The competitive advantage of inline flexo printing

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Inline flexo is a competitive, single-pass solution for sophisticated, high-quality packaging - whether short and long production runs are needed. Thanks to a stable, ergonomic and modular build, the latest mid-web presses achieve repeatable results at faster speeds, with minimal manual input. Inline flexo presses also provide the ideal platform for a lean workflow, with advanced ink supply and drying systems. And with an ability to convert recycled, thinner materials with water-based inks, they provide the solution for environmentally friendly production.

While the package printing market is steadily growing, there is a noticeable trend to shorter production runs as manufacturers diversify their brands, increasing SKUs, with greater variation in pack size, and more targeted geographical availability. This practice puts pressure on converters, as suppliers reduce costs by ordering smaller volumes more frequently. The result is that it's not unheard of for converters to print up to 15 jobs in an eight-hour shift. Furthermore, brand owners are demanding sustainable packaging solutions that minimise the burden on the environment.

Paperboard packaging constructions – notably folding cartons – are particularly attractive to the supply chain because they enable unique branding through a variety of design and size variations, maximum graphic coverage, easier supply-chain logistics as well as better recyclability.

The key to supplying this growing market lies in controlling costs, limiting setup times, and creating a flexible printing and converting workflow where it is possible to change jobs - including formats – at short notice, and with minimal waste.

Inline flexo, with its capability for short set-up times, speed, ergonomic operation and modularity, provides a productive, flexible and cost-controlled solution. With the appropriate configuration and support from the press manufacturer, converters using inline flexo are well-placed to succeed in this shifting market.

Modularity is key

Thanks to its horizontal configuration, inline is the only flexo process to offer safe, manual accessibility at all stages in the printing / converting sequence, without the need for ladders or stairwells. A modular platform enables customisation with any number of colours as well as a wide variety of added-value converting options to deliver a finished product in a single pass. The press's ability to print with UV- and water-based ink sets as well as metallic foil is also crucial in a multi-process line.

With front and back printing capabilities, it is possible to offer protective coating and pattern gluing on reverse surfaces. Following the colour positions, cold foil is often included in the configuration to achieve metallic effects. There may be additional flexo varnish units for achieving high gloss, matte, 'velvet touch' or aromatic effects, sometimes in creative combinations.

Automated systems ensure process efficiency

These effects require advanced ink supply systems, controls and drying systems, in order to achieve optimum throughput, low waste and minimised setup times. Automated ink and coating circulation, with an enclosed ink supply system and sealed chamber doctor blades, ensure uniform, accurate and uncontaminated print results, fast ink changes, lower emissions and reduced waste.

Crucially, these components should be seen as one system, perfectly calibrated to work together, regulating the ink or coating medium's flow, viscosity and pressure from the bucket to the point where it is dispensed into the anilox cell.

Ink supply systems – such as TRESU's F10 iCon - automatically replenish the chamber at finely calibrated rates as the cells of the rotating anilox roll obtain the ink. Flow is measured by counting the pump strokes, multiplied by a stroke volume that can be estimated to an accuracy of 2.5 per cent.

Stroke counting ensures that the supply system pumps precise amounts of fresh ink into the chamber at the right time.

Optimum pressure ensures ink or coating is free of air bubbles, both in the chamber and when it flows into the anilox cells. The operator raises the pressure so a wall of ink forms at the point where the rotating cells meet the doctor blade, preventing foaming caused by air entering. The supply system also assures an accurate way of returning inks to the bucket and fast, thorough chamber cleaning, without manual intervention.

After job completion, the cleaning system returns almost all the remaining ink to the ink bucket, and cleans the chamber thoroughly without manual assistance, easily within five to eight minutes. Up to 20 litres of ink per colour station on each job can be saved in this way.

Ceramic and carbon fibre chambers offer optimum resistance against corrosive fluids with high pH values; for wider widths, carbon fibre chambers are easiest to handle because of their light weight.

To accelerate setup times further, packaging converters commonly prefer eight to ten printing stations, even though the majority of jobs are seven colours or fewer. In most cases, therefore, the operator can prepare the next job's idle stations while the previous job is in production, thereby cutting waiting times.

Quick-change sleeve systems minimise setup times

A key factor enabling fast changeovers is a pneumatic quick-change sleeve system, allowing exchange within seconds. For optimised speed and quality, the sleeve features a recess stretching across its entire width, along which the edge of the printing plate is fixed.

This recess ensures the plate's height is equal to that of the sleeve surface when it meets the substrate. This eliminates cylinder bounce and ensures accurate register and reduced dot gain at relatively high speeds. Flexo plates come in a wide range of hardnesses, so all substrates may be coated or printed for virtually any packaging application.

Automated process control cuts time and material waste

The increased reliance on repeat orders necessitates high levels of automation, so that a host of job settings can be recalled instantly, not only saving time but reducing risk of error. The latest generation presses calibrate the press according to a host of data for each job, such as ink flow, register, impression, anilox cells, web thickness, tension, and drying temperatures, among others.

Servo technologies also enable fast change between the wide range of repeat sizes needed in folding carton – typically, between 480mm and 1050mm – without the need for lengthy recalibration.

Heat and speed are critical for inks, coating and substrates and can mean the difference between outstanding results, good enough results, and waste.

Gas-heated drying systems have strong sustainability advantages. The drying system's ability to recirculate air provides an optimal heat-exchange, reducing energy consumption and emissions further. The dryer expels hot air, to warm up incoming air. This heat exchange method generates 80 per cent of energy needs and significantly reduces emissions. Furthermore, an important reason why inline flexo can reach higher speeds is the longer distance it offers between drying stations.

Furthermore, inline flexo offers strong advantages when more environment-friendly production processes are demanded. Inline flexo offers the flexibility to convert thinner, lighter and recycled packaging substrates at speed, delivering outstanding colour results with water-based inks.

Commitment to long-term support

A manufacturer with extensive engineering expertise coupled with experience in ancillary and drying technology, is well-placed to offer a high performance press for a profitable inline flexo workflow.

Packaging printers and converters should look for supplier who regard customer support as a strategic partnership that lasts the lifetime of the press and beyond. It begins at the moment of first contact; working with the customer to design the configuration, and selecting the right components for optimum productivity, print quality, and footprint.

Following training, the press manufacturer, often in collaboration with co-suppliers of ink, tapes, dispensing systems and proofing equipment, works with the customer to monitor the complete workflow and seek continuous improvements in terms of quality, cost reduction and productivity.

As a minimum, the press manufacturer should have the resources to offer global care programmes that include round-the-clock support, on-going machine optimisation, training and materials testing – remotely and on-site.

Inspired by the '4M' manufacturing programme management philosophy, the press manufacturer seeks to optimise human resources, machines and equipment, materials and production methods employed, to drive waste out of the workflow and help everyone adopt a 'lean' manufacturing culture.

The benefits are not only financial, but reputational, principally as lowering waste is the making of a sustainable operation. Arguably, today's package printing 'Formula One' races are won in the pit-stops, and to a great extent, competitiveness in print depends on similar co-ordination and agility during setup times.

Flexo has numerous variables and each job change can require a complex sequence of actions, so there are benefits to be reaped even by reducing waste – whether measured in seconds, linear web metres or kilos of inks – at each stage of the changeover.

Working towards that aim, the press manufacturer's technical engineers are likely to be monitoring and researching areas such as speed, waste levels, and working procedures.

For example: is the logistics between the printing machine, warehouse and workbench arranged to eliminate waiting times? Is there duplication or excessive stockholding? How can we maximise ink yields? Will the supplier give you the best production productivity and life out of their consumables and ancillary equipment? Does their sustainability ethos match yours and that of your customers? These are just some of the many questions packaging printers and converters should ask supplier to be able to take performance, productivity and profitability to the next level.

In a dynamic, service-driven market where uptime is critical, the willingness of the OEM partner to act as a partner for achieving continuous improvement is paramount for maintaining competitive edge and a sustainable process.