

**Cold rolled
steel strip**

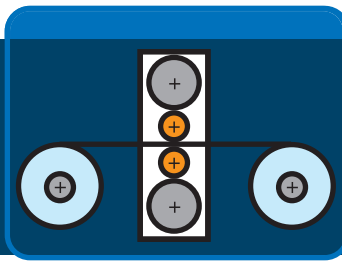


TRUST US!

The road to cold rolled steel strip



hot rolled strip



rolling



annealing

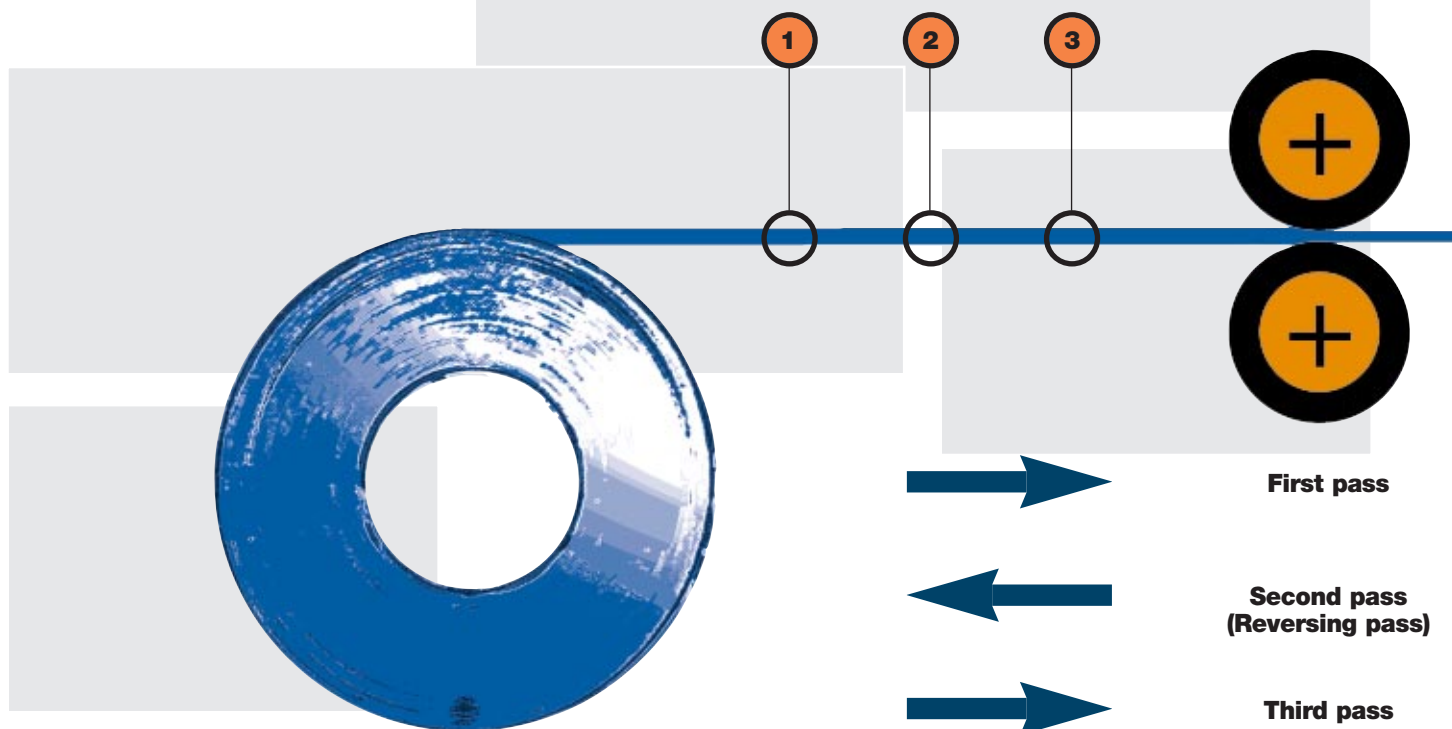
Today, Wickeder Westfalenstahl is considered to be one of the world's leading cold rollers. We cold roll strip for you - from hot rolled strip we can produce standard cold rolled strip qualities as well as individually tailored materials to meet each customer's requirement.

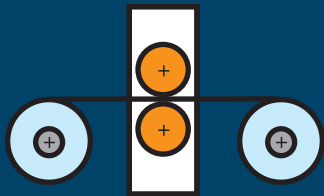
Processing starts with the use of pickled hot rolled steel strip, which we obtain from the integrated iron and steel works or one of the highly specialised hot rolled strip mills. We use state-of-the-art machinery during all the key stages of production, i.e. cold rolling, annealing, skin passing, finishing and packing.

Our precision reversing rolling stands are equipped with sophisticated measuring devices to automatically control tension, thickness and shape of the strip. These measures guarantee that the tightest tolerances are met. The annealing of the work-hardened strip is carried out in our heat treatment plant in controlled atmospheres, and because we have total control of the rolling stands we are able to achieve special surface finishes, mechanical properties, tolerances and flatness. The strip is slit to exact customer's width, inspected and oiled before being packed for delivery.

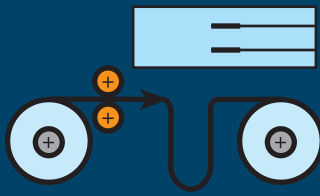
All processes are controlled by computer where the processing data is recorded, documented and can be statistically evaluated. Additionally, our Quality Control team carries out final checks to certify all metallurgical parameters are met.

Our works have been audited by Lloyds and meet the demands of DIN ISO 9001:2000 and DIN ISO TS 16949:2002. Our Environmental Management System also fulfills the requirements of ISO 14001.





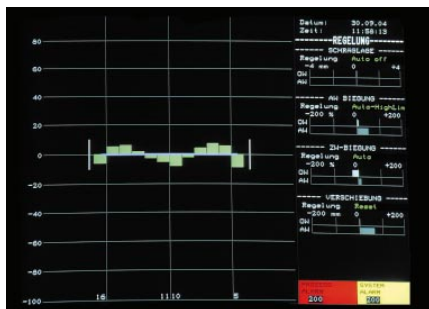
skin passing



slitting



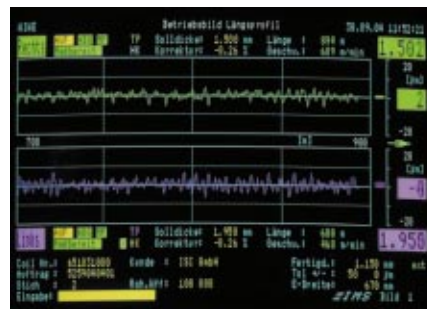
packing



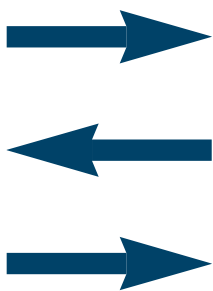
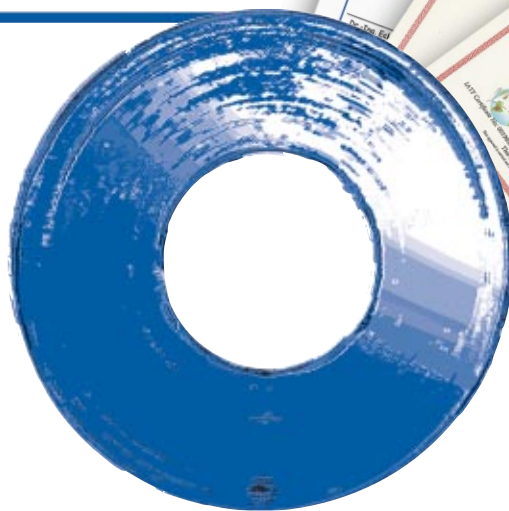
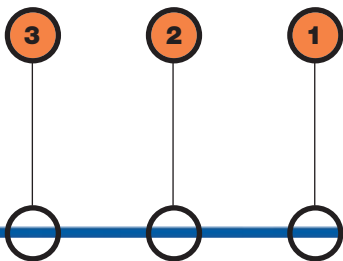
1 Flatness control



2 Technical parameters



3 X-ray thickness control



Wickeder makes the difference



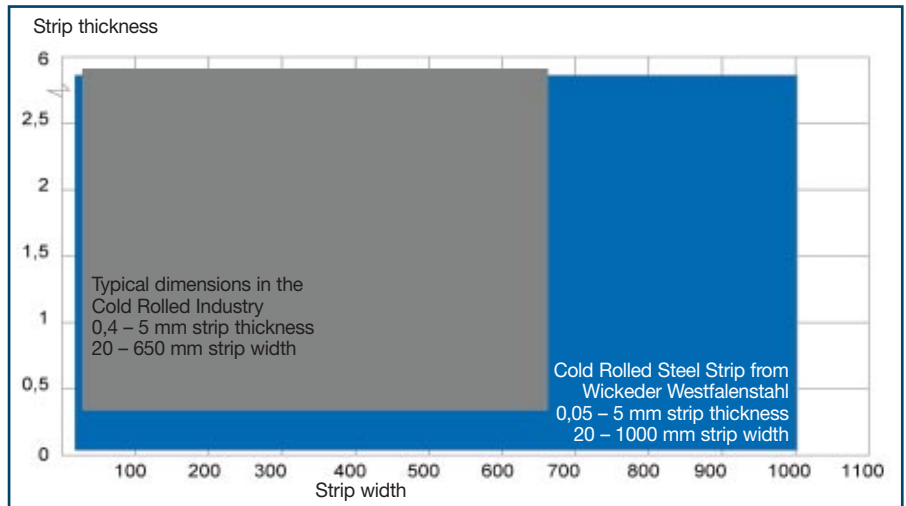
Not all steel is the same and not all cold rolled steel strip is the same! Wickeder Westfalenstahl is a cold rolling mill with the flexibility to offer made-to-order solutions for your specific requirements. The high-tech plant is suited to fulfill even the most demanding of require-

ments. Our technicians are always available for consultation regarding your material in the development phase, to optimize the operational processes and to organize the logistics - all suited to your special requirements.



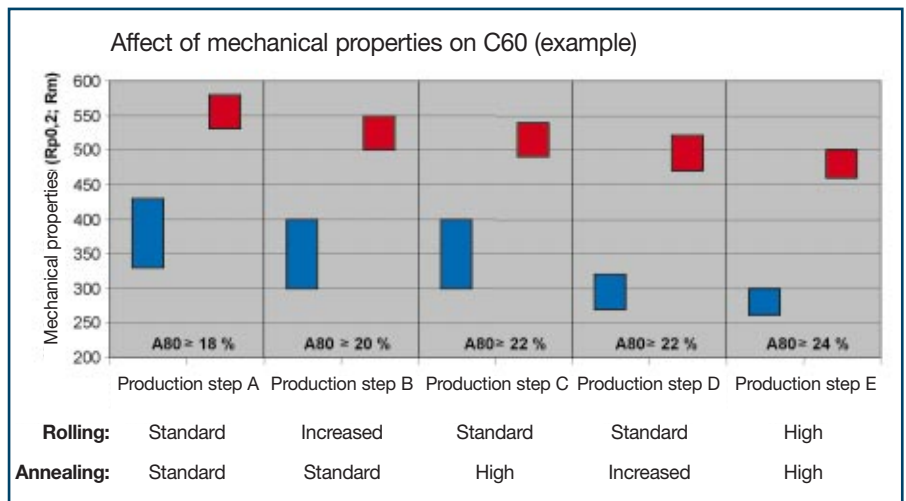
Extent of dimensional spectrum

Wickeder Westfalenstahl rolls thinner and/or wider than the typical cold rolling mill.



Extent of product specification

Wickeder Westfalenstahl is able to satisfy customers' individual requirements by using a variety of manufacturing parameters to pre-set the mechanical properties of the cold rolled products.



When it matters



Apart from safety belt systems most vehicles are fitted with several airbags to ensure the safety of the passengers in cars or commercial vehicles. Front, side and floor airbags might only have to function once in the lifetime of the vehicle.

Wickeder Westfalenstahl supplies soft steel qualities for the seemingly rather unspectacular gas cylinders (airbag cartridges) used in airbag systems. For this component too, which at first glance appears to be a very simple structure, state-of-the-art-cold rolling technology is required. After all, in case of emergency these components have to give reliable service and perform a precise function. The inert gases, stored in the cylinders with a pressure of more than 60 MPa for

up to several decades, have to deploy the airbag in the event of a crash in a controlled manner. Each gas cylinder has to undergo up to 70 different individual tests. Each product must achieve 100% success for pressure, density and compression strength under rising temperatures.

The processing parameters relevant to the production of such safety components are fully documented at Wickeder Westfalenstahl and stored for decades. Even after several years, the production data for each gas cylinder is retrievable on demand. A material supplier like Wickeder Westfalenstahl has to be as reliable as the functioning of this component.



Airbag gas cylinder ...



Snap retaining ring ...



Corner connections ...



Airbag gas cylinders ...



Furniture hinge ...



High strength connector ...



The end customer's wish for car safety takes pole position on the list of the car manufacturer's priorities. When taking into account the number of fatalities and traffic density, car driving was twelve times more dangerous in 1959 as it is today. Safety belts and airbags are without a doubt two significant milestones in the history of car safety technology. Cold rolled steel strip from Wickeder Westfalenstahl plays a considerable part in the complex functioning of these protection systems.

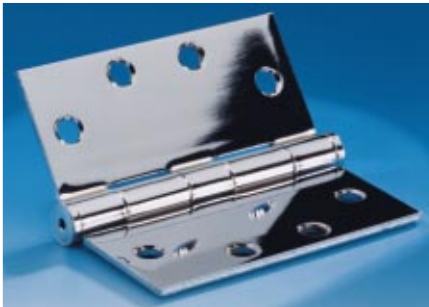
A crash at only 50 km/h accelerates the body mass of the passengers by thirty times the body weight. For instance, if a person weighing 80 kg is involved in an accident, the fastening mechanism in the seatbelt must withstand a load capacity of 2.4 t.

It is difficult to imagine the load that these steel components have to bear even though the links are only a few millimetres wide. When considering this point it is evident, that these components cannot be made from any type of steel but need to be made from a specific material – and not all mills can satisfy the great demands of the safety belt system manufacturers.

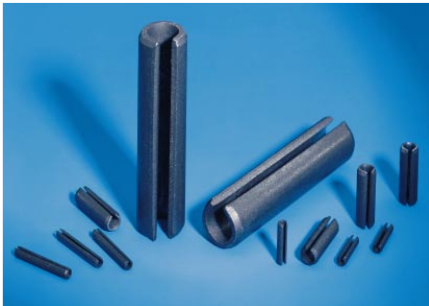
Wickeder Westfalenstahl is the leading producer of high-carbon steels (C-grades), which are used for these critical safety components for passengers' protection. The finished parts are 100% eddy-current-tested by our customers and Wickeder Westfalenstahl achieves the required standard on a daily basis with high-quality products.



Seatbelt-housing ...



Door hinge ...



Tension pins ...



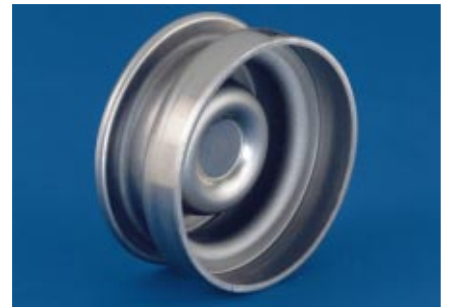
Seatbelt-buckles ...



Seatbelt-housing ...

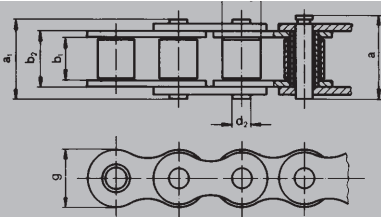


Relays ...



Piston ring ...

Moving cold rolled steel strip



Take Timing Chains, any type of cold rolled steel strip cannot be used here. Roller Chains perform under high temperatures and dynamic demands within the engine-block. They drive the camshaft with precision, ensuring environment-friendly variable valves are able to perform consistently throughout hundreds of thousands miles of service. This is where quality cold rolled steel strip from Wickeder Westfalenstahl is needed. Each chain-link and bolt of the drivebelt has a breaking strain of 11,500 N

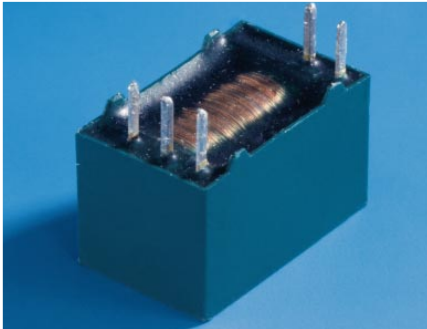
and a fatigue resistance of 3,500 N. This means that each link of the chain can pull 1.15t (!).

Only by making the right selection of high-quality heat-treatable case-hardening steel, combined with the state-of-the-art cold rolling and heat treatment facilities, ensure the consistent func-

tionability of these components – and thereby the reliability of your car, year in and year out. Quality, you can rely upon.



Chain-link ...



Relay ...



Relays ...



Clutch housing ...



Starter ring gear ...



Anti-friction bearing housing ...

Range



Our range of qualities consists of unalloyed and micro-alloyed forming steel with properties aligned to the end use, micro-alloyed fine grained steels, unalloyed and low-alloyed case-hardened steel, heat-treatable and spring steel. Typical coil dimensions are between 0.08 and 4.0 mm thickness and can be produced in widths of up to 800 mm, in exceptional cases even up to 1,000 mm.

To help you choose the right steel from the array of specifications available please consult our Technical Product Management which will be only too pleased to assist you in the choice of

the material best suited to your requirements.

Our customers from the

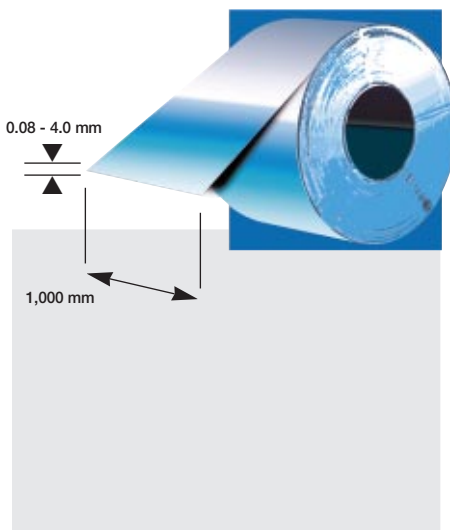
- Automotive industry
- Electrical engineering industry
- Furniture, fittings and hinges industry
- Fastening industry
- Manufacturers of stamped, drawn and pressed parts

appreciate the numerous manufacturing options we offer all housed 'under one roof'.

When we understand our customers processes we can adjust the properties

of our cold rolled steel to suit their individual demands. Depending on the product requirements, material properties like formability, weldability, surface treatment, heat treatment, tight tolerance control, corrosion resistance, flatness etc. are all controllable with the aid of specific manufacturing processes. We have numerous options at our disposal thanks to our extensive range of facilities. We pride ourselves in our ability to offer specialised processes for example open-coil annealing for decarburization of steel surfaces or stretcher levelling.

Dimensional product lines

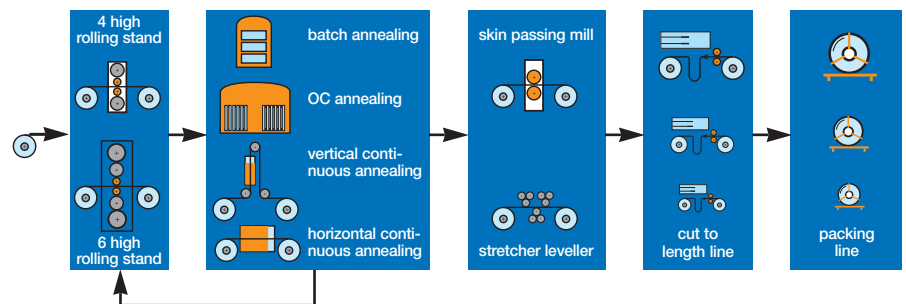


Manufacturing options

Standard process



Optional process and facilities



Standard product range

... we are sure to be able to satisfy your quality demands!



UNALLOYED AND MICROALLOYED MILD AND HIGHER-STRENGTH FORMING STEELS, MILD-MAGNETIC STEELS, UNALLOYED STRUCTURAL STEELS

Quality (EN 10027-1)	Material-No. (EN 10027-2)	Standard	Mechanical Properties			Remarks
			Yield Strength (N/mm)	Tensile Strength (N/mm)	Elongation A80%	
DC01 (St2)	1.0330	EN 10139 (DIN 1624)	<= 280	270-410	>=28	skin passed acc. to EN 10139 (DIN 1624) r90>=1,6 / n90>=0,18 (DC04)
DC03 (RRSt3)	1.0347	EN 10139 (DIN 1624)	<= 240	270-37	>=34	
DC04 (St4)	1.0338	EN 10139 (DIN 1624)	<= 210	270-350	>=38	
ZA	-	-	<=240	270-370	>=34	low earing
DC05	1.0312	EN 10139	<= 180	270-330	>=40	r90>=1,9 / n90>=0,20 r90>=1,8 / n90>=0,22 r90>=2,2 / n90>=0,24
DC06 (IF 18)	1.0873	EN 10139 (SEW 095)	<= 180	270-350	>=38	
ULCN 140	-	-	<= 140	270-330	>=42	
RFe80	1.1014	DIN 17405		<=430	Hc <= 80 A/m	Hc <= 60 A/m Hc <= 40 A/m
RFe60	1.1015	DIN 17405		<=430		
RFe40	1.1016	DIN 17405		<=430		
H 240 LA (ZStE 260)	1.0480	EN 10268 (SEW 093)	240-310	min. 340	>= 27	microalloyed with Nb and/or Ti
H 280 LA (ZStE 300)	1.0489	EN 10268 (SEW 093)	280-360	min. 370	>=24	
H 320 LA (ZStE 340)	1.0548	EN 10268 (SEW 093)	320-410	min. 400	>= 22	
H 360 LA (ZStE 380)	1.0550	EN 10268 (SEW 093)	360-460	min. 430	>= 20	
H 400 LA (ZStE 420)	1.0556	EN 10268 (SEW 093)	400-500	min. 460	>= 18	
H 440 LA (ZStE 460)			440-560	min. 490	>= 16	

CHOICE OF UNALLOYED AND LOW ALLOYED CASE-HARDENING, HEAT TREATABLE AND SPRING STEELS ¹⁾

Quality (EN 10027-1)	Material-No. (EN 10027-2)	Standard	Mechanical Properties									Remarks
			Yield Strength (N/mm)			Tensile Strength (N/mm)			Elongation A80%			
			G	GKZ	VTZ	G	GKZ	VTZ	G	GKZ	VTZ	
C 10 E	1.1121	EN 10132-2 (DIN 17210)	300	270	-	440	390	-	20	25	-	additional on request: - CaSi sulphide influenced - extra low desulphured (S<= 0.003%) - with approx. 0.2 - 0.3% Cr
C 15 E	1.1141	EN 10132-2 (DIN 17210)	330	300	-	480	410	-	20	25	-	
C 22 E	1.1151	EN 10132-3 (DIN 17200)	350	320	-	500	450	-	20	25	-	
C 35 E	1.1181	EN 10132-3 (DIN 17200)	380	350	270	520	480	450	18	23	25	
C 45 E	1.1191	EN 10132-3 (DIN 17200)	420	380	300	550	510	480	17	21	23	
C 55 E	1.1203	EN 10132-3 (DIN 17200)	450	410	330	580	540	510	16	20	21	
C 55 S	1.1204	EN 10132-3 (DIN 17200)										
C 60 E	1.1221	EN 10132-4 (DIN 17222)	450	410	330	580	540	510	16	20	21	
C 60 S	1.1211	EN 10132-4 (DIN 17222)										
C 67 S	1.1248	EN 10132-4 (DIN 17222)	500	460	360	620	570	540	15	18	20	
C 75 S	1.1248	EN 10132-4 (DIN 17222)	540	500	380	640	590	560	14	17	19	
C 85 S	1.1269	EN 10132-4 (DIN 17222)	560	530	420	670	620	590	12	14	18	
C 100 S	1.1274	EN 10132-4 (DIN 17222)	580	550	450	700	650	610	11	13	17	
16 Mn Cr 5	1.7131	EN 10132-2 (DIN 17210)	400	370	290	550	500	470	18	22	24	
25 Cr Mo 4	1.7218	EN 10132-3 (DIN 17200)	440	410	330	590	550	510	19	20	21	
42 Cr Mo 4	1.7225	EN 10132-3 (DIN 17200)	490	450	350	650	580	530	16	20	21	
51 Cr V 4	1.8159	EN 10132-4 (DIN 17222)	540	500	400	680	600	550	15	18	20	

¹⁾ additional steel grades on request **G**: soft annealed, 90% spheroidized - **GKZ**: fine blanking quality, 100% spheroidized - **VTZ**: improved formability, 100% spheroidized -
Remarks: EN 10132/1 replace as special standards for cold rolled strip EN 10083 and DIN 17210/17200/17222 respectively

SPECIAL QUALITIES

Cold rolled steel strip for CRT-components, with high tolerance demands, flatness and surface finish

Analysis: - low-carbon-steels (open coil annealed)
 - iron-nickel-alloys

Thickness from 0.08 mm, width up to 1000 mm

Worldwide presence



Think global – act local. “In touch with Customers” is a maxim that Wickeder Westfalenstahl has achieved through a world-wide network of subsidiaries and representatives.

Germany

- Wickede (head office, mill I+III)
- Hagen (mill II)
- Berlin
- Schwabach
- Backnang

Europe

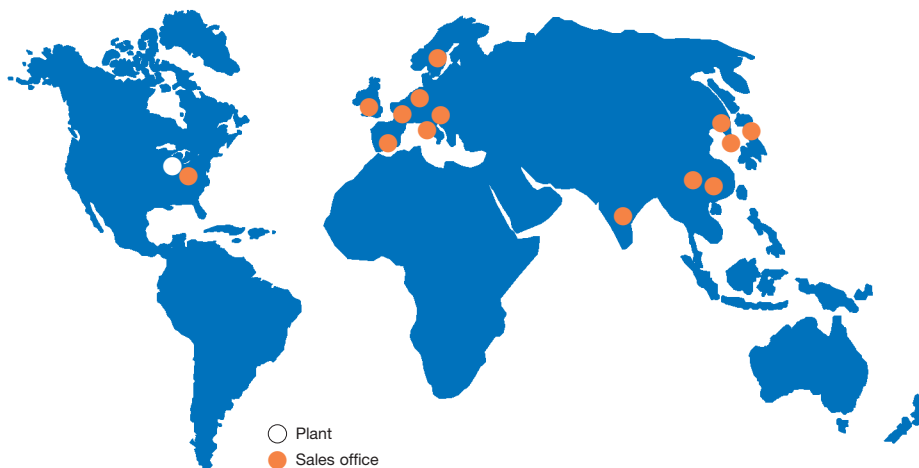
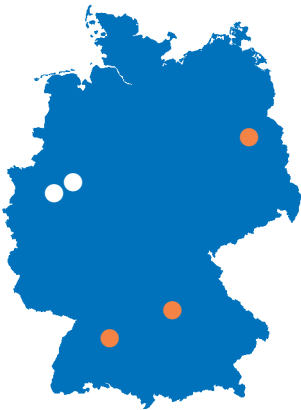
- Scandinavia
- Great Britain
- Benelux countries
- Austria
- Italy
- France
- Spain

America

- USA (Detroit)
- USA (mill IV: Wickeder Steel Company, Wisconsin)

Asia

- Korea
- China
- Japan
- India



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Cold rolled steel strip
Clad materials
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for CRT components

 **Wickeder®
Westfalenstahl**