

Blow Molding. The topics of energy and resource efficiency are as much at the heart of current developments in blow molding as the production of varied blow molding products meeting ever higher standards. Besides innovative engineering solutions in order to secure technical leadership, the sustainable design of processes and products, in particular, will play an important role in future.

Flexibly into the Future

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To respond flexibly to product and material changes, packaging manufacturers need access to systems that are flexible enough to meet these requirements. For the manufacture of hollow articles with volumes up to 10 liters, Bekum Maschinenfabrik GmbH, Berlin, Germany, with the xBlow series, presents a machine range that is supplied with both all-electric (E) and hydraulic drives (HY) (Fig. 1). The clamping unit is based on a wear-free and stable C frame, which allows targeted force transmission into the mold area and absolute platen parallelism. If an optional downward blowing station is used, outputs of up to 20,000 bottles per hour can be achieved. Moreover, the tandem blowing process permits calibration of the blow-molded articles both from the top and from the bottom. Moreover, the blowing line operates energy efficiently in the all-electric model. Compared to hydraulically operated blow molding machines, up to 50 % energy can be saved. The compact machine series KCC from Kautex Maschinenbau GmbH, Bonn, Germany, too, can be used flexibly to produce consumer and industrial packaging in sizes from 50 ml up to



Fig. 1. The EBlow 407 D with a all-electric drive is a twin-station blow molding system for hollow articles with a volume up to 10 liter (photo: Bekum Maschinenfabriken)

30 liter for mono- or coex-6 applications and thereby permits a large product variety for processors. The KCC15D extrusion blow molding line (Fig. 2) of this series, presented at Chinaplas, is equipped with a six-layer die head in two-layer DeCo configuration. The machine is suitable for processing all conventional blow-moldable materials and producing consumer packaging with a volume between 50 ml and 5 l. With this model, the decorative outer layer is produced by a separate extruder, so that masterbatch can be saved and production waste can be processed in the inner layer without affecting the product appearance. One two-station line with 12 cavities achieves an output of up to 3,600 articles per hour.

Similar concepts are also pursued by the stretch blow molding machine manufactur-

ty to the machine's current production output. The modifications permit continuous production output of up to 2,250 containers per hour and blow molding station. That corresponds to a productivity increase of about 10 % compared to the preceding generation. As a consequence, the machine can be made significantly smaller than before for the same output. According to the machine manufacturer, it is possible to reduce the number of cavity in a machine with an output of 36,000 containers per hour from 18 to 16. The reduction of the blow molding station additionally has a positive effect on downtimes during product exchange. Besides the increase in flexibility, development focused on the reduction of the overall energy consumption. The integrated drive concept operates with servo motors and, due to the precise mode of operation, ensures →

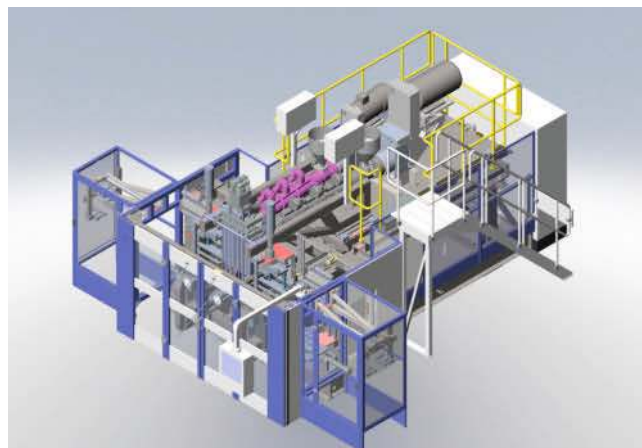


Fig. 2. The KCC15D extrusion blow molding machine is suitable for producing packaging of different sizes and different materials (figure: Kautex Maschinenbau)

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Fig. 3. The Contiform 316 stretch blow molding line has a production output of up to 36,000 containers per hour (figure: Krones AG)

precise transfer between the transfer stars, oven and blowing wheel. Moreover, the elimination of the transfer belts increases the energy efficiency and stability of the machines. The modifications of the heating zone ensure further savings in energy costs. Reduced clearance between the reflectors and infrared emitters reduces the primary energy consumption of the oven by about 15 % compared to the 2010 oven model.

Functionalized Products

The second German manufacturer of stretch blow molding machines, KHS Corpoplast GmbH, Hamburg, Germany, is going with sustainability and flexibility. The new InnoPET Blomax Series IV machine generation, in its biggest configuration with 36 blow molding stations, has a maximum output of 72,000 bottles per hour. At the same time, the plant has 25 % less energy consumption than the preceding generation. Moreover, a servo-controlled stretching process supports the optimization of the material efficiency of stretch blow-molded hollow articles. The manufacturer has retained the modular construction of the machine familiar from Series III. By using standardized modules for the main machine module, transfer module or oven, the customer still has high flexibility in configuring a new system.

Besides advances in the field of machine technology, product-oriented developments have also been made in the field of process engineering. In

the production of technical parts in particular, functionalization of the products plays an important role. Examples of technically challenging parts are plastic fuel tanks. A wide variety of severe demands are made on these parts. In particular, the ever stricter emission standards require innovative solutions in production methods and product design. To reduce hydrocarbon emissions, fuel tanks are of multilayered design, with special barrier layers. However, the downstream integration of functional elements usually results in the destruction of this barrier layer. Kautex Maschinenbau GmbH and Kautex Textron GmbH, Bonn, Germany, have developed solutions that permit the integration of functional elements, such as the fuel pump, directly during manufacture and therefore without destroying the layer structure. In the C3LS blow molding technique from Kautex Maschinenbau, the tubular parison is cut and folded open at one side in the longitudinal direction during extrusion (Fig. 4). With this opening in the parison, tank components can be introduced into the interior of the preformed tank bubble with the blow mold partly closed. The advantage of the new process is that existing die technologies and wall thickness control systems can still be used. Another concept was developed by Kautex Textron. The Next Generation Fuel System (NGFS) is a twin-sheet process that also permits direct integration of functional components into the tank. Instead of a round parison, in this process two sheets are extrud-

ed, which form the two halves of the fuel tank. During the forming process, the components are applied to the interior wall of the tank with a handling system. The mold halves are subsequently closed and the blow molding of the tank is completed. With this process, complete tank systems with all necessary functional parts can be produced in only one step (Fig. 5).

Packaging solutions, such as those from the food sector or industrial packaging, must meet a wide variety of challenges. At Fachpack 2012, Schütz GmbH & Co. KG, Selters, Germany, presented a new intermediate

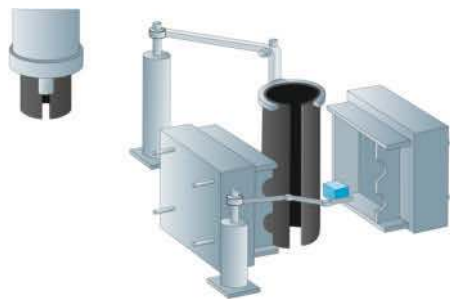


Fig. 4. The C3LS process permits the integration of functional elements into the fuel tank

(figure: Kautex Maschinenbau GmbH)

bulk container (IBC), the Ecobulk MX-EV FDA, which besides having an EVOH permeation barrier layer, also features a special inner layer for the transport of high-viscosity substances, an integrated removal system and a solid-plastic palette. The Ecobulk thus meets the specific requirements in the food sector and is equipped for transporting sensitive materials. At the packaging tradeshow, Schütz also presented the IBC model MX-EX, which is specially designed for use in Ex zones. To neutralize electrostatic charging of the filling material during emptying, the threaded flange with integrally molded grounding cable at the discharge nozzle

so support the concept of optimized energy efficiency.

Along with this ecologically motivated trend, a further economically driven trend can be seen: Increasing customer demands in product design or product functionality increasingly lead to a variety of customer solutions and a large diversity of models on the market. The blow molding industry is trying to counter this trend with the development of the most flexible machine concepts. New blow molding machines, therefore, support the direct integration of functional elements through rapid cavity exchange systems, or the processors' flexibility through a strictly modular system architecture. ■

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Fig. 5. NGFS tank with integrated functional components (photo: Kautex Textron)