

# TZM

## Technical Datasheet

|                          |                             |   |     |      |      |         |
|--------------------------|-----------------------------|---|-----|------|------|---------|
| <b>Short-Name</b>        | TZM (Titan-Zirkon-Molybdän) | <b>Chemical<br/>Composition<br/>(Reference values in %)</b> | Ti  | Zr   | C    | Mo      |
| <b>Code</b>              | -                           |   | 0.5 | 0.08 | 0.03 | balance |
| <b>Material-No.(old)</b> | -                           |   |     |      |      |         |

**Material-Properties** High melting point, higher high-temperature strength in comparison with pure Molybdenum, low thermal extension, good thermal conductivity and chemical resistance.

**Applications**

- Trays in continuous heating furnaces
- Sinter boats
- Hot-runner tips in plastic injection nozzles
- Vacuum furnace heating elements
- Electrodes for RP welding of copper sheets

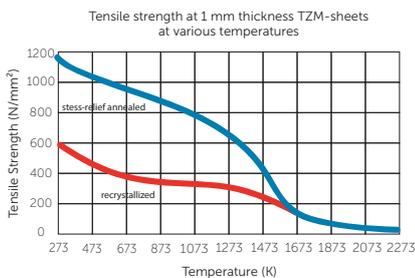
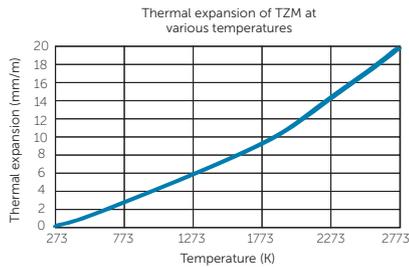
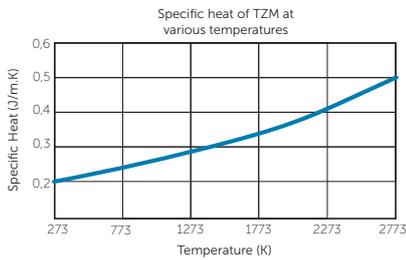
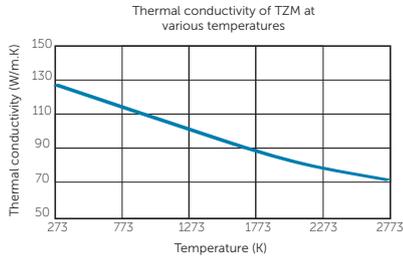
|   |  |                    |           |
|---|--|--------------------|-----------|
| <b>Mechanical Properties<br/>(Reference values)</b> | Hardness                               | HV                 | 200–250   |
|   | Tensile strength<br>c. 85 % reduced    | N/mm <sup>2</sup>  | 800–1.000 |
|   | Yield strength                         | N/mm <sup>2</sup>  | 750–900   |
|   | Elongation L = 5 D                     | %                  | 6–10      |
|   | Modulus of elasticity<br>20 °C (293 K) | kN/mm <sup>2</sup> | 300       |

|                            |   |   |                            |
|----------------------------|---|---|----------------------------|
| <b>Physical Properties</b> | Electrical conductivity<br>20 °C (293 K)                | MS/m  | ca. 15                     |
|                            | Electrical resistance<br>20 °C (293 K)                  | $\frac{\Omega \cdot \text{mm}^2}{\text{m}}$ | ca. 0.06                   |
|                            | Coefficient of electrical resistance                    | $\frac{1}{\text{K}}$                        | ca. 0.0046                 |
|                            | Coefficient of thermal expansion<br>0-300°C (273-573 K) | $\frac{1}{\text{K}}$                        | 5.3 – 5.7•10 <sup>-6</sup> |
|                            | Specific heat   | $\frac{\text{J}}{\text{g} \cdot \text{K}}$  | 0.25                       |
|                            | Thermal conductivity<br>20 °C (293 K)                   | $\frac{\text{W}}{\text{m} \cdot \text{K}}$  | ca. 130                    |
|                            | Density   | g/cm <sup>3</sup>                           | 10.2                       |

**Products** Wire, bars, sheets, machined parts against drawing.  
Tensile strength properties depend on cross-section and design.

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### Machining Instructions (Reference values)

| Turning               | Tungsten Carbide ISO K 05 | HSS 1.3202 |
|-----------------------|---------------------------|------------|
| Cutting speed (m/min) | 70–120                    | 30–40      |
| Rake angle            | ca. 20°                   | ca. 20°    |
| Feed and depth of cut | –                         | –          |
| Clearance angle       | 7–10°                     | 7–10°      |

| Milling               | Tungsten Carbide ISO K 10 / ISO K 05 | HSS 1.3202 |
|-----------------------|--------------------------------------|------------|
| Cutting speed (m/min) | 80–120                               | 20–25      |
| Rake angle            | 10°                                  | 10°        |
| Feed (mm/min)         | –                                    | –          |

| Drilling              | Tungsten Carbide ISO K 10 or ISO K 05 | HSS 1.3202 |
|-----------------------|---------------------------------------|------------|
| Cutting speed (m/min) | 12                                    | 10–15      |

| Wire-cut EDM and die sinking | Possible, electrodes and machining datas according to the machine producers experience. |
|------------------------------|---|
|------------------------------|---|

All statements as to the properties or utilization of the materials and products mentioned in this datasheet are only for the purpose of description. Guarantees in respect of the existence of certain properties or utilization at the material mentioned are only valid if agreed upon in writing.