

Plastics in Packaging

Issue 237: July 2021

PROOF OF CONCEPT

How Bekum's Michael Mehnert is on a mission to set the benchmark for blow moulding technology

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Changing of the guard

Conserving the qualities of the company while simultaneously bringing fresh momentum was the mission of Michael Mehnert, when he took over from his father at the helm of extrusion blow moulding machinery maker Bekum. Four years on, **Steven Pacitti** finds out if he's achieving his objectives

A family business built on technology that is now used in every blow moulding machine in the world today, Bekum Maschinenfabriken presents itself as a business fuelled by innovation.

It brought this innovation to the K 2019 show in Düsseldorf, Germany in the form of the Concept 808 machine, which was a showcase of different technologies. It was Michael Mehnert's first opportunity to present his vision to the global plastics industry, since his appointment as chief executive two years earlier, and the concept machine certainly came with a large dose of *raz-zamatazz* on the company's impressive stand.

K 2019 held a certain significance for Bekum in that it took place 60 years after the company was founded in Germany, by Michael's father Gottfried. But it was, at the same time, a celebration of 40 years of doing business in the US, and 50 years in Austria. Plans were also finalised in 2019 for a significant expansion in North America.

That year, the German firm confirmed that it would add 40,000 sq ft of manufacturing space and 7,400 sq ft of office space to the existing 115,000 sq ft facility in Williamston, Michigan, USA, and broke ground in November, just after the K show, but also just before the global pandemic struck.

"We started the groundwork, and then came the pandemic, and so we had to take a break from construction for three months," Michael Mehnert recalls, during an interview with *Plastics in Packaging*. "The building is fully there now and the moving in date was this spring. We have a huge assembly hall there and are manufacturing machines mainly for the North American market, including Mexico.



Chief executive Michael Mehnert is keen to push the technological envelope as far as he can

Bekum America is very successful, enjoying a record year last year, so this has given it room to grow."

Last year was generally more successful than the company had expected, with good earnings in the America business, especially. In fact, 2021 looks even better, according to Mehnert, with the company fully booked for orders in the US and Europe.

"The US might turn out to be bigger than Europe with the new expansion," he claims. "Here in Europe we make mechanical parts, weld and perform tasks such as cutting and machining the spiral heads, whereas the US is more into assembly. We deliver blow moulding heads, which are expensive parts, to the US."

Mehnert explains that, as a part of Bekum's longevity in the North American market, the company has adapted to the quirks of doing business there. "There is a loyalty among US customers to American-made machinery, while good service is also extremely important in the market. A less expensive machine can win there, so you have to have the right offering. Our machine components in that market are American."

Bekum also claims to have taken apprenticeships to another level in the US, overcoming the huge challenge in finding suitably-educated people for jobs in manufacturing. "We brought

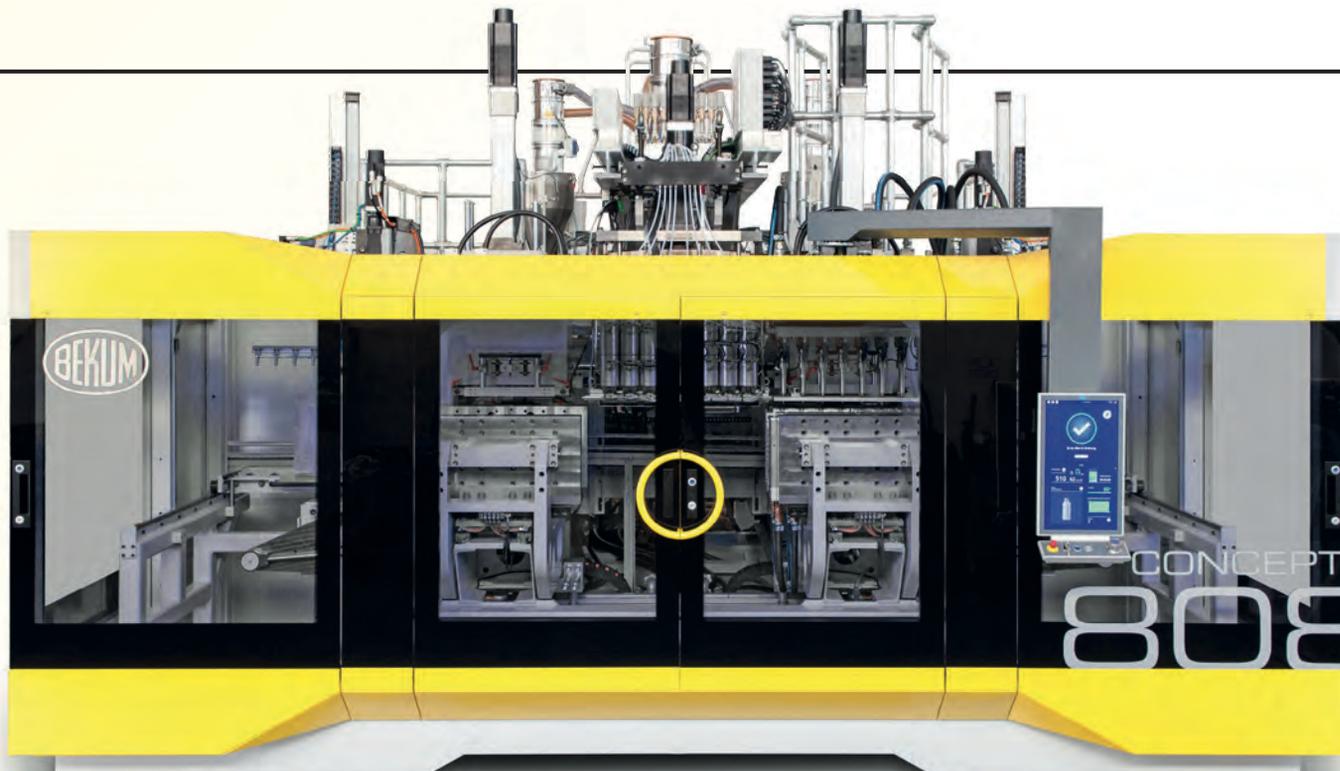
the German system of apprenticeships to the US, and we now have a full-time teacher there to 'grow' our own people."

Despite the company's success in the region with its current range, Bekum is also actively developing new machines specifically for the North American market.

"The H-155 continuous extrusion blow moulding machine is economical and a solid performer, but we are considering a successor to this," Mehnert confirms. But he adds: "Our machines are high-end and we won't ever go simple, low cost, like some machines from Asia."

Emphasising that he came into the role of chief executive with "lots of new ideas", Mehnert, an engineer by profession, was excited to present the Concept 808 machine at K 2019. This was because it gave the company a chance to demonstrate several new ideas and technologies that could play a key role in the future. Among the technologies on display were the energy-saving HiPEX 36D generation of extruders and the new Bekum Control 8.0 machine-control system, both of which have now gone into most of Bekum's new machines as standard.

Control 8.0 brought with it a huge new touchscreen to improve ease-of-use, designed by an external company. It is designed to find errors more quickly during production, and to enhance Industry 4.0 credentials.



*Above: The Concept 808 machine gave Bekum a chance to demonstrate technologies that could play a pivotal role in the future
Below: Extrusion blow moulding lends itself to a wide range of applications*

“We have also developed new sizes of the energy-saving extruder since the last K show,” says Mehnert. “What’s more, the new magnetic quick-change system, which can change moulds within 15 minutes per machine side, has been adopted by most of our packaging machines. The quick-change system for blowpins, which is just as simple and also operated by means of magnetic clamping technology, is particularly impressive. Moulds and blowpins are still exchanged from the front of the machine.

“All of that was tied together by our Bekum three-layer spiral mandrel extrusion head, which allows for precise layer distributions and the increased use of post-consumer recycled (PCR) plastics, in support of the circular economy.”

Concept 808 has scooped two international design awards, including the Good Design Award – presented by the Chicago Athenaeum: Museum of Architecture and Design – in March 2021. This gave recognition to Bekum’s ‘CUT’ machine design, which emphasises aesthetics, and modern colours and shapes, including large, lightly-tinted viewing panels.

Like Mehnert’s own mission of combining innovation with his father’s legacy, the concept machine also blended forward-thinking ideas with traditional technologies to create generational change – for both machine and management.

“The new machine design achieves our goal of being the benchmark in blow moulding technology,” he says. “My ultimate vision is that Bekum becomes the global reference for blow moulding quality, service and manufacturing.”

Finding a niche

Bekum’s extrusion blow moulding technology finds itself in a wide variety of industries, ranging from consumer goods packaging – including ketchup bottles, cosmetics, shampoo, and milk bottles – canisters and drums, and industrial packaging. The latter sector is developing very well, confirms Mehnert.

“We have two new machines for the industrial side with hybrid drive systems, and new extruders, making things such as 60-litre canisters,” he says. “This has represented a sizeable investment area for us over the last three years and we embarked on a design

process to make the machines look more modern.”

In this area, Bekum enlists the help of design partners to generate new types of industrial aesthetic, while trying to keep the costs reasonable.

“There are so many hydraulic machines out there and the technology itself is simple,” Mehnert explains. “Packaging was focused for a long time on energy savings, an area where industrial packaging got left behind, and this led us to a combination of electric movements and hydraulics, which can be just as energy-saving as an all-electric machine in the bigger tonnage ranges.

“With electric drives, you don’t always have the flexibility of changing mould thicknesses, so having two thicknesses becomes a challenge. Having said that, packaging mould thickness usually stays uniform. We prefer a more flexible solution using hybrid technology.”

Bekum’s new extruder series is a big step-change in energy savings, boasting a 20-30 per cent reduction in consumption for electric or hybrid systems. This is a crucial saving, considering 70-80 per cent of the total blow moulding machine’s energy consumption comes at the extruder.

“The saving is a combination of several things,” he explains. “We’ve utilised a much longer extrusion screw – 36D instead of 24D – where the special design of the screw ensures that the pressure does not go up too fast during the melting process. We’ve also changed the gearbox and motors. We work with partners, with universities and also external companies on design enhancements.



“During the last five years, we’ve changed the way that the machine works, using electric drives. We’ll stick to the path of innovation from the Concept 808, which was for the 8 series of machines, and the next machine series is in development for the upcoming K show in 2022. What the pandemic did give us is the capacity to really push engineering and developmental work.”

A process refinement that Bekum has perfected in recent years is the ability to produce PET hand-ware. In the past, this has proved challenging and often involved the use of clip-on handles. By perfecting the technology for PET handled bottles, Bekum has tapped into a burgeoning opportunity in North America, especially in the juice sector.

“We have a significant number of machines in the US for this, whereas generally containers in Europe are smaller,” Mehnert points out. “A 1-gallon (4.5-litre) bottle is commonplace in the US. In terms of resins, we are seeing a continued shift away from PETG, as it’s a problem for recycling, so ‘real’ PET is the focus for brand owners. In Asia, we still see a lot of water dispensers in polycarbonate. We have conducted lab trials for water dispensers made from PET and have proven successful blowing of bottles. But there remains a question mark over the drop test for such a large bottle.”

Bekum has also completed trials with bio-based plastics and PCR, and has proven the ability to blow bottles using a variety of emerging materials. More often, the questions hinge on local demands and what materials national markets can handle.

“We’re seeing a big push for three-layer bottles, and have enjoyed large orders from that,” he explains. “It’s a known technology, and we developed the new series of extruder heads for that purpose. They have a special coating, and the three-layer setup enables us to use upwards of 80 per cent regrind in the middle layer. You could blow with 100 per cent but that would be reflected in the colour, which could be a problem for a drum, for example. Our niche is in special solutions for customers and engineering. It’s not just the standard shampoo bottle, but also technical projects that require individual product development. That’s one of our big strengths.”

“We are also in a unique position in terms of offering pharmaceutical and cleanroom-approved extrusion blow moulding machines. Here, we specialise in pipettes for labs, inhalers and small bottles that meet FDA guidelines. We recently completed a pipette project in North America, for example.”



Above: Bekum’s concept machine drew the audiences in at K 2019, and the company will be hoping for more of the same at the next edition of the show in 2022

Left: Aftermarket service is growing in significance due to the ability to work remotely

Bekum is also active in the automotive sector, although this market dipped between 2018-19 as the shift to electric cars gathered pace.

Breaking down walls

Back in the 1960s, Bekum grew exponentially, but found it hard to expand due to the Berlin Wall, so the company inaugurated the Austrian facility.

“Having started in Austria because of restrictions in Germany, it’s now more economical to manufacture in Austria, due to the huge plant we operate here,” admits Mehnert. “We operate across two main product lines: packaging machines and industrial machines. One was produced in Austria and one in Germany, but the markets go up and down, so it made sense to switch everything to one site [Austria].”

Although Mehnert would not consider starting a manufacturing subsidiary in Asia, he is open to an acquisition or partnership on that continent, for special lines or applications.

“Blow moulding is such a mature market, with so many small competitors, so it is time for some consolidation,” he argues. “It’s a very different space to injection moulding. Of course, packaging is our biggest market share, led by food, beverage and household products, but medical is growing, as is the market for canisters. Automotive is on the backburner.”

“There is always a bespoke element to our machines, and I’d say 10-20 per cent of a machine design depends on the speciality, whereas in injection blow moulding you’d find 20 machines the same.”

Aftermarket service is a growing concern, and part of that is the ability to work remotely. Here, Mehnert says Bekum has made significant strides.

“We have a lot of remote control on the machine, and we’ve also conducted a lot of remote installations during the pandemic. It has worked much better than we expected,

especially for changing spare parts, and we’ve been to India, South America, and beyond.

“By using remote control, we essentially tunnel into the machines, so we are not touching the customer’s equipment network. They also have a key, so they can switch it on or off, to give them peace of mind that nobody is looking at their machinery.”

Given the significance that the K show seems to have for Bekum and its progress milestones, what can we expect at K 2022?

“We will have a new electric clamp system,” explains Mehnert, “whereby the toggle drive, gearbox and motor are directly mounted. A twin toggle drive protects the gearbox and motor from the force of the clamping unit, if something is between the moulds, so it’s reliable and can work with smaller motors and gearboxes. It also helps with energy consumption, too, as it’s a moving mass. There will be four different sizes of this system.”

You can forgive Mehnert for his infectious enthusiasm in pushing the technological envelope as far as he can, as quickly as he can, but he admits that he needs to rein in the speed of change at times: “Sometimes my employees stop me and say that we cannot do everything at once, and we must do things step-by-step. We have to make sure we are not going too fast.”

Times have indeed changed. The focus in the early days of the company was on building robust and solid machines, and it did not matter how they looked. Now, first impressions can be key and Bekum enlisted a German design studio to help deliver on the aesthetic front, too. Meanwhile, the use of artificial intelligence gathers pace and converters fully expect to soon be able to measure a multitude of variables at the press of a button, such as water and energy consumption, temperatures, and so on.

It is, as Mehnert explains, about bringing technology to the forefront but in a much more intelligent way than in the past.

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