Powering the digital revolution

Mainstream canmakers are taking up digital printing as the use of the technology for metal decorating advances. Danielle Ingram reports

Demand for digital printing technology for metal decorating has been rising as the benefits of the technology offer more flexibility to customers of all kinds.

With the minimum of setup time, the ability to print any quantity, switching between jobs quickly and easily, and a shorter time to market, the use of digital technology has been mostly used by small- to medium-size brand owners who cannot afford to decorate cans using conventional lithography due to its necessary high minimum order quantities.

Previously limited to labels and shrink sleeves for its decoration, these beverage can manufacturers have found in digital printing the answer to cost-effective short production runs.

Meanwhile, mainstream brand owners have limited the use of digital printing to special applications such as promotional products, as the technology's speed cannot compare to those offered by conventional lithography at more than 2,000 cans per minute (cpm).

It's undeniable that the technology has been advancing and leading canmakers have started to become more involved. Last year saw both Crown and Ardagh Metal Packaging (AMP) make significant moves.

Having previously been involved in the development of flat-sheet digital printing technology for three-piece metal packaging, Crown announced its partnership with Israeli firm Velox to develop a direct-to-shape digital printer for beverage cans capable of running up to 500cpm.

Known as the 'Silicon Valley of digital printing', Israel has plenty of resources and knowledge available in this sector. Established in 2012 by brothers Marian and Adrian Cofler, Velox brought together an expert team with a range of capabilities in inkjet systems.

Both co-founders drew upon their own expertise in the sector as an inspiration to drive forward the use of inkjet technology for metal decorating. While chief operating officer Adrian Cofler worked at Israeli-American manufacturer of inkjet printers and inks Kornit Digital, chief executive Marian Cofler spent a decade at NUR Macroprinters and Hewlett Packard Enterprise.

The digital printing specialist offers two systems for beverage cans: the IDS-BC series for printing on straight-walls and the IDS-NC series for necked cans. Velox said it has been working with Crown for a few years, which helped make its system industry-compatible by employing the canmaker's strict guidelines and professional testing. From the beginning, all R&D efforts focused on developing a digital printing system for mass production, explained the company.

The machines for straight wall and necked beverage cans have the same patented core technologies: a proprietary ink formulation and system architecture. These enable the system to achieve running speeds much faster than existing digital solutions and deliver proprietary features including the ability to print up to 14 colours simultaneously and embellishments such as gloss, matte and embossing.

Crown's technology chief Dan Abramowicz comments: "Crown has kept a watching brief on the development of digital printing for metal packaging for many years. In assessing the Velox technology, we determined that their unique proprietary technologies offer a competitive advantage by enabling superior high-speed digital printing of two-piece beverage cans, versatility and excellent print quality and other print finishes."

To increase capacity, Velox has equipped the decoration system with an elliptical track on which multiple carriages, each carrying tens of containers, move around between the different stations such as printing, curing and image inspection. Through this concept, the machine is able to print on hundreds of containers in parallel.

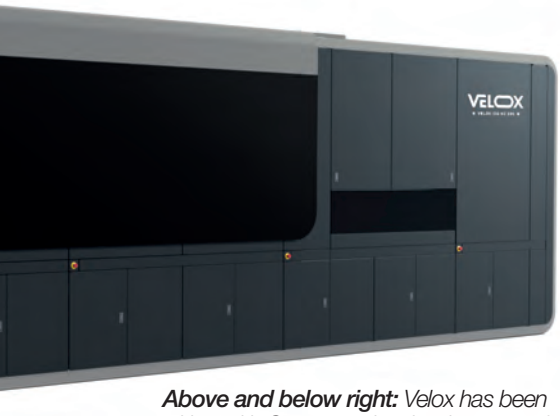
"Another significant element is that Velox's proprietary inks and deposition mechanism were being developed hand-in-hand, which has enabled us to achieve the high standard that an industrial system must meet," says chief executive Marian Cofler.

The canmaker has developed can loading and unloading mechanisms and equipment to facilitate the higher operating speed.

Both printers deliver photorealistic image quality with 900dpi resolution and seamless end-to-end decoration with no slit or overlap. In the Velox IDS-NC series on-chime and on-neck printing is also available.

The difference between the straight wall and the necked can systems is the way in which the cans are held on the carriages, moved throughout the various decoration stations, and transferred in and out of the decoration system: "The technology and the way we print on the can enables us to print on the entire length of the can including the neck and chime which is quite a challenge due to the non-flat surface in these areas, as well as the coatings and lubricants used there," says the company.

Proprietary inks were developed to work with a range of substrates including metals and pre-coatings applied to the metals and plastics surfaces, says Velox. Called 'Variable Viscosity Ink (VVI) technology', it allows per-pixel control of the drop shape, which means that the drops jetted from the printhead are of the same volume but can behave differently as they hit the can surface to achieve better ink efficiency.



Above and below right: *Velox has been working with Crown on the development of a direct-to-shape digital printer for necked beverage cans capable of running up to 500cpm*

Large-diameter drops are used to cover large design areas whereas small-diameter drops are applied when fine details and sharp text are needed. The range includes decorative effects such as gloss, matte and embossing which may be used in full or selective as required by design.

"Our printers offer small and medium beverage brands the ability to decorate cans using a high-quality, direct-to-shape system, without the hassle of typical [plastic] sleeving issues like seam distortion, wrinkling or the slowing down of filling lines due to sleeve friction."

The option of producing an accurate print proof of the metal packaging will also be available.

Commercial can production using the technology has not yet started, even though Velox has already taken orders for its necked can printers. The company said that demand for its technology is stronger in the North American and European markets, including co-packers and fillers as well as small-to-medium beverage brands. "Craft beverage markets are growing every year. A transition from plastic and glass into the cans is leading the trend," says Velox.

The equipment has passed factory acceptance testing in Israel and has been shipped to Crown's technical centre at Wantage in the UK, where it will soon enter its final 'production ready' development phase, Abramowicz explains.

He added that the commercial deployment strategy of the straight wall machine should be determined over the coming months. Even though Abramowicz was not able to disclose when or how the system may be used by Crown, he revealed that several possibilities are being considered by the canmaker:

"The technology could be utilised in a number of different ways, either supplementing existing dry-offset printing technology within an existing manufacturing operation or in a dedicated facility or via partnerships.

"No specific decisions have been made and it is possible Crown could apply the technology in different ways for different markets or geographic regions."

There are challenges that still need to be overcome by manufacturers for major brands to adopt digital printing, said Abramowicz, who added that canmakers and brands need to gain a better understanding of the costs and benefits of it under different scenarios: "Digital inks are generally more expensive than the traditional inks used in the dry-offset beverage can printing process. This cost is partially balanced by the lower printing costs for digital printing on smaller scales due to dramatically reduced setup times.

"Being a market disruption opportunity, the plan is to fully understand how this is best used in differing applications, such as complex higher-quality designs, smaller volume manufacturing, product targeting and promotions and larger unit volume printing."

Examining the role that digital printing will play in beverage can printing in the future, he believes that the shift will be significant for some customers, Abramowicz said: "Shrink sleeves can negatively impact the recycling of beverage cans and legislation is being enacted in various regions to limit their use in this application. Furthermore, direct-to-shape printing is less expensive than shrink sleeves in most applications as well as enabling higher productivity.

"Penetration more broadly in the beverage can manufacturing arena will depend upon many different factors, including market trends towards more SKU variations and shorter run lengths, digital ink costs, capital equipment costs and utilisation, digital printer efficiencies, and utilisation strategies. As this is a rapidly-evolving technology, reliable forward projections are not yet possible, but look extremely promising."

More information from Velox, 8 Hamelacha Street, Rosh Ha'Ayin, Carmelim Bld. 3rd floor, POB 11493, 4809114 Israel. Tel: 972 3 513 8050. Website: www.velox-digital.com

Canadian provider expands into the US

Last November it was Ardagh Metal Packaging's (AMP) turn to announce advancements in the digital printing space: the canmaker bought Canadian metal decorating specialist Hart Print to provide digital beverage can decoration capability in North America.

"From the onset, we had a pretty aggressive growth plan and wanted to take advantage of being one of the first in the market doing digital printing on cans. But we had certain limitations, both financial and involving our ability to source cans as there have been major shortages in North America," explains Hart Print's co-founder Stephanie Hart.

"We were put in touch with Ardagh through our bank as we were looking to raise more capital. It was a tremendous opportunity for us, and for Ardagh I think it was clear that we were catering to a huge market that we could not entirely cover. Hart Print was the perfect vehicle for them to reach a different type of customer."

The Quebec-based supplier was established in 2018 by three co-founders who met through an MBA course at Concordia University. The business idea came from Hart, who is a partner at microbrewery Brasserie Harricana.

"We were moving from bottles to cans and I couldn't understand why we were using adhesive labels," said Hart. "I found them ugly but the very large minimum quantities for one SKU meant that we could only use shrink sleeves or stickers. This got me thinking about digital printing."

Intending to turn the academic project into a real business, the trio focused on researching the 'perfect' technology, which they found in German company Hinterkopf.

"Hinterkopf did exactly what we needed to do but on aerosol cans," said Hart. "We were the first to bring the technology to North America. We graduated business school in July 2018 ▸