

# LENS™ 850-R

## Proven Industrial Additive Manufacturing System for Repair, Rework, Modification and Manufacturing

LENS 850-R is a state-of-the-art Additive Manufacturing system, using advanced alloys to restore the functionality of high value metal components.



LENS 850-R System



Impeller repaired by LENS 850-R System

The LENS 850-R system offers a large 900 x 1500 x 900mm working volume, making it ideal for repair, rework and modification of large industrial components. The LENS 850-R uses a high-power IPG Fiber Laser to build up structures one layer at a time directly from metal powder. The resulting material has mechanical properties that can be equivalent to or superior than the original component. The 850-R offers a full range of features, including 5-axis CNC-controlled motion, closed-loop controls, and full atmosphere control. These features, backed by Optomec's full application and service support, make the 850-R the system of choice for industrial additive manufacturing users.

### FEATURES

- ▶ Large working volume - ideal for blisks, impellers and shafts
- ▶ 5-axis motion - rotary and complex repairs
- ▶ Closed-loop controls – precision process control
- ▶ Fiber Lasers – Reduced cost of ownership
- ▶ Full software suite – generate toolpaths rapidly
- ▶ Full atmosphere control – superior material quality
- ▶ Common materials: Inconel Alloys, Stainless Steels, Titanium alloys

### APPLICATIONS

- ▶ Repair of worn components
- ▶ Rework of mis-machined components
- ▶ Modification of tooling for re-use
- ▶ Hybrid Manufacturing
- ▶ Advanced Product Development

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**OPTOMECS**  
Additive Manufacturing Systems—from NANO to MACRO™



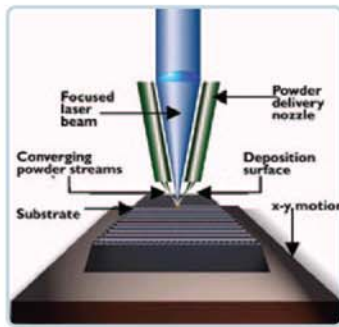
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## Laser Engineered Net Shaping



### How the LENS system works:

LENS systems utilize a high-power laser together with powdered metals to build fully dense structures directly from a 3-dimensional CAD solid model. The CAD model is automatically sliced into a tool-path, which instructs the LENS machine how to build the part. The part is constructed layer by layer under the control of software that monitors a variety of parameters to ensure geometric and mechanical integrity. The LENS process is housed in a chamber which is purged with argon such that the oxygen level stays below 10 parts per million to ensure there is no impurity pick-up during deposition. The metal powder is fed to the process by Optomec's proprietary powder-feed system, which is able to flow small quantities of powder very precisely. When complete, the part is removed and can be heat-treated, Hot-Isostatic-Pressed, machined, or finished in any other manner.



Defense Housing  
Fabricated by LENS System



Compressor Blade  
Repaired by LENS System



Exhaust Duct  
Fabricated by LENS System

## LENS 850-R Typical Performance Parameters

Process Work Envelope	900 x 1500 x 900 mm
Enclosure	Class I Laser Enclosure, Hermetically sealed to maintain process environment and Safety
Motion Control	5-axes standard: XYZ linear gantry motion Tilt-Rotate worktable All axes under full CNC control
Positional Accuracy	± .25mm
Linear Resolution	± .025 mm
Motion Velocity	60 mm/s
Deposition Rate	Up to 0.5 kg/hr
Parts Handling	Tilt-Rotate table tilts +/- 90°, infinite rotation. Rails and part cart allow table to move through machine and out. 38 cm diameter antechamber.
Gas Purification System	Dual unit maintains O2 level continuously ≤ 10 ppm
Powder Feeder	Two feeders each hold up to 14 kg of powder
Lasers	1, 2, 3, or 4 kW IPG Fiber Laser
Software	G-code Workstation Control; STL Editing; Part-Prep slicing
Closed-Loop Controls	Optional melt-pool-sensor
Enclosure Dimensions	3 x 3 x 3 m w/o gas purification system or laser

### ABOUT OPTOMECH

Optomec® is the world leading provider of additive manufacturing systems for high-performance applications in the Electronics, Biomedical, Photovoltaic, and Aerospace & Defense markets. These systems utilize Optomec's patented Aerosol Jet Printed Electronics technology and LENS powder-metal fabrication technology.

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