Facilities

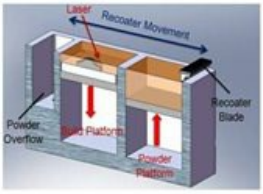
The AMPLab hosts a number of industrial scale facilities, including:

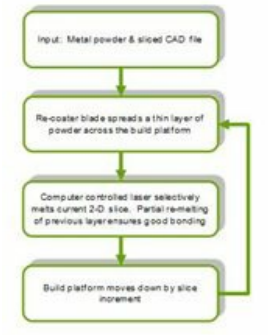
Open all sections

Selective Laser Melting/Laser Powder Bed

Process Overview

Selective laser sintering or laser powder bed is an additive manufacturing technique for building components layer-by-layer. Thin layers of powders are selectively melted by a focuser laser beam and fused sequentially to build a 3D component from a CAD model.





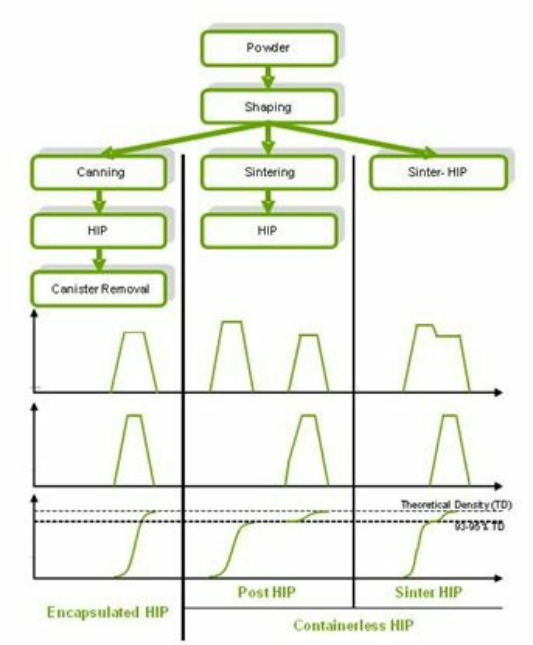
CONCEPT M2 Cusing System:

- Argon atmosphere for the processing of reactive powder systems
- Net shape manufacture of fully dense components
- Build envelope 250 x 250 x 280mm
- Layer thickness 20 - 50µm
- Production speed 2 – 20cm^3/hr (depending on material)
- Fiber laser system (400W, cw)
- Maximum scanning speed 7m/s
- Focus diameter 70 - 200µm

Hot Isostatic Pressing (HIP)

Process Overview

During hot isostatic pressing powder is consolidated into desired geometries through the application of temperature and isostatic pressure.



Encapsulated HIP – allows pressure-aided densification over the complete range from green compact density to theoretical density.

Post HIP – densification of pre-sintered compacts (90-93% TD).

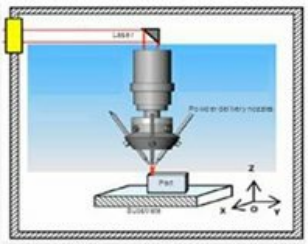
Sinter HIP – continuous process combining pressureless sintering followed by a HIP cycle without intermediate cooling of the compact.

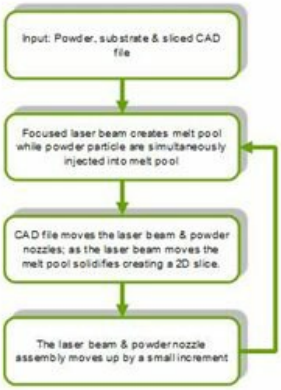
- Maximum pressure: 200MPa
- Maximum temperature: 1450°C
- Vessel size: Ø120mm x 300mm

Direct Laser Fabrication (DLF)

Process Overview

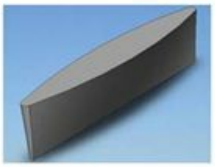
Direct laser fabrication is an additive manufacturing technique for building components layer-by-layer by direct deposition of powders in a melt pool. Powders are injected into a focused laser beam to create a melt pool; the powder is rapidly melted and solidified as the laser scans over each layer building 3D components





Key Features

- Near net-shape components can be easily fabricated
- Compositionally graded materials can be fabricated
- Wear resistance and corrosion properties of components can be improved by cladding
- Damaged components can be easily repaired (e.g. airfoils blades etc)



CAD model

DLF Cladding of a pipe

DLF Build

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