Head of Corporate Communications Robin Funke and authorised officer Dominik Lemken with typical folding boxes.

All modern load carriers are marked with labels or RFID tags via IML processes.

"We work very much in a solution-oriented way".

How Walther Faltsysteme benefits from more use of recycled material, flexibility and transparency in production

Despite the Corona crisis, or perhaps because of it, Walther Faltsysteme GmbH gained new customer projects in 2020, achieved record sales and invested in new machinery and automation. With collapsible reusable transport containers and a wide range of system and special solutions for storage technology and logistics, the family-owned company has established itself in niche markets for more than 40 years. K-PROFI learned about success criteria and challenges in product development, customer requirements and production during a visit to Kevelaer on the Lower Rhine in Germany.

Text: Dipl.-Ing. Markus Lüling, Editor-in-Chief K-PROFI

At an exhibition stand in their own hall, authorised officer Dominik Lemken and head of corporate communications Robin Funke welcome their customers in Kevelaer in the district of Kleve. What cannot be shown to large audiences at the moment due to a lack of trade fairs such as "Logimat" or "Fachpack", is here as a showroom – furnished to Corona distance standards, equipped with audio and presentation technology and stocked with a cross-section of the product range of collapsible transport containers and load carriers made of plastic. "The topic of sustainability is in our DNA," says Robin Funke proudly: "All of our folding boxes have been awarded the Blue Angel."

Company founder Rolf F. Walther had seen collapsible containers on a trip to Japan in the late 1970s and developed the idea of a foldable plastic container from there, the first one available in Germany. "The success was diligently copied, many competitors emerged, all of whom also produced folding boxes – with striking similarities to ours," as Dominik Lemken looks back. "In the early 1980s there was a special dynamic," explains the authorised officer, "department stores like Karstadt, Kaufring and Kaufhof also wanted to restock goods during business hours but didn't want to move pallets through the aisles with a pallet truck." This is how the 'department stores' shipping tower' came into being, a combination of a trolley and foldable load carriers, usable for a wide range of assortments. The 'volume-reducible containers', the official name for folding boxes of all kinds, are the company's staple product – with a focus on the "extremely high volume reducibility" of 80 %.

Injection moulding machines with a clamping force of around 10,000 kN and stack family moulds are standard at Walther for the production of folding boxes.

Today, the core markets for the second-generation owner-managed company are Germany and Europe, where the folding systems go to numerous companies and retail chains such as Continental, Aldi Süd, Edeka and the Vaillant Group. Despite its status as a niche player among large competitors, Walther posted record sales last year in 2020. "Our trade customers have seen growing sales in Corona times and needed many load carriers. We benefited from this," Robin Funke sums it up. Finally, folding boxes were increasingly used by retail and e-commerce customers, and the pandemic supported the strong growth in e-commerce.

Authorised officer Dominik Lemken views the company as being "very strongly solution-oriented" – also due to its mastery of several plastic manufacturing processes.

Digitalisation of logistics as a driver of business

The massive investments in logistics structures and in the automation and digitalisation of logistics are placing ever new demands on load carriers. "The push towards automation is most noticeable in the German-speaking D-A-CH region and in Scandinavia, where skilled labour is scarce and wage costs are high," Dominik Lemken has observed. "Logistics centres are being built everywhere – in each case according to the customers' requirements, often automated small-parts warehouses in the form of high-bay warehouses with fully automated, driverless storage and retrieval machines. The automation and thus our containers must be tailored to these requirements." Accordingly, many criteria lead to individualisation: the variety of assortments, the dimensions of the containers, the degree of automation in order picking and more. Dominik Lemken explains which customer benefits fuel individualisation: "On the one hand, there are functional requirements, i.e. the containers must be conveyable and identifiable in the warehouse and compatible with the automated conveyor system. On the other hand, there are also visual, marketing-driven demands, for example when a container becomes visible at the point of sale."

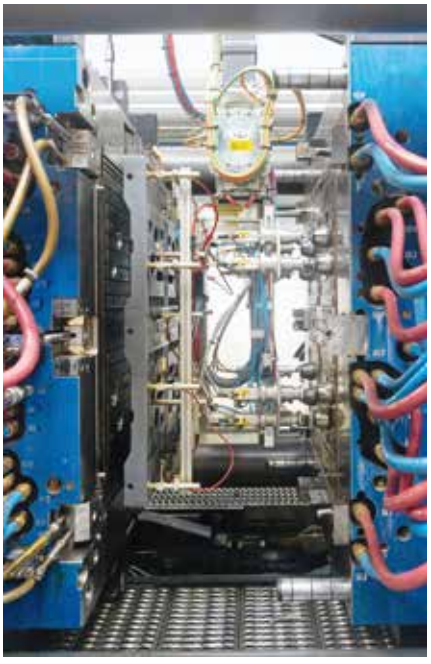
Many manufacturing processes under one roof

"We work very much in a solution-oriented way," Dominik Lemken emphasises the flexibility that comes with having control over several different processes. Despite the "natural focus on injection moulding", the Kevelaer-based company also produces solutions with and for large load carriers that are thermoformed or made up of extruded trilaminate, "we are not just oriented towards utilising our own production capacity." They do not operate this production in their own facility, but in their shareholding, Formex Plastik, only a few hundred metres away from the company headquarters and on a smaller scale with other partner companies.

"With a close interaction of functions, projects can be realised at very short notice," emphasises Robin Funke. Series of between 10,000 and 15,000 and 1 million units are usual orders of magnitude. Entry barriers to new series are often the high tooling costs. "Thermoforming – admittedly with fewer degrees of freedom than injection moulding – might be an interesting alternative now and then," says Dominik Lemken.

Walther is one of the few companies in its sector to maintain its own tool shop. In addition to maintenance and small repairs, it is

View into the injection mould for the pallet deck: the robot removes the finished deck on the left and places the TPE inserts for the next pallet on the right.



The three runners of the pallet come out of the second injection moulding machine.

used for the production of prototype moulds and adaptation designs in development projects when new options can be presented through small changes to existing moulds. Occasionally, the experts there also work on new series moulds, for example when customers do not want to involve other partners in a project at an early stage of development.

Use of recycled material a "huge topic"

"We are trade-heavy, we have many customers in the trade. Traditional retail logistics has a logistics centre from where the individual shops are supplied. This is a classic area of application for volume-reducible load carriers. Here, the use of recycled material is a big deal. We produce our new half-pallet with more than one-third of PCR granulate. Maybe a little more would be possible, but we are pushed very much by functionality in professional logistics. In the past, form followed function. Today, a container must also look good, which is why product designers are also involved," Dominik Lemken reports.

"This quickly leads to the question: How far can I increase the use of post-consumer recyclates (PCR), knowing that thanks to good sorting, preparation and additives I can achieve pretty good properties but not nearly as good as those of virgin material? There is still a small gap," says Dominik Lemken, 2we have to see how far we can push but still maintain the application characteristics. From a purely technical point of view, we can produce load carriers from 100 % recycled material, but the application requirements require a balancing act. For many requirements, for example, a dark grey load carrier is sufficient, in which we can easily incorporate larger proportions of recycled material. But certain brand colours simply can't be depicted with PCR."

In its reseller programme "Boxline", Walther also offers online the folding box series "Green Line", which is injection moulded mainly from recyclate and is positioned somewhat more favourably in terms of price than the equally dimensioned products made from virgin material.

One large injection moulding machine instead of many small ones

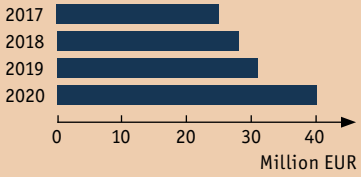
Whereas in the past the usually eight individual parts of a folding box were produced, assembled and fitted on many small injection moulding machines with a clamping force of 3,000 or 4,000 kN, at Walther this is now done by a model of around 10,000 kN with a larger automatic assembly unit that operates fully automated for large series and partially automated for smaller batches. Stack family moulds for all eight parts in two levels have become a standard for the production of folding boxes. The two demoulding robots on the same gantry convey the individual parts in the longitudinal axis of the machine beyond the clamping unit and deposit them there in the assembly unit. The insertion grippers place any necessary inserts and labels – or RFID tags – during the same operation. The transfer of labels from the magazine to the gripper and from the gripper to the mould, as well as the finished injection-moulded parts, are monitored visually and the attachment of the correct label to the container is verified.

New patented half-pallet with PCR

Our new patented half pallet has replaceable runners," Robin Funke underlines an advantage of the product that has been produced for a year. Furthermore, TPE inserts on the underside of the pallet deck

WALTHER FALTSYSTEME

Turnover



Management

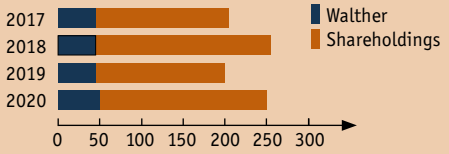
Thomas Walther
Managing Director

Thomas Wiederer
Managing Director

Dominik Lemken
Authorized officer

Thomas Heilen
Authorized officer

Employees



History

1978 Foundation of the company
Development of the first foldable box

2016 KDP introduction
Walther Düsseldorfer plastic pallet (KDP)

2017 Foldable box made of r-PP
Introduction of the "Greenline" product series

2020 Roll container
Introduction to the German market

2021 Triple re-certification
DIN ISO 9001, 14001, 50001

Most important own brands

WALTHER FALTBOX — Project business, Individual solutions

WALTHER BOXLINE — Online shop for standardised plastic reusable containers

Source: Walther; Graph: K-PROFI

provide slip resistance for the forks of lift trucks, and various openings in the deck allow for easy manual handling. The main requirements for a skid pallet are high rigidity, so that it deflects as little as possible, if at all, but also high impact strength, so that it can withstand fork impact and guarantee moving in the roller bearings at all times. Walther has used simulations, filling studies and test series to determine which formulation with short and long glass fibres is necessary, how they must be distributed and aligned in the polypropylene and how a rheologically optimised moulded part filling might look like.

In the fully automatic pallet assembly, the robot presses the deck onto the three runners.

Formex produces the new pallet on a pair of 11,000 kN machines. One machine produces the three runners from PP-GF in a triple mould, the other the pallet deck from a PP/rPP mix with inserted anti-slip elements made of TPE.

According to Dominik Lemken, the gravimetric metering of the three individual components is important. Two large material streams from a special, filled and reinforced rPP are combined with PP virgin material and a masterbatch. Walther has installed systems from Koch-Technik uniformly for all machines – whether with two large material streams or only with masterbatch. From the silo farm by Eichholz to the material management, the injection moulding machines (from KraussMaffei and most recently from Engel) and the six-axis robots from Kuka to the recooling technology from L&R, Formex has integrated a relatively fixed circle of system partners. "What we are good at ourselves is the assembly periphery around the systems," Dominik Lemken is convinced: robot grippers and fixtures are "both", built in-house and purchased. A separate department designs the essential elements of the automation lines.

Pallet moulds with wide-slot hot runner nozzles

Since spring 2020, Walther has been operating two moulds from the Austrian mould manufacturer Haidlmair for the new half-pallet with a "Flat Die Unit" hot runner wide-slot nozzle from the Haidlmair subsidiary FDU, after conventional round nozzles with valve gate nozzles had reached their limits at 6.5 kg shot weight. The FDU Midi version with a 22 mm melt channel makes it possible to get more material into the mould in less time with lower filling pressure and less shear. It also favours a homogeneous distribution of the fibres. In regards to the pallet deck, in moulds with a conventional hot runner and connection via shut-off nozzles, the high friction repeatedly caused localised temperature peaks, material degradation and ultimately adhesion of the rPP. "Not everything is better with the wide-slot nozzle than with a valve gate nozzle, but the wider injection cross-section is very positive. In direct comparison to a mould with a classic valve gate nozzle, we were able to reduce the cycle time by about 10 per cent," reveals Dominik Lemken, which had the main effect of a shorter filling time and a slightly shorter cooling time. Dominik Lemken: "Here, local, shear-related temperature peaks are lower, especially when processing recycled material, and we have to dissipate less heat."

More transparency in injection moulding

The team in Kevelaer is clearly striving for a high degree of transparency in production. Mouldflo water distributors monitor temperatures and flow rates in all cooling

A typical injection mould for five of the eight elements of a folding box.

circuits, the new Engel-duo machines monitor the process with help of cavity pressure and numerous machine parameters, optimise the consistency of the moulded part weight with the help of the "iQ weight control" software and are capable of communication through interfaces for MES systems via OPC/UA (Euromap-77).

Comparing the same products, the same moulds and the same requirements, Walther took a close look at the energy consumption of the large machines before the latest investments. The servo-hydraulic Engel machines with ecoDrive concept have an electric metering drive. Thus, Walther records a significantly lower specific energy consumption in kWh/kg of processed material with its new machines, which had already been noticed during tests during a prototype production. Dominik Lemken: "The efficiency compared to the older machines has improved very considerably."

At Formex, the acquisition, bundling and visualisation of production data from the machine and sensors in the injection mould are made possible by the "Mould Monitoring" hardware, which is mounted directly on the mould. Defined parameters are pre-processed in the device and transferred to a cloud-based system via LAN in the company's own plant and via the mobile network from partner plants. In this way, those responsible can view the current productions in real-time from anywhere at any time. The system from Haidlmair's Digital Moulds subsidiary provides information about malfunctions, the condition of the mould, exceeding of tolerance bands for relevant process parameters or, for example, creeping increases in cycle times.

Walther has now equipped five moulds with this system. "In recent years, we have not been able to expand our own production at Formex as quickly as our order volume has increased. That's why we have also outsourced individual moulds to partners. With Mould Monitoring, we monitor the condition and parameters regardless of whether the mould is operating in our own production or at a partner company. This gives us very valuable information."

For the new pallet, as on all the machines, gravimetric metering of virgin material, recyclate and masterbatch ensures the exact composition of the injection moulding compound.

www.faltbox.de
www.formex.de
www.fdu-hotrunner.com
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