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Tonejet's Cyclone system digitally prints on the sidewalls of these white base-coated cans

Digital printing offers flexibility

Digital printing system manufacturer Tonejet has opened a manufacturing and demonstration facility in the UK. Rick Pendrous explains the reasoning behind this investment

Tonejet, which has been developing digital printing systems for cans, has opened a new 1,300sqm facility in the UK. The outfit will enable the company to increase production to meet what it sees as growing worldwide demand for this technology from large beverage brands and craft brewers.

The new centre at Melbourn in Hertfordshire is primarily a manufacturing and test facility, but it will also maintain a single pilot can printing line for demonstrations to potential customers.

The building was constructed on the site of an old sofa manufacturing factory that has been stripped out, refurbished and equipped at a total cost of around £1 million (US\$ 1.25m), reports Tonejet chief executive Rob Day, who joined the business just under two years ago from the company's owner, The Technical Partnership group.

The facility allows prospective customers to see the capabilities of Tonejet's Cyclone digital printing system. This is designed for low-cost, short-run digital decoration of beverage cans, enabling beverage canmakers and brand owners to carry out direct-to-pack digital print demonstrations, trial runs and pre-production proofing.

"On the ground floor we have enough storage and manufacturing space to assemble and test multiple systems in parallel, giving the production capacity we need to accommodate planned growth," says Day. "There is a mezzanine level with office and meeting space, as well as a large storage area." Tonejet gets through 30,000 cans a day during life and endurance testing, he adds.

"We do not plan to compete with our customers by offering can printing

services, but in the next six months we will be printing cans for two major brewers that are trialling our technology," Day discloses. "We want to exercise the equipment as much as possible so will also no doubt print cans for local craft breweries on an ad-hoc basis."

Cyclone digital printing system

The Cyclone system is said to offer lower running costs than those associated with shrink sleeves or

pressure-sensitive labels and avoids the recycling headache created by such processes while providing a high-quality finish.

“Our total consumable cost per can (including primer, ink and varnish) is about 25 per cent of the cost of a label or a sleeve, with no minimum order quantity, of course,” says Day. “Our customers are able to print on demand – the same day that an order comes in if necessary – with no need to order, stock and apply labels, which is typically a four-week turnaround in itself.

“Everybody we talk to in the industry feels bad about covering a 100 per cent recyclable aluminium can in a non-recyclable plastic sleeve, and they will switch to direct decoration as soon as they can. In Quebec, the government is ready to ban shrink sleeves completely, and that is one reason why our first installation is in Montreal.”

Compared with other digital direct-to-pack systems, the key difference of Cyclone is in the ink chemistry and cost per can, says Day.

“We use our own proprietary ink set and primer coating, developed here by our chemistry team. We have formulated our inks to be as simple as possible, containing a very high pigment concentration, and have ensured that they work beautifully with industry standard over-print varnish (OPV).

“We apply this very thin – less than one micron – highly pigmented image layer digitally at 600dpi with up to



This pilot Cyclone system shows potential users how the necked cans are processed during printing

“We do not plan to compete with our customers by offering can printing services,” say Tonejet chief executive Rob Day

128 grey levels, and then inside the Tonejet Cyclone printer use a standard gravure coater to apply the OPV, prior to a brief heat cure. The result is very low ink consumption and a beautiful smooth finish in the hand, identical to the surface finish of a traditional offset-printed can.”

In contrast, Day says his digital equipment competitors are all using UV-curable inkjet inks, which contain relatively low pigment concentration in a liquid comprised primarily of migratable acrylate monomers. These inks were developed by the industrial inkjet sector for use on non-porous substrates in applications like outdoor graphics, he adds.

“The result is a relatively thick – typically of the order of ten microns – brittle layer which may suffer a loss of adhesion when the can surface flexes during necking, handling or filling, and which exhibits a textured effect after printing,” claims Day. “Text has a raised feel and there are distinct tactile edges ▶

Craft beer will lead the digital revolution

Digital printing on cans for craft beers will outstrip the development of this technology in other areas of metal decoration, according to UK-based packaging specialist Smithers.

While the digital print market for packaging overall is expected to more than double from US\$138 million today to more than \$300m by 2024, the digital metal can printing share will remain marginal, a recent report from Smithers, ‘The Future of Digital Print for Packaging to 2024’, predicts.

“Digital print will have a high profile, however, because the scope of customisation and improving print effects means it will be seen in some more prominent segments,” says John Nelson, commissioning editor at Smithers. “These include top-end cosmetics, craft beers and special promotional runs to celebrate a specific event, like the Rugby World Cup, for example.

“Inkjet printing is used to print small quantities of flat sheets on x-y plotters with higher performance, larger-format machines, and on direct-to-shape equipment. Direct-to-shape/object is interesting as many platforms are set up for cylindrical packs, and

speeds are improving with better handling systems and UV curing/pinning stations.”

Regarding the prospects for closed-loop control during metal decoration, Nelson says: “Anything that improves precision is likely to be welcomed in the print room, especially as digital print is liable to be confined to specific promotional can runs where the client is actually committing the funds to make a visual impact. There is also a benefit as designs get more complex.”

Intelligent packaging is another fast-developing area within packaging and as consumers become less brand loyal – especially in competitive segments like beers – so, anything that is engaging or different has a value, reports Nelson.

“Metal cans are one of the more popular uses for thermochromic inks already and there is potential for further design innovation – assuring the buyer his or her drink is genuinely cold or refreshing does have a real benefit,” he says.

“Augmented reality (AR) is an interesting concept in packaging and has been trialled on multiple formats. The problem is while it can be an innovative and exciting concept to add to a pack for a single promotion, it is limited by a novelty value – how often

will consumers want to scan their can of cola or beer? And hence subject to diminishing returns.”

Nelson notes that adding radio frequency identification tabs (RFID) or near-field communication (NFC) antennas to packaging to give an immediate link to the online worlds is something marketers have been doing in other packaging formats. “For cans however, you are adding metal circuitry to a metal substrate, so I can imagine this being quite technically challenging.”

While the use of adhesive paper labels, shrink sleeves and wrap-round film labels on cans are tried and tested solutions in many areas, reports Nelson, one of the main challenges they present in packaging generally relates to sustainability, he adds.

“Metal packaging currently has a high recovery and recycling rate – and is an established process because of economics,” says Nelson. “It is important that labels or components are easy to remove or this impinges on that.”

He points to a recent survey of material recovery facilities in the US, which found that shrink-wrapped cans presented a specific problem format to recycling using contemporary technology.

to printed areas, which increases friction between cans during downstream handling.

“This layer thickness difference also means that we consume 90 per cent less ink than we would if we worked with traditional formulations, resulting in a much more economical solution for our customers.”

The images are applied to the parallel section of the finished cans which have been previously base coated with a white lacquer during the canmaking process.

So far, two beta printing systems have been manufactured. The first has now passed its factory acceptance test and will be shipped to a customer in Canada this month (October). The second beta machine is being commissioned now and will be operated in-house for the remainder of the year under the watchful eyes of Tonejet’s new product introduction (NPI) team until it is certain that reliability is at industrial levels, says Day. Only then will it be shipped to a customer.

Future developments

Tonejet is currently working on developing larger and faster print heads to increase the productivity of the



‘Technology like ours will disrupt the status quo,’ says Tonejet chief executive Rob Day

machines, as well as creating a white ink. As far as the beverage can market is concerned, though, Day says closed-loop control of the system is not a priority.

“The customers we talk to are very happy with the gamut we can achieve using flat and metallic CMYK,” he says. “We don’t see significant colour density

drift, even during extended multi-shift print runs, and perhaps for that reason it isn’t something that customers are asking for right now.”

Currently, Tonejet is attracting interest in Cyclone from packaging suppliers and contract fillers within the craft beverage industry in the US, Canada, Brazil and Europe.

“There is a huge unmet need for short-run, fast-turnaround decoration of necked cans coming from craft beer, premium seltzer, water and wine makers that don’t have the volume to buy pre-printed cans from the big canmakers,” he says. “Frankly, even if they did have the volumes, they move too fast to be able to deal with the lead times that are common in the mass-market beverage can industry.”

Eventually, however, he expects demand to spread to larger beverage brands that want the flexibility offered by late-stage can decoration for their niche brands and special projects.

“They love the idea of printing cans in-house the day before they fill them, rather than ordering months ahead and holding stock,” says Day. “Of course, this only makes sense for relatively short run product because traditional can manufacturers will always be able to offer the lowest cost solution if your batch sizes are measured in millions and your market demand is established and predictable.

“We are running trials for some major global brands – these guys will adopt the technology within the next two years.”

Coca-Cola and other major brand owners have been experimenting with mass customisation for a few years and can see the benefits, both in terms of increased sales volumes and – crucially – the buzz they can create around their brands by producing packaging targeted at a specific demographic or event, claims Day.

“It will take a while for supply chains to adapt, but technology like ours will disrupt the status quo by creating a shift towards printing at the point of filling, rather than in the can factory,” predicts Day. “We think in five to ten years direct digital decoration will be commonplace.”

While he also expects the big canmakers to adopt the technology too, he recognises that for them it represents a new business model, so take-up will inevitably be slower. Canmakers are more likely to use direct-to-can digital to provide the flexibility they need for special pack variants or new entrants, while retaining traditional offset printing for high volume output, says Day.

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