The thyssenkrupp Steel magazine
Issue 01/2023
thyssenkrupp-steel.com

steel compact

Start into the hydrogen era

With the construction of the first direct reduction plant, thyssenkrupp Steel is starting one of the world's biggest decarbonization projects.

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Ideas and impulses:
Innovation department is pushing ahead with developments

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ZM Ecoprotect® Solar:
The steel for photovoltaic systems

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thyssenkrupp

Center for high-tech steel

By taking the new hot-dip galvanizing line (FBA 10) into operation, thyssenkrupp Steel has opened another chapter in its history at Dortmund with plenty of scope for future developments. The production facility mainly benefits the automotive industry, which is relying more and more on hot dip galvanizing.

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Tough and strong

Lemken, the manufacturer of agricultural technology, relies on boron-alloyed tempered steels from thyssenkrupp Steel for the production of its plows. Brand new in use: the TBL® 45.

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bluemint® Steel for car bodies

In future, the automotive supplier Snop will purchase CO_2-reduced steel from thyssenkrupp Steel. This implements a 2022 memorandum of understanding.

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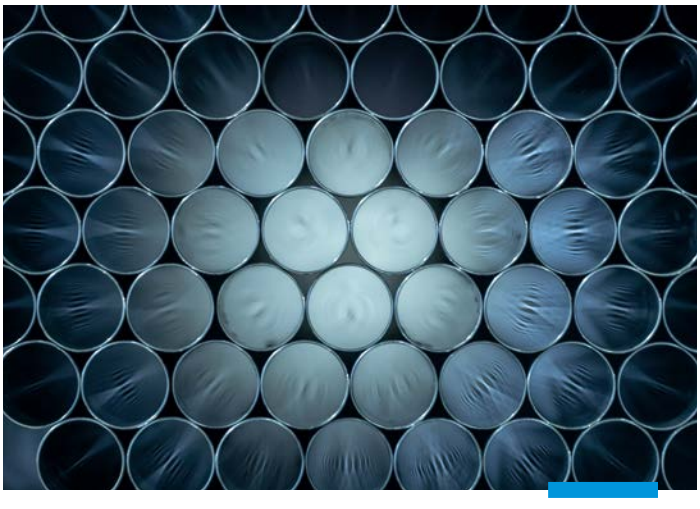

Precise and firm

Vincenz Wiederholt uses tubor® steels from thyssenkrupp Steel to produce precision steel tubes that are used in almost every European car.

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Climate steels for transformers

Electrical steel of the bluemint® powercore® brand from thyssenkrupp Electrical Steel is being used for the first time in the production of transformers at the internationally active R&S Group.

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Credits

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The thyssenkrupp Steel magazine

“We are gearing up tomorrow’s green steel markets for the future.”

March 1, 2023 will be remembered as a historic day for thyssenkrupp Steel: On this day, we celebrated awarding the contract for Germany’s largest direct reduction plant (DR plant) with innovative melters to the SMS group from Düsseldorf. With this, we have initiated one of the largest industrial decarbonization projects in the world. The technological leap towards direct reduction represents a milestone in the history of steel production – and a unique opportunity to gear up CO_2-intensive steelmaking for the future.

We are delighted that policymakers have been prepared to provide comprehensive support for our technologically leading transformation process. After all, changing the structures toward a carbon-neutral industry in Germany and Europe represents a task that can only be accomplished through joint efforts by all the stakeholders.

We are also delighted to have a strong partner at our side in the SMS group from Düsseldorf. We have enjoyed many years of successful cooperation with SMS, and both companies know they can trust one another. Two traditional companies are thus sending out an important signal for North Rhine-Westphalia as an industrial center, and creating the best possible basis for the green steel markets of the future in Germany and Europe.

Dr. Heike Denecke-Arnold,
COO thyssenkrupp Steel

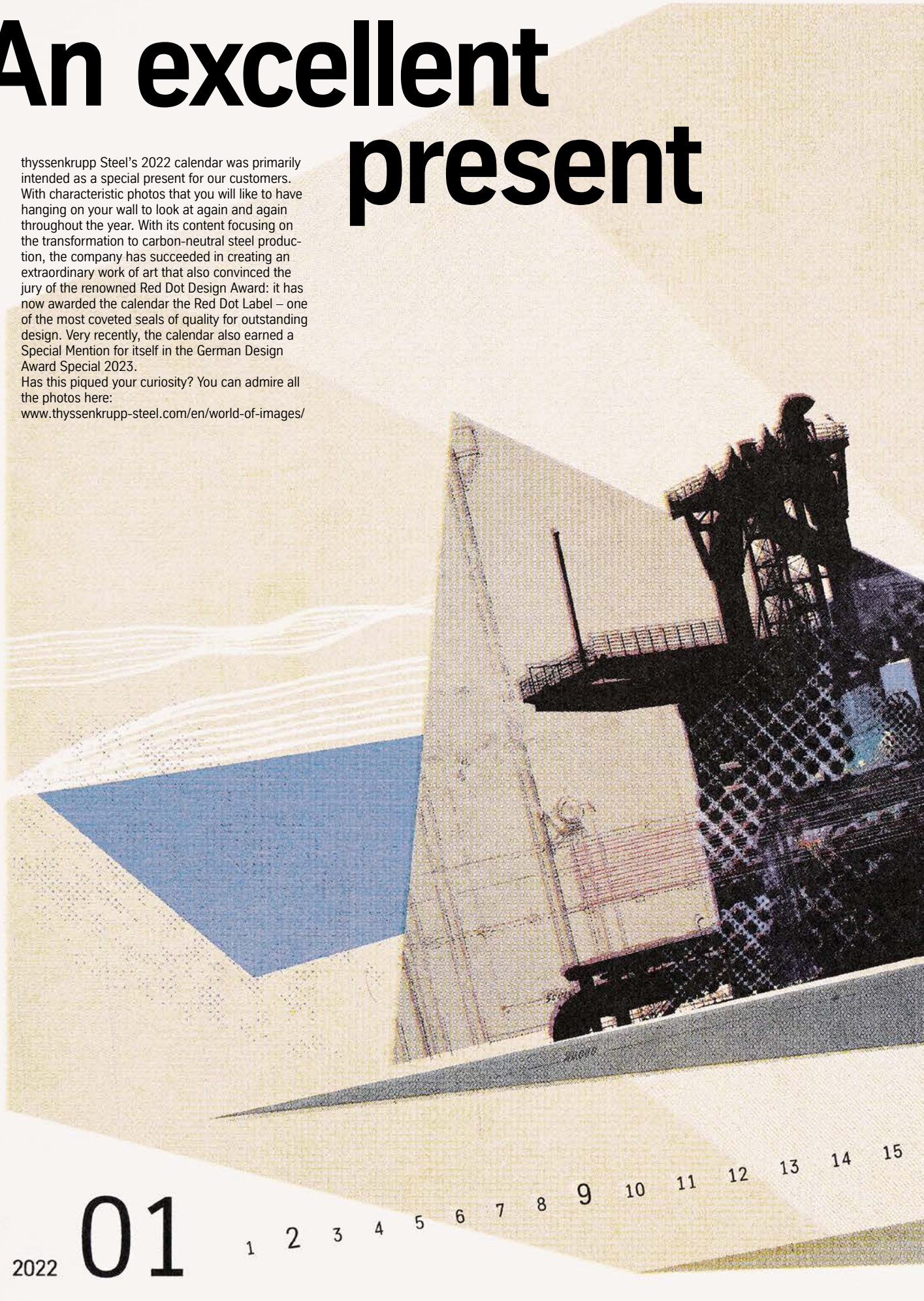
We are also breaking new technological ground with the innovation alliance with SMS: the new plant is the first of its kind and will be the world’s first fully hydrogen-capable DR plant. At the same time, the innovative plant concept guarantees unchanged product quality of our premium steel grades, because we can integrate it seamlessly into the existing iron and steel plant. This means we can retain all production steps from the steel mill onward.

But quite apart from the new DR plant, we are consistently pursuing our Strategy 20-30 and investing in our production network in many other places: we are developing the Bochum location into a center of excellence for electric mobility. To this end, in addition to a new double reversing stand capable of rolling particularly thin and sturdy steels, we are also building a new annealing and isolating line which will produce high-tech electrical steel. In Dortmund, we have taken the hot-dip galvanizing line FBA 10 – one of the most modern plants of its kind in the world – into operation. Together with the FBA 8, can produce around 1 million metric tons of hot-dip galvanized, corrosion-resistant steel products every year.

We are laying the foundations for our future with the implementation of our Strategy 20-30 and the pioneering construction of the first direct reduction plant at the Duisburg location: high-tech steels for our customers’ future needs, and for a premium portfolio which we are converting to green step by step.

An excellent present

thyssenkrupp Steel's 2022 calendar was primarily intended as a special present for our customers. With characteristic photos that you will like to have hanging on your wall to look at again and again throughout the year. With its content focusing on the transformation to carbon-neutral steel production, the company has succeeded in creating an extraordinary work of art that also convinced the jury of the renowned Red Dot Design Award: it has now awarded the calendar the Red Dot Label – one of the most coveted seals of quality for outstanding design. Very recently, the calendar also earned a Special Mention for itself in the German Design Award Special 2023.
Has this piqued your curiosity? You can admire all the photos here:
www.thyssenkrupp-steel.com/en/world-of-images/



reddot winner 2022

GERMAN DESIGN AWARD SPECIAL 2023

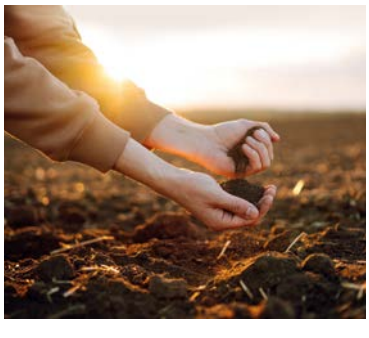
Graphic: blutsbrüder®

Knowledge & value

Agriculture

Converter lime increases yields

Under the new clevercalx© brand, thyssenkrupp Steel now is offering the agricultural industry its tried-and-tested hydrated granular converter lime. This improves the pH value of agricultural land and ensures that important nutrients are available to plants growing in the soil. Unlike lime from natural deposits, this unique siliceous converter lime is produced during steelmaking at high temperatures of up to 1600 °C. The industrial co-product is rich in active basic components – including calcium, magnesium, phosphorus, manganese and copper – and also contains a high proportion of soluble silicic acid. In soils, these elements ensure an efficient lime fertilizer effect, support balanced plant nutrition and thus prevent deficiency symptoms. thyssenkrupp Steel not only delivers clevercalx© within its region, but also ships it to more distant locations in Germany via its own port and also by train on the railway network. Distributors then deliver the product directly to the edge of the field for the farmer.



thyssenkrupp Steel – on all channels!

Always find out the latest trends from the steel sector. Follow us! We are represented on all popular social media channels.

Bernhard Osburg new President of the German Steel Federation

The Executive Board of the German Steel Federation (WV) has elected Bernhard Osburg, CEO of thyssenkrupp Steel, as its new President for the years 2023 and 2024. He succeeds Hans Jürgen Kerkhoff, who retired at the end of 2022 after 14 years at the head of the association as its President and CEO. Bernhard Osburg will hold the presidency on an honorary basis for the next two years. "I am taking up this office amid turbulent times. The steel industry in Germany is currently facing existential challenges, namely the energy price crisis and further economic upheavals. At the same time, our industry is taking decisive steps toward the carbon-neutral economy of the future. This transformation will culminate with a green steel industry as a key pillar of a strong and sustainable industrial location," says Osburg.

For more information, please visit: **www.stahl-online.de.**

Material news

Special steel for agriculture in a wear test

Hardenable boron steels TBL® offer an impressive final hardness

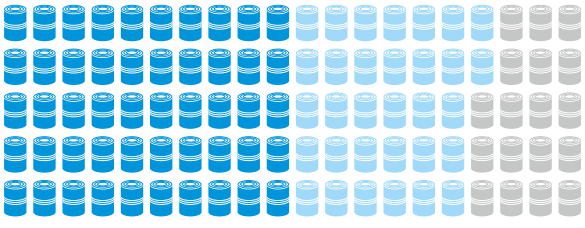
Farming Revolution is a company with a mission to provide farmers with a sustainable and economical alternative to today's weed control: by using an efficient electromechanical hoeing robot to remove weeds from fields and land using a rotating chopper made of wear-resistant steels.
In a special wear test, Farming Revolution examined not only structural and microalloyed steels but also the boron-alloyed wear-resistant TBL® steels from thyssenkrupp Steel. Result: Farming Revolution confirms the excellent product properties. The steel grades prove their effectiveness with average hardness values from 57 to 60 HRC after hardening in water. Indeed, they had the lowest wear compared to other investigated steels from the competition.

In numbers

High level of interest in climate-friendly food cans

Many consumers are already expressing a high level of interest in climate-friendly packaging materials. In a representative survey conducted nationwide in Germany by YouGov on behalf of weissblech-kommt-weiter.de in January 2023, half of the respondents said they would prefer to buy food cans made from CO_2-reduced tin plate rather than from conventional tin plate.

Would you rather buy food cans made of CO_2-reduced tin plate than food cans made of conventional tin plate?



50% Yes

32% Don't know/ no response

18% No

Basis: All respondents (2105)

Transformation

Hydrogen pipeline inaugurated

Four-kilometer-long pipeline connects steel mill with hydrogen network in the Ruhr region

Four-kilometer-long pipeline connects steel mill with hydrogen network in the Ruhr region
As part of the H2Stahl real-world laboratory sponsored by the Federal Ministry for Economic Affairs and Climate Protection, Air Liquide completed a pipeline to thyssenkrupp Steel in Duisburg in late 2022. The approximately four-kilometer-long pipeline connects the steel mill site with Air Liquide's hydrogen network in the Ruhr area and was inaugurated in the presence of North Rhine-Westphalia's State Minister of Economic Affairs Mona Neubaur. Bernhard Osburg, CEO of thyssenkrupp Steel: "I am pleased that we are taking another step towards decarbonization. By linking our site to the Air Liquide hydrogen pipeline, we at thyssenkrupp Steel are creating the conditions for climate-friendly steel production." In 2024, hydrogen is set to be delivered for the first time to thyssenkrupp Steel via the pipeline, primarily intended for powering the new direct reduction plant.

Gilles Le Van, Vice President Larges Industries and Energy Transition for Air Liquide Central Europe (left), North Rhine-Westphalia's State Minister of Economic Affairs Mona Neubaur and Bernhard Osburg, CEO of thyssenkrupp Steel, inaugurate the first hydrogen pipeline to supply the Duisburg plant.

Photos: thyssenkrupp Steel Photography, Framing Revolution, Rainer Schroeer, Dirk Jochmann, Shutterstock

Obituary

Farewell to Friedrich-Ernst von Garnier

thyssenkrupp bids farewell to Friedrich-Ernst von Garnier. The artist, color philosopher, graphic artist and industrial designer passed away in Berlin on March 7, 2023 at the age of 87. Among other achievements, he helped develop the "reflectionsOne" color collection for thyssenkrupp Steel, which shows industrial facades above all in the right light. The concept is still relevant today and is also used by Corporate Architecture when designing the Group's own building projects. Those who worked with Friedrich-Ernst von Garnier always appreciated him as a committed, reliable and helpful colleague. We wish to express our most sincere condolences to his family and relatives on behalf of all thyssenkrupp Steel employees.

Electric steel sheet news

NGO Electrical Steel business sector repositioned

Effective January 1, 2023, thyssenkrupp Steel combined key functions of non-grain-oriented powercore® electrical steel that are important for customers in the new NGO business area within Sales Automotive. The teams from Research, Product Management, Application Technology, Production Control, Technical Customer Support and Sales have been working together on an interdisciplinary basis since the beginning of the year. The new business area is geared up to exploit opportunities and sales potential, especially in the fast-growing future market of electric mobility. This is happening against the background of decarbonizing mobility and expanding renewable energies, which not only means the demand for electrical steel has increased, but also that increasingly sophisticated grades are called for. Combining forces in an agile business sector will enable thyssenkrupp Steel to satisfy rising customer requirements and secure its currently strong market position. The business sector is headed by Miguel Arrabal.

Technological transformation heralds the hydrogen era

In March 2023, thyssenkrupp Steel awarded the contract for construction of its first hydrogen-powered direct reduction plant to the SMS group. This marks the official start of **one of the biggest industrial decarbonization projects worldwide.** The startup is planned for the end of 2026, with annual emissions savings of over 3.5 million metric tons of CO_2. A milestone for green steel production – and the climate.

Copy Jan Ritterbach

Grafik: blutsbruder®

The order placed with the Düsseldorf-based plant builder, SMS group, was announced at a high-profile press conference attended by Hendrik Wüst, Minister President of North Rhine-Westphalia. Financially speaking, with a volume of €1.8 billion, it represents the biggest single order ever placed by thyssenkrupp Steel. Within the next three years, SMS will design, supply and build the first hydrogen-powered direct reduction plant (DR plant) at the Duisburg site. "With this contract award, we are now embarking on the implementation of our transformation. A historic moment for thyssenkrupp Steel and a good day for industrial climate change mitigation. Because, just by itself, our first direct reduction plant will enable us to avoid emitting 3.5 million metric tons of CO_2 per year," said CEO Bernhard Osburg at the official announcement in March.

The plant has a planned annual capacity of around 2.5 million metric tons of directly reduced iron. It is scheduled to go into operation as early as the end of 2026, when it will herald the end of CO_2-intensive steel production at thyssenkrupp Steel. Up to this point, coal-based hot iron production in the blast furnace always involved emitting large amounts of CO_2, amounting to about 20 million metric tons per year from the Duisburg location alone. By contrast, hydrogen-based processes in direct reduction plants offer the possibility of producing steel in a carbon-neutral way in the future. thyssenkrupp Steel is already planning to avoid as much as 6 million metric tons of CO_2 by 2030, representing well in excess of 30 percent of its emissions as part of its tkH2Steel transformation concept. The transformation to carbon-neutral production should be completed by 2045 at the latest.

Milestone for green metal industry

The unprecedented green transformation of steel production is based on a unique technological solution: thyssenkrupp Steel is the first manufacturer in the world to combine a 100 percent hydrogen-capable direct reduction plant

A media sensation: many journalists were live on site at the official announcement of the contract award to the SMS group.

Photos: Rainer Kaysers, Nils Röscher

with two innovative melters. Positioning these two units – which will also be supplied by SMS – immediately adjacent to the DR plant allows the solid input stock produced there to be converted directly into molten iron. The entire process is thus particularly efficient.

The direct reduction plant is based on MIDREX® Flex technology. The central element is a shaft furnace that is suitable for a wide range of oxide feedstocks, guarantees maximum availability and productivity, and is 100 percent ready for operation with hydrogen. Special aspect: The melter produces a slag that is comparable to that of the blast furnace process. Like the hot metal slag known as granulated blast furnace sand, it can be used further as an important basic material in the cement industry. This further processing of byproducts, which already forms an integral part of the iron and steel plant today, will thus also form a continuing building block in future climate change mitigation.

Bernhard Osburg comments: "We are very pleased that we have SMS as our partner for the technological leap into hydrogen-based steel production. Together, we intend to demonstrate that an innovative and sustainable transformation of the steel industry is possible in Germany and Europe. We are thus creating the basis for tomorrow's green steel markets."

The Düsseldorf project partner is building the plant on an EPC basis. This means the company bears overall responsibility for the engineering, procurement and construction of the plant. Burkhard Dahmen, CEO of the SMS group, emphasizes: "This project means a great deal to us. thyssenkrupp and SMS have been working together closely for many decades now. We are looking forward to taking responsibility for this forward-looking project as well. We are also delighted that our technology, know-how and expertise in project management will support the green transformation at Germany's ›

This is the SMS group

SMS group, a company from North Rhine-Westphalia, has been awarded the contract for the ground-breaking plant at thyssenkrupp Steel. SMS employs a good 14,500 people at around 100 locations. As a specialist for steel industry production plants, it is actively helping shape the transformation of the industry. The order that has now been placed is also historic for SMS: It is the largest single order in the company's history spanning more than 150 years.

Together, they are placing a milestone for the green steel industry in Germany: Bernhard Osburg, CEO of thyssenkrupp Steel, and Burkhard Dahmen, CEO of the SMS group.

Writing the history books for Germany as a steel location: Martina Merz, Chair of the Executive Board of thyssenkrupp, Hendrik Wüst, Minister President of North Rhine-Westphalia, and Bernhard Osburg, CEO of thyssenkrupp Steel, at the official announcement of the contract award for the construction of the DR plant.

biggest steel producer. We all know: this is an important milestone on the road to a green metals industry." What is important from the customers' perspective: The new concept ensures consistently high product quality for clients and consumers alike. This is because it is seamlessly integrated into the existing iron and steel plant, thereby allowing all subsequent process steps from the steel mill onward to be maintained in addition. Consequently, the existing plant structure can be used efficiently, and the process parameters that are optimized to customers' requirements can be retained. Bernhard Osburg: "Our customers will continue to receive the complete, high-quality product portfolio with the premium quality they are accustomed to – but produced even more sustainably."

One giant leap for climate change mitigation

The cooperation between thyssenkrupp Steel and SMS also sends a strong signal for North Rhine-Westphalia as an industrial center. In building the direct reduction plant with melters, the two companies are forming a partnership for innovation and efficient industrial climate change mitigation. "The contract award to the Düsseldorf-based SMS group represents a great decision for the climate, for thyssenkrupp and for the location of North Rhine-Westphalia. It shows: in our federal state, there is not only the knowledge to produce basic materials car-

The MIDREX® process

The MIDREX® process comprises three steps: Iron ore reduction, gas preheating and natural gas reforming. The feedstock for producing directly reduced iron is primarily iron ore pellets and, to a lesser extent, lump ores. Iron ore is reduced in a shaft furnace with the aid of hot reduction gas according to the counterflow principle: the feedstock falls down under gravity and meets the hot reduction gas, which is injected into the central, cylindrical part of the MIDREX® shaft. In the process, oxygen is stripped from the ore without the ore melting. The shaft furnace is a flexible and versatile reactor that can be operated with natural gas, hydrogen or any mixing ratio of natural gas and hydrogen as reduction gas.

thyssenkrupp Steel in focus: news of the construction of the DR plant created a media sensation at the press conference in March 2023.

Photos: Rainer Kaysers, Nils Röscher

bon-neutrally but also the competence to build the necessary plants," says Hendrik Wüst, Minister President of North Rhine-Westphalia. "In this way, we are combining climate change mitigation with sustainable industry and its high-quality jobs, and are taking a major step toward becoming a carbon-neutral industrialized country. We are supporting this project with conviction and to the tune of up to 700 million euros, thus contributing to the preservation and transformation of an important value chain for the entire economy in the state," continues Wüst.

The new technology offers huge potential, and thyssenkrupp Steel is underlining its leading role in the transformation of the steel industry. At the same time, the underlying technological concept can serve as a model for many other decarbonization projects in the industry in Europe and beyond. Another positive aspect: with the step into the green transformation, many thousands of high-quality, highly skilled jobs will be preserved. The innovation alliance between thyssenkrupp Steel and SMS will also call for new qualifications, in addition to the jobs created during the construction of Germany's biggest direct reduction plant.

Transparent dialog on the future of the industry

Detailed planning and preparatory work for the construction of the direct reduction plant has already begun. This includes, for example, preparation of the construction site on the Duisburg plant premises. To ensure the highest possible level of public acceptance along this road into the future of the industry, thyssenkrupp Steel will enter into an open and transparent dialog with residents in the neighborhood, politicians and civil society during the project, and showcase the pioneering project now being developed to decarbonize steelmaking.

Green economy creates employment prospects

The direct reduction plant will preserve many thousands of high-quality, highly skilled jobs as part of the green transformation. The innovation alliance between thyssenkrupp Steel and SMS will also call for new qualifications, in addition to the new jobs created during the construction of Germany's biggest direct reduction plant.

Web

Click here to see thyssenkrupp Steel's climate strategy:
www.thyssenkrupp-steel.com/climate_strategy

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Geared up for the future (from left): Tekin Nasikkol, Chairman of the General Works Council at thyssenkrupp Steel, Bernhard Osburg, Steel CEO, Burkhard Dahmen, CEO of the SMS group, Dr. Arndt Köfler, Steel CTO and Hubertus Jakobi, Head of Implementation at SMS.

bluemint® Steel for car body construction

The renowned French automotive supplier Snop plans to source **CO_2-reduced steel** from thyssenkrupp Steel for selected components in the future. A corresponding memorandum of understanding was signed by both cooperation partners at the end of 2022, and is now being put into practice.

Copy Jan Ritterbach

The memorandum of understanding (MoU) on the supply of more environmentally friendly steel is the latest result of an intensive cooperation between thyssenkrupp Steel and Snop that has been in place for many years already. The French supplier sources various materials from the thyssenkrupp Steel plant in Duisburg and uses them for many international customers in the automotive sector. The focus is on cold-rolled, surface-coated grades and MBW® manganese-boron steels for hot stamping. At Snop, for example, these are used to produce outer panels as well as components for the chassis and bodywork area.

When selecting materials, OEMs are increasing placing emphasis on material solutions with an improved life cycle assessment. Snop – just like its competitors – is therefore faced with increasingly stringent targets in manufacturing. “Automotive manufacturers are more and

Photos: Rainer Kaysers

This is Snop

Snop is a major tier-one supplier to the automotive industry in Europe. Its products range from body-in-white stampings and assemblies, through complex assemblies, to Class A parts and roll-formed parts. The production capacities make it possible to serve the trend in the automotive industry toward lightweight construction: hot stamping, for example, as well as the use of other technologies for ultra-high-strength steels. Production plants are located close to customers' sites, to ensure transport with reduced CO_2 emissions.

Snop is a business unit of Groupe Financière SNOP Dunois (Groupe FSD), a large privately owned automotive supplier with established ties to all European OEMs. Groupe FSD employs more than 8000 people at 38 production sites and five Tech-Centers in thirteen countries. Snop is the largest business unit with more than 7000 employees. In addition, there are two other business units that develop and manufacture stamping dies and automatic presses, respectively.

"When it comes to producing vehicle components, OEMs need to focus on materials with an improved life cycle assessment, more than ever before. bluemint® Steel is the ideal solution for this," says Dr. Heike Denecke-Arnold, COO of thyssenkrupp Steel. Hervé Daenens, VP Operations at Snop (2nd from right), Simon Stephan, Senior Vice President Sales Automotive (l.) and Stefan Slawik, responsible key account manager, are in agreement.

more looking to reduce their CO_2 emissions in the production phase as well. This poses challenges that we are responding to, among other things, with a climate-friendly material like bluemint® Steel," says Key Account Manager Stefan Slawik from thyssenkrupp Steel's Sales Automotive unit.

Growing interest in CO_2-reduced steel

The concept of high-quality flat steel with reduced CO_2 intensity is currently gaining momentum in many processing industries. Consequently, it has also aroused marked interest among those in positions of responsibility at Snop. "The whole automotive industry is looking at emissions reduction right now. Snop is playing the active role and regards this as an opportunity to safeguard its position as a supplier to OEMs in the long-term," explains Hervé Daenens, VP Operations at Snop.

The material could now be used for the first time in a car body component manufactured at the Snop plant in Zwickau for a European premium manufacturer. For years now, the traditional brand has placed a special focus on the topic of sustainability, and was thus attracted to bluemint® Steel. Simon Stephan, Senior Vice President Sales Automotive at thyssenkrupp Steel: "The fact that bluemint® Steel is being received so positively by renowned automotive industry partners represents an important signal for the industry, and shows which way the wind is blowing in terms of sustainable materials in the future."

Climate-friendly cooperation (from left): Slobodan Vukovic, Steel Executive Manager, Jan Selbach, Senior Director Purchasing, and Hervé Daenens, VP Operations, all three from Snop, with Dr. Heike Denecke-Arnold, Steel COO, Simon Stephan, Senior Vice President Sales Automotive, Stefan Slawik, responsible key account manager at Steel and Luis Frias, Manager Purchasing Steel Trading at Snop.

bluemint® Steel is in great demand

Snop is by no means the only company to have signed a memorandum of understanding with thyssenkrupp Steel on the future supply of bluemint® Steel. There are now well over a dozen different MoUs (memorandums of understanding) in place in the Automotive, Industry, Electrical Steel, Packaging Steel and Precision Steel sales areas. The cooperation partners currently include, among others:

Amprion Enel | Benteler | Bilstein | CDW | EMW | Ford | Gedia | Italpack | Itla-Bonaiti | JFE Shoji | Kaldewei | Miele | MPE/ZF | Mubea | Risse + Wilke | Siemens Energy | Snop | Würth

Web

More information about bluemint® is available here:
www.bluemint-steel.com

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Sustainably aesthetic: building with bluemint® pladur®

bluemint® pladur® is a material like no other. The diverse selection of surfaces is greatly beloved by architects for their **planning and design of buildings**. However, it is not only the appearance but also the technical characteristics that win their hearts: the CO_2-reduced material is ideal for sustainable building projects. This is demonstrated by a current project at the steel trading company Heinrich Schütt.

Copy Julia Joswig

7000 square meters of facade clad with bluemint® pladur® Daylight: Heinrich Schütt relies on sustainable materials when refurbishing the warehouse at its Hamburg location.

pladur® has been established as a coil-coated steel of the highest quality for more than 60 years now. The versatile product offers impressive economy, functionality, workability, sustainability and, of course, surfaces. Now it is also available in the CO_2-reduced bluemint® variant – and is already being used by the Heinrich Schütt company as a commercial facade solution.

Specifically, this is for a 24,000 square-meter warehouse that Heinrich Schütt modernized at its Hamburg location. The company pursues ambitious sustainability goals, so it was clear from the start: when refurbishing the existing building, it was important to select materials

Taking the path of transformation together, towards greater sustainability (from left): Christian Winkler and Thomas Naydowski, Managing Directors of Heinrich Schütt, Thomas Naydowski, Managing Director of Heinrich Schütt, Axel Pohl, Head of Sales Industry OEM and SSC at thyssenkrupp Steel, and Georg Wurzer, owner and Managing Director of Wurzer Profiliertechnik.

not only on the basis of their performance, but also taking their environmental footprint into account.

bluemint® pladur® offers several key advantages

bluemint® pladur® from thyssenkrupp Steel was chosen for the wall area, covering a total of around 7000 square meters. The trapezoidal profiles produced from the CO_2-reduced steel were manufactured and supplied by Wurzer Profiliertechnik. "We know pladur® from the surface refinement sector. What really appealed to us was the corrosion resistance as well as its good formability and resilience against outdoor weathering. Ideal for the facade," explains Thomas Naydowski, Managing Director of the steel trading company Heinrich Schütt. "With bluemint® pladur®, we are making a contribution to sustainability and reducing the carbon footprint by around 70 percent – and at the same time achieving real savings in CO_2 emissions from steelmaking at the Duisburg location. So, our decision could not have been clearer."

Successful partnership

The decision has left Heinrich Schütt's warehouse looking resplendent: bluemint® pladur® Daylight is used in the elegant color of silver-gray. The color was not chosen at random, but references the look of the steel stored in the hall. "We have been sourcing pladur® for many decades now, primarily for facade solutions – in this case including the bluemint® variant. That means we now also have a sustainable coil-coated product in our portfolio, one which presents our customers with additional options for sustainable building planning," says Georg Wurzer, owner and Managing Director of Wurzer Profiliertechnik.

It took less than one year to build the warehouse – from the time the bluemint® pladur® was ordered in April 2022 to completion in January 2023. We are proud that we were able to supply our first bluemint® material under the pladur® brand to two strategically important partners of thyssenkrupp Steel at once as part of this project: Heinrich Schütt, which took a conscious decision in favor of our material for sustainability reasons, and Wurzer Profiliertechnik. The latter snapped up the order for the production of trapezoidal profiles," says Axel Pohl, Head of Sales Industry OEM and SSC at thyssenkrupp Steel. "It's great to see that we're taking the important path of transformation with our customers, not just by addressing the issue, but by actively living it."

Web

More information about bluemint® is available here:
www.bluemint-steel.com

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Photos: Rainer Kaysers

Decarbonizing
the energy industry together

At the internationally active R&S Group, headquartered in Switzerland, the tension is literally building in the business: specializing in the construction of distribution, dry-type and power transformers, the group of companies produces precisely those systems that are indispensable for the energy and mobility revolution. **bluemint® powercore®** from thyssenkrupp Electrical Steel is now being used in production there for the first time. CO_2-reduced electrical steel opens a new chapter in sustainable climate steels used for transformer construction.

Copy Jan Ritterbach

The first transformers containing bluemint® powercore® electrical steel strips were built at R&S in early 2023 by the subsidiary Rauscher & Stoecklin. Intended for the Swiss distribution network operator Stadtwerke Wetzikon, the systems are a strategically important lighthouse project for the manufacturer. It demonstrates the positive leverage effect that can be applied within production processes for their own carbon footprint if sustainable climate steel is used in plant construction instead of conventional materials. "This is increasingly becoming a relevant topic for industry right now, because many of our customers' customers are aiming to reduce their Scope 3 emissions," observes Martin Berendt, Key Account Manager at thyssenkrupp Electrical Steel. Berendt continues: "A transformer that is already CO_2-reduced is effectively the plug-and-play solution to achieving these goals."

Top grades from Europe

The emission savings in transformer production are made possible because bluemint® powercore® is not only a material that offers low losses in use, but also low CO_2 in production. The CO_2 intensity of bluemint® powercore® is 50 percent less than conventional grain-oriented electrical steel. Specifically, thyssenkrupp Electrical Steel processes CO_2-reduced hot strip from thyssenkrupp Steel into bluemint® powercore® in both Gelsenkirchen (Germany) and Isbergues (France). And it does so in the highest technological grades currently available – the top grades – and as the only company at all to do so in Europe. For the R&S Group, this regional factor should not be underestimated: "Global supply chains have come under significant pressure in recent years. Having a reliable supplier in Europe with thyssenkrupp Electrical Steel is a big advantage for us," says Mirco Gisin, head of the Transformers profit center at Rauscher & Stoecklin.

It therefore goes without saying that Rauscher & Stoecklin is banking on reliably available bluemint® powercore® for its pilot project with Stadtwerke Wetzikon. The low-loss electrical steel is installed in the transformer core of the 1000 kVA-strong unit, and has thus been helping to supply energy to a public building complex belonging to the municipal utility, Stadtwerke Wetzikon, in Canton Zurich, in a

Photos: Rainer Kaysers, Rauscher & Stoecklin, Silas Films/F. Borner AG

sustainable manner since April 2023. The system not impresses with its internal performance values. The sustainability concept is also made apparent to the outside world by means of a special design. Mirco Gisin: "The transformers are branded with the bluemint® logo, indicating that environmental considerations also played a role in selecting the material – and not just for the municipal utility company, but also for our customer Borner from Reiden, one of the leading power engineering companies in Switzerland, which installed the transformer."

Sustainable and powerful: the new bluemint® transformer was installed in April 2023 and has successfully started operation

bluemint® powercore® scores twice over

The transformer project in Switzerland is not the only order in which R&S is relying on bluemint® Steel. Another current use case can be found at the branch of a premium automotive manufacturer from Germany – albeit on the other side of the Alps.In the Italian capital Rome, R&S subsidiary Tesar supplied transformers for the vehicle dealer's electric mobility charging solutions in early March. bluemint® powercore® is also used for these charging stations because the customer's stipulations are moving to a growing extent in the direction of sustainability.

This is not an isolated case, explains Luigi Corsico, a member of Tesar's Executive Board: "On the one hand, sustainability is becoming increasingly crucial for end customers. This is what manufacturers need to pay attention to. On the other hand, EU regulations such as the new Ecodesign Directive stipulate that new-build transformers must be more efficient than previously." With bluemint® powercore®, both of these requirements can now be met. Corsico: "We score twice over because the material is CO_2-reduced while also cutting losses during transformation even more than required by the new rules. We will bring these benefits to our customers proactively in the future."

Martin Berendt of thyssenkrupp Electrical Steel (l.) shows his customers Luigi Corsico of Tesar (m.) and Mirco Gisin of Rauscher & Stoecklin around the steel production operations in Duisburg. In the next processing step, bluemint® powercore® for transformers is produced from this input stock in Gelsenkirchen and Isbergues.

Finally, at Rauscher & Stoecklin's headquarters in Switzerland, bluemint® powercore® is prepared for use in the latest generation of low-loss transformers.

Web

Further information about bluemint® Steel can be found here:
www.bluemint-steel.com

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The line applies high-quality zinc coatings to the steel strip: pure zinc and zinc-magnesium coatings, such as ZM Ecoprotect®.

Taken into operation (from l.): thyssenkrupp Steel CEO Bernhard Osburg, Minister President of North Rhine-Westphalia Hendrik Wüst, Dortmund's Lord Mayor Thomas Westphal and District President Heinrich Böckelühr symbolically pressed the red button in October 2022.

Dortmund will be a center for high-tech surfaces

By taking the new hot-dip galvanizing line (FBA 10) into operation, thyssenkrupp Steel has opened another chapter in the history of its Dortmund location with plenty of scope for future developments. The production facility, which was inaugurated in the presence of the Minister President of North Rhine-Westphalia Hendrik Wüst, will primarily benefit customers from the automotive industry. They are increasingly turning to **hot dip galvanizing** for premium surfaces and improved corrosion protection.

Copy Jan Ritterbach

thyssenkrupp Steel has invested about a quarter of a billion euros in the new line, which will produce 600,000 metric tons of flat steel every year, predominantly high-tech steels for vehicle production. They include high-quality zinc, pure zinc and zinc-magnesium coatings such as ZM Ecoprotect®, for all inner and outer panels, also in primetex® quality. It is also noteworthy that strip widths from 950 to 1850 millimeters can be produced in the FBA 10. This is a major benefit for the automotive industry, especially for the manufacture of SUVs. The available thicknesses range from 0.5 to 2.3 millimeters, and the maximum coil weight is up to 36 metric tons.

The FBA 10 also offers numerous customer benefits with regard to finishing: a modern four-high skin-pass mill with state-of-the-art high-pressure cleaning for working and backup rolls and integrated shapemeter meets high demands in terms of roughness and flatness. The strip inspection stand offers ideally illuminated horizontal and vertical observation and grinding sections. The electrostatic oiling machine is designed for second generation prelubes. Bernhard Osburg, Chairman of the Executive Board of thyssenkrupp Steel, declares: "With the new state-of-the-art hot-dip galvanizing line, we are serving the continuing trend among our customers toward hot-dip galvanized steels, especially in the automotive industry, but also in the household appliances industry. The FBA 10 line will enable us to differentiate ourselves even more decisively from the competition through the quality of our products."

This is the new FBA 10

The finished line has a length of about 350 meters and measures about 65 meters at the highest point. Among other things, 8,000 metric tons of steel and 24,000 cubic meters of concrete were used. The work included 180 foundation piles with a diameter of about 1.5 meters that extend as much as eleven meters deep into the ground. The line will produce around 600,000 metric tons of hot-dip galvanized steel per year. A wide range of grades will be produced in almost all strength classes for outer panels and structural components, as well as selected industrial products.

The goal is carbon neutrality

With the completion of the major investment, thyssenkrupp Steel has implemented another key project in its strategy for the future. The Minister President of North Rhine-Westphalia, Hendrik Wüst, spoke in its praise during the opening ceremony in the fall of 2022: "The steel industry is a key sector in our state when it comes to meeting the challenges presented by the transformation toward carbon neutrality, and creating secure and well-paying jobs. This is impressively demonstrated by thyssenkrupp Steel's new hot-dip galvanizing line."

Wüst also regards the investment in the future as a vote of confidence in the location, which now has the opportunity to become the first carbon-neutral industrial region in Europe. In fact, the new FBA 10 will make Dortmund the continent's center for competence for hot dip galvanizing and surface technologies. Together with the FBA 8 line, which is located just a few meters away, around one million metric tons of hot-dip galvanized products will roll off the two state-of-the-art lines in the future.

Web

All the information about the current investments can be found here:
www.thyssenkrupp-steel.com/de/investitionen

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The Minister President of North Rhine-Westphalia, Hendrik Wüst ((l. central) and CEO of thyssenkrupp Steel, Bernhard Osburg agree that the investment is a vote of confidence in the location. Now, it has the chance to become Europe's first carbon-neutral industrial region.

Photos: Jochen Brood, Rainer Kaysers, thyssenkrupp Steel Photography

Priority for electric mobility in Bochum

With the laying of the foundation stone for the new annealing and isolating line in March 2023 and the new double reversing stand in fall 2022, thyssenkrupp Steel has launched two important **innovation projects** in Bochum at the same time. The focus is on special steels for the energy turnaround and electric mobility,expanding the location into a center of competence for electric mobility.

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thyssenkrupp Steel continues to press ahead with the implementation of its Steel Strategy 20-30. The foundation stone for a double reversing stand was laid at the Bochum location in October 2022. This unit will make it possible to produce even thinner and higher-strength steels in the future for electric mobility applications. The investment amounts to about 100 million euros. The project partner is plant manufacturer Primetals Technologies, based in London, UK. The unit is scheduled for completion by summer 2023.
Dr. Heike Denecke-Arnold, Chief Operations Officer (COO) at thyssenkrupp Steel: "The investment in the new double reversing stand is a clear signal for the Bochum site. We aim to further strengthen our competencies in ultra high-strength steels and in the field of electric mobility in order to distinguish ourselves more clearly through the quality of our products in the future as well. We want to produce even thinner and higher-strength sheets, for example, to help further increase the energy efficiency and thus the range of electric motors."

Trend toward thin materials

The background for the new-build lies in the trend in the automotive industry towards ever thinner and highly silicized materials, which place increased demands on the cold rolling technology, among other things. The new double reversing stand will meet these demands and significantly enhance the site's capabilities for non-grain-oriented electrical steel. With its back and forth (reversing) actions, the number of which can be controlled at will, the mill stand will be able to roll particularly thin materials with excellent flatness and tightest thickness tolerances. This is particularly important for sheets used in electric motors and generators, for example for wind turbines, because it can minimize core losses.

Moreover, the new double reversing stand will strengthen the Bochum site's capabilities in ultra high-strength products for the automotive industry. Such steels are used, for example, in chassis and crash-relevant components and pro-

The foundation stone is laid (from l.): Engin Karakut, Chairman of the Works Council at thyssenkrupp Steel in Bochum, Markus Kovac, head of the Bochum works area, Eyüp Demirtas, foreman at the Friedrich Rempke building contractor, Steel COO Dr. Heike Denecke-Arnold, André Schneider, CEO SMS group for the European region, and Rouven Beeck, Managing Director of Bochum Wirtschaftsentwicklung (Bochum Economic Development).

Photos: Rainer Kaysers

Construction gets underway: thyssenkrupp Steel COO Dr. Heike Denecke-Arnold lays the foundation stone together with (from l.): Markus Kovac, head of the Bochum works area, Eyüp Demirtas, foreman at the Friedrich Rempke building contractor, and Bochum's mayor Thomas Eiskirch.

vide occupant protection. The investment will help thyssenkrupp Steel further expand its capabilities in cost-effective lightweight construction for the automotive industry.

Bochum becomes a center of competence

However, the new double reversing stand is only one of the major investments made within the scope of the Steel Strategy 20-30. In addition to this investment, for example an annealing and isolating line will be built, the foundation stone for which was also laid in March 2023. The modern and energy-efficient unit will be capable of producing even thinner electrical steel strips with particularly homogeneous mechanical and magnetic properties. They are designed to meet the requirements of highly efficient motors used primarily in electric vehicles. In the new plant, the microstructure of the cold-rolled strip is recrystallized during the annealing process, following which it is adjusted to the corresponding texture. After the annealing process, it is provided with an insulating layer, which is particularly important for the sheets used in electric motors and generators to increase the efficiency of the motors. With this goal in mind, the plant will produce up to 218,000 metric tons of non-grain-oriented electrical steel per year in the future. The investment amounts to about 150 million euros. The project partner is the plant builder SMS group from Düsseldorf. The unit is scheduled for completion by 2024.

With the investments in the two future projects, the location on Essener Strasse is to be developed into a center of competence for electric mobility over the next few years. "Materials for electric mobility are going to shape tomorrow's steel markets to an increasing extent. We intend to be a leading player in this with high-tech products from Bochum. The new annealing and isolating line will further strengthen our capabilities in thinner, highly silicized, non-grain-oriented electrical steel for electric mobility. The double reversing stand will also further enhance capabilities in higher strength products. With our steels, we will thus contribute to further increasing energy efficiency, for example, and with that also the range of electric vehicles," states Dr. Denecke-Arnold.

The trend in electric mobility is toward increasingly sophisticated grades. The new lines will meet these demands and significantly enhance the capabilities and capacities for non-grain-oriented electrical steel at the Bochum site.

Web

All the information about the current investments can be found here:
www.thyssenkrupp-steel.com/en/investments

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“Setting the pace with new ideas”

To implement Strategy 20-30, the **Innovation** department is driving **product, service and application development** at thyssenkrupp Steel. Solutions that create added value for customers not only today, but also tomorrow.

Copy Jan Ritterbach

Innovation at thyssenkrupp Steel is multifaceted. The department of the same name brings together Product Development, Application Technology and the two service departments of Chemical and Materials Testing, all under one roof. In addition, there is a further team for the protection of intellectual property. Because of their enormous strategic importance for the transformation, the ideas, products and services developed here will require decisions from the top tier of management – and consequently, the department has been organizationally assigned to CEO Bernhard Osburg’s area of responsibility of since the beginning of 2023. The department is headed by Niels Lohmeyer and comprises around 650 employees in total in 20 highly specialized teams. Its aim is, above all, to drive forward the customer-oriented development of high-quality flat steel products.

Emphasizes the importance of trend analysis in finding new ideas and innovations for thyssenkrupp Steel: Niels Lohmeyer, head of Innovation.

Identifying trends quickly

Niels Lohmeyer is concerned with two aspects with two different time tracks. On the one hand, a task that must be carried out in the here and now: providing the company’s own Sales department with the developments that are immediately required by customers. On the other hand, a task with a view to the future, namely anticipating new market needs and thinking ahead to appropriate solutions: for example, the bodies of electric cars or autonomous driving. Niels Lohmeyer is convinced that this is not only a genuine necessity but also a real opportunity: “As a German steelmaker, we are never going to be the cost leader in global terms. That explains why it is important for us to generate momentum with new ideas, applications and products. Ideally, we will be the first to identify trends and quicker on the draw than others when it comes to innovations.”

To ensure it has the right products in its portfolio not just today, but also in 15 years’ time, thyssenkrupp Steel is focusing more than ever on networking. This includes not only our own internal customers at the distribution companies but also other players in the supply chain, such as companies from the chemical industry or paint production. In addition, organizations such as steel institutes, research centers and universities are welcome partners.

In demand: efficiency and sustainability

Efficiency and sustainability are driving development right across the industry: “We are all part of the transformation and we need to find carbon-neutral solutions. The recent extreme hikes in cost for energy and raw materials are making for a particular sense of urgency. Here, we want to work with our customers and partners quickly to develop the relevant products and processes so we can jointly benefit from the changes,” explains Stefan Eiden, head of Application Technology at thyssenkrupp Steel.

Whether it’s about a product, service or any other topic: development work at thyssenkrupp Steel always takes a holistic approach. For example, expertise in materials and processing goes hand in hand with conceptual knowledge and scientific methodology. “We support our customers’ demands for solutions that save resources, involving alternative concepts in combination with our materials and processing expertise. Reporting cost, weight and LCA ratings

Niels Lohmeyer (l.) and Stefan Eiden will be happy to answer any questions about materials or processes.

helps customers in all end-user industries to make informed decisions," says Stefan Eiden.

This is also made apparent through the close integration of product development and application technology at the Duisburg and Dortmund locations. There are more than 150 pilot and test facilities – including a wide variety of presses and welding systems as well as a roll forming and flow-forming machine – enabling tests to be carried out in advance to ensure that the materials developed will perform as desired later at the customer's plant.

Answers to complex questions

The experts from thyssenkrupp Steel are also involved in conceptual work. For example, they are looking into the economic and technical advantages of lightweight steel solutions. Electric mobility presents major opportunities for thyssenkrupp Steel with additional material requirements of 200 to 250 kilograms per vehicle. Eiden: "That explains why we have developed body concepts with the selectrify® reference structure. We recognized at a very early stage what advantages that steel would bring for battery housings in terms of cost, LCA and fire protection, for example. In our new benchmark area, for example, we have analyzed electric motors, and we can now also use a new laser cutting machine to provide the thinnest possible electrical steel strips for electric motor prototype studies."

When it comes to collaboration, Niels Lohmeyer observes an interesting trend: "More and more frequently, these intensive collaborations are giving rise to genuine development partnerships with equipment builders and customers. They start off with research and then move on to customized product and process development, followed by support in series production. We are delighted about this and it makes us very optimistic about the future."

Stefan Eiden, head of Application Technology at thyssenkrupp Steel, is driving forward networking with academics, customers and suppliers.

Photos: Rainer Kaysers

Milestones in steel development

An overview of key innovations from thyssenkrupp Steel over the last four decades:

1983: Invention of the tailored blank

2002: Market maturity of ultra-high-strength multiphase steels

2003: NSB® NewSteelBody concept

2012: Start of series production of the tailored tempering process

2014: InCar® plus – solutions for automotive construction

2014: ZM Ecoprotect® – zinc-magnesium coating for car bodies

2018 – 2022: Completion of the dual-phase steel portfolio and expansion of dimensions

2020: selectrify® – steel solutions for electric mobility

2020: AS Pro – new, pioneering coating for hot stamping of ultra-high-strength MBW® steels in automotive construction

2021: smartform® – first high-volume application of cost-optimized forming of ultra-high-strength steel grades without springback

Web

For more information about innovation at thyssenkrupp Steel:
www.thyssenkrupp-steel.com/en/innovations

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“We have internalized what dual-phase steels need to achieve”

thyssenkrupp Steel’s broad **portfolio of dual-phase steels** is backed up by an interdisciplinary team of experts from Research and Development, Application Technology and Product Management. Their common mission: to understand market requirements in detail, leverage potential for tangible customer benefits, and deliver tailored solutions for them.

Copy Jan Ritterbach

Dual-phase steels are like the Swiss Army knife in thyssenkrupp Steel’s product portfolio. As classic universal grades for crash-relevant structural components in car body construction, they show their potential when a balance is required between high and ultra-high strengths, and good forming and joining properties. This is why they play an important role in lightweight construction, and especially in electric mobility in which the demands for crash safety and battery protection are extremely high. Their share among multiphase lightweight structural steels for cold forming has been rising for years, and currently stands at an impressive 90 percent.

There is nothing to suggest that demand will weaken. On the contrary: steel not only has an excellent price/performance ratio, but also represents the simplest way of saving weight efficiently in lightweight vehicle construction. As a product manager for multiphase steels at thyssenkrupp Steel, Dr. Patrick Kuhn has also been the direct contact for all questions relating to the product portfolio for several years now. He raises customer awareness of efficient and sustainable lightweight construction solutions:

“The most sustainable material, is always the one that is not produced in the first place. Here, we are not only talking about the basic material but also alloying elements, of course, which can all be saved as resources. That’s why steel – and dual-phase steels in particular – are unavoidable in lightweight construction.”

Correct answers to complex questions

The team’s secret of success with DP steels is to respond precisely to the requirements of the market, and to work out what is essential in the development of a successful product. “What makes the grade?” or: “Which properties are critical?” These are just a few of the many questions on which Product Management, Application Technology and Steel Development work closely together to find the right answers. It is a general rule: Complex component geometries continue to set limits on the use of ever higher strengths for weight optimization in the automotive industry. Whereas forming operations can still be carried out without problems at 600 MPa, doing this might no longer be readily feasible if a higher strength is used. DP steels provide a remedy here: “We have internalized what dual-phase steels need to achieve, and we are now able to supply the right DP steel for every application. There are even three different variants for each strength class. This gradation of the portfolio is something really special on the market,” explains Dr. Patrick Kuhn.

Targeted development work forms the basis for creating such a differentiated product range. This is where Nicholas Winzer, among others, comes in. He has been working at thyssenkrupp Steel for eight years now, and conducts import-

Photos: Rainer Kayser

ant fundamental research into dual-phase steels. "It's about balancing material concepts in such a way that efficiency and stable processing generate added customer value." His core topics include, for example, investigating and optimizing the edge cracking sensitivity of multiphase steels. "Compared to other steel grades, DP grades are more prone to cracking at the punched edges during the forming processes. The better we can get a handle on this problem, the better a material can be formed into the desired shape."

Efficient improvements for perfect products

Winzer and his colleagues have many years of experience under their belts, thanks to which grades from the 600 to the 1,200 strength class score particularly well when processed in the stamping shop. The hole expansion ratio, which is decisive for edge cracking sensitivity, has been significantly increased in all classes. "Our main attention is always on developing our products efficiently and optimally. In this case, we were able to achieve the desired edge cracking sensitivity by changing the annealing process, for example. We did not have to intervene at the chemical level."

The pursuit of high-performance products is positively fueled within the company by the Application Technology department. Here, the team has to put itself in the customer's shoes and understand exactly what their colleagues need. Thorsten Beier from the Forming Technology department explains: "Crash safety plays a particularly important role when building a car body. Then, a key question is: Which material do we need to use where, and with which properties? Our analyses can provide us with important impetus for the further improvement of materials in research and development." Our customers' requirements are also becoming increasingly specific. Understanding local properties such as robustness to edge cracking plays an important role in addition to familiar global properties.

Beier, who has called thyssenkrupp Steel his professional home for more than two decades now, is involved with virtual methods for designing forming processes and components, among other things. These are used to investigate the local and global behavior of the materials – for example, how far a material can be deformed until necking or cracking occurs. "Through our investigations, we ensure that the material will flow into the component and come out of the press as desired, even before it is used at the customer's site."

In addition, Beier and the Application Technology team provide advice and support to Product Management and customers on detailed questions: for example, in issues relating to material approval or at shop floor level if irregularities occur during processing. Dr. Patrick Kuhn: "Providing close support to our customers on the wide range of topics relating to multiphase steels is an essential part of our understanding of service."

Combined expertise and responsive team competence in multiphase steels at thyssenkrupp Steel: Nicholas Winzer, Dr. Patrick Kuhn and Thorsten Beier (from l.)

Web

Further information about the multiphase steel can be found here:
www.thyssenkrupp-steel.com/en/dp-steels

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In service:

New chassis steel for high flexibility and production reliability

With its new **CH-W® 660Y760T** product, thyssenkrupp Steel is offering the automotive industry a high-strength multiphase steel ideally suited for meeting highly demanding requirements, especially in the chassis area. The cooperation partner Gestamp, an internationally renowned supplier to the automotive and commercial vehicle industry, is the first customer to successfully use the material for producing complex chassis parts.

Copy Jan Ritterbach

Good cooperation, successful development: the new hot-rolled chassis steel is a product of the close cooperation between Gestamp and thyssenkrupp Steel.

There is hardly any other area of production today where the formability of materials plays such an important role as in the chassis. The increasingly complex components used in automotive chassis require not only very robust, but also high-strength steels with good formability. Tight bending radii or good hole expansion properties are just two examples among many showing how the automotive industry is placing increasing demands on modern chassis steel.

thyssenkrupp Steel developed hot-rolled CH-W® 660Y760T chassis steel in close cooperation with its customer Gestamp. "The new grade guarantees a hole expansion of at least 60 percent and is ideal for complex, cold-formed chassis components," explains Melanie Dinter, sales engineer at thyssenkrupp Steel. "The targeted coordination of chemical analysis and production in our modern hot strip mills results in a particularly homogeneous microstructure, with a positive effect on processing in the customer's stamping shop."

Tests deliver convincing results

Initial test stampings at Gestamp have already confirmed the good property profile of the new multiphase steel. The multinational company operates several locations in Germany, including Bielefeld and Ludwigsfelde. It supplies a wide range of products that are installed in the body, chassis, and mechanical and mechatronic systems of automobiles and commercial vehicles. From the initial idea, along the entire development phase, through to series production: Gestamp works together with its customers throughout the entire process. As part of the process of selecting a material to be used in control arm components for a well-known German vehicle manufacturer, the supplier embarked on a complex component release process in close cooperation with thyssenkrupp Steel. Melanie Dinter: "As part of this practically oriented work conducted jointly, intensive trials were carried out over a period of months both at our Duisburg location and at the Gestamp centers in Bielefeld and Bilbao." Initially on a laboratory scale, then later on the prototype die and, finally, on the series production die.

Many advantages and a robust process

Several trial runs in a production die showed that CH-W® 660Y760T can reliably handle even critical forming stages as well as accommodating large openings and the tightest of radii. Both in component design and during subsequent processing by the customer: the hot strip in the 800 strength class promises the greatest possible flexibility with guaranteed high production reliability. Also an advantage: The material meets the requirements of VDA grade HR660Y760T-CP and DIN EN grade HDT760C, and offers significant reserves in elongation at break compared with established complex-phase steels of this class. The chemistry is also right: "The coordinated chemical analysis indicates a low carbon equivalent, which leads to excellent MAG welding properties," explains Alexander Lange, the product manager responsible for hot strip at thyssenkrupp Steel. "Welding tests, for example, confirmed an extremely low hardening in the heat-affected zone. This is a considerable advantage, and not only for components subjected to vibration."

After a final check of the fatigue endurance properties on the real component, the material was approved by Gestamp and is now being used in various chassis components made by a well-known German OEM. "With the new chassis steel grade from thyssenkrupp Steel, we are in the best possible position to meet our customers' requirements for complex, high-strength chassis parts, and set up a robust production process," says Dr. Mehdi Asadi, Material Engineering Manager at Gestamp, with satisfaction.

Close and successful cooperation: Alexander Lange (left) and Melanie Dinter from thyssenkrupp Steel together with Dr. Mehdi Asadi, Material Engineering Manager at Gestamp.

About Gestamp

Gestamp is one of the largest and most eminent suppliers to the international automotive and commercial vehicle industry, with a presence in more than 24 countries. Headquartered in Madrid, the company currently employs nearly 43,000 people at more than 100 locations and 13 R&D Centers around the world. The broad portfolio includes, among other things, the design, development and production of chassis and body parts as well as mechanical and mechatronic components.

Web

You can find out more about bainitic chassis steels with guaranteed hole expansion at:
www.thyssenkrupp-steel.com/en/ch-w

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Photos: Rainer Kaysers

ZM Ecoprotect® Solar: the steel for solar parks

Solar parks need robust mounting structures with effective corrosion protection in order to generate green energy economically and sustainably. With **ZM Ecoprotect® Solar**, thyssenkrupp Steel is now offering high-performance zinc-magnesium-coated steels for PV mounting systems – durable, robust and sustainable..

Copy Julia Joswig

"ZM Ecoprotect® Solar – guaranteed durability for PV installations," says Arne Schreiber, Product Management Industry at thyssenkrupp Steel.

In order to advance the energy turnaround in Europe in a decisive way, significantly more photovoltaic capacity will have to be installed over the coming years than has been the case to date. The average service life of a solar installation is between 20 and 25 years. Given these long operating times, high-performance steel substructures are required in particular for the solar modules of photovoltaic ground-mounted systems. With ZM Ecoprotect® Solar, thyssenkrupp Steel is now offering a zinc-magnesium-based corrosion protection solution that is significantly more effective than conventional hot dip galvanizing, and can withstand almost anything that the weather can throw at it.

"We know what exacting demands our customers have in terms of service life and workmanship in the construction of PV mounting systems, and we offer a corresponding portfolio of grades with high-quality ZM coating – including a 25-year guarantee against rust penetration", explains Arne Schreiber, Product Management Industry at thyssenkrupp Steel. „This is a further development of the tried-and-tested ZM Ecoprotect® zinc-magnesium coating, which has already proven itself in the construction industry for decades."

ZM Ecoprotect® Solar offers several advantages compared to pure zinc coatings. Thanks to the addition of magnesium, the application

Photos: Rainer Kaysers, Shutterstock

Sturdy for many years to come: mounting structures made of ZM Ecoprotect® Solar for safe and low-maintenance operation of your photovoltaic installations.

Jörg Paffrath, Senior Vice President Sales Industry: "Additional sustainability: ZM Ecoprotect® Solar and bluemint® Steel conserve resources."

thickness can be significantly reduced compared to conventional zinc coatings, while offering equivalent corrosion protection and even higher-quality protection at cut edges and drilled holes.

This is possible because ZM Ecoprotect® Solar forms a particularly resistant and durable protective layer on the steel surface, thus protecting the steel in corrosive atmospheres. As a result, the new coating is ideal for steel fabrications in outdoor applications. „The ZM coating will also appeal to customers with its excellent processing properties. ZM-coated steels are excellently formable and particularly suitable for roll forming. Their surface is harder than that of zinc coatings, which means significantly less abrasion is generated in the die, and this in turn reduces wear on the forming dies," observes Jennifer Schulz, responsible for the development of zinc-magnesium coating at thyssenkrupp Steel.

The excellent properties of the coating are confirmed by the building regulations approval from the German Institute for Construction Technology (DIBt) and tests by the Karlsruhe Technologies Institute (KTI). For this purpose, an alternate climate test – among other procedures – was carried out on the coated steels to demonstrate the good corrosion resistance of the coatings.

Robust reasons for users to choose these products

„All scenarios for the expansion of photovoltaics point to an enormous demand for steel in Europe. With ZM Ecoprotect® Solar, we are responding to the needs of an attractive and, above all, sustainable market trend in the field of renewable energies. Consequently, we are supporting emission-free power generation using photovoltaics," says Jörg Paffrath, Senior Vice President Sales Industry.

The new coating is the consistent economic further development as an alternative to batch galvanizing The guaranteed service life of up to 25 years also leads to low maintenance expenditure on the PV ground-mounted systems. Paffrath: „With ZM Ecoprotect® Solar, we are clearly offering extra sustainability. It conserves resources through reduced use of zinc, it is 100 percent recyclable, and the entire portfolio is also available as bluemint® Steel – our high-quality flat steel with reduced CO_2 intensity and the same excellent material and processing properties."

Curious? Learn more at the Intersolar trade show.

thyssenkrupp Steel will be at Intersolar Europe this year for the first time with ZM Ecoprotect® Solar. The world's leading trade show for the solar industry will take place in Munich from June 14 to 16, 2023. You will find your contact persons in Hall A6, booth 614.

Made a major contribution to developing the new zinc-magnesium coating: Jennifer Schulz.

Web

Further information about ZM Ecoprotect® Solar can be found here:
www.thyssenkrupp-steel.com/en/solar

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Daily endurance test: Clays, silts, sands, and loams, as well as the stones they contain, represent a continuous challenge to plowshares

Tough and strong

Originally founded as a blacksmith's workshop, the **Lemken** family business has been producing high-quality agricultural machinery since 1780. Today, the company based on the Lower Rhine is one of the leading international manufacturers of agricultural machinery, with 30 subsidiaries worldwide. Its most important products include plows, which are manufactured using boron-alloyed wear-resistant steels from thyssenkrupp Steel. Brand new in use: **TBL® 45**.

Copy Jan Ritterbach

Hardly any tool has influenced the development of agriculture over the past centuries as much as the plow. Today, it is both a curse and a blessing. On the one hand, it loosens and turns over the topsoil, thus increasing the oxygen supply and promoting the decomposition of organic matter. On the other hand, plowing increases soil erosion and water evaporation. "The plow is regaining importance as an alternative to phytosanitary treatments. It continues to be the tool of choice for many farmers, particularly for controlling treatment-resistant weeds," explains Ingo Fricke, a materials technology specialist at Lemken.

The company, whose products are immediately recognizable by their characteristic blue paintwork, specializes in the development of innovative solutions for profitable agricultural machinery. Lemken exports machines with a working width between one and 36 meters to 55 countries worldwide – with great success. In 2022, sales broke through the €500 million barrier for the first time in the company's history.

Every application is a new test

One decisive factor in boosting demand is the special quality of Lemken machines. This is put to the test every day when they used in the various soil types. Clays, silts, sands, and loams, as well as the stones they contain, represent an ongoing challenge to plowshares in practical use.

For this reason, Lemken leaves nothing to chance when it comes to the materials used. The product of choice: Steel. For more than 25 years – and except for brief interruptions – the manufacturer from Alpen in the Lower Rhine region has been sourcing its input stock from

Photos: thyssenkrupp Steel Photography

Successful development partnership (from top): Lena Ruf from thyssenkrupp Steel together with Ingo Fricke and Arne Maas from Lemken.

thyssenkrupp Steel. Hardenable boron steels in particular play a major role in the production of agricultural machinery. From this starting point, further heat treatments and finishing measures are carried out at Lemken in order to be able to offer its demanding clientèle precisely those properties that are required in arable farming. It's about two things in particular: "We need maximum hardness after quenching and tempering to ensure that the parts subject to wear perform as well as possible in all soil conditions. The considerable toughness of the material is equally important, so that the component does not break even under peak loads," says Arne Maas, a strategic purchasing employee at Lemken

Close development partnership

In thyssenkrupp Steel, Lemken has a partner at its side who can supply highly specific steel grades for the special tasks the machines must perform, and who also provides active support in the development of new products. The latest example is the fine-grained boron-alloyed tempered steel, TBL® 45. This is the result of an intensive development partnership that enables completely new qualities in wearing parts at economical costs. The background to this was Lemken's desire to critically examine its own choice of materials. This involved testing different steels for their final hardness and expected service life under the aspect of wear stress on the parts to be manufactured with them during soil cultivation.

Various materials performed well in the demanding tests – including field trials in the truest sense of the word. But only the TBL® 45 grade proved convincing on several levels. On the one hand, with its special hardness of at least 57 Rockwell (HRC – an internationally used unit of measurement for the hardness of technical materials) after quenching and tempering. On the other hand, its price, which is essential not only for Lemken but also for the agricultural technology manufacturer's customers. In addition, the hardenable boron steel simplifies processes at Lemken because the number of steps in the finishing process is lower than for other materials.

The effort was worth it

The overall package of various advantages ultimately led to the decision to use TBL® 45 from thyssenkrupp Steel in Lemken plows in the future. A well-considered decision, in the run-up to which both project partners invested a lot of time and effort for interdisciplinary cooperation. Ingo Fricke: "The product development process, the construction of the prototypes, the work on the validation test rigs, the production of a pilot series – we spared no efforts with thyssenkrupp's help, and in the end achieved the best possible result."

Web

More information about TBL® can be found here:
www.thyssenkrupp-steel.com/en/tbl

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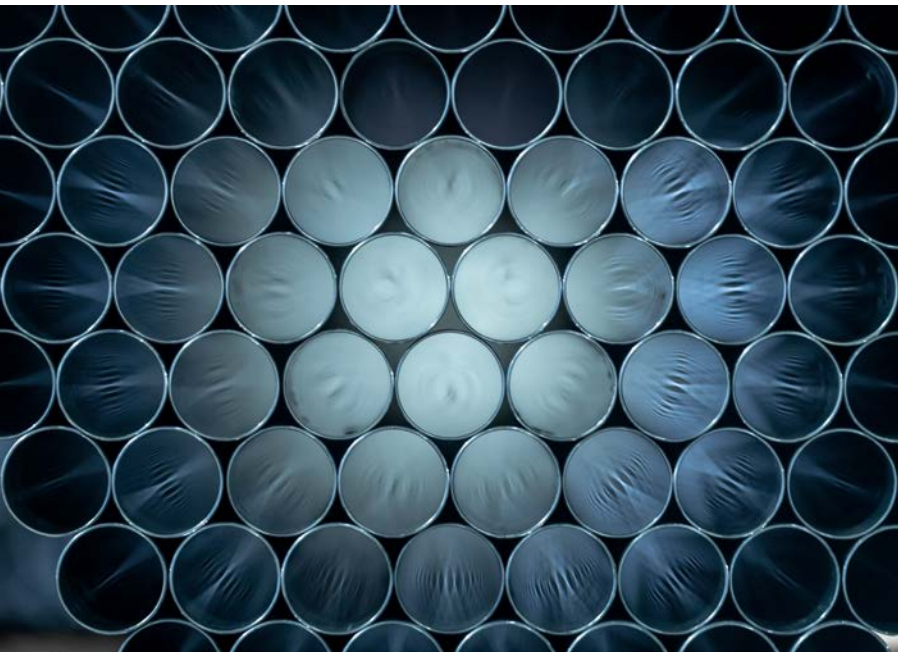
Lemken machines require highly specific steel grades in their application. thyssenkrupp Steel supports the development. The latest example: the boron-alloyed wear-resistant steel, TBL® 45.

Safety thanks to precision and strength

Vincenz Wiederholt is a German company with a tradition stretching back over many years. It manufactures precision steel tubes that can be found in almost every European car, and are also key components for general engineering and the agricultural industry. Most of the input stock for the **high-end precision steel tubes** is supplied by thyssenkrupp Steel.

Copy Julia Joswig



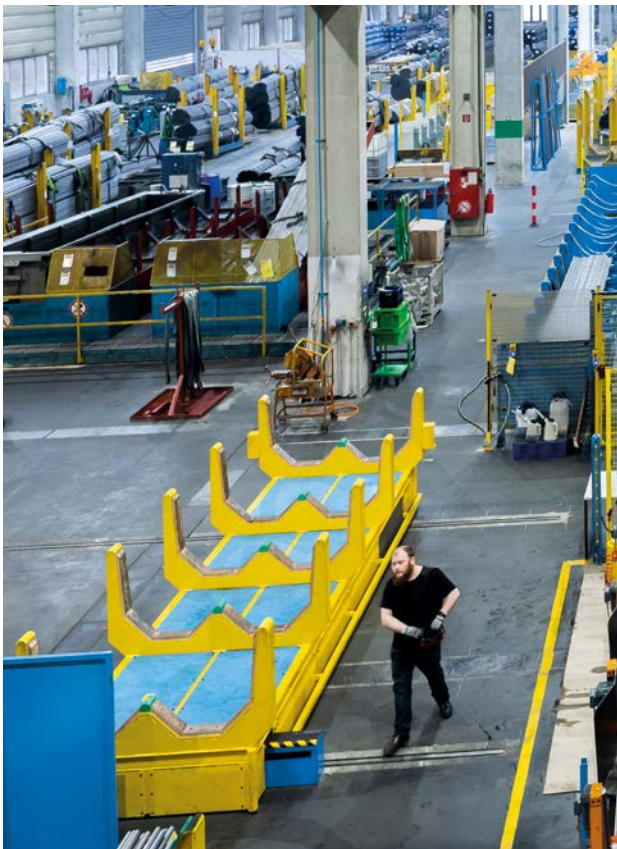
Perfection through precision: tubes from Vincenz Wiederholt play a particularly important role for safety-related parts in vehicles.

The premises for precision tube manufacturing at Vincenz Wiederholt are certainly impressive to behold: at the company's headquarters in Holzwickede, silver tubes are neatly stacked and waiting to be shipped to customers. The tubes shimmer and reflect the sun's rays almost like a vast kaleidoscope, depending on how the light strikes them.

The company processes more than 70,000 metric tons of steel annually, providing a versatile range of structural elements to industrial customers predominantly in the automotive industry. Around 80 percent of the products are used in the form of tubes, sections and components in automotive systems. These include, for example, shock absorbers, cylinder tubes, tubes for tanks or even camshafts. The manufacturing process is far more complex than the layperson might think. "Almost all of our products are used as safety-related parts in the automotive industry. This means we place the very highest demands on the material," explains Uwe Seiger, Purchasing Manager at Vincenz Wiederholt.

Quality combined with responsibility

During production, many parameters have to be coordinated with one another. At Vincenz Wiederholt, the manufacturing process from steel to the finished tube takes place in stages. Hardenable manganese-boron (MnB) steels from thyssenkrupp Steel serve as one of the basic materials. They are characterized by high strength, as well as homogeneity of mechanical properties after quenching and tempering. "Optimized production combined with analysis tailored to the ultimate application mean that our manganese-boron steels in the tubor® series offer high-



Photos: Rainer Kayers

Successful partnership of equals (from l.): thyssenkrupp Steel Key Account Manager Hasan Bagci together with Dr. Johannes Fien and Uwe Seiger from Vincenz Wiederholt.

Cooperation made in the Ruhr region

It's surprising to think that thyssenkrupp and Vincenz Wiederholt have been working together since 1919. What started back then with a delivery of band iron has blossomed into a cooperation between partners who trust one another, and one that positively influences many end-user industries. For example, thyssenkrupp itself: Vincenz Wiederholt also supplies precision tubes to the thyssenkrupp Automotive business unit – a material cycle that benefits everyone.

er strength and improved toughness after quenching and tempering than other grades do," explains Hasan Bagci, the key account manager responsible for them at thyssenkrupp Steel. "Their excellent forming properties in the as-delivered condition make them eminently suitable for welded, cold-rolled or cold-drawn precision steel tubes."

Degree of purity of paramount importance

The hot-rolled wide strip supplied by thyssenkrupp Steel and cut into strips at service centers is welded into tubes at Vincenz Wiederholt. After annealing and chemical preparation, the tubular blank is threaded into a draw bench and then pulled through a die over a mandrel to reduce the outside diameter and wall thickness. The process optimizes the geometrical tolerance of the tube. The drawing process gives the inner surface of the finished tube particularly smooth surface properties. These are required, for example, for further processing into hydraulic cylinders for agricultural machinery. This is also ensured by the tubor® 26 and tubor® 34 steels supplied by thyssenkrupp Steel.

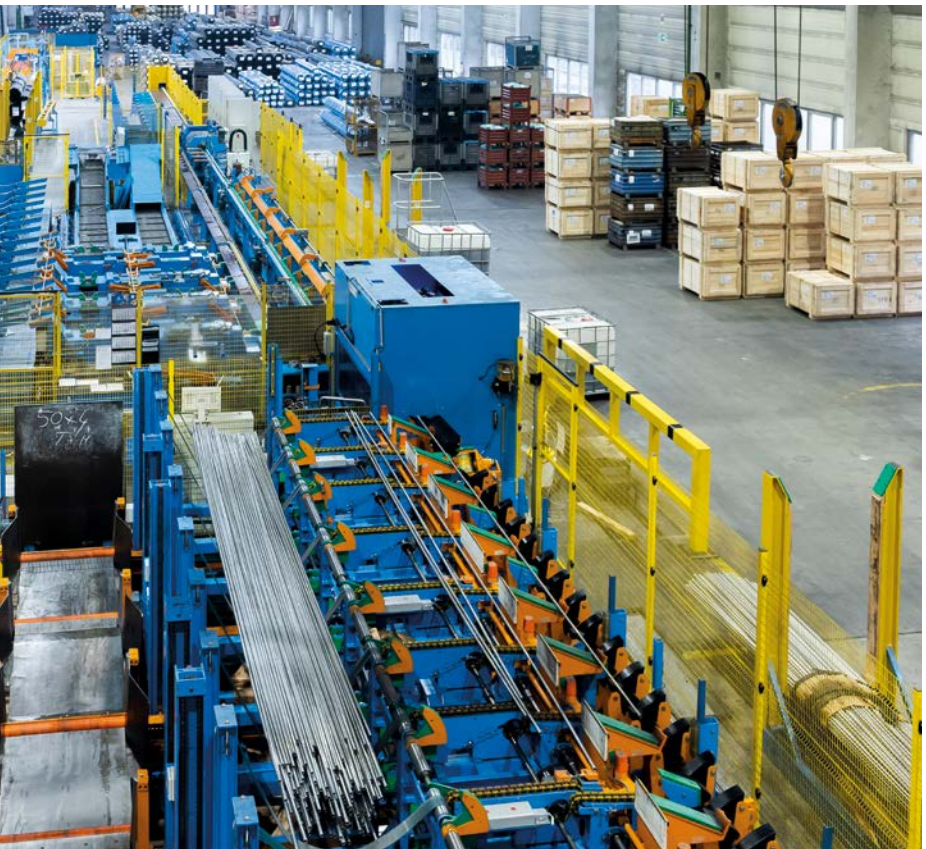
Only after completion can the tubes be checked for cleanliness and defects by eddy-current and ultrasonic testing. Any defects detected are costly, because all of the value added at Vincenz Wiederholt has already been incorporated into this tube.

Homogeneous and fine-grained

As a result, it is all the more important for the input stock from Duisburg to be of very high quality. Especially when the tube has to be annealed, the degree of purity of the steel is very important due to the underlying chemical analysis. "Manganese-boron steels are prone to an effect called segregation. This is not critical as long as it is located centrally in the wall of the strip, but if off-center, for example due to a casting process that is not well controlled, it can have a highly negative effect on the properties of the finished tube," says Dr. Johannes Fien, responsible for process development and application consulting at Wiederholt. "The material from thyssenkrupp Steel is characterized by a homogeneous and fine-grained microstructure with low sulfur and phosphorus content. We take special process engineering measures to significantly minimize segregations in the microstructure – which is a huge advantage for us."

Hasan Bagci is pleased to be able to meet his customer's high expectations: "We are proud that, with our tubor®, we can meet the complex requirements of one of the leading precision tube manufacturers, and thus ensure safety in a wide range of areas together with Vincenz Wiederholt."

It's all about the tube: a look inside Vincenz Wiederholt's production facility, where precision steel tubes of the highest grades are manufactured.



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More information on our tubor® product can be found here:
www.thyssenkrupp-steel.com/en/tubor

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Green steel as a foundation for sustainable construction

Concrete was long considered the only solution for stable and secure foundations. In a joint project, the Winkelmann Group and thyssenkrupp Steel are developing a climate-friendly alternative. The solution: **screw pile foundations**. CO_2-reduced coated hot strip could be used for producing them in the future.

Copy Julia Joswig

Screw pile foundations are the sustainable and future-oriented solution for modern foundation construction. The construction site is always kept in its original state without harmful interference with nature because these foundations can also be screwed into challenging soils. Another advantage compared to the classic method with concrete: The screw pile foundation is quickly screwed into the ground with a force of about 10,000 Newton meters. There is no need for it to be dry, and the builder does not have to wait for suitable weather conditions either. The potential of such construction methods is demonstrated by Winkelmann in Bremerhaven, among other places. There, on unfavorable terrain in a marsh, a 1.2-kilometer-long footbridge has already been built based on screw pile foundations.

The idea of screw pile foundations already came up in the 1990s, albeit with a welded sheet metal strip used as a helix, i.e. a threaded contour, along the length of the tube. The disadvantage is that these pipes had to cut their way into the ground, and thus needed to penetrate a long way down into the soil. Otherwise, the surface displacement and thus the grip were not high

Turning the screw for the future of construction (from l.): Bernd Rudert and Besim Jakob from Winkelmann with Dr. Franz Domenic Boos, Key Account Manager SSC Automotive at thyssenkrupp Steel.

Constructive exchange among the experts of the development project (from l.): Dr. Ingo Rogner, Ullrich Gajewski, Simone Reiter, Bernd Rudert, Thomas Grosserüschkamp.

enough. For this reason, Winkelmann decided to rethink the concept of screw pile foundations. The development work in the Construction Components business area headed by CEO Besim Jakob and COO Dr. Andreas Nilsson is currently focused on materials, among other things. Up to now, screw piles have been made of classic hot strip with grade S235, and then batch galvanized. Jakob: "We want to get away from that. Subsequent coating results in unnecessary CO_2 pollution and is logistically complex."

Overcoming challenges together

Winkelmann has now intensified its cooperation with thyssenkrupp Steel to solve this problem. "We have been working with thyssenkrupp Steel for a long time, the connections are very good at all levels. So, it was clear to us that we wanted to push ahead with this development partnership," says Besim Jakob. Together, they are now researching a new material that represents a sustainable alternative to concrete. Ideally, a green steel that allows the pipes needed for the screw piles to be manufactured at Winkelmann without a welding process.

So far, the first joint tests have taken place, looking into the corrosion of flow-rolled material in particular. The favorite so far is coated hot strip, which is also available from thyssenkrupp Steel as CO_2-reduced bluemint® Steel. "For this application, we test our surface coatings in corrosive atmospheres and find solutions to the challenge of corrosion protection," explains Simone Reiter from the corrosion laboratory at thyssenkrupp Steel's Westfalenhütte facility.

A wide range of possible applications in the future

Further tests scheduled for mid-2023 should determine which material will ultimately be used. However, Winkelmann's direction of travel is clear: "Sustainability and responsibility are very important for us. We want to substitute as much concrete as possible and make people aware of screw pile foundations," says Jakob. There is no shortage of ideas for practical implementation: For example, Winkelmann wants to support rebuilding in Ukraine or post-earthquake reconstruction in Turkey with screw pile foundations, as well as holistic solutions. The company also sees potential in expanding the use of sustainable resources: together with a well-known supermarket chain, Winkelmann is planning carports anchored with screw pile foundations and equipped with solar panels on the roof. In this way, supermarkets will be able to produce their own energy. "We are delighted to be working with such an innovative and forward-thinking company. The initial results we have achieved together indicate the highly promising nature of this development partnership," says Dr. Franz Dominic Boos, Key Account Manager SSC Automotive at thyssenkrupp Steel.

Besim Jakob, CEO at Winkelmann Foundation+Construction, is positive about the further cooperation with thyssenkrupp Steel. The primary benefits will be in sustainability.

Web

More information about the development project can be found here:
www.thyssenkrupp-steel.com/en/screw-pile-foundations

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Photos: Rainer Kaysers

Less weight, more sustainability

In the production of cans, customers increasingly want to reduce weight and save material. thyssenkrupp Rasselstein offers an innovative solution for this: **rasselstein® Solidflex.** The material is ideal for producing can lids with a ring pull as well as aerosol can lids and bottoms, because it is safe, stable and sustainable at the same time. A study has now also shown how much CO_2 can be saved by using this material for food and aerosol can components.

Copy Julia Joswig

rasselstein® Solidflex is used, among other things, for the production of the Easy Open End, i.e. the ring-pull lid of a food can. The material is hard, but also formable at the same time. With an elongation of more than five percent and yield points of 600 to 750 megapascals, the material is particularly suitable for applications that require both high strength as well as considerable forming potential, and enables thickness reductions there.

rasselstein® Solidflex is an ideal material for producing Easy Open Ends, which is the jargon for can lids with a ring pull.

"We asked ourselves whether the innovative rasselstein® Solidflex manufacturing process and the use of this new packaging steel grade would, on balance, enable material-related CO_2 reductions to be achieved per can. That explains why we commissioned a study from Sphera Solutions to calculate precisely that. We are very pleased that we can now demonstrate this with figures," says project manager Nicole Korb from the Communications and Market Development team. The results of the external study conducted by Sphera Solutions were subsequently verified and confirmed in a critical review conducted by TÜV Süd.

"Sphera Solutions conducted the study in line with the requirements of ISO 14040 and ISO 14044. The study covers the production of the packaging steels under consideration according to the cradle-to-gate principle: that means starting with the mining of the ore and ending with the finished packaging steel at our plant gate, as well as the use of the material in the can," explains Dr. Linda Kerkhoff, a development engineer in Materials Technology.

In terms of scope, the study considered, for one thing, commercially available food cans with a filling volume of 425 grams, a diameter of 72 millimeters and a height of 110 millimeters. It also focused on aerosol cans with a rim-full volume of 378 milliliters, a diameter of 52 millimeters and a height of 190 millimeters. Result: comparing the baseline and optimization scenarios clearly showed the potential for CO_2 emission savings.

rasselstein® Solidflex reduces weight

In a first step, the thickness of the pull-tab lid of food cans was reduced in the calculations using rasselstein® Solidflex. The total weight of the food can was thus reduced from 48.45 grams to

The team behind the CO_2 calculation for rasselstein® Solidflex (from l.): Dr. Blaise Massicot, Dr. Linda Kerkhoff, Dr. Peter Kirchesch and Nicole Korb

47.49 grams. This represents a 1.98 percent weight reduction. In a second step, the thicknesses of the body and bottom of the can were additionally reduced by using suitable innovative packaging steel grades. This allowed an even higher difference to be achieved: in absolute figures, a weight reduction of 6.55 grams thanks to the use of rasselstein® Solidflex in the Easy Open End.

The results in the optimization scenario for aerosol cans were similarly impressive, with the weight of the can demonstrated to be reduced by more than 14 percent. "Many of our customers produce very high volumes of the cans that were under consideration. Using rasselstein® Solidflex means that significantly less material is used in the manufacture of these cans. The overall material savings are therefore enormous," says Dr. Peter Kirchesch, responsible for sustainability at thyssenkrupp Rasselstein. And without compromising on the important quality features of safety and stability.

Sustainable improvement in life cycle assessment

In the short term, the aspect of CO_2 savings going hand in hand with the lighter weight enabled by rasselstein® Solidflex is already set to become a decisive factor in the industry. "Thanks to the innovative material, we are not only reducing weight but also improving the carbon footprint of each can," explains Dr. Blaise Massicot, development engineer at thyssenkrupp Rasselstein. The Sphera study shows that CO_2 savings of 2.14 percent have already been achieved in the first optimization scenario for food cans – i.e. simply by using rasselstein® Solidflex in the Easy Open End. Dr. Massicot: "In the second optimization scenario – when innovative packaging steel grades are used for the entire food can – the figure was as high as 13.52 percent. This corresponds to a reduction of 18.435 grams of CO_2 per can. Looking at this value, you can imagine the level of CO_2 emissions that can be saved given the number of cans that are produced every year." The study also showed significant savings of more than 14 percent in CO_2 emissions for aerosol cans. This corresponds to a reduction of 21.955 grams of CO_2 per can.

Good life cycle assessment becomes the product standard

Sustainable product development is an integral part of the sustainability strategy at thyssenkrupp Rasselstein. In order to push ahead with this development in the future, we have built up the expertise needed to carry out our own life cycle assessments. Particular attention is being paid to the holistic ecological assessment (LCA) of the company's own products. Dr. Peter Kirchesch: "Implementing the LCA as an integral part of the development process adds further value for our customers. In this way, we are paving the way to a more climate-friendly future together."

Web

For more information about rasselstein® Solidflex:
www.thyssenkrupp-steel.com/en/solidflex

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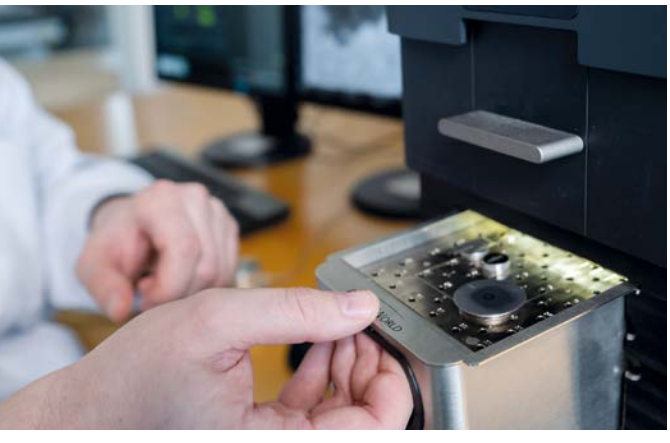
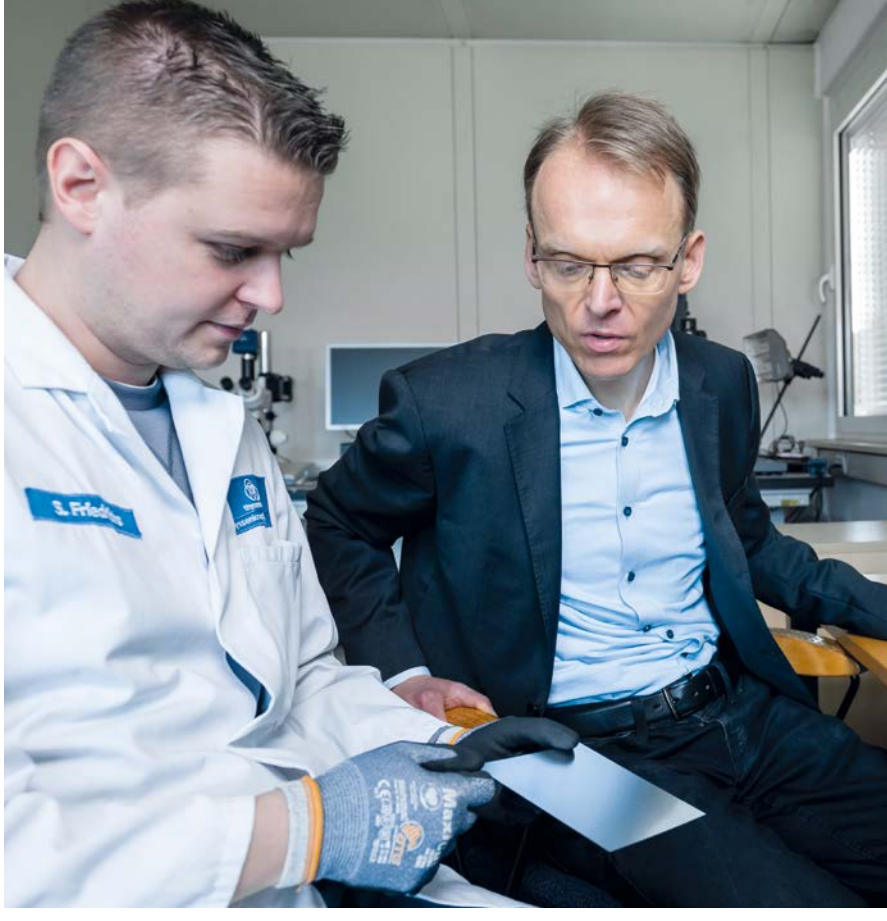
Photos: Rainer Kaysers





Hand-in-hand to high-tech material

The Materials Technology department at Germany's only tin plate manufacturer, thyssenkrupp Rasselstein in Andernach, and the Innovation department at thyssenkrupp Steel in Duisburg work hand-in-hand when it comes to developing **new steel grades** for use in packaging. For example, synergy effects are created and exploited for virtual material and product optimization. Innovations and experience from the automotive industry are thus also being applied in the further development of packaging steel.

Copy Julia Joswig

Each development process always starts out from the input stock such as the molten steel, the slab and finally the hot strip – and for tin plate production in Andernach that traditionally comes from thyssenkrupp Steel in Duisburg. The materials that have become established in the packaging industry are constantly being optimized and developed further. This explains why thyssenkrupp Rasselstein has a Materials Technology department, whose experts aim to continuously optimize the further processing of the input stock used, and to be able to even better meet customer requirements. This applies both to the further development of existing products and to the development of innovations. The developers in Andernach are also benefiting from knowledge already gained in Duisburg. "We call these transfer developments, because we in Materials Technology here can take a lot of what the Development department at thyssenkrupp Steel uses for the automotive sector, for example, and transfer it like for like to our products, or else interpret and adapt it accordingly," says Dr. Burkhard Kaup, head of Materials Technology at thyssenkrupp Rasselstein.

Photo: Rainer Kaysers

Closely networked: the Innovation department at thyssenkrupp Steel and Materials Technology at thyssenkrupp Rasselstein. The short optimization cycles benefit customers

Consequently, a product manufactured in Andernach might be based on a development from Duisburg which has already been tested there for its quality and efficiency. The finite element method (FEM), for instance, is a good example of the interdisciplinary exchange of expertise. This efficient process has already been used in the automotive industry for years, and is constantly being developed further. It uses complex material models to simulate how materials perform in terms of forming and stability. Interdisciplinary cooperation now allows the effects of changes in packaging geometries to be simulated in a targeted manner, and thickness reductions can be implemented efficiently. With the help of this technology, manufacturers quickly know whether innovative ideas can be implemented in practice without a process of trial and error.

Optimization thanks to close networking

thyssenkrupp Steel also benefits from the intensive exchange with Rasselstein. "Rasselstein is a very important partner for us. Our close cooperation offers the advantage that we get feedback very promptly on every development or change in the material. We coordinate our actions with all our cards on the table – which makes the process a more traceable and dynamic one for us," explains Matthias Stock from the Quality Steel team at thyssenkrupp Steel. The close networking and short optimization cycles ultimately benefit the respective customers, because they often want a solution quickly. thyssenkrupp Rasselstein works very close to the product, and thus always keeps an eye on efficiency and quality.

Specialist knowledge with added value

"We are a service provider of innovation and we play a dual role," explains Dr. Volker Marx, project coordinator for materials testing at thyssenkrupp Steel. For one thing, there is metallography from the field of materials testing. This involves examining the hot strip and, if necessary, addressing problems and challenges in the process. Working together, we can find solutions much more quickly and easily. For another thing, thyssenkrupp Steel can provide various testing methods for developing new products which are complex and require specialist knowledge. "These results achieved through joint efforts are in turn interesting for the Quality department. This is precisely the efficiency with which the product is produced, optimized and ultimately passed on to the customer," says Marx.

The future is green

Another joint challenge for the two partners: the green transformation. Product development at thyssenkrupp Rasselstein is being geared up for sustainability through the life cycle assessment (LCA). "In the future, we will use life cycle assessments to develop only steels that contribute to increasing sustainability, such as reducing the carbon footprint," says Dr. Kaup. From a sustainability perspective, tin plate made from CO_2-reduced bluemint® from thyssenkrupp Steel is also interesting. Looking to the future, he sums up, "Materials Technology continuously contributes to optimizing production processes and products, as well as developing entirely new packaging steel grades. The result is intelligent solutions that even better meet customer requirements in terms of quality, sustainability, efficiency and lean processes."

Dr. Burkhard Kaup, head of Materials Technology at thyssenkrupp Rasselstein, identifies valuable synergy effects for the packaging steel sector, thanks to close cooperation with the Innovation department at thyssenkrupp Steel.

Web

Further information about R&D in Rasselstein can be found here:
www.thyssenkrupp-steel.com/en/packaging-steel/development-and-research

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Matching pieces of the puzzle for a comprehensive portfolio

thyssenkrupp Hohenlimburg presents **precidur® HSM 500 HD**, the next milestone on the way to a complete HD range.

Thanks to the work of Dr. Stephan Kovacs, Maximilian Nagel and Marisa Taube-Levermann (from l.) developed a microalloyed fine-grained steel with improved hole expansion ratio to production maturity. The next step will soon follow with HSM 550 HD.

1

The gap is closed

thyssenkrupp Hohenlimburg has been a reliable supplier of highly ductile microalloyed fine-grained steels to the market for a great many years. However, there was a gap in the middle of the portfolio, which is now being closed piece by piece. First, the new HSM 380 HD and HSM 420 HD grades were launched in 2022. Now another milestone followed with the improved HSM 500 HD, which is available with immediate effect before the HSM 550 HD (summer 2023) and HSM 460 HD (early 2024) are to finally completing the HD range. “Then, for the first time, we will be able to supply all the grades from the DIN EN 10149 standard as HD steels,” says Maximilian Nagel, Senior Manager Application Technology at thyssenkrupp Hohenlimburg.

2

Advantages for customers

The new HD steels are characterized by the highest hole expansion capacity and significantly higher local ductilities compared to conventional high-strength low-alloy (HSLA) steels. “Moreover, we supply them with significantly tighter mechanical property tolerances than those demanded in DIN EN 10149,” says Marisa Taube-Levermann, who as project manager oversaw the further development of the grades. Suitable for cold rolling as well as for direct processing, the grades always show their strengths where material has to undergo strong forming globally and especially locally. Development Engineer Dr. Stephan Kovacs: “Compared to conventional microalloyed steels, they expand the range of design possibilities and increase process reliability in component production – especially for lightweight automotive construction.”

3

Ideal for recycling management

A special aspect of the new HD grades lies in their improved recycling potential compared to both the standard’s requirements as well as the conventional grades. The particular advantage of medium and lower-strength HD steels lies in the fact that they have a lower alloy content, meaning materials such as HSM 380 HD or HSM 500 HD can be recycled in a manner that consumes even fewer resources than steel scrap. Consequently, they contribute to a more efficient and climate-friendly recycling management.

Web

Further information about the HD range can be found here:
www.thyssenkrupp-steel.com/en/precidur-hd

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We are setting new standards with VA13”

thyssenkrupp Rasselstein is setting a landmark for electrolytically chromium-coated blackplate with its new **VA13 coating line**. A resource-saving and globally unique line has been created thanks to innovative process technology. steel[compact] spoke to Dr. Peter Biele, CEO of thyssenkrupp Rasselstein, about this.

Dr. Biele, a major project like VA13 takes years of planning before it can enter operation. What did you feel at the line’s inauguration?

Pride, tinged with relief. It takes an expert team of people who trust one another and work in a disciplined manner to complete the years of planning, and then put those plans into effect. I am glad to have such a team by my side. With the investment in VA13, thyssenkrupp Steel has given us a great vote of confidence and recognized packaging steel for what it is: a product of the future.

This is because VA13 replaces an older line – one that was no longer a suitable candidate for renovation and used a chromium 6 (Cr6) process for chrome plating. However, the new EU REACH regulations prohibit the use of this input material. That’s why we switched to trivalent chromium Cr3. We have developed a new process technology for this based on a licensed patent, enabling us to replace Cr6 with Cr3 in production. Neither the quality nor the properties of the end product are changed in the process – the product remains the same. This makes us a global technology leader.

How important is the topic of sustainability to customers today – and what does the new VA13 contribute to this?

Not only have many of our customers clearly defined sustainability goals, they have also often set deadlines and put numbers on their targets. With lines such as VA13, we are making a significant contribution toward achieving these goals. The installed process units use energy efficiently and save resources. In figures, this means that media such as cooling water or wastewater containing chromium are reduced by 50 to 90 percent. Energy streams such as steam or LED lighting can also be reduced by 60 percent thanks to VA13. Even the rectifier technology used for electroplating – which we had assumed to be fully developed – has been tweaked to consume a quarter less energy.

Currently, chrome-plated material is used for lids , pull-tab lids and bases for food and pet food cans, as well as for valve mounting cups on aerosol cans, crown corks or printing ink cans. Could other fields of application be added in the future?

Yes, for sure. Packaging steel in general protects food for several years without needing a cold chain. Food is canned and packaged at the place where it originates, and taken to where it feeds people. At the same time, it is safely protected from the effects of light and air, which preserves nutrients and vitamins. No other packaging medium can do the same.

Our customers play a decisive role, often guiding us to where they see further potential. We then contribute our materials and processing expertise, such as forming using finite element methods, or joining expertise with tool manufacturers. Together, we develop innovative processes and lines in this way.

Dr. Peter Biele sees thyssenkrupp Rasselstein playing a leading technological role thanks to the new VA13.

Photos: Nils Roscher, Rainer Kaysers

Web

Click here for the full interview:
www.thyssenkrupp-steel.com/en/biele-on-va-13

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