container with maximum precision. As part of our service, we produced an exact replica of the glass container to be tested for our customer: in this case, a 390-ml European jar.

This dummy made of highly resilient plastic was fitted with a ShockQC sensor calibrated by the manufacturer. It then began its journey along the filling line together with a batch of other jars. A total of four tests were performed, each at different belt speeds. The dummy and sensor passed through the entire line, starting with unpacking of the jars all the way to the final conveyor belt that carries the jars away in their finished cartons. The measured datasets were transmitted no less than 100,000 times per second to a tablet PC for visualisation on an easy-to-understand dashboard.

The result: the jars are conveyed along the line from the unpacking station to the filler and from the cooling tower to the cartoning and outbound transport stations at a rather leisurely pace, with sufficient minimum clearance. However, there is an impact zone between the filler and sealing station where the jars are subject to shocks that exceed Vetropack's guaranteed minimum impact strength by as much as 60 percent. This stress does not necessarily cause defects in a jar that has been processed without faults. But even if very minor faults or inclusions are present, an impact of this magnitude usually causes glass fragments to chip off. In this way, the cause of the problem was found and the basis for a targeted approach to eliminating it was established. Our customer is now able to optimise their filling line exactly where improvement is really needed. Michael Waltl is also satisfied: "Following on from the success of the first assignment, we have since used this service for several other interested parties – and we were able to provide rapid assistance every time. Now we're looking forward to helping the next customers optimise their lines – quickly and easily, with a results-oriented method that involves no unnecessary effort or expense."

3D PRINTING LABORATORY

Glass design you can feel

Thanks to the 3D printing service from Vetropack, customers as well as our own in-house staff can now experience the physical feel of new glass containers. The Vetropack Group has set up a 3D printing laboratory for glass models so that our customers can literally get to know glass packaging "hands-on" prior to series production. The prototypes, which are made from a special resin, precisely replicate the geometry of the containers to convey a sense of their look and feel.

Customers and internal stakeholders of the Vetropack Group have been able to take advantage of a new service since summer 2022. Mould Designer Christian Bruckner and his team are responsible for this innovation at our Pöchlarn site in Austria: "With the help of a 3D printer, we can produce realistic 3D models of new glass bottles and jars in small quantities. In fact, this isn't an entirely new service – we used to outsource it in the past. But the internal solution has given us far more flexibility."

People are already keen to make use of the service, and they are using the online form to send in requests from all over the Vetropack Group. The 3D printed models are created from a special resin that allows the entire geometry of the desired glass container to be replicated – including details such as alignment notches, handles and engravings. Bruckner continues: "The only thing that isn't possible, for technical reasons, is reproduction of 2D elements such as labels. That's because the model is built up layer by layer."

Look and feel from the 3D printer

The digital light synthesis (DLS) printer delivers a layer thickness of 75 micrometres with platform dimensions of 189x118x326 millimetres. "So depending on the size of the glass container, several models can be printed simultaneously – or, in the case of a litre bottle, for example, just one model. The limiting factor is the height. And the larger the container, the longer it will take to print it: the speed is around 30 millimetres per hour, and then the support structure is removed." But before the model can be handled, it has to be washed twice in isopropyl alcohol (once mechanically and once manually), followed by drying and then curing with UV light.

Together with the project planning, this adds up to a lead time of one to two days for each print order. "Of course, a 3D model like this is a great way to give Vetropack customers a feel for their new glass packaging before everything goes into series production. But since our capacities are limited, people should only place orders when it really makes sense," Bruckner emphasises.

Wide variety of potential applications

Apart from the obvious benefit for customers, who can use the 3D model to optimise their packaging design, these transparent containers are also used in house: on the one hand as illustrative specimens for training purposes, and on the other as samples of faults in automation. Bruckner is also involved in the design for our second Austrian site at Kremsmünster and for St-Prex in Switzerland. He explains: "You can also make very good use of the models to teach machines – automatic detection of defects and separation in production are just two examples."

"Of course, a 3D model like this is a great way to give Vetropack customers a feel for their new glass packaging before everything goes into series production."

Christian Bruckner

The consumption of transparent resin is approximately equal to the amount of glass that would be needed for the desired container. Unused resin is filtered after printing so it can be reutilised. The 3D printing lab in Pöchlarn is also equipped with a state-of-the-art extraction system to make sure that all residues – especially highly volatile isopropyl alcohol – are entirely removed.