HYBRID PISTON

Dimensions: 102 x 92mm
Weight: 2.3kg

OBJECTIVE
Proof of concept: demonstrate the feasibility of a multi-material part made with PBF and DED

RESULTS
- Multi-material part combining steel and Inconel 625
- Proven ability of PBF to create complex structures
- Proven ability of DED to add metal to an existing part

CONTEXT
In 2019, AddUp and its subsidiary BeAM worked together to manufacture a high-performance piston concept using two metal additive manufacturing technologies: Laser Powder Bed Fusion Laser (PBF) and Directed Energy Deposition - Powder (DED)

MULTI-TECHNOLOGIES AND MULTI-MATERIALS
The demonstrator has a lower part made with PBF technology. The inside of the volume contains lattice structures to show the ability of PBF to produce low mass parts
AddUp designers also integrated channels into the walls of the part to demonstrate the ability of the FormUp 350 machine to create complex internal channels.
BeAM experts then added ring structures on top with the Magic 800 machine and developed a formula to weld Inconel 625 on steel, proving the ability of DED to create coatings on existing parts improving their temperature resistance

Steel and Inconel® 625
Sectional view of the inside of the part obtained with PBF (before addition of material with DED)

THE ADDUP ADVANTAGE
This project demonstrates the ability of AddUp to produce a multi-materials part with two additive technologies.

Improved wear resistance
Inconel® 625 helps to withstand very high temperature
Deposited fast with no support

Improved performance
Lattice helps to provide a lightweight structure
Internal fluid channels assist in cooling