A powdermetallurgically produced tungsten-copper composite material. It combines tungsten’s high resistance to arc erosion with the extremely good electrical conductivity of copper in the same material.

Mechanical Properties

<table>
<thead>
<tr>
<th>Material-Properties (Reference values)</th>
<th>TUCO 80/20</th>
<th>TUCO 75/25</th>
<th>TUCO 70/30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardness (HV)</td>
<td>230</td>
<td>200</td>
<td>170</td>
</tr>
<tr>
<td>Tensile strength (N/mm²)</td>
<td>490</td>
<td>440</td>
<td>390</td>
</tr>
<tr>
<td>Modulus of elasticity (kN/mm²)</td>
<td>230</td>
<td>225</td>
<td>225</td>
</tr>
</tbody>
</table>

Physical Properties

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Reference values</th>
<th>TUCO 80/20</th>
<th>TUCO 75/25</th>
<th>TUCO 70/30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical conductivity</td>
<td>20 °C (293 K)</td>
<td>15</td>
<td>22</td>
<td>29</td>
</tr>
<tr>
<td>Electrical resistance</td>
<td>20 °C (293 K)</td>
<td>0.07</td>
<td>0.04</td>
<td>0.03</td>
</tr>
<tr>
<td>Coefficient of electrical resistance</td>
<td>1/K</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Coefficient of thermal expansion</td>
<td>1/K</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Thermal conductivity</td>
<td>20 °C (293 K)</td>
<td>130</td>
<td>140</td>
<td>150</td>
</tr>
<tr>
<td>Density (g/cm³)</td>
<td></td>
<td>15.3</td>
<td>14.6</td>
<td>14.0</td>
</tr>
</tbody>
</table>
### Machining Instructions

#### Drilling

<table>
<thead>
<tr>
<th>Property</th>
<th>Tungsten Carbide ISO K 05</th>
<th>Twist drills in acc. with DIN 338</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting speed m/min.</td>
<td>40</td>
<td>15 – 20</td>
</tr>
<tr>
<td>Lip angle</td>
<td>118 – 120°</td>
<td>like with steel machining</td>
</tr>
<tr>
<td>Machining</td>
<td>dry</td>
<td>dry</td>
</tr>
</tbody>
</table>

#### Turning

<table>
<thead>
<tr>
<th>Property</th>
<th>Tungsten Carbide ISO K 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting speed m/min.</td>
<td>80 – 120</td>
</tr>
<tr>
<td>Rake angle</td>
<td>6 – 10°</td>
</tr>
<tr>
<td>Clearance angle</td>
<td>7 – 10°</td>
</tr>
<tr>
<td>Feed at depth of cut</td>
<td>what ever is chosen</td>
</tr>
<tr>
<td>Machining</td>
<td>dry</td>
</tr>
</tbody>
</table>

#### Milling

<table>
<thead>
<tr>
<th>Property</th>
<th>Tungsten Carbide ISO K 10 or ISO K 05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting speed m/min.</td>
<td>80 – 100</td>
</tr>
<tr>
<td>Rake angle</td>
<td>10°</td>
</tr>
<tr>
<td>Clearance angle</td>
<td>12°</td>
</tr>
<tr>
<td>Angle of incidence</td>
<td>6°</td>
</tr>
<tr>
<td>Setting angle at main tooth</td>
<td>45°</td>
</tr>
<tr>
<td>Machining</td>
<td>dry</td>
</tr>
</tbody>
</table>

#### Grinding

<table>
<thead>
<tr>
<th>Property</th>
<th>Silicon Carbide Wheels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardness</td>
<td>J, K</td>
</tr>
<tr>
<td>Grain size</td>
<td>40 – 120</td>
</tr>
<tr>
<td>Structure</td>
<td>medium</td>
</tr>
<tr>
<td>Binder</td>
<td>ceramic</td>
</tr>
<tr>
<td>Cutting speed m/sec.</td>
<td>30</td>
</tr>
<tr>
<td>Infeed</td>
<td>max. 0.02 mm</td>
</tr>
<tr>
<td>Machining</td>
<td>cooling with soluble oil coolant mixtures</td>
</tr>
</tbody>
</table>