**MATERIAL OVERVIEW**

- MHA3300® is a new superalloy developed by Mitsubishi Power for Additive Manufacturing (AM).
- This carbide-strengthened Co-based alloy is designed for high temperature structural applications in aerospace engines and industrial gas turbines.
- This alloy has an excellent creep strength and tensile behavior, similar to alloy Ni939, while having better ductility at high temperature up to 850°C, as well as a good oxidation resistance and a good microstructure stability to high temperature.

**KEY PROPERTIES**

<table>
<thead>
<tr>
<th>Mechanical (900°C)</th>
<th>Yield strength (MPa)</th>
<th>Z 213</th>
<th>XY 201</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ultimate tensile strength (MPa)</td>
<td>Z 306</td>
<td>XY 290</td>
</tr>
<tr>
<td></td>
<td>Elongation at failure %</td>
<td>Z 73</td>
<td>XY 112.2</td>
</tr>
<tr>
<td></td>
<td>Area reduction at failure %</td>
<td>Z 87</td>
<td>XY 96.9</td>
</tr>
<tr>
<td>Thermo-physical (25-1200°C)</td>
<td>Thermal conductivity (W/(m°C))</td>
<td>12.4 - 29.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specific heat (J/(kg°C))</td>
<td>434 - 620</td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>Density (g cm⁻³)</td>
<td>8.73</td>
<td></td>
</tr>
</tbody>
</table>

1All measurements are performed after heat treatment without HIP.

**PRINTABILITY**

MHA3300® parts show very low porosity content (below 0.02%) and are crack free in as-built state. Standard laser parameters of SLM280, EOS290, Concept Laser M2 have been developed and are available under request.

**POWDER CHARACTERISTICS**

Particle size distributions:

- Laser Beam Melting (powder bed): 15-53 μm
- Custom size distributions available on request

MHA3300® is well suited for gas atomisation

MHA3300® is available for R&T and series production.

Contact: powder@eramet.com
www.aubertduval.com

The above is for information only and does not create any binding contractual obligations. Pearl® is a registered trademark of Erasteel and is used under license by Aubert & Duval. MHA3300® is a registered trademark of Mitsubishi Power.

Contact: powder@eramet.com
www.aubertduval.com
**TENSILE PROPERTIES**

MHA3300® has a better strength than Ni939 by Conventional Casting (CC) at relatively low temperature and a little lower than Ni939 (CC) at higher temperature.

![Graphs showing tensile properties](image)

The MHA3300® test pieces are built by Concept Laser in vertical direction, and heat-treated. Test conditions in accordance to JIS G 0567:2020 evaluated at a strain rate of 0.3%/min until Yield strength and 7.5%/min until rupture.

**TENSILE DUCTILITY & REDUCTION OF AREA**

MHA3300® has better elongation and shrinkage properties than Ni939 (CC).

![Graphs showing ductility and reduction of area](image)

The MHA3300® test pieces are built by Concept Laser in vertical direction, and heat-treated. Test conditions in accordance to JIS G 0567:2020 evaluated at a strain rate of 0.3%/min until Yield strength and 7.5%/min until rupture.

---

The above is for information only and does not create any binding contractual obligations. Pearl® is a registered trademark of Erasteel and is used under license by Aubert & Duval. MHA3300® is a registered trademark of Mitsubishi Power.
LOW CYCLE FATIGUE (LCF)

MHA3300® has superior low cycle fatigue properties than commercial casting alloys M-M247, Ni939 and Ni738.

The MHA3300® test pieces are built by Concept Laser in vertical direction, and heat-treated. No HIP was performed. Test conditions in accordance to JIS Z 2279:1992.

STRESS RUPTURE PROPERTIES

The temperature capability of MHA3300® is close to 900°C (creep rupture: 59MPa-105h). MHA3300® shows much better better creep elongation than cast material at high temperatures.

It is suitable alloy for gas turbine static blade and shroud at high temperature in low stress conditions.

HIGH CYCLE FATIGUE (HCF)

MHA3300® has comparable level high cycle fatigue properties as that of M-M247 and Ni939.

The MHA3300® test pieces are built by Concept Laser in vertical direction, and heat-treated. No HIP was performed. Test conditions in accordance to JIS Z 2286:2003.

LONG TERM STABILITY

MHA3300® is confirmed to have very good microstructure stability at high temperature.

No degradation of tensile behavior is seen by 800°C tensile test after aging for 3000 h from 750 to 900°C.
The above is for information only and does not create any binding contractual obligations. Pearl® is a registered trademark of Erasteel and is used under license by Aubert & Duval. MHA3300® is a registered trademark of Mitsubishi Power.

Contact: powder@eramet.com - www.aubertduval.com