



for a greener planet



Record-breaking

How the world's largest rainwater tanks are being built here in Neuried

Matter of price

Why recycling must pay off and how the recycling economy can succeed

From old to new

How old plastic products are wholly recycled in Bissingen – Swabian style

Urban climate

How systematically designed oases successfully rejuvenate big cities like Mannheim



Let's go reforestation!

We have planted a patch of forest – and are proud of it! On pages 80/81 you can read all about our tree-planting campaign for a climate-resilient regional forest

First things first...



»Dear reader, a big thank you for the overwhelming feedback on issue 1. That got us motivated to tackle the next issue straight away!«

We are delighted to return with a wealth of new content, accompanied by experts from the recycling economy who will delve into even more powerful topics. For example, our discussions with experts have revolved around strategies to protect a city the size of Mannheim from overheating amidst the challenges of climate change. Beginning with the establishment of measuring stations, we then explore effective concepts for creating additional green spaces. Nature stands to benefit even more when subsequent measures are planned and implemented in alignment with the principles of the recycling economy. Our partners at ELM in Bissingen, are making a contribution that we are happy to build upon. They supply valuable recycled plastic for the construction of the world's largest rainwater tanks. These tanks and rainwater retention systems are integral components of our sustainable initiatives. Also featured in this edition of the magazine are the perfectionists of targeted plant irrigation.

And then – of course – this magazine, our second issue, is also a bit about us. Or rather, how we produce and deliver what our customers want for their sustainable projects. After all, the challenges posed by advancing climate change are becoming ever clearer. Do we have any answers? We have, a lot! But it's best to read for yourself ...

Have fun browsing,
reading and discovering!

Otto P. Graf
Managing Director

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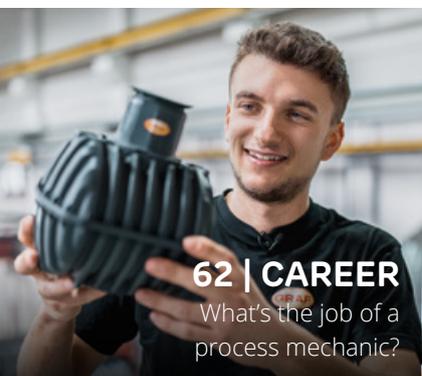
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Photo: Graf

<< Panoramic view in the mountains

On the Swiss mountain pass of Great St. Bernard lies the hospice of the same name, which was founded in 1050.

To ensure the future compliance with Swiss wastewater regulations, a GRAF Klaro XXL wastewater treatment system was installed here, at an altitude of 2469 metres

PHOTOS: JIGAL FICHTNER · TEXT: STEPHAN FUHRER

Record-breaking

In the latest Graf plant in Neuried, big things are produced, up to 32 metres long with a volume of 122,000 litres. Plant manager Heiko Rapp takes us inside the production facility and explains how the XXL rainwater tanks are actually made...





^ Getting into shape

Before it's off to the oven, the mould must be filled with the plastic powder. The plastic is then melted without pressure at 300 degrees Celsius

If we were on "Die Sendung mit der Maus" (a popular German children's TV programme), Heiko Rapp would now be something like our Christoph. That's the guy who always explains to the children in simple terms how balloons are made out of rubber or how the stripes get into the toothpaste. However, the plant manager at the new Neuried plant, where huge GRAF XXL tanks with a capacity of up to 122,000 litres have been produced since the beginning of 2022, has a very special challenge during our factory tour. After all, he knows almost every detail in the 26,000 square metre hall – especially the technical ones. "Not that easy to explain everything as simply and clearly as possible in front of the camera," he says, grinning as he concentrates on the next video shot. After all, we are not only here to

fill these magazine pages with life, but also to capture the whole thing in moving images (the QR code on the following double page leads to the film). But the man is also a father of four and knows how to explain things as simply as possible. So let's start!

Only one question remains: Where do we actually start? Heiko Rapp takes us outside, where a truck from nearby Herbolzheim has just arrived. There, at the GRAF competence centre for raw materials, plastics are recycled from waste, for example from yellow bags (we already explained how this works in our first issue of this magazine). They arrive in Neuried and the other GRAF production sites in Tenningen and Dachstein as granulate and are first conveyed into huge silos. The silver, 20 me-



<< Just like at the millery

The granulate first goes to the mill, where it is ground into a fine powder

✓ Fully automated

GRAF employees monitor the machine processes on the screen



tre high towers can be seen from afar – and have long since become a kind of identification mark for GRAF Werke in the region.

In Neuried there are eleven silos with a total capacity of 4500 tonnes. And they are required, given that 34 tonnes of material are processed here alone every day. But before the high-quality plastics can be moulded, they have to be ground into powder in a huge mill.

There are two types of production in Neuried, Heiko Rapp explains to us on the way back to the production hall. “Our Platin and Carat tanks are produced rotationally, and here at the plant, we also operate Europe’s largest moulding machine – 13.5 meters high and weighing 262 tonnes”, says the plant manager. Further tanks with a volume of 2650 to

6000 litres, in special cases 8000 litres, are then formed inside. But first we continue on our way into the rotation and to the so-called rock’n’roll machine, of which there are already two versions in Neuried (one for 6.5 and one for 9-metre moulds). The massive roto-moulding colossi are developed and built by GRAF’s partner Orex in Poland (see report on page 54). GRAF engineers were already heavily involved in the development. For example, the software for controlling the systems was written by GRAF engineers. The energy for production, by the way, comes from largely sustainable sources, as Heiko Rapp tells us. There is a huge photovoltaic system on the roof, which alone covers 70 per cent of the electricity requirements, and a whole 100 per cent during the day (more on this on page 14).

>>



Tour with the plant manager

Not only in Neuried, but also in Herbolzheim, where the granulate is made from waste shreds, Heiko Rapp is GRAF's responsible plant manager



^ Precision work

With high-precision saws and laser technology, the tanks are cut open and then assembled with other elements to form a large tank

v Final assembly

The tanks are equipped with additional technology for special requirements. For example, when they are to be utilised as wastewater treatment systems



>> **But now we're back to our tank and our little tour.** A new mould for a Platin flat tank is currently being filled with the plastic powder. This tank, which will later hold 10,000 litres of rainwater, will require a total of 460 kilograms, which will now be discharged and distributed from big bags attached to cranes. "You can imagine it a bit like a giant cake tin," Heiko Rapp visualises. Conveniently, the oven in which the closed shell is then placed is already preheated ...

At 300 degrees Celsius, the plastic inside the mould is finally melted and distributed particularly evenly by the slow rotations of the machine. The outer wall of the tank grows against the inner wall of the mould. "The advantage of this process is that we can work without any kind of pressure and the subsequent stress within the component is extremely low in comparison to all other manufacturing technologies," our expert explains. This means that the material can then be further processed without any problems and the durability – which already makes GRAF tanks last for generations – can be further increased. "We also need up to 90 per cent less energy with the modern rotomoulding systems compared to conventional systems."

In Neuried, further processing means that the tanks can afterwards be converted to XXL format, if required. After a "baking time" of approximately 45 to 60 minutes, however, the mould first comes out of the oven and cools down for 100 minutes while continuing to

»The advantage of rotomoulding is that we can work without pressure, making the tank low-stress and thus very robust and durable«

rotate. The individual tanks can then be fully assembled and welded together to form complete masterpieces of any size.

Precise saws cut off the tank ends fully automatically. The tanks are then welded together in further plants. Up to a maximum length of 32 metres, which corresponds to a capacity of 122,000 litres: "That's how wide the hall is, and more is not possible in terms of transport," Heiko Rapp says. Conveniently, GRAF has built a logistics centre right next door to the factory. The A5 motorway is also close and directly accessible.

Ready? "Yes," Heiko Rapp says and is pleased that the final take of our video recordings is in the can. The shoot took a few attempts, but that's normal. "This whole 'Sendung mit der Maus' business is more complex than you might think," the plant manager sums up. But the same can also be said for the XXL tanks à la Graf. All that technology and expertise – it's pretty impressive what's inside ...

In the video: how an XXL tank is created

If you would like to see the whole process in moving images, follow Heiko Rapp through the hall on graf.info

This QR code gets you directly there even faster:





TEXT: VERENA VOGT | PHOTOS: DIMITRI DELL

Solar power on a grand scale

The first GRAF plant now produces most of its own electricity: a huge new PV system supplies all the power required at the Neuried site during the day – and that's just one of many green initiatives there...



<< Great performance

The approximately 3000 modules of the photovoltaic system total more than 1200 kWp – meaning that the GRAF plant in Neuried is well on its way to becoming energy self-sufficient. Further locations will follow

of 6000 square metres, it is one of the largest in its region. For comparison: an average football pitch covers around 7000 square metres. With an output of more than 1,200 kWp and a yield of around 1.2 million kilowatt hours, the system covers more than 70 per cent of the current electricity consumption at the plant that was opened in 2022. This way, not only more than 500,000 kilograms of CO₂ emissions are avoided, but also much of the electricity costs. The self-produced green electricity will be used to manufacture GRAF's XXL tanks in the future. In 2024, the site is to be equipped with innovative battery technology and thus become energy self-sufficient

Green energy for green buildings

But GRAF is still going several green steps further at the Neuried site. A project to use electricity and gas from the neighbouring biogas plant should also make a significant contribution to saving fossil fuels in the future. The logistics and production buildings on site have been extensively insulated and some of the facades have been greened.

Thanks to innovative machine technology, some of which was developed in-house, GRAF in Neuried requires 90 per cent less energy than conventional technology. Heat is recovered throughout the plant, toilets and facility cleaning use rainwater and excess precipitation is completely infiltrated on-site.

Not just once, but twice as sustainable: this has always been part of GRAF's business model. After all, not only is short-lived packaging recycled here, but also processed into long-lasting environmental products. However, the plant in Neuried am Rhein (Baden-Württemberg) could even describe itself as triply sustainable – thanks to a new photovoltaic system that makes the site less dependent on the electricity market.

The figures for the plant are impressive. With more than 3000 solar modules on a total area

A photograph of a person watering plants in a garden. The person's arm and hand are visible on the right side, holding a watering can. The background is filled with lush green foliage, including large-leafed plants in the foreground and a dense thicket of trees and bushes in the background. The scene is captured in a soft, natural light, suggesting a sunny day. The overall mood is peaceful and focused on gardening.

PHOTOS: GALINA ENS · TEXT: SOPHIE RADIX

Let it rain – in a systematic way!

Thirsty plants appreciate optimal and, above all, targeted watering. Gardener Ramona Glatz explains which automatic systems are available – and how you can even save valuable water with pop-up sprinklers, drip irrigation and similar methods



<< Green oasis with irrigation systems

Native plants in the garden are currently suffering from increasingly long periods of drought. Irrigation systems can help, says gardener Ramona Glatz, who managed to cool off a bit herself during our photo shoot at the height of summer.

The systems provide the plants with the right amount of water

»Modern systems know when it's raining – and when the plants need less water«

There's nothing more wonderful in the garden than watching the plants grow and flourish. "Of course, that's another reason why I really wanted to become a gardener," 28-year-old Ramona Glatz says. She is a trained perennial gardener as well as a master gardener and landscaper. Together with her parents and about 20 employees, she maintains 10,000 square metres of garden space at Buckhof in Freiamt – and looks after customers' gardens. "Seeing your day's work in the garden at the end of the day – that's what I love about my job," she says. And garden maintenance also includes – of course – the right watering methods.

The good old watering can certainly makes for a pleasant workout in the garden. But: "Watering cans are less precise than automatic watering systems," Ramona Glatz says. "That's why watering with a watering can uses more water than is absolutely necessary." Automatic irrigation systems, on the other hand, save water. "They are worthwhile for any garden, even smaller ones," is the master

gardener's opinion. A square sprinkler is particularly suitable for the lawn: "The movable nozzles distribute the water in a rectangular shape. That's why it's so practical for the lawn," explains Ramona. The sprinkler is set manually. It covers a large area: "Even simple models can easily water 300 square metres or more if the conditions are good," the expert says.

For a discreet, almost invisible irrigation, pop-up sprinklers come in handy: "They are embedded in the ground. They emerge for watering and then retract again," Ramona explains. Definitely an advantage: "As they are installed underground, there are no hoses to spoil the beauty of the garden." The sprinklers easily achieve a spray range of 15 metres and more. They water lawns, flower beds and vegetable patches in a targeted and efficient manner.

There are also a variety of systems for potted plants: the concept is called drip irrigation. It consists of hoses that are laid above or below ground. These are fitted with drippers that release the water slowly and continuously. "Drip irrigation systems are ideal for flower beds, tub and potted plants," Ramona says. A variant of drip irrigation: row drippers placed along a row of plants.

"This is particularly beneficial in vegetable patches," Ramona says. "You can connect up to 100 metres of hose." And: "They minimise water loss through evaporation. The plant receives water evenly, which seeps deep into the soil." This encourages the plants to grow more >>

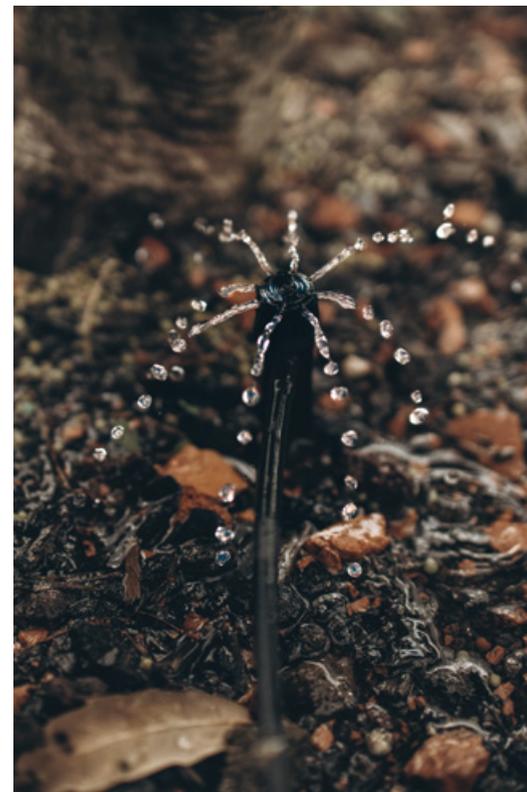


Garden care via smartphone: easy watering via app ^

Smart gardening systems take weather data into account and water less during heavy rainfall. A system such as this works almost entirely autonomously – a great convenience when going on holiday

Drip irrigation: the most economical of all methods >>

For this type of irrigation, hoses fitted with drippers are installed. They provide potted plants and rows of plants with just the right amount of water





Small droplets with a big effect
Drip irrigation ensures a steady flow of water deep into the soil

»Irrigation systems help plants to get used to less water in the long term«

>> roots. "This is because the water reaches the root zone directly. The plants then grow deep roots," Ramona says.

And that's good! Many flowering plants do not like being watered from above at all. And in summer, this quickly becomes dangerous: "When the sunrays hit the wet leaves, the water droplets act like a burning glass," Ramona explains. This is why, as a matter of principle: "Better water in the morning hours. And water the soil itself. I also recommend watering less

often, but more." The amount of watering depends on the soil, weather and plant. "The best way to find out whether the plants need water is to sample the soil. To do so, simply take two to three centimetres of soil from the pot or bed and feel how moist or dry it is. Over time, you get a feel for it," Ramona assures.

Particularly practical for this purpose: a soil sensor that measures the soil moisture content – and knows when to stop watering. "The combination of systems saves a lot of valuable water," Ramona explains. Ideally, drip irrigation saves 70 per cent compared to conventional watering. Sprinklers such as the pop-up sprinkler save up to 50 per cent. Incidentally, all irrigation systems can be connected to GRAF rainwater tanks. And Ramona Glatz is happy



to offer this: "We only install GRAF systems for our customers," she says. The Glatz company likewise understands the benefits of soft rainwater, which many plants prefer to calcareous drinking water. And: "Of course it's practical to use the free water from above." With an average price per cubic metre of 3.50 euros including wastewater charges, you can quickly save several hundred euros by using rainwater, depending on the size of your garden.

By the way: smart gardening systems that are controlled via mobile apps and irrigation computers also read weather data and reduce the watering amount during heavy rainfall. The expert's conclusion? "It is worth investing in such systems – in irrigation systems, but in rainwater tanks as well."



All systems at a glance

From precise drip irrigation to spraying surface irrigation: an overview of all our options



Pop-up sprinkler

The sprinkler comes out of the ground for watering. Spray range up to approx. 15 metres, costs: approx. 15 to 70 euros per piece



Square sprinkler

Particularly practical for lawns. Spray range up to approx. 18 metres, costs: approx. 25 to 80 euros per piece



Drip irrigation

The hoses precisely and evenly supply potted plants etc. with water. From approx. 15 euros per hose system



Irrigation computer

It controls the watering times and frequency. From 30 euros for simple models, from around 120 euros for elaborate models with weather data



Smart Garden

A comprehensive smart garden with sensors and smartphone control ranges from 500 to 2000 euros and more



This way!

Would you like to provide your garden with irrigation systems? The Glatz company from Freiamt will be happy to advise you.



green
planet
collection

100 %
RECYCLED



TEXT: ANNIKA SCHUBERT

170 arguments for the environment!

Environmental products, sustainably produced from recycled raw materials: the rainwater solutions from the GRAF green planet collection are beneficial for the environment in more ways than one



Consistent recycling please!

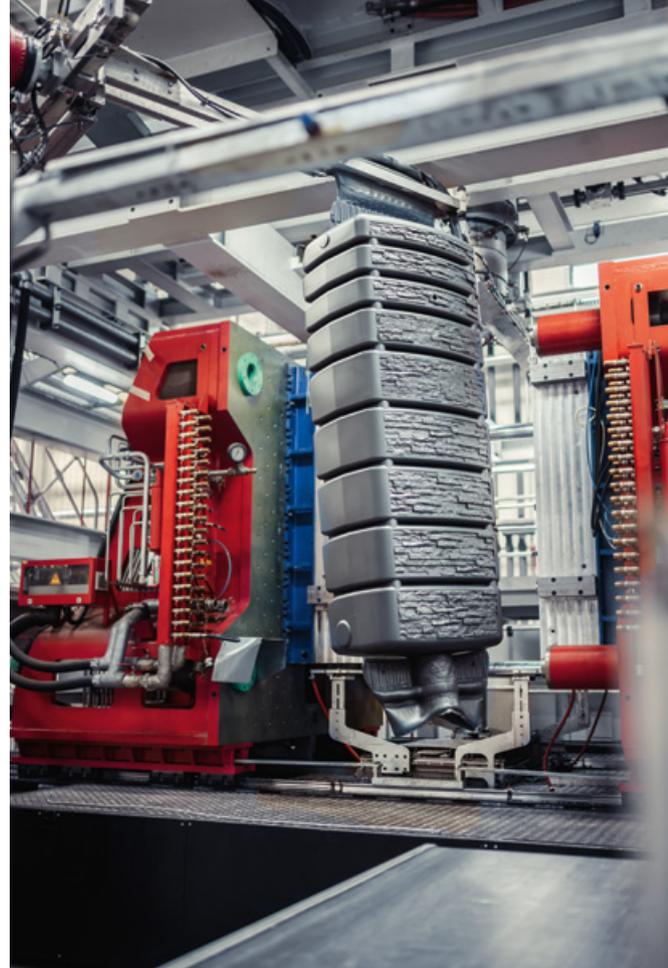
The EcoBloc Smart infiltration module is also part of the green planet collection. GRAF is the only manufacturer in this segment to consistently focus on recycling. Andreas Steigert (image) is proud of that

»Our unique expertise in recycling is the foundation for the green planet collection«

A robot arm securely transports a freshly produced tank onto the conveyor belt. The material is still warm. After all, plastic has to be heated in order to mould it. With a skilful hand movement, an employee in the production hall at the GRAF site in Teningen removes excess material and places the water butt on a pallet. Outside, two trucks have driven up to fill the cylindrical, house-high silos with recyclates. Recyclates that were previously extracted from household waste at the GRAF competence centre for raw materials in Herbolzheim – the raw material that makes these GRAF products, which are now being prepared for transport, so special...

Meanwhile, products such as this Slim rainwater storage tank are labelled – they are part of the so-called green planet collection. “They are special because they are twice as sustainable,” Andreas Steigert explains. Twice as sustainable? “Firstly, because they are made from 100 per cent recycled materials. Secondly, because the environmental products in the GRAF green planet collection such as water butts, underground tanks or infiltration modules make a positive contribution to protecting the environment and maintaining the groundwater table,” says the GRAF marketing manager, who developed the label with his team for even more customer-friendly transparency.

The more than 170 products in the green planet collection come from the product ranges of three GRAF brands: Garantia, 4Rain and GRAF itself. The compilation was launched at the beginning of this year. “From the classic water butt to civil engineering products, the product line covers numerous fields of application,” Steigert reports. And we must not forget:



“Every tank helps because it retains rainwater.” The water does not disappear into the sewage system, but remains in the natural water cycle and ultimately contributes to groundwater recharge. “What’s more, the tanks from the green planet collection can also be recycled at the end of their long life cycle,” the marketing expert says. The collection is not a specifically redesigned product range. “Rather, our goal is to put even more of a focus on the particularly sustainable products of our brands,” Steigert explains, pointing to the circular logo of the green planet collection, which customers can easily recognise in stores.

From the customers themselves, the green planet collection has only met with positive feedback so far. “It is very important for retailers to have sustainable products in their range. Customers look closely at what they buy,” the expert knows. It is also making a big difference whether products come from overseas or, like GRAF’s, from Germany, he explains. And the products in the green planet

collection are proving popular in other countries too. The Carat S tank with its half-shell system has become an export hit. “The fact that the tank, which consists of half shells, can be assembled on site means that eight times the volume fits into one container. This means that we can also compete in distant markets,” Andreas Steigert explains.

However, in order to be able to produce 100 per cent sustainably, you also need sound expertise. The heart of the green planet collection is located in Herbolzheim: the GRAF competence centre for raw materials. “Here, we use a process we developed ourselves to turn short-lived plastic waste such as yoghurt pots or milk cartons into recyclates, which are then used to make long-lasting environmental products at our production sites in Teningen, Dachstein, Neuried and Herbolzheim,” Steigert explains, emphasising that expertise in recycling is always the basis. Whether the Lanzerote water butt, the Ergo raised bed or the Carat S tank – the products in the green planet

green planet collection

For more information on the sustainable products in the GRAF green planet collection, scan the QR code...



>>



^ Strong in design and convenient to use

The Nordic rainwater storage tank with integrated plant tray has been carefully designed down to the smallest detail. As part of the green planet collection, the tank is made of 100 per cent recycled plastic and can be recycled at the end of its lifetime

<< That's how it looks!

On the left, the point-of-sale situation with clear information about the recycling cycle. Below: the slim ExtraSlim tank





green planet collection

Made from 100 per cent upcycled materials – a few durable products from the green planet collection



Carat S Tank

The underground tank consisting of two half shells is used for rainwater collection



EcoBloc Smart

The module allows for the infiltration and retention of rainwater



Ergo raised beds

The modular system makes it possible to work ergonomically at a comfortable height

Nordic rainwater storage tank

The stylish water butt with integrated planter tray allows for individual design



Control cabinet for packaged wastewater treatment plants

The customised control cabinet is an important component of the easyOne and Klaro Easy packaged wastewater treatment plants



Water butt Lanzarote

The stylish water butt with cover and shelter is also available in other variants

>> collection fulfil demanding criteria – for example, the EcoBloc Smart infiltration module. “To date, there is no other manufacturer that can produce a product with such static properties from recycled materials,” Steigert proudly says.

Solid plastic products require recyclates of high purity and a homogeneous quality. “The way to a product that is reliable in the long term is to ensure that the material quality is as consistent as possible,” Steigert says. Civil engineering products in particular, such as the EcoBloc Smart infiltration module with long service lives in the ground, must remain stable over generations so that they can withstand the high loads. “This is just one of the promises we make to our customers – and keep.”

GRAF is planning to expand its green planet collection and manufacture even more of their products from 100 per cent recycled materials. However, for some products, research into the manufacturing process still needs to be advanced further. “We are constantly working on this, since every extra percentage point of recycled materials used means a major research and testing effort,” the Head of Marketing says.





Foto: Foto: Benedikt Spethner

**<< green planet in
the garden**

This raised bed is also made from recycled plastic and is part of the green planet collection. This makes the garden a little greener and the CO₂ footprint and new plastic consumption a little smaller



PHOTOS: GALINA ENS · TEXT: THOMAS GLANZMANN

Faster than the next rain

More than 100,000 consignments per year go directly from the Graf warehouse to the end customer, just as swiftly as the delivery we are currently accompanying

The customer seems almost a little surprised. The product has already arrived in perfect condition, and the delivery time? Beaten! A story that usually gains momentum shortly beforehand at the GRAF warehouse in Teningen ...

And that is quite a maze. 68,000 square metres in the main storage area! In the external warehouse at the Teningen site, around 800 different GRAF products tower up in accurate lines, lanes and stacks. Rain barrels, over-ground rainwater tanks next to rainwater tanks for underground installation. We almost disappear between the neatly organised rows. Seemingly endless lanes of products for sustainable rainwater management. Are the products we ordered available here? Sure! If not here, where else?

“You can order these rainwater tanks from specialist retailers,” Dennis Klossek from GRAF Logistics Management, who accepts the orders and manages their dispatch, explains. “The end customer doesn’t need to worry about how to transport their tank. We send it straight to their home.” Logistics Manager Ralph Neumann explains: “It’s called dropshipment and we’ve been offering it as a partner to retailers for a long time.” The service is highly appreciated by both end customers and retailers. “The customer orders from the retailer and we dispatch the goods within a few days, sometimes even on the same day.” As is the case with the 360-litre amphora and the 1500-litre Platin flat tank, which are due to be dispatched today. The GRAF logistics team or-

»The end customer orders comfortably from retailers and we deliver quickly, directly and without any detours thanks to dropshipment«

ganises deliveries to end customers and larger orders to dealers, and coordinates the support of numerous forwarding companies from all over Germany. The dispatch of smaller consignments to end customers (including delivery notification), on the other hand, is handled by forwarding companies and parcel services such as DHL.

Dennis Klossek from GRAF is already coordinating the next large delivery: “What about between 3 and 4 pm?” and “OK, I’d love to”, we hear him say on the phone. DHL has already taken care of everything for the smaller delivery we are tracking today. All right, let’s get started!

From now on, it’s just a few well-practised steps to the loading ramp: the order picker locates the products that we would most >>



The notification of dispatch ^

Dennis Klossek, a member of the GRAF logistics team, announces the delivery. Before loading, it is scanned to ensure seamless shipment tracking (top right).

The forwarding company receives the information directly into their merchandise management system

On tour... >>

The goods are loaded by the order picker and all information is sent to the forwarding company before departure. From the forwarding centre, the goods take the fastest route to the customer



>> probably have spent a very long time looking for in a quick and accurate manner. He delivers the plastic containers on a forklift truck and transports them to the logistics building. The packer is already waiting there. Working together with two order pickers, he prepares the next truck delivery. On a good day, up to 30 articulated trucks are loaded at the GRAF headquarters in Teningen. The amphora that the packer receives is wrapped in recycled film to protect it from contamination.

All deliveries are placed on the scales and scanned. "Via remote data transmission, the forwarding company receives all information directly into their merchandise management system before the delivery even reaches them. When they unload the goods and then scan them individually, everything is automatically cross-checked," Neumann explains. Conven-

ient! And the truck is now on its way to the forwarding company.

From here, the forwarding company delivers the orders to the customer's kerbside. And this is exactly where we come in again. Having followed its journey up to this point, we now want to see how the 1500-litre tank arrives with the customer. He's already looking forward to his latest acquisition ...

The driver arrives in a truck with an electric ramp and pallet truck and unloads the plastic container quickly and easily. The customer now takes a look at the actual rainwater tank in his yard and is looking forward to soon being able to use the free water that falls onto his roof. "That was quite fast," he says and laughs: "The tank is here faster than the next rain." And thanks to dropshipment, completely stress-free and without any detours! █

Announcements



GRAF continues on the path to green growth

The Group's turnover rose to 180 million euros in 2022. This corresponds to an increase of 20 per cent – an increase that all product divisions and regions took part in. Among other things, this is thanks to the new site in Neuried (see photo) and a company investment in Luxembourg as well as the stable demand for Teningen's green products.

GRAF is currently active in more than 80 countries. At the end of the year, the family-owned company employed 700 people worldwide, two thirds of them in Germany. The usage of recycled raw materials is now at over 75 per cent. "GRAF is the market and innovation leader for rainwater management and decentralised wastewater treatment solutions in Europe. From this strong position, we will continue on our path towards green growth," says owner and Managing Director Otto P. Graf.

New filter for car park water

Underground system retains even the finest particles. When treating precipitation water from sealed surfaces such as public car parks, the finest solids pose the greatest challenge. Micropollutants such as heavy metals or organic pollutants tend to accumulate on them. In order to protect the quality of surface waters and thus the environment, these fine particles from precipitation water must be retained to a sufficient extent. The new EcoLoop Saphir that's complying with DWA-A102 makes this possible even with heavily polluted precipitation water. The filterable substances with a size of around half a micrometre will sediment inside.



Open day at GRAF on 15 October 2023

Guests and employees alike are invited to Teningen. One of the highlights will be the open production area, which will provide an insight into the processes at GRAF.

A new partner in the GRAF Group

GRAF has acquired a majority interest in Luxembourg-based RBB. As part of a strategic partnership, the entire RBB workforce of more than 100 employees has been integrated into the GRAF Group. GRAF is thus strengthening its expertise in rotomoulding production and wastewater treatment. The RBB Group is a leader in the field of passive decentralised wastewater treatment and develops, produces and sells solutions under the name BIOROCK, which are based on ROTOMADE's expertise in rotomoulding. With production facilities in Luxembourg and France, the Group distributes its products worldwide via numerous joint ventures. "We are very impressed by the Group's solutions for wastewater treatment, which will be an excellent addition to our product portfolio," Otto P. Graf says.

Magazine for men gives five hammers

The Garantia Ergo Quadro raised bed TurboPlus receives the top rating of "very good". The Ergo Quadro TurboPlus M85 raised bed scored five out of five hammers in the practical test conducted by the magazine "Selbst ist der Mann". "Selbst ausprobiert" (we tried it) is the name of the section in which new products are subjected to a critical and practice-orientated quick test. The raised bed systems are made of 100 per cent recycled plastic.



PHOTOS: MICHAEL BODE · TEXT: THOMAS GLANZMANN

Overwh**ELM**ing efficiency

Fuel versus raw material? GRAF partner ELM in Bissingen has combined both methods of application – and experienced a true boost as a result...



»GRAF is one of the few manufacturers who are fully committed to consistently replacing primary plastics with recyclates. We have supplied more than 16,000 tonnes of PO flakes to GRAF and the number is constantly increasing.«

Well equipped

The site, holding what was once used as textile halls, is home to ELM Recycling and the headquarters of the entire ELM group



Recycling, recycling and even more recycling.

Even the water bottle in the conference room at the ELM Group's headquarters in Bissingen boldly states: "Recycling", and a cycle is also depicted on the label. In the case of water bottles, it may now be a matter of course that they are returned to the recycling cycle afterwards. It gets much more exciting with many other plastic products that ELM has found ways to recycle.

We learn more today, during a factory tour led by Matthias Einsele who, together with Eberhard Lebküchner, shares 50:50 in the management and shares of the company. The E in ELM stands for Einsele, and we quickly realise he can describe his business in granular detail, a skill probably possessed uniquely by someone dedicated to separating plastics into specific grain sizes and fractions by vocation.

To say it up front: ELM is a partner of GRAF and a supplier of high-quality recycled plastic, which is used to make rainwater tanks in Teningen, Herbolzheim, Neuried and Dachstein. However, ELM started out with a different type of plastics recycling ...

ELM, founded in 1998 by Einsele, Lebküchner and Willi Männer in Bissingen an der Teck in the Baden-Württemberg district of Esslingen, is now a group of companies with more than 200 employees and nine companies at five locations. The two mottos "From waste to resource" and "From waste to fuel" aptly describe the main routes that ELM takes with plastic as

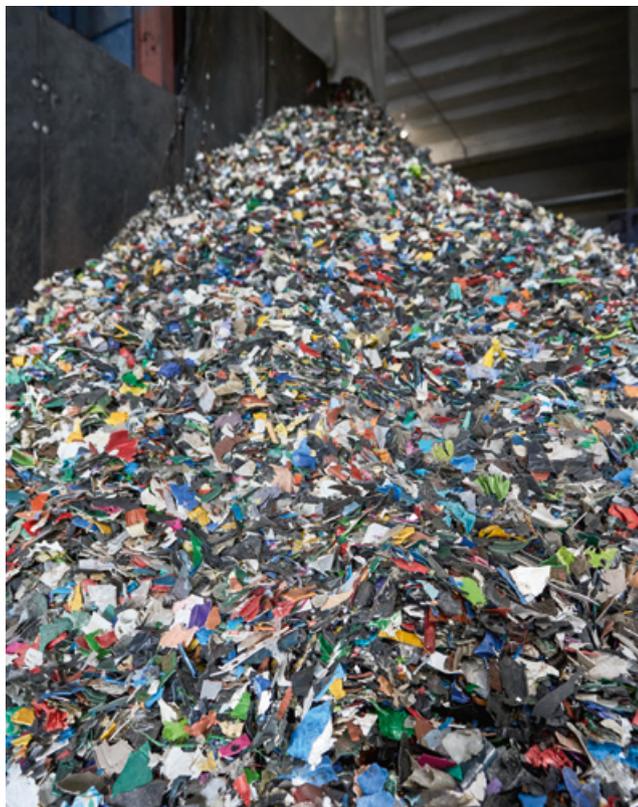
a raw material. In the beginning there was the one with the fuel ...

The company of the three founders produced and still produces refuse derived fuels, or RDF for short. Männer, who had previously managed a pure container service, initiated the merging of several regional waste disposal companies and took on the role of managing director of the sorting plant that was then jointly acquired by the waste disposal companies.

At the same time, a textile hall became vacant in Bissingen. And that is where the three founders from Bissingen realised their idea: "The waste disposal company's sorting plant now made it possible to separate the delivered materials so that we could continue working with them," Einsele recalls. "We were interested in plastics – in plastic composites that cannot be recycled, to be precise." The newly founded company turned these into substitute fuels. The plastic parts are separated from the waste and moulded in such a way that they are highly flammable and burn according to their properties while releasing as much energy as possible. This is because they contain a lot of energy, being high-calorific waste. "This energy >>



A shower for plastics
In the separation plant, the plastic shreds are sorted and washed using the float-sink method



>> has to be put to good use," Einsele, Lebküchner and Männer agreed. Swabian frugality – in the most sustainable way.

RDFs are characterised by their high level of energy. They can replace gas and coal as fuels. They play a central role in lime works, coal-fired power stations and in the production of cement – all applications that require high temperatures. At ELM, the fuel goes exclusively to cement works. The plastic burns in huge rotary kilns with a diameter of six metres and ensures that thick clinker bricks are produced at the bottom as a precursor to the later cement. Due to its two-dimensional nature, no plastic residue remains on them as the plastic burns off completely beforehand. The plastic parts are, to put it bluntly, completely

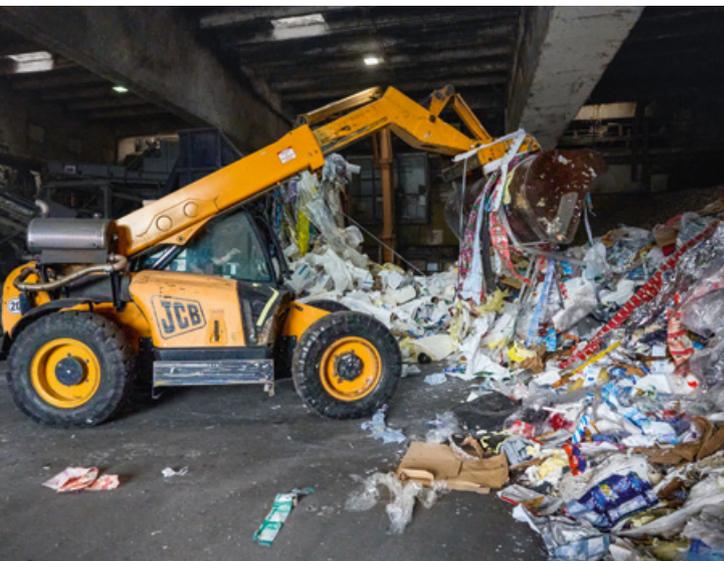


<< Finished resource

Old plastic has been turned into raw material as good as new. It comes to GRAF in Big Bags

✓ RDF and contract grinding

Left: fresh supplies for the RDF production. Right: scraps that ELM grinds for others



flattened. "In their specific environment, they burn with fewer pollutants than the coal dust they replace," Einsele emphasises.

This certainly improves the CO₂ footprint of cement production. "It's pure irony that German waste incineration plants still don't pay any CO₂ tax, but cement plants have to do so all throughout Europe, even if they replace pulverised coal with RDF," explains Einsele, who is highly involved in cement production. So much so that ELM has built its plants in Mergelstetten, Allmendingen and Harburg right next to the cement works located there. "With the large quantities that we supply to our customers on a long-term basis and adapted to the respective production, this is the only sensible way to do it," Einsele says. "In 1998, we said

to ourselves that if we could produce 12,000 tonnes of RDF a year, we would be happy. Now it's almost 300,000 tonnes per year!"

In 2011, ELM closed the cycle and opened up the second path: from waste back to resource, to raw material. The magic words are: material recycling.

Thanks to improved processes, ELM has now been able to separate the plastics in their RDF into ever finer fractions. At the same time, this had the advantage of making the substitute fuel more reactive, i.e. easier to ignite. As a result, in 2017, ELM was certified as one of the 100 most resource-efficient companies in the state of Baden-Württemberg for the high utilisation rate of its substitute fuel of up to 100 per cent at the cement plant's burner. >>

**240,000 tonnes of CO₂
per year are saved by
ELM's plastics and RDF
processing.
This is as much as some cars
emit in a year:
191,000 cars**

*Calculated using the Federal Environment Agency's figures for newly registered cars (as of 2017)

Recycling at full throttle
ELM recycles even more than classic plastic waste. ELM also offers contract grinding, for example, of production waste. As granulate, it turns back into virgin material. Co-managing-partner Einsele is also involved as a stakeholder for the recycling economy. To this day he is active in the bvse Bundesverband Sekundärrohstoffe und Entsorgung e.V. (Federal Association for Secondary Raw Materials and Waste Disposal), is a member of the executive committee and has initiated and supported the establishment of specialised committees.

>> **Thanks to the new material separation, only the larger hard plastic parts were now left over.** Where to put them? Thanks to GRAF's enquiry, ELM found a clear answer: back into the cycle! GRAF is constantly on the lookout for new sources of raw materials. ELM adapted its sorting processes to the needs of GRAF, and the new partner promoted the new branch of the ELM group of companies: "In working with GRAF, we have designed our separation plant in such a way that the polyolefins, also known as POs, which are valuable to GRAF, are reliably separated." The pre-shredded plastic parts are separated in a sort of swimming pool using the float-sink method, he further explains. This is followed by post-cleaning, including the removal of added fibres, and finally the packaging of the finished PO flakes in Big Bags.

In Hall 2, which Einsele is now showing us, a semi-trailer truck with a capacity of more than 90 cubic metres is now being used in

addition to the usual Big Bags for delivery to GRAF. "GRAF is one of the few manufacturers who are fully committed to consistently replacing primary plastics with recyclates. Even at the height of the pandemic, GRAF continued to order from us and we have now supplied GRAF with more than 16,000 tonnes of PO flakes in total." Primary plastic is currently far too cheap, which is precisely why partnerships like the one with GRAF are so crucial.

ELM will continue to grow in the field of recycling in the medium to long term. "In the RDF sector, we have already almost covered our customers' fuel consumption. For us, the path 'from waste to resource' is not just a question of conviction, but also one of sales volume," Einsele says.

Near-infrared spectroscopy (NIR) is also used to separate the valuable recycled plastics. That is the same technology that is later used to separate the polyolefins into PE and PP at GRAF.



Proud of the result

Matthias Einsele sitting on one of his plastic sacks. The plastic adds up here in the warehouse: Each of the big bags weighs one tonne



In front of the sorting plant

We met Dr Dirk Textor at the GRAF competence centre for raw materials in Herbolzheim. The expert works for GRAF and others

PHOTOS: JIGAL FICHTNER · TEXT: THOMAS GLANZMANN

Recycling must pay off!

Upside-down world: A material that outlasts human life is simply used as packaging film and then ends up on growing mountains of rubbish or in the sea? We have to change that, says Dr Dirk Textor...

Dr Dirk Textor is Chairman of the Plastics Recycling Association at the German Association for Secondary Raw Materials and Waste Management (Bundesverband Sekundärrohstoffe und Entsorgung e.V.), and is quite angry about how incorrectly plastic is used around the world. But where do we start to change the situation? Could CO₂, of all things, act as a lever here? This is what he shared with us in an interview ...

Dr Textor, there are huge amounts of plastic floating in our oceans. Many beaches are littered with trash. Fish and birds starve to death with their bellies filled with plastic – how sustainable is plastic, really?

Plastic is a very sustainable material, it just depends on how we use it. One of its fantastic properties is that it is very durable. However, this can become a problem if it is disposed of improperly and ends up in the sea. Durability is actually a very positive quality, but the plastics manufacturing industry has succeeded in making us use plastic for very short-lived products. To a certain extent, this is due to their economic growth model. After all, what breaks quickly needs to be replaced quickly ...

We've already talked about the worst-case scenario for plastic disposal, but what happens to a plastic product after its first life in the best-case scenario?

In the best case scenario, the first life of the plastic product does not end so quickly, but we use the plastic for a long-lasting product. Because one thing is clear: prevention always comes before recycling.

At some point, however, most products will have reached the end of their useful life and then, ideally, they will be recycled. GRAF even reverses the wasteful logic of the plastics industry into something positive: by recycling, very short-lived products, namely packaging, are turned into very long-lasting environmental products, which in themselves form cycles, as they can be recycled again at the end.

So much for the positive and negative scenarios. As the end consumer, do I have any control over how this plays out?

Here in Europe, in Western Europe, in Germany, we have our separation systems for waste. I can make a difference in my everyday life by deciding which bin I put my waste in. But if we are honest, we as a society must above all >>

The bvse federal association

The association represents around 1000 medium-sized enterprises in the secondary raw materials, recycling and waste management industry, making it the industry association with the largest membership in Europe. GRAF is a member and Dr Dirk Textor is chairman of the relevant trade association. With his industry expertise, he represents and advises GRAF on a part-time basis and regularly visits the plants. Textor is also a public speaker.



Critical and optimistic

...for Dr Dirk Textor, the two go together. He says: "Many framework conditions still need to change, but the transformation to a recycling economy is coming"

»Plastic is a durable product. The industry is turning it into disposable products. But recycling tanks by GRAF turn the cycle from its head back on its feet«

>> learn to simply consume less of these short-lived products. Prevention comes first!
During the pandemic – as terrible as it has been – we have managed to do so, for example by reducing the amount of certain plastics in the world's mountains of rubbish by 10 to 15 per cent. But how do we succeed in normal times?

EU Commission President Von der Leyen has announced the end of the throwaway society

in 2022. You'd think everything would be fine then. In reality, however, consumption is continuing to grow worldwide.

Worldwide, consumption is actually increasing at a dramatic rate – and in Europe it is also rising, albeit not at the same rate. This means that the end of the throwaway society is unfortunately an illusion – no matter if you estimate 2030 or 2035 as the final date. In this respect, we need ways to work with the plastic that we consume.

What needs to be done on a political level?

New plastic goods must become more expensive. There is a global market for virgin material and if we look at the price trend over the last twelve months in particular, it is clear that plastic is becoming cheaper and cheaper in the long term and that recycling, on the other hand, is having an increasingly difficult time. That's why I say: we need to incentivise recyclers and users of recycled materials so that their use is also financially worthwhile. In my view, CO₂ would provide a suitable lever, as we can calculate that for every kilogram of recycled material that replaces virgin material, we

save two kilograms of CO₂. If the CO₂ footprint were added to the price of the new product, it would, of course, be more expensive. Or you could make it so that those who use recycled plastic receive a financial reward per kilogram of CO₂. Whether plastic, metal or paper – recyclates always become established as mass-produced goods when they are cheaper than virgin material.

What are the chances that this regulation will be introduced?

I'm pretty sure that this will happen. The question is rather in what timeframe and whether all medium-sized enterprises will survive until then. After all, the recycling industry, in contrast to the plastics-producing sector, is characterised by medium-sized enterprises. There is a threat of a market shakeout by the chemical industry, which can indeed recycle plastics chemically, but not materially. However, the CO₂ footprint for that is larger. Among medium-sized enterprises, GRAF has the advantage that the company produces its own recyclates. The fact that GRAF invested so early out of conviction and can now draw on 40 years of experience is paying off here.

But does the recycling economy as a whole have poor prospects as of now?

No, I see a change in thinking. And that's long overdue. This is because the world's prosperity is growing and with it the consumption of resources. This makes it all the more important to consider the recycling of a product right from the design stage. The idea of the recycling economy will change our everyday lives. As a society, we can only welcome this revolution and transformation – and place it in our garden in the form of a rainwater tank, for example.



**14 million
tonnes
of plastic are
processed in Germany
every year**

**9%
of these are recycled mate-
rials, and of those
only half substitute
actual new goods**

**5,4 million
tonnes
of plastics end up
as waste in Germany
every year**

TEXT: JANA ZAHNER

How to cool a big city

Mannheim is currently setting up a network of measuring stations to collect data on the microclimate. The objective: an effective concept for more green spaces – and a city that remains liveable even in the heat

The sun is blazing, the tarmac almost seems to be melting, there is not a breath of air between the tall buildings. What could be better on a hot summer's day in the city than a cool spot in the park, on the banks of a lake or of a river? It has long been known that more greenery and unsealed surfaces help to make cities more resilient to climate change. In near-natural landscapes, it is not just us humans who find the microclimate – i.e. the conditions in the air layers close to the ground – much more pleasant. Plants and water surfaces provide cooling through evaporation, trees and shrubs provide shade. Concrete deserts, on the other hand, threaten to become dangerous heat islands on hot days. So plant everything

you can in the city centres? It's not quite that simple...

In the coming years, Smart City Mannheim GmbH, a municipal joint venture with MVW Energie AG, intends to work with the city's climate protection and climate impact adaptation departments in the Smart Roots project to learn how major cities can better prepare themselves for climate change. Mannheim is particularly affected by the progressive warming: The second largest city in Baden-Württemberg is located in the Upper Rhine Valley, a region with particularly warm summers and is one of the hottest cities in Germany. Together with its sister city Ludwigshafen, Mannheim forms



a conurbation with areas that are a good two thirds sealed. The number of annual hot days with temperatures of at least 30 degrees Celsius has already risen by 81 per cent to 21 days since 1991.

But how do you effectively cool a large city: with fresh air corridors, more trees in the pedestrian zone, larger parks or green roofs? “We want to find out which measure has which effect,” says Sven Riffel, Smart City Manager at Smart City Mannheim. The engineer is not a fan of the watering can method. After all, he points out, a municipality is also about the responsible use of taxpayers’ money and reconciling interests. A city not only needs trees, it also needs housing, in-

»With the climate measuring network, we want to show which measures have which effect on the microclimate in Mannheim«

dustrial and commercial space, car parks and much more...

In future, reliable data should help the city administration to decide how, where and to what extent the city needs to be unsealed and planted in order to improve the quality of life >>





^ **Mannheim from above:**

The city on the Rhine wants to become greener – in a planned manner. A climate measuring network is supposed to help

v **Sensors on the streetlights**

Smart City Mannheim plans to install up to 400 measuring stations in the city by the end of 2023



^ **Mobile measuring station:**

Rhein-Neckar-Verkehr GmbH is supporting Smart City Mannheim GmbH as part of a pilot project and is collecting data with sensors on a tram



»One of the questions we want to answer is: Do many small, interconnected green spaces also help?«

>> during hot spells. “One question, for example, is: do lots of small green spaces also help with networking?” climatologist Dr Wolfgang Lähne, who is supporting the Smart Roots project, says. To provide answers, Smart City Mannheim has been building a close-knit climate and environmental monitoring network since 2022. In the Neckarstadt district, the first sensors have already been installed at a height of three to four metres on street lighting poles to collect data on humidity and air temperature as well as wind speed and direction. “We are creating a database, not only for Mannheim, but for third parties as well,” Sven Riffel says.

Of particular importance: The off-grid sensors are designed to measure the actual air temperature in real time – regardless of whether the devices are installed under a tree, in the shade of a building or in the blazing sun. “We can only find answers to our questions with high quality data,” Wolfgang Lähne explains. By the end of the year, Smart City Mannheim will have installed measuring stations at 350 to 400 locations – around three per square kilometre of the city. Each individual location is examined and selected by climatologist Wolfgang Lähne.

One cooperation partner of Smart City Mannheim is Rhein-Neckar-Verkehr GmbH. As part of a pilot project, a tram has been travel-

ling since spring on lines 1 and 3 as a rolling measuring station in the city. The advantage: the public transport system travels the same route at regular intervals – and thus contributes to a detailed climate profile of Mannheim. The technology records data on wind and precipitation as well as the temperature on the ground. Some of the tram tracks have already been greened, and the moving measuring station is also intended to show how great the positive effect of this measure is.

A lot helps a lot? This no longer applies to greenery when the plants, which are supposed to cool the city, themselves are suffering from heat stress and die. This is why, in addition to data on climate and air quality, the Smart City Mannheim project team is also collecting data on soil moisture and soil temperature in urban green spaces.

“We work closely with our colleagues from the Mannheim city transport service,” Sven Riffel says. As part of a pilot project, ten trees of different species throughout the city are fitted with sensors in order to derive findings for comparable locations. “We want to know >>



»We want to make the city resilient for the future and adapt it to the consequences of climate change«

>> which tree needs water and when,” the Smart City Manager says. In future, the data collected in the process will help the employees of the urban space service to water the green spaces in Mannheim in a more resource-efficient manner.

Climate change is increasing the amount of extremes. Problems are caused not only by long droughts, but also when too much precipitation falls on sealed surfaces in a short space of time. “The municipal sewerage company is also interested in the data,” Sven Riffel says. The climate measuring network is intended to show how much rain falls in which neighbourhoods. “It used to happen that the world virtually came to an end in one part

of the city – and the rest of Mannheim didn’t even notice,” the Smart City Manager says. Such weather phenomena, which are limited to a very small area, could become more frequent as a result of climate change, says climatologist Wolfgang Lähne. All the more reason to collect data in the urban area more continuously than in the past. In the event of heavy rainfall, for example, the measuring stations could support the fire brigade in planning their operations, which would then know at an early stage where flooding is imminent in Mannheim. The population can also be warned via apps.

Sven Riffel is convinced that it makes sense to take a close look at which measures really help in the face of climate change. “We want to make the city resilient for the future and adapt it to the consequences of climate change.” That’s why he and his colleagues are passionate about the Smart Roots project and the development of the climate measuring network. “I think many other cities can benefit from this.”



INTERVIEW: JANA ZAHNER

„It is not enough to install drinking fountains“

Heat islands, droughts, heavy rain: landscape architect Stephan Lenzen explains how cities will have to deal with plants and water in the future in order to prepare for climate change

A profession that shapes the climate: Stephan Lenzen is President of the Association of German Landscape Architects (bdla) and owner of the planning office RMP Stephan Lenzen Landschaftsarchitekten based in Bonn. In this interview, the 56-year-old explains how well-planned open spaces improve the quality of life and how cities need to prepare for a hotter future.

Mr Lenzen, how important is the topic of microclimate for landscape architects?

It depends on the scale of the project. At the moment, our designs are primarily focussed on large-scale climatic conditions in the city, fresh air corridors and cold air recovery areas. But in the end, the planning is aimed at creating cooling elements in a small space and increasing the quality of space. In view of the rising number of hot days, this is becoming increasingly important not only for landscape architects, but for everyone. We used to incorporate this intuitively into our designs, but now there are computer programs that simulate where heat islands form.

In your opinion, have local authorities in Germany already recognised that they need

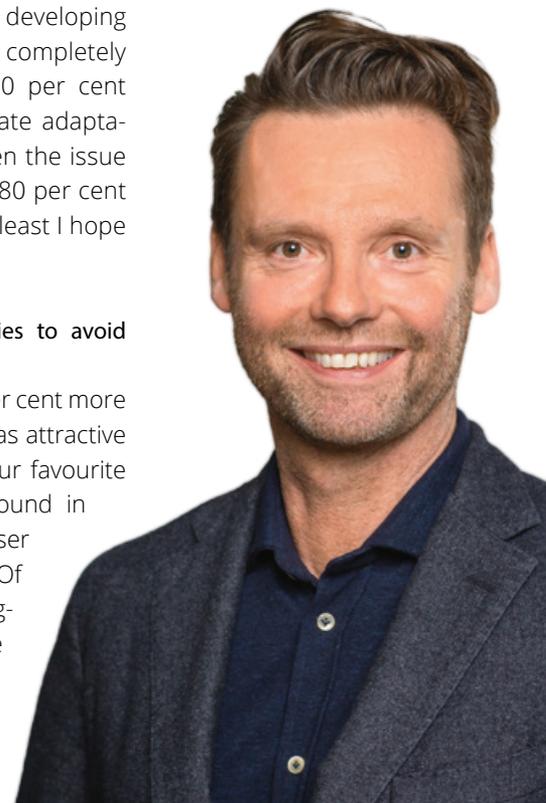
to become more resilient to climate change?

Let me put it this way: I believe that on a national level, this is being understood. I see this in my voluntary work as President of the Association of German Landscape Architects when talking to ministries and members of parliament. Knowing that you have to do something is one thing. However, developing a strategy and implementing it is a completely different matter. Only around 20 per cent of cities in Germany have a climate adaptation concept or have at least given the issue a lot of thought. The other 70 or 80 per cent are only now starting to plan – at least I hope so.

What needs to change in our cities to avoid heat islands in the long term?

Most cities would need 40 to 50 per cent more green spaces. Areas that are just as attractive for housing construction or for our favourite child, the car. Without a turnaround in transport, we will not get any closer to the goal of greener cities. Of course, this is where society struggles. However, making cities more resilient to climate change is not

✓ **Committed to the climate**
Stephan Lenzen has been President of the Association of German Landscape Architects since 2022





Green lungs for Mannheim

For the Bundesgartenschau (federal horticulture show) in Mannheim, Stephan Lenzen's team developed a concept for the conversion of a former military site into 2,300,000 square metres of green space

>> just a task for the public sector. If you look at the city centres with the highest amount of heat islands, it's also about private areas, courtyards, facades and roofs. For every new construction project, open spaces must be secured.

Your planning office designed the 2,300,000 square metre north-east green corridor on a former military site for the Federal Horticultural Show in Mannheim. What effect does this have on the urban climate?

The city of Mannheim is to be commended for not selling the site to investors when converting the Spinelli barracks. On the basis of a climate report, the administration decided to demolish the barracks and not to build new ones, as this would create a fresh air corridor carrying cold air from the Odenwald that would reach as far as the city centre. These are the kind of decisions we have to make nowadays based on analyses. Our design contains few trees so as not to obstruct the air flow.

It is a somewhat austere landscape that was created for the Federal Garden Show. But of course there's not only the climate catastrophe. In response to the extinction of species, we have created habitats for sand bees, lizards and larks.

Undeveloped land in cities is in high demand. Do effective green areas always need so much space or can you also achieve a lot on a small scale?

Yes, definitely! The north-eastern green corridor is of a dimension that can hardly be achieved elsewhere. When we build new buildings, we need good redensification, but at the same time we also need a sophisticated system of contiguous open spaces. Actually, trees should be planted wherever possible. But this often conflicts with our infrastructure. If you want to plant something today and open up the soil, you think you're no longer in Germany. Cables run all over the place – and they take up space from the roots.



»Cities need trenches that store water, retention roofs, overflow areas«

Climate change is bringing more droughts – but also heavy rainfall. How will cities have to handle water in the future?

I said this back in the late 1990s: water is the gold of the 21st century. Cities need unsealed surfaces that absorb precipitation, which can then be used to support the vegetation during dry periods.

The term “sponge city” is perhaps a better way of visualising this. We need ways of retaining water, tree-rigs that store water, retention roofs and multifunctional areas. For example, sports fields that can also serve as overflow areas during floods.

Can landscape architecture also contribute to greater climate justice?

That is, at least, one of the demands of our profession. Poorer people often don't have gardens, air conditioning or a pool. We are getting older and older as a society, and the group that is particularly vulnerable to the heat is growing. Adapting to the effects of cli-

mate change is not only an ecological and architectural issue, but also a social one. It is not enough to simply install drinking fountains.

Climate change doesn't leave us much time. What measures could cities tackle in a reasonably straightforward way?

A tree planted now will take 30 or 40 years to develop its full cooling effect. In future, we may have to get used to shading by mobile elements such as pergolas in city centres. The most effective approach would be to draw up climate adaptation concepts now and gradually start implementing the measures. Incidentally, it is not just about new vegetation, but also about preserving existing urban trees that are dying due to climate change.



PHOTOS: JIGAL FICHTNER · TEXT: ULF TIETGE

Size matters

No matter which manufacturing process, GRAF brings out the big guns for its environmental products. These are built by Orex in Poland, among others. We visited the machine manufacturer for the extra large dimension...



CEO of the hidden champion

Przemysław Orlik is Managing Director of Orex, has established the company with his father and developed it into the world market leader in the field of XXL rotomoulding machines

»We work with 300 degrees. This is the Orex standard for the fastest, most efficient production possible«

The baby is quite big. 18 metres long, weighing 25 tonnes, five and a half metres high. More important, however, are the intrinsic values: this rotomoulding production plant for large plastic parts can be operated in a climate-neutral manner. “We designed it as a hybrid machine,” says Orex project manager Christoph Kanafek, and you can see how proud he is of his work with the innovative thermal circulation. “The system can be powered by wind and solar energy and produce workpieces up to three and a half metres in size without any cost for electricity, or by gas if no renewable energy is available.”

Where high-tech machines are made in the south of Poland today, people used to boil sugar. On a grand scale and with high standards. “The sugar from Chybie was considered the best in the world,” Sales Manager David Urbanek says as we walk through the nave-sized halls made of red brick. The sugar factory was built around 1860, survived two wars, survived the communists and, with 9,000 square metres of factory space and 35,000 square metres of land, is now home to a Polish hidden champion that would like to grow even faster. The only problem is: there is not enough qualified labour. “We have the same problems as everyone else in Europe,” Andrezej Chwolek, Head of Mould Making, says.

Fancy a little demonstration of a hybrid machine? With pleasure! After all, that’s what we’re here for! In addition, the green machine will only be set up for a few more days; customer acceptance is planned for Monday. Kanafek goes to one of the two control panels, presses a button, moves the small joystick and it starts: the right-hand mould carrier closes slowly and the casting mould begins to move at a leisurely pace. Held by a steel arm, the mould is swivelled back and forth, while the plastic granulate is distributed inside and immediately begins to melt in the oven with 260 kilowatts of connected load.

“We’re working with 300 degrees,” says the project manager. “This is the Orex standard to allow for the tanks to be produced as quickly and efficiently as possible.” For this reason, there are also two mould carriers. While a new tank is being created and the mould is being heated inside the machine, the mould on the other mould carrier is cooling down and the polyethylene is hardening. The entire process takes a good one and a half hours, allowing for the production of around 20 large tanks per day.

Orex is the market leader for shuttle machines. The partnership with GRAF began when GRAF approached Orex with a concept for special production systems for large tanks with a volume of more than 100,000 litres. Orex developed the hardware for the large specialised machines, GRAF the software. Since then, Orex has been producing these machines exclusively for GRAF.

Orex is one of the few specialised machine manufacturers in the industry to use high-quality servomotors for its drives. >>



^ Customised work

This is where the rings for the reinforced dome openings on the large GRAF tanks are created

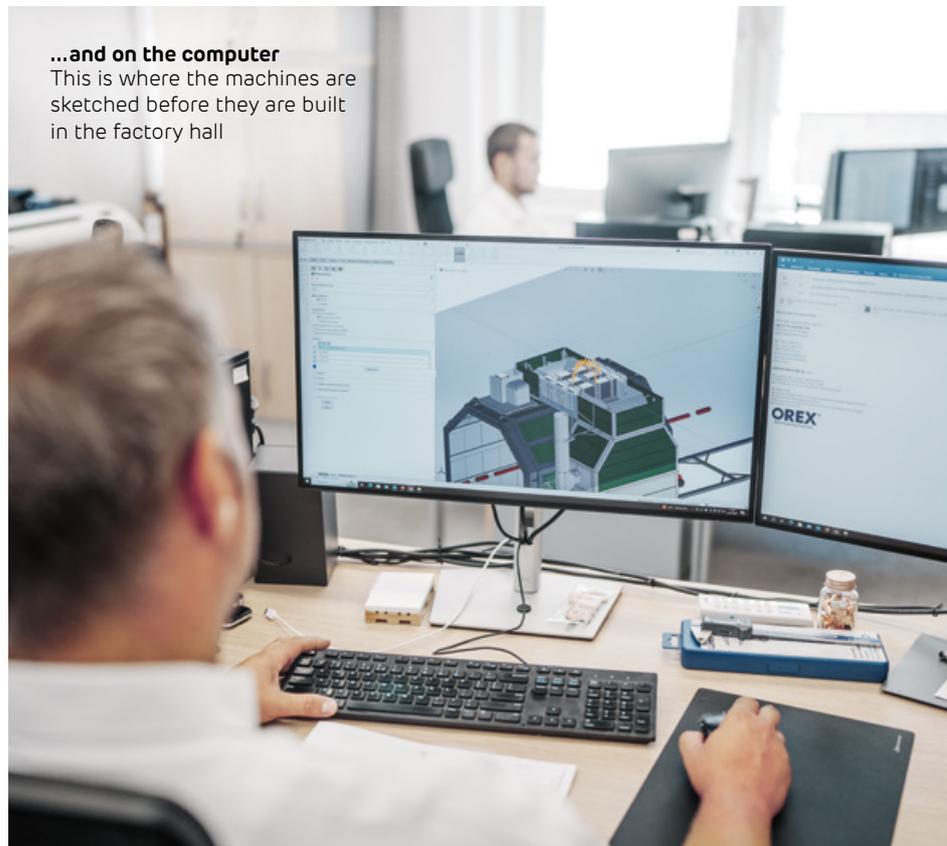
<< Everything in order?

Mould construction manager Andrzej Chwolek with one of the frames in which the casting moulds will later be produced



Manual labour

The moulds for tank production are assembled from more than 1000 individual parts and welded by hand



...and on the computer

This is where the machines are sketched before they are built in the factory hall





<< The maiden voyage

Project manager Christoph Kanafek starts up his latest machine for the first time. The 25-tonne system can be operated entirely with electricity from renewable energy sources or, if necessary, with gas, and takes in moulds up to 3.5 metres in size

»If you have a wind turbine or solar cells, you can create workpieces up to three and a half metres in size in a climate-neutral way and without any cost for electricity. Alternatively, the system can also be operated with gas«



<< Chybie's old sugar factory:
The building in which Orex works today was built around 1860

>> This enables particularly precise and slow movements, which are important to ensure that the plastic is well distributed. Orex is also characterised by a high level of vertical integration thanks to its own metal processing. This is particularly important for mould making – because the three-dimensionally sophisticated steel moulds are welded together from components produced in-house. Like a 3D puzzle in an XXL format and with welding equipment. For assembly, the moulds are suspended in frames and welded together, piece by piece, by hand. A job for professionals.

While the green hybrid machine continues its test programme in the prototype hall, we go next door with CEO Przemyslaw Orlik. One of the world's largest rotomoulding machines is located here. As high as a house, almost 40 metres long – but completely dismantled. "It's called a rock'n'roll machine," the boss explains. "It has now been running for six years and will now be completely dismantled and cleaned." After all, six years of continuous operation for the production of the currently largest possible tanks on the market have left their mark. "But you shouldn't let that fool you," Orlik says. "The machine will certainly run for another 20 years, because we take great care to ensure that the technology is robust and durable."

Orex was created in a garage. Just like Google, only not in California, but deep in the south of Poland. "That was in 1995," Przemyslaw Orlik says. "Back then, my father and I started building a machine to produce balustrades." 25 years later, Orex is one of the market leaders in the field of shuttle rotomoulding machines and processes 500 tonnes of steel per year. The company employs 65 people. About half of them are working in metal processing, where moulds and components for tanks are produced. The other half work as mechanical engineers in development, or take care of assembly and commissioning. Sometimes they go to Germany or France – sometimes halfway around the world. "We'll be in Australia next week, setting up two large shuttle machines near Perth," Przemyslaw Orlik says and follows up. "It's different to Ikea – our machines are so complex, we have to assemble them for our customers."

Especially as Orex now has new goals: The first fully automated machines will be available from 2025 – Industry 4.0 in plastics production. As CEO, this makes Orlik very optimistic about the future. "We will certainly sell ten hybrid machines in 2025. In this way, we are playing our part in making plastics production more economical and ecological."



PHOTOS: BENEDIKT SPETHER · TEXT: THOMAS GLANZMANN

The lord of the machines

As process mechanic and shift supervisor, Sven Leisten controls the really big machines – with state-of-the-art technology, recycled plastic and tools weighing tonnes...





Tool change

Sven Leisten and his colleague use the crane to change the tool, which weighs several tonnes

Production meeting in Teningen: This is where the day's work at the plant is decided. Sven Leisten and his team of two other shift supervisors as well as several production assistants have already ticked off part of the list by 9.30 am. Sven has an early shift today, starting at 6 am. "It feels good," he says, "we're right on schedule." As process mechanic for plastics and rubber technology, he changes the tools weighing several tonnes on the machines that use state-of-the-art technology to mould recycled plastic into rainwater tanks – here in Teningen, for example, Carat tanks with a capacity of six and a half thousand litres.

Halfway through each shift, there is a meeting for a team from each of the production departments: the injection moulding and blow moulding production managers, the mainte-

nance manager and the reporting shift manager – this morning it's Sven. He writes the work plans with his former trainer, the head of injection moulding production. These plans serve as precise instructions for machine operators, regulating, for example, when to set the parts required for the next production run or when to perform maintenance work, such as the replacement or cleaning of certain parts. As soon as everything is determined, Sven leaves the meeting room and returns to the hustle and bustle of the production hall.

Sven is 22 years old and has been commuting between Freiburg and Teningen since 2016. He was the first apprentice in the Teningen production department. Together with two colleagues, he now manages a shift and

>> Well planned

What and with which machines?
Production planner Oliver Kiefer
and the team review everything

✓ A closer look

Many things can be done on
screen, but some hardware
requires close-up inspection



organises the staffing of the production assistants. “That accounts for about half of my work. The other half of the time, our process mechanics are helping out with the tools.”

When he says “tools”, he is talking about monstrous moulds consisting of two halves of 60 to 80 tonnes each. “They are so heavy that our overhead crane can only lift one half of a mould at a time,” he explains. That’s why it has to be done one piece at a time. And when Sven talks about “machines”, he is speaking of systems costing up to five million euros, that are made out of sheer know-how and up to 560 tonnes of steel. “That’s what got me excited about working for GRAF even back then. You won’t find machines like this anywhere else! Even before and during my training, in ad-

dition to the sustainability and job security, this unique selling point completely convinced me.” Every shift, the process mechanic works with these machines, maintains them, changes tools, aligns material – “and every two hours we check all the parts that we are currently producing.” A large proportion of the work on all machines is now done on screen. The display provides information on all the machine’s important diagnostic data. Is the hydraulic injection pressure correct? How long is the cooling time? Has the switching position been set correctly? Sven checks and adjusts everything. His tour takes him to every machine.

The next station is quality control. Product parts coming from the large machines lie on a roller conveyor belt. Sven checks the >>



»At GRAF, we use four different moulding methods. That's what makes it so interesting from a technical point of view!«

>> Carat tank halves both visually and by hand. Everything looks good. "Well, we are constantly checking the machines," he says. "The machine also does a large part of quality assurance itself. More than 700 parameters are monitored and documented and each component is given an individual number for traceability."

This is just as much about process safety as it is about a sustainable end product. "It's clear that we want to minimise waste. But even if something goes wrong, nothing is lost because we can simply recycle it using our own technology." With its competence centre

for raw materials in Herbolzheim just about 13 kilometres away, GRAF is a pioneer in recycling. The plant in Teningen is no exception: production is completely waste-free. Plastic waste from production is ground directly on site and fed back into the production process.

Sven's area of expertise is injection moulding. During his training, however, he worked with several processes and can therefore, in principle, work at any of the company's locations: "At GRAF, we use four out of seven moulding methods for plastics. That's what makes it so attractive and thrilling for someone like me, who has always wanted to know exactly how things work." In addition, he was always assigned one permanent contact person during his training and knew whom to look over the shoulder if he was in doubt. "Since I really liked it here as part of the team right from the start, it was immediately clear to me that I would stay," he says. He did have the option: GRAF takes on all its trainees on a permanent basis.

But he is still a long way from reaching the limit. Sven Leisten is currently attending master craftsman school. "I'm ready to take on even more responsibility in the company in the future," he says. But first, it's shift change time for today. 1.30 pm. And Sven Leisten's working day ends now. Not that bad if you have a whole afternoon to yourself ...

Colleagues wanted

Under the motto "Become a GRAF", we are looking for reinforcement and have turned our employees into models for this purpose



PHOTOS: DIMITRI DELL · TEXT: THOMAS GLANZMANN

Become a Graf

A new address to the colleagues of today and tomorrow: GRAF has repositioned itself in employer branding and is now promoting itself to employees!

The new GRAF employer brand is the fitting response to the labour market situation – the shortage of skilled workers is real. According to analyses by the German Economic Institute, almost 540,000 jobs in Germany are not regularly filled. According to the Federal Ministry for Economic Affairs and Climate Protection, 352 out of 801 professions are currently suffering from a shortage of skilled labour.

GRAF has found its answer and is doing what half the world is talking about: GRAF applies to its employees. In fact, to both future and current employees. This is the basic idea behind what is now increasingly publicised under the motto "Become a GRAF". The company has a lot to offer its employees – and is now communicating that with new self-confidence. The management, along with the marketing and HR departments, collaborated with the Offenburg >>

The career page

The career page integrated on the homepage is more than just a job search engine. It offers exciting content for all interested parties:





^ Show me how it's done

During the shoot, photographer Dimitri Dell wanted to know the facts. Above, his portrait of the production

>> agency team Tietge to achieve this. The short distances within the family business proved to be a significant advantage. Throughout the collaborative process of defining the Graf employer brand, the feedback structures within the established teams and departments were extensively utilised.

Based on the results, measures were designed in collaboration with the Tietge agency, based on the identified benefits such as team spirit, authenticity, familiarity, environmental protection, and responsible entrepreneurship. These measures were then implemented directly in close cooperation with media professionals. Soon after the com-



<< Storage and logistics

What counts are the people. The backdrop is their natural working environment

✓ In all divisions

This is how the images for each division came about. Voilà, the campaign's look and feel



mencement, it was time for the photoshoot of a lifetime. The most popular motif featured employees in their familiar working environment performing their day-to-day tasks. The resulting images are brimming with naturalness and portray the company as approachable as it truly is.

It is not only the newspapers which already advertise "Become a GRAF" in simple, clear, and pleasantly straightforward sentences. We have also made significant changes to our online presence. Now, an integrated career page welcomes all interested parties on the internet via the URL www.graf.info/jobs. This is where GRAF intro-

duces itself and offers target-group orientated access for newcomers and graduates, experienced professionals and managers as well as trainees and students.

Job stories in the form of portraits and reports captured in moving images, sound as well as text complement the photos, giving an even more authentic experience of everyday working life. For example, there is a job portrait of Sven Leisten and his exciting work as a process mechanic with a video showing his day-to-day work (more from page 62). And with GRAF you are safe: nothing is more convincing than having your employees explain themselves what they value about their job. █



PHOTOS: GRAF · TEXT: ANNIKA SCHUBERT

The global player next door

Exporting to 80 countries, with sites in Europe, Asia, and Australia, customer proximity is a top priority for Graf. Additionally, Graf undertakes major projects in unconventional locations around the world

Whether large-scale projects in Germany, Bulgaria, Israel, Ireland or Switzerland – GRAF supports its customers worldwide in the implementation of rainwater solutions. Unique products, a strong orientation towards service, reliable partner companies and a sophisticated logistics network with short response and delivery times make the Black Forest-based global player this successful. GRAF operates worldwide – customer proximity is a priority, which is why there are production sites in Germany, France, Poland and Australia, among others.

In Bulgaria, for example, the Palfinger Group relied on the expertise of the GRAF Group for the installation of a KLARO XXL wastewater treatment system. The plant is characterised by minimal power consumption and meets all ecological wastewater management standards. And the Palfinger Group? The company is committed to sustainability and nature conservation in Bulgaria by installing the latest environmental technology. And this is how it works: a pumping system transports the wastewater to the wastewater treatment system, which is around 200 metres away from the Palfinger Group's production site. After purification, the clean water is then fed into a watercourse next to the factory premises. And with that, the recycling system is complete.

In Switzerland, at the elevated altitude of 2,459 meters on the Great St. Bernard mountain pass, just below the hospice of the same name, Graf has supplied another wastewater treatment system of this type. (Have you already seen the photo of it on page 6?)

Graf is also undertaking significant projects in the Middle East. One example is the employee car park project at the 70,000-square-meter site of the Plugot natural gas power plant in the southern region of Israel. Beneath the car park, the Teningen-based company supplied the EcoBloc Inspect Smart infiltration system with 800 modules. The system contributes to the ecologically sensible use of rainwater. Rainwater is collected and seeps into the ground, contributing to groundwater recharge.

In Ireland, GRAF has recently finished a major project: in the country's largest independent distillery. Thanks to GRAF, the Killarney Brewery and Distillery Centre in Kerry can now call the multifunctional EcoBloc maxx rainwater retention basin its own. The basin regulates the high amount of rainfall that determines everyday life on the island and thus relieves the burden on the sewage system – the rainwater is, of course, recycled in the building's water cycle.

Customised wastewater treatment system

GRAF installed a Klaro XXL wastewater treatment system at the Palfinger Group site in Cherven, Bulgaria, in summer 2022. The system consists of plastic containers which, due to their composition, are not at risk of corrosion, unlike concrete tanks.

This QR code takes you to a video about the project.





<< Extinguishing water supply

During a fire protection inspection in an industrial park in Schönau in the Black Forest, it was determined that an additional 264 cubic metres of extinguishing water needed to be provided. The city council decided to install four GRAF Carat XXL underground extinguishing water tanks on the company premises



^ Infiltration of precipitation

GRAF installed the EcoBloc maxx system with a capacity of 980 cubic metres below the employee car park at the natural gas-fired Plugot power plant in southern Israel. 800 infiltration modules made from 100 per cent recycled plastic are used for rainwater infiltration

✓ It's raining cats and dogs

GRAF has implemented a multifunctional EcoBloc maxx rainwater retention basin at the Killarney Brewery and Distillery Centre in Kerry, Ireland. The system is particularly important during heavy rainfall. It relieves the sewage system and prevents flooding. It also serves as a storage basin for the reuse of rainwater



PHOTOS: JIGAL FICHTNER · TEXT: ULF TIETGE

ALL KLARO!

A container designed to help handle the wastewater of up to 250 people? With KLARO, it all adds up. The Bayreuth specialists of the GRAF Group manufacture, for instance, containerised wastewater treatment plants that are used all over the world

»Every year, 8,000 wastewater treatment systems are built with our technology, helping purify millions of litres of water«

The white 40-foot container looks as good as new, even though it has already travelled the world. Built in Shanghai, loaded and shipped, then sold in Hamburg. Now it is being converted into one of the most modern packaged sewage treatment plants in the world in Bayreuth, Franconia, before it sets off on its big journey again. To Sweden perhaps? To Canada? Or perhaps to the desert? "I don't really know with this one," KLARO Managing Director Tobias Pankse says almost apologetically, opening the large doors at the end of the container.

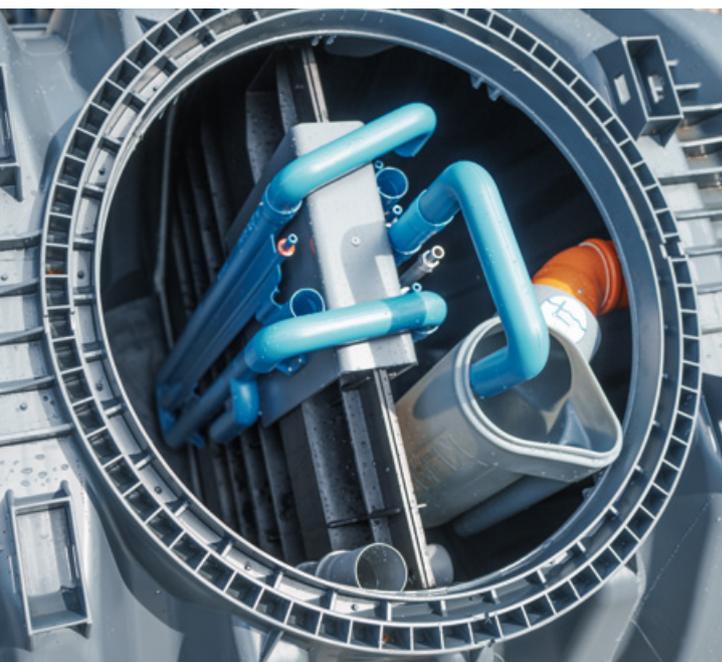
Behind the doors is the machine room of the sewage treatment plant. A specially developed control system, two powerful air compressors, an air conditioning unit, a control cabinet, the fuse box and various pipes, lines and cables are installed here on a footprint of just under two square metres – because most of the container is used as a clarifier. It is home to the bacteria that play the main role in the purification of the wastewater – and must therefore be treated with appropriate care. A whole battery of membrane ventilators is installed on the floor in two rows and, thanks to the air compressors from the engine room, constantly supplies the little helpers with fresh air. A whirlpool for bacteria, if you like – but a very effective one. After 12 hours, the water is so clean that, after disinfection, it can be used for irrigation purposes. That's the recycling economy for you. Applied environmental protection with innovative technology made in Germany: an export hit.

KLARO's wastewater treatment technology is already in use in 80 countries – and treats the wastewater of more than 800,000 people. On major construction sites in Germany, on the edge of mining operations in Australia, >>



Screws for a clean world

The packaged wastewater treatment plants that are manufactured here are at times delivered to the most remote locations



»Our plants are in every corner of the world. That's why everything is designed so that our specialist partners can also control the plants over long distances«

^ Resilient and sophisticated

The compact technology (bottom) is used with GRAF tanks where there would otherwise be no wastewater treatment (top)



<< In the tightest of spaces

While the clarifier is designed to be as large as possible, Klaro's experts fit their technology into a space of barely two square metres

>> By helicopter

Many locations cannot be reached by truck. The GRAF tanks with KLARO purification technology are then flown to the construction site and installed immediately after



>> in desolate regions of Norway and in the remotest parts of the world. "Every year, 8,000 wastewater treatment systems are built with our technology, helping purify millions of litres of water," Tobias Pankse says and adds: "60 to 70 per cent are exported." Important to know: the systems are not only plug-and-play connectable, robust and durable by design, but can also be controlled via remote maintenance. "Our systems are located in the remotest corners of the world, where technicians are not always available. That's why everything is designed so that our specialist partners can also control their plants and correct any faults from long distances," Pankse says.

The container is just one of many KLARO products. The core business is wastewater treatment technology for packaged wastewater treatment plants, which GRAF also sells

together with a tank as a packaged wastewater treatment plant.

KLARO, founded in 2009, has been part of the GRAF Group since 2014. The inventive Franconians started out with packaged wastewater treatment plants, for which GRAF tanks were perfectly suited: A partition wall, a few pipes, the control unit and other electronics at a safe distance from the wastewater. A clean solution for small and very small projects. A mountain farm, a research station, a holiday home or a tiny settlement in the Alps: underground tanks with KLARO purification technology are perfectly suited. "However, if the plants need to be mobile or have to perform better, containers are the go-to staple," Pankse says, proud of the fact that KLARO is Europe's market leader for small wastewater treatment systems with SBR technology.

>>



Help the bacteria

The membrane ventilators, which are distributed in two rows at the bottom of the container, supply the bacteria in the wastewater with fresh air



<< Tobias Pankse, managing Director of KLARO, is proud of the fact that KLARO is Europe's market leader in small wastewater treatment systems with SBR technology

>> The capacity of wastewater treatment plants is measured by PE, by population equivalent. One resident constitutes one PE; two hotel guests also constitute one PE. The legislator has decided that all plants with less than 50 PE are considered packaged wastewater treatment plants and those with up to 500 PE are considered small wastewater treatment plants. This is exactly the category that the KLARO containers with 45 to 1380 PE generally fall into. Developed in 2020, the containers were immediately well received on the market.

During the preliminary work for the containers, the partition wall separating the sewage tank and machine room is built, along with various flaps, flanges and steel strips. Afterwards, the container is sealed. This way, a freight container is transformed into a state-of-the-art wastewater treatment plant. "In the past, tanks were built in containers – but of course this is

nowhere near as efficient as simply using the container as a tank," explains Product Manager Julian Ulbrich, who supports specialist partners from pretty much all parts of the world in putting KLARO containers to use.

The containerised wastewater treatment plants are available as 10-, 20- and 40-foot containers. "We also have the option of connecting up to five containers," Ulbrich explains. "Then, the new systems from the KLARO MAX series come into play." For a university in Bangladesh, a village in Yegang, China, and for a textile factory in South East Asia. "We're talking about tanks with more than 1,000 cubic metres and really big technology that treat the wastewater of over 5,000 people," Ulbrich says. "At the same time, the plants prove that our technology is both sophisticated and extremely reliable, even when faced with very large volumes of wastewater."



Colourful troupe for the home forest
Foresters and employees from tietge and GRAF collaborated in planting efforts

PHOTOS: JIGAL FICHTNER · TEXT: SOPHIE RADIX

A patch of forest for the future

Sustainable team action: last November, we planted 500 trees – instead of buying Christmas presents for our customers

A forest for Christmas? Sounds good, we thought to ourselves. Then we took the whole team to the Ignazhof farm in Welschensteinach to plant 500 trees. Yes, that's quite a number – but we weren't alone: At the farm we met up with several foresters and the staff from team tietge, our agency from Offenburg. They launched their #heimatwald (#home-forest) project in 2021. The aim is to make the Black Forest more resilient by increasing biodiversity and creating new habitats for animals and plants. Of course, that suits us and our own goals. "This year, instead of Christmas presents, we want to make our customers

the gift of sustainability," Otto P. Graf said. He came with his family and, of course, helped with the planting.

Foresters on site made sure we did everything right. They brought the 500 trees donated by us – and all of these had to go into the ground! So we shouldered our spades and scrambled up the 10,000 square metre slope behind the farm. The foresters marked the correct distances on the slope and we began to plant the trees under their guidance. We planted wild service trees and sorb trees. Acorns had already been sown in advance. It rained that day



for the first time in a long time, so the ground was damp and the conditions were ideal. For us this meant a different thing: our clothes used to be clean once ... But what the heck! After all, we are happy to work towards greater sustainability. That little bit of mud didn't bother us. After all, from now on, a colourful mixed forest will grow on this slope.

And there is no other way in the future: "We are focussing on diversity and different tree species with a high level of drought tolerance," district manager Günter Schmidt explained. The domestic forest suffers above all from

periods of drought and heat. Therefore, we need to plant tree species that are better suited to cope with these changed conditions. And that's exactly what we planted: "Service trees and sorb trees are thermophilic," Schmidt confirmed. "They are not yet very common here – but will most likely be soon. They will certainly feel very comfortable here!" They are also more resistant to the bark beetle.

But remember, a good forest takes time. Ideally, we will only be able to marvel at a climate-resistant mixed forest in Welschensteinach in a few decades' time. We finished the joint activity dirty but happy: planting was not only good for the environment, but for us as well. The activity was great fun for everyone – and the shared snack afterwards perfectly completed the day.

A well-deserved schnapps

The foresters thanked us with home-distilled schnapps: "Bring such a large, motivated team along more often," district manager Schmidt said. Farmer Tobias Himmelsbach added: "The sorb tree bears fruit that can be used to make schnapps. We'll meet again in a few years and toast the young trees." Well, count us in!

TEXT: THOMAS GLANZMANN

Our little rain hero

Rain is not only a natural phenomenon but also a symbol of age. Our author remembers – and immediately he's 25 years younger again (i.e. five). Better than May rain, right?

Rain is like milk. As children we can't get enough of it – and as adults it doesn't do anything for us. It's purely a question of attitude. The neighbour's child outside is happily splashing around in his yellow raincoat. Somehow the drops seem to affect him less than his mother with her umbrella, hunched shoulders and furrowed brow. "Filthy weather!" I think out loud. And the breakfast tea spills back into the cup and onto my trousers from all the excitement. Great, even in here you get wet!

But luckily I'll be spending this beautiful summer's day in the office, rain-free. It's rather fitting that I'm writing a story for the market and innovation leader for rainwater tanks. Carat tanks, Platin tanks, EcoBlocs and even more rainwater harvesting and retention – it's great to see all the solutions GRAF has created. After all, each of them is about using water responsibly, a resource that is becoming increasingly precious and scarce as a result of climate change (even if it may not seem that

way at the moment, looking outside the window). When I think about it, my feelings about the rain suddenly change dramatically. Lightning and thunder! All of a sudden, completely different memories pop into my head...

What fun it used to be as a child! Mum just had to quickly put on my raincoat and off I went. In the courtyard with the small bike right into the shallows, where the water of the entire area between the rows of garages accumulated. Splash! Drive through the puddle until the last drop of rainwater and then do it again! And if there's no bike around, children simply hop through any puddle in their wellies. Awesome!

Hm ... I could actually take this attitude as an example when I leave the house on a Monday morning. After all, nature needs the rain. And surely she has nothing against cycling either. So, up on the bike! Then I will be a little hero now, too!

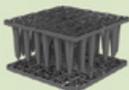
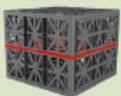




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