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Technical article

Smooth production in the cleanroom

The patented RotaricE²® technology for injection molding is characterized by maximum compactness and efficiency. Its designer, Braunform, an innovation driver in precision mold making, has combined several production steps for its cleanroom mold, as the production example of pharmaceutical caps shows. Coatings from their long-standing partner Oerlikon Balzers ensure lubricant-free operation with this technology in a small space.

Braunform, based in Bahlingen at the foot of the Kaiserstuhl in the German state of Baden-Württemberg, has made a name for itself as a leading global partner in plastic mold making, particularly with the aim of increasing production efficiency and reducing costs. The RotaricE²® mold concept, which combines two-component injection molding with servo technology and component assembly in a very small space, impressively achieves this goal and saves the customer time, money, installation space and production area. In this way, the ready-to-use tool does the work of two injection molds and machines, as well as an assembly line to put the individual parts together.

What this means in practice becomes clear in the production of Luer connectors, delicate two-component caps for the pharmaceutical industry. Braunform designed a 4+4 cavity mold that was used as a demonstration for later production molds with up to 64+64 cavities. Its special feature is the multi-component injection mold, combining the two-components core-back function, Luer capping and unscrewing with servo-electric drives in a very small space.

Smooth operation with three high-performance coatings

The overall design is cleanroom compatible. The proven MED Mold® concept is therefore used. Since 2010, Braunform has been using and further developing this concept for pharmaceutical customers in its own cleanroom production in nearby Endingen. In cleanroom manufacturing, low friction coatings are an important component for reducing grease and emissions. They help to ensure the largely lubricant-free operation of moving parts in the mold. "Pharmaceutical and medical products must not be contaminated during production under any circumstances. That's why high-performance coatings are essential," says Reinhard Steger, Senior Business Development Manager at Braunform.

The company relies on three coatings from its long-standing partner Oerlikon Balzers: the DLC (diamond-like-carbon) coating BALINIT DYLYN as corrosion protection with its non-sticking properties, especially for the system with sliding elements; the very smooth, scratch-resistant S3p layer BALIQ CRONOS for better demolding, shaping elements and contours; and the BALITHERM PRIMEFORM diffusion process for mold surface hardening.

"A partner who speaks our language"

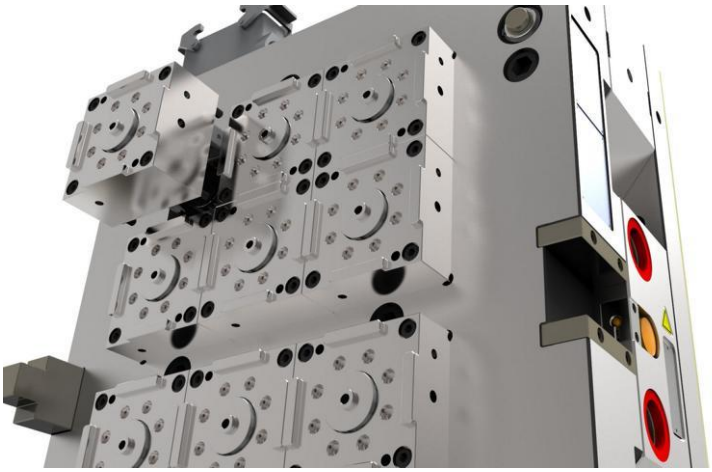
"We use coatings mainly from Oerlikon for almost every tool," emphasizes Nico Kramer, Head of Production Planning at Braunform. He explains why: "Oerlikon has an extremely broad, FDA-compliant coating portfolio for virtually all applications. Oerlikon is an innovative company and the people we work with are experts and speak our language. And very important, our elaborately manufactured parts are treated with the utmost care. Coating is the last step in the process chain, where all the costs incurred before are at stake. Oerlikon meets all our requirements."

In the pharmaceutical industry, an injection mold must run reliably for up to 15 years, with volumes in the tens of millions. Sometimes an expansion or replacement is required, and it must be 100% identical to the previous tool. With this in mind, Braunform produces between 100 and 130 molds per year, setting the bar at the top of the industry. This is what RotaricE²® stands for. And what Oerlikon stands for with its surface solutions.

A prime example of compact design and efficiency: the patented RotaricE²® injection mold technology from Braunform, shown here in the form of a 4+4 injection mold to produce Luer connectors / Image: Braunform

Product example from Braunform's 4+4-cavity injection mold: a Luer connector with cap. / Image: Braunform

Braunform’s technology can also be used to produce Luer lock connectors, shown here with a retrofitted needle.
/ Image: Braunform



Based on RotaricE²®, Braunform offers injection molds with up to 64+64 cavities, shown here an example with 48+48 cavities.
/ Image: Braunform

(From left to right:) Reinhard Steger and Nico Kramer from Braunform and customer consultant Ronald Baumhöfer from Oerlikon inspect a guide column coated with the new, rainbow-colored BALINIT MAYURA from Oerlikon Balzers.
/ Image: Braunform

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About Oerlikon Balzers
Oerlikon Balzers is a leading global technology brand for coatings that significantly improve the performance and service life of precision components and tools for metal and plastics processing.

The coatings developed under the product brand names BALINIT and BALIQ are extremely thin, are characterized by high hardness and significantly reduce friction and wear. The diamond coatings in the BALDIA portfolio enable top performance when machining the most demanding materials. BALITHERM offers a wide range of heat treatments, while BALTONE includes coatings that are perfect for decorative applications with their elegant colors. BALORA efficiently protects components from oxidation and corrosion in extremely high temperature environments. BALIMED thin-film coatings, specially developed for medical applications, are wear-resistant, biocompatible, antimicrobial and chemically inert. With the BALIFOR technology brand, the company has introduced individual solutions for the automotive market.

Oerlikon Balzers and its customers use more than 1300 coating systems worldwide. The development and assembly of Balzers systems are based in Liechtenstein and Bergisch Gladbach (Germany). Oerlikon Balzers has a dynamically growing network of over 110 coating centers in 35 countries in Europe, North and South America and Asia. Together with Oerlikon Metco and Oerlikon AM, Oerlikon Balzers is part of the Surface Solutions Division of the Swiss Oerlikon Group (SIX: OERL).
Further information can be found at www.oerlikon.com/balzers

About the Surface Solutions Division of Oerlikon
Oerlikon is a leading global provider of surface treatment and additive manufacturing solutions and services. The division offers a comprehensive portfolio of market-leading technologies, systems, components and materials in the fields of thin film coating, thermal spraying and additive manufacturing. Reduced emissions during transportation, optimal durability and performance for tools and components, higher efficiency and intelligent materials are just some of the achievements that Oerlikon owes its leading global position to. After decades at the forefront of technological innovation, the division is now represented through a global network of more than 170 locations in 37 countries with standardized and customized solutions for its customers.

Oerlikon's Surface Solutions Division and its technology brands - Oerlikon Balzers, Oerlikon Metco and Oerlikon AM - focus on technologies and services that improve and optimize performance, function, design, reliability and sustainability. These are innovative, game-changing benefits for customers in the automotive, aerospace, tooling, general industrial, luxury goods, medical, semiconductor, power generation and oil and gas sectors.

The division is part of the listed Oerlikon Group (SIX: OERL), which is headquartered in Switzerland. The Group employs around 13,000 people and generated sales of CHF 2.9 billion in 2022.
Further information can be found at www.oerlikon.com/surface-solutions/