







Hot Rolled Steel


| Delivery range in mm | Coils  | Slit strips  | Cut-to-length sheets  |
|----------------------|--|--|---|
| Thickness | 1,5 - 4 | 1,5 - 4 | 1,5 - 4 |
| Width | 400 - 1650 | 30 - 1650 | 200 - 1650 |
| Length | N/A | N/A | 220 - 6000 |

Tolerances for strips and sheets: EN 10051. Finer tolerances and special edge formation available by arrangement.

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 **Soft grades – Continuously hot-rolled strip and sheet of soft steels for cold forming acc. to EN 10111 : 2008**

| Chemical composition (Melt analysis) | | | | | |
|--------------------------------------|--------------|--------|--------|--------|--------|
| Steel grade/type | | C | Mn | P | S |
| Code | Material no. | max. % | max. % | max. % | max. % |
| DD11 | 1.0332 | 0.12 | 0.60 | 0.045 | 0.045 |
| DD12 | 1.0398 | 0.10 | 0.45 | 0.035 | 0.035 |
| DD13 | 1.0335 | 0.08 | 0.40 | 0.030 | 0.030 |
| DD14 | 1.0389 | 0.08 | 0.35 | 0.025 | 0.025 |

| Mechanical properties (lat.) | | | | | | | | |
|------------------------------|--------------|-------------------------|-------------------------|-------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| Steel grade/type | | $R_{el}^{1)}$ | | Rm | Min. fracture elongation | | | |
| | | | | | $L_0 = 80 \text{ mm}$ | | $L_0 = 5,65 \sqrt{S_0}$ | |
| | | $1,0 \text{ mm} \leq e$ | $2,0 \text{ mm} \leq e$ | max. | $1,0 \text{ mm} \leq e$ | $1,5 \text{ mm} \leq e$ | $2,0 \text{ mm} \leq e$ | $3,0 \text{ mm} \leq e$ |
| Code | Material no. | N/mm ² | N/mm ² | N/mm ² | % | % | % | % |
| DD11 | 1.0332 | 170 – 360 | 170 – 340 | 440 | 22 | 23 | 24 | 28 |
| DD12 | 1.0398 | 170 – 340 | 170 – 320 | 420 | 24 | 25 | 26 | 30 |
| DD13 | 1.0335 | 170 – 330 | 170 – 310 | 400 | 27 | 28 | 29 | 33 |
| DD14 | 1.0389 | 170 – 310 | 170 – 290 | 380 | 30 | 31 | 32 | 36 |




 **Construction steels – Hot-rolled products of unalloyed construction steels with values for notch impact strength acc. to EN 10025 : 2019**

| Chemical composition after melt analysis for flat and long products made of steel types with values for notch impact strength | | | | | | | | |
|---|--------------|--------|--------|--------|--------|--------|----------------|--------|
| Steel grade/type | | C | Si | Mn | P | S | N _i | Cu |
| Code | Material no. | % max. | % max. | % max. | % max. | % max. | % max. | % max. |
| S235JR | 1.0038 | 0.17 | – | 1.40 | 0.035 | 0.035 | 0.012 | 0.55 |
| S235J0 | 1.0114 | 0.17 | – | 1.40 | 0.030 | 0.030 | 0.012 | 0.55 |
| S235J2 | 1.0117 | 0.17 | – | 1.40 | 0.025 | 0.025 | – | 0.55 |
| S275JR | 1.0044 | 0.21 | – | 1.50 | 0.035 | 0.035 | 0.012 | 0.55 |
| S275J0 | 1.0143 | 0.18 | – | 1.50 | 0.030 | 0.030 | 0.012 | 0.55 |
| S275J2 | 1.0145 | 0.18 | – | 1.50 | 0.025 | 0.025 | – | 0.55 |
| S355JR | 1.0045 | 0.24 | 0.55 | 1.60 | 0.035 | 0.035 | 0.012 | 0.55 |
| S355J0 | 1.0553 | 0.20 | 0.55 | 1.60 | 0.030 | 0.030 | 0.012 | 0.55 |
| S355J2 | 1.0577 | 0.20 | 0.55 | 1.60 | 0.025 | 0.025 | – | 0.55 |
| S355K2 | 1.0596 | 0.20 | 0.55 | 1.60 | 0.025 | 0.025 | – | 0.55 |

¹⁾ If the product has no pronounced yield point, $R_{p0.2}$ must be used instead of R_{el} .






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| Mechanical properties | | | | | | | | | | | | | | | | | |
|-----------------------|--------------|---|---|-----------|-----------|-------------------------------|---|----------------|----------------|----------------|----------------|---|--------------|---------------|----------------|----------------|----------------|
| Steel grade/type | | Minimum yield point $R_{eh}^{(1)}$ N/mm ² nominal thickness mm | Tensile strength $R_m^{(1)}$ N/mm ² | | | Sample position ¹⁾ | Min. fracture elongation ¹⁾ | | | | | | | | | | |
| Code | Material no. | | ≤ 4 | < 3 | ≥ 3 - ≤ 4 | | $L_0 = 80$ mm Thickness nominalna mm | | | | | $L_0 = 5,65 \sqrt{S_0}$ Thickness nominalna mm | | | | | |
| | | | | | | | ≤ 1 | > 1.0 ≤ 1.5 | > 1.5 ≤ 2.0 | > 2.0 ≤ 2.5 | > 2.5 ≤ 3.0 | ≥ 30 ≤ 40 | > 40 ≤ 63 | > 63 ≤ 100 | > 100 ≤ 150 | > 150 ≤ 250 | > 250 ≤ 400 |
| S235JR | 1.0038 | 235 | 390 - 510 | 360 - 510 | l | 17 | 18 | 19 | 20 | 21 | 26 | 25 | 24 | 22 | 21 | 21 | |
| S235JO | 1.0114 | 235 | 390 - 510 | 360 - 510 | t | 15 | 16 | 17 | 18 | 19 | 24 | 23 | 22 | 22 | 21 | 21 | |
| S235J2 | 1.0117 | 235 | 390 - 510 | 360 - 510 | - | 15 | 16 | 17 | 18 | 19 | 24 | 23 | 22 | 22 | 21 | 21 | |
| S275JR | 1.0044 | 275 | 430 - 580 | 410 - 560 | - | 15 | 16 | 17 | 18 | 19 | 23 | 22 | 21 | 19 | 18 | 18 | |
| S275JO | 1.0143 | 275 | 430 - 580 | 410 - 560 | l | 13 | 14 | 15 | 16 | 17 | 21 | 20 | 19 | 19 | 18 | 18 | |
| S275J2 | 1.0145 | 275 | 430 - 580 | 410 - 560 | t | 13 | 14 | 15 | 16 | 17 | 21 | 20 | 19 | 19 | 18 | 18 | |
| S355JR | 1.0045 | 355 | 510 - 680 | 470 - 630 | - | 14 | 15 | 16 | 17 | 18 | 22 | 21 | 20 | 18 | 17 | 17 | |
| S355JO | 1.0553 | 355 | 510 - 680 | 470 - 630 | - | 12 | 13 | 14 | 15 | 16 | 20 | 19 | 18 | 18 | 17 | 17 | |
| S355J2 | 1.0577 | 355 | 510 - 680 | 470 - 630 | l | 14 | 15 | 16 | 17 | 18 | 22 | 21 | 20 | 18 | 17 | 17 | |
| S355K2 | 1.0596 | 355 | 510 - 680 | 470 - 630 | t | 12 | 13 | 14 | 15 | 16 | 20 | 19 | 18 | 18 | 17 | 17 | |

¹⁾ For sheet, strip and wide flats in widths > 600 mm, the direction lateral (t) means transverse to roller direction. For all other products, the values are for roller direction (l).

| Mechanical properties / Chemical composition | | | | | | | | | | | | | | | | | |
|--|--------------|---|---|-----------|-------------|-------------------------------|---|----------------|----------------|----------------|----------------|-------------------------|-------------|-------------|-------------|---|--|
| Steel grade/type | | Minimum yield point $R_{eh}^{(1)}$ N/mm ² nominal thickness mm | Tensile strength $R_m^{(1)}$ N/mm ² nominal thickness mm | | | Sample position ¹⁾ | Min. fracture elongation ¹⁾ | | | | | | | | | | |
| Code | Material no. | | ≤ 4.5 | < 3 | ≥ 3 - ≤ 4.5 | | $L_0 = 80$ mm Thickness nominalna mm | | | | | $L_0 = 5,65 \sqrt{S_0}$ | | | | | |
| | | | | | | | ≤ 1 | > 1.0 ≤ 1.5 | > 1.5 ≤ 2.0 | > 2.0 ≤ 2.5 | > 2.5 ≤ 3.0 | ≥ 3.0 ≤ 4.0 | P % max. | S % max. | N % max. | | |
| S 185 | 1.0035 | 185 | 310 - 540 | 290 - 510 | lt | 10 | 11 | 12 | 13 | 14 | 18 | - | - | - | - | - | |
| E 295 | 1.0050 | 295 | 490 - 660 | 470 - 610 | lt | 12 | 13 | 14 | 15 | 16 | 20 | 0.045 | 0.045 | 0.012 | - | - | |
| E 335 | 1.0060 | 335 | 590 - 770 | 570 - 710 | lt | 8 | 9 | 10 | 11 | 12 | 16 | 0.045 | 0.045 | 0.012 | - | - | |
| E 360 | 1.0070 | 360 | 690 - 900 | 670 - 830 | lt | 4 | 5 | 6 | 7 | 8 | 11 | 0.045 | 0.045 | 0.012 | - | - | |



Microalloyed grades – hot-rolled flat products of steels with high yield point for cold forming acc. to EN 10149 : 2013

| Chemical composition (melt analysis) of thermo-mechanically rolled steels | | | | | | | | | | | | | |
|---|--------------|-------------|--------------|--------------|-------------|-------------|--------------------------------|--------------------|--------------------|--------------------|--------------|-------------|--|
| Steel grade/type | | C % max. | Mn % max. | Si % max. | P % max. | S % max. | Al _{gesamt} % max. | Nb % max. | V % max. | Ti % max. | Mo % max. | B % max. | |
| Code | Material no. | | | | | | | | | | | | |
| S315MC | 1.0972 | 0.12 | 1.30 | 0.50 | 0.025 | 0.020 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.15 ²⁾ | - | - | |
| S355MC | 1.0976 | 0.12 | 1.50 | 0.50 | 0.025 | 0.020 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.15 ²⁾ | - | - | |
| S420MC | 1.0980 | 0.12 | 1.60 | 0.50 | 0.025 | 0.015 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.15 ²⁾ | - | - | |
| S460MC | 1.0982 | 0.12 | 1.60 | 0.50 | 0.025 | 0.015 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.15 ²⁾ | - | - | |
| S500MC | 1.0984 | 0.12 | 1.70 | 0.50 | 0.025 | 0.015 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.15 ²⁾ | - | - | |
| S550MC | 1.0986 | 0.12 | 1.80 | 0.50 | 0.025 | 0.015 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.15 ²⁾ | - | - | |
| S600MC | 1.8969 | 0.12 | 1.90 | 0.50 | 0.025 | 0.015 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.22 ²⁾ | 0.50 | 0.005 | |
| S650MC | 1.8976 | 0.12 | 2.00 | 0.60 | 0.025 | 0.015 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.22 ²⁾ | 0.50 | 0.005 | |
| S700MC | 1.8974 | 0.12 | 2.10 | 0.60 | 0.025 | 0.015 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.22 ²⁾ | 0.50 | 0.005 | |
| S900MC | 1.8798 | 0.20 | 2.20 | 0.60 | 0.025 | 0.010 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.25 ²⁾ | 1.00 | 0.005 | |
| S960MC | 1.8799 | 0.20 | 2.20 | 0.60 | 0.025 | 0.010 | 0.015 | 0.09 ²⁾ | 0.20 ²⁾ | 0.25 ²⁾ | 1.00 | 0.005 | |

¹⁾ The values for the tensile test are those determined for longitudinal samples.

²⁾ The sum of Nb, V and Ti must not exceed 0.22 %.

| Mechanical properties of thermo-mechanically rolled steels (long.) | | | | | |
|--|--------------|---|---|---|--------------------------------|
| Steel grade/type | | Upper yield point $R_{eH}^{(1)}$ N/mm ² min | Tensile strength $R_m^{(1)}$ N/mm ² | Fracture elongation, A ¹⁾ % min. nominal thickness in mm | |
| Code | Material no. | | | < 3 $L_0 = 80$ mm | ≥ 3 $L_0 = 5,65 \sqrt{S_0}$ |
| S315MC | 1.0972 | 315 | 390 - 510 | 20 | 24 |
| S355MC | 1.0976 | 355 | 430 - 550 | 19 | 23 |
| S420MC | 1.0980 | 420 | 480 - 620 | 16 | 19 |
| S460MC | 1.0982 | 460 | 520 - 670 | 14 | 17 |
| S500MC | 1.0984 | 500 | 550 - 700 | 12 | 14 |
| S550MC | 1.0986 | 550 | 600 - 760 | 12 | 14 |
| S600MC | 1.8969 | 600 | 650 - 820 | 11 | 13 |
| S650MC | 1.8976 | 650 ³⁾ | 700 - 880 | 10 | 12 |
| S700MC | 1.8974 | 700 ³⁾ | 750 - 950 | 10 | 12 |
| S900MC | 1.8798 | 900 | 930 - 1.200 | 7 | 8 |
| S960MC | 1.8799 | 960 | 980 - 1.250 | 6 | 7 |

¹⁾ For sheet, strip and wide flats in widths < 600 mm, the direction lateral (t) means transverse to roller direction. For all other products, the values are for roller direction (l). In the case of sheets used for the production of hot-rolled patterned sheets, the elongation applies only to the base sheet and not to the final hot rolled patterned sheets.