

LENS[®] PRINT ENGINE

Add Laser Deposition Capability to Any CNC Machine Tool

The LENS Print Engine provides Optomec industry proven metal 3D Printing technology in a modular form and makes it available for integration with other metal working platforms such as mills, lathes, robots, custom gantries, or table system. Now metal deposition and machining can be performed in the same system allowing you to leverage capital assets and accelerate implementation of additive technology through an HMI already familiar to your machinists.



New or Pre-Owned CNC Machine Tool



LENS Additive Repair

The modular LENS Print Engine components include Optomec proprietary SteadyFlow™ Powder Feeders, LENS Process Head with interchangeable nozzles, SmartAM™ closed loop process controls, fiber laser support, integrated tool path generation software, and full safety packages. Combined with a CNC machine tool, the LENS Print Engine simplifies metal fabrication applications such as net shape rapid prototyping, hybrid manufacturing, full production, in-situ repair, manufacturing rework and more.

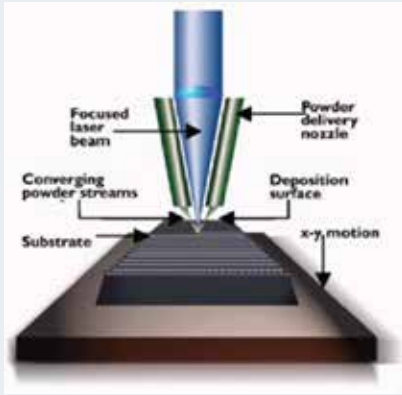
LENS FEATURES

- ▶ Industry-leading Deposition Heads
- ▶ Best-in-Class Powder Feed System
- ▶ Industry Proven Control System
- ▶ Integrated Toolpath Generation Software
- ▶ Support for fiber-delivered lasers, including IPG
- ▶ Full Safety Packages

LENS APPLICATIONS

- ▶ Net Shape Rapid Prototyping & Manufacturing
- ▶ Hybrid Manufacturing
- ▶ Manufacturing Rework
- ▶ In-situ Repair
- ▶ Addition of Wear Surfaces
- ▶ Cladding and Surface Modification

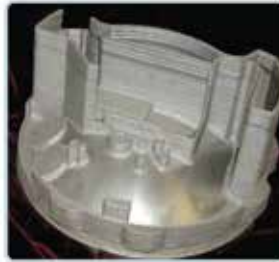
Laser Engineered Net Shaping



LENS® Deposition Head

How the LENS Print Engine works:

LENS Print Engine 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 Print Engine is housed in any suitable machine tool – a CNC mill, a lathe, a vertical or horizontal machining center, a robot, gantry, or any other suitable motion package. Optomec's LENS Print Engine Control System provides full industrial CNC control of both the LENS Print Engine components and the machine tool itself. Add appropriate safety systems, Optomec's applications knowledge and process support, and a full system can be implemented in any machine shop.



Defense Housing
Fabricated by LENS/CNC Process



Compressor Blade
Repaired by LENS System

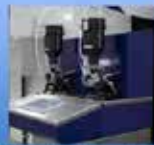


Exhaust Duct
Fabricated by LENS System

LENS Print Engine Example Installations

FEATURE	POSSIBLE INSTALLATION
Motion	Vertical or horizontal machining center, new or used Robot or Custom Gantry
Controller	Customer-supplied control, with M-codes for LENS Engine control
Toolpath Generation	Art-to-Part Toolpath Software Conversational Toolpath Generation Utilities
Deposition Head	LENS Process Head with Interchangeable Nozzles
Powder Feeder	SteadyFlow Powder Feed System, up to 8 powder feeders per LENS Print Engine system
Laser	IPG Fiber Laser from 500 W to 3 kW Other Fiber Delivered Lasers
Safety	Full safety packages, including laser-safe glass and interlocks
Key Process Variable Monitoring	SmartAM Closed Loop Process Controls for Layer to Layer & Part to Part Consistency
Process Parameters	Full training in process, operation and maintenance
Support	Full Optomec applications and service support

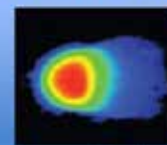
LENS PRINT ENGINE – For Structural Metals



Powder Feeders



Print Nozzles



Process Controls



Tool Path Software

ABOUT OPTOMECC

Optomec® is the world-leading provider of additive manufacturing solutions for high-performance applications in the Electronics, Solar, Medical, and Aerospace & Defense markets. These systems utilize Optomec's patented Aerosol Jet Printed Electronics technology and LENS powder-metal fabrication technology. The company has a global customer base of more than 200 users that includes many industry-leading manufacturers.