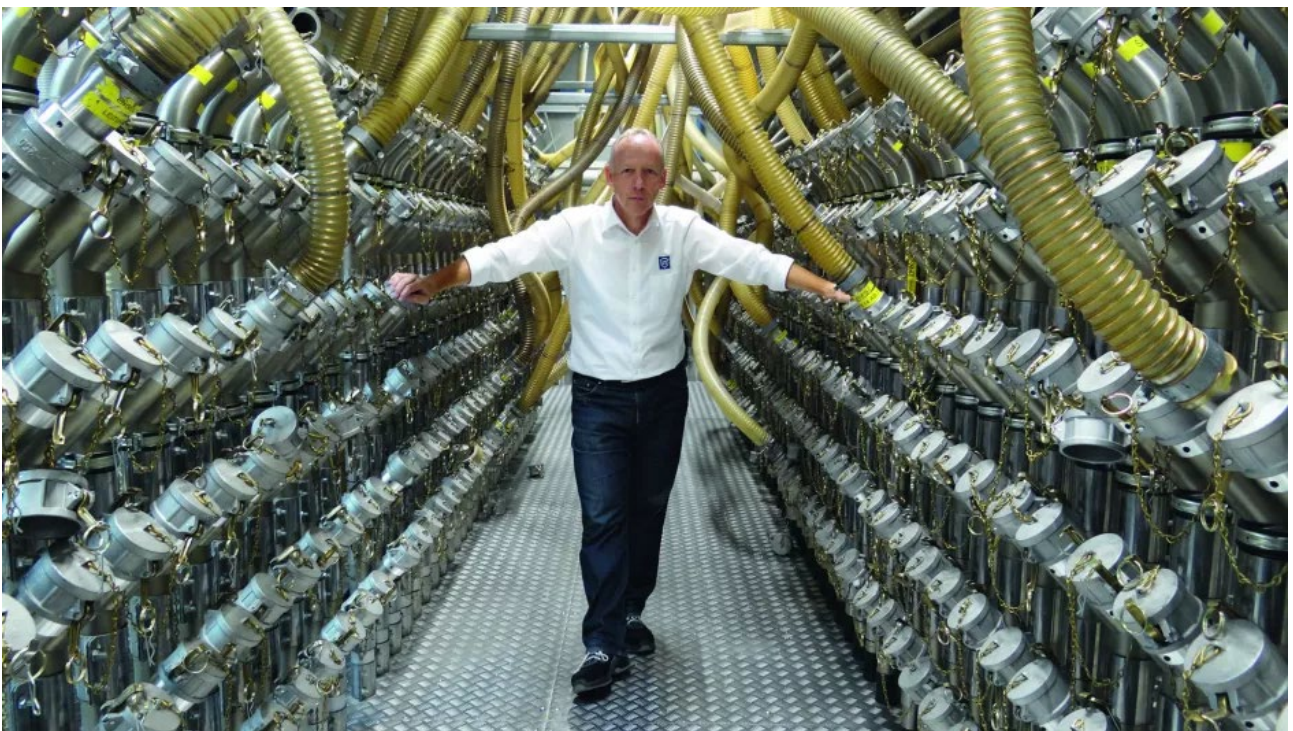


Bundled instead of individual

How a manufacturer of transport packaging distributes its granules smartly

Material supply is a central element in plastics production, especially when shot weights of up to 25 kg are involved. In the following article, you will find out why the German plant of Georg Utz Holding decided on a central material supply and why this serves as a blueprint for other plants.



Frank-Olaf Schütte, technical manager in Schüttorf, in the middle of the coupling station, through which two production halls are supplied with new material and regrind. (Image: editorial team).

According to the German Federal Logistics Association (BVL), logistics is the largest economic sector in Germany after the automotive industry and trade and is ahead of the electronics industry and mechanical engineering. The manufactured goods must be securely packaged during

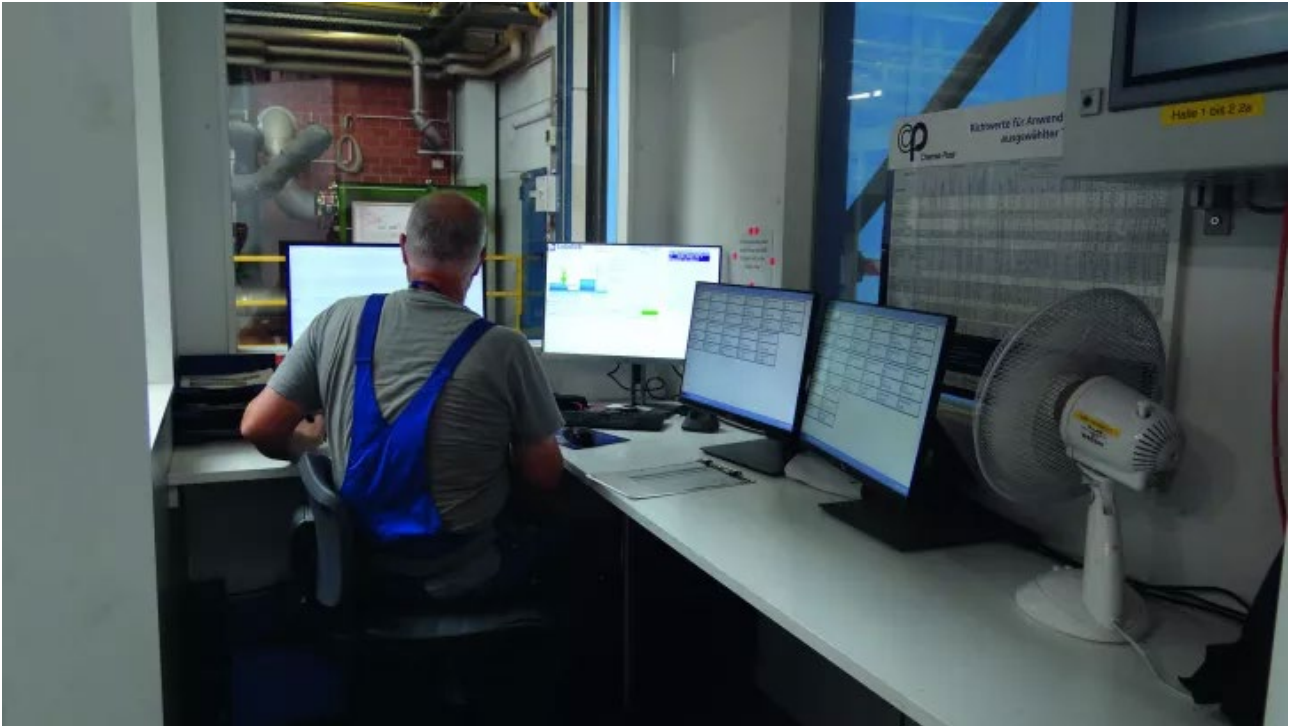
transport, storage, and in use or consumption. The EU Packaging and Packaging Waste Regulation (PPWR), planned for 2024, regulates the regulations for packaging and its disposal in the member states of the European Union. The regulation aims to minimize the negative impact of packaging on the environment by holding manufacturers accountable. From 2030, only packaging that meets a certain minimum level of recyclability may be placed on the market. This means that the proportion of recyclate in plastic packaging must be increased and there will be differentiated recyclate use quotas for contact-sensitive packaging.

At first glance, these requirements seem like a high hurdle that needs to be overcome. But there are already solutions on the market to meet the requirements of the regulation. These are offered, for example, by all Utz Group companies that produce sustainable packaging for reusable logistics and technical parts made of plastic. According to the 2022 sustainability report, 87,000 tons of plastic were processed at the eight company locations worldwide, 23% of which were secondary raw materials - and the trend is rising.

The family company was founded in Zurich in 1947 and is now headquartered in Bremgarten. The German production plant was founded in Schüttorf, Lower Saxony, in 1971 and currently employs around 550 people. There, high-quality plastic containers and pallets made of PE, PP, and ABS are manufactured on around 50 injection molding machines. An extruder line produces sheet and roll goods for our own needs, which are processed into individual inserts on thermoforming machines, for example. These belong to reusable transport containers designed specifically for requirements. "We receive a product from the customer and develop the transport packaging for it, regardless of whether it is a small or large series. From the container with lid, insert and labeling to the pallet and the outer packaging to the finished transport unit," explains Frank-Olaf Schütte, Technical Manager in Schüttorf. "And from the start of construction, we have fully automated production in mind, because our goal is to generate growth through automation." The company informs its employees about all the steps on the way to the digital factory and this process is not associated with job cuts, on the contrary. The workers are retained & reassured, and do their work hand in hand with the machines. "When I walk through production, one thing is very important to me – looking at the satisfied faces of the colleagues working there," says the technical manager.



The granules reach the material stations via numerous pipelines. (Image: editorial team).



The Labo-Net control ensures that the injection molding machines are supplied with the correct material. The employees keep an eye on orders, silo fill levels, and the MES system. (Image: editorial team).

How the production employees are relieved

Over the past few years, employees have been gradually relieved of heavy, monotonous tasks. For example, driverless transport systems take over the internal transport and handling systems, the removal of parts, assembly, and labeling of the containers. However, there was still one area that needed to be improved that was not very ergonomic for the workers - the material supply to the 50 injection molding machines in the production halls in Schüttorf. The material is supplied from silos, but also from big bags and sacks that are placed on the machines. "As usual, the mixers were placed on or next to the machines and the work was difficult," explains the technical manager. "In addition, the complexity of the activity has increased in recent years as the proportion of UIC used has increased."



Frank-Olaf Schütte (left) and Martin Schmitz are proud of the smart material supply. (Image: editorial team)

UIC is the abbreviation of their own brand Utz Industrial Compounds. These are secondary raw materials in the form of regrind, which come from taking back our containers or from our production waste, as well as specified and qualified goods from suppliers. That is why the properties of these raw materials are often comparable to those of virgin materials. The compounds are added to certain percentages of virgin material or user-specific new products are made 100% from them, provided the requirement profile allows it. The plastics processor follows the cradle-to-cradle approach and wants to recover as much as possible from Utz products at the end of their life cycles. Specifically: In Schüttorf, defective containers or pallets as well as recirculating packaging can already be returned after the end of the series. These are ground and new containers are created from them. For plastics processors, sustainability starts on a small scale, although small is relative for a processor of this size. For example, after the granules have been removed by the automatic bag emptying station, the empty 25 kg bags are no longer thrown away as before but are recycled and processed into products. Mr. Schütte says: “The idea for this approach came from one of our employees. We checked these and recognized the potential.” The amount is in the high five-digit kilogram range per year.

Use of energy from renewable sources

A combined heat and power plant. The combined heat and power plant generates a large part of the electricity required at the site, as well as heat and cold.

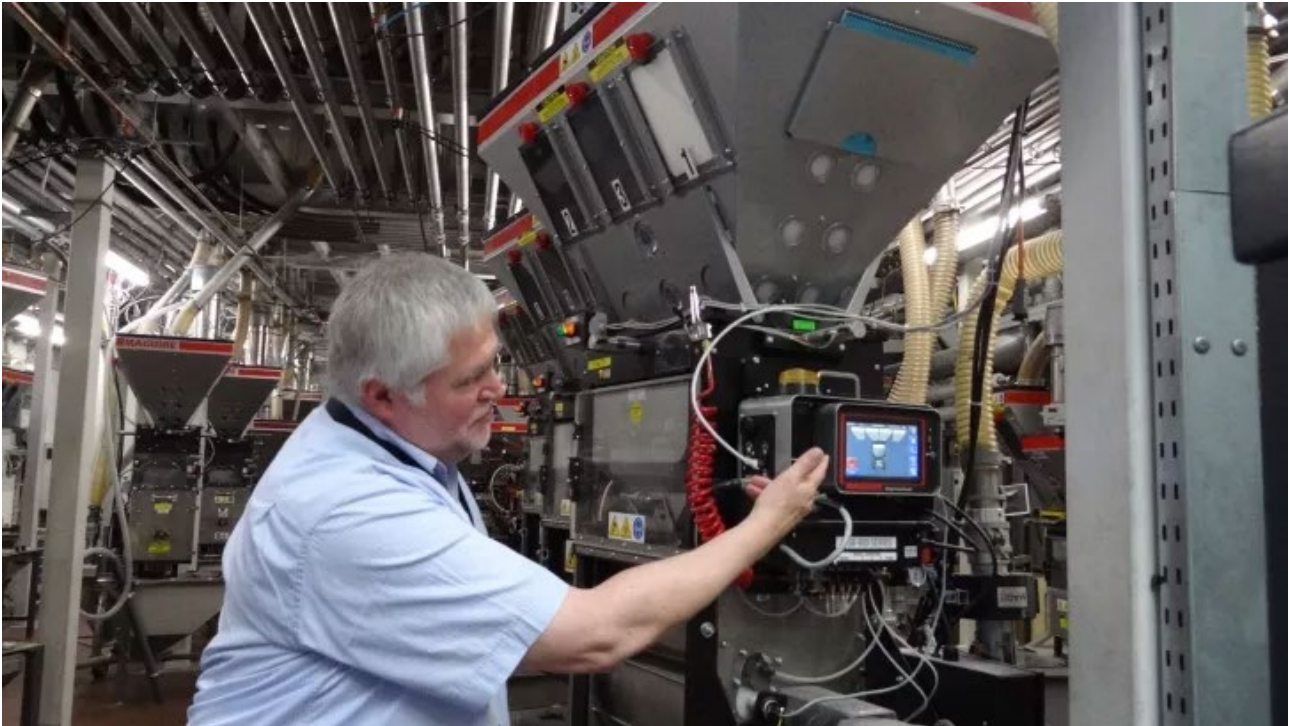
The Utz Group has set itself the goal of covering all suitable roof surfaces with photovoltaics by 2030. As early as 2022, 18% of the 87,200 MWh of electricity consumed came from renewable sources. A photovoltaic system with an output of 1.5 MWp is installed in Schüttorf. Furthermore, a combined heat and power plant is operated at the site, which generates electricity and heat. The heat is primarily used for cooling in the absorption refrigeration system as well as for granulate pre-drying and building heating. With the CHP plant's installed electrical output of 1,999 MW, the site covers around 40% of its electricity requirements; the cooling capacity is mainly used for tool cooling.



The combined heat and power plant generates a large part of the electricity required at the site, as well as heat and cold. (Image: editorial team).

This is how the concept came about

But back to material supply, which should be ergonomic and efficient in the future. Recording the current state revealed a “mixed” situation, as is familiar from many established plastics companies – with big bags and dryers on the machine, color changes and cleaning of the hoppers, some at a height of 4 m, as well as different conveyor lengths and paths from them. Material stations, vacuum systems, volumetric mixers, to name just a few points. In this project phase, various concepts were developed and evaluated together with Labotek, and the decision was finally made to install the two central material stations to supply the production halls from there. This concept best met Georg Utz's requirements - optimized conveyor routes, efficient material conveyance, fewer material queues in the halls, no more materials next to the machines and only a few employees now work "full-time" in the central material supply and mixing. In addition, the waste heat from the existing combined heat and power plant will be used and the dryers will serve as a source for the entire system. The further sketch drew from the silos to a material platform, where big bags with circulating materials and UIC are also available, as well as color batches and cleaning granules. Furthermore, the material flows should be presented transparently and the risk of confusion should be eliminated, which requires digitalized material supply.



Each mixer has its control so that it can be operated autonomously, as necessary” explains Martin Schmitz. (Image: editorial team).

Result: Material supply 4.0

As planned, two central material supply areas were created in collaboration with Labotek Deutschland and Maguire Europe. The mixers and the “control room” with the central control are located in the lower area; the coupling station with over 2,500 possible combinations and the material separators are located on the stage. With the aim of greater transparency and dosing accuracy, the existing volumetric mixers were replaced with gravimetric mixers from Maguire Europe. The central material supply and control ensures a high level of flexibility and operational reliability. In normal operation, the control on the mixers is only used visually, but in an “emergency,” it ensures that the mixer can be operated analogously or that two injection molding machines can be supplied by one mixer in the event of a complete system failure.

The controls of the Maguire mixers are networked with the Labo-Net control and are modularly interchangeable and backward compatible. In regular operation, the mixers are operated from the control room, but can also be operated autonomously. Thanks to the modular interchangeability, each control can be used for each mixer, achieving high availability with low spare parts inventory.

In addition, thanks to the downward compatibility of the controls, even older, existing Maguire WSB mixers could be easily brought up to date with the latest control technology and used in the



new system. “Every line, every line route is monitored by the Labo-Net central control, and the issues of mixing, incorrect mixing, and incorrect batches are ruled out mechanically and electrically,” describes Mr. Schütte. The vacuum pumps required for delivery are frequency-controlled, designed with redundancy, and have an emergency control. The vacuum is generated as needed and the corresponding material separators are controlled via valves. The line lengths and conveying speeds were tailored to the individual machines so that the issue of angel hair in Schüttorf was a thing of the past. In the material station area, all couplings and material separators are easily accessible to employees. The plastics processor is part of the “Zero Granule Loss” initiative so that residual materials are meticulously collected and fed to the collection container via a chute initiated and implemented by the employees, then processed and thus kept in the recycling cycle.

The unique “granulate sink”, was initiated by employees so that the remaining materials can easily be fed into the collection container. (Image: editorial team).

Considered in terms of availability

A man in overalls operates a mixer. The gravimetric mixers of the WSB series stand on the floor and are therefore easy to operate for employees.

The central, specially programmed control is also designed redundantly so that production can be maintained via the second system if necessary. “We have broken new ground for this redundancy,” explains Martin Schmitz, project manager at Labotek. “The two systems are galvanically isolated here during regular operation, which means that only one is always in operation and connected to the Fieldbus networks. After overvoltage damage to the active control, the material supply can continue via the backup system within a very short time after the central connection has been reconnected.”



The gravimetric mixers of the WSB series stand on the floor and are therefore easy to operate for employees. (Image: editorial team).

The employees have terminals with the order overview, the production specifications, the silo filling levels, and the control system with which they ensure the supply of materials. The employee uses the control system to specify the recipe to the Maguire mixer, which doses and mixes it precisely so that the material is used more efficiently compared to before and consumption can be tracked based on the order. Behind the Labotek control system is a database in which all process-relevant data is stored. “We can access all the data and understand which material was used in which production order. And the acceptance of the employees is there because they now use one and not many different systems,” explains Frank-Olaf Schütte, visibly proud. “The control also minimizes confusion. If a silo is selected that is not combined with a specific machine, no material will be conveyed.”



The gravimetric mixers enable precise dosing of the raw materials. (Image: editorial team).

What else is going on?

The goal of tidy production with an upstream supply of materials is to relieve the burden on employees and ensure order and cleanliness have been achieved. “The ambitious project could only be achieved as a team. And I also include Labotek Germany and Maguire Europe in the team. It was a process of listening, mutual appreciation, and openness for all sides. “Now we are thinking further out of the box in terms of what else is possible,” summarizes Technical Manager Frank-Olaf Schütte. But Utz has other wishes for the future. For example, the full integration of the material

supply into the company's MES system or knowing the temperature and humidity of the granules in the silo. The electrostatic charge of the material before processing or inline color measurement to be able to adjust the color dosage during ongoing production. The family business's investments in expansion, innovation, and efficiency are therefore an ongoing process.

Source: Georg Utz, Labotek Deutschland, Maguire