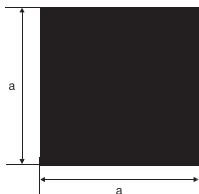


ΕΛΑΣΤΡΟΝ

ΧΑΛΥΒΟΥΡΓΙΚΑ ΠΡΟΪΟΝΤΑ

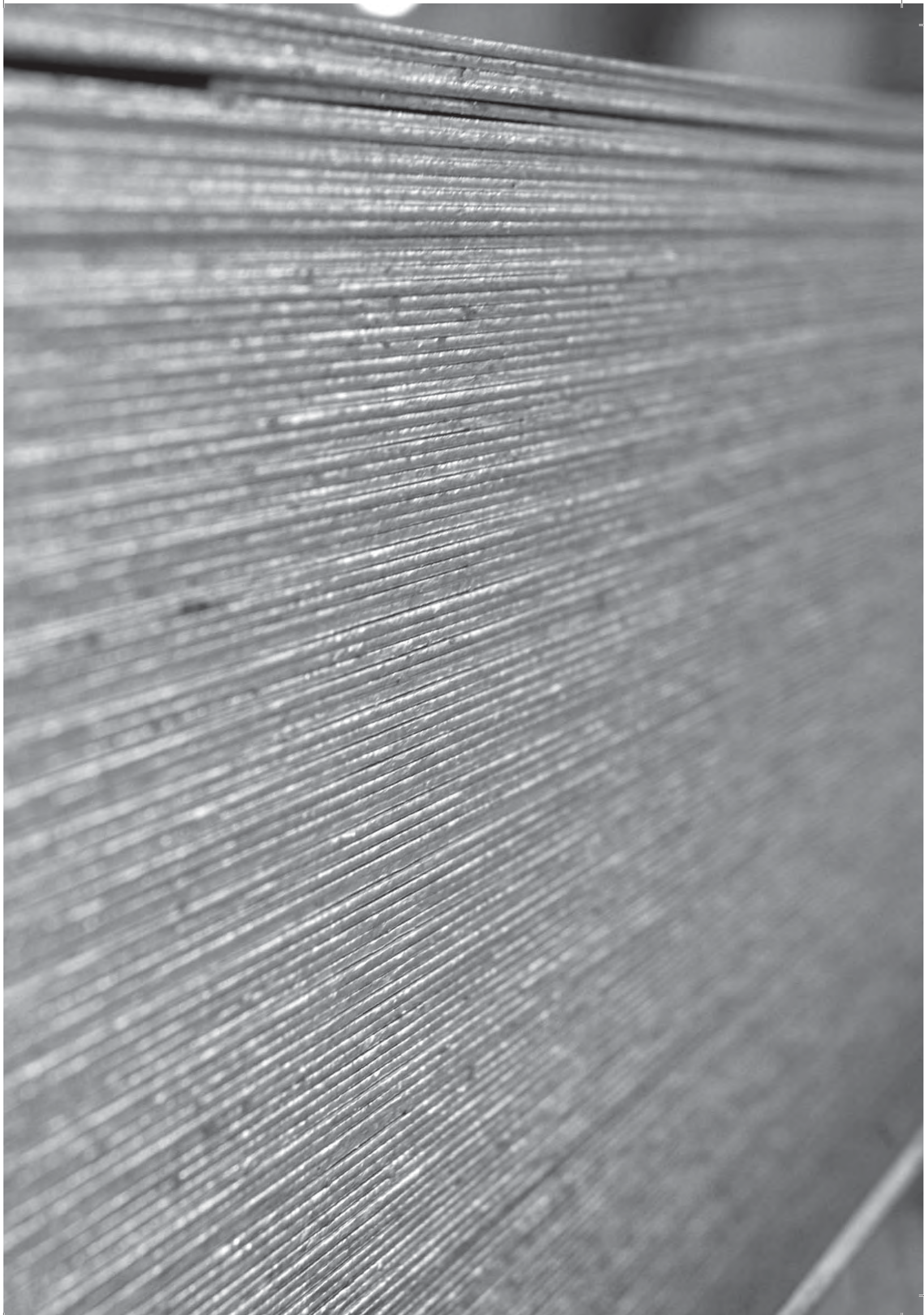
ΤΕΤΡΑΓΩΝΑ (κατά DIN 1014) S235 (EN 10025)



| Πλευρά | Βάρος | Διατομή | Επιφάνεια |
|--------|----------|-----------------|--------------------|
| d (mm) | G (kg/m) | cm ² | cm ² /m |
| 8 | 0,502 | 0,64 | 320 |
| 10 | 0,785 | 1,00 | 400 |
| 12 | 1,13 | 1,44 | 480 |
| 13 | 1,33 | 1,69 | 520 |
| 14 | 1,54 | 1,96 | 560 |
| 15 | 1,77 | 2,25 | 600 |
| 16 | 2,01 | 2,56 | 640 |
| 18 | 2,54 | 3,24 | 720 |
| 19 | 2,83 | 3,61 | 760 |
| 20 | 3,14 | 4,00 | 800 |
| 22 | 3,8 | 4,84 | 880 |
| 24 | 4,52 | 5,76 | 960 |
| 25 | 4,91 | 6,25 | 1000 |
| 28 | 6,15 | 7,84 | 1120 |
| 30 | 7,07 | 9,00 | 1200 |

| Πλευρά | Βάρος | Διατομή | Επιφάνεια |
|--------|----------|-----------------|--------------------|
| d (mm) | G (kg/m) | cm ² | cm ² /m |
| 32 | 8,04 | 10,2 | 1280 |
| 35 | 9,62 | 12,3 | 1400 |
| 40 | 12,6 | 16,0 | 1600 |
| 45 | 15,9 | 20,3 | 1800 |
| 50 | 19,6 | 25,00 | 2000 |
| 55 | 23,7 | 30,3 | 2200 |
| 60 | 28,3 | 36,0 | 2400 |
| 65 | 33,2 | 42,3 | 2600 |
| 70 | 38,5 | 49,00 | 2800 |
| 80 | 50,2 | 64,00 | 3200 |
| 90 | 63,6 | 81,00 | 3600 |
| 100 | 78,5 | 100,00 | 4000 |
| 110 | 95,00 | 121,00 | 4400 |
| 120 | 113,00 | 144,00 | 4800 |





ΑΝΤΙΣΤΟΙΧΙΕΣ ΠΟΙΟΤΗΤΩΝ

| EN | | EN | | | | | | | | | | | NORWAY |
|----------------|---------------------------|---------------|-----------|--------|------|----------------|----------|--------------|----------|-----------|-----------|-----------|--------|
| EN 1005-2:2004 | EN 10025:1990 +A1:1993 | EN 10025:1990 | GERMANY | FRANCE | U.K. | SPAIN | ITALY | BELGIUM | SWEDEN | PORTUGAL | AUSTRIA | NORWAY | |
| S185 | 1.0035 | Fe 310-0 | St 33 | A 33 | | UNE 36-080 | UNI 7070 | NBN A 21-101 | SS 14 | NP 1729 | N 3116 | | |
| | S235JR | Fe 360 B | St 37-2 | E24-2 | | | Fe 360 B | AE 235-B | 13 11-00 | Fe 360-B | | NS 12 120 | |
| | S235JRG1 | Fe 360 BFN | Ust 37-2 | | | AE 235 B-FU | | | | | Ust 360 B | NS 12 122 | |
| S235JR | 1.0038 | Fe 360 BFN | RSt 37-2 | | 40B | AE 235 B-FN | | | 13 12-00 | | Rst 360 B | NS 12 123 | |
| S235JO | 1.0114 | Fe 360 C | St 37-3 U | E24-3 | 40C | AE 235 C | Fe 360 C | AE 235-C | | Fe 360-C | St 360 C | NS 12 124 | |
| | S235J2G3 | Fe 360 D1 | St 37-3 N | E24-4 | 40D | AE 235 D | Fe 360 D | AE 235-D | | Fe 360-CE | | | |
| S235J2 | 1.0117 | Fe 360 D2 | | | | | | | | | | | |
| S275JR | 1.0044 | Fe 430 B | St 44-2 | E 28-2 | 43B | AE 275 B | Fe 430 B | AE 255-B | 14 12-00 | Fe 430-B | St 430 B | NS 12 142 | |
| S275JO | 1.0143 | Fe 430 C | St 44-3 U | E 28-3 | 43C | AE 275 C | Fe 430 C | AE 255-C | | Fe 430-C | St 430 C | NS 12 143 | |
| | S275JOG3 | Fe 430 D1 | St 44-3 N | E 28-4 | 43D | AE 275 D | Fe 430 D | AE 255-D | 14 14-00 | Fe 430-D | St 430 D | NS 12 143 | |
| S275J2 | 1.0145 | Fe 430 D2 | | | | | | | | | | | |
| S355JR | 1.0045 | Fe 510 B | | E 36-2 | 50B | AE 355 B | Fe 510 B | AE 355-B | | Fe 510-B | | | |
| S355JO | 1.0553 | Fe 510 C | St 52-3 U | E 36-3 | 50C | AE 355 C | Fe 510 C | AE 355-C | | Fe 510-C | St 51C | NS 12 153 | |
| | S355J2G3 | Fe 510 D1 | St 52-3N | | 50D | AE 355D | Fe 510 D | AE 355-D | | Fe 510-D | St 51 D | NS 12 153 | |
| S355J2 | 1.0577 | Fe 510 D2 | | | | | | | | | | | |
| | S355K2G3 | Fe 510 DD1 | | E 36-4 | 50DD | | | AE 355-DD | | Fe 510-DD | | | |
| S355K2 | 1.0596 | Fe 510 DD2 | | | | | | | | | | | |
| S450JO | 1.0590 | | | | 55C | | | | | | | | |
| E295 | 1.0050 | Fe 490-2 | St 50-2 | A 50-2 | | A 490 | Fe 490 | A 490-2 | 15 50-00 | Fe 490-2 | St 490 | | |
| | E335 | Fe 590-2 | St 60-2 | A 60-2 | | A 590 | Fe 590 | A 590-2 | 15 50-01 | Fe 590-2 | St 590 | | |
| E360 | 1.0070 | Fe 690-2 | St 70-2 | A 70-2 | | A 690 | Fe 690 | A 690-2 | 16 50 00 | Fe 690-2 | St 690 | | |
| | | | | | | | | | 16 55 01 | | | | |
| | | | | | | | | | 16 55 01 | | | | |

CHEMICAL COMPOSITION OF THE PRODUCT ANALYSIS

| Designation | | Method of deoxidation ^b | C in % max. for nominal product thickness in mm | | | Si % max. | Mn % max. | P % max. ^d | S % max. ^{d,e} | N % max. ^f | Cu % max. ^g | Other % max. ^h |
|--------------------------------------|-------------------------|------------------------------------|---|-------------------|-------------------|-----------|-----------|-----------------------|-------------------------|-----------------------|------------------------|---------------------------|
| According to EN 10027-1 and CR 10260 | According to EN 10027-2 | | ≤ 16 | > 16 ≤ 40 | > 40 ^c | | | | | | | |
| S235JR | 1.0038 | FN | 0,19 | 0,19 | 0,23 | - | 1,50 | 0,045 | 0,045 | 0,014 | 0,60 | - |
| S235J0 | 1.0114 | FN | 0,19 | 0,19 | 0,19 | - | 1,50 | 0,040 | 0,040 | 0,014 | 0,60 | - |
| S235J2 | 1.0117 | FF | 0,19 | 0,19 | 0,19 | - | 1,50 | 0,035 | 0,035 | - | 0,60 | - |
| S275JR | 1.0044 | FN | 0,24 | 0,24 | 0,25 | - | 1,60 | 0,045 | 0,045 | 0,014 | 0,60 | - |
| S275J0 | 1.0143 | FN | 0,21 | 0,21 | 0,23 ⁱ | - | 1,60 | 0,040 | 0,040 | 0,014 | 0,60 | - |
| S275J2 | 1.0145 | FF | 0,21 | 0,21 | 0,23 ⁱ | - | 1,60 | 0,035 | 0,035 | - | 0,60 | - |
| S355JR | 1.0045 | FN | 0,27 | 0,27 | 0,27 | 0,60 | 1,70 | 0,045 | 0,045 | 0,014 | 0,60 | - |
| S355J0 | 1.0553 | FN | 0,23 ^j | 0,23 ^k | 0,24 | 0,60 | 1,70 | 0,040 | 0,040 | 0,014 | 0,60 | - |
| S355J2 | 1.0577 | FF | 0,23 ^j | 0,23 ^k | 0,24 | 0,60 | 1,70 | 0,035 | 0,035 | - | 0,60 | - |
| S355K2 | 1.0596 | FF | 0,23 ^j | 0,23 ^k | 0,24 | 0,60 | 1,70 | 0,035 | 0,035 | - | 0,60 | - |
| S450J0 ^l | 1.0590 | FF | 0,23 | 0,23 ^k | 0,24 | 0,60 | 1,80 | 0,040 | 0,040 | 0,027 | 0,60 | ^m |

^b FN = rimming steels not permitted; FF = fully killed steel

^c For sections with nominal thickness > 100 mm the C content by agreement.

^d For long products the P and S content can be 0,005% higher.

^e For long products the max. S content can be increased for improved machinability by 0,015% by agreement if the steel is treated to modify the sulphide morphology and the chemical composition shows min. 0,0020% Ca.

^f The max. value for nitrogen does not apply if the chemical composition shows a minimum total Al content of 0,015% or alternatively min. 0,013% acid soluble Al or if sufficient other N binding elements are present. In this case the N binding elements shall be mentioned in the inspection document.

^g Cu content above 0,45% may cause hot shortness during hot forming.

^h If other elements are added, they shall be mentioned on the inspection document.

ⁱ For nominal thickness > 150 mm: C = 0,22% max.

^j For grades suitable for cold roll forming C = 0,24% max.

^k For nominal thickness > 30 mm: C = 0,24% max.

^l Applicable for long products only.

^m The steel may show a Nb content of max. 0,06%, a V content of max. 0,15% and a Ti content of max. 0,06%.

(according to EN10025)

MECHANICAL PROPERTIES AT AMBIENT TEMPERATURE FOR FLAT AND LONG PRODUCTS OF STEEL GRADES AND QUALITIES WITH VALUES FOR THE IMPACT STRENGTH

| Designation | | Minimum yield strength R _{eH} ^a MPa ^b Nominal thickness mm | | | | | | | | | | Tensile strength R _m ^a MPa ^b Nominal thickness mm | | | | | | | |
|--------------------------------------|-------------------------|---|-----------|-----------|-----------|------------|-------------|-------------|-------------|--------------------------|------------|--|-------------|-------------|--------------------------|--|--|--|--|
| According to EN 10027-1 and CR 10260 | According to EN 10027-2 | ≤ 16 | > 16 ≤ 40 | > 40 ≤ 63 | > 63 ≤ 80 | > 80 ≤ 100 | > 100 ≤ 150 | > 150 ≤ 200 | > 200 ≤ 250 | > 250 ≤ 400 ^c | > 3 | ≥ 3 ≤ 100 | > 100 ≤ 150 | > 150 ≤ 250 | > 250 ≤ 400 ^c | | | | |
| S235JR | 1.0038 | 235 | 225 | 215 | 215 | 215 | 195 | 185 | 175 | - | 360 to 510 | 360 to 510 | 350 to 500 | 340 to 490 | - | | | | |
| S235J0 | 1.0114 | 235 | 225 | 215 | 215 | 215 | 195 | 185 | 175 | - | 360 to 510 | 360 to 510 | 350 to 500 | 340 to 490 | - | | | | |
| S235J2 | 1.0117 | 235 | 225 | 215 | 215 | 215 | 195 | 185 | 175 | 165 | 360 to 510 | 360 to 510 | 350 to 500 | 340 to 490 | 330 to 480 | | | | |
| S275JR | 1.0044 | 275 | 265 | 255 | 245 | 235 | 225 | 215 | 205 | - | 430 to 580 | 410 to 560 | 400 to 540 | 380 to 540 | - | | | | |
| S275J0 | 1.0143 | 275 | 265 | 255 | 245 | 235 | 225 | 215 | 205 | - | 430 to 580 | 410 to 560 | 400 to 540 | 380 to 540 | - | | | | |
| S275J2 | 1.0145 | 275 | 265 | 255 | 245 | 235 | 225 | 215 | 205 | 195 | 430 to 580 | 410 to 560 | 400 to 540 | 380 to 540 | 380 to 540 | | | | |
| S355JR | 1.0045 | 355 | 345 | 355 | 325 | 315 | 295 | 285 | 275 | - | 510 to 680 | 470 to 630 | 450 to 600 | 450 to 600 | - | | | | |
| S355J0 | 1.0553 | 355 | 345 | 355 | 325 | 315 | 295 | 285 | 275 | - | 510 to 680 | 470 to 630 | 450 to 600 | 450 to 600 | - | | | | |
| S355J2 | 1.0577 | 355 | 345 | 355 | 325 | 315 | 295 | 285 | 275 | 265 | 510 to 680 | 470 to 630 | 450 to 600 | 450 to 600 | 450 to 600 | | | | |
| S355K2 | 1.0596 | 355 | 345 | 355 | 325 | 315 | 295 | 285 | 275 | 265 | 510 to 680 | 470 to 630 | 450 to 600 | 450 to 600 | 450 to 600 | | | | |
| S450J0 ^d | 1.0590 | 450 | 430 | 410 | 390 | 380 | 380 | - | - | - | - | 550 to 720 | 530 to 700 | - | - | | | | |

^a For plate and wide flats with widths ≥ 600 mm the direction transverse (t) to the rolling applies. For all other products the values apply for the direction parallel (l) to the rolling direction.

^b 1 MPa = 1 N/mm².

^c The values apply to flat products.

^d Applicable for long products only.

(according to EN10025)

MECHANICAL PROPERTIES AT AMBIENT TEMPERATURE FOR FLAT AND LONG PRODUCT OF STEEL GRADES AND QUALITIES WITH VALUES FOR THE IMPACT STRENGTH (CONCLUDED)

| Designation | | Position of test pieces ^a | Minimum percentage elongation after fracture ^a % | | | | | | | | | | |
|-----------------------------------|----------------------|--------------------------------------|--|----------------|----------------|----------------|-------------|---|----------------|-----------------|------------------|------------------|---------------------------------------|
| | | | $L_0 = 80$ mm Nominal thickness mm | | | | | $L_0 = 5,65 \sqrt{S_0}$ Nominal thickness mm | | | | | |
| According EN 10027-1 and CR 10260 | According EN 10027-2 | | ≤ 1 | $> 1 \leq 1,5$ | $> 1,5 \leq 2$ | $> 2 \leq 2,5$ | $> 2,5 < 3$ | $\geq 3 \leq 40$ | $> 40 \leq 63$ | $> 63 \leq 100$ | $> 100 \leq 150$ | $> 150 \leq 250$ | $> 250^c \leq 400$ only for J2 and K2 |
| S235JR | 1.0038 | l | 17 | 18 | 19 | 20 | 21 | 26 | 25 | 24 | 22 | 21 | - |
| S235J0 | 1.0114 | | | | | | | | | | | | - |
| S235J2 | 1.0117 | t | 15 | 16 | 17 | 18 | 19 | 24 | 23 | 22 | 22 | 21 | 21 (l and t) |
| S275JR | 1.0044 | l | 15 | 16 | 17 | 18 | 19 | 23 | 22 | 21 | 19 | 18 | - |
| S275J0 | 1.0143 | | | | | | | | | | | | - |
| S275J2 | 1.0145 | t | 13 | 14 | 15 | 16 | 17 | 21 | 20 | 19 | 19 | 18 | 18 (l and t) |
| S355JR | 1.0045 | l | 14 | 15 | 16 | 17 | 18 | 22 | 21 | 20 | 18 | 17 | - |
| S355J0 | 1.0553 | | | | | | | | | | | | - |
| S355J2 | 1.0577 | | | | | | | | | | | | 17 (l and t) |
| S355K2 | 1.0596 | t | 12 | 13 | 14 | 15 | 16 | 20 | 19 | 18 | 18 | 17 | 17 (l and t) |
| S450J0 ^d | 1.0590 | l | - | - | - | - | - | 17 | 17 | 17 | 17 | - | - |

^a For plate, strip and wide flats with widths ≥ 600 mm the direction transverse (t) to the rolling direction applies. For all other products the values apply for the direction parallel (l) to the rolling direction.

^c The values apply to flat products.

^d Applicable for long product only.

(according to EN10025)

