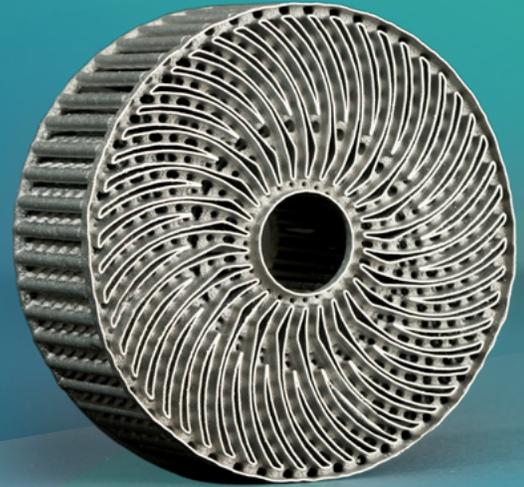


Direct Metal Printing (DMP)

Direct Metal Printing (DMP), also known as DMLS or SLM, is an additive manufacturing technology that builds high quality, complex metal parts from 3D CAD data in a variety of standard engineering metal alloys.



A high precision laser is directed on to metal powder bed, selectively melting and building up thin horizontal metal layers. This technology allows for the production of metal parts with challenging geometries, not possible using traditional subtractive or casting technologies.

- 3D Systems' own range of printers and materials: Expertise over the complete process chain
- Class leading surface finish
- Fully dense
- Lowest oxygen content from build chamber vacuum and argon back fill
- High build height



Lead Time

Typically 1-2 weeks



Dimensional Limitations

Up to 275 x 275 x 420 mm
(10.82 x 10.82 x 16.53") in a single piece



Applications

- Motorsport components
- Tool and die making
- Biocompatible applications
- Turbomachinery
- Chemistry and petrochemistry
- Aerospace engines
- Automotive parts
- Medical and veterinary devices
- Heat exchangers
- Air/oil/fuel mixing devices
- Customized sporting goods
- Industrial burner parts
- Radiation collimators
- Semiconductor and wafer handling equipment
- Customized production line equipment

Advantages

- Production of small, fine and extremely complex shapes without the need for tooling
- High quality parts ideal for R&D and serial part manufacturing
- Ideal for part consolidation and assembly simplification
- Industry's best surface finished parts with exceptional accuracy
- Accommodate innovative part design versus conventional processes
- Topology optimized parts and mass customization
- Complex and thin-walled structures allow significant lightweighting
- Post print machining operations available to meet tolerances & surface finishes of final end use products



Materials

3D Systems offers a variety of metal powders to help achieve your part requirements. Materials available are:

LaserForm Stainless Steel 316L:

An extra low carbon grade of 316. This steel is used as a general purpose material with excellent mechanical and corrosion properties at room temperature. Its chloride resistance makes this specific grade of stainless steel suitable for marine applications.

316L stainless steel is also the preferred material for use in hydrogen atmospheres or for hydrogen piping / cooling applications, retaining good mechanical properties at sub-zero and even cryogenic temperatures and is suitable for structural components in low-temperature applications.

LaserForm Maraging Steel 18Ni300:

This steel is easily heat-treatable in a simple age-hardening process resulting in excellent hardness and strength. It has good wear resistance and offers excellent weldability and machinability.

It is ideal for innovative tool and mold designs including conformal cooling channels for injection molding, die casting and extrusion. The material is also used for high-performance aerospace, automotive and other industrial applications which require high strength and wear resistance.

LaserForm Ni625 (Inconel 625):

Ni625 is known for its combination of high strength, high temperature resistance and excellent corrosion resistance. LaserForm Ni625 is the ideal material for industries where these two strengths need to come together, whether that's chemical, marine, aerospace, auto-sport or nuclear industry.

Applications include reaction vessels, tubing, heat exchangers, valves, engine exhaust systems, turbine seals, propeller blades, submarine fittings, propulsion motors, reactor core and control-rod components in nuclear water reactors.

LaserForm Ni718 (Inconel 718):

LaserForm Ni718 is a nickel-based heat resistant alloy. This precipitation-hardening nickel-chromium alloy is characterized by good tensile, fatigue, creep and rupture strength at temperatures up to 700°C, with outstanding corrosion resistance in various corrosive environments as well as excellent cryogenic properties.

It is ideal for many high temperature applications such as gas turbine parts, instrumentation parts, power and process industry parts etc. Parts can be posthardened to 40 HRC by precipitation-hardening heat treatments. The parts can be machined, spark-eroded, welded, shot-peened, polished and coated if required.

LaserForm Titanium Ti6Al4V:

This titanium alloy is commonly used for lightweight and high strength components such as aerospace and motorsports applications. Because of its excellent biocompatibility Ti6Al4V is also very well suited for medical implants, tools and devices and dental prostheses.

LaserForm AlSi10Mg:

AlSi10Mg combines silicon and magnesium as alloying elements, which results in a significant increase in strength and hardness compared to other aluminum alloys. Due to the very rapid melting and solidification during Direct Metal Printing, LaserForm AlSi10Mg in as-printed condition shows fine microstructure and high strengths.

In the aerospace and automotive industry, LaserForm AlSi10Mg is used for its light weight. Both innovative approaches to mold design and specific heat exchanger applications make use of the high thermal conductivity of this alloy.



Finishing & Post Processing

DMP parts can be finished in a variety of ways, from sanding of surfaces and bead blasting, through to polishing and anodising. Additional post processes are also available including heat treatments, 5 axis CNC machining and EDM to achieve the performance requirements you need.

3D Systems has a wealth of experience in producing reliable and repeatable metal parts using additive manufacturing and can give invaluable advice on where it can be best deployed, best practices and further consultative advice where needed.



Want to explore the options best suited to your project's requirements?

Contact our team at:
ondemand.uk@3dsystems.com
+44 (0) 1494 479690