Sapphire® Printer

The VELO3D Sapphire is the next generation in metal laser powder bed fusion. While conventional systems often require supports for any surface below 45 degrees, Sapphire uniquely enables designs with overhangs down to zero degrees.

Sapphire is designed from the ground up with production in mind. Offering the same SupportFree capability and quality control in two different build volumes, Sapphire supports a comprehensive list of applications.

Sapphire integrates with VELO3D Flow™ pre-print software and Assure™ quality assurance and control system.

Production-Level Additive Manufacturing

Enabling SupportFree™ Geometries
Low angles down to zero degrees (vs 45 degrees with conventional AM) enables impossible geometries and significantly less post processing
Large inner diameters up to 100 mm (vs 10 mm with conventional AM) enables manifolds, volutes and crossovers
High aspect ratios up to 3000:1 (vs 8:1 with conventional AM) enables high performance heat exchangers and assemblies

Made for Production
Our cylindrical 315 mm diameter build chamber is now available in 400 mm and 1000 mm configurations
Both feature dual kW lasers for faster printing and our proprietary non-contact recoater to reduce the risk of part collisions
In-situ metrology sensors enable visibility into the quality of every layer of the build
Calibration requires no external instrumentation enabling runtime and one-click optics calibration
Continuous powder handling and inert powder unpacking included

Configurations Available:
Standard (400 mm)
1MZ (1000 mm)
**VELO 3D**

Sapphire Printer

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**Laser and Optics Fidelity**
- Run-time and one-click optics calibrations
- Self-cleaning laser windows

**Powder Bed Uniformity**
- Non-contact recoater
- Per-layer 3D powder bed height mapping
- Full-height printing without interruption for powder addition or filter changes

**Environmental Control**
- Sub-10 ppm $O_2$ during normal operation
- Active humidity monitoring
- Ambient temperature and pressure operation
- Highly regulated chamber gas flows
- High efficiency spatter removal

**1MZ Features**
- 1000mm tall build volume
- Same SupportFree capabilities with identical build parameters as standard Sapphire

**SupportFree Metal 3D Printing**

VELO\textsuperscript{3D} separates itself from existing powder bed fusion solutions with its unique ability to print low angles and overhangs down to zero degrees, as well as large diameters and inner tubes up to 100 mm without the need for supports.

This not only reduces the need for post-processing, but it overcomes the “45 degree rule” for conventional AM which recommends supports for any any surface less than 45 degrees. VELO\textsuperscript{3D} frees designers to build the impossible – unlocking a wealth of designs that can now be produced with additive technology.

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**System Features**

<table>
<thead>
<tr>
<th>Lasers:</th>
<th>Dual 1 kW laser</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser class:</td>
<td>Class 1</td>
</tr>
<tr>
<td>Materials:</td>
<td>IN718, Ti6Al4V, Al357</td>
</tr>
<tr>
<td>Typ. throughput:</td>
<td>Up to 60 cc/hr</td>
</tr>
<tr>
<td>Typ. surface finish:</td>
<td>5-15 µm Sa</td>
</tr>
<tr>
<td>Size (L x W x H)</td>
<td>2.1 by 2.1 by 2.5 m (82.5 by 82.5 by 98 in)</td>
</tr>
<tr>
<td>Size (1MZ)</td>
<td>2.1 by 2.1 by 2.5 plus 1.37 m (54 in) pit</td>
</tr>
<tr>
<td>Weight</td>
<td>5700 kg (12,560 lbs)</td>
</tr>
<tr>
<td>Weight (1MZ)</td>
<td>5900 kg (12,980 lbs)</td>
</tr>
</tbody>
</table>

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Unlock SupportFree Capabilities for your company

info@velo3D.com

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