Titanium Aluminides

_γ-TiAl TNM®-B1 Ingots_

**Manufacturing**

TiAl TNM®-B1 Ingots are manufactured by double or triple VAR melting with consumable electrodes. Consumable electrodes are made up of compacted Ti sponge, Aluminum and master alloys.

**Applications**

TNM®-B1 Ingots are used as feed stock materials for further thermomechanical processing to semi-finished products or γ-TiAl components.

**Chemical Composition**

Ti -43.5Al -4Nb -1Mo -0.1B (at.-%)

<table>
<thead>
<tr>
<th>Alloying Elements (wt.-%)</th>
<th>Ti</th>
<th>Al</th>
<th>Nb</th>
<th>Mo</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>bal.</td>
<td>28.6</td>
<td>9.2</td>
<td>2.3</td>
<td>0.026</td>
<td></td>
</tr>
<tr>
<td>+/- 0.7</td>
<td>+/- 0.5</td>
<td>+/- 0.5</td>
<td>+/- 0.5</td>
<td>+/- 0.05</td>
<td></td>
</tr>
</tbody>
</table>

**Impurities (wt.-ppm)**

<table>
<thead>
<tr>
<th>H</th>
<th>N</th>
<th>O</th>
<th>C</th>
<th>Fe</th>
<th>Ni</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>&lt; 200</td>
<td>&lt; 800</td>
<td>&lt; 200</td>
<td>&lt; 1000</td>
<td>&lt; 500</td>
</tr>
</tbody>
</table>

**Forms of Delivery**

Cylindrical ingots of 180 mm – 280 mm diameter and up to 1.200 mm length.

Surface conditions as-cast or mechanically machined.

Other sizes and individual customer specifications on request.

**Physical Properties**

- **Density:** 4.16 g/cm³
- **Hardness:** 350 HV10
- **Youngs Modulus (RT):** 150 GPa
  - (700 °C): 130 GPa
- **Microstructure consists of:**
  - _α₂/γ_ lamellar colonies
  - globular _β}/B2 grains
  - globular _γ_-TiAl grains
  - globular _α₂-/Ti₃Al grains

- **_Teutectoid:_** 1160 °C
- **_Tα-transus:_** 1250 °C
- **Working Temp.:** up to 850 °C

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