

High quality packaging printing

The advantages of sheet-fed gravure

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Moog's Research and Technical Centre in Miehlen/Taunus, Germany, provided the opportunity to see the Moog TBR-104 in action and to discuss the potential for sheet-fed gravure in today's highly competitive packaging market. The case for sheet-fed gravure is based on its ability to produce high quality printing with precise levels of ink coverage, and great repeatability across a range of substrates.

Typical markets for this type of work are cosmetics and security, and now principally the tobacco industry, where the visual impact of the cigarette carton has assumed a new level of importance with the banning of media advertising in so many countries. In addition, the growth of illegally produced counterfeit products strengthens the case for gravure printed packaging, with its inherent ability to produce 'secure quality' results.

The gravure market is split between web and sheet-fed presses, and previously the decision to go for one or the other has largely been a function of run length, with web presses preferred for longer runs. However, things are now changing according to industry experts. As run lengths shorten and greater flexibility is demanded, the sheet-fed gravure press, with its faster make-ready and ability to print up to eight colours or coat and deboss inline, can deliver high quality sheets direct to the die-cutter.

How easily a sheet slides, which enhances the performance of downstream automated packaging lines and ensures a smoother product throughput, is often used here as a measure of quality.

The case for sheet-fed

As one of the leading proponents of sheet-fed gravure, H C Moog, which was established in 1950, and which is now under third generation family management, makes a strong sales case for its latest TBR series of presses.

Moog press technology is the best solution for consistent colour reproduction, which, in turn, is vital for global branding and for the stability that packaging converters demand. It is also the best solution for when very fine characters need to be printed across the full sheet with no loss of quality and legibility. Gravure can print up to four times the ink quantity of flexo and offset and deliver a sheet that is ready for



finishing. Wastage is also significantly lower.

The Moog TBR series was launched in 1986 and featured a design that replaced the inter-unit chains with drums, similar to an offset press. Over the intervening years Moog has continually refined the design and secured worldwide sales, mostly in Asia, North and South America, the Middle East and Europe. Depending upon the market and applications, Asian customers typically specify three-colour presses for multi-pass printing (because of low labour costs), whilst European and American ones prefer six colour lines. The majority (around 70 percent) of Moog's installed customer base produce cigarette cartons, which, like many other branded products, are now required in shorter runs with a variety of limited editions to constantly refresh market awareness. A growing trend in this market is for six-colour gravure plus six-colour offset printed cartons. Sheet-fed gravure has established a firm foothold because of its ability to use inks such as UV, soft touch, water-based, special inks and coatings and security inks, which are essential to combat the highly lucrative counterfeit market. Sheet-fed gravure works well offline in combination with sheet-fed offset.

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H. C. Moog turns 70 in 2020

Henry Cornelius Moog (HCM) founded his company in Rheingau in 1950 and ever since it has developed bespoke gravure, flexo and screen presses as well as handling machinery such as fully automatic cylinder stores and their components for a constantly changing market. Today, Moog continues to develop, design and build new solutions and innovations.

For many years it has focused on sheet-fed gravure presses for the high-quality printing of small batches in the folding box and label segments. Various different finishing options for packaging are also offered in order to help promote

sales. Moog serves sectors such as cosmetics, perfumery, tobacco and confectionery as well as general finishing with conventional gravure inks, UV as well as water-based inks and coatings. Highly efficient hybrid dryers after each press unit means that products can be converted immediately after printing. Economically blind embossed finishes can also be used to really catch the customer's attention.

Moog's rotary technology can deliver twice the pressure of a flat-bed die-cutter and this means that designs can be realized that were previously difficult or impossible.



Source: H. C. Moog

The TBR-104 is a sheet-fed gravure printing press for the printing and finishing of packaging with high quality standards

It also offers an economical and environmentally friendly alternative to hot and cold foil stamping or laminated board. This is particularly true where less than 60 percent sheet coverage is required, when the former techniques are highly wasteful in terms of expensive unused foil. The customer can choose the most environmentally friendly option for each job. Another advantage is that Moog's gravure printed product is fully recyclable. Speaking of waste and recycling, gravure printing offers significant cost savings and a recycling option. Moog claims that a significant part of its success in gaining acceptance for sheet-fed gravure is the close consultation it undertakes with packaging designers and innovators. A proactive approach that involves demonstrating new techniques and effects to end users stimulates de-

mand for what sheet-fed gravure has to offer. In addition to its previously mentioned traditional markets, Moog is closely studying its options in Europe for a move into high-end food, drinks and confectionery packaging, as well as pharmaceutical cartons, where the technique is already established in the Japanese market.

Economic efficiency

For today's market, Moog offers single to eight colour configurations. Capable of handling paper to cartonboard up to a maximum thickness of 1 mm, the Moog TBR series offers production speeds of up to 12,000 sheets/hour and man-

Experience

ning requirements of 1.5 (1-3 colour press) to two persons (four colours and more). Moog claims a working life expectancy of around 30 years for each of its bespoke presses, which more than offsets its price differential over litho and produces superior quality throughout. When it comes to the prepress costs associated with gravure printing, the cost and time required for producing engraved cylinders has fallen considerably over recent years, but in many cases Moog's customers opt for direct laser, which is faster to produce.

Plate rather than cylinder

Alternatively, there is the option to use the well-established photopolymer gravure plates, which have a stable steel backing for dimensional strength. The plate is water washable and has a hardness of 92 shore(D), meaning that conventional doctor blades are used. They can be prepared within a matter of hours and transportation costs are also significantly lower. Moog has developed a special clamping cylinder to make it easy to use gravure plates on its printing units. Fast changeover on the clamping cylinder is similar to changing conventional gravure cylinders on the press. Both the Moog clamping cylinder and the conventional cylinder feature a fixed circumference, regardless of the repeat length of the printed package.

Imaging of the printing plate with an infrared laser delivers a very high print resolution (up to 10,160 dpi), which allows the reproduction of the finest details with screen rulings of up to 120 L/cm. The gravure plate is particularly suitable for printing metallic pig-

"The Moog clamping cylinder is also used for blind embossing work."

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"The gravure plate is particularly suitable for printing metallic pigment inks, pearlescent inks, gloss and matt coatings and haptic effect coatings."

ment inks, pearlescent inks, gloss and matt coatings and haptic effect coatings. It is capable of transferring up to 24 grams / m² and delivering outstanding print quality with excellent solid coverage. The combination of precise ink transfer with brilliant halftone reproduction offers sheet-fed gravure printers a quality advantage and the opportunity to stand out in print finishing. Cell profile and the associated ink transfer properties can be defined at the prepress stage for any application, including thin film applications, by varying the screen ruling and the cell-wall ratio. Consequently, ink transfer can be determined before printing and start-up waste can be reduced to a minimum.

The Moog clamping cylinder is also used for blind embossing work in the area of cosmetic, tobacco and security features (hidden images). A hard photopolymer plate is clamped in the same way as the printing plate. Thanks to the massive printing unit, a maximum pressure of 900 Tons is applied to the sheet.

Smart printing

The brain of the Moog TBR production line is its central multi-functio-



An embossing pattern produced with the Moog TBR

nal console, which allows the operator to fully control the entire sheet-fed gravure process, including all press settings and remote adjustment, as well as offering instant job recall for repeat work. The computer also reads sensors on the



With the Moog sheet-fed gravure press, impressive effects can be achieved

press to provide both job analysis and fault diagnosis. The line itself begins with a high pile sheet feeder, which is set up from the console and remotely adjusted for sheet format, thickness, air suction, speed and many more parameters. The electronically aligned sheets are fed into a swing gripper that accelerates them to the printing speed before passing them to the double diameter transfer drum, and from there to the impression and gravure cylinders with the associated ink duct. It is here that the Moog cylinder cocking system comes into play, allowing adjustment of diagonal register, and making a significant saving in substrate waste.

The inking system, which uses oscillating, pneumatically controlled doctor blades, offers precise viscosity management, and it, together with the gravure cylinder, can easily be changed by means of a trolley. The transfer drums have both internal and external high-speed hot air knives that ensure the ink on each sheet is completely dry before transfer to the next unit. There is also an option to use the inter-unit UV-curing system.

Further advantages

An adjustable air cushion between the drum and sheet ensures consistent register by preventing any sheet distortion. After the last printing unit, the sheets pass through the delivery dryer, which features a three-stage heater and optional water-cooled UV lamps, before reaching the high capacity delivery unit. Piles can be changed without slowing the press from full production speed.

Two of the major benefits of sheet-fed gravure are the lack of downtime compared with offset production and the ability to run high quality work without the need for highly trained specialists. Gravure is a relatively simple process, where the principle investment is in the plant itself. It is also a very clean process, and despite using solvent-based inks, generates no problems with emissions.

Thanks to its exhaust volume being greater than its air intake, it runs in an odourless environment. As carton converters look for profitable niches, the latest generation of sheet-fed gravure presses may well offer an unexpected lifeline.

With right type of press for today's short and medium run market and a name for quality, H. C. Moog is intent on expanding its sales into new areas.