Increasingly complex closures dominate the beverages market in the middle- and high-price ranges: innovative machine designs can today manufacture closures that were not profitable just a few years ago. The following overview shows you the typical assembly steps involved in the production of a complex sportscap.

One manufacturer in this market is the assembly-machine builder Contexo, who has been building turnkey-ready machines for beverage closures for 15 years. The company became well known for its solutions in the medical-devices sector. Contexo has successfully transferred this expertise to the beverages market. Today, the family-run firm is one of the leading providers of machines for complex beverage closures.

The portfolio of Contexo includes machines for complex-closure designs (e.g., non-rotationally symmetrical), closures with additives (e.g., powders or fluids integrated into the cap), and for special seals for highly carbonated beverages.

The assembly steps for a complex closure with a chamber for a powder are presented below.

SPOUT: THE HEART OF THE CLOSURE
The spout is important to the user primarily for its haptic qualities. It is the part of the bottle users touch with their mouth. With complex closures, it is especially the internal structure that is important. It can contain powder, fluid or pills.

Production: First the parts have to be fed in. This is a particularly gentle procedure that uses vibration-feeding devices to prevent pearlescence and damage to the seal elements. Contexo developed its own feeding technology that guarantees gentle handling of the parts even at high speeds. If the closure type is not rotationally symmetrical, the part must also be correctly oriented.

A dosing unit integrated into the assembly machine fills the chamber. Powders and fluids are dosed in the ml range. Tabs and pills are also frequently used.

Finally, a foil seal is used to close the chamber. The Contexo assembly machine stamps the foil inline immediately prior to assembly. This saves time, minimizes production area and avoids contamination. The chamber is then closed and sealed with the foil. To guarantee the seal’s tightness, inline vision inspection is used to check around half a dozen criteria. Only 100-percent perfect parts may continue to the next stages of the production process. The checked parts are then turned around prior to the assembly process so that they can later be correctly mounted to the body.
BODY: THE BASE OF THE CLOSURE
The body’s main role is to connect bottleneck and spout. In the case of the present closure with powder chamber, the body contains cutting teeth. By turning the spout, the cutting teeth open the foil seal and empty the chamber’s contents.

Production: First, the bodies are fed in and oriented according to their visual features. Visual-inspection systems check the quality of the cutting teeth. This ensures that the foil seal is cleanly opened. Here too, Contexo uses inline vision inspection.

Now comes the “wedding”. The filled spout is united with the body – the two parts are mounted together. Finally, the TE band is folded and activated.

OVERCAP: THE CLOSURE’S PROTECTIVE JACKET
The closure’s cap mainly performs a protective role: it guarantees that the beverage is uncontaminated at point of sale and enables secure re-closing.

An EU regulation is currently being planned for this functionality. Overcaps will soon have to be securely attached to the closure base to prevent pollution and choking on the cap.

The closure cap used in this example already conforms to coming EU requirements: the hinge is securely welded to the body by laser.

Production: First, the overcaps have to be fed in and oriented. Contexo uses servo technology to align the caps according to the hinge’s location, and position them over the body-spout module. At the same time, the hinge pin is precisely inserted into the body and welded in place by laser. A final check for captivity completes production of this closure.

PRODUCT LIFE CYCLE: MODULAR PLATFORM SYSTEM
Because today complex closures frequently come to market with new beverage products, a beverage’s success leads to a sudden increase in the number of complex closures demanded. A flexible platform that can adapt to the new required output is therefore critical. For this reason, Contexo has developed a modular platform system capable of widely different output rates within a short period of time. It also handles the various phases of the product’s life cycle:

Market launch: Contexo builds its machines for this phase primarily around the highly economical rotary indexing system.

European market: Should the product start to become successful on the European market, multi-lane linear indexing machines are the best choice.

Global market: If a small installation footprint is required for global production, Contexo switches to continuous-motion technologies.

The modular platform system allows existing stations and tools to be transferred to new machines. This enables very economical adaptation to changing output amounts.

The key to success: innovative technology combined with a flexible platform system

This overview of the assembly process shows how the number of automation tasks increases in the production of complex closures. New technologies are a requirement. But to bring closures to market successfully, it is also important to develop a platform system that enables quick adaptation to changing output needs.

→ www.contexo-automation.com
**Continuous motion**

**UP TO 800 MIO.**

**Linear indexing**

**UP TO 300 MIO.**

**Task:** 3 Parts SportsCap with Powder Filling

**Round Indexing**

**FROM 8 MIO.**

**Linear Indexing**

**FROM 300 MIO.**