

Goss M-600 Folia press

PRODUCTION EFFICIENCY

- Measurement by OEE and the limitations of traditional perfecting presses

PRESS OVERVIEW

- Reel input – efficiencies and paper savings
- Simultaneous perfecting at 30,000 sheets per hour
- Standard sheetfed features
- The benefits of digital inking
- Advanced sheeting

CONTINUOUS RUNNING

SUMMARY

The Goss M-600 Folia – Production Efficiency



“Higher productivity” has always been a key aspiration for the printing industry. But as costs of paper, energy, printing inks and skilled labor continue to increase, this frequently used, but not always measured term, must now become an essential element in every printer’s day-to-day thinking.

To understand the quantitative measurements of “productivity”, some printers have already started using a methodology developed for the manufacturing industry called Overall Equipment Effectiveness (OEE).

**Overall Equipment Effectiveness =
Availability x Performance x Quality**

Combining these factors in this way shows their relative impact on each other and to the overall rating, which for world-class products should be in the 80-85 percent region.

For example, if a press is out of action for 10 percent of the time due to makereadies, cleaning and paper loading its availability is 90 percent. But at the same time, the same press may only be running at 80 percent of its design speed, and 5 percent of production is below specification or is waste, hence quality is 95 percent.

In this scenario OEE is $0.9 \times 0.8 \times 0.95 = 68.4$ percent. So, individual performance figures that looked good actually combine to give an overall efficiency which is well below target.

For traditional long perfecting presses, OEE is affected mainly by the ‘performance’ part of the equation. Although most

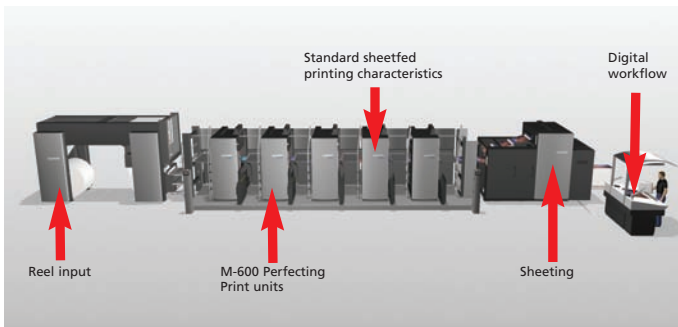
presses are rated at 15,000 sheets per hour (sph), many printers run at 11-12,000 sph throughout the process of printing one side, flipping the sheet and then printing the other.

The new Goss® M-600 Folia™ press eliminates this restrictive sheet handling requirement and delivers a higher OEE rating. This white paper describes how the elements of this innovative press configuration combine to provide productivity that is more than double that of a traditional perfecting press, with running speeds up to 30,000 sph.

REEL INPUT **Optimal productivity, cost reduction, paper utilization**

Reel paper supply is a key productivity factor, as it eliminates the complex paper feed and handling systems that affect the performance of traditional sheetfed perfecting presses. In a sheetfed press, the acceleration of individual sheets so that they enter the first printing unit at the right time, place and speed is a complex problem, which requires sophisticated mechanical systems. The dynamics of these systems, and those that handle the continued progression of the sheet through the press, limit the overall speed and productivity. They also reduce the printable area on each sheet due to non-print area required for the gripper operation.

The benefits of printing from a reel are not restricted to the dynamics of the press. Depending on supplier and location, the cost of purchasing paper in reels can be up to 15 percent less than the cost of purchasing sheeted paper. The M-600 Folia press capitalizes on this saving by using Goss reelstands, which deliver a 99.7 percent success rate for automatic splicing from one reel to the next, and facilitate continuous running until a job is completed. The reelstand also has automatic web guiding and tension control to ensure a perfect flow of paper into the press. With full reports on paper usage and optional storage solutions, the M-600 Folia

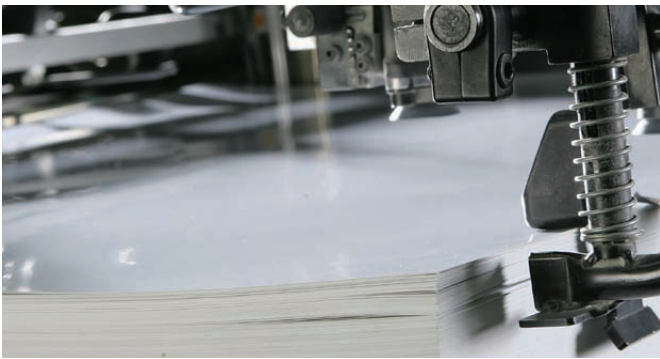


Press overview

reelstand reduces press crew involvement with paper infeed, giving them time to focus on the performance and quality factors of good printing.

Sheetfed press manufacturers have attempted to gain the cost savings of paper reels with systems that sheet the paper at the beginning of the process rather than post-impression.

Although the systems offer cost savings, the press speed is still restricted by the need for gripper mechanisms. In addition, drawbacks due to the pre-cutting, such as paper dust being dragged into the first printing unit by the flow of paper, have an adverse effect on print quality.



The conventional paper infeed for a sheetfed press is a barrier to higher productivity

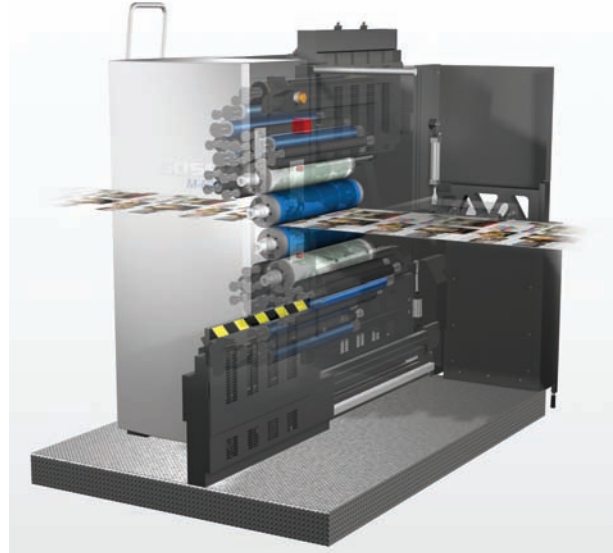
SIMULTANEOUS PERFECTING AT 30,000 SPH

The printing units of the M-600 Folia press have a long pedigree, with installation in over 600 press lines worldwide. The blanket-to-blanket design allows the press to print at 30,000 sheets per hour, almost twice the speed attained by single-sided sheetfed units because there is no need to transport and register individual sheets. Simultaneous perfecting also facilitates perfect back-to-back registration and utilization of the entire sheet format on both sides, as the gripper margins (10 mm) and the non-print gutters (12 mm x 3) conventionally required to turn sheets are redundant. Taking this saved space into account, which is as much as 20 mm across the sheet, the maximum press format of 700 x 1020 mm provides full eight-page working with all printer's marks and color bars included.

STANDARD SHEETFED FEATURES

With their tried-and-tested design, the M-600™ printing units have many advanced features to ensure optimum printing quality, minimum makeready time and low waste. They also use standard sheetfed inks and consumables, printing with the same characteristics as a sheetfed press so that users do not have to adjust their prepress or pressroom workflows.

Other unit features include dual 15-roller ink trains for optimum inking performance on both sides, narrow blanket gaps (7 mm) to save paper, and Goss Autoplate™ technology to maximize press 'availability'. Autoplate is a patented



Blanket-to-blanket printing with no sheet handling, allows speeds up to 30,000 sheets per hour

technology that allows an entire job, or a single plate in version work, to be changed in less than three minutes, enhancing cylinder-to-plate registration in the process.

Further enhancements to ensure fast makereadies on each printing unit are provided by the digital workflow package of the M-600 Folia press. Presetting is one specific feature that illustrates the continued design focus on Overall Equipment Efficiency.

Ink train presetting is an established technology using RIPped page data, but further enhancements are needed to optimize its capabilities. The first of these featured in the conventional inker of the M-600 Folia not only presets the inking system, but also calculates the overall print coverage and adjusts the ink roller speed accordingly – an extremely important feature for very high and very low coverage jobs, where maintaining a constant ink film without causing misting, starvation and excessive waste is critical.

Similarly, the need to remove leftover ink from the prior job from the entire ink train before establishing correct levels for the next job is another key to fast makereadies, particularly when changing between jobs with significant variations in ink density. The solution provided partially removes ink in advance, during the deceleration of the press for a job change.

Using the preset feature just described, the system can assess the ink coverage needed for the next job and calculate the difference between the ink remaining in the ink train and the

pre-charge required for the second job at start-up.

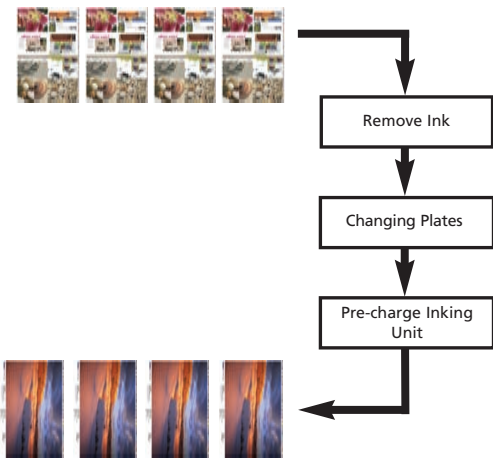
Actual results indicate that by using this feature, printers changing from a job with 40 percent coverage to a job with 10 percent coverage can reduce the number of wasted sheets attributed to adjusting the level of ink in the ink train by more than 50 percent.

THE BENEFITS OF DIGITAL INKING

The Goss DigiRail™ inker has won awards for its accuracy and control. As such, it is a strongly recommended option for the M-600 Folia press. The system uses high precision, low torque, inline gear pumps to feed individually controlled ‘digital’ valves, which then provide a stream of accurately metered ink pulses onto the ink train.

The gear pumps are enclosed in a manifold, which feeds ink evenly to the gear pumps from a single-pipe supply system. Unlike other inking systems there are no extra external pipes, blades or servo units to cause leaking or unreliability, giving advantages in maintenance, cleaning and ink-waste reduction.

The simple manifold design is a completely sealed unit, which means that no contamination can get into the ink from lint,

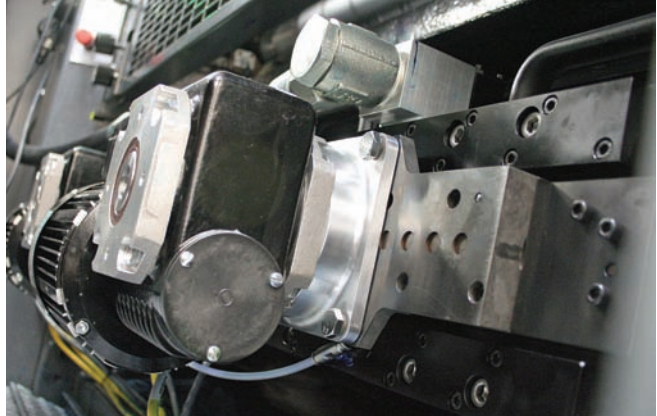


If a job has a different print coverage than the former, paper waste (used to obtain the right amount of ink in the ink train) is minimized

paper dust or excess dampener. Also, the M-600 Folia press uses standard sheetfed inks, which are air drying, so the enclosure maintains ink fluidity and ensures a precisely controlled supply of fresh, non-contaminated ink to the inking rollers.

More importantly, the design of the pumps and their drive

system, which uses synchronous AC motors that maintain speed regardless of motor load, means that the volume of ink delivered is independent of viscosity or temperature. Due to this fact, the Goss DigiRail inker automatically compensates for ink-batch differences and the hotter running conditions associated with higher press speeds. When combined with the presetting capabilities of the award-winning digital inking

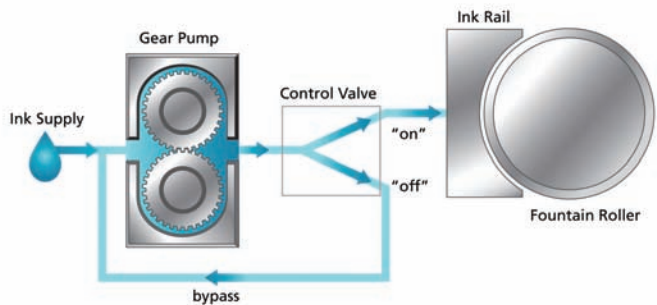


DigiRail ink manifold

option, the M-600 Folia press has unmatched ‘up-to-color’ performance.

ADVANCED SHEETING

The original target during the development of the M-600 Folia press was to run at over 25,000 sheets per hour without a dryer and to enable the printed stack to enter the finishing workflow within four hours. Having considered all the options, and determined to maintain ease-of-use and lower



Digitally controlled ink pulses

the cost-per-page compared with sheetfed perfecting, the development team chose anti-set-off application. The technical challenge now was to develop a system that could run at speeds much higher than ever before tried. Anti-set-off powder separates the printed sheets enabling air to dry the printing ink naturally, so that it is not transferred from one sheet to the next, or “set off”.

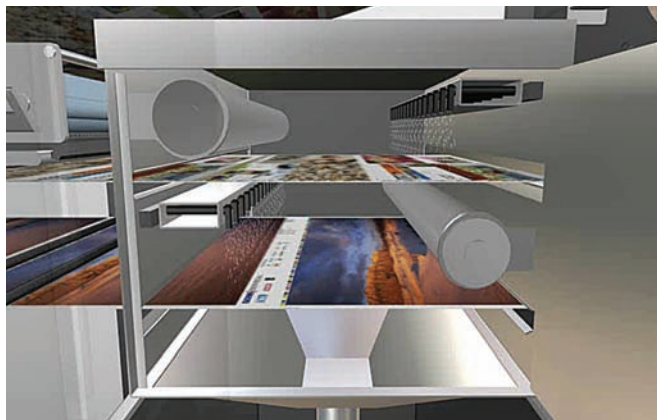
To ensure the “quality” factor of the OEE productivity equation was not undermined by anti-set-off application, Goss, in conjunction with a high quality print consumables specialist, tested numerous combinations of particle size and deposition rates. The target was to match sheetfed print quality and typical drying time in the production workflow before a stack can be passed to the finishing department. Normally with coated stocks, this time varies between 4 and 8 hours, depending on whether the paper finish is gloss, silk or matte. For uncoated stocks, this can increase substantially.

With the M-600 Folia press, there is the added challenge of applying the powder to both sides of a moving web. Although the powder particles are between 15µm and 70µm in size, gravity still has its part to play – vertical deposition is needed for consistency and evenness. The electrostatic and hydrophobic properties of the powders also had to be taken into consideration by the design team.

To solve the need to apply the powder vertically, Goss International worked with sheeter expert VITS. Turning webs with a series of rollers is a common procedure, but in this case the turning immediately preceded cutting the web, and the cut had to be in precisely the right position. So, the challenge was to flip the web with rollers that did not ‘pick’ any of the wet ink, and yet had enough contact to keep total control on lateral and circumferential positioning.

The solution shown uses two specially designed traction rollers. These are highly polished to minimize ink adhesion, but also have a matrix of vacuum holes that provide just enough overall adhesion for the rollers to guide the wet web into the rotary cutter. The potential for ink to stick to the rollers is minimized by the fact that they are positioned after the anti-set-off application unit. However, for fail-safe performance an automatic cleaning system for the rollers, with selectable and adjustable cleaning programs ensures continued optimum performance.

The sheeting system of the M-600 Folia consists of two rotary straight knives which run against the anvils of a counter



Traction roller

cylinder. Both knives are easy to set up and require low maintenance.

Once cut, the sheets move towards the delivery via a transfer cylinder and then a breaking cylinder. By sequentially switching the vacuum surfaces of these two cylinders, the sheets are guided, controlled and slowed down so that they can be laid on the printed stack with great accuracy. The process uses the air between the sheets to ‘float’ one over the other so that there is no marking. The combined effect is a perfectly formed stack that is ready to join any finishing workflow within the same timeframe as traditionally printed perfected sheets.

CONTINUOUS RUNNING

As the printing units of the M-600 Folia press are fed by a reel of paper with automatic changeover, they can run continuously as long as the printed stack is removed at regular intervals. This is achieved by having a second base to the stacking mechanism, which can be manually inserted at the top of the current stack to allow new sheets to be collected. Once inserted, the existing stack is then removed and the second base collects the new sheets until the process needs to be

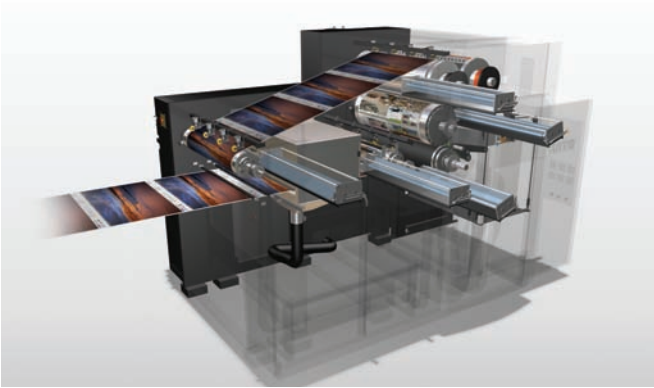


Inserting the second base of the stacking mechanism while the press is running

repeated. For short runs, the stack height is one meter high, giving a capacity of approximately 5000 sheets when working with 150 gsm stock.

SUMMARY

The M-600 Folia press has been designed from the outset to dramatically enhance Overall Equipment Effectiveness in the printing of high-quality sheeted products. In addition, it offers the potential to reduce paper and power costs while maintaining print quality and traditional workflows. These features provide key differentiators to printers in an increasingly competitive marketplace.



Automatic roller cleaning

FSC Logo to appear
within red Box

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