Powder Bed Fusion

METAL ADDITIVE MANUFACTURING



What is Powder Bed Fusion?



Powder Bed Fusion (PBF) is the most widely used AM technology today

85%

Additive Manufacturing machine sales internationally





Click image to watch video

Metal powder bed fusion consists of spreading thin layers of metal powder on a tray and then melting the metal with one or more lasers.

When a layer is made, a spreading device (roller, scraper or brush) deposits a new layer of powder and the cycle starts again until the finished part is obtained.



Advantages of PBF

Advantages

- Unleash your creativity with PBF. Produce and customize parts with complex geometries.
- Lighten your metal parts! With the PBF you eliminate the volume of useless material mechanically. The material savings can then be recycled.
- Add functions to your part, such as internal channels with complex shapes
- Print parts without support and therefore less post-processing
- Print the part all at once and in one block. Save production time.
 No welding or assembly work, no risk of leakage.
- Optimize your part to become more efficient.

Generate added value through PBF applications

- Improve the performance of metal parts
- Reduce the weight of the parts
- Improve heat exchange and fluid circulation
- Improve system reliability
- Generate value





Improving Performance of Metal parts

The principle of layered construction allows for the printing of complex shapes that are impossible to obtain by conventional means.



Reduction of Part Weight

The PBF process allows the printing of hollow or hollowed parts resulting from topological optimization.

This PBF technique consists in depositing material only where it is needed. The part is lighter while keeping its mechanical and thermal characteristics. There is also a significant reduction of raw material needed.



Reduction of 304 cm³



Original part



Optimized part



3D printed part



Example: hydraulic manifold - aeronautics







Original machined part

Volume: 351 cm³ Weight: 1.5 kg



Optimized part V1 Volume: 53 cm³

Same cylinders and fasteners to the original machined part.



Optimized part for PBF V2

Volume: 47 cm³ Weight: 200 g 3D metal printed without support



Example: hydraulic manifold - aeronautics





3D metal printed part TA6V (Titanium) No supports 12 parts on a plate TA6V (Titanium) Fusion time for 2 layers: 27h 35 min Bidirectional layering



Significant reduction of part weight and optimized flow path.

-40%

3D printed Hydraulic manifold Titanium Gain of 1.3 kg and -304 cm³



Improve Heat Exchange / Fluid Circulation

The PBF technology is used to create complex surfaces or to create internal channels within the part, with complex geometries (curved bends, network), designed for a better distribution of fluids and resistance to high pressures.



Material deposition where it is necessary to take up the forces and ensure the functionality of the part (fluid guidance).



Improve System Reliability



With PBF it is possible to print a part all at once.

No more assembling, soldering, or screwing components together to create a part. PBF reduces assembly, adjustment and maintenance costs and improves the reliability of solutions.

> A part printed in Additive Manufacturing extends the service life of a system.

Generating Value

PBF can help to produce better performing parts, save money, and imagine new products or services.







More information at:

www.addupsolutions.com