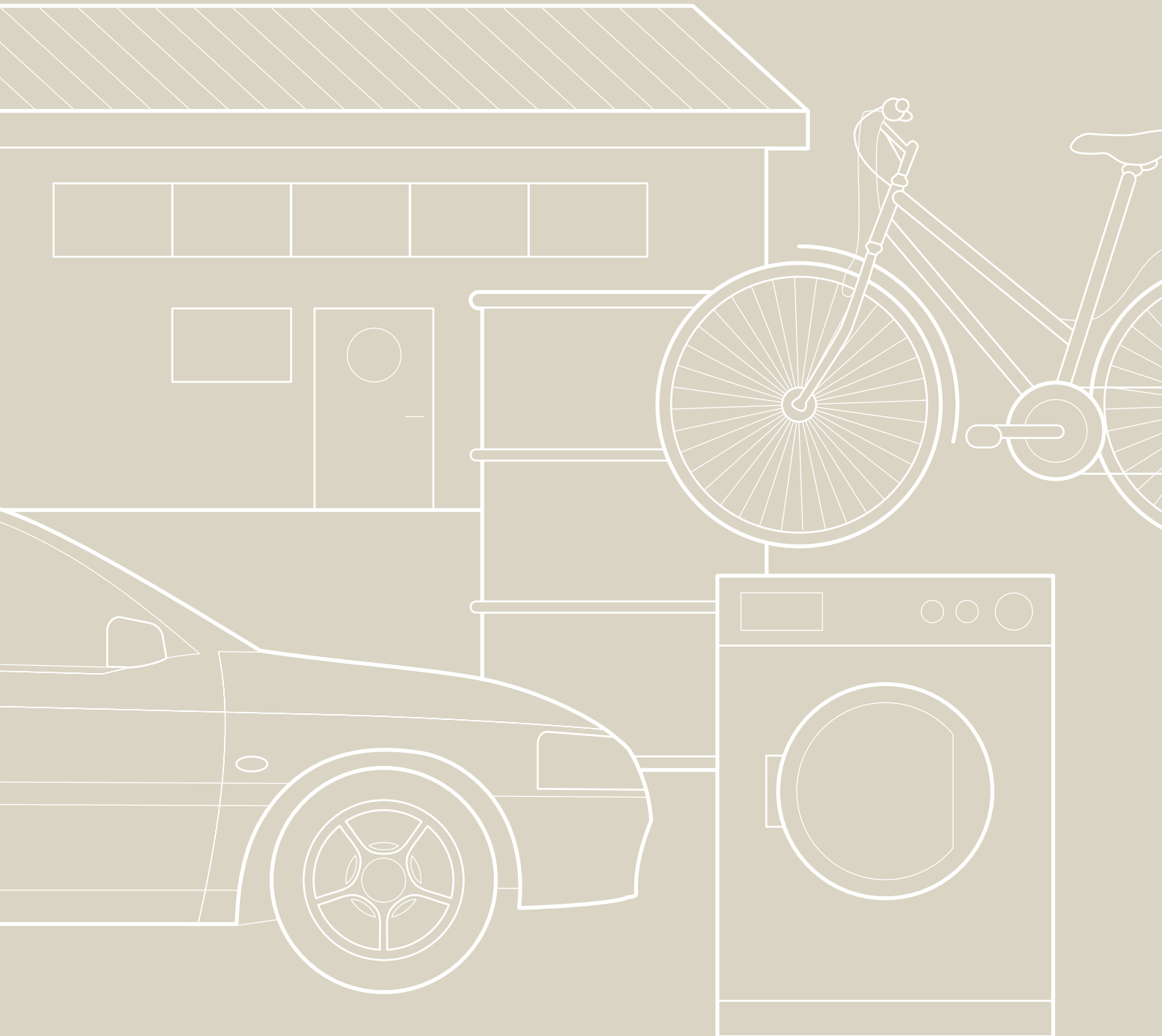


Corus Strip Products UK

Product catalogue



Hot-rolled, cold-rolled and metallic-coated strip steels from Corus

Corus





We aim to deliver outstanding value to our customers and to be a leading corporate citizen—goals that we shall achieve through a passionate workforce.

Using research and development, the power of technology and our expertise, we shall deliver the best products and services while respecting people and continuously improving our environmental performance.

Seeking the earliest possible involvement with our customers, we shall ensure that they get the most suitable steel for their application and use the best design and processing technologies to produce their end product. The result is innovative steel solutions that help our customers compete.

This catalogue

This catalogue is divided into four main sections, each colour-coded for easy recognition.

-  Hot-rolled products
-  Cold-rolled products
-  Galvatite hot-dip galvanised products
-  General information

Symbols used in the catalogue are defined in the glossary on page 53.

Some *combinations* of product specifications in this catalogue may be subject to conditions. In addition, specifications not shown here may have become available since this catalogue was published. Please consult us about your needs.

If you have questions about the information in this catalogue, please call us at the appropriate office listed on page 52.

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Hot-rolled products

Hot rolling at Corus produces primary strip steel products in a range that offers extensive performance characteristics, versatility and economy, as well as steels for specific applications.

General

The hot-rolled strip steel products offered in this section are listed below.

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Grades

This section of the catalogue shows the standard grades of hot-rolled steel offered by Corus.

Typical applications

- automotive components
- tubes and sections
- ship plate
- bridge components
- pressure vessels and boilers
- domestic appliances
- industrial furniture
- components for building and construction
- feed stock for cold-rolled, galvanised and packaging steels

Coil condition

Corus can supply hot-rolled steel in the following conditions:

Hot-rolled coil:

Mill edges
Skin-passed (on request); available in thicknesses $\leq 6.25\text{mm}$

Pickled and oiled coil:

Mill edges
Trimmed edges

Pickled dry (on request):

Mill edges
Trimmed edges

Overall thickness and width limits

The overall thickness and width limits for hot-rolled products are shown in table 1 on page 6. The limits for specific products are shown under individual product headings throughout the hot-rolled section.

Coil diameters

The coil diameters that apply to hot-rolled coil are shown in table 2 on page 6.

Coil weight

The maximum weight of hot-rolled coils offered by Corus is determined by three factors:

- Manufacturing limit: Maximum 21kg/mm of width up to 34 tonnes
- Maximum safe outside diameter of coil (mm): 10/7 x coil width (limit of 2015mm)
- Maximum weight allowed by road/rail transport

Corus will discuss these factors with the customer to ensure compatibility with the quantity ordered.

Particular hot-rolled products may have maximum coil weights that differ from the range as a whole.

Tolerances on dimensions and shape

Tolerances for continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels are given in EN 10051 : 1991+A1 : 1997.

Tolerances for wide strip and slit wide strip

The values in EN 10051 : 1991+A1 : 1997 do not apply to the uncropped ends of the coil, i.e. the 'head' and 'tail'. The maximum length (in metres) of these ends can be equal to 90/nominal thickness (mm), but will not exceed 20 metres in total.

Thickness

The thickness tolerances shown in table 3 on page 6 are from EN 10051 : 1991+A1 : 1997 and are for hot-rolled steel with normal deformation resistance. The tolerances for grades with yield strengths greater than 350N/mm² can be calculated as shown in note 1 to table 3.

Corus can supply hot-rolled coil to tighter tolerances than those in EN 10051 : 1991+A1 : 1997. If improved tolerances are required, they must be agreed with Corus before ordering.

For cold-forming steels supplied to EN 10111 : 2008, the thickness tolerances are shown in table 4 on page 6.

Crown values

Maximum crown value can be agreed between the customer and Corus when the material is ordered.

Coil width

The coil width tolerances in table 5 on page 7 are from EN 10051 : 1991+A1 : 1997.

Flatness

Flatness complies with EN 10051 : 1991+A1 : 1997 as shown in table 6 for steel grades with normal deformation resistance and table 7 for high deformation resistance, both on page 7.

Edge camber

The deviation over a length of 5 metres will not exceed 20mm for mill edges and 15mm for trimmed edges as specified in EN 10051 : 1991+A1 : 1997.

Surface

Hot-rolled steel is available in mill finish or pickled condition.

Pickled material can be supplied with rolling oil or preservative oil, normally from 1.0g/m² to 1.7g/m², or with more or less oil on request.

If the level of oiling required is not specified in the order, a normal amount of oil will be applied.

Health and safety

Corus publishes the health and safety information for its hot-rolled steels at www.corusgroup.com/stripproductsuk. *Product health and safety data sheet 16a* covers all the hot-rolled products in this section except for DP600, which is covered by *Product health and safety data sheet 2*.

Table 1: Thickness and width limits

| Product | Product form | Thickness | | Width | |
|--------------------|--------------------------------|-----------|-------|-------|------|
| | | Min | Max | Min | Max |
| Hot-rolled dry | Mill finish | 1.40 | 16.50 | 700 | 1830 |
| Hot-rolled pickled | Pickled & oiled, mill edge | 1.40 | 5.00 | 735 | 1550 |
| Hot-rolled pickled | Pickled & oiled, trimmed edges | 1.40 | 5.00 | 735 | 1525 |

Notes: Dimensions are in millimetres

Table 2: Diameter of hot-rolled coil

| | |
|------------------------------------|---------------------------------|
| Inside diameter, mill finish | 762mm |
| Inside diameter, pickled and oiled | 610mm |
| Tolerance on inside diameter | +0/-50mm |
| Outside diameter | Max 10/7 x width (limit 2015mm) |

Table 3: Thickness tolerances

Normal deformation resistance

EN 10051 : 1991+A1 : 1997

| Nominal thickness | | Tolerances for a nominal width of | | | |
|-------------------|-------|-----------------------------------|----------------|----------------|-------|
| | | ≤1200 | >1200 ≤1500 | >1500 ≤1800 | >1800 |
| > | ≤ | ± | ± | ± | ± |
| 1.40 | 2.00 | 0.17 | 0.19 | 0.21 | – |
| 2.00 | 2.50 | 0.18 | 0.21 | 0.23 | 0.25 |
| 2.50 | 3.00 | 0.20 | 0.22 | 0.24 | 0.26 |
| 3.00 | 4.00 | 0.22 | 0.24 | 0.26 | 0.27 |
| 4.00 | 5.00 | 0.24 | 0.26 | 0.28 | 0.29 |
| 5.00 | 6.00 | 0.26 | 0.28 | 0.29 | 0.31 |
| 6.00 | 8.00 | 0.29 | 0.30 | 0.31 | 0.35 |
| 8.00 | 10.00 | 0.32 | 0.33 | 0.34 | 0.40 |
| 10.00 | 12.50 | 0.35 | 0.36 | 0.37 | 0.43 |
| 12.50 | 15.00 | 0.37 | 0.38 | 0.40 | 0.46 |
| 15.00 | 20.00 | 0.40 | 0.42 | 0.45 | 0.50 |

Notes:

- Tolerances on steel grades with a specified yield strength >350 N/mm² (Class B) are increased by 15%, >420 N/mm² (Class C) by 30%, and >480 N/mm² (Class D) by 40%.
- Dimensions are in millimetres.

Table 4: Thickness tolerances

Cold forming steels

EN 10111 : 2008

| Nominal thickness | | Tolerances for a nominal width of | | | |
|-------------------|------|-----------------------------------|----------------|----------------|-------|
| | | ≤1200 | >1200 ≤1500 | >1500 ≤1800 | >1800 |
| > | ≤ | ± | ± | ± | ± |
| 1.40 | 2.00 | 0.13 | 0.14 | 0.16 | – |
| 2.00 | 2.50 | 0.14 | 0.16 | 0.17 | 0.19 |
| 2.50 | 3.00 | 0.15 | 0.17 | 0.18 | 0.20 |
| 3.00 | 4.00 | 0.17 | 0.18 | 0.20 | 0.20 |
| 4.00 | 5.00 | 0.18 | 0.20 | 0.21 | 0.22 |
| 5.00 | 6.00 | 0.20 | 0.21 | 0.22 | 0.22 |
| 6.00 | 8.00 | 0.22 | 0.23 | 0.23 | 0.26 |

Note: Dimensions are in millimetres.

Table 5: Tolerances on coil width**EN 10051 : 1991+A1 : 1997**

| Nominal width | | Mill edge | | Trimmed edge | |
|---------------|-------|------------|------------|--------------|------------|
| | | lower - | upper + | lower - | upper + |
| ≥700 | ≤1200 | 0 | 20 | 0 | 3 |
| >1200 | ≤1500 | 0 | 20 | 0 | 5 |
| >1500 | ≤1830 | 0 | 20 | 0 | 6 |

Notes:

1. Side trimming is available on thicknesses ≤ 5mm only.
2. Dimensions are in millimetres.

Table 6: Flatness tolerances**Normal deformation resistance****EN 10051 : 1991+A1 : 1997**

| Nominal thickness | Nominal width | | Tolerance class | |
|-------------------|---------------|-------------|-------------------|--------------------|
| | | | Normal tolerances | Special tolerances |
| ≤2 | - | ≤1200 | 18 | 9 |
| | | >1200 ≤1500 | 20 | 10 |
| | | >1500 - | 25 | 13 |
| >2≤16.5 | - | ≤1200 | 15 | 8 |
| | | >1200 ≤1500 | 18 | 9 |
| | | >1500 - | 23 | 12 |

Notes:

1. The tolerances in this table represent maximum deviation from flatness.
2. Flatness tolerances in EN 10051 : 1991+A1 : 1997 apply to sheet only.
3. Dimensions are in millimetres.

Table 7: Flatness tolerances**High deformation resistance****EN 10051 : 1991+A1 : 1997**

| Nominal thickness | Nominal width | | Tolerance class | | |
|-------------------|---------------|-------------|-----------------|----|--------|
| | | | B | C | D |
| ≤16.5 | - | ≤1200 | 18 | 23 | Note 1 |
| | | >1200 ≤1500 | 23 | 30 | Note 1 |
| | | >1500 - | 28 | 38 | Note 1 |

Notes:

1. This tolerance shall be agreed at the time of enquiry and order.
2. Tolerance classes B, C and D are defined by yield strength (see table 3, note 1) and represent grades with an increased resistance to high temperature deformation.
3. The tolerances in this table represent maximum deviation from flatness.
4. Flatness tolerances in EN 10051 : 1991+A1 : 1997 apply to sheet only.
5. Dimensions are in millimetres.

Steel for forming

Hot-rolled steel for cold forming is used for bending and deep drawing and is suitable for pickling and welding. It has good properties for moderately deep-drawn parts.

Typical applications

- car components
- tubes and sections
- components for domestic appliances
- industrial furniture
- garden furniture

Standards

Corus offers hot-rolled steel for forming in grades that comply with EN 10111 : 2008 and in a special Corus grade, as shown (right). All grades are available in qualities suitable for galvanising. As the standard only applies to steel ≤ 11 mm thick, please consult Corus about the properties of steel thicker than this.

EN 10111 : 2008

- DD11
- DD12
- DD13
- DD14

Corus

DD14+ (HR1 improved)

Mechanical properties

The values shown for the mechanical properties in table 8 below are for test pieces taken transverse to the rolling direction.

Chemical composition

Hot-rolled steel for forming meets the requirements of the cast analysis in the standard, as shown in table 9 on page 9.

Dimensions

The width and thickness limits are shown in tables 10 and 11 on page 9.

Table 8: Mechanical properties

| Grade | R_{eL} (N/mm ²) | | R_m (N/mm ²) | A (%) | | Bend test radius | |
|------------------------|-------------------------------|-------------------|----------------------------|-----------------------------------|----------------|--|----|
| | Min-max | | Max | Min | | Min | |
| | $1.5 \leq t < 2$ | $2 \leq t \leq 8$ | | $L_0 = 80$ mm $1.5 \leq t < 2$ | $2 \leq t < 3$ | $L_0 = 5.65\sqrt{S_0}$ $3 \leq t < 8$ | |
| EN 10111 : 2008 | | | | | | | |
| DD11 | 170-360 | 170-340 | 440 | 23 | 24 | 328 | – |
| DD12 | 170-340 | 170-320 | 420 | 25 | 26 | 30 | – |
| DD13 | 170-330 | 170-310 | 400 | 28 | 29 | 33 | – |
| DD14 | 170-310 | 170-290 | 380 | 31 | 32 | 36 | – |
| Corus | | | | | | | |
| DD14+ (HR1 improved) | 170-250 | 170-250 | 340 | 36 | 36 | 36 | 0t |

Notes:

1. The mechanical properties in this table apply to hot-rolled dry and to hot-rolled pickled and oiled, whether skin-passed or not.
2. The mechanical properties for the grades in the table are unchanged when those grades are supplied in qualities guaranteed suitable for galvanising.
3. Material thickness, t , is in millimetres.
4. DD11 products should be formed within 6 weeks of their availability.

Table 9: Chemical composition

| Grade | C | Mn | P | S |
|------------------------|-------|------|-------|-------|
| | Max | Max | Max | Max |
| EN 10111 : 2008 | | | | |
| DD11 | 0.12 | 0.60 | 0.045 | 0.045 |
| DD12 | 0.10 | 0.45 | 0.035 | 0.035 |
| DD13 | 0.08 | 0.40 | 0.030 | 0.030 |
| DD14 | 0.08 | 0.35 | 0.025 | 0.025 |
| Corus | | | | |
| DD14+ | 0.055 | 0.25 | 0.020 | 0.020 |

Note: Values are in weight percentages.

Table 10: Dimensions: Mill finish

| Thickness | | Width | | |
|-----------|-------|-------|--------------|---------------------|
| | | Min | Max | |
| ≥ | < | | DD11 DD12 | DD13, DD14 DD14+ |
| 1.40 | 1.50 | 700 | 1250 | 1125 |
| 1.50 | 1.60 | 700 | 1300 | 1275 |
| 1.60 | 1.70 | 700 | 1325 | 1360 |
| 1.70 | 1.80 | 700 | 1375 | 1425 |
| 1.80 | 1.90 | 700 | 1475 | 1500 |
| 1.90 | 2.00 | 700 | 1500 | 1550 |
| 2.00 | 2.50 | 700 | 1600 | 1650 |
| 2.50 | 3.00 | 700 | 1725 | 1830 |
| 3.00 | 16.50 | 700 | 1830 | 1830 |

Note: Dimensions are in millimetres.

Table 11: Dimensions: Pickled

| Thickness | | Width | | |
|-----------|------|-------|--------------|---------------------|
| | | Min | Max | |
| ≥ | < | | DD11 DD12 | DD13, DD14 DD14+ |
| 1.40 | 1.50 | 735 | 1250 | 1125 |
| 1.50 | 1.60 | 735 | 1300 | 1320 |
| 1.60 | 1.80 | 735 | 1320 | 1320 |
| 1.80 | 2.00 | 735 | 1475 | 1475 |
| 2.00 | 5.00 | 735 | 1550 | 1550 |

Notes:

1. For trimmed edges, reduce the maximum widths shown by 25mm.
2. Dimensions are in millimetres.

Tenform high-strength low-alloy steel

Tenform is hot-rolled high-strength steel with enhanced properties for forming and welding. It has been specially developed to combine high strength with good formability. The products in this section are Tenform XK and Tenform XF (reduced level of sulphur).

Typical applications

- longitudinal members for chassis parts
- wheels
- seats
- airbag parts
- headrests
- safety belts
- clutch plates
- carriages for conventional and high-speed trains
- light towers
- warehouse shelving
- silos and containers
- earth moving and agricultural machines

Standards

Tenform is available in the Corus grades shown in table 12 (right). Corus can also supply steels to the exact specifications of EN 10149-2 : 1996, as shown in the same table.

Mechanical properties

The values shown for strength and elongation in table 13 on page 11 are for test pieces taken in the rolling direction; those for the bend test are for test pieces taken transverse to the rolling direction. For reference, table 14 on page 11 shows the values for steels to EN 10149-2 : 1996.

Chemical composition

Table 15 on page 11 shows the chemical composition of Tenform steels. For reference, table 16 on page 12 shows the chemical composition of steels to EN 10149-2 : 1996.

Dimensions

The width and thickness limits for Tenform and for the nearest equivalent grades from EN 10149-2 : 1996 are shown in tables 17 and 18 on pages 12 and 13 respectively.

Table 12: Standards: Tenform XK/XF

| Corus | European |
|-------|-------------------|
| | EN 10149-2 : 1996 |
| Grade | |
| XK300 | – |
| XF300 | S315MC |
| XK350 | – |
| XF350 | S355MC |
| XK400 | – |
| XF400 | – |
| XF420 | S420MC |
| XK450 | – |
| XF450 | – |
| XF460 | S460MC |
| XF500 | S500MC |

Table 13: Mechanical properties: Tenform XK/XF

| Grade | R _{eL} (N/mm ²) | R _m (N/mm ²) | A (%) | Bending at 180° Mandrel diameter |
|-------|--------------------------------------|-------------------------------------|-----------------------|-------------------------------------|
| | Min | Min | Min | Min |
| | | | L ₀ = 80mm | |
| XK300 | 300 | 400 | 24 | 2t |
| XF300 | 300 | 400 | 26 | 0t |
| XK350 | 350 | 430 | 21 | 2t |
| XF350 | 350 | 430 | 23 | 0.5t |
| XK400 | 400 | 460 | 18 | 3t |
| XF400 | 400 | 460 | 20 | 0.5t |
| XF420 | 420 | 480 | 20 | 0.5t |
| XK450 | 450 | 500 | 18 | 3t |
| XF450 | 450 | 500 | 20 | 1t |
| XF460 | 460 | 520 | 18 | 1t |
| XF500 | 500 | 550 | 18 | 1t |

Note: Material thickness, t, is in millimetres.

Table 14: Mechanical properties: EN 10149-2 : 1996

| Grade | R _{eH} (N/mm ²) | R _m (N/mm ²) | A (%) | Bending at 180° Mandrel diameter ² | |
|--------|--------------------------------------|-------------------------------------|-----------------------|--|------|
| | Min | Min-max | Min | | Min |
| | | | L ₀ = 80mm | L ₀ = 5.65√S ₀ | |
| | | | t < 3 | t ≥ 3 | |
| S315MC | 315 | 390-510 | 20 | 24 | 0t |
| S355MC | 355 | 430-550 | 19 | 23 | 0.5t |
| S420MC | 420 | 480-620 | 16 | 19 | 0.5t |
| S460MC | 460 | 520-670 | 14 | 17 | 1t |
| S500MC | 500 | 550-700 | 12 | 14 | 1t |

Notes:

1. Material thickness, t, is in millimetres.
2. The values shown for the bend test apply to transverse test pieces.

Table 15: Chemical composition: Tenform XK/XF

| Grade | C | Mn | P | S | Si | Micro-alloying elements (e.g. Nb) |
|-------------------|------|------|-------|-------|------|--------------------------------------|
| | Max | Max | Max | Max | Max | Max |
| XK300/350/400 | 0.10 | 1.20 | 0.030 | 0.020 | 0.04 | 0.300 |
| XK450 | 0.10 | 1.50 | 0.025 | 0.020 | 0.35 | 0.300 |
| XF300/350/400/420 | 0.10 | 1.20 | 0.025 | 0.010 | 0.04 | 0.300 |
| XF450/460/500 | 0.10 | 1.50 | 0.025 | 0.010 | 0.35 | 0.300 |

Note: Values are in weight percentages.

Table 16: Chemical composition: EN 10149-2 : 1996

| Grade | C | Mn | P | S | Si | Al-total | V |
|--------|------|------|-------|-------|------|----------|------|
| | Max | Max | Max | Max | Max | Min | Max |
| S315MC | 0.12 | 1.30 | 0.025 | 0.020 | 0.50 | 0.015 | 0.20 |
| S355MC | 0.12 | 1.50 | 0.025 | 0.020 | 0.50 | 0.015 | 0.20 |
| S420MC | 0.12 | 1.60 | 0.025 | 0.015 | 0.50 | 0.015 | 0.20 |
| S460MC | 0.12 | 1.60 | 0.025 | 0.015 | 0.50 | 0.015 | 0.20 |
| S500MC | 0.12 | 1.70 | 0.025 | 0.015 | 0.50 | 0.015 | 0.20 |

Note: Values are in weight percentages.

Table 17: Dimensions: Mill finish

| Thickness | Width | | | | | | | | |
|-----------|-------|------------------|----------|----------|----------|--------|-------------------|------------------|--|
| | | Min | Max | | | | | | |
| | | | XK/XF300 | XK/XF350 | XK/XF400 | XF420 | XK/XF450 XF460 | XF500 XF500MC | |
| ≥ | < | | | S315MC | S420MC | S460MC | S500MC | | |
| 1.40 | 1.50 | 700 | 1150 | 950 | 950 | 950 | 950 | – | |
| 1.50 | 1.60 | 700 | 1250 | 1100 | 1100 | 1100 | 1100 | – | |
| 1.60 | 1.90 | 700 ¹ | 1425 | 1250 | 1250 | 1250 | 1250 | 1000 | |
| 1.90 | 2.10 | 700 ¹ | 1525 | 1300 | 1300 | 1300 | 1300 | 1050 | |
| 2.10 | 2.20 | 700 ¹ | 1550 | 1300 | 1300 | 1300 | 1300 | 1050 | |
| 2.20 | 2.40 | 700 ¹ | 1550 | 1375 | 1375 | 1375 | 1300 | 1100 | |
| 2.40 | 2.50 | 700 | 1550 | 1525 | 1525 | 1550 | 1350 | 1100 | |
| 2.50 | 2.70 | 700 | 1550 | 1525 | 1525 | 1550 | 1350 | 1280 | |
| 2.70 | 3.00 | 700 | 1550 | 1525 | 1525 | 1550 | 1550 | 1280 | |
| 3.00 | 4.00 | 700 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | |
| 4.00 | 5.00 | 700 | 1550 | 1560 | 1560 | 1550 | 1550 | 1550 | |
| 5.00 | 6.00 | 700 | 1550 | 1830 | 1830 | 1550 | 1600 | 1550 | |
| 6.00 | 6.30 | 700 | 1550 | 1830 | 1830 | 1550 | 1750 | 1550 | |
| 6.30 | 7.00 | 700 | 1550 | 1830 | 1830 | 1550 | 1750 | 1500 | |
| 7.00 | 8.00 | 700 | 1550 | 1830 | 1830 | 1550 | 1830 | 1500 | |
| 8.00 | 10.00 | 700 | – | 1600 | – | – | 1440 | – | |
| 10.00 | 12.00 | 700 | – | 1600 | – | – | 1280 | – | |
| 12.00 | 15.00 | 700 | – | 1600 | – | – | – | – | |

Notes:

1. For thicknesses from 1.80mm to 2.20mm, in S500MC, the minimum width is 810mm.
2. Dimensions are in millimetres.

Table 18: Dimensions: Pickled

| Thickness | Width | | | | | | | | |
|-----------|-------|------------------|----------|----------|----------|--------|-------------------|----------------|--|
| | Min | Max | XK/XF300 | XK/XF350 | XK/XF400 | XF420 | XK/XF450 XF460 | XF500 XF460 | |
| ≥ | < | | | | S315MC | S420MC | S460MC | S500MC | |
| 1.40 | 1.50 | 735 | 1150 | 950 | 950 | 950 | 950 | – | |
| 1.50 | 1.60 | 735 | 1250 | 1100 | 1100 | 1100 | 1100 | – | |
| 1.60 | 1.70 | 735 | 1425 | 1250 | 1250 | 1250 | 1250 | 1000 | |
| 1.70 | 1.90 | 735 ¹ | 1425 | 1250 | 1300 | 1300 | 1300 | 1050 | |
| 1.90 | 2.10 | 735 ¹ | 1525 | 1300 | 1300 | 1300 | 1300 | 1050 | |
| 2.10 | 2.20 | 735 ¹ | 1550 | 1300 | 1300 | 1300 | 1280 | 1050 | |
| 2.20 | 2.40 | 735 ¹ | 1550 | 1375 | 1375 | 1375 | 1300 | 1100 | |
| 2.40 | 2.50 | 735 | 1550 | 1525 | 1525 | 1550 | 1350 | 1100 | |
| 2.50 | 3.00 | 735 | 1550 | 1525 | 1525 | 1550 | 1550 | 1280 | |
| 3.00 | 5.00 | 735 | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 | |

Notes:

1. For thicknesses from 1.80mm to 2.20mm, in S500MC, the minimum width is 810mm.
2. Dimensions are in millimetres.

DP600 dual-phase advanced high-strength steel

Hot-rolled DP600 is advanced high-strength steel for the automotive industry. It allows the user to increase the strength of the finished component or to reduce the thickness of the steel, or both. This can increase the output from each tonne of steel and produce products that are strong, light and safe under load. Its high strain-hardening capacity gives it good formability.

Typical applications

- suspension components
- chassis components for cars and trucks
- wheel discs
- precision tubes

Standard and grade

Draft European standard prEN 10338 : 2007 covers hot-rolled multiphase steels with higher yield strength for cold forming. We have used this standard to develop DP600, which not only

meets the properties in the standard for HDT580X, but also in many cases exceeds them. Please consult us for more information about the typical properties of DP600.

Mechanical properties

The values shown for the mechanical properties in table 19 below are for test pieces taken in the rolling direction.

Chemical composition

Table 20 below shows the chemical composition of HDT580X to Draft prEN 10338 : 2007.

Dimensions

Width and thickness limits are shown in tables 21 and 22 below.

Table 19: Mechanical properties: prEN 10338 : 2007

| Grade | R _{p0.2} (N/mm ²) | R _m (N/mm ²) | A ₈₀ (%) |
|---------|--|-------------------------------------|---------------------|
| HDT580X | 330-460 | 580 | ≥19 |

Table 20: Chemical composition: prEN 10338 : 2007

| Grade | C | Si | Mn | P | S | Al _{tot} | Cr+Mo | Nb+Ti | V | B |
|---------|-------|-------|-------|-------|--------|-------------------|-------|-------|-------|--------|
| HDT580X | ≤0.17 | ≤0.80 | ≤2.20 | ≤0.08 | ≤0.015 | ≤2.00 | ≤1.00 | ≤0.15 | ≤0.20 | ≤0.005 |

Note: Values are in weight percentages.

Table 21: Dimensions: Mill finish

| Thickness | | Width | |
|-----------|------|-------|------|
| ≥ | < | Min | Max |
| 2.50 | 3.00 | 1000 | 1400 |
| 3.00 | 4.50 | 1000 | 1500 |

Notes:

1. Widths refer to mill edge material.
2. For dimensions outside those shown in the table, please consult Corus.
3. Dimensions are in millimetres.

Table 22: Dimensions: Pickled

| Thickness | | Width | |
|-----------|------|-------|------|
| ≥ | < | Min | Max |
| 2.50 | 3.00 | 1000 | 1400 |
| 3.00 | 4.50 | 1000 | 1500 |

Notes:

1. Widths refer to mill edge material. Side-trimmed material is available from Corus.
2. For dimensions outside those shown in the table, please consult Corus.
3. Dimensions are in millimetres.

Tenform carbon-manganese steel

Tenform carbon-manganese steel is high-strength formable steel with enhanced fatigue performance for the automotive industry. It allows the user to increase the strength of the finished component or to reduce the thickness of the steel, or both. The product in this section is Tenform CMN.

Typical applications

- wheel rims
- wheel discs
- chassis parts for passenger cars and trucks
- suspension housings
- transverse links

Grades

CMN250 and CMN300.

Mechanical properties

The values shown for strength and elongation in table 23 below are for test pieces taken in the rolling direction; those for the bend test are for test pieces taken transverse to the rolling direction.

Chemical composition

Tenform carbon-manganese steel meets the requirements of the cast analysis shown in table 24 below.

Dimensions

The width and thickness limits are shown in tables 25 and 26 below.

Table 23: Mechanical properties: Tenform CMN

| Grade | R_{eL} (N/mm ²) | R_m (N/mm ²) | A (%) | Bend test Mandrel diameter |
|--------|-------------------------------|----------------------------|---------------------|-------------------------------|
| | Min | Min | Min | Min |
| | | | $L_0 = 80\text{mm}$ | |
| CMN250 | 250 | 360 | 28 | 0t |
| CMN300 | 300 | 440 | 26 | 0t |

Note: Material thickness, t, is in millimetres.

Table 24: Chemical composition: Tenform CMN

| Grade | C | Mn | P | S | Si |
|--------|------|------|-------|-------|------|
| | Max | Max | Max | Max | Max |
| CMN250 | 0.12 | 0.90 | 0.035 | 0.010 | 0.10 |
| CMN300 | 0.16 | 1.10 | 0.035 | 0.006 | 0.10 |

Note: Values are in weight percentages.

Table 25: Dimensions: Mill finish

| Thickness | | Width | | | |
|-----------|------|---------|------|---------|------|
| ≥ | < | CMN 250 | | CMN 300 | |
| | | Min | Max | Min | Max |
| 1.40 | 1.50 | 700 | 1150 | – | – |
| 1.50 | 1.60 | 700 | 1250 | – | – |
| 1.60 | 1.80 | 700 | 1425 | 710 | 1425 |
| 1.80 | 1.90 | 700 | 1425 | 710 | 1425 |
| 1.90 | 2.00 | 700 | 1525 | 710 | 1500 |
| 2.00 | 2.10 | 700 | 1525 | 710 | 1500 |
| 2.10 | 3.00 | 700 | 1600 | 710 | 1550 |
| 3.00 | 8.00 | 700 | 1830 | 710 | 1550 |

Note: Dimensions are in millimetres.

Table 26: Dimensions: Pickled

| Thickness | | Width | | | |
|-----------|------|---------|------|---------|------|
| ≥ | < | CMN 250 | | CMN 300 | |
| | | Min | Max | Min | Max |
| 1.40 | 1.50 | 735 | 1150 | – | – |
| 1.50 | 1.60 | 735 | 1250 | – | – |
| 1.60 | 1.80 | 735 | 1425 | 735 | 1425 |
| 1.80 | 1.90 | 735 | 1425 | 735 | 1425 |
| 1.90 | 2.10 | 735 | 1525 | 735 | 1500 |
| 2.10 | 5.00 | 735 | 1550 | 735 | 1550 |

Note: Dimensions are in millimetres.

Structural steel

The good welding properties and guaranteed strength of hot-rolled structural steel make it suitable for many applications.

Typical applications

- yellow goods
- building and construction
- tubes and pipes
- transport
- chassis parts
- sections and warehouse shelving
- simple pressure vessels

Standards

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

EN 10025-2 : 2004

- S185+AR
- S235JR+AR
- S235J0+AR
- S235J2+AR
- S275JR+AR
- S275J0+AR
- S275J2+AR
- S355JR+AR
- S355J0+AR
- S355J2+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, Corus’ test certificates bear the CE mark and Corus has issued a certified Declaration of Conformity.

Mechanical properties

The values shown for strength and elongation in table 27 on page 17 are for test pieces taken transverse to the rolling direction; those for the impact test are for test pieces taken in the rolling direction.

Chemical composition

Structural steel meets the requirements of the cast analysis in the standard, as shown in table 28 on page 17.

Corus does not supply steel with increased copper content.

Suitability for cold forming

If chemistry suitable for cold forming is required, this must be specified when the material is ordered.

When ordering qualities EN 10025-2 : 2004 suitable for cold forming, add the letter “C” to the end of the grade, e.g. S355J0C.

Cold forming cannot be guaranteed for structural steel that is not specified as cold formable.

Suitability for galvanising

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

Dimensions

The width and thickness limits are shown in tables 29 and 30 on page 18.

Table 27: Mechanical properties: EN 10025-2 : 2004

| Grade | R_{eL} (N/mm ²) | | R_m (N/mm ²) | | A (%) | | | | Impact test | |
|-----------|-------------------------------|------------|----------------------------|---------------------|------------------------|------------------|------------------|---------------|----------------------|------------|
| | Min | Min-Max | Min | | Min | | | | Temp | Min energy |
| | $t \leq 16^2$ | $t \leq 3$ | $3 < t \leq 16.5$ | $L_0 = 80\text{mm}$ | $L_0 = 5.65\sqrt{S_0}$ | $1.5 < t \leq 2$ | $2 < t \leq 2.5$ | $2.5 < t < 3$ | $3 \leq t \leq 16.5$ | °C |
| S185+AR | 185 | 310-540 | 290-510 | 10 | 11 | 12 | 16 | – | – | |
| S235JR+AR | 235 | 360-510 | 360-510 | 17 | 18 | 19 | 24 | 20 | 27 | |
| S235J0+AR | 235 | 360-510 | 360-510 | 17 | 18 | 19 | 24 | 0 | 27 | |
| S235J2+AR | 235 | 360-510 | 360-510 | 17 | 18 | 19 | 24 | -20 | 27 | |
| S275JR+AR | 275 | 430-580 | 410-560 | 15 | 16 | 17 | 21 | 20 | 27 | |
| S275J0+AR | 275 | 430-580 | 410-560 | 15 | 16 | 17 | 21 | 0 | 27 | |
| S275J2+AR | 275 | 430-580 | 410-560 | 15 | 16 | 17 | 21 | -20 | 27 | |
| S355JR+AR | 355 | 510-680 | 470-630 | 14 | 15 | 16 | 20 | 20 | 27 | |
| S355J0+AR | 355 | 510-680 | 470-630 | 14 | 15 | 16 | 20 | 0 | 27 | |
| S355J2+AR | 355 | 510-680 | 470-630 | 14 | 15 | 16 | 20 | -20 | 27 | |

Notes:

1. Material thickness, t , is in millimetres.
2. For thicknesses $>16\text{mm}$, the R_{eL} value is decreased by 10N/mm^2 .
3. The impact properties of quality JR products are verified only when specified at the time of enquiry or order.
4. Impact strengths apply to thicknesses $\geq 6\text{mm}$ and are for standard test pieces only.
5. For the mechanical properties of cold forming qualities, please consult Corus.

Table 28: Chemical composition: EN 10025-2 : 2004

| Grade | C | Mn | P | S | Si | N ¹ | Cu |
|-----------|------|------|-------|-------|------|----------------|------|
| | Max | Max | Max | Max | Max | Max | |
| S185+AR | – | – | – | – | – | – | 0.55 |
| S235JR+AR | 0.17 | 1.40 | 0.035 | 0.035 | – | 0.014 | 0.55 |
| S235J0+AR | 0.17 | 1.40 | 0.030 | 0.030 | – | 0.014 | 0.55 |
| S235J2+AR | 0.17 | 1.40 | 0.025 | 0.025 | – | – | 0.55 |
| S275JR+AR | 0.21 | 1.50 | 0.035 | 0.035 | – | 0.014 | 0.55 |
| S275J0+AR | 0.18 | 1.50 | 0.030 | 0.030 | – | 0.014 | 0.55 |
| S275J2+AR | 0.18 | 1.50 | 0.025 | 0.025 | – | – | 0.55 |
| S355JR+AR | 0.24 | 1.60 | 0.035 | 0.035 | 0.55 | 0.014 | 0.55 |
| S355J0+AR | 0.20 | 1.60 | 0.030 | 0.030 | 0.55 | 0.014 | 0.55 |
| S355J2+AR | 0.20 | 1.60 | 0.025 | 0.025 | 0.55 | – | 0.55 |

Notes:

1. 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.
2. For the chemical composition of cold forming qualities, please consult Corus.
3. The chemical composition of steels suitable for galvanising complies with EN 10025-2 : 2004.
4. Values are in weight percentages.

Table 29: Dimensions: Mill finish

| Thickness | | Width | | | |
|-----------|-------|-------|--|-------------------------------------|--|
| | | Min | Max | | |
| ≥ | < | | S185+AR S235JR+AR S235J0+AR S235J2+AR | S275JR+AR S275J0+AR S275J2+AR | S355JR+AR ¹ S355J0+AR ¹ S355J2+AR ¹ |
| 1.40 | 1.50 | 700 | 1150 | 1150 | 1150 |
| 1.50 | 1.60 | 700 | 1250 | 1250 | 1250 |
| 1.60 | 1.80 | 700 | 1425 | 1250 | 1250 |
| 1.80 | 1.90 | 700 | 1425 | 1425 | 1425 |
| 1.90 | 2.00 | 700 | 1525 | 1500 | 1500 |
| 2.00 | 2.50 | 700 | 1550 | 1525 | 1525 |
| 2.50 | 3.00 | 700 | 1600 | 1560 | 1560 |
| 3.00 | 12.50 | 700 | 1830 | 1830 | 1830 |
| 12.50 | 16.50 | 700 | – | 1830 | 1830 |

Notes:

1. The maximum thickness for these grades in cold-forming quality is 12.5mm.
2. Dimensions are in millimetres.

Table 30: Dimensions: Pickled

| Thickness | | Width | | | |
|-----------|------|-------|--|-------------------------------------|-------------------------------------|
| | | Min | Max | | |
| ≥ | < | | S185+AR S235JR+AR S235J0+AR S235J2+AR | S275JR+AR S275J0+AR S275J2+AR | S355JR+AR S355J0+AR S355J2+AR |
| 1.40 | 1.50 | 735 | 1150 | 1150 | 1150 |
| 1.50 | 1.80 | 735 | 1250 | 1250 | 1250 |
| 1.80 | 1.90 | 735 | 1425 | 1425 | 1425 |
| 1.90 | 2.10 | 735 | 1525 | 1500 | 1500 |
| 2.10 | 2.50 | 735 | 1550 | 1525 | 1525 |
| 2.50 | 5.00 | 735 | 1550 | 1550 | 1550 |

Note: Dimensions are in millimetres.

Durbar floor plate

Durbar is hot-rolled structural steel floor plate with an evenly distributed, raised pattern that is integral to the product. It has excellent welding properties and can be used as a structural component.

Standards and grades

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

Mechanical properties

The mechanical properties of Durbar comply with EN 10025-2 : 2004 and are shown in table 31 below. The values shown for strength and elongation in table 31 are for test pieces taken transverse to the rolling direction; those for the impact test are for test pieces taken in the rolling direction.

Chemical composition

The chemical composition of Durbar complies with EN 10025-2 : 2004 and is shown in table 32 on page 20.

Dimensions

Corus manufactures Durbar S275JR+AR in standard sizes, which are shown in table 33 on page 20.

Other combinations of thickness and width will be considered, based upon the volume required.

Standard lengths are twice the widths shown in the table, e.g. the length of 1000mm wide Durbar is 2000mm. Non-standard cut lengths from 700mm to 10,000mm are available by agreement.

Please consult Corus about the dimensional range of S355JR+AR.

The thickness of Durbar is that of the plain plate, exclusive of the raised pattern. The studs in the pattern are typically between 1.5mm and 2.2mm.

Surface aspects

Durbar has an evenly distributed, raised pattern that is integral to the product and which allows plates to be used in any direction. An independent research establishment tested Durbar both wet (clean water) and dry in accordance with BS7976 and the guidelines of the UK Slip Resistance Group. Durbar improves slip-resistance at all angles.

Table 31: Mechanical properties: Durbar: EN 10025-2 : 2004

| Grade | R _{eL} (N/mm ²) | R _m (N/mm ²) | A (%) | Impact test | |
|-----------|--------------------------------------|-------------------------------------|-------|-------------|--------------|
| | Min | Min-max | Min | Temp °C | Min energy J |
| S275JR+AR | 275 | 410-560 | 21 | 20 | 27 |
| S355JR+AR | 355 | 470-630 | 20 | 20 | 27 |

Notes:

1. Material thickness, t, is in millimetres.
2. Impact properties of quality JR products are verified only when specified at the time of the enquiry and order.
3. Impact strengths apply to thicknesses ≥6mm and are for standard test pieces only.

Table 32: Chemical composition: Durbar: EN 10025-2 : 2004

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

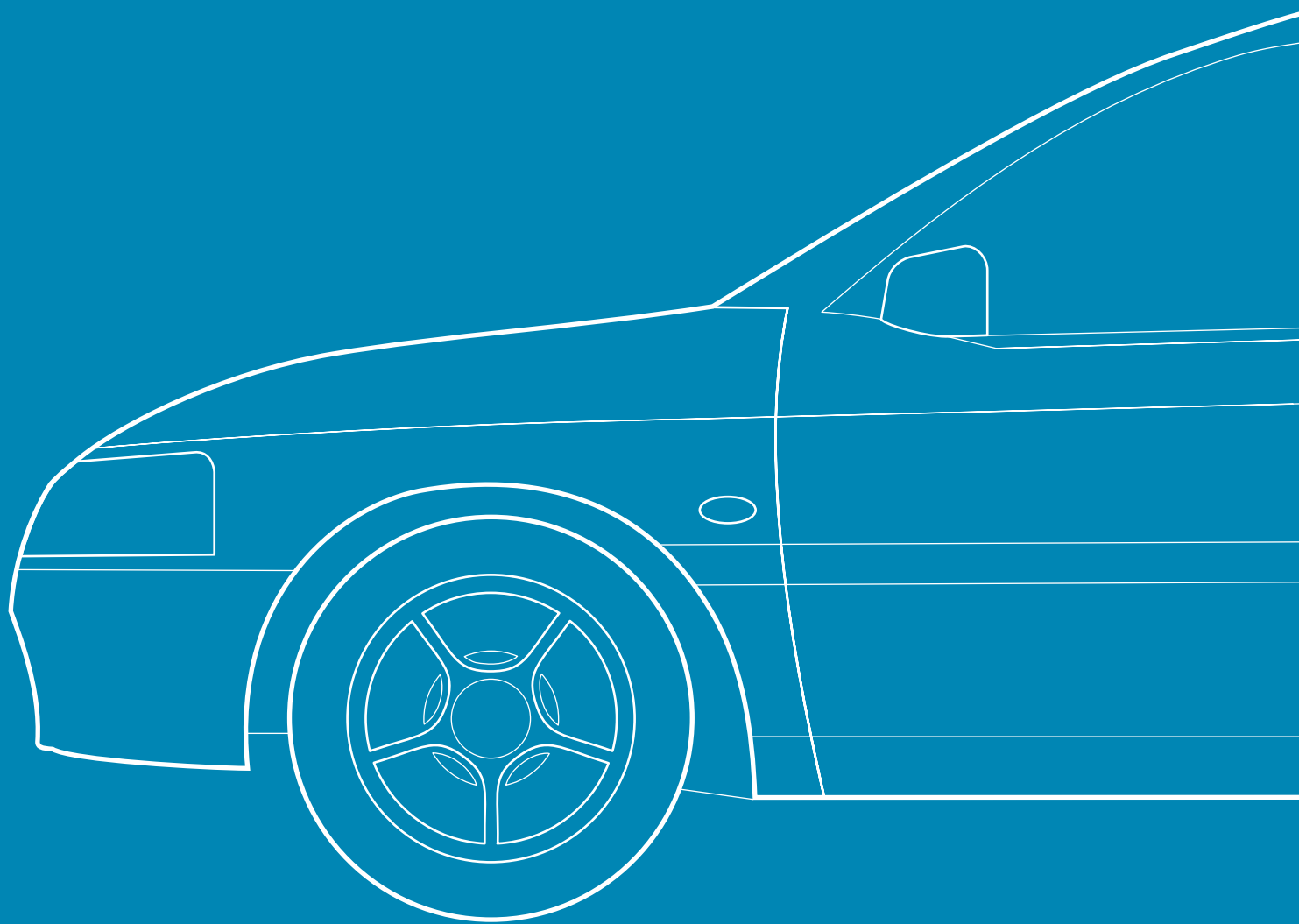
Note: Values are in weight percentages.

Table 33: Dimensions: Durbar coil

| Standard thickness | Standard widths |
|--------------------|-----------------|
| | S275JR+AR |
| 3.00 | 1000/1250 |
| 4.50 | 1000/1250/1500 |
| 6.00 | 1000/1250/1500 |
| 8.00 | 1000/1250/1500 |
| 10.00 | 1000/1250/1500 |
| 12.50 | 1000/1250/1500 |

Note: Dimensions are in millimetres.

Cold-rolled products



Cold-rolled products

Cold rolling at Corus produces processed strip steel products in a range that offers reduced thicknesses, enhanced surface finishes and forming characteristics, and high-strength grades. Many of these products are specially developed for demanding applications.

General

The cold-rolled strip steel products offered in this section are listed below.

| Page | Steel |
|------|---|
| 22 | General |
| 28 | Steel for forming |
| 30 | High-strength steel |
| 32 | DP600 dual-phase advanced high-strength steel |
| 33 | Structural steel |

Grades

This section of the catalogue shows the standard grades of cold-rolled steel offered by Corus.

Specific material requirements should be stated in the order, since any parameters not specified then will be supplied according to the most appropriate values in the standard.

Typical applications

- automotive components and body panels
- components for building and construction
- tubes and sections
- drums and boilers
- radiators
- furniture
- domestic appliances
- electrical goods

Most cold-rolled steel grades are suitable for:

- electrolytic coating
- hot-dip coating
- post-galvanising
- organic coating
- powder coating

Coil condition

Corus can supply cold-rolled steel in the conditions shown below:

- Annealed and skin-passed
- Full hard (on request)

Overall thickness and width limits

The overall thickness and width limits for cold-rolled products are shown in table 1 below. The limits for specific products are shown under individual product headings throughout the cold-rolled section.

Coil diameters

The coil diameters that apply to cold-rolled coil are shown in table 2 below.

Coil weight

The maximum weight of cold-rolled coils offered by Corus is determined by three factors:

- Manufacturing limit: Maximum 21kg/mm of width up to 31 tonnes
- Maximum safe outside diameter of coil (mm): 10/7 x coil width (limit of 2250mm)
- Maximum weight allowed by road/rail transport

Corus will discuss these factors with the customer to ensure compatibility with the quantity ordered.

Particular cold-rolled products may have maximum coil weights that differ from the range as a whole.

Tolerances on dimensions and shape

Thickness

The thickness tolerances from EN 10131 : 2006 for the four ranges of yield strength are shown in tables 3-6 on pages 24 and 25. Corus can offer tolerances closer than the special tolerances (S) shown in the table. They must be agreed with Corus before ordering.

Coil width

The coil width tolerances in table 7 on page 26 are from EN 10131 : 2006.

Flatness

Flatness complies with EN 10131 : 2006 as shown in table 8 for steel grades with $R_{eL} < 260\text{N/mm}^2$ and table 9 for steel grades with $R_{eL} \geq 260\text{N/mm}^2$ and $< 340\text{N/mm}^2$, both on page 26. Flatness tolerances in EN 10131 : 2006 apply to sheet only.

If there is a dispute about the flatness of material that was ordered to the Special tolerances shown in table 8, then the minimum acceptable standards of flatness described in table 10 on page 27 must be verified.

Edge camber

The deviation over a length of 2 metres will not exceed 5mm as specified in EN 10131 : 2006.

Health and safety

Corus publishes the health and safety information for its cold-rolled steels at www.corusgroup.com/stripproductsuk. *Product health and safety data sheet 16a* covers all the cold-rolled products in this section except for DP600, which is covered by *Product health and safety data sheet 2*.

Table 1: Thickness and width limits

| Product form | Thickness | | Width | |
|----------------------------|-----------|------|-------|------|
| | Min | Max | Min | Max |
| Mill edges ¹ | 0.35 | 3.00 | 710 | 1815 |
| Trimmed edges ² | 0.35 | 2.00 | 900 | 1803 |

Notes:

1. Batch annealed.
2. Continuously annealed.
3. Dimensions are in millimetres.

Table 2: Diameter of cold-rolled coil

| | |
|------------------|---------------------------------|
| Inside diameter | 610mm standard |
| Outside diameter | Max 10/7 x width (limit 2250mm) |

Table 3: Thickness tolerances: EN 10131 : 2006 : $R_{eL} < 260\text{N/mm}^2$

| Nominal thickness | | Normal tolerances for a nominal width of | | | Special tolerances (S) ² for a nominal width of | | |
|-------------------|------|--|----------------|-------|--|----------------|-------|
| | | ≤1200 | >1200 ≤1500 | >1500 | ≤1200 | >1200 ≤1500 | >1500 |
| > | ≤ | ± | ± | ± | ± | ± | ± |
| 0.35 | 0.40 | 0.03 | 0.04 | 0.05 | 0.020 | 0.025 | 0.030 |
| 0.40 | 0.60 | 0.03 | 0.04 | 0.05 | 0.025 | 0.030 | 0.035 |
| 0.60 | 0.80 | 0.04 | 0.05 | 0.06 | 0.030 | 0.035 | 0.040 |
| 0.80 | 1.00 | 0.05 | 0.06 | 0.07 | 0.035 | 0.040 | 0.050 |
| 1.00 | 1.20 | 0.06 | 0.07 | 0.08 | 0.040 | 0.050 | 0.060 |
| 1.20 | 1.60 | 0.08 | 0.09 | 0.10 | 0.050 | 0.060 | 0.070 |
| 1.60 | 2.00 | 0.10 | 0.11 | 0.12 | 0.060 | 0.070 | 0.080 |
| 2.00 | 2.50 | 0.12 | 0.13 | 0.14 | 0.080 | 0.090 | 0.100 |
| 2.50 | 3.00 | 0.15 | 0.15 | 0.16 | 0.100 | 0.110 | 0.120 |

Notes:

1. $1\text{N/mm}^2 = 1\text{MPa}$
2. For special tolerances, not all combinations of thickness and width are available in every product. Please consult Corus.
3. Dimensions are in millimetres.

Table 4: Thickness tolerances: EN 10131 : 2006 : $R_{eL} \geq 260\text{N/mm}^2$ and $< 340\text{N/mm}^2$

| Nominal thickness | | Normal tolerances for a nominal width of | | | Special tolerances (S) ² for a nominal width of | | |
|-------------------|------|--|----------------|-------|--|----------------|-------|
| | | ≤1200 | >1200 ≤1500 | >1500 | ≤1200 | >1200 ≤1500 | >1500 |
| > | ≤ | ± | ± | ± | ± | ± | ± |
| 0.35 | 0.40 | 0.04 | 0.05 | 0.06 | 0.025 | 0.030 | 0.035 |
| 0.40 | 0.60 | 0.04 | 0.05 | 0.06 | 0.030 | 0.035 | 0.040 |
| 0.60 | 0.80 | 0.05 | 0.06 | 0.07 | 0.035 | 0.040 | 0.050 |
| 0.80 | 1.00 | 0.06 | 0.07 | 0.08 | 0.040 | 0.050 | 0.060 |
| 1.00 | 1.20 | 0.07 | 0.08 | 0.10 | 0.050 | 0.060 | 0.070 |
| 1.20 | 1.60 | 0.09 | 0.11 | 0.12 | 0.060 | 0.070 | 0.080 |
| 1.60 | 2.00 | 0.12 | 0.13 | 0.14 | 0.070 | 0.080 | 0.100 |
| 2.00 | 2.50 | 0.14 | 0.15 | 0.16 | 0.100 | 0.110 | 0.120 |
| 2.50 | 3.00 | 0.17 | 0.18 | 0.18 | 0.120 | 0.130 | 0.140 |

Notes:

1. $1\text{N/mm}^2 = 1\text{MPa}$
2. For special tolerances, not all combinations of thickness and width are available in every product. Please consult Corus.
3. Dimensions are in millimetres.

Table 5: Thickness tolerances: EN 10131 : 2006 : $R_{eL} \geq 340\text{N/mm}^2$ and $\leq 420\text{N/mm}^2$

| Nominal thickness | | Normal tolerances for a nominal width of | | | Special tolerances (S) ² for a nominal width of | | |
|-------------------|--------|--|------------------------|---------|--|------------------------|---------|
| | | ≤ 1200 | >1200 ≤ 1500 | >1500 | ≤ 1200 | >1200 ≤ 1500 | >1500 |
| > | \leq | \pm | \pm | \pm | \pm | \pm | \pm |
| 0.35 | 0.40 | 0.04 | 0.05 | 0.06 | 0.030 | 0.035 | 0.040 |
| 0.40 | 0.60 | 0.05 | 0.06 | 0.07 | 0.035 | 0.040 | 0.050 |
| 0.60 | 0.80 | 0.06 | 0.07 | 0.08 | 0.040 | 0.050 | 0.060 |
| 0.80 | 1.00 | 0.07 | 0.08 | 0.10 | 0.050 | 0.060 | 0.070 |
| 1.00 | 1.20 | 0.09 | 0.10 | 0.11 | 0.060 | 0.070 | 0.080 |
| 1.20 | 1.60 | 0.11 | 0.12 | 0.14 | 0.070 | 0.080 | 0.100 |
| 1.60 | 2.00 | 0.14 | 0.15 | 0.17 | 0.080 | 0.100 | 0.110 |
| 2.00 | 2.50 | 0.16 | 0.18 | 0.19 | 0.110 | 0.120 | 0.130 |
| 2.50 | 3.00 | 0.20 | 0.20 | 0.21 | 0.130 | 0.140 | 0.150 |

Notes:

1. $1\text{N/mm}^2 = 1\text{MPa}$
2. For special tolerances, not all combinations of thickness and width are available in every product. Please consult Corus.
3. Dimensions are in millimetres.

Table 6: Thickness tolerances: EN 10131 : 2006 : $R_{eL} > 420\text{N/mm}^2$

| Nominal thickness | | Normal tolerances for a nominal width of | | | Special tolerances (S) ² for a nominal width of | | |
|-------------------|--------|--|------------------------|---------|--|------------------------|---------|
| | | ≤ 1200 | >1200 ≤ 1500 | >1500 | ≤ 1200 | >1200 ≤ 1500 | >1500 |
| > | \leq | \pm | \pm | \pm | \pm | \pm | \pm |
| 0.35 | 0.40 | 0.05 | 0.06 | 0.07 | 0.035 | 0.040 | 0.050 |
| 0.40 | 0.60 | 0.05 | 0.07 | 0.08 | 0.040 | 0.050 | 0.060 |
| 0.60 | 0.80 | 0.06 | 0.08 | 0.10 | 0.050 | 0.060 | 0.070 |
| 0.80 | 1.00 | 0.08 | 0.10 | 0.11 | 0.060 | 0.070 | 0.080 |
| 1.00 | 1.20 | 0.10 | 0.11 | 0.13 | 0.070 | 0.080 | 0.100 |
| 1.20 | 1.60 | 0.13 | 0.14 | 0.16 | 0.080 | 0.100 | 0.110 |
| 1.60 | 2.00 | 0.16 | 0.17 | 0.19 | 0.100 | 0.110 | 0.130 |
| 2.00 | 2.50 | 0.19 | 0.20 | 0.22 | 0.130 | 0.140 | 0.160 |
| 2.50 | 3.00 | 0.22 | 0.23 | 0.24 | 0.160 | 0.170 | 0.180 |

Notes:

1. $1\text{N/mm}^2 = 1\text{MPa}$
2. For special tolerances, not all combinations of thickness and width are available in every product. Please consult Corus.
3. Dimensions are in millimetres.

Table 7: Tolerances on coil width: EN 10131 : 2006

| Nominal width | Normal tolerances | | Special tolerances (S) | |
|---------------|-------------------|------------|------------------------|------------|
| | lower - | upper + | lower - | upper + |
| ≤1200 | 0 | 4 | 0 | 2 |
| >1200 ≤1500 | 0 | 5 | 0 | 2 |
| >1500 | 0 | 6 | 0 | 3 |

Note: Dimensions are in millimetres.

Table 8: Flatness tolerances $R_{eL} < 260 \text{N/mm}^2$

EN 10131 : 2006

| Tolerance class | Nominal width | Nominal thickness | | |
|-----------------|---------------|-------------------|----------|------|
| | | <0.7 | ≥0.7<1.2 | ≥1.2 |
| Normal | <1200 | 10 | 8 | 7 |
| | ≥1200 <1500 | 12 | 10 | 8 |
| | ≥1500 | 17 | 15 | 13 |
| Special (FS) | <1200 | 5 | 4 | 3 |
| | ≥1200 <1500 | 6 | 5 | 4 |
| | ≥1500 | 8 | 7 | 6 |

Notes:

1. If sheet is ordered non skin-passed, only the normal tolerances are applicable.
2. The tolerances in this table represent maximum deviation from flatness when the sheet is placed on a horizontal surface.
3. Dimensions are in millimetres.

Table 9: Flatness tolerances $R_{eL} \geq 260 \text{N/mm}^2$ and $< 340 \text{N/mm}^2$

EN 10131 : 2006

| Tolerance class | Nominal width | Nominal thickness | | |
|-----------------|---------------|-------------------|----------|------|
| | | <0.7 | ≥0.7<1.2 | ≥1.2 |
| Normal | <1200 | 13 | 10 | 8 |
| | ≥1200 <1500 | 15 | 13 | 11 |
| | ≥1500 | 20 | 19 | 17 |
| Special (FS) | <1200 | 8 | 6 | 5 |
| | ≥1200 <1500 | 9 | 8 | 6 |
| | ≥1500 | 12 | 10 | 9 |

Notes:

1. If sheet is ordered non skin-passed, only the normal tolerances are applicable.
2. The tolerances in this table represent maximum deviation from flatness when the sheet is placed on a horizontal surface.
3. Flatness tolerances for material with an $R_{eL} \geq 340 \text{N/mm}^2$ must be specified when the material is ordered.
4. Dimensions are in millimetres.

Surface

Surface Quality

Cold-rolled steels are available in surface quality A or B to EN 10130 : 2006.

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 discoloration.

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 consult Corus.

Inspected side

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

Surface texture

Cold-rolled steel is available in several surface textures. Unless specified otherwise, Corus will supply normal roughness. Surface texture cannot be guaranteed for steel that has not been skin passed. Table 11 below shows the range of surface textures according to EN 10130 : 2006. Other surface textures may be available depending upon your requirement.

Preservative oil

The standard oil applied by Corus acts as a protective coating. Other kinds of oil may be available depending upon your requirement.

Corus offers a range of oiling levels from 0.4-1.7g/m² per side. Other levels are available on request.

Corus is not responsible for the risk of corrosion if material is ordered in the un-oiled condition.

Table 10: EN 10131 : 2006

Criteria in case of disputes over Special (FS) flatness tolerances ($R_{eL} < 260N/mm^2$)

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

Notes:

- 1N/mm² = 1MPa
2. Dimensions are in millimetres.

Table 11: Roughness: EN 10130 : 2006

| Grade | Symbol | Ra (µm) cut off 0.8mm |
|-------------|--------|--------------------------|
| bright | b | ≤0.4 |
| semi-bright | g | ≤0.9 |
| normal | m | 0.6-1.9 |
| rough | r | >1.6 |

Steel for forming

Cold-rolled steel for cold forming and deep drawing is available in a range of qualities, each designed for particular applications.

Typical applications

- automotive components and body panels
- components for building
- domestic appliances
- electrical goods
- furniture
- radiators
- tubes

Standards

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

EN 10130 : 2006

- DC01
- DC03
- DC04
- DC05
- DC06

Mechanical properties

The values shown for the mechanical properties in table 12 below are for skin-passed material and are for test pieces taken transverse to the rolling direction.

Chemical composition

Cold-rolled steel for forming meets the requirements of the cast analysis in the standard, as shown in table 13 on page 29.

Dimensions

The width and thickness limits are shown in table 14 on page 29. The minimum width is 710mm.

Table 12: Mechanical properties: EN 10130 : 2006

| Grade | R_e (N/mm ²) ¹ | R_m (N/mm ²) | A_{80} (%) ² | r_{90} ^{3,4} | n_{90} ³ |
|-------|---|----------------------------|---------------------------|-------------------------|-----------------------|
| | Max | Min-max | Min | Min | Min |
| DC01 | 280 ^{5,7} | 270-410 | 28 | – | – |
| DC03 | 240 ⁵ | 270-370 | 34 | 1.3 | – |
| DC04 | 210 ⁵ | 270-350 | 38 | 1.6 | 0.18 |
| DC05 | 180 ⁵ | 270-330 | 40 | 1.9 | 0.20 |
| DC06 | 170 ⁶ | 270-330 | 41 | 2.1 | 0.22 |

Notes:

1. The values of yield strength are 0.2% proof strength for products that do not present a definite yield point, and lower yield strength (R_{eL}) for other products. For thicknesses >0.5mm and ≤0.7mm, the value for yield strength is increased by 20N/mm². For thicknesses ≤0.5mm, the value is increased by 40N/mm².
2. For thicknesses >0.5mm and ≤0.7mm, the minimum value for elongation is reduced by 2 units. For thicknesses ≤0.5mm, the minimum value is reduced by 4 units.
3. The values of r_{90} and n_{90} apply only to products with a thickness ≥0.5mm.
4. For thicknesses greater than 2mm, the value for r_{90} is reduced by 0.2.
5. For design purposes, the lower yield strength (R_e) may be assumed to be 140N/mm².
6. For design purposes, the lower yield strength (R_e) may be assumed to be 120N/mm².
7. This upper limit is only valid for 8 days from the day the material is available.

Table 13: Chemical composition: EN 10130 : 2006

| Grade | C | Mn | P | S | Ti |
|-------|------|------|-------|-------|-------------------|
| | Max | Max | Max | Max | Max |
| DC01 | 0.12 | 0.60 | 0.045 | 0.045 | – |
| DC03 | 0.10 | 0.45 | 0.035 | 0.035 | – |
| DC04 | 0.08 | 0.40 | 0.030 | 0.030 | – |
| DC05 | 0.06 | 0.35 | 0.025 | 0.025 | – |
| DC06 | 0.02 | 0.25 | 0.020 | 0.020 | 0.30 ¹ |

Notes:

1. Titanium may be replaced by niobium.
2. Carbon and nitrogen will be completely bound.
3. Values are in weight percentages.

Table 14: Dimensions

| Thickness | | Width | | | |
|-----------|------|-------|--------------|------|------|
| | | DC01 | DC03 DC04 | DC05 | DC06 |
| ≥ | < | Max | Max | Max | Max |
| 0.35 | 0.38 | 1250 | 1250 | 1250 | – |
| 0.38 | 0.40 | 1260 | 1250 | 1250 | – |
| 0.40 | 0.43 | 1330 | 1275 | 1275 | – |
| 0.43 | 0.45 | 1390 | 1275 | 1275 | – |
| 0.45 | 0.50 | 1390 | 1300 | 1300 | 1350 |
| 0.50 | 0.53 | 1532 | 1350 | 1350 | 1350 |
| 0.53 | 0.55 | 1532 | 1400 | 1400 | 1350 |
| 0.55 | 0.58 | 1532 | 1475 | 1475 | 1350 |
| 0.58 | 0.60 | 1532 | 1525 | 1525 | 1425 |
| 0.60 | 0.65 | 1532 | 1532 | 1580 | 1580 |
| 0.65 | 0.70 | 1632 | 1632 | 1655 | 1650 |
| 0.70 | 0.75 | 1672 | 1672 | 1680 | 1680 |
| 0.75 | 0.95 | 1820 | 1815 | 1680 | 1680 |
| 0.95 | 1.20 | 1820 | 1815 | 1655 | 1650 |
| 1.20 | 1.60 | 1820 | 1815 | 1525 | 1525 |
| 1.60 | 2.00 | 1537 | 1525 | 1525 | 1525 |
| 2.00 | 2.50 | 1350 | 1350 | 1350 | – |
| 2.50 | 2.90 | 1300 | 1300 | 1300 | – |
| 2.90 | 3.00 | 1295 | 1295 | 1295 | – |

Notes:

1. The minimum width is 710mm.
2. Dimensions are in millimetres.

High-strength steel

Cold-rolled high-strength steel is available in Corus' own Tenform grade and to a European standard.

High-strength steel allows the user to increase the strength of the finished component or reduce the steel thickness, or both.

Tenform CMN

Tenform CMN is a carbon-manganese grade and combines high strength with excellent formability for the most difficult cold-forming applications.

Other high-strength steel grades

Corus can also supply cold-rolled high-strength low-alloy steel grades to comply with EN 10268 : 2006.

Typical applications

- automotive suspension components
- internal structural parts
- welded tube

Standards

Tenform grade

Tenform CMN is available in the grade shown in table 15 below.

High-strength low-alloy steel

Corus offers cold-rolled high-strength low-alloy steel to EN 10268 : 2006 as shown in table 16 below. The former European standard grades are shown for reference.

Table 15: Corus

Tenform CMN

| Grade |
|--------|
| CMN300 |

Table 17: Mechanical properties: Tenform CMN

| Grade | R _p (N/mm ²) | R _m (N/mm ²) | A ₈₀ (%) |
|--------|-------------------------------------|-------------------------------------|---------------------|
| | Min-max | Min-max | Min |
| CMN300 | 300-360 | 440-500 | 26 |

Table 16: Standards

European

| EN 10268 : 2006 | EN 10268 : 1999 |
|-----------------|-----------------|
| Grade | |
| HC260LA | H240LA |
| HC300LA | H280LA |
| HC340LA | H320LA |
| HC380LA | H360LA |

Table 18: Mechanical properties: EN 10268 : 2006

| Grade | R _{p0.2} ¹ | R _m | A ₈₀ ² |
|---------|--------------------------------|----------------------|------------------------------|
| | (N/mm ²) | (N/mm ²) | (%) |
| | Min-max | Min | Min |
| HC260LA | 240-310 | 340 | 27 |
| HC300LA | 280-360 | 370 | 24 |
| HC340LA | 320-410 | 400 | 22 |
| HC380LA | 360-460 | 430 | 20 |

Notes:

1. If the yield strength is pronounced, the values apply to the lower yield point (R_{eL}).
2. For thicknesses >0.5mm and ≤0.7mm, the minimum value for elongation is reduced by 2 units.

Table 19: Chemical composition: Tenform CMN

| Grade | C | Mn | Si | P | S |
|--------|------|------|------|-------|-------|
| | Max | Max | Max | Max | Max |
| CMN300 | 0.18 | 1.40 | 0.03 | 0.025 | 0.012 |

Note: Values are in weight percentages.

Mechanical properties

Tenform CMN

The values shown for the mechanical properties in table 17 on page 30 are for skin-passed material and are for test pieces taken in the rolling direction.

High-strength low-alloy steel

The values shown for the mechanical properties in table 18 on page 30 are for skin-passed material and are for test pieces taken in the rolling direction.

Chemical composition

Tenform CMN

Tenform CMN meets the requirements of the cast analysis shown in table 19 on page 30.

High-strength low-alloy steel

Cold-rolled high-strength low-alloy steel meets the requirements of the cast analysis in the standard, as shown in table 20 below.

Dimensions

The width and thickness limits are shown in table 21 below. The minimum width is 900mm for all products.

Table 20: Chemical composition: EN 10268 : 2006

| Grade | C | Si | Mn | P | S | Al | Ti ¹ | Nb ¹ |
|---------|-----|-----|-----|-------|-------|-------|-----------------|-----------------|
| | Max | Min | Max | Max | Max | Min | Max | Max |
| HC260LA | 0.1 | 0.5 | 0.6 | 0.025 | 0.025 | 0.015 | 0.15 | – |
| HC300LA | 0.1 | 0.5 | 1.0 | 0.025 | 0.025 | 0.015 | 0.15 | 0.09 |
| HC340LA | 0.1 | 0.5 | 1.1 | 0.025 | 0.025 | 0.015 | 0.15 | 0.09 |
| HC380LA | 0.1 | 0.5 | 1.6 | 0.025 | 0.025 | 0.015 | 0.15 | 0.09 |

Notes:

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%.
2. Values are in weight percentages.

Table 21: Dimensions

| Thickness | | Width | | | | |
|-----------|------|--------|---------|---------|---------|---------|
| | | CMN300 | HC260LA | HC300LA | HC340LA | HC380LA |
| ≥ | < | Max | Max | Max | Max | Max |
| 0.40 | 0.43 | – | 1330 | – | – | – |
| 0.43 | 0.50 | – | 1390 | – | – | – |
| 0.50 | 0.60 | – | 1532 | – | – | – |
| 0.60 | 0.65 | – | – | 1300 | 1300 | 1186 |
| 0.65 | 0.70 | – | 1632 | 1300 | 1300 | 1186 |
| 0.70 | 0.75 | 1400 | 1672 | 1300 | 1300 | 1186 |
| 0.75 | 1.00 | 1400 | 1815 | 1300 | 1300 | 1186 |
| 1.00 | 1.40 | 1400 | 1815 | 1300 | 1300 | 1350 |
| 1.40 | 1.60 | 1400 | 1815 | 1300 | 1300 | 1366 |

Notes:

1. The minimum width is 900mm for all products.
2. Dimensions are in millimetres.

DP600 dual-phase advanced high-strength steel

Cold-rolled DP600 is advanced high-strength steel for the automotive industry. It allows the user to increase the strength of the finished component or to reduce the thickness of the steel, or both. This can increase the output from each tonne of steel and produce products that are strong, light and safe under load. Its high strain-hardening capacity gives it good formability.

For body-in-white applications, DP600 offers the opportunity to switch from hot-dip galvanised steels.

Typical applications

- automotive body-in-white
- automotive superstructure components
- precision tubes

Standard and grade

Draft European standard prEN 10338 : 2007 covers cold-rolled multiphase steels with higher yield strengths for cold forming. We have used this standard to develop DP600, which not only meets the properties in the standard for HCT600X but also in many cases exceeds them. Please consult Corus for more information about the typical properties of DP600.

Mechanical properties

The values shown for the mechanical properties in table 22 below are for test pieces taken in the rolling direction.

Chemical composition

Table 23 shows the chemical composition of HCT600X to Draft prEN 10338 : 2007.

Dimensions

Width and thickness limits are shown in table 24.

Table 22: Mechanical properties: prEN 10338 : 2007

| Grade | R _{p0.2} (N/mm ²) | R _m (N/mm ²) | A ₈₀ (%) |
|---------|--|-------------------------------------|---------------------|
| | | Min | Min |
| HCT600X | 340-420 | 600 | 20 |

Notes:

1. 1N/mm²=1MPa
2. Yield strength refers to the 0.2% proof strength for the product.
3. Corus DP600 comfortably meets the 'n' and BH2 requirements.

Table 23: Chemical composition: prEN 10338 : 2007

| Grade | C | Si | Mn | P | S | Al _{tot} | Cr + Mo | Nb + Ti | V | B |
|---------|------|------|------|------|-------|-------------------|---------|---------|------|-------|
| | Max | Max | Max | Max | Max | | Max | Max | Max | Max |
| HCT600X | 0.17 | 0.80 | 2.20 | 0.08 | 0.015 | ≤2.00 | 1.00 | 0.15 | 0.20 | 0.005 |

Note: Values are in weight percentages.

Table 24: Dimensions

| Thickness | | Width |
|-----------|------|-------|
| ≥ | < | Max |
| 1.00 | 1.10 | 1300 |
| 1.10 | 1.20 | 1350 |
| 1.20 | 1.60 | 1400 |

Notes:

1. Minimum width is 900mm.
2. Widths refer to untrimmed material. Mill edge or side-trimmed material is also available.
3. Dimensions are in millimetres.

Structural steel

Cold-rolled structural steel has guaranteed minimum strength and good welding properties.

Typical applications

- tubing
- domestic appliances
- steel furniture
- warehouse shelving

Standards

Cold-rolled structural steel is available in two grades from Corus.

CA200
CA240

Mechanical properties

The values shown for the mechanical properties in table 25 below are for skin-passed material and are for test pieces taken transverse to the rolling direction.

Chemical composition

Cold-rolled structural steel meets the requirements of the cast analysis as shown in table 26 below.

Dimensions

The width and thickness limits are shown in table 27 on page 34. The minimum width for all products is 900mm.

Table 25: Mechanical properties: Corus

| Grade | R _p (N/mm ²) | R _m (N/mm ²) | A ₈₀ (%) |
|-------|-------------------------------------|-------------------------------------|---------------------|
| | Min-max | Min-max | Min |
| CA200 | 200-260 | 320-380 | 30 |
| CA240 | 240-300 | 340-400 | 28 |

Table 26: Chemical composition: Corus

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

Note: Values are in weight percentages.

Table 27: Dimensions

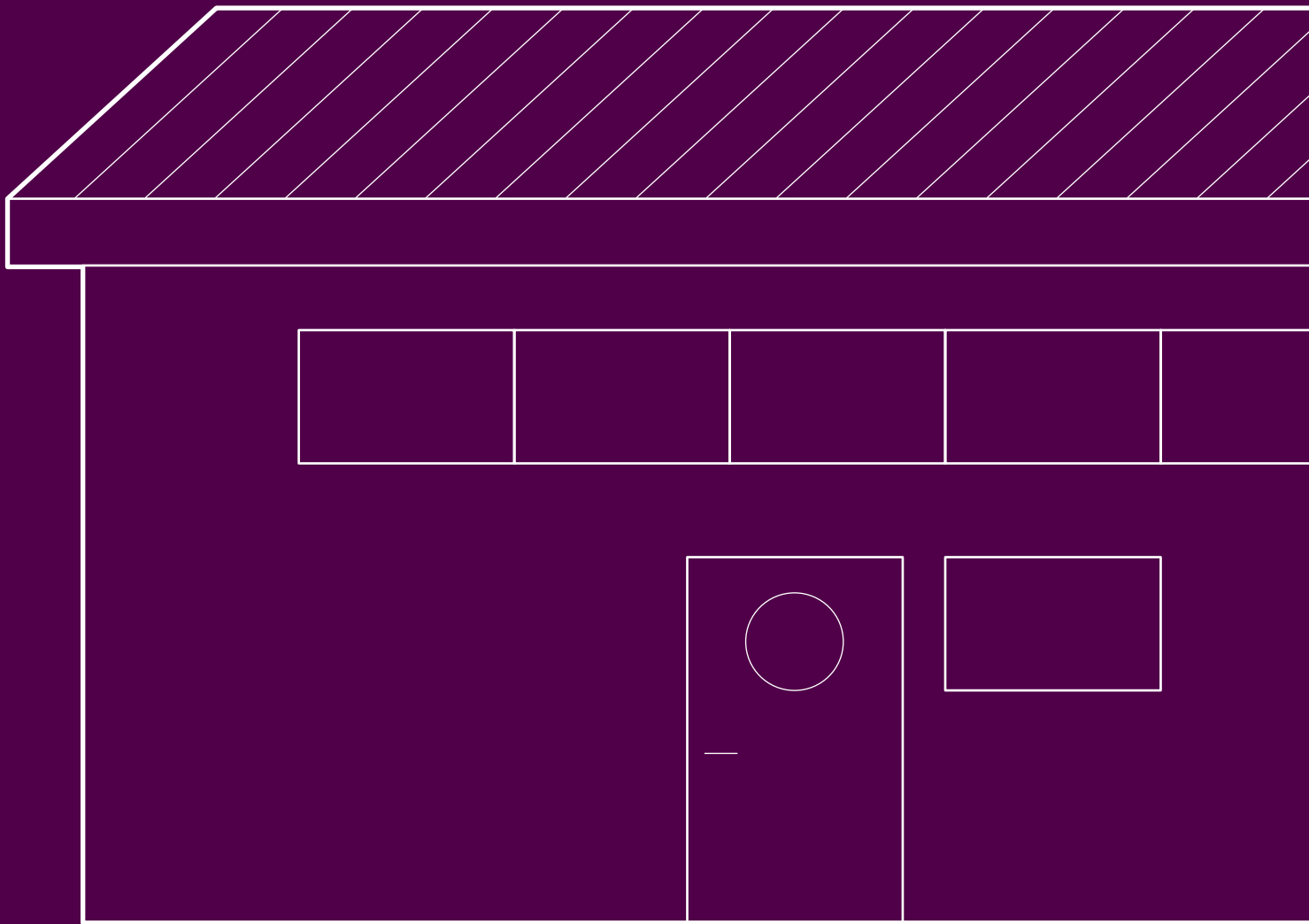
| Thickness | | Width | |
|-----------|------|-------|-------|
| | | CA200 | CA240 |
| \geq | < | Max | |
| 0.38 | 0.40 | 1260 | – |
| 0.40 | 0.43 | 1330 | 1330 |
| 0.43 | 0.50 | 1390 | 1390 |
| 0.50 | 0.65 | 1532 | 1532 |
| 0.65 | 0.70 | 1632 | 1632 |
| 0.70 | 0.75 | 1672 | 1672 |
| 0.75 | 1.60 | 1815 | 1815 |

Notes:

1. The minimum width for all products is 900mm.
2. Dimensions are in millimetres.

Galvatite

Hot-dip galvanised products



Galvatite hot-dip galvanised products

Corus manufactures Galvatite with either a pure zinc coating or an iron-zinc alloy coating, offering corrosion resistance and a variety of characteristics for fabrication and performance.

General

The hot-dip galvanised strip steel products offered in this section are listed below.

| Page | Steel |
|------|-------------------------------|
| 36 | General |
| 42 | Galvatite for forming |
| 44 | Galvatite high-strength steel |
| 47 | Galvatite structural steel |

Grades

This section of the catalogue shows the standard grades of hot-dip galvanised steels offered by Corus.

Typical applications

- automotive components and body panels
- steel framing
- roof and wall cladding (when painted or pre-finished)
- components for building and construction
- rainwater goods (when painted/coated)
- tubes and sections
- engineering components
- domestic appliances
- electrical goods
- components for agricultural machinery

Zinc and iron-zinc coatings

Galvatite is available in the combinations of coating mass and surface finish shown in table 1 on page 37. For coating masses not shown in the table, please consult Corus.

Overall thickness and width limits

The overall thickness and width limits for Galvatite are shown in table 2 on page 38. The limits for specific Galvatite products are shown under the individual headings for each product.

Coil diameters

The coil diameters that apply to Galvatite coils are shown in table 3 on page 38.

Coil weights

The maximum weight of Galvatite coils offered by Corus is determined by three factors:

- Manufacturing limit: Maximum 21kg/mm of width up to 30 tonnes
- Maximum safe outside diameter of coil (mm): 10/7 x coil width (limit of 2135mm)
- Maximum weight allowed by road/rail transport

Corus will discuss these factors with the customer to ensure compatibility with the quantity ordered.

Particular products may have maximum coil weights that differ from the range as a whole.

Tolerances on dimensions and shape

Thickness

The thickness tolerances from EN 10143 : 2006 for the four ranges of yield strength—and for specific grades in the case of table 5—are shown in tables 4-7 on pages 38 and 39.

Thickness refers to the total thickness (including the coating), measured at least 40mm from either edge.

For the zinc coatings Z450 and Z600, the tolerances on thickness shown in the tables should be increased by 0.01mm.

The thickness tolerances in the region of coil welds may be increased by a maximum of 50% over a length of 10 metres.

Coil width

The coil width tolerances in table 8 on page 40 are from EN 10143 : 2006.

Flatness

Flatness complies with EN 10143 : 2006. Table 9 on page 40 shows the flatness tolerances for steel grades with $R_{eL} < 260 \text{N/mm}^2$. Table 10 on page 40 shows the flatness tolerances for steel grades with $R_{eL} \geq 260 \text{N/mm}^2$ and $< 360 \text{N/mm}^2$ and for grades DX51D and S550GD.

Edge camber

The deviation over a length of 2 metres will not exceed 5mm as specified in EN 10143 : 2006.

Health and safety

Corus publishes the health and safety information for its Galvatite hot-dip galvanised steels in *Product health and safety data sheet 18*, which is available at www.corusgroup.com/stripproductsuk.

Table 1: Coating type, finish and designation

| Coating type | Coating finish | Description | Coating designation ^{Note} | | | | | | | | |
|----------------|----------------|---|-------------------------------------|------|-------|-------|-------|------|------|------|------|
| | | | Z100 | Z120 | Z140 | Z200 | Z225 | Z275 | Z350 | Z450 | Z600 |
| Zinc (Z) | NA | Normal spangle, as coated surface | • | • | • | • | • | • | • | • | • |
| | MA | Minimised spangle, as coated surface | • | • | • | • | • | • | • | • | • |
| | MB | Minimised spangle, improved surface | • | • | • | • | • | • | • | – | – |
| | MC | Minimised spangle, best quality surface | • | • | • | • | • | • | • | – | – |
| Iron-zinc (ZF) | | | ZF60 | ZF90 | ZF100 | ZF120 | ZF140 | | | | |
| | RA | Regular, as coated surface | • | • | • | • | • | | | | |
| | RB | Regular, improved surface | • | • | • | • | • | | | | |
| | RC | Regular, best quality surface | • | • | • | • | – | | | | |

Notes:

1. The number contained in the coating designation indicates the coating mass in g/m², which includes both surfaces. Consult Corus about the availability of coating masses other than those shown here, including coating masses between those shown.
2. • = Available
– = Consult Corus

Table 2: Thickness and width limits

| Condition | Thickness | | Width | |
|--------------|-----------|-----|-------|------|
| | Min | Max | Min | Max |
| Mill edge | 0.40 | 2.5 | 700 | 1820 |
| Side trimmed | 0.40 | 2.5 | 700 | 1810 |

Note: Dimensions are in millimetres.

Table 3: Diameter of Galvatite coil

| | |
|------------------|----------------------------------|
| Inside diameter | 610mm standard, 508mm on request |
| Outside diameter | Max 10/7 x width (limit 2135mm) |

Table 4: Thickness tolerances: EN 10143 : 2006 : $R_{p0.2}$ or $R_{eL} < 260N/mm^2$

| Nominal thickness | | Normal tolerances for a nominal width of | | | Special tolerances (S) for a nominal width of | | |
|-------------------|------|--|----------------|-------|---|----------------|-------|
| | | ≤1200 | >1200 ≤1500 | >1500 | ≤1200 | >1200 ≤1500 | >1500 |
| > | ≤ | ± | ± | ± | ± | ± | ± |
| 0.20 | 0.40 | 0.04 | 0.05 | 0.06 | 0.030 | 0.035 | 0.040 |
| 0.40 | 0.60 | 0.04 | 0.05 | 0.06 | 0.035 | 0.040 | 0.045 |
| 0.60 | 0.80 | 0.05 | 0.06 | 0.07 | 0.040 | 0.045 | 0.050 |
| 0.80 | 1.00 | 0.06 | 0.07 | 0.08 | 0.045 | 0.050 | 0.060 |
| 1.00 | 1.20 | 0.07 | 0.08 | 0.09 | 0.050 | 0.060 | 0.070 |
| 1.20 | 1.60 | 0.10 | 0.11 | 0.12 | 0.060 | 0.070 | 0.080 |
| 1.60 | 2.00 | 0.12 | 0.13 | 0.14 | 0.070 | 0.080 | 0.090 |
| 2.00 | 2.50 | 0.14 | 0.15 | 0.16 | 0.090 | 0.100 | 0.110 |

Notes:

1. $1N/mm^2 = 1MPa$
2. Dimensions are in millimetres.

Table 5: Thickness tolerances: EN 10143 : 2006 : $R_{p0.2} \geq 260N/mm^2$ and $< 360N/mm^2$ and grades DX51D and S550GD

| Nominal thickness | | Normal tolerances for a nominal width of | | | Special tolerances (S) for a nominal width of | | |
|-------------------|------|--|----------------|-------|---|----------------|-------|
| | | ≤1200 | >1200 ≤1500 | >1500 | ≤1200 | >1200 ≤1500 | >1500 |
| > | ≤ | ± | ± | ± | ± | ± | ± |
| 0.20 | 0.40 | 0.05 | 0.06 | 0.07 | 0.035 | 0.040 | 0.045 |
| 0.40 | 0.60 | 0.05 | 0.06 | 0.07 | 0.040 | 0.045 | 0.050 |
| 0.60 | 0.80 | 0.06 | 0.07 | 0.08 | 0.045 | 0.050 | 0.060 |
| 0.80 | 1.00 | 0.07 | 0.08 | 0.09 | 0.050 | 0.060 | 0.070 |
| 1.00 | 1.20 | 0.08 | 0.09 | 0.11 | 0.060 | 0.070 | 0.080 |
| 1.20 | 1.60 | 0.11 | 0.13 | 0.14 | 0.070 | 0.080 | 0.090 |
| 1.60 | 2.00 | 0.14 | 0.15 | 0.16 | 0.080 | 0.090 | 0.110 |
| 2.00 | 2.50 | 0.16 | 0.17 | 0.18 | 0.110 | 0.120 | 0.130 |

Notes:

1. $1N/mm^2 = 1MPa$
2. Dimensions are in millimetres.

Table 6: Thickness tolerances: EN 10143 : 2006 : $R_{p0.2} \geq 360\text{N/mm}^2$ and $\leq 420\text{N/mm}^2$

| Nominal thickness | | Normal tolerances for a nominal width of | | | Special tolerances (S) for a nominal width of | | |
|-------------------|--------|--|------------------------|---------|---|------------------------|---------|
| | | ≤ 1200 | >1200 ≤ 1500 | >1500 | ≤ 1200 | >1200 ≤ 1500 | >1500 |
| > | \leq | \pm | \pm | \pm | \pm | \pm | \pm |
| 0.35 | 0.40 | 0.05 | 0.06 | 0.07 | 0.040 | 0.045 | 0.050 |
| 0.40 | 0.60 | 0.06 | 0.07 | 0.08 | 0.045 | 0.050 | 0.060 |
| 0.60 | 0.80 | 0.07 | 0.08 | 0.09 | 0.050 | 0.060 | 0.070 |
| 0.80 | 1.00 | 0.08 | 0.09 | 0.11 | 0.060 | 0.070 | 0.080 |
| 1.00 | 1.20 | 0.10 | 0.11 | 0.12 | 0.070 | 0.080 | 0.090 |
| 1.20 | 1.60 | 0.13 | 0.14 | 0.16 | 0.080 | 0.090 | 0.110 |
| 1.60 | 2.00 | 0.16 | 0.17 | 0.19 | 0.090 | 0.110 | 0.120 |
| 2.00 | 2.50 | 0.18 | 0.20 | 0.21 | 0.120 | 0.130 | 0.140 |

Notes:

1. $1\text{N/mm}^2 = 1\text{MPa}$
2. Dimensions are in millimetres.

Table 7: Thickness tolerances: EN 10143 : 2006 : $R_{p0.2} > 420\text{N/mm}^2$ and $\leq 900\text{N/mm}^2$

| Nominal thickness | | Normal tolerances for a nominal width of | | | Special tolerances (S) for a nominal width of | | |
|-------------------|--------|--|------------------------|---------|---|------------------------|---------|
| | | ≤ 1200 | >1200 ≤ 1500 | >1500 | ≤ 1200 | >1200 ≤ 1500 | >1500 |
| > | \leq | \pm | \pm | \pm | \pm | \pm | \pm |
| 0.35 | 0.40 | 0.06 | 0.07 | 0.08 | 0.045 | 0.050 | 0.060 |
| 0.40 | 0.60 | 0.06 | 0.08 | 0.09 | 0.050 | 0.060 | 0.070 |
| 0.60 | 0.80 | 0.07 | 0.09 | 0.11 | 0.060 | 0.070 | 0.080 |
| 0.80 | 1.00 | 0.09 | 0.11 | 0.12 | 0.070 | 0.080 | 0.090 |
| 1.00 | 1.20 | 0.11 | 0.13 | 0.14 | 0.080 | 0.090 | 0.110 |
| 1.20 | 1.60 | 0.15 | 0.16 | 0.18 | 0.090 | 0.110 | 0.120 |
| 1.60 | 2.00 | 0.18 | 0.19 | 0.21 | 0.110 | 0.120 | 0.140 |
| 2.00 | 2.50 | 0.21 | 0.22 | 0.24 | 0.140 | 0.150 | 0.170 |

Notes:

1. $1\text{N/mm}^2 = 1\text{MPa}$
2. Dimensions are in millimetres.

Table 8: Tolerances on coil width: EN 10143 : 2006

| Nominal width | Normal tolerances | | Special tolerances (S) | |
|---------------|-------------------|------------|------------------------|------------|
| | lower - | upper + | lower - | upper + |
| ≤1200 | 0 | 5 | 0 | 2 |
| >1200 ≤1500 | 0 | 6 | 0 | 2 |
| >1500 ≤1800 | 0 | 7 | 0 | 3 |
| >1800 | 0 | 8 | 0 | 3 |

Note: Dimensions are in millimetres.

Table 9: Flatness tolerances : EN 10143 : 2006 : R_{eL} or $R_{p0.2} < 260N/mm^2$

| Tolerance class | Nominal width | Nominal thickness | | |
|-----------------|---------------|-------------------|----------|------|
| | | <0.7 | ≥0.7<1.6 | ≥1.6 |
| Normal | <1200 | 10 | 8 | 8 |
| | ≥1200 <1500 | 12 | 10 | 10 |
| | ≥1500 | 17 | 15 | 15 |
| Special (FS) | <1200 | 5 | 4 | 3 |
| | ≥1200 <1500 | 6 | 5 | 4 |
| | ≥1500 | 8 | 7 | 6 |

Notes:

1. The tolerances in this table represent maximum deviation from flatness when the sheet is placed on a horizontal surface.
2. Dimensions are in millimetres.

Table 10: Flatness tolerances : EN 10143 : 2006 : $R_{p0.2} ≥ 260N/mm^2$ and $< 360N/mm^2$ and grades DX51D and S550GD

| Tolerance class | Nominal width | Nominal thickness | | |
|-----------------|---------------|-------------------|----------|------|
| | | < 0.7 | ≥0.7<1.6 | ≥1.6 |
| Normal | <1200 | 13 | 10 | 10 |
| | ≥1200 <1500 | 15 | 13 | 13 |
| | ≥1500 | 20 | 19 | 19 |
| Special (FS) | <1200 | 8 | 6 | 5 |
| | ≥1200 <1500 | 9 | 8 | 6 |
| | ≥1500 | 12 | 10 | 9 |

Notes:

1. The tolerances in this table represent maximum deviation from flatness when the sheet is placed on a horizontal surface.
2. For $R_{p0.2} > 360N/mm^2$, please specify flatness tolerances at the time of the enquiry or order.
3. Dimensions are in millimetres.

Surface

Surface quality

Galvatite is available in surface quality A, B or C to EN 10327 : 2004 and EN 10326 : 2004.

The surface qualities shown below are not necessarily available in every dimensional combination for this product. Please consult Corus for more information.

Surface quality A: As coated surface

Imperfections such as small pits, differences in spangle size, dark spots, stripes and light passivation from the chemical treatment are permissible.

Surface quality B: Improved surface

This surface quality is obtained by temper rolling. To a small extent, imperfections are permissible, such as stretch-levelling breaks, skin-pass marks, scratches, indentations, spangle structure, zinc run-off marks and light passivation from chemical treatment. The surface has no pits.

Surface quality C: Best quality surface

This surface quality is obtained by temper rolling. The better side is suitable for the uniform appearance of a high-quality paint finish. The other side must at least conform to surface quality B.

Inspected side

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

Surface texture

All Galvatite products except those with a normal spangle (NA) finish are available in several surface textures. Unless the customer specifies otherwise, Corus will supply a matt surface texture.

Table 11 below shows the range of surface textures available from Corus.

Table 11: Roughness

| | $R_a(\mu\text{m})$ cut off 2.5mm | $R_a(\mu\text{m})$ cut off 0.8mm |
|--------------|-------------------------------------|-------------------------------------|
| Matt | 0.9-1.5 | 0.70-1.30 |
| Middle rough | 1.2-1.8 | 1.00-1.55 |

Surface treatment

Galvatite is available oiled, chemically passivated, or both.

Oiling (O)

The material surface can be oiled with preservative oil. Other kinds of oil may be available, depending upon your requirement.

Table 12 below shows the levels of oiling available. If no particular level of oiling is specified by the customer, a normal level will be applied.

Chemical passivation (C)

Chemical passivation, which includes chrome-free treatment, protects against the effects of humidity and thereby reduces the risk of white rust formation during shipment and storage.

Chrome-free passivation is available in coating finishes MA and MB. Please consult Corus for more information.

Chemical passivation and oiling (CO)

This combination of surface treatments increases the degree of protection against white rust.

Untreated (U)

Corus does not recommend that Galvatite be ordered in the untreated condition owing to the risk of white rust formation during shipment and storage. However, if untreated material is specified, it is supplied on the condition that the purchaser is responsible for any corrosion arising from material ordered in the untreated condition.

Table 12: Levels of oiling

| Coating type | Level of oiling | Approximately g/m ² /side |
|--------------|-----------------|--------------------------------------|
| Z | Light | 0.7 |
| Z/ZF | Normal | 1.1 |
| ZF | Heavy | 1.8 |

Galvatite for forming

Galvatite for cold forming offers a range that extends from bending and profiling qualities to extra deep drawing qualities.

Typical applications

- automotive components and body panels
- tubes
- domestic appliances
- steel furniture
- electrical goods
- domestic heating
- drums
- building components
- components for agricultural machinery

Standards

Galvatite for cold forming complies with European standard EN 10327 : 2004 and is available in the grades shown below.

EN 10327 : 2004

- DX51D+Z/+ZF
- DX52D+Z/+ZF
- DX53D+Z/+ZF
- DX54D+Z/+ZF
- DX56D+Z/+ZF
- DX57D+Z

Mechanical Properties

The values shown for the mechanical properties in table 13 below are for test pieces taken transverse to the rolling direction.

Chemical composition

Galvatite for cold forming meets the requirements of the cast analysis shown in table 14 below.

Dimensions

The width and thickness limits are shown in tables 15 and 16 on page 43. The minimum width is 900mm. Widths below this may be available after consultation.

The surface finishes, treatments and coating weights shown in the general section for Galvatite are not necessarily available in all the dimensional combinations for this product. Please consult Corus about your specific requirements.

Table 13: Mechanical properties : EN 10327 : 2004

| Grade | R_{eL} ⁵ (N/mm ²) | R_m (N/mm ²) | A_{80} (%) ² | r_{90} ^{3,4} | n_{90} ⁴ |
|-------------|--|----------------------------|---------------------------|-------------------------|-----------------------|
| | Min-Max | Min-Max | Min | Min | Min |
| DX51D+Z/+ZF | – | 270-500 | 22 | – | – |
| DX52D+Z/+ZF | 140-300 ¹ | 270-420 | 26 | – | – |
| DX53D+Z/+ZF | 140-260 | 270-380 | 30 | – | – |
| DX54D+Z | 120-220 | 260-350 | 36 | 1.6 | 0.18 |
| DX54D+ZF | 120-220 | 260-350 | 34 | 1.4 | 0.18 |
| DX56D+Z | 120-180 | 260-350 | 39 | 1.9 | 0.21 |
| DX56D+ZF | 120-180 | 260-350 | 37 | 1.7 | 0.20 |
| DX57D+Z | 120-170 | 260-350 | 41 | 2.1 | 0.22 |

Notes:

1. This range of values applies to skin-passed products only.
2. For thicknesses >0.5mm and ≤0.7mm (including coating), the minimum elongation after fracture is decreased by 2 units. For thicknesses ≤0.5mm, the reduction is 4 units.
3. For thicknesses greater than 1.5mm, the r_{90} value is decreased by 0.2 units.
4. For thicknesses less than or equal to 0.7mm (including coating), the r_{90} value is decreased by 0.2 units and the n_{90} value is decreased by 0.01 units.
5. If the yield point is not pronounced, values apply to the 0.2% proof strength ($R_{p0.2}$). If the yield strength is pronounced, values apply to the lower yield point (R_{eL}).

Table 14: Chemical composition: EN 10327 : 2004

| Grade | C | Si | Mn | P | S | Ti |
|------------|------|------|------|------|-------|------|
| | Max | Max | Max | Max | Max | Max |
| All grades | 0.12 | 0.50 | 0.60 | 0.10 | 0.045 | 0.30 |

Note: Values are in weight percentages.

Table 15: Dimensions**Coating type Z : Finishes NA¹, MA, MB, MC**

| Thickness | | Width | | | | | |
|-----------|------|---------|---------|---------|---------|---------|---------|
| | | Max | | | | | |
| ≥ | < | DX51D+Z | DX52D+Z | DX53D+Z | DX54D+Z | DX56D+Z | DX57D+Z |
| 0.40 | 0.50 | 1375 | 1375 | – | – | – | – |
| 0.50 | 0.55 | 1375 | 1375 | 1250 | 1250 | 1250 | 1250 |
| 0.55 | 0.65 | 1520 | 1570 | 1570 | 1570 | 1570 | 1570 |
| 0.65 | 0.70 | 1650 | 1640 | 1640 | 1640 | 1640 | 1640 |
| 0.70 | 0.80 | 1750 | 1650 | 1670 | 1670 | 1670 | 1670 |
| 0.80 | 0.90 | 1800 | 1650 | 1670 | 1670 | 1670 | 1670 |
| 0.90 | 0.95 | 1820 | 1650 | 1670 | 1670 | 1670 | 1670 |
| 0.95 | 1.00 | 1820 | 1650 | 1650 | 1650 | 1650 | 1650 |
| 1.00 | 1.25 | 1820 | 1650 | 1650 | 1650 | 1650 | – |
| 1.25 | 1.45 | 1820 | 1640 | 1650 | 1650 | 1650 | – |
| 1.45 | 1.50 | 1820 | 1640 | 1640 | 1640 | 1640 | – |
| 1.50 | 1.60 | 1750 | 1640 | 1640 | 1640 | 1640 | – |
| 1.60 | 1.65 | 1650 | 1640 | 1640 | 1640 | 1640 | – |
| 1.65 | 1.70 | 1650 | 1380 | 1380 | 1380 | 1380 | – |
| 1.70 | 1.80 | 1560 | 1380 | 1380 | 1380 | 1380 | – |
| 1.80 | 1.90 | 1450 | 1380 | 1380 | 1380 | 1380 | – |
| 1.90 | 2.00 | 1400 | 1380 | 1380 | 1380 | 1380 | – |
| 2.00 | 2.50 | 1375 | – | – | – | – | – |

Notes:

1. The maximum width for surface finish NA is 1375mm.
2. Please consult Corus about the availability of specific coating weights and surface finishes.
3. Dimensions are in millimetres.

Table 16: Dimensions**Coating type ZF : Finishes RA, RB, RC**

| Thickness | | Width | | | | |
|-----------|------|----------|----------|-----------------------|-----------------------|-----------------------|
| | | Max | | | | |
| ≥ | < | DX51D+ZF | DX52D+ZF | DX53D+ZF ¹ | DX54D+ZF ¹ | DX56D+ZF ¹ |
| 0.55 | 0.60 | 1490 | 1550 | 1550 | 1550 | 1550 |
| 0.60 | 0.65 | 1500 | 1550 | 1550 | 1550 | 1550 |
| 0.65 | 0.70 | 1500 | 1620 | 1620 | 1620 | 1620 |
| 0.70 | 0.75 | 1630 | 1650 | 1650 | 1650 | 1650 |
| 0.75 | 0.80 | 1760 | 1650 | 1650 | 1650 | 1650 |
| 0.80 | 0.95 | 1800 | 1650 | 1650 | 1650 | 1650 |
| 0.95 | 1.50 | 1800 | 1650 | 1620 | 1620 | 1620 |
| 1.50 | 1.60 | 1620 | 1650 | 1620 | 1620 | 1620 |
| 1.60 | 1.65 | 1620 | 1620 | 1620 | 1620 | 1620 |
| 1.65 | 1.70 | 1620 | 1360 | 1360 | 1360 | 1360 |
| 1.70 | 1.80 | 1530 | 1360 | 1360 | 1360 | 1360 |
| 1.80 | 1.90 | 1450 | 1360 | 1360 | 1360 | 1360 |
| 1.90 | 2.00 | 1380 | 1360 | 1360 | 1360 | 1360 |

Notes:

1. Surface finish RC is only available up to 1.6mm.
2. Dimensions are in millimetres.

Galvatite high-strength steel

Galvatite high-strength steel allows the user to increase the strength of the finished component or reduce the steel thickness, or both. It also offers corrosion resistance and good forming properties.

Typical applications

- automotive components
- cold-formed tubes
- building frames
- floor decking
- racking and shelving
- building components

Standard

Galvatite high-strength steel complies with EN 10292 : 2007 and is available in the grades and coatings shown in table 17 below.

Corus supplies four types of Galvatite high-strength steel.

Interstitial free

This is a re-phosphorised, interstitial-free steel that gains its strength by solid solution hardening. Its extremely low and tightly-controlled carbon content gives it excellent flexibility. Other elements such as nitrogen, sulphur and manganese are also tightly controlled. With its combination of high-strength and excellent formability, this steel is suitable for the most difficult automotive applications such as bodysides and exterior panels. It is available in the grades and coating types shown in table 17.

Bake hardening

Bake hardening steel gains its strength by solid solution hardening. It starts with good ductility, allowing it to be pressed into complex shapes. It then increases in strength after being heated in the automotive paint stoving process, giving it improved dent resistance and a higher strength in the final part. The improved dent resistance of bake hardening steel makes it particularly suitable for automotive body panels. It is available in the grades and coating types shown in table 17.

Low alloy (micro-alloyed)

Low alloy steel gains its strength by precipitation strengthening and grain refinement. This product combines high strength with good formability for automotive structural applications including side-members, cross-members, pillars and sills. The construction industry also uses this product. It is available in the grades and coating type shown in table 17.

Carbon manganese (CMN300)

Corus uses its modern manufacturing processes to produce tightly controlled properties in this carbon manganese steel. It is characterised by high tensile strength and a low ratio of yield strength to tensile strength. This, together with its good formability, makes it suitable for automotive structural applications including side members, cross-members, pillars and sills. It is available in the grade and coating type shown in table 17.

Mechanical properties

The values shown for the mechanical properties in table 18 on page 45 are for temper-rolled material and are for test pieces taken transverse to the rolling direction.

Chemical composition

Galvatite high-strength steel meets the requirements of the cast analysis in the standard, as shown in table 19 on page 45.

Dimensions

The width and thickness limits are shown in tables 20 and 21 on page 46. The minimum width for all products is 900mm. Widths below this may be available after consultation.

Table 17: Standard: EN 10292 : 2007

| Grade | Symbol for coating type |
|----------------------------------|-------------------------|
| Interstitial free | |
| HX180YD | Z, ZF |
| HX220YD | Z, ZF |
| Bake hardening | |
| HX180BD | Z, ZF |
| HX220BD | Z, ZF |
| HX260BD | Z |
| HX300BD | Z |
| Low alloy (micro-alloyed) | |
| HX260LAD | Z |
| HX300LAD | Z |
| HX340LAD | Z |
| Corus | |
| CMN300 | ZF |

Note: Where only one coating type is shown for a particular grade, please consult Corus about the availability of the other coating type.

Table 18: Mechanical properties: EN 10292 : 2007

| Grade | $R_{p0.2}$ (N/mm ²) | BH_2 (N/mm ²) | R_m (N/mm ²) | A_{80} (%) | r_{90} | n_{90} |
|----------------------------------|---------------------------------|-----------------------------|----------------------------|--------------|----------|----------|
| | Min-Max | Min | Min-Max | Min | Min | Min |
| Interstitial free | | | | | | |
| HX180YD ² | 180-240 | – | 340-400 | 34 | 1.7 | 0.18 |
| HX220YD ² | 220-280 | – | 340-420 | 32 | 1.5 | 0.17 |
| Bake hardening | | | | | | |
| HX180BD ² | 180-240 | 35 | 290-360 | 34 | 1.5 | 0.16 |
| HX220BD ² | 220-280 | 35 | 320-400 | 32 | 1.2 | 0.15 |
| HX260BD | 260-320 | 35 | 360-440 | 28 | – | – |
| HX300BD | 300-360 | 35 | 400-480 | 26 | – | – |
| Low alloy (micro-alloyed) | | | | | | |
| HX260LAD | 260-330 | – | 350-430 | 26 | – | – |
| HX300LAD | 300-380 | – | 380-480 | 23 | – | – |
| HX340LAD | 340-420 | – | 410-510 | 21 | – | – |
| Corus | | | | | | |
| CMN300 | 300-360 | – | 400-480 | 26 | – | – |

Notes:

1. These values apply for three months for bake-hardening grades and six months for all other grades, from the date the works makes the material available.
2. For iron-zinc alloy coatings (ZF), the A_{80} (%) values are lowered by 2 units and the r_{90} values are lowered by 0.2.

Table 19: Chemical composition: EN 10292 : 2007

| Grade | C | Mn | Si | Al | P | S | Ti ¹ | Nb ¹ |
|----------------------------------|------|------|------|-------|-------|-------|-----------------|-----------------|
| | Max | Max | Max | Min | Max | Max | Max | Max |
| Interstitial free | | | | | | | | |
| HX180YD | 0.01 | 0.70 | 0.50 | – | 0.060 | 0.025 | 0.120 | 0.09 |
| HX220YD | 0.01 | 0.90 | 0.20 | – | 0.080 | 0.025 | 0.120 | 0.09 |
| Bake hardening | | | | | | | | |
| HX180BD | 0.10 | 0.70 | 0.15 | – | 0.060 | 0.025 | 0.12 | 0.09 |
| HX220BD | 0.10 | 0.70 | 0.50 | 0.015 | 0.080 | 0.025 | 0.12 | 0.09 |
| HX260BD | 0.10 | 0.80 | 0.50 | 0.015 | 0.100 | 0.025 | 0.12 | 0.09 |
| HX300BD | 0.10 | 0.80 | 0.50 | 0.015 | 0.120 | 0.025 | 0.12 | 0.09 |
| Low alloy (micro-alloyed) | | | | | | | | |
| HX260LAD | 0.12 | 0.60 | 0.50 | 0.015 | 0.030 | 0.025 | 0.120 | 0.09 |
| HX300LAD | 0.11 | 1.00 | 0.50 | 0.015 | 0.030 | 0.025 | 0.150 | 0.09 |
| HX340LAD | 0.11 | 1.00 | 0.50 | 0.015 | 0.030 | 0.025 | 0.150 | 0.09 |
| Corus | | | | | | | | |
| CMN300 | 0.16 | 1.10 | 0.03 | 0.070 | 0.024 | 0.012 | – | – |

Notes:

1. These elements may be used individually or in combination. Vanadium and boron may also be added, but the combined level of Ti+Nb+V shall not exceed 0.22% by weight.
2. Values are in weight percentages.

Table 20: Dimensions: Zinc coatings

| Thickness | | Width | | | | | | | | |
|-----------|------|-------------------|---------------|----------------|---------------|---------------|---------------|----------------|----------------|----------------|
| | | Max | | | | | | | | |
| ≥ | < | Interstitial free | | Bake Hardening | | | | Low alloy | | |
| | | HX180 YD+Z | HX220 YD+Z | HX180 BD+Z | HX220 BD+Z | HX260 BD+Z | HX300 BD+Z | HX260 LAD+Z | HX300 LAD+Z | HX340 LAD+Z |
| 0.55 | 0.65 | – | – | 1490 | – | – | – | – | – | – |
| 0.65 | 0.70 | 1270 | 1270 | 1500 | – | – | – | – | – | – |
| 0.70 | 0.75 | 1445 | 1445 | 1630 | 1289 | – | – | 1400 | – | – |
| 0.75 | 0.80 | 1467 | 1467 | 1760 | 1289 | – | – | 1400 | – | – |
| 0.80 | 0.90 | 1482 | 1482 | 1800 | 1482 | – | – | 1400 | – | 1400 |
| 0.90 | 1.10 | 1389 | 1389 | 1800 | 1389 | 1400 | – | 1400 | 1300 | 1400 |
| 1.10 | 1.20 | 1389 | 1389 | 1800 | 1389 | 1400 | 1300 | 1400 | 1300 | 1400 |
| 1.20 | 1.50 | 1400 | 1400 | 1800 | 1400 | 1400 | 1300 | 1400 | 1300 | 1400 |
| 1.50 | 1.60 | 1400 | 1400 | 1620 | 1400 | 1400 | 1300 | 1400 | 1300 | 1400 |
| 1.60 | 1.70 | 1400 | 1400 | 1620 | 1400 | – | 1300 | – | 1300 | 1400 |
| 1.70 | 1.80 | 1400 | 1400 | 1530 | 1400 | – | 1300 | – | 1300 | 1400 |
| 1.80 | 1.90 | 1400 | 1400 | 1450 | 1400 | – | 1300 | – | 1300 | 1400 |
| 1.90 | 2.00 | 1400 | 1400 | 1380 | 1400 | – | 1300 | – | 1300 | 1400 |

Note: Dimensions are in millimetres.

Table 21: Dimensions: Iron-zinc alloy coatings

| Thickness | | Width | | | |
|-----------|------|------------|------------|------------|--------|
| | | Max | | | |
| ≥ | < | HX180YD+ZF | HX220YD+ZF | HX220BD+ZF | CMN300 |
| 0.60 | 0.65 | – | – | 1490 | – |
| 0.65 | 0.70 | 1270 | 1270 | 1490 | – |
| 0.70 | 0.75 | 1445 | 1445 | 1490 | 1400 |
| 0.75 | 0.80 | 1467 | 1467 | 1490 | 1400 |
| 0.80 | 0.90 | 1482 | 1482 | 1490 | 1400 |
| 0.90 | 1.20 | 1389 | 1389 | 1389 | 1400 |
| 1.20 | 1.60 | 1400 | 1400 | 1400 | 1400 |
| 1.60 | 2.00 | 1400 | 1400 | 1400 | – |

Note: Dimensions are in millimetres.

Galvatite structural steel

Galvatite structural steel has guaranteed minimum strength.

Typical applications

- Roof decking
- Domestic appliances
- Steel furniture
- Agricultural applications
- Building components including:
 - Steel framing
 - Infills
 - Dry lining
 - Purlins
 - Mezzanine flooring
 - Composite floor decking
 - HEVAC
 - Nail plates
 - Lintels
 - Angle bead
 - Access flooring

Standards

Galvatite structural steel complies with European standard EN 10326 : 2004 and is available in the grades shown below. Corus also offers S390GD+Z and S450GD+Z, which are not in EN 10326 : 2004.

EN 10326 : 2004

- S220GD+Z
- S250GD+Z
- S280GD+Z
- S320GD+Z
- S350GD+Z
- S550GD+Z

Corus

- S390GD+Z
- S450GD+Z

Mechanical properties

The values shown for the mechanical properties in table 22 below are for test pieces taken in the rolling direction.

Chemical composition

Galvatite structural steel meets the requirements of the cast analysis shown in table 23 below.

Dimensions

The width and thickness limits are shown in table 24 on page 48. This table includes dimensions for S390GD+Z and S450GD+Z, which are grades not included in EN 10326 : 2004. The minimum width is 900mm. Widths below this may be available after consultation.

Table 22: Mechanical properties

| EN 10326 : 2004 | $R_{p0.2}$ (N/mm ²) | R_m (N/mm ²) | A_{80} (%) |
|-----------------|---------------------------------|----------------------------|--------------|
| Grade | Min | Min | Min |
| S220GD+Z | 220 | 300 | 20 |
| S250GD+Z | 250 | 330 | 19 |
| S280GD+Z | 280 | 360 | 18 |
| S320GD+Z | 320 | 390 | 17 |
| S350GD+Z | 350 | 420 | 16 |
| S550GD+Z | 550 | 560 | – |
| Corus | | | |
| S390GD+Z | 390 | 470 | 14 |
| S450GD+Z | 450 | 500 | 14 |

Note: For thicknesses less than or equal to 0.7mm (including coating), the minimum elongation after fracture is decreased by 2 units.

Table 23: Chemical composition: EN 10326 : 2004

| Grade | C | Mn | P | S | Si |
|------------|-----|-----|-----|-------|-----|
| | Max | Max | Max | Max | Max |
| All grades | 0.2 | 1.7 | 0.1 | 0.045 | 0.6 |

Notes:

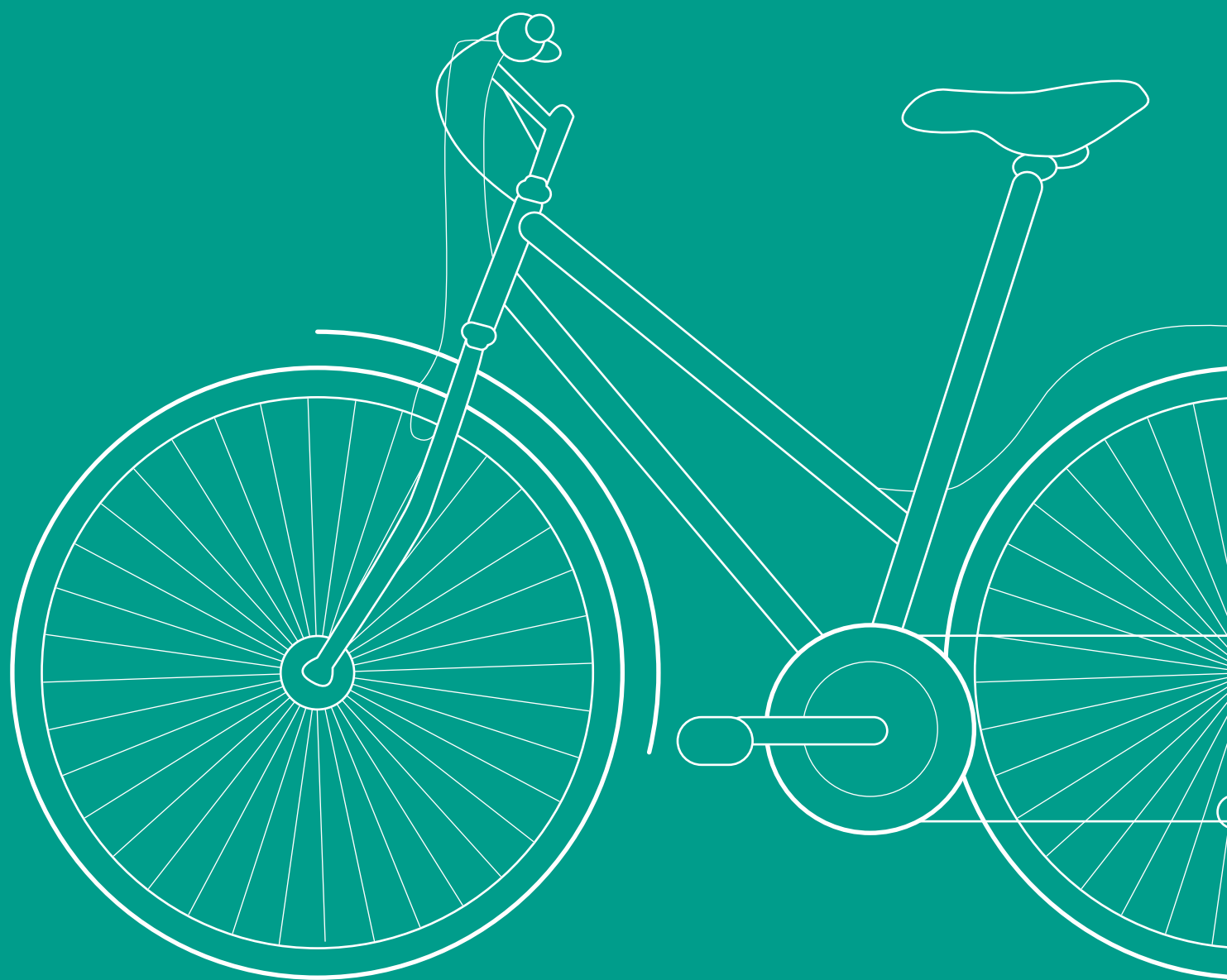
1. The chemical composition shown in this table also applies to S390GD+Z and S450GD+Z.
2. Values are in weight percentages.

Table 24: Dimensions

| Thickness | | Width | | | | | | | |
|-----------|------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | Max | | | | | | | |
| ≥ | < | S220GD+Z | S250GD+Z | S280GD+Z | S320GD+Z | S350GD+Z | S390GD+Z | S450GD+Z | S550GD+Z |
| 0.40 | 0.45 | 1375 | 1375 | 1375 | 1375 | 1375 | – | – | 1070 |
| 0.45 | 0.55 | 1375 | 1375 | 1375 | 1375 | 1375 | – | – | 1220 |
| 0.55 | 0.60 | 1520 | 1520 | 1520 | 1520 | 1520 | – | – | 1220 |
| 0.60 | 0.65 | 1525 | 1525 | 1525 | 1525 | 1525 | – | – | 1220 |
| 0.65 | 0.70 | 1650 | 1650 | 1650 | 1650 | 1650 | – | – | 1220 |
| 0.70 | 0.75 | 1700 | 1700 | 1650 | 1650 | 1650 | 1325 | 1250 | 1220 |
| 0.75 | 0.80 | 1800 | 1700 | 1650 | 1650 | 1650 | 1325 | 1250 | 1220 |
| 0.80 | 1.00 | 1800 | 1800 | 1650 | 1650 | 1650 | 1325 | 1323 | 1220 |
| 1.00 | 1.10 | 1800 | 1800 | 1650 | 1650 | 1650 | 1325 | 1323 | – |
| 1.10 | 1.25 | 1800 | 1800 | 1650 | 1650 | 1650 | 1345 | 1323 | – |
| 1.25 | 1.30 | 1800 | 1800 | 1520 | 1520 | 1520 | 1345 | 1323 | – |
| 1.30 | 1.50 | 1800 | 1800 | 1520 | 1520 | 1520 | 1500 | 1323 | – |
| 1.50 | 1.60 | 1750 | 1750 | 1520 | 1520 | 1520 | 1500 | 1323 | – |
| 1.60 | 1.70 | 1650 | 1650 | 1520 | 1520 | 1520 | 1500 | 1323 | – |
| 1.70 | 1.80 | 1550 | 1550 | 1520 | 1520 | 1520 | 1500 | 1323 | – |
| 1.80 | 1.85 | 1450 | 1450 | 1520 | 1520 | 1520 | 1400 | 1323 | – |
| 1.85 | 1.90 | 1450 | 1450 | 1465 | 1465 | 1465 | 1400 | 1323 | – |
| 1.90 | 1.95 | 1400 | 1400 | 1465 | 1465 | 1465 | 1400 | 1323 | – |
| 1.95 | 2.00 | 1400 | 1400 | 1395 | 1395 | 1395 | 1400 | 1323 | – |
| 2.00 | 2.05 | 1375 | 1375 | 1375 | 1375 | 1375 | 1250 | 1275 | – |
| 2.05 | 2.50 | 1375 | 1375 | 1375 | 1375 | 1375 | 1275 | 1275 | – |

Note: Dimensions are in millimetres.

General information



General information

This section provides information about further aspects of Corus' products and services.

Quality

We are third-party approved to ISO/TS 16949 : 2002, the global automotive standard for quality management systems.

Finishing touches

Labels

Products bear an ODETTE transport label, which contains information about the product and its destination, both in printed characters and bar code.

Packing

We can adapt packing to suit your needs.

The standard packs described below are designed to suit the method of transport and the destination.

Hot-rolled and pickled & oiled coils

– Plain banded

The coil has at least two circumferential bands and one radial band. We can add additional banding on request.

– Pickled and oiled

The coil is banded as above, but offers edge protection and paper wrapping on request.

– Fully protected

The coil is secured with internal bands and is paper-wrapped, fully metal-wrapped with galvanised sheets, and supplied with fluted metal edge protection and a plastic bore protector. This pack is externally banded with three circumferential and four radial bands.

Cold-rolled and coated coils

– Plain banded

The coil has one circumferential band, at least two radial bands and can be supplied with edge protection on request.

– Paper wrapped

The coil has one circumferential band and four radial bands, plus bore protection and crane protection.

– Film wrapped

The coil is machine-wrapped and has one circumferential band, bore protection and crane protection.

– Fully protected

The coil is secured with one circumferential band and is paper or film-wrapped. It is then fully metal-wrapped and secured with three circumferential bands and six radial bands.

Transport

We are highly experienced in arranging appropriate transport, including the necessary documentation.

Based on the modes of transport acceptable to you and on the coil weights in your order, we calculate the most suitable arrangements. The mode of transport is an important consideration in determining coil weight. The maximum weight of coils transported by road is limited by the maximum load weight for each vehicle.

Order item weights

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: $\pm 10\%$

20 tonnes to under 50 tonnes: $\pm 15\%$

Under 20 tonnes: $\pm 25\%$

Inspection documents

We provide inspection documents to EN 10204 : 2004. The criteria for the more common certificates are shown below.

2.1 Certificate of compliance with order

This document certifies that the products supplied comply with the specification ordered.

2.2 Test report with cast analysis only or with mechanical properties and cast analysis

This document certifies that the product supplied complies with the specification ordered. It provides non-specific test results, i.e. based upon Corus' procedures for determining that the manufacturing process produces the product specified in the order.

3.1B Inspection certificate

Corus' authorised representative reports the test results based upon the specific product supplied.

Service and support

We are focused on delivering world-class customer service and support.

Service

Close relationships with our customers are at the heart of our business.

Delivery

We carefully manage the supply chain to deliver your material when you want it. Under our *Speedstock* service, we can offer certain popular specifications in less than normal lead time.

To link with trading partners, we use UN/EDIFACT EDI messages, which cater for delivery schedules, Advanced Shipping Notification, invoices and other services.

Customers can manage many aspects of their orders using our e-SURE on-line order management system.

Technical support

Our highly-trained support engineers can work with you on concept validation, material selection and vetting of parts, all to ensure you make optimum use of the material's properties and produce the best possible product.

This technical support carries on after delivery. It ensures that the material continues to meet your requirements. We offer a rapid problem-solving resource and look for ways to improve the in-service performance of the product. We also ensure that the material complies with all applicable legislative requirements and environmental directives.

Our technical helpline can supply information about specifications, applications, performance, health and safety and much more.

Meanwhile, our product and market development programmes help anticipate future market requirements that will help you compete. Our research and development is creating new and better products and ways of using them.

Information

Information about our business, its products and services, useful contacts and product literature is available on our web site at www.corusgroup.com/stripproductsuk.

Corus service centres

Our extensive European service centre network provides innovative material solutions to all sectors of industry. These service centres create bespoke packages of products using the latest processing technologies, including laser cutting and welding, multi-strand, trapezoidal and press blanking, powder coating, slitting, sawing and profiling. The products are supplied cut and finished to exact size and specification, ready for immediate fabrication or assembly. The service is supported by the latest e-commerce, stock management and logistics facilities, which ensure the efficient operation of the supply chain, from initial order to delivery.

Health and safety

Product health and safety data sheets for the products in this catalogue are available from our web site. They comply with the Chemicals (Hazard Information and Packaging for Supply) Regulations, which ensure compliance with the EU Dangerous Substances and Dangerous Preparations Directives.

The environment

We recognise our environmental responsibilities.

Our commitment is to minimise the environmental impact of our operations and products by adopting sustainable practices and by continuously improving our environmental performance. For more information about Corus Strip Products UK and the environment, see the section entitled *The environment* on our web site at www.corusgroup.com/stripproductsuk.

Contacting us

We have offices in many countries around the world, each with in-depth knowledge of the local markets and access to all our commercial, technical and distributive resources.

For full details of our offices and agents worldwide, visit: www.corusgroup.com.

Sales to service centres

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F: +44 (0)121 609 5050

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UK

Automotive sector

T: +44 (0)1633 755201
F: +44 (0)1633 755287

Tube, re-roller and general engineering sectors

T: +44 (0)1633 755369
F: +44 (0)1633 755002

Drum and radiator sectors

T: +44 (0)1633 755180
F: +44 (0)1633 755002

Export sales

T: +44 (0)1633 755137
F: +44 (0)1633 755002

Aluminised products

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F: +44 (0)1633 755287

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Publications

This catalogue and other publications are available in the publications section of our web site at:
www.corusgroup.com/stripproductsuk

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Glossary of symbols

| Symbol | Definition | Symbol | Definition |
|-----------------|---|-----------|--|
| ≤ | Less than or equal to | 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. |
| < | Less than | \bar{r} | The weighted average Note: The weighted average value is calculated using the formula: $r = \frac{(r_0+r_{90}+2r_{45})}{4}$ |
| ≥ | Greater than or equal to | 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. |
| > | Greater than | \bar{n} | The weighted average Note: the weighted average is calculated using the formula: $n = \frac{(n_0+n_{90}+2n_{45})}{4}$ |
| R _{eL} | Lower yield strength: lowest value of stress during plastic yielding, ignoring any initial transient effects. | BH | Bake hardening Steels that demonstrate an increase in proof strength following heating in the region of 170°C for 20 minutes. |
| R _{eH} | Upper yield strength: value of stress at the moment when the first decrease in force is observed. | LA | Low-alloy/micro-alloyed |
| R _p | Proof strength, non-proportional extension: stress at which a non-proportional extension is equal to a specified percentage of the extensometer gauge length. Note: The symbol used is followed by a suffix, giving the prescribed percentage, e.g. R _{p0,2} | Y | Interstitial free |
| R _m | Tensile strength: stress corresponding to the maximum force (F _m). | D | Intended for hot-dip coating |
| A | Percentage elongation after fracture: permanent elongation of the gauge length after fracture, expressed as a percentage of the original gauge length. Note: In the case of proportional test pieces, only if the original gauge length is other than 5.65√S ₀ , where S ₀ is the original cross-sectional area of the parallel length, the symbol A should be supplemented by an index indicating the coefficient of proportionality used. 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√S ₀ Proportional test piece L ₀ =80mm Non-proportional test piece | JR | A longitudinal Charpy V-notch impact of 27J at 20°C. |
| 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. | J2 | A longitudinal Charpy V-notch impact of 27J at -20°C. |
| | | J0 | A longitudinal Charpy V-notch impact of 27J at 0°C. |
| | | +AR | Supply condition as rolled |

www.corusgroup.com

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