

Steel

General product range



thyssenkrupp



Premium
steel products.
From today.
From tomorrow.
From us.

thyssenkrupp Steel is one of the world's leading suppliers of high-grade flat steel. Our goal and incentive is to continue to offer our customers technologically, economically and ecologically first-class products for their individual needs.

Contents

#1 Uncoated hot strip

#2 Medium strip

#3 Strip plate

#4 Thin sheet and surface-refined products

#5 Organically coated strip and sheet

#6 Electrical steel strip


#7 Packaging steel

#8 Composite materials

Our performance – in a class of its own


More than 200 years of tradition, an immeasurable wealth of experience, state-of-the-art technologies and, above all, highly qualified employees – this is the unique basis for our outstanding product and service portfolio.

Everything we do is ultimately geared towards just one goal: We want to develop and produce the high-quality steel products with and for our customers that give them a clear competitive edge in terms of quality, cost-effectiveness and sustainability.



High-quality flat steel

Basic material in various grades for diverse further processing, supplied as coil, panel or strip.



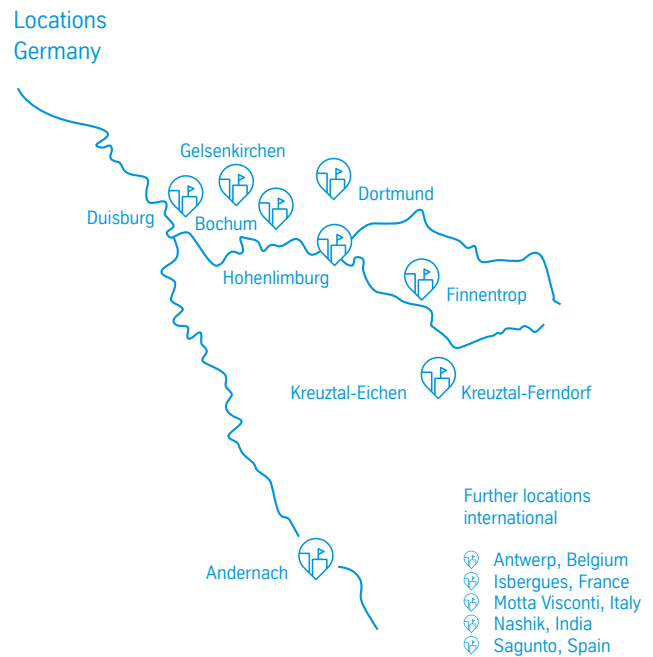
Customized material solutions

Materials and components with optimized properties that not only serve to improve customer products, but can also contribute to the holistic further development of processes.



Comprehensive service

Consultation during the entire project, partnership-based support for customers with optimization, material testing and processing test phases as well as training measures and constant total quality management.



Our locations – the best conditions for high quality

With our integrated production network on the Rhine and Ruhr and beyond, we have an ideal basis for the high quality and great variety of our product range.

From our own Rhine port, to the upstream area with our four large blast furnaces, to steelmaking and rolling mills, to the finishing plants, we offer something special: consistent orientation of all processes towards reliable and demanding product qualities.

In order to further strengthen our position in important markets of the future, we will expand our technological capabilities and adjust our production network for even greater flexibility. To this end, we have launched an extensive investment program for building important new core units and converting existing ones.



Toward technology and quality leadership in the markets of the future

We are renewing our production network in order to meet the future requirements of our customers. For example, by converting our casting-rolling line into a modern continuous casting line and building a new hot strip mill. Or by a new double reversing stand and a new annealing and insulation line in Bochum. With such improved and optimized facilities, we are in a position to meet our customers' growing demand for ever better, stronger and thinner steel products. For example, with high-strength steels for crash-relevant components to increase safety in vehicles, with high-performance electrical steel grades for highly efficient e-motors in e-mobility, and also with outstanding premium surfaces for applications in the outer skin.

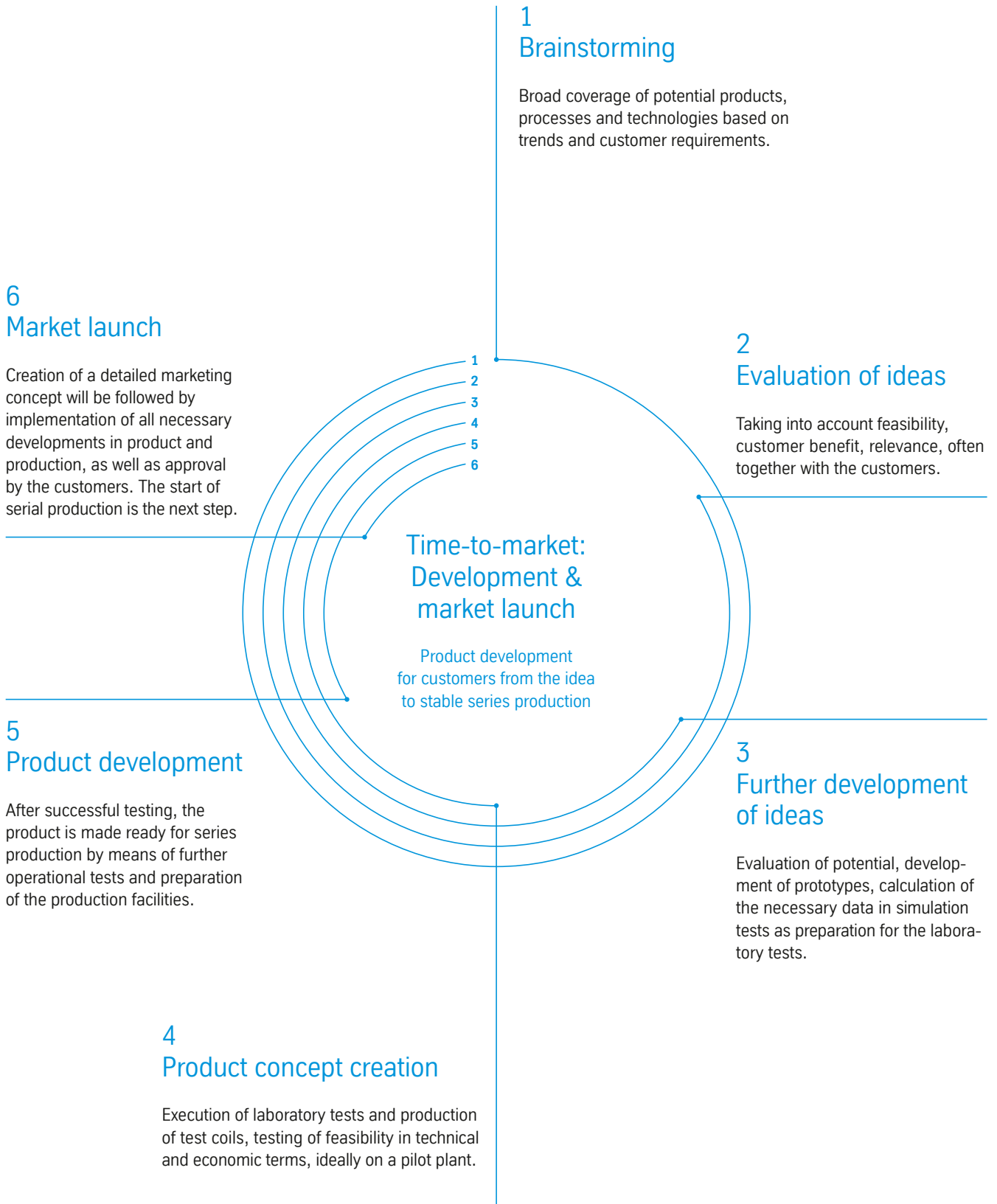


Our innovative spirit – shaped by combined forces

Our products are the result of an intensive exchange between sales, development and production as well as a close partnership with our customers. In addition, universities, institutes and industrial partners are integrated into our constantly active innovation network.

Our current focus is on the successful implementation of a product portfolio consistently geared to future markets and profitable steel grades. We continuously monitor the requirements derived from this for our materials and the necessary equipment within the framework of materials testing and chemical analysis; these serve as the basis for investment decisions.

Two factors are crucial for the early identification of important material trends and new markets: The constant inflow of knowledge from our internal and external networks and the close and intensive exchange with our customers. Each of these activities is an essential building block for increasing innovative capability and technological competence, and thus the future viability of our company.



#next
generation
steel



Heralding a new era in steel production with sustainability

Turning vision into reality:
The construction of our first direct reduction
plant will make thyssenkrupp Steel a pioneer
for a carbon-neutral Europe.

Producing premium steel using hydrogen, rather than in a coal-fired
blast furnace – this is the focus of our tkH2Steel® plant configuration,
with which we are once again making industrial history.

Because our transformation is a win-win for everyone. Especially
for the climate, which can count on us in one of the world's largest
decarbonization projects. In addition, all the lights are truly green
for the hydrogen economy, for our workforce and for the entire region.

Supported by:



Federal Ministry
for Economic Affairs
and Climate Action

on the basis of a decision
by the German Bundestag

Funded by:

Ministry of Economic Affairs,
Industry, Climate Action and Energy
of the State of North Rhine-Westphalia



tkH2Steel®: with hydrogen toward carbon-neutral steel

A direct reduction plant is a shaft furnace that can run on natural gas or hydrogen. There is no need to use coal, which has been the main source of CO₂ to date.

At about 1,000 degrees Celsius, the oxygen is stripped from the iron ore. Sponge iron, or directly reduced iron (DRI) is produced, which we convert to liquid hot metal in electricity-powered melters while it is still hot.

After delivery to the integrated BOF meltshops, it will be further processed there into the proven steel grades.

The result: we cut the CO₂, but not our quality. **All premium steel grades are planned to be decarbonized in future.**



Pioneering for climate change mitigation

With the first direct reduction plant alone, we can save up to 3.5 million metric tons of CO₂ in pure hydrogen operation. This corresponds to just under 5% of emissions in the Ruhr region, or around 2% of emissions in North Rhine-Westphalia.



Crucial for Germany's independence and economic might

Decarbonized steel is the foundation of the industrial value chain. With it, we are strengthening Germany as an industrial location and securing attractive jobs in the region – 26,000 directly in thyssenkrupp Steel and 150,000 in downstream industries in North Rhine-Westphalia. Nationwide, as many as four million jobs need to be preserved in steel-intensive industries.

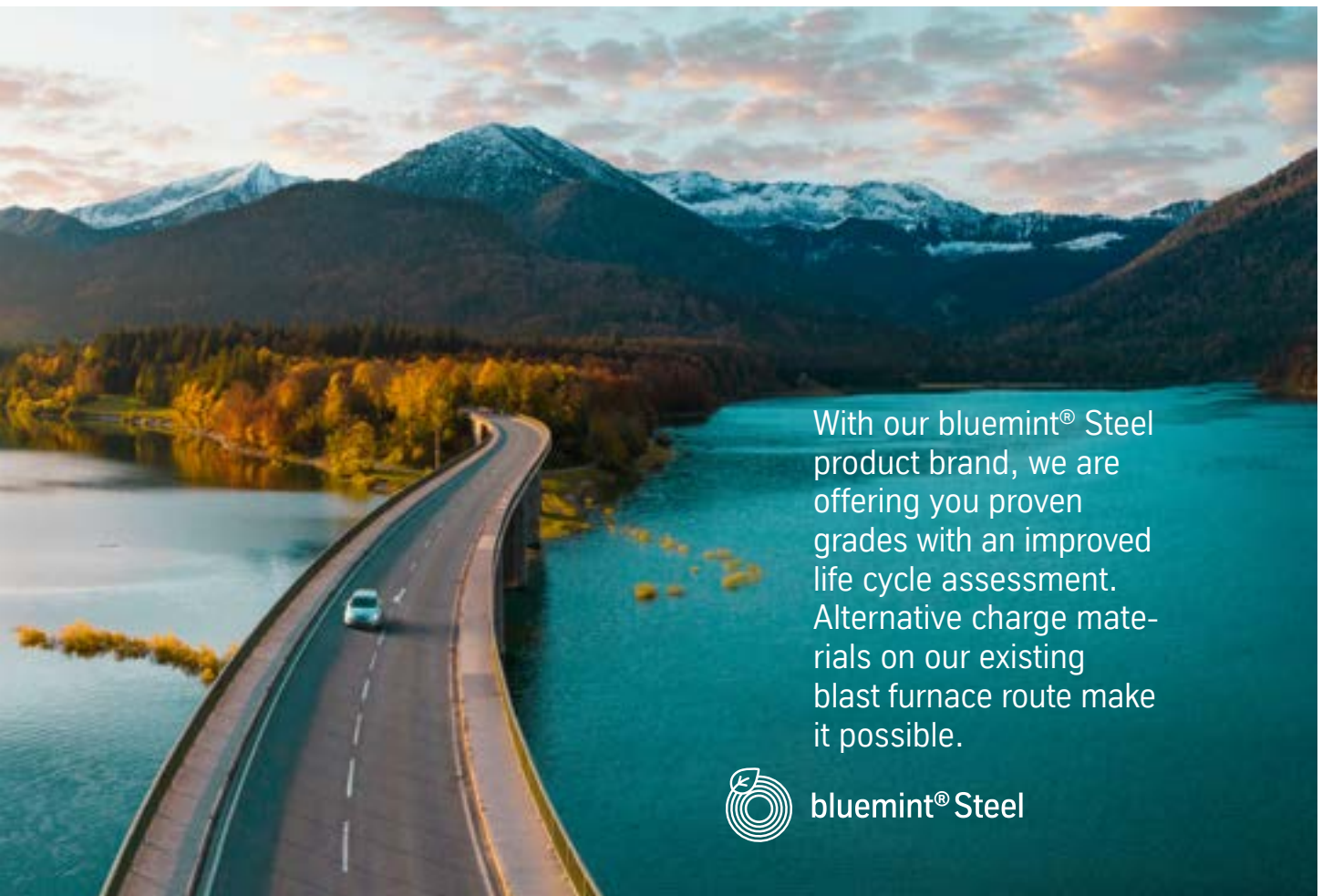


Elementary for the build-up of the hydrogen economy

As a secure long-term buyer of gigantic quantities of hydrogen, we provide European manufacturers with the investment and planning security they need to build up capacities and infrastructure. To illustrate the point: from 2029 onward, we will need 143,000 metric tons of hydrogen annually to operate the DR plant. This is equivalent to filling the Oberhausen gasometer every two hours.

The era of sustainable steel production is just round the corner. Each metric ton of green hydrogen will save 28 metric tons of CO₂ in the future. However, we do not skimp on quality: We will continue to be able to offer you all proven grades without restriction.

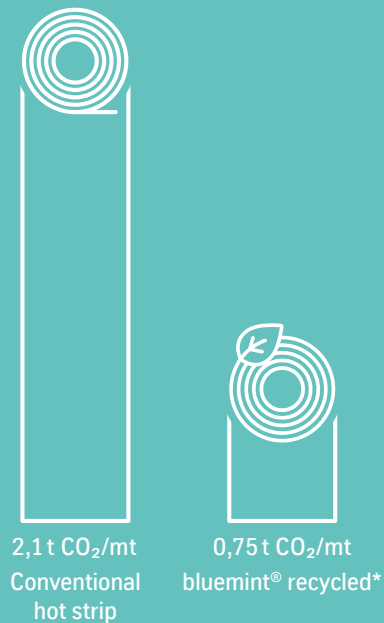
bluemint[®] Steel: High quality. Less CO₂.



With our bluemint[®] Steel product brand, we are offering you proven grades with an improved life cycle assessment. Alternative charge materials on our existing blast furnace route make it possible.



bluemint[®] Steel



* Balancing of an independent scrap route in the blast furnace process

How bluemint® Steel is already saving CO₂ today

If we use bluemint® recycled to replace part of the added iron ore or coking coal with a high-quality scrap product, we are already reducing the overall CO₂ emissions from our current steel production in Duisburg.

We chalk up these savings in the life cycle assessment in our bluemint® Steel products – so that we can offer you unchanged quality grades with an improved Scope 3 for your carbon footprint.

bluemint® Steel features in detail:

- ➞ Primary steel, all qualities can be produced
- ➞ Recycling product in the life cycle assessment
- ➞ Specific CO₂ emissions of 0.75 metric tons of CO₂ per metric ton of hot strip
- ➞ DIN EN ISO/EC 17029 and TÜV SÜD VERIsteel standards
- ➞ Certified by TÜV SÜD
- ➞ Can be directly credited toward your Scope 3 emissions

Product stories and success stories: bluemint® Steel in practice

High quality, less CO₂. With this bluemint® Steel brand promise, we have already been able to convince a number of demanding customers to include our CO₂-reduced flat steel in their value chain.

What's more: our customers have been able to make the improved carbon footprint part of their product story and marketing.



Climate change mitigation in tall cans: bluemint® Steel in the Hoffmann Neopac can for RICOLA




The bathroom with a clean carbon footprint: bluemint® Steel in the KALDWEI nature protect product series



Non-stop CO₂ reduction with electric steel strip: bluemint® Steel at transformer manufacturer SGB-SMIT



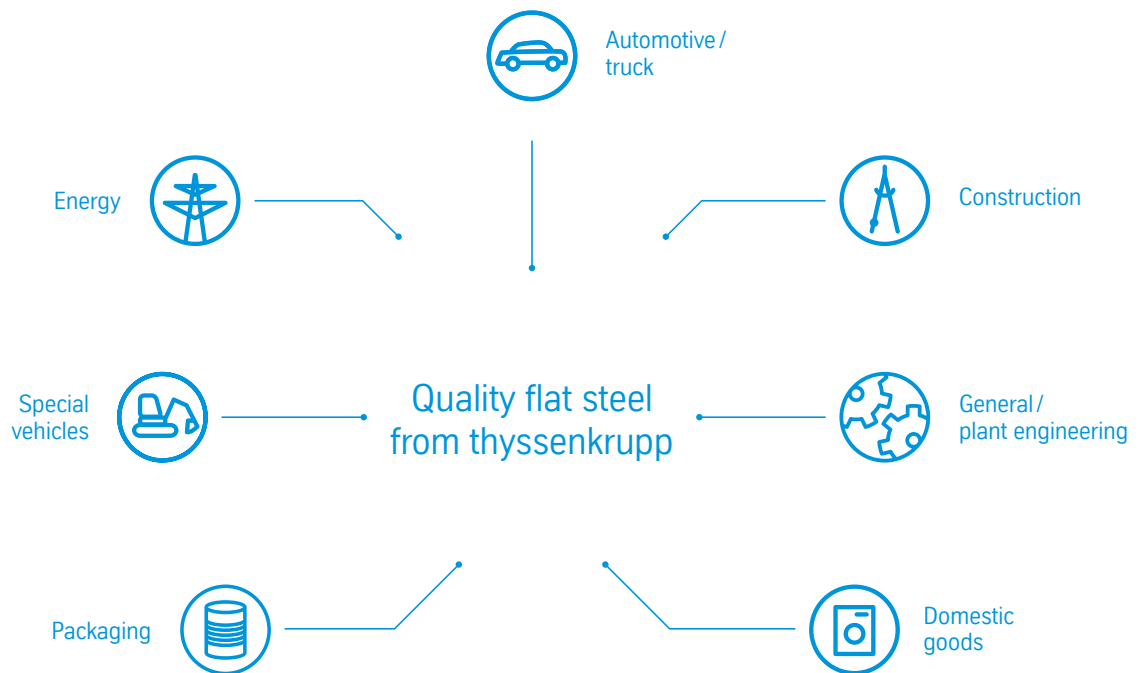
Picking up speed for climate protection: bluemint® Steel at the Accuride Corporation, producer of steel truck wheels



Thin, thick, wide, narrow, light, stiff, elastic, flexible, strong, single-layered, multi-layered, single-colored, multi-colored, inconspicuous, eye-catching – the series of properties (some of which are even mutually exclusive) with which quality steel products play supporting roles in our modern world can be continued almost at will. And thyssenkrupp's Steel division is doing everything in its power to ensure that the qualities are even better and the ranges of functions even more diverse in order to open up even more areas of application.

With our comprehensive industry-specific materials, technology and application expertise, we are a long-standing partner who is ideally equipped to meet the highest demands of our customers – today, tomorrow and thereafter.

Our steel – forward-looking material for many industries



With exemplary dedication



Automotive / truck

Sustainability, safety and economy are important topics in the automotive industry. As a long-standing partner, thyssenkrupp's Steel division understands these requirements and offers comprehensive industry-specific materials and technology expertise.

Whether for the body, chassis, powertrain or interior, we help automakers around the world build lightweight, safe and affordable vehicles. Examples of this are our high-strength and ultra-high-strength lightweight steel materials for safety-relevant structural components, our high-quality flat steel and premium surfaces for the outer skin of the body. Innovative sandwich materials such as bondal® for effective noise reduction and non-grain-oriented electrical steel strip for hybrid or electric drives are modern materials that make a further contribution to automotive efficiency.

Commercial vehicle manufacturers also benefit from our know-how. Among other things, our hot-rolled, highly ductile, microalloyed steels of the perform® HD family are characterized by particularly tight tolerances. For trailer bodies, pladur® organically coil-coated quality steel opens up many design possibilities. Various product versions of pladur® are already replacing the manufacturers' own paint application.



Construction

A variety of surfaces, a wide range of colors, good processability and optimum corrosion protection – these are the wide range of properties of pladur®, the organically coil-coated quality flat steel. It opens up completely new perspectives for engineers, architects, planners and project developers: from roofs and facades to garage doors, from air-conditioning and sanitary installations to interior fittings and steel construction.

Together with our customers, we promptly develop pladur® innovations for specific customers and applications. Among the new products, our walls with anti-graffiti coating and the reflections One color series are providing new impulses. Our innovative steels with the zinc-magnesium alloy ZM Ecoprotect® round off the portfolio.



General / plant engineering

Modern general and plant engineering requires both innovative technologies and reliable, high-quality materials. thyssenkrupp develops and manufactures products that are among the most efficient of their time in both technical and economic terms. Whether for production machines, process engineering plants or pressure vessels – our product range offers a wide spectrum from unalloyed structural steels to sophisticated special steels with very high hardness.

Our wear-resistant perdur® strip plates are available in various grades and sheet thicknesses. They can be used as an innovative solution, for example in applications such as mining technology or in steel and cement works.



Energy

The demand for energy is growing world-wide. The energy supply of the future requires, among other things, intelligent materials that enable responsible energy management in generation, distribution and use. Our steel is an ideal material for the diverse areas of the energy industry, meeting high technical demands on the material.

With our high-quality product portfolio of the powercore® brand, we offer suitable solutions for generating regenerative and fossil energy, for transport and storage as well as for the transformation of energy. Whether grain oriented electrical steel for use in transformers, non-grain-oriented electrical steel strip for electric motors or hot strip for pipelines – we develop solutions to meet the increasing demands of the energy industry. Your solar farm needs to generate green energy both economically and sustainably. To do so, it requires a robust supporting structure made from high-quality steel with effective corrosion protection. With ZM Ecoprotect® Solar, thyssenkrupp Steel now offering high-performance, zinc-magnesium-coated steels for PV mounting systems – durable, robust and sustainable.



Special vehicles

From dump trucks and refuse collection vehicles to cranes and lift vehicles and on to agricultural and construction machinery: We offer high-performance solutions for a wide variety of special vehicles that set standards in the respective area of application. We produce premium strip plate that offer maximum robustness, durability and load-bearing capacity. For example, perdur® wear-resistant special structural steel, which is particularly suitable for heavy construction machinery. Or perform®, the material that enables a low inherent weight with increased load-bearing capacity, especially in mobile cranes. There is also TBL®, the wear-resistant, hardenable boron steel for harrows and plowshares in agricultural machinery.



Packaging

It comes down to the packaging: Our Packaging Steel business unit is Germany's only innovative producer of tinplate, which is the preferred product for packaging steel. The possible applications of the materials are diverse and range from food packaging and beverage cans to chemical and technical products such as aerosol or paint cans.

We supply material grades for every application. The rasselstein® product range includes tin-plated and specially chrome-plated backplate – cold-rolled steel sheet in thicknesses from 0.100 to 0.499 mm – as well as packaging steel with and without organic coatings such as paint and film. Packaging Steel is continuously working on reducing the thickness of packaging steel. rasselstein® Thinplate, for example, stands for reliable high-end material in thinner gages with consistently good material properties.



Domestic goods

Telescopic rails for drawers made of scalur®+ Z or galvanized steels for modern coffee machines and refrigerators – when it comes to sophisticated design combined with cost-consciousness, our materials for domestic products are at the forefront. This is because the demands placed on domestic products are increasing, as is cost awareness.

We supply the suitable raw material for white and brown goods, furniture and other domestic industrial products. For example galfan®, the surface refinement for corrosion-resistant thin sheets with excellent forming properties. Or pladur®, our band-coated quality flat steel with unique variations in color and appearance, which makes costly piece coatings superfluous.





#1

Uncoated hot strip

Premium material with outstanding surface finish and tightest tolerances for further processing into a wide variety of end products.

Mild steel

Multiphase steel

C-steel

High-strength steel

Pressure vessel steel

scalur®

Structural steel

Manganese-boron steel
for hot forming

Steel for lines pipes

Your contact persons



Automotive

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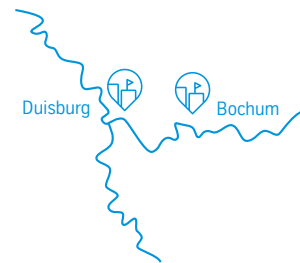
Industry

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Production locations



Thanks to innovative technologies and specialized equipment, we are always able to meet the high quality requirements of our customers. For example, with our modern hot strip mills, we ensure the production of even thinner or higher-strength steel sheets with close tolerances.

About our uncoated hot strip

Overall, we have an extensive portfolio of steels with a wide variety of dimensions and different grades to meet customer-specific requirements in terms of strength, formability and toughness. These include, for example, the high-strength and outstandingly cold-formable perform[®] microalloyed steel.

Many special products also strengthen our product range.

These include scalur[®], our pickled hot strip with the closest thickness tolerances and best suitability for deep-drawing products, our tubular strip with acid gas resistance particularly suitable for pipelines, or tubor[®], the manganese-boron steels for precision tubes.



Narrow tolerances

Impressive diversity

Thinnest dimensions

By investing in the modernization of our facilities, we are able, among other things, to offer high-strength grades with an even wider range of dimensions. At the same time, we have further improved the tolerances of our hot strip products.

Mild steel

Thickness ¹
from _ to in mm

Width ¹
from _ to in mm

Mild unalloyed steel for cold rolling

DIN 1614-1

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
St22	St22	1.50–16.00	50–2,030
RRSt23	RRSt23	1.50–16.00	50–2,030
St24	St24	1.50–16.00	50–2,030

Mild unalloyed steel for cold forming

DIN EN 10111

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
DD11	DD11	1.50–16.00 ³	50–2,030
DD12	DD12	1.50–16.00 ³	50–2,030
DD13	DD13	1.50–16.00 ³	50–2,030
DD14	DD14	1.50–16.00 ³	50–2,030

Deep-drawing steel

VDA 239-100

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
HR2	HR2	1.60–6.00	50–2,030

Structural steel

Thickness ¹
from _ to in mm

Width ¹
from _ to in mm

Unalloyed/general structural steel

DIN EN 10025-2

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
S235	S235	1.50–25.00	50–2,030
S275	S275	1.50–25.00	50–2,030
S355	S355	1.50–25.00	50–2,030

Normalized-rolled fine grain structural steel

DIN EN 10025-3

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
S275N/NL	S275N/NL	○	○
S355N/NL	S355N/NL	○	○

Structural steel _ continued

		Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
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Weatherproof steel

DIN EN 10025-5

Steel grade designation	Standard designation		
patinax® 355P	S355J2WP	2.00–12.00	600–2,030
patinax® 355	S355J2W	2.00–12.00	600–2,030

Normalizing with teardrop pattern

DIN 59220

Steel grade designation	Standard designation		
S235	S235	3.00–12.00	1,000–2,030
S275	S275	4.00–12.00	1,000–2,030

Pressure vessel steel

		Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
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Steel for welded gas cylinders

DIN EN 10120

Steel grade designation	Standard designation		
P245NB	P245NB	On request	50–2,030
P265NB	P265NB	On request	50–2,030
P310NB	P310NB	On request	50–2,030
P355NB	P355NB	On request	50–2,030

Weldable fine grain structural steel
for pressure vessels**DIN EN 10028-2**

Steel grade designation	Standard designation		
P275NH	P275NH	3.00–12.00	50–2,030
P355N/P355NH	P355N/P355NH	3.00–12.00	50–2,030
P...NL/P...NL2	P...NL/P...NL2	○	○

Steel for simple pressure vessels

DIN EN 10207

Steel grade designation	Standard designation		
P235S	P235S	3.00–14.00	50–2,030
P265S	P265S	3.00–14.00	50–2,030
P275SL	P275SL	○	○

 Explanation of symbols
on the last page

C-steel

Thickness ¹
from _ to in mm

Width ¹
from _ to in mm

Case-hardening steel

Based on
DIN EN ISO 683-3 (formerly DIN EN 10084),
DIN EN 10132-2

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
C10	C10	1.91–20.00	50–1,630
C15	C15	1.91–20.00	50–1,630
16MnCr5	16MnCr5	2.00–13.00	50–1,630
20MnCr5	20MnCr5	2.00–13.00	50–1,630

Unalloyed tempering steel

Based on
DIN EN ISO 683-1 (formerly DIN EN 10083-2),
DIN EN 10132-3

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
C22	C22	2.00–13.00	50–1,630
C25	C25	2.00–13.00	50–1,630
C30	C30	2.00–13.00	50–1,630
C35	C35	2.00–13.00	50–1,630
C40	C40	2.00–13.00	50–1,630
C45	C45	2.00–13.00	50–1,630
C50	C50	2.00–13.00	50–1,630
C55	C55	2.00–13.00	50–1,630
C60	C60	2.00–13.00	50–1,630

Alloyed tempering steel

Based on
DIN EN ISO 683-2 (formerly DIN EN 10083-1,
DIN EN 10083-3), DIN EN 10132-3

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
25CrMo4	25CrMo4	2.00–13.00	100–1,630
34CrMo4	34CrMo4	2.00–13.00	100–1,630
42CrMo4	42CrMo4	2.00–13.00	100–1,630
50CrMo4	50CrMo4	2.00–13.00	100–1,630
51CrV4	51CrV4	2.00–13.00	100–1,630
58CrV4	Works special quality	2.00–13.00	100–1,630

C-steel _ continued

		Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
Spring steel			
Based on DIN EN 10132-4			
Steel grade designation	Standard designation		
C55S	C55S	2.00–13.00	50–1,630
C60S	C60S	2.00–13.00	50–1,630
C67S	C67S	2.00–13.00	60–1,630
C75S	C75S	2.00–13.00	60–1,630
C85S	C85S	2.00–13.00	80–1,630
C90S	C90S	2.00–13.00	80–1,630
C100S	C100S	2.00–13.00	80–1,630
51CrV4	51CrV4	2.00–13.00	100–1,630
80CrV2	80CrV2	2.00–13.00	100–1,630
75Cr1	Works special quality	2.00–13.00	100–1,630

tubor® – manganese-boron steel
for precision steel tubes

**Based on
DIN EN ISO 683-2 (formerly DIN EN 10083-3)**

Steel grade designation	Standard designation		
tubor® 26	26MnB5	1.95–13.00	70–2,030
tubor® 34	34MnB5	1.75–18.00	70–2,030

Hardenable manganese-boron steel

**Based on
DIN EN ISO 683-2 (formerly DIN EN 10083-3)**

Steel grade designation	Standard designation		
20MnB5	20MnB5	2.00–13.00	70–1,630
30MnB5	30MnB5	2.00–13.00	70–1,630
39MnB5	39MnB5	2.00–13.00	70–1,630
27MnCrB5-2	27MnCrB5-2	2.00–13.00	70–1,630
33MnCrB5-2	33MnCrB5-2	2.00–13.00	70–1,630
39MnCrB6-2	39MnCrB6-2	2.00–13.00	70–1,630

Hardenable boron steel TBL®

**Based on
DIN EN ISO 683-2 (formerly DIN EN 10083-3)**

Steel grade designation	Standard designation		
TBL® 30	Works special quality	2.50–18.00	1,000–2,030
TBL® 35	Works special quality	2.50–15.00	1,000–1,630
TBL® 40	Works special quality	3.00–12.00	1,000–1,630
TBL® 45	Works special quality	3.00–12.00	1,000–1,630
TBL® 50	Works special quality	3.00–12.00	1,000–1,630

High-strength steel

Thickness ¹
from _ to in mm

Width ¹
from _ to in mm

Micro-alloyed steel
for cold forming

VDA 239-100. DIN EN 10149-2

Steel grade designation	Standard designation VDA 239-100	Standard designation DIN EN 10149-2	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
perform [®] 300	HR300LA		2.00–20.00	50–2,030
perform [®] 315	Works special quality	S315MC	1.50–20.00	50–2,030
perform [®] 340	HR340LA		1.50–20.00	50–2,030
perform [®] 355	Works special quality	S355MC	1.50–20.00	50–2,030
perform [®] 380	HR380LA		1.50–20.00	50–2,030
perform [®] 420	HR420LA	S420MC	1.75–20.00	50–2,030
perform [®] 460	HR460LA	S460MC	1.75–20.00	50–2,030
perform [®] 500	HR500LA	S500MC	1.50–20.00	50–2,030
perform [®] 550	HR550LA	S550MC	1.50–8.50	60–2,030
perform [®] 600	Works special quality	S600MC	2.00–9.50	80–1,800
perform [®] 650	Works special quality	S650MC	2.00–10.50	80–1,600
perform [®] 700	HR700LA	S700MC	2.00–12.00	80–1,800

Highly ductile micro-alloyed steel
for cold forming

VDA 239-100. DIN EN 10149-2

Steel grade designation	Standard designation VDA 239-100	Standard designation DIN EN 10149-2	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
perform [®] 315 HD	Works special quality	S315MC	1.50–20.00	50–2,030
perform [®] 340 HD	HR340LA	Works special quality	1.50–20.00	50–2,030
perform [®] 355 HD	Works special quality	S355MC	1.50–20.00	50–2,030
perform [®] 420 HD	HR420LA	S420MC	1.50–20.00	50–2,030
perform [®] 460 HD	HR460LA	S460MC	1.75–20.00	50–2,030
perform [®] 500 HD	HR500LA	S500MC	1.50–16.00	50–2,030
perform [®] 550 HD	HR550LA	S550MC	1.50–8.50	60–1,850

scalur®

Thickness¹
from _ to in mmWidth¹
from _ to in mm

scalur® – pickled hot strip
with narrowest thickness tolerances

DIN EN 10111, DIN EN 10025, DIN EN 10149-2

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
scalur® DD11	DD11	1.50–9.00	900–1,600
scalur® DD12	DD12	1.50–9.00	900–1,600
scalur® DD13	DD13	1.50–9.00	900–1,600
scalur® DD14	DD14	1.50–9.00	900–1,600
scalur® S235 *	S235	1.50–7.00	900–1,600
scalur® S315MC	S315MC	1.50–9.00	900–1,600
scalur® S355MC	S355MC	1.50–9.00	900–1,600
scalur® S420MC	S420MC	1.50–9.00	900–1,600
scalur® S460MC	S460MC	1.50–9.00	900–1,600
scalur® S500MC	S500MC	1.50–9.00	900–1,600
scalur® S550MC	S550MC	1.50–6.00	900–1,600
scalur® S600MC	S600MC	2.00–5.00	900–1,600
scalur® S650MC	S650MC	2.00–4.00	900–1,600
scalur® S700MC	S700MC	2.00–5.00	900–1,350
scalur® CP-W 800	Works special quality	1.60–4.50	900–1,600

* Delivery condition in the rolled state (+AR, "as rolled").

Steels for line pipes

Thickness¹
from _ to in mm

Width¹
max. in mm

Thickness¹
from _ to in mm

Width¹
max. in mm

For the conveyance of oil and other flammable liquids, natural gas and other gaseous media, for CO₂ transportation

API 5L/DIN EN ISO 3183 PSL 2 + DWTT

Steel grade designation	API 5L/DIN EN ISO 3183 PSL 2*		With Battelle drop weight tear test (DWT test)**	
L245 / Grade B	3.00 – 25.40	2,000	○	○
L290 / X42	3.00 – 25.40	2,000	○	○
L360 / X52	3.00 – 25.40	2,000	○	○
L415 / X60	3.00 – 25.40	1,900	6.00 – 14.00	1,600
L450 / X65	3.00 – 25.40	1,900	6.00 – 23.00	1,700
L485 / X70	3.00 – 23.00	1,900	6.00 – 23.00	1,700
L555 / X80	○	○	○	○

*As-delivered condition +N: Grade B, X42, X52, as-delivered condition +M: all grades.

**No requirements for this steel grade according to API/DIN EN ISO; Steel grades ≤ X52 on request.

Steels for line pipes _ continued

Thickness¹
from _ to in mm

Width¹
max. in mm

API 5L Annex H PSL 2 + Sour Service

Steel grade

L245 / Grade B	3.00 – 25.40	2,000
L290 / X42	3.00 – 25.40	2,000
L360 / X52	3.00 – 25.40	2,000
L415 / X60	3.00 – 16.00	1,600
L450 / X65	3.00 – 16.00	1,600
L485 / X70	○	○

Steels for line pipes _ continued

	Thickness ¹ from _ to in mm	Width ¹ max. in mm
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Steels for the transport of hydrogen (H₂)

EIGA Guideline IGC Doc 121/14

Steel grade

X42	3.00 – 25.40	2,000
X52	3.00 – 25.40	2,000

H₂ readiness based on API 5L

Steel grade

X60	○	○
X65	○	○
X70	○	○

Steel for oil country tubular goods (OCTG)

API 5CT

Steel grade

H40	5.00 – 25.40	2,000
J55	5.00 – 25.40	2,000
K55 and higher	5.00 – 25.40	2,000

Steel for water tubes

EN 10224

Steel grade

L235	3.00 – 25.40	2,000
L275	3.00 – 25.40	2,000
L355	3.00 – 25.40	2,000

API 5L PSL 1

Steel grade

L245 / Grade B	3.00 – 25.40	2,000
L290 / X42	3.00 – 25.40	2,000
L360 / X52	3.00 – 25.40	2,000
L415 / X60	3.00 – 25.40	2,000
L450 / X65	3.00 – 25.40	2,000
L485 / X70	3.00 – 25.40	2,000
L555 / X80	○	○

Steels for cold formed structural steel pipes

	Thickness ¹ from_to in mm	Width ¹ max, in mm
DIN EN 10219-1		
Steel grade		
S275JRH, S275J0H, S75J2H	3.00 – 25.40	2,000
S355JRH, S355J0H, S355J2H	3.00 – 25.40	2,000
S420MH, S420MLH	3.00 – 20.00	1,800

API 5L PSL 1

Steel grade	Thickness ¹ from_to in mm	Width ¹ max, in mm
L245 / Grade B	3.00 – 25.40	2,000
L290 / X42	3.00 – 25.40	2,000
L360 / X52	3.00 – 25.40	2,000
L415 / X60	3.00 – 25.40	2,000
L450 / X65	3.00 – 25.40	2,000
L485 / X70	3.00 – 25.40	2,000
L555 / X80	○	○

Multiphase steels

Comparison grade	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
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Dual-phase steel

DIN EN 10338 VDA 239-100

Steel grade designation	DIN EN	VDA	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
DP-W® 300Y530T	–	–	2.50–5.50	70–1,630
DP-W® 330Y580T	HDT580X	HR330Y580T-DP	2.50–5.50	70–1,630
DP-W® 300Y580T	–	–	3.00–5.50	70–1,630

Complex-phase steel

DIN EN 10338 VDA 239-100

Steel grade designation	DIN EN	VDA	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
CP-W® 660Y760T	HDT760C	HR660Y760T-CP	1.70–5.00	70–1,400
CP-W® 800	–	–	1.70–5.00	70–1,400
CP-W® 1000	–	–	1.70–4.50	70–1,400

Ferritic-bainitic-phase steel

DIN EN 10338 VDA 239-100

Steel grade designation	DIN EN	VDA	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
FB-W® 300Y450T	HDT450F	HR300Y450T-FB	1.80–6.00	70–1,500
FB-W® 460Y580T	HDT560F	HR440Y580T-FB	1.80–4.00	70–1,500

Chassis steel

Based on VDA VDA 239-100, DIN EN 10346

Steel grade designation	Standard designation	VDA	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
CH-W® 660Y760T	HDT760C*	HR660Y760T-CP*	1.80–5.00	70–1,360
CH-W® 700Y950T	–	–	2.00–4.00	900–1,450

* Guaranteed hole expansion of 60% according to ISO 16630.

Manganese-boron steel for hot forming

Thickness ¹
from _ to in mm

Width ¹
from _ to in mm

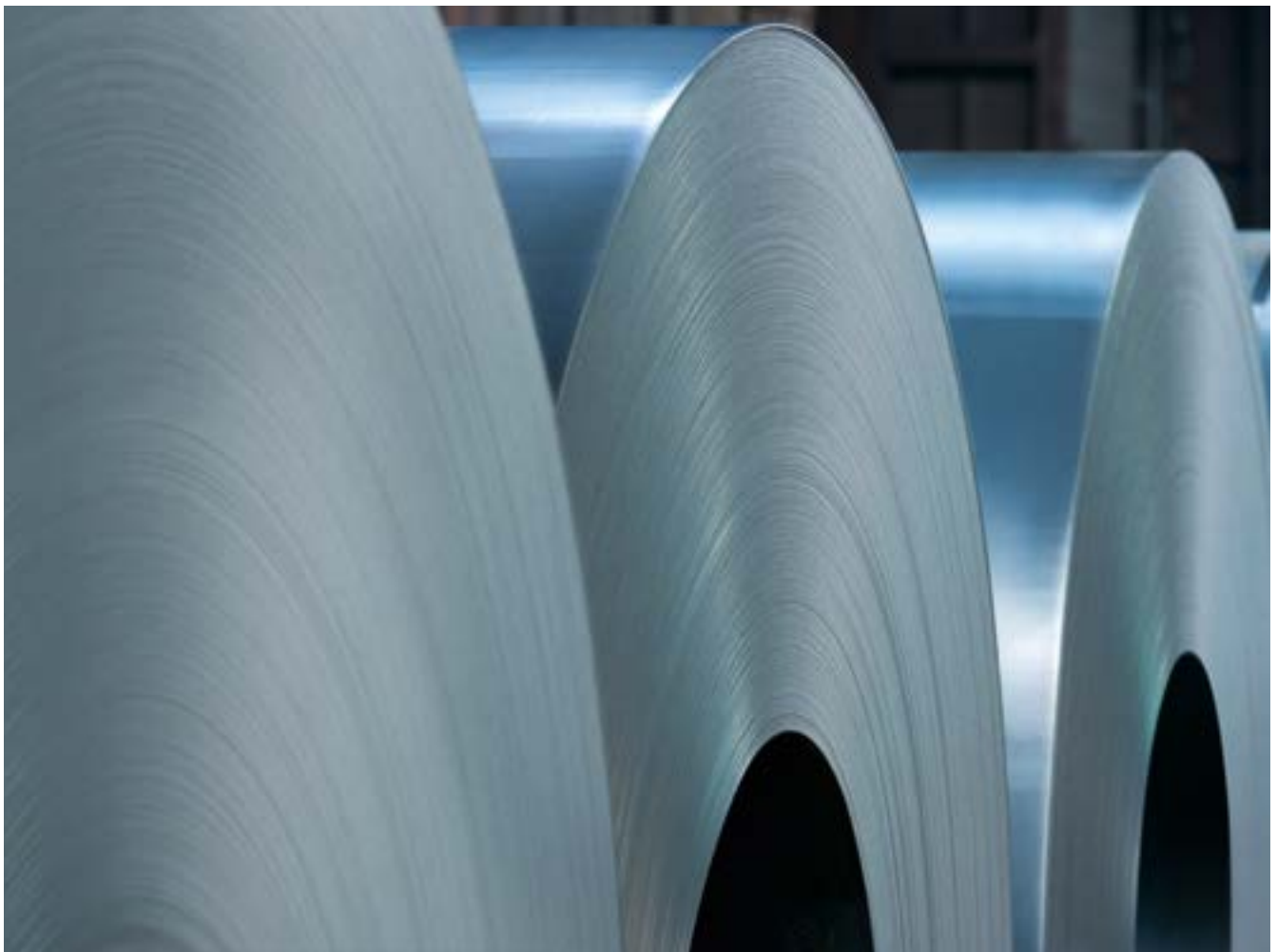
**Based on
VDA 239-100**

Steel grade designation	Standard designation		
MBW-W® 1500	Works special quality	1.75–6.00	70–2,000

Overview of delivery options

	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm	Coil inner diameter in mm
Hot strip pickled			
Tolerances acc. to DIN EN 10051			
Strip	1.20–12.50	600–1,650	610 (±20 mm)
Longitudinally slit strip	1.20–6.70	50–600	○
Hot strip unpickled			
Tolerances acc. to DIN EN 10051			
Strip	1.50–25.40	600–2,030	762 (±7%)
Longitudinally slit strip	2.00–12.00	50–600	○

Panels on request.





#2

Medium strip

Hot-rolled strip steel with the closest thickness tolerances, best surface qualities, uniform material properties and excellent deformation behavior.

precidur®

Your contact persons



Precision Steel

P: +49 2334 91 - 2555

info.precision-steel@thyssenkrupp.com

thyssenkrupp Hohenlimburg GmbH
Oeger Strasse 120
58119 Hagen


Production location



About our medium strip

precidur® is the trademark for our outstanding quality medium strip. It is the ideal starting material for products that are subject to the highest demands in terms of further processing and forming. For example, the narrowest thickness tolerances and mechanical scatter bands for direct processors as well as natural edge strip without burrs or micro-cracks for further processing in the cold rolling industry. The material, which is produced in widths of up to 720 mm and thicknesses of 1.5 to 16 mm, is characterized by the best surface properties and particularly uniform material properties. Customer-specific homogeneous microstructural properties (e.g. fine pearlitic microstructure) can be produced over strip width and strip length. precidur® offers the best processing properties – even with higher-strength steels – and is excellently suited for direct use due to its optimum microstructure. Whether pickled or unpickled, roll-hardened or annealed – precidur® always offers suitable solutions in terms of surfaces and material properties for further processing, and in batch sizes tailored to requirements and production.





With the tightest thickness
and profile tolerances

Max. 720 mm width*
1.5 – 16 mm thickness

Dynamically loadable

The medium strip is ideal for the most difficult forming processes in direct processing and for component construction, especially for components that are exposed to high dynamic loads.

Medium strip

Mild unalloyed steels**

DIN EN 10111

Standard designation	Material number
DD11	1.0332
DD12	1.0398
DD13	1.0335
DD14	1.0389

Free cutting steel**

DIN EN ISO 683-4

Standard designation	Material number	Works brand
9SMn30	1.0715	precidur® 9SMn30
9SMnPb30	1.0718	precidur® 9SMnPb30

Structural steels**

DIN EN 10025

Standard designation	Material number
S235JR/J0/J2	1.0038 / 1.0114 / 1.0117
S275JR/J0/J2	1.0044 / 1.0143 / 1.0145
S355JR/J0/J2	1.0045 / 1.0553 / 1.0577

Micro-alloyed fine-grained steels**

DIN EN 10149-2

Standard designation	Material number	Works brand	Highly ductile variant
S315MC	1.0972	precidur® HSM 315	precidur® HSM 315 HD
S355MC	1.0976	precidur® HSM 355	precidur® HSM 355 HD
S380MC	1.0978	precidur® HSM 380	in development
S420MC	1.0980	precidur® HSM 420	in development
S460MC	1.0982	precidur® HSM 460	in development
S500MC	1.0984	precidur® HSM 500	precidur® HSM 500 HD
S550MC	1.0986	precidur® HSM 550	precidur® HSM 550 HD
S600MC	1.8969	precidur® HSM 600	in development
S650MC	1.8976	precidur® HSM 650	precidur® HSM 650 HD
S700MC	1.8974	precidur® HSM 700	precidur® HSM 700 HD
S760MC	1.0968	precidur® HSM 760	

Bainitic steels**

DIN EN 10338, VDA 239-100

Standard designation	Material number	Works brand
HDT600F	1.0988	precidur® HBS 600
HDT760C, HR660Y760T-CP	1.0998	precidur® HBS 800
HDT850C		precidur® HBS 900
HR700Y950T-CP		precidur® HBS 1000
HR700Y950T-CP ²		precidur® HBS 1000 HE

Widths up to max. 720 mm, thicknesses from 1.5 to 16 mm.

Medium strip _ continued

Boron-alloyed case-hardening
and tempering steels**

**DIN EN ISO 683-2,
DIN EN ISO 683-3**

Standard designation	Material number	Works brand	
8MnCrB3	1.7135	precidur® HLB 8	
17MnB3	1.5506	precidur® HLB 17	
20MnB5	1.5530	precidur® HLB 20	
22MnB5	1.5528	precidur® HLB 22	
27MnCrB5-2	1.7182	precidur® HLB 27	
30MnB5	1.5531	precidur® HLB 30	
37MnB4	1.5524	precidur® HLB 37	
36MnB4/38MnB5	1.5537/1.5532	precidur® HLB 38	acc. to standard 39MnB5
40MnB4	1.5527	precidur® HLB 42	

Case-hardening steels**

DIN EN ISO 683-3

Standard designation	Material number
C10/C10E	1.0301/1.1121
C15/C15E	1.0401/1.1141
16MnCr5	1.7131
20MnCr5	1.7147

Unalloyed tempering steels,
spring steels and tool steels**

**DIN EN ISO 683-1,
DIN EN ISO 4957**

Standard designation	Material number
C22/C22E	1.0402/1.1151
C35/C35E	1.0501/1.1181
C45/C45E	1.0503/1.1191
C50/C50E	1.0540/1.1206
C55/C55E/C55S	1.0535/1.1203/1.1204
C60/C60E/C60S	1.0601/1.1221/1.1211
C67/C67S	1.0603/1.1231
C75/C75S	1.0605/1.1248
C80SA	based on 1.1525
C85S	1.1269
C90S	1.1217
C100S	1.1274

Widths up to max. 720 mm, thicknesses from 1.5 to 16 mm.

* The width depends on the quality and thickness.

** Non-standard grades are also listed in some cases.

Medium strip _ continued

Alloyed tempering steels,
spring steels and tool steels **

**DIN EN ISO 683-2, DIN EN ISO 4957,
DIN EN ISO 683-17**

Standard designation	Material number
25CrMo4	1.7218
X32CrMoV4	
32CrMoV12-10	1.7765
34CrMo4	1.7220
42CrMo4	1.7225
48CrMoNiV4-4 (D6A)	
50CrMo4	1.7228
51CrMoV4	based on 1.7701
51CrV4	1.8159
58CrV4	1.8161
64NiNb4	1.2751
68CrNiMo3-2	1.2753
75Cr1	1.2003
75Ni8	1.5634
80CrV2	1.2235
100MnCrW4	1.2510
100Cr6	1.3505
102Cr6	1.2067
105WCr6	1.2419
125Cr2	1.2002

Widths up to max. 720 mm, thicknesses from 1.5 to 16 mm.

Medium strip _ continued

TWIP steels**

Standard designation	Material number	Works brand
X40MnCrAlV19-2	1.7401	precidur® H-Mn HY
X40MnCrAlV19-2	1.7401	precidur® H-Mn LY

Widths up to max. 720 mm, thicknesses from 1.5 to 16 mm.

* The width depends on the quality and thickness.

** Non-standard grades are also listed in some cases.



#8

Strip plate

Sheet cut from hot wide strip, mainly in thicknesses up to 15 mm, max. up to 20 mm, and in widths of max. 2000 mm.

Wear resistant steel perform[®]

High-strength steel perdur[®]

Hardenable boron steel TBL[®]

Your contact persons



Industry

P: +49 203 52-75617

thyssenkrupp Steel Europe AG
Kaiser-Wilhelm-Strasse 100
47166 Duisburg
Postal address: 47161 Duisburg

Production location



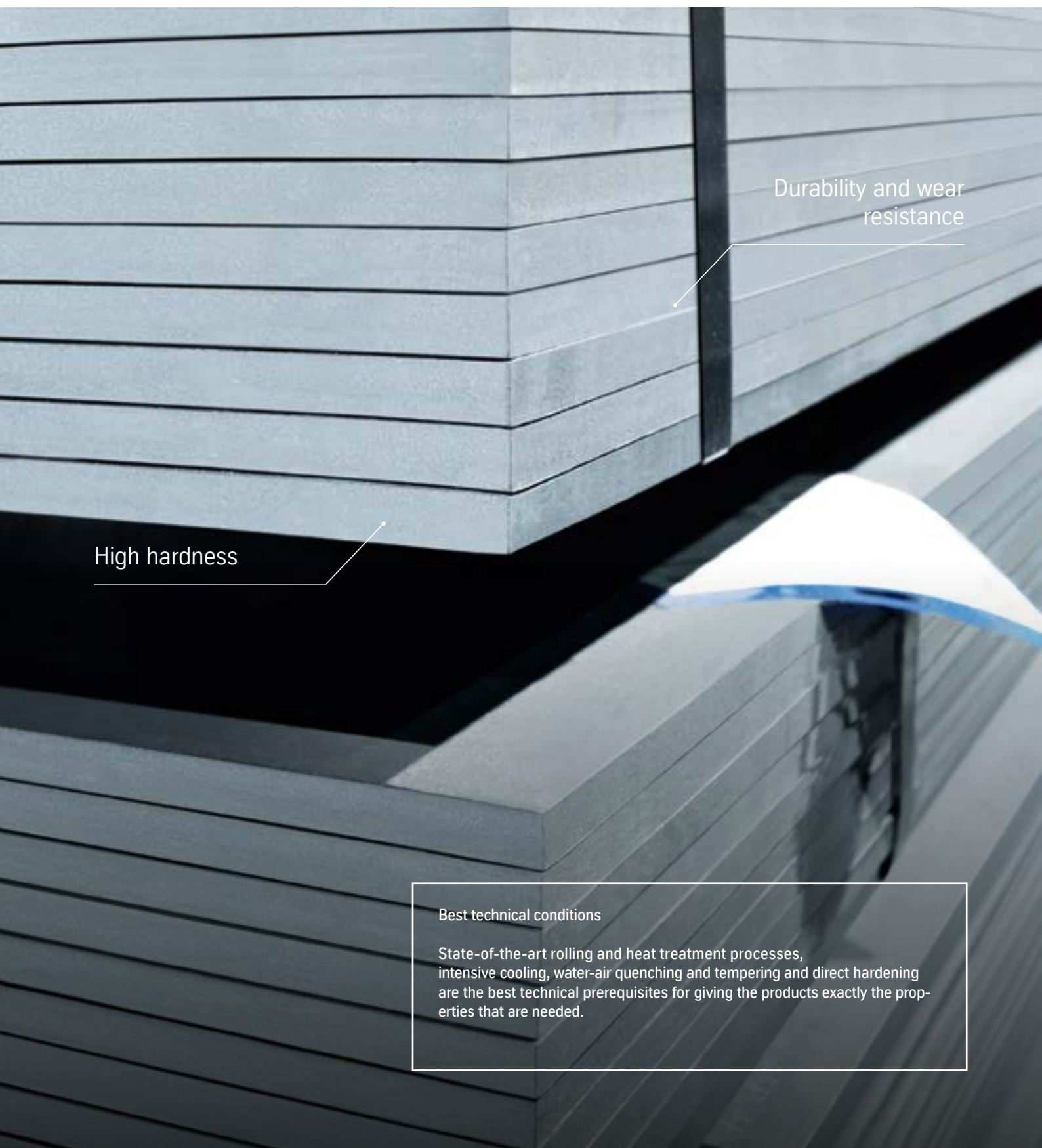
Our hot strip cut-to-length line in Antwerp is one of the most efficient of its kind, producing wear-resistant and high-strength premium strip plates with excellent properties for all requirements.

About our strip plate

Our strip plate business is characterized by a select portfolio of high-quality products made from cross-cut hot strip steel. Our premium brands perdur[®], perform[®] and TBL[®] stand for a high range of functions and excellent processing properties – with less weight. In addition to product qualities, holistic customer service plays a decisive role for us in this area. As an experienced materials technology partner, we place our focus here on even more intensive and closer support for our customers right from the start. From materials consulting and innovation to application and process optimization.

Dump trucks, refuse collection vehicles, agricultural and construction machinery, cranes and, of course, trucks as well – the range of special vehicles on and in which our premium strip plate products are used is immense.





Durability and wear resistance

High hardness

Best technical conditions

State-of-the-art rolling and heat treatment processes, intensive cooling, water-air quenching and tempering and direct hardening are the best technical prerequisites for giving the products exactly the properties that are needed.

High-strength steel

Thickness ¹
from _ to in mm

Width ¹
max. in mm

Micro-alloyed steel
for cold forming

DIN EN 10149-2
VDA 239-100

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ max. in mm
perform [®] 500	S500MC	1.5–20.0	2,000
perform [®] 550	S550MC	1.5–8.5	2,000
perform [®] 600	S600MC	2.0–9.5	1,600
perform [®] 650	S650MC	2.0–12.0	1,800
perform [®] 700	S700MC	2.0–12.0	1,600

Wear resistant steel

Strip plates

Thickness ¹ from_ to in mm	Width ¹ max. in mm
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Wear-resistant special structural steel perdur[®],
hardened/tempered

Steel grade designation	Standard designation	Thickness ¹ from_ to in mm	Width ¹ max. in mm
perdur [®] 400	Works special quality	4.0 ≤ t ≤ 8.0	1,500
perdur [®] 450	Works special quality	4.0 ≤ t < 6.0	1,500
		6.0 ≤ t ≤ 8.0	1,600

Hardenable boron steel TBL[®]Based on
DIN EN 683-2

Steel grade designation	Standard designation	Thickness ¹ from_ to in mm	Width ¹ max. in mm
TBL [®] 30	Works special quality	2.0 – 18.0	1,000 – 2,000
TBL [®] 35	Works special quality	2.5 – 15.0	1,000 – 1,630
TBL [®] 40	Works special quality	3.0 – 12.0	1,000 – 1,630
TBL [®] 45	Works special quality	3.0 – 12.0	1,000 – 1,630
TBL [®] 50	Works special quality	3.0 – 12.0	1,000 – 1,630



#4

Thin sheet and surface-refined products

Cold-rolled flat products prepared for a wide variety of demanding applications by hot-dip coating and electrolytic refining.

Mild steel

Multiphase steel

High-strength steel

Higher-strength steel

scalur[®]+Z

Structural steel

Manganese-boron steel
for hot forming

Your contact persons



Automotive

P: +49 203 52 - 45541



Industry

P: +49 203 52 - 41048

F: +49 203 52 - 26667

thyssenkrupp Steel Europe AG
Kaiser-Wilhelm-Strasse 100
47166 Duisburg
Postal address: 47161 Duisburg

Customer consulting Color
P: +49 2732 599 - 4578
F: +49 2732 599 - 4108

thyssenkrupp Steel Europe AG
Hammerstrasse 11
57223 Kreuztal

Production locations



About our thin sheet

More than 80% of our cold-rolled steels are refined with different high-quality surfaces. This results in products with very good flatness, low layer thicknesses, high corrosion protection and good formability combined with maximum strength, for example with metallic coatings of pure zinc, zinc-iron or zinc-magnesium. It is also possible to combine a zinc-aluminum alloy to achieve particularly high corrosion resistance, as with the galfan® coating variant.

Furthermore, we offer electrolytically galvanized thin sheet as well as special products made of hot-dip aluminized manganese-boron steel and special textures such as primetex®, which is the basis for an excellent paint appearance.





Highest strength

Good formability

Spectrum of surface refinement

With more than ten finishing plants, we are in an excellent position to cover the entire spectrum of metallic and organic coatings.

Mild steel

Surface refinement

-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
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Deep-drawing steel

DIN EN 10130, DIN EN 10152

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
DC01	DC01	●	●					
DC03	DC03	●	●					
DC04	DC04	⊙	■					
DC05	DC05	⊙	■					
DC06	DC06	⊙	■					
DC07	DC07	⊙	■					

DIN EN 10346

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
DX51D	DX51D			⊙	⊙	⊙	●	●
DX52D	DX52D			⊙	⊙	⊙	●	●
DX53D	DX53D			⊙	⊙	⊙	●	●
DX54D	DX54D			■	⊙	■	●	●
DX56D	DX56D			■	⊙	■	●	○
DX57D	DX57D			■	⊙	■		
DX58D	Works special quality			●				

VDA 239-100

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
CR1	CR1	●	●	●	●	●	●	
CR2	CR2	●	●	●	●	●	●	
CR3	CR3	⊙	■	■	⊙	■	●	
CR4	CR4	⊙	■	■	⊙	■	●	
CR5	CR5	⊙	■	■	⊙	■		

DIN EN 10346

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
lightprotect® AS DX52D	DX52D						●	
lightprotect® AS DX53D	DX53D						●	
lightprotect® AS DX54D	DX54D						●	
lightprotect® AS DX56D	DX56D						●	

Mild steel

Surface refinement

-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
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Steel for enameling

DIN EN 10209

Steel grade designation	Standard designation	
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DC01EK	DC01EK	●
DC04EK	DC04EK	●
DC06EK	DC06EK	●
DC06EK Plus	Works special quality	●

Structural steel

Surface refinement

-/UC	ZE/EG	Z/GI	ZF/GA	ZM**	ZM Solar**	AS	ZA
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Cold-rolled structural steel

DIN 1623

Steel grade designation	Standard designation		
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S215G	S215G	●	●
S245G	S245G	●	●
S325G	S325G	●	●

Hot-dip coated structural steel

DIN EN 10346

Steel grade designation	Standard designation						
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S220GD	S220GD	●	●	●	●	●	●
S250GD	S250GD	●	●	●	●	●	●
S280GD	S280GD	●	●	●	●	●	●
S320GD	S320GD	●	●	●	●	●	●
S350GD	S350GD	●	●	●	●	●	●
S390GD*	S390GD*	●	●	●	●	●	●
S420GD*	S420GD*	●		●	●		
S450GD*	S450GD*	●		●	●		
S550GD*	S550GD*	●		●	●		

* The grades are generally approved by the building authorities in the thickness range from 0.75 to 4.00 mm and with zinc platings of up to 275 g/m².

** ZM-coated steels have the building regulations approval from the German Institute for Construction Technology (DIBt).

[→ Explanation of symbols on the last page](#)

Higher-strength steel

	Comparison grade		Surface refinement						
			-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
Microalloyed steel									
DIN EN 10152, DIN EN 10268, DIN EN 10346									
VDA 239-100									
Steel grade designation	DIN EN	VDA							
MHZ [®] 220	–	CR210LA	●	●	●	●	●	●	●
MHZ [®] 260	HC260LA/HX260LAD	CR240LA	●	●	●	●	●	●	●
MHZ [®] 300	HC300LA/HX300LAD	CR270LA	●	●	●	●	●	●	●
MHZ [®] 340	HC340LA/HX340LAD	CR300LA	●	●	●	●	●	●	●
MHZ [®] 380	HC380LA/HX380LAD	CR340LA	●	●	●	●	●	●	●
MHZ [®] 420	HC420LA/HX420LAD	CR380LA	●	●	●	●	●	●	●
MHZ [®] 460	HC460LA/HX460LAD	CR420LA			●		●		
MHZ [®] 500	HC500LA/HX500LAD	CR460LA			●		●		

Work-hardening steel

Steel grade designation							
WHZ 300	–	–	⊙	⊙	⊙	●	
WHZ 420	–	–	●	●	●	●	

Higher-strength steel

Steel grade designation					
EHZ [®] 550	–	–		○	●

High-strength steel

Surface refinement

-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
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High-strength IF steel

DIN EN 10152, DIN EN 10268,
DIN EN 10346

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
HX 160	-/HX160YD	○	○	○	○	○		
HX 180	HC180Y/HX180YD	○	□	□	○	□		
HX 220	HC220Y/HX220YD	○	□	□	○	□		●
HX 260	HC260Y/HX260YD	○	○	○	○	○		
HX 280	-			○		○		

VDA 239-100

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
CR160IF	CR160IF	○	○	○	●			
CR180IF	CR180IF	○	□	□	○	□		
CR210IF	CR210IF	○	□	□	○	□		
CR240IF	CR240IF	○	○	○	○	○		

Bake-hardening steel

DIN EN 10152, DIN EN 10268,
DIN EN 10346

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
BHZ 180	HC180B/HX180BD	○	□	□	○	□		
BHZ 220	HC220B/HX220BD	○	□	□	○	□		
BHZ 260	HC260B/HX260BD	○	○	○	○	○		
BHZ 300	HC300B/HX300BD	●	●	●	●			

VDA 239-100

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
CR180BH	CR180BH	○	□	□	○	□		
CR210BH	CR210BH	○	□	□	○	□		
CR240BH	CR240BH	○	○	○	○	○		

High-strength steel

DIN EN 10152, DIN EN 10268

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
HSZ 220	HC220I	○	□					

scalur[®]+ZThickness ¹
from _ to in mmWidth ¹
from _ to in mmHot-dip galvanized flat product
with narrowest thickness tolerances**DIN EN 10346**

Steel grade designation	Standard designation	Thickness ¹ from _ to in mm	Width ¹ from _ to in mm
scalur [®] +Z DX51D	DX51D	1.5–4.0	900–1,550
scalur [®] +Z DX52D	DX52D	1.5–4.0	900–1,550
scalur [®] +Z S220GD	S220GD	1.5–4.0	900–1,550
scalur [®] +Z S250GD	S250GD	1.5–4.0	900–1,550
scalur [®] +Z S280GD	S280GD	1.5–4.0	900–1,550
scalur [®] +Z S320GD	S320GD	1.5–4.0	900–1,550
scalur [®] +Z S350GD	S350GD	1.5–4.0	900–1,550
scalur [®] +Z S390GD	S390GD	1.5–4.0	900–1,500
scalur [®] +Z S420GD	S420GD	1.5–4.0	900–1,500
scalur [®] +Z HX260LAD	HX260LAD	1.5–4.0	900–1,550
scalur [®] +Z HX300LAD	HX300LAD	1.5–4.0	900–1,550
scalur [®] +Z HX340LAD	HX340LAD	1.5–4.0	900–1,550
scalur [®] +Z HX380LAD	HX380LAD	1.5–4.0	900–1,550
scalur [®] +Z HX420LAD	HX420LAD	1.5–4.0	900–1,550
scalur [®] +Z HX460LAD	HX460LAD	1.8–3.0	900–1,500
scalur [®] +Z HX500LAD	HX500LAD	1.8–3.0	900–1,500
scalur [®] +Z HDT760C	HDT760C	1.8–3.0	900–1,325

Modern multiphase steels

Steel grade designation	DIN EN	VDA	Surface refinement						
			-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
Dual-phase steel									
DIN EN 10152, DIN EN 10338, DIN EN 10346									
VDA 239-100									
DP-W® 300Y530T	–	–	●						
DP-W® 330Y580T	HDT580X	HR330Y580T-DP	●						
DP-W® 300Y580T	–	–	●	●					
DP-K® 290Y490T	HCT490X	CR290Y490T-DP	⊙	⊙	●	⊙		●	
DP-K® 330Y590T	HCT590X	CR330Y590T-DP	●	●	■	●		■	
DP-K® 330Y590T DH	–	–			●				
DP-K® 420Y590T	–	–			●				
DP-K® 440Y780T	HCT780X	CR440Y780T-DP			●				
DP-K® 440Y780T DH	–	CR440Y780T-DH			●				
DP-K® 440Y780T HHE	–	–	●		●				
DP-K® 590Y780T	–	–			●				
DP-K® 590Y980T	HCT980X	CR590Y980T-DP			●	●			
DP-K® 700Y980T	HCT980XG	CR700Y980T-DP	●	●	●	●			
DP-K® 780Y1180T	–	–			●				
DP-K® 900Y1180T	–	–	●		●				

Retained austenite steel (TRIP steel)

DIN EN 10152, DIN EN 10338, DIN EN 10346

VDA 239-100

Steel grade designation	DIN EN	VDA	Surface refinement						
RA-K® 400Y690T	HCT690T	CR400Y690T-TR	●		●				

Complex-phase steel

DIN EN 10152, DIN EN 10338, DIN EN 10346

VDA 239-100

Steel grade designation	DIN EN	VDA	Surface refinement						
CP-W® 660Y760T	HDT760C	HR660Y760T-CP	●		●				
CP-W® 800	–	–	●		●				
CP-W® 1000	–	–	●						
CP-K® 570Y780T	HCT780C	CR570Y780T-CP	●						
CP-K® 780Y980T	HCT980C	CR780Y980T-CP	●		●				
CP-K® 900Y1180T	–	CR900Y1180T-CP	●		●				

Modern multiphase steels _ continued

Steel grade designation	Comparison grade	VDA	Surface refinement							
			-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA	
Ferritic-bainitic-phase steel										
DIN EN 10152, DIN EN 10338, DIN EN 10346										
VDA 239-100										
FB-W® 300Y450T	HDT450F	HR300Y450T-FB	●		●					
FB-W® 460Y580T	HDT580F	HR440Y580T-FB	●		●					

Chassis steel

Based on VDA 239-100, DIN EN 10338, DIN EN10346

Steel grade designation	DIN EN	VDA	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
CH-W® 660Y760T	HDT760C*	HR660Y760T-CP*	●		●				
CH-W® 1000Y950T	–	–	●						

* Guaranteed hole expansion of 60% according to ISO 16630.

Manganese-boron steel for hot forming

Steel grade designation	Standard designation	Surface refinement							
		-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA	AS Pro
MBW-W® 1500 UC	Works special quality	●							
MBW® 500	Works special quality						●		●
MBW® 600	Works special quality						●		●
MBW® 1200	Works special quality						●		●
MBW® 1500	Works special quality						●		●
MBW-K® 1500	Works special quality	●							
MBW-K® 1900	Works special quality	●							

Surface refinements

	Nominal plating per side		Single surface sample	Single surface sample	
	Thickness [µm]	Weight [g/m ²]	Weight [g/m ²]	Thickness [µm]	Weight [g/m ²]

Electrolytically galvanized thin sheet ZE/EG

Location / type	According to DIN EN 10346				According to VDA 239-100		
	Designation				Designation		
Both sides	ZE25/25	2.5/2.5	18/18	12/12	EG12/12	1.7–4.5	12–32
	ZE50/50	5.0/5.0	36/36	29/29	EG18/18	2.5–5.4	18–38
	ZE75/75	7.5/7.5	54/54	47/47	EG29/29	4.1–6.9	29–49
	ZE100/100	10.0/10.0	72/72	65/65	EG53/53	7.5–10.0	53–73
One-sided	ZE25/0	2.5/0.0	18/0	12/0	EG70/70	9.9–13.0	70–90
	ZE50/0	5.0/0.0	36/0	29/0			
	ZE75/0	7.5/0.0	54/0	47/0			
	ZE100/0	10.0/0.0	72/0	65/0			

Surface refinements _ continued

Hot-dip coated
thin sheet

	Z/GI		ZF/GA		ZM		ZM Solar	AS	ZA	
	DIN EN 10346	VDA 239-100	DIN EN 10346	VDA 239-100	DIN EN 10346	VDA 239-100	DIN EN 10346	DIN EN 10346	VDA 239-100	DIN EN 10346
					70	30/30				
					80					
	100	40/40	100	40/40	100	40/40				95
			120	50/50	120	50/50				
					130			50		
	140	60/60			140			60		130
					150					
					185					
	200	85/85			200			80	30/30	185
										200
	225									
								100		
	275				275			120	45/45	255
										300
					300		310			
	350				350 ⁵			150		
							430			
	450 ⁵							200		
	600 ⁵						620 ⁵	250		

Plating weight
in g/m² *

* In the standard, the three-surface sample is used for DIN EN and the single-surface sample for VDA 239-100.
In deviation from the standard, a three-surface or single-surface sample can also be ordered in accordance with DIN EN or VDA 239-100.

Surface treatments

		Surface refinement						
		-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
U	Without surface treatment	●	●	●	●	●	●	●
O	Oiled	●	●	●	●	●	●	●
C	Chemically passivated		●	●	●	●	●	●
CO	Chemically passivated and oiled		●	●	●	●	●	●
P	Phosphated		●					
PO	Phosphated and oiled		●					
PC	Phosphated and chemically passivated		●					
PCO	Phosphated, chemically passivated and oiled		●					
S	Sealed			●		●	●	●
JAZ	JAZ®				●			

Further forming aids on request.

Thin sheet _ surface finishes _ surface types

	Surface finishes				Surface types	
	Especially smooth	Smooth	Matt	Rough		
Cold-rolled flat products						
UC uncoated	●	●	●	●	A	Normal surface
					U	Unexposed (internal parts)
					B	Best surface
					E	Exposed (external parts)
ZE/EG electrolytically galvanized	●	●	●	●	A	Normal surface
					U	Unexposed (internal parts)
					B	Best surface
					E	Exposed (external parts)
					primetex®	

A/B/C According to DIN EN 10346.

U/E According to VDA 239-100.

Thin sheet _ surface finishes _ surface types _ continued

Surface types

Hot-dip coated
strip and sheet

Z/GI hot-dip galvanized	A	Normal surface
	B	Improved surface
	U	Unexposed (internal parts)
	C	Best surface
	E	Exposed (external parts)
	primetex®	
ZF/GA Galvannealed	A	Normal surface
	B	Improved surface
	U	Unexposed (internal parts)
	C	Best surface
	E	Exposed (external parts)
ZM Ecoprotect®	A	Normal surface
	B	Improved surface
	U	Unexposed (internal parts)
	C	Best surface
	E	Exposed (external parts)
	primetex®	
ZM Ecoprotect® Solar	A	Normal surface
	B	Improved surface
AS aluminum-silicon-coated	A	Normal surface
	B	Improved surface
	U	Unexposed (internal parts)
	C	Best surface
ZA galfan®	A	Normal surface
	B	Improved surface
	U	Unexposed (internal parts)
	C	Best surface

A/B/C According to DIN EN 10346.

U/E According to VDA 239-100.

Thin sheet_hot-dip galvanized

	Thickness from _ to in mm	Width from _ to in mm	Length from _ to in mm
Hot-dip galvanized corrugated sheet			
Tolerances acc. to DIN EN 59231			
Sections 18/76	0.60–2.00	836	max. 4,000
Sections 27/100	0.60–2.00	800	max. 4,000
Hot-dip galvanized ladle plate			
Tolerances on dimensions and shape according to DIN EN 59231			
Sheet metal	0.60–1.00	850	1,000–3,000
Hot-dip galvanized strip steel normalized (Z150 – Z500)			
Tolerances according to DIN EN 10111, DIN EN 10025 form tolerances according to DIN EN 10051			
Strip	1.50–6.00	15–200	–
Rods	1.50–6.00	15–120	500–7,500

The platings Z150 – Z500 each refer to one side.

Thin sheet _ delivery forms and dimensions

	Thickness ⁴ from _ to in mm	Width ^{4,*} from _ to in mm	Length from _ to in mm
Cold-rolled			
Tolerances acc. to DIN EN 10131			
Strip	0.40–4.00	600–1,950	–
Sheet metal	0.40–4.00	600–1,800	500–6,500
Longitudinally slit strip	0.40–4.00	20–600	–

Electrolytically refined
ZE/EG zinc**Tolerances acc. to DIN EN 10131**

Strip	0.40–3.00	600–1,950	–
Sheet metal	0.40–3.00	600–1,800	500–6,500
Longitudinally slit strip	0.40–3.00	20–600	–

Hot-dip coated
Z/GI zinc**Tolerances acc. to DIN EN 10143**

Strip	0.30–4.00	600–1,950	–
Sheet metal	0.30–4.00	600–1,800	500–6,000
Longitudinally slit strip	0.30–4.00	20–600	–

Hot-dip coated
ZF/GA Galvannealed**Tolerances acc. to DIN EN 10143**

Strip	0.50–2.60	600–1,950	–
Sheet metal	0.50–2.60	600–1,800	500–6,000
Longitudinally slit strip	0.50–2.60	20–600	–

* Depending on steel grade and thickness.

Thin sheet _ delivery forms and dimensions _ continued

	Thickness ⁴ from _ to in mm	Width ^{4,*} from _ to in mm	Length from _ to in mm
Hot-dip coated ZA galfan®			
Tolerances acc. to DIN EN 10131			
Strip	0.40–3.00	700–1,600	–
Sheet metal	0.40–3.00	700–1,600	500–6,000
Longitudinally slit strip	0.40–3.00	20–600	–

AS aluminum-silicon-coated **

Tolerances acc. to DIN EN 10143

Strip	0.30–3.00	600–1,600	–
Sheet metal	0.30–3.00	600–1,600	500–6,000
Longitudinally slit strip	0.30–3.00	20–600	–

Hot-dip coated
ZM Ecoprotect®**Tolerances acc. to DIN EN 10143**

Strip	0.30–3.00	600–1,830	–
Sheet metal	0.30–3.00	600–1,650	500–6,000
Longitudinally slit strip	0.30–3.00	20–600	–

Hot-dip coated
ZM Ecoprotect® Solar**Tolerances acc. to DIN EN 10143**

Strip	0.60–3.00	900–1,530	–
Sheet metal	0.60–3.00	900–1,530	500–6,000
Longitudinally slit strip	0.60–3.00	20–600	–

* Depending on steel grade and thickness.

** lightprotect® AS is available in thicknesses from 0.26 to 0.39 mm.



#5

Organically coated strip and sheet

Steel with a finished surface in a wide range of qualities, which makes time-consuming and cost-intensive piece coatings superfluous.

pladur®

Your contact persons



Industry

Customer consulting Color

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thyssenkrupp Steel Europe AG

Hammerstrasse 11

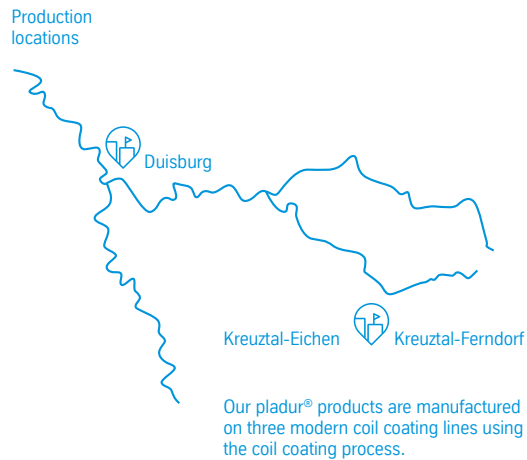
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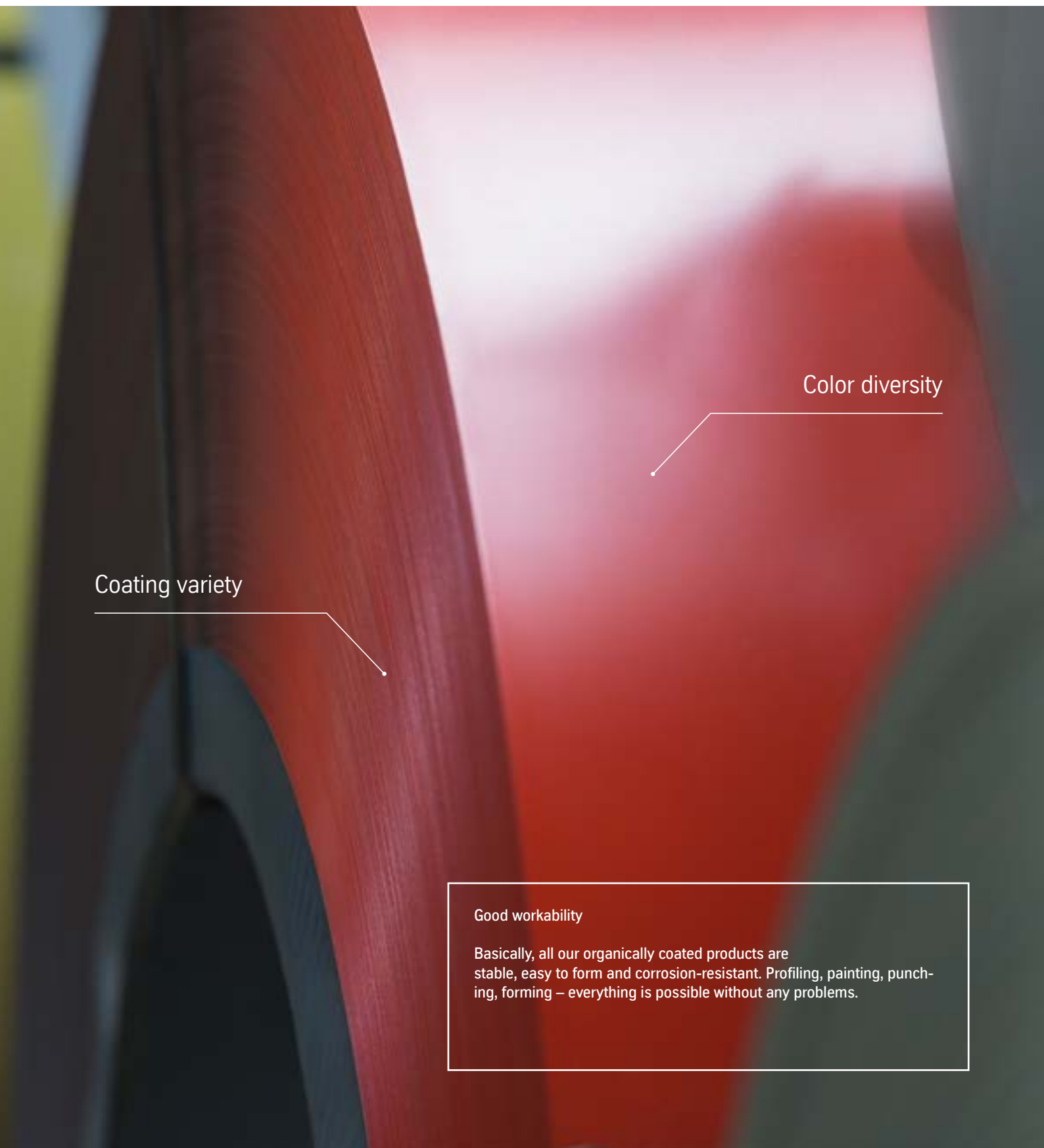


About our organically coated thin sheet – pladur®

With our constantly growing range of organically coated strip and sheet, we cover a broad spectrum of applications in a wide variety of industries. Depending on the requirements profile, our surface-coated products with the name pladur® can be adjusted to numerous effective properties: abrasion-resistant, wear-resistant, insensitive to certain aggressive substances, dirt-repellent and much else besides.

The visual design of the surface also leaves nothing to be desired. In addition to the colors from our reflections One collection and almost all colors from the RAL or NCS range, it is also possible to reproduce wood grains or stone patterning as well as metallic surfaces. Following the motto “finish first, fabricate later”, the use of steel with finished surface leads to significant cost advantages in numerous industries.





Coating variety

Color diversity

Good workability

Basically, all our organically coated products are stable, easy to form and corrosion-resistant. Profiling, painting, punching, forming – everything is possible without any problems.

The pladur® family

pladur® Aesthetic
 pladur® Basic
 pladur® Clear
 pladur® Cool
 pladur® Daylight
 pladur® Decor
 pladur® Deluxe
 pladur® Durable
 pladur® Durable IR
 pladur® Flexible
 pladur® Indoor

pladur® Lumen
 pladur® Multishell
 pladur® Primed
 pladur® Protect
 pladur® Relief Icecrystal
 pladur® Relief Icecrystal Plus
 pladur® Relief Texture
 pladur® Relief Wood
 pladur® Resistant
 pladur® Robust
 pladur® Smooth

pladur® Smooth Plus
 pladur® Strong
 pladur® Structured
 pladur® Sunlight
 pladur® Sunlight Plus
 pladur® Tough
 pladur® Ultramatt
 pladur® Wrinkle
 pladur® Wrinkle Plus

The reflections family

reflections One
 reflections Pearl

Base materials for pladur®

Surface refinement

-/UC ZE/EG Z/GI ZF/GA ZM AS ZA

Mild steel

**DIN EN 10130, DIN EN 10152,
 DIN EN 10346**

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
DC01	DC01	●	●					
DC03	DC03	●	●					
DC04	DC04	●	●					
DC05	DC05	●	●					
DC06	DC06	●	●					
DX51D	DX51D			●		●	●	●
DX52D	DX52D			●		●	●	●
DX53D	DX53D			●		●	●	●
DX54D	DX54D			●		●	●	●
DX55D	DX55D						●	
DX56D	DX56D			●		●	●	●
DX57D	DX57D			●		●	●	●

Base materials for pladur®

Surface refinement

-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
------	-------	------	-------	----	----	----

Structural steel

DIN EN 10346

Steel grade designation	Standard designation	-/UC	ZE/EG	Z/GI	ZF/GA	ZM	AS	ZA
S220GD	S220GD			●		●	●	●
S250GD	S250GD			●		●	●	●
S280GD	S280GD			●		●	●	●
S320GD	S320GD			●		●	●	●
S350GD	S350GD			●		●	●	●

Delivery forms and dimensions

	Thickness from _ to in mm	Width from _ to in mm	Length from _ to in mm
Strip	0.30–3.00	600–1,600	
Panel	0.30–3.00	600–1,650	600–6,000
Split strip	0.40–3.30	20–800	

Special dimensions on request.

Various coating types for pladur®

	Coating material	Abbreviation*
Liquid coatings	Polyester	SP
	Polyamide-modified polyester	SP-PA
	Polyurethane	PUR
	Polyamide-modified polyurethane	PUR-PA
	High-durable polymer	HDP
	Polyvinylidene fluoride	PVDF
Film coating	Epoxy	EP
	Polyvinyl chloride	PVC (F)
	Polypropylene	PP
Combined coating	Polyethylene terephthalate	PET
	Liquid coating and Film coating	

* According to DIN EN 10169 Tabelle B.1

[→ Explanation of symbols on the last page](#)



#6

Electrical steel strip

Innovative mild magnetic material used to achieve greater efficiency in the transmission and distribution of energy.

Grain oriented electrical steel strip (KO)

Non-grain-oriented electrical steel strip (NO)

Your contact



Electrical Steel

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F: +49 209 407 50-832

thyssenkrupp Electrical Steel GmbH
Kurt-Schumacher-Strasse 95
45881 Gelsenkirchen



Automotive

Sales & Distribution NO
P: +49 203 52-24627


thyssenkrupp Steel Europe AG
Kaiser-Wilhelm-Strasse 100
47166 Duisburg



About our electrical steel strip

Our powercore® electrical steel strip is a material for maximum efficiency that plays a role in the entire energy value chain. As grain oriented electrical steel strip, which is given a special grain structure by a complex production process, it is used in transformers. As non-grain-oriented electrical steel strip, on the other hand, it is used in electric motors and appliances as well as generators.





Less consumption of resources such as copper, oil and insulation materials

More power with the same energy consumption

True bundles of energy

Electrical steel strips are used in the generation, transmission, distribution and consumption of electrical energy. The efficiency of electrical machines is determined in particular by the magnetic properties of the electrical steel strip. Our powercore® products make it possible to build electrical machines with extremely high efficiencies – for the benefit of resource conservation and environmental protection. As high-tech electrical steel strips, they are characterized by excellent processability, outstanding magnetic properties and maximum energy efficiency.

Magnetic properties

		Thickness		Maximum specific loss at		Minimum polarization at
		[mm]	[inch]	1.7 50 Hz W/kg	1.7 60 Hz W/kg	800 A/m T
powercore grade	Compatible with grade as defined in IEC 60404-8-7					
H 070-20	M70-20R5	0.20	0.008	0.70	0.92	1.88
H 075-20	M75-20R5	0.20	0.008	0.75	0.99	1.88
H 070-23		0.23	0.009	0.70	0.92	1.88
H 075-23	M75-23R5	0.23	0.009	0.75	0.99	1.88
H 078-23		0.23	0.009	0.78	1.03	1.88
H 080-23	M80-23R5	0.23	0.009	0.80	1.05	1.88
H 085-23	M85-23R5	0.23	0.009	0.85	1.12	1.88
H 090-23	M90-23R5	0.23	0.009	0.90	1.18	1.88
H 100-23	M100-23P5	0.23	0.009	1.00	1.32	1.85
H 085-27	M85-27R5	0.27	0.011	0.85	1.12	1.88
H 090-27	M90-27R5	0.27	0.011	0.90	1.18	1.88
H 095-27	M95-27R5	0.27	0.011	0.95	1.25	1.88
H 100-27	M100-27P5	0.27	0.011	1.00	1.32	1.88
H 110-27	M110-27P5	0.27	0.011	1.10	1.45	1.88
H 100-30	M100-30P5	0.30	0.012	1.00	1.32	1.88
H 105-30	M105-30P5	0.30	0.012	1.05	1.38	1.88
H 110-30	M110-30P5	0.30	0.012	1.10	1.45	1.88
H 125-35	M125-35P5	0.35	0.014	1.25	1.64	1.88

All grades are delivered with laser domain refinement if not specifically agreed otherwise. This domain refinement is not heatproof. If no annealing is applied to these materials, they are compatible to the high permeability "P" grades of IEC 60404-8-7, table 2. Magnetic properties measured by SST according to IEC 60404-3. Obtained losses at 1.7 T are converted by applying a factor of 0.925 as defined by IEC 60404-8-7. For the magnetic polarization at 800 A/m a conversion of 1.01 is applied.

powercore® according to BIS standard 3024

Magnetic properties					
	Thickness		Maximum specific loss at		Minimum polarization at
	[mm]	[inch]	1.7T	1.7T	800 A/m
			50 Hz	60 Hz	T
			W/kg	W/kg	
Grade					
23HP80d	0.23	0.009	0.80	1.04	1.85
23HP85d	0.23	0.009	0.85	1.12	1.85
23HP90d	0.23	0.009	0.90	1.19	1.85
23HP95d	0.23	0.009	0.95	1.25	1.85
23HP100d	0.23	0.009	1.00	1.32	1.85
27HP90d	0.27	0.011	0.90	1.19	1.85
27HP95d	0.27	0.011	0.95	1.25	1.85
27HP100	0.27	0.011	1.00	1.32	1.88
27HP110	0.27	0.011	1.10	1.45	1.88
30HP105	0.30	0.012	1.05	1.38	1.88
30HP110	0.30	0.012	1.10	1.46	1.88
30HP120	0.30	0.012	1.20	1.58	1.88
35HP115	0.35	0.014	1.15	1.51	1.88
35HP125	0.35	0.014	1.25	1.64	1.88
35HP135	0.35	0.014	1.35	1.77	1.88

(d) = Magnetic domain refined by laser scribing.

All the grades may be delivered with laser domain refinement if not agreed otherwise.
Magnetic properties measured by Epstein frame or by SST as defined in IS 649.

powercore® Rotate

Our powercore® Rotate grades are optimized for use in rotating machinery, taking into account the magnetic properties of grain-oriented electrical steel strip.

Due to their high magnetic polarization, the powercore® Rotate grades are optimum for applications that work with high induction

values. The magnetic properties are determined according to the Epstein test in the rolling direction (see IEC 60404-10).

Typical magnetic properties at significant inductivities and frequencies are:

powercore® Rotate for rotational applications in the medium-frequency range

	nominal thickness [mm]	guaranteed P 1.5 400 Hz W/kg	typical P 1.5 1,000 Hz W/kg	typical P 1.5 2,000 Hz W/kg	typical J2500 50 Hz T
--	---------------------------	---------------------------------------	--------------------------------------	--------------------------------------	--------------------------------

Product name

R 18-MF	0.18	15	65	200	1.93
R 20-MF	0.20	16	70	215	1.94

powercore® Rotate for rotational applications in the low-frequency range

	nominal thickness [mm]	typical P 1.7 10 Hz W/kg	typical P 1.7 20 Hz W/kg	guaranteed P 1.7 50 Hz W/kg	typical J2500 50 Hz T
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Product name

R 30-LF	0.30	0.11	0.27	1.05	1.95
R 35-LF	0.35	0.13	0.30	1.40	1.95

Insulation

Grain oriented electrical steel strip is supplied with a thin inorganic coating on the glass film layer formed during annealing. A film thickness of 2 to 5 µm provides good electrical resistance and a high stacking factor.

The coating, which is annealing resistant up to 840 °C, enables wound cores and sheet blanks to be stress relief annealed.

The coating is chemically resistant to liquids to which it is typically exposed during the production process and has no effect on the various types of transformer oils.

We offer two types of insulation coatings: the chromium-containing coating and the chromium-free coating. Both coatings are similar from a technological point of view.

Insulation types

Coloration

Color deviations are possible, but they have no influence on the properties

Phosphate layer on glass film: gray

Annealing resistance

Under inert gas according to IEC 60404-12

840 °C/2 h

Coated sides

both sides

Comparison with the designations IEC 60404-1-1

EC-5-G on EC-2

Coating thickness

2 µm – 5 µm

Comparison with the designations ASTM A976

C-5 over C-2

Surface insulation resistance

at room temperature according to IEC 60404-11

> 10 Ω cm²

Chemical resistance

w.r.t. transformer oil

very good

Dimensions and geometrical tolerances

Dimensions

Full widths

Internal diameter	508 mm
Nominal widths	900–1,020 mm
Nominal thicknesses	0.20 mm
	0.23 mm
	0.27 mm
	0.30 mm
	0.35 mm

Slit widths

Internal diameter	508 mm
Nominal widths	< 6 mm
Nominal thicknesses	0.20 mm
	0.23 mm
	0.27 mm
	0.30 mm
	0.35 mm

Geometrical tolerances

Thickness tolerances

Max. deviation from the nominal thickness	± 0.020 mm
Max. thickness difference parallel to the rolling direction within a strip section of 1,000 mm length	0.025 mm
Max. thickness difference perpendicular to the rolling direction, measured at least 40 mm from the edge	0.020 mm

Width tolerances

Full widths	± 1 mm
Slit widths* < 150 mm	0/-0.2 mm
> 150–400 mm	0/-0.3 mm
> 400–750 mm	0/-0.5 mm
> 750–1,000 mm	0/-0.6 mm

* Plus tolerances must be specially agreed when ordering.

Typical properties and tolerances

Undulation (horizontal method)

Max. curvature for a strip section of 500 mm length for application widths > 150 mm	17.5 mm
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Max. cut line deviation within a strip section

From 1,000 mm length for application widths > 500 mm	1 mm
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Burr height (for slit width)

Max. burr height	0.025 mm
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Tensile strength R_m

Longitudinal to rolling direction	330–370 MPa
Transverse to rolling direction	390–420 MPa

Ultimate yield strength $R_{p0.2}$

Longitudinal to rolling direction	300–340 MPa
Transverse to rolling direction	330–360 MPa

Saturation polarization J_s	2.03 T
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Coercive field strength H_s	5 A/m
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Curie temperature T_c	745°C / 1,345°F
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Specific resistance ρ_e	0.48 $\mu\Omega\text{m}$
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Edge curvature

Max. edge curvature within a strip section of 1,000 mm length for application widths > 150 mm	0.5 mm
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Flatness (waviness factor)

Max. flatness for cut widths > 150 mm	1.5 %
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All test methods for thickness and width according to EN 10107 and IEC 60404-8-7. All other test methods and definitions according to EN 10251 and IEC 60404-9.

Elongation at break $A_{1=80}$

Longitudinal to rolling direction	6–14 %
Transverse to rolling direction	24–48 %

Hardness

HRB 15T	75–85
HV0.1	185–200

Stacking factor, density

0.20 mm	95.0 %
0.23 mm	95.5 %
0.27 mm	96.0 %
0.30 mm	96.5 %
0.35 mm	97.0 %

Density ρ_m	7.65 kg/dm ³
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Other properties and tolerances on request.

bondal® E

bondal® E bo330-3535E non-grain-oriented electrical steel strip grade is a sandwich-type composite material. It is ideally suited for damping vibrations occurring in the stator and rotor area during the operation of electric drives, thus optimizing the acoustics at the source of generation.

DIN EN 10106 standard. This is coated with a damping layer of polyacrylate resin, which is partially cross-linked. The composite sheet is then continuously produced on a coil coating line. The thickness of the damping layer is $6 \mu\text{m} \pm 1 \mu\text{m}$.

The base material used is non-grain-oriented electrical steel strip of the powercore® M330-35A grade in accordance with the

bondal® E _ Mechanical properties – grade-specific average values

Test direction in rolling direction at room temperature	Ultimate yield strength	Tensile strength	Elongation at rupture	Microhardness
	$R_{p0.2}$ [MPa]	R_m [MPa]	A_{80} [%]	HV5 [-]
Steel grade				
bondal® E bo330-3535E	331	472	26	155

For typical product properties, insulation types, thickness tolerances, etc., please refer to the currently valid product information.

bondal® E _ Magnetic properties – guaranteed values

	Max. magnetic reversal loss ¹		Min. polarization ¹		
	[W/kg] at	[W/lb] at	[T] at		
	50 Hz	50 Hz	2,500	5,000	10,000
	1.0 T ²	1.5 T	[A/m]	[A/m]	[A/m]

Steel grade

bondal® E bo330-3535E	1.30	3.30	1.49	1.60	1.70
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¹Guaranteed values for the composite material bondal® E bo330-3535E limited according to DIN EN 60404-2.

²The magnitude of the core loss at 1.0 T is a guide value and is provided for information.

bondal® E _ Magnetic properties – grade-specific average values

	Core loss ¹		Polarization ¹		
	[W/kg] at	[W/lb] at	[T] at		
	50 Hz	50 Hz	2,500	5,000	10,000
	1.0 T ²	1.5 T	[A/m]	[A/m]	[A/m]

Steel grade

bondal® E bo330-3535E	1.18	2.80	1.58	1.67	1.77
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¹Grade-specific magnetic average values for the composite material bondal® E bo330-3535E limited according to DIN EN 60404-2 for information (there are not yet sufficient values for a reliable statistical statement):

²The magnitude of the core loss at 1.0 T is a guide value and is provided for information.

Electrical steel strip (NO) _ powercore® A: Standard grades finally annealed

	Thickness [mm]	Density [kg/dm ³]	Max. core loss				Min. polarization		
			[W/kg] at		[W/lb] at		[T] at		
			50 Hz	60 Hz	1.5T	1.0T	2,500	5,000	10,000
							[A/m]	[A/m]	[A/m]

DIN EN 10106

Steel grade designation Standard designation

powercore® M235-35A	M235-35A	0.35	7.60	2.35	0.95	1.35	0.55	1.49	1.60	1.70
powercore® M250-35A	M250-35A	0.35	7.60	2.50	1.05	1.44	0.59	1.49	1.60	1.70
powercore® M270-35A	M270-35A	0.35	7.65	2.70	1.10	1.55	0.63	1.49	1.60	1.70
powercore® M300-35A	M300-35A	0.35	7.65	3.00	1.20	1.72	0.69	1.49	1.60	1.70
powercore® M330-35A	M330-35A	0.35	7.65	3.30	1.30	1.90	0.75	1.49	1.60	1.70
powercore® M250-50A	M250-50A	0.50	7.60	2.50	1.05	1.44	0.59	1.49	1.60	1.70
powercore® M270-50A	M270-50A	0.50	7.60	2.70	1.10	1.55	0.63	1.49	1.60	1.70
powercore® M290-50A	M290-50A	0.50	7.60	2.90	1.15	1.67	0.66	1.49	1.60	1.70
powercore® M310-50A	M310-50A	0.50	7.65	3.10	1.25	1.78	0.72	1.49	1.60	1.70
powercore® M330-50A	M330-50A	0.50	7.65	3.30	1.35	1.90	0.78	1.49	1.60	1.70
powercore® M350-50A	M350-50A	0.50	7.65	3.50	1.50	2.01	0.86	1.50	1.60	1.70
powercore® M400-50A	M400-50A	0.50	7.70	4.00	1.70	2.30	0.98	1.53	1.63	1.73
powercore® M470-50A	M470-50A	0.50	7.70	4.70	2.00	2.70	1.15	1.54	1.64	1.74
powercore® M530-50A	M530-50A	0.50	7.70	5.30	2.30	3.05	1.32	1.56	1.65	1.75
powercore® M600-50A	M600-50A	0.50	7.75	6.00	2.60	3.45	1.49	1.57	1.66	1.76
powercore® M700-50A	M700-50A	0.50	7.80	7.00	3.00	4.02	1.72	1.60	1.69	1.77
powercore® M800-50A	M800-50A	0.50	7.80	8.00	3.60	4.60	2.07	1.60	1.70	1.78
powercore® M940-50A	M940-50A	0.50	7.85	9.40	4.20	5.40	2.41	1.62	1.72	1.81
powercore® M310-65A	M310-65A	0.65	7.60	3.10	1.25	1.78	0.72	1.49	1.60	1.70
powercore® M330-65A	M330-65A	0.65	7.60	3.30	1.35	1.90	0.78	1.49	1.60	1.70
powercore® M350-65A	M350-65A	0.65	7.60	3.50	1.50	2.01	0.86	1.49	1.60	1.70
powercore® M400-65A	M400-65A	0.65	7.65	4.00	1.70	2.30	1.52	1.52	1.62	1.72
powercore® M470-65A	M470-65A	0.65	7.65	4.70	2.00	2.70	1.15	1.53	1.63	1.73
powercore® M530-65A	M530-65A	0.65	7.70	5.30	2.30	3.05	1.32	1.54	1.64	1.74
powercore® M600-65A	M600-65A	0.65	7.75	6.00	2.60	3.45	1.49	1.56	1.66	1.76
powercore® M700-65A	M700-65A	0.65	7.75	7.00	3.00	4.02	1.72	1.57	1.67	1.76
powercore® M800-65A	M800-65A	0.65	7.80	8.00	3.60	4.60	2.07	1.60	1.70	1.78
powercore® M1000-65A	M1000-65A	0.65	7.80	10.00	4.40	5.75	2.53	1.61	1.71	1.80
powercore® M600-100A	M600-100A	1.00	7.60	6.00	2.60	3.45	1.49	1.53	1.63	1.72
powercore® M700-100A	M700-100A	1.00	7.65	7.00	3.00	4.02	1.72	1.54	1.64	1.73
powercore® M800-100A	M800-100A	1.00	7.70	8.00	3.60	4.60	2.07	1.56	1.66	1.75
powercore® 940-100A	Works special quality	1.00	7.80	9.40	4.20	5.40	2.41	1.58	1.68	1.78
powercore® M1000-100A	M1000-100A	1.00	7.80	10.00	4.40	5.75	2.53	1.58	1.68	1.76
powercore® M1300-100A	M1300-100A	1.00	7.80	13.00	5.80	7.47	3.33	1.60	1.70	1.78

Electrical steel strip (NO) _ powercore® AP: Higher permeability grades finally annealed

		Thickness [mm]	Density [kg/dm ³]	Max. core loss				Min. polarization		
				[W/kg] at		[W/lb] at		[T] at		
				50 Hz		60 Hz		2,500	5,000	10,000
				1.5 T	1.0 T	1.5 T	1.0 T	[A/m]	[A/m]	[A/m]
Steel grade designation	Standard designation									
powercore® 330-35AP	Works special quality	0.35	7.65	3.30	1.30	1.90	0.75	1.55	1.64	1.76
powercore® 440-35AP	Works special quality	0.35	7.80	4.40	2.10	2.53	1.21	1.62	1.71	1.82
powercore® 330-50AP	Works special quality	0.50	7.65	3.30	1.35	1.90	0.78	1.75	1.67	1.79
powercore® 400-50AP	Works special quality	0.50	7.70	4.00	1.70	2.30	0.98	1.61	1.70	1.81
powercore® 530-50AP	Works special quality	0.50	7.80	5.30	2.30	3.05	1.32	1.65	1.74	1.84
powercore® 700-50AP	Works special quality	0.50	7.85	7.00	3.00	4.02	1.72	1.68	1.76	1.87
powercore® 350-65AP	Works special quality	0.65	7.60	3.50	1.50	2.01	0.86	1.57	1.67	1.79
powercore® 470-65AP	Works special quality	0.65	7.75	4.70	2.20	2.70	1.26	1.61	1.70	1.81
powercore® 600-65AP	Works special quality	0.65	7.80	6.00	2.60	3.45	1.49	1.67	1.75	1.86
powercore® 800-65AP	Works special quality	0.65	7.85	8.00	3.60	4.60	2.07	1.68	1.76	1.87
powercore® 1400-100AP	Works special quality	1.00	7.85	14.00	5.50	8.05	3.16	1.68	1.76	1.87

Electrical steel strip (NO) _ powercore® K: Standard grades not finally annealed

		Thickness [mm]	Density [kg/dm ³]	Max. core loss*				Min. polarization*		
				[W/kg] at		[W/lb] at		[T] at		
				50 Hz		60 Hz		2,500	5,000	10,000
				1.5 T	1.0 T	1.5 T	1.0 T	[A/m]	[A/m]	[A/m]
DIN EN 10341										
Steel grade designation	Standard designation									
powercore® M890-50K	M890-50K	0.50	7.85	8.90	3.70	5.12	2.13	1.60	1.68	1.78
powercore® M1050-50K	M1050-50K	0.50	7.85	10.50	4.30	6.04	2.47	1.57	1.65	1.77
powercore® M800-65K	M800-65K	0.65	7.85	8.00	3.30	4.60	1.90	1.62	1.70	1.79
powercore® M1000-65K	M1000-65K	0.65	7.85	10.00	4.20	5.75	2.41	1.60	1.68	1.78

DIN EN 10341

		Thickness [mm]	Density [kg/dm ³]	Max. core loss*				Min. polarization*		
				[W/kg] at		[W/lb] at		[T] at		
				50 Hz		60 Hz		2,500	5,000	10,000
				1.5 T	1.0 T	1.5 T	1.0 T	[A/m]	[A/m]	[A/m]
Steel grade designation	Standard designation									
powercore® M890-50K	M890-50K	0.50	7.85	8.90	3.70	5.12	2.13	1.60	1.68	1.78
powercore® M1050-50K	M1050-50K	0.50	7.85	10.50	4.30	6.04	2.47	1.57	1.65	1.77
powercore® M800-65K	M800-65K	0.65	7.85	8.00	3.30	4.60	1.90	1.62	1.70	1.79
powercore® M1000-65K	M1000-65K	0.65	7.85	10.00	4.20	5.75	2.41	1.60	1.68	1.78

*After reference annealing analogous to DIN EN 10341.

Electrical steel strip (NO) _ powercore® PP: Higher permeability grades not finally annealed

		Thickness [mm]	Density [kg/dm ³]	Max. core loss *				Min. polarization *		
				[W/kg] at		[W/lb] at		[T] at		
				50 Hz		60 Hz		2,500	5,000	10,000
				1.5 T	1.0 T	1.5 T	1.0 T	[A/m]	[A/m]	[A/m]
Steel grade designation	Standard designation									
powercore® 235-35PP	Works special quality	0.35	7.60	2.35	0.95	1.35	0.55	1.49	1.60	1.70
powercore® 280-35PP	Works special quality	0.35	7.60	2.80	1.10	1.61	0.63	1.49	1.60	1.70
powercore® 330-35PP	Works special quality	0.35	7.65	3.30	1.30	1.90	0.75	1.49	1.60	1.70
powercore® 270-50PP	Works special quality	0.50	7.70	2.70	1.16	1.55	0.67	1.61	1.70	1.81
powercore® 330-50PP	Works special quality	0.50	7.75	3.30	1.60	1.90	0.92	1.61	1.70	1.81
powercore® 390-50PP	Works special quality	0.50	7.70	3.90	1.70	2.24	0.98	1.60	1.68	1.78
powercore® 450-50PP	Works special quality	0.50	7.80	4.50	2.00	2.58	1.15	1.60	1.68	1.78
powercore® 660-50PP	Works special quality	0.50	7.85	6.60	3.00	3.79	1.72	1.68	1.76	1.86
powercore® 800-65PP	Works special quality	0.65	7.85	8.00	3.50	4.60	2.01	1.68	1.75	1.87

* After reference annealing analogous to DIN EN 10341.

Electrical steel (NO) – For e-mobility and high frequencies

	Thickness [mm]	Density [kg/dm ³]	Max. Core loss		Min. Polarization			Min. yield strength as per DIN EN ISO 6892-1 R _{p0.2} in the rolling direction at room temperature [MPa]
			[W/kg] at		[T] at			
			400 Hz		2,500	5,000	10,000	
			1.0 T		[A/m]	[A/m]	[A/m]	

According to EN 10303

Steel grade designation	Standard designation	Thickness	Density	Max. Core loss	Min. Polarization	Min. Polarization	Min. Polarization	Min. yield strength
powercore® traction 020-130Y320	NO20-13	0.20	7.60	13	1.48	1.59	1.69	320
powercore® traction 020-130Y350	NO20-13	0.20	7.60	13	1.48	1.59	1.69	350
powercore® traction 020-150Y320	NO20-15	0.20	7.60	15	1.48	1.59	1.69	320
powercore® traction 025-140Y400	NO25-14	0.25	7.60	14	1.52	1.61	1.71	400
powercore® traction 027-140Y420	NO27-15	0.27	7.60	14	1.51	1.61	1.73	420
powercore® traction 027-150Y370*	NO27-15	0.27	7.60	15	1.52	1.61	1.73	370
powercore® traction 027-150Y420*	NO27-15	0.27	7.60	15	1.52	1.61	1.73	420
powercore® traction 027-180Y370*	NO27-18	0.27	7.60	18	1.52	1.61	1.73	370
powercore® traction 030-150Y420*	NO30-16	0.30	7.60	15	1.52	1.61	1.73	420
powercore® traction 030-160Y420*	NO30-16	0.30	7.60	16	1.52	1.61	1.73	420
powercore® traction 032-190Y330*	NO35-19	0.32	7.65	19	1.52	1.62	1.74	330
powercore® traction 035-170Y420*	NO35-19	0.35	7.60	17	1.52	1.61	1.73	420
powercore® traction 035-180Y400	NO35-19	0.35	7.60	18	1.52	1.61	1.73	400
powercore® traction 035-190Y390	NO35-22	0.35	7.60	19	1.52	1.61	1.73	390
powercore® traction 035-220Y330	NO35-22	0.35	7.65	22	1.52	1.62	1.74	330
powercore® traction 035-220Y300	NO35-22	0.35	7.65	22	1.55	1.64	1.76	300

*Steel grades stand out on account of their excellent further processing properties and advantages with regard to their final applications.

Electrical steel strip (NO) _ insulation types

	Insulation type	Paint	Layer thickness per side [μm]	Insulation resistance* [Ω cm ² /disk]
IEC 60 404-1-1				
Designation				
stabolit® 10 EC-3	organic	yellow-green	0.50–1.50	> 5
			2.50–4.50	> 20
			3.00–5.00	> 50
stabolit® 20 EC-5-P	inorg. with org. constituents	colorless	max. 1.00	> 2
			0.50–1.50	> 5
			1.50–2.50	> 50
stabolit® 30 EC-5-P	inorganic	light green	0.50–1.00	> 5
stabosol (stabolit 50)	Highly reactive adhesive and insulating varnish with surface resistance	colorless	2.00 (side 1) 4.00 (side 2)	–
stabolit® 60 EC-5	inorg. with org. Components, pigmented	gray	1.00–3.00	> 15
stabolit® 70	Organic baking varnish	colorless	3.00–5.00 (water-soluble)	–
			4.00–6.00 (water-soluble)	–

* At room temperature according to ASTM A717. With stabolit® 70, it must be ensured that the max. storage temperature of 40 °C and also the max. processing time of 6 months are not exceeded. The adhesive properties decrease with increasing storage time. The following applies for stabosol: The storage stability over at least 6 months at room temperature corresponds to that of commercially available baking varnishes, without reduction of the adhesion and processing properties. The adhesive strength can be reduced at higher storage temperatures.

Electrical steel strip (NO) _ dimensions

	Width [mm]
Narrow strip	
Internal diameter 508 mm	30–500 *
Narrow strip	
Internal diameter 508 mm	500–1,250

* Narrower on request.





#7

Packaging steel

Thin, cold-rolled backplate used in tinplated, special chrome-plated or uncoated form as an efficient packaging material.

special
chrome-plated

tin-plated

unrefined

Your contact persons



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Production
location




About our packaging steel

Efficient, highly optimized and sustainable – that is rasselstein® packaging steel. It is not only versatile, it is also and above all an economical and ecological packaging material in premium quality.

In Andernach, thyssenkrupp produces backplate in thicknesses of 0.100 to 0.499 mm, the production is characterized by high efficiency, stability and safety. The best example is rasselstein® Thinplate, a high-end material that offers consistently good material properties at thinner thicknesses. The backplate is refined with tin or chromium and can also be coated with paint or polymer film.

Since packaging steel offers optimum protection against light and air, more than 95% of the material produced is used for manufacturing packaging – for food and beverages as well as for chemical and technical products such as paints or aerosols. However, the material is also being used more and more in other areas, for example in the automotive and electronics industries.





Highly efficient

High stability

Backplate expertise

The Packaging Steel business unit has the world's biggest production location for packaging steel in Andernach, from where it develops the intelligent solutions that make tinplate even more efficient, thinner, stronger and easier to shape.

Tinplate

Tensile yield point $R_{p0,2}$
 Lower yield strength R_{eL}
 Upper yield strength R_{eH} [MPa]

Qualities

EN 10202:2002

Steel grade designation	Standard designation	
rasselstein® TS230	TS230	230 +/- 50
rasselstein® TS245	TS245	245 +/- 50
rasselstein® TS260	TS260	260 +/- 50
rasselstein® TS275	TS275	275 +/- 50
rasselstein® TS290	TS290	290 +/- 50
rasselstein® TS340	TS340	340 +/- 50
rasselstein® TS480	TS480	480 +/- 50
rasselstein® TS520	TS520	520 +/- 50
rasselstein® TS550	TS550	550 +/- 50
rasselstein® TH200	–	200 +/- 50
rasselstein® TH230	–	230 +/- 50
rasselstein® TH245	–	245 +/- 50
rasselstein® TH275	–	275 +/- 50
rasselstein® TH330	TH330	330 +/- 50
rasselstein® TH340	–	340 +/- 50
rasselstein® TH360	TH360	360 +/- 50
rasselstein® TH415	TH415	415 +/- 50
rasselstein® TH435	TH435	435 +/- 50
rasselstein® TH450	–	450 +/- 50
rasselstein® TH460	TH460	460 +/- 50
rasselstein® TH480	TH480	480 +/- 50
rasselstein® TH520	TH520	520 +/- 50
rasselstein® TH550	TH550	550 +/- 50
rasselstein® TH580	TH580	580 +/- 50
rasselstein® TH620	TH620	620 +/- 50
rasselstein® TH650	TH650	650 +/- 50
rasselstein® TH700	–	700 +/- 50

In EN 10202:2022, the relevant tensile test parameters were defined in order to describe the temper grades more precisely depending on their properties.
 The applicable strength parameter depends on the steel grade and can be found in the EN 10202:2022 standard.
 In addition to the standard grades above, we offer steel grades with special properties for the respective application.

Tinplate

		Hardness nominal [HR30TS]	Nominal tensile strength [MPa]
AISI / ASTM 623			
Steel grade designation	Standard designation		
rasselstein® T 1	T 1	49 +/- 4	
rasselstein® T 2	T 2	53 +/- 4	
rasselstein® T 3	T 3	57 +/- 4	
rasselstein® T 4	T 4	61 +/- 4	
rasselstein® T 5	T 5	65 +/- 4	
rasselstein® DR 7	DR 7		480 +/- 50
rasselstein® DR 7,5	DR 7,5		520 +/- 50
rasselstein® DR 8	DR 8		550 +/- 50
rasselstein® DR 8,5	DR 8,5		580 +/- 50
rasselstein® DR 9	DR 9		620 +/- 50
rasselstein® DR 9,5	DR 9,5		660 +/- 50

	Lower yield strength R_{eL} [MPa]	Minimum elongation at break [%]
rasselstein® Solidflex: higher-strength packaging steel with good forming properties		
Steel grade designation		
rasselstein® Solidflex 600	600 +/- 50	5
rasselstein® Solidflex 620	620 +/- 50	5
rasselstein® Solidflex 650	650 +/- 50	5
	Upper yield strength R_{eH} [MPa]	

rasselstein® Solid: high-strength packaging steel

Steel grade designation		
rasselstein® Solid 650	650	
rasselstein® Solid 700	700	
rasselstein® Solid 750	750	
	Lower yield strength $R_{p0,2}$ [MPa]	Typical elongation [%]

rasselstein® High Formability: soft, non-ageing packaging steel with high breaking elongation

Steel grade designation		
rasselstein® High Formability 200	200 +/- 50	38
rasselstein® High Formability 230	230 +/- 50	35
rasselstein® High Formability 245	245 +/- 50	33

[→ Explanation of symbols on the last page](#)

Electrolytically plated tinplate

	[g/m ²] one-side	corresponds to [lb/bb] both-sides
Coating weights for tin		
EN 10202:2022		
	0.60	0.050
	1.00	0.089
	1.40	0.125
	2.00	0.179
	2.80	0.250
	4.00	0.357
	5.00	0.446
	5.60	0.500
	8.40	0.750
	11.20	1.000

AISI/ASTM

	0.60	0.05
	1.10	0.10
	1.70	0.15
	2.20	0.20
	2.80	0.25
	3.90	0.35
	5.60	0.50
	8.40	0.75
	11.20	1.00

The above coating weights are available for equal or differential coating.
Deviations in coating weights are possible in the range 0.60 to 11.20 g/m² (0.050 to 1.000 lb/bb).

One-side tin coatings possible in the range 0.50 to 5.60 g/m².
Marking for differential coatings in accordance with Euronorm, alternative markings by arrangement.

Other tin coatings on request.

	Code	Chromium coating [mg/m ²] per side	Titanium [mg/m ²] per side
Passivation for tinned grades			
CFPA (Chromium-free Passivation Alternative)	555	–	1 +/- 0.2
Dip passivation	300	1–3	–
Electrochemical passivation	310	2–7	–
Electrochemical passivation	311	3.5–9	–
Electrochemical passivation	314 ⁵	> 5	–

Special chromium-coated, Electrolytic zinc coated steel, Blackplate

Average coating weight
[mg/m²] per side

min. max.

Coating weights for TCCT® (ECCS-RC)

Chromium metal	50	250
Chromium oxide	2	35

Note: The total chromium is the sum of metallic chromium and chromium oxide.

Coating weights for ECCS

Chromium metal	50	140
Chromium oxide	7	35

Note: The total chromium is the sum of metallic chromium and chromium oxide.

Nominal coating weight
[g/m²] per side

Special product: Electrolytic zinc coated steel

11 (1.5 µm)

Uncoated blackplate EN 10205

Oiling

	Tinplate for foodstuffs	TCCT®/ECCS or foodstuffs	Blackplate
DOS	●	●	
ATBC	●		
Anticorit			●

Oiling (in accordance with European Standard EN 10202:2022) is applied uniformly across the surface in certain quantities to be compatible with lacquering, printing and handling operations. Our standard is oil coatings with max. 6 mg/m².

Finishes in accordance with EN 10202:2022

	Roughness [μm]
Surface finish	
bright	≤ 0.30
fine stone	0.25 – 0.45
stone	0.35 – 0.60
silver	0.40 – 2.25
matt	0.40 – 2.25

Different roughness values per side on request.
Closer tolerances within the roughness ranges in accordance with the standards or on request.

Organic coating

	Color	Thickness [μm]	Surface finishing
Coil coating with film			
Film			
PET	Clear	12, 23	TCCT®/ECCS
PET	Clear	15	TCCT®/ECCS
PET	White	23	TCCT®/ECCS
PET B*	White	20	TCCT®/ECCS
PP	Clear	100, 200	Tinned/TCCT®/ECCS

Combinations of coatings, other film thicknesses or colors as well as base materials available on request.
*For subsequent painting on the back side and/or printing.

Coil coating with lacquer

Lacquer		
Single-layered lacquer (one side or both sides)	Clear, gold	For example for mounting cups. Coating weights for lacquer or combination options with PP film and base materials available on request.
Lacquer on both sides	Silver, gold	For example for tab stock. Coating weights for lacquer and base material options available on request.

Other applications on request.

Lacquered sheets

Colors and coating weights
(one side or both sides) available
on request.

BPA NI solutions are also available.

Dimensions

Thickness [mm]	SR BA width [mm]	SR CA width [mm]	DR BA width [mm]	DR CA width [mm]
Coils				
< 0.100*	○	–	○	○
0.100–0.119	600–900*	–	600–1,000*	–
0.120–0.129	600–900*	–	600–1,090	–
0.130–0.139	600–1,000*	–	600–1,090	600***–1,090
0.140–0.149	600–1,050	–	600–1,090	600***–1,090
0.150–0.179	600–1,090	600***–1,090	600–1,220**	600***–1,090
0.180–0.199	600–1,170	600***–1,170	600–1,220**	600***–1,220**
0.200–0.499	600–1,220**	600***–1,220**	600–1,220**	600***–1,220**
≥ 0.50	○	○	○	○

Max. width for TCCT®: 1,250 mm.

Max. width for ECCS/TFS: 1,085 mm, additional dimensions on request.

After consultation for rasselstein® Solidflex, rasselstein® High Formability and rasselstein® Solid.

* After consultation.

** Up to 1,230 mm by arrangement.

*** After consultation for width < 700 mm.

Sheets

0.100–0.119	600–900*	–	600–1,000*	–
0.120–0.129	600–900*	–	600–1,090	–
0.130–0.139	600–1,000*	–	600–1,090	600**–1,090
0.140–0.149	600–1,050	–	600–1,090	600**–1,090
0.150–0.179	600–1,090	600**–1,090	600–1,120	600**–1,090
0.180–0.199	600–1,140	600**–1,140	600–1,140	600**–1,140
0.200–0.499	600–1,140	600**–1,140	600–1,140	600**–1,140
≥ 0.50	○	○	○	○

Sheet length: Straight cut: 450 – 1,200 mm, scroll cut: 560 – 1,150 mm, lacquered sheets: ECCS/TFS: min. 660 mm x 510 mm, max. 1,120 mm x 980 mm.

TCCT®: min. 660 mm – 510 mm, max. 1,250 mm x 980 mm.

After consultation for rasselstein® Solidflex, rasselstein® High Formability and rasselstein® Solid.

* After consultation.

** After consultation for width < 700 mm.

Shipping weights and transport dimensions

Alignment	max. weight [t]	max. outside diameter [mm]	Inside diameter [mm]	Inside diameter ⁵ [mm]
Coils				
vertical axis	3.0–12.7	1,630	420	450/508
horizontal axis	3.0–18.0	1,850	508	420/450
Sheets				
–	2.5	–	–	–

Narrow strip coated

Thickness [mm]	Width [mm]	Inside diameter [mm]	Coil weight [kg/mm strip width]
Dimensions according to EN 10140			
0.100–0.149 ⁵	20–460	400/450/508	2–10
0.150–0.199	20–540	400/450/508	2–10
0.200–0.499	20–600	400/450/508	2–10

Max. width for TCCT®: 625 mm.
Max. width for ECCS/TFS: 540 mm.

Blackplate strip uncoated

Delivery conditions

Qualities

Quality according to EN 10139, dimensions according to EN 10140

Steel grade designation	Standard designation		
rasselstein® DC 01	DC 01	LC	C290–C690
rasselstein® DC 03	DC 03	LC	C290–C590
rasselstein® DC 04	DC 04	LC	C290–C590
rasselstein® DC 05	DC 05	LC	
rasselstein® DC 06 ⁵	DC 06	LC	

Oiling

Anticorit

Oiling weights by arrangement (min. 300 +/- 100 mg/m² – max. 750 +/- 100 mg/m²).

Surfaces

	Roughness [μm]
Surface finish	
smooth	< 0.35
stone finish fine	0.25–0.45
stone finish	0.35–0.60
matt fine	0.75–1.25
matt	1.00–2.00
matt rough	1.75–2.25

C590 and C690 only available in “stone finish” surface with minimum values also < 0.35 μm .

Dimensions

Thickness [mm]	Width [mm]		Inside diameter [mm]	Coil weight [kg/mm strip width]
< 0.150	○	○	400 / 450 / 508	2–10 *
0.150–0.199	10–540	650–1,080	400 / 450 / 508	2–10 *
0.200–0.499	10–600	650–1,200	400 / 450 / 508	2–10 *

Axis: horizontal/vertical.

* Higher coil weights on request. After consultation up to 1,250 mm possible.





#8

Composite materials

Multilayer products with function-optimized material properties that cannot be achieved with monolithic steel materials.

bondal®

Your contact persons

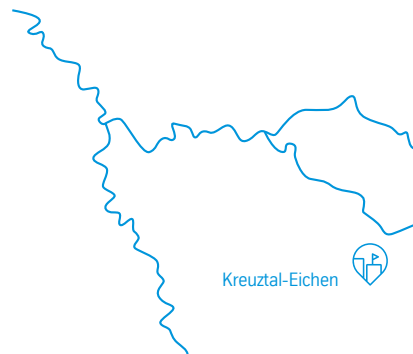


Automotive

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Production location



About our composite materials

bondal® is a sheet steel composite with a visco-elastic polymer intermediate layer, which is characterized by high structure-borne noise damping and good airborne noise insulation. Components made of bondal® can reduce the sound pressure level significantly in comparison with components made of conventional steel. This is particularly advantageous when – as is often the case with automotive components – the use of secondary damping materials is problematic for economic or package-related reasons.





High structure-borne
noise damping

Reduction of acoustic stresses

Steel sandwich sheet as vibration damper

The viscoelastic polymer layer between the two cover sheets allows them to slide slightly back and forth on one another. As a result of the internal friction of the polymer, vibration energy is converted into heat, which in turn leads to vibration damping.

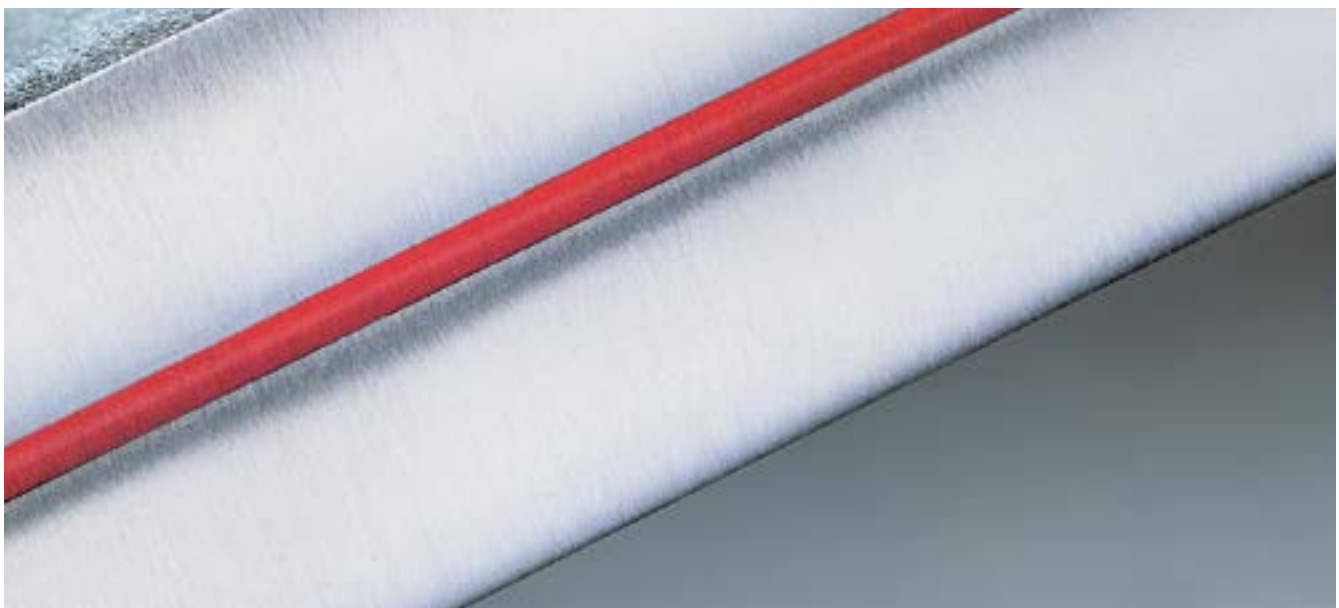
Composite materials _ dimensioning

Product name	Standard designation	Thickness ⁴ from _ to in mm		Width from _ to in mm	
bondal® CPT	Works special quality	0.5–1.0		600–1,480	
bondal® CB	Works special quality	0.5–1.0		600–1,480	
bondal® CL	Works special quality	0.5–3.0		1,000	
bondal® CLSi	Works special quality	0.5–3.0		1,250	

Composite materials _ coating

Product name	Standard designation	Surface refinement				
		-/UC	Z/GI	ZF/GA	ZM	ZA
bondal® CPT	Works special quality	●	●			●
bondal® CB	Works special quality	●	●			●
bondal® CL	Works special quality		●			●
bondal® CLSi	Works special quality	●				

→ Explanation of symbols
on the last page





For further information, please visit our website at

www.thyssenkrupp-steel.com

Symbols

Availability

- Available
- ⦿ Available, surface in outer skin quality (O5)
- ▣ Series production for outer skin parts in primetex® quality
- On request

Surface refinement

- /UC Uncoated
- ZE/EG Electrolytically galvanized
- Z/GI Hot-dip galvanized
- ZF/GA Galvannealed
- ZM ZM Ecoprotect®
- AS Aluminum-silicon coated
- ZA galfan®
- AS Pro AS Pro

- 1 Not all thickness and width combinations are possible.
- 2 In the delivery conditions + AR (rolled condition) or + N (normalized-rolled).
- 3 According to DIN EN 10111, only up to d = 11.00 mm, for d > 11.00 mm in accordance with DIN EN 10111.
- 4 Other thicknesses/ dimensions on request.
- 5 On request.
- 6 According to DIN EN 10025-5, only up to d = 12.00 mm, for d > 12.00 mm in accordance with DIN EN 10025-5.
- 7 According to DIN EN 10120, only up to d = 5.00 mm, for d > 5.00 mm in accordance with DIN EN 10120.

The information on standards refers to the current edition at the time of printing.

General information

Information about the quality or usability of materials or products serves as a description. Commitments regarding the existence of certain properties or a certain purpose of use always require special written agreement.

Steel

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