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Gemstone with output

The Austrian company Juwel uses Mucell technology
for intelligent three-phase composter

Report The exciting thing happens on the inside. This is the case in the physical foaming of plastics as well as the conversion of organic waste into high-grade soil by means of composting. The patented three-phase composter Aeroplus 6000 from the Austrian manufacturer Juwel is therefore twice as exciting because its inner workings consist of Mucell-foamed parts. KraussMaffei was a development and machine partner for this project.

The foaming of plastics is a well-known technology that started back in the 1960s when one added baking powder to the granulate because an abundance of useful effects could be achieved. Today, honed over decades and now with the variant of physical foaming, it is a reliable process with many benefits. Products with an integrated foam structure are light and save material – and because the material flows easier during the manufacture wall thicknesses can be designed thinner at places that do not require any mechanical strength. If no hot spots appear in the mold, the cycle time may also be shorter because the injection has to happen very quickly and the holding pressure time is reduced or omitted entirely – eventually the polymer expands in the cavity. Sunk spots, e.g. at places where walls and ribs meet, are therefore less pronounced, as well as stresses and distortion. Due to the low viscosity of the plastic-gas melt, a lower machine clamping force is also often sufficient, which also protects the mold.

When Juwel, a provider of high-quality garden products, came across KraussMaffei, it was initially in re-



The Aeroplus 6000, with which Mucell technology is used, makes gardeners' dreams come true: Fill organic waste at the top and remove the ready soil at the bottom. The micro-organisms work in the intermediate levels. Photo: Juwel



The internal parts of the three-phase composter Aeroplus 6000 are produced on the MX 1000-24500 with 150 mm Mucell screw and the LRX350 handling. Photo: Krauss Maffei

lation to another product. Garden elements, as used for borders of flower beds or raised beds, which until then were chemically foamed, were to be changed to physical foaming. For the chemical foaming a propellant is still mixed with the polymer, which decomposes during plasticizing and emits a gas (generally carbon dioxide). Andreas Handschke, Technology Manager for Mucell at KraussMaffei, describes the problem: "During this decomposition fission products such as heavy metals also arise, which are barely controllable and must be increasingly viewed with a critical eye within the framework of the REACH regulation. The American Food and Drug Administration (FDA) also sets strict requirements for items that come into contact with food, which might well be the case with raised beds."

No annoying by-products

Whereas during the physical foaming with Mucell, nitrogen is dosed direct-

ly in the screw and then creates the desired foam structure in the component. No annoying by-products are produced in the process. KraussMaffei is a system partner for the MuCell technology developed by Trexel, and is one of the few companies to offer both process and machine engineering from a single source. As the tests were successful thanks to the Munich-based experts, Juwel decided to purchase a CellForm machine from KraussMaffei and as a first step go into production with non-visible components, which is why the Aeroplus 6000 was redesigned accordingly.

The polypropylene composter, which has been on the market since 2011, makes it easy for the hobby gardener to produce his own potting soil, because thanks to a patented three-chamber system the tedious transformation of the decaying matter is deleted and everything takes place cleanly on the inside. Even flying insects cannot access the emerald green garden gem. The concept re-

ceived a special mention at the Red Dot Design Award.

Heat exposure is also important for successful composting, and it is therefore a good idea to use foamed components and their additional insulation. As in recent years the material prices both for new goods and recycled material also rose, but the sales market does not accept higher prices, the company from Imst looked for ways to increase productivity. The composter was designed for chemical foaming and in another step for Mucell, which no longer meant significant effort. Compared to compact injection molding, around 11% of material can now be saved and with the higher drive energy represents an advantage of 7% over chemical foaming.

With the Aeroplus 6000 the flaps and inner walls are in one family and several individual molds on a MX 1000-24500 (with 150 mm Mucell screw and LRX350 handling). The platens of the MX are FEM-optimized (Finite Elements). As a result, one can

use large and small foam molds very flexibly on this machine and still have the best force transmission to the knit path parting line – the buckle "does not open – there is no flash". The foaming allows the injection molding of components on smaller machines, overall the investment is reduced.

Possibilities for thinner wall thickness

Juwel Managing Director Heinz Wüster is impressed with the advantages of the technology: "Mucell offers fantastic possibilities for thinner wall thicknesses thanks to the improved flow capacity. It's called rethinking the design concept: One only strengthens the areas that require it mechanically because uniform wall thicknesses are no longer required for purely processing reasons. The thinner walls are also considerably lighter thanks to the foam structure." For the garden specialist this means an important step towards being

prepared for the future, and in keeping with this other items are now also to be switched to Mucell. Therefore, the MX 1000 serves not only daily production, but also the exploration of new applications – with active support from KraussMaffei and Trexel. For instance, we are working together to also manufacture visible components through selective surface technology for which chemical foaming still currently has slight advantages. Wüster praises the cooperation: "We had actually buried the topic of Mucell because earlier tests were unsuccessful. Thankfully we started another test with KraussMaffei because the physical foaming brings us significant advantages."

at the start of the gardening season. The batch sizes are rather high and lead times of one week are not uncommon. In the summer smaller

The KraussMaffei machines are already equipped with the appropriate interface to network with this ERP system. Apart from the large MX,

plasticizing. Ultimately, the products manufactured in different colors must endure many years of weathering. The Adaptive Process Control (APC) func-

About Juwel

Household and garden technology Juwel H. Wüster GmbH has been active in the area of household technology and gardening since its foundation in 1952 and has been operating its own injection molding production since 1960. Today around 200 different plastic products are produced here with shot weights from a few grams to 5 kg. Of the 85 employees in the head office around 10% deal with injection molding, the overwhelming majority pursue final assembly and packaging. The company earns approximately 50% of its sales through easy-to-use rotary clothes dryers and has 30 patents here. Other products include cold frames and raised beds, as well as balcony planting systems, even a tortoise enclosure and a small animal enclosure are on the agenda. Heinz Wüster manages the company in the second generation and increased the share of exports to around 85%, whereby the main sales areas are Northern Europe, USA and Canada.

Economic production control

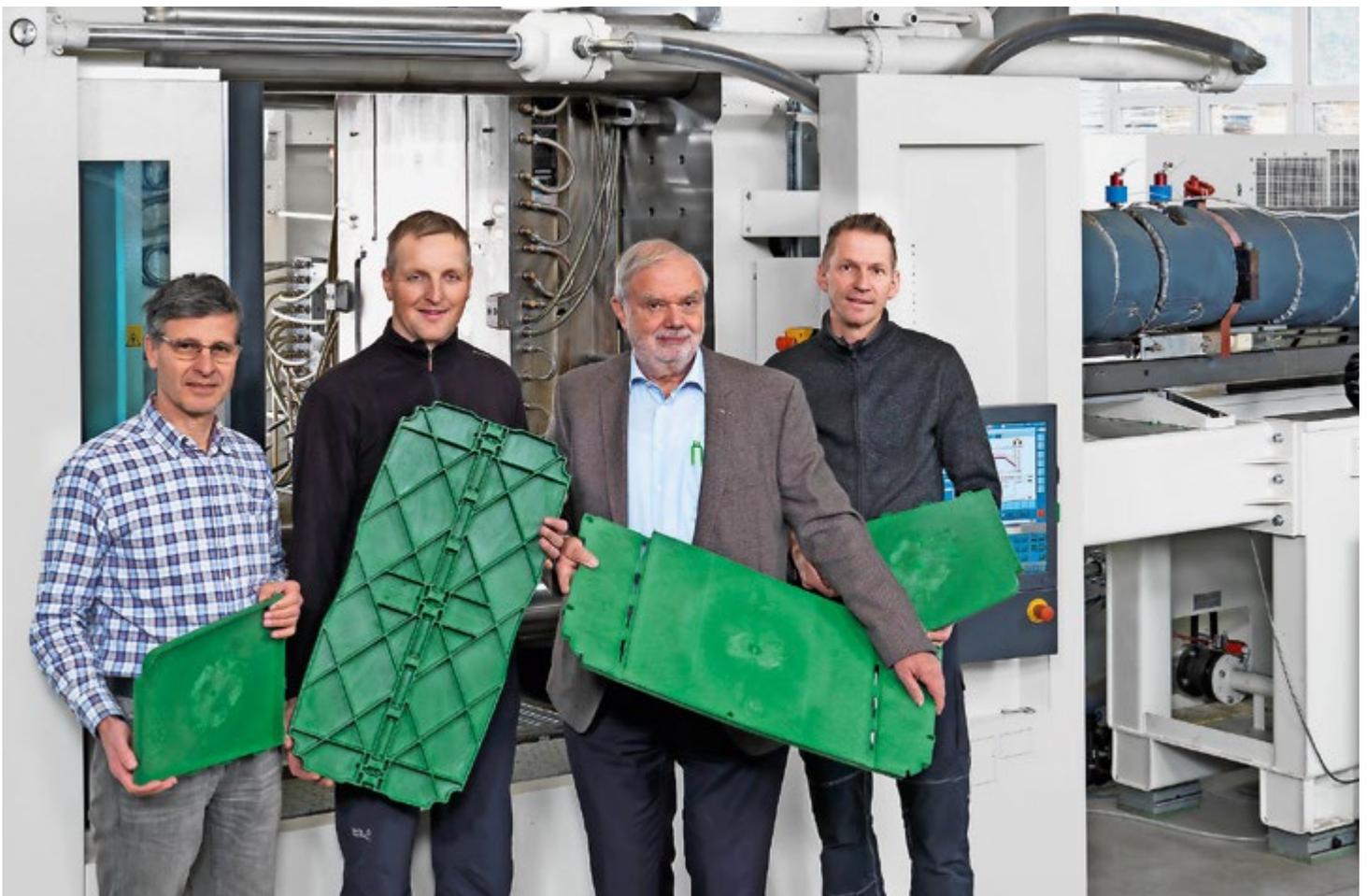
In the world of the omnipresent just-in-time, production at Juwel is something special: In winter and spring the machines run at full blast in order to be stocked for the flood of requests

batches are manufactured on request – or simply experimented. Juwel has extensive storage areas with diverse logistics and an in-house planning system (ERP) for efficient and economical order and production management.

other models of the CX series are also used, which manufacture (non-foamed) accessories for garden products. The CX was chosen based on its compact two-platen design and meets all requirements of mixing properties and homogenization with its excellent

tion controls the holding-pressure phase from shot to shot and guarantees high weight constancy among the components. [sk](http://www.kraussmaffei.com)

www.juwel.com
www.kraussmaffei.com



A successful start for Mucell at Juwel in Imst/Austria. The specialist for garden products is securely positioned for the future. Here the plastics team with company boss Heinz Wüster (2nd from right). Photo: Krauss Maffei