Designing for Additive Manufacturing: Lightweighting a 3D Printed Metal Part

Original Part 10.33 lbs

New Part 5.95 lbs

~100 hr build time

EOS M280 IN718 Powder

IN718 Powder

Final Build Layout

Precision & Quality Measurements Lab

Dimensional Analysis (in mm)
- Build Height: 135.612, 135.645
- Diameter: 81.082, 81.041
- Cylindricity: 0.134, 0.173
- Perpendicularity: 0.052, 0.069
- Flatness (Top): 0.075, 0.059
- Parallelism (Top): 0.07, 0.078
- Inner Circle (Right): 4.879, 4.800
- Inner Circle (Left): 4.808, 4.813

3D Model
Lattice Refinement

Unit Cells

Parameters
- Cell Size
- Strut thickness

Design Workflow

Boundary Conditions
Deflection Analysis

Finite Element Modeling (FEM) Analysis
Factor of Safety Analysis

Plastic Prototype (~96 hr build time)

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