

# Inline flexo: the key to added value packaging for retail markets

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*Inline printing machines gives possibility to run jobs with water based ink and coatings at production speeds up to 800 m/min. A part of this is due to the machine design that allows a full drying process after each printing unit. The TRESU Flexo Innovators drying system offers a solution where the drying process is done with high airflow and volume rather than increasing the temperature.*

With stable printing and coating at up to 800 metres per minute, the ability to include many processes in a single pass with a high level of versatility through modularity, the latest inline flexo presses provide a competitive solution for delivering retail packaging solutions that add value through a variety of means, and not just for consumers, but for the supply chain as a whole.

When we think of 'added value' packaging for retail goods, images of attractive finishing effects spring to mind - folds and creases, as well as foils, varnishes, embossing and other tactile features. However, aesthetics are only part of the story. While consumers increasingly expect products to be tailored to their needs, for the supply chain, adding value comes from flexibility to deliver short and long runs efficiently and fast.

First, let us consider what added value means and to whom. For the consumer, it is about creating an engaging buying experience, both by conveying quality, and offering better functionalities for handling, performance or protection. Brand owners depend on a distinctive, attention-grabbing package that persuades the shopper to buy, and builds brand identity.

Arguably, the packaging has to work harder nowadays to generate sales. A package, among a proliferation of competing brands, has only a few seconds to convince the consumer to buy. Also, more creativity is needed to build and retain customer interest and loyalty, and this is typically achieved through versioning and promotions, to appeal to specific lifestyles and tastes. In food and beverage markets especially, there are more niche players – consider the craft beer and chocolate sectors – yet, familiar global brands are still dominant.

At the same time, supply chain partners face greater cost and time pressure. Converters are expected to deliver in shorter volumes, at shorter notice, to reduce logistics and warehousing costs.

These trends are having a disruptive influence on the supply chain, particularly for converters. Increasingly, packaging printers are telling us that they have to meet a wider range of run-length demands: from short-runs, where up to 14 jobs must be performed in one eight-hour shift, to traditional run lengths as well as occasional runs up to 160 rolls, lasting up to three days.

Paperboard converters, especially in food and beverage markets that cater for such diverse job mixes, tend to 'expect the unexpected' and need to cope with both high volume output as much as easy job changes.

This complex combination of demands makes it essential for converters to invest in a press that offers the right mix of versatility, as well as quality, efficiency and speed capabilities to suit customer needs.

Necessary characteristics include:

- The ability to offer more sophisticated, unique printing solutions in a single pass: this can mean more colours, combined with foiling and varnish coating stations, to provide visual and tactile appeal, as well as reverse printing and coating
- The ability of the press to integrate with and contribute to a workflow where waste in terms of materials, time, human input, energy, – can be eliminated. Shorter makeready times, to optimize uptime, especially when performing shorter runs
- The ability to reduce time to market through simplified workflows and faster production speed to maintain high output for large volume orders

Inline flexo has clear advantages for many package printing situations, as it offers both the high standards of quality and flexibility.

## Quality throughout the workflow

While offset has a fast, economical workflow, the same can be said for flexo, thanks to advances in printing plates and digital imaging systems that facilitate a definition of 180lpi (70l/cm).



For the consumer, this level of quality is indistinguishable from either offset or gravure. However, the thicker ink coverage of flexo makes it possible to achieve richer solid colours, as well as an array of contrasting varnish effects in a single pass, and quality reproduction on economical substrates such as kraft paper.

Inline flexo offers modularity, so that presses can be configured with any desired number of colour and coating stations, as well as complementary processes. These can include reverse printing, coating, the inclusion of digital and rotogravure processes, and a combination of different ink sets, in a single pass.

It is the role of the press manufacturer to look carefully at the converter's job mix so that the optimum press configuration can be devised. The right choice offers a return on investment that should continue for 20 years or more.

Another important advantage of inline presses is the ability to add additional units as needs change. A gap in the middle of the line can be created to retrofit UV-curing, inkjet modules, or not-yet-invented enhancement techniques. For liquid packaging applications, it is possible to integrate cutting and creasing units between the printing stations and re-winder.

## Web Widths to Suit Numerous Packaging Applications

Flexo lines can be configured in several widths making them suitable for a wide range of packaging applications. The finishing line for the products will dictate the press web width needed, not the other way round. For that reason, press flexibility and versatility is best achieved with the modular, inline press that has standard widths for applications, but can also be custom-configured.



This makes it crucial for a flexo press manufacturer to offer a range of width options. Folding carton lines can be between 670mm and 1700mm; paper cup and plate converters tend to prefer a width of 1100mm, while liquid packaging converters prefer 1700mm. A 670mm-wide press is also suitable for label and narrow web converting.

## Hybrid Flexo: Advanced Drying and Curing for Distinctive Packaging

Line configurations also allow greater web distance between printing stations, for better control as well as faster speeds during drying and curing. This enables 'hybrid flexo' printing – where different flexo ink sets can be combined in a single pass.

Hybrid flexo printing, combining several water-based stations with one or two UV-curable and solvent ink printing stations, is growing in demand, as these allow a wider range of printed and coating effects to be incorporated, for better product differentiation.

At TRESU, we have converted gravure and direct-reverse gravure jobs to flexo within fifteen minutes, thanks in part to the performance of the drying and curing systems.

## Drying Systems

Inline flexo is beneficial for fast water-based printing because a longer web path between printing stations is possible, resulting in cleaner colour printing. High-performance drying depends on air flow and velocity rather than temperature, especially when water-based inks are involved. We have optimised drying speeds and efficiency by situating the fan that applies the air and pressure inside the drying hood, shortening the distance from the fan to the air nozzle.

This enables heat and noise to be contained within the head and provide better insulation: up to 80 per cent of the air inside the dryer – and 60 per cent of the exhaust energy – can be recycled, through an overhead exchanger.

Additional UV-flexo units for adding a high gloss or matte varnish effect are specified for high-end packaging, not only to provide reflectivity, but to create a velvet 'soft' touch effect. Using both varnish types in combination provides a contrast to make a logo or icon stand out. UV-curing in these situations is a productive alternative to water-based inks that may require excessive ink coverage.

Solvent flexo inks are in decline, but still chosen for specific applications, like adhesion and abrasion resistance. Incorporating solvent inline with UV or water-based stations has no impact on web path or press footprint.

However, because of the ink's flammability, the unit must be sealed and grounded to meet ATEX1 regulations, meaning more covering. To comply with environmental regulations, exhaust drying air for solvent inks must pass through an incinerator before being evacuated from the factory, and may not mix with air used to dry water-based inks.

Inline features with growing demand. Many added-value processes can be incorporated with ease in the flexo line.

Double-sided coating capability is a growth area, for printing and coating on the inside of the carton. This is used to give grease and water-proof qualities to fast food containers and provide decorative graphics – such as a colour grid to enhance the quality perception of retail food packages, as well as promotions or product information.

With flexo, this process is integrated into the line with ease, with the addition of a turner bar.

Digital inkjet printing modules are increasingly demanded not only for coding and numbering for track and trace data, but for consumer promotions, with the inclusion of QR codes that link to a website to enhance relationships with a brand. Units are integrated in the final printing position, mounted on a platform above the press.

Metallic, high-lustre and scratch-and-sniff effects can also be applied and cured by standard flexo process, thanks to the development of inks together with specially designed ink supply systems and chambers to apply the ink at carefully controlled viscosity levels to protect the particles.

Cold foil lamination, for metallic effects, provides a cost-effective way of reinforcing the premium positioning of a brand, especially in the case of confectionery, wines, spirits and cosmetics.

A UV-curable adhesive is applied to the board, then the metallic foil is laminated, cured and the waste is split away and re-wound. The extra processing requirements limit speeds, but following extensive tests, at TRESU we have incorporated achieved speeds of 160m/min when incorporating this process.



Automation for a 'lean' efficient workflow. Value-adding enhancements come at a cost, but when implemented with an efficient inline production line and lean manufacturing processes, margins can be maintained. While an 'average' print run may be six colours, many customers may require additional printing stations that are idle while the present job is running can be set up for use on the next production run.

Automated ink supply systems regulate viscosity, flow rate and pressure at precise levels. Chamber doctor blades, available in light-weight, corrosion-resistant carbon fibre as well as ceramic and aluminium varieties, ensure even coverage, consistent ink density, and contamination-free printing at highest speeds.

Their seal systems prevent leakage, and safe exchange of doctor blades is possible within two minutes. Automated ink supply systems enable fast, simultaneous cleaning of the chambers at all print stations after the job within a few minutes, and the return of ink or coating media to the bucket after printing. This feature significantly cuts makeready times and delivers significant long-term ink savings.

Thanks to automatic controls and supply systems, manual intervention is minimized. Inline flexo offers potential for ergonomic design because all parts of the press are easily and safely accessible without the need for a ladder.

Efficiency is built into the inline flexo concept. For example, start-up waste is drastically reduced with print quality and register achieved virtually immediately – often with the first complete print.

This single saving resonates down the production line and beyond: set-up costs are cut; substrate is saved; waste disposal costs are reduced; press run-times are cut, so additional jobs may be run within a shift. The combination of increasing revenue while cutting costs can transform a company's operations.

### Stable printing with coating at maximum speeds

One of the strongest advantages of inline flexo is speed, which is significantly faster than sheet-fed offset. Speed optimisation depends on a controlled, and enclosed ink supply, servo drives, sleeve systems that eliminate bouncing, automated register controls, tightly regulated web tension and drying system design.

These features can be included in the latest presses, ensuring stability and quality consistency, at up to 600m/min in many cases, and sometimes, even 800m/min. Web tension can be measured at all units with relatively little intervention, as it is controlled centrally through a single human-machine interface.

### Commitment to innovation

An additional important factor for converters to consider is the expertise and support offered by the press manufacturer. Finding the right partner is also a matter of great value to the converter. At TRESU, for instance, we have applied more than 35 years' experience in building presses for global brand owners in markets such as food, non-food, beverage and liquid packaging, as well as supplying ancillary and drying systems, and expertise.

Another important quality of a press builder is the commitment to continuous improvement. A supplier with dedicated and substantial testing facilities can work with value chain partners, to optimise the way different coating media can be controlled, for instance, and help customers bring more exciting innovations to market, faster.

In an age when uptime is critical, a machine supplier must also provide a global, accessible support network, providing a fast supply of consumables, 24/7 trouble-shooting, as well as on-site support with experienced technicians, and strategic support, including testing for the launching of new products.

We believe this level of involvement, which we call 'Coating Intelligence,' provides a basis for a sound understanding of the process, and the ability to develop printing line solutions that keep the converter ahead of the pack for years to come.

Inline flexo offers a distinct advantage through its diversity of processes that makes creative, high-impact, added-value packaging possible. It offers converters the potential for high output, fast changeovers and cost-efficiency, and makes it possible to compete for both short and long production runs.

With reliable service and support on the ground, and continuous innovation and application expertise provided by the flexo press manufacturer, new opportunities for success exist for the converter as well as the brand owner.