

# Database of Steel and Alloy (Marochnik)

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## Characteristics for grade BrO19 ( БpO19 ).

|                           |                     |
|---------------------------|---------------------|
| <b>Grade :</b>            | BrO19 ( БpO19 )     |
| <b>Classification :</b>   | Tin foundry bronzes |
| <b>Equivalent grades:</b> | Is absent           |

## Chemical composition in % for grade BrO19 ( БpO19 )

| Si       | P       | Al       | Cu        | Pb      | Zn      | Sb      | Bi       | Sn        | Impurity |
|----------|---------|----------|-----------|---------|---------|---------|----------|-----------|----------|
| max 0.02 | max 0.1 | max 0.02 | 79.3 - 82 | max 0.5 | max 0.2 | max 0.3 | max 0.02 | 18 - 19.5 | all 1.2  |

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

## Mechanical properties under T=20°C for grade BrO19 ( БpO19 )

| Assortment            | Dimension | Direct. | $\sigma_B$ | $\sigma_T$ | $\delta_5$ | $\psi$ | KCU                 | Heat treatment |
|-----------------------|-----------|---------|------------|------------|------------|--------|---------------------|----------------|
| -                     | mm        | -       | MPa        | MPa        | %          | %      | kJ / m <sup>2</sup> | -              |
| cast in a metal mould |           |         | 295        | 175        |            |        | 41                  |                |

|                                                              |                               |
|--------------------------------------------------------------|-------------------------------|
| Brinell hardness for BrO19 ( БpO19 ) , cast in a metal mould | HB 10 <sup>-1</sup> = 157 MPa |
|--------------------------------------------------------------|-------------------------------|

## Friction coefficient of the material BrO19 ( БpO19 ).

|                                    |       |
|------------------------------------|-------|
| Friction coefficient with oil :    | 0.005 |
| Friction coefficient without oil : | 0.4   |

## Technological properties of the material BrO19 ( БpO19 ).

|                       |        |
|-----------------------|--------|
| Melting temperature : | 880 °C |
|-----------------------|--------|

## Physical properties for grade BrO19 ( БpO19 )

| 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    | 0.96               | 18.8                     |                | 8600              |              |                   |

## 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]

Database of steels and alloys (Marochnik) contains information about chemical composition and properties more then 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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