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
Hot-rolled

Direct-rolled

Cold-rolled

Metallic coated

Service centres

General information
Terms and conditions of sale
The information in this product catalogue is non binding upon Tata Steel Europe Ltd. and her subsidiary companies and is given for information purposes only. Tata Steel Europe Ltd. and her subsidiary companies do not in any way, implicitly or explicitly, guarantee that the information in this product catalogue is correct, free of errors, complete or exhaustive. Tata Steel Europe Ltd. and her subsidiary companies do not accept any form of liability or responsibility for damages or claims (partly) based on or derived from the information in this product catalogue.

The information in this product catalogue is not in any way, implicitly or explicitly, meant to be an offer in any way from Tata Steel IJmuiden BV or Tata Steel UK Ltd. and must not in any way be understood or interpreted to be such an offer. Offers can only be obtained from authorized staff at the sales department of Tata Steel Steel IJmuiden BV, Tata Steel UK Ltd. or from authorized staff at your local Sales Office.

Tata Steel IJmuiden BV and Tata Steel UK Ltd. and their group companies within Tata Steel of Europe operate standard conditions of sale which they apply to all their sales. These conditions contain limitation of liability, retention of title and forum / choice of law clauses. See our website for relevant documents with regard to sales confirmed on behalf of Tata Steel IJmuiden BV and for sales confirmed on behalf of Tata Steel UK Ltd. Terms and conditions used or referred to by buyer are already herewith explicitly rejected.
# Hot-rolled

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>11</td>
</tr>
<tr>
<td>Steel for forming</td>
<td>15</td>
</tr>
<tr>
<td>High-strength steel</td>
<td>22</td>
</tr>
<tr>
<td>Advanced and ultra high-strength steel</td>
<td>36</td>
</tr>
<tr>
<td>Structural steel</td>
<td>43</td>
</tr>
<tr>
<td>Floor plate</td>
<td>52</td>
</tr>
<tr>
<td>Heat-treatable steel</td>
<td>55</td>
</tr>
<tr>
<td>Steel for pressure vessels</td>
<td>59</td>
</tr>
<tr>
<td>Steel for gas cylinders</td>
<td>63</td>
</tr>
<tr>
<td>Ship plate</td>
<td>65</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Side/surface condition</th>
<th>non-pickled</th>
<th>pickled</th>
<th>pickled and oiled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mill edges</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Trimmed edges</td>
<td>-</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Production location</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>Surface finish</td>
</tr>
<tr>
<td>Oiling</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

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.
<table>
<thead>
<tr>
<th>Product type</th>
<th>Thickness tolerances available (%) of full EN 10051: 2010 tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Steel for forming</td>
<td>Yes</td>
</tr>
<tr>
<td>High-strength low-alloy</td>
<td>Yes</td>
</tr>
<tr>
<td>(HSLA EN 10149-2)</td>
<td></td>
</tr>
<tr>
<td>Ympress HSLA</td>
<td>Yes</td>
</tr>
<tr>
<td>Ympress Laser</td>
<td>Yes</td>
</tr>
<tr>
<td>Structural steel</td>
<td>Yes</td>
</tr>
<tr>
<td>Durbar floor plate</td>
<td>Yes</td>
</tr>
<tr>
<td>Case hardening steel</td>
<td>Yes</td>
</tr>
<tr>
<td>Hardenable steel</td>
<td>Yes</td>
</tr>
<tr>
<td>Dual phase steel</td>
<td>Yes</td>
</tr>
<tr>
<td>Hot forming steel</td>
<td>Yes</td>
</tr>
<tr>
<td>Steel for pressure vessels</td>
<td>Yes</td>
</tr>
<tr>
<td>Steel for gas cylinders</td>
<td>Yes</td>
</tr>
<tr>
<td>Ship plate</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Production location</th>
<th>Description</th>
<th>UK</th>
<th>NL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coil diameter inner non-pickled</td>
<td>762mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coil diameter inner pickled</td>
<td>610mm standard</td>
<td>762mm not available</td>
</tr>
<tr>
<td></td>
<td>Tolerance on inner diameter</td>
<td>+0/-50mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coil diameter outer non-pickled</td>
<td>Outer diameter available is 10/7 x width to reduce possibility of coil tipping over</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outer diameter limit 2200mm</td>
<td>Max. 2100mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Min. 1650mm</td>
<td>Min. 1050mm</td>
</tr>
<tr>
<td></td>
<td>Coil diameter outer pickled and oiled</td>
<td>Outer diameter available is 10/7 x width to reduce possibility of coil tipping over</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outer diameter limit 2200mm</td>
<td>Outer diameter limit 2000mm (2050mm when inner diameter is 762mm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Min. 1650mm</td>
<td>Min. 1050mm</td>
</tr>
<tr>
<td></td>
<td>Coil weight</td>
<td>Max. 34 tonnes</td>
<td>Max. 33 tonnes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>KIM: width ≤ 1200mm</td>
<td>12.2 - 19.7 kg/mm width</td>
<td>15.5 - 23.0 kg/mm width</td>
</tr>
<tr>
<td></td>
<td>KIM: 1200mm &lt; width ≤ 1700 mm</td>
<td>12.1 - 19.2 kg/mm width</td>
<td>15.5 - 21.7 kg/mm width</td>
</tr>
<tr>
<td></td>
<td>KIM: width &gt; 1700mm</td>
<td>12.1 - 19.1 kg/mm width</td>
<td>11.0 kg/mm width and 15.5 - 21.7 kg/mm width</td>
</tr>
<tr>
<td></td>
<td>Minimum tonnage per order</td>
<td>Refer to price list for order quantity details</td>
<td>Minimum order quantities may apply</td>
</tr>
</tbody>
</table>

Additional maximum limits from transport limits and outer coil diameter may apply.

Some HR products may have different coil weight ranges.
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.

<table>
<thead>
<tr>
<th>European standard</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10111: 2008</td>
<td>DIN 1614 part 2</td>
</tr>
<tr>
<td>DD11(^1) 2</td>
<td>StW22</td>
</tr>
<tr>
<td>DD12</td>
<td>RRStW23</td>
</tr>
<tr>
<td>DD13</td>
<td>StW24</td>
</tr>
<tr>
<td>DD13WR(^1)</td>
<td>-</td>
</tr>
<tr>
<td>DD14</td>
<td>-</td>
</tr>
<tr>
<td>DD14+ (^1)</td>
<td>-</td>
</tr>
</tbody>
</table>

\(^1\) 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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. - Max. yield strength $R_{eL}$¹</th>
<th>Max. tensile strength $R_m$</th>
<th>Min. elongation after fracture $A$</th>
<th>Min. bend test diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10111: 2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td><strong>$L_o = 80\text{mm}$</strong></td>
<td><strong>$L_o = 5.65\sqrt{S_o}$</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 ≤ $t &lt; 2$</td>
<td>2 ≤ $t &lt; 3$</td>
<td>3 ≤ $t &lt; 11$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DD11</td>
<td>170 - 360</td>
<td>170 - 340</td>
<td>440</td>
<td>23</td>
</tr>
<tr>
<td>DD12</td>
<td>170 - 340</td>
<td>170 - 320</td>
<td>420</td>
<td>25</td>
</tr>
<tr>
<td>DD13</td>
<td>170 - 330</td>
<td>170 - 310</td>
<td>400</td>
<td>28</td>
</tr>
<tr>
<td>DD14</td>
<td>170 - 310</td>
<td>170 - 290</td>
<td>380</td>
<td>31</td>
</tr>
<tr>
<td>DD14+</td>
<td>²</td>
<td>170 - 250</td>
<td>340</td>
<td>36</td>
</tr>
</tbody>
</table>

¹ Lower yield strength or 0.2% proof stress applies.

$t$ – material thickness in mm.

**DD13WR**¹

<table>
<thead>
<tr>
<th>Test direction</th>
<th>Yield strength $R_{eL}$¹</th>
<th>Tensile strength $R_m$</th>
<th>Elongation after fracture $A_{dp5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical</td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
</tr>
<tr>
<td>Transverse</td>
<td>271</td>
<td>379</td>
<td>38.4</td>
</tr>
<tr>
<td>Longitudinal</td>
<td>252</td>
<td>369</td>
<td>40.3</td>
</tr>
</tbody>
</table>


$t$ – 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:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DD11</td>
<td>0.120</td>
<td>0.60</td>
<td>0.045</td>
<td>0.045</td>
<td></td>
</tr>
<tr>
<td>DD12</td>
<td>0.100</td>
<td>0.45</td>
<td>0.035</td>
<td>0.035</td>
<td></td>
</tr>
<tr>
<td>DD13</td>
<td>0.080</td>
<td>0.40</td>
<td>0.030</td>
<td>0.030</td>
<td></td>
</tr>
<tr>
<td>DD13WR</td>
<td>0.068</td>
<td>0.36</td>
<td>0.012</td>
<td>0.0065</td>
<td></td>
</tr>
<tr>
<td>DD14</td>
<td>0.080</td>
<td>0.35</td>
<td>0.025</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td>DD14+</td>
<td>0.055</td>
<td>0.25</td>
<td>0.020</td>
<td>0.020</td>
<td></td>
</tr>
</tbody>
</table>


All values are in weight%.
# Dimensions

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

**Dimensions in mm.**

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD11</td>
<td>DD12</td>
</tr>
<tr>
<td>1.47 - 1.50</td>
<td>1300</td>
</tr>
<tr>
<td>1.50 - 1.60</td>
<td>1330</td>
</tr>
<tr>
<td>1.60 - 1.70</td>
<td>1405</td>
</tr>
<tr>
<td>1.70 - 1.80</td>
<td>1480</td>
</tr>
<tr>
<td>1.80 - 1.90</td>
<td>1555</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td>1630</td>
</tr>
<tr>
<td>2.00 - 2.20</td>
<td>1705</td>
</tr>
<tr>
<td>2.20 - 2.40</td>
<td>1820</td>
</tr>
<tr>
<td>2.40 - 2.50</td>
<td>1925</td>
</tr>
<tr>
<td>2.50 - 2.60</td>
<td>1970</td>
</tr>
<tr>
<td>2.60 - 2.70</td>
<td>2020</td>
</tr>
<tr>
<td>2.70 - 11.00</td>
<td>2070</td>
</tr>
<tr>
<td>12.50 - 20.00</td>
<td>2070</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DD11</td>
</tr>
<tr>
<td>1.50 - 1.60</td>
<td>1250</td>
</tr>
<tr>
<td>1.60 - 1.70</td>
<td>1275</td>
</tr>
<tr>
<td>1.70 - 1.80</td>
<td>1315</td>
</tr>
<tr>
<td>1.80 - 1.90</td>
<td>1511</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td>1511</td>
</tr>
<tr>
<td>2.00 - 2.50</td>
<td>1600</td>
</tr>
<tr>
<td>2.50 - 2.90</td>
<td>1749</td>
</tr>
<tr>
<td>2.90 - 16.50</td>
<td>1830</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
<th>DD11</th>
<th>DD12</th>
<th>DD13</th>
<th>DD13WR</th>
<th>DD14</th>
<th>DD14+</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.50 - 1.60</td>
<td></td>
<td>1330</td>
<td>1330</td>
<td>1330</td>
<td>-</td>
<td>1330</td>
<td>-</td>
</tr>
<tr>
<td>1.60 - 1.70</td>
<td></td>
<td>1405</td>
<td>1405</td>
<td>1405</td>
<td>-</td>
<td>1405</td>
<td>-</td>
</tr>
<tr>
<td>1.70 - 1.80</td>
<td></td>
<td>1480</td>
<td>1480</td>
<td>1480</td>
<td>-</td>
<td>1480</td>
<td>-</td>
</tr>
<tr>
<td>1.80 - 1.90</td>
<td></td>
<td>1555</td>
<td>1555</td>
<td>1555</td>
<td>-</td>
<td>1555</td>
<td>-</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td></td>
<td>1630</td>
<td>1630</td>
<td>1630</td>
<td>-</td>
<td>1630</td>
<td>-</td>
</tr>
<tr>
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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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
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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:

<table>
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<tr>
<th>Tata Steel Grade</th>
<th>Tata Steel Grade</th>
<th>EN 10149-2:2013 Grade</th>
<th>Germany SEW 092 Grade</th>
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<td>XF300</td>
<td>S315MC</td>
<td>QStE340TM</td>
</tr>
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<td>Ympress S355MC</td>
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<td>S355MC</td>
<td>QStE380TM</td>
</tr>
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<td>XF420</td>
<td>S420MC</td>
<td>QStE460TM</td>
</tr>
<tr>
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<td>XF450</td>
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<td>QStE500TM</td>
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<td>S500MC</td>
<td>QStE550TM</td>
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<td>S550MC</td>
<td>-</td>
</tr>
<tr>
<td>Ympress S650MC</td>
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<td>S650MC</td>
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<td>Ympress E690TM</td>
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<td>Ympress S700MC</td>
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Ympress Laser grades comply with the following standards:

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<th>Thickness</th>
<th>Corresponding designations</th>
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<tr>
<td></td>
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<tr>
<td></td>
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<td>Germany SEW 092: -</td>
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<td>12.7 - 20</td>
<td>EN 10025-2:2004: S235J0+AR</td>
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<td>EN 10149-2:2013: -</td>
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<td>Germany SEW 092: -</td>
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<td>Germany SEW 092: QStE380TM</td>
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<tr>
<td>Ympress Laser S420MC</td>
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<tr>
<td></td>
<td></td>
<td>Germany SEW 092: QStE460TM</td>
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</table>
# 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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. yield strength $R_{eH}$</th>
<th>Tensile strength $R_m$</th>
<th>Min. elongation after fracture $A%$</th>
<th>Min. bend test diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>t &lt; 3</td>
<td>t ≥ 3</td>
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<tr>
<td>S315MC</td>
<td>315</td>
<td>390 - 510</td>
<td>20</td>
<td>24</td>
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<td>400 - 500</td>
<td>24</td>
<td>33</td>
</tr>
<tr>
<td>S355MC</td>
<td>355</td>
<td>430 - 550</td>
<td>19</td>
<td>23</td>
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<td>450 - 550</td>
<td>22</td>
<td>27</td>
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<td>S420MC</td>
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<td>14</td>
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<td>700</td>
<td>750 - 900</td>
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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
### Ympress Laser E250C
- **Min. yield strength** $R_{el}$: 240 N/mm²
- **Tensile strength** $R_m$: 370 - 490 N/mm²
- **Min. elongation after fracture** $A%$: 23, 24, 24
- **Min. bend test diameter** $t$: 0.5 t, 0.5 t

### Ympress Laser S355MC
- **Min. yield strength** $R_{el}$: 355 N/mm²
- **Tensile strength** $R_m$: 450 - 550 N/mm²
- **Min. elongation after fracture** $A%$: 22, 27, 24
- **Min. bend test diameter** $t$: 0 t, 0 t

### Ympress Laser S420MC
- **Min. yield strength** $R_{el}$: 420 N/mm²
- **Tensile strength** $R_m$: 500 - 600 N/mm²
- **Min. elongation after fracture** $A%$: 18, 22, 21
- **Min. bend test diameter** $t$: 0 t, 0 t

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

### XF300
- **Min. yield strength** $R_{el}$: 300 N/mm²
- **Tensile strength** $R_m$: ≥ 400 N/mm²
- **Min. elongation after fracture** $A%$: 26, 26, 26
- **Min. bend test diameter** $t$: 0 t, 0 t

### XF350
- **Min. yield strength** $R_{el}$: 350 N/mm²
- **Tensile strength** $R_m$: ≥ 430 N/mm²
- **Min. elongation after fracture** $A%$: 23, 23, 23
- **Min. bend test diameter** $t$: 0.5 t, 0.5 t

### XF400
- **Min. yield strength** $R_{el}$: 400 N/mm²
- **Tensile strength** $R_m$: ≥ 460 N/mm²
- **Min. elongation after fracture** $A%$: 20, 20, 20
- **Min. bend test diameter** $t$: 0.5 t, 0.5 t

### XF450
- **Min. yield strength** $R_{el}$: 450 N/mm²
- **Tensile strength** $R_m$: ≥ 500 N/mm²
- **Min. elongation after fracture** $A%$: 20, 20, 20
- **Min. bend test diameter** $t$: 1 t, 1 t

### XF500
- **Min. yield strength** $R_{el}$: 500 N/mm²
- **Tensile strength** $R_m$: ≥ 550 N/mm²
- **Min. elongation after fracture** $A%$: 18, 18, 18
- **Min. bend test diameter** $t$: 1 t, 1 t

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

### 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.

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<th>P Max.</th>
<th>S Max.</th>
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<th>Nb Max</th>
<th>V Max</th>
<th>Ti Max</th>
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<th>Cu Max</th>
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<td>0.02</td>
<td>0.5</td>
<td>0.015</td>
<td>0.09</td>
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<td>0.015</td>
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<td>0.01</td>
<td>0.15</td>
<td>0.06</td>
<td>-</td>
</tr>
</tbody>
</table>

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%.
<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Si</th>
<th>Al_{tot}</th>
<th>Nb</th>
<th>V</th>
<th>Ti</th>
<th>Mo</th>
<th>Cu</th>
</tr>
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<td>Max.</td>
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<td>0.015</td>
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<td>0.025</td>
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<td>0.08</td>
<td>0-</td>
<td>0.05</td>
<td>-</td>
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</tr>
</tbody>
</table>

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%.

<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Si</th>
<th>Micro-alloying elements (e.g. Nb)</th>
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<td>0.03</td>
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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.

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<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
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<td><strong>S355MC</strong></td>
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</tr>
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<tr>
<td>15.00 - 20.00</td>
<td>-</td>
</tr>
</tbody>
</table>

*table continued on next page*
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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width Ympress Laser E250C</th>
<th>Max. width Ympress Laser S355MC</th>
<th>Max. width Ympress Laser S420MC</th>
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<tbody>
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<td>1.49 - 1.50</td>
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</tr>
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<td>1100</td>
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</tr>
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<td>1.57 - 1.60</td>
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</table>

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.

<table>
<thead>
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<th>Thickness</th>
<th>Max. width</th>
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<td><strong>S315MC</strong></td>
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<tr>
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<tr>
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</table>

The minimum width is 900mm.

Other dimensions are available - please contact us.
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<td>9.00 - 15.00</td>
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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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
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The minimum width is 1000mm.
Widths smaller than 1000mm and/or thicknesses up to 20mm may be available - please contact us.
<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Thickness Max. width</th>
<th>Ympress Laser E250C</th>
<th>Ympress Laser S355MC</th>
<th>Ympress Laser S420MC</th>
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</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
<th>S315MC</th>
<th>S355MC</th>
<th>S420MC</th>
<th>S460MC</th>
<th>S500MC</th>
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<tbody>
<tr>
<td>1.50 - 1.60</td>
<td></td>
<td>1100</td>
<td>1061</td>
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<td>1.80 - 1.90</td>
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<td>1100</td>
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<td>1250</td>
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<td>1300</td>
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<tr>
<td>2.50 - 2.60</td>
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<tr>
<td>2.60 - 2.70</td>
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<td>1530</td>
<td>1400</td>
</tr>
<tr>
<td>3.50 - 4.00</td>
<td></td>
<td>1530</td>
<td>1530</td>
<td>1530</td>
<td>1400</td>
<td>1280</td>
</tr>
<tr>
<td>4.00 - 5.00</td>
<td></td>
<td>1530</td>
<td>1530</td>
<td>1530</td>
<td>1400</td>
<td>1280</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
<th>XF300</th>
<th>XF350</th>
<th>XF400</th>
<th>XF450</th>
<th>XF500</th>
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</thead>
<tbody>
<tr>
<td>1.50 - 1.60</td>
<td></td>
<td>1099</td>
<td>1061</td>
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<td>1250</td>
<td>-</td>
<td>-</td>
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<td>1.80 - 1.90</td>
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<td>1250</td>
<td>1125</td>
<td>1100</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td></td>
<td>1300</td>
<td>1250</td>
<td>1250</td>
<td>1175</td>
<td>1150</td>
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<tr>
<td>2.00 - 2.20</td>
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<td>1250</td>
<td>1250</td>
<td>1250</td>
<td>1250</td>
</tr>
<tr>
<td>2.20 - 2.40</td>
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<td>1250</td>
<td>1330</td>
<td>1300</td>
</tr>
<tr>
<td>2.40 - 2.50</td>
<td></td>
<td>1530</td>
<td>1350</td>
<td>1350</td>
<td>1350</td>
<td>1300</td>
</tr>
<tr>
<td>2.50 - 2.60</td>
<td></td>
<td>1530</td>
<td>1400</td>
<td>1400</td>
<td>1400</td>
<td>1300</td>
</tr>
<tr>
<td>2.60 - 3.50</td>
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<td>1530</td>
<td>1530</td>
<td>1400</td>
</tr>
<tr>
<td>3.50 - 4.00</td>
<td></td>
<td>1530</td>
<td>1530</td>
<td>1530</td>
<td>1400</td>
<td>1280</td>
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<tr>
<td>4.00 - 5.00</td>
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<td>1530</td>
<td>1530</td>
<td>1400</td>
<td>1280</td>
</tr>
</tbody>
</table>

(table continued on next page)
(table continued from previous page)

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:

<table>
<thead>
<tr>
<th></th>
<th>EN 10338:2015</th>
<th>EN 10083-3:2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB590 HR</td>
<td>HDT580F</td>
<td>-</td>
</tr>
<tr>
<td>HR XPF800-UC</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HR CP800-UC</td>
<td>HDT760C</td>
<td>-</td>
</tr>
<tr>
<td>HR HQ1500-UC</td>
<td>-</td>
<td>20MnB5&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1</sup> 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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Yield strength ( R_{p0.2} ) N/mm²</th>
<th>Tensile strength ( R_m ) N/mm²</th>
<th>Elongation after fracture ( A ) (( L_0 = 80)mm) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10338: HDT580F</td>
<td>440 - 600</td>
<td>≥ 580</td>
<td>&gt; 15</td>
</tr>
<tr>
<td>FB590 HR - Typical</td>
<td>490</td>
<td>595</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>530 (^2)</td>
<td>600 (^2)</td>
<td>18 (^2)</td>
</tr>
</tbody>
</table>

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 XP800-UC

<table>
<thead>
<tr>
<th>Grade</th>
<th>Standard</th>
<th>Test direction</th>
<th>Yield strength ( R_{p0.2} ) N/mm²</th>
<th>n-value</th>
<th>( A_{80} ) %</th>
<th>( A_{50} ) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR XP800-UC - Guaranteed</td>
<td>Tata Steel</td>
<td>L</td>
<td>680 - 820</td>
<td>780 - 920</td>
<td>≥ 14</td>
<td>≥ 16</td>
</tr>
<tr>
<td>HR XP800-UC - Typical</td>
<td>Tata Steel</td>
<td>L</td>
<td>730</td>
<td>820</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>760</td>
<td>840</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>HR660Y760T-CP</td>
<td>VDA</td>
<td>660-820</td>
<td>760 - 960</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>Yield strength $^1$</th>
<th>Tensile strength</th>
<th>Elongation after fracture $A$ ($L_0 = 50\text{mm}$)</th>
<th>Elongation after fracture $A$ ($L_0 = 5,65\sqrt{S_0}$)</th>
<th>Elongation after fracture $A$ ($L_0 = 80\text{mm}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR660Y760T-CP (VDA 239-100)</td>
<td>$R_{el}$ 660-820</td>
<td>$R_m$ 760-960</td>
<td>$\geq 11$</td>
<td>$\geq 13$</td>
<td>$\geq 10$</td>
</tr>
<tr>
<td>HDT780C (EN 10338:2015)</td>
<td>$\geq 760$</td>
<td>-</td>
<td>-</td>
<td>$\geq 12$</td>
<td>$\geq 10$</td>
</tr>
<tr>
<td>HR CP800-UC - Typical</td>
<td>700</td>
<td>790</td>
<td>16</td>
<td>17</td>
<td>14</td>
</tr>
</tbody>
</table>

$^1$ 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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>As delivered</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yield strength ¹</td>
<td>Tensile strength</td>
<td>Elongation after fracture A</td>
</tr>
<tr>
<td></td>
<td>$R_{p0,2}$</td>
<td>$R_m$</td>
<td>($L_0 = 80\text{mm}$)</td>
</tr>
<tr>
<td>HR HQ1500-UC - Guaranteed</td>
<td>≥320</td>
<td>≥500</td>
<td>≥15</td>
</tr>
<tr>
<td>HR HQ1500-UC - Typical</td>
<td>350 - 450</td>
<td>520 - 650</td>
<td>&gt;17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>Hot formed</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yield strength ¹</td>
<td>Tensile strength</td>
<td>Elongation after fracture A</td>
</tr>
<tr>
<td></td>
<td>$R_{p0,2}$</td>
<td>$R_m$</td>
<td>($L_0 = 50\text{mm}$)</td>
</tr>
<tr>
<td>HR HQ1500-UC - Guaranteed</td>
<td>1000 - 1250</td>
<td>1300 - 1600</td>
<td>≥5</td>
</tr>
<tr>
<td>HR HQ1500-UC - Typical</td>
<td>1023 - 1105</td>
<td>1420 - 1520</td>
<td>5 - 7</td>
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</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>Mn</th>
<th>Si</th>
<th>P</th>
<th>S</th>
<th>Al</th>
<th>Cr+</th>
<th>Mo</th>
<th>Nb+</th>
<th>Ti</th>
<th>V</th>
<th>B</th>
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<tbody>
<tr>
<td>EN 10338:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>HDT580F</td>
<td>0.18</td>
<td>0.5</td>
<td>2.0</td>
<td>0.05</td>
<td>0.010</td>
<td>2.0</td>
<td>1.0</td>
<td>0.15</td>
<td>0.15</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FB590 HR</td>
<td>0.18</td>
<td>0.5</td>
<td>2.0</td>
<td>0.05</td>
<td>0.010</td>
<td>2.0</td>
<td>1.0</td>
<td>0.15</td>
<td>0.15</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR XPF800-UC</td>
<td>0.08</td>
<td>1.7</td>
<td>0.5</td>
<td>0.020</td>
<td>0.005</td>
<td>0.015</td>
<td>0.3</td>
<td>0.2</td>
<td>0.3</td>
<td>0.008</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR CP800-UC</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Typical</td>
<td>0.18</td>
<td>2.5</td>
<td>1</td>
<td>0.08</td>
<td>0.015</td>
<td>1.2</td>
<td>1</td>
<td>0.25</td>
<td>0.005</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>HR HQ1500-UC</td>
<td>0.20-</td>
<td>1.1-</td>
<td>0.2-</td>
<td>0.02-</td>
<td>0.1-</td>
<td>0.02-</td>
<td>0.002-</td>
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<td></td>
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</tr>
<tr>
<td>- Typical</td>
<td>0.23</td>
<td>1.3</td>
<td>0.3</td>
<td>0.025</td>
<td>0.010</td>
<td>0.06</td>
<td>0.3</td>
<td>0.04</td>
<td>0.005</td>
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</tr>
<tr>
<td>HR HQ1500-UC</td>
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<td>0.24</td>
<td>0.01</td>
<td>0.005</td>
<td>0.04</td>
<td>0.2</td>
<td>0.03</td>
<td>0.003</td>
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<td>EN 10083-3:</td>
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<td>2006</td>
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</tr>
<tr>
<td>20MnB5</td>
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<td>0.4</td>
<td>0.025</td>
<td>0.035</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.005</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FB590 HR $^2$</td>
</tr>
<tr>
<td>1.80 - 1.90</td>
<td>-</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td>-</td>
</tr>
<tr>
<td>2.00 - 2.50</td>
<td>1181</td>
</tr>
<tr>
<td>2.50 - 2.80</td>
<td>1339</td>
</tr>
<tr>
<td>2.80 - 3.00</td>
<td>1374</td>
</tr>
<tr>
<td>3.00 - 3.50</td>
<td>1400</td>
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<td>4.10 - 4.30</td>
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<td>4.30 - 4.50</td>
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<td>4.50 - 4.70</td>
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<tr>
<td>4.70 - 5.00</td>
<td>1400</td>
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<td>5.50 - 6.00</td>
<td>-</td>
</tr>
<tr>
<td>6.00 - 6.30</td>
<td>-</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>EN 10025-2:2004 Grade</th>
<th>Min. yield strength $R_{eh}$</th>
<th>Tensile strength $R_m$</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>N/mm²</td>
<td>N/mm²</td>
</tr>
<tr>
<td><strong>t ≤ 16</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S185</td>
<td>185</td>
<td>310 - 540</td>
</tr>
<tr>
<td>S235JR $^3$</td>
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<td>360 - 510</td>
</tr>
<tr>
<td>S235J2</td>
<td>235</td>
<td>360 - 510</td>
</tr>
<tr>
<td>S275JR $^3$</td>
<td>275</td>
<td>430 - 580</td>
</tr>
<tr>
<td>S275J0</td>
<td>275</td>
<td>430 - 580</td>
</tr>
<tr>
<td>S275J2</td>
<td>275</td>
<td>430 - 580</td>
</tr>
<tr>
<td>S355JR $^3$</td>
<td>355</td>
<td>510 - 680</td>
</tr>
<tr>
<td>S355J0</td>
<td>355</td>
<td>510 - 680</td>
</tr>
<tr>
<td>S355J2</td>
<td>355</td>
<td>510 - 680</td>
</tr>
<tr>
<td>S355K2</td>
<td>355</td>
<td>510 - 680</td>
</tr>
<tr>
<td><strong>16 &lt; t ≤ 20</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S185</td>
<td>175</td>
<td>290 - 510</td>
</tr>
<tr>
<td>S235JR $^3$</td>
<td>225</td>
<td>360 - 510</td>
</tr>
<tr>
<td>S235J0</td>
<td>225</td>
<td>360 - 510</td>
</tr>
<tr>
<td>S235J2</td>
<td>225</td>
<td>360 - 510</td>
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<tr>
<td>S275JR $^3$</td>
<td>265</td>
<td>410 - 560</td>
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<tr>
<td>S275J0</td>
<td>265</td>
<td>410 - 560</td>
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<td>470 - 630</td>
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<td>345</td>
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<td></td>
</tr>
<tr>
<td>S185</td>
<td>310 - 540</td>
<td></td>
</tr>
<tr>
<td>S235JR $^3$</td>
<td>360 - 510</td>
<td></td>
</tr>
<tr>
<td>S235J0</td>
<td>360 - 510</td>
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</tr>
<tr>
<td>S235J2</td>
<td>360 - 510</td>
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</tr>
<tr>
<td>S275JR $^3$</td>
<td>430 - 580</td>
<td></td>
</tr>
<tr>
<td>S275J0</td>
<td>430 - 580</td>
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<tr>
<td>S275J2</td>
<td>430 - 580</td>
<td></td>
</tr>
<tr>
<td>S355JR $^3$</td>
<td>510 - 680</td>
<td></td>
</tr>
<tr>
<td>S355J0</td>
<td>510 - 680</td>
<td></td>
</tr>
<tr>
<td>S355J2</td>
<td>510 - 680</td>
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<td>S355K2</td>
<td>510 - 680</td>
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<tr>
<td><strong>3 ≤ t ≤ 20</strong></td>
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<tr>
<td>S185</td>
<td>290 - 510</td>
<td></td>
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<td>S235JR $^3$</td>
<td>360 - 510</td>
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<tr>
<td>S235J0</td>
<td>360 - 510</td>
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</tr>
<tr>
<td>S235J2</td>
<td>360 - 510</td>
<td></td>
</tr>
<tr>
<td>S275JR $^3$</td>
<td>410 - 560</td>
<td></td>
</tr>
<tr>
<td>S275J0</td>
<td>410 - 560</td>
<td></td>
</tr>
<tr>
<td>S275J2</td>
<td>410 - 560</td>
<td></td>
</tr>
<tr>
<td>S355JR $^3$</td>
<td>470 - 630</td>
<td></td>
</tr>
<tr>
<td>S355J0</td>
<td>470 - 630</td>
<td></td>
</tr>
<tr>
<td>S355J2</td>
<td>470 - 630</td>
<td></td>
</tr>
<tr>
<td>S355K2</td>
<td>470 - 630</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min elongation after fracture A</th>
<th>Impact test</th>
</tr>
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<td>$L_0 = 5.65\sqrt{S_0}$</td>
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<td>$2 &lt; t \leq 2.5$</td>
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<td>16</td>
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<td>S355JR$^3$</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>S355J0</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>S355J2</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>S355K2</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Si</th>
<th>N</th>
<th>Cu</th>
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<tbody>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>–</td>
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</tr>
<tr>
<td>S235JR</td>
<td>0.17</td>
<td>1.40</td>
<td>0.035</td>
<td>0.035</td>
<td>–</td>
<td>0.012</td>
<td>0.55</td>
</tr>
<tr>
<td>S235J0</td>
<td>0.17</td>
<td>1.40</td>
<td>0.030</td>
<td>0.030</td>
<td>–</td>
<td>0.012</td>
<td>0.55</td>
</tr>
<tr>
<td>S235J2</td>
<td>0.17</td>
<td>1.40</td>
<td>0.025</td>
<td>0.025</td>
<td>–</td>
<td>–</td>
<td>0.55</td>
</tr>
<tr>
<td>S275JR</td>
<td>0.21</td>
<td>1.50</td>
<td>0.035</td>
<td>0.035</td>
<td>–</td>
<td>0.012</td>
<td>0.55</td>
</tr>
<tr>
<td>S275J0</td>
<td>0.18</td>
<td>1.50</td>
<td>0.030</td>
<td>0.030</td>
<td>–</td>
<td>0.012</td>
<td>0.55</td>
</tr>
<tr>
<td>S275J2</td>
<td>0.18</td>
<td>1.50</td>
<td>0.025</td>
<td>0.025</td>
<td>–</td>
<td>–</td>
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<td>0.012</td>
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<td>1.60</td>
<td>0.030</td>
<td>0.030</td>
<td>0.55</td>
<td>0.012</td>
<td>0.55</td>
</tr>
<tr>
<td>S355J2</td>
<td>0.20</td>
<td>1.60</td>
<td>0.025</td>
<td>0.025</td>
<td>0.55</td>
<td>–</td>
<td>0.55</td>
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<tr>
<td>S355K2</td>
<td>0.20</td>
<td>1.60</td>
<td>0.025</td>
<td>0.025</td>
<td>0.55</td>
<td>–</td>
<td>0.55</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
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<td>1.47 - 1.49</td>
<td>1300</td>
<td>1300</td>
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<td>1.49 - 1.50</td>
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<td>1170</td>
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</tr>
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</table>

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.

Other dimensions are available - please contact us.
### Dimensional capability for steel produced in the UK – non-pickled
Dimensions in mm.

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<td>From - up to</td>
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<td></td>
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<tr>
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<td>1600</td>
<td>1525</td>
<td>1499</td>
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<td>1600</td>
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<td>2.50 - 2.90</td>
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<td>1830</td>
<td>1560</td>
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</tr>
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<td>16.50 - 20.00</td>
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<td>-</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Max. width</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.40 - 1.50</td>
<td>-</td>
</tr>
<tr>
<td>1.50 - 1.53</td>
<td>1330</td>
</tr>
<tr>
<td>1.53 - 1.57</td>
<td>1350</td>
</tr>
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<td>1380</td>
</tr>
<tr>
<td>1.60 - 1.70</td>
<td>1410</td>
</tr>
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<td>1.70 - 1.80</td>
<td>1480</td>
</tr>
<tr>
<td>1.80 - 2.00</td>
<td>1550</td>
</tr>
<tr>
<td>2.00 - 2.20</td>
<td>1700</td>
</tr>
<tr>
<td>2.20 - 2.40</td>
<td>1820</td>
</tr>
<tr>
<td>2.40 - 2.60</td>
<td>1920</td>
</tr>
<tr>
<td>2.60 - 2.70</td>
<td>2030</td>
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<tr>
<td>2.70 - 2.80</td>
<td>2070</td>
</tr>
<tr>
<td>2.80 - 3.00</td>
<td>2070</td>
</tr>
<tr>
<td>3.00 - 3.20</td>
<td>2070</td>
</tr>
<tr>
<td>3.20 - 3.47</td>
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</tr>
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<td>3.47 - 3.65</td>
<td>2070</td>
</tr>
<tr>
<td>3.65 - 4.00</td>
<td>2070</td>
</tr>
<tr>
<td>4.00 - 4.40</td>
<td>2070</td>
</tr>
<tr>
<td>4.40 - 4.83</td>
<td>2070</td>
</tr>
<tr>
<td>4.83 - 5.00</td>
<td>2000</td>
</tr>
<tr>
<td>5.00 - 5.25</td>
<td>1900</td>
</tr>
<tr>
<td>5.25 - 5.50</td>
<td>1820</td>
</tr>
<tr>
<td>5.50 - 5.80</td>
<td>1720</td>
</tr>
<tr>
<td>5.80 - 6.35</td>
<td>1570</td>
</tr>
</tbody>
</table>

*(table continued on next page)*
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 may be available - please contact us.

**Dimensional capability for steel produced in the UK – pickled.**

Dimensions in mm.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Max. width</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>From - up to</strong></td>
<td><strong>S185</strong></td>
</tr>
<tr>
<td>1.40 - 1.50</td>
<td>-</td>
</tr>
<tr>
<td>1.50 - 1.60</td>
<td>1250</td>
</tr>
<tr>
<td>1.60 - 1.70</td>
<td>1275</td>
</tr>
<tr>
<td>1.70 - 1.80</td>
<td>1315</td>
</tr>
<tr>
<td>1.80 - 1.90</td>
<td>1511</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td>1511</td>
</tr>
<tr>
<td>2.00 - 2.20</td>
<td>1530</td>
</tr>
<tr>
<td>2.20 - 2.50</td>
<td>1530</td>
</tr>
<tr>
<td>2.50 - 5.00</td>
<td>1530</td>
</tr>
<tr>
<td>5.00 - 6.35</td>
<td>-</td>
</tr>
</tbody>
</table>

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
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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. yield strength $R_{el}$</th>
<th>Tensile strength $R_m$</th>
<th>Min. elongation after fracture A</th>
<th>Impact test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td>$L_0 = 5.65\sqrt{S_0}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$3 \leq t \leq 12.5$</td>
</tr>
<tr>
<td>S235JR+AR</td>
<td>235</td>
<td>360 - 510</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>S275JR+AR</td>
<td>275</td>
<td>410 - 560</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>S355JR+AR</td>
<td>355</td>
<td>470 - 630</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Si</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>S235JR+AR</td>
<td>0.17</td>
<td>1.40</td>
<td>0.035</td>
<td>0.035</td>
<td>-</td>
<td>0.012</td>
</tr>
<tr>
<td>S275JR+AR</td>
<td>0.21</td>
<td>1.50</td>
<td>0.035</td>
<td>0.035</td>
<td>-</td>
<td>0.012</td>
</tr>
<tr>
<td>S355JR+AR</td>
<td>0.24</td>
<td>1.60</td>
<td>0.035</td>
<td>0.035</td>
<td>0.55</td>
<td>0.012</td>
</tr>
</tbody>
</table>

All values in weight%.
**Dimensions**
Dimensions in mm.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Standard width</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S235JR+AR</td>
</tr>
<tr>
<td>3</td>
<td>1250</td>
</tr>
<tr>
<td>4.5</td>
<td>1500</td>
</tr>
<tr>
<td>6</td>
<td>1500</td>
</tr>
<tr>
<td>8</td>
<td>1500</td>
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<td>10</td>
<td>1500</td>
</tr>
<tr>
<td>12.5</td>
<td>1500</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Case hardening</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Si</th>
</tr>
</thead>
<tbody>
<tr>
<td>C15E</td>
<td>0.12 - 0.18</td>
<td>0.30 - 0.60</td>
<td>0.035</td>
<td>0.035</td>
<td>0.4</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Nb+ Max.</th>
<th>Mn Max.</th>
<th>Si Max.</th>
<th>P Max.</th>
<th>S Max.</th>
<th>Al Max.</th>
<th>Cr+ Max.</th>
<th>Mo Max.²</th>
<th>Nb+ Max.</th>
<th>Ti Max.²</th>
<th>B Max.²</th>
</tr>
</thead>
<tbody>
<tr>
<td>22MnB5</td>
<td>0.20 -</td>
<td>1.1 -</td>
<td>0.2 -</td>
<td>0.025</td>
<td>0.010</td>
<td>0.02 -</td>
<td>0.1 -</td>
<td>0.02 -</td>
<td>0.002 -</td>
<td>0.005</td>
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</tr>
<tr>
<td></td>
<td>0.23</td>
<td>1.3</td>
<td>0.3</td>
<td>0.06</td>
<td>0.3</td>
<td>0.060</td>
<td>-</td>
<td>0.060</td>
<td>0.0035</td>
<td></td>
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</tr>
<tr>
<td>26MnB5</td>
<td>0.24 -</td>
<td>1.20 -</td>
<td>0.20 -</td>
<td></td>
<td></td>
<td>0.020 -</td>
<td></td>
<td></td>
<td>0.0020 -</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>0.28</td>
<td>1.40</td>
<td>0.25</td>
<td>0.020</td>
<td>0.006</td>
<td>0.060</td>
<td>-</td>
<td>-</td>
<td>0.0035</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
<th>C15E</th>
<th>22MnB5</th>
<th>26MnB5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00 - 2.50</td>
<td>1300</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.50 - 3.00</td>
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<tr>
<td>3.00 - 3.50</td>
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<td></td>
</tr>
<tr>
<td>4.30 - 4.50</td>
<td>1500</td>
<td>1630</td>
<td>1630</td>
<td></td>
</tr>
<tr>
<td>4.50 - 7.00</td>
<td>-</td>
<td>1700</td>
<td>1700</td>
<td></td>
</tr>
<tr>
<td>7.00 - 20.00</td>
<td>-</td>
<td>2050</td>
<td>2050</td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
<th>C15E</th>
<th>22MnB5</th>
<th>26MnB5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.80 - 1.90</td>
<td>-</td>
<td>1149</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td>-</td>
<td>1170</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.00 - 2.50</td>
<td>-</td>
<td>1192</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.50 - 3.00</td>
<td>-</td>
<td>1284</td>
<td>-</td>
<td>-</td>
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<tr>
<td>3.00 - 3.50</td>
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<td>1360</td>
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<td>3.50 - 4.00</td>
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</tr>
<tr>
<td>4.00 - 4.50</td>
<td>-</td>
<td>1480</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4.50 - 5.00</td>
<td>-</td>
<td>1530</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Minimum width is 900mm.

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

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
<th>C15E</th>
<th>22MnB5</th>
<th>26MnB5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00 - 2.50</td>
<td>1300</td>
<td>-</td>
<td>-</td>
<td>1450</td>
</tr>
<tr>
<td>2.50 - 3.00</td>
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<td>1600</td>
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<td>1510</td>
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<tr>
<td>3.00 - 3.50</td>
<td>1500</td>
<td>1650</td>
<td>1450</td>
<td>1570</td>
</tr>
<tr>
<td>3.50 - 4.00</td>
<td>1500</td>
<td>1650</td>
<td>1450</td>
<td>1640</td>
</tr>
<tr>
<td>4.00 - 4.10</td>
<td>1500</td>
<td>1640</td>
<td>1450</td>
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</tr>
<tr>
<td>4.10 - 4.30</td>
<td>1500</td>
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<td>1450</td>
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<tr>
<td>4.30 - 4.50</td>
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<td>1630</td>
</tr>
<tr>
<td>4.50 - 4.70</td>
<td>-</td>
<td>1600</td>
<td>1450</td>
<td>1600</td>
</tr>
<tr>
<td>4.70 - 5.00</td>
<td>-</td>
<td>1500</td>
<td>1450</td>
<td>1500</td>
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<tr>
<td>5.00 - 5.50</td>
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</tr>
<tr>
<td>5.50 - 6.00</td>
<td>-</td>
<td>1210</td>
<td>1450</td>
<td>1210</td>
</tr>
<tr>
<td>6.00 - 6.30</td>
<td>-</td>
<td>1140</td>
<td>1450</td>
<td>1140</td>
</tr>
</tbody>
</table>

*(table continued on next 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.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>C15E</th>
<th>22MnB5</th>
<th>26MnB5</th>
</tr>
</thead>
<tbody>
<tr>
<td>From - up to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.80 - 1.90</td>
<td>-</td>
<td>1149</td>
<td>-</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td>-</td>
<td>1170</td>
<td>-</td>
</tr>
<tr>
<td>2.00 - 2.50</td>
<td>-</td>
<td>1192</td>
<td>-</td>
</tr>
<tr>
<td>2.50 - 3.00</td>
<td>-</td>
<td>1284</td>
<td>-</td>
</tr>
<tr>
<td>3.00 - 3.50</td>
<td>-</td>
<td>1360</td>
<td>-</td>
</tr>
<tr>
<td>3.50 - 4.00</td>
<td>-</td>
<td>1425</td>
<td>-</td>
</tr>
<tr>
<td>4.00 - 4.50</td>
<td>-</td>
<td>1480</td>
<td>-</td>
</tr>
<tr>
<td>4.50 - 5.00</td>
<td>-</td>
<td>1530</td>
<td>-</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>European standards</th>
<th>National standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10028-2: 2009</td>
<td>EN 10207: 2005</td>
</tr>
<tr>
<td></td>
<td>Germany DIN 17155</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade</th>
<th>National standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>P235GH</td>
<td>P235S</td>
<td>HI</td>
</tr>
<tr>
<td>P265GH</td>
<td>P265S</td>
<td>HII</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. yield strength $^{1}$ $R_{eH}$ N/mm²</th>
<th>Tensile strength $R_{m}$ N/mm²</th>
<th>Min. elongation after fracture A %</th>
<th>Impact test $^{2}$ Temp. °C</th>
<th>Min. energy J</th>
</tr>
</thead>
<tbody>
<tr>
<td>P235GH</td>
<td>235</td>
<td>360-480</td>
<td>24</td>
<td>-20</td>
<td>27</td>
</tr>
<tr>
<td>P265GH</td>
<td>265</td>
<td>410-530</td>
<td>22</td>
<td>-20</td>
<td>27</td>
</tr>
</tbody>
</table>

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 and Tensile strength

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. yield strength</th>
<th>Tensile strength</th>
<th>Min. elongation after fracture A</th>
<th>Impact test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>L₀ = 80mm</td>
<td>L₀ = 5.65√S₀</td>
<td>Temp. °C</td>
<td>Min. energy J</td>
</tr>
</tbody>
</table>

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

### Chemical composition

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Si</th>
<th>Altot</th>
<th>Nb</th>
<th>Ti</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>P235GH</td>
<td>0.16</td>
<td>0.60</td>
<td>0.025</td>
<td>0.010</td>
<td>0.350</td>
<td>0.020</td>
<td>0.020</td>
<td>0.030</td>
<td>0.020</td>
</tr>
<tr>
<td>P265GH</td>
<td>0.20</td>
<td>0.80</td>
<td>0.025</td>
<td>0.010</td>
<td>0.400</td>
<td>0.020</td>
<td>0.020</td>
<td>0.030</td>
<td>0.020</td>
</tr>
<tr>
<td>P235S</td>
<td>0.16</td>
<td>0.40</td>
<td>0.025</td>
<td>0.025</td>
<td>0.350</td>
<td>0.020</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>P265S</td>
<td>0.20</td>
<td>0.50</td>
<td>0.025</td>
<td>0.025</td>
<td>0.400</td>
<td>0.020</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Thick Max. width</th>
<th>P235GH</th>
<th>P265GH</th>
<th>P235S</th>
<th>P265S</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00 - 2.20</td>
<td>-</td>
<td>-</td>
<td>1700</td>
<td>1590</td>
<td></td>
</tr>
<tr>
<td>2.20 - 2.40</td>
<td>-</td>
<td>-</td>
<td>1820</td>
<td>1730</td>
<td></td>
</tr>
<tr>
<td>2.40 - 2.60</td>
<td>-</td>
<td>-</td>
<td>1920</td>
<td>1800</td>
<td></td>
</tr>
<tr>
<td>2.60 - 2.70</td>
<td>-</td>
<td>-</td>
<td>2030</td>
<td>1880</td>
<td></td>
</tr>
<tr>
<td>2.70 - 2.80</td>
<td>-</td>
<td>-</td>
<td>2070</td>
<td>1920</td>
<td></td>
</tr>
<tr>
<td>2.80 - 3.00</td>
<td>-</td>
<td>-</td>
<td>2070</td>
<td>1960</td>
<td></td>
</tr>
<tr>
<td>3.00 - 3.20</td>
<td>2070</td>
<td>2030</td>
<td>2070</td>
<td>2030</td>
<td></td>
</tr>
<tr>
<td>3.20 - 4.83</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td></td>
</tr>
<tr>
<td>4.83 - 5.00</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td></td>
</tr>
<tr>
<td>5.00 - 5.25</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td></td>
</tr>
<tr>
<td>5.25 - 5.50</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td></td>
</tr>
<tr>
<td>5.50 - 5.80</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td></td>
</tr>
<tr>
<td>5.80 - 6.35</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td></td>
</tr>
<tr>
<td>6.35 - 10.00</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td>2070</td>
<td></td>
</tr>
<tr>
<td>10.00 - 12.70</td>
<td>2070</td>
<td>-</td>
<td>2070</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

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

Dimensional capability – pickled.
Dimensions in mm.

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

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:

<table>
<thead>
<tr>
<th>EN 10120: 2008 Grade</th>
<th>Min. yield strength $^{1}$ $R_{eH}$</th>
<th>Tensile strength $^{1}$ $R_{m}$</th>
<th>Min elongation after fracture $A$ $\frac{L_o}{L_o = 80mm}$ $\frac{L_o = 5.65\sqrt{S_o}}{t &lt; 3 \text{ mm}}$ $t \geq 3 \text{ mm}$</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>P245NB</td>
<td>245</td>
<td>360 - 450</td>
<td>26</td>
<td>34</td>
</tr>
<tr>
<td>P265NB</td>
<td>265</td>
<td>410 - 500</td>
<td>24</td>
<td>32</td>
</tr>
</tbody>
</table>

$^{1}$ 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:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P245NB</td>
<td>0.16</td>
<td>0.30</td>
<td>0.025</td>
<td>0.015</td>
<td>0.25</td>
<td>0.020</td>
<td>0.009</td>
<td>0.050</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>P265NB</td>
<td>0.19</td>
<td>0.40</td>
<td>0.025</td>
<td>0.015</td>
<td>0.25</td>
<td>0.020</td>
<td>0.009</td>
<td>0.050</td>
<td>0.03</td>
<td></td>
</tr>
</tbody>
</table>

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

**Dimensions**

Dimensions in mm.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Max. width</th>
</tr>
</thead>
<tbody>
<tr>
<td>From - up to</td>
<td>P245NB</td>
</tr>
<tr>
<td>2.00 - 2.20</td>
<td>1700</td>
</tr>
<tr>
<td>2.20 - 2.40</td>
<td>1820</td>
</tr>
<tr>
<td>2.40 - 2.60</td>
<td>1920</td>
</tr>
<tr>
<td>2.60 - 2.70</td>
<td>2030</td>
</tr>
<tr>
<td>2.70 - 5.00</td>
<td>2070</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Lloyds EMEA Grade</th>
<th>Min. yield strength $R_{eh}$ N/mm²</th>
<th>Tensile strength $R_m$ N/mm²</th>
<th>Min. elongation after fracture A %</th>
<th>Impact test $L_0 = 5.65\sqrt{S_0}$</th>
<th>Temp. °C</th>
<th>min. energy J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade A</td>
<td>235</td>
<td>400 - 520</td>
<td>22</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Grade B</td>
<td>235</td>
<td>400 - 520</td>
<td>22</td>
<td>0</td>
<td>27 (l)/ 20 (t)$^2$</td>
<td></td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Lloyds EMEA</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Si</th>
<th>Al_{sol}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade A</td>
<td>0.21</td>
<td>-</td>
<td>0.035</td>
<td>0.035</td>
<td>0.50</td>
<td>0.02</td>
</tr>
<tr>
<td>Grade B</td>
<td>0.21</td>
<td>0.80</td>
<td>0.035</td>
<td>0.035</td>
<td>0.35</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Dimensions
Dimensions in mm.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width Grade A</th>
<th>Max. width Grade B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.49 - 1.60</td>
<td>1170</td>
<td>1170</td>
</tr>
<tr>
<td>1.60 - 1.70</td>
<td>1280</td>
<td>1280</td>
</tr>
<tr>
<td>1.70 - 1.80</td>
<td>1370</td>
<td>1370</td>
</tr>
<tr>
<td>1.80 - 1.90</td>
<td>1440</td>
<td>1440</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td>1520</td>
<td>1520</td>
</tr>
<tr>
<td>2.00 - 2.20</td>
<td>1590</td>
<td>1590</td>
</tr>
<tr>
<td>2.20 - 2.40</td>
<td>1730</td>
<td>1730</td>
</tr>
<tr>
<td>2.40 - 2.60</td>
<td>1800</td>
<td>1800</td>
</tr>
<tr>
<td>2.60 - 2.80</td>
<td>1880</td>
<td>1880</td>
</tr>
<tr>
<td>2.80 - 3.12</td>
<td>1960</td>
<td>1960</td>
</tr>
<tr>
<td>3.12 - 12.70</td>
<td>2070</td>
<td>2070</td>
</tr>
<tr>
<td>12.70 - 20.00</td>
<td>2070</td>
<td>2070</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>69</td>
</tr>
<tr>
<td>Steel for forming</td>
<td>72</td>
</tr>
<tr>
<td>High-strength steel</td>
<td>73</td>
</tr>
<tr>
<td>Structural steel</td>
<td>76</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.15 ≤ t ≤ 2.0</td>
<td>± 0.05</td>
</tr>
<tr>
<td>2.0 &lt; t &lt; 2.5</td>
<td>± 0.06¹</td>
</tr>
<tr>
<td>2.5 ≤ t ≤ 3.0</td>
<td>± 0.07²</td>
</tr>
<tr>
<td>3.0 &lt; t ≤ 4.0</td>
<td>± 0.09³</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Dimension or weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside diameter</td>
<td>minimum 1050mm</td>
</tr>
<tr>
<td></td>
<td>maximum 2000mm (Ymagine)</td>
</tr>
<tr>
<td></td>
<td>maximum 2100mm (mill scale)</td>
</tr>
<tr>
<td>Coil Weight</td>
<td>maximum 31.5 tonne ¹</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Relationship with European standard</th>
<th>$R_{pL}$ / $R_p$</th>
<th>$R_m$</th>
<th>$A_{80}$</th>
<th>$A_{dp5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10111: 2008, DD11</td>
<td>N/mm$^2$</td>
<td>N/mm$^2$</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Hot-rolled flat products</td>
<td>170 - 360</td>
<td>≤ 440</td>
<td>≥ 23</td>
<td>≥ 28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ymagine D1</th>
<th>$R_p$</th>
<th>$R_m$</th>
<th>$A_{80}$</th>
<th>$A_{dp5}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/mm$^2$</td>
<td>N/mm$^2$</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Typical value</td>
<td>290</td>
<td>380</td>
<td>28</td>
<td>-</td>
</tr>
<tr>
<td>Guaranteed values</td>
<td>210 - 360</td>
<td>335 - 425</td>
<td>≥ 23</td>
<td>≥ 28</td>
</tr>
</tbody>
</table>

Chemical composition
Cast analysis in weight%:

<table>
<thead>
<tr>
<th>Ymagine D1</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Si</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical</td>
<td>0.045</td>
<td>0.220</td>
<td>0.008</td>
<td>0.007</td>
<td>0.018</td>
</tr>
<tr>
<td>Guaranteed (max)</td>
<td>0.065</td>
<td>0.300</td>
<td>0.025</td>
<td>0.015</td>
<td>0.035</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness from - up to</th>
<th>Ymagine D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum width</td>
<td>Maximum width</td>
</tr>
<tr>
<td>1.15 - 4.00</td>
<td>1000</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Grade</th>
<th>EN 10149-2:2013</th>
<th>R_eH / R_p</th>
<th>R_m</th>
<th>A_80</th>
<th>A_{dp5}</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hot-rolled flat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>products</td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Ymagine H320</td>
<td>S315MC</td>
<td>≥ 315</td>
<td>390 - 510</td>
<td>≥ 20</td>
<td>-</td>
</tr>
<tr>
<td>Ymagine H360</td>
<td>S355MC</td>
<td>≥ 355</td>
<td>430 - 550</td>
<td>≥ 19</td>
<td>-</td>
</tr>
<tr>
<td>Ymagine H420</td>
<td>S420MC</td>
<td>≥ 420</td>
<td>480 - 620</td>
<td>≥ 16</td>
<td>≥ 19</td>
</tr>
<tr>
<td>Ymagine H500</td>
<td>S500MC</td>
<td>≥ 500</td>
<td>550 - 700</td>
<td>≥ 12</td>
<td>≥ 14</td>
</tr>
<tr>
<td>t - material thickness in mm.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>EN 10268: 2006: longitudinal test pieces</th>
<th>R_eH / R_p</th>
<th>R_m</th>
<th>A_80</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cold-rolled flat products</td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
</tr>
<tr>
<td>Ymagine H240</td>
<td>HC260LA</td>
<td>240 - 310</td>
<td>340 - 420</td>
<td>≥ 27</td>
</tr>
<tr>
<td>Ymagine H320</td>
<td>HC340LA</td>
<td>320 - 410</td>
<td>400 - 500</td>
<td>≥ 22</td>
</tr>
<tr>
<td>Ymagine H360</td>
<td>HC380LA</td>
<td>360 - 460</td>
<td>430 - 550</td>
<td>≥ 20</td>
</tr>
<tr>
<td>Ymagine H420</td>
<td>HC420LA</td>
<td>400 - 500</td>
<td>460 - 580</td>
<td>≥ 18</td>
</tr>
</tbody>
</table>
### Mechanical properties

<table>
<thead>
<tr>
<th>Direct-rolled strip products</th>
<th>Rp</th>
<th>Rm</th>
<th>A80</th>
<th>Adps</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Ymagine H240</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical value</td>
<td>275</td>
<td>385</td>
<td>32</td>
<td>-</td>
</tr>
<tr>
<td>Guaranteed</td>
<td>240 - 310</td>
<td>340 - 420</td>
<td>≥ 27</td>
<td>≥ 32</td>
</tr>
<tr>
<td>Ymagine H320</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical value</td>
<td>340</td>
<td>425</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>Guaranteed</td>
<td>320 - 410</td>
<td>400 - 500</td>
<td>≥ 22</td>
<td>-</td>
</tr>
<tr>
<td>Ymagine H360</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical value</td>
<td>385</td>
<td>455</td>
<td>26</td>
<td>-</td>
</tr>
<tr>
<td>Guaranteed</td>
<td>360 - 460</td>
<td>430 - 550</td>
<td>≥ 20</td>
<td>-</td>
</tr>
<tr>
<td>Ymagine H420</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical value</td>
<td>465</td>
<td>530</td>
<td>23</td>
<td>-</td>
</tr>
<tr>
<td>Guaranteed</td>
<td>420 - 500</td>
<td>480 - 580</td>
<td>≥ 18</td>
<td>≥ 22</td>
</tr>
<tr>
<td>Ymagine H500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical value</td>
<td>540</td>
<td>610</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>Guaranteed</td>
<td>500 - 600</td>
<td>560-700</td>
<td>≥ 14</td>
<td>≥ 18</td>
</tr>
</tbody>
</table>

\(t\) - material thickness in mm.

### Chemical composition

**Cast analysis in weight percentages:**

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

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Ymagine H240</th>
<th>Ymagine H320</th>
<th>Ymagine H360</th>
<th>Ymagine H420</th>
<th>Ymagine H500</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.15 - 1.19</td>
<td>1530</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1.19 - 1.50</td>
<td>1530</td>
<td>1530</td>
<td>1530</td>
<td>1350</td>
<td>-</td>
</tr>
<tr>
<td>1.50 - 2.00</td>
<td>1530</td>
<td>1530</td>
<td>1530</td>
<td>1530</td>
<td>1350</td>
</tr>
<tr>
<td>2.00 - 3.00</td>
<td>1530</td>
<td>1530</td>
<td>1530</td>
<td>1530</td>
<td>1450</td>
</tr>
<tr>
<td>3.00 - 4.00</td>
<td>1530</td>
<td>-</td>
<td>-</td>
<td>1530</td>
<td>1450</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Relationship with European standard</th>
<th>( R_{eH} / R_p )</th>
<th>( R_m )</th>
<th>( A_{80} )</th>
<th>( A_{dp5} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10025-2: 2004, S235JR t &lt; 3 t ≥ 3</td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Hot-rolled flat products</td>
<td>≥ 235</td>
<td>360 - 510</td>
<td>≥ 17</td>
<td>24</td>
</tr>
<tr>
<td>Ymagine S1 t &lt; 3 t ≥ 3</td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Typical value</td>
<td>300</td>
<td>395</td>
<td>28</td>
<td>-</td>
</tr>
<tr>
<td>Guaranteed values</td>
<td>235 - 360</td>
<td>360 - 510</td>
<td>≥ 19</td>
<td>24</td>
</tr>
</tbody>
</table>

Chemical composition

Cast analysis in weight percentages:

<table>
<thead>
<tr>
<th>Ymagine S1</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Si 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical</td>
<td>0.045</td>
<td>0.220</td>
<td>0.008</td>
<td>0.007</td>
<td>0.018</td>
</tr>
<tr>
<td>Guaranteed (max)</td>
<td>0.065</td>
<td>0.300</td>
<td>0.025</td>
<td>0.015</td>
<td>0.035</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness from - up to</th>
<th>Ymagine S1 Minimum width</th>
<th>Maximum width</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.15 - 4.00</td>
<td>1000</td>
<td>1530</td>
</tr>
</tbody>
</table>
# Cold-rolled

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>79</td>
</tr>
<tr>
<td>Steel for forming</td>
<td>85</td>
</tr>
<tr>
<td>Steel for enamelling</td>
<td>90</td>
</tr>
<tr>
<td>High-strength steel</td>
<td>94</td>
</tr>
<tr>
<td>Advanced and ultra high-strength steel</td>
<td>102</td>
</tr>
<tr>
<td>Structural steel</td>
<td>106</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>EN 10130: 2006 Grade</th>
<th>Symbol</th>
<th>Roughness $R_a$ (µm) cut off 0.8 mm</th>
<th>UK</th>
<th>NL</th>
</tr>
</thead>
<tbody>
<tr>
<td>extra-bright</td>
<td>-</td>
<td>≤ 0.30</td>
<td>-</td>
<td>Available</td>
</tr>
<tr>
<td>bright</td>
<td>b</td>
<td>≤ 0.4</td>
<td>-</td>
<td>Available</td>
</tr>
<tr>
<td>semi-bright</td>
<td>g</td>
<td>≤ 0.9</td>
<td>Refer</td>
<td>Available</td>
</tr>
<tr>
<td>normal</td>
<td>m</td>
<td>0.6 - 1.9</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>rough</td>
<td>r</td>
<td>&gt; 1.6</td>
<td>Refer</td>
<td>Available</td>
</tr>
<tr>
<td>extra rough</td>
<td>-</td>
<td>&gt; 2.5</td>
<td>-</td>
<td>Available</td>
</tr>
</tbody>
</table>


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/m² per side from Tata Steel in the UK
- 0.25 - 1.7 g/m² 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

<table>
<thead>
<tr>
<th>Tolerance (EN 10131: 2006)</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full thickness tolerance</td>
<td>Available</td>
</tr>
<tr>
<td>Special thickness tolerances</td>
<td>Available</td>
</tr>
<tr>
<td>50% of full thickness tolerance</td>
<td>Refer before ordering</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Edge-wave length</th>
<th>Maximum acceptable wave height</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1500</td>
<td>&gt; 200</td>
<td>&lt; 1% of edge-wave length</td>
</tr>
<tr>
<td>≥ 1500</td>
<td>&gt; 200</td>
<td>&lt; 1.5% of edge-wave length</td>
</tr>
<tr>
<td>−</td>
<td>&lt; 200</td>
<td>2mm</td>
</tr>
</tbody>
</table>

Tolerances on width

<table>
<thead>
<tr>
<th>Tolerance (EN 10131: 2006)</th>
<th>Production location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal width tolerances</td>
<td>UK Available</td>
</tr>
<tr>
<td>Special width tolerances</td>
<td>NL Available trimmed edges only</td>
</tr>
<tr>
<td></td>
<td>Refer (± 0.25mm available on 750 - 2000mm width)</td>
</tr>
</tbody>
</table>
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.

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

<table>
<thead>
<tr>
<th>European standard</th>
<th>National standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10130: 2006</td>
<td>Germany</td>
</tr>
<tr>
<td>Grade</td>
<td>DIN 1623 part 1</td>
</tr>
<tr>
<td>DC01</td>
<td>St 12</td>
</tr>
<tr>
<td>DC03</td>
<td>St 13</td>
</tr>
<tr>
<td>DC04</td>
<td>St 14</td>
</tr>
<tr>
<td>DC05</td>
<td>St 15&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>DC06</td>
<td>IF 18&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1.</sup> Not in standard. Tata Steel’s own specification.
<sup>2.</sup> 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:

<table>
<thead>
<tr>
<th>EN 10130: 2006</th>
<th>Max. yield strength $R_{e}^{1, 2, 6}$ N/mm$^2$</th>
<th>Tensile strength $R_{m}$ N/mm$^2$</th>
<th>Min. elongation after fracture $A_{80}^{3}$ %</th>
<th>Min. $r_{90}$-value $^{4, 5}$</th>
<th>Min. $n_{90}$-value $^{4}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC01</td>
<td>280</td>
<td>270 - 410</td>
<td>28</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DC03</td>
<td>240</td>
<td>270 - 370</td>
<td>34</td>
<td>1.3</td>
<td>-</td>
</tr>
<tr>
<td>DC04</td>
<td>210</td>
<td>270 - 350</td>
<td>38</td>
<td>1.6</td>
<td>0.180</td>
</tr>
<tr>
<td>DC05</td>
<td>180</td>
<td>270 - 330</td>
<td>40</td>
<td>1.9</td>
<td>0.200</td>
</tr>
<tr>
<td>DC06</td>
<td>170</td>
<td>270 - 330</td>
<td>41</td>
<td>2.1</td>
<td>0.220</td>
</tr>
</tbody>
</table>

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/mm$^2$. For thicknesses ≤ 0.5mm, the value is increased by 40 N/mm$^2$.
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 $t \geq 0.5$mm.
5. For a thickness of $t > 2$mm, 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/mm$^2$ can be assumed for DC06 and 140 N/mm$^2$ 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%.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC01</td>
<td>0.12</td>
<td>0.60</td>
<td>0.045</td>
<td>0.045</td>
<td>-</td>
</tr>
<tr>
<td>DC03</td>
<td>0.10</td>
<td>0.45</td>
<td>0.035</td>
<td>0.035</td>
<td>-</td>
</tr>
<tr>
<td>DC04</td>
<td>0.08</td>
<td>0.40</td>
<td>0.030</td>
<td>0.030</td>
<td>-</td>
</tr>
<tr>
<td>DC05</td>
<td>0.06</td>
<td>0.35</td>
<td>0.025</td>
<td>0.025</td>
<td>-</td>
</tr>
<tr>
<td>DC06</td>
<td>0.02</td>
<td>0.25</td>
<td>0.020</td>
<td>0.020</td>
<td>0.30</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Max. width</th>
</tr>
</thead>
<tbody>
<tr>
<td>From - up to</td>
<td>DC01</td>
</tr>
<tr>
<td>0.37 - 0.45</td>
<td>1390</td>
</tr>
<tr>
<td>0.45 - 0.50</td>
<td>1470</td>
</tr>
<tr>
<td>0.50 - 0.55</td>
<td>1550</td>
</tr>
<tr>
<td>0.55 - 0.60</td>
<td>1550</td>
</tr>
<tr>
<td>0.60 - 0.65</td>
<td>1710</td>
</tr>
<tr>
<td>0.65 - 0.70</td>
<td>1710</td>
</tr>
<tr>
<td>0.70 - 0.75</td>
<td>1710</td>
</tr>
<tr>
<td>0.75 - 0.78</td>
<td>1820</td>
</tr>
<tr>
<td>0.80 - 0.80</td>
<td>1820</td>
</tr>
<tr>
<td>0.80 - 1.20</td>
<td>1820</td>
</tr>
<tr>
<td>1.20 - 1.60</td>
<td>1820</td>
</tr>
<tr>
<td>1.60 - 1.70</td>
<td>1750</td>
</tr>
<tr>
<td>1.70 - 1.80</td>
<td>1650</td>
</tr>
<tr>
<td>1.80 - 1.90</td>
<td>1525</td>
</tr>
<tr>
<td>1.90 - 1.95</td>
<td>1520</td>
</tr>
<tr>
<td>1.95 - 2.00</td>
<td>1500</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Max. width</th>
</tr>
</thead>
<tbody>
<tr>
<td>From - up to</td>
<td>DC01</td>
</tr>
<tr>
<td>0.37 - 0.40</td>
<td>1630</td>
</tr>
<tr>
<td>0.40 - 0.50</td>
<td>1690</td>
</tr>
<tr>
<td>0.50 - 0.60</td>
<td>1920</td>
</tr>
<tr>
<td>0.60 - 0.70</td>
<td>1920</td>
</tr>
<tr>
<td>0.70 - 0.80</td>
<td>1970</td>
</tr>
<tr>
<td>0.80 - 0.90</td>
<td>2030</td>
</tr>
<tr>
<td>0.90 - 1.00</td>
<td>2030</td>
</tr>
<tr>
<td>1.00 - 1.10</td>
<td>2030</td>
</tr>
<tr>
<td>1.10 - 1.20</td>
<td>2030</td>
</tr>
<tr>
<td>1.20 - 1.30</td>
<td>2030</td>
</tr>
<tr>
<td>1.30 - 1.50</td>
<td>2030</td>
</tr>
<tr>
<td>1.50 - 1.60</td>
<td>2030</td>
</tr>
<tr>
<td>1.60 - 1.70</td>
<td>2030</td>
</tr>
<tr>
<td>1.70 - 1.80</td>
<td>2030</td>
</tr>
<tr>
<td>1.80 - 1.90</td>
<td>2030</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td>2030</td>
</tr>
<tr>
<td>2.00 - 2.10</td>
<td>2030</td>
</tr>
<tr>
<td>2.10 - 2.20</td>
<td>2030</td>
</tr>
<tr>
<td>2.20 - 2.40</td>
<td>2030</td>
</tr>
<tr>
<td>2.40 - 2.50</td>
<td>1960</td>
</tr>
<tr>
<td>2.50 - 2.60</td>
<td>1940</td>
</tr>
<tr>
<td>2.60 - 2.70</td>
<td>1920</td>
</tr>
<tr>
<td>2.70 - 2.80</td>
<td>1850</td>
</tr>
<tr>
<td>2.80 - 2.90</td>
<td>1790</td>
</tr>
<tr>
<td>2.90 - 3.00</td>
<td>1730</td>
</tr>
</tbody>
</table>

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.

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

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:

<table>
<thead>
<tr>
<th>Tata Steel</th>
<th>European standard</th>
<th>Germany</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ymvit Grade</td>
<td>EN 10209</td>
<td>DIN 1623, part 3</td>
<td>ASTM A 424</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Tata Steel</th>
<th>Ymvit</th>
<th>EN 10209:1996</th>
<th>Max. yield strength $R_e$</th>
<th>Min. - Max. tensile strength $R_m$</th>
<th>Min. elongation after fracture $A_{80}$</th>
<th>Min. average r-value $r_{av}$</th>
<th>FLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ymvit 01</td>
<td>DC01EK</td>
<td>270</td>
<td>270 - 390</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Ymvit 04</td>
<td>DC04EK</td>
<td>220</td>
<td>270 - 350</td>
<td>36</td>
<td>-</td>
<td>-</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Ymvit 04 plus</td>
<td>DC04EK</td>
<td>210</td>
<td>270 - 350</td>
<td>38</td>
<td>-</td>
<td>-</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Ymvit Ultra 03</td>
<td>DC03ED</td>
<td>240</td>
<td>270 - 370</td>
<td>34</td>
<td>-</td>
<td>-</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Ymvit Ultra 04</td>
<td>DC04ED</td>
<td>210</td>
<td>270 - 350</td>
<td>38</td>
<td>-</td>
<td>-</td>
<td>Yes/No</td>
</tr>
<tr>
<td>Ymvit Extra 06</td>
<td>DC06ED</td>
<td>190</td>
<td>270 - 350</td>
<td>38</td>
<td>1.6</td>
<td>Yes</td>
<td>Yes/No</td>
</tr>
</tbody>
</table>

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 $t \leq 0.5mm$ 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 $t \geq 0.5mm$. For a thickness of $t > 2mm$, the r value is decreased by 0.2.
5. For a thickness of $t \geq 1.5mm$ 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:

<table>
<thead>
<tr>
<th>Tata Steel</th>
<th>EN 10209</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Ti</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ymvit</td>
<td>Grade</td>
<td>Max.</td>
<td>Max.</td>
<td>Max.</td>
<td>Max.</td>
<td>Max.</td>
</tr>
<tr>
<td>Ymvit 01</td>
<td>DC01EK</td>
<td>0.09</td>
<td>0.50</td>
<td>0.030</td>
<td>0.050</td>
<td>-</td>
</tr>
<tr>
<td>Ymvit 04 /</td>
<td>DC04EK</td>
<td>0.08</td>
<td>0.40</td>
<td>0.030</td>
<td>0.050</td>
<td>-</td>
</tr>
<tr>
<td>Ymvit 04 plus</td>
<td>DC03ED</td>
<td>0.004</td>
<td>0.40</td>
<td>0.035</td>
<td>0.050</td>
<td>-</td>
</tr>
<tr>
<td>Ymvit Ultra 03</td>
<td>DC04ED</td>
<td>0.004</td>
<td>0.40</td>
<td>0.030</td>
<td>0.050</td>
<td>-</td>
</tr>
<tr>
<td>Ymvit Ultra 04</td>
<td>DC06ED</td>
<td>0.004</td>
<td>0.35</td>
<td>0.020</td>
<td>0.050</td>
<td>0.30</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Max. width</th>
</tr>
</thead>
<tbody>
<tr>
<td>From - up to</td>
<td>Ymvit 01</td>
</tr>
<tr>
<td>0.37 - 0.40</td>
<td>1540</td>
</tr>
<tr>
<td>0.40 - 0.50</td>
<td>1580</td>
</tr>
<tr>
<td>0.50 - 0.60</td>
<td>1650</td>
</tr>
<tr>
<td>0.60 - 0.70</td>
<td>1720</td>
</tr>
<tr>
<td>0.70 - 0.80</td>
<td>1770</td>
</tr>
<tr>
<td>0.80 - 0.90</td>
<td>1820</td>
</tr>
<tr>
<td>0.90 - 1.00</td>
<td>1870</td>
</tr>
<tr>
<td>1.00 - 1.10</td>
<td>1910</td>
</tr>
<tr>
<td>1.30 - 1.40</td>
<td>2010</td>
</tr>
</tbody>
</table>

(table continued on next page)
### (table continued from previous page)
Dimensions in mm.

#### Thickness Max. width

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

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.


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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HC260LA</td>
<td>H240LA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HC300LA</td>
<td>H280LA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HC340LA</td>
<td>H320LA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HC380LA</td>
<td>H360LA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HC420LA</td>
<td>H400LA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Bake hardening grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC220B</td>
<td>CR210BH</td>
</tr>
</tbody>
</table>

### Rephosphorised grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>SEW 094 Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC220P</td>
<td>ZSt E220P</td>
</tr>
<tr>
<td>HC260P</td>
<td>ZSt E260P</td>
</tr>
</tbody>
</table>

### Carbon manganese grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC300CM</td>
<td>No EN specified equivalent</td>
</tr>
</tbody>
</table>

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

### RADECOL grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>RADECOL 2</td>
<td>No EN specified equivalent</td>
</tr>
<tr>
<td>RADECOL 3</td>
<td>No EN specified equivalent</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. - Max.</th>
<th>Min. - Max.</th>
<th>Min. elongation after fracture</th>
<th>Min. r-value</th>
<th>Min. n-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yield strength $R_{p0.2}$</td>
<td>tensile strength $R_m$</td>
<td>$A_2$</td>
<td>$r_{90}$</td>
<td>$n_{90}$</td>
</tr>
<tr>
<td>HC260LA</td>
<td>260 - 330</td>
<td>350 - 430</td>
<td>26</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HC300LA</td>
<td>300 - 380</td>
<td>380 - 480</td>
<td>23</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HC340LA</td>
<td>340 - 420</td>
<td>410 - 510</td>
<td>21</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HC380LA</td>
<td>380 - 480</td>
<td>440 - 560</td>
<td>19</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HC420LA</td>
<td>420 - 520</td>
<td>470 - 590</td>
<td>17</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Bake hardening grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. - Max.</th>
<th>Min. - Max.</th>
<th>Min. elongation after fracture</th>
<th>Min. r-value</th>
<th>Min. n-value</th>
<th>Min. BH$_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yield strength $R_{e1}$</td>
<td>tensile strength $R_m$</td>
<td>$A_2$</td>
<td>$r_{90}$</td>
<td>$n_{90}$</td>
<td>$N/mm^2$</td>
</tr>
<tr>
<td>HC220B</td>
<td>220 - 270</td>
<td>320 - 400</td>
<td>32</td>
<td>1.5</td>
<td>0.16</td>
<td>35</td>
</tr>
</tbody>
</table>

### Rephosphorised grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. - Max.</th>
<th>Min. - Max.</th>
<th>Min. elongation after fracture</th>
<th>Min. r-value</th>
<th>Min. n-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yield strength $R_{e1}$</td>
<td>tensile strength $R_m$</td>
<td>$A_2$</td>
<td>$r_{90}$</td>
<td>$n_{90}$</td>
</tr>
<tr>
<td>HC220P</td>
<td>220 - 270</td>
<td>320 - 400</td>
<td>32</td>
<td>1.3</td>
<td>0.16</td>
</tr>
<tr>
<td>HC260P</td>
<td>260 - 320</td>
<td>360 - 440</td>
<td>29</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1. If the yield strength is pronounced (yield flag), the values apply to the lower yield point ($R_{p0.2}$).
2. When thickness $\leq 0.7\, \text{mm}$, the minimum value for elongation is reduced by 2%.
3. For products with thickness $> 2\, \text{mm}$ the minimum $r_{90}$ is reduced by 0.2.
## Carbon manganese steel

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. - Max. yield strength $R_{eL}$</th>
<th>Min. - Max. tensile strength $R_m$</th>
<th>Min. elongation after fracture A</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC300CM</td>
<td>300 - 360</td>
<td>440 - 500</td>
<td>26</td>
</tr>
</tbody>
</table>

## RADECOL grades

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. - Max. yield strength $R_{p0.2}$</th>
<th>Min. - Max. tensile strength $R_m$</th>
<th>Min. elongation after fracture A</th>
</tr>
</thead>
<tbody>
<tr>
<td>RADECOL 2</td>
<td>245 - 330</td>
<td>350 - 440</td>
<td>26</td>
</tr>
<tr>
<td>RADECOL 3</td>
<td>300 - 380</td>
<td>380 - 480</td>
<td>23</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>EN 10268: 2006+ A1:2013</th>
<th>C</th>
<th>Mn</th>
<th>Si</th>
<th>P</th>
<th>S</th>
<th>Al</th>
<th>Ti</th>
<th>Nb</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC260LA</td>
<td>0.10</td>
<td>1.0</td>
<td>0.5</td>
<td>0.030</td>
<td>0.025</td>
<td>0.015</td>
<td>0.15</td>
<td>0.09</td>
</tr>
<tr>
<td>HC300LA</td>
<td>0.12</td>
<td>1.4</td>
<td>0.5</td>
<td>0.030</td>
<td>0.025</td>
<td>0.015</td>
<td>0.15</td>
<td>0.09</td>
</tr>
<tr>
<td>HC340LA</td>
<td>0.12</td>
<td>1.5</td>
<td>0.5</td>
<td>0.030</td>
<td>0.025</td>
<td>0.015</td>
<td>0.15</td>
<td>0.09</td>
</tr>
<tr>
<td>HC380LA</td>
<td>0.12</td>
<td>1.6</td>
<td>0.5</td>
<td>0.030</td>
<td>0.025</td>
<td>0.015</td>
<td>0.15</td>
<td>0.09</td>
</tr>
<tr>
<td>HC420LA</td>
<td>0.14</td>
<td>1.6</td>
<td>0.5</td>
<td>0.030</td>
<td>0.025</td>
<td>0.015</td>
<td>0.15</td>
<td>0.09</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>EN 10338:2010</th>
<th>C</th>
<th>Mn</th>
<th>Si</th>
<th>P</th>
<th>S</th>
<th>Al</th>
<th>Ti</th>
<th>Nb</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC220B</td>
<td>0.08</td>
<td>0.7</td>
<td>0.5</td>
<td>0.085</td>
<td>0.025</td>
<td>0.015</td>
<td>-</td>
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</tr>
</tbody>
</table>

Values in weight%.

Rephosphorised grades

<table>
<thead>
<tr>
<th>C Mn Si P S Al Ti Nb</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC220P</td>
</tr>
<tr>
<td>HC260P</td>
</tr>
</tbody>
</table>

Values in weight%.

Carbon manganese grades

<table>
<thead>
<tr>
<th>C Mn Si P S</th>
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</thead>
<tbody>
<tr>
<td>Grade</td>
</tr>
<tr>
<td>HC300CM</td>
</tr>
</tbody>
</table>

Values in weight%.

RADECOL grades

<table>
<thead>
<tr>
<th>C Mn Si P S</th>
</tr>
</thead>
<tbody>
<tr>
<td>RADECOL 2</td>
</tr>
<tr>
<td>RADECOL 3</td>
</tr>
</tbody>
</table>

Values in weight%.
# Dimensions

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

## Thickness | Max. width

<table>
<thead>
<tr>
<th>From - up to</th>
<th>HC260LA</th>
<th>HC300LA</th>
<th>HC340LA</th>
<th>HC380LA</th>
<th>HC420LA</th>
<th>HC220B</th>
<th>RADECOL 2</th>
<th>RADECOL 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.38 - 0.40</td>
<td>1390</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1390</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.40 - 0.43</td>
<td>1330</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>0.43 - 0.50</td>
<td>1390</td>
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<td>-</td>
<td>-</td>
<td>1390</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.50 - 0.55</td>
<td>1515</td>
<td>1500</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1400</td>
<td>1515</td>
<td>1500</td>
</tr>
<tr>
<td>0.55 - 0.60</td>
<td>1515</td>
<td>1500</td>
<td>1500</td>
<td>-</td>
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<td>1400</td>
<td>1515</td>
<td>1500</td>
</tr>
<tr>
<td>0.60 - 0.65</td>
<td>1600</td>
<td>1545</td>
<td>1515</td>
<td>1410</td>
<td>-</td>
<td>1400</td>
<td>1600</td>
<td>1545</td>
</tr>
<tr>
<td>0.65 - 0.70</td>
<td>1600</td>
<td>1545</td>
<td>1515</td>
<td>1410</td>
<td>-</td>
<td>1400</td>
<td>1600</td>
<td>1545</td>
</tr>
<tr>
<td>0.70 - 0.80</td>
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<td>1750</td>
<td>1515</td>
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<td>-</td>
<td>1400</td>
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<td>1750</td>
</tr>
<tr>
<td>0.80 - 0.90</td>
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<td>1750</td>
<td>1515</td>
<td>1410</td>
<td>1300</td>
<td>1400</td>
<td>1710</td>
<td>1750</td>
</tr>
<tr>
<td>0.90 - 0.95</td>
<td>1820</td>
<td>1750</td>
<td>1515</td>
<td>1410</td>
<td>1319</td>
<td>1400</td>
<td>1820</td>
<td>1750</td>
</tr>
<tr>
<td>0.95 - 1.00</td>
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<td>1750</td>
<td>1515</td>
<td>1410</td>
<td>1319</td>
<td>1400</td>
<td>1820</td>
<td>1750</td>
</tr>
<tr>
<td>1.00 - 1.10</td>
<td>1820</td>
<td>1750</td>
<td>1545</td>
<td>1484</td>
<td>1400</td>
<td>1820</td>
<td>1750</td>
<td>1750</td>
</tr>
<tr>
<td>1.10 - 1.20</td>
<td>1820</td>
<td>1750</td>
<td>1545</td>
<td>1484</td>
<td>1400</td>
<td>1400</td>
<td>1820</td>
<td>1750</td>
</tr>
<tr>
<td>1.20 - 1.28</td>
<td>1750</td>
<td>1750</td>
<td>1545</td>
<td>1484</td>
<td>1400</td>
<td>1400</td>
<td>1400</td>
<td>1750</td>
</tr>
<tr>
<td>1.28 - 1.30</td>
<td>1750</td>
<td>1750</td>
<td>1545</td>
<td>1484</td>
<td>1400</td>
<td>1400</td>
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<td>-</td>
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</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
<th>HC260LA</th>
<th>HC300LA</th>
<th>HC340LA</th>
<th>HC380LA</th>
<th>HC420LA</th>
<th>HC220P</th>
<th>HC260P</th>
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<td>2.20 - 2.30</td>
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<td>1940</td>
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<td>2.30 - 2.40</td>
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<td>1300</td>
<td>1370</td>
<td>1600</td>
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<tr>
<td>2.50 - 2.60</td>
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<td>1320</td>
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<td>1290</td>
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<td>2.90 - 3.00</td>
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<td>-</td>
<td>-</td>
<td>1170</td>
<td>1400</td>
<td>1400</td>
</tr>
</tbody>
</table>

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/mm² 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:

<table>
<thead>
<tr>
<th>Tata Steel</th>
<th>EN 10338:2015 ¹</th>
<th>EN 10083: 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP600</td>
<td>HCT600X</td>
<td></td>
</tr>
<tr>
<td>DP800</td>
<td>HCT780X</td>
<td></td>
</tr>
<tr>
<td>DP1000</td>
<td>HCT980X</td>
<td></td>
</tr>
<tr>
<td>HQ1500 CR</td>
<td></td>
<td>20MnB5 ²</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Product</th>
<th>Yield strength ¹ ( R_{p0.2} )</th>
<th>Min. Tensile strength ( R_m )</th>
<th>Elongation after fracture A ( (L_0 = 80mm) )</th>
<th>Min. n-value ( (10% - Ag) )</th>
<th>Min. BH₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td>N/mm²</td>
<td></td>
</tr>
<tr>
<td>DP600</td>
<td>340 - 420</td>
<td>600</td>
<td>20</td>
<td>0.14</td>
<td>30</td>
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<tr>
<td>DP800</td>
<td>450 - 560</td>
<td>780</td>
<td>14</td>
<td>-</td>
<td>30</td>
</tr>
<tr>
<td>DP1000</td>
<td>600 - 750</td>
<td>980</td>
<td>10</td>
<td>-</td>
<td>30</td>
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</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Product</th>
<th>Yield strength ¹ ( R_{p0.2} )</th>
<th>Min. - Max. tensile strength ( R_m )</th>
<th>Elongation after fracture A ( (L_0 = 80mm) )</th>
<th>n-value</th>
<th>r-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HQ1500 CR - Guaranteed</td>
<td>≥ 300</td>
<td>500 - 580</td>
<td>≥ 20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HQ1500 CR - Typical</td>
<td>340 - 440</td>
<td>500 - 580</td>
<td>&gt; 21</td>
<td>&gt; 0.150</td>
<td>0.90 - 1.0</td>
</tr>
</tbody>
</table>
## COLD-ROLLED

Product | Hot formed | **Min. - Max. yield strength $R_{p0.2}$** | **Min. - Max. tensile strength $R_m$** | Elongation after fracture $A (L_0 = 80\text{mm})$ |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>HQ1500 CR - Guaranteed</td>
<td>1000 - 1250</td>
<td>1300 - 1600</td>
<td>≥ 5</td>
<td></td>
</tr>
<tr>
<td>HQ1500 CR - Typical</td>
<td>1025 - 1100</td>
<td>1420 - 1520</td>
<td>5 - 7</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DP600</td>
<td>0.17</td>
<td>0.80</td>
<td>2.20</td>
<td>0.080</td>
<td>0.015</td>
<td>≤ 2.00</td>
<td>1.00</td>
<td>0.15</td>
<td>0.20</td>
<td>0.005</td>
</tr>
<tr>
<td>DP800</td>
<td>0.18</td>
<td>0.80</td>
<td>3.00</td>
<td>0.080</td>
<td>0.015</td>
<td>≤ 2.00</td>
<td>1.00</td>
<td>0.15</td>
<td>0.20</td>
<td>0.005</td>
</tr>
<tr>
<td>DP1000</td>
<td>0.23</td>
<td>0.80</td>
<td>3.00</td>
<td>0.080</td>
<td>0.015</td>
<td>≤ 2.00</td>
<td>1.00</td>
<td>0.15</td>
<td>0.20</td>
<td>0.005</td>
</tr>
<tr>
<td>HQ1500 CR - Guaranteed</td>
<td>0.23</td>
<td>0.3</td>
<td>1.3</td>
<td>0.02</td>
<td>0.010</td>
<td>0.06</td>
<td>0.3</td>
<td>0.04</td>
<td>-</td>
<td>0.005</td>
</tr>
<tr>
<td>HQ1500 CR - Typical</td>
<td>0.22</td>
<td>0.24</td>
<td>1.2</td>
<td>0.01</td>
<td>0.005</td>
<td>0.04</td>
<td>0.2</td>
<td>0.03</td>
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<td>0.0008</td>
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<tr>
<td>20MnB5</td>
<td>0.23</td>
<td>0.4</td>
<td>1.4</td>
<td>0.025</td>
<td>0.035</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>- 0.005</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
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<tbody>
<tr>
<td></td>
<td>DP600 ¹</td>
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<tr>
<td>0.70 - 0.80</td>
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<td>0.80 - 0.85</td>
<td>1437</td>
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<td>0.85 - 0.90</td>
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<tr>
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<td>1.10 - 1.20</td>
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<td>1.90 - 1.95</td>
<td>1500</td>
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<tr>
<td>1.95 - 2.00</td>
<td>1500</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Min. - Max. yield strength $R_p$</th>
<th>Min. - Max. tensile strength $R_m$</th>
<th>Min. elongation after fracture A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/mm$^2$</td>
<td>N/mm$^2$</td>
<td>%</td>
</tr>
<tr>
<td>CA200</td>
<td>200 - 260</td>
<td>320 - 380</td>
<td>30</td>
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<td>CA240</td>
<td>240 - 300</td>
<td>340 - 400</td>
<td>28</td>
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</table>

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:

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<th></th>
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<tbody>
<tr>
<td>CA200</td>
<td>0.085</td>
<td>0.55</td>
<td>0.03</td>
<td>0.03</td>
<td>0.015 - 0.080</td>
</tr>
<tr>
<td>CA240</td>
<td>0.085</td>
<td>0.55</td>
<td>0.03</td>
<td>0.03</td>
<td>0.020 - 0.080</td>
</tr>
</tbody>
</table>
### Dimensions
For continuously-annealed (CA) products.
Dimensions in mm.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width CA200</th>
<th>Max. width CA240</th>
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<tbody>
<tr>
<td>0.37 - 0.38</td>
<td>1390</td>
<td>-</td>
</tr>
<tr>
<td>0.38 - 0.40</td>
<td>1390</td>
<td>1390</td>
</tr>
<tr>
<td>0.45 - 0.50</td>
<td>1470</td>
<td>1390</td>
</tr>
<tr>
<td>0.50 - 0.60</td>
<td>1550</td>
<td>1515</td>
</tr>
<tr>
<td>0.60 - 0.65</td>
<td>1600</td>
<td>1600</td>
</tr>
<tr>
<td>0.65 - 0.70</td>
<td>1710</td>
<td>1600</td>
</tr>
<tr>
<td>0.70 - 0.75</td>
<td>1710</td>
<td>1710</td>
</tr>
<tr>
<td>0.75 - 0.90</td>
<td>1710</td>
<td>1710</td>
</tr>
<tr>
<td>0.90 - 0.95</td>
<td>1820</td>
<td>1820</td>
</tr>
<tr>
<td>0.95 - 1.60</td>
<td>1820</td>
<td>1820</td>
</tr>
<tr>
<td>1.60 - 1.70</td>
<td>1750</td>
<td>1750</td>
</tr>
<tr>
<td>1.70 - 1.80</td>
<td>1650</td>
<td>1620</td>
</tr>
<tr>
<td>1.80 - 1.90</td>
<td>1525</td>
<td>1500</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td>1500</td>
<td>1500</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>111</td>
</tr>
<tr>
<td>Steel for forming</td>
<td>117</td>
</tr>
<tr>
<td>High-strength steel</td>
<td>123</td>
</tr>
<tr>
<td>Advanced high-strength steel</td>
<td>134</td>
</tr>
<tr>
<td>Structural steel</td>
<td>138</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Coating</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure zinc (Z)</td>
<td>100 (7 µm/side)</td>
<td>600 (42 µm/side)</td>
</tr>
<tr>
<td>Zinc-iron (ZF)</td>
<td>100 (7 µm/side)</td>
<td>140 (10 µm/side)</td>
</tr>
<tr>
<td>MagiZinc (ZM)</td>
<td>70 (5 µm/side)</td>
<td>200 (14 µm/side)</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Roughness $R_a$ ($\mu$m)</th>
<th>cut off 0.8mm</th>
<th>cut off 2.5mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6 - 1.9</td>
<td>0.7 - 2.2</td>
<td></td>
</tr>
</tbody>
</table>
**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:

<table>
<thead>
<tr>
<th>Coating type</th>
<th>Production location UK</th>
<th>Production location NL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure zinc (Z)</td>
<td>0.5 - 1.7 g/m²</td>
<td>0.25 - 1.0 g/m²</td>
</tr>
<tr>
<td>Zinc-iron(ZF)</td>
<td>-</td>
<td>0.5 - 1.5 g/m²</td>
</tr>
<tr>
<td>MagiZinc (ZM)</td>
<td>-</td>
<td>0.25 - 1.0 g/m²</td>
</tr>
</tbody>
</table>

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 1550 mm. 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:

<table>
<thead>
<tr>
<th>Thickness tolerance</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full thickness tolerance</td>
<td>Available</td>
</tr>
<tr>
<td>Special thickness tolerance</td>
<td>Available</td>
</tr>
<tr>
<td>50% of full thickness tolerance</td>
<td>Refer before ordering</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Description</th>
<th>UK</th>
<th>NL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside diameter</td>
<td>standard 610mm, 508mm on request</td>
<td></td>
</tr>
<tr>
<td>Outside diameter</td>
<td>maximum 2500mm and at the most 10/7 x width</td>
<td></td>
</tr>
<tr>
<td>Coil weight</td>
<td>Maximum 33 tonnes, but limited to 10/7 x width and limited by road or rail transport.</td>
<td>maximum 30 tonnes</td>
</tr>
<tr>
<td></td>
<td>minimum by agreement or 50% of maximum</td>
<td>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.</td>
</tr>
<tr>
<td>KIM: width ≤ 1200mm</td>
<td>11.7 - 22.7 kg/mm width</td>
<td>15.5 - 22.0 kg/mm width</td>
</tr>
<tr>
<td>KIM: 1200 &lt; width ≤ 1700mm</td>
<td>11.6 - 20.0 kg/mm width</td>
<td>15.5 - 21.7 kg/mm width</td>
</tr>
<tr>
<td>KIM: width &gt; 1700mm</td>
<td>11.6 - 19.9 kg/mm width</td>
<td>11.0 kg/mm width and 15.5 - 21.7 kg/mm width</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>European standard</th>
<th>National standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10346: 2015</td>
<td>Germany</td>
</tr>
<tr>
<td>DIN 17162-1</td>
<td></td>
</tr>
<tr>
<td>DX51D+Z/+ZF/+ZM</td>
<td>St 02 Z</td>
</tr>
<tr>
<td>DX52D+Z/+ZF/+ZM</td>
<td>St 03 Z</td>
</tr>
<tr>
<td>DX53D+Z/+ZF/+ZM</td>
<td>St 05 Z</td>
</tr>
<tr>
<td>DX54D+Z/+ZF/+ZM</td>
<td>St 06 Z</td>
</tr>
<tr>
<td>DX56D+Z/+ZF/+ZM</td>
<td>St 07 Z</td>
</tr>
<tr>
<td>DX57D+Z/+ZF/+ZM</td>
<td>-</td>
</tr>
<tr>
<td>DX57D HyperForm®+Z</td>
<td>-</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>Yield strength $R_e$</th>
<th>Tensile strength $R_m$</th>
<th>Min. elongation after fracture $A$</th>
<th>Min. r-value $r_{90}$</th>
<th>Min. n-value $n_{90}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX51D+Z+/+ZF/+ZM</td>
<td>-</td>
<td>270 - 500</td>
<td>22</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DX52D+Z+/+ZF/+ZM</td>
<td>140 - 300 $^3$</td>
<td>270 - 420</td>
<td>26</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DX53D+Z+/+ZF/+ZM</td>
<td>140 - 260</td>
<td>270 - 380</td>
<td>30</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DX54D+Z</td>
<td>120 - 220</td>
<td>260 - 350</td>
<td>36</td>
<td>1.6 $^4$</td>
<td>0.18</td>
</tr>
<tr>
<td>DX54D+ZF+/+ZM</td>
<td>120 - 220</td>
<td>260 - 350</td>
<td>34</td>
<td>1.4 $^4$</td>
<td>0.18</td>
</tr>
<tr>
<td>DX56D+Z</td>
<td>120 - 180</td>
<td>260 - 350</td>
<td>39</td>
<td>1.9 $^4$</td>
<td>0.21</td>
</tr>
<tr>
<td>DX56D+ZF+/+ZM</td>
<td>120 - 180</td>
<td>260 - 350</td>
<td>37</td>
<td>1.7 $^4,^5$</td>
<td>0.20 $^5$</td>
</tr>
<tr>
<td>DX57D+Z</td>
<td>120 - 170</td>
<td>260 - 350</td>
<td>41</td>
<td>2.1 $^4$</td>
<td>0.22</td>
</tr>
<tr>
<td>DX57D+ZF+/+ZM</td>
<td>120 - 170</td>
<td>260 - 350</td>
<td>39</td>
<td>1.9 $^4,^5$</td>
<td>0.21 $^5$</td>
</tr>
<tr>
<td>DX57D HyperForm+Z $^6$</td>
<td>120 - 160</td>
<td>260 - 310</td>
<td>43</td>
<td>2.3</td>
<td>0.225</td>
</tr>
</tbody>
</table>

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 $t \leq 0.50$mm (minus 4 units) and for $0.50$mm $\leq t \leq 0.70$mm (minus 2 units).
3. This value applies to skin-passed products only (surface qualities B and C).
4. For $t > 1.5$mm, the minimum $r_{90}$ - value reduced by 0.2 applies
5. For $t \leq 0.70$mm, the minimum $r_{90}$ - value reduced by 0.2 and minimum $n_{90}$ - value reduced by 0.01 apply.
Chemical composition
Tata Steel complies with the following cast analysis with maximum values in weight percentages: EN 10346:2015.

<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Al</th>
<th>N</th>
<th>Ti</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX51D+Z/+ZF/+ZM</td>
<td>0.18</td>
<td>1.20</td>
<td>0.12</td>
<td>0.045</td>
<td>-</td>
<td>-</td>
<td>0.30</td>
</tr>
<tr>
<td>DX52D+Z/+ZF/+ZM</td>
<td>0.12</td>
<td>0.60</td>
<td>0.10</td>
<td>0.045</td>
<td>-</td>
<td>-</td>
<td>0.30</td>
</tr>
<tr>
<td>DX53D+Z/+ZF/+ZM</td>
<td>0.12</td>
<td>0.60</td>
<td>0.10</td>
<td>0.045</td>
<td>-</td>
<td>-</td>
<td>0.30</td>
</tr>
<tr>
<td>DX54D+Z/+ZF/+ZM</td>
<td>0.12</td>
<td>0.60</td>
<td>0.10</td>
<td>0.045</td>
<td>-</td>
<td>-</td>
<td>0.30</td>
</tr>
<tr>
<td>DX56D+Z/+ZF/+ZM</td>
<td>0.12</td>
<td>0.60</td>
<td>0.10</td>
<td>0.045</td>
<td>-</td>
<td>-</td>
<td>0.30</td>
</tr>
<tr>
<td>DX57D+Z/+ZF/+ZM</td>
<td>0.12</td>
<td>0.60</td>
<td>0.10</td>
<td>0.045</td>
<td>-</td>
<td>-</td>
<td>0.30</td>
</tr>
<tr>
<td>DX57D HyperForm+Z ¹</td>
<td>0.12</td>
<td>0.60</td>
<td>0.10</td>
<td>0.045</td>
<td>-</td>
<td>-</td>
<td>0.30</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
<th>DX51D</th>
<th>DX52D</th>
<th>DX53D</th>
<th>DX54D</th>
<th>DX56D</th>
<th>DX57D</th>
<th>DX57D HyperForm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.35 - 0.40</td>
<td></td>
<td>1370</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>0.40 - 0.45</td>
<td></td>
<td>1520</td>
<td>1520</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>0.45 - 0.50</td>
<td></td>
<td>1520</td>
<td>1520</td>
<td>1520</td>
<td>1350</td>
<td>1350</td>
<td>-</td>
<td></td>
</tr>
<tr>
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<td>1500</td>
<td>1470</td>
<td>-</td>
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<tr>
<td>0.55 - 0.60</td>
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<td>1590</td>
<td>1590</td>
<td>1640</td>
<td>1620</td>
<td>1620</td>
<td>1590</td>
<td>-</td>
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<td></td>
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<td>1910</td>
<td>1970</td>
<td>1970</td>
<td>1790</td>
<td>1780</td>
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<td>0.75 - 0.80</td>
<td></td>
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<td>1950</td>
<td>1970</td>
<td>1970</td>
<td>1720</td>
<td>1710</td>
</tr>
</tbody>
</table>

(table continued on next page)
<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>DX51D</th>
<th>DX52D</th>
<th>DX53D</th>
<th>DX54D</th>
<th>DX56D</th>
<th>DX57D HyperForm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.80 - 0.90</td>
<td>2020</td>
<td>2020</td>
<td>2000</td>
<td>1970</td>
<td>1970</td>
<td>1610</td>
</tr>
<tr>
<td>0.90 - 1.00</td>
<td>2020</td>
<td>2020</td>
<td>2000</td>
<td>1970</td>
<td>1970</td>
<td>1480</td>
</tr>
<tr>
<td>1.00 - 1.20</td>
<td>2020</td>
<td>2020</td>
<td>2000</td>
<td>1970</td>
<td>1970</td>
<td>-</td>
</tr>
<tr>
<td>1.20 - 1.30</td>
<td>2020</td>
<td>2020</td>
<td>1940</td>
<td>1940</td>
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<td>1.30 - 1.40</td>
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<td>1.40 - 1.50</td>
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<td>-</td>
</tr>
<tr>
<td>1.50 - 1.60</td>
<td>2020</td>
<td>2020</td>
<td>1740</td>
<td>1840</td>
<td>1840</td>
<td>-</td>
</tr>
<tr>
<td>1.60 - 1.70</td>
<td>2020</td>
<td>2020</td>
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<td>-</td>
</tr>
<tr>
<td>1.70 - 1.75</td>
<td>2000</td>
<td>1970</td>
<td>1600</td>
<td>1720</td>
<td>1720</td>
<td>-</td>
</tr>
<tr>
<td>1.75 - 1.90</td>
<td>2000</td>
<td>1970</td>
<td>1530</td>
<td>1630</td>
<td>1630</td>
<td>-</td>
</tr>
<tr>
<td>1.90 - 2.00</td>
<td>2000</td>
<td>1970</td>
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<td>1530</td>
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<tr>
<td>2.00 - 2.50</td>
<td>1580</td>
<td>1580</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.50 - 3.50</td>
<td>1540</td>
<td>1540</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3.50 - 3.60</td>
<td>1500</td>
<td>1500</td>
<td>-</td>
<td>-</td>
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<tr>
<td>3.60 - 3.70</td>
<td>1450</td>
<td>1450</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>3.70 - 3.85</td>
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<td>-</td>
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</tr>
<tr>
<td>3.85 - 4.00</td>
<td>1350</td>
<td>1350</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Max. width</th>
</tr>
</thead>
<tbody>
<tr>
<td>From - up to</td>
<td>DX51D</td>
</tr>
<tr>
<td>-----------</td>
<td>-------</td>
</tr>
<tr>
<td>0.36 - 0.40</td>
<td>1324</td>
</tr>
<tr>
<td>0.40 - 0.50</td>
<td>1375</td>
</tr>
<tr>
<td>0.50 - 0.55</td>
<td>1375</td>
</tr>
<tr>
<td>0.55 - 0.57</td>
<td>1525</td>
</tr>
<tr>
<td>0.57 - 0.60</td>
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<td>0.60 - 0.65</td>
<td>1525</td>
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<td>0.65 - 0.66</td>
<td>1525</td>
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<tr>
<td>0.66 - 0.70</td>
<td>1650</td>
</tr>
<tr>
<td>0.70 - 1.25</td>
<td>1750</td>
</tr>
<tr>
<td>1.25 - 1.45</td>
<td>1750</td>
</tr>
<tr>
<td>1.45 - 1.50</td>
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</tr>
<tr>
<td>1.50 - 1.60</td>
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<td>1.60 - 1.65</td>
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<tr>
<td>1.65 - 1.70</td>
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<tr>
<td>1.70 - 1.80</td>
<td>1560</td>
</tr>
<tr>
<td>1.80 - 2.00</td>
<td>1500</td>
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</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width MX1D</th>
<th>DX52D</th>
<th>DX53D</th>
<th>DX54D</th>
<th>DX56D</th>
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</thead>
<tbody>
<tr>
<td>0.45 - 0.50</td>
<td>1350</td>
<td>1350</td>
<td>1350</td>
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<tr>
<td>0.60 - 0.65</td>
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<td>1730</td>
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<tr>
<td>0.65 - 1.60</td>
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<td>1850</td>
<td>1850</td>
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<td>1.60 - 1.75</td>
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</table>

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

MagiZinc (+ZM) dimensional capability.

Dimensions in mm.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width MX1D</th>
<th>DX52D</th>
<th>DX53D</th>
<th>DX54D</th>
<th>DX56D</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.40 - 0.45</td>
<td>1520</td>
<td>1520</td>
<td>-</td>
<td>-</td>
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<tr>
<td>0.45 - 0.60</td>
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<td>1520</td>
<td>1520</td>
<td>1520</td>
<td>1520</td>
</tr>
<tr>
<td>0.60 - 1.20</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
</tr>
<tr>
<td>1.20 - 2.00</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
<td>-</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>European standard</th>
<th>National standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10346:2015</td>
<td>Germany</td>
</tr>
</tbody>
</table>

### Phosphorus alloyed interstitial-free

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>HX180YD+Z</td>
<td></td>
</tr>
<tr>
<td>HX220YD+Z/+ZF</td>
<td></td>
</tr>
<tr>
<td>HX260YD+Z/+ZF</td>
<td></td>
</tr>
</tbody>
</table>

### Bake hardening

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HX180BD+Z/+ZF</td>
<td></td>
</tr>
<tr>
<td>HX220BD+Z/+ZF</td>
<td></td>
</tr>
<tr>
<td>HX260BD+Z/+ZF</td>
<td></td>
</tr>
<tr>
<td>HX300BD+Z/+ZF</td>
<td></td>
</tr>
</tbody>
</table>

### Phosphorus-alloyed

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HX220PD+Z/+ZF</td>
<td></td>
</tr>
<tr>
<td>HX260PD+Z/+ZF</td>
<td></td>
</tr>
<tr>
<td>HX300PD+Z/+ZF</td>
<td></td>
</tr>
</tbody>
</table>

### Micro-alloyed

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HX220LAD+Z/+ZF/+ZM</td>
<td>-</td>
</tr>
<tr>
<td>HX260LAD+Z/+ZF/+ZM</td>
<td>ZStE260</td>
</tr>
<tr>
<td>HX300LAD+Z/+ZF/+ZM</td>
<td>ZStE300</td>
</tr>
<tr>
<td>HX340LAD+Z/+ZF/+ZM</td>
<td>ZStE340</td>
</tr>
<tr>
<td>HX380LAD+Z/+ZF/+ZM</td>
<td>ZStE380</td>
</tr>
<tr>
<td>HX420LAD+Z/+ZF/+ZM</td>
<td>ZStE420</td>
</tr>
<tr>
<td>HX460LAD+Z</td>
<td>-</td>
</tr>
<tr>
<td>HX500LAD+Z</td>
<td>-</td>
</tr>
</tbody>
</table>

**Mechanical properties**

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

<table>
<thead>
<tr>
<th>European standard EN 10346:2015</th>
<th>Yield strength $R_{el}$ $[^2]$</th>
<th>Min. BH$_2$</th>
<th>Tensile strength $R_m$</th>
<th>Min. elongation after fracture A</th>
<th>Min. r-value $r_{90}$</th>
<th>Min. n-value $n_{90}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>N/mm$^2$</td>
<td>N/mm$^2$</td>
<td>N/mm$^2$</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HX180YD+Z/+ZF</td>
<td>180 - 240</td>
<td>-</td>
<td>330 - 390</td>
<td>34</td>
<td>1.7</td>
<td>0.18</td>
</tr>
<tr>
<td>HX220YD+Z/+ZF</td>
<td>220 - 280</td>
<td>-</td>
<td>340 - 420</td>
<td>32</td>
<td>1.5</td>
<td>0.17</td>
</tr>
<tr>
<td>HX260YD+Z/+ZF</td>
<td>260 - 320</td>
<td>-</td>
<td>380 - 440</td>
<td>30</td>
<td>1.4</td>
<td>0.16</td>
</tr>
<tr>
<td>HX180BD+Z/+ZF</td>
<td>180 - 240</td>
<td>30</td>
<td>290 - 360</td>
<td>34</td>
<td>1.5</td>
<td>0.16</td>
</tr>
<tr>
<td>HX220BD+Z/+ZF</td>
<td>220 - 280</td>
<td>30</td>
<td>320 - 400</td>
<td>32</td>
<td>1.2</td>
<td>0.15</td>
</tr>
<tr>
<td>HX260BD+Z/+ZF</td>
<td>260 - 320</td>
<td>30</td>
<td>360 - 440</td>
<td>28</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX300BD+Z/+ZF</td>
<td>300 - 360</td>
<td>30</td>
<td>400 - 480</td>
<td>26</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX220LAD +Z/+ZF/+ZM $[^1]$</td>
<td>220 - 300</td>
<td>-</td>
<td>320 - 400</td>
<td>29</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX260LAD +Z/+ZF/+ZM</td>
<td>260 - 330</td>
<td>-</td>
<td>350 - 430</td>
<td>26</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX300LAD +Z/+ZF/+ZM</td>
<td>300 - 380</td>
<td>-</td>
<td>380 - 480</td>
<td>23</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX340LAD +Z/+ZF/+ZM</td>
<td>340 - 420</td>
<td>-</td>
<td>410 - 510</td>
<td>21</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX380LAD +Z/+ZF/+ZM</td>
<td>380 - 480</td>
<td>-</td>
<td>440 - 560</td>
<td>19</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX420LAD +Z/+ZF/+ZM</td>
<td>420 - 520</td>
<td>-</td>
<td>470 - 590</td>
<td>17</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX460LAD+Z</td>
<td>460 - 560</td>
<td>-</td>
<td>500 - 640</td>
<td>15</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX500LAD+Z</td>
<td>500 - 620</td>
<td>-</td>
<td>530 - 690</td>
<td>13</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>


$[^2]$ 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

<table>
<thead>
<tr>
<th></th>
<th>Yield strength $R_{el}$</th>
<th>Tensile strength $R_m$</th>
<th>Min. elongation after fracture A</th>
<th>Min. r-value $r_{90}$</th>
<th>Min. n-value $n_{90}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N/mm²</td>
<td>N/mm²</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HX220PD+Z/+ZF $^1$</td>
<td>220 - 280</td>
<td>340 - 400</td>
<td>32</td>
<td>1.3</td>
<td>0.150</td>
</tr>
<tr>
<td>HX260PD+Z/+ZF $^1$</td>
<td>260 - 320</td>
<td>380 - 440</td>
<td>28</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX300PD+Z/+ZF $^1$</td>
<td>300 - 360</td>
<td>400 - 480</td>
<td>26</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>


$^2$ 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:

<table>
<thead>
<tr>
<th>EN 10346:2015</th>
<th>C</th>
<th>Mn</th>
<th>Si</th>
<th>P</th>
<th>S</th>
<th>Al_{tot}</th>
<th>Ti</th>
<th>Nb</th>
</tr>
</thead>
<tbody>
<tr>
<td>HX180YD+Z+ZF</td>
<td>0.01</td>
<td>0.70</td>
<td>0.20</td>
<td>0.06</td>
<td>0.025</td>
<td>≤ 0.1</td>
<td>0.12</td>
<td>0.09</td>
</tr>
<tr>
<td>HX220YD+Z+ZF</td>
<td>0.01</td>
<td>0.90</td>
<td>0.20</td>
<td>0.08</td>
<td>0.025</td>
<td>≤ 0.1</td>
<td>0.12</td>
<td>0.09</td>
</tr>
<tr>
<td>HX260YD+Z+ZF</td>
<td>0.01</td>
<td>1.30</td>
<td>0.25</td>
<td>0.10</td>
<td>0.025</td>
<td>≤ 0.1</td>
<td>0.12</td>
<td>0.09</td>
</tr>
<tr>
<td>HX180BD+Z+ZF</td>
<td>0.10</td>
<td>0.70</td>
<td>0.50</td>
<td>0.06</td>
<td>0.025</td>
<td>≤ 0.1</td>
<td>0.12</td>
<td>0.09</td>
</tr>
<tr>
<td>HX220BD+Z+ZF</td>
<td>0.10</td>
<td>0.70</td>
<td>0.50</td>
<td>0.08</td>
<td>0.025</td>
<td>≤ 0.1</td>
<td>0.12</td>
<td>0.09</td>
</tr>
<tr>
<td>HX260BD+Z+ZF</td>
<td>0.10</td>
<td>0.80</td>
<td>0.50</td>
<td>0.10</td>
<td>0.025</td>
<td>≤ 0.1</td>
<td>0.12</td>
<td>0.09</td>
</tr>
<tr>
<td>HX300BD+Z+ZF</td>
<td>0.11</td>
<td>0.80</td>
<td>0.50</td>
<td>0.12</td>
<td>0.025</td>
<td>≤ 0.1</td>
<td>0.12</td>
<td>0.09</td>
</tr>
<tr>
<td>HX220LAD+Z+ZF(1)</td>
<td>0.10</td>
<td>0.60</td>
<td>0.50</td>
<td>0.03</td>
<td>0.025</td>
<td>≥ 0.015</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX260LAD+Z+ZF(1)</td>
<td>0.11</td>
<td>0.60</td>
<td>0.50</td>
<td>0.03</td>
<td>0.025</td>
<td>≥ 0.015 0.12</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>HX300LAD+Z+ZF(1)</td>
<td>0.11</td>
<td>1.00</td>
<td>0.50</td>
<td>0.03</td>
<td>0.025</td>
<td>≤ 0.1   0.15</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>HX340LAD+Z+ZF(1)</td>
<td>0.11</td>
<td>1.00</td>
<td>0.50</td>
<td>0.03</td>
<td>0.025</td>
<td>≥ 0.015 0.15</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>HX380LAD+Z+ZF(1)</td>
<td>0.11</td>
<td>1.40</td>
<td>0.50</td>
<td>0.03</td>
<td>0.025</td>
<td>≥ 0.015 0.15</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>HX420LAD+Z+ZF(1)</td>
<td>0.11</td>
<td>1.40</td>
<td>0.50</td>
<td>0.03</td>
<td>0.025</td>
<td>≥ 0.015 0.15</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>HX460LAD+Z(1)</td>
<td>0.15</td>
<td>1.70</td>
<td>0.50</td>
<td>0.03</td>
<td>0.025</td>
<td>≥ 0.015 0.15</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td>HX500LAD+Z(1)</td>
<td>0.15</td>
<td>1.70</td>
<td>0.50</td>
<td>0.03</td>
<td>0.025</td>
<td>≥ 0.015 0.15</td>
<td>0.09</td>
<td></td>
</tr>
</tbody>
</table>


## Phosphorus-alloyed steels

<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>Mn</th>
<th>Si</th>
<th>Al</th>
<th>P</th>
<th>S</th>
<th>Ti</th>
<th>Nb</th>
</tr>
</thead>
<tbody>
<tr>
<td>HX220PD+Z+ZF</td>
<td>0.08</td>
<td>0.7</td>
<td>0.5</td>
<td>0.02</td>
<td>0.1</td>
<td>0.025</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX260PD+Z+ZF</td>
<td>0.08</td>
<td>0.8</td>
<td>0.5</td>
<td>0.02</td>
<td>0.1</td>
<td>0.025</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HX300PD+Z+ZF</td>
<td>0.1</td>
<td>0.7</td>
<td>0.5</td>
<td>0.02</td>
<td>0.12</td>
<td>0.025</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

## Dimensions

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

Dimensions in mm.

### Thickness

<table>
<thead>
<tr>
<th>Thickness</th>
<th>HX220 YD</th>
<th>HX260 YD</th>
<th>HX180 BD</th>
<th>HX220 YD</th>
<th>HX220 BD</th>
<th>HX260 YD</th>
<th>HX260 BD</th>
<th>HX300 YD</th>
<th>HX300 BD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.45 - 0.50</td>
<td>1350</td>
<td>-</td>
<td>1320</td>
<td>1320</td>
<td>-</td>
<td>1340</td>
<td>1340</td>
<td></td>
<td></td>
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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.

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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.

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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.

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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.

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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:

<table>
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<th>Grade</th>
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<tr>
<td>DP600+Z/+ZF</td>
<td>HCT590X+Z/+ZF</td>
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<tr>
<td>DP800+Z</td>
<td>HCT780X+Z</td>
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<tr>
<td>DP800 HyperForm®+Z</td>
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<tr>
<td>DP1000LY+Z</td>
<td>HCT980X+Z</td>
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<td>DP1000HY+Z</td>
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<tr>
<td><strong>Complex-phase</strong></td>
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<tr>
<td>CP800+Z</td>
<td>HCT780C+Z</td>
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</table>
**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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Yield strength $R_{el}$ N/mm²</th>
<th>Min. tensile strength $R_m$ N/mm²</th>
<th>Min. elongation after fracture $A$ %</th>
<th>Min. r-value $r_{90}$</th>
<th>Min. n-value $n_{90}$</th>
<th>Min. BH2 N/mm²</th>
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<td>DP600+Z/Z+ZF ¹</td>
<td>330 - 430</td>
<td>590</td>
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<td>0.14</td>
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<tr>
<td>DP800+Z</td>
<td>440 - 550</td>
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<td>14</td>
<td>-</td>
<td>-</td>
<td>30</td>
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<tr>
<td>DP800 HyperForm+Z</td>
<td>450 - 550</td>
<td>780</td>
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<td>0.6</td>
<td>0.14</td>
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<tr>
<td>DP1000LY+Z</td>
<td>590 - 740</td>
<td>980</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>30</td>
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<tr>
<td>DP1000HY+Z</td>
<td>700 - 850</td>
<td>980 - 1130</td>
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<tr>
<td>CP800+Z</td>
<td>570 - 720</td>
<td>780</td>
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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%:

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<td>0.015</td>
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<td>0.080</td>
<td>0.015</td>
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<td>1.00</td>
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<tr>
<td>DP800 HyperForm+Z</td>
<td>0.18</td>
<td>2.50</td>
<td>0.80</td>
<td>0.080</td>
<td>0.015</td>
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<td>1.00</td>
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<td>0.080</td>
<td>0.015</td>
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# Dimensions

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

Dimensions in mm.

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</table>

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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>DP600</th>
<th>DP800</th>
<th>HyperForm DP1000LY</th>
<th>DP1000HY</th>
<th>CP800</th>
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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:

<table>
<thead>
<tr>
<th>European standard</th>
<th>National standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 10346:2015</td>
<td>Germany</td>
</tr>
<tr>
<td>Grade</td>
<td>DIN 17162-1</td>
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<tr>
<td>S220GD+Z/+ZM</td>
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<td>St E 250-2Z</td>
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<td>S280GD+Z/+ZM</td>
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<td>St E 320-3Z</td>
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<td>St E 350-3Z</td>
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<td>S550GD+Z</td>
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</table>
**Mechanical properties**

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

### EN 10346:2015

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<tr>
<th>Grade</th>
<th>Min. yield strength $R_{p0.2}$</th>
<th>Min. tensile strength $R_m$</th>
<th>Min. elongation after fracture $A$</th>
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<td>300 N/mm²</td>
<td>20 %</td>
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<td>S280GD+Z/+ZM</td>
<td>280 N/mm²</td>
<td>360 N/mm²</td>
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<td>320 N/mm²</td>
<td>390 N/mm²</td>
<td>17 %</td>
</tr>
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<td>S350GD+Z/+ZM</td>
<td>350 N/mm²</td>
<td>420 N/mm²</td>
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<tr>
<td>S390GD+Z</td>
<td>390 N/mm²</td>
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<td>S420GD+Z</td>
<td>420 N/mm²</td>
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<td>S450GD+Z</td>
<td>450 N/mm²</td>
<td>510 N/mm²</td>
<td>14 %</td>
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<tr>
<td>S550GD+Z</td>
<td>550 N/mm²</td>
<td>560 N/mm²</td>
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</tbody>
</table>

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 $t \leq 0.7$mm the minimum elongation after fracture is decreased by 2% and for a thickness $t \leq 0.5$mm 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:

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<td>0.045</td>
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<td>0.60</td>
<td>1.70</td>
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## Dimensions

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

**Dimensions in mm.**

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<th>S280GD</th>
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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.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width</th>
<th>S220GD</th>
<th>S250GD</th>
<th>S280GD</th>
<th>S320GD</th>
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<td>2.00 - 2.50</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1300</td>
<td>-</td>
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</tr>
</tbody>
</table>

The minimum width is 900mm.
MagiZinc (+ZM) products.
Dimensions in mm.

<table>
<thead>
<tr>
<th>Thickness From - up to</th>
<th>Max. width S220GD</th>
<th>S250GD</th>
<th>S280GD</th>
<th>S320GD</th>
<th>S350GD</th>
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</thead>
<tbody>
<tr>
<td>0.40 - 0.45</td>
<td>1520</td>
<td>1520</td>
<td>1520</td>
<td>1350</td>
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</tr>
<tr>
<td>0.45 - 0.50</td>
<td>1520</td>
<td>1520</td>
<td>1520</td>
<td>1370</td>
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<td>0.50 - 0.60</td>
<td>1520</td>
<td>1520</td>
<td>1520</td>
<td>1420</td>
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</tr>
<tr>
<td>0.60 - 0.75</td>
<td>1520</td>
<td>1520</td>
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<td>0.75 - 0.90</td>
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<td>1520</td>
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<tr>
<td>0.90 - 1.60</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
</tr>
<tr>
<td>1.60 - 2.00</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
<td>1520</td>
<td>1520</td>
</tr>
</tbody>
</table>

The minimum width is 900mm.

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

<table>
<thead>
<tr>
<th>Service Centre</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our service centre network</td>
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<tr>
<td>France Service Centre</td>
<td>151</td>
</tr>
<tr>
<td>Germany / Benelux Service Centres</td>
<td>153</td>
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<tr>
<td>- Heavy Gauge Europe - Maastricht, the Netherlands</td>
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<td>Ireland Service Centre</td>
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<td>Spain Service Centre</td>
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<td>Sweden / Norway Service Centres</td>
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<td>United Kingdom</td>
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<tr>
<td>- Automotive Service Centre - Steelpark</td>
<td>167</td>
</tr>
<tr>
<td>- Light Gauge Decoiling and Slitting - Steelpark</td>
<td>170</td>
</tr>
<tr>
<td>- Heavy Gauge Decoiling - Llanwern</td>
<td>172</td>
</tr>
<tr>
<td>- Profiling Centre</td>
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</tr>
<tr>
<td>- Stockholder sales</td>
<td>177</td>
</tr>
<tr>
<td>- Metal Centres - General Steel</td>
<td>179</td>
</tr>
</tbody>
</table>
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

Tata Steel
Naantali Steel Service Centre Oy
Rautakatu 5
21110 Naantali
Finland
T +358 (0) 102 876900
E sales.naantali@tatasteel.com

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 22,000m² 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

<table>
<thead>
<tr>
<th></th>
<th>Slitting</th>
<th>Decoiling</th>
<th>Recoiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>0.4 – 4.0mm</td>
<td>0.4 – 6.0mm</td>
<td>0.4-1.5mm</td>
</tr>
<tr>
<td>Width</td>
<td>10 – 1500mm</td>
<td>&lt; 2050mm</td>
<td>400-1250mm</td>
</tr>
<tr>
<td>Length</td>
<td>-</td>
<td>400 – 12000mm</td>
<td>-</td>
</tr>
</tbody>
</table>

---

150
France Service Centre

Tata Steel
Unitol
1 rue Fernand Raynaud
ZA de l’apport Paris
91814 Corbeil Essonnes
France
T +33 (0) 160 887777
F +33 (0) 160 887778
E contact.unitol@tatasteel.com

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 CO₂ 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 30,000m² 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.

<table>
<thead>
<tr>
<th>Processing capability</th>
<th>Slitting</th>
<th>Blanking</th>
<th>Decoiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>0.50 – 4mm</td>
<td>0.50 – 3.0mm</td>
<td>0.50 – 3.0mm</td>
</tr>
<tr>
<td>Width</td>
<td>From 30mm up to 1800mm</td>
<td>Up to 1600mm</td>
<td>From 600mm up to 1600mm</td>
</tr>
<tr>
<td>Length</td>
<td>-</td>
<td>Up to 2300mm (w &lt; 600mm)</td>
<td>Up to 6000mm (w &gt; 600mm)</td>
</tr>
</tbody>
</table>
Germany / Benelux Service Centres

Germany
Tata Steel
Service Center Gelsenkirchen GmbH
Grimbergstrasse 75
45889 Gelsenkirchen
Germany
T +49 (0) 209 98460
F +49 (0) 209 984620-0
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Germany
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F +49 (0) 213 174950-999
E degels@tatasteel.com

Benelux
Tata Steel
MultiSteel Service Centre
Fregatweg 44b
6222 NZ Maastricht
The Netherlands
General enquiries:
T +31 (0) 433 688444
F +31 (0) 433 636828
E info.scm@tatasteel.com

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:

- CO₂ 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/mm².
• at Gelsenkirchen – two slitters and a blanking line which can process steel coils with a maximum yield strength of 1400 N/mm².
• at Neuss – three slitters and a blanking line which can process steel coils with a maximum yield strength of 700 N/mm² 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

<table>
<thead>
<tr>
<th>Slitting</th>
<th>Cut-to-length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>0.4 - 6.0mm</td>
</tr>
<tr>
<td>Width</td>
<td>30 - 2000mm</td>
</tr>
<tr>
<td>Length</td>
<td>-</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Slitting</th>
<th>Decoiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>0.4 – 3.0mm</td>
</tr>
<tr>
<td>Width</td>
<td>10 – 2050mm</td>
</tr>
<tr>
<td>Length</td>
<td>-</td>
</tr>
</tbody>
</table>

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

### MultiSteel

<table>
<thead>
<tr>
<th>Slitting</th>
<th>Multiblanking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>0.2 - 3.0mm</td>
</tr>
<tr>
<td>Width</td>
<td>25 - 1850mm</td>
</tr>
<tr>
<td>Length</td>
<td>-</td>
</tr>
</tbody>
</table>

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

Tata Steel
Service Centre Maastricht BV
Feijen Service Centre
Fregatweg 42
6222 NZ Maastricht
The Netherlands
T +31 (0) 433 688444
F +31 (0) 433 636828
E info.scm@tatasteel.com

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/mm² at a maximum weight of 35 tonnes.

<table>
<thead>
<tr>
<th>Decoiling</th>
<th>Thickness</th>
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<tr>
<td></td>
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<td>&lt; 2.600mm</td>
</tr>
<tr>
<td></td>
<td>Length</td>
<td>1000 - 18.400mm</td>
</tr>
</tbody>
</table>

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

Tata Steel
Steel House
Moira Road, Lisburn
Co. Antrim BT28 2SN
Northern Ireland
T +44 (0) 2892 660747
F +44 (0) 2892 660748
E lisburn.reception@tatasteel.com

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

<table>
<thead>
<tr>
<th>Processing unit</th>
<th>Thickness Min.</th>
<th>Thickness Max.</th>
<th>Width Min.</th>
<th>Width Max.</th>
<th>Length Min.</th>
<th>Length Max.</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decoiling</td>
<td>0.5</td>
<td>6</td>
<td>600</td>
<td>2000</td>
<td>300</td>
<td>8700</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot-rolled, Hot-rolled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P&amp;O, Cold-rolled,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Metallic coated</td>
</tr>
<tr>
<td>Slitting</td>
<td>0.5</td>
<td>2.9</td>
<td>60</td>
<td>1524</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
<pre><code>                                         |                |                |            |            |             | Hot-rolled                     |
</code></pre>
<p>| Multi-Strand Blanking   | 0.5            | 2.9            | 250        | 1530       | 300         | 4000        |                               |</p>
Spain Service Centre

Tata Steel
Layde Steel slu
Bo Eguzkitza, 11
Ctra. Durango-Elorrio Km 1
48200 Durango – Bizkaia
Spain
T +34 (0) 946 217850
F +34 (0) 946 217868
E info@layde.es

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:

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

**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

<table>
<thead>
<tr>
<th></th>
<th>Slitting</th>
<th>Decoiling</th>
<th>Pickling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>0.2 – 7.0mm</td>
<td>0.3 – 3.0mm</td>
<td>1.4 – 7.0mm</td>
</tr>
<tr>
<td>Width</td>
<td>10 – 1650mm</td>
<td>300 – 1500mm</td>
<td>Up to 1300mm</td>
</tr>
<tr>
<td>Length</td>
<td>-</td>
<td>300 – 6000mm</td>
<td>-</td>
</tr>
</tbody>
</table>

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

Halmstad Steel Service Centre
Stationsgatan 55
SE-302 50 Halmstad
Sweden
T: +46 (0) 102 065700
E: HalmstadSSC@tatasteel.com

Norsk Stål Tynnplater
Habornveien 60
N-1630 Gamle Fredrikstad
Norway
T: +47 (0) 693 58400
E: firmapost@nst.eu

Norsk Stål Tynnplater
Östra Rönneholmsvägen 11B
211 47 Malmö
Sweden
T: +46 (0)405 79241
T: +46 (0)706 200755
T: +46 (0)706 940755

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**

<table>
<thead>
<tr>
<th>Slitting</th>
<th>Decoiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>0.3 – 4.0mm</td>
</tr>
<tr>
<td>Width</td>
<td>8 – 1310mm</td>
</tr>
<tr>
<td>Length</td>
<td>-</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Slitting</th>
<th>Decoiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>0.4 – 3.0mm</td>
</tr>
<tr>
<td>Width</td>
<td>20 – 1550mm</td>
</tr>
<tr>
<td>Length</td>
<td>-</td>
</tr>
</tbody>
</table>

Please consult our sales department regarding specific technical feasibility of dimensional combinations, tolerances and grades.
United Kingdom
Automotive Service Centre – Steelpark

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

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

<table>
<thead>
<tr>
<th>Processing unit</th>
<th>Thickness</th>
<th>Width</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td>Min.</td>
</tr>
<tr>
<td>Tailor welded blanks</td>
<td>0.6 (steel)</td>
<td>0.9 (Aluminium)</td>
<td>3.0</td>
</tr>
<tr>
<td>Press blanks</td>
<td>0.4</td>
<td>3.0</td>
<td>210</td>
</tr>
<tr>
<td>Blanking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Trapezoidal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Radial</td>
<td>0.4</td>
<td>3.0</td>
<td>400</td>
</tr>
<tr>
<td>- Square/rectangular</td>
<td></td>
<td></td>
<td>250</td>
</tr>
<tr>
<td>Slitting</td>
<td>0.4</td>
<td>3.2</td>
<td>34.5</td>
</tr>
<tr>
<td>Shearing</td>
<td>0.4</td>
<td>3.2</td>
<td>50</td>
</tr>
</tbody>
</table>
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:
• **Repeatably 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

<table>
<thead>
<tr>
<th>Processing unit</th>
<th>Thickness Min.</th>
<th>Thickness Max.</th>
<th>Width Min.</th>
<th>Width Max.</th>
<th>Length Min.</th>
<th>Length Max.</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decoiling</td>
<td>0.7 mm</td>
<td>3 mm</td>
<td>900 mm</td>
<td>2000 mm</td>
<td>700 mm</td>
<td>4000 mm</td>
<td>2t pack weight</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Minimum blank width = 150mm Up to 5 strands per coil width</td>
</tr>
<tr>
<td>Blanking</td>
<td>0.35 mm</td>
<td>3.2 mm</td>
<td>600 mm</td>
<td>2000 mm</td>
<td>420 mm</td>
<td>4000 mm</td>
<td>Minimum blank size = 20mm Five high-accuracy shears</td>
</tr>
<tr>
<td>Shearing</td>
<td>0.4 mm</td>
<td>6 mm</td>
<td>200 mm</td>
<td>3050 mm</td>
<td>200 mm</td>
<td>2450 mm</td>
<td>Hot-rolled, Hot-rolled P&amp;O, Cold-rolled, Metallic coated (inc. MagiZinc®)</td>
</tr>
<tr>
<td>Slitting</td>
<td>0.2 mm</td>
<td>8 mm</td>
<td>0.2 mm</td>
<td>TBC</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
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/mm² 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**

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Width</th>
<th>Length</th>
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</thead>
<tbody>
<tr>
<td>Max.</td>
<td>Max.</td>
<td>Max.</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>Decoiling</td>
<td>25 mm</td>
<td>2100 mm</td>
</tr>
</tbody>
</table>

Maximum thickness of Hot-rolled Pickled & Oiled is 12mm. Maximum thickness of Durbar® floor plate is 12.5mm. Maximum tensile strength is 1600 N/mm². 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

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Width</th>
<th>Length</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td></td>
</tr>
<tr>
<td>Oxy-gas profiling</td>
<td>170</td>
<td>5700</td>
<td>20000</td>
</tr>
<tr>
<td>High-definition Plasma profiling</td>
<td>55</td>
<td>5000</td>
<td>20000</td>
</tr>
<tr>
<td>Laser profiling</td>
<td>20</td>
<td>2500</td>
<td>8000</td>
</tr>
<tr>
<td>Flattening press</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machining centres</td>
<td>170</td>
<td>970</td>
<td>2300</td>
</tr>
<tr>
<td>Edge finishing</td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press brakes</td>
<td>30</td>
<td>3600</td>
<td>800</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Processing unit</th>
<th>Thickness</th>
<th>Width</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td>Min.</td>
</tr>
<tr>
<td>Sheets - light gauge</td>
<td>0.7</td>
<td>3</td>
<td>900</td>
</tr>
<tr>
<td>Sheets - heavy gauge</td>
<td>3</td>
<td>25</td>
<td>2100</td>
</tr>
<tr>
<td>Slitting</td>
<td>0.2</td>
<td>0.8</td>
<td>&gt;30</td>
</tr>
<tr>
<td>Blanks</td>
<td>0.4</td>
<td>6</td>
<td>200</td>
</tr>
</tbody>
</table>
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
### General information

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<th>Page</th>
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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
Room 2306
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):

**Singapore**
Tata Steel
22 Tanjong Kling Road
Singapore 628048
Singapore
T: +65 6297 6678
F: +65 6297 6682
E: singapore@tatasteel.com

**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:

Czech Republic
Tata Steel
Malá Stepánská 9, 4th floor
Praha 2 - 120 00
Czech Republic
T: +420 224 920 477
F: +420 224 919 546
E: prague@tatasteel.com

Denmark
Tata Steel
Frederiksborgvej 23
3520 Farum
Denmark
T: +45 39 960900
F: +45 39 960949
E: denmark@tatasteel.com

Finland
Tata Steel
Hitsaajankatu 22
00810 Helsinki
Finland
T: +358 9 45424510
F: +358 9 45424520
E: helsinki@tatasteel.com

France
Tata Steel
3 Allée des Barbanniers
F-92632 Gennevilliers Cedex
Paris
France
T: +33 (0)1414 73329
F: +33 (0)140 851149
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
Italy
T: +39 02 422 5541
F: +39 02 422 5542 50
E: milano@tatasteel.com

(Europe continued on next page)
Tata Steel sales offices

Europe (continued):

Poland
Tata Steel
ul. Piastowska 7
40-005 Katowice
Poland
T: +48 32 608 3500
F: +48 32 608 3502
E: katowice@tatasteel.com

Portugal
Tata Steel
BelaVista Office
Estrada de Paço de Arcos, 66-66a,
2735-336 Cacém
Portugal
T: +351 217 817 040
F: +351 217 817 049
E: lisbon@tatasteel.com

Romania
Tata Steel
169A Calea Floreasca,
A Building, 4th floor,
campus 10, office 2039-2044
Sector 1, Bucharest
Romania
T: +40 723 160 381
E: bucharest@tatasteel.com

Spain
Tata Steel
Calle Rosario Pino 14-16
Torre Rioja, 9 Planta
28020 Madrid
Spain
T: +34 91 425 2910
F: +34 91 572 1295
E: madrid@tatasteel.com

Sweden
Amerikahuset
Barlastgatan 2
41463 Gothenburg
Sweden
T: +46 31 779 3200
F: +46 31 779 3228
E: sweden@tatasteel.com
Tata Steel sales offices

India:

Mumbai
Tata Steel
One Forbes 3rd Floor
Dr V B Gandhi Marg
Fort, near Rhythm House
Mumbai, 400 001
India
T: +91 22 6749 4665
F: +91 99 62576006 /
+91 98 9200 6897
E: mumbai@tatasteel.com

Middle East:

Turkey
Tata Steel Ticaret
48 Cumhuriyet Cad.
Pegasus Bldg. Floor 7
34367 Harbiye
Istanbul
Turkey
T: +90 (212) 241 5700
F: +90 (212) 241 6366
E: istanbul@tatasteel.com

United Arab Emirates (UAE)
Tata Steel
PO Box 18294
Jebel Ali
Dubai
United Arab Emirates
T: +971 (0) 4 8873 232
F: +971 (0) 4 8873 966
E: dubai@tatasteel.com
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
E: chicago@tatasteel.com

Detroit
Tata Steel
26777 Central Park Blvd.
Suite 150S
Southfield, MI 48076
USA
T: +1 248 809 1330
E: detroit@tatasteel.com

South America

Brazil
Tata Steel
Avenida Brigadeiro Faria Lima, 1.685
5 andar - conj. 5J - Jardim Paulistano
CEP: 01452-001 São Paulo
Brazil
T: +55 21 3385 4570
E: brazil@tatasteel.com

Mexico
Tata Steel
Avenida Ing. Armando Birlain Shaffler,
No. 2001
Corporative Central Park,
Torre 1, Piso 16 C
Col. Centro Sur
Querétaro CP 76090
Mexico
T: +52 442 673 7501
E: mexico@tatasteel.com
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 CO₂ 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

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 CO₂ 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 CO₂ 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 CO₂ emissions by 20% compared to conventional ironmaking. Used in combination with carbon capture and storage techniques, it should be possible to achieve CO₂ 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.

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<tr>
<th>Legislation</th>
<th>Subject</th>
<th>Our position</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>Tata Steel is aware of this Directive and also has a specific statement for RoHS compliance.</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td>Tata Steel is fully aware and compliant wit this Regulation.</td>
<td></td>
</tr>
</tbody>
</table>

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### Legislation and Subject

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<tr>
<th>Legislation</th>
<th>Subject</th>
<th>Our position</th>
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</thead>
<tbody>
<tr>
<td>2002/525/EC (End of life Vehicles)</td>
<td>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.</td>
<td>All automotive steel grades currently produced by Tata Steel are in conformity with the requirements of this Directive.</td>
</tr>
<tr>
<td>Reg (EU) No. 305/2011 (Construction Products)</td>
<td>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.</td>
<td>All steel products are in conformity to EN 10025 (2004)</td>
</tr>
<tr>
<td>94/62/EC (Packaging and Packaging Waste)</td>
<td>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</td>
<td>All the steel grades currently produced are in conformity with the requirements of this directive.</td>
</tr>
<tr>
<td>97/23/EC (Pressure Equipment)</td>
<td>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.</td>
<td>All relevant steel produced are in conformity.</td>
</tr>
</tbody>
</table>

For more information about EU legislation visit the European Commission website at [www.ec.europa.eu](http://www.ec.europa.eu)

Our Sustainability pages of our website show our approach to environmental responsibility, please visit us at [www.tatasteeleurope.com](http://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 barcode 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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤</td>
<td>Less than or equal to</td>
</tr>
<tr>
<td>&lt;</td>
<td>Less than</td>
</tr>
<tr>
<td>≥</td>
<td>Greater than or equal to</td>
</tr>
<tr>
<td>&gt;</td>
<td>Greater than</td>
</tr>
<tr>
<td>$R_{eL}$</td>
<td>Lower yield strength: lowest value of stress during plastic yielding, ignoring any initial transient effects.</td>
</tr>
<tr>
<td>$R_{eH}$</td>
<td>Upper yield strength: value of stress at the moment when the first decrease in force is observed.</td>
</tr>
<tr>
<td>$R_p$</td>
<td>Proof strength, non-proportional extension: stress at which a non-proportional extension is equal to a specified percentage of the extensometer gauge length. <strong>Note:</strong> The symbol used is followed by a suffix, giving the prescribed percentage, e.g. $R_{p0.2}$.</td>
</tr>
<tr>
<td>$R_m$</td>
<td>Tensile strength: stress corresponding to the maximum force (Fm).</td>
</tr>
<tr>
<td>A</td>
<td>Percentage elongation after fracture: permanent elongation of the gauge length after fracture, expressed as a percentage of the original gauge length. <strong>Note:</strong> In the case of proportional test pieces, only if the original gauge length is other than $5.65\sqrt{S_o}$, where $S_o$ 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.</td>
</tr>
</tbody>
</table>
**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
- \( L_0 = 80\text{mm} \) 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:

\[
\bar{n} = \frac{n_0 + n_{90} + 2n_{45}}{4}
\]

**BH** Bake-hardening
Steels that demonstrate an increase in proof strength following heating in the region of 170°C for 20 minutes.
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA</td>
<td>Low-alloy/microalloyed</td>
</tr>
<tr>
<td>Y</td>
<td>Interstitial free</td>
</tr>
<tr>
<td>D</td>
<td>Intended for hot-dip coating</td>
</tr>
<tr>
<td>JR</td>
<td>A longitudinal Charpy V-notch impact of 27J at 20°C.</td>
</tr>
<tr>
<td>J2</td>
<td>A longitudinal Charpy V-notch impact of 27J at -20°C.</td>
</tr>
<tr>
<td>J0</td>
<td>A longitudinal Charpy V-notch impact of 27J at 0°C.</td>
</tr>
<tr>
<td>+AR</td>
<td>Supply condition as rolled</td>
</tr>
<tr>
<td>+N</td>
<td>Normalised</td>
</tr>
</tbody>
</table>
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)**

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>≤ 1200</th>
<th>≤ 1500</th>
<th>≤ 1800</th>
<th>&gt; 1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 2.00</td>
<td>± 0.13</td>
<td>± 0.14</td>
<td>± 0.16</td>
<td>-</td>
</tr>
<tr>
<td>&gt; 2.00 ≤ 2.50</td>
<td>± 0.14</td>
<td>± 0.16</td>
<td>± 0.17</td>
<td>± 0.19</td>
</tr>
<tr>
<td>&gt; 2.50 ≤ 3.00</td>
<td>± 0.15</td>
<td>± 0.17</td>
<td>± 0.18</td>
<td>± 0.20</td>
</tr>
<tr>
<td>&gt; 3.00 ≤ 4.00</td>
<td>± 0.17</td>
<td>± 0.18</td>
<td>± 0.20</td>
<td>± 0.20</td>
</tr>
<tr>
<td>&gt; 4.00 ≤ 5.00</td>
<td>± 0.18</td>
<td>± 0.20</td>
<td>± 0.21</td>
<td>± 0.22</td>
</tr>
<tr>
<td>&gt; 5.00 ≤ 6.00</td>
<td>± 0.20</td>
<td>± 0.21</td>
<td>± 0.22</td>
<td>± 0.23</td>
</tr>
<tr>
<td>&gt; 6.00 ≤ 8.00</td>
<td>± 0.22</td>
<td>± 0.23</td>
<td>± 0.23</td>
<td>± 0.26</td>
</tr>
<tr>
<td>&gt; 8.00 ≤ 11.00</td>
<td>± 0.24</td>
<td>± 0.25</td>
<td>± 0.25</td>
<td>± 0.28</td>
</tr>
</tbody>
</table>
### Tolerances on thickness of steel grades with a specified minimum yield strength $R_e \leq 300 \text{N/mm}^2$ (category A)

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>≤ 1200</th>
<th>≤ 1500</th>
<th>≤ 1800</th>
<th>&gt; 1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 2.00</td>
<td>± 0.17</td>
<td>± 0.19</td>
<td>± 0.21</td>
<td>-</td>
</tr>
<tr>
<td>&gt; 2.00 ≤ 2.50</td>
<td>± 0.18</td>
<td>± 0.21</td>
<td>± 0.23</td>
<td>± 0.25</td>
</tr>
<tr>
<td>&gt; 2.50 ≤ 3.00</td>
<td>± 0.20</td>
<td>± 0.22</td>
<td>± 0.24</td>
<td>± 0.26</td>
</tr>
<tr>
<td>&gt; 3.00 ≤ 4.00</td>
<td>± 0.22</td>
<td>± 0.24</td>
<td>± 0.26</td>
<td>± 0.27</td>
</tr>
<tr>
<td>&gt; 4.00 ≤ 5.00</td>
<td>± 0.24</td>
<td>± 0.26</td>
<td>± 0.28</td>
<td>± 0.29</td>
</tr>
<tr>
<td>&gt; 5.00 ≤ 6.00</td>
<td>± 0.26</td>
<td>± 0.28</td>
<td>± 0.29</td>
<td>± 0.31</td>
</tr>
<tr>
<td>&gt; 6.00 ≤ 8.00</td>
<td>± 0.29</td>
<td>± 0.30</td>
<td>± 0.31</td>
<td>± 0.35</td>
</tr>
<tr>
<td>&gt; 8.00 ≤ 10.00</td>
<td>± 0.32</td>
<td>± 0.33</td>
<td>± 0.34</td>
<td>± 0.40</td>
</tr>
<tr>
<td>&gt; 10.00 ≤ 12.50</td>
<td>± 0.35</td>
<td>± 0.36</td>
<td>± 0.37</td>
<td>± 0.43</td>
</tr>
<tr>
<td>&gt; 12.50 ≤ 15.00</td>
<td>± 0.37</td>
<td>± 0.38</td>
<td>± 0.40</td>
<td>± 0.46</td>
</tr>
<tr>
<td>&gt; 15.00 ≤ 25.00</td>
<td>± 0.40</td>
<td>± 0.42</td>
<td>± 0.45</td>
<td>± 0.50</td>
</tr>
</tbody>
</table>
Tolerances on thickness of steel grades with a specified minimum yield strength $300 \text{ N/mm}^2 < R_e \leq 360 \text{ N/mm}^2$ (category B)

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>≤ 1200</th>
<th>&gt; 1200</th>
<th>≤ 1500</th>
<th>&gt; 1500</th>
<th>≤ 1800</th>
<th>&gt; 1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 2.00</td>
<td>± 0.20</td>
<td>± 0.22</td>
<td>± 0.24</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 2.00</td>
<td></td>
<td>± 0.21</td>
<td>± 0.24</td>
<td>± 0.26</td>
<td>± 0.29</td>
<td></td>
</tr>
<tr>
<td>&gt; 2.50</td>
<td></td>
<td>± 0.23</td>
<td>± 0.25</td>
<td>± 0.28</td>
<td>± 0.30</td>
<td>± 0.31</td>
</tr>
<tr>
<td>&gt; 3.00</td>
<td></td>
<td>± 0.25</td>
<td>± 0.28</td>
<td>± 0.30</td>
<td>± 0.31</td>
<td></td>
</tr>
<tr>
<td>&gt; 4.00</td>
<td></td>
<td>± 0.28</td>
<td>± 0.30</td>
<td>± 0.32</td>
<td>± 0.33</td>
<td>± 0.33</td>
</tr>
<tr>
<td>&gt; 5.00</td>
<td></td>
<td>± 0.30</td>
<td>± 0.32</td>
<td>± 0.33</td>
<td>± 0.36</td>
<td>± 0.36</td>
</tr>
<tr>
<td>&gt; 6.00</td>
<td></td>
<td>± 0.33</td>
<td>± 0.35</td>
<td>± 0.36</td>
<td>± 0.40</td>
<td></td>
</tr>
<tr>
<td>&gt; 8.00</td>
<td></td>
<td>± 0.37</td>
<td>± 0.38</td>
<td>± 0.39</td>
<td>± 0.46</td>
<td>± 0.46</td>
</tr>
<tr>
<td>&gt; 10.00</td>
<td></td>
<td>± 0.40</td>
<td>± 0.41</td>
<td>± 0.43</td>
<td>± 0.49</td>
<td>± 0.49</td>
</tr>
<tr>
<td>&gt; 12.50</td>
<td></td>
<td>± 0.43</td>
<td>± 0.44</td>
<td>± 0.46</td>
<td>± 0.53</td>
<td>± 0.53</td>
</tr>
<tr>
<td>&gt; 15.00</td>
<td></td>
<td>± 0.46</td>
<td>± 0.48</td>
<td>± 0.52</td>
<td>± 0.58</td>
<td>± 0.58</td>
</tr>
</tbody>
</table>
Tolerances on thickness of steel grades with a specified minimum yield strength $360 \text{ N/mm}^2 < R_e \leq 420 \text{ N/mm}^2$ (category C)

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>$\leq 1200$</th>
<th>$&gt; 1200$</th>
<th>$\leq 1500$</th>
<th>$&gt; 1500$</th>
<th>$\leq 1800$</th>
<th>$&gt; 1800$</th>
<th>$&gt; 1800$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\leq 2.00$</td>
<td>± 0.22</td>
<td>± 0.25</td>
<td>± 0.27</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&gt; 2.00$</td>
<td>$\leq 2.50$</td>
<td>± 0.23</td>
<td>± 0.27</td>
<td>± 0.30</td>
<td>± 0.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&gt; 2.50$</td>
<td>$\leq 3.00$</td>
<td>± 0.26</td>
<td>± 0.29</td>
<td>± 0.31</td>
<td>± 0.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&gt; 3.00$</td>
<td>$\leq 4.00$</td>
<td>± 0.29</td>
<td>± 0.31</td>
<td>± 0.34</td>
<td>± 0.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&gt; 4.00$</td>
<td>$\leq 5.00$</td>
<td>± 0.31</td>
<td>± 0.34</td>
<td>± 0.36</td>
<td>± 0.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&gt; 5.00$</td>
<td>$\leq 6.00$</td>
<td>± 0.34</td>
<td>± 0.36</td>
<td>± 0.38</td>
<td>± 0.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&gt; 6.00$</td>
<td>$\leq 8.00$</td>
<td>± 0.38</td>
<td>± 0.39</td>
<td>± 0.40</td>
<td>± 0.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&gt; 8.00$</td>
<td>$\leq 10.00$</td>
<td>± 0.42</td>
<td>± 0.43</td>
<td>± 0.44</td>
<td>± 0.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&gt; 10.00$</td>
<td>$\leq 12.50$</td>
<td>± 0.46</td>
<td>± 0.47</td>
<td>± 0.48</td>
<td>± 0.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&gt; 12.50$</td>
<td>$\leq 15.00$</td>
<td>± 0.48</td>
<td>± 0.49</td>
<td>± 0.52</td>
<td>± 0.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&gt; 15.00$</td>
<td>$\leq 25.00$</td>
<td>± 0.52</td>
<td>± 0.55</td>
<td>± 0.59</td>
<td>± 0.65</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Tolerances on thickness of steel grades with a specified minimum yield strength 420 N/mm² < \( R_e \leq 900 \) N/mm² (category D)**

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>≤ 1200</th>
<th>&gt; 1200</th>
<th>≤ 1500</th>
<th>&gt; 1500</th>
<th>≤ 1800</th>
<th>&gt; 1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 2.00</td>
<td>± 0.24</td>
<td>± 0.27</td>
<td>± 0.29</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 2.00 ≤ 2.50</td>
<td>± 0.25</td>
<td>± 0.29</td>
<td>± 0.32</td>
<td>± 0.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 2.50 ≤ 3.00</td>
<td>± 0.28</td>
<td>± 0.31</td>
<td>± 0.34</td>
<td>± 0.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 3.00 ≤ 4.00</td>
<td>± 0.31</td>
<td>± 0.34</td>
<td>± 0.36</td>
<td>± 0.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 4.00 ≤ 5.00</td>
<td>± 0.34</td>
<td>± 0.36</td>
<td>± 0.39</td>
<td>± 0.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 5.00 ≤ 6.00</td>
<td>± 0.36</td>
<td>± 0.39</td>
<td>± 0.41</td>
<td>± 0.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 6.00 ≤ 8.00</td>
<td>± 0.41</td>
<td>± 0.42</td>
<td>± 0.43</td>
<td>± 0.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 8.00 ≤ 10.00</td>
<td>± 0.45</td>
<td>± 0.46</td>
<td>± 0.48</td>
<td>± 0.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 10.00 ≤ 12.50</td>
<td>± 0.49</td>
<td>± 0.50</td>
<td>± 0.52</td>
<td>± 0.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 12.50 ≤ 15.00</td>
<td>± 0.52</td>
<td>± 0.53</td>
<td>± 0.56</td>
<td>± 0.64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 15.00 ≤ 25.00</td>
<td>± 0.56</td>
<td>± 0.59</td>
<td>± 0.63</td>
<td>± 0.70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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).

<table>
<thead>
<tr>
<th>Category 1</th>
<th>C 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal thickness (mm)</td>
<td>≤ 1200</td>
</tr>
<tr>
<td>From - up to</td>
<td>≤ 1500</td>
</tr>
<tr>
<td>&gt; 1.47 - ≤ 2.00</td>
<td>40</td>
</tr>
<tr>
<td>&gt; 2.00 - ≤ 2.50</td>
<td>40</td>
</tr>
<tr>
<td>&gt; 2.50 - ≤ 3.00</td>
<td>40</td>
</tr>
<tr>
<td>&gt; 3.00 - ≤ 6.00</td>
<td>40</td>
</tr>
<tr>
<td>&gt; 6.00 - ≤ 11.00</td>
<td>50</td>
</tr>
</tbody>
</table>

Maximum crown C40 in µm values of structural steel grades (S185-S235-S275 ≤ 10mm in EN 10025-2:2004).

<table>
<thead>
<tr>
<th>Category 2</th>
<th>C 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal thickness (mm)</td>
<td>≤ 1200</td>
</tr>
<tr>
<td>From - up to</td>
<td>≤ 1500</td>
</tr>
<tr>
<td>&gt; 1.47 - ≤ 2.00</td>
<td>40</td>
</tr>
<tr>
<td>&gt; 2.00 - ≤ 2.50</td>
<td>40</td>
</tr>
<tr>
<td>&gt; 2.50 - ≤ 20.00</td>
<td>50</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Nominal thickness (mm)</th>
<th>≤ 1200</th>
<th>&gt; 1200</th>
<th>&gt; 1500</th>
<th>&gt; 1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>From - up to</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 1.47 - ≤ 2.00</td>
<td>50</td>
<td>50</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>&gt; 2.00 - ≤ 2.50</td>
<td>50</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>&gt; 2.50 - ≤ 3.00</td>
<td>50</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>&gt; 3.00 - ≤ 20.00</td>
<td>60</td>
<td>60</td>
<td>70</td>
<td>70</td>
</tr>
</tbody>
</table>


### Category 4

<table>
<thead>
<tr>
<th>Nominal thickness (mm)</th>
<th>≤ 1200</th>
<th>&gt; 1200</th>
<th>&gt; 1500</th>
<th>&gt; 1800</th>
</tr>
</thead>
<tbody>
<tr>
<td>From - up to</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 1.47 - ≤ 2.00</td>
<td>60</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>&gt; 2.00 - ≤ 2.50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>&gt; 2.50 - ≤ 3.00</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>&gt; 3.00 - ≤ 5.00</td>
<td>70</td>
<td>70</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>&gt; 5.00 - ≤ 20.00</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>
**Tolerances on width**  
Tolerances in mm.

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Tolerances mill edges</th>
<th>Tolerances trimmed edges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lower</td>
<td>upper</td>
</tr>
<tr>
<td>≥ 700 ≤ 1200</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>&gt; 1200 ≤ 1850</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>&gt; 1850 ≤ 2070</td>
<td>0</td>
<td>25</td>
</tr>
</tbody>
</table>

**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:

\[
\text{length (in metres)} = \frac{90}{\text{nominal thickness (in mm)}}, \text{ with a maximum of 20 metres.}
\]

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/mm$^2$.**

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>Normal tolerances for a nominal width of $^1$</th>
<th>Special tolerances (S) for a nominal width of $^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\leq 1200$</td>
<td>$&gt; 1200$</td>
</tr>
<tr>
<td>$\geq 0.35$</td>
<td>$\leq 0.40$</td>
<td>± 0.03</td>
</tr>
<tr>
<td>$&gt; 0.40$</td>
<td>$\leq 0.60$</td>
<td>± 0.03</td>
</tr>
<tr>
<td>$&gt; 0.60$</td>
<td>$\leq 0.80$</td>
<td>± 0.04</td>
</tr>
<tr>
<td>$&gt; 0.80$</td>
<td>$\leq 1.00$</td>
<td>± 0.05</td>
</tr>
<tr>
<td>$&gt; 1.00$</td>
<td>$\leq 1.20$</td>
<td>± 0.06</td>
</tr>
<tr>
<td>$&gt; 1.20$</td>
<td>$\leq 1.60$</td>
<td>± 0.08</td>
</tr>
<tr>
<td>$&gt; 1.60$</td>
<td>$\leq 2.00$</td>
<td>± 0.10</td>
</tr>
<tr>
<td>$&gt; 2.00$</td>
<td>$\leq 2.50$</td>
<td>± 0.12</td>
</tr>
<tr>
<td>$&gt; 2.50$</td>
<td>$\leq 3.00$</td>
<td>± 0.15</td>
</tr>
</tbody>
</table>

$^1$ 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 $260 \text{ N/mm}^2 \leq R_e < 340 \text{ N/mm}^2$.

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>Normal tolerances for a nominal width of $^1$</th>
<th>Special tolerances (S) for a nominal width of $^{12}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\leq 1200 &gt; 1200 &gt; 1500$ $\leq 1200 &gt; 1200 &gt; 1500$</td>
<td></td>
</tr>
<tr>
<td>$\geq 0.35$</td>
<td>$\leq 0.40$ $\pm 0.04$ $\pm 0.05$ $\pm 0.06$</td>
<td>$\pm 0.025$ $\pm 0.030$ $\pm 0.035$</td>
</tr>
<tr>
<td>$&gt; 0.40$</td>
<td>$\leq 0.60$ $\pm 0.04$ $\pm 0.05$ $\pm 0.06$</td>
<td>$\pm 0.030$ $\pm 0.035$ $\pm 0.040$</td>
</tr>
<tr>
<td>$&gt; 0.60$</td>
<td>$\leq 0.80$ $\pm 0.05$ $\pm 0.06$ $\pm 0.07$</td>
<td>$\pm 0.035$ $\pm 0.040$ $\pm 0.050$</td>
</tr>
<tr>
<td>$&gt; 0.80$</td>
<td>$\leq 1.00$ $\pm 0.06$ $\pm 0.07$ $\pm 0.08$</td>
<td>$\pm 0.040$ $\pm 0.050$ $\pm 0.060$</td>
</tr>
<tr>
<td>$&gt; 1.00$</td>
<td>$\leq 1.20$ $\pm 0.07$ $\pm 0.08$ $\pm 0.10$</td>
<td>$\pm 0.050$ $\pm 0.060$ $\pm 0.070$</td>
</tr>
<tr>
<td>$&gt; 1.20$</td>
<td>$\leq 1.60$ $\pm 0.09$ $\pm 0.11$ $\pm 0.12$</td>
<td>$\pm 0.060$ $\pm 0.070$ $\pm 0.080$</td>
</tr>
<tr>
<td>$&gt; 1.60$</td>
<td>$\leq 2.00$ $\pm 0.12$ $\pm 0.13$ $\pm 0.14$</td>
<td>$\pm 0.070$ $\pm 0.080$ $\pm 0.100$</td>
</tr>
<tr>
<td>$&gt; 2.00$</td>
<td>$\leq 2.50$ $\pm 0.14$ $\pm 0.15$ $\pm 0.16$</td>
<td>$\pm 0.100$ $\pm 0.110$ $\pm 0.120$</td>
</tr>
<tr>
<td>$&gt; 2.50$</td>
<td>$\leq 3.00$ $\pm 0.17$ $\pm 0.18$ $\pm 0.18$</td>
<td>$\pm 0.120$ $\pm 0.130$ $\pm 0.140$</td>
</tr>
</tbody>
</table>

$^1$ 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 $340 \text{ N/mm}^2 \leq R_e \leq 420 \text{ N/mm}^2$.

| Nominal thickness | Normal tolerances for a nominal width of $^1$ | Special tolerances (S) for a nominal width of $^1$ | Special tolerances (S) for a nominal width of $^2$
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 1200</td>
<td>&gt; 1200</td>
<td>&gt; 1500</td>
</tr>
<tr>
<td>≥ 0.35</td>
<td>± 0.40</td>
<td>± 0.45</td>
<td>± 0.60</td>
</tr>
<tr>
<td>&gt; 0.40 ≤ 0.60</td>
<td>± 0.50</td>
<td>± 0.70</td>
<td>± 0.80</td>
</tr>
<tr>
<td>&gt; 0.60 ≤ 0.80</td>
<td>± 0.60</td>
<td>± 0.80</td>
<td>± 0.90</td>
</tr>
<tr>
<td>&gt; 0.80 ≤ 1.00</td>
<td>± 0.70</td>
<td>± 0.90</td>
<td>± 1.00</td>
</tr>
<tr>
<td>&gt; 1.00 ≤ 1.20</td>
<td>± 0.90</td>
<td>± 1.10</td>
<td>± 1.20</td>
</tr>
<tr>
<td>&gt; 1.20 ≤ 1.60</td>
<td>± 1.10</td>
<td>± 1.40</td>
<td>± 1.70</td>
</tr>
<tr>
<td>&gt; 1.60 ≤ 2.00</td>
<td>± 1.40</td>
<td>± 1.80</td>
<td>± 2.10</td>
</tr>
<tr>
<td>&gt; 2.00 ≤ 2.50</td>
<td>± 1.60</td>
<td>± 2.00</td>
<td>± 2.40</td>
</tr>
<tr>
<td>&gt; 2.50 ≤ 3.00</td>
<td>± 2.00</td>
<td>± 2.50</td>
<td>± 3.00</td>
</tr>
</tbody>
</table>

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 $R_e > 420 \text{ N/mm}^2$.

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>Normal tolerances for a nominal width of $^1$</th>
<th>Special tolerances (S) for a nominal width of $^{12}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\leq 1200$</td>
<td>$&gt; 1200$</td>
</tr>
<tr>
<td>$\geq 0.35$</td>
<td>$\leq 0.40$</td>
<td>$\pm 0.05$</td>
</tr>
<tr>
<td>$&gt; 0.40$</td>
<td>$\leq 0.60$</td>
<td>$\pm 0.05$</td>
</tr>
<tr>
<td>$&gt; 0.60$</td>
<td>$\leq 0.80$</td>
<td>$\pm 0.06$</td>
</tr>
<tr>
<td>$&gt; 0.80$</td>
<td>$\leq 1.00$</td>
<td>$\pm 0.08$</td>
</tr>
<tr>
<td>$&gt; 1.00$</td>
<td>$\leq 1.20$</td>
<td>$\pm 0.10$</td>
</tr>
<tr>
<td>$&gt; 1.20$</td>
<td>$\leq 1.60$</td>
<td>$\pm 0.13$</td>
</tr>
<tr>
<td>$&gt; 1.60$</td>
<td>$\leq 2.00$</td>
<td>$\pm 0.16$</td>
</tr>
<tr>
<td>$&gt; 2.00$</td>
<td>$\leq 2.50$</td>
<td>$\pm 0.19$</td>
</tr>
<tr>
<td>$&gt; 2.50$</td>
<td>$\leq 3.00$</td>
<td>$\pm 0.22$</td>
</tr>
</tbody>
</table>

$^1$: 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.

$^{12}$: 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.

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Normal tolerances</th>
<th>Special tolerances (S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\leq 1200)</td>
<td>0 4</td>
<td>0 2</td>
</tr>
<tr>
<td>(&gt; 1200 \leq 1500)</td>
<td>0 5</td>
<td>0 2</td>
</tr>
<tr>
<td>(&gt; 1500)</td>
<td>0 6</td>
<td>0 3</td>
</tr>
</tbody>
</table>

**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 \((R_{el} < 260 \text{ N/mm}^2)\)**

Dimensions in mm.

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Edge-wave length</th>
<th>Maximum acceptable wave height</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1500</td>
<td>&gt; 200</td>
<td>&lt; 1% of edge-wave length</td>
</tr>
<tr>
<td>(\geq 1500)</td>
<td>&gt; 200</td>
<td>&lt; 1.5% of edge-wave length</td>
</tr>
<tr>
<td>–</td>
<td>&lt; 200</td>
<td>2mm</td>
</tr>
</tbody>
</table>
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/mm².

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>Normal tolerances for a nominal width of 12</th>
<th>Special tolerances (S) for a nominal width of 12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 1200</td>
<td>&gt; 1200</td>
</tr>
<tr>
<td>≤ 1500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 0.40 ≤ 0.60</td>
<td>± 0.04</td>
<td>± 0.05</td>
</tr>
<tr>
<td>&gt; 0.60 ≤ 0.80</td>
<td>± 0.05</td>
<td>± 0.06</td>
</tr>
<tr>
<td>&gt; 0.80 ≤ 1.00</td>
<td>± 0.06</td>
<td>± 0.07</td>
</tr>
<tr>
<td>&gt; 1.00 ≤ 1.20</td>
<td>± 0.07</td>
<td>± 0.08</td>
</tr>
<tr>
<td>&gt; 1.20 ≤ 1.60</td>
<td>± 0.10</td>
<td>± 0.11</td>
</tr>
<tr>
<td>&gt; 1.60 ≤ 2.00</td>
<td>± 0.12</td>
<td>± 0.13</td>
</tr>
<tr>
<td>&gt; 2.00 ≤ 2.50</td>
<td>± 0.14</td>
<td>± 0.15</td>
</tr>
<tr>
<td>&gt; 2.50 ≤ 3.00</td>
<td>± 0.17</td>
<td>± 0.17</td>
</tr>
<tr>
<td>&gt; 3.00 ≤ 5.00</td>
<td>± 0.20</td>
<td>± 0.20</td>
</tr>
<tr>
<td>&gt; 5.00 ≤ 6.50</td>
<td>± 0.22</td>
<td>± 0.22</td>
</tr>
</tbody>
</table>

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 $260 \text{ N/mm}^2 \leq R_{p0.2} < 360 \text{ N/mm}^2$ and for grades DX51D and S550GD.

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>Normal tolerances for a nominal width of $\leq 1200$</th>
<th></th>
<th></th>
<th>Special tolerances (S) for a nominal width of $\leq 1200$</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\leq 1200$</td>
<td>$&gt; 1200$</td>
<td>$&gt; 1500$</td>
<td>$\leq 1200$</td>
<td>$&gt; 1200$</td>
<td>$&gt; 1500$</td>
</tr>
<tr>
<td></td>
<td>$\leq 1500$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\geq 0.35$</td>
<td>$\leq 0.40$</td>
<td>$\pm 0.05$</td>
<td>$\pm 0.06$</td>
<td>-</td>
<td>$\pm 0.035$</td>
<td>$\pm 0.040$</td>
</tr>
<tr>
<td>$&gt; 0.40$</td>
<td>$\leq 0.60$</td>
<td>$\pm 0.05$</td>
<td>$\pm 0.06$</td>
<td>$\pm 0.07$</td>
<td>$\pm 0.040$</td>
<td>$\pm 0.045$</td>
</tr>
<tr>
<td>$&gt; 0.60$</td>
<td>$\leq 0.80$</td>
<td>$\pm 0.06$</td>
<td>$\pm 0.07$</td>
<td>$\pm 0.08$</td>
<td>$\pm 0.045$</td>
<td>$\pm 0.050$</td>
</tr>
<tr>
<td>$&gt; 0.80$</td>
<td>$\leq 1.00$</td>
<td>$\pm 0.07$</td>
<td>$\pm 0.08$</td>
<td>$\pm 0.09$</td>
<td>$\pm 0.050$</td>
<td>$\pm 0.060$</td>
</tr>
<tr>
<td>$&gt; 1.00$</td>
<td>$\leq 1.20$</td>
<td>$\pm 0.08$</td>
<td>$\pm 0.09$</td>
<td>$\pm 0.11$</td>
<td>$\pm 0.060$</td>
<td>$\pm 0.070$</td>
</tr>
<tr>
<td>$&gt; 1.20$</td>
<td>$\leq 1.60$</td>
<td>$\pm 0.11$</td>
<td>$\pm 0.13$</td>
<td>$\pm 0.14$</td>
<td>$\pm 0.070$</td>
<td>$\pm 0.080$</td>
</tr>
<tr>
<td>$&gt; 1.60$</td>
<td>$\leq 2.00$</td>
<td>$\pm 0.14$</td>
<td>$\pm 0.15$</td>
<td>$\pm 0.16$</td>
<td>$\pm 0.080$</td>
<td>$\pm 0.090$</td>
</tr>
<tr>
<td>$&gt; 2.00$</td>
<td>$\leq 2.50$</td>
<td>$\pm 0.16$</td>
<td>$\pm 0.17$</td>
<td>$\pm 0.18$</td>
<td>$\pm 0.110$</td>
<td>$\pm 0.120$</td>
</tr>
<tr>
<td>$&gt; 2.50$</td>
<td>$\leq 3.00$</td>
<td>$\pm 0.19$</td>
<td>$\pm 0.20$</td>
<td>$\pm 0.20$</td>
<td>$\pm 0.130$</td>
<td>$\pm 0.140$</td>
</tr>
<tr>
<td>$&gt; 3.00$</td>
<td>$\leq 5.00$</td>
<td>$\pm 0.22$</td>
<td>$\pm 0.24$</td>
<td>$\pm 0.25$</td>
<td>$\pm 0.17$</td>
<td>$\pm 0.18$</td>
</tr>
<tr>
<td>$&gt; 5.00$</td>
<td>$\leq 6.50$</td>
<td>$\pm 0.24$</td>
<td>$\pm 0.25$</td>
<td>$\pm 0.26$</td>
<td>$\pm 0.19$</td>
<td>$\pm 0.20$</td>
</tr>
</tbody>
</table>

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 $\geq Z450$ 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 $360 \text{ N/mm}^2 \leq R_{p0.2} \leq 420 \text{ N/mm}^2$.

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>Normal tolerances for a nominal width of $^{1,2}$</th>
<th>Special tolerances (S) for a nominal width of $^{1,2}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\leq 1200$</td>
<td>$&gt; 1200$</td>
</tr>
<tr>
<td>$\leq 1500$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\geq 0.35$</td>
<td>$\leq 0.40$</td>
<td>$\pm 0.05$</td>
</tr>
<tr>
<td>$&gt; 0.40$</td>
<td>$\leq 0.60$</td>
<td>$\pm 0.06$</td>
</tr>
<tr>
<td>$&gt; 0.60$</td>
<td>$\leq 0.80$</td>
<td>$\pm 0.07$</td>
</tr>
<tr>
<td>$&gt; 0.80$</td>
<td>$\leq 1.00$</td>
<td>$\pm 0.08$</td>
</tr>
<tr>
<td>$&gt; 1.00$</td>
<td>$\leq 1.20$</td>
<td>$\pm 0.10$</td>
</tr>
<tr>
<td>$&gt; 1.20$</td>
<td>$\leq 1.60$</td>
<td>$\pm 0.13$</td>
</tr>
<tr>
<td>$&gt; 1.60$</td>
<td>$\leq 2.00$</td>
<td>$\pm 0.16$</td>
</tr>
<tr>
<td>$&gt; 2.00$</td>
<td>$\leq 2.50$</td>
<td>$\pm 0.18$</td>
</tr>
<tr>
<td>$&gt; 2.50$</td>
<td>$\leq 3.00$</td>
<td>$\pm 0.22$</td>
</tr>
<tr>
<td>$&gt; 3.00$</td>
<td>$\leq 5.00$</td>
<td>$\pm 0.22$</td>
</tr>
<tr>
<td>$&gt; 5.00$</td>
<td>$\leq 6.50$</td>
<td>$\pm 0.24$</td>
</tr>
</tbody>
</table>

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 $\geq Z450$ 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 $420 \text{ N/mm}^2 < R_{p0.2} \leq 900 \text{ N/mm}^2$.

<table>
<thead>
<tr>
<th>Nominal thickness</th>
<th>Normal tolerances for a nominal width of $\leq 1200$</th>
<th>&gt; 1200</th>
<th>&gt; 1500</th>
<th>Special tolerances (S) for a nominal width of $\leq 1200$</th>
<th>&gt; 1200</th>
<th>&gt; 1500</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\leq 1500$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\geq 0.35$</td>
<td>$\leq 0.40$</td>
<td>$\pm 0.06$</td>
<td>$\pm 0.07$</td>
<td>$-$</td>
<td>$\pm 0.045$</td>
<td>$\pm 0.050$</td>
</tr>
<tr>
<td>$&gt; 0.40$</td>
<td>$\leq 0.60$</td>
<td>$\pm 0.06$</td>
<td>$\pm 0.08$</td>
<td>$\pm 0.09$</td>
<td>$\pm 0.050$</td>
<td>$\pm 0.060$</td>
</tr>
<tr>
<td>$&gt; 0.60$</td>
<td>$\leq 0.80$</td>
<td>$\pm 0.07$</td>
<td>$\pm 0.09$</td>
<td>$\pm 0.11$</td>
<td>$\pm 0.060$</td>
<td>$\pm 0.070$</td>
</tr>
<tr>
<td>$&gt; 0.80$</td>
<td>$\leq 1.00$</td>
<td>$\pm 0.09$</td>
<td>$\pm 0.11$</td>
<td>$\pm 0.12$</td>
<td>$\pm 0.070$</td>
<td>$\pm 0.080$</td>
</tr>
<tr>
<td>$&gt; 1.00$</td>
<td>$\leq 1.20$</td>
<td>$\pm 0.11$</td>
<td>$\pm 0.13$</td>
<td>$\pm 0.14$</td>
<td>$\pm 0.080$</td>
<td>$\pm 0.090$</td>
</tr>
<tr>
<td>$&gt; 1.20$</td>
<td>$\leq 1.60$</td>
<td>$\pm 0.15$</td>
<td>$\pm 0.16$</td>
<td>$\pm 0.18$</td>
<td>$\pm 0.090$</td>
<td>$\pm 0.110$</td>
</tr>
<tr>
<td>$&gt; 1.60$</td>
<td>$\leq 2.00$</td>
<td>$\pm 0.18$</td>
<td>$\pm 0.19$</td>
<td>$\pm 0.21$</td>
<td>$\pm 0.110$</td>
<td>$\pm 0.120$</td>
</tr>
<tr>
<td>$&gt; 2.00$</td>
<td>$\leq 2.50$</td>
<td>$\pm 0.21$</td>
<td>$\pm 0.22$</td>
<td>$\pm 0.24$</td>
<td>$\pm 0.140$</td>
<td>$\pm 0.150$</td>
</tr>
<tr>
<td>$&gt; 2.50$</td>
<td>$\leq 3.00$</td>
<td>$\pm 0.24$</td>
<td>$\pm 0.25$</td>
<td>$\pm 0.26$</td>
<td>$\pm 0.170$</td>
<td>$\pm 0.180$</td>
</tr>
<tr>
<td>$&gt; 3.00$</td>
<td>$\leq 5.00$</td>
<td>$\pm 0.26$</td>
<td>$\pm 0.27$</td>
<td>$\pm 0.28$</td>
<td>$\pm 0.23$</td>
<td>$\pm 0.24$</td>
</tr>
<tr>
<td>$&gt; 5.00$</td>
<td>$\leq 6.50$</td>
<td>$\pm 0.28$</td>
<td>$\pm 0.29$</td>
<td>$\pm 0.30$</td>
<td>$\pm 0.25$</td>
<td>$\pm 0.26$</td>
</tr>
</tbody>
</table>

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 $\geq Z450$ 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.

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Normal tolerances</th>
<th>Special tolerances (S)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lower</td>
<td>upper</td>
</tr>
<tr>
<td>≥ 700 ≤ 1200</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>&gt; 1200 ≤ 1500</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>&gt; 1500 ≤ 1800</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>&gt; 1800</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>
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