| **Quality** | **S235J2** | **Structural Steel** | *Technical card* |
|---|---|---|---|
| According to standard | **EN 10025-2: 2004** | | ***Lucefin Group*** |
| Number | **1.0117** | | *rev. 2018* |

## Chemical composition

| **C%** max | **Si%** | **Mn%** max | **P%** max | **S%** max | **N%** max | **Cu%** max | |
|---|---|---|---|---|---|---|---|
| 0,17 [a)] | - | 1,40 | 0,025 | 0,025 | - | 0,40 | **Cast** analysis |
| 0,19 [a)] | - | 1,50 | 0,035 | 0,035 | - | 0,45 | **Product** analysis |

FN deoxidation method -N rimming steel not admitted

[a)] for nominal thickness > 100 mm, C content to be agreed

## Temperature °C

| **Hot-forming** | **Supply state +U** | **Soft annealing +A** | **Isothermal annealing +I** | **Temperature values are valid for analysis close to:** | | |
|---|---|---|---|---|---|---|
| | | | | C% | Mn% | Si% |
| 1200-850 | natural state | 690 air | - | ~ 0.10 | ~ 0.50 | ~ 0.20 |

In some cases, the piece can be normalized and tempered **+NT** or quenched and tempered **+QT**

| **Normalizing and tempering** | **Quenching and Tempering** | **Stress-relieving +SR** |
|---|---|---|
| 920 air<br>540-650 air | 920 water<br>540-665 air | 50° under the temperature of tempering |

| **Pre-heating welding** | **Stress-relieving after welding** |
|---|---|
| not required | slow cooling |

| **Ac1** | **Ac3** | **Ms** | **Mf** |
|---|---|---|---|
| 725 | 880 | 480 | 260 |

## Mechanical properties

**Hot-rolled** EN 10025-2: 2004 **S235J2** 1.0117

Testing at room temperature, impact testing at – 20 °C

| size mm | | **R** | **$R_{eH}$** | **A%** | **A%** | **Kv** -20 °C | ***HB*** | **Mod. of Elasticity** | |
|---|---|---|---|---|---|---|---|---|---|
| from | to | N/mm² | N/mm² min | min (L) | min (T) | J min [a)] (L) | *for inf.* | GPa +20 °C | |
| | 3 | 360-510 | 235 | - | - | - | - | 200 | 77 |
| 3 | 16 | 360-510 | 235 | 26 | 24 | 27 | *104-154* | | |
| 16 | 40 | 360-510 | 225 | 26 | 24 | 27 | *104-154* | | |
| 40 | 63 | 360-510 | 215 | 25 | 23 | 27 | *104-154* | | |
| 63 | 80 | 360-510 | 215 | 25 | 23 | 27 | *104-154* | | |
| 80 | 100 | 360-510 | 215 | 25 | 23 | 27 | *104-154* | | |
| 100 | 150 | 350-500 | 195 | 22 | 22 | 27 | *103-152* | | |
| 150 | 200 | 340-490 | 185 | 21 | 21 | 27 | *100-149* | | |
| 200 | 250 | 340-490 | 175 | 21 | 21 | 27 | *100-149* | | |
| *250* | *400* | *330-480* | *165* | *21* | *21* | *27* | *94 -146 apply to flat products* | | |

[a)] values to be agreed for thickness > 100 mm ( **normalization** +N treatment is suggested)

| **Cold-drawn** | | | | | | Hot-rolled **– Peeled** | | | |
|---|---|---|---|---|---|---|---|---|---|
| size mm | | Testing at room temperature (longitudinal) | | | | Testing at room temperature (longitudinal) | | | |
| | | **R** | **Rp** 0.2 | **A%** | **HB** | **R** | **Rp** 0.2 | **A%** | **HB** |
| from | to | N/mm² | N/mm² min | min | | N/mm² | N/mm² min | min | |

No indications are shown in the reference standards,
(please refer to the same values of quality S235JRC EN 10277-2)

**Forged** normalized UNI EN 10250-2: 2001 **S235J2G3** n° 1.0116

Tensile testing at room temperature, Kv testing at - 20 °C (normalizing treatment is suggested)

| size | | **R** | **Re** | **A%** | **A%** | **Kv** - 20 °C | **Kv** - 20 °C | ***HB*** |
|---|---|---|---|---|---|---|---|---|
| from | to | N/mm² min | N/mm² min | min (L) | min (T) | J min (L) | J min (T) | *min* |
| | 100 | 340 | 215 | 24 | - | 35 | - | *100* |
| 100 | 250 | 340 | 175 | 23 | 17 | 30 | 20 | *100* |
| 250 | 500 | 340 | 165 | 23 | 17 | 27 | 15 | *100* |

| **EUROPE** EN | **ITALY** UNI | **CHINA** GB | **GERMANY** DIN | **FRANCE** AFNOR | **U.K.** B.S. | **RUSSIA** GOST | **USA** AISI/SAE |
|---|---|---|---|---|---|---|---|
| S235J2 | appr. Fe 360 D | Q235A | appr. St 37- 3 U | appr. E 24 - 4 | appr. 40 D | St3ps-5 | appr. A 515 |