TATA STEEL

TATA

Strip products and services catalogue 2018

Metric Units

SERVING DEMANDING MARKETS

Tata Steel is one of Europe's largest steel producers and has two integrated steelmaking sites in the UK and in the Netherlands supported by a global sales and distribution network. Our European operations are a subsidiary of Tata Steel Group, one of the world's leading steel producers.

We serve many different and demanding markets worldwide, including automotive, engineering, construction and industrial packaging.

To meet your demand for quality, we are continuously investing in our manufacturing capabilities.

We also have a number of services to support you. These range from customer technical support, backed up by world-class research and development facilities, to logistical solutions offered through our robust distribution network.

How to use this catalogue

This catalogue provides detailed information on our strip products, customer technical support and logistical services.

At the front, you will find information on our wide range of standard and advanced strip products and our processing capabilities. Each product section contains detailed technical information on grades, material properties, dimensions in metric units and performance.

We offer:
- hot-rolled
- direct-rolled
- cold-rolled
- metallic coated
- material processing capabilities

In the General information section at the back of this catalogue, you will also find additional information on:
- who to contact for sales
- compliance to quality and environmental standards
- customer technical services and research and development
- our global reach, transport and logistics capabilities
- guidance on our pack styles for product transportation

Who to contact for sales

At the back, you will find our sales contact details by either market sector or geographic location. Depending on your location or market expertise we have dedicated sales teams to help you find the products you need.

Customers requiring smaller volume orders tailored specifically to their manufacturing and operational needs can contact Tata Steel's dedicated steel service centres. These offer specialised services to meet your light and heavy gauge product requirements. Tata Steel additionally supplies a wide network of established and reputable independent steel service centres (ISSCs) that are supported by a Tata Steel sales team.

For larger volume orders, customers should contact our dedicated market-focused sales teams in the automotive, engineering and construction sectors. These sector sales teams have a range of services to support your individual technical and logistical needs.

If you are unable to find what you are looking for in this catalogue or on our website, our account teams are here to help you with your requirements and talk through solutions we have on offer to meet your specific needs. Visit us at www.tatasteeleurope.com or contact our dedicated strip enquiries team via email: **connect.engineering@tatasteel.com**

Our website contains the latest detailed product information
Find detailed strip product information, including downloadable product brochures, case studies and price lists on our product and services pages at www.tatasteeleurope.com. There is also information on the other steel products in Tata Steel's comprehensive range which includes other flat products such as plated strip and construction products.

Strip products that create advantage

Tata Steel offers a wide range of strip products for demanding applications, such as high-strength, low-alloy (HSLA) steel for load-bearing structural components and ultra high-strength steel for cars and cranes operating in extreme temperatures. Our strip product range includes a growing portfolio of advanced products including our reliable and market-proven family of high-strength steels – Ympress®.

We are continuously improving gauge control, coil weight flexibility and lead times to achieve and maintain the highest quality standards in the industry. We work closely with our partners, combining dedicated customer service with world-class research facilities to develop and deliver high-quality steel products that add value to your business.

Hot-rolled

We have an extensive range of hot-rolled strip products. These are designed to meet both standard and specialist performance requirements such as forming, bending, deep drawing, laser cutting and welding. Our high-strength Ympress® range includes Ympress S700MC offering weight reduction possibilities, while our advance high-strength steel grades offer excellent fatigue performance and lightweighting opportunities.

Direct-rolled

Ymagine® is our family of high-quality steels with unique properties that provides excellent product consistency and processing efficiency. These steels have been developed to offer wide-ranging performance capabilities. They include steels for light gauge drawing processes and grades designed to deliver high-strength structural performance to your end product.

Cold-rolled

We offer a variety of steel grades and gauges with enhanced surface finishes and strength. They are designed to perform in demanding processing environments. They include steels for deep drawing and enamelling and steels for applications where high-strength and formability are key.

Metallic coated

Our metallic coated steels meet a range of processing requirements. They include forming grades with extra deep drawing qualities and structural grades guaranteeing minimum strength. Our high-strength grades mean that finished components can have increased strength with reduced steel thickness.

Service centres

Tata Steel operates one of Europe's largest networks of steel service centres. Offering a local, convenient and responsive service, these centres provide steel processing, distribution and sales support to customers across the continent. With extensive capacity and proven capability, our centres can process smaller volumes of light gauge or heavy gauge material to meet your needs.

We serve customers in a range of markets and offer:
· ready access to a wide selection of steel products
· processes including decoiling, slitting, blanking, narrow cold rolling and profiling
· short lead times and reliable delivery

Terms and conditions of sale

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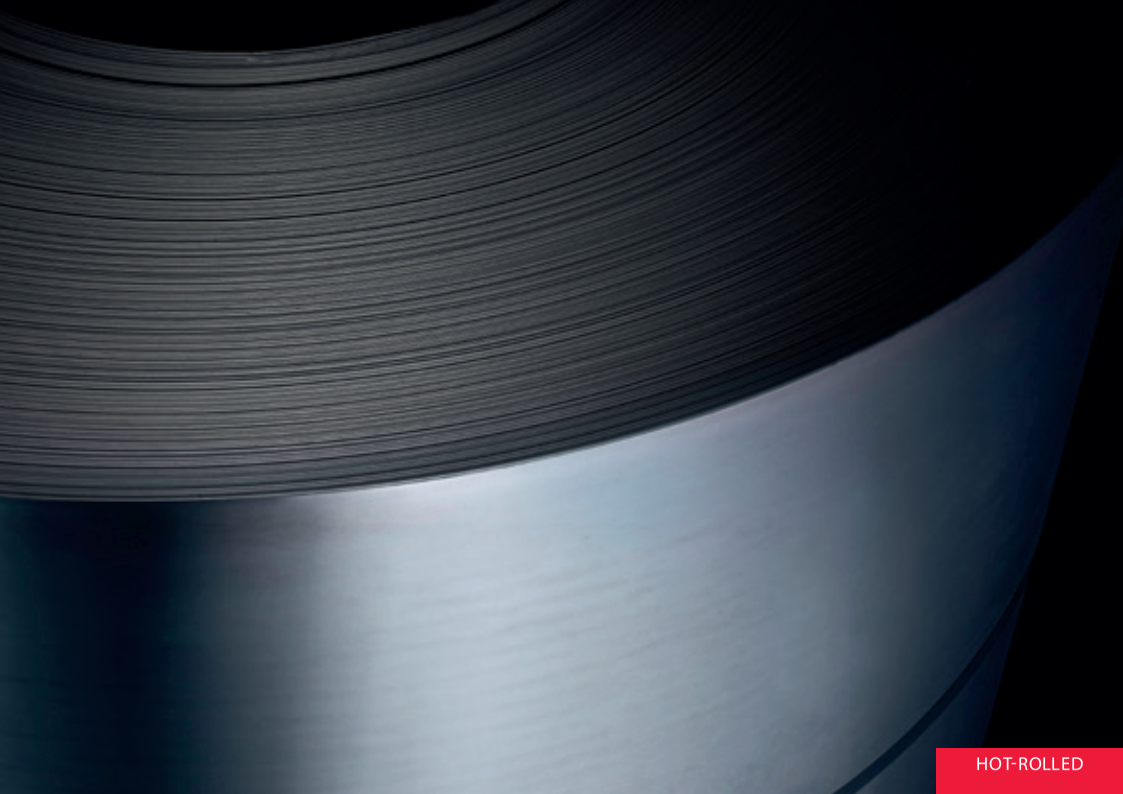

HOT-ROLLED

Hot-rolled

Hot-rolled

Hot-rolled steel offers performance, versatility and value. Tata Steel's line of hot-rolled strip steel includes forming and structural grades, heat-treatable steels and advanced and high-strength low-alloy steels. All are specially designed for specific and demanding applications.

You can rely on the consistent quality of our hot-rolled steel. Our products comply with all the relevant European standards. We have also enhanced many of our steel grades to deliver added benefits – both for end products and customer processes. Our hot-rolled steel line includes exclusive Tata Steel products developed to save you money and make your life easier. These include Ympress® Laser, developed specifically for fast and efficient laser-cutting, and Durbar® - a product that has become the byword for structural steel floor plate.

The main benefits of our hot-rolled steel include:
- enhanced end product performance
- extended product life
- stronger, lighter products
- opportunities to cut costs
- repeatable, trouble-free processing
- opportunities to simplify processing
- maximised yield

Applications

Agricultural equipment
Automotive components
Construction and building components
Domestic appliances
Electrical goods
Infrastructure and street furniture
Pressure vessels and boilers
Ship plate
Trucks and trailers
Tubes and sections
Heavy vehicles equipment

Supply – product conditions

Hot-rolled steel can be supplied with the following product conditions, finishes and surface treatments:

Side/surface condition	non-pickled	pickled	pickled and oiled
Mill edges	Yes	Yes	Yes
Trimmed edges	-	Yes	Yes

Trimmed edges are available in thicknesses up to 5mm for products from the UK and 6.35mm for products from the Netherlands.

The steel grades shown on the following pages belong to the standard range offered by Tata Steel. Please contact us regarding other specifications we may have that meet your needs.

Surface aspects

	Production location	
Description	**UK**	**NL**
Surface finish	Coils are available in non-pickled and pickled finish	
Oiling	Pickled finish is available with rolling or preservative oil applied	
	Oil weight normally 0,4-1.75 g/m^2	Oil weight normally 0.5-2.5 g/m^2

Alternative oiling ranges are available – please contact us for details.

Shape and dimension tolerances

Tolerances on thickness

Tata Steel can supply to full thickness tolerance specified in EN 10051:2010 (see Appendix A). Tighter tolerances are available as shown on the next page.

Product type	Thickness tolerances available (% of full EN 10051: 2010 tolerance)					
	100%	75%	66%	60%	50%	33%
Steel for forming	Yes	Yes	Yes	Yes	Yes	Yes [1]
High-strength low-alloy (HSLA EN 10149-2)	Yes	Yes	Yes	Yes	Yes	Yes [1]
Ympress HSLA					Yes	Yes [1]
Ympress Laser					Yes	Yes [1]
Structural steel	Yes	Yes	Yes	Yes	Yes	Yes [1]
Durbar floor plate	Yes	Yes	Yes	Yes	Yes	
Case hardening steel	Yes	Yes	Yes	Yes	Yes	
Hardenable steel	Yes					
Dual phase steel	Yes					
Hot forming steel	Yes					
Steel for pressure vessels	Yes					
Steel for gas cylinders	Yes					
Ship plate	Yes					

[1.] Available for certain grades and thicknesses between 3.0mm and 6.3mm.

Please contact us on the availability of special tolerances to meet your requirements.

Edge camber

The deviation from the edge over a length of 5000mm:

- with mill edges, no more than 20mm
- with trimmed edges, no more than 15mm.

Flatness

Requirements as regards flatness can be agreed at the time of enquiry.

Dimensions and coil weights

Tata Steel can supply hot-rolled steels with the following minimum and maximum dimensions and weights:

	Production location	
Description	**UK**	**NL**
Coil diameter inner non-pickled	762mm	
Coil diameter inner pickled	610mm standard	
	762mm not available	762mm on request
Tolerance on inner diameter	+0/-50mm	
Coil diameter outer non-pickled	Outer diameter available is 10/7 x width to reduce possibility of coil tipping over	
	Outer diameter limit 2200mm	Max. 2100mm
	Min. 1650mm	Min. 1050mm
Coil diameter outer pickled and oiled	Outer diameter available is 10/7 x width to reduce possibility of coil tipping over	
	Outer diameter limit 2200mm	Outer diameter limit 2000mm (2050mm when inner diameter is 762mm)
	Min. 1650mm	Min. 1050mm
Coil weight	Max. 34 tonnes	Max. 33 tonnes
	additional maximum limits from transport limits and outer coil diameter	
	some HR products may have different coil weight ranges	
KIM: width ≤ 1200mm	12.2 - 19.7 kg/mm width	15.5 - 23.0 kg/mm width
KIM: 1200mm < width ≤ 1700 mm	12.1 - 19.2 kg/mm width	15.5 - 21.7 kg/mm width
KIM: width > 1700mm	12.1 - 19.1 kg/mm width	11.0 kg/mm width and 15.5 - 21.7 kg/mm width
Minimum tonnage per order	Refer to price list for order quantity details	
	Minimum order quantities may apply	

Steel for forming

Hot-rolled steel for cold forming is used for bending and deep drawing. Tata Steel's forming grades offer consistency for reliable processing and low carbon content for excellent welding performance. The optimised chemistry of Tata Steel grade DD14+ offers enhanced formability for complex components. DD13WR is particularly suitable for use in wheel rims because of its low aluminium content and controlled Mn:Si ratio. The low carbon content gives DD13WR excellent welding performance.

Applications

Automotive components
Domestic appliance components
Furniture
Switch gear panels
Wheel rims
Tubes and sections

Relationship with standards

Tata Steel offers hot-rolled steel for forming in grades that comply with EN 10111:2008 and in a special Tata Steel grade as shown in the table below. All grades are available in qualities suitable for galvanising.
As the EN standard applies only to steel ≤ 11mm thick, please consult us about the properties of steel in other thicknesses.

European standard	Germany
EN 10111: 2008	**DIN 1614 part [2]**
DD11[2]	StW22
DD12	RRStW23
DD13	StW24
DD13WR [1]	-
DD14	-
DD14+ [1]	-

[1.] Not in EN 10111: 2008. Tata Steel's own specification.
[2.] DD11 products should be used within one month of their availability.

Mechanical properties

The values shown for the mechanical properties in the table below are for test pieces taken transverse to the rolling direction:

EN 10111: 2008	Min. - Max. yield strength R_{eL} [1]		Max. tensile strength R_m	Min. elongation after fracture A			Min. bend test diameter
	N/mm²		N/mm²	%			
Grade				$L_o = 80mm$		$L_o = 5.65\sqrt{S_o}$	
	1.5 ≤ t < 2	2 ≤ t < 11		1.5 ≤ t < 2	2 ≤ t < 3	3 ≤ t < 11	
DD11	170 - 360	170 - 340	440	23	24	28	1t
DD12	170 - 340	170 - 320	420	25	26	30	0t
DD13	170 - 330	170 - 310	400	28	29	33	0t
DD14	170 - 310	170 - 290	380	31	32	36	0t
DD14+ [2]	170 - 250		340	36	36	39	0t

1. Lower yield strength or 0.2% proof stress applies.
2. Not in EN 10111: 2008. Tata Steel's own specification.
t – material thickness in mm.

DD13WR[1]	Yield strength R_{eL} [1]	Tensile strength R_m	Elongation after fracture A_{dp5}
Typical	N/mm²	N/mm²	%
Test direction			t > 3 mm
Transverse	271	379	38.4
Longitudinal	252	369	40.3

1. Not in EN 10111: 2008. Tata Steel's own specification.
t – material thickness in mm.

Chemical composition

Hot-rolled steel for forming meets the requirements of the cast analysis in the standard as shown in the table below:

EN 10111: 2008	C	Mn	P	S
Grade	**Max.**	**Max.**	**Max.**	**Max.**
DD11	0.120	0.60	0.045	0.045
DD12	0.100	0.45	0.035	0.035
DD13	0.080	0.40	0.030	0.030
DD13WR [1]	0.068	0.36	0.012	0.0065
DD14	0.080	0.35	0.025	0.025
DD14+ [1]	0.055	0.25	0.020	0.020

[1.] Not in EN 10111: 2008. Tata Steel's own specification.
All values are in weight%.

Dimensions

Dimensional capability for steel produced in the Netherlands – non-pickled.
Dimensions in mm.

Thickness	Max. width					
From - up to	**DD11**	**DD12**	**DD13**	**DD13WR**	**DD14**	**DD14+**
1.47 - 1.50	1300	1300	1300	-	1300	-
1.50 - 1.60	1330	1330	1330	-	1330	-
1.60 - 1.70	1405	1405	1405	-	1405	-
1.70 - 1.80	1480	1480	1480	-	1480	-
1.80 - 1.90	1555	1555	1555	-	1555	-
1.90 - 2.00	1630	1630	1630	-	1630	-
2.00 - 2.20	1705	1705	1705	-	1705	-
2.20 - 2.40	1820	1820	1820	-	1820	-
2.40 - 2.50	1925	1925	1925	-	1925	-
2.50 - 2.60	1970	1970	1970	-	1970	-
2.60 - 2.70	2020	2020	2020	-	2020	-
2.70 - 11.00	2070	2070	2070	-	2070	-
12.50 - 20.00	2070	-	-	-	-	-

The minimum width is 1000mm.
Widths smaller than 1000mm are available - please contact us.
EN 10111:2008 only specifies material up to 11mm thick.
Material exceeding this thickness is supplied to Tata Steel own specification.

Dimensional capability for steel produced in the UK – non-pickled.
Dimensions in mm.

Thickness	Max. width					
From - up to	**DD11**	**DD12**	**DD13**	**DD13WR**	**DD14**	**DD14+**
1.50 - 1.60	1250	1250	1250	1250	1250	1250
1.60 - 1.70	1275	1275	1275	1299	1275	1275
1.70 - 1.80	1315	1315	1315	1399	1315	1315
1.80 - 1.90	1511	1511	1511	1511	1511	1511
1.90 - 2.00	1511	1511	1511	1511	1511	1511
2.00 - 2.50	1600	1600	1600	1600	1600	1600
2.50 - 2.90	1749	1749	1749	1749	1749	1749
2.90 - 16.50	1830	1830	1830	1830	1830	1830

The minimum width is 900mm. Other dimensions are available - please contact us.
EN 10111:2008 only specifies material up to 11mm thick. Material exceeding this thickness is supplied to Tata Steel's own specification.

Dimensional capability for steel produced in the Netherlands – pickled.

Dimensions in mm.

Thickness	Max. width					
From - up to	DD11	DD12	DD13	DD13WR	DD14	DD14+
1.50 - 1.60	1330	1330	1330	-	1330	-
1.60 - 1.70	1405	1405	1405	-	1405	-
1.70 - 1.80	1480	1480	1480	-	1480	-
1.80 - 1.90	1555	1555	1555	-	1555	-
1.90 - 2.00	1630	1630	1630	-	1630	-
2.00 - 2.20	1705	1705	1705	-	1705	-
2.20 - 2.40	1820	1820	1820	-	1820	-
2.40 - 2.50	1925	1925	1925	-	1925	-
2.50 - 2.60	1970	1970	1970	-	1970	-
2.60 - 2.70	2030	2030	2030	-	2030	-
2.70 - 4.76	2070	2070	2070	-	2070	-
4.76 - 4.90	2040	2040	2040	-	2040	-
4.90 - 5.00	2000	2000	2000	-	2000	-
5.00 - 5.10	1960	1960	1960	-	1960	-
5.10 - 5.20	1925	1925	1925	-	1925	-
5.20 - 5.30	1885	1885	1885	-	1885	-
5.30 - 5.40	1850	1850	1850	-	1850	-
5.40 - 5.50	1820	1820	1820	-	1820	-
5.50 - 5.60	1785	1785	1785	-	1785	-
5.60 - 5.70	1755	1755	1755	-	1755	-
5.70 - 5.80	1725	1725	1725	-	1725	-
5.80 - 5.90	1695	1695	1695	-	1695	-
5.90 - 6.35	1670	1670	1670	-	1670	-

The minimum width is 1000mm.
Widths smaller than 1000mm and/or thicknesses up to 20mm may be available - please contact us.

Dimensional capability for steel produced in the UK – pickled.
Dimensions in mm.

Thickness	Max. width					
From - up to	**DD11**	**DD12**	**DD13**	**DD13WR**	**DD14**	**DD14+**
1.50 - 1.60	1250	1250	1250	1250	1250	1250
1.60 - 1.70	1275	1275	1275	1299	1275	1275
1.70 - 1.80	1315	1315	1315	1399	1315	1315
1.80 - 1.90	1511	1511	1511	1511	1511	1511
1.90 - 2.00	1511	1511	1511	1511	1511	1511
2.00 - 5.00	1530	1530	1530	1530	1530	1530

The minimum width is 900mm. Other dimensions are available - please contact us.
For trimmed edges, reduce the maximum widths shown by 23mm.

Tolerances

Tolerances for wide strip and slit wide strip comply with standard EN 10051:2010 (see Appendix A). Tighter tolerances are available, please contact us.

High-strength steel

Tata Steel's high-strength, low-alloy (HSLA) grades offer formability and strength for demanding applications.
The range includes Ympress® with grades that exceed the Euronorm, resulting in stronger and lighter products with increased yield and simplified processing. Our Ympress® Laser range was developed specifically for fast and efficient laser-cutting. The resulting clean-cut edges mean end products require less finishing. Our high-strength steel grades have been developed to meet a wide variety of applications. The consistent quality of these steels means they can be relied on to deliver benefits for your end products and processes.

The high yield strength of Ympress delivers weight savings and increased component strength. This can help you create lighter, stronger products and increase yield through down-gauging. Consistent properties and tight control of material thickness allow trouble-free, repeatable processing. Ympress can be easily welded and galvanised. Its high surface quality can lead to fewer processing steps.

The consistent quality of Ympress Laser products ensures fast, reliable automated processing. A well-adhered oxide layer and consistent chemical contents deliver a clean-cut edge – even at high cutting speeds. This allows simple release of cut parts and reduces post-cut work. Suitable also for conventional cutting methods, Ympress Laser comes with all the advantages of the Ympress product family. To protect the integrity of this product, Ympress Laser is available only through a dedicated supply route. A full customer support package is available.

Applications

Agricultural machinery
Automotive components
Containers
Cranes and crane booms
Earthmoving equipment
Lighting
Industrial silos
Lightweight towers
Radiator components
Safety-critical applications
Racking and shelving
Telescopic booms
Tow hooks
Train carriages

Relationship with standards

Tata Steel's high-strength low-alloy steels comply with the following standards:

Tata Steel Grade	Tata Steel Grade	EN 10149-2:2013 Grade	Germany SEW 092 Grade
Ympress S315MC	XF300	S315MC	QStE340TM
Ympress S355MC	XF350	S355MC	QStE380TM
-	XF400	-	-
Ympress S420MC	XF420	S420MC	QStE460TM
Ympress S460MC	XF450	S460MC	QStE500TM
Ympress S500MC	XF500	S500MC	QStE550TM
Ympress S550MC	-	S550MC	-
Ympress S650MC	-	S650MC	-
Ympress E690TM	-	-	QStE690TM
Ympress S700MC	-	S700MC	-

Ympress Laser grades comply with the following standards:

Tata Steel	Thickness	Corresponding designations		
Grade	mm	EN 10025-2: 2004	EN 10149-2: 2013	Germany SEW 092
Ympress Laser E250C	≤ 12.7	S235J2+AR	-	-
Ympress Laser E250C	12.7 - 20	S235J0+AR	-	-
Ympress Laser S355MC	All	-	S355MC	QStE380TM
Ympress Laser S420MC	All	-	S420MC	QStE460TM

Mechanical properties

Steel supplied will comply with the mechanical property limits below.
The values of the tensile test apply to test bars parallel to the rolling direction.
The values of the bend test apply to test bars transverse to the rolling direction.
All Ympress E690TM values are measured transverse to the rolling direction.

	Min. yield strength R_{eH} [1]	Tensile strength R_m	Min. elongation after fracture A%			Min. bend test diameter	
Grade	**N/mm²**	**N/mm²**	**t < 3**	**t ≥ 3**	**t ≥ 5**	**t < 5**	**t ≥ 5**
S315MC	315	390 - 510	20	24	26	0 t	0 t
Ympress S315MC	315	400 - 500	24	33	26	0 t	0 t
S355MC	355	430 - 550	19	23	24	0.5 t	0 t
Ympress S355MC	355	450 - 550	22	27	24	0 t	0 t
S420MC	420	480 - 620	16	19	21	0.5 t	0 t
Ympress S420MC	420	500 - 600	18	22	21	0 t	0 t
S460MC	460	520 - 670	14	17	19	1 t	0.5 t
Ympress S460MC	460	550 - 660	17	21	19	0 t	0.5 t
S500MC	500	550 - 700	12	14	17	1 t	0.5 t
Ympress S500MC	500	580 - 700	13	18	17	0.5 t	0.5 t
S550MC	550	600 - 760	12	14	17	1.5 t	0.5 t
Ympress S550MC	550	610 - 750	13	17	17	0.5 t	0.5 t
S650MC	650	700 - 880	12	12	12	2.0 t	2.0 t
Ympress S650MC	650	700 - 880	refer	12	12	2.0 t	2.0 t
Ympress E690TM	690	750 - 950	12	14	14	1.0 t	1.5 t
S700MC	700	750 - 950	10	12	14	2.0 t	2.0 t
Ympress S700MC	700	750 - 900	-	14	14	2.0 t	2.0 t

[1] Upper yield strength or 0.2% proof stress applies.
t – material thickness in mm.
Elongation test piece length $L_0 = 80$mm for $t < 3$mm. $L_0 = 5.65\sqrt{S_0}$ for $t \geq 3$mm

	Min. yield strength R_{eH} [1]	Tensile strength R_m	Min. elongation after fracture A%			Min. bend test diameter	
Grade	**N/mm²**	**N/mm²**	**t < 3**	**t ≥ 3**	**t ≥ 5**	**t < 5**	**t ≥ 5**
Ympress Laser E250C	240	370 - 490	23	24	24	0.5 t	0.5 t
Ympress Laser S355MC	355	450 - 550	22	27	24	0 t	0 t
Ympress Laser S420MC	420	500 - 600	18	22	21	0 t	0 t

[1] Upper yield strength or 0.2% proof stress applies.
t – material thickness in mm.
Elongation test piece length $L_0 = 80$mm for t < 3mm. $L_0 = 5.65\sqrt{S_0}$ for t ≥ 3mm

	Min. yield strength R_{eH} [1]	Tensile strength R_m	Min. elongation after fracture A%			Min. bend test diameter	
Grade	**N/mm²**	**N/mm²**	**t < 3**	**t ≥ 3**	**t ≥ 5**	**t < 5**	**t ≥ 5**
XF300	300	≥ 400	26	26	26	0 t	0 t
XF350	350	≥ 430	23	23	23	0.5 t	0.5 t
XF400	400	≥ 460	20	20	20	0.5 t	0.5 t
XF450	450	≥ 500	20	20	20	1 t	1 t
XF500	500	≥ 550	18	18	18	1 t	1 t

[1] Upper yield strength or 0.2% proof stress applies.
t – material thickness in mm.
Elongation test piece length $L_0 = 80$mm.

Impact strength

For Ympress S355MC and S355MC, a guaranteed Charpy impact strength of 40J at -20° C in longitudinal direction is available.
For Ympress Laser E250C >12.7mm, the impact test is limited to EN 10025-2:2004 (grade S235J0+AR).
Impact tests can be performed for thicknesses ≥ 6.0mm for other grades. Please contact us for details.

Chemical composition

Steel supplied will comply with the chemical limits below.

	C	Mn	P	S	Si	Al_{tot}	Nb	V	Ti	Mo	Cu
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Min.**	**Max [1]**	**Max [1]**	**Max [1]**	**Max [1]**	**Max [1]**
S315MC	0.12	1.3	0.025	0.02	0.5	0.015	0.09	0.2	0.15	-	-
Ympress S315MC	0.1	0.6	0.02	0.008 [2]	0.03	0.015	0.04	-	0.05	-	-
S355MC	0.12	1.5	0.025	0.02	0.5	0.015	0.09	0.2	0.15	-	-
Ympress S355MC	0.1	1.4	0.02	0.008 [2]	0.03	0.015	0.05	-	-	-	-
S420MC	0.12	1.6	0.025	0.015	0.5	0.015	0.09	0.2	0.15	-	-
Ympress S420MC	0.1	1.5	0.02	0.008 [2]	0.03	0.015	0.08	-	0.05	-	-
S460MC	0.12	1.6	0.025	0.015	0.5	0.015	0.09	0.2	0.15	-	-
Ympress S460MC	0.1	1.5	0.02	0.008 [2]	0.03	0.015	0.08	-	0.05	-	-
S500MC	0.12	1.7	0.025	0.015	0.5	0.015	0.09	0.2	0.15	-	-
Ympress S500MC	0.1	1.65	0.02	0.003	0.03	0.015	0.08	-	0.06	-	-
S550MC	0.12	1.8	0.025	0.015	0.5	0.015	0.09	0.2	0.15	-	-
Ympress S550MC	0.1	1.65	0.02	0.003	0.03	0.015	0.09	-	0.06	-	-
S650MC	0.12	2	0.025	0.015	0.6	0.015	0.09	0.2	0.22	-	-
Ympress S650MC	0.08	2	0.02	0.003	0.15	0.015	0.09	0.01	0.15	0.06	-
Ympress E690TM	0.08	2	0.02	0.003	0.15	0.015	0.09	0.01	0.15	0.06	-
S700MC	0.12	2.1	0.025	0.015	0.6	0.015	0.09	0.2	0.22	-	-
Ympress S700MC	0.1	2.1	0.02	0.003	0.15	0.015	0.09	0.01	0.15	0.06	-
Ympress E690TM	0.08	2	0.02	0.003	0.15	0.015	0.09	0.01	0.15	0.06	-
S700MC	0.12	2.1	0.025	0.015	0.6	0.015	0.09	0.2	0.22	-	-
Ympress S700MC	0.1	2.1	0.02	0.003	0.15	0.015	0.09	0.01	0.15	0.06	-

[1.] The sum of Nb, V and Ti shall be max. 0.22%.

[2.] These grades are available with a maximum sulphur content of 0.005%.

All values are in weight%.

	C	Mn	P	S	Si	Al_{tot}	Nb	V	Ti	Mo	Cu
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Min.**	**Max [1]**	**Max [1]**	**Max [1]**	**Max [1]**	**Max [1]**
Ympress Laser E250C	0.17	1.1	0.025	0.02	0.03	0.015	-	-	-	-	0.07
Ympress Laser S355MC	0.1	1.4	0.02	0.0082	0.03	0.015	0.05	-	0.025	-	-
Ympress Laser S420MC	0.1	1.5	0.02	0.0082	0.03	0.015	0.08	0-	0.05	-	-

[1.] The sum of Nb, V and Ti shall be max. 0.22%.
[2.] These grades are available with a maximum sulphur content of 0.005%.
All values are in weight%.

	C	Mn	P	S	Si	Micro-alloying
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**elements (e.g. Nb)**
XF300/XF350/XF400	0.1	1.2	0.025	0.01	0.03	0.3
XF450/XF500	0.1	1.5	0.025	0.01	0.35	0.3

All values are maximum in weight%.

Dimensions

Dimensional capability for steel produced in the Netherlands – non-pickled.

Dimensions in mm. These dimensions are also applicable to the EN equivalent grade.

Thickness	Max. width								
From - up to	Ympress	Ympress	Ympress	Ympress	Ympress	Ympress	Ympress	Ympress	Ympress
	S315MC	S355MC	S420MC	S460MC	S500MC	S550MC	S650MC	E690TM	S700MC
1.49 - 1.50	1170	-	-	-	-	-	-	-	-
1.50 - 1.53	1180	1060	-	-	-	-	-	-	-
1.53 - 1.57	1210	1100	-	-	-	-	-	-	-
1.57 - 1.60	1250	1150	1000	-	-	-	-	-	-
1.60 - 1.70	1280	1160	1040	-	-	-	-	-	-
1.70 - 1.80	1370	1250	1150	1030	-	-	-	-	-
1.80 - 1.90	1440	1330	1230	1130	1030	1030	-	-	-
1.90 - 2.00	1520	1400	1300	1200	1100	1100	-	-	-
2.00 - 2.20	1590	1480	1380	1280	1180	1180	1030	1030	1030
2.20 - 2.40	1730	1600	1500	1400	1300	1300	1120	1120	1070
2.40 - 2.60	1810	1730	1630	1510	1420	1420	1210	1210	1130
2.60 - 2.70	1880	1760	1680	1640	1540	1540	1310	1310	1180
2.70 - 2.80	1880	1790	1710	1640	1540	1540	1310	1310	1180
2.80 - 3.00	1960	1840	1750	1720	1650	1650	1400	1400	1230
3.00 - 3.20	2030	1900	1790	1750	1710	1710	1490	1490	1280
3.20 - 3.50	2070	1960	1840	1780	1740	1740	1490	1490	1330
3.50 - 3.65	2070	2030	1880	1810	1780	1780	1500	1500	1400
3.65 - 4.00	2070	2070	1920	1860	1800	1800	1530	1530	1440
4.00 - 4.40	2070	2070	1990	1910	1850	1850	1630	1630	1530
4.40 - 5.00	2070	2070	2070	1970	1900	1900	1750	1750	1630
5.00 - 5.60	2070	2070	2070	2070	2000	2000	1830	1830	1630
5.60 - 6.00	2070	2070	2070	2070	2070	2070	1850	1850	1630
6.00 - 7.50	2070	2070	2070	2070	2070	2070	1880	1880	1630
7.50 - 8.00	2070	2070	2070	2070	2070	2070	1960	1960	1750
8.00 - 10.00	2070	2070	2070	2070	2070	-	1960	1960	-
10.00 - 15.00	-	2070	2070	2070	2070	-	-	-	-
15.00 - 20.00	-	2070	-	2070	-	-	-	-	-

(table continued on next page)

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For Ympress S700MC the minimum width is 1030mm.
For all other grades the minimum width is 1000mm.
Other dimensions are available - please contact us.
Please contact us also regarding the availability of Ympress S700MC with thickness less than 3.0mm.

Thickness	**Max. width**		
From - up to	**Ympress Laser E250C**	**Ympress Laser S355MC**	**Ympress Laser S420MC**
1.47 - 1.49	1310	-	-
1.49 - 1.50	1320	-	-
1.50 - 1.53	1330	1060	-
1.53 - 1.57	1350	1100	-
1.57 - 1.60	1380	1150	1000
1.60 - 1.70	1410	1160	1040
1.70 - 1.80	1480	1250	1150
1.80 - 1.90	1550	1330	1230
1.90 - 2.00	1550	1400	1300
2.00 - 2.20	1710	1480	1380
2.20 - 2.40	1820	1600	1500
2.40 - 2.60	1920	1730	1630
2.60 - 2.70	2030	1760	1680
2.70 - 2.80	2070	1790	1710
2.80 - 3.00	2070	1840	1750
3.00 - 3.20	2070	1900	1790
3.20 - 3.50	2070	1960	1840
3.50 - 3.65	2070	2030	1880
3.65 - 4.00	2070	2070	1920
4.00 - 4.40	2070	2070	1990
4.40 - 15.00	2070	2070	2070
15.00-20.00	2070	-	-

The minimum width is 1000mm.
Please consult with us for other dimensions, including Ympress Laser S355MC up to 20mm thickness.

Dimensional capability for steel produced in the UK – non-pickled.

Dimensions in mm.

Thickness	Max. width				
From - up to	**S315MC**	**S355MC**	**S420MC**	**S460MC**	**S500MC**
1.49 - 1.50	-	-	-	-	-
1.50 - 1.60	1100	1061	-	-	-
1.60 - 1.80	1250	1250	-	-	-
1.80 - 1.90	1300	1250	1250	1125	1100
1.90 - 2.00	1300	1250	1250	1175	1151
2.00 - 2.20	1360	1360	1330	1250	1250
2.20 - 2.40	1400	1389	1330	1330	1272
2.40 - 2.50	1530	1530	1350	1330	1272
2.50 - 2.60	1530	1530	1400	1330	1275
2.60 - 2.70	1530	1530	1400	1400	1275
2.70 - 2.80	1530	1530	1550	1400	1275
2.80 - 3.50	1560	1560	1550	1400	1275
3.50 - 3.65	1560	1560	1550	1400	1280
4.00 - 4.40	1560	1560	1560	1530	1480
5.00 - 6.00	1600	1600	1600	1611	1550
6.00 - 9.00	1625	1625	1600	1611	1611
9.00 - 10.00	1625	1625	1600	-	-
12.00 - 12.50	1625	1625	-	-	-
12.50 - 15.00	-	1625	-	-	-
15.00 - 20.00	-	-	-	-	-

The minimum width is 900mm.
Other dimensions are available - please contact us.

Thickness	Max. width				
From - up to	**XF300**	**XF350**	**XF400**	**XF450**	**XF500**
1.50 - 1.60	1099	1061	-	-	-
1.60 - 1.80	1250	1250	-	-	-
1.80 - 1.90	1250	1250	1250	1125	1100
1.90 - 2.00	1350	1250	1250	1175	1151
2.00 - 2.20	1500	1360	1320	1250	1250
2.20 - 2.40	1500	1389	1340	1330	1272
2.40 - 2.50	1500	1530	1426	1330	1272
2.50 - 2.60	1625	1530	1426	1330	1275
2.60 - 2.80	1625	1530	1449	1400	1275
2.80 - 3.00	1625	1560	1449	1400	1275
3.00 - 3.50	1625	1560	1499	1400	1275
3.50 - 4.00	1625	1560	1499	1400	1280
4.00 - 5.00	1625	1560	1560	1530	1480
5.00 - 6.00	1625	1600	1600	1611	1550
6.00 - 8.00	1625	1625	1625	1611	1611
8.00 - 9.00	-	1625	-	1611	1611
9.00 - 15.00	-	1625	-	-	-

The minimum width is 900mm.
Other dimensions are available - please contact us.

Dimensional capability for steel produced in the Netherlands – pickled.

Dimensions in mm. These dimensions are also applicable to the EN equivalent.

Thickness	Max. width					
From - up to	Ympress S315MC	Ympress S355MC	Ympress S420MC	Ympress S460MC	Ympress S500MC	Ympress S550MC
1.50 - 1.53	1180	1060	-	-	-	-
1.53 - 1.57	1210	1100	-	-	-	-
1.57 - 1.60	1250	1150	1000	-	-	-
1.60 - 1.70	1280	1160	1040	-	-	-
1.70 - 1.80	1370	1250	1150	1030	-	-
1.80 - 1.90	1440	1330	1230	1130	1030	1030
1.90 - 2.00	1520	1400	1300	1200	1100	1100
2.00 - 2.20	1590	1480	1380	1280	1180	1180
2.20 - 2.40	1730	1600	1500	1400	1300	1300
2.40 - 2.60	1810	1730	1630	1510	1420	1420
2.60 - 2.80	1880	1790	1710	1640	1540	1540
2.80 - 3.00	1960	1840	1750	1720	1650	1650
3.00 - 3.20	2030	1900	1790	1750	1710	1710
3.20 - 3.47	2070	1960	1840	1780	1740	1740
3.47 - 3.65	2070	2030	1880	1810	1780	1780
3.65 - 4.00	2070	2070	1920	1650	1650	1650
4.00 - 4.40	2070	2070	2000	1500	1500	1500
4.40 - 4.83	1950	1950	1950	1360	1360	1360
4.83 - 5.00	1880	1880	1880	1320	1320	1320
5.00 - 5.25	1790	1790	1790	1260	1260	1260
5.25 - 5.50	1710	1710	1710	1200	1200	1200
5.50 - 5.70	1650	1650	1650	1160	1160	1160
5.70 - 6.00	1550	1550	1550	-	-	-
6.00 - 6.35	1480	1480	1480	-	-	-

The minimum width is 1000mm.
Widths smaller than 1000mm and/or thicknesses up to 20mm may be available - please contact us.

Thickness	Max. width		
From - up to	Ympress Laser E250C	Ympress Laser S355MC	Ympress Laser S420MC
1.50 - 1.53	1330	1060	-
1.53 - 1.57	1350	1100	-
1.57 - 1.60	1380	1150	1000
1.60 - 1.70	1410	1160	1040
1.70 - 1.80	1480	1250	1150
1.80 - 1.90	1550	1330	1230
1.90 - 2.00	1550	1400	1300
2.00 - 2.20	1710	1480	1380
2.20 - 2.40	1820	1600	1500
2.40 - 2.60	1920	1730	1630
2.60 - 2.70	2030	1760	1710
2.70 - 2.80	2070	1790	1710
2.80 - 3.00	2070	1840	1750
3.00 - 3.20	2070	1900	1790
3.20 - 3.47	2070	1960	1840
3.47 - 3.65	2070	2030	1880
3.65 - 4.00	2070	2070	1920
4.00 - 4.40	2070	2070	2000
4.40 - 4.83	2070	1950	1950
4.83 - 5.00	2000	1880	1880
5.00 - 5.25	1900	1790	1790
5.25 - 5.50	1820	1710	1710
5.50 - 5.70	1720	1650	1650
5.70 - 5.80	1720	1550	1550
5.80 - 6.00	1570	1550	1550
6.00 - 6.35	1570	1480	1480

The minimum width is 1000mm.
Widths smaller than 1000mm and/or thicknesses up to 20mm may be available - please contact us.

Dimensional capability for steel produced in the UK – pickled.

Dimensions in mm.

Thickness	Max. width				
From - up to	**S315MC**	**S355MC**	**S420MC**	**S460MC**	**S500MC**
1.50 - 1.60	1100	1061	-	-	-
1.60 - 1.80	1250	1250	-	-	-
1.80 - 1.90	1300	1250	1250	1125	1100
1.90 - 2.00	1300	1250	1250	1175	1151
2.00 - 2.20	1360	1360	1360	1250	1250
2.20 - 2.40	1400	1400	1330	1330	1272
2.40 - 2.50	1530	1530	1350	1330	1272
2.50 - 2.60	1530	1530	1400	1330	1275
2.60 - 2.70	1530	1530	1400	1400	1275
2.70 - 3.50	1530	1530	1530	1400	1275
3.50 - 4.00	1530	1530	1530	1400	1280
4.00 - 5.00	1530	1530	1530	1530	1480

The minimum width is 900mm. Other dimensions are available - please contact us.

Thickness	Max. width				
From - up to	**XF300**	**XF350**	**XF400**	**XF450**	**XF500**
1.50 - 1.60	1099	1061	-	-	-
1.60 - 1.80	1250	1250	-	-	-
1.80 - 1.90	1250	1250	1250	1125	1100
1.90 - 2.00	1350	1250	1250	1175	1151
2.00 - 2.20	1500	1360	1360	1250	1250
2.20 - 2.40	1500	1400	1400	1330	1272
2.40 - 2.50	1500	1530	1530	1330	1272
2.50 - 2.60	1530	1530	1530	1330	1275
2.60 - 3.50	1530	1530	1530	1400	1275
3.50 - 4.00	1530	1530	1530	1400	1280
4.00 - 5.00	1530	1530	1530	1530	1480

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The minimum width is 900mm.
Other dimensions are available - please contact us.
For trimmed dimensions reduce max. width by 23mm.

Tolerances

Tolerances for wide strip and slit wide strip comply with standard EN 10051:2010 (see Appendix A). Tighter tolerances are available, please contact us.

Advanced and ultra high-strength steel

Tata Steel's range of versatile, advanced and ultra high-strength steels has been developed primarily to meet the needs of the automotive industry – increasing strength or reducing weight to help achieve optimal performance parameters. Using our higher-strength steels, you can enhance the performance of finished components. Alternatively, we can help reduce the component weight using steel with a lower thickness without compromising performance. This can increase your output per tonne of steel. Our hot-rolled advanced high-strength steels include complex phase, ferrite-bainite and hot forming steel grades.

Ferrite-bainite - FB590 HR

FB590 HR is a ferrite-bainite advanced high-strength steel offering excellent ductility and formability. It is particularly suited to automotive chassis and suspension applications where a combination of superior strength and fatigue performance is required on relatively complex shaped parts. FB590 HR offers a high hole expansion coefficient and high tensile strength – ideal for components with a significant amount of edge stretching. The tensile strength levels deliver excellent fatigue resistance as an additional benefit.

HR XPF800-UC

HR XPF800-UC combines high strength with good fatigue resistance. It outperforms HSLA and multiphase products of equivalent strength levels, due to its outstanding hole expansion capacity (HEC), averaging 90%, and a far superior minimum elongation of 14%.

Complex phase – HR CP800-UC

HR CP800-UC is a complex phase advanced high-strength steel featuring a very fine-grained bainitic matrix microstructure combined with a small fraction of ferrite and martensite phases. This microstructure results in a strength of at least 760 MPa combined with an optimal balance between hole expansion capacity (HEC) and material elongation. The balance enables the design of relatively complex-shaped components requiring high strength and fatigue performance to be manufactured by cold stamping or roll forming.

Hot forming steel – HR HQ1500-UC

Our die-quenched hot forming steel HQ1500-UC is a hot-rolled ultra high-strength steel. It enables an excellent degree of shape accuracy and mechanical performance. Its ultra high strength delivers significant benefits – especially when it comes to weight saving. By switching to HQ1500-UC from high-strength low-alloy or dual phase steels, designers can reduce the material gauge – creating stronger, lighter structures.

We can supply our hot forming steel in either an 'as rolled' non-pickled condition or pickled and oiled. The 'as rolled' condition is suitable for forming both prior to or during heat and quenching treatments. The steel's hardness properties after heat treatment make it highly suitable for applications requiring high wear-resistance.

Applications

Automotive components

Relationship with standards

Tata Steel can supply the following hot-rolled advanced and ultra high-strength steel grades:

	EN 10338:2015	EN 10083-3:2006
FB590 HR	HDT580F	-
HR XPF800-UC	-	-
HR CP800-UC	HDT760C	-
HR HQ1500-UC	-	20MnB5 [1]

[1]. This grade is also widely known as 22MnB5.

Mechanical properties

FB590 HR

The values shown for the mechanical properties of FB590 HR are for test pieces taken parallel to the rolling direction unless otherwise stated.

Grade	Yield strength [1] $R_{p0,2}$	Tensile strength R_m	Elongation after fracture A (L_0 = 80mm)
	N/mm²	N/mm²	%
EN 10338:HDT580F	440 - 600	≥ 580	> 15
FB590 HR - Typical	490	595	20
	530 [2]	600 [2]	18 [2]

1. Lower yield strength or 0.2% proof stress applies.
2. These mechanical property values are quoted for the transverse rolling direction.

Hole expansion coefficient values can be supplied (although not as part of the production release test) – please contact us for details.

HR XPF800-UC

Grade	Standard	Test direction	Yield strength $R_{p0,2}$	n-value	A_{80} %	A_{50} %
			N/mm²	N/mm²	t ≤ 3mm	t > 3mm
HR XPF800-UC - Guaranteed	Tata Steel	L	680 - 820	780 - 920	≥ 14	≥ 16
HR XPF800-UC - Typical	Tata Steel	L	730	820	16	18
		T	760	840	14	15
HR660Y760T-CP	VDA	L	660-820	760 - 960	10	11

HEC values : average 90% (min. 70% - between 2.5mm/4.5mm).

HR CP800-UC

The mechanical properties of HR CP800-UC are shown below in the table. Values are for test pieces taken parallel to the rolling direction unless otherwise stated.

Grade	Yield strength [1] R_{eL}	Tensile strength R_m	Elongation after fracture A (L_0 = 50mm)	Elongation after fracture A ($L_0 = 5{,}65\sqrt{S_0}$)	Elongation after fracture A (L_0 = 80mm)
	N/mm²	N/mm²	%	%	%
HR660Y760T-CP (VDA 239-100)	660-820	760-960	≥11	≥13	≥10
HDT780C (EN 10338:2015)	660-830	≥760	-	≥12	≥10
HR CP800-UC - Typical	700	790	16	17	14

[1.] Lower yield strength or 0.2% proof stress applies.

HR HQ1500-UC

The mechanical properties of uncoated HR HQ1500-UC before and after hot forming are shown below in the table. Values are for test pieces taken parallel to the rolling direction.

	As delivered				
Grade	Yield strength [1] $R_{p0,2}$	Tensile strength R_m	Elongation after fracture A (L_0 = 80mm)	n-value	r-value
	N/mm²	N/mm²	%		
HR HQ1500-UC - Guaranteed	≥320	≥500	≥15		
HR HQ1500-UC - Typical	350 - 450	520 - 650	>17	≥0.150	0.90 - 1.0

	Hot formed		
Grade	Yield strength [1] $R_{p0,2}$	Tensile strength R_m	Elongation after fracture A (L_0 = 50mm)
	N/mm²	N/mm²	%
HR HQ1500-UC - Guaranteed	1000 - 1250	1300 - 1600	≥5
HR HQ1500-UC - Typical	1023 - 1105	1420 - 1520	5 - 7

1. Lower yield strength or 0.2% proof stress applies.

Chemical composition

Tata Steel supplies the following cast analysis with maximum values in weight percentages unless shown otherwise:

	C	Mn	Si	P	S	Al	Cr+ Mo	Nb+ Ti	V	B
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max. [1]**	**Max. [2]**	**Max.**	**Max.**
EN 10338: HDT580F	0.18	0.5	2.0	0.05	0.010	0.015 - 2.0	1.0	0.15	0.15	0.01
FB590 HR	0.18	0.5	2.0	0.05	0.010	0.015 - 2.0	1.0	0.15	0.15	0.01
HR XPF800-UC	0.08	1.7	0.5	0.020	0.005	0.015	0.3	0.2	0.3	0.008
HR CP800-UC - Typical	0.18	2.5	1	0.08	0.015	0.015 - 1.2	1	0.25		0.005
HR HQ1500-UC	0.20 - 0.23	1.1 - 1.3	0.2 - 0.3	0.025	0.010	0.02 - 0.06	0.1 - 0.3	0.02 - 0.04		0.002 - 0.005
HR HQ1500-UC typical	0.22	1.2	0.24	0.01	0.005	0.04	0.2	0.03		0.003
EN 10083-3: 2006 20MnB5	0.17 - 0.23	1.1 - 1.4	0.4	0.025	0.035	-	-	-		0.0008 - 0.005

[1] Refers to Cr max. for HQ1500.

[2] Refers to Ti max. for HQ1500.

Dimensions

HR XPF800-UC and HR CP800-UC are available in pickled condition.
FB590 HR and HR HQ1500-UC are available in pickled and non-pickled condition.

Dimensional capability

Dimensions in mm.

Thickness	Max. width			
From - up to	FB590 HR [2]	HR XPF800-UC[1]	HR CP800-UC [1]	HR HQ1500-UC [2]
1.80 - 1.90	-	-	-	1149
1.90 - 2.00	-	-	-	1170
2.00 - 2.50	1181	1400 [3]	-	1300
2.50 - 2.80	1339	1400	1450	1300
2.80 - 3.00	1374	1400	1450	1300
3.00 - 3.50	1400	1475	1505	1360
3.50 - 4.00	1400	1550	1560	1425
4.00 - 4.10	1400	1625	1570	1480
4.10 - 4.30	1400	1640	1650	1480
4.30 - 4.50	1400	1675	1580	1480
4.50 - 4.70	1400	1950 [3]	1450	1530
4.70 - 5.00	1400	1950 [3]	-	1530
5.00 - 5.50	-	1950 [3]	-	-
5.50 - 6.00	-	1950 [3]	-	-
6.00 - 6.30	-	-	-	-

1. HR XPF800-UC, and HR CP800-UC minimum width is 1000mm.
2. FB590 HR and HQ1500 HR minimum width is 900mm.
3. Dimensional capability under development.

Other dimensions are available - please contact us.

Tolerances

Tolerances for wide strip and slit wide strip comply with standard EN 10051:2010 (see Appendix A). Tighter tolerances are available, please contact us.

Structural steel

The guaranteed strength and good weldability of our hot-rolled structural steel help ensure ease of processing and reliable end product performance.
As with all our hot-rolled steel products, our structural steel is manufactured under tight controls – for consistent quality that you can depend on.

Applications

Automotive wheel rims and chassis components
Construction and building
Cold formed sections
Pressure vessels
Transport
Tubes and pipes
Warehouse shelving
Heavy vehicles equipment

Availability

Structural steel products are available as follows:
As-rolled (+AR)
Normalised rolling (+N)
Suitable for cold forming (C)
Suitable for post-galvanising (Class 1)

Relationship with standards

Hot-rolled structural steel complies with European standard EN 10025:2004 and is available in the grades shown in the table below.

If normalised rolling (+N) or cold forming (C) is required, please specify when ordering. In these cases, this should be indicated by adding the relevant letter to the grade at the time of ordering (for example: S355J0C+AR). Cold forming cannot be guaranteed for structural steel that is not specified as cold-formable.

European standard	German standards
EN 10025-2: 2004	**DIN 17100, 1987-1**
S185+AR	St 33
S235JR+AR	St 37-2
S235J0+AR	St 37-3U
S235J2+N	St 37-3N
S235J2+AR	-
S275JR+AR	St 44-2
S275J0+AR	St 44-3U
S275J2+N	St 44-3N
S275J2+AR	-
S355JR+AR	St 52-3
S355J0+AR	St 52-3U
S355J2+N	St 52-3N
S355J2+AR	-
S355K2+N	-
S355K2+AR	-

The CE mark

The CE mark is a symbol devised by the European Council to signify that a product meets the conditions of the applicable council directives. These conditions aim to ensure that the product is reliable and safe. Products that are "produced for incorporation in a permanent manner in construction works" fall under the Construction Products Directive.

Hot-rolled steels covered by EN 10025:2004 are used in such "works" and are therefore covered by the directive. For these products, Tata Steel's test certificates bear the CE mark and Tata Steel has issued a certified Declaration of Performance (DoP). All the structural products produced by Tata Steel in Europe are CE-marked except for S185+AR.

Mechanical properties

The values shown for strength and elongation in the table below are for test pieces taken transverse to the rolling direction; those for the impact test are for test pieces taken in the rolling direction.

EN 10025-2:2004 Grade	Min. yield strength [1] [2] R_{eH}		Tensile strength R_m	
	N/mm²		N/mm²	
	t ≤ 16	16 < t ≤ 20	t < 3	3 ≤ t ≤ 20
S185	185	175	310 - 540	290 - 510
S235JR [3]	235	225	360 - 510	360 - 510
S235J0	235	225	360 - 510	360 - 510
S235J2	235	225	360 - 510	360 - 510
S275JR [3]	275	265	430 - 580	410 - 560
S275J0	275	265	430 - 580	410 - 560
S275J2	275	265	430 - 580	410 - 560
S355JR [3]	355	345	510 - 680	470 - 630
S355J0	355	345	510 - 680	470 - 630
S355J2	355	345	510 - 680	470 - 630
S355K2	355	345	510 - 680	470 - 630

[1] Upper yield strength or 0.2% proof stress applies.
[2] For thicknesses > 16mm, the R_{eH} value is decreased by 10 N/mm².
[3] The impact properties of quality JR products are verified only when specified at the time of enquiry or order.

Impact strengths apply to thicknesses > 6mm and are for standard test pieces only.
For the mechanical properties of cold-forming qualities – please consult us.
Tensile tests may be carried out on non-proportional test pieces as specified in EN 10025-1:2004.
t – material thickness in mm.

EN 10025-2:2004

Grade	Min elongation after fracture A				Impact test	
	%					
	$L_0 = 80mm$			$L_0 = 5.65\sqrt{S_0}$		Min.
	1.5 < t ≤ 2	2 < t ≤ 2.5	2.5 < t < 3	3 ≤ t ≤ 20	Temp. °C	energy J
S185	10	11	12	16	-	-
S235JR [3]	17	18	19	24	20	27
S235J0	17	18	19	24	0	27
S235J2	17	18	19	24	-20	27
S275JR [3]	15	16	17	21	20	27
S275J0	15	16	17	21	0	27
S275J2	15	16	17	21	-20	27
S355JR [3]	14	15	16	20	20	27
S355J0	14	15	16	20	0	27
S355J2	14	15	16	20	-20	27
S355K2	14	15	16	20	-20	40

[1.] Upper yield strength or 0.2% proof stress applies.
[2.] For thicknesses > 16mm, the ReH value is decreased by 10 N/mm^2.
[3.] The impact properties of quality JR products are verified only when specified at the time of enquiry or order.

Impact strengths apply to thicknesses > 6mm and are for standard test pieces only.
For the mechanical properties of cold-forming qualities – please contact us for details.
Tensile tests may be carried out on non-proportional test pieces as specified in EN 10025-1:2004.
t – material thickness in mm.

Chemical composition

Structural steel meets the requirements of the cast analysis in the standard, as shown in the table below.
The steel grades supplied by Tata Steel are always fully killed.
Tata Steel does not supply steel with increased copper content.

Grade	C	Mn	P	S	Si	N	Cu
	Max.	Max.	Max.	Max.	Max.	Max.	Max.
S185	–	–	–	–	–	–	0.55
S235JR	0.17	1.40	0.035	0.035	–	0.012	0.55
S235J0	0.17	1.40	0.030	0.030	–	0.012	0.55
S235J2	0.17	1.40	0.025	0.025	–	–	0.55
S275JR	0.21	1.50	0.035	0.035	–	0.012	0.55
S275J0	0.18	1.50	0.030	0.030	–	0.012	0.55
S275J2	0.18	1.50	0.025	0.025	–	–	0.55
S355JR	0.24	1.60	0.035	0.035	0.55	0.012	0.55
S355J0	0.20	1.60	0.030	0.030	0.55	0.012	0.55
S355J2	0.20	1.60	0.025	0.025	0.55	–	0.55
S355K2	0.20	1.60	0.025	0.025	0.55	–	0.55

The maximum value for nitrogen does not apply if the chemical composition shows a minimum total aluminium content of 0.020% or if sufficient other nitrogen-binding elements are present.
The nitrogen-binding elements shall be mentioned in the inspection document.
For the chemical composition of cold-forming qualities, please consult us.
The chemical composition of steels suitable for galvanising complies with EN 10025-2:2004.
All values are in weight%.

Suitability for cold forming

If chemistry suitable for cold forming (+C) is required, this must be specified when the material is ordered. Cold forming cannot be guaranteed for structural steel that is not specified as cold-formable.

Suitability for galvanising

If chemistry suitable for post-galvanising (Class 1) is required, this must be specified when the material is ordered.

Dimensions

Dimensional capability for steel produced in the Netherlands – non-pickled

Dimensions in mm.

Thickness	Max. width			
From - up to	S185	S235JR S235J0 S235J2	S275JR S275J0 S275J2	S355JR S355J0 S355J2 S355K2
1.47 - 1.49	1300	1300	-	-
1.49 - 1.50	1320	1320	1170	-
1.50 - 1.53	1330	1330	1180	-
1.53 - 1.57	1350	1350	1210	-
1.57 - 1.60	1380	1380	1250	1010
1.60 - 1.70	1410	1410	1280	1050
1.70 - 1.80	1480	1480	1370	1150
1.80 - 2.00	1550	1550	1440	1230
2.00 - 2.20	1700	1700	1590	1380
2.20 - 2.40	1820	1820	1730	1500
2.40 - 2.60	1920	1920	1810	1630
2.60 - 2.70	2030	2030	1880	1710
2.70 - 2.80	2070	2070	1920	1730
2.80 - 3.00	2070	2070	1960	1760
3.00 - 3.20	2070	2070	2030	1790
3.20 - 3.50	2070	2070	2070	1840
3.50 - 3.65	2070	2070	2070	1900
3.65 - 4.00	2070	2070	2070	1930
4.00 - 4.40	2070	2070	2070	2000
4.40 - 12.70	2070	2070	2070 [2]	2070
12.70 - 20.00	2070	2070 [1]	2070	2070 [3]

All grades are available in the as-rolled (+AR), normalized rolling (+N) and suitable for cold rolling (C) conditions.

The minimum width is 1000mm.

[1.] S235 J2 available for thicknesses ≤ 12.70mm.

[2.] S275 JR/J0/J2 + N available for thicknesses ≤ 10mm.

[3.] S355 JR/J0/J2/K2 + N available for thicknesses ≤ 12.70mm.

Other dimensions are available - please contact us.

Dimensional capability for steel produced in the UK – non-pickled

Dimensions in mm.

Thickness	Max. width			
From - up to	S185	S235JR S235J0 S235J2	S275JR S275J0 S275J2	S355JR S355J0 S355J2 S355K2
1.50 - 1.60	1250	1250	1264	-
1.60 - 1.70	1275	1275	1264	-
1.70 - 1.80	1315	1315	1264	-
1.80 - 1.90	1511	1450	1499	1250
1.90 - 2.00	1511	1525	1510	1250
2.00 - 2.10	1600	1525	1499	1300
2.10 - 2.20	1600	1550	1560	1300
2.20 - 2.50	1600	1550	1560	1525
2.50 - 2.90	1749	1550	1830	1560
2.90 - 3.00	1830	1550	1830	1560
3.00 - 5.00	1830	1830	1830	1830
5.00 - 16.00	1830	1830	1830	1606
16.00 - 16.50	1830	1830	1830	-
16.50 - 20.00	-	-	-	-

All grades are available in the as-rolled (+AR) and suitable for cold rolling (C) conditions.
The minimum width is 900mm. Other dimensions are available - please contact us.
The maximum thickness for these grades in cold-forming quality is 12.5mm.

Dimensional capability for steel produced in the Netherlands – pickled.

Dimensions in mm.

Thickness	Max. width			
From - up to	S185	S235JR S235J0 S235J2	S275JR S275J0 S275J2	S355JR S355J0 S355J2 S355K2
1.40 - 1.50	-	-	-	-
1.50 - 1.53	1330	1330	1180	-
1.53 - 1.57	1350	1350	1210	960
1.57 - 1.60	1380	1380	1265	1010
1.60 - 1.70	1410	1410	1280	1050
1.70 - 1.80	1480	1480	1370	1150
1.80 - 2.00	1550	1550	1440	1230
2.00 - 2.20	1700	1700	1590	1380
2.20 - 2.40	1820	1820	1730	1500
2.40 - 2.60	1920	1920	1810	1630
2.60 - 2.70	2030	2030	1880	1710
2.70 - 2.80	2070	2070	1920	1730
2.80 - 3.00	2070	2070	1960	1760
3.00 - 3.20	2070	2070	2030	1790
3.20 - 3.47	2070	2070	2070	1840
3.47 - 3.65	2070	2070	2070	1890
3.65 - 4.00	2070	2070	2070	1800
4.00 - 4.40	2070	2070	2070	1640
4.40 - 4.83	2070	2070	2070	1490
4.83 - 5.00	2000	2000	2000	1440
5.00 - 5.25	1900	1900	1900	1370
5.25 - 5.50	1820	1820	1820	1300
5.50 - 5.80	1720	1720	1720	-
5.80 - 6.35	1570	1570	1570	-

(table continued on next page)

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All grades are available in the as-rolled (+AR), normalized rolling (+N) and suitable for cold rolling (C) conditions.
The minimum width is 1000mm.
Widths smaller than 1000mm are available and thicknesses up to 20mm are may be available - please contact us.

Dimensional capability for steel produced in the UK – pickled.

Dimensions in mm.

Thickness	Max. width			
From - up to	S185	S235JR S235J0 S235J2	S275JR S275J0 S275J2	S355JR S355J0 S355J2 S355K2
1.40 - 1.50	-	-	-	-
1.50 - 1.60	1250	1250	1264	-
1.60 - 1.70	1275	1275	1264	-
1.70 - 1.80	1315	1315	1264	-
1.80 - 1.90	1511	1450	1499	1250
1.90 - 2.00	1511	1525	1510	1250
2.00 - 2.20	1530	1530	1530	1300
2.20 - 2.50	1530	1530	1530	1525
2.50 - 5.00	1530	1530	1530	1530
5.00 - 6.35	-	-	-	-

All grades are available in the as-rolled (+AR) and suitable for cold rolling (C) conditions.
The minimum width is 900mm. Other dimensions are available - please contact us.

Tolerances

Tolerances for wide strip and slit wide strip comply with standard EN 10051:2010 (see Appendix A). Tighter tolerances are available, please contact us.

Floor plate

Durbar® is hot-rolled structural steel floor plate which can reduce construction costs. Durbar's distinctive, raised surface pattern is extremely slip-resistant at all angles – allowing plates to be used in any direction. Its self-draining surface is easy to clean and reduces corrosion.

Applications

Bridges
Cladding and protective barriers
Commercial vehicles
Containers
Lifts
Offshore installations
Shipbuilding
Stairs and walkways
Steps and safety platforms

Limitation of use statement

EN 10025-1:2004 CE Approved Factory Production Control Certificate 0038/CPD/20060004/A (Limitations of Use "Floor Plate Applications")

Relationship with standards

Durbar meets the mechanical and chemical properties of EN 10025-2:2004 and is available in grades S235JR+AR, S275JR+AR and S355JR+AR.

Load span data

Members of The Steel Construction Institute can view load span data for Durbar at www.steelbiz.org, in table C242, floor plates simply supported, from the Steel Designers Manual, 6th Edition, 2003.

Mechanical properties

The mechanical properties of Durbar comply with EN 10025-2:2004 and are shown in the table below. The values shown for strength and elongation are for test pieces taken transverse to the rolling direction; those for the impact test are for test pieces taken in the rolling direction.

Grade	Min. yield strength [1] R_{eL}	Tensile strength R_m	Min. elongation after fracture A	Impact test	
	N/mm²	N/mm²	%		
			$L_0 = 5.65\sqrt{S_0}$	Temp. °C	Min. energy J
			$3 \leq t \leq 12.5$		
S235JR+AR	235	360 - 510	24	20	27
S275JR+AR	275	410 - 560	21	20	27
S355JR+AR	355	470 - 630	20	20	27

[1.] Lower yield strength or 0.2% proof stress applies.
t – material thickness in mm.

Chemical composition

The chemical composition of Durbar complies with EN 10025-2:2004 and is shown in the table below.

Grade	C	Mn	P	S	Si	N
	Max.	Max.	Max.	Max.	Max.	Max.
S235JR+AR	0.17	1.40	0.035	0.035	-	0.012
S275JR+AR	0.21	1.50	0.035	0.035	–	0.012
S355JR+AR	0.24	1.60	0.035	0.035	0.55	0.012

All values in weight%.

Dimensions

Dimensions in mm.

Thickness	Standard width		
	S235JR+AR	S275JR+AR	S355JR+AR
3	1250	1250	1250
4.5	1500	1500	1500
6	1500	1500	1500
8	1500	1500	1500
10	1500	1500	1500
12.5	1500	1500	1250

Widths of 1000mm (minimum) are also available – please contact us. Please contact us also for details for any other non-standard dimensions.

Tolerances

Tolerances for wide strip and slit wide strip comply with standard EN 10051:2010 (see Appendix A). Tighter tolerances are available, please contact us.

Heat-treatable steel

Tata Steel offers a choice of hot-rolled heat-treatable steels.
Case hardening and hardenable grades offer advantages across many applications. We exercise stringent control over chemical composition and production processes, resulting in a robust, consistent and reliable quality you can depend on.

Case hardening steel

Case hardening grades provide excellent formability and good punching quality. Our case hardening steel is suitable for wear-resistant components that must withstand extreme fatigue stress.

Hardenable steel

Hardenable steel offers consistent formability combined with excellent strain hardening behaviour. Our 22MbB5 and 26MnB5 hardenable steel grades are primarily used for precision tubes.
In their 'as-delivered' condition the material is considered 'soft', enabling the forming of relatively complex shapes. The final strength of the end product is provided during a heat treatment process, where the addition of boron leads to the strain hardenability of this carbon-manganese-chromium alloy. The 22MnB5 and 26MnB5 grades also feature homogeneous material properties that enable consistent and predictable performance of the final component. The material is very clean (meaning impurity levels are carefully controlled) which helps with consistency in formability and weldability.

These grades are used in a number of end product applications in the automotive sector including stabiliser bars, drive and gear shafts.

Chemical composition

The chemical composition of case hardening grade C15E conforms to EN 10084-8. It is suitable for re-rolling to produce cold-rolled products conforming to EN 10132-2.

Case hardening	C	Mn	P	S	Si
Grade	**Min. - Max.**	**Min. - Max.**	**Max.**	**Max.**	**Max.**
C15E	0.12 - 0.18	0.30 - 0.60	0.035	0.035	0.4

Tighter chemical compositions are available – please consult us.

The chemical composition of high-carbon products conforms to EN 10132-4:2000 and is shown in the table below.
Product is supplied in hot-rolled condition (mill finish, untrimmed) suitable for re-rolling to produce cold-rolled products conforming to EN 10132-4:2000.

Hardenable	C	Mn	Si	P	S	Al	Cr+ Mo	Nb+ Ti	B
Grade	**Nb+**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.[1]**	**Max. [2]**	**Max.**
22MnB5	0.20 - 0.23	1.1 - 1.3	0.2 - 0.3	0.025	0.010	0.02 - 0.06	0.1 - 0.3	0.02 - 0.04	0.002 - 0.005
26MnB5	0.24 - 0.28	1.20 - 1.40	0.20 - 0.25	0.020	0.006	0.020 - 0.060	-	-	0.0020 - 0.0035

[1.] Refers to Cr max. for 22MnB5.
[2.] Refers to Ti max. for 22MnB5.

Dimensions

Dimensional capability for steel produced in the Netherlands - non-pickled.
Dimensions in mm.

Thickness	Max. width		
From - up to	**C15E**	**22MnB5**	**26MnB5**
2.00 - 2.50	1300	-	-
2.50 - 3.00	1500	1450	1450
3.00 - 3.50	1500	1510	1510
3.50 - 4.00	1500	1570	1570
4.00 - 4.10	1500	1640	1640
4.10 - 4.30	1500	1650	1650
4.30 - 4.50	1500	1630	1630
4.50 - 7.00	-	1700	1700
7.00 - 20.00	-	2050	2050

Minimum width is 1100mm for C15E and 1000mm for all other grades.
Please contact us for the availability of 22MnB5 and 26MnB5 below 2.5mm. Other dimensions are available - please contact us.

Dimensional capability for steel produced in the UK - non-pickled.

Dimensions in mm.

Thickness	Max. width		
From - up to	C15E	22MnB5	26MnB5
1.80 - 1.90	-	1149	-
1.90 - 2.00	-	1170	-
2.00 - 2.50	-	1192	-
2.50 - 3.00	-	1284	-
3.00 - 3.50	-	1360	-
3.50 - 4.00	-	1425	-
4.00 - 4.50	-	1480	-
4.50 - 5.00	-	1530	-

Minimum width is 900mm.

Dimensional capability for steel produced in the Netherlands - pickled.

Dimensions in mm.

Thickness	Max. width		
From - up to	C15E	22MnB5	26MnB5
2.00 - 2.50	1300	-	-
2.50 - 3.00	1500	1600	1450
3.00 - 3.50	1500	1650	1510
3.50 - 4.00	1500	1650	1570
4.00 - 4.10	1500	1640	1640
4.10 - 4.30	1500	1650	1650
4.30 - 4.50	1500	1630	1630
4.50 - 4.70	-	1600	1600
4.70 - 5.00	-	1500	1500
5.00 - 5.50	-	1340	1340
5.50 - 6.00	-	1210	1210
6.00 - 6.30	-	1140	1140

(table continued on next page)

(table continued from previous page)
Minimum width is 1100mm for C15E and 1000mm for all other grades.
Please contact us for the availability of 26MnB5 below 2.5mm. Other dimensions are available - please contact us.

Dimensional capability for steel produced in the UK - pickled.
Dimensions in mm.

Thickness	Max. width		
From - up to	**C15E**	**22MnB5**	**26MnB5**
1.80 - 1.90	-	1149	-
1.90 - 2.00	-	1170	-
2.00 - 2.50	-	1192	-
2.50 - 3.00	-	1284	-
3.00 - 3.50	-	1360	-
3.50 - 4.00	-	1425	-
4.00 - 4.50	-	1480	-
4.50 - 5.00	-	1530	-

Minimum width is 900mm.

Tolerances

Tolerances for wide strip and slit wide strip comply with standard EN 10051:2010 (see Appendix A). Tighter tolerances are available, please contact us.

Steel for pressure vessels

Our structural steel for pressure vessels delivers excellent impact toughness and weldability. Special grades offer guaranteed strength levels at temperatures up to 400°C and steels compliant with EN 10207 and/or EN 10028 for the manufacture of simple pressure vessels.

Relationship with standards

Steel for pressure vessels complies with the following standards:

European standards		National standard
EN 10028-2: 2009	EN 10207: 2005	Germany DIN 17155
Grade		
P235GH	P235S	HI
P265GH	P265S	HII

Mechanical properties

Steel for pressure vessels has the following mechanical properties, measured transverse to the rolling direction:

EN 10028-2: 2009	Min. yield strength [1] R_{eH}	Tensile strength R_m	Min. elongation after fracture A	Impact test [2]	
	N/mm²	N/mm²	%		
Grade			$L_0 = 5.65\sqrt{S_0}$	Temp. °C	Min. energy J
P235GH	235	360-480	24	-20	27
P265GH	265	410-530	22	-20	27

[1.] Upper yield strength or 0.2% proof stress applies.
[2.] Impact test EN 10207:2005 is measured longitudinal to the rolling direction.
t - material thickness in mm.

EN 10207: 2005	Min. yield strength [1] R_{eH}	Tensile strength R_m	Min. elongation after fracture A			Impact test [2]	
	N/mm²	N/mm²	%				
			$L_0 = 80mm$		$L_0 = 5.65\sqrt{S_0}$	Temp. °C	Min. energy J
Grade			**2 < t ≤ 2.5**	**2.5 < t < 3**	**3 ≤ t ≤ 20**		
P235S	235	360 - 480	20	21	26	-20	28
P265S	265	410 - 530	17	18	22	-20	28

1. Upper yield strength or 0.2% proof stress applies.
2. Impact test EN 10207: 2005 is measured longitudinal to the rolling direction.
t – material thickness in mm.

Chemical composition

Tata Steel will satisfy the following cast analysis with maximum values:

	C	Mn	P	S	Si	Al_{tot}	Nb	Ti	V
Grade	**Max.**	**Min. - Max.**	**Max.**	**Max.**	**Max.**	**Min.**	**Max.**	**Max.**	**Max.**
P235GH	0.16	0.60[1] - 1.20	0.025	0.010	0.350	0.020	0.020	0.030	0.020
P265GH	0.20	0.80[1] - 1.40	0.025	0.010	0.400	0.020	0.020	0.030	0.020
P235S	0.16	0.40 - 1.20	0.025	0.025	0.350	0.020	-	-	-
P265S	0.20	0.50 - 1.50	0.025	0.025	0.400	0.020	-	-	-

1. For product thicknesses < 6mm, a minimum manganese content of 0.20% lower than specified is permitted.
All values in weight%.
Tata Steel does not use Cr, Cu, Mo or Ni as alloying elements for these specific steel grades.

Dimensions

Dimensional capability – non-pickled.

Dimensions in mm.

Thickness	Max. width			
From - up to	P235GH	P265GH	P235S	P265S
2.00 - 2.20	-	-	1700	1590
2.20 - 2.40	-	-	1820	1730
2.40 - 2.60	-	-	1920	1800
2.60 - 2.70	-	-	2030	1880
2.70 - 2.80	-	-	2070	1920
2.80 - 3.00	-	-	2070	1960
3.00 - 3.20	2070	2030	2070	2030
3.20 - 4.83	2070	2070	2070	2070
4.83 - 5.00	2070	2070	2070	2070
5.00 - 5.25	2070	2070	2070	2070
5.25 - 5.50	2070	2070	2070	2070
5.50 - 5.80	2070	2070	2070	2070
5.80 - 6.35	2070	2070	2070	2070
6.35 - 10.00	2070	2070	2070	2070
10.00 - 12.70	2070	-	2070	-

The minimum width is 1000mm.
Widths smaller than 1000mm are available on request - please contact us.

Dimensions

Dimensional capability – pickled.

Dimensions in mm.

Thickness	Max. width			
From - up to	P235GH	P265GH	P235S	P265S
2.00 - 2.20	-	-	1700	1590
2.20 - 2.40	-	-	1820	1730
2.40 - 2.60	-	-	1920	1800
2.60 - 2.70	-	-	2030	1880
2.70 - 2.80	-	-	2070	1920
2.80 - 3.00	-	-	2070	1960
3.00 - 3.20	2070	2030	2070	2030
3.20 - 4.83	2070	2070	2070	2070
4.83 - 5.00	2000	2000	2000	2000
5.00 - 5.25	1900	1900	1900	1900
5.25 - 5.50	1820	1820	1820	1820
5.50 - 5.80	1720	1720	1720	1720
5.80 - 6.35	1570	1570	1570	1570
6.35 - 10.00	-	-	-	-
10.00 - 12.70	-	-	-	-

The minimum width is 1000mm.
Widths smaller than 1000mm are available on request - please contact us.

Tolerances

Tolerances for wide strip and slit wide strip comply with standard EN 10051:2010 (see Appendix A). Tighter tolerances are available, please contact us.

Steel for gas cylinders

Tata Steel's structural steel for gas cylinders offers excellent deep drawing properties and weldability for ease of processing.
The grades allow for reliable normalising of the welded gas cylinder – retaining strength that contributes to optimal safety in use.

Relationship with standards

Steel for gas cylinders complies with the following European standard:

EN 10120: 2008
Grade
P245NB
P265NB

Mechanical properties

Steel for gas cylinders has the following mechanical properties, measured transverse to the rolling direction:

EN 10120: 2008 Grade	Min. yield strength [1] R_{eH}	Tensile strength [1] R_m	Min elongation after fracture A	
			$L_0 = 80mm$	$L_0 = 5.65\sqrt{S_0}$
			t < 3 mm	t ≥ 3 mm
	N/mm²	N/mm²	%	
P245NB	245	360 - 450	26	34
P265NB	265	410 - 500	24	32

[1.] Upper yield strength or 0.2% proof stress applies.
t – material thickness in mm.

Chemical composition

Tata Steel will satisfy the following cast analysis with values in weight percentages:

EN 10120: 2008	C	Mn	P	S	Si	Al_{tot}	N	Nb	Ti
Grade	**Max.**	**Min.**	**Max.**	**Max.**	**Max.**	**Min.**	**Max.**	**Max.**	**Max.**
P245NB	0.16	0.30	0.025	0.015	0.25	0.020	0.009	0.050	0.03
P265NB	0.19	0.40	0.025	0.015	0.25	0.020	0.009	0.050	0.03

Tata Steel does not use Cr, Cu, Mo or Ni as alloying elements for these steel grades.

Dimensions

Dimensions in mm.

Thickness	Max. width
From - up to	P245NB P265NB
2.00 - 2.20	1700
2.20 - 2.40	1820
2.40 - 2.60	1920
2.60 - 2.70	2030
2.70 - 5.00	2070

The above capabilities apply to both pickled and non-pickled conditions.
The minimum width is 1000mm.
Widths smaller than 1000mm are available on request - please contact us.

Tolerances

Tolerances for wide strip and slit wide strip comply with standard EN 10051:2010 (see Appendix A). Tighter tolerances are available, please contact us.

Ship plate

This hot-rolled structural steel offers excellent weldability for ease of processing. We exercise stringent control over the chemical composition and mechanical properties of our ship plate – ensuring products of consistent and reliable quality for demanding marine applications.

Relationship with standards

Ship plate is normally supplied according to Lloyds EMEA (Europe, Middle East and Africa) grade A and grade B.
Grade A is also available according to Germanischer Lloyds.

Mechanical properties

Ship plate has the following mechanical properties, measured transverse to the rolling direction:

Lloyds EMEA Grade	Min. yield strength[1] R_{eH}	Tensile strength R_m	Min. elongation after fracture A	Impact test	
	N/mm²	N/mm²	%		
			$L_0 = 5.65\sqrt{S_0}$	Temp. °C	min. energy J
Grade A	235	400 - 520	22	-	-
Grade B	235	400 - 520	22	0	27 (l)/ 20 (t)[2]

1. Upper yield strength applies.
2. l is measured longitudinal to the rolling direction; t is measured transverse to the rolling direction.

Chemical composition

Tata Steel will satisfy the following cast analysis with maximum values in weight percentages:

Lloyds EMEA	C	Mn	P	S	Si	Al_{sol}
	Max.	Min.	Max.	Max.	Max.	Min.
Grade A	0.21	-	0.035	0.035	0.50	0.02
Grade B	0.21	0.80	0.035	0.035	0.35	0.02

Dimensions

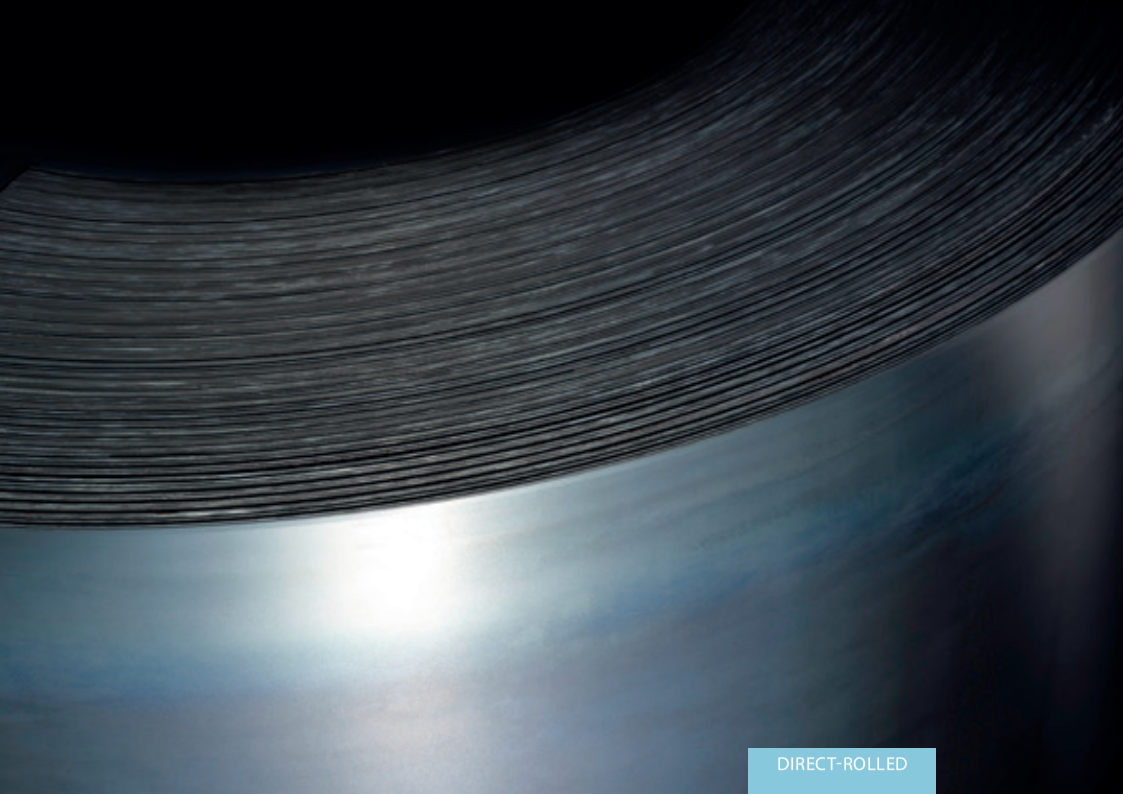
Dimensions in mm.

Thickness	Max. width	
From - up to	Grade A	Grade B
1.49 - 1.60	1170	1170
1.60 - 1.70	1280	1280
1.70 - 1.80	1370	1370
1.80 - 1.90	1440	1440
1.90 - 2.00	1520	1520
2.00 - 2.20	1590	1590
2.20 - 2.40	1730	1730
2.40 - 2.60	1800	1800
2.60 - 2.80	1880	1880
2.80 - 3.12	1960	1960
3.12 - 12.70	2070	2070
12.70 - 20.00	2070	2070

Minimum width is 1000mm.
Widths smaller than 1000mm are available on request - please contact us.

Tolerances

Tolerances for wide strip and slit wide strip comply with standard EN 10051:2010 (see Appendix A). Tighter tolerances are available, please contact us.


DIRECT-ROLLED

Direct-rolled

Direct-rolled

Tata Steel's Ymagine® direct-rolled product line includes forming, structural and high-strength grades. Consistent product characteristics deliver trouble-free processing and help to maximise yield. Ymagine is pickled and oiled and comes in a wide choice of grades, dimensions and coil weights.

Processing

Processing is straightforward with Ymagine. Due to the low content of residual elements, it provides good weldability using all conventional welding methods. Ymagine is coatable and has been successfully tested for wet paint as well as powder coatings.
A low silicon content means Ymagine is being used in a variety of laser cutting processes. For batch galvanising, Ymagine can be ordered with a maximum silicon content. It can be continuously hot-dip galvanised without any restrictions and is suitable for enamelling – although we always advise a trial first.

The main benefits of Ymagine® direct-rolled steel include:
- end products of consistent and reliable quality
- lighter and stronger products
- faster and easier processing
- increased output per tonne of steel
- reduced waste and rework

Applications

Automotive components, seating and safety systems
Construction and building components
Drums
Furniture
Lighting
Racking and shelving

Grades

The product range includes:
- basic light gauge drawing grade: Ymagine D1
- a structural steel: Ymagine S1
- five high-strength low-alloy steels: Ymagine H240, Ymagine H320, Ymagine H360, Ymagine H420 and Ymagine H500

Shape and dimension tolerances

Tolerances on thickness

Ymagine® is available with the following tolerances.
Dimensions in mm:

Thickness	Tolerances
1.15 ≤ t ≤ 2.0	± 0.05
2.0 < t < 2.5	± 0.06 [1]
2.5 ≤ t ≤ 3.0	± 0.07 [2]
3.0 < t ≤ 4.0	± 0.09 [3]

1. In some instances, the material will be supplied with a tolerance of -0.06/+0.15mm, only on the coil head and tail and to a maximum of 20 metres from the start of the coil.
2. In some instances, the material will be supplied with a tolerance of -0.07/+0.17mm, only on the coil head and tail and to a maximum of 20 metres from the start of the coil.
3. In some instances, the material will be supplied with a tolerance of -0.09/+0.21mm, only on the coil head and tail and to a maximum of 20 metres from the start of the coil.

Tolerances on width

Width tolerances comply with standard EN 10051:2010 for hot-rolled steel (see Appendix A) and EN 10131:2006 for cold-rolled steel (see Appendix B). Closer tolerances are possible – please contact us for details.

Dimensions and coil weights

The weight of weld-free coils can be specified freely between 13 and 20.5 kg/mm. Ymagine is supplied with trimmed edges as standard. Mill edges are available on request.

Description	Dimension or weight
Outside diameter	minimum 1050mm maximum 2000mm (Ymagine) maximum 2100mm (mill scale)
Coil Weight	maximum 31.5 tonne [1]

[1.] For Ymagine H500 the maximum coil weight is 25 tonne for thicknesses > 2.5mm. Above 3.20mm maximum coil weight for all grades is 25 tonne. Higher coil weights available on request.

Tata Steel assumes a minimum and a maximum coil weight agreed upon with the customer on the basis of our normal production practices and an order quantity corresponding to this coil weight. Usually a minimum coil weight up to 90% of the maximum coil weight can be requested.

Surface aspects

The surface quality of Ymagine is comparable to hot-rolled pickled and oiled i.e. 1 - 3 µm Ra (cut off 2.5mm).
Ymagine is suitable for cold-rolled applications that are not surface-critical.

Steel for forming

Ymagine® D1

Ymagine D1 is a direct-rolled, pickled and oiled, basic light-gauge drawing grade. Like all of our Ymagine grades, it is suitable for a range of production processes. Consistent quality delivers trouble-free processing and helps to maximise yield.

Mechanical properties

The mechanical properties are measured transverse to the rolling direction:

Relationship with European standard	R_{eL} / R_p	R_m	A_{80}	A_{dp5}
EN 10111: 2008, DD11	**N/mm²**	**N/mm²**	**%**	**%**
			t < 3	**t ≥ 3**
Hot-rolled flat products	170 - 360	≤ 440	≥ 23	≥ 28

Ymagine D1	R_p	R_m	A_{80}	A_{dp5}
	N/mm²	**N/mm²**	**%**	**%**
			t < 3	**t ≥ 3**
Typical value	290	380	28	-
Guaranteed values	210 - 360	335 - 425	≥ 23	≥ 28

Chemical composition

Cast analysis in weight%:

Ymagine D1	C	Mn	P	S	Si [1]
Typical	0.045	0.220	0.008	0.007	0.018
Guaranteed (max)	0.065	0.300	0.025	0.015	0.035

[1] For the purpose of batch galvanising, Ymagine D1 can be ordered after consultation with a maximum Si content of 0.030%.

Dimensions

Dimensions in mm.

Thickness	Ymagine D1	
from - up to	**Minimum width**	**Maximum width**
1.15 - 4.00	1000	1530

High-strength steel

Ymagine® HSLA grades

Ymagine also comes in five high-strength, low-alloy (HSLA) grades offering either weight savings or enhanced product strength without weight penalties. The consistent quality of this direct-rolled steel ensures repeatable and reliable performance.
Ymagine H500 offers excellent formability. It has been developed to meet the growing demand for strong but lightweight automotive components in gauges that are difficult to produce by conventional hot strip mills.

Relationship with standards

Grade	EN 10149-2:2013	R_{eH} / R_p	R_m	A_{80}	A_{dp5}
	Hot-rolled flat products	N/mm²	N/mm²	%	%
				t < 3	t ≥ 3
Ymagine H320	S315MC	≥ 315	390 - 510	≥ 20	-
Ymagine H360	S355MC	≥ 355	430 - 550	≥ 19	-
Ymagine H420	S420MC	≥ 420	480 - 620	≥ 16	≥ 19
Ymagine H500	S500MC	≥ 500	550 - 700	≥ 12	≥ 14

t - material thickness in mm.

Grade	EN 10268: 2006: longitudinal test pieces	R_{eH} / R_p	R_m	A_{80}
	Cold-rolled flat products	N/mm²	N/mm²	%
Ymagine H240	HC260LA	240 - 310	340 - 420	≥ 27
Ymagine H320	HC340LA	320 - 410	400 - 500	≥ 22
Ymagine H360	HC380LA	360 - 460	430 - 550	≥ 20
Ymagine H420	HC420LA	400 - 500	460 - 580	≥ 18

Mechanical properties

Direct-rolled strip products		R_p N/mm²	R_m N/mm²	A_{80} %	A_{dp5} %
				t < 3	**t ≥ 3**
Ymagine H240	Typical value	275	385	32	-
	Guaranteed	240 - 310	340 - 420	≥ 27	≥ 32
Ymagine H320	Typical value	340	425	30	-
	Guaranteed	320 - 410	400 - 500	≥ 22	-
Ymagine H360	Typical value	385	455	26	-
	Guaranteed	360 - 460	430 - 550	≥ 20	-
Ymagine H420	Typical value	465	530	23	-
	Guaranteed	420 - 500	480 - 580	≥ 18	≥ 22
Ymagine H500	Typical value	540	610	20	-
	Guaranteed	500 - 600	560-700	≥ 14	≥ 18

t - material thickness in mm.

Chemical composition

Cast analysis in weight percentages:

		C	Mn	P	S	Si [1]	Nb	V
Ymagine H240	Typical	0.045	0.22	0.008	0.007	0.018	refer	refer
	Guaranteed (max)	0.065	0.3	0.025	0.015	0.035	refer	refer
Ymagine H320	Typical	0.045	0.25	0.008	0.007	0.018	0.01	refer
	Guaranteed (max)	0.065	0.31	0.025	0.015	0.035	0.015	refer
Ymagine H360	Typical	0.045	0.5	0.008	0.006	0.018	0.013	refer
	Guaranteed (max)	0.065	0.6	0.025	0.015	0.035	0.018	refer
Ymagine H420	Typical	0.045	0.8	0.009	0.006	0.02	0.013	0.04
	Guaranteed (max)	0.065	1	0.025	0.015	0.035	0.02	0.06
Ymagine H500	Typical	0.045	0.8	0.009	0.006	0.02	0.013	0.13
	Guaranteed (max)	0.065	1	0.025	0.015	0.035	0.02	0.15

[1.] For the purpose of batch galvanising, Ymagine high-strength steels can be ordered on consultation with a maximum Si content of 0.030%.

Dimensions

Dimensions in mm.

Thickness	Maximum width				
From - up to	Ymagine H240	Ymagine H320	Ymagine H360	Ymagine H420	Ymagine H500
1.15 - 1.19	1530	-	-	-	-
1.19 - 1.50	1530	1530	1530	1350	-
1.50 - 2.00	1530	1530	1530	1530	1350
2.00 - 3.00	1530	1530	1530	1530	1450
3.00 - 4.00	1530	-	-	1530	1450

Minimum width is 1000mm for H240, H320 and H360.
Minimum width is 1100mm for H420 and 1150mm for H500.
Other dimensions may be available - please contact us.

Structural steel

Ymagine® S1 is a direct-rolled, pickled and oiled, structural steel. It provides a viable alternative to cold-rolled and hot-rolled steel and is suitable for a range of production processes. Consistent quality delivers trouble-free processing and helps to maximise yield.

Mechanical properties

The mechanical properties are measured transverse to the rolling direction:

Relationship with European standard	**R_{eH} / R_p**	**R_m**	**A_{80}**	**A_{dp5}**
EN 10025-2: 2004, S235JR	**N/mm²**	**N/mm²**	**%**	**%**
			t < 3	**t ≥ 3**
Hot-rolled flat products	≥ 235	360 - 510	≥ 17	24

Ymagine S1	**R_p**	**R_m**	**A_{80}**	**A_{dp5}**
	N/mm²	**N/mm²**	**%**	**%**
			t < 3	**t ≥ 3**
Typical value	300	395	28	-
Guaranteed values	235 - 360	360 - 510	≥ 19	24

Chemical composition

Cast analysis in weight percentages:

Ymagine S1	**C**	**Mn**	**P**	**S**	**Si** [1]
Typical	0.045	0.220	0.008	0.007	0.018
Guaranteed (max)	0.065	0.300	0.025	0.015	0.035

[1.] For the purpose of batch galvanising, Ymagine S1 can be ordered on consultation with a maximum Si content of 0.030%.

Dimensions

Dimensions in mm.

Thickness	**Ymagine S1**	
from - up to	**Minimum width**	**Maximum width**
1.15 - 4.00	1000	1530


COLD-ROLLED

Cold-rolled

Cold-rolled

Tata Steel offers a comprehensive range of cold-rolled steel comprising both continuously-annealed and batch-annealed products. This means we can tailor our offer to meet your precise requirements for formability, strength, surface finish or flatness. Coupled with consistent quality, our wide product selection provides opportunities for you to optimise both your products and processes.

The benefits of our cold-rolled steel include:
- consistent and reliable end product quality
- lighter and stronger products
- repeatable, trouble-free processing
- maximised yield
- reduced waste and rework

Applications

Automotive components
Bathtubs
Construction and building components
Domestic appliances
Drums and pressure vessels
Electrical goods
Electrolytic coating
Feedstock for galvanising and coating
Furniture
Radiators
Tubes and sections

Grades

This section of the catalogue shows the grades of cold-rolled steel offered by Tata Steel. These include advanced high-strength steels, high-strength steels and grades for enamelling and forming.

Supply – product conditions

We supply cold-rolled steel in the following conditions:
- annealed and skin-passed
- full hard
- sheets, discs and slit wide coil

Tata Steel produces cold-rolled and annealed strip by either the continuously-annealed (CA) or batch-annealed (BA) processes.

Surface quality

Surface quality A

Defects that do not influence the formability or the application of surface coatings are permitted. They are defects such as pores, minor scratches, slight indentations, small grooves or slight discolouration.

Surface quality B

The better side must be free of defects that can spoil the uniform appearance of a high-quality paint or of an electrolytic coating. The other side must at least conform to surface quality A. Not all combinations of thickness and width are available in surface quality B. Please contact us for details.

Inspected side

As a rule, the upper side of the strip is inspected; on request, the strip can be wound so that the inspected side is the underside.

Surface texture/roughness

Cold-rolled annealed and skin-passed steel is available in several surface textures. Unless specified otherwise, Tata Steel will supply normal roughness. The table below shows the range of surface textures according to EN 10130: 2006.

			Production location	
EN 10130: 2006 Grade	**Symbol**	**Roughness R_a (µm) cut off 0.8 mm**	**UK**	**NL**
extra-bright [1]	-	≤ 0.30	-	Available
bright	b	≤ 0.4	-	Available
semi-bright	g	≤ 0.9	Refer	Available
normal	m	0.6 - 1.9	Available	Available
rough	r	> 1.6	Refer	Available
extra rough [1]	-	> 2.5	-	Available

[1.] Not in EN 10130: 2006 – Tata Steel's own specification.

Other surface textures are available to meet your requirements – please contact us for details.

Preservative oil

The standard oil applied by Tata Steel acts as a protective coating. Other types of oil may be available to meet your requirement.

Tata Steel offers a range of oiling levels from
- 0.4 - 1.7 g/m^2 per side from Tata Steel in the UK
- 0.25 - 1.7 g/m^2 per side from Tata Steel in the Netherlands.

Other oiling levels are available on request. Tata Steel is not responsible for the risk of corrosion during storage or shipment if material is ordered in the un-oiled condition.

Surface cleanliness

Tata Steel can guarantee improved surface cleanliness on request for batch-annealed products. The cleanliness is tested with a tape test, in which the loss of reflection is measured. The reflection gives an indication of the oil residue on the annealed product. Two levels of loss of reflectivity are available for batch-annealed products: a maximum of 20% or a maximum of 30%. Continuously-annealed products typically exhibit a loss of reflection up to around 10%.

Shape and dimension tolerances

Tolerances on shape and dimensions comply with standard EN 10131: 2006 and are shown in Appendix B.

Tolerances on thickness

Tolerance (EN 10131: 2006)	Availability
Full thickness tolerance	Available
Special thickness tolerances	Available
50% of full thickness tolerance	Refer before ordering

Out-of-squareness (products supplied as cut sheets only)

The deviation does not exceed 1% of the actual width of the sheet according to the EN 10131: 2006 standard. The deviation from the edge camber does not exceed 5mm for a length of 2 metres as specified in EN 10131: 2006.

Flatness (products supplied as skin-passed cut sheets only)

Flatness complies with EN 10131: 2006.
If there is a dispute about the flatness of material that was ordered to the special tolerances shown in table 8 of EN 10131: 2006, then the minimum acceptable standards of flatness described below must be verified.

Criteria in case of disputes over special (FS) flatness tolerances (R_{eL} < 260 N/mm²)

Dimensions in mm.

Nominal width	Edge-wave length	Maximum acceptable wave height
< 1500	> 200	< 1% of edge-wave length
≥ 1500	> 200	< 1.5% of edge-wave length
–	< 200	2mm

Tolerances on width

	Production location	
Tolerance (EN 10131: 2006)	**UK**	**NL**
Normal width tolerances	Available	Available
Special width tolerances	Available trimmed edges only	Refer (± 0.25mm available on 750 - 2000mm width)

Winding

For winding, there may be a maximum width gap of 3mm between two consecutive windings. The total width stagger across the coil wall will not exceed 10mm.

Dimensions and coil weights

Tata Steel can supply cold-rolled steel with the following minimum and maximum dimensions and coil weights.

	Production location	
Description	**UK**	**NL**
Coil diameter inner	610mm	610mm (508mm available on request)
Coil diameter outer	10/7 x width max	
		1000mm min.
	2250mm max.	2800mm max.
Coil weight	34t max.	30t max. 30 - 45t max available after consultation
	Coil weight limited by maximum outer diameter	
	Maximum weight allowed by road/rail transport	
	Some products may have different coil weight ranges available	
	Usually a minimum coil weight up to 85% of the maximum coil weight can be requested	
KIM: width ≤ 1200mm	11.9 - 21.5 kg/mm width	14.5 - 20.8 kg/mm width
KIM: 1200mm < width ≤ 1700mm	11.9 - 19.3 kg/mm width	14.5 - 20.3 kg/mm width
KIM: width > 1700mm	11.9 - 18.9 kg/mm width	10.3 kg/mm width and 14.5 - 20.3 kg/mm width
Minimum tonnage per order	Refer to price list for order quantity details	
	Minimum order quantities may apply	

Coil welds

For batch-annealed coils, in general, pickling line welds are included. The number of permissible recoiling line welds is determined in consultation with the customer. If welds are permitted, Tata Steel is better able to implement the best coil weight. A recoiling line weld is marked with a single hole in the centre of the strip, close to the weld. On request the identifying hole can be left out. Coils with welds are available on continuously-annealed products – please contact us for details.

Steel for forming

Cold-rolled steel for cold forming and deep drawing is available in a range of grades. Each grade is designed for particular applications – allowing you to pick the best steel for your product. Our forming steel is available in a choice of widths up to 2050mm and thicknesses up to 3.1mm. This provides opportunities for cutting waste and maximising yield.

These products are made using one of two process routes:
• continuous annealing (CA)
• batch annealing (BA)

Applications

Automotive components and body panels
Components for building
Domestic appliances
Electrical goods
Furniture
Radiators
Tubes

Relationship with standards

Cold-rolled steel for forming complies with European standard EN 10130: 2006 and is available in the grades shown below.

European standard	National standards
EN 10130: 2006	**Germany**
Grade	**DIN 1623 part 1**
DC01	St 12
DC03	St 13
DC04	St 14
DC05	St 15 [1]
DC06	IF 18 [2]

[1.] Not in standard. Tata Steel's own specification.
[2.] Also part of the SEW095 specification.

Mechanical properties

Cold-rolled steel for forming has the following mechanical properties (skin-passed) - these are measured transverse to the rolling direction:

EN 10130: 2006	Max. yield strength R_e [1, 2, 6]	Tensile strength R_m	Min. elongation after fracture A_{80} [3]	Min. r_{90}-value [4, 5]	Min. n_{90}-value [4]
Grade	**N/mm²**	**N/mm²**	**%**		
DC01	280	270 - 410	28	-	-
DC03	240	270 - 370	34	1.3	-
DC04	210	270 - 350	38	1.6	0.180
DC05	180	270 - 330	40	1.9	0.200
DC06	170	270 - 330	41	2.1	0.220

1. The values of the yield strength are those of the 0.2% yield strength for products with no definite yield point and the lower yield strength R_{eL} for the other products.
2. For thicknesses > 0.5mm and ≤ 0.7mm, the value for yield strength is increased by 20 N/mm². For thicknesses ≤ 0.5mm, the value is increased by 40 N/mm².
3. For thicknesses > 0.5mm and ≤ 0.7mm the minimum elongation after fracture is decreased by 2%. For thicknesses ≤ 0.5mm the minimum elongation after fracture is decreased by 4%.
4. The r- and n-values apply to a thickness of t ≥ 0.5mm.
5. For a thickness of t > 2mm, the r_{90} value or r-average value is decreased by 0.2.
6. For design purposes, a lower yield strength R_{eL} of at least 120 N/mm² can be assumed for DC06 and 140 N/mm² for DC01/3/4/5.

Chemical composition

Cold-rolled steel for forming supplied by Tata Steel complies to the following cast analysis with maximum values in weight percentages unless otherwise shown: All values in weight%.

EN 10130: 2006	C	Mn	P	S	Ti
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**
DC01	0.12	0.60	0.045	0.045	-
DC03	0.10	0.45	0.035	0.035	-
DC04	0.08	0.40	0.030	0.030	-
DC05	0.06	0.35	0.025	0.025	-
DC06	0.02	0.25	0.020	0.020	0.30

Titanium may be replaced by niobium. Carbon and nitrogen will be completely bound.

Dimensions

For steel produced in the UK – continuously-annealed (CA)

Dimensions in mm.

Thickness	Max. width				
From - up to	**DC01**	**DC03**	**DC04**	**DC05**	**DC06**
0.37 - 0.45	1390	-	-	-	-
0.45 - 0.50	1470	-	-	-	-
0.50 - 0.55	1550	1400	1450	1450	1450
0.55 - 0.60	1550	1510	1450	1450	1450
0.60 - 0.65	1710	1600	1600	1600	1600
0.65 - 0.70	1710	1635	1650	1650	1650
0.70 - 0.75	1710	1650	1700	1700	1700
0.75 - 0.78	1820	1815	1700	1700	1700
0.78 - 0.80	1820	1815	1785	1785	1785
0.80 - 1.20	1820	1815	1785	1785	1785
1.20 - 1.60	1820	1815	1785	1785	-
1.60 - 1.70	1750	1750	1750	-	-
1.70 - 1.80	1650	1650	1650	-	-
1.80 - 1.90	1525	1525	1525	-	-
1.90 - 1.95	1520	1500	1500	-	-
1.95 - 2.00	1500	1500	1500	-	-

Minimum width is 900mm for thicknesses below 0.5mm.
Minimum width is 825mm for all other thicknesses.

For steel produced in the Netherlands – batch-annealed (BA).
Dimensions in mm.

Thickness	Max. width				
From - up to	**DC01**	**DC03**	**DC04**	**DC05**	**DC06**
0.37 - 0.40	1630	1530	1530	-	-
0.40 - 0.50	1690	1680	1680	1760	-
0.50 - 0.60	1920	1750	1750	1840	1900
0.60 - 0.70	1920	1790	1790	1880	2010
0.70 - 0.80	1970	1830	1830	1920	2030
0.80 - 0.90	2030	1880	1880	1970	2030
0.90 - 1.00	2030	1920	1920	2020	2030
1.00 - 1.10	2030	1970	1970	2030	2030
1.10 - 1.20	2030	2020	2020	2030	2030
1.20 - 1.30	2030	2030	2030	2030	2030
1.30 - 1.50	2030	2030	2030	1880	2030
1.50 - 1.60	2030	2030	2030	1880	1920
1.60 - 1.70	2030	2030	2030	1730	1800
1.70 - 1.80	2030	2030	2030	1730	1720
1.80 - 1.90	2030	2030	2030	1570	1600
1.90 - 2.00	2030	1960	1960	1570	1550
2.00 - 2.10	2030	1840	1840	1430	1490
2.10 - 2.20	2030	1840	1840	1430	1420
2.20 - 2.40	2030	1700	1700	1310	-
2.40 - 2.50	1960	1570	1570	-	-
2.50 - 2.60	1940	1570	1570	-	-
2.60 - 2.70	1920	1470	1470	-	-
2.70 - 2.80	1850	1470	1470	-	-
2.80 - 2.90	1790	1370	1370	-	-
2.90 - 3.00	1730	1370	1370	-	-

Minimum width is 900mm.
Other dimensions are available on request – please contact us.

For steel produced in the UK – batch-annealed (BA).

Dimensions in mm.

Thickness	Max. width				
From - up to	DC01	DC03	DC04	DC05	DC06
0.35 - 0.37	1300	1300	1300	1300	-
0.37 - 0.45	1390	1300	1300	1300	-
0.45 - 0.50	1470	1300	1300	1300	-
0.50 - 0.55	1550	1400	1450	1450	1450
0.55 - 0.60	1550	1510	1450	1450	1450
0.60 - 0.65	1710	1600	1600	1600	1600
0.65 - 0.70	1710	1635	1650	1650	1650
0.70 - 0.75	1710	1650	1700	1700	1700
0.75 - 0.78	1820	1815	1700	1700	1700
0.78 - 1.20	1820	1815	1785	1785	1785
1.20 - 1.60	1820	1815	1785	1785	1300
1.60 - 1.70	1750	1750	1750	1300	-
1.70 - 1.80	1650	1650	1650	1300	-
1.80 - 1.95	1525	1525	1525	1300	-
1.95 - 2.50	1500	1500	1500	1300	-
2.50 - 3.00	1500	1500	1500	-	-

Minimum width is 710mm.
Other dimensions may be available – please contact us.

Tolerances

Tolerances comply with standard EN 10131:2006 (see Appendix B).
Tighter tolerances are available, please contact us for details.

Steel for enamelling

Tata Steel's Ymvit® cold-rolled steel for enamelling delivers end product and process benefits including superb coating adhesion and reliable deep drawing. Ymvit Ultra grades provide perfect coating adhesion and improved resistance to carbon boiling and fish scaling.

Applications

Barbecues
Bathtubs
Domestic appliances
Heat exchange panels (pore-free)
Photo Voltaic solar panels
Sinks
White boards and wall panels

Relationship with standards

Steel for enamelling complies with the following standards:

Tata Steel	European standard	Germany	USA
Ymvit Grade	**EN 10209**	**DIN 1623, part 3**	**ASTM A 424**
Ground Coat Enamelling (if necessary followed by cover coat)			
Ymvit 01	DC01EK	-	type II CS
Ymvit 04	DC04EK	-	type II DS
Ymvit 04 plus	DC04EK (bath tubs)	-	-
Two Coat/One Fire and Pore Free Enamelling			
Ymvit Ultra 03	DC03ED	ED 3	type I CS
Ymvit Ultra 04	DC04ED	ED 4	type I DS
Ymvit Extra 06	DC06ED	-	type III IF
Direct White Enamelling			
Ymvit Ultra 03	DC03ED	ED 3	type I CS
Ymvit Ultra 04	DC04ED	ED 4	type I DS
Ymvit Extra 06	DC06ED	-	type III IF

Surface aspects

Steel for enamelling shall be supplied with normal finish (Ra between 1.0 µm and 1.9 µm, cut-off 2.5mm). Steel for direct enamelling; Ymvit Ultra 03 and Ymvit Ultra 04, normally have a rhombic pattern. Ymvit Extra 06 normally has a stripe pattern. If a different roughness is ordered, a rhombic or stripe pattern is not possible.

Mechanical properties

Steel for enamelling has the following mechanical properties (skin-passed) – these are measured transverse to the rolling direction:

Tata Steel Ymvit	EN 10209: 1996	Max. yield strength R_e [1, 2, 3]	Min. - Max. tensile strength R_m	Min. elongation after fracture [3] A_{80}	Min. average r-value [4] $r_{av.}$	FLD
Grade	**Grade**	**N/mm²**	**N/mm²**	**%**		**Yes/No**
Ymvit 01	DC01EK	270	270 - 390	30	-	-
Ymvit 04 [2]	DC04EK	220 [6]	270 - 350	36	-	-
Ymvit 04 plus	DC04EK	210	270 - 350	38	-	-
Ymvit Ultra 03 [2]	DC03ED	240 [6]	270 - 370	34	-	-
Ymvit Ultra 04 [2]	DC04ED	210 [5, 6]	270 - 350	38	-	Yes
Ymvit Extra 06 [2]	DC06ED	190 [6]	270 - 350	38	1.6	Yes

1. The values of the yield strength are those of the 0.2% yield strength for products that do not present a definite yield point, and the lower yield strength R_{eL} for the other products.
2. For a thickness of 0.5mm < t < 0.7mm the maximum value of the yield strength is increased by 20 N/mm² and the minimum elongation after fracture is decreased by 2%.
3. For a thickness of t ≤ 0.5mm the maximum value of the yield strength is increased by 40 N/mm² and the minimum elongation after fracture is decreased by 4%.
4. The r value applies to a thickness of t ≥ 0.5mm. For a thickness of t > 2mm, the r value is decreased by 0.2.
5. For a thickness of t ≥ 1.5mm the maximum value of the yield strength is 225 N/mm².
6. For design purposes, a lower yield strength R_{eL} of at least 120 N/mm² can be assumed.

Chemical composition

Tata Steel complies with the following cast analysis with maximum values in weight percentages:

Tata Steel	EN 10209	C	Mn	P	S	Ti
Ymvit	**Grade**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**
Ymvit 01	DC01EK	0.09	0.50	0.030	0.050	-
Ymvit 04 / Ymvit 04 plus	DC04EK	0.08	0.40	0.030	0.050	-
Ymvit Ultra 03	DC03ED	0.004	0.40	0.035	0.050	-
Ymvit Ultra 04	DC04ED	0.004	0.40	0.030	0.050	-
Ymvit Extra 06	DC06ED	0.004	0.35	0.020	0.050	0.30

The elements P and Cu are kept within certain limits to ensure that the reactivity of the steel surface is as constant as possible. Under normal conditions this leads to a reproducible enamelling result.

Dimensions

Dimensions in mm.

Thickness	Max. width					
From - up to	**Ymvit 01**	**Ymvit 04**	**Ymvit 04 plus**	**Ymvit Ultra 03**	**Ymvit Ultra 04**	**Ymvit Extra 06**
0.37 - 0.40	1540	1500	-	-	-	-
0.40 - 0.50	1580	1540	-	1900	1900	1820
0.50 - 0.60	1650	1610	-	1940	1940	1950
0.60 - 0.70	1720	1680	-	1960	1960	1980
0.70 - 0.80	1770	1730	-	1960	1960	1990
0.80 - 0.90	1820	1780	1780	1960	1960	2010
0.90 - 1.00	1870	1830	1830	1960	1960	2010
1.00 - 1.10	1910	1900	1850	1960	1960	2010
1.10 - 1.20	1970	1960	1820	1960	1960	2010
1.20 - 1.30	1980	1970	1780	1960	1960	2010
1.30 - 1.40	2010	2000	1740	1960	1960	2010

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Dimensions in mm.

Thickness	Max. width					
From - up to	Ymvit 01	Ymvit 04	Ymvit 04 plus	Ymvit Ultra 03	Ymvit Ultra 04	Ymvit Extra 06
1.50 - 1.60	2010	2000	1680	1860	1860	1950
1.60 - 1.70	2010	2000	1660	1760	1760	1850
1.70 - 1.80	1940	1930	1620	1660	1660	1750
1.80 - 1.90	1910	1900	1600	1580	1580	1660
1.90 - 2.00	1880	1870	1570	1510	1510	1570
2.00 - 2.10	1850	1840	1530	1430	1430	1500
2.10 - 2.20	1830	1820	1500	-	-	-
2.20 - 2.30	1800	1790	1500	-	-	-
2.30 - 2.40	1770	1760	1500	-	-	-
2.40 - 2.50	1750	1740	1500	-	-	-
2.50 - 2.60	1720	1710	1500	-	-	-
2.60 - 2.70	1680	1670	-	-	-	-
2.70 - 2.80	1640	1630	-	-	-	-
2.80 - 2.90	1600	1590	-	-	-	-
2.90 - 3.00	1540	1530	-	-	-	-

Minimum width is 900mm.
Other dimensions are available on request – please contact us for details.

Tolerances

Tolerances comply with standard EN 10131:2006 (see Appendix B).
Tighter tolerances are available, please contact us for details.

High-strength steel

Tata Steel offers a range of steels for applications requiring high strength without the weight penalty. The range comprises micro-alloyed, rephosphorised and carbon manganese high-strength steels in cold-rolled uncoated condition. These steels are ideal for strong, thin-gauge products.

Micro-alloyed grades

Micro-alloyed grades have high-strength levels through precipitation and grain refinement hardening. Careful use of alloying elements ensures high mechanical resistance and good weldability. There is limited scope for cold forming.

Tata Steel supplies high-strength micro-alloyed (HSLA) steel which complies with European standard EN 10268:2006+A1:2013.

Bake hardening grades

Bake hardening steel gains extra strength after going through an automotive paint oven. The benefit of this is a product with relatively good formability, combined with a higher strength final part.

Rephosphorised grades

These grades deliver high mechanical resistance and good suitability for cold forming due to solid solution hardening by phosphorus. Our rephosphorised grades are highly suited to the manufacture of car body panels and structural components because of their good resistance to impact and fatigue.

Carbon manganese grades

Our carbon manganese product combines high strength with excellent formability for the most difficult cold forming applications.

Applications

Automotive components
Construction components
Furniture
Precision tubes

Relationship with standards

Tata Steel can supply the following cold-rolled high-strength steel grades:

Microalloyed grades

EN 10268:2006+A1:2013	EN 10268:1999
Grade	**Grade**
HC260LA	H240LA
HC300LA	H280LA
HC340LA	H320LA
HC380LA	H360LA
HC420LA	H400LA

Bake hardening grades

EN 10338:2010	VDA239
HC220B	CR210BH

Rephosphorised grades

Grade	SEW 094 Grade
HC220P	ZSt E220P
HC260P	ZSt E260P

Carbon manganese grades

Grade	Grade
HC300CM	No EN specified equivalent

The carbon manganese product is supplied to Tata Steel's own standard.
There is no direct EN standard equivalent.

RADECOL grades

Grade	Grade
RADECOL 2	No EN specified equivalent
RADECOL 3	No EN specified equivalent

The RADECOL product is supplied to Tata Steel's own standard.
There is no direct EN standard equivalent.

Mechanical properties

The available grades have the following mechanical properties measured perpendicular to the rolling direction (transverse test pieces):

Microalloyed grades

EN 10268: 2006+A1:2013	Min. - Max. yield strength $R_{p0.2}$ [1]	Min. - Max. tensile strength R_m	Min. elongation after fracture A [2]	Min. r-value r_{90} [3]	Min. n-value n_{90}
Grade	**N/mm²**	**N/mm²**	**%**		
HC260LA	260 - 330	350 - 430	26	-	-
HC300LA	300 - 380	380 - 480	23	-	-
HC340LA	340 - 420	410 - 510	21	-	-
HC380LA	380 - 480	440 - 560	19	-	-
HC420LA	420 - 520	470 - 590	17	-	-

Bake hardening grades

EN EN10338: 2010	Min. - Max. yield strength R_e [1]	Min. - Max. tensile strength R_m	Min. elongation after fracture A [2]	Min. r-value r_{90} [3]	Min. n-value n_{90}	Min. BH_2
Grade	**N/mm²**	**N/mm²**	**%**			**N/mm²**
HC220B	220 - 270	320 - 400	32	1.5	0.16	35

Rephosphorised grades

	Min. - Max. yield strength R_e [1]	Min. - Max. tensile strength R_m	Min. elongation after fracture A [2]	Min. r-value r_{90} [3]	Min. n-value n_{90}
Grade	**N/mm²**	**N/mm²**	**%**		
HC220P	220 - 270	320 - 400	32	1.3	0.16
HC260P	260 - 320	360 - 440	29	-	-

[1.] If the yield strength is pronounced (yield flag), the values apply to the lower yield point (R_{eL}).

[2.] When thickness ≤ 0.7mm, the minimum value for elongation is reduced by 2%.

[3.] For products with thickness > 2mm the minimum r_{90} is reduced by 0.2.

Carbon manganese steel

	Min. - Max. yield strength R_{eL} [1]	Min. - Max. tensile strength R_m	Min. elongation after fracture A
Grade	**N/mm²**	**N/mm²**	**%**
HC300CM	300 - 360	440 - 500	26

RADECOL grades

	Min. - Max. yield strength $R_{p0.2}$ [1]	Min. - Max. tensile strength R_m	Min. elongation after fracture A
Grade	**N/mm²**	**N/mm²**	**%**
RADECOL 2	245 - 330	350 - 440	26
RADECOL 3	300 - 380	380 - 480	23

[1] If the yield strength is pronounced (yield flag), the values apply to the lower yield point (R_{eL}).

Chemical composition

Cold-rolled high-strength steels supplied by Tata Steel comply to the following cast analysis with maximum values in weight percentages unless otherwise shown:

Micro-alloyed grades

EN 10268: 2006+ A1:2013	C	Mn	Si	P	S	Al	Ti [1]	Nb [1]
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Min.**	**Max.**	**Max.**
HC260LA	0.10	1.0	0.5	0.030	0.025	0.015	0.15	0.09
HC300LA	0.12	1.4	0.5	0.030	0.025	0.015	0.15	0.09
HC340LA	0.12	1.5	0.5	0.030	0.025	0.015	0.15	0.09
HC380LA	0.12	1.6	0.5	0.030	0.025	0.015	0.15	0.09
HC420LA	0.14	1.6	0.5	0.030	0.025	0.015	0.15	0.09

[1] These additional elements may be used individually or in combination where they appear in the definition of the steel within the composition limits indicated. Vanadium and boron may also be added. However, the sum of the contents of these four dispersoidal elements shall not exceed 0.22%.

Values in weight%.

Bake-hardening grades

EN 10338:2010	C	Mn	Si	P	S	Al	Ti	Nb
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Min.**	**Max.**	**Max.**
HC220B	0.08	0.7	0.5	0.085	0.025	0.015	-	-

Values in weight%.

Rephosphorised grades

	C	Mn	Si	P	S	Al	Ti	Nb
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Min.**	**Max.**	**Max.**
HC220P	0.07	0.7	0.5	0.08	0.025	0.015	-	-
HC260P	0.08	0.7	0.5	0.1	0.025	0.015	-	-

Values in weight%.

Carbon manganese grades

	C	Mn	Si	P	S
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**
HC300CM	0.18	1.40	0.03	0.025	0.012

Values in weight%.

RADECOL grades

	C	Mn	Si	P	S	S.Al
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Min.**
RADECOL 2	0.12	1.10	0.5	0.10	0.025	0.015
RADECOL 3	0.11	1.00	0.5	0.12	0.025	0.015

Values in weight%.

Dimensions

For steel produced in the UK – continuously-annealed (CA).

Dimensions in mm.

Thickness	Max. width							
From - up to	HC260LA	HC300LA	HC340LA	HC380LA	HC420LA	HC220B	RADECOL 2	RADECOL 3
0.38 - 0.40	1390	-	-	-	-	-	1390	-
0.40 - 0.43	1330	-	-	-	-	-	1330	-
0.43 - 0.50	1390	-	-	-	-	-	1390	-
0.50 - 0.55	1515	1500	-	-	-	1400	1515	1500
0.55 - 0.60	1515	1500	1500	-	-	1400	1515	1500
0.60 - 0.65	1600	1545	1515	1410	-	1400	1600	1545
0.65 - 0.70	1600	1545	1515	1410	-	1400	1600	1545
0.70 - 0.80	1710	1750	1515	1410	-	1400	1710	1750
0.80 - 0.90	1710	1750	1515	1410	1300	1400	1710	1750
0.90 - 0.95	1820	1750	1515	1410	1319	1400	1820	1750
0.95 - 1.00	1820	1750	1515	1410	1319	1400	1820	1750
1.00 - 1.10	1820	1750	1545	1484	1400	1400	1820	1750
1.10 - 1.20	1820	1750	1545	1484	1400	1400	1820	1750
1.20 - 1.28	1750	1750	1545	1484	1450	1400	1750	1750
1.28 - 1.30	1750	1750	1545	1484	1450	1400	1750	1750
1.30 - 1.40	1750	1750	1545	1484	1450	1400	1750	1750
1.40 - 1.50	1750	1750	1545	1484	1450	1400	1750	1750
1.50 - 1.60	1750	1750	1545	1484	1450	1400	1750	1750
1.60 - 1.70	1750	1750	1545	1545	1450	1400	1750	1750
1.70 - 1.80	1620	1750	1545	1545	1450	1400	1620	1750
1.80 - 1.90	1500	1550	1500	1500	-	1400	1500	1550
1.90 - 2.00	1500	1550	1500	1500	-	1400	1500	1550

Minimum width is 821mm for HC300LA.
Minimum width is 900mm for HC220B.
Minimum width is 825mm for all other grades.
Please contact us for the available dimensions of HC300CM.

For steel produced in the Netherlands – batch-annealed (BA).
Dimensions in mm.

Thickness	Max. width						
From - up to	**HC260LA**	**HC300LA**	**HC340LA**	**HC380LA**	**HC420LA**	**HC220P**	**HC260P**
0.40 - 0.50	1590	-	-	-	-	-	-
0.50 - 0.55	1640	1520	-	-	-	1500	1500
0.55 - 0.60	1670	1550	-	-	-	1500	1500
0.60 - 0.65	1700	1570	1420	1380	1100	1800	1800
0.65 - 0.70	1730	1590	1450	1430	1170	1800	1800
0.70 - 0.80	1760	1620	1500	1480	1190	1800	1800
0.80 - 0.90	1810	1680	1600	1580	1340	1800	1800
0.90 - 1.00	1840	1710	1600	1600	1380	1800	1800
1.00 - 1.10	1880	1750	1610	1620	1450	1800	1800
1.10 - 1.20	1920	1780	1620	1650	1480	1800	1800
1.20 - 1.30	1940	1810	1630	1680	1510	1800	1800
1.30 - 1.40	1970	1830	1680	1700	1560	1800	1800
1.40 - 1.50	1990	1850	1700	1720	1630	1800	1800
1.50 - 1.60	2000	1870	1670	1700	1580	1800	1800
1.60 - 1.70	2000	1910	1650	1680	1530	1800	1800
1.70 - 1.80	2000	1910	1620	1650	1500	1800	1800
1.80 - 1.90	2000	1900	1590	1640	1470	1800	1800
1.90 - 2.00	2000	1870	1560	1630	1440	1800	1800
2.00 - 2.10	2000	1840	1520	1610	1430	1800	1800
2.10 - 2.20	2000	1810	1480	1500	1410	1800	1800
2.20 - 2.30	1940	1770	1440	1420	1400	1700	1700
2.30 - 2.40	1880	1720	1400	1360	1390	1700	1700
2.40 - 2.50	1820	1670	1360	1300	1370	1600	1600
2.50 - 2.60	1750	1640	1320	1240	1320	1600	1600
2.60 - 2.70	1690	1570	1260	1200	1290	1600	1600
2.70 - 2.80	1650	1520	1200	1150	1250	1400	1400
2.80 - 2.90	1590	1460	1150	-	1210	1400	1400
2.90 - 3.00	1530	1410	-	-	1170	1400	1400

Minimum width is 1050mm for HC380LA and HC420LA.
Minimum width is 900mm for the other grades.
Other dimensions are available on request - please contact us.

Tolerances

Tolerances comply with standard EN 10131:2006 (see Appendix B).
Tighter tolerances are available, please contact us for details.

Advanced and ultra high-strength steel

Our cold-rolled dual phase and hot forming grades include advanced and ultra high-strength steels. Originally developed for the demanding automotive market, they also meet a variety of performance and processing requirements for other advanced applications.

Dual phase grades

Cold-rolled dual phase steels allow you to increase the strength of the finished component or reduce the thickness of the steel – or both. By increasing product performance and helping reduce weight, these steels support you to achieve your optimum performance parameters. The use of dual phase grades increases the output from each tonne of steel and produces products that are strong, light and safe under load. High strain-hardening capacity ensures our dual phase steels have good formability.

Hot forming steel - HQ1500 CR

Our HQ1500 CR product is an uncoated, ultra high-strength hot forming steel. It combines a strength level of 1500 N/mm^2 with excellent shape accuracy. Compared with conventional high-strength, low-alloy grades, HQ1500 CR offers real opportunities for weight reduction through down-gauging. It also ensures good repeatability in long production runs when compared with cold press forming.

Applications

Automotive body-in-white
Precision tubes

Relationship with standards

Tata Steel can supply the following cold-rolled advanced and ultra high-strength steel grades:

Tata Steel	EN 10338:2015 [1]	EN 10083: 2009
DP600	HCT600X	
DP800	HCT780X	
DP1000	HCT980X	
HQ1500 CR		20MnB5 [2]

[1.] This specification is in draft format at present.
[2.] This grade is also widely known as 22MnB5.

Mechanical properties

The values shown for the mechanical properties in the table below are for test pieces taken parallel to the rolling direction.

Product	Yield strength [1] $R_{p0.2}$	Min. Tensile strength R_m	Elongation after fraction A (L_0 = 80mm)	Min. n-value (10% - Ag)	Min. BH_2
Grade	**N/mm²**	**N/mm²**	**%**		**N/mm²**
DP600	340 - 420	600	20	0.14	30
DP800	450 - 560	780	14	-	30
DP1000	600 - 750	980	10	-	30

[1.] Yield strength refers to the 0.2% proof strength for the product.

The mechanical properties of the uncoated product before and after hot forming (taken parallel to the rolling direction) are shown in the table below.

Product	As delivered				
	Yield strength [1] $R_{p0.2}$	Min. - Max. tensile strength R_m	Elongation after fracture A (L_0 = 80mm)	n-value	r-value
Grade	**N/mm²**	**N/mm²**	**%**		
HQ1500 CR - Guaranteed	≥ 300	500 - 580	≥ 20	-	-
HQ1500 CR - Typical	340 - 440	500 - 580	> 21	> 0.150	0.90 - 1.0

Product	Hot formed		
	Min. - Max. yield strength $R_{p0.2}$ [1]	Min. - Max. tensile strength R_m	Elongation after fracture A (L_0 = 80mm)
Grade	**N/mm²**	**N/mm²**	**%**
HQ1500 CR - Guaranteed	1000 - 1250	1300 - 1600	≥ 5
HQ1500 CR - Typical	1025 - 1100	1420 - 1520	5 - 7

[1.] Yield strength refers to the 0.2% proof strength for the product.

Chemical composition

The table below shows the chemical composition to the draft EN 10338:2015 (for dual phase) and EN 10083-3: 2006 (for hot forming steel) specifications.

Product	C	Si	Mn	P	S	Al_{tot}	Cr + Mo [1]	Nb + Ti [2]	V	B
	Max.	Max.	Max.	Max.	Max.		Max.	Max.	Max.	Max.
DP600	0.17	0.80	2.20	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
DP800	0.18	0.80	3.00	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
DP1000	0.23	0.80	3.00	0.080	0.015	≤ 2.00	1.00	0.15	0.20	0.005
HQ1500 CR - Guaranteed	0.23	0.3	1.3	0.02	0.010	0.02 - 0.06	0.3	0.04	-	0.005
HQ1500 CR - Typical	0.22	0.24	1.2	0.01	0.005	0.04	0.2	0.03	-	0.003
EN 10083 20MnB5	0.23	0.4	1.4	0.025	0.035	-	-	-	-	0.0008 - 0.005

[1.] Refers to Cr max for HQ1500 CR.
[2.] Refers to Ti max for HQ1500 CR.
Values in weight%.

Dimensions

Order volumes may apply to some dimensions – please contact us for details.

For continuously-annealed (CA).

Dimensions in mm.

Thickness	Max. width			
From - up to	**DP600 [1]**	**DP800 [2]**	**DP1000**	**HQ1500 CR**
0.70 - 0.80	-	-	-	-
0.80 - 0.85	1437	1400	1240	-
0.85 - 0.90	1437	1400	1255	-
0.90 - 0.95	1437	1400	1280	1188
0.95 - 1.00	1437	1400	1330	1188
1.00 - 1.10	1437	1400	1380	1188
1.10 - 1.20	1437	1400	1420	1188
1.20 - 1.30	1437	1400	1420	1238
1.30 - 1.40	1437	1400	1440	1238
1.40 - 1.60	1500	1400	1460	1313
1.60 - 1.70	1500	1400	1460	1363
1.70 - 1.80	1500	1400	1480	1363
1.80 - 1.90	1500	1419	1480	1388
1.90 - 1.95	1500	1419	1480	1388
1.95 - 2.00	1500	1419	1500	1388

[1.] DP600 thicknesses from 0.7mm up to 0.8mm are under development. Please contact us for latest availability.

[2.] DP800 thicknesses from 0.7mm up to 0.8mm for widths up to 1475mm are under development. Please contact us for latest availability.

Minimum width is 900mm for all grades.

Tolerances

Tolerances comply with standard EN 10131:2006 (see Appendix B).
Tighter tolerances are available, please contact us for details.

Structural steel

Our structural steel is suitable for a wide range of applications. It has a guaranteed minimum strength and offers good weldability for ease of processing.

Applications

Domestic appliances
Furniture
Tubing
Racking and shelving
Pressure vessels

Mechanical properties

Cold-rolled structural steel has the following mechanical properties (skin-passed) - these are measured transverse to the rolling direction:

Grade	Min. - Max. yield strength [1] R_p	Min. - Max. tensile strength [1] R_m	Min. elongation after fracture A
	N/mm²	N/mm²	%
CA200	200 - 260	320 - 380	30
CA240	240 - 300	340 - 400	28

[1] Lower yield point or 0.2% proof stress applies.
There are no direct EN standard equivalents.

Chemical composition

Cast analysis with maximum values in weight percentages:

	C	Mn	P	S	Sol. Al
Grade	Max.	Max.	Max.	Max.	Min. - Max.
CA200	0.085	0.55	0.03	0.03	0.015 - 0.080
CA240	0.085	0.55	0.03	0.03	0.020 - 0.080

Dimensions

For continuously-annealed (CA) products.
Dimensions in mm.

Thickness	Max. width	
From - up to	**CA200**	**CA240**
0.37 - 0.38	1390	-
0.38 - 0.40	1390	1390
0.45 - 0.50	1470	1390
0.50 - 0.60	1550	1515
0.60 - 0.65	1600	1600
0.65 - 0.70	1710	1600
0.70 - 0.75	1710	1710
0.75 - 0.90	1710	1710
0.90 - 0.95	1820	1820
0.95 - 1.60	1820	1820
1.60 - 1.70	1750	1750
1.70 - 1.80	1650	1620
1.80 - 1.90	1525	1500
1.90 - 2.00	1500	1500

Minimum width is 900mm for thicknesses below 0.5mm.
Minimum width is 825mm for all other thicknesses.

Tolerances

Tolerances comply with standard EN 10131:2006 (see Appendix B).
Tighter tolerances are available, please contact us for details.

METALLIC COATED

Metallic coated

Metallic coated

Tata Steel offers a wide choice of metallic coated steel. Our product line comprises forming and structural grades and high-strength and advanced high-strength steels. Our steels deliver benefits including weight savings and improved component performance.

You can choose from a range of metallic coatings including Tata Steel's innovative MagiZinc® coating. MagiZinc delivers improved corrosion resistance with up to half the thickness of a conventional zinc coating. The thinner, lighter coating means increased yield per tonne of steel.

The main benefits of our metallic coated steel include:
- consistent and reliable end product quality
- proven corrosion resistance for extended product life
- opportunities to produce stronger, lighter products
- repeatable, trouble-free processing
- maximised yield

Applications

Agricultural machinery and components
Automotive components
Construction and building components
Domestic appliances
Drain pipes, tubes and sections
Electrical goods
Machinery

Grades

Metallic coated grades include advanced high-strength steels, high-strength steels, structural steels and grades for forming.

Coatings

Three types of metallic coating are available:

Pure zinc

Galvanised steel (+Z) is coated with an almost pure zinc coating (>99% zinc).

Zinc-iron alloy

Galvannealed steel (+ZF) is coated with a zinc coating containing approximately 8-12% iron.

MagiZinc

MagiZinc steel (+ZM) is coated with a zinc coating containing additional magnesium and aluminium.

Coating weight

Coating	Minimum	Maximum
Pure zinc (Z)	100 (7 µm/side)	600 (42 µm/side)
Zinc-iron (ZF)	100 (7 µm/side)	140 (10 µm/side)
MagiZinc (ZM)	70 (5 µm/side)	200 (14 µm/side)

Coating weight measured in g/m² double-sided (µm, per side).
Coils with coatings > 350 g/m² produced in the Netherlands will be supplied in oscillated coiled condition.
Coils coated with 600 g/m² and produced in the Netherlands are only available in width range 980 to 1300mm.

Surface quality

Surface quality complies with standard: EN 10346:2015. Galvanised steels are available in surface quality A, B or C.
For the highest surface quality requirements we also offer Serica®.

Surface quality A: as coated surface

Imperfections such as pimples, marks, scratches, pits, variations in surface appearance, dark spots, stripe marks and light passivation stains are permissible. Stretch levelling breaks or run-off marks may appear. Coil breaks and stretcher strains may also appear.

Surface quality B: improved surface

With this surface quality, small imperfections such as stretch levelling breaks, skin pass marks, slight scratches, indentations, surface structure, zinc run-off marks and light passivation stains are permissible.

Surface quality C: best quality surface

Surface quality C is obtained by skin passing.
The controlled surface shall make it possible to apply a uniform high-class paint finish. The other surface shall at least have the characteristics of surface quality B.

Surface finish

Pure zinc

MA: minimised spangle, as coated surface (Z).
MB: minimised spangle, improved surface (Z).
MC: minimised spangle, best quality surface (Z).
Serica premium surface finish

Zinc-iron alloy

A: as coated surface (ZF).
B: improved surface (ZF).
C: best quality surface (ZF).

MagiZinc

A : as coated surface (ZM).
B : improved surface (ZM).
C : best quality surface (ZM).

Surface roughness

Metallic coated steel (with the exception of galvanised steel with standard surface (MA)) can be supplied in various grades of roughness – please contact us for more details. If no roughness is specified, roughness will be as shown in the table below.

Roughness R_a (µm)

cut off 0.8mm	cut off 2.5mm
0.6 - 1.9	0.7 - 2.2

Surface treatments

The surface treatments available are O, C and CO.

Oiling (O)

The material surface can be oiled with preservative oil. Other types of oil increasing strength or reducing weight to help achieve your optimum performance parameters are available to meet your requirements – please contact us for details.

Tata Steel offers the following range of oiling levels:

	Production location	
Coating type	**UK**	**NL**
Pure zinc (Z)	0.5 - 1.7 g/m^2	0.25 - 1.0 g/m^2
Zinc-iron(ZF)	-	0.5 - 1.5 g/m^2
MagiZinc (ZM)	-	0.25 - 1.0 g/m^2

Other oiling levels are available on request.

Chromium-free passivation (C)*

This surface treatment temporarily protects the zinc-coated material against white rust during transportation and storage (not applicable to all qualities – please contact us for details).

Chromium-free passivation and oiled (CO)*

This surface treatment temporarily protects the zinc-coated material against white rust during transportation and storage (not applicable to all qualities – please contact us for details).

Untreated (U)

Please contact us regarding the availability of untreated coils.

* Passivated material can be supplied with a maximum width of 1550mm. Wider passivated material may be available - please contact us.

Shape and dimension tolerances

The tolerances comply with standard EN 10143:2006 (see Appendix C). Tighter tolerances are available on request.

Thickness tolerance availability is shown below:

Thickness tolerance	Availability
Full thickness tolerance	Available
Special thickness tolerance	Available
50% of full thickness tolerance	Refer before ordering

Tolerances on width

The tolerances on width comply with standard EN 10143:2006 (see Appendix C). MagiZinc is not included in the standard, but fulfils EN 10143:2006 requirements. Tighter tolerances are available on request.

Dimensions and coil weights

	Production location	
Description	**UK**	**NL**
Inside diameter	standard 610mm, 508mm on request	
Outside diameter	maximum 2500mm and at the most 10/7 x width	
Coil weight	Maximum 33 tonnes, but limited to 10/7 x width and limited by road or rail transport.	maximum 30 tonnes
	minimum by agreement or 50% of maximum	Tata Steel assumes a minimum and a maximum coil weight as agreed with the customer on the basis of our normal production practices and an order quantity corresponding to this coil weight. Usually a minimum coil weight up to 85% of the maximum coil weight can be requested.
KIM: width ≤ 1200mm	11.7 - 22.7 kg/mm width	15.5 - 22.0 kg/mm width
KIM: 1200 < width ≤ 1700mm	11.6 - 20.0 kg/mm width	15.5 - 21.7 kg/mm width
KIM: width > 1700mm	11.6 - 19.9 kg/mm width	11.0 kg/mm width and 15.5 - 21.7 kg/mm width

Steel for forming

Our forming steels are available in a wide range of grades and corrosion-resistant coatings. Each grade is designed for specific applications and comes with a choice of surface quality. Extensive dimensional choice provides opportunities for cutting waste and maximising yield.

Applications

Automotive components
Building components
Domestic appliances
Drain pipes
Electrical goods
Tubes and sections

Relationship with standards

European standard	National standards
EN 10346: 2015	**Germany**
	DIN 17162-1
DX51D+Z/+ZF/+ZM	St 02 Z
DX52D+Z/+ZF/+ZM	St 03 Z
DX53D+Z/+ZF/+ZM	St 05 Z
DX54D+Z/+ZF/+ZM	St 06 Z
DX56D+Z/+ZF/+ZM	St 07 Z [1]
DX57D+Z/+ZF/+ZM	-
DX57D HyperForm®+Z [1]	-

[1.] Not in standard. Tata Steel's own specification.

Mechanical properties

Metallic coated steel for forming has the following mechanical properties. These are measured transverse to the rolling direction:

EN 10346:2015	Yield strength R_e [1]	Tensile strength R_m	Min. elongation after fracture A [2]	Min. r-value r_{90}	Min. n-value n_{90}
Grade	**N/mm²**	**N/mm²**	**%**		
DX51D+Z/+ZF/+ZM	-	270 - 500	22	-	-
DX52D+Z/+ZF/+ZM	140 - 300 [3]	270 - 420	26	-	-
DX53D+Z/+ZF/+ZM	140 - 260	270 - 380	30	-	-
DX54D+Z	120 - 220	260 - 350	36	1.6 [4]	0.18
DX54D+ZF/+ZM	120 - 220	260 - 350	34	1.4 [4]	0.18
DX56D+Z	120 - 180	260 - 350	39	1.9 [4]	0.21
DX56D+ZF/+ZM	120 - 180	260 - 350	37	1.7 [4,5]	0.20 [5]
DX57D+Z	120 - 170	260 - 350	41	2.1 [4]	0.22
DX57D+ZF/+ZM	120 - 170	260 - 350	39	1.9 [4,5]	0.21 [5]
DX57D HyperForm+Z [6]	120 - 160	260 - 310	43	2.3	0.225

1. If the yield point is not pronounced, the values apply to the 0.2% – proof strength $R_{p0.2}$. If the yield strength is pronounced, the values apply to the lower yield point R_{eL}.
2. Decreased minimum elongation values apply for product thickness t ≤ 0.50mm (minus 4 units) and for 0.50mm ≤ t ≤ 0.70mm (minus 2 units).
3. This value applies to skin-passed products only (surface qualities B and C).
4. For t > 1.5mm, the minimum r_{90} - value reduced by 0.2 applies
5. For t ≤ 0.70mm, the minimum r_{90} - value reduced by 0.2 and minimum n_{90}- value reduced by 0.01 apply.
6. Not in EN 10346:2015. Tata Steel's own specification.

Chemical composition

Tata Steel complies with the following cast analysis with maximum values in weight percentages: EN 10346:2015.

Grade	C	Mn	P	S	Al	N	Ti
	Max.	Max.	Max.	Max.	Min.	Max.	Max.
DX51D+Z/+ZF/+ZM	0.18	1.20	0.12	0.045	-	-	0.30
DX52D+Z/+ZF/+ZM	0.12	0.60	0.10	0.045	-	-	0.30
DX53D+Z/+ZF/+ZM	0.12	0.60	0.10	0.045	-	-	0.30
DX54D+Z/+ZF/+ZM	0.12	0.60	0.10	0.045	-	-	0.30
DX56D+Z/+ZF/+ZM	0.12	0.60	0.10	0.045	-	-	0.30
DX57D+Z/+ZF/+ZM	0.12	0.60	0.10	0.045	-	-	0.30
DX57D HyperForm+Z [1]	0.12	0.60	0.10	0.045	-	-	0.30

All values in weight%.

[1] Not in EN 10346:2015. Tata Steel's own specification.

Dimensions

Galvanised (+Z) dimensional capability, for steel produced in the Netherlands.
Dimensions in mm.

Thickness	Max. width						
From - up to	DX51D	DX52D	DX53D	DX54D	DX56D	DX57D	DX57D HyperForm
0.35 - 0.40	1370	-	-	-	-	-	-
0.40 - 0.45	1520	1520	-	-	-	-	-
0.45 - 0.50	1520	1520	1520	1350	1350	-	-
0.50 - 0.55	1520	1520	1540	1500	1500	1470	-
0.55 - 0.60	1590	1590	1640	1620	1620	1590	-
0.60 - 0.65	1770	1770	1740	1730	1730	1710	1800
0.65 - 0.70	1870	1870	1830	1870	1870	1840	1820
0.70 - 0.75	1890	1890	1910	1970	1970	1790	1780
0.75 - 0.80	1990	1990	1950	1970	1970	1720	1710

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Thickness	Max. width						
From - up to	**DX51D**	**DX52D**	**DX53D**	**DX54D**	**DX56D**	**DX57D**	**DX57D HyperForm**
0.80 - 0.90	2020	2020	2000	1970	1970	1610	1600
0.90 - 1.00	2020	2020	2000	1970	1970	1480	1490
1.00 - 1.20	2020	2020	2000	1970	1970	-	-
1.20 - 1.30	2020	2020	1940	1940	1940	-	-
1.30 - 1.40	2020	2020	1890	1840	1840	-	-
1.40 - 1.50	2020	2020	1830	1840	1840	-	-
1.50 - 1.60	2020	2020	1740	1840	1840	-	-
1.60 - 1.70	2020	2020	1640	1800	1800	-	-
1.70 - 1.75	2000	1970	1600	1720	1720	-	-
1.75 - 1.90	2000	1970	1530	1630	1630	-	-
1.90 - 2.00	2000	1970	1450	1530	1530	-	-
2.00 - 2.50	1580	1580	-	-	-	-	-
2.50 - 3.50	1540	1540	-	-	-	-	-
3.50 - 3.60	1500	1500	-	-	-	-	-
3.60 - 3.70	1450	1450	-	-	-	-	-
3.70 - 3.85	1400	1400	-	-	-	-	-
3.85 - 4.00	1350	1350	-	-	-	-	-
3.70 - 3.85	1400	1400	-	-	-	-	-
3.85 - 4.00	1350	1350	-	-	-	-	-

The minimum width is 900mm except for thickness over 3.00mm where the minimum width is 1000mm. Other dimensions may be available - please contact us.

Surface quality MA, MB, MC available.
Please contact us about the availability of surface quality C with a thickness greater than 1.2mm or about the availability of Serica premium surface quality.

Galvanised (+Z) dimensional capability, for steel produced in the UK.

Dimensions in mm.

Thickness	Max. width						
From - up to	DX51D	DX52D	DX53D	DX54D	DX56D	DX57D	DX57D HyperForm
0.36 - 0.40	1324	-	-	-	-	-	-
0.40 - 0.50	1375	1375	-	-	-	-	-
0.50 - 0.55	1375	1375	1251	1250	-	-	-
0.55 - 0.57	1525	1525	1291	1291	1356	-	-
0.57 - 0.60	1525	1525	1525	1541	1541	1541	1541
0.60 - 0.65	1525	1570	1570	1580	1580	1656	1656
0.65 - 0.66	1525	1640	1641	1756	1756	1656	1656
0.66 - 0.70	1650	1650	1641	1756	1756	1656	1656
0.70 - 1.25	1750	1650	1700	1800	1800	1800	1800
1.25 - 1.45	1750	1640	1700	1800	1800	1791	1791
1.45 - 1.50	1750	1640	1670	1800	1800	1791	1791
1.50 - 1.60	1750	1640	1670	1800	1800	-	-
1.60 - 1.65	1650	1640	1670	1756	1756	-	-
1.65 - 1.70	1650	1380	1570	1756	1756	-	-
1.70 - 1.80	1560	1380	1570	1756	1756	-	-
1.80 - 2.00	1500	1380	1414	1525	1525	-	-

The minimum width is 900mm.
Surface quality MA, MB, MC available.
Please contact us about the availability of specific coating weights and surface finishes or about the availability of Serica® premium surface quality.

Galvannealed (+ZF) dimensional capability.

Dimensions in mm.

Thickness	Max. width				
From - up to	**DX51D**	**DX52D**	**DX53D**	**DX54D**	**DX56D**
0.45 - 0.50	1350	1350	1350	1350	1350
0.50 - 0.60	1470	1470	1470	1470	1470
0.60 - 0.65	1730	1730	1730	1730	1730
0.65 - 1.60	1850	1850	1850	1850	1850
1.60 - 1.75	1680	1680	1680	1680	1680

The minimum width is 900mm.
For DX57D – please contact us for available widths.

MagiZinc (+ZM) dimensional capability.

Dimensions in mm.

Thickness	Max. width				
From - up to	**DX51D**	**DX52D**	**DX53D**	**DX54D**	**DX56D**
0.40 - 0.45	1520	1520	-	-	-
0.45 - 0.60	1520	1520	1520	1520	1520
0.60 - 1.20	1550	1550	1550	1550	1550
1.20 - 2.00	1550	1550	1550	1550	-

The minimum width is 900mm.
For DX57D, please contact us for available widths.

Tolerances

Tolerances comply with standard EN 10143:2006 (see Appendix C).
Tighter tolerances are available on request.

High-strength steel

Our range of metallic coated high-strength steels includes micro-alloyed, phosphorus-alloyed and bake hardening grades. Available with various corrosion-resistant coatings, they are ideal for applications requiring strength without a weight penalty. MagiZinc® coatings optimise weight savings.

Applications

Automotive components
Tubes

Relationship with standards

European standard	National standards
EN 10346:2015	**Germany**
Phosphorus alloyed interstitial-free	
HX180YD+Z	
HX220YD+Z/+ZF	
HX260YD+Z/+ZF	
Bake hardening	
HX180BD+Z/+ZF	
HX220BD+Z/+ZF	
HX260BD+Z/+ZF	
HX300BD+Z/+ZF	
Phosphorus-alloyed	**SEW 094**
HX220PD+Z/+ZF [1]	ZStE220P
HX260PD+Z/+ZF [1]	ZStE260P
HX300PD+Z/+ZF [1]	ZStE300P
Micro-alloyed	**SEW 093**
HX220LAD+Z/+ZF/+ZM [1]	-
HX260LAD+Z/+ZF/+ZM	ZStE260
HX300LAD+Z/+ZF/+ZM	ZStE300
HX340LAD+Z/+ZF/+ZM	ZStE340
HX380LAD+Z/+ZF/+ZM	ZStE380
HX420LAD+Z/+ZF/+ZM	ZStE420
HX460LAD+Z	-
HX500LAD+Z	-

[1.] Not in EN 10346:2015. Tata Steel's own specification.

Mechanical properties

Metallic coated high-strength steel grades have the following mechanical properties (skin-passed) – these are measured transverse to the rolling direction:

European standard EN 10346:2015	Yield strength R_{eL} [2]	Min. BH_2	Tensile strength R_m	Min. elongation after fracture A	Min. r-value r_{90}	Min. n-value n_{90}
Grade	**N/mm²**	**N/mm²**	**N/mm²**	**%**		
HX180YD+Z/+ZF	180 - 240	-	330 - 390	34	1.7	0.18
HX220YD+Z/+ZF	220 - 280	-	340 - 420	32	1.5	0.17
HX260YD+Z/+ZF	260 - 320	-	380 - 440	30	1.4	0.16
HX180BD+Z/+ZF	180 - 240	30	290 - 360	34	1.5	0.16
HX220BD+Z/+ZF	220 - 280	30	320 - 400	32	1.2	0.15
HX260BD+Z/+ZF	260 - 320	30	360 - 440	28	-	-
HX300BD+Z/+ZF	300 - 360	30	400 - 480	26	-	-
HX220LAD +Z/+ZF/+ZM [1]	220 - 300	-	320 - 400	29	-	-
HX260LAD +Z/+ZF/+ZM	260 - 330	-	350 - 430	26	-	-
HX300LAD +Z/+ZF/+ZM	300 - 380	-	380 - 480	23	-	-
HX340LAD +Z/+ZF/+ZM	340 - 420	-	410 - 510	21	-	-
HX380LAD +Z/+ZF/+ZM	380 - 480	-	440 - 560	19	-	-
HX420LAD +Z/+ZF/+ZM	420 - 520	-	470 - 590	17	-	-
HX460LAD+Z	460 - 560	-	500 - 640	15	-	-
HX500LAD+Z	500 - 620	-	530 - 690	13	-	-

[1] Not in EN 10346:2015. Tata Steel's own specification.

[2] Lower yield strength or 0.2% proof stress applies.

For galvannealed grades (ZF) the minimum elongation before fracture is lowered by 2%.

For galvannealed grades (ZF) the minimum r_{90}-value is lowered by 0.2.

BH_2 refers to the increase of 0.2% proof stress after heating (bake hardening). Not applicable for hot rolled substrate.

The values of the yield strength are: those of the 0.2% yield strength for products with no definite yield point; the lower yield strength R_{eL} for the other products.

Phosphorus-alloyed steels

	Yield strength R_{eL} [2]	Tensile strength R_m	Min. elongation after fracture A	Min. r-value r_{90}	Min. n-value n_{90}
	N/mm²	N/mm²	%		
HX220PD+Z/+ZF [1]	220 - 280	340 - 400	32	1.3	0.150
HX260PD+Z/+ZF [1]	260 - 320	380 - 440	28	-	-
HX300PD+Z/+ZF [1]	300 - 360	400 - 480	26	-	-

[1.] Not in EN 10346:2015. Tata Steel's own specification.
[2.] Lower yield strength or 0.2% proof stress applies.

For galvannealed grades (ZF) the minimum elongation before fracture is lowered by 2%.
For galvannealed grades (ZF) the minimum r_{90}-value is lowered by 0.2.

Chemical composition

Tata Steel supplies the following cast analysis with maximum values in weight percentages:

EN 10346:2015	C	Mn	Si	P	S	Al_{tot}	Ti	Nb
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**		**Max.**	**Max.**
HX180YD+Z/+ZF	0.01	0.70	0.20	0.06	0.025	≤ 0.1	0.12	0.09
HX220YD+Z/+ZF	0.01	0.90	0.20	0.08	0.025	≤ 0.1	0.12	0.09
HX260YD+Z/+ZF	0.01	1.30	0.25	0.10	0.025	≤ 0.1	0.12	0.09
HX180BD+Z/+ZF	0.10	0.70	0.50	0.06	0.025	≤ 0.1	0.12	0.09
HX220BD+Z/+ZF	0.10	0.70	0.50	0.08	0.025	≤ 0.1	0.12	0.09
HX260BD+Z/+ZF	0.10	0.80	0.50	0.10	0.025	≤ 0.1	0.12	0.09
HX300BD+Z/+ZF	0.11	0.80	0.50	0.12	0.025	≤ 0.1	0.12	0.09
HX220LAD+Z/+ZF/+ZM [1]	0.10	0.60	0.50	0.03	0.025	≥ 0.015	-	-
HX260LAD+Z/+ZF/+ZM	0.11	0.60	0.50	0.03	0.025	≥ 0.015	0.12	0.09
HX300LAD+Z/+ZF/+ZM	0.11	1.00	0.50	0.03	0.025	≤ 0.1	0.15	0.09
HX340LAD+Z/+ZF/+ZM	0.11	1.00	0.50	0.03	0.025	≥ 0.015	0.15	0.09
HX380LAD+Z/+ZF/+ZM	0.11	1.40	0.50	0.03	0.025	≥ 0.015	0.15	0.09
HX420LAD+Z/+ZF/+ZM	0.11	1.40	0.50	0.03	0.025	≥ 0.015	0.15	0.09
HX460LAD+Z	0.15	1.70	0.50	0.03	0.025	≥ 0.015	0.15	0.09
HX500LAD+Z	0.15	1.70	0.50	0.03	0.025	≥ 0.015	0.15	0.09

[1.] Not in EN 10346:2015. Tata Steel's own specification.

Phosphorus-alloyed steels

	C	Mn	Si	Al	P	S	Ti	Nb
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**
HX220PD+Z/+ZF	0.08	0.7	0.5	0.02	0.1	0.025	-	-
HX260PD+Z/+ZF	0.08	0.8	0.5	0.02	0.1	0.025	-	-
HX300PD+Z/+ZF	0.1	0.7	0.5	0.02	0.12	0.025	-	-

Not in EN 10346:2015. Tata Steel's own specification.

Dimensions

Galvanised (+Z) products, for steel produced in the Netherlands.
Dimensions in mm.

Thickness

From - up to	HX220 YD	HX260 YD	HX180 BD	HX220 BD	HX220 PD	HX260 BD	HX260 PD	HX300 BD	HX300 PD
0.45 - 0.50	1350	-	1320	1320	1320	-	-	1340	1340
0.50 - 0.55	1500	1500	1470	1470	1470	1480	1480	1550	1550
0.55 - 0.60	1640	1590	1600	1610	1610	1610	1610	1620	1620
0.60 - 0.65	1760	1680	1700	1720	1720	1750	1750	1620	1620
0.65 - 0.70	1830	1710	1850	1880	1880	1770	1770	1660	1660
0.70 - 0.75	1850	1740	1930	1920	1920	1810	1810	1680	1680
0.75 - 0.80	1880	1760	1940	1960	1960	1860	1860	1710	1710
0.80 - 0.90	1910	1780	1950	2000	2000	1890	1890	1740	1740
0.90 - 1.00	1970	1800	1960	2030	2030	1970	1970	1780	1780
1.00 - 1.10	1970	1840	1930	2030	2030	1970	1970	1750	1750
1.10 - 1.20	1920	1850	1870	2030	2030	1920	1920	1720	1720
1.20 - 1.30	1870	1810	1840	1980	1980	1880	1880	1690	1690
1.30 - 1.40	1820	1770	1800	1900	1900	1800	1800	1660	1660
1.40 - 1.50	1720	1680	1770	1840	1840	1730	1730	1610	1610
1.50 - 1.60	1640	1600	1730	1760	1760	1650	1650	1570	1570
1.60 - 1.70	1570	1510	1680	1670	1670	1570	1570	1510	1510
1.70 - 1.75	1500	1470	1630	1610	1610	1520	1520	1480	1480
1.75 - 1.80	1460	1430	1580	1560	1560	1480	1480	1460	1460
1.80 - 1.90	1390	1370	1500	1480	1480	1410	1410	1390	1390
1.90 - 2.00	1330	1300	1430	1410	1410	1340	1340	1320	1320
2.00 - 2.10	-	-	-	-	-	-	-	1260	1260

The minimum width is 900mm.
Widths under 900mm are available on request. Please contact us.

Please contact us also on the availability of:
- widths exceeding 1850mm;
- surface quality C with a thickness greater than 1.2mm;
- galvannealed (+ZF) high-strength grades.

Please contact us about the availability of Serica® premium surface quality.

Galvanised (+Z) products, for steel produced in the Netherlands.
Dimensions in mm.

Thickness	Max. width							
From - up to	HX220 LAD	HX260 LAD	HX300 LAD	HX340 LAD	HX380 LAD	HX420 LAD	HX460 LAD	HX500 LAD
0.35 - 0.40	1370	-	-	-	-	-	-	-
0.40 - 0.45	1520	-	-	-	-	-	-	-
0.45 - 0.50	1520	1520	1460	1280	1390	1240	-	-
0.50 - 0.55	1520	1520	1530	1350	1450	1300	-	-
0.55 - 0.60	1580	1580	1640	1430	1480	1360	-	-
0.60 - 0.65	1720	1720	1740	1510	1510	1420	-	-
0.65 - 0.70	1780	1780	1760	1600	1550	1470	-	-
0.70 - 0.75	1800	1800	1780	1700	1580	1520	-	-
0.75 - 0.80	1830	1850	1800	1710	1600	1570	-	-
0.90 - 1.00	1870	1900	1860	1740	1620	1620	-	-
1.00 - 1.10	1930	1940	1890	1760	1620	1600	-	-
1.10 - 1.20	1970	1980	1930	1780	1630	1580	-	-
1.20 - 1.25	2010	2010	1970	1810	1630	1570	-	-
1.25 - 1.30	2010	2010	1980	1810	1640	1570	-	-
1.30 - 1.40	2010	2000	1980	1800	1640	1570	-	-
1.40 - 1.50	2010	1960	1930	1770	1590	1570	-	-
1.50 - 1.60	2010	1930	1900	1740	1550	1570	-	-
1.60 - 1.80	2010	1550	1550	1550	1530	1280	1520	-
1.80 - 1.90	1920	1550	1550	1550	1530	1350	1520	1130
1.90 - 2.00	1920	1550	1550	1550	1530	1430	1520	1200
2.00 - 2.10	1550	1550	1550	1550	1530	1560	1520	1200
2.10 - 2.20	1550	1550	1550	1550	1530	1560	1520	1330
2.20 - 2.30	1540	1540	1550	1550	1530	1550	1520	1330
2.30 - 2.50	1540	1540	1550	1550	1530	1550	1540	1450
2.50 - 3.00	1540	1540	1550	1550	1530	1550	1540	1540

(table continued on next page)

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Thickness	Max. width							
From - up to	**HX220 LAD**	**HX260 LAD**	**HX300 LAD**	**HX340 LAD**	**HX380 LAD**	**HX420 LAD**	**HX460 LAD**	**HX500 LAD**
3.00 - 3.30	1540	1540	1540	1540	1530	1550	*	-
3.30 - 3.50	1540	1540	1540	1540	1500	1530	-	-
3.50 - 3.60	1450	1450	1450	1450	1470	1490	-	-
3.60 - 3.70	1430	1430	1430	1430	1450	1440	-	-
3.70 - 3.85	1400	1400	1400	1400	1400	1390	-	-
3.85 - 4.00	1350	1350	1350	1350	1350	1350	-	-

The minimum width is 1000mm for HX460LAD and HX500LAD.
The minimum width is 900mm for all other grades.
Widths under 900mm are available on request. Please contact us.

Please contact us also on the availability of:
- widths exceeding 1850mm
- dimensions marked '*'
- surface quality C with a thickness greater than 1.2mm
- For the dimensions of galvannealed (+ZF) high-strength grades.
- Serica® premium surface quality.

Galvanised (+Z) products, for steel produced in the UK.

Dimensions in mm.

Thickness	Max. width									
From - up to	HX180 YD	HX220 YD	HX260 YD	HX180 BD	HX220 BD	HX220 PD	HX260 BD	HX260 PD	HX300 BD	HX300 PD
0.58 - 0.60	-	-	-	1461	1464	-	-	-	-	-
0.60 - 0.65	-	-	-	1580	1589	-	1539	-	1594	-
0.65 - 0.66	1267	-	-	1661	1664	-	1564	-	1644	-
0.66 - 0.70	1267	-	-	1686	1664	-	1564	-	1694	-
0.70 - 0.75	1442	-	-	1711	1714	-	1650	-	1694	-
0.75 - 0.80	1464	-	-	1711	1714	-	1800	-	1694	-
0.80 - 0.95	1536	-	-	1711	1714	-	1800	-	1707	-
0.95 - 1.15	1536	-	-	1611	1714	-	1800	-	1707	-
1.15 - 1.20	1536	-	-	1611	1714	-	1800	-	1744	-
1.20 - 1.35	1627	-	-	1611	1714	-	1800	-	1744	-
1.35 - 1.50	1627	-	-	1611	1714	-	1764	-	1744	-
1.50 - 1.60	1617	-	-	1636	1714	-	1650	-	1744	-
1.60 - 1.65	1617	-	-	1636	1714	-	1564	-	1744	-
1.65 - 1.80	1617	-	-	1386	1664	-	1564	-	1744	-
1.80 - 1.90	1617	-	-	1386	1589	-	1539	-	1694	-
1.90 - 1.95	1586	-	-	1386	1580	-	1539	-	1594	-
1.95 - 2.00	1586	-	-	1386	1539	-	1539	-	1594	-

The minimum width is 900mm.

For the dimensions of galvannealed (+ZF) high-strength grades, please contact us for details or about the availability of Serica® premium surface quality.

Galvanised (+Z) products, for steel produced in the UK.
Dimensions in mm.

Thickness	Max. width							
From - up to	HX220 LAD	HX260 LAD	HX300 LAD	HX340 LAD	HX380 LAD	HX420 LAD	HX460 LAD	HX500 LAD
0.58 - 0.60	-	-	-	1444	-	-	-	-
0.60 - 0.65	1525	1539	1594	1594	-	-	-	-
0.65 - 0.70	1589	1564	1644	1594	1544	1544	-	-
0.70 - 0.75	1750	1650	1694	1594	1544	1544	-	-
0.75 - 0.90	1750	1739	1694	1594	1544	1544	-	-
0.90 - 1.15	1750	1800	1707	1594	1544	1544	-	-
1.15 - 1.35	1750	1800	1744	1594	1544	1544	-	-
1.35 - 1.50	1750	1764	1744	1594	1544	1544	-	-
1.50 - 1.60	1750	1650	1744	1594	1544	1544	-	-
1.60 - 1.70	1664	1564	1744	1594	1544	1544	-	-
1.70 - 1.80	1589	1564	1744	1594	1544	1544	-	-
1.80 - 1.90	1525	1539	1694	1594	1544	1544	-	-
1.90 - 2.00	1525	1539	1594	1594	1544	1544	-	-
2.00 - 2.10	-	1414	-	-	-		-	-

The minimum width is 900mm.
For the dimensions of galvannealed (+ZF) high-strength grades – please contact us for details.

MagiZinc (+ZM) products.

Dimensions in mm.

Thickness	Max. width					
From - up to	HX220LAD	HX260LAD	HX300LAD	HX340LAD	HX380LAD	HX420LAD
0.40 - 0.45	1520	1520	1270	-	-	-
0.45 - 0.50	1520	1520	1370	-	-	-
0.50 - 0.55	1520	1520	1520	-	-	-
0.55 - 0.60	1550	1550	1520	-	-	-
0.60 - 0.65	1550	1550	1520	1520	1420	-
0.65 - 0.70	1550	1550	1550	1520	1420	-
0.70 - 0.75	1550	1550	1550	1520	1520	1420
0.75 - 1.60	1550	1550	1550	1520	1520	1520
1.60 - 1.70	1550	1550	1400	1520	1150	1040
1.70 - 1.80	1550	1550	1400	1460	1250	1140
1.80 - 1.90	1550	1550	1550	1430	1320	1220
1.90 - 2.00	1550	1550	1550	1430	1320	1220

The minimum width is 900mm.
For the dimensions of galvannealed (+ZF) high-strength grades, please contact us.

Tolerances

Tolerances comply with standard EN 10143:2006 (see Appendix C).
Tighter tolerances are available on request.

Advanced high-strength steel

We offer dual-phase and complex-phase steels. Dual-phase steels combine high yield strength with good ductility – ensuring excellent fatigue properties and energy absorption. Complex-phase steels provide good bendability and edge ductility, enabling the cold forming of simple-shaped components.

Applications

Automotive A-, B- and C-pillars;
Box girders for chassis
Crash boxes
Support components

Relationship with standards

Tata Steel offers the following grades:

Grade	EN 10346:2015
Dual-phase	
DP600+Z/+ZF	HCT590X+Z/+ZF
DP800+Z	HCT780X+Z
DP800 HyperForm®+Z	-
DP1000LY+Z	HCT980X+Z
DP1000HY+Z	-
Complex-phase	
CP800+Z	HCT780C+Z

Mechanical properties

The available grades have the following mechanical properties. These are measured longitudinal to the rolling direction. DP800 HyperForm values are measured transverse to the rolling direction.

Grade	Yield strength R_{eL}	Min. tensile strength R_m	Min. elongation after fracture A	Min. r-value r_{90}	Min. n-value n_{90}	Min. BH2
	N/mm²	N/mm²	%			N/mm²
DP600+Z/+ZF [1]	330 - 430	590	20	-	0.14	30
DP800+Z	440 - 550	780	14	-	-	30
DP800 HyperForm+Z	450 - 550	780	17	0.6	0.14	35
DP1000LY+Z	590 - 740	980	10	-	-	30
DP1000HY+Z	700 - 850	980 - 1130	8	-	-	30
CP800+Z	570 - 720	780	10	-	-	30

[1.] For galvannealed grades (ZF) the minimum elongation before fracture is lowered by 2%.

Chemical composition

Tata Steel supplies the following cast analysis with maximum values in weight%:

	C	Mn	Si	P	S	Al	Cr+Mo
Grade	Max.	Max.	Max.	Max.	Max.	Max.	Max.
DP600+Z/+ZF	0.15	2.50	0.75	0.040	0.015	1.50	1.00
DP800+Z	0.18	2.50	0.80	0.080	0.015	2.00	1.00
DP800 HyperForm+Z	0.18	2.50	0.80	0.080	0.015	2.00	1.00
DP1000LY+Z	0.20	2.90	1.00	0.080	0.015	2.00	1.40
DP1000HY+Z	0.23	2.90	1.00	0.080	0.015	2.00	1.40
CP800+Z	0.18	2.50	1.00	0.080	0.015	2.00	1.00

Dimensions

Galvanised (+Z) products, for steel produced in the Netherlands.

Dimensions in mm.

Thickness	Max. width					
From - up to	DP600	DP800	DP800 HyperForm	DP1000LY	DP1000HY	CP800
0.70 - 0.80	1600	-	-	-	-	-
0.80 - 0.90	1625	1205	-	-	-	-
0.90 - 1.00	1650	1335	-	1260	1260	-
1.00 - 1.10	1700	1400	1170	1300	1300	1320
1.10 - 1.20	1710	1410	1200	1320	1320	1340
1.20 - 1.30	1715	1420	1240	1340	1340	1350
1.30 - 1.40	1720	1470	1280	-	1360	1360
1.40 - 1.50	1730	1490	1315	-	1380	1370
1.50 - 1.55	1735	1505	1315	-	1380	1370
1.55 - 1.60	1740	1520	-	-	1380	1375
1.60 - 1.70	1700	1515	-	-	1380	-
1.70 - 1.80	1650	1480	-	-	1380	-
1.80 - 1.90	1560	1480	-	-	1380	-
1.90 - 2.00	1475	-	-	-	1380	-

The minimum width is 1000mm for all grades except DP800 HyperForm where the minimum width is 1050mm.
Width refers to mill edge. Side-trimmed product is available on request.
For the dimensions of DP600+ZF, please contact us for details.
The maximum dimensions in the upper left corner of the 1.00 - 2.00 matrix are defined by the line from 1.00 x 1400mm to 1.20 x 1550mm.
The tightest available thickness tolerances are according to the 'Special' tolerances of EN 10143:2006.
DP800 HyperForm and CP800 thicknesses from 0.8mm up to 1.0mm are under development. Please contact us for the latest availability.

Galvanised (+Z) products, for steel produced in the UK.
Dimensions in mm.

Thickness	Max. width					
From - up to	DP600	DP800	DP800 HyperForm	DP1000LY	DP1000HY	CP800
0.70 - 0.80	-	1239	-	-	-	-
0.80 - 1.00	1437	1339	-	-	-	-
1.00 - 1.40	1437	1389	-	-	-	-
1.40 - 2.00	1500	1400	-	-	-	-

The minimum width for DP600+Z and DP800+Z is 900mm.

Tolerances

Tolerances comply with standard EN 10143:2006 (see Appendix C).
Tighter tolerances are available on request.

Structural steel

Tata Steel's metallic coated structural steel behaves reliably in roll-forming and bending processes and is suitable for welding.
For exceptionally demanding applications, we have grades that exceed the minimum strength levels specified in EN 10346:2015.

Applications

Agricultural components
Building components
Domestic appliances
Furniture

Relationship with standards

Galvanised structural steel complies with the following European standards:

European standard	National standards
EN 10346:2015	**Germany**
Grade	**DIN 17162-1**
S220GD+Z/+ZM	-
S250GD+Z/+ZM	St E 250-2Z
S280GD+Z/+ZM	St E 280-2Z
S320GD+Z/+ZM	St E 320-3Z
S350GD+Z/+ZM	St E 350-3Z
S390GD+Z	-
S420GD+Z	-
S450GD+Z	-
S550GD+Z	-

Mechanical properties

The values shown for the mechanical properties are for test pieces taken in the rolling direction.

EN 10346:2015	Min. yield strength $R_{p0.2}$ [1]	Min. tensile strength [2] R_m	Min. elogation after fracture A [3]
Grade	**N/mm²**	**N/mm²**	**%**
S220GD+Z/+ZM	220	300	20
S250GD+Z/+ZM	250	330	19
S280GD+Z/+ZM	280	360	18
S320GD+Z/+ZM	320	390	17
S350GD+Z/+ZM	350	420	16
S390GD+Z	390	460	16
S420GD+Z	420	480	15
S450GD+Z	450	510	14
S550GD+Z	550	560	-

[1.] If the yield point is pronounced, the values apply to the upper yield point (ReH).

[2.] For all grades except S550GD+Z a range of 140 N/mm² can be expected for tensile strength.

[3.] For a thickness t ≤ 0.7mm the minimum elongation after fracture is decreased by 2% and for a thickness t ≤ 0.5mm the minimum elongation after fracture is decreased by 4%.

Chemical composition

Tata Steel's metallic coated steel complies with the following cast analysis with maximum values in weight percentages:

EN 10346:2015	C	Si	Mn	P	S
Grade	**Max.**	**Max.**	**Max.**	**Max.**	**Max.**
S220GD+Z/+ZM	0.20	0.60	1.70	0.10	0.045
S250GD+Z/+ZM	0.20	0.60	1.70	0.10	0.045
S280GD+Z/+ZM	0.20	0.60	1.70	0.10	0.045
S320GD+Z/+ZM	0.20	0.60	1.70	0.10	0.045
S350GD+Z/+ZM	0.20	0.60	1.70	0.10	0.045
S390GD+Z	0.20	0.60	1.70	0.10	0.045
S420GD+Z	0.20	0.60	1.70	0.10	0.045
S450GD+Z	0.20	0.60	1.70	0.10	0.045
S550GD+Z	0.20	0.60	1.70	0.10	0.045

Dimensions

Galvanised (+Z) products, for steel produced in the Netherlands.
Dimensions in mm.

Thickness	Max. width							
From - up to	**S220GD**	**S250GD**	**S280GD**	**S320GD**	**S350GD**	**S390GD**	**S420GD**	**S450GD**
0.35 - 0.40	1370	1370	1370	-	-	-	-	-
0.40 - 0.45	1520	1520	1520	1350	-	-	-	-
0.45 - 0.50	1520	1520	1520	1370	-	-	-	-
0.50 - 0.60	1580	1580	1580	1420	1420	-	-	-
0.60 - 0.70	1720	1720	1720	1520	1420	1360	-	-
0.70 - 0.75	1800	1800	1800	1520	1420	1420	1420	-
0.75 - 0.80	1830	1830	1830	1620	1520	1420	1420	-
0.80 - 0.90	2020	1830	1830	1620	1520	1420	1420	-
0.90 - 1.10	2020	1850	1850	1620	1570	1420	1420	-
1.10 - 1.30	2020	1850	1850	1620	1620	1520	1420	-
1.30 - 1.40	2020	1850	1850	1620	1620	1520	1420	1350
1.40 - 1.50	2020	1830	1830	1620	1570	1520	1420	1350
1.50 - 1.60	2020	1830	1830	1620	1570	1520	1420	1520
1.60 - 2.20	1550	1550	1550	1520	1520	1520	1520	1520
2.20 - 2.50	1540	1540	1540	1540	1540	1540	1520	1520
2.50 - 3.00	1540	1540	1540	1540	1540	1540	1520	1540
3.00 - 3.30	1540	1540	1540	1540	1540	1540	1540	1540
3.30 - 3.50	1540	1540	1540	1540	1540	-	-	-
3.50 - 3.60	1500	1500	1500	1500	1500	-	-	-
3.60 - 3.70	1450	1450	1450	1450	1450	-	-	-
3.70 - 3.85	1400	1400	1400	1400	1400	-	-	-
3.85 - 4.00	1350	1350	1350	1350	1350	-	-	-

The minimum width is 1000mm for thicknesses above 3mm and 900mm for all other thicknesses. Widths under 900mm are available on request. Please contact us.
S550GD+Z dimensions available upon request.

Galvanised (+Z) products, for steel produced in the UK.

Dimensions in mm.

Thickness	Max. width							
From - up to	S220GD	S250GD	S280GD	S320GD	S350GD	S390GD	S420GD	S450GD
0.36 - 0.40	1324	1324	1275	-	-	-	-	-
0.40 - 0.45	1375	1375	1275	-	-	-	-	-
0.45 - 0.50	1375	1375	1275	1360	1360	-	-	-
0.50 - 0.55	1375	1375	1520	1360	1360	-	-	-
0.55 - 0.60	1525	1520	1520	1360	1360	-	-	-
0.60 - 0.65	1525	1525	1525	1360	1360	-	-	-
0.65 - 0.66	1525	1525	1525	1525	1525	-	-	-
0.66 - 0.70	1650	1650	1650	1525	1525	-	-	-
0.70 - 0.80	1750	1750	1650	1525	1525	1331	-	1228
0.80 - 1.20	1750	1750	1650	1525	1525	1331	-	1324
1.20 - 1.25	1750	1750	1650	1520	1520	1331	-	1324
1.25 - 1.60	1750	1750	1520	1520	1520	1331	-	-
1.60 - 1.70	1650	1650	1520	1520	1520	1331	-	-
1.70 - 1.80	1560	1560	1520	1520	1520	1331	-	-
1.80 - 1.83	1500	1500	1520	1520	1520	1331	-	-
1.83 - 1.91	1500	1500	1465	1465	1465	1331	-	-
1.91 - 2.00	1500	1500	1395	1395	1395	1331	-	-
2.00 - 2.50	-	-	-	-	-	1300	-	-

The minimum width is 900mm.

MagiZinc (+ZM) products.
Dimensions in mm.

Thickness	Max. width				
From - up to	**S220GD**	**S250GD**	**S280GD**	**S320GD**	**S350GD**
0.40 - 0.45	1520	1520	1520	1350	-
0.45 - 0.50	1520	1520	1520	1370	-
0.50 - 0.60	1520	1520	1520	1420	-
0.60 - 0.75	1520	1520	1520	1520	1420
0.75 - 0.90	1550	1550	1550	1550	1520
0.90 - 1.60	1550	1550	1550	1550	1550
1.60 - 2.00	1550	1550	1550	1520	1520

The minimum width is 900mm.

Tolerances

Tolerances comply with standard EN 10143:2006 (see Appendix C).
Tighter tolerances are available on request.

ESUCHER

Service centres

Our service centre network

Tata Steel's extensive distribution network is one of the largest in Europe. These downstream facilities provide processing, service, distribution and sales support for customers across Finland/Baltics, France, Germany/Benelux, Ireland, Spain, Sweden/Norway and the United Kingdom.

As well as a large product offering, we provide customer value through:

• **Customer technical service engineers.** Our engineers have detailed knowledge of our products and processes and how they interact with yours. It means we can provide responsive support, helping to resolve material and processing issues quickly. Our engineers also provide guidance on product specifications and the introduction of new products.

• **Supply chain.** We are experienced in the management of Kanban/JIT and other supply arrangements. We utilise complete IT systems that allow you to focus on your own processing activities with peace of mind regarding security of supply. Our operations support flexible and regular delivery schedules on a pan-European basis.

• **Integration and traceability.** We are part of an integrated supply chain, from initial steelmaking through to final processing. Visibility of customer requirements and demand through the supply chain allows stock levels to be managed to meet demand effectively. Our supply chain also ensures we can manage product traceability effectively from primary production through to dispatch.

• **More choice.** As part of Tata Steel, direct access to our own manufacturing facilities allows greater choice of product specifications – meaning you don't need to compromise on the mechanical properties or dimensions required for your specific applications.

• **Product development.** As one of the world's largest steel producers, Tata Steel is able to offer an increasing range of innovative products. We launch a wide variety of new products each year in support of our aim to supply differentiated products. Examples include highly formable and high-strength steels and novel coatings. We have also developed additional processing services.

• **In-depth industry knowledge.** Tata Steel service centres serve more than 4,000 individual customers each year. Our extensive experience of steel products, processing and applications can be utilised to support the development of your business.

• **Global support.** Our European steel service centres offer access to Tata Steel's global network of sales offices. This means we can support customer operations throughout Europe and beyond.

Finland / Baltics Service Centre

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Naantali Steel Service Centre Oy is Finland's leading steel service centre. Large production capacity and storage facilities, coupled with strong logistics connections, enable us to offer an efficient and fast service in Finland and the Baltics.

The service centre uses eight processing lines to produce steel blanks and narrow coils in precise dimensions to customer requirements. Our product range includes hot-dip galvanised, electro-galvanised, cold-rolled, hot-rolled and pre-finished steels. We serve customers in sectors including:

- HVAC industry
- electrical equipment manufacturing
- IT and electronics manufacturing, construction
- shipbuilding
- lighting
- agricultural equipment
- domestic appliances

Product quality

Steel, supplied from Tata Steel's manufacturing facilities in Europe and from quality third party producers, is delivered to the service centre mostly in coil form. Our experienced and capable team processes steel products to tight dimensional tolerances using four cut-to-length lines, three slitting lines and one recoiling line.

Sheets are suitable for automated storage and machine tools equipped with sheet processing equipment. Material dimensions processed at Naantali can range from 0.4mm to 6mm in thickness – in sheet lengths up to 12 metres. Thicker hot-rolled and pickled cut-to-length sheets are also a key part of our local inventory.

Our products are used for a variety of applications including ventilation ducts, cable racks, light fittings, silos, conveyors, cabin modules, refrigeration equipment and roofing products.

Fast and reliable

Naantali has more than 22,000m^2 of processing and storage space. Extensive storage capacity plays a key role in fast and reliable delivery of customer orders. We can store steel in our warehouse to meet your requirement – processing it quickly as soon as the products are needed. Our standard sizes service offers delivery of sheet steel and hot-rolled products in set dimensions in one to two working days.

Our well-designed, clean and tidy storage facilities also ensure that steel quality is not compromised at any point during storage and production.

Our products

Our products include:

- hot-dip galvanised steels
- electro-galvanised steels
- aluminium zinc galvanised steels
- pre-finished or colour-coated steels
- cold-rolled steels
- hot-rolled steels

Certifications

Naantali Steel Service Centre Oy is certified to the following standards:

- ISO 9001 and ISO 14001
- EN 1090 - allowing labelling of processed materials with the CE-mark as proof of compliance with the EU Construction Products Regulation

Processing capability

	Slitting	Decoiling	Recoiling
Thickness	0.4 – 4.0mm	0.4 – 6.0mm	0.4-1.5mm
Width	10 –1500mm	< 2050mm	400-1250mm
Length	-	400 –12000mm	-

France Service Centre

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Part of Tata Steel, Unitol has been recognised as one of France's leading steel processors for more than 40 years. Our plant in Corbeil Essonnes serves a wide range of market sectors including:
• automotive
• domestic appliances
• mechanical engineering
• construction

We have a strong presence in the automotive market – supplying OEMs and tiers. Our facilities are specially geared towards processing advanced and ultra-high strength steel (AHSS/UHSS). This enables us to meet customer demand for differentiated products that assist in:
• lightweighting to support reduction of CO_2 emissions
• improvement of passenger safety

Automotive applications

We convert wide strip coil into precision slit coil, de-coiled sheets and multi-strand blanks. Our steels are used for a variety of modern automotive components used in: chassis, suspension, wheels, seats, interior and body in white. We also process strip for outer panels (full finish).

All of our products are produced to the highest automotive standards with a clear focus on continuous improvement (IATF16949).

Multimodal reception centre

We operate a multimodal reception centre at Corbeil Essonnes for road, rail and ship freight. We have ultra-modern storage facilities at nearby Evry. These facilities extend to 30,000m^2 and are equipped to receive a variety of steel by barge, train and truck.

Assured quality

We operate accredited management systems that guarantee the best quality products. We are certified to the following standards:

- ISO/TS 16949 – dedicated to automotive products, we have achieved this standard for our production and quality management systems.
- ISO 9001 – working to this standard ensures ongoing compliance with your specifications and requirements through our commitment to continuous improvement.
- ISO 14001 – this standard recognises our management system geared to limiting the environmental impact of our operations. In line with this standard, we have installed anti-pollution systems and operate waste reduction measures.

Innovative products

We process a range of hot-rolled, cold-rolled, metallic coated or hot dip galvanised steel and electrozinc-plated steel. We also process the following innovative products:

MagiZinc® Auto – Tata Steel's MagiZinc is a corrosion-resistant coating that is at least four times more efficient than the coating on standard galvanised products.

Ymvit® – steel for enamelling.

Ymagine® – this high quality steel is produced by continuous casting of thin slab and is thinner than hot-rolled steel. The Ymagine family includes products ideal for stamping, construction and HLE.

Ympress® – Ympress is Tata Steel's family of hot-rolled, high-strength steels. It offers consistent product characteristics and reliable flatness. It combines high strength with formability and has a high-quality surface. Available in a wide range of tensile strength and dimensions, Ympress is suitable for stamping applications.

Processing capability

	Slitting	Blanking	Decoiling
Thickness	0.50 – 4mm	0.50 – 3.0mm	0.50 – 3.0mm
Width	From 30mm up to 1800mm	Up to 1600mm	From 600mm up to 1600mm
Length	-	Up to 2300mm (w < 600mm) Up to 6000mm (w > 600mm)	Up to 6000mm

Germany / Benelux Service Centres

Germany

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Benelux

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Tata Steel's light gauge steel service centres in Germany and the Netherland offer one of the broadest ranges of strip products in Europe. Using state-of-the-art machinery, we convert wide strip coils into precision slit coil, cut-to-size sheets and multi-strand blanks. All products are produced to the highest standards and tailored to meet customer needs.

The Gelsenkirchen service centre, in the Ruhr region of Germany, is dedicated to serving the automotive market sector. The Degels service centre at Neuss, Germany, and the Multisteel service centre at Maastricht in the Netherlands, serve the automotive sector and a range of general industry sectors. All of our sites are located at or close to harbours – ensuring efficient and seamless inbound and outbound logistics from our steel mill all the way through to customers.

Product choice

As part of Tata Steel, we can provide you with local access to a comprehensive range of standard and advanced steel products and, customer-specific processing services.

We process the following products:

- hot-rolled
  - Ympress®
- cold-rolled
  - Ymvit®
- direct-rolled
  - Ymagine®
- metallic coated
  - hot-dip galvanised, MagiZinc®, electrozinc-plated,Galfan®, galvannealed
  - hot-dip aluminised
  - Galvalume
  - Aluzinc
- pre-finished or organic coated
  - Colorcoat HPS200 ULTRA®, Colorcoat Prisma®, laminated

Automotive applications

Service for the automotive sector is geared towards processing advanced and ultra-high strength steel (AHSS/UHSS). Our processing capability ensures we can meet customer demand for differentiated products that aid:

- CO_2 emission reduction
- weight reduction
- improvements in passenger safety

Steel processed at our service centres is used for a variety of modern automotive components used in: chassis, suspension, wheels, seats, interior and body in white. We also process strip for outer panels (full finish). All of our products are manufactured to the highest automotive standards with a clear focus on continuous improvement (IATF16949).

Other markets

In addition to processing products for the automotive sector, our service centres at Neuss and Maastricht also serve market sectors including:

- domestic appliances
- mechanical engineering
- construction
- heating, ventilation and air conditioning (HVAC)
- storage
- furniture

Capacity and capability

Our service centres offer a total annual processing capacity of more than 700kt. Our capability comprises:

- at Maastricht – two slitters, a multi-blanker and mini-blanker which can process steel coils with a maximum strength of 800 N/mm^2.
- at Gelsenkirchen – two slitters and a blanking line which can process steel coils with a maximum yield strength of 1400 N/mm^2.
- at Neuss – three slitters and a blanking line which can process steel coils with a maximum yield strength of 700 N/mm^2 at maximum 3mm thickness.

Services

- Just-in-time delivery. We offer significant experience in meeting the automotive market's demand for just-in-time deliveries. Our flexibility is combined with excellent geographical reach and technical expertise. This has enabled us to become the preferred route-to-market for both direct and indirect deliveries to original equipment manufacturers and their subcontractors.
- Customer support. Our multilingual teams are here to support you and answer all your queries about:
  - product packing
  - supply chain
  - self-billing
  - stockholding possibilities

Global support

Our European steel service centres offer access to Tata Steel's global network of sales offices. This means we can support customer operations throughout Europe and beyond.

Processing capability

Gelsenkirchen

	Slitting	Cut-to-length
Thickness	0.4 - 6.0mm	1.0 - 6.0mm
Width	30 - 2000mm	< 2100mm
Length	-	405 - 6495mm

Slitting up to 1400 MPa strength level (max. 2mm thickness)
Maximum 30t coil weight.

Degels

	Slitting	Decoiling
Thickness	0.4 – 3.0mm	0.4 – 3.0mm
Width	10 – 2050mm	300 – 2000mm
Length	-	400 - 6100mm

Slitting up to 700 MPa strength level (max. 3mm thickness).
Maximum 29t coil weight.

MultiSteel

	Slitting	Multiblanking
Thickness	0.2 - 3.0mm	0.3 - 3.0mm
Width	25 - 1850mm	300 - 1850mm
Length	-	300 - 6000mm

Maximum strength level is 800 MPa.
Maximum 20t coil weight.

Please consult our sales department regarding specific technical feasibility of dimensional combinations, tolerances and grades.

Heavy Gauge Europe

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Our heavy gauge steel service centre at Maastricht, the Netherlands, is dedicated to the supply of cut-to-length, hot-rolled sheets to several market sectors. These sectors include shipbuilding, machinery, yellow goods, trailers and automotive. Geared towards processing high-strength steels (HSS), our centre meets customer demands for differentiated products that enable:
• weight reduction
• improved processing operations including laser cutting, welding and bending

To meet your needs, we hold a large variety of steel grades in stock. Our harbour location, coupled with a closely-linked network of warehouses and sales offices, means we are well-placed to supply customers all over the world.

Broad product range

We manufacture all products to the highest standards and offer a broad range of heavy plate and hot-rolled strip products for a variety of end user applications. Our products include:
• standard structural steel
• high-tensile, fine-grained structural steel
• shipbuilding plate
• boiler plate
• abrasion-resistant plate

Products for the heavy vehicles segment include abrasion-resistant plate and high-strength steel (HSS) grades in addition to standard structural steel. Our products are used in a variety of applications including:
• construction equipment
• cranes
• agricultural machinery

- material handling equipment
- trailers
- shipbuilding
- machine manufacturing
- automotive solutions

Capacity and capability

The Maastricht service centre is equipped with state-of-the-art machinery. This enables us to process more than 450,000 tonnes of steel per year from a range of steel coil comprising:

- hot-rolled dry
- hot-rolled pickled and oiled
- Ympress® and Ympress® Laser

Flexible and responsive service

We offer significant experience in meeting market demand for just-in-time deliveries. Our flexibility, combined with excellent geographical reach and technical expertise, has led us to become the preferred route-to-market for both direct and indirect deliveries to original equipment manufacturers and their subcontractors.

Our multilingual teams are here to support you and answer your queries about:

- product packing
- supply chain solutions
- stockholding possibilities
- technical solutions

Processing capability

The Maastricht service centre has four cut-to-lengths lines which can process steel coils with a maximum yield strength of 700 N/mm^2 at a maximum weight of 35 tonnes.

	Decoiling
Thickness	1.0 -25.0mm
Width	< 2.600mm
Length	1000 -18.400mm

Please consult our sales department regarding specific technical feasibility of dimensional combinations, tolerances and grades.

Ireland Service Centre

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The Ireland Service Centre provides a wide product and service offering, covering the full range of Tata Steel flat products. In-house processing capability comprises coil slitting, decoiling and shearing. Local processing, combined with an extensive stock range, provides a flexible and responsive service including multi-product supply.

Our centre benefits from several supporting activities to provide you with the optimum solution to your requirements.

Customer benefits

The Ireland Service Centre offers multiple benefits to customers resulting from:

• **Consistency.** As part of the Tata Steel supply chain, our steel is supplied to consistent quality standards from Tata Steel's modern manufacturing sites at Port Talbot, Llanwern, Shotton and IJmuiden. This means you can rely on our products for repeatable processing.

• **Capacity.** Our in-house processing capability provides a secure supply and sufficient capacity to support your growth plans – without compromising service. Our service is complemented by other best-in-class processing hubs at Tata Steel to provide additional processing capacity when required.

• **Choice.** We can supply hot-rolled, cold-rolled and metallic coated steel processed as sheets, slit coil or blanks to best match your requirements. As an integrated service centre, we can supply you with multiple products as part of the same delivery – saving you time and cost.

• **Capability.** For more complex processing requirements, we provide access to other Tata Steel service centres. These include the Profiling Centre, a plate profiling facility serving a wide range of market sectors, and our Automotive Service Centre, home to value-added processes such as fine blanking, press blanking and tailor welded blanks.

Integrated supply chain

Ireland Service Centre is part of an integrated supply chain, from initial steelmaking through to final processing. Visibility of customer requirements and demand through the supply chain allows stock levels to be managed to meet demand effectively.

Processing capability

	Thickness		Width		Length		
	Min.	Max.	Min.	Max.	Min.	Max.	
Processing unit	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**Comments**
Decoiling	0.5	6	600	2000	300	8700	
Slitting	0.5	2.9	60	1524	n/a		Hot-rolled, Hot-rolled P&O, Cold-rolled, Metallic coated
Multi-Strand Blanking	0.5	2.9	250	1530	300	4000	

Spain Service Centre

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Part of Tata Steel, Layde Steel slu is located in Durango, Spain, very close to the port of Bilbao. This offers very good logistics for our incoming Tata Steel material from the Netherlands and the UK. In addition to our service centre activities of slitting and cut-to-length, we also have our own narrow cold-rolling production line. We supply a wide range of flat steel products to a variety of demanding sectors including:
• automotive
• construction
• home appliances
• furniture
• general industry

We have been serving customers since 1941. We improve our processes continuously in order to add value and deliver tailored solutions to our customers. Our dynamic, flexible team works hard to achieve cost-effective operations. Our steel service centre is certified to the ISO 9001, IATF16949 and ISO14000 standards.

Products

We slit and package coils and sheets to meet your exact needs. We offer the following steel products:
• pickled
• hot-dip galvanised
• standard cold-rolled
• electrozinc-plated steel
• pre-finished or organic-coated steel

The following standard grades are available, with all properties following the Euronorm:
• Pickled – DD11 to DD14 – EN 10111
• Pickled – S235JR to S355JR – EN 10025
• Pickled – S315MC to S700MC – EN 10149
• Galvanised – DX51D + Z/ZF to DX57D+Z/ZF – EN 10346
• Galvanised – S220GD+Z to S550GD+Z – EN 10346
• Galvanised – HX260LAD+Z/ZF to HX420LAD+Z/ZF – EN 10346
• Galvanised – HCT600X+Z/ZF to HCT780X+Z - EN 10346

Automotive applications

Our steel service centre supplies customers in the automotive industry with a wide range of steel grades designed to:
• reduce vehicle weight
• increase passenger safety

Our steels are used for a variety of modern automotive components used in chassis, suspension, wheels, seats, interior and body in white. All of our products are manufactured according to the highest automotive standards with a clear focus on continuous improvement.

Processing capability

Layde has the following facilities:

Pickling line

Our 136m-long pickling line uses a hydrochloric acid bath to remove the surface oxide layer on hot-rolled coils. This ensures a completely clean and dry surface – allowing post-process oiling and eliminating the risk of oxidation. This facility is directly connected to a slitting line where we produce strips to required final width.

Specialist narrow cold rolling

Our facilities consist of two reversing 650mm Sendzimir cold rolling mills. Sendzimir technology is known worldwide for its ability to roll extremely hard materials to very thin gauges, with few intermediate anneals. Compared with steel from wide strip mills, our cold rolling process produces materials with:
• tighter mechanical properties
• tighter thickness tolerances
• better surface quality

Our cold rolling process begins with pickled hot-rolled coil. This coil is cold-rolled to the required thickness and subjected to annealing prior to a skinpass. This process combination delivers a level of material ductility that makes our products suitable for a variety of applications including coins, keys and filters. .

Our manufacturing range is between 0.20mm and 3.0mm (thickness) and between 10mm and 650mm (width). Inner diameters are 400-508mm depending on the product.

The following standard grades are available:

Grade	Norm
C10E to C100S	EN 10132
51CrV4 and 58CrV4	EN 10132
9MnPb28 and 11MnPb30	EN 10087
DC01 LC-C590 to DC06	EN 10139
ST 37-2 to ST42-2	DIN 1623
HC260LA to HC420LA	EN 10268
DC01 EK-DC06 EK, DC03ED-DC06 ED	EN 10209

Annealing

Our EBNER furnaces are fully automatic. They use natural gas and a 100% hydrogen atmosphere that delivers an equal temperature in the whole coil. This ensures identical mechanical characteristics throughout the entire coil. This process also prevents contractions that can cause marks and scratches on the coil surface. Use of hydrogen provides a coil surface that is extraordinarily clean and oil-free.

Slitting and Cut-to-Length (CTL)

To produce material to your required dimensions, we have various slitters and a cut-to-length facility for processing precision cold-rolled, galvanised and pre-finished steel coils. We can produce strips and sheets in the following dimensions:

- width from 10mm to 1650mm
- length from 300mm to 6000mm

Skinpass

Our skinpass facilities provide material with a slight surface hardening but without modifying any mechanical properties. This process delivers a smooth surface within the roughness range demanded by customers.

Dimensional capability

	Slitting	Decoiling	Pickling
Thickness	0.2 – 7.0mm	0.3 – 3.0mm	1.4 – 7.0mm
Width	10 – 1650mm	300 – 1500mm	Up to 1300mm
Length	-	300 – 6000mm	-

Max. pickling strength level is 800 MPa.

Please consult our sales department regarding specific technical feasibility of dimensional combinations, tolerances and grades.

Sweden / Norway Service Centres

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Halmstad Steel Service Centre in Sweden and Norsk Stål Tynnplater based in Fredrikstad, Norway, are two of the most established steel service centres in Scandinavia.

Our service centres process light gauge coil to pre-specified formats. The steel is cut and slit for a range of end product applications supplying most industrial segments across the Nordic region. Key elements of our service are product quality assurance, efficient management of customer deliveries and flexible order management.

Improved service

Our two businesses, Halmstad Steel Service Centre and Norsk Stål Tynnplater, cooperate closely together to provide improved customer service. The sites offer:

- shorter lead times
- faster deliveries
- greater flexibility in both product and service delivery

In addition, our service centres can offer the entire Tata Steel European strip product range to customers throughout the Nordic region for the first time. Significant processing capacity means we can quickly deliver large product volumes for customers in all industrial segments.

Logistic benefits

Both of our steel service centres are well-positioned for deliveries in Nordic countries and in wider Europe. Halmstad Steel Service Centre, which is close to both the rail network and the harbour, is well-placed to handle deliveries to and from southern Sweden. It is also close to the main Gothenburg-Copenhagen road for truck delivery.

Norsk Stål Tynnplater is close to the Swedish-Norwegian border and is well-placed for reaching both the Norwegian and Swedish markets.

Processing capability

Halmstad Steel Service Centre

	Slitting	Decoiling
Thickness	0.3 – 4.0mm	0.4 – 3.0mm
Width	8 – 1310mm	< 1600mm
Length	-	300 – 6000mm

We also collaborate with external slit and cut lines for additional capacity and production opportunities. Please contact us and we'll find the best solution for your needs.

Norsk Stål Tynnplater

	Slitting	Decoiling
Thickness	0.4 – 3.0mm	0.4 – 3.0mm
Width	20 – 1550mm	< 1550mm
Length	-	300 – 4125mm

Please consult our sales department regarding specific technical feasibility of dimensional combinations, tolerances and grades.

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Automotive Service Centre – Steelpark

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Our hi-tech automotive service centre provides dedicated processing and services which offer a range of benefits to OEMs and tier suppliers. The centre's complete multi-metal and full-finish capability includes precision slitting and decoiling, tailor welded blanks, press blanks and blanking.

With a capacity in excess of 200,000 tonnes of processed steel per annum, our dedicated automotive facility is located at Steelpark near Wolverhampton (one of the largest steel service centres in Europe). It is close to many of our customers and has excellent logistical links. We can also exploit capability elsewhere in Tata Steel's extensive service centre network. This includes the UK's largest flat product slitting and decoiling facilities, also located at Steelpark.

Key processes

Tailor welded blanks

Ongoing investment means we operate the very latest tailor welded blank (TWB) technology, capable of producing complex two-dimensional/non-linear weld geometries. This provides designers with increased freedom to create:

- weight saving opportunities
- cost reduction possibilities

Our capability is particularly relevant for parts such as door inners or larger body side blanks. Our TWB lines can join up to five individual shaped blanks of differing material grades and thickness. Without compromise to structural performance, our engineered blanks ensure:

- optimised material use
- minimised post-joining operations
- reduced overall tooling costs

Press blanks.
We operate five different press blanking lines from 150-600 tonne capacity and of varying size. Press blanks offer customers potential cost reduction and productivity improvements through:
• enhanced part nesting
• reduction of in-process scrap handling
• re-deployment of floor space and press capacity for additional production
• lowering of inventory costs through supply chain management

We have invested in multi-metal processing capability with purpose-designed process sections dedicated to either steel or aluminium. It includes a novel coating section for application of customer-specific solutions to aid subsequent pressing.

Blanking
With a total of seven different blanking lines, we can produce square, rectangular, trapezoidal and radial blanks of an almost limitless configuration. Additional multi-strand blanking lines located at Steelpark mean we have the flexibility and capacity to respond to customer requirements.

Other services
The Automotive Service Centre – Steelpark provides several services to complement our best-in-class processing capability. These are:
• **Product packing.** We can present products in the most convenient orientation for subsequent processing. We use bespoke or customer-own pallets and, specific wrapping materials. We utilise pack turners to configure left- or right-handed parts and can apply 'dimples' to blanks to aid separation and handling.
• **Customer technical service engineers.** Our engineers have detailed knowledge of our products and processes and how they interact with those of our customers. Available to work closely with you from the earliest stages of a project, our engineers offer significant experience in new part introduction and project management.
• **Tool design and management.** Tata Steel works closely with leading toolmakers across Europe to undertake design, procurement and subsequent management of the tool fleet needed for your specific blanked parts.
• **Supply chain management.** We are experienced in the management of Kanban/JIT and other supply arrangements. We utilise complete IT systems that allow you to focus on your own processing activities with peace of mind regarding security of supply.

Processing capability

	Thickness		Width		
	Min.	Max.	Min.	Max.	
Processing unit	**mm**	**mm**	**mm**	**mm**	**Comments**
Tailor welded blanks	0.6 (steel 0.9 (Aluminium)	3.0	400	3000	Blank lengths up to 3600mm
Press blanks	0.4	3.0	210	2050	150-600t press capacity Stacking up to 5000mm length blanks
Blanking					
- Trapezoidal			400	1810	
- Radial	0.4	3.0	400	1680	
- Square/rectangular			250	2010	
Slitting	0.4	3.2	34.5	2020	Up to 30 individual slits across coil width
Shearing	0.4	3.2	50	2500	

Light Gauge Decoiling and Slitting – Steelpark, UK

Tata Steel
Light Gauge Decoiling and Slitting
The Steelpark, Steelpark Way
Wednesfield, Wolverhampton
WV11 3SQ
United Kingdom
T +44 (0) 1902 484040
F +44 (0) 1902 484049
E customer-services@tatasteel.com

Light Gauge Decoiling – Steelpark supplies flat sheet for a wide variety of market applications in the sheet metal fabrication and light engineering segments. Located at Steelpark near Wolverhampton, it employs three highly productive multi-strand blankers and a large dedicated decoiler for sheet production. It processes the full range of Tata Steel cold-rolled, metallic coated and hot-rolled coil specifications.

Light Gauge Slitting – Steelpark, Wolverhampton, supplies slit steel coil to a multitude of customers in the construction fit-out and light engineering markets. Diverse applications include purlins and channels, racking and shelving, office furniture, fencing, automotive exhausts, ceiling systems and coinage. Employing four large slitting machines and a dedicated unit for slitting narrow coil, the service centre processes the full range of Tata Steel cold-rolled, metallic coated and hot-rolled coil specifications.

Customer benefits

Our Steelpark facilities offer a range of benefits:

• **Repeatable processing.** As part of a UK-based supply chain, we benefit from the consistent product quality of Tata Steel's modern manufacturing sites at Port Talbot, Llanwern and Shotton. This ensures repeatable processing for our customers. As part of a lean supply chain, the majority of coil is supplied from South Wales via our own Round Oak rail terminal a few miles from Steelpark.

• **Security of supply.** We offer a unique combination of three highly-productive multi-strand blankers and a large dedicated decoiler for sheet production, all located under one roof. It means we can provide you with secure supply and sufficient capacity to support your growth plans – without compromising service.

• **Choice and savings.** As well as supplying sheets and blanks, we also have the capability to shear in the same facility. This provides customers with a wide choice of blank size and shape, saving cost and time in further processing.

Products and services

Our service centres offer:

• Multi-products. As Steelpark is also home to our large Automotive Service Centre, we can source a wider range of blanks (including press blanks) and additional processing from one of the largest and most modern steel service centres in Europe.

• Tailored products. As part of the supply chain that includes Tata Steel production mills, we can work with manufacturing, technical and RD&T colleagues regarding product specification. We can access the full range of steel grades, finishes and dimensional tolerances to develop unique specifications for particular applications. With greater choice of both surface texture and finish, we can also provide the best match for your processing and coating requirements. In addition, chrome-free passivation (HDG) is available for compliance with application-related market standards.

Processing capability

	Thickness		Width		Length		
	Min.	Max.	Min.	Max.	Min.	Max.	
Processing unit	mm	mm	mm	mm	mm	mm	Comments
Decoiling	900	2000	0.7	3	700	4000	2t pack weight
Blanking	600	2000	0.35	3.2	420	4000	Minimum blank width = 150mm Up to 5 strands per coil width
Shearing	200	3050	0.4	6	200	2450	Minimum blank size = 20mm Five high-accuracy shears
Slitting	30	TBC	0.2	8	-	-	Hot-rolled, Hot-rolled P&O, Cold-rolled, Metallic coated (inc. MagiZinc®)

Heavy Gauge Decoiling – Llanwern, UK

Tata Steel
Heavy Gauge Decoiling
A11 East
Llanwern Works
Newport, NP19 4QZ
United Kingdom
T +44 (0) 1633 464714
F +44 (0) 1633 464718
E customer-services@tatasteel.com

Heavy Gauge Decoiling – Llanwern, in South Wales, focuses on the supply of hot-rolled sheet for a wide variety of market applications. It employs two decoilers to process the full range of Tata Steel hot-rolled coil.

The service centre operates with high levels of automation. Key line parameters in areas such as the levellers and stacker are controlled on a coil-by-coil basis. This ensures a consistently superior product with respect to flatness and sheet presentation.

Customer benefits

We offer customers a wide range of benefits including:

• **Reduced lead times.** The hub is located adjacent to Tata Steel's Llanwern hot strip mill, with direct rail links to the nearby Port Talbot hot strip mill. As a result, it benefits from increased stock visibility and reduced lead times – providing customers with a more responsive service.

• **Superior sheet flatness.** Investment of £11m in Europe's most powerful strip decoiler delivers superior flatness across the widest possible range of dimensions and grades. Sheets up to 25mm in thickness and grades up to 1600 N/mm^2 tensile strength can be readily decoiled.

• **Ease of fabrication.** In-line brushing of the surface during the levelling process, combined with indoor storage of coils after rolling on the nearby hot strip mills, provides a consistent and clean surface finish. This makes our products ideal for fabrication without intermediate surface treatment.

• **Reduced processing time.** We can side-trim during the decoiling process – offering tighter dimensional tolerances than a mill-edge sheet. This eliminates the need for additional processing associated with a sheared product.

• **Security of supply.** We offer a unique combination of two decoilers located adjacent to our hot strip mill. It means we can provide you with a secure supply and sufficient capacity to support your growth plans – without compromising service.

Services

We offer services to complement our best-in-class processing capability. These include various product packing options to ensure our product reaches you in optimum condition.

Integrated supply chain

Heavy Gauge Decoiling – Llanwern is part of an integrated supply chain. We make steel in Port Talbot or IJmuiden, we hot roll the steel in Llanwern, Port Talbot or IJmuiden, and we decoil it in Llanwern. The majority of our sales are produced and processed in South Wales – limiting unnecessary transportation and reducing order lead times.

Processing capability

	Thickness	Width	Length
	Max.	Max.	Max.
	mm	mm	mm
Decoiling	25	2100	17000

Maximum thickness of Hot-rolled Pickled & Oiled is 12mm.
Maximum thickness of Durbar® floor plate is 12.5mm. Maximum tensile strength is 1600 N/mm^2. In-line side-trimming available for exacting width tolerances.

Profiling Centre – Steelpark, UK

Tata Steel
Profiling Centre
Steelpark Way
Wednesfield, Wolverhampton
WV11 3SQ
T +44 (0) 1902 484040
F +44 (0) 1902 484049
E customer-services@tatasteel.com

The Profiling Centre is a centre of excellence for profiling steel strip and plate – offering a full-service capability to customers. Located at Steelpark near Wolverhampton – one of Europe's largest steel service centres – the Profiling Centre operates as part of a unique supply chain extending right back to the steel mill.

Profiling Centre activities meet the CE mark requirements of BSEN1090-1. Profiling and finishing operations take place under a single roof – ensuring the most appropriate and cost-effective process route for each customer's requirements. The centre offers:

- the latest plate profiling technologies
- comprehensive finishing facilities
- access to the widest range of steel grades

Capacity and capability

After successfully serving the heavy vehicles segment sector for more than 20 years, we have made a significant investment in the Plate Profiling Centre. Our investment – including installation of new high definition plasma profiling machines and machining centres – has resulted in:

- increased capacity
- extended processing capability
- operational flexibility – to meet customers' current and future needs
- improved delivery service

Serving your market

The Plate Profiling Centre delivers benefits to customers in a wide range of markets:

- **Heavy vehicles.** The centre is ideally configured for high-volume repeat part production for most machinery segments, including off-highway wheels. We have

the capability to manage lean supply chains, providing kitting of parts ready for fabrication and just-in-time delivery.
• **Construction.** Structural components can be readily handled from large-area profiling beds and associated handling systems, for one-off projects or general applications.
• **Energy & Power.** We can profile and handle the very largest of plates. To save you processing time and cost, we provide a wide choice of edge finishing as preparation for welding and further fabrication.
• **Transport.** Rail and road schemes are making increasing use of gantries and other fabricated structures, for applications such as line electrification, information systems and signage. Our profiling capability and capacity allows contractors to concentrate on their core fabrication processes. By supplying components, we can save you time and cost – removing waste from the supply chain
• **General Engineering.** We can supply a multitude of parts for applications involving steel plate, from single-part prototypes to low-volume production runs.

Customer services

The Profiling Centre can provide a range of services to save you time and cost. These include:
• **Kits.** We can combine selections of parts into kits. This ensures the exact required parts are presented to a fabrication or assembly process – removing the need for you to sort and aggregate parts from stocks
• **Design.** When customers share their part specifications, we are able to interpret the design and tolerances to ensure the most appropriate processing routes and part nesting. It means you benefit from the most efficient use of material and processing time. Utilising our economy of scale and scope ensures that you receive the most efficient processing service.

Processing capability

	Thickness	Width	Length	
	Max.	Max.	Max.	
	mm	mm	mm	Comments
Oxy-gas profiling	170	5700	20000	Best suited to profiling thicker plates
High-definition Plasma profiling	55	5000	20000	Outstanding capability from five machines capable of cutting 'bolt-ready' holes
Laser profiling	20	2500	8000	High precision cutting of lighter plate or sheet from two machines
Flattening press	60			Flattening down to 2mm/m deviation from three machines
Machining centres	170	970	2300	High precision finishing of profiled components from five machines
Edge finishing	150			Detailed edge finishing from one slag grinder and five edge bevellers
Press brakes	30	3600	800	300t capacity press braking from two machines

Further processing can be undertaken either by Tata Steel, or with our partners, including shotblasting/priming and heat treatment.

Stockholder Sales – Steelpark, UK

Tata Steel
Distribution UK and Ireland
The Steelpark, Steelpark Way
Wednesfield, Wolverhampton
WV11 3SQ
United Kingdom
T +44 (0) 1902 484000
E customer-services@tatasteel.com

Our Stockholder Sales team provides a dedicated competitive offering to UK stockholders – ensuring access to the full range of Tata Steel product and processing capabilities. By utilising the integrated Tata Steel supply chain and our extensive processing capability we can provide you with high-quality products when and where you need them. Products on offer include wide coil, sheets, plate, slit coils and long products.

Competitive and convenient

To save you time and money, we offer:

• **Extensive capacity and reliable products.** As the country's largest distributor and processor of steel, we utilise best-in-class facilities to supply superior quality products manufactured by Tata Steel. Our processing capacity ensures we can supply the product you need on a competitive basis from our large-scale, low-cost facilities.

•**Product choice.** As well as wide coil, we also supply decoiled sheets, slit coil and blanks – saving you cost and time in further processing.

• **Multi-product service.** Our team can handle all your steel requirements – acting as a single point-of-contact for the wide product and processing capabilities available from Tata Steel's multiple processing hubs.

Customer services

At Stockholder Sales we provide several services to support you and to complement our comprehensive offering:

• **Finding the right product.** We combine knowledge of Tata Steel's products and extensive processing capability with an understanding of customer applications. We use our experience and expertise to ensure that the most appropriate solutions are offered for each enquiry.

• **Flexible and regular delivery.** Our 24-hour supply chain operations support flexible and regular delivery schedules on a nationwide basis. Integrated IT

systems allow you to focus on your own business activities with peace of mind regarding security of supply.
• **More support.** As part of Tata Steel, we have direct access to our own manufacturing facilities. This means you can benefit from increased levels of product information, technical support and material availability.

Integrated supply chain

Stockholder Sales is part of an integrated Tata Steel supply chain. Visibility of customer requirements and demand through the chain allows stock levels to be managed to meet demand effectively.

Full product traceability

The Tata Steel supply chain ensures we are able to manage product traceability effectively from primary production through to dispatch.

Processing capability

	Thickness		Width		Length		
	Min.	Max.	Min.	Max.	Min.	Max.	
Processing unit	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**Comments**
Sheets - light gauge	0.7	3	900	2000	700	4000	2t pack weight
Sheets - heavy gauge	3	25		2100		17000	
Slitting	0.2	0.8	>30	2000	-	-	
Blanks	0.4	6	200	3050	200	2450	Minimum blank size = 20mm

Metal Centres – General Steel – Rotherham, UK

Tata Steel
Rotherham Metal Centre
Doncaster Road
Old T Bay, rear of Roundwood
Rotherham S65 3ES,
United Kingdom
T: +44 (0) 1709 842670
F: +44 (0) 1709 842671
E: rotherhammc.sales@tatasteel.com

Our regional Metal Centres provide customers with a quick and convenient way to buy smaller quantities of a wide range of steel products. Ideal for jobs where fast completion is needed, our centres offer:
- nationwide next-day delivery service
- immediate collection facilities
- flexible payment methods

Whether you need a couple of bars, the odd sheet or several tonnes, our knowledgeable teams are on hand to help.

Extensive product range

Metal Centres offer access to the extensive Tata Steel product range as well as selected complementary products. These include sheet, plate, flooring and handrailing products, mesh, beams, columns, channels, angles, bar and engineering bar and tube.

Proven and reliable

Our in-depth industry knowledge ensures you receive the best possible product for your application. As part of an integrated supply chain, we provide customers with access to high-performance products with full traceability.

Fast and convenient

Metal Centres carry an extensive stock range, enabling us to satisfy most customer requirements with same or next-day delivery. Our well-placed network of sites is conveniently located, with excellent logistics, to service the UK market. Making use of our own transport fleet we offer fast and reliable next-day delivery in the immediate area. Alternatively, customers can visit sites immediately to collect their own material.

Processing capability

Our Metal Centres provide local cutting of products to a multitude of shapes and sizes, using combinations of CNC controlled, fully automatic, cold and band saws. This service is available for one-off parts and for higher volume, repeat cutting for kits.

In addition, we can call upon the best-in-class processing capability of Tata Steel's national processing hubs, offering:

- engineering bar in single and multi-cut billets, with an array of further processing options available
- plate profiling via laser, plasma and oxy-gas cutting, with further finishing operations including machining, press braking, flattening and grinding
- slitting, blanking and decoiling of sheet steel


TATA
FULL
FINISH

General information

Understanding your market

We appreciate that the needs of our customers are different in each market, so we have created dedicated market sector teams that understand your market's needs.

This enables us to support your business through one team. It means we can grow our knowledge of your market and of your current and future challenges.

Our dedicated account teams are ready to help you with all your requirements, right across our product range. They ensure you have access to sector-specific experts in our technical, engineering, supply chain planning and research and development departments all over Europe.

These resources, with our expertise in materials management and logistics, help you get the most out of your steel.

Who to contact for sales

Our sales teams are organised into dedicated market sector teams to support you. In this catalogue you will find sales contact details by market sector or geographic location. The volume you may be intending to buy could also influence who you call – see our general guidance below.

Small volume orders tailored to your needs

If you require smaller volume orders with service tailored to your specific needs, you may consider buying our products from Tata Steel's dedicated steel service centres. Our products are also available from a wide network of independent steel service centres.

At Tata Steel, our dedicated distribution network of service centres and metal centres can tailor products to your specific requirements and offer expertise in processing according to gauge:

- Light gauge processing expertise: slitting, blanking, products cut to length, stamping, pickling and narrow cold-rolling
- Heavy gauge processing expertise: decoiling, profiling and stockholding.

Large volume orders with dedicated customer technical support

For larger volume orders please contact our dedicated market-focused sales teams either in the automotive, engineering or construction sectors. These sector sales teams are backed by knowledgeable customer technical services engineers. By working in partnership with you, our teams can help widen your operating windows and maximise your line processing efficiency whilst supporting you to improve your yield. Our robust supply chain and transportation networks are truly global. We have transport modalities that ensure our products reach you wherever you are.

If you are unable to find the product you are looking for, our dedicated sales teams are available to help you with your requirements and talk through solutions on offer to meet your needs.

Sales teams at our service centres (for smaller volume orders)

Tata Steel supplies a wide network of established and reputable independent steel service centres (ISSCs) that are supported by a Tata Steel sales team. Contact information for our European service centres can be found in the service centre chapter of this catalogue.

Our market-focused sales teams (for larger volume orders)

Automotive sales team

Tata Steel
Automotive
Wenckebachstraat 1
1951 JZ Velsen-Noord
The Netherlands

Automotive enquiries
Sales: sales.automotive@tatasteel.com
General: connect.automotive@tatasteel.com
www.tatasteeleurope.com/automotive

Engineering sales team

Tata Steel
Engineering
Wenckebachstraat 1
1951 JZ Velsen-Noord
The Netherlands

Sales and general enquiries
connect.engineering@tatasteel.com
www.tatasteeleurope.com/strip

Construction sales team

Visit www.tatasteelconstruction.com to find your nearest contact by product.

Tata Steel sales offices

Africa

South Africa
Tata Steel
1st Floor, Kamogelo Suites
39 Lakefield Avenue
Benoni 1501
South Africa
T: + 27 (011) 849 8500
F: + 27 (011) 849 8501
E: south.africa@tatasteel.com

Asia and the Pacific:

China
Tata Steel
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568 Hengfeng Road
Zhabei District, 200070
Shanghai
China
T: +86 21 3366 1616
F: +86 21 3304 0108
E: china@tatasteel.com

Hong Kong
Tata Steel
Unit 603B, Empire Centre
68 Mody Road, Tsim Sha Tsui East
Kowloon, Hong Kong
T: +852 2887 5333
F: +852 2807 1805
E: hong-kong@tatasteel.com

Japan
Tata Steel
Oak Minami Azabu Building
2F 3-19-23 Minami-Azabu Minato-ku
Tokyo 106-0047
Japan
T: +81 (0)3 4580 2717
F: +81 (0)3 4580 2701
E: Tokyo@tatasteel.com

(Asia and the Pacific continued on next page)

Tata Steel sales offices

Asia and the Pacific (continued):

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Tata Steel
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F: +65 6297 6682
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Thailand
Tata Steel
Rasa Tower 1
14th Floor, 555 Phaholyothin Road
Chatuchak
Bangkok, 10900
Thailand
T: +66 2 664 2901 to 664 2903 Ext. 15/16
F: +66 2 664 2905
E: thailand@tatasteel.com

Tata Steel sales offices

Europe:

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F: +420 224 919 546
E: prague@tatasteel.com

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E: denmark@tatasteel.com

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00810 Helsinki
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E: helsinki@tatasteel.com

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Paris
France
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E: paris@tatasteel.com

Germany
Tata Steel (International)
Am Trippelsberg 48
40589 Düsseldorf
Germany
T: +49 211 4926-0
F: +49 211 4926282
E: dusseldorf@tatasteel.com

Italy
Tata Steel
Via G.G. Winckelmann n. 2
20146, Milan
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(Europe continued on next page)

Tata Steel sales offices

Europe (continued):

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T: +48 32 608 3500
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2735-336 Cacém
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T: +351 217 817 040
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Tata Steel
169A Calea Floreasca,
A Building, 4th floor,
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Calle Rosario Pino 14-16
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Spain
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E: madrid@tatasteel.com

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Amerikahuset
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Tata Steel sales offices

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E: mumbai@tatasteel.com

Middle East:

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Tata Steel Ticaret
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United Arab Emirates (UAE)
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United Arab Emirates
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Tata Steel sales offices

North and South America:

This is the 2018 Metric Units edition of our Strip products and services catalogue. A US Standard Units version (North America) of this catalogue is also available, describing our product offering against other standards such as ASTM and SAE. Please contact us to obtain a copy.

To find more about the industry and customer standards for your region please contact either:
- our local sales office in your region or
- our dedicated market sales teams (details in the front of this section)

North America

Chicago
Tata Steel
475 N. Martingale Road
Suite 400
Schaumburg, IL 60173
USA
T: +1 847 619 0400 or
+1 800 542 6244 (N. America only)
F: +1 847 619 0468
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Detroit
Tata Steel
26777 Central Park Blvd.
Suite 150S
Southfield, MI 48076
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E: detroit@tatasteel.com

South America

Brazil
Tata Steel
Avenida Brigadeiro Faria Lima, 1.685
5 andar - conj. 5J - Jardim Paulistano
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E: brazil@tatasteel.com

Mexico
Tata Steel
Avenida Ing. Armando Birlain Shaffler,
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Corporative Central Park,
Torre 1, Piso 16 C
Col. Centro Sur
Querétaro CP 76090
Mexico
T: +52 442 673 7501
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Quality standards compliance

Quality control

The quality policy of Tata Steel in Europe embraces the pursuit of excellence in the quality of our products and services to ensure sustained customer satisfaction. We ensure that all our material complies with all applicable legislative requirements and environmental legislation.

In line with our corporate citizenship policy, Tata Steel takes all necessary steps to maintain a safe, healthy and fair workplace for all our employees and contractors – protecting the environment, respecting and engaging with local communities and maintaining high ethical standards wherever we operate.

We also take responsibility for our operations, improving their efficiency and sustainability in an ongoing and ambitious programme. In some cases, this demands substantial investment, such as the £60m BOS gas recovery scheme at our Port Talbot site, which saves nearly 300,000 tonnes of CO_2 emissions per year. Responsible manufacturing is also about how we work every day – driving down accident rates, reducing waste, increasing efficiency and contributing to society wherever we can make a difference.

Tata Steel's quality management systems fulfil the following quality compliance standards:

- NEN/EN/ISO 9001: 2008
- ISO/TS 16949:2009
- Germanischer Lloyds (GL) ; DNV ; Lloyds Register – Steelmaking and Semi-Finished Products
- United Kingdom Accreditation service (UKAS) ISO 17025:2005
- Environmental Management ISO14001:2004.

Tata Steel systems have been approved to standards recognised by third party certification bodies and apply to all our products:

- hot-rolled coil (pickled and non-pickled)
- cold-rolled coils
- metallic coated coils

Inspection documents

The inspection documents are structured according to EN 10204:
Please let your sales team and support engineers know your test certificate requirements.

2.1 Declaration of compliance with order:
Non-specific inspection. No report of test results

2.2 Test report (cast analysis only):
Non-specific inspection. No report of (mechanical) test results

2.2 Test report (cast and mechanical properties):
With report of test results

3.1 Inspection certificate:
Specified required inspection: With report of test results

3.2 Inspection certificate:
Specified required inspection: With report of test results, external inspector

Product technology and quality improvement

For improvement of the performance of material processing or advice on substitutes for steel grades, please contact us.

To learn more about the different aspects of steelmaking and the manufacturing of the ordered products, we offer a course 'Customer and Steel'.

We have facilities to test materials for our customers and to carry out tests on behalf of product trials. Our mill-based test laboratories can also provide customers with material certificates.

To find our more please contact your Customer Technical Services team or sales team for details. They can also provide more information about:
- mechanical properties
- test certificates
- our course 'Customer and Steel'
- the Tata Steel product range

Please note production location variations may apply, please contact your support engineer or sales team for details.

Sustainability and our belief in steel

The Tata Group has long been committed to sustainable development. Its founder, Jamsetji Tata (1839-1904), viewed the creation of wealth not as an end in itself, but as the means by which his company could make a positive contribution to the communities it served.
There are many challenges facing the world today. The list includes climate change; energy security; the management of finite, non-renewable resources in the entire life cycle of products; repairing the damage made by human activity on ecosystems; and safeguarding people's health, safety and equal opportunities. Ensuring the sustainable development of the global society, with economic prosperity and social equality, must be balanced with looking after the planet on which we live. At Tata Steel, we understand that, to sustain our business, we must make a positive contribution to the sustainable development of the global community. We can and must play an important part in addressing these challenges both through our products and in the sustainability of our operations.

Our belief in steel

Steel is an essential material, intrinsic to our way of life and to the products society will demand in a sustainable future. Steel is a uniquely sustainable material and once made, it can be used, as steel, forever.
Steel is at the heart of modern society and helps to build essential infrastructure, such as bridges, buildings, railways and energy generation. Moreover, steel touches our everyday lives around the world, through a myriad of consumer goods. It is true to say that if it is not made from steel, it is made using steel.
Apart from being essential to modern society, steel is sustainable because it is a permanent material. Steel products can last a lifetime, and after they have had the maximum value extracted from them, they can be reused or remanufactured for another life cycle. Steel can be recycled, without losing any of its properties, in a continuous loop. Fundamental to the circular economy, it offers society the materials efficiency it is looking for.
Steel is used, not consumed. It is a long-term investment that does not go to waste. Steel products often outperform similar products made from alternative materials in terms of CO_2 efficiency.

Some facts:

Steel is used – never consumed
Steel is a permanent material that does not go to waste
Once made, steel can be used again and again
Steel is the most recycled material in the world
Steel is a truly cradle-to-cradle recycled material.

Investing in step-change improvements

With limited scope for achieving further substantial CO_2 emission reductions from conventional ironmaking processes, a step-change in emissions can only be achieved by finding a completely new technological path for the production of hot metal, away from the blast furnace route.

Tata Steel is playing a leading role in ULCOS, a Europe-wide initiative to reduce carbon emissions in steelmaking. In 2010, as part of this work, Tata Steel Europe built the €20m HIsarna pilot plant at our IJmuiden integrated steelmaking site in the Netherlands. HIsarna's

revolutionary cyclone converter-based ironmaking process directly converts iron ore fines and coal into iron. This avoids the need for agglomeration (collection into a cluster or mass) pre-treatment of the ore via sintering or pellet making and the need for coke making from coal. This new technology could reduce CO_2 emissions by 20% compared to conventional ironmaking. Used in combination with carbon capture and storage techniques, it should be possible to achieve CO_2 reductions of up to 80%.

The ULCOS project is currently in its second phase. This aims to demonstrate HIsarna feasibility under large-scale, industrial production conditions. During this phase we will also assess the opportunity to use this technology to recover zinc from zinc coated steel scrap. If successful, this technology will contribute enormously to the creation of a low carbon, circular economy and could potentially be rolled out some 15 to 20 years from now.

Product safety

More detailed health and safety information can be found on safety data sheets which have been produced for each steel type, these are available on request from your sales account team.

Our products comply with the EU Dangerous Substances and Dangerous Preparations Directives and their consequent Member State transposed regulations. Please note that the above Regulations in all Member States and the associated European directives will be replaced by the Classification Labelling and Packaging Regulations 2009 ((EC) No 1272/2008) in 2015.

Environmental compliance

Our products are in compliance with the following European Regulations and Directives. These Directives will be transposed directly into Member State Regulation that will be adhered to in each of our operating facilities within the EU.

Legislation	Subject	Our position
2011/65/EU (RoHS 2)	EU legislation restricting the use of hazardous substances in electrical and electronic equipment (RoHS Directive 2002/95/EC) and promoting the collection and recycling of such equipment (WEEE Directive 2002/96/EC) has been in force since February 2003. The legislation provides for the creation of collection schemes where consumers return their used e-waste free of charge. The objective of these schemes is to increase the recycling and/or re-use of such products. It also requires heavy metals such as lead, mercury, cadmium, and hexavalent chromium and flame-retardants such as polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) to be substituted by safer alternatives.	Tata Steel is aware of this Directive and also has a specific statement for RoHS compliance.
(EC) No. 1907/2006 (REACH)	The Registration, Evaluation, Authorisation and restriction of Chemicals Regulation, places a number of obligations on EU manufacturers and Importers. It aims to protect worker health and the Environment as well as promote innovation and free market trade.	Tata Steel is fully aware of its obligations under REACH and has put measures in place to comply with the requirements of the Regulation. Tata Steel has a number of REACH Statements relating to REACH compliance.
(EC) No. 1272/2008 (CLP)	European Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures came into force on 20 January 2009 in all EU Member States. The CLP Regulation adopts the United Nations' Globally Harmonised System on the classification and labelling of chemicals (GHS) across the EU. Tata Steel is fully aware and compliant wit this Regulation.	

(table continued on next page)

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Legislation	Subject	Our position
2002/525/EC (End of life Vehicles)	Directive 2002/525/EC on restriction of the use of certain hazardous substances in vehicles (ELV). The directive aims to prevent waste from end-of-life vehicles and promote the collection, re-use and recycling of their components to protect the environment. This Directive amends the Directive 2000/53/EC.	All automotive steel grades currently produced by Tata Steel are in conformity with the requirements of this Directive.
Reg (EU) No. 305/2011 (Construction Products)	Construction Products Regulation (the CPR) is to ensure reliable information on construction products in relation to their performances. This is achieved by providing a "common technical language", offering uniform assessment methods of the performance of construction products.	All steel products are in conformity to EN 10025 (2004)
94/62/EC (Packaging and Packaging Waste)	The Directive covers all packaging placed on the market in the European Community and all packaging waste, whether it is used or released at industrial, commercial, office, shop, service, household or any other level, regardless of the material used. This directive has been amended by 2004/12/EC and 2005/20/EC	All the steel grades currently produced are in conformity with the requirements of this directive.
97/23/EC (Pressure Equipment)	The purpose of this directive is to ensure the free movement of pressure equipment and assemblies within the European Community market by harmonizing the national safety and health protection requirements to which they are subject.	All relevant steel produced are in conformity.

For more information about EU legislation visit the European Commission website at www.ec.europa.eu

Our Sustainability pages of our website show our approach to environmental responsibility, please visit us at www.tatasteeleurope.com

Customer technical services

Tata Steel combines dedicated customer technical support with world-class research facilities to develop and deliver high-quality steel products that add value to your business.

Our Customer Technical Services team supports you to get the most out of our products. Knowledgeable, approachable engineers provide practical advice to ensure the best product match for your application. We can work with you to optimise your processing efficiency and help improve your product's performance.

By collaborating with customers early in the product lifecycle, we can add even more value. For instance, we can explore the development of steel grades to meet your specific needs. Or we can work with you to reduce the cost or weight of your product at the design stage.

The services we offer include:
- technical advice on product selection
- product or application concept validation
- support to help improve your line processing efficiency
- efficiency improvement assessments
- supporting your continuous improvement initiatives
- early vendor involvement (EVI)
- customer engagement sessions

Our support engineers can also help you to fully exploit our range of advanced products. These include multiphase and high-strength steels and our families of Tata Steel branded products, MagiZinc®, Ympress®, Ymagine®, Ymvit® and Durbar®. We can help you quantify the advantages and benefits of these products for your processes and end product applications.

Please contact your technical support engineer or your sales team for details.

Innovation

At Tata Steel innovation is about turning customer understanding into the right solution. We are committed to providing customers with reliable, advanced products and services that help to improve your products or business. That's why we continue to invest in our world-class research and development organisation. In addition, we work in collaboration with universities and research institutes worldwide.

We serve many different and demanding markets including automotive, engineering and construction. Our steel contributes to lighter, stronger, safer and more sustainable solutions for our customers. It is used in the world's most sustainable buildings and transport infrastructure. Our steel also supports the performance of some of the most efficient vehicles on the market.

Technology

Working closely with our customers, we are committed to long-term relationships to help develop new products and technologies. Our research and development teams utilise in-depth knowledge of market issues and customers' processing requirements to create effective and reliable solutions.

We exploit the best technologies to expand and improve our product quality and performance. Our knowledgeable, approachable experts use the latest methods in process analysis and design, product design, modelling/simulation and prototyping to support you in realising your market ambitions.

Our large-scale test facilities permit new products to be tested on an industrial scale. For example, we can test steel performance in volume production of cans or blanks for car parts. We can also perform corrosion testing of civil constructions.

Our global reach

We can support you with the size and strength of our operations too. As one of Europe's largest steel producers we have two integrated steelmaking sites, Port Talbot in the UK, and IJmuiden in the Netherlands. Their coastal locations open up a global transport infrastructure for our customers.

We also have manufacturing sites in other locations such as Germany, Sweden, Turkey, Spain and USA. This manufacturing capability, in combination with a wide service and distribution network, enables us to grow and support your business.

Working together closely with you and our supply chain partners we are able to deploy the best solution to suit your operations, location and market.

Transport
Tata Steel has a multi modal network, using road, rail, barge or sea-going vessels (including container shipments) to any specified destination. We have our own sea harbours and have shipment facilities for handling steel under the best possible conditions. These facilities are available 24 hours per day and seven days per week. In addition, Tata Steel arranges the required formalities for customs and transport documents. We will gladly calculate the most suitable shipment arrangement for you in relation to the coil weight. By working closely with you, we are able to maximise your pay load per order according to your chosen modality of transport and location.

To be sure that your order can be transported to your location, please make the sure that the maximum coil weight for your order does not exceed the legal weight requirement per truck for your country.

Order item weights (for steel produced in the Netherlands)
For small order items, i.e. less than six coils, the order item weight must be a multiple of the coil weight.

Please consult Tata Steel price lists for more detailed information about order item weights.

Order item weights (for steel produced in the UK)

If an order weighs less than 100 tonnes, the total weight for that order must be a multiple of the feasible coil weight. The weight tolerances for any item on an order are shown below:

- 50 tonnes and over: ±10%
- 20 tonnes to under 50 tonnes: ±15%
- Under 20 tonnes: ±25%

Pack styles for product transportation

Labels

As a rule, all dispatched products, hot-rolled, direct-rolled, cold-rolled as well as metallic coated, are provided with the accredited world wide ODETTE transport label. This label contains information printed in a legible typeface as well as in bar code form.

Every label consists of two parts:

- a transport section, with information about destination and Tata Steel
- a product section, with information about the product such as coil number, cast number and dimensions

During the last phase of production after hot-rolling, all Tata Steel coils are issued with a unique coil number. From this moment on, your order is easily identifiable in all our manufacturing and supply chain systems. We do not manually enter data at any stage of our manufacturing or supply chain process. At each phase of our production process, the coil is labelled.

On arrival in the warehouse for distribution and packing, a unique barcode label is generated for your shipment from your unique coil number - ensuring we can trace your order at any time. The physical delivery of your order can be traced through the use of Electronic Data Interchange (EDI) at any stage with up-to-date delivery information. This unique number ensures that you receive the correct coil with the correct mechanical properties and dimensions.

Pack styles

All our packaging is fully recyclable and designed to meet our customers' stringent quality requirements. In order to suit your needs and to ensure the safe delivery of our products, the most effective pack style is chosen for method of transport, climatic conditions and destination.

Hot-rolled coils:

Plain banded

A minimum of one circumferential band and two radial bands. Additional banding can be provided.

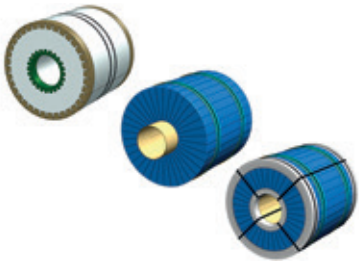
Hot-rolled pickled, cold-rolled and metallic coated coils:

Plain banded

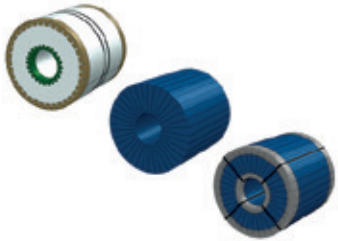
(Direct delivery at max. 200 km's loaded and delivered on the same day)
Restriction: no protection against dust, dirt and water/condensation

Unit load multi modal, PE film wrap

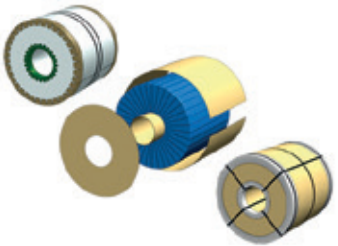
(deliveries via rail, truck or barge)
Radial bands (4)
Circumferential belly bands (2 outside, 2 on naked coil)
Bore edge protection
Outer edge protection
Circumferential coil (belly) protection straps – softboard
Bore protection (cardboard spool)



Unit load direct delivery, film wrap
(direct delivery via truck or rail)
Radial bands (4)
Circumferential belly bands
(2 on a naked coil)
Bore edge protection
Outer edge protection



Unit load, full export; board,
PE film wrapped
(all modalities, including container)
Radial bands (4)
Circumferential bands (3 outside;
1 in the middle for coils over 1600mm
4 belly bands are used
2 belly bands on the naked coil
Bore edge protection
Outer edge protection
Bore protection (board spool)
Wall protection (board)
Outer lap protection (board)



Glossary of symbols

Symbol	Definition
≤	Less than or equal to
<	Less than
≥	Greater than or equal to
>	Greater than
R_{eL}	Lower yield strength: lowest value of stress during plastic yielding, ignoring any initial transient effects.
R_{eH}	Upper yield strength: value of stress at the moment when the first decrease in force is observed.
R_p	Proof strength, non-proportional extension: stress at which a non-proportional extension is equal to a specified percentage of the extensometer gauge length. **Note:** The symbol used is followed by a suffix, giving the prescribed percentage, e.g. $R_{p0.2}$
R_m	Tensile strength: stress corresponding to the maximum force (Fm).
A	Percentage elongation after fracture: permanent elongation of the gauge length after fracture, expressed as a percentage of the original gauge length. Note: In the case of proportional test pieces, only if the original gauge length is other than $5.65\sqrt{S_0}$, where S_0 is the original cross-sectional area of the parallel length, the symbol A should be supplemented by an index indicating the coefficient of proportionality used.

Symbol	Definition

In the case of non-proportional test pieces, the symbol A should be supplemented by an index indicating the original gauge length used, expressed in millimetres, e.g.:

A_{80}	Percentage elongation of a gauge length of 80mm
L_0	Original gauge length
$L_0=5.65\sqrt{S_0}$	Proportional test piece
$L_0=80mm$	Non-proportional test piece

R_a Surface roughness measured in micrometres
Note: In the symbol $R_{a0.8}$, the suffix represents the cut-off point used when measuring the surface roughness.

r Plastic strain ratio
Note: The symbol r shall be completed by index figure x giving the orientation of the test piece relative to the rolling direction.

$\bar{r}$ The weighted average
Note: The weighted average value is calculated using the formula:

$$\bar{r} = \frac{(r_0+r_{90}+2r_{45})}{4}$$

n Strain-hardening exponent

Note: the symbol shall be completed by an index figure x giving the orientation of the test piece relative to the rolling direction.

$\bar{n}$ The weighted average
Note: the weighted average is calculated using the formula:

$$-n = \frac{(n_0+n_{90}+2n_{45})}{4}$$

BH Bake-hardening
Steels that demonstrate an increase in proof strength following heating in the region of 170°C for 20 minutes.

Symbol	Definition
LA	Low-alloy/microalloyed
Y	Interstitial free
D	Intended for hot-dip coating
JR	A longitudinal Charpy V-notch impact of 27J at 20°C.
J2	A longitudinal Charpy V-notch impact of 27J at -20°C.
J0	A longitudinal Charpy V-notch impact of 27J at 0°C.
+AR	Supply condition as rolled
+N	Normalised


TATA
TATA STEEL

Hot-rolled

Appendix A

Tolerances applicable to hot-rolled products (EN 10051:2010)

Tolerances on thickness

Tolerances closer than special tolerances may be agreed at the time of enquiry.
Tolerances in mm.

Tolerances on thickness for hot-rolled steel with a low carbon content for cold forming (DD11-DD14 in EN 10111:2008)

		Tolerances for a nominal width of			
			> 1200	> 1500	
Nominal thickness		**≤ 1200**	**≤ 1500**	**≤ 1800**	**> 1800**
	≤ 2.00	± 0.13	± 0.14	± 0.16	-
> 2.00	≤ 2.50	± 0.14	± 0.16	± 0.17	± 0.19
> 2.50	≤ 3.00	± 0.15	± 0.17	± 0.18	± 0.20
> 3.00	≤ 4.00	± 0.17	± 0.18	± 0.20	± 0.20
> 4.00	≤ 5.00	± 0.18	± 0.20	± 0.21	± 0.22
> 5.00	≤ 6.00	± 0.20	± 0.21	± 0.22	± 0.23
> 6.00	≤ 8.00	± 0.22	± 0.23	± 0.23	± 0.26
> 8.00	≤ 11.00	± 0.24	± 0.25	± 0.25	± 0.28

Tolerances on thickness of steel grades with a specified minimum yield strength $R_e \leq 300$ N/mm² (category A)

		Tolerances for a nominal width of			
			> 1200	> 1500	
Nominal thickness		≤ 1200	≤ 1500	≤ 1800	> 1800
	≤ 2.00	± 0.17	± 0.19	± 0.21	-
> 2.00	≤ 2.50	± 0.18	± 0.21	± 0.23	± 0.25
> 2.50	≤ 3.00	± 0.20	± 0.22	± 0.24	± 0.26
> 3.00	≤ 4.00	± 0.22	± 0.24	± 0.26	± 0.27
> 4.00	≤ 5.00	± 0.24	± 0.26	± 0.28	± 0.29
> 5.00	≤ 6.00	± 0.26	± 0.28	± 0.29	± 0.31
> 6.00	≤ 8.00	± 0.29	± 0.30	± 0.31	± 0.35
> 8.00	≤ 10.00	± 0.32	± 0.33	± 0.34	± 0.40
> 10.00	≤ 12.50	± 0.35	± 0.36	± 0.37	± 0.43
> 12.50	≤ 15.00	± 0.37	± 0.38	± 0.40	± 0.46
> 15.00	≤ 25.00	± 0.40	± 0.42	± 0.45	± 0.50

Tolerances on thickness of steel grades with a specified minimum yield strength 300 N/mm² < R_e ≤ 360 N/mm² (category B)

		Tolerances for a nominal width of			
			> 1200	> 1500	
Nominal thickness		**≤ 1200**	**≤ 1500**	**≤ 1800**	**> 1800**
	≤ 2.00	± 0.20	± 0.22	± 0.24	-
> 2.00	≤ 2.50	± 0.21	± 0.24	± 0.26	± 0.29
> 2.50	≤ 3.00	± 0.23	± 0.25	± 0.28	± 0.30
> 3.00	≤ 4.00	± 0.25	± 0.28	± 0.30	± 0.31
> 4.00	≤ 5.00	± 0.28	± 0.30	± 0.32	± 0.33
> 5.00	≤ 6.00	± 0.30	± 0.32	± 0.33	± 0.36
> 6.00	≤ 8.00	± 0.33	± 0.35	± 0.36	± 0.40
> 8.00	≤ 10.00	± 0.37	± 0.38	± 0.39	± 0.46
> 10.00	≤ 12.50	± 0.40	± 0.41	± 0.43	± 0.49
> 12.50	≤ 15.00	± 0.43	± 0.44	± 0.46	± 0.53
> 15.00	≤ 25.00	± 0.46	± 0.48	± 0.52	± 0.58

Tolerances on thickness of steel grades with a specified minimum yield strength 360 N/mm² < R_e ≤ 420 N/mm² (category C)

		Tolerances for a nominal width of			
			> 1200	> 1500	
Nominal thickness		**≤ 1200**	**≤ 1500**	**≤ 1800**	**> 1800**
	≤ 2.00	± 0.22	± 0.25	± 0.27	-
> 2.00	≤ 2.50	± 0.23	± 0.27	± 0.30	± 0.33
> 2.50	≤ 3.00	± 0.26	± 0.29	± 0.31	± 0.34
> 3.00	≤ 4.00	± 0.29	± 0.31	± 0.34	± 0.35
> 4.00	≤ 5.00	± 0.31	± 0.34	± 0.36	± 0.38
> 5.00	≤ 6.00	± 0.34	± 0.36	± 0.38	± 0.40
> 6.00	≤ 8.00	± 0.38	± 0.39	± 0.40	± 0.46
> 8.00	≤ 10.00	± 0.42	± 0.43	± 0.44	± 0.52
> 10.00	≤ 12.50	± 0.46	± 0.47	± 0.48	± 0.56
> 12.50	≤ 15.00	± 0.48	± 0.49	± 0.52	± 0.60
> 15.00	≤ 25.00	± 0.52	± 0.55	± 0.59	± 0.65

Tolerances on thickness of steel grades with a specified minimum yield strength 420 N/mm² < R_e ≤ 900 N/mm² (category D)

		Tolerances for a nominal width of			
			> 1200	> 1500	
Nominal thickness		**≤ 1200**	**≤ 1500**	**≤ 1800**	**> 1800**
	≤ 2.00	± 0.24	± 0.27	± 0.29	-
> 2.00	≤ 2.50	± 0.25	± 0.29	± 0.32	± 0.35
> 2.50	≤ 3.00	± 0.28	± 0.31	± 0.34	± 0.36
> 3.00	≤ 4.00	± 0.31	± 0.34	± 0.36	± 0.38
> 4.00	≤ 5.00	± 0.34	± 0.36	± 0.39	± 0.41
> 5.00	≤ 6.00	± 0.36	± 0.39	± 0.41	± 0.43
> 6.00	≤ 8.00	± 0.41	± 0.42	± 0.43	± 0.49
> 8.00	≤ 10.00	± 0.45	± 0.46	± 0.48	± 0.56
> 10.00	≤ 12.50	± 0.49	± 0.50	± 0.52	± 0.60
> 12.50	≤ 15.00	± 0.52	± 0.53	± 0.56	± 0.64
> 15.00	≤ 25.00	± 0.56	± 0.59	± 0.63	± 0.70

Option for maximum crown values

The following high crown C40 options are available for hot-rolled products. Crown values on the C20-position as well as minimum crown values on both C20 and C40 position are also available on request.

Maximum crown C40 in µm values for hot-rolled steel with a low carbon content for cold forming (DD11-DD14 in EN 10111: 2008).

Category 1	C 40			
Nominal thickness (mm)	**≤ 1200**	**> 1200**	**> 1500**	**> 1800**
From - up to		**≤ 1500**	**≤ 1800**	
> 1.47 - ≤ 2.00	40	40	40	40
> 2.00 - ≤ 2.50	40	40	50	50
> 2.50 - ≤ 3.00	40	40	50	50
> 3.00 - ≤ 6.00	40	50	50	50
> 6.00 - ≤ 11.00	50	50	50	50

Maximum crown C40 in µm values of structural steel grades (S185-S235-S275 ≤ 10mm in EN 10025-2:2004).

Category 2	C 40			
Nominal thickness (mm)	**≤ 1200**	**> 1200**	**> 1500**	**> 1800**
From - up to		**≤ 1500**	**≤ 1800**	
> 1.47 - ≤ 2.00	40	40	40	40
> 2.00 - ≤ 2.50	40	40	50	50
> 2.50 - ≤ 20.00	50	50	50	50

Maximum crown C40 in µm values of structural steel grades (S275 > 10mm in EN 10025-2:2004) and HSLA grades (S315MC in EN 10149-2:1996).

Category 3	C 40			
Nominal thickness (mm)	**≤ 1200**	**> 1200**	**> 1500**	**> 1800**
From - up to		**≤ 1500**	**≤ 1800**	
> 1.47 - ≤ 2.00	50	50	60	60
> 2.00 - ≤ 2.50	50	60	60	60
> 2.50 - ≤ 3.00	50	60	60	60
> 3.00 - ≤ 20.00	60	60	70	70

Maximum crown C40 in µm values of HSLA grades (S355MC, S420MC, S460MC, S500MC, S550MC in EN 10149-2:1996)

Category 4	C 40			
Nominal thickness (mm)	**≤ 1200**	**> 1200**	**> 1500**	**> 1800**
From - up to		**≤ 1500**	**≤ 1800**	
> 1.47 - ≤ 2.00	60	70	70	70
> 2.00 - ≤ 2.50	60	70	80	80
> 2.50 - ≤ 3.00	60	70	80	80
> 3.00 - ≤ 5.00	70	70	80	80
> 5.00 - ≤ 20.00	80	80	80	80

Tolerances on width

Tolerances in mm.

		Tolerances mill edges		Tolerances trimmed edges	
Nominal width		**lower**	**upper**	**lower**	**upper**
≥ 700	≤ 1200	0	20	0	3
> 1200	≤ 1850	0	20	0	5
> 1850	≤ 2070	0	25	0	6

Tolerances for wide strip and slit wide strip

The tolerances for wide strip and slit wide strip comply with standard EN 10051:2010.

The specified values for wide strip do not apply to the uncropped ends of the coil ('head' and 'tail'). The length of these uncropped ends is calculated using the following formula:

length (in metres) = 90/nominal thickness (in mm), with a maximum of 20 metres.

If required, this part of the coil can be removed, however an additional cost may be charged for this.

Edge camber

The deviation from the edge over a length of 5000mm:
- with mill edges, no more than 20mm
- with trimmed edges, no more than 15mm.

Flatness

Requirements as regards flatness can be agreed at the time of enquiry.

Cold-rolled

Appendix B

Tolerances applicable to cold-rolled products (EN 10131:2006)

Tolerances on thickness

Tolerances closer than special tolerances may be agreed at the time of enquiry. Tolerances in mm.

Tolerances on thickness for steel grades with a specified minimum yield strength R_e < 260 N/mm².

Nominal thickness		Normal tolerances for a nominal width of [1]			Special tolerances (S) for a nominal width of [1 2]		
		≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.35	≤ 0.40	± 0.03	± 0.04	± 0.05	± 0.020	± 0.025	± 0.030
> 0.40	≤ 0.60	± 0.03	± 0.04	± 0.05	± 0.025	± 0.030	± 0.035
> 0.60	≤ 0.80	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
> 0.80	≤ 1.00	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
> 1.00	≤ 1.20	± 0.06	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
> 1.20	≤ 1.60	± 0.08	± 0.09	± 0.10	± 0.050	± 0.060	± 0.070
> 1.60	≤ 2.00	± 0.10	± 0.11	± 0.12	± 0.060	± 0.070	± 0.080
> 2.00	≤ 2.50	± 0.12	± 0.13	± 0.14	± 0.080	± 0.090	± 0.100
> 2.50	≤ 3.00	± 0.15	± 0.15	± 0.16	± 0.100	± 0.110	± 0.120

1. Around cold-rolled welds - the pickling welds - an increase of 20% at the most over the thickness is allowed over a length of 15 metres.
2. For special tolerances, not all combinations of thickness and width are available in every product. Please contact us for more details.

Tolerances on thickness for steel grades with a specified minimum yield strength 260 N/mm² ≤ R_e < 340 N/mm².

Nominal thickness		Normal tolerances for a nominal width of [1]			Special tolerances (S) for a nominal width of [1 2]		
		≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.35	≤ 0.40	± 0.04	± 0.05	± 0.06	± 0.025	± 0.030	± 0.035
> 0.40	≤ 0.60	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
> 0.60	≤ 0.80	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
> 0.80	≤ 1.00	± 0.06	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
> 1.00	≤ 1.20	± 0.07	± 0.08	± 0.10	± 0.050	± 0.060	± 0.070
> 1.20	≤ 1.60	± 0.09	± 0.11	± 0.12	± 0.060	± 0.070	± 0.080
> 1.60	≤ 2.00	± 0.12	± 0.13	± 0.14	± 0.070	± 0.080	± 0.100
> 2.00	≤ 2.50	± 0.14	± 0.15	± 0.16	± 0.100	± 0.110	± 0.120
> 2.50	≤ 3.00	± 0.17	± 0.18	± 0.18	± 0.120	± 0.130	± 0.140

1. Around cold-rolled welds - the pickling welds - an increase of 20% at the most over the thickness is allowed over a length of 15 metres.
2. For special tolerances, not all combinations of thickness and width are available in every product. Please contact us for more details.

Tolerances on thickness for steel grades with a specified minimum yield strength 340 N/mm² ≤ R_e ≤ 420 N/mm².

Nominal thickness		Normal tolerances for a nominal width of [1]			Special tolerances (S) for a nominal width of [1 2]		
		≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.35	≤ 0.40	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
> 0.40	≤ 0.60	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
> 0.60	≤ 0.80	± 0.06	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
> 0.80	≤ 1.00	± 0.07	± 0.08	± 0.10	± 0.050	± 0.060	± 0.070
> 1.00	≤ 1.20	± 0.09	± 0.10	± 0.11	± 0.060	± 0.070	± 0.080
> 1.20	≤ 1.60	± 0.11	± 0.12	± 0.14	± 0.070	± 0.080	± 0.100
> 1.60	≤ 2.00	± 0.14	± 0.15	± 0.17	± 0.080	± 0.100	± 0.110
> 2.00	≤ 2.50	± 0.16	± 0.18	± 0.19	± 0.110	± 0.120	± 0.130
> 2.50	≤ 3.00	± 0.20	± 0.20	± 0.21	± 0.130	± 0.140	± 0.150

[1.] Around cold-rolled welds - the pickling welds - an increase of 20% at the most over the thickness is allowed over a length of 15 metres.

[2.] For special tolerances, not all combinations of thickness and width are available in every product. Please contact us for more details.

Tolerances on thickness for steel grades with a specified minimum yield strength R_e > 420 N/mm².

Nominal thickness		Normal tolerances for a nominal width of [1]			Special tolerances (S) for a nominal width of [1 2]		
		≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.35	≤ 0.40	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
> 0.40	≤ 0.60	± 0.05	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
> 0.60	≤ 0.80	± 0.06	± 0.08	± 0.10	± 0.050	± 0.060	± 0.070
> 0.80	≤ 1.00	± 0.08	± 0.10	± 0.11	± 0.060	± 0.070	± 0.080
> 1.00	≤ 1.20	± 0.10	± 0.11	± 0.13	± 0.070	± 0.080	± 0.100
> 1.20	≤ 1.60	± 0.13	± 0.14	± 0.16	± 0.080	± 0.100	± 0.110
> 1.60	≤ 2.00	± 0.16	± 0.17	± 0.19	± 0.100	± 0.110	± 0.130
> 2.00	≤ 2.50	± 0.19	± 0.20	± 0.22	± 0.130	± 0.140	± 0.160
> 2.50	≤ 3.00	± 0.22	± 0.23	± 0.24	± 0.160	± 0.170	± 0.180

1. Around cold-rolled welds - the pickling welds - an increase of 20% at the most over the thickness is allowed over a length of 15 metres.
2. For special tolerances, not all combinations of thickness and width are available in every product. Please contact us for more details.

Tolerances on width

Dimensions in mm.

Nominal width		Normal tolerances		Special tolerances (S)	
≤ 1200		**0**	**4**	**0**	**2**
> 1200	≤ 1500	0	5	0	2
> 1500		0	6	0	3
> 1500		0	6	0	3

Out-of-squareness (products supplied as cut sheets only)

The deviation does not exceed 1% of the actual width of the sheet according to the EN 10131:2006 standard. The deviation from the edge camber does not exceed 5mm for a length of 2 metres as specified in EN 10131:2006.

Flatness (products supplied as skin-passed cut sheets only)

Flatness complies with EN 10131:2006

If there is a dispute about the flatness of material that was ordered to the special tolerances shown in table 8 of EN 10131:2006, then the minimum acceptable standards of flatness described below must be verified.

Criteria in case of disputes over Special (FS) flatness tolerances (R_{eL} < 260 N/mm²)

Dimensions in mm.

Nominal width	Edge-wave length	Maximum acceptable wave height
< 1500	> 200	< 1% of edge-wave length
≥ 1500	> 200	< 1.5% of edge-wave length
–	< 200	2mm

Metallic coated

Appendix C

Tolerances applicable to metallic coated products (EN 10143:2006)

Tolerances on thickness

Tolerances closer than special tolerances may be agreed at the time of enquiry.
Tolerances in mm.

The following tolerances apply to the grades with a minimum value for the yield strength lower than 260 N/mm^2.

Nominal thickness		Normal tolerances for a nominal width of [1] [2]			Special tolerances (S) for a nominal width of [1] [2]		
		≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
> 0.40	≤ 0.60	± 0.04	± 0.05	± 0.06	± 0.035	± 0.040	± 0.045
> 0.60	≤ 0.80	± 0.05	± 0.06	± 0.07	± 0.040	± 0.045	± 0.050
> 0.80	≤ 1.00	± 0.06	± 0.07	± 0.08	± 0.045	± 0.050	± 0.060
> 1.00	≤ 1.20	± 0.07	± 0.08	± 0.09	± 0.050	± 0.060	± 0.070
> 1.20	≤ 1.60	± 0.10	± 0.11	± 0.12	± 0.060	± 0.070	± 0.080
> 1.60	≤ 2.00	± 0.12	± 0.13	± 0.14	± 0.070	± 0.080	± 0.090
> 2.00	≤ 2.50	± 0.14	± 0.15	± 0.16	± 0.090	± 0.100	± 0.110
> 2.50	≤ 3.00	± 0.17	± 0.17	± 0.18	± 0.110	± 0.120	± 0.130
> 3.00	≤ 5.00	± 0.20	± 0.20	± 0.21	± 0.15	± 0.16	± 0.17
> 5.00	≤ 6.50	± 0.22	± 0.22	± 0.23	± 0.17	± 0.18	± 0.19

[1.] Around cold-rolled welds an increase of 20% at the most over the thickness tolerance is allowed over a length of 15 metres.

[2.] For zinc coatings ≥ Z450 the tolerance on the thickness must be raised by 0.02mm.

The following tolerances apply to the steel grades with a minimum value for the yield strength 260 N/mm² ≤ $R_{p0.2}$ < 360 N/mm² and for grades DX51D and S550GD.

Nominal thickness		Normal tolerances for a nominal width of [1] [2]			Special tolerances (S) for a nominal width of [1] [2]		
		≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.35	≤ 0.40	± 0.05	± 0.06	-	± 0.035	± 0.040	-
> 0.40	≤ 0.60	± 0.05	± 0.06	± 0.07	± 0.040	± 0.045	± 0.050
> 0.60	≤ 0.80	± 0.06	± 0.07	± 0.08	± 0.045	± 0.050	± 0.060
> 0.80	≤ 1.00	± 0.07	± 0.08	± 0.09	± 0.050	± 0.060	± 0.070
> 1.00	≤ 1.20	± 0.08	± 0.09	± 0.11	± 0.060	± 0.070	± 0.080
> 1.20	≤ 1.60	± 0.11	± 0.13	± 0.14	± 0.070	± 0.080	± 0.090
> 1.60	≤ 2.00	± 0.14	± 0.15	± 0.16	± 0.080	± 0.090	± 0.110
> 2.00	≤ 2.50	± 0.16	± 0.17	± 0.18	± 0.110	± 0.120	± 0.130
> 2.50	≤ 3.00	± 0.19	± 0.20	± 0.20	± 0.130	± 0.140	± 0.150
> 3.00	≤ 5.00	± 0.22	± 0.24	± 0.25	± 0.17	± 0.18	± 0.19
> 5.00	≤ 6.50	± 0.24	± 0.25	± 0.26	± 0.19	± 0.20	± 0.21

1. Around cold-rolled welds an increase of 20% at the most over the thickness tolerance is allowed over a length of 15 metres.
2. For zinc coatings ≥ Z450 the tolerance on the thickness must be raised by 0.02mm.

The following tolerances apply to the steel grades with a minimum value for the yield strength 360 N/mm² ≤ $R_{p0.2}$ ≤ 420 N/mm².

Nominal thickness		Normal tolerances for a nominal width of [1] [2]			Special tolerances (S) for a nominal width of [1] [2]		
		≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.35	≤ 0.40	± 0.05	± 0.06	-	± 0.040	± 0.045	-
> 0.40	≤ 0.60	± 0.06	± 0.07	± 0.08	± 0.045	± 0.050	± 0.060
> 0.60	≤ 0.80	± 0.07	± 0.08	± 0.09	± 0.050	± 0.060	± 0.070
> 0.80	≤ 1.00	± 0.08	± 0.09	± 0.11	± 0.060	± 0.070	± 0.080
> 1.00	≤ 1.20	± 0.10	± 0.11	± 0.12	± 0.070	± 0.080	± 0.090
> 1.20	≤ 1.60	± 0.13	± 0.14	± 0.16	± 0.080	± 0.090	± 0.110
> 1.60	≤ 2.00	± 0.16	± 0.17	± 0.19	± 0.090	± 0.110	± 0.120
> 2.00	≤ 2.50	± 0.18	± 0.20	± 0.21	± 0.120	± 0.130	± 0.140
> 2.50	≤ 3.00	± 0.22	± 0.22	± 0.23	± 0.140	± 0.150	± 0.160
> 3.00	≤ 5.00	± 0.22	± 0.24	± 0.25	± 0.17	± 0.18	± 0.19
> 5.00	≤ 6.50	± 0.24	± 0.25	± 0.26	± 0.19	± 0.20	± 0.21

1. Around cold-rolled welds an increase of 20% at the most over the thickness tolerance is allowed over a length of 15 metres.
2. For zinc coatings ≥ Z450 the tolerance on the thickness must be raised by 0.02mm.

The following tolerances apply to the steel grades with a minimum value for the yield strength 420 N/mm² < $R_{p0.2}$ ≤ 900 N/mm².

Nominal thickness		Normal tolerances for a nominal width of [1] [2]			Special tolerances (S) for a nominal width of [1] [2]		
		≤ 1200	> 1200 ≤ 1500	> 1500	≤ 1200	> 1200 ≤ 1500	> 1500
≥ 0.35	≤ 0.40	± 0.06	± 0.07	-	± 0.045	± 0.050	-
> 0.40	≤ 0.60	± 0.06	± 0.08	± 0.09	± 0.050	± 0.060	± 0.070
> 0.60	≤ 0.80	± 0.07	± 0.09	± 0.11	± 0.060	± 0.070	± 0.080
> 0.80	≤ 1.00	± 0.09	± 0.11	± 0.12	± 0.070	± 0.080	± 0.090
> 1.00	≤ 1.20	± 0.11	± 0.13	± 0.14	± 0.080	± 0.090	± 0.110
> 1.20	≤ 1.60	± 0.15	± 0.16	± 0.18	± 0.090	± 0.110	± 0.120
> 1.60	≤ 2.00	± 0.18	± 0.19	± 0.21	± 0.110	± 0.120	± 0.140
> 2.00	≤ 2.50	± 0.21	± 0.22	± 0.24	± 0.140	± 0.150	± 0.170
> 2.50	≤ 3.00	± 0.24	± 0.25	± 0.26	± 0.170	± 0.180	± 0.190
> 3.00	≤ 5.00	± 0.26	± 0.27	± 0.28	± 0.23	± 0.24	± 0.26
> 5.00	≤ 6.50	± 0.28	± 0.29	± 0.30	± 0.25	± 0.26	± 0.28

[1.] Around cold-rolled welds an increase of 20% at the most over the thickness tolerance is allowed over a length of 15 metres.

[2.] For zinc coatings ≥ Z450 the tolerance on the thickness must be raised by 0.02mm.

Tolerances on width

The tolerances on width comply with standard EN 10143:2006.
MagiZinc® is not included in the standard, but fulfils EN 10143:2006 requirements.
Tighter tolerances are available on request.

Tolerances in mm

Normal width tolerances are available for mill edge (untrimmed) products.
Special width tolerances are available for trimmed edges.

		Normal tolerances		Special tolerances (S)	
Nominal width		**lower**	**upper**	**lower**	**upper**
≥ 700	≤ 1200	0	5	0	2
> 1200	≤ 1500	0	6	0	2
> 1500	≤ 1800	0	7	0	3
	> 1800	0	8	0	3

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