Datasheet

Nickel Alloy X - NiCrFeMo

Properties

Nickel Alloy X is a 3d printed from a nickel-based, solid solution strengthened powder product with chemistry similar to AMS 5536, EN 2.4665 and UNS N06002. The raw material has been developed to mitigate cracking when processing with SLM or DMLS 3d printing technologies.

The room temperature static properties of built and heat treated test samples have been shown to be comparable to those of AMS 5536 plate and well in excess of AMS 5390 cast material. Elevated temperature tensile and creep rupture data may be available upon request.

For reference purposes, Nickel Alloy X test parts were built using 40 µm layer thickness and built on a EOS M290 to provide data below. Properties may be optimised based on application specific requirements.

Application

- Aerospace: Gas turbine and airframe parts
- Power Generation: Gas turbine parts
- Parts for petrochemical applications
- Industrial furnace components

Chemical Composition: Weight Percent (nominal)

<table>
<thead>
<tr>
<th></th>
<th>Ni</th>
<th>Cr</th>
<th>Fe</th>
<th>Mo</th>
<th>Co</th>
<th>W</th>
<th>C</th>
<th>Mn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>20.5 - 23%</td>
<td>17-20</td>
<td>8-10</td>
<td>0.5 - 2.5</td>
<td>0.2 - 1</td>
<td>&lt;0.15</td>
<td>&lt;1.00</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Si</th>
<th>Cu</th>
<th>Al</th>
<th>Ti</th>
<th>P</th>
<th>S</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 1.0</td>
<td>&lt; 0.05</td>
<td>&lt; 0.05</td>
<td>&lt; 0.15</td>
<td>&lt; 0.04</td>
<td>&lt; 0.03</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

Mechanical Properties:

<table>
<thead>
<tr>
<th>Material Property</th>
<th>Unit</th>
<th>Heat Treated</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultimate Tensile Strength XY/Z</td>
<td>MPa</td>
<td>690 ± 10 / 690 ± 4</td>
<td>ASTM E8</td>
</tr>
<tr>
<td>Yield Strength XY/Z</td>
<td>MPa</td>
<td>393 ± 9 / 388 ± 5</td>
<td>ASTM E8</td>
</tr>
<tr>
<td>Elongation at Break XZ/Z</td>
<td>%</td>
<td>44 ± 6 / 70 ± 3</td>
<td>ASTM E8</td>
</tr>
<tr>
<td>Relative Density</td>
<td>%</td>
<td>&gt; 99.9</td>
<td>ASTM E1245</td>
</tr>
<tr>
<td>Hardness</td>
<td>HRB</td>
<td>94 ± 1</td>
<td>ASTM E18</td>
</tr>
</tbody>
</table>

This data sheet contains approximate values. These values are influenced by part’s geometry, additives, and environmental influences. They were developed based on current experiences and knowledge. Therefore, the above mentioned properties cannot be claimed legally binding nor can a definite purpose be derived.