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Digital printing on corrugated board is at the starting gate

A closer look on new advances in digital corrugated printing

Dieter Finna

One of the focal points of this year's Corrugated & Carton Exhibition, held in Munich from 21 to 23 March, was digital printing on corrugated board, both in preprint and postprint applications. The latest developments of the single-pass Inkjet digital printing systems were the main points of interest. The fair, which was attended by more than 2,100 visitors, gave a broad overview of how corrugated board printing has developed and what new developments are pending.

Growth in corrugated and the dawn of digital printing

The worldwide increase in corrugated packaging will experience an annual growth rate of 3.6% by 2021, as reported by market research company Smithers Pira.^[1] Despite the continuing margin pressure and rising raw material costs, the volume growth is a good sign for digital printing on corrugated board, whose share in this market segment is currently below 1%. So far, digital printing has been the key to accessing the corrugated board market with multi-pass systems for printing high-quality displays. Now, faster single-pass machines with different colour technologies are opening up access to medium and longer print runs in pre- and post-print corrugated cardboard. Currently three colour technologies systems are available from which to choose.

Water-based inkjet printing systems

Water-based Inkjet printing systems currently offer the greatest performance potential for corrugated cardboard printing. HP has consistently developed its preprint machines in this segment. Three T400S production machines and four T1100 S machines were installed in the market from the PageWide model series. They are used for corrugated cardboard printing in England, Italy, the Czech Republic and the USA, in the latter case they are also used as a hybrid machine with two flexo printing units. The first installation of a T1100S in Germany at Christiansen Print in Ilsenburg. This single-pass machine with a working width of 2794 mm (110") produces four-colour printing using water-based inks and thermal Inkjet printing heads. With a resolution of

1200 dpi, it can reach a maximum printing speed of over 180 m/min (590 fpm) or a performance of 31,000 sqm/h (333,681 sqft/h).

For printing on coated liner, a primer is necessary which is applied using a flexo unit beforehand. For uncoated liners, a bonding agent is applied digitally. This seals the surface structure of the paper so that the ink can adhere better to the surface.

HP introduces the PageWide C500

At drupa 2016, HP introduced the PageWide C500 machine in the single pass sector for long print runs. A prototype already exists in the HP development centre in Israel but it needs the addition of one of the HP-designed sheet transport systems. Water-based inks are used in the thermal Inkjet print heads based on the fact that HP views print heads as consumable materials. They have, in general, lower consumption costs than other types of print heads. The new machine has been designed to use six colours CMYK +2C with a resolution of 1200 dpi in a later version a higher resolution will be possible. The C500 prints in a print format of 1300 x 2100 mm (51" x 83"). In this sheet system, it is intended to omit the primer when printing on coated liner and to print on the sheet directly without pre-treatment. When using uncoated materials, better adhesion to the surface of the paper is achieved with a bonding agent positioned just below the printing dots and applied digitally as a col-

Seen in the middle is the digital printing unit of the PageWide T1100S with the primer station on the right side and the coating unit on the left side



Source: Christiansen Print



The prototype HP PageWide C500 digital printing machine

our. HP has announced that they will install a digital sheet printing machine at an international packaging group by the end of the year. The HP PageWide C500 will also likely go into production in late 2018.

Bobst moves forward

Bobst, another pioneer in digital printing for single-pass systems using water-based inks, has gained extensive experience from two Beta-test post-print installations in Switzerland and Germany, both are now complete. From these experiences, numerous improvements and changes in design were intro-

duced into the machine build.

At the German beta testing site, 7 to 8 million sqm (over 80 million ft) of corrugated board was printed in the test phase, at the same time equalling the highest quality in the market. The machines are equipped with continuous Kodak Prosper-S print heads and are designed for high production speeds of up to 200 m/min (656 fpm). The estimated annual capacity of this machine is 15-16 million sqm (over 160 million ft). Perhaps the most valuable result from these tests is that currently it is difficult to generate the required order volumes to allow this type of machine to operate economically. Bobst enjoys a

strong partnership with Kodak and is currently bundling their activities in the newly created Mouvent competence centre for digital printing.

Here comes the Sun

The third player in the market for water-based single-pass Inkjet systems is Sun Automation Group. The CorrStream digital printing machines for corrugated cardboard are offered in one size up to a maximum printing width of 1345 mm (53"), with a maximum sheet size of 1600 x 3000 mm (63" x 118"). The maximum printing speed is 70 m/min (230 fpm) and the produc-



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tivity is estimated to be 4500 sheets per hour. The machines with the drop-on-demand Inkjet heads print four-colours on sheet material from E to BC flutes.

The world's first beta-installation of a water-based single-pass printing machine in the wide printing range took place at HSG Packaging in Bradford, UK. According to Sun Automation Group, the digital printing machines are intended to close a profitability gap for print runs of up to 10,000 sheets against flexo printing. According to the company, the digital printing technology for corrugated cardboard printers is particularly interesting for orders which include two or more colours.

Hybrid inkjet printing systems

Durst has developed a new colour system for its multi-pass Delta WT 250 model digital printing machines and has subsequently introduced them to the market. This colour system has now been transferred to the Delta SPC 130 model series' single-pass machines. The machine can be configured with up to six colours. It is a type of hybrid colour system, in which the water-based ink is dried by infrared drying and UV crosslinking. The advantages of this colour system are the strong adhesion and abrasion resistance and the high gloss of the colours. Additionally, the Durst colours do not require special labelling. The maximum sheet size of this machine is 1300 x 2200 mm (51" x 87") with a maximum printing format of 1285 x 2185 mm (50" x 86"). The machines achieve a resolution of 800 dpi with the drop-on-demand printheads and a production speed of 60 m/min up to a



Sun Automation's Corr-Stream machine prints CMYK with water-based inks

Source: SUN Automation Group



The Durst Delta SPC 130 system for corrugated packaging and display printing

Source: Durst

maximum of 120 m/min (197 to 394 fpm) or 9350 sqm/h (100,642 sqft/h).

UV Inkjet printing systems

Based in Castelldefels south of Barcelona, Barberán is one of the leading manufacturers of digital printing machines with multiple machine installations of digital printing systems in Spain, Italy, Australia and the USA. The first printing system at Hinojosa Group in Spain was originally installed in 2013.

The Jetmaster system can be designed for printing with four or six colours (CMYK + light cyan + light magenta) and prints at a speed of 55 m/min (180 fpm). The best results are achieved with a resolution of 360 dpi. All systems work with UV inks. The advantage is that they can be used on a wide variety of substrates and have good adhesion and an excellent gloss. Depending on the substrate, they can be supplemented with a primer station or extended by a UV-varnish station for finishing.



Barberán Jetmaster 1890 with the largest printing width of the series

Source: Barberán



Source: EFI

Barberán's product range includes digital roll and sheet printing systems. The Jetmaster 1890 is the company's latest six-colour machine (CMYK + orange + violet) and consists of various models with printing widths 840 mm (33"), 1050 mm (41"), 1260 mm (50"), 1680 mm (66") and 1890 mm (74").

At the beginning of the year, EFI brought to market the Nozomi C18000 digital printing machine

designed to print corrugated cardboard displays and corrugated packaging. It achieves printing speeds of up to 75 m/min (246 fpm) or 7,200 sqm per hour (77500 sqf/h) with a resolution of 360 x 720 dpi. The machine can be equipped with up to six colours plus white and handles a maximum sheet size of 1800 x 3000 mm (71" x 118"). LED inks are used which are transferred from the

drop-on-demand piezo Inkjet printheads. An inline primer is used that optimizes the ink intake and the dot gain for a number of different surface qualities of the corrugated cardboard. EFI says that corrugated printing is achieving a similar rapid development to a digital process already experienced in the ceramic printing sector. EFI relies on the experience of its UV installations in this segment.

The EFI Nozomi C18000 inkjet printing machine.

Source references

[1] SmithersPira: The Future of Global Corrugated Packaging to 2021



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