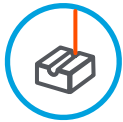


Metal 3D Printing

Produce complex geometries in one fluid build with Direct Metal Laser Melting (DMLM) that would be impossible to compose with traditional manufacturing. Additive metals deliver dense, corrosive resistant and high strength parts which can be further treated through heat, coating and sterilization.

DMLM MANUFACTURING PROCESS



DMLM build

A precise, high-wattage laser micro-welds powdered metals and alloys to form functional metal parts from your CAD model.



Support removal

Parts are detached from the build plate and support structures are removed.



Shipment

Metal parts are carefully packaged and shipped.



Stress relief

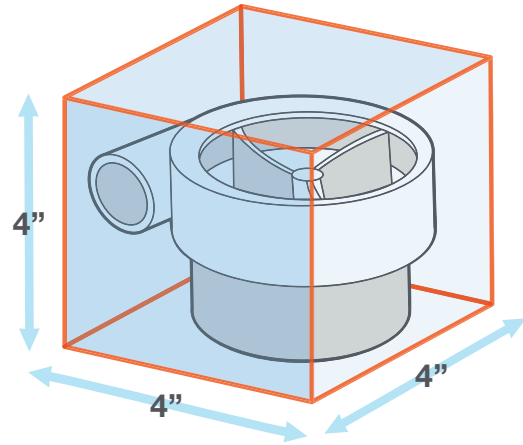
Parts are heated to reduce the internal material stress within the part and is required for Stainless Steel 316L and Aluminum.



Quality inspection

Our certified systems ensure parts are within the parameters defined by your project requirements.

IDEAL PART SIZE 4 IN³ OR LESS



CHOOSING THE RIGHT METAL

Identifying the perfect combination of strength to weight and corrosion resistance is not always an easy task

- + Cobalt Chrome has high wear resistance
- + Stainless Steel 316L offers excellent weldability and corrosion resistance
- + Titanium Ti64 produces extremely strong yet light parts
- + Nickle Alloy 625 possess high strength without ever having to go through heat treatments
- + AISi10Mg is ideal for low weight and good thermal properties

DMLM materials	Ultimate tensile strength	Elongation	Operating Temperature	Hardness
Aluminum (AISI10Mg)	55 ksi (379 MPa)	7%	750°F (399°C)	64 HRB
Stainless Steel (316L)	78 ksi (538 MPa)	50%	1,200°F (649°C)	85 HRB
Nickel Alloy (625)	146 ksi (1,010 MPa)	42%	1,600°F (871°C)	29 HRC
Cobalt Chrome (CoCr)	152 ksi (1,050 MPa)	10%	2,100°F (1,149°C)	38 HRC
Titanium Ti-64	166 ksi (1,140 MPa)	11%	1,112°F (600°C)	42 HRC

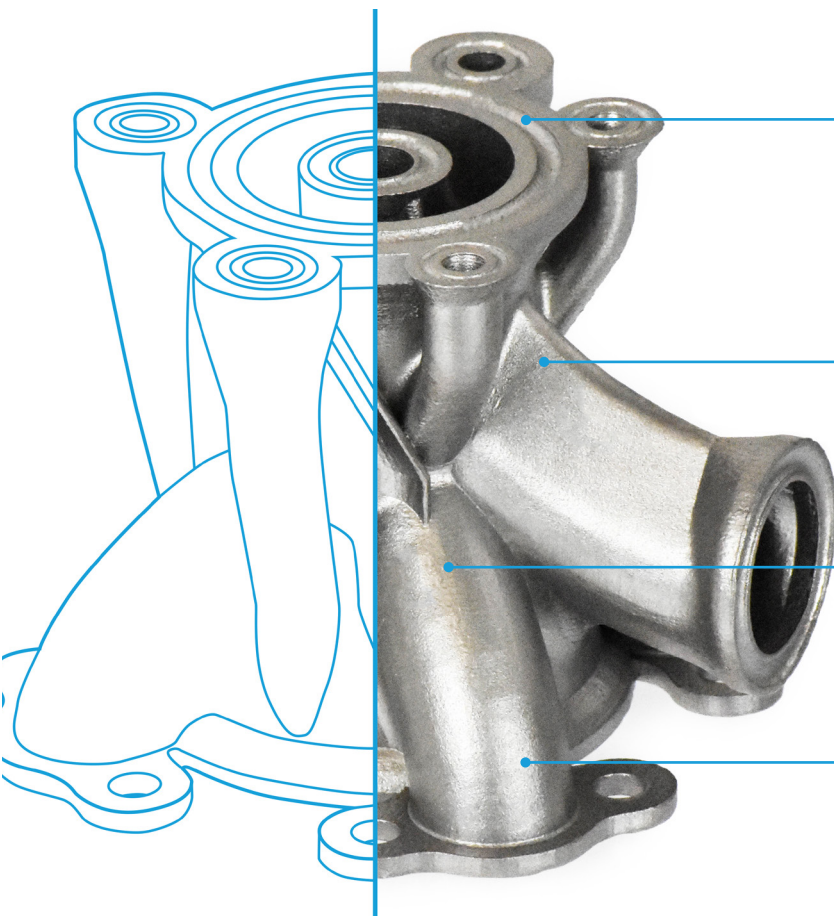
Design tips

When identifying or designing parts for metal printing, it can seem overwhelming. Here are some recommendations that will help achieve better part. Many of these design guidelines are universal for the DMLM process but staying within the geometric recommendations will help ensure that parts turn out as desired.

- + Avoid thin walls
- + Features under 1mm can be an issue
- + 45 Degree chamfers are best
- + 8:1 Aspect ratio for max H:W
- + Escape holes may be required

DMLM Design Specifications

Resolution	20 – 60 μ m (Z resolution)
Minimum feature size	0.012" – 0.016" (300-400 micron) is achievable depending on geometry
Ideal minimum wall thickness	0.06" (1.5mm)
Standard as-built tolerances (XY)	\pm 0.005" for the first inch and \pm 0.002 in./in. whichever is greater



DMLM BENEFITS

ABSORB FEATURES

Additive metal has the ability to absorb features at the cad level and produce what once was a multi part assembly can add enormous value and/or reduce development time.

GEOMETRY WEIGHT REDUCTION

Produce parts that are stronger than previously allowed. Metal printed parts can be up to 60% lighter than their machined counterparts.

SPEED OF DEVELOPMENT

The casting process can take 6-9 months to get the production process vetted. With additive metal we shorten lead times to days vs. months.

ENDLESS POSSIBILITIES

With DMLM you can create usable parts that were once impossible to manufacture.



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