

# Database of Steel and Alloy (Marochnik)

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### Characteristics for grade 65G ( 65Г ).

|                           |                                             |
|---------------------------|---------------------------------------------|
| <b>Grade :</b>            | 65G ( 65Г )                                 |
| <b>Substitute:</b>        | 70, Y8A, 70Г, 60C2A, 9XC, 50XΦA, 60C2, 55C2 |
| <b>Classification :</b>   | Spring structural steel                     |
| <b>Equivalent grades:</b> | <a href="#">Go here</a>                     |

### Chemical composition in % for grade 65G ( 65Г )

| C          | Si          | Mn        | Ni       | S         | P         | Cr       | Cu      |
|------------|-------------|-----------|----------|-----------|-----------|----------|---------|
| 0.62 - 0.7 | 0.17 - 0.37 | 0.9 - 1.2 | max 0.25 | max 0.035 | max 0.035 | max 0.25 | max 0.2 |

## Temperature of critical points for grade 65G ( 65Г ).

$$Ac_1 = 721, \quad Ac_3(Ac_m) = 745, \quad Ar_3(Arc_m) = 720, \quad Ar_1 = 670, \quad Mn = 270$$

**Mechanical properties under T=20°C for grade 65G ( 65Г )**

| Assortment                       | Dimension | Direct. | $\sigma_B$ | $\sigma_T$ | $\delta_5$ | $\psi$ | KCU                 | Heat treatment        |
|----------------------------------|-----------|---------|------------|------------|------------|--------|---------------------|-----------------------|
| -                                | mm        | -       | MPa        | MPa        | %          | %      | kJ / m <sup>2</sup> | -                     |
| Rolled stock, GOST 14959-79      |           |         | 980        | 785        | 8          | 30     |                     | Guenching and drawing |
| Sheet trick, GOST 1577-93        |           |         | 740        |            | 12         |        |                     |                       |
| Band cold-w orked , GOST 2283-79 |           |         | 740-1180   |            |            |        |                     |                       |
| Band annealed , GOST 2283-79     |           |         | 640-740    |            | 10-15      |        |                     |                       |

|                      |                                        |                            |                               |
|----------------------|----------------------------------------|----------------------------|-------------------------------|
| Brinell hardness for | 65G ( 65Г ) (without heat treatment) , | GOST 14959                 | HB 10 <sup>-1</sup> = 285 MPa |
| Brinell hardness for | 65G ( 65Г ) (heat treatment) ,         | Rolled stock GOST 14959-79 | HB 10 <sup>-1</sup> = 241 MPa |
| Brinell hardness for | 65G ( 65Г ) (annealing) ,              | Sheet trick GOST 1577-93   | HB 10 <sup>-1</sup> = 229 MPa |

### Technological properties for grade 65G ( 65Г )

|                            |                    |
|----------------------------|--------------------|
| <b>Weldability:</b>        | is not used.       |
| <b>Flakes :</b>            | weakly predisposed |
| <b>Temper brittleness:</b> | predisposed        |

### Physical properties for grade 65G ( 65Г )

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
|--|--|--|--|--|--|

| 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    | 2.15               |                          | 37             | 7850              |              |                   |
| 100   | 2.13               | 11.8                     | 36             | 7830              | 490          |                   |
| 200   | 2.07               | 12.6                     | 35             | 7800              | 510          |                   |
| 300   | 2                  | 13.2                     | 34             |                   | 525          |                   |
| 400   | 1.8                | 13.6                     | 32             | 7730              | 560          |                   |
| 500   | 1.7                | 14.1                     | 31             |                   | 575          |                   |
| 600   | 1.54               | 14.6                     | 30             |                   | 590          |                   |
| 700   | 1.36               | 14.5                     | 29             |                   | 625          |                   |
| 800   | 1.28               | 11.8                     | 28             |                   | 705          |                   |
| T     | E 10 <sup>-5</sup> | $\alpha$ 10 <sup>6</sup> | $\lambda$      | $\rho$            | C            | R 10 <sup>9</sup> |

**Equivalent steels for grade 65G ( 65Г )**

Warning! Indicated both exact and nearest equivalents.

| USA                    | Germany       | England | China | Bulgaria | Poland |
|------------------------|---------------|---------|-------|----------|--------|
| -                      | DIN,WNr       | BS      | GB    | BDS      | PN     |
| 1066<br>1566<br>G15660 | 66Mn4<br>Ck67 | 080A67  | 65Mn  | 65G      | 65G    |

**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]  
 $\lambda$  - Thermal (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 treating  
**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, carbone steel, structural steel, tool steel,  
cast iron, aluminum alloy, titanium alloy, copper alloy, nickel alloy, magnesium alloy and others).  
Helpfull for specialists in grade technology, structural engineer, mechanical engineer, metallurgy and metal trader

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