The Sapphire family of printers are capable of printing a variety of metals, depending on the need and use case. This flexibility gives engineers more options and configurations to achieve their goals. Furthermore, Velo3D participates in a NASA guided program to build a database of material properties. This process, while targeted at the qualification required for manned space flight, is highly applicable to many industries and helps to establish a set of design allowables for each material. Detailed material properties are available from our website or by contacting our engineering team.

<table>
<thead>
<tr>
<th>Image</th>
<th>Name</th>
<th>Known for</th>
<th>Typical Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Aheadd CP1" /></td>
<td>Aheadd CP1</td>
<td>Aheadd CP1 is Constellium’s new high-performance Aluminum-Iron-Zirconium powder, designed for laser powder bed fusion. Aheadd CP1 brings high strength and ductility, excellent thermal and electrical conductivity, high productivity LPBF processing, and simplified post-processing.</td>
<td>Ideal for heat transfer applications in the motorsport, defense and aerospace industries.</td>
</tr>
<tr>
<td><img src="image2.png" alt="Aluminum F357" /></td>
<td>Aluminum F357</td>
<td>A foundry-grade beryllium free aluminum-silicon alloy. It has excellent weldability and corrosion resistance and is heat treatable to T5, T6, and T7. It is a lightweight, corrosion resistant, and highly dynamic load-bearing material.</td>
<td>Ideal for heat transfer in the defense and automotive industries.</td>
</tr>
<tr>
<td><img src="image3.png" alt="Copper GRCop-42" /></td>
<td>Copper GRCop-42</td>
<td>A copper-chromium-niobium alloy, developed by NASA to additively manufacture parts in need of high-strength dispersion and high conductivity. It retains strength at temperature, has excellent creep resistance, and a low cycle fatigue life.</td>
<td>Valuable for rocket engine components such as fuel injector faces and combustion chamber linings with regenerative cooling.</td>
</tr>
<tr>
<td><img src="image4.png" alt="HASTELLOY® C22" /></td>
<td>HASTELLOY® C22</td>
<td>An alloy containing chromium, molybdenum, tungsten, and iron, making the alloy resistant to seawater corrosion with excellent weldability. Resistant to both uniform and localized corrosion and a variety of mixed industrial chemicals. Superior pitting, crevice attack, and stress corrosion cracking.</td>
<td>Used in corrosive environments with high chloride and high temperature conditions, such as flue-gas scrubbers, nuclear fuel re-processing, sour gas handling, and pesticide production.</td>
</tr>
<tr>
<td><img src="image5.png" alt="HASTELLOY® X" /></td>
<td>HASTELLOY® X</td>
<td>A nickel-chromium-iron-molybdenum alloy that is corrosion resistant. It possesses excellent forming and welding characteristics and is easy to fabricate with localized corrosion resistance and oxidation resistance up to 2200° F (1200° C).</td>
<td>Used in high temperature and corrosive atmosphere applications. Commonly used in gas turbines, energy generation applications such as transition duct, combustor cans, afterburners, and spray bars.</td>
</tr>
<tr>
<td><img src="image6.png" alt="forAM® HAYNES® 282®" /></td>
<td>forAM® HAYNES® 282®</td>
<td>A gamma-prime strengthened superalloy developed for high temperature structural applications, especially those in aero and industrial gas turbine engines. It possesses a unique combination of creep strength, thermal stability, weldability, and fabricability.</td>
<td>Ideal for high temperature applications such as gas turbine and power/process industry parts.</td>
</tr>
<tr>
<td><img src="image7.png" alt="HAYNES® 214® (UNS N07214)" /></td>
<td>HAYNES® 214® (UNS N07214)</td>
<td>A nickel-chromium-aluminum-iron alloy designed to provide the optimum high-temperature oxidation resistance, while at the same time allowing for conventional forming and joining. This alloy offers outstanding oxidation resistance to 2300° F (1260° C).</td>
<td>Ideal for high temperature, oxygen rich environments including turbo-machinery components found in rocket engines.</td>
</tr>
<tr>
<td><img src="image8.png" alt="Inconel® 625" /></td>
<td>Inconel® 625</td>
<td>A nickel-based superalloy that possesses high strength properties and resistance to elevated temperature. Shows remarkable protection against corrosion and oxidation. It has an ability to withstand high stress over a wide temperature range, both in and out of water, as well as resisting corrosion while exposed to highly acidic environments.</td>
<td>Ideal for nuclear energy and marine applications.</td>
</tr>
</tbody>
</table>
Inconel® 718

- **Image**
- **Name**: Inconel® 718
- **Known for**: A precipitation-hardenable nickel-based alloy known for superb tensile strength under extreme pressure and heat. It has rupture strength at temperatures up to 1290° F (700° C), and is characterized by its superb fatigue, creep and corrosion resistance in extreme environments.
- **Typical Applications**: Ideal for applications in gas turbine and power/process industry parts in aerospace, defense, and chemical industries.

M300 Steel

- **Known for**: M300 Steel is an ultra-low carbon alloy with very high strength and hardness properties derived from intermetallic compounds rather than carbon content. The material is comprised mainly of nickel, with cobalt, molybdenum, and titanium as secondary intermetallic alloying metals.
- **Typical Applications**: Ideal for tooling applications such as High Pressure Die Cast (HPDC) inserts, injection molding, and other types of tooling.

Scalmalloy®

- **Known for**: Made from scandium (Sc), aluminum (Al) and magnesium (Mg), it is the only AM alloy which substitutes for high strength 7000-series aluminum. It has outstanding properties in terms of weldability and low thermal expansion, and is well-suited for anodizing processes and offers good corrosion resistance.
- **Typical Applications**: Ideal for highly loaded, safety-critical parts exposed to high mechanical stress and which are required to be light weight.

Stainless 415

- **Known for**: Stainless Steel 415 is a chromium-nickel stainless steel with additional molybdenum. Stainless 415 exhibits high mechanical properties due to the concentration of molybdenum and nickel. Its molybdenum content also provides basic pitting and crevice corrosion resistance.
- **Typical Applications**: The combination of good corrosion resistance and excellent strength and toughness makes it a perfect candidate for mechanically highly stressed components in wet corrosive environments.

Ti 6Al-4V

- **Known for**: An alpha-beta titanium alloy characterized by its strength-to-mass ratio and corrosion resistance. It is a strong lightweight alloy suitable for highly loaded structures.
- **Typical Applications**: Used in jet engines, gas turbines, pressure vessels, and biomechanical components.

---

**Alloy Vendor Vendor Part Number**

- **Aheadd® CP1**
  - Vendor: Constellium
  - Part Number: Aheadd CP1

- **Aluminum F357**
  - Vendor: Tekna
  - Part Number: AlSi7Mg-63/20-F357

- **Aluminum F357**
  - Vendor: Tekna
  - Part Number: AlSi7Mg-63/20-C511

- **Aluminum F357**
  - Vendor: Valimet
  - Part Number: AM-357

- **Copper GRCap-42**
  - Vendor: Carpenter
  - Part Number: Carpenter CT-GRCop42-AAAA

- **Copper GRCap-42**
  - Vendor: KBM
  - Part Number: RocketPowder GRCU42015063ROC

- **Copper GRCap-42**
  - Vendor: Praxair
  - Part Number: TruForm Cu42-N30

- **Copper GRCap-42**
  - Vendor: Praxair
  - Part Number: TruForm Cu42-P55

- **Hastelloy® X**
  - Vendor: Praxair
  - Part Number: TruForm HXLC

- **Hastelloy® C22**
  - Vendor: Oerlikon
  - Part Number: MetcoAdd 6022A

- **Hastelloy® C22**
  - Vendor: Praxair
  - Part Number: Truform 22

- **Haynes® 214**
  - Vendor: Haynes
  - Part Number: TruForm 214-N51

- **Haynes® 282**
  - Vendor: Höganäs
  - Part Number: Amperprint 0233, Haynes 282

- **Inconel® 625**
  - Vendor: Carpenter
  - Part Number: CarTech Micro-Melt 625

- **Inconel® 625**
  - Vendor: Praxair
  - Part Number: Truform 625-2

- **Inconel® 625**
  - Vendor: Tekna
  - Part Number: Implytek Ni-625

---

**Alloy Vendor Vendor Part Number**

- **Inconel® 718**
  - Vendor: Böhler Edelstahl
  - Part Number: Böhler 1718 AMPO

- **Inconel® 718**
  - Vendor: Carpenter
  - Part Number: PowderRange 718F

- **Inconel® 718 API**
  - Vendor: Oerlikon MetcoAdd
  - Part Number: OptiPowder 718

- **Inconel® 718**
  - Vendor: Praxair
  - Part Number: Truform 718-35

- **M300 Steel**
  - Vendor: Praxair
  - Part Number: FE-339.3

- **Scalmalloy®**
  - Vendor: Toyo Alum.
  - Part Number: SCALMA408S

- **Stainless 415**
  - Vendor: Carpenter
  - Part Number: Carpenter CT 415-AADV 45-90 µm

- **Ti 6Al-4V grade 5**
  - Vendor: AP&C
  - Part Number: Ti6Al-4V grade 5 45-106µm

- **Ti 6Al-4V grade 5**
  - Vendor: Tekna
  - Part Number: TEKMAT Ti64-53/20, grade 5

- **Ti 6Al-4V ELI grade 23**
  - Vendor: Tekna
  - Part Number: TEKMAT Ti64-53/20, grade 23

- **Ti 6Al-4V grade 23**
  - Vendor: AP&C
  - Part Number: Ti6AI-4V grade 23 15-53

- **Ti 6Al-4V grade 23**
  - Vendor: Carpenter
  - Part Number: Purish Ti 6AI-4V ELI Grade23 15-45

- **Ti 6Al-4V grade 23**
  - Vendor: Praxair
  - Part Number: TruForm 64-23