



SYNERGY
ADDITIVE MANUFACTURING, LLC.



**ADDITIVE MANUFACTURING
+ LASER HEAT TREATING**

LASER HEAT TREATING

Laser heat treatment is a process in which a laser beam illuminates the surface of a metal part as a means of delivering heat to it. The laser raises the temperature of the metal's surface above its metallurgical transformation temperature. When the laser heat source is removed, the thermal mass of the metal provides rapid quenching of the heated area by conductive heat removal, resulting in the desired hardness. The details of the laser beam's operation can be fine-tuned so as to exert precise control over all aspects of the hardening process.

ADVANTAGES

- Consistent hardness depth
- Higher hardness & outstanding wear properties
- Minimal to no distortion
- No post hard milling is required on most automotive dies
- Precise application of beam energy to the work spot

APPLICATIONS

- Automotive tool & dies
- Large gears & shafts
- Transmission shafts
- Pump components
- Bearings

ADDITIVE MANUFACTURING

SAM performs laser additive manufacturing by using an approach called directed energy deposition (DED). In this approach, complex shapes and geometries are built layer-by-layer using a powder nozzle attached to a gantry system or robot. Compared to other laser-based additive manufacturing techniques such as direct metal laser sintering (DMLS) or selective laser melting (SLM), the deposition rates using the DED approach are substantially higher.

ADVANTAGES

- Low heat input process
- Near net shape results—minimal post deposition machining is required
- 99.95% or higher density in manufactured parts
- Large build volumes are possible

APPLICATIONS

- Creation of complex 3D parts
- Rapid prototyping
- Molds & dies



LASER CLADDING

While laser additive manufacturing involves building entire components layer-by-layer, laser cladding typically involves adding only a few layers of deposited material to dimensionally restore or enhance the surface characteristics of an existing component.

ADVANTAGES

- Delivers substantially less heat to the substrate
- Minimal to no distortion
- Minimal dilution of the deposited or substrate material
- Low heat affected zone (HAZ) in the existing component

APPLICATIONS

- Hardfacing
- Corrosion resistant coatings
- Dimensional restoration
- Repair & rebuilding of tooling, dies, & other components

AUTOMATION & SYSTEM INTEGRATION

CUSTOMIZED SYSTEMS

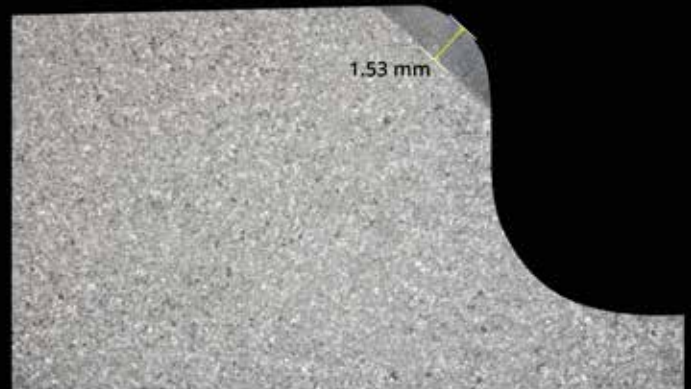
- Robotic or CNC based motion systems
- Laser sources & Class I laser safety enclosures
- High speed robust processing heads, optics, & accessory equipment
- Complete integration of all peripherals with PLC & HMI
- Tool path programming software

CONTRACT R&D

R&D is vital in order to stay ahead of the competition. SAM heavily invests in internal R&D and offers contract-based research services to its customers. Contact us to discuss how we can transform your research project into a successful commercial application.

SERVICES

- Short & long term research contracts
- Joint research projects with shared costs
- Partnerships with other small businesses & universities
- Collaborative research proposal submissions for SBIR, OTA, & other government grants



6510

2 mm



WHO WE ARE

Synergy Additive Manufacturing, LLC (SAM) specializes in high power laser-based solutions for complex manufacturing challenges related to wear, corrosion, and tool life. We provide job shop services for laser heat treating and metal-based additive manufacturing. We strive to provide innovations that benefit everyone in the manufacturing industry. Making it smarter, faster, easier, and cheaper for you to keep the world turning.

CERTIFICATION: ISO 9001:2015

CONTACT US

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LOCATION

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ADDITIONAL SERVICES



Synergy Prototype Stamping, LLC, specializes in prototype and short run production of sheet metal stampings for the automotive, military, commercial, off-road, and HVAC industries. We have extensive experience in tool and die, as well as a full machine shop capable of building soft tools, line dies, progressive dies, and more. In house we have full design, CNC milling, CMM inspection, 3 & 5-axis laser cutting and other metalworking services. If it's metal, we can make it happen!

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