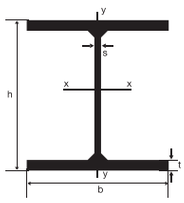
# ΕΛΑΣΤΡΟΝ

ΧΑΛΥΒΟΥΡΓΙΚΑ ΠΡΟΪΟΝΤΑ

# ΔΟΚΟΙ ΠΛΑΤΥΠΕΛΜΟΙ – ΒΑΡΥΣ ΤΥΠΟΣ HEM (κατά DIN 1025-4) S275 JR & S355 (EN 10025)

## Ανοχές διαστάσεων σύμφωνα με EN 10034




| HEM | Διαστάσεις | | | | Διατομή | Βάρος | Ροπή αντίστασης | |
|---|---|---|---|---|---|---|---|---|
| | h (mm) | b (mm) | s (mm) | t (mm) | F ($cm^2$) | G (kg/m) | $W_x$ ($cm^3$) | $W_y$ ($cm^3$) |
| 100 | 120 | 106 | 12,0 | 20,0 | 53,2 | 42,8 | 190,0 | 75,3 |
| 120 | 140 | 126 | 12,5 | 21,0 | 66,4 | 53,4 | 288,0 | 112,0 |
| 140 | 160 | 146 | 13,0 | 22,0 | 80,6 | 64,8 | 411,0 | 157,0 |
| 160 | 180 | 166 | 14,0 | 23,0 | 97,1 | 78,1 | 566,0 | 212,0 |
| 180 | 200 | 186 | 14,5 | 24,0 | 113,0 | 91,1 | 748,0 | 277,0 |
| 200 | 220 | 206 | 15,0 | 25,0 | 131,0 | 106,0 | 967,0 | 354,0 |
| 220 | 240 | 226 | 15,5 | 26,0 | 149,0 | 120,0 | 1220,0 | 444,0 |
| 240 | 270 | 248 | 18,0 | 32,0 | 200,0 | 161,0 | 1800,0 | 657,0 |
| 260 | 290 | 268 | 18,5 | 32,5 | 220,0 | 176,0 | 2160,0 | 780,0 |
| 280 | 310 | 288 | 21,0 | 33,0 | 240,0 | 194,0 | 2550,0 | 914,0 |
| 300 | 340 | 310 | 16,0 | 39,0 | 303,0 | 244,0 | 3480,0 | 1250,0 |
| 320/305 | 320 | 305 | 21,0 | 29,0 | 225,0 | 180,0 | 2560,0 | 901,0 |
| 320 | 359 | 309 | 21,0 | 40,0 | 312,0 | 251,0 | 3800,0 | 1280,0 |
| 340 | 377 | 309 | 21,0 | 40,0 | 316,0 | 254,0 | 4050,0 | 1280,0 |
| 360 | 395 | 308 | 21,0 | 40,0 | 319,0 | 256,0 | 4300,0 | 1270,0 |
| 400 | 432 | 307 | 21,0 | 40,0 | 326,0 | 262,0 | 4820,0 | 1260,0 |
| 450 | 478 | 307 | 21,0 | 40,0 | 335,0 | 270,0 | 5500,0 | 1260,0 |
| 500 | 524 | 306 | 21,0 | 40,0 | 344,0 | 277,0 | 6180,0 | 1250,0 |
| 550 | 572 | 306 | 21,0 | 40,0 | 354,0 | 285,0 | 6920,0 | 1250,0 |
| 600 | 620 | 305 | 21,0 | 40,0 | 364,0 | 292,0 | 7660,0 | 1240,0 |
| 650 | 668 | 305 | 21,0 | 40,0 | 374,0 | 300,0 | 8430,0 | 1240,0 |
| 700 | 716 | 304 | 21,0 | 40,0 | 383,0 | 309,0 | 9200,0 | 11240,0 |
| 800 | 814 | 303 | 21,0 | 40,0 | 404,0 | 325,0 | 10870,0 | 1230,0 |
| 900 | 910 | 302 | 21,0 | 40,0 | 424,0 | 341,0 | 12540,0 | 1220,0 |
| 1000 | 1000 | 302 | 21,0 | 40,0 | 444,0 | 358,0 | 14330,0 | 1220,0 |

## ΑΝΤΙΣΤΟΙΧΙΕΣ ΠΟΙΟΤΗΤΩΝ

| EN | | | | | GERMANY | FRANCE | U.K. | SPAIN | ITALY | BELGIUM | SWEDEN | PORTUGAL | AUSTRIA | NORWAY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EN 1005-2:2004** | | **EN 10025:1990 +A1:1993** | | **EN 10025:1990** | **DIN 17100** | **NF A 35-501** | **BS 4360** | **UNE 36-080** | **UNI 7070** | **NBN A 21-101** | **SS 14** | **NP 1729** | **N 3116** | |
| S185 | 1.0035 | S185 | 1.0035 | Fe 310-0 | St 33 | A 33 | | A 310-0 | Fe 320 | A 320 | 13 00-00 | Fe 310-0 | St 320 | |
| | | S235JR | 1.0037 | Fe 360 B | St 37 – 2 | E24-2 | | | Fe 360 B | AE 235-B | 13 11-00 | Fe 360-B | | NS 12 120 |
| | | S235JRG1 | 1.0036 | Fe 360 BFU | Ust 37 -2 | | | AE 235 B-FU | | | | | Ust 360 B | NS 12 122 |
| S235JR | 1.0038 | S235JRG2 | 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 | 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 |
| | | | | | | | | | | | | Fe 360-CE | | |
| | | S235J2G3 | 1.0116 | Fe 360 D1 | St 37-3 N | E24-4 | 40D | AE 235 D | Fe 360 D | AE 235-D | | Fe 360-D | St 360 D | NS 12 124 |
| S235J2 | 1.0117 | S235J2G4 | 1.0117 | Fe 360 D2 | | | | | | | | | | |
| S275JR | 1.0044 | 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 | 1.0043 | 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 |
| | | | | | | | | | | | | | St 430 CE | |
| | | S275JOG3 | 1.0144 | 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 | S275JOG4 | 1.0145 | Fe 430 D2 | | | | | | | | | | |
| S355JR | 1.0045 | 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 | 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 | 1.0570 | 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 | S355J2G4 | 1.0577 | Fe 510 D2 | | | | | | | | | | |
| | | S355K2G3 | 1.0595 | Fe 510 DD1 | | E 36-4 | 50DD | | | AE 355-DD | | Fe 510-DD | | |
| S355K2 | 1.0596 | S355K2G4 | 1.0596 | Fe 510 DD2 | | | | | | | | | | |
| S450JO | 1.0590 | | | | | | 55C | | | | | | | |
| E295 | 1.0050 | 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 | |
| | | | | | | | | | | | 15 50-01 | | | |
| E335 | 1.0060 | E335 | 1.0060 | Fe 590 – 2 | St 60-2 | A 60-2 | | A 590 | Fe 590 | A 590-2 | 16 50 00 | Fe 590-2 | St 590 | |
| | | | | | | | | | | | 16 50 01 | | | |
| E360 | 1.0070 | E360 | 1.0070 | Fe 690 - 2 | St 70-2 | A 70-2 | | A 690 | Fe 690 | A 690-2 | 16 55 00 | Fe 690-2 | St 690 | |
| | | | | | | | | | | | 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 EN 10027-01 and CR 10260 | According 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 | 0,23k | 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 mach inability 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

| Designatio n | | Minimum yield strength $R_{eH}$[a] MPa[b] Nominal thickness mm | | | | | | | | | Tensile strength $R_m$[a] MPa[b] Nominal thick-ness mm | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| According EN 10027-1 and CR 10260 | Accord-ing 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] % | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $L_o = 80$ mm Nominal thickness mm | | | | | $L_o = 5{,}65\sqrt{S_o}$ Nominal thickness mm | | | | | |
| According EN 10027-1 and CR 10260 | According EN 10027-2 | | ≤ 1 | > 1 ≤ 1,5 | > 1,5 ≤ 2 | > 2 ≤ 2,5 | >2,5 < 3 | ≥ 3 ≤ 40 | > 40 ≤ 63 | > 63 ≤ 100 | > 100 ≤ 150 | > 150 ≤ 250 | > 250[c] ≤ 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)