover, which conforms to the parent roll topography and is less sensitive to paper CD profile variation than a hard drum. Good contact with the web helps produce parent rolls with uniform tightness. A compliant cover also dampens nip-induced vibration and eliminates paper marking.

**WinRolls for fully automated winding**

PM 1 production is transformed into customer rolls by two fully automated WinRoll multi-station winders. Their drive speed is 3,000 m/min and maximum trim width 10,500 mm. The printing roll sizes is dimensioned to vary from 400 mm up to 5,200 mm in width, the maximum roll weight being 10 metric tons.

The winders feature completely automated full-width web threading, reel handling and reel change with a printing press quality butt-joint splice, positioning of slitters, winding stations and rider rolls, core handling and gluing, wound roll tail gluing, fast set change, as well as WindControl, an accurate feedback-controlled winder control system, and WindHelp, an intelligent winder diagnostics system.

**No hydraulics issues with the StreamLine roll wrapping machine**

The StreamLine roll wrapping machine has a capacity of 120 rolls per hour, with maximum roll widths of 5,200 mm and roll weights of 10 metric tons. It is equipped with overlap wrapping for wide shipping rolls, which are wrapped with two, three or even four overlapped wrappers. Overlap wrapping provides the best protection against humidity changes and causes less stress on the roll, as its rotation is minimized.

No hydraulic actuators or components are used on StreamLine. All actuators are either electric gear-motor-operated or pneumatic. The lack of hydraulics means no hydraulic oil leaks, no hydraulic power units and consequently no maintenance and environmental issues. Electric drives also save more energy than hydraulic systems do.
Efficient air systems lower environmental impacts

The Plattling Papier has paid special attention to external and internal noise control. For example, there are Valmet silencers on the roof of the mill which attenuate external or environmental noise and make the mill surroundings very silent.

Heat recovery is an essential part of the paper mill's energy management. Its main purpose is to efficiently recycle the process energy so that no usable energy is wasted. As a result, over 60% of the energy needed to produce paper is recovered into the process air and water.

A closed hood efficiently prevents the flow of hot and humid process air from the machine to the machine hall, and thus helps to create good working conditions. At the same time, the controlled air treatment improves the energy economy of the process.

The control of indoor climate and environment not only creates better conditions for the process, the process supervision, the building structures, the equipment and equipment maintenance, but also provides good indoor air for the personnel. The machine room is ventilated by wall-mounted units that require minimum space.

Summary

PM 1 now competes among the top SC producers in Europe. The development of the mill's rotogravure grades has been very good, while the offset grades have been considered of very high quality from the beginning. According to the Project Director, "...we can clearly see that the new line will become one of the best SC-A paper machines in the world. The printing results have so far been extremely good compared with other SC-papers."

This white paper combines technical information obtained from Valmet personnel and published Valmet articles and papers.

Valmet provides competitive technologies and services to the pulp, energy and paper industries. Valmet's pulp, paper and power professionals specialize in processes, machinery, equipment, services, paper machine clothing and filter fabrics. Our offering and experience cover the entire process life cycle including new production lines, rebuilds and services.

We are committed to moving our customers' performance forward.