

# Database of Steel and Alloy (Marochnik)

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## Characteristics for grade VT16 ( BT16 ).

|                           |                        |
|---------------------------|------------------------|
| <b>Grade :</b>            | VT16 ( BT16 )          |
| <b>Classification :</b>   | Titanium wrought alloy |
| <b>Equivalent grades:</b> | Is absent              |

## Chemical composition in % for grade VT16 ( BT16 )

| Fe          | C          | Si          | Mo           | V        | N           | Ti              | Al           | Zr         | O           | H            | Impurity  |
|-------------|------------|-------------|--------------|----------|-------------|-----------------|--------------|------------|-------------|--------------|-----------|
| max<br>0.25 | max<br>0.1 | max<br>0.15 | 4.5 -<br>5.5 | 4 -<br>5 | max<br>0.05 | 84.85 -<br>89.7 | 1.8 -<br>3.8 | max<br>0.3 | max<br>0.15 | max<br>0.015 | other 0.3 |

Comment: Ti is a basis; the percentage of Ti is given approximately.

## Mechanical properties under T=20°C for grade VT16 ( BT16 )

| Assortment | Dimension | Direct. | $\sigma_B$ | $\sigma_T$ | $\delta_5$ | $\psi$ | KCU                 | Heat treatment       |
|------------|-----------|---------|------------|------------|------------|--------|---------------------|----------------------|
| -          | mm        | -       | MPa        | MPa        | %          | %      | kJ / m <sup>2</sup> | -                    |
| Sheet thin |           |         | 840-1250   |            | 12-22      |        |                     | Annealing            |
| Sheet thin |           |         | 1300-1400  |            | 5-6        |        | 500                 | Hardening and ageing |

|                                                                     |                                     |
|---------------------------------------------------------------------|-------------------------------------|
| Brinell hardness for VT16 ( BT16 ) (quenching, ageing) , Sheet thin | HB 10 <sup>-1</sup> = 302 - 415 MPa |
|---------------------------------------------------------------------|-------------------------------------|

## Technological properties for grade VT16 ( BT16 )

|                     |                      |
|---------------------|----------------------|
| <b>Weldability:</b> | without limitations. |
|---------------------|----------------------|

## Physical properties for grade VT16 ( BT16 )

| 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    | 1.1                |                          |                |                   |              |                   |

## 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, carbon 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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