LIVING METALS

How we strengthen our strengths together

What's actually wrong with designing a production facility as aesthetically pleasing and sustainable as a good eco-hotel? Nothing, thought Ceratizit. And they built a new facility in the **Kreckelmoos** district of Reutte accordingly.

You don't have to be a seafarer to become a **Sindbad**: It is enough to make yourself available as a mentor and companion to young people who are struggling to choose their next school or education. Plansee is in.

Bulgaria is more than a beach party destination: it is also home to vibrant business metropolises like **Gabrovo**. Plansee and Ceratizit were involved in the rebirth of the "Bulgarian Manchester."

Editorial

Dear Reader,

Last year once again presented challenges. But thanks to our clear strategy, committed employees and the high adaptability of our organisation, the Plansee Group successfully mastered these challenges. We used the time to further develop the entire organisation and to launch new projects – such as the electrolyser, with which we will produce our hydrogen using electricity from renewable energy sources instead of gas.

The world does not stand still and the market is constantly presenting us with new tasks – whether in the area of sustainability, as a reliable employer or as a development partner for our customers from the high-tech world. We work every day to support the technical and economic progress of our customers based on the materials tungsten and molybdenum and to give our employees opportunities for further development.

In this issue of *Living Metals*, we take a look around the Plansee Group and talk to people who make these goals visible. Gabriele Pozzetti introduces us to his work with artificial intelligence and outlines the opportunities it offers to make work easier. Our collaboration with Sindbad's mentoring programme bears its first fruits and a team consisting of a staff member and a student share their experiences. We also visit the Gabrovo site, which is steeped in history, the new production facility in Kreckelmoos at the Reutte site and the Ceratizit Creative Garage – together with a guest from the world of cycle racing.

Furthermore, we take a look behind the scenes of development and production and show projects that set new technical standards and advance our customers: be it the optimisation of hot zones, the cooperation with the Münze Österreich or the EUV technology with ASML.

In addition, we reflect on some milestones of the past year together with Karlheinz Wex, Chairman of the Executive Board of the Plansee Group, and look at how we can further strengthen our core competencies and the Group by setting various internal courses.

We hope you enjoy this issue of *Living Metals*!

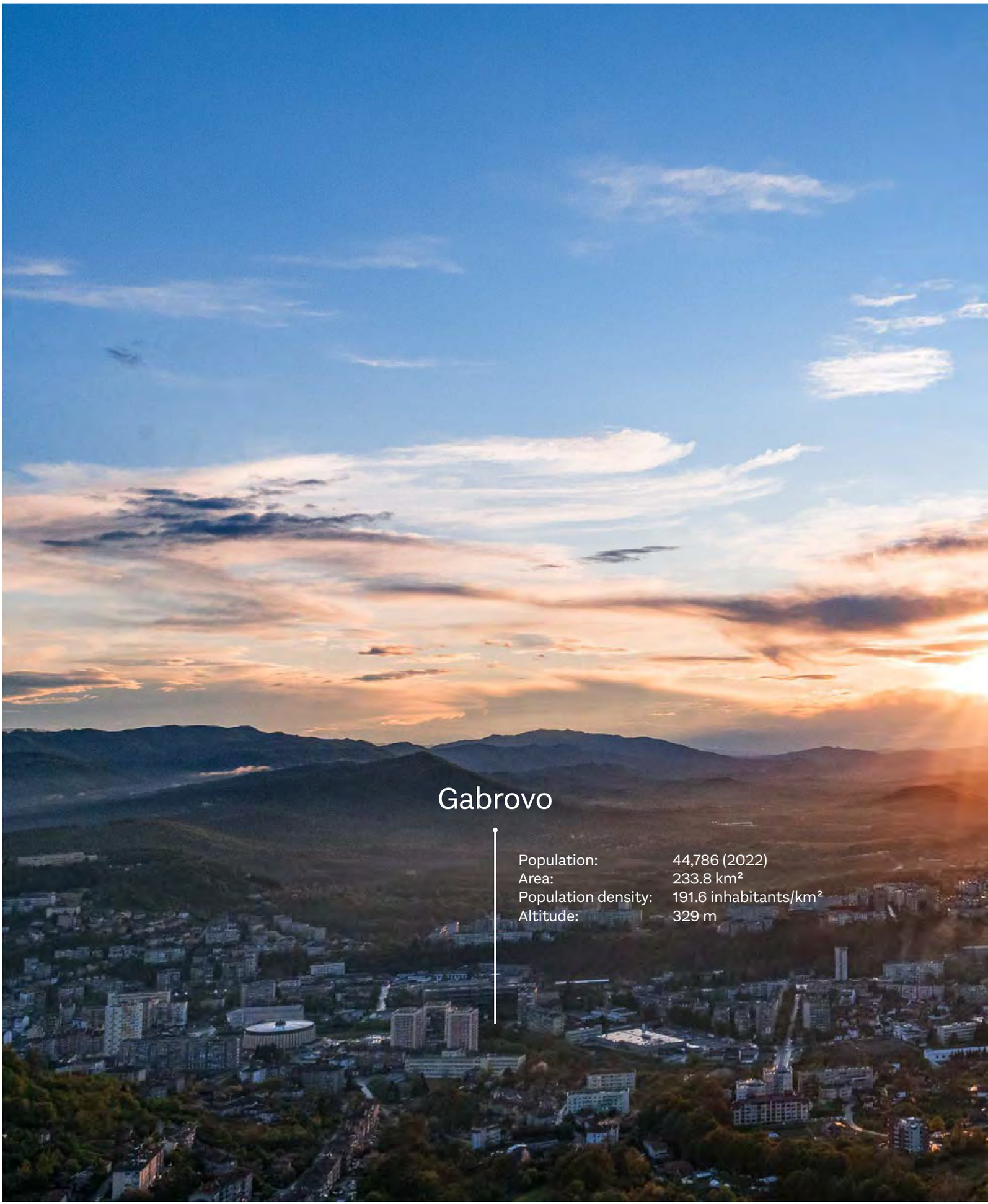
Your editorial team

Content

Right in middle and yet not far away

Plansee and
Ceratizit
in Gabrovo

For many Europeans, Bulgaria is still a kind of *terra incognita*, an unknown country, even though the Sunny Beach is very popular with party tourists. But away from the Black Sea coast, Bulgaria has great landscapes and a lot of history in store. In the heart of this wonderful country lies Gabrovo, the headquarter of Plansee MW and Ceratizit Bulgaria.


Gabrovo
Population: 44,786 (2022)
Area: 233.8 km²
Population density: 191.6 inhabitants/km²
Altitude: 329 m

The city with its almost 45,000 inhabitants lies next to the Yantra River and has been an economic centre of Bulgaria for centuries.

Bulgaria is a bridge country, situated at the transition from Europe to Asia – or vice versa – and marked by a history that is unparalleled. Bulgaria is not only home to the first evidence of human life in Europe, but also to the Karanovo culture, the oldest remains of human settlements on the continent. In addition, we owe the oldest known gold treasure in human history to the Varna culture.

The country's geographical position in the area of influence between Greece, the Roman Empire and the Ottoman Empire led to an eventful history with numerous wars and occupations by foreign powers. History left its mark on Bulgaria and ensured that it is not only a scenically beautiful but also a culturally highly interesting country.

In the heart of this country lies the industrial city of Gabrovo, home to Plansee MW, Ceratizit Bulgaria and CB-Ceratizit Europe. The city with its almost 45,000 inhabitants is located

In 1949, the state tool factory Bolshevik was founded in Gabrovo. Later it was renamed Instrument. But with the collapse of the Eastern Bloc, a large part of the Bulgarian economy also collapsed.

next to the Yantra River and has been an economic centre of Bulgaria for centuries. Part of the reason for this is the period of Ottoman occupation of Bulgaria, which lasted from the late 14th to the late 19th century. At that time Gabrovo was located on the outer border of the Ottoman Empire and was thus an important trading hub. In the late 19th century, the city began to develop into a textile centre, earning it the nickname “Bulgarian Manchester.” After the Second World War, Bulgaria became a communist People’s Republic, and industry in Gabrovo shifted from textiles to metal processing to further Bulgaria’s modernisation.

In 1949, the state-owned tool factory Bolshevik was founded in Gabrovo. It was later renamed Instrument. But with the collapse of the Eastern Bloc, a large part of the Bulgarian economy also collapsed. Many factories closed, people lost their jobs and the “Bulgarian Manchester” went through difficult times. At the end of the 1990s, interest in the former industry in Gabrovo increased again and the Plansee Group also came to Gabrovo. In 1996, the then Plansee Tizit acquired Instrument and integrated it into the then Tizit (now part of Ceratizit). In 1998, Plansee MW GmbH was founded as a subsidiary of Ceratizit Bulgaria.

Today, 155 employees at Plansee MW produce components for the lighting industry, power electronics, the transport sector and medical technology. In addition, rotating anodes used in computer tomographs are processed here.

At the same time, Ceratizit Bulgaria is developing into a competence centre for standard products and custom-made products and employs over 600 people.

> “Bulgarians are very similar to Austrians,” says Schranzhofer. “They are sociable, uncomplicated and attach a lot of importance to good food.”

A Tyrolean in Bulgaria

Plansee MW has been managed by Robert Schranzhofer since 2018. Born in Tyrol, he had already been involved with the Gabrovo site for many years. He recognised the potential and opportunities there early on and was therefore happy to move his workplace from Reutte to Gabrovo. He had no problems settling in. “Bulgarians are very similar to Austrians,” he says. “They are sociable, uncomplicated and attach great importance to good food.” The Germans sometimes have a harder time, he adds with a wink. His counterpart at Ceratizit Bulgaria is Georgi Petrov. He is a native of Plovdiv, a good two and a half hours south of Gabrovo. Like him, many Bulgarians from all parts of the country have moved to Gabrovo in recent years. The reason for this is the revitalisation of the city. Many large companies from all over Europe have ensured that the “Bulgarian Manchester” has once again become a vibrant economic metropolis. “One reason for this is quickly explained,” Robert Schranzhofer tells us. “If you look at the map, Gabrovo is in the middle of Bulgaria. It is only about three hours by car to the Black Sea. You can reach the Turkish or Romanian border just as quickly. The Greek border is just four hours away.” Georgi Petrov adds, “At the same time, Gabrovo has a long history of high quality metal production, going back 70 years.”

The Plansee Group firmly believes in the potential of the Gabrovo site. That is why it has initiated expansion and conversion measures at the site this year. This includes the construction of an all-round sustainable production facility for Ceratizit Bulgaria – a novelty in Gabrovo. The new production, storage and service areas are being built on the site of a former production facility. In the process, the long-neglected riverbank will be transformed into an appealing recreational area with green spaces, walkways and benches overlooking the Jantra River as well as the surrounding forests. The declared goal: not only to create the best possible conditions for production, but also to provide people with sufficient compensation and relaxation in the fresh air.

The well-being of the employees is also taken care of in the buildings. For heating, cooling, ventilation and lighting, the architects rely on sunlight, river water and the reuse of waste heat generated by the manufacturing processes. This not only helps to reduce the CO_2 footprint, but also pays off economically.

Operating costs are significantly reduced, heating and cooling costs by 75 and 65 percent respectively, energy demand for ventilation by 75 kilowatts per hour and electricity consumption for lighting by 50 percent.

By manufacturing new products, modernising the plants and designing sustainable manufacturing processes, Ceratizit will continue to gain importance in the region – an important argument for the attractiveness of the site within the Plansee Group's production network and locally for existing and future employees. A training centre is being built within the production facility for the education and training of employees.

The main technologies at Plansee MW Gabrovo are mechanical processing, surface treatment and coating of components made of molybdenum and tungsten. The products manufactured there are used in the semiconductor, lighting, and medical industry.

Ceratizit Bulgaria supplies customised and standard solutions in the field of cutting tools and hard material solutions for many industries such as aerospace, electronics industry, power engineering, automotive industry, mechanical engineering, and medical industry.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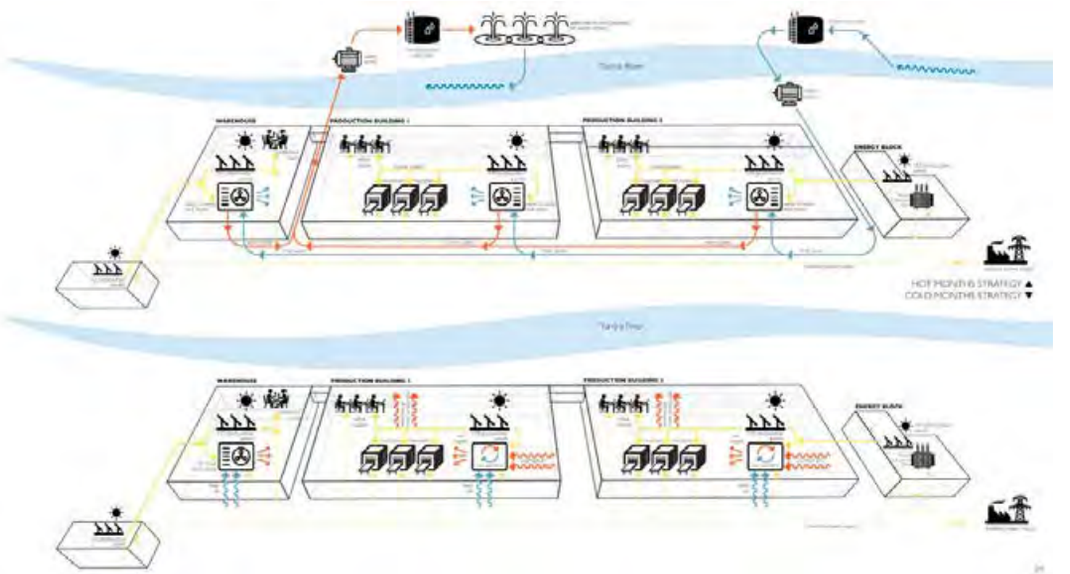
DMG MORI

Plansee MW is also modernising its production areas. Behind the “Hexenküche” (Witches’ Kitchen) project lies the refurbishment of a factory hall in which base plates for semiconductor production are finished. Production is scheduled to start on three levels by the end of the year. The plant includes a new coating line, a surface treatment line and clean and final inspection rooms.

The Gabrovo site is an integral part of the Plansee Group, as is the city itself. To become the employer of choice in Gabrovo and raise awareness of Ceratizit and Plansee MW, the company has decided to sponsor the FC Yantra football club. The traditional club from Gabrovo currently plays in the second Bulgarian football league and has ambitious goals. From now on, the logos of Plansee MW and Ceratizit Bulgaria will not only be emblazoned on the scoreboards and tickets, but also directly on the players’ jerseys. “This way, all the fans in the stadium can see that we really feel to be part of the city and the region,” says Robert Schranzhofer. “We have seen that this campaign has already increased interest, which is also visible in the social media and has a very positive effect on the image of the two companies,” adds Georgi Petrov.



PROJECT DETAILS:

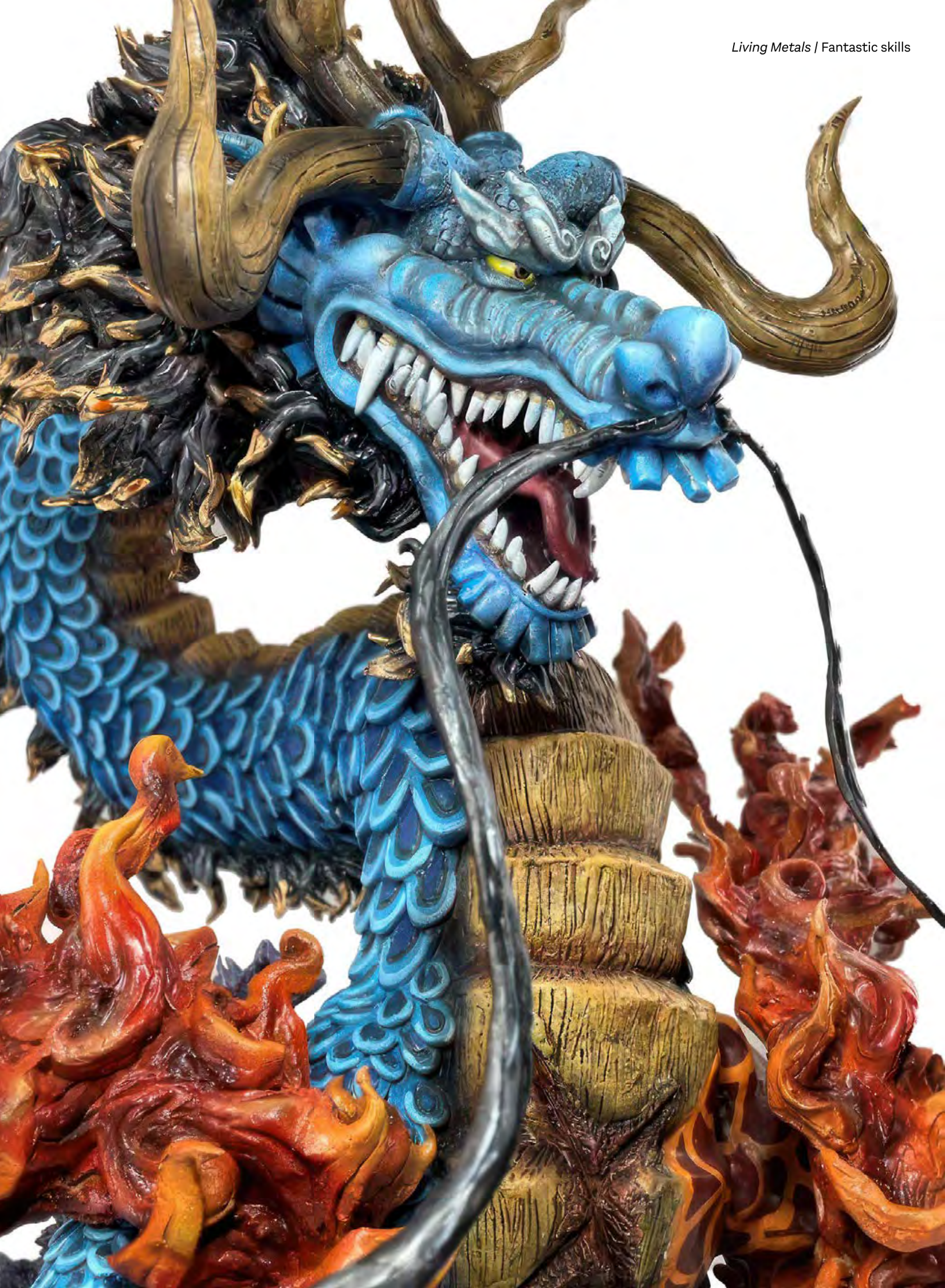
Logistics centre with canteen, 2 production halls with administration areas, energy centre, storage hall for automatic disposal of chips and recreation rooms

Gross floor area	Building height	Building depth
12,161 m^2	10 m	223 m
Gross volume (GV)	**Building width**	**Investment**
120,000 m^3	45 m	20 million €

Fantastic skills

Normally, Syota Suzuki works in the turning shop at Plansee Japan, where he manufactures products for the semiconductor industry. After work, however, he immerses himself in the fantastic world of *One Piece*, Japan's most successful manga series, and creates characters from the series out of plasticine, epoxy resin and papier-mâché. In 2022, he won a national prize for a dragon figure and received a personal letter of thanks from Eiichiro Oda, the creator and illustrator of *One Piece*.

He makes the two-dimensional three-dimensional: Syota Suzuki's detailed and artistic model figures almost bring the characters of his favourite manga series *One Piece* to life. With his version of the dragon Ssangyong, he won a relevant competition in Japan.



Mangas probably belong to Japan like sushi or crowded commuter trains. Comics have been delighting readers there for decades. Thanks to series like *Dragon Ball* or *Naruto* as well as numerous anime series, the characters also have numerous fans outside Japan. At the top of the list is the manga series *One Piece*, which has sold more than 450 million books worldwide. A very big *One Piece* fan is Syota Suzuki, whom we asked about his characters and his passion for this comic series.

How did the idea to create these figures come about?

Syota: Originally, I collected the *One Piece* figures that were available as toys and displayed them in my room. However, a few figurines of the supporting characters from the series were not available. So I thought to myself: If these figures are not available for purchase, then I'll just have to make them myself. In May 2021, I started modelling the figures out of plasticine. I specifically chose the figures that I believe will never be available for purchase.

Was it difficult to make the first figures?

Syota: Yes and no. Just one year after I started modelling, I created the Ssangyong dragon for which I received the prize. However, I also chose the dragon because it looks good and reptiles are rather easy to make.

What was the competition you participated in?

Syota: Since volume five of *One Piece*, there has been this competition where fans submit their creations related to the series. Eiichiro Oda, the creator and illustrator of *One Piece*, then selects the nominees that will eventually be published in the comics. A winner is then chosen from the nominees to receive the grand prize and an autograph card from Eiichiro Oda. I entered Ssangyong in the competition for volume 103. It was published there and I won the grand prize. It was also published again in volume 104.

How long did you work on Ssangyong?

Syota: I started modelling in early February and finished in mid-April. I didn't work on it every day though, but at my own pace whenever I felt like it. So it took about two months.

What materials do you work with?

Syota: I use different types of clay such as resin clays and epoxy resins. Resin clay has the advantage that you can work on it as often as you like. It only hardens when it is heated. However, the plasticine is quite expensive. That's why I only use it for detailed parts like faces and hands. For parts that can easily flake off, are particularly thin or need to be very strong, I use epoxy resins.

Do you limit yourself to One Piece figures?

Syota: Yes, I concentrate exclusively on *One Piece* figures. I also only buy *One Piece* figures to display in my showcases, along with my own figures.

There are now over 100 volumes in the series. Do you own them all?

Syota: Yes, I have all the volumes – and I have read them all.

What do you like about this manga series?

Syota: *One Piece* has been around for 25 years now. It's been my favourite manga since my school days. I can't really put my finger on what exactly I like about *One Piece* so much – it's just been part of my life for so long. It's so familiar to me. But the fact that I collect the *One Piece* characters makes the series very special to me. But I also like a lot of other manga and I could imagine making figures from other series at some point.

Off to new shores!

Working for the Plansee Group and living in Japan, the USA, Finland or at one of the more than 30 other sites – every year, the Plansee Group sends employees abroad as expatriates for a certain period of time. We met Maximilian Vater and Hendrik Hotz and talked to them about their expectations, experiences and challenges.

It’s cold here!

“It’s cold here,” says Maximilian Vater. The 33-year-old from the Allgäu region lives in Jyväskylä, pretty much in the middle of Finland at the site of Tikomet. At the weekend, he says, he went ice fishing. One of his special hobbies. In Finland you can still do it well until the end of March because the ice cover on the lakes is still very thick. Spring starts much later up there than in Germany or Austria.

The fact that Maximilian Vater is in Finland, however, is more of a compromise. Actually, he was supposed to go to the USA for several months a year. “There I was supposed to rebuild the Group Controlling team at Global Tungsten & Powders Corp (GTP),” he says. This was not so easy, however, as a private difficulty arose. “I was in Finland for a longer period of time before I started at Plansee. There I met my girlfriend, a Finn. When I was then offered the job at Plansee, we moved to Reutte together” – and now the German with the Finnish girlfriend, who lived in Austria, was supposed to go to the USA for several months every year. He didn’t like the idea that his girlfriend would be alone for four months in Austria, where she had no family. Then his supervisor came up with the saving idea: How would it be if he went to Tikomet in Finland and from there travelled to the USA several times a year? He would still be away for a few months a year, but his girlfriend would be close to her family. This plan appealed to Maximilian’s father and his girlfriend, so he moved from Reutte to Jyväskylä in May 2022.

On site, his current workplace proved to be very advantageous for the job at GTP. “Tikomet and GTP are active in comparable fields. Now, when colleagues from the USA describe a certain process to me, I can consult with colleagues at Tikomet to get a comparison of how it is done there. That often leads to useful insights.” But he also appreciates his colleagues at Tikomet. Since he speaks very little Finnish, it is natural for colleagues to talk in English in his presence and with him. “But there are also quite a few Finns who speak good German,” Maximilian adds. In general, he says, the Finns are an extremely friendly people who make it easy for newcomers to feel at home. In the meantime, he and his girlfriend have found a house that is situated in such a way that Maximilian can pursue his hobbies in the immediate vicinity: kayaking and ice fishing. “Finland is almost as big as Germany, but only has five and a half million inhabitants. So there is still a lot of wilderness here.” Maximilian therefore likes to go to the large national parks and enjoys the many opportunities in nature, such as wild camping, which is still allowed almost everywhere in Finland.

Everything but low-fat curd

The situation is quite different a good 18.5 hours' flight to the south-east. Around 23 million people live in the Shanghai metropolitan area. The city is known more for its smog than for its large green recreational areas. But that should not obscure the fact that the commercial metropolis in China's east has a lot to offer. To experience this, however, Hendrik Hotz had to wait quite a while at the beginning of 2022. The mechanical engineer with a doctorate spent two and a half months in quarantine in his hotel in Shanghai. The reason: the Corona lockdown. Two and a half months in a hotel room that he was initially not allowed to leave at all and later only within a few metres. "I made a daily plan for myself what I wanted to do so that being locked up wouldn't be so bad." This included lots of fitness, chatting with family and friends back home and, of course, work. When redemption finally came and he was allowed to leave the hotel, he immediately started looking for a place to live.

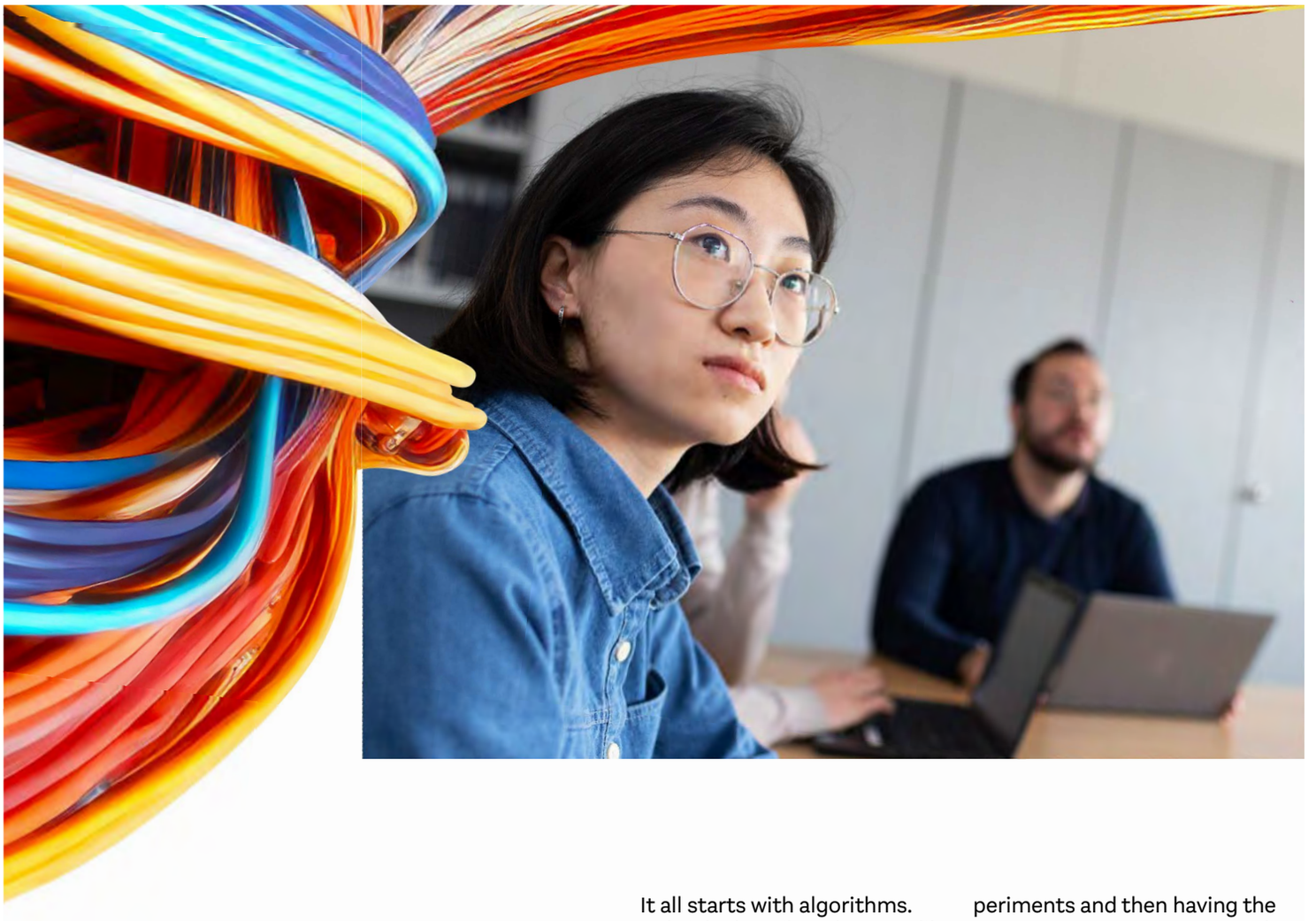
"I had already thought about roughly where I would like to live beforehand. My colleagues in Shanghai helped me a lot in the search. They told an estate agent what I had in mind, and he came back shortly afterwards with various offers." The second flat he looked at matched his wishes. In a nice neighbourhood and not too big. On the 42nd floor of a modern high-rise. "It's not so easy to find a small flat for just one person in Shanghai. Most flats are well over 100 square metres," says Hendrik Hotz. In general, he says, getting started at Plansee in Shanghai was quite easy. The employees he dealt with directly all spoke good English. If there are colleagues who don't speak English, they have to translate over two stations. Sometimes something can get "lost" in the process, but on the whole it works very well. On his holidays, Hendrik Hotz prefers to travel through China. He has already visited twelve provinces. Travelling went particularly well after the end of the lockdown, he says, because

The Plansee site in Shanghai. Since the end of the weeks-long hotel room quarantine imposed by the authorities during the pandemic, Hendrik Hotz considers himself luckier than ever to be here.

many Chinese were still sceptical and held back on travelling. This allowed him to enjoy destinations that are normally overrun with tourists. On weekends, he usually goes to the city centre. This works very well with taxis and public transport. The metro is especially good for this, because it only costs the equivalent of one euro each way, no matter where you go. There he goes out to eat with his Chinese girlfriend. Even after a year, he still appreciates the food there very much.“ Although it’s often very greasy and contains a lot of sugar, more and more Chinese are also paying attention to their health and so there are more and more healthy alternatives.” Does he miss anything in Shanghai? Sometimes the mountains and the fresh air in Reutte, as well as the clear water, and of course, the bread. But basically you can get almost everything you want in Shanghai. Really everything? Everything except low-fat curd cheese.

Intelligent help

Artificial intelligence – what was long considered a vision of the future has now become a reality for the broad market. But away from the headlines, many companies have long been looking at the possibilities of artificial intelligence – including the Plansee Group. In Mamer, Luxembourg, Gabriele Pozzetti and his team of six have been tasked with exploring and harnessing this field. But what exactly is AI? We asked Gabriele Pozzetti, an engineer from Bergamo in northern Italy who joined Ceratizit in 2018.



It all starts with algorithms.

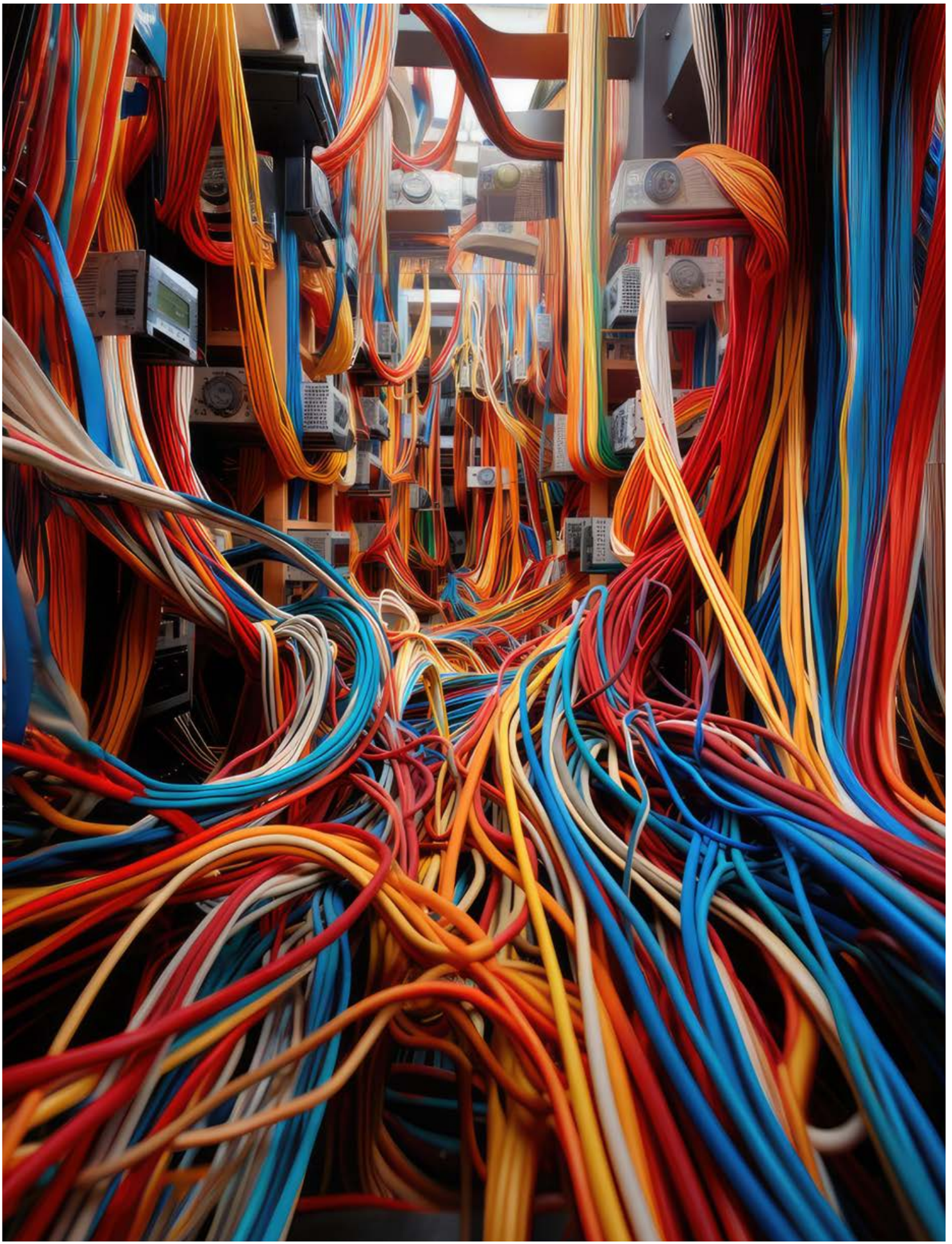
It all starts with algorithms. Gabriele describes them as diligent students who can learn new things from data. "So far, Plansee has managed to master the complex physics of powder metallurgy by trying out new processes, in practical experiments," Gabriele explains. "By feeding the computers with the data we have gathered from the processes and experimentations, we have now developed complex algorithms that we can use to add value for our customers. In the past, when a process change occurred, we always needed to follow up with new, expensive experiments again, whereas with AI, the idea is that you only need data directly from production." With AI, he says, it is now possible to shorten the adaptation of production processes. In theory, it works quite simply. Instead of obtaining data through experiments and then having the computer process it, you teach the computer the whole process itself. It sounds easy, but it's not. To make it work, you first need a lot of data. "Put simply, you feed the AI with so much data that it recognises the pattern behind it, that is, it understands the process. If it does, you can use the algorithm to perform very useful tasks. Among other things, this can lead to material savings without affecting the stability of the product. The algorithm can then calculate on its own – without having to make several prototypes first – how much saving is possible."

"A practical example: it is a great advantage for any company to know before production whether a product will be defective or not. For example, an assistant was developed for the production of ready-to-

“Training” the algorithm, however, is a complex task.

press tungsten powders that can predict the quality of a batch based on its composition before spray drying. The advantage: with every faulty batch that can be detected before production starts, a tonne of material can be saved.”

However, “training” an algorithm is a complex task. In addition to extensive data collection, the employees must be prepared to accompany the process with a lot of patience. “But as soon as they notice how well the algorithm can support them in their work later on, many colleagues are happy to participate.” One example of this is a project at the Ceratizit plant in Empfingen. “We are currently working on teaching algorithms how to predict the deformation of a workpiece during sintering. This was only possible with a lot of help from the team, because large amounts of data had to be digitised for this, which previously only existed on paper.”



Gabriele’s goal is to create such tools for several locations and perhaps one day develop a tool that can also be sold to customers for their processes.

The advantage of software solutions, after all, is that once they are developed, they can be scaled up much more easily. Thus, a successful product can later be used elsewhere at a fraction of the cost. An example from the controlling department shows how well this works. There, the task was to create an automatic sales preview. “We quickly realised that many forecasting activities take place in different parts of the Plansee Group.” These previews are created by highly qualified analysts. Very different models are used. It is a very labour-intensive process that has to be repeated month after month. “We thought it would be much better to have a common platform that knows these different forecasts and automatically generates forecasts for different activities based on the data stored and the different models, using the most suitable forecast model in each case. This simplifies the life of the analysts, who can now rely on a powerful digital assistant for process activity, allowing them to focus more on extraordinary events.” But that is not the end of the tool, he said. It can continue to learn. Gabriele believes it can one day become a very powerful tool for previewing product life cycles, incoming orders and other forecasts in general.

Gabriele’s goal is to create such tools for multiple sites and perhaps one day develop a tool that can also be sold to customers for their processes. But until that happens, a lot of data has to be harvested first. And that can only be done together, or as Gabriele underlines it: “We learn every day that the key to success is to conceive these tools together. My team has shown a remarkable proficiency in developing technically exceptional tools, but none of this would have been possible without our great colleagues in the field.”

When Sindbad sails into the mountains

Reutte is the main town in the Tyrolean Außerfern region. A municipality with fewer than 7,000 inhabitants, surrounded by mountains, equally popular with winter and summer tourists. A piece of idyll in Tyrol, far away from the hustle and bustle of the large metropolises of Munich or Vienna. And yet Reutte shares a challenge with these big cities: here, as well as in the neighbouring communities, more and more young people are leaving school without having completed their education. In Austria, the figure is as high as 25 percent. A frighteningly high number.

Karlheinz Wex, Chairman of the Executive Board of the Plansee Group, has been dealing with this topic for quite a while, as the Reutte/Breitenwang site in particular relies on young people from the region applying for one of the numerous apprenticeship positions every year. “Unfortunately, however, we had to turn down many of the applicants because they did not have the required qualifications,” explains Karlheinz Wex. But how could this development be counteracted? Especially in rural areas, where there are traditionally few offers to support or encourage young people? When Karlheinz Wex heard about the social business Sindbad, his interest was aroused. Sindbad’s mentoring programme offered a good approach to support young people on their path towards educational or vocational training.

Sindbad, on the other hand, had so far focused on urban centres in Austria such as Vienna, Graz, Salzburg, Innsbruck or Linz. In rural areas, both the experience and the infrastructure were lacking. Nevertheless, it was quickly agreed to start a pilot project. Five mentees who were in their last year of compulsory schooling in Reutte were each to be assigned a mentor who would accompany them for a year. The mentors were sought among the more than 2,500 employees of the Plansee Group at the Reutte/ Breitenwang site. The response from the employees far exceeded expectations. In the end, mentors were selected from various company departments, from plant safety to manufacturing and product development.

Kathrin Schreieck is a machining technician at Plansee. She passed her school-leaving exams with the emotional support of those around her. At Sindbad, she is exactly the mentor for young people like Alexis that she herself would have liked to have – an understanding adult companion.

Mentors and mentees got to know each other at a one-and-a-half-day kick-off meeting before the actual start of the programme.

One of the mentors is Kathrin Schreieck. The machining technician first came to Plansee as a temporary worker after completing her school-leaving exam at the local high school, before starting her apprenticeship. “At the time, I had no idea at all what I wanted to do,” says the now 29-year-old. “The reason I went to school until I graduated was because those around me encouraged me that I could do it. And then I made it, but didn’t know what to do next.” This experience motivated Kathrin to come forward when she heard about the Sindbad programme. “At the time, I wished I had had a mentor to guide me through the different options.” Now she takes on that role herself for her mentee Alexis. Is there anything she is afraid of in her role as mentor? Kathrin thinks for a moment and then tells us that she definitely doesn’t want to push her mentee in a certain direction.

Mentor and mentee meet at least once a month. The meeting place is always different: in a café, at Kathrin’s home, at the Plansee site in Reutte and at Lebenshilfe. Alexis goes to a secondary school in Reutte. “My mother comes from the catering industry,” she says, “but she advised me to look for a job that I could do in the office.” But Alexis had no idea at first what exactly that should be. So Kathrin started to show Alexis some “office jobs” at Plansee: “We were in the HR department, with a departmental assistant and in purchasing. Everywhere, colleagues showed us their jobs, told us what was fun and what was perhaps sometimes annoying. In any case, we got a good insight into all areas.

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So? “None of it was for me!” says Alexis with a laugh. “Sitting in front of the computer all day like that. No, I don’t want that.” Was that a setback? “No, not at all,” Kathrin explains. They finally came to what really interested Alexis via a completely different path. Since early childhood, Alexis has had to overcome some health challenges. So, for personal reasons, she came to deal intensively with issues around health and nutrition. “Then one day I asked her directly if that wouldn’t be something for her,” Kathrin says, “so something like a nutritionist.” And that was it. “That’s exactly my subject,” Alexis delightedly explains. So they had an insightful meeting with a nutrition specialist. Then the two of them set about finding out what training options were available for this profession. It quickly became clear that the school-leaving exam would be necessary. Highly motivated, Alexis therefore applied to the Höhere Bundeslehranstalt für wirtschaftliche Berufe (HLW), a secondary school for economic professions, in Reutte – with success.

And is she happy about this decision? “Definitely,” replies the pupil. She also feels a little queasy because she struggles with learning, but the feeling of having found the right thing motivates her a lot, she says. And Kathrin? She is glad that Alexis has found out for herself what she would like to do.

In addition to the regular meetings, Sindbad supports the teams of mentors and mentees with supervision as well as communication and application training. The hope is that this programme will set a precedent in the Außerfern region. “It would be wonderful if other companies in the region were to participate in the future,” says Karlheinz Wex. Because there are still far too many pupils who leave school without a diploma every year.

Walking the path together

The social business Sindbad was founded in 2016. The concept of Sindbad is based on the idea of counteracting the social problem of youth unemployment and disorientation of young people after compulsory schooling, especially after the New Middle School and the Polytechnic School, through interpersonal relationships. The concept provides for a mentoring programme for young people. The mentors are between 20 and 35 years old and are already in professional life. They therefore have a practical view and accompany the young people on their way to an apprenticeship or to secondary school. Working together, the mentors deepen their social skills and assume social responsibility. In addition, mentors have the opportunity to complete social leadership coaching. Sindbad is financed by private donations, public support and partnerships with private companies. So far, Sindbad has been able to support over 2,600 students in choosing their further school and educational path.

Sustainably beautiful

When you see the building from the outside, you might think it is a new hotel at first glance. A beautifully designed wooden facade, large windows reflecting the surrounding mountain landscape and lots of greenery around it. But what at first appears to be a wellness resort actually has a different function: it is a production facility for Ceratizit. Under the wooden ceiling that stretches across the room, machines stand and employees hurry about. The facility in Kreckelmoos is the Plansee Group's newest production facility and also the most innovative in its construction. Sustainability, energy efficiency and environmental compatibility were the focus of the planning.

The construction of energy-efficient production buildings like the one in Kreckelmoos supports the Plansee Group's path to sustainably reduce the company's carbon footprint (CCF). This in turn also reduces the Product Carbon Footprint (PCF) of Plansee and Ceratizit products. The PCF indicates the amount of greenhouse gases emitted during the production of a product or per kilogram of product. Ceratizit was the first company in the industry to present a model for calculating and classifying the PCF of its carbide products. However, the model for the calculation was developed for both companies. Ceratizit wants to encourage customers, partners and other companies to adopt the newly developed standard – for more transparency within the industry. For Ceratizit and Plansee, the calculation of the PCF includes all processes from the extraction of the raw materials, the production of the semi-finished products/ blanks and the finished product, and the transport of the raw materials and intermediate products up to the point where the product leaves the company (cradle-to-gate). In this way, Plansee HPM continues to strengthen its position as an innovation and development partner for its customers in this area, and Ceratizit moves closer to its goal of being an industry pioneer in sustainability.

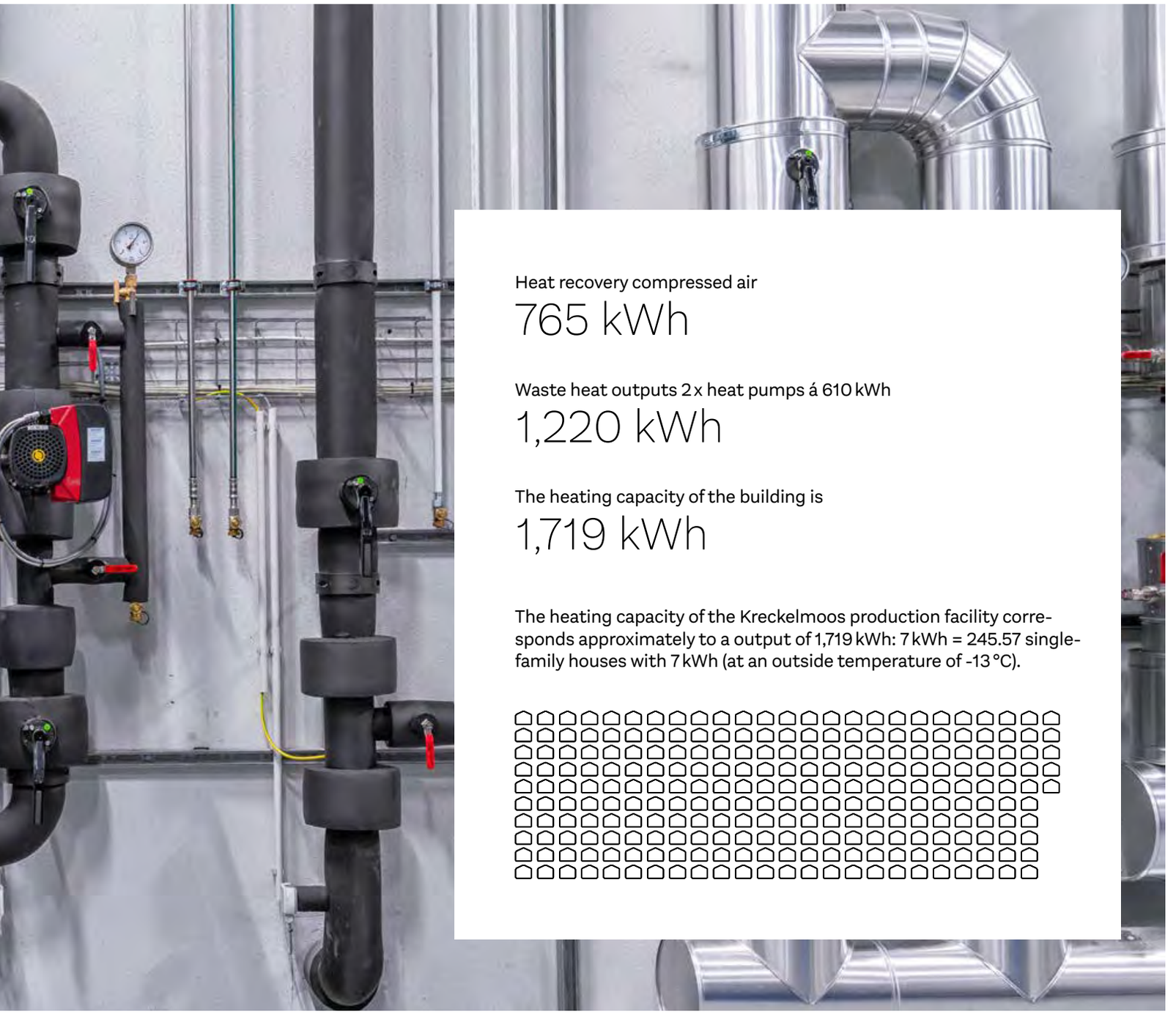
History

The story of the new building began a good six years ago under the premise of growing even further at the location in Reutte. But where? After an intensive search, a suitable building site was found on the B179 on a former landfill site. The Breitenwang neighbourhood of Kreckelmoos is only one kilometre away from the main site in Reutte and is connected to it by a byroad. The planning and concept phase was followed by the tendering process and finally the start of construction in 2019, when the first diggers rolled in. *ATP architekten ingenieure* realised the production facility in Kreckelmoos with primarily regional partners from Tyrol. The moving-in process began in January 2023 and is expected to continue until the second half of 2024. Ceratizit produces carbide tools at the Kreckelmoos plant. Plansee produces coating materials for displays, electrodes for glass melting and components for the semiconductor industry and medical technology. The machinery is complemented by state-of-the-art automation solutions.

Cooling

Cooling for the building is provided by the open, canalised Breitenwang watercourse “Ritsche,” underground slope water in pipelines and primarily by two heat pumps in the basement, which were installed in a specially designed machine room. In order to prevent an artificial backwater of groundwater and slope water and to collect and drain the accumulating water, drainage pipes were installed under the foundation during the construction of Kreckelmoos. The water is taken from the two water sources for thermal use and then discharged back into the Ritsche. The remaining drainage water is discharged into a nearby biotope, thus revitalising it. From spring to late summer, the building is largely cooled directly through the thermal use of the two water sources. In the winter months, the required machine cooling is generated via the heat pumps and at the same time the waste heat is used for heating.

Heat pumps draw energy from the air, the ground or water and make the heat gained from it usable for heating. The principle is similar to that of a refrigerator. It extracts heat from its interior and conducts it outside to cool the interior. The heat pump reverses this principle. Like the refrigerator, however, a heat pump can also function as an air conditioner. In Kreckelmoos, the Plansee Group uses both functions.



Heat recovery compressed air

765 kWh

Waste heat outputs 2 x heat pumps á 610 kWh

1,220 kWh

The heating capacity of the building is

1,719 kWh

The heating capacity of the Kreckelmoos production facility corresponds approximately to a output of 1,719 kWh: 7 kWh = 245.57 single-family houses with 7 kWh (at an outside temperature of -13 °C).

Heating

The three-storey building, which is about the size of two football fields, is heated by heat pumps, the use of waste heat from the air compressors and heat recovery when cooling the cooling lubricants. In the latter process, the cooling lubricant is cooled and the waste heat generated in the process is raised to a higher temperature level by the heat pumps and used for heating. Any excess waste heat is dissipated back into the ambient air. The heat pumps are supplied with electricity via a photovoltaic system on the roof. If the power supply from the photovoltaic system is insufficient, the heat pumps are operated via the electricity grid. This means that the new building generates 100 percent self-sufficient heating and cooling energy under optimal conditions. This means that heating and cooling is practically possible without fossil fuels. In the production halls, ventilation, recirculation units on the ceiling and freely suspended induction diffusers ensure the optimal indoor climate.

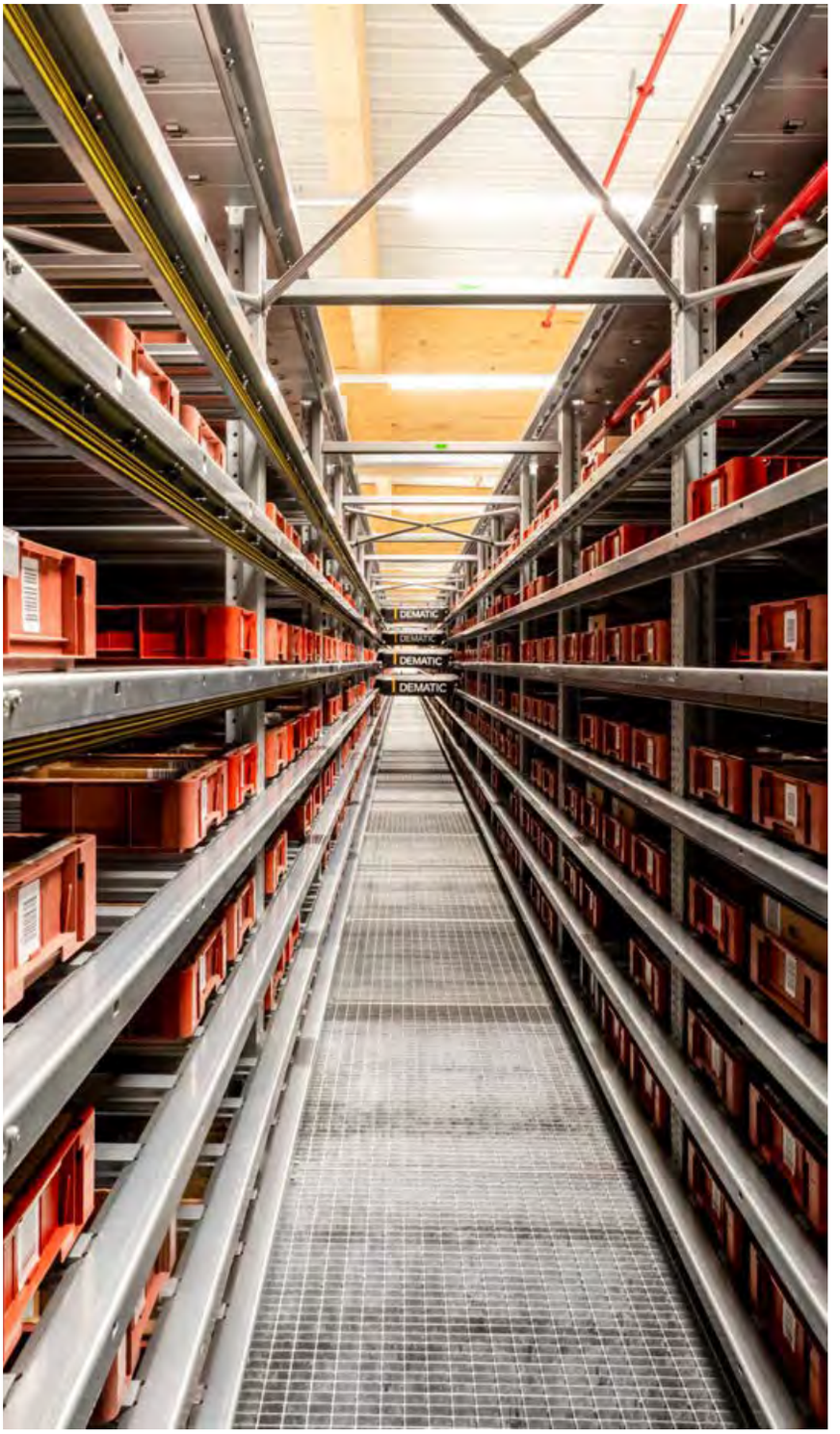
Green roof

In addition to the exterior greening with hardy native plants, the roof of the production facility was also the focus of revitalisation measures. It is greened over an area of 15,000 square metres. The advantage: the greenery on the roof helps to improve the microclimate because it lowers the ambient temperature and thus prevents the formation of heat islands. This ensures an ideal indoor climate inside, so that less energy is needed for air conditioning. Secondly, the green roof serves as a natural protection against precipitation, which leads to a longer service life of the roof sealing and thus to a reduction in maintenance and repair costs. In addition, the vegetation is a natural retention filter in case of precipitation: In case of heavy rainfall, the water is retained by the plants and the special roof structure and is discharged to the roof drainage system with a delay. This relieves the public rainwater drainage system and prevents flooding.

Pretty fast!

Today's Ceratizit Business Services GmbH was founded in 2002. Due to the strong growth of the Ceratizit Group, a new 17,000-square-metre-large logistics centre was opened in Kempten in September 2021. In terms of energy efficiency, this centre meets the highest standards. The energy demand is almost exclusively covered by solar energy. The logistics centre is the most modern in the industry worldwide. The goods are transported exclusively by renowned transport companies that can prove their carbon footprint and implement measures to reduce it.

Dematic Multishuttle warehouse

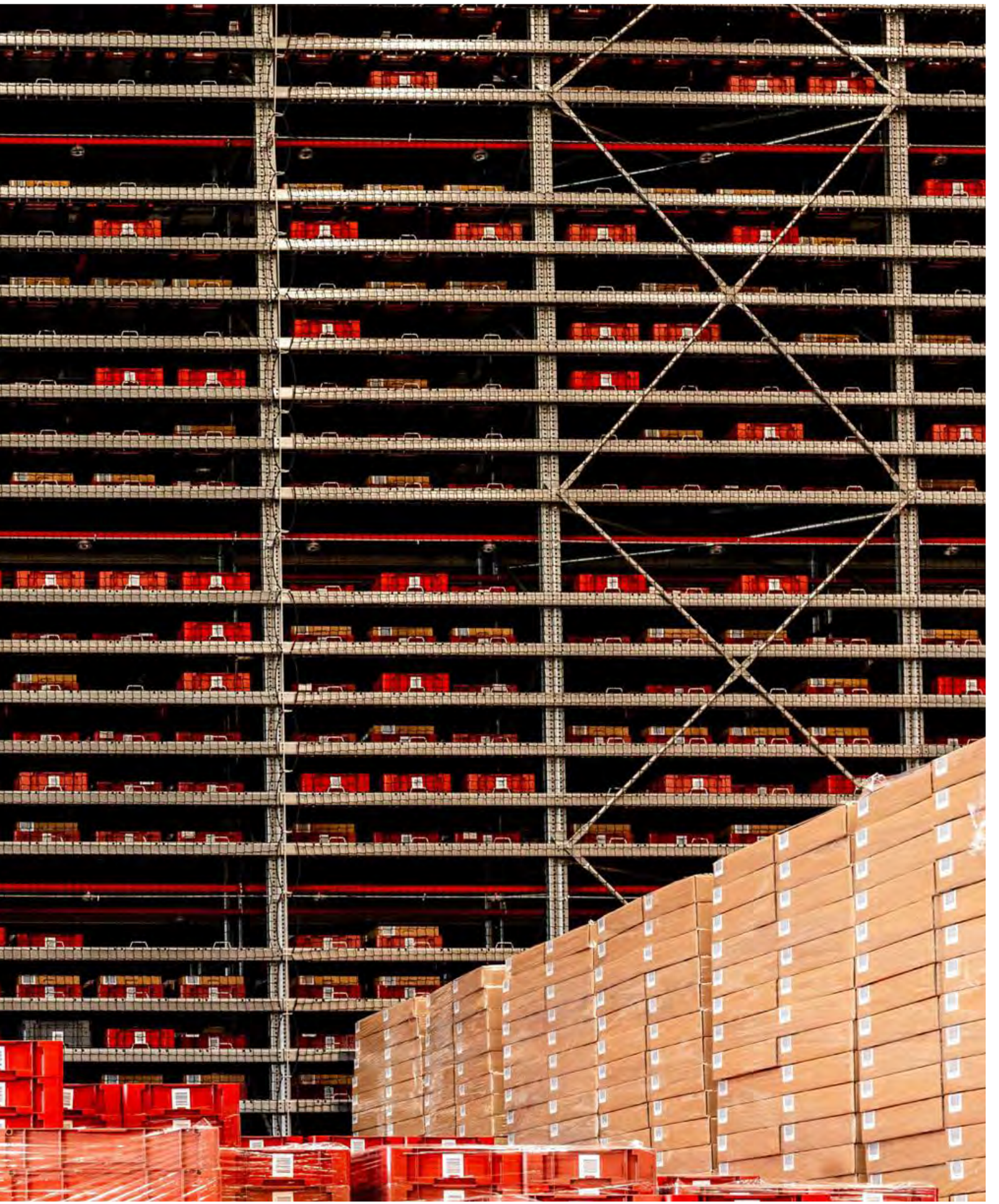


90,000

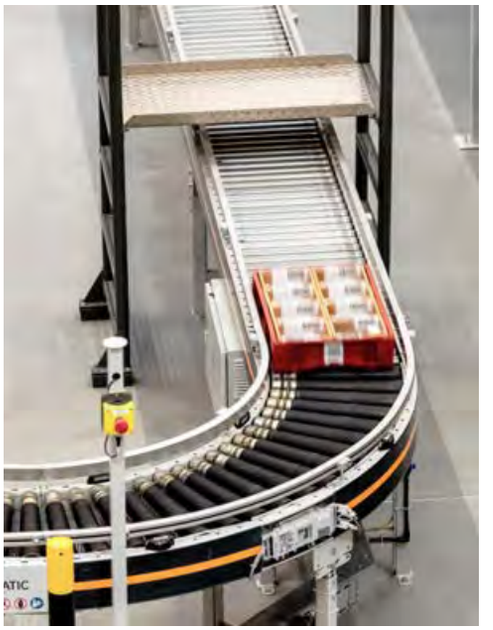
container in the shuttle warehouse

17,000

square metre area with
max. 14 m height

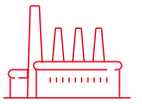



CERATIZIT



74

countries to which exports are made



> 80,000

customers

125

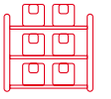
employees

ø 1,000

order value

90 million

own warehouse stock



40,000

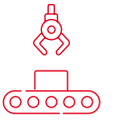
storage locations

ø 11,000,–

withdrawals per day

7

high-performance order picking stations (mainly machining products)



5

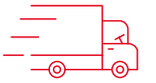
heavy goods picking stations (hard metal rods as well as wood and rock products)

30 million

in consignment stocks

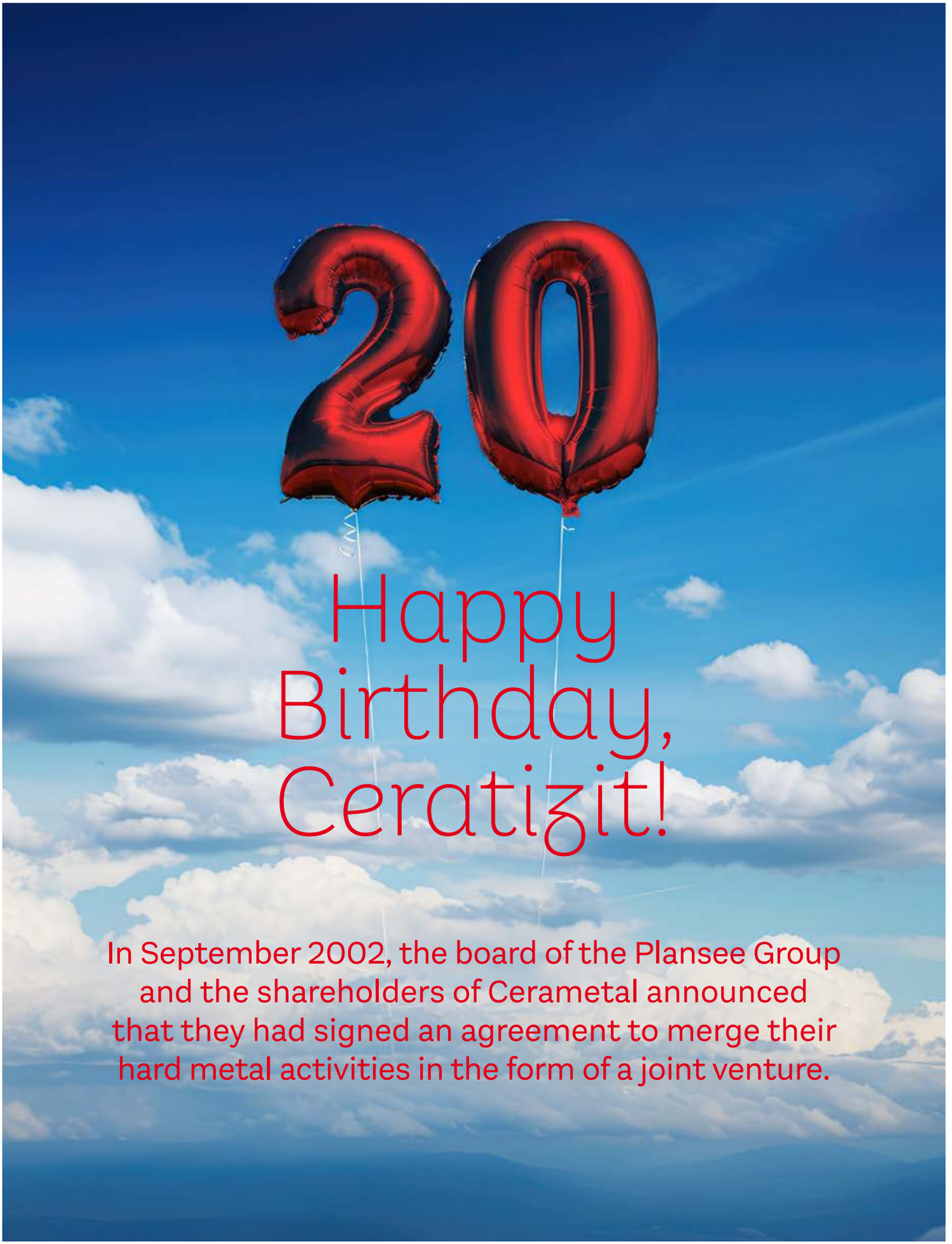
ø 23,000

total weight of outgoing shipments



ø 4,000

deliveries per day



Happy Birthday, Ceratizit!

In September 2002, the board of the Plansee Group and the shareholders of Cerametal announced that they had signed an agreement to merge their hard metal activities in the form of a joint venture.

On 29 November 2002, the Ceratizit brand was born. In autumn 2022, on its 20th birthday, the group celebrated this success story.

Two competitors growing together

They appreciated each other as competitors and knew each other's strengths, says Karlheinz Wex, Chairman of the Executive Board of Plansee Group. Plansee Tizit and Cerametal were no strangers before their merger. However, it almost never happened. In 1996, a devastating fire destroyed the entire carbide sintering plant in Reutte as well as adjacent production areas and offices. In this difficult hour, Cerametal came to rescue Plansee Tizit. Thanks to this support, the hard metal business in Reutte had a future. "The Lanners and Schwarzkopf families had known each other for more than 50 years. I think that if Cerametal had had this major fire or another problem, Plansee Tizit would certainly have helped too," says Luca Picco, former Engineering Manager at Ceratizit for Hard Material Solutions.

Cooperation in times of need eventually turned into talks about a merger. Thierry Wolter, a member of Ceratizit's Executive Board, recalls: "When Schwarzkopf came and proposed a cooperation, we said either we work very closely together or we continue to compete." In the course of the merger and thanks to the form of the joint venture, a lively exchange began between the former competitors. The aim was to bring in the competences of both sides in the best possible way to create the conditions for growth and market strength. "There was an attempt to intertwine the two companies in the best possible way. I believe that this was the decisive reason why the merger worked so well," summarises Andreas Lackner, Spokesman of the Executive Board of Ceratizit. Today, the Plansee Group holds a majority stake in Ceratizit S.A.

Ambitious roadmap

In 2002, Ceratizit had a turnover of 400 million euros and employed 3,500 people. Over the past 20 years, these figures have grown to over 1.5 billion euros in turnover and more than 7,000 employees. 20 years in which what was once a medium-sized company has become a global player in the hard metal market that is well on its way to catching up with the biggest in this market. "I am very proud to be able to work in this company, and I am also very proud of my team and what we have achieved together. So I am not afraid of the next 20 years," says Peter Fink, Director of Global Operations for Branded Products.

"We have strengthened our position in solid carbide tools, gradually expanded our product range with cutting tools to become a full-range supplier, and built up a seamless self-supply of our most important raw material, tungsten," says Andreas Lackner about the milestones of the company's development over the past two decades.

In 2022, Ceratizit also set the course to become the most sustainable carbide company in the market and to achieve "Net Zero" by 2040. The ambitious roadmap on the way to accomplishing this goal is to become climate-neutral by 2025 and to reduce CO_2 emissions by 35 % compared to the base year 2020. In addition, Ceratizit will increase the share of raw materials remaining in the carbide production chain to over 95 percent by 2030.

Adaptable, sustainable & future-proof

The Plansee Group looks back on the past fiscal year with a 17 percent increase in sales: Despite difficult conditions, the Group was able to fully play to its strengths in all markets – thanks to the commitment of its employees and the high adaptability of the organisation.

Karlheinz Wex,
Chairman of the Executive Board of the Plansee Group, summarises how the focus on its core competencies strengthens the company and what goals the group-wide sustainability strategy pursues.

How did the Plansee Group perform last year?

In terms of sales volume, we have more or less maintained the level of the previous year. However, our product mix has shifted – we have produced and sold more products with higher added value, especially in the semiconductor industry and medical technology. Our goal must continue to be to increase the share of new products in our turnover, because these new products keep us stable even in difficult conditions. In doing so, we also want to operate in our core areas in the future.

Do these core areas offer sufficient scope to continue to grow profitably in the future?

Our core competences are the knowledge of our materials molybdenum and tungsten and our extensive application knowledge. When a customer comes to us with a topic, we put all our knowledge and ambition into finding a solution and thus opening up a new application for our materials. This focus has made us successful in recent years, not least in EUV technology for semiconductor manufacturing. We are always finding new applications for our materials and still have great growth potential in markets in regions that have been rather underrepresented so far.

Does this logic also apply to last year's acquisitions – the companies AgriCarb and MiTech?

Yes, absolutely. Both companies are an excellent strategic fit for us. With MiTech, we are strengthening our market position in North America for tungsten composites, especially in the energy, mechanical engineering and aerospace markets. We want to further expand our presence and position here – not only in sales, but also in production.

With AgriCarb we are opening up a new market segment with wear products for agricultural soil cultivation. A very interesting business with growth potential. AgriCarb products and tools are reinforced with components made of tungsten carbide and thus achieve a longer service life than conventional products made of steel. And due to increasing restrictions on the use of herbicides in agriculture, the mechanical removal of weeds is moving into the focus of farmers. AgriCarb offers convincing and sustainable solutions for this.

What developments do you see in the markets worldwide and how does the Plansee Group have to adapt to them?

Our markets outside the EU are growing faster than in the EU. This trend will continue. Therefore, we need to expand our presence more where there is growth, in sales and production. The long-term trends show that Europe's competitiveness is declining. We have to adjust to this in order to continue to be successful. China's economy has lost momentum due to the Corona measures, but we expect the momentum to return once the measures are lifted and our share of sales to increase again.

Geopolitical conflicts, local protectionism, inflation – the world is full of uncertainties. What are you doing to build Plansee Group's adaptability and resilience?

We are a company with a global footprint – and are therefore also exposed to all global risks. Will globalisation reverse, and if so, how far? How far will markets decouple? We are dealing very intensively with these questions and developing scenarios for our production and logistics network. Manufacturing products for the whole world in one place is efficient, but it can also be risky in view of growing trade barriers and customs barriers. We need to find a balance between focus and local value creation in individual regions.

Raw material prices are currently fluctuating at a high level and input prices for energy, auxiliary and operating materials and other external services have risen sharply. How is the Group dealing with this? How successful is it with this?

Our supply of the essential raw materials molybdenum, tungsten and cobalt is largely secured – also due to high recycling rates for tungsten and cobalt. We have learned to live with the sometimes strong price fluctuations on the raw material markets.

What we are currently very concerned about are the high energy costs in Europe, especially compared to the USA, and the high inflation in the EU and the USA, which is not happening in China, for example. The question arises again and again where and for how long we can produce our products competitively in view of these general conditions.

What are the Group's goals for developing its production network? And what were the measures taken last year?

To make our production network more resilient, we need to focus, specialise and have a regional presence. Last year we closed the sites in Los Angeles, USA and Liezen, Austria and partly relocated them to Reutte, Austria and Querétaro, Mexico.

We also sold Ceraspin, a company specialising in ceramic materials, a marginal activity that lies outside our materials universe. We are convinced that Ceraspin can be more successful with a new owner – in line with the "best owner" principle.

In addition, the materials database Matmatch was discontinued. Did similar motives play a role here?

Our materials database Matmatch was very successful. With around one million users, it had a large community that greatly appreciated the functions. Unfortunately, the economic success did not materialise. That's why we decided not to continue operating the database. However, we are committed to finding a future for the database in the academic environment.

"Our approach is definitely not to become CO_2-neutral as quickly as possible by buying certificates. That is not sustainable from my point of view."

The Plansee Group has defined its sustainability strategy in four materiality fields. What is the status of the concrete setting of goals and formulation of measures?

The first and most important step in our sustainability programme is to create transparency. To show what we are doing and where we stand, we need clear and meaningful key figures. These are currently being defined. We will link these figures to concrete goals and measures.

Fortunately, compared to other companies, we do not have to develop new core technologies to achieve our climate goals. For the processing of our raw materials, we mainly need electricity and hydrogen. So the decisive lever is to obtain energy from renewable sources. Then we have already achieved a lot in scope 1 and 2.

Nevertheless – the path to climate neutrality is a great challenge and requires the commitment of the entire organisation. Our declared goal here is to do our homework. That means reducing our carbon footprint as much as possible through our own efforts. Every little saving helps. Our path is definitely not to become CO_2-neutral as quickly as possible by buying certificates. In my view, that is not sustainable.

Apart from that, sustainability has traditionally been an important element of our corporate strategy, even if it was not called that for the longest time of our more than 100-year success story. Operational excellence is an important driver for us. We are an energy-intensive company and our raw materials are expensive. Therefore, we have to be careful with our resources.

Where is the path heading in the area of technology and product innovation?

We are constantly driven by product development: Our approach is to develop products with the smallest possible CO_2 footprint that are also recyclable. Our innovations are designed to help customers reduce their carbon footprint in their process.

There is certainly great potential for optimisation in the area of material and resource efficiency in production.

Hydrogen is a big issue in our production. We have set the course for producing hydrogen in the future via electrolysis from electricity from renewable sources. Up to now, we have produced it via steam reforming from natural gas. The prerequisite for this is that sufficient electricity from renewable sources is available – only then is the production of hydrogen using electrolysis sustainable. This path is much more expensive, but irreversible.

"Education and training are essential for me. Only education creates prosperity. That applies worldwide."

Chairman of the Executive Board of the Plansee Group Karlheinz Wex is responsible for the Holding functions (Communication, Business Development, Internal Audit, Information and Corporate Security) of the Plansee Group and is also responsible for Strategy and Leadership Development. Karlheinz Wex has been with the company for 32 years. He was CFO of Plansee Holding AG and additionally on the Executive Board of Ceratizit for three years. From 2021 to 2023, he was Spokesman of the Executive Board of Plansee Holding AG.

Our tungsten recycling is constantly being expanded. Scrap is collected and processed. Currently, 70 to 80 percent of our products are made from recycled material. Some customers already insist on products made from 100 percent recycled tungsten. We make this possible too – at the same quality level.

With regard to the electrolyser: the production of hydrogen from electricity was common practice in Reutte until 20 years ago. For various reasons, it was then switched to gas. How do the two processes differ in terms of their CO_2 balance?

Steam reforming produces ten kilogrammes of CO_2 per kilogramme of hydrogen produced. Emissions are significantly reduced when using an electrolyser that runs on electricity from renewable sources. With several million cubic metres of hydrogen we need per year, that's a huge CO_2 saving.

How do you plan to develop environmental and social responsibility in the supply chain?

In the case of tungsten and cobalt as so-called conflict materials, our responsibility is particularly great to obtain these materials from reliable sources. In the molybdenum supply, we essentially rely on Molymet as a long-standing and absolutely reputable supplier. Now we have to go even further and look at the supply chains for other primary materials. In doing so, we rely on a careful selection of suppliers and long-term partnership relationships that are geared towards sustainability and future viability.

The fourth pillar is employer branding, that is, the goal of being the employer of choice for employees. What adjustments are being made here?

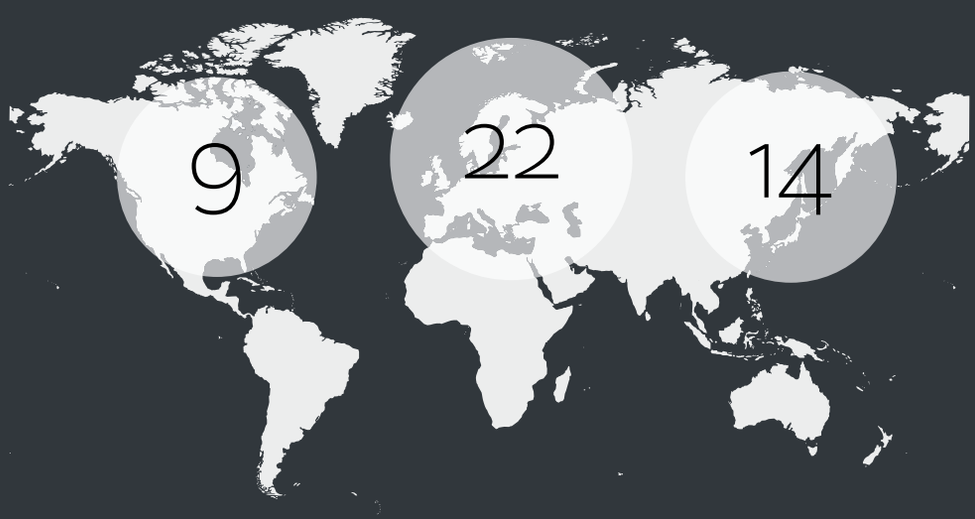
We are a very attractive employer. Many long-term employees who have been with the company for many years and a low fluctuation rate are indicators that we are doing many things right. We need to make this more transparent through key figures, across all locations. We also need to work on our external image. So far, we have been a rather introverted company. We have to go more out into the public and tell what distinguishes us from other employers. And we have to think about which actions and measures are in line with the times in order to offer existing employees long-term perspectives in the company.

Education and training are essential for me. Only education creates prosperity. This is true all over the world. We are already doing a lot here and want to do even more to offer our employees, but also the people at the sites where we are active, up-to-date training and further education opportunities and thus open up chances.

Plansee Group

Numbers / Data / Facts

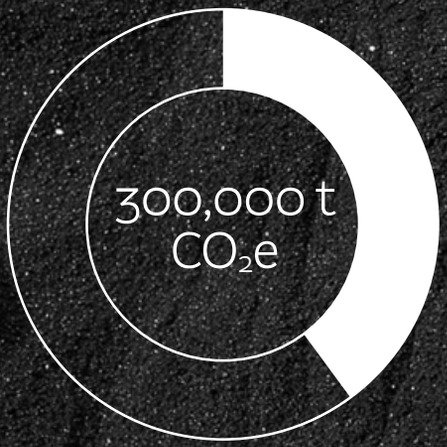
Consolidated figures per financial year 2022/23



Worldwide	(North & South) America	Europe	Asia
45 production sites	9 production sites	22 production sites	14 production sites
11,445 employees	1,125 employees	7,672 employees	2,648 employees
Turnover in billion euros: 2.35	24 %	56 %	20 %

share of turnover with new products less than 5 years old

Products are considered new if they are five years old or younger. In total, the Plansee Group has spent 85 million euros on the development of new products. The share of turnover with new products is 30 %.



CO_2 footprint in the fiscal year 2022/23 (Scope 1, 2, 3)

of which 100,000 tonnes in Scope 1 & 2

The focus of the sustainability programme is on reducing the carbon footprint. In the base year 2020/21, this is 320,000 tonnes of CO_2e in Scope 1, 2 and 3. 130,000 tonnes of CO_2e are attributable to Scope 1 and 2.

Scope 1 covers all direct greenhouse gas emissions of the company, e.g., from the production of hydrogen from natural gas.

Scope 2 covers all indirect emissions resulting from the purchase of energy, e.g., electricity and gas.

Scope 3 covers indirect greenhouse gas emissions that arise, for example, from the production of purchased raw materials and input materials or from the transport of goods or through the transport of goods.

254

million euros
investment & innovation

The Plansee Group has invested heavily. Expenditure on buildings, facilities and innovations amounted to 254 million euros.

investment

innovation

Rolling it out

to take off again straight away

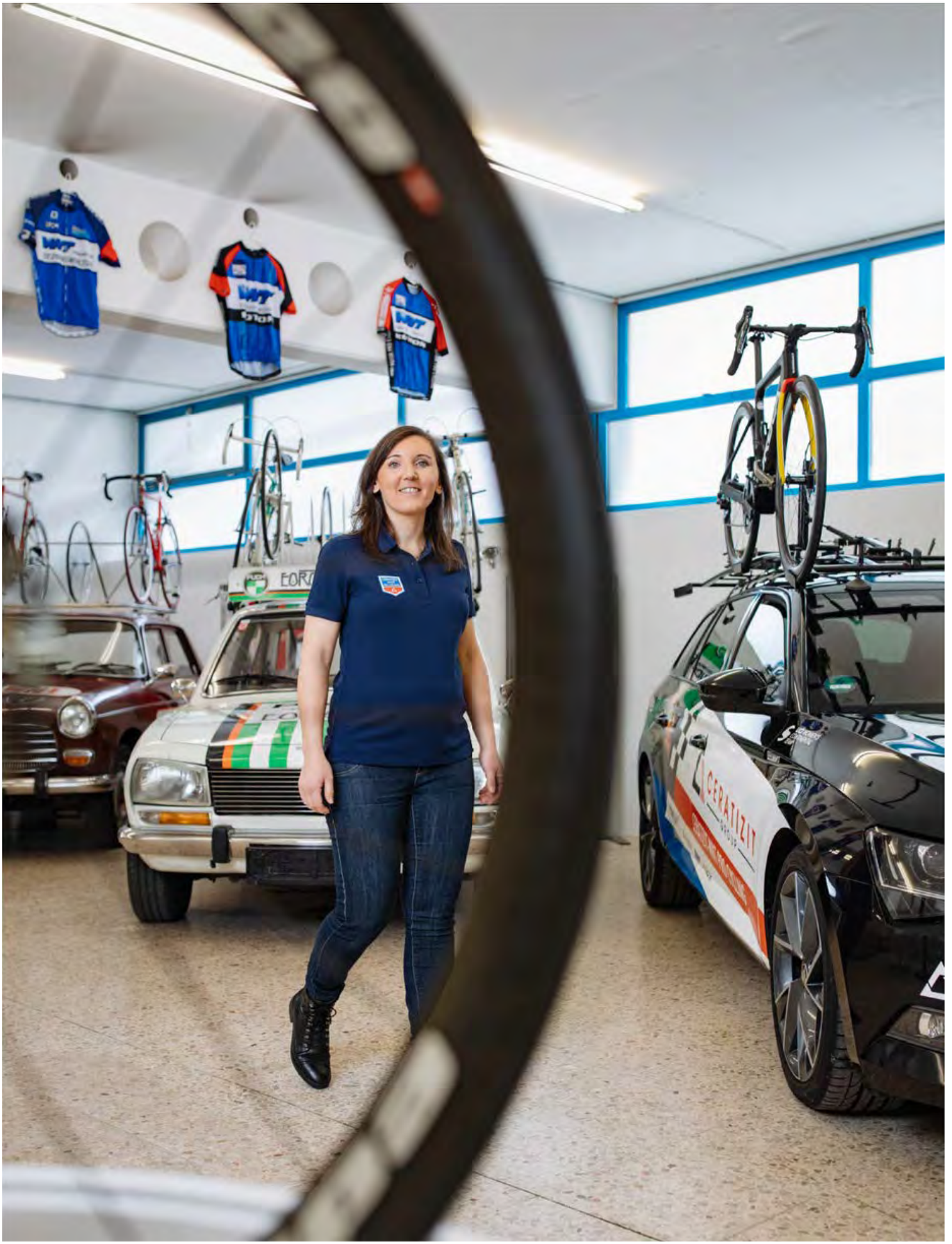
You don’t have
to become
world champion
right away.


S.D.
ORBEA
Legnano

“It was often the case that I was standing on the podium at the end of a competition and in my head I was already at the next competition…”

Slowly, with a quiet clatter, the garage door opens to reveal a room that you would not have expected to find here. To the left, numerous hooks hang from the ceiling, from which, in turn, ultra-modern, high-performance racing bikes hang. To the right are two old Peugeots with bicycle racks on their roofs. On the bike racks are old racing bikes from days long gone. On the left, the future of cycle racing, on the right, the past. The picture is complemented by numerous photos of female athletes, jerseys and posters of competitions hanging on walls and supporting pillars. What at first glance looks like a cycling museum is Ceratizit’s Creative Garage. This is where managers, sales staff, product managers, key account managers, IT or product developers meet when they want to brood freely over a topic outside of meeting rooms or far away from office desks. There are bistro tables, upholstered armchairs and a kitchen where you can also cook together.

The racing bikes belong to the Ceratizit – WNT Pro Cycling Team and the posters and photos on the walls celebrate the athletes and their successes. We have an appointment with one of them here: Lisa Brennauer. Cycling fans go into raptures at this name. She is one of the most successful German cyclists of all time. German junior champion, junior world champion, multiple German champion, European champion, seven-time world champion and finally Olympic champion in the team pursuit in Tokyo in 2021 – there is hardly a title that Lisa Brennauer has not won in her 15-year professional career. In 2022 she announced her retirement from active cycling. Now she sits in the Creative Garage, surrounded by memories and awards from her career. The question: How is she doing now that her life is no longer determined by training schedules and rides to competitions? Fine, she says without hesitation. Thank God she didn’t fall into a hole after she ended her active career. On the one hand, that is because she decided for herself when it was time to stop. Nobody advised her to do so. On the other hand, she had seamlessly started working as a trainer for the German Cyclists’ Federation (BDR), so cycling was still very present in her life. However, something else had happened: For the first time in her cycling life, she became really aware of all she had achieved. “It was often the case that I stood on the podium at the end of a competition and was already thinking about the next competition. I sometimes couldn’t really appreciate the joy of a success.” She says this worked for her during the break caused by the Corona pandemic, on the one hand, and with the ending of her career, on the other. Now she sometimes sits in her attic flat, where she lives with her partner Sebastian Nittke, who works as a mechanic in the Ceratizit – WNT Pro Cycling team, and looks at the numerous medals and jerseys. It was also her boyfriend who had the idea to display a few of her achievements in the flat. Doesn’t it sometimes feel strange to always be surrounded by what you have achieved athletically? Lisa laughs. Yes, sometimes it does. But she says it also had a very positive effect during her active career. “Even as a professional athlete, you don’t wake up every morning and you’re highly motivated,” she says. When you come out of the bathroom and there are medals and a world champion’s jersey welcoming you, that can be quite motivating.”



“But with this title it was clear to me:

now I can’t stop…”

Her motivation was the thread that ran through her life. She was sporty from an early age. Her father, an avid mountain biker, got her into cycling. But an even stronger motivation was her brother. “He was supposed to take part in a cycling competition, and that’s what I really wanted to do as well.” The following year was the year and it immediately became apparent what a talent Lisa was. She won the Bavarian Championships at the age of 14. This qualified her for the German Championships. “I really wanted to compete there. But the venue was several hours’ drive from Durach.” So she wished to take part in the German Championships for her birthday. Her parents agreed and her father drove her there. There she finished in twelfth place. Wasn’t that sobering for a cyclist so used to success? “No, not at all,” says Lisa Brennauer.

“I was always able to accept it when others were better. That rather motivated me. Especially when I could improve my personal performance. You don’t have to aim to become world champion right away.” But things continued to go upward for Lisa. Already the following year, she was called up to the national youth team. From then on, everything revolved around cycling for Lisa Brennauer. She went to competitions almost every weekend. Her parents usually drove her there. “I could never have done all this without my parents,” says Lisa. “They supported me insanely.” Then, at 17, she won the decisive title: junior world champion. “It was the time when everyone around me started thinking about what they wanted to be when they grew up – and I did too. But with this title it was clear to me: now I can’t stop.”

“If I had a figure eight in the spokes, I could also centre it out myself. Otherwise we were supported by local bike dealers.”

Lisa Brennauer was born in Kempten Germany in 1988. At the age of 14, inspired by her brother, she began competing in cycling races. Her talent and willpower quickly became apparent. Sporting success was not long in coming: After many victories in Germany, she made her international breakthrough in 2005 with the junior world championship title in the individual time trial. In total, she collected seven World Championship titles in her career – on the track as well as on the road – including a gold medal in the team pursuit on the track at the Olympic Games in Tokyo. The cyclist from the Allgäu region ended her career in 2022 and now works as a coach for the German Cyclists’ Federation.

“I was given a bike for the first time when I was 17 years old,” Lisa Brennauer says, looking at the heart of her sport: the bicycle. What role did the equipment play in her early career? Not too much at the beginning. If something small broke, her father would fix it. “If I had a figure eight in the spokes, I could also centre it out myself. Otherwise we were supported by local bike dealers.” Of course, there were always female riders at the competitions who already had far better bikes, but at that time she was initially satisfied with what was available to her. But the importance of the material quickly continued to increase. And what influence did she have on the material later in her career? “I have always been very interested in the bike itself. That’s why working with Ceratizit made a lot of sense, because many parts of a wheel are made using machining processes. So the sponsor and the product are a perfect match.” On the other hand, bike manufacturers also seek advice from Lisa. “For example, they develop a new gear system for a women’s bike, and when they give it to me for testing, I find that the gear and brake levers are difficult to reach for smaller hands, i.e., women’s hands.” If you can help develop a bike, you automatically get a completely different relationship with it. She is now taking all this knowledge with her into her coaching career. But before she can really take off, a whole new challenge awaits her. She and her partner are expecting their first child. Then she will add the four wheels of the pram to the two wheels of her racing bike. She will certainly do a masterful job of that, too.


Creative
GARAGE

In the smallest of spaces

ASML & Plansee

Our journey
from supplier
to partner

Did you know that you can fly to the moon with your cell phone?

Did you know that you can fly to the moon with your cell phone? At least in theory. But before you start looking for hidden engines in your smartphone, here are a few words of clarification. This statement only refers to the processors in the cell phone. Their performance is higher than that of all the computers on the moon landing in 1969 combined. This is made possible by the architecture of modern computer chips, which are manufactured using EUV technology. Plansee has been involved in the development of these modern chips for many years. Today, the company is one of many key suppliers to the Dutch company ASML, the world's largest supplier of lithography equipment for the semiconductor industry.

But let's start from the beginning. It was in the late 1990s when Plansee received an inquiry from a customer. This customer wanted to produce a plasma source, i.e., a source for a particle mixture of ions, free electrons and often neutral atoms or molecules. For what purpose the customer needed this source was not known. This was Plansee's first exposure to this technology. However, the customer quickly realised that the development of this plasma source was beyond his capabilities, so he sold the development department. The new owner decided to work with Plansee and develop the project further together. This involved a development in the field of the semiconductor industry. At the same time, the American company Cymer was working on a similar solution, and here too Plansee helped by supplying components made of molybdenum. The aim was to develop a process with which more powerful computer chips could be produced. For here a momentous development was on the horizon.

For decades, the performance of computer chips has been continuously improved. According to Moore's Law, performance doubled every two years. At a certain point, however, it was clear that the Deep Ultraviolet (DUV) technology used in the manufacture of chips would reach its limits. The range of 120 to 300 nanometres in which DUV technology could operate was not suitable for even more powerful chips. So a new technology was needed: extreme ultraviolet technology (EUV). It operates at a wavelength of 13.5 nanometres. To get a better idea of this, it is helpful to imagine two pencils with leads of different thicknesses. To do this, take two sheets of paper, each measuring two by two centimetres. These represent the chips. Short lines are now drawn on both pieces of paper with the pencils. Take the thicker pencil for one piece of paper and the thinner pencil for the other. It is not difficult to imagine that you can draw more lines on the paper with the finer pencil. Each of these lines represents a processor. So putting more processors on one chip is possible with EUV technology. As a result, the chips are faster, consume less energy and make the device cheaper because fewer chips are needed.

ASML is a leading supplier to the semiconductor industry. The company provides chipmakers with hardware, software and services to mass produce microchips. Together with its many partners such as Plansee, ASML drives the advancement of more affordable, more powerful, more energy-efficient microchips. ASML is a multinational company headquartered in Veldhoven, the Netherlands, with offices across Europe, the US and Asia.

ASML's EUV machines are roughly the size of a mobile home, weigh around 180 tonnes and consist of over 100,000 parts.

The Dutch company ASML is one of the pioneers in this field and acquired parts of Cymer Inc. in the USA in 2013 to speed up development. This led to a direct collaboration between ASML and Plansee. The challenge was to make EUV technology stable enough to produce chips on an industrial scale. And that was much more difficult than initially thought. Originally, ASML wanted to bring a production-ready EUV machine to market in 2006. The machine actually started its shipment in 2013. The challenges associated with the new technology were many. In today's equipment, 50,000 tin drops per second are initially produced. These drops, 25 micrometres in diameter, fall into a vacuum chamber where their position is measured with a high-speed camera. Each droplet is then first hit by a laser prepulse, which shapes it into a pancake, and is then converted by the main pulse laser into a plasma that emits EUV light with a wavelength of 13.5 nanometres. It is crucial that the tin is absolutely pure. And this is exactly where Plansee came into play. While the tanks in which the tin was stored were initially made of titanium, it soon became apparent that the material had weaknesses. Again and again, particles came loose and contaminated the tin, which itself is highly corrosive.

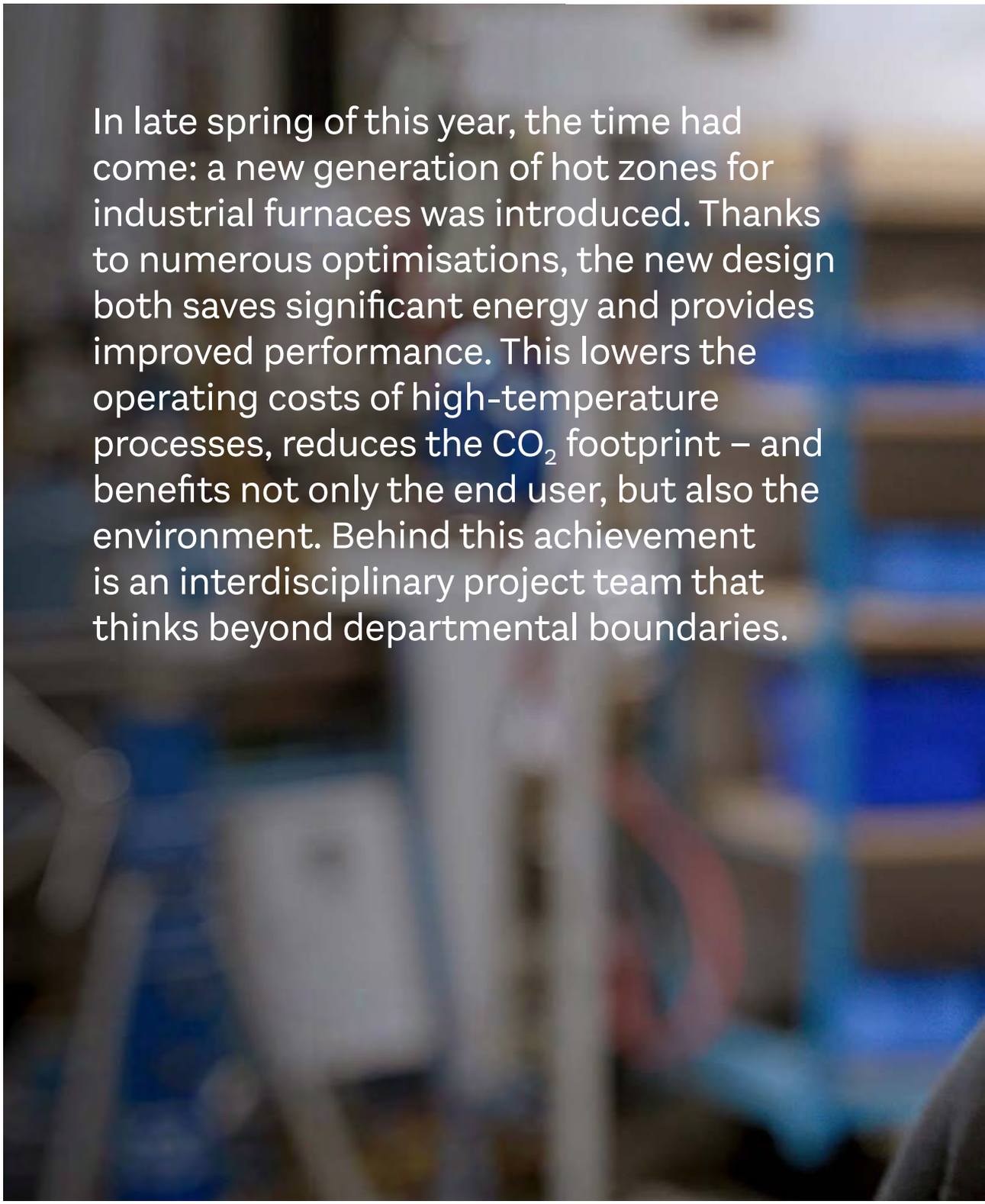
Thus, the engineers came to the refractory metals, and here, in particular, molybdenum. The material is highly resistant to corrosion and therefore ideally suited for storage and supply of tin.

A single 30-nanometre grain of dust would destroy the functionality of the microchip - therefore extreme cleanliness is necessary. The machines from ASML as well as the components for them, for example at Plansee, are therefore manufactured in clean rooms.

When ASML shipped its first EUV production system in 2013, it signalled another big step forward in the development of this new technology. This also changed a lot for Plansee. From a previously rather small business area, which was handled by a few employees, an important market emerged virtually overnight. In the course of further orders from ASML, Plansee also set up a clean room in which complex component groups of various origins are assembled and qualified for ASML.

In the meantime, Plansee and ASML can look back on a partnership of more than 20 years. But it is not only in the development of new products that the companies work closely together. They are also closely connected when it comes to sustainability. ASML has defined nine areas for itself that are intended to make the company more sustainable. As part of this, ASML places high demands on its own suppliers and this includes Plansee. In 2022, Plansee was awarded the Sustainability Excellence Award by ASML. The measures Plansee has been taking for many years regarding environmental protection, social responsibility and sustainable corporate governance proved to be the decisive factors. These are based on the ESG approach, which stands for Environmental, Social and Governance. Plansee already uses 100 percent renewable energy, and the Group-wide tungsten recycling rate is 75 percent. By 2030, Plansee will be CO_2-neutral. For years now, raw materials have come exclusively from socially, ethically and ecologically sound sources. In addition to the measures Plansee is taking to become even more sustainable itself, the concept of sustainability also plays a major role in the cooperation with ASML. The focus is on extending the product life of components through remanufacturing or repair. “If components are really at the end of their life cycle and can neither be reused nor remanufactured, we recycle them for ASML. So we have the complete life cycle management in mind to make it even more sustainable,” says Andreas Feichtinger, Managing Director at Plansee HPM.

A passion for innovation



In late spring of this year, the time had come: a new generation of hot zones for industrial furnaces was introduced. Thanks to numerous optimisations, the new design both saves significant energy and provides improved performance. This lowers the operating costs of high-temperature processes, reduces the CO_2 footprint – and benefits not only the end user, but also the environment. Behind this achievement is an interdisciplinary project team that thinks beyond departmental boundaries.

To develop the new design, the project team met every three weeks in so-called “sprints” to develop and assign new tasks, to be implemented by the next meeting. The coordination between the project managers and the executive team was always very close. “We did not assign tasks top-down, but instead together agreed on a feasible scope. Every team member had a voice,” explains Bernhard Mayr-Schmölzer, head of the “ThermoTec” innovation project.

Industry faces the challenge of saving energy on a massive scale. This is the only way to reduce long-term costs and the only way to produce goods in a climate-friendly process. However, this new efficiency must not come at the expense of quality. As a result, a need exists for optimisations that combine high performance and sustainability. This need becomes a complex task where industrial processes require a particularly large amount of energy. This is the case, for example, with high-temperature vacuum furnaces used for numerous heat treatment processes in industries such as aerospace or medical technology, where working temperatures between 1,000 and 1,800 degrees Celsius are reached.

Plansee supplies industrial furnace OEM’s (Original Equipment Manufacturers) and end users worldwide with all-metal hot zones made of

molybdenum, molybdenum alloys and tungsten, which are a critical part for high-temperature processes. The design must ensure that the temperature in the furnace is optimally distributed. The energy balance of these processes depends on the quality of the hot zone design. If the design is not optimised for the particular process, heat, and with this, energy is lost.

“For decades, we have incrementally improved our hot zones. Now, for the first time, we brought together different departments to work as an agile project team on a new overall concept,” Bernhard Mayr-Schmölzer points out. The design, calculation, simulation, technology development and production departments worked hand in hand. “I’m really proud of how we work as a team across design, manufacturing and simulation,” says designer Peter Wehrmeister.

High performance and sustainability

The challenge given to the innovation team was to develop the best design and material for the longest service life, while keeping the manufacturing costs stable and reducing delivery times. The interdisciplinary team also set itself the goal of constantly improving energy efficiency. The new generation of hot zones fulfils all these aspects: The delivery time for the standard versions of the hot zones could be reduced by 30 percent. Thanks to a series of technical optimisations, the new hot zones consume up to 27 percent less energy compared to the previous generation. This reduces operating costs and supports customers in achieving their sustainability goals. The lightweight design of the support frame means that the new models weigh up to 15 percent less, which saves resources. “In production, we make sure that we use materials that we can recycle well,” emphasises Thomas Müller, group manager in production – because that also ensures more sustainability. This efficiency goes hand in hand with excellent performance data and a longer service life. The design and materials used in the hot zone ensure that the batch is heated optimally and that problems such as short circuits or sagging of the heating elements are almost impossible. However, it is not only the heating process that is important, it is just as important that the heated parts in the furnace can be efficiently cooled using gas once the process is complete. Simulations and measurements on a prototype helped the Plansee development team to place the gas nozzles in the hot zone in such a way that they cool the batches optimally and evenly. Several new design solutions have already been filed for patent. The project ran parallel to the daily business – additional work, but the successes were motivating. The good mood did the rest. “The project also enabled us to overcome the insular thinking in the departments,” says Bernhard Mayr-Schmölzer. Once a year, team events were organised – to conclude the project, the team cooked a four-course Italian meal together in the company cafeteria in Reutte. Under the watchful eye of cafeteria manager Christian Bartel, the team prepared everything themselves and of course enjoyed it afterwards.

Another innovation is the “FlowBox”, which enables the smooth outflow of gas at the rear of the hot zone. By eliminating the typical cold spot in front of the conventional gas outlet, the “FlowBox” improves the temperature uniformity during high temperature operation.

From customisation to platform solution

Another goal of the innovation team was to evolve from customisation of each project to a standardised platform solution: Prior to the project, each hot zone was designed and manufactured in an elaborate customised process. The project team has now developed a platform solution. This means that a standardised design is available, which can be scaled within a defined size range and allows for individual customisation depending on the customer’s wishes. The hot zone can be configured in advance to the customer’s individual needs via an online tool. A design proposal is then created at the push of a button, which can be customised as needed.

The team continues to work on further optimisations and possibilities in the pursuit of even greater customer satisfaction. Thus, the Plansee experts are currently working on another digital solution: an app that can be used to calculate energy consumption and CO_2 emissions. This transparency will help with energy and emissions management. This will benefit not only the customers’ energy balance, but also climate protection goals

Embossed, coloured & award-winning

Plansee has been using an innovative surface technology to produce the colourful surfaces of the 25 euro silver niobium coins for the Münze Österreich for 20 years. To ensure that each coin is like the other, sure instinct and process knowledge are required.


+1,5°C
ERDERWÄRMUNG
5 EURO REPUBLIK ÖSTERREICH
2023

What is Niobium?

Niobium is a metal with a high melting point that belongs to the group of refractory metals. The melting point of these metals is higher than that of platinum (1,772 °C). Niobium is ductile and workable at room temperature. Like all refractory metals, niobium is characterised by a low vapour pressure, a high heat resistance and a low coefficient of thermal expansion.

Niobium can shimmer in different colours due to a passivating oxide layer and is resistant to many chemicals, similar to tantalum. Due to its good strength at low weight and its high ductility at room temperature, niobium is used in various fields of application: in aerospace as control and drive nozzles, in chemical plant construction as heat exchangers, in coating technology as evaporator boats, as dimensionally stable crucibles in (laboratory) diamond growing and, due to its good biocompatibility, as an implant material - and also as a coin metal.

The Austrian bi-metallic coin on the theme of "Mobility of the Future" from 2021 was awarded the "Coin of the Year Award" in the category "Best Bi-Metallic Coin 2023." The international competition recognises outstanding coin design and innovative spirit. This is the ninth time that the Austrian silver niobium coins have received the award.

Plansee is involved in the production of the 25 euro bi-metallic coins with an innovative technology. A specially developed oxidation process oxidises the surface of the niobium coins, creating an attractive colour contrast – without any colour application at all. The result of the so-called anodic oxidation is a coin that is not only unique but also has a high collector's value. In addition, the coins are polished by hand in Reutte. This requires manual work, because this precise work is not done by a robot.

Natural colours

Development engineer Robert Grill was involved in the project from the very beginning. The oxidation process, which was previously used in tantalum wire production, was further developed for the Münze Österreich. "The colour is not applied: it practically grows out of the metal as an oxide layer. The colour impression is created by interference of the thin layer and therefore appears so natural," explains Robert Grill.

In the anodic oxidation process, the coin is immersed in an electrolyte solution and connected to an electrical voltage source. This voltage creates an oxide layer on the metal surface that is only a few nanometres thick. The respective colour effect depends on the thickness of the oxide layer. The oxidation process is very precise, so that the same colour tone can be maintained on all coins of an issue.

"The first coin should look exactly like the 55,000th piece," emphasises production line manager Diethard Lang. "To achieve this, the voltage, concentration and temperature of the solution must always be exactly the same. Process stability is essential."

The first coin produced in this way in 2003 to honour the city of Hall in Tyrol in cooperation with Plansee was sold out within minutes. Three years of work were behind it. And it was not enough. This first generation with a matte colour effect was followed by a second with stained and thus brighter colours for the first time, and a third in which even two colours were used.

Winning coin with topical relevance

This is also how the new 25 euro coin on the topic of "global warming" was created. The face of the coin shows a thermometer, which is also part of a clock showing two minutes to twelve. To the left of it is a globe with the inscription +1.5 °C. The topic of sustainability in the areas of economy, ecology and social issues is dealt with on the other side of the coin. A globe can be seen in the centre of the coin, and the silhouettes of two faces are indicated on the right. Moreover, a sea turtle, threatened with extinction due to environmental pollution and global warning, swims through the picture.

The site in Liezen, where the coloured coin blanks were previously manufactured, was closed in the beginning of 2023. The wire production facilities were sold to an American company. Coin production and other production areas were relocated to Reutte from 2021. In the course of the knowledge transfer, the areas of responsibility were handed over and the employees were trained by the permanent staff of Plansee Liezen. And all this while production for the 2022 edition was ongoing.

For a good two years, two employees in Reutte, among others, have been taking care of the coins: Development engineer Christian Bienert is responsible for the conception and development of the prototypes. Diethard Lang is responsible for the execution and production. "The eye plays an important role in production," Lang emphasises. Using a defect catalogue and retention patterns, his team ensures the uniform appearance of the coins.

The now already retired Robert Grill had handed over the project internally to his successors and observed the last coin production from a distance. But every time it is something special to hold the finished coin in his hands. His favourite motifs: "Fascination of Light" and "Time." The project is also close to the heart of Wolfgang Simader, Head of Business Segment Engineering. "The silver niobium coins are a prestige product that lots of people know. With 20 years history, it also has a long tradition by now," says Simader.

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