

## PRESS RELEASE

Lightweighting

### Less is more

- PET bottle development for still beverages sets standards
- Close cooperation between KHS and Husky Technologies
- Development time of just four months

**Dortmund, May 13, 2025 – KHS has set an impressive new benchmark by engineering one of the world’s lightest PET bottles for still beverages to date. Under the working title of Factor 101, in close cooperation with Canadian-based injection molding technology equipment and services provider [Husky Technologies](#), a container has been produced that uses just 5.89 grams of material to hold 591 milliliters of product. This is equivalent to the 20-ounce size common in the United States.**

At drinktec 2017 KHS presented its Factor 100 concept as a feasibility study that featured a PET bottle weighing approximately five grams with a capacity of 500 milliliters. A number of optimizations have now been made to the further development, as KHS packaging designer Fabian Osterhold in Hamburg explains. “With such extreme lightweighting, what’s known as the top load is especially important. This value tells us how sturdy the bottle is from a vertical perspective. It determines whether the container can be stacked or not and survive transportation undamaged.”

### **Extremely robust lightweight**

To increase stability, the shoulder design of Factor 101 has been modified and the bottle body reinforced with functional webbing. Moreover, Osterhold and his colleagues have developed a base with a pop-in effect. Here, the base pops inwards to a certain degree when a top load is applied, increasing the internal pressure and therefore the stability of the bottle.

Two hundred newtons is a common top load threshold in the industry; at 220 newtons, the Factor 101 exceeds this. In order to achieve this high value for a PET bottle used for still beverages, adapting just the container shape wasn't enough. "The preform design also needed to be developed further," emphasizes Osterhold. This is why KHS joined forces with the specialists at Husky. The company has a wealth of expertise as the world's leading equipment supplier of PET preform injection molding systems and services and has been in cooperation with KHS for many years.

### **Challenging coordination**

Technically speaking, the stretching factors from blank to bottle and the resulting preform dimensions were especially important here. The relation of length to wall thickness is particularly relevant to injection molding. In this context, KHS addressed the specifications and feasibilities of the stretch blow molder and bottle design, while Husky made the necessary modifications to the preform. "The focus here was on the exact profiling of the preform made possible by KHS technology," Osterhold ascertains. "Focus lamps in the heater on our [InnoPET Blomax Series V](#), for example, make for extremely precise temperature profiling directly under the bottle neck ring. This ensures that no material stays unstretched. In turn, this considerably reduces the amount of plastic used."

### **30% less material**

Compared to the standard lightweight PET container holding 500 milliliters of still water that usually weighs seven grams on the US market, the joint KHS/Husky product requires 30% less material. It can also be manufactured entirely from rPET.

However, bottle geometry is just one factor. “Line compatibility in the high-capacity range of up to 90,000 bottles per hour was a key challenge,” says Osterhold. “The main issues here were conveying, labeling and the secondary packaging. In the shrink tunnel, for instance, special attention had to be paid to the bottle shoulder – and the bottle of course shouldn’t fall over during conveying.”

### **High-speed development**

“Not only the weight but also the time in which the project was implemented are possibly record-breaking,” Osterhold states. Thanks to the great teamwork between Husky and the many KHS departments involved in the development process, the project was successfully concluded in just four months.

### **Great interest on the market**

Factor 101 was first presented live by Husky at the NPE 2024 plastics trade show in Orlando, Florida, in May of last year. The extreme lightweight was met with great interest in the industry. “The bottle in this form is of particular relevance to contract fillers who operate under great cost pressure,” believes Osterhold. The prime target markets are the United States, the Middle East and South America. The first projects are already in preparation.

**In conversation with Frank Haesendonckx, head of Stretch Blow Molding Technology at KHS, and Michael Müller, Director of Aftermarket PET Tooling for Husky Technologies**

**Haesendonckx:** Factor 101 is an excellent example of how we're combining Husky's engineering expertise in preform manufacturing with our proficiency in bottle design and production. Our joint aim is to produce a high-quality, high-performing, lighter weight result than either of us could do working on our own. Or, as I like to put it: for us, one plus one is greater than two.

**Müller:** We see great benefit in combining our technical expertise and envisage leveraging this for future projects. Here, Factor 101 acts as a starting point for discussion of a lightweight program and optimization of current packaging systems and solutions.

**Haesendonckx:** We aim to combine more cost-efficient preform and bottle manufacture with improved performance – also above and beyond Factor 101.

**Müller:** We're joined by a common spirit and goal – namely working towards developing sustainable packaging.

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## **Pictures and captions**

(source: Jörg Schwalfenberg)

**Image download:** <https://KHS.dphoto.com/album/zzj93z>

## **Picture captions**

### **Holistic approach**

Consistent concept: from preform through blown PET container to filled, labeled and capped bottle.

### **Direct comparison**

The predecessor Factor 100 bottle from 2017 (left) has now been successfully further developed as the Factor 101 concept.

### **Shoulder design**

The shoulder of the extremely light bottle has been strengthened with vertical webbing, among other features, to stabilize it.

### **Fabian Osterhold**

“The focus is on the exact profiling of the preform made possible by KHS technology,” explains KHS packaging designer Fabian Osterhold.

### About the KHS Group

The KHS Group is one of the world's leading manufacturers of filling and packaging systems for the beverage and liquid food industries. Besides the parent company (KHS GmbH) the group includes various subsidiaries outside Germany, with production sites in Ahmedabad (India), Waukesha (USA), Zinacantepec (Mexico), São Paulo (Brazil) and Kunshan (China). It also operates numerous sales and service centers worldwide. KHS manufactures modern filling and packaging systems for the high-capacity range at its headquarters in Dortmund, Germany, and at its factories in Bad Kreuznach, Kleve, Worms and Hamburg. The KHS Group is a wholly owned subsidiary of the SDAX-listed Salzgitter AG corporation. In 2024 the KHS Group and its 5,626 employees achieved a turnover of around €1.654 billion.

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