

# Database of Steel and Alloy ( Marochnik )

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## Characteristics for grade 35L ( 35Л ).

|                           |                         |
|---------------------------|-------------------------|
| <b>Grade :</b>            | 35L ( 35Л )             |
| <b>Substitute:</b>        | 30Л, 40Л, 45Л           |
| <b>Classification :</b>   | Non-alloy casting steel |
| <b>Equivalent grades:</b> | <a href="#">Go here</a> |

## Chemical composition in % for grade 35L ( 35Л )

| C          | Si         | Mn         | S        | P        |
|------------|------------|------------|----------|----------|
| 0.32 - 0.4 | 0.2 - 0.52 | 0.45 - 0.9 | max 0.06 | max 0.06 |

## Temperature of critical points for grade 35L ( 35Л ).

$A_{c1} = 730$  ,  $A_{c3}(A_{cm}) = 802$  ,  $A_{r3}(A_{rcm}) = 795$  ,  $A_{r1} = 691$

## Mechanical properties under T=20°C for grade 35L ( 35Л )

| Assortment           | Dimension | Direct. | $\sigma_B$ | $\sigma_T$ | $\delta_5$ | $\psi$ | KCU                 | Heat treatment                                |
|----------------------|-----------|---------|------------|------------|------------|--------|---------------------|-----------------------------------------------|
| -                    | mm        | -       | MPa        | MPa        | %          | %      | kJ / m <sup>2</sup> | -                                             |
| Casting, GOST 977-88 | to 100    |         | 491        | 275        | 15         | 25     | 343                 | Normalizing 860 - 880°C, Drawing 600 - 630°C, |
| Casting, GOST 977-88 |           |         | 540        | 343        | 16         | 20     | 294                 |                                               |

Brinell hardness for 35L ( 35Л ) ,

HB 10 <sup>-1</sup> = 137 - 229 MPa

## Technological properties for grade 35L ( 35Л )

|                            |                      |
|----------------------------|----------------------|
| <b>Weldability:</b>        | limited weldability. |
| <b>Flakes :</b>            | not predisposed      |
| <b>Temper brittleness:</b> | not predisposed      |

## Technological properties of the material 35L ( 35Л ) .

|                           |             |
|---------------------------|-------------|
| <b>Linear shrinkage :</b> | 2.2 - 2.3 % |
|---------------------------|-------------|

## Heat treatment of the material 35L ( 35Л )

Normalizing 860 - 880 ° C, Tempering 600 - 630 ° C

**Physical properties for grade 35L ( 35Л )**

| T     | E 10 <sup>-5</sup> | $\alpha$ 10 <sup>6</sup> | $\lambda$      | $\rho$            | C            | R 10 <sup>9</sup> |
|-------|--------------------|--------------------------|----------------|-------------------|--------------|-------------------|
| Grade | MPa                | 1/Grade                  | Watt/(m·Grade) | kg/m <sup>3</sup> | J/(kg·Grade) | Ohm·m             |
| 20    | 2.12               |                          | 53             | 7830              |              | 172               |
| 100   | 2.06               | 11.1                     | 51             |                   | 470          | 223               |
| 200   | 2.01               | 12                       | 49             |                   | 491          | 301               |
| 300   | 1.92               | 12.9                     | 45             |                   | 512          | 394               |
| 400   | 1.76               | 13.5                     | 42             |                   | 533          | 497               |
| 500   | 1.63               | 13.9                     | 39             |                   | 554          | 623               |
| 600   | 1.51               | 14.5                     | 35             |                   | 580          | 771               |
| 700   | 1.31               | 14.8                     | 31             |                   | 613          | 935               |
| 800   | 1.18               | 11.9                     | 27             |                   | 710          | 1115              |
| 900   |                    | 12.5                     | 27             |                   | 701          | 1154              |
| T     | E 10 <sup>-5</sup> | $\alpha$ 10 <sup>6</sup> | $\lambda$      | $\rho$            | C            | R 10 <sup>9</sup> |

**Equivalent steels for grade 35L ( 35Л )**

Warning! Indicated both exact and nearest equivalents.

| USA           | Germany                    | Japan        | France   | England       | China                   | Bulgaria      | Hungary          | Poland         | Romania            | Czechia | Finland            | Norway |
|---------------|----------------------------|--------------|----------|---------------|-------------------------|---------------|------------------|----------------|--------------------|---------|--------------------|--------|
| -             | DIN, WNr                   | JIS          | AFNOR    | BS            | GB                      | BDS           | MSZ              | PN             | STAS               | CSN     | SFS                | NS     |
| Gr1<br>J03502 | 1.0552<br>GS-52<br>S355JRC | SC480<br>SCC | 280-480M | 161-480<br>A2 | ZG270-500<br>ZGD290-510 | 35LI<br>35LII | Ao500<br>Ao500FK | L500<br>LII500 | OT500-1<br>OT500-3 | 422650  | G-26-52<br>G-30-57 | Sst520 |

**Specification :****Mechanical properties :**

- $\sigma_B$  - Tensile strength , [MPa]  
 $\sigma_T$  - Yield stress , [MPa]  
 $\delta_5$  - Specific elongation at fracture , [ % ]  
 $\psi$  - Reduction of area , [ % ]  
**KCU** - Impact strength , [ kJ / m<sup>2</sup> ]  
**HB** - Brinell hardness , [MPa]

**Physical properties :**

- T** - Test temperature , [Grade]  
**E** - Young modulus , [MPa]  
 $\alpha$  - Coefficient of linear expansion ( range 20° - T ) , [1/Grade]  
 $\lambda$  - Termal (heat) condition coefficient , [Watt/(m·Grade)]  
 $\rho$  - Density , [kg/m<sup>3</sup>]  
**C** - Specific heat ( range 20° - T ) , [J/(kg·Grade)]  
**R** - Electrical resistance , [Ohm·m]

**Weldability :****without limitations** - welding is done without heating and subsequent heat treeting

- limited weldability** - welding is possible under heating up to 100-120 grade and subsequent heat treating
- hard weldability** - obtaining the quality welding needs the additional operations: heating up to 200-300 grade; the heat treating is annealing

Database of steels and alloys (Marochnik) contains information about chemical composition and properties more than 2500 steels and alloys (stainless steel, alloy steel, carbon steel, structural steel, tool steel, cast iron, aluminum alloy, titanium alloy, copper alloy, nickel alloy, magnesium alloy and others).  
Helpful for specialists in grade technology, structural engineer, mechanical engineer, metallurgy and metal trader

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