

Hidden champions

The coronavirus pandemic has brought people and products to light that normally operate backstage. One of these hidden champions is the borosilicate glass vials produced by SCHOTT's workforce that hold the vaccines.

As people around the world waited for the development and roll-out of COVID-19 vaccines, the role of the pharmaceutical supply chain received an unexpected amount of public attention. For SCHOTT, this was rewarding and challenging at the same time. "Since we are at the very beginning of the supply chain, our vials play a crucial role, yet often go unnoticed by a wider audience," explains Fabian Stöcker, VP Global Strategy and Innovation for SCHOTT's Pharmaceutical Systems business unit. With the biggest vaccination campaign in history underway and demand for such vials doubling within weeks, suddenly all eyes were on these tiny vials and their production network.

In the initial phase, the vaccines were filled in ISO standardized borosilicate glass vials ranging from 2 milliliter (mL) to 10 mL. This is something that SCHOTT mass produces in the millions every day at production sites around the globe. "Manufacturing a vial only takes a matter of minutes. If you add up all the different packaging types, we manufacture 30 million pharma containers a day," says Stöcker. The preferred base material for these vials is FIOLAX® borosilicate glass tubing, invented by the company's founder Otto Schott around 1890. Since then, it has been the gold standard to produce high-quality pharmaceutical containers to package drugs. Its chemical inertness preserves the drug's effectiveness. "The pharmaceutical industry has a lot of experience with this specialty glass and knows how it behaves towards different drug formulas," states Jörg Döscher, VP Strategic Marketing and Innovation for SCHOTT's Tubing business unit. During the pandemic, borosilicate glass proved its strength, with the vast majority of COVID-19 vaccines relying on this glass type. "It's very important to have high-quality glass to package the vaccine because nothing should get into the vaccine itself," explains Sierk Poetting, COO at BioNTech. "We were very happy to work with SCHOTT and bring our vaccine to the market in SCHOTT glass."

New challenges enable new approaches

Yet the pandemic confronted SCHOTT with unprecedented situations that no one could have imagined in their wildest dreams. For example, when the borders between Germany and the Czech Republic closed overnight, more than 120 colleagues suddenly faced the question of whether they should move to Germany for their jobs and risk not being able to return home for an indefinite period. In France, authorities confiscated personal protective equipment (PPE), such as masks, for the general public, even though these were also



COVID-19 vaccine: In the future, vials made of borosilicate glass will be partially replaced by prefillable syringes made of polymer.

essential for the team's clean-room production. This all happened almost simultaneously all over the world and required individual and quick solutions. "We're proud and thankful that our company's spirit helped the

teams through these times and that everyone pulled together to meet our COVID-19 vial supply targets," comments Dr. Frank Heinrich, CEO at SCHOTT. "To highlight another example: Despite the pandemic, a team of German and Chinese experts managed to complete and start production of our new tubing factory in Jinyun, China in a record-breaking time of just 15 months."

By the end of 2021, SCHOTT will have delivered enough vials to hold over five billion COVID-19 vaccine doses. "With sophisticated hygiene measures and coordination with authorities, pharma companies and our own production, we were able to manage the demand and increase the global output," says Stöcker. Moreover, forming well-integrated teams and relying on processes that are well-established within the industry helped to make a running start when COVID-19 appeared. Also, a global investment of \$1 billion from the company in its pharmaceutical business in early 2019 played an important role. It includes expansion activities around the globe, including in China, Germany, Hungary, India, Mexico, Switzerland, and the United States, and made a quick production ramp-up possible.

A joint look into the future

The story does not end there. The experts are already evaluating the next steps of how to package COVID-19 vaccines together with pharma manufacturers. Based on the typical drug lifecycle, SCHOTT expects that at least a part of these will be stored in prefillable syringes in the mid-term. "We are foreseeing a shift toward prefillable syringes and have compiled comprehensive datasets, for example, for low-temperature storage, to support vaccine manufacturers in their next steps," confirms Stöcker. By offering both glass and polymer prefillable syringes (namely cyclic olefin copolymer), a holistic approach can be taken together with customers to help find the best solution to safely store drugs.

Throughout the pandemic, high-quality primary packaging solutions paired with tuned-in supply chain performance and the company's workforce have proven to be true hidden champions. SCHOTT will continue to do its utmost to support customers and partners with advanced solutions. After all, close cooperation is essential, especially in times like these.