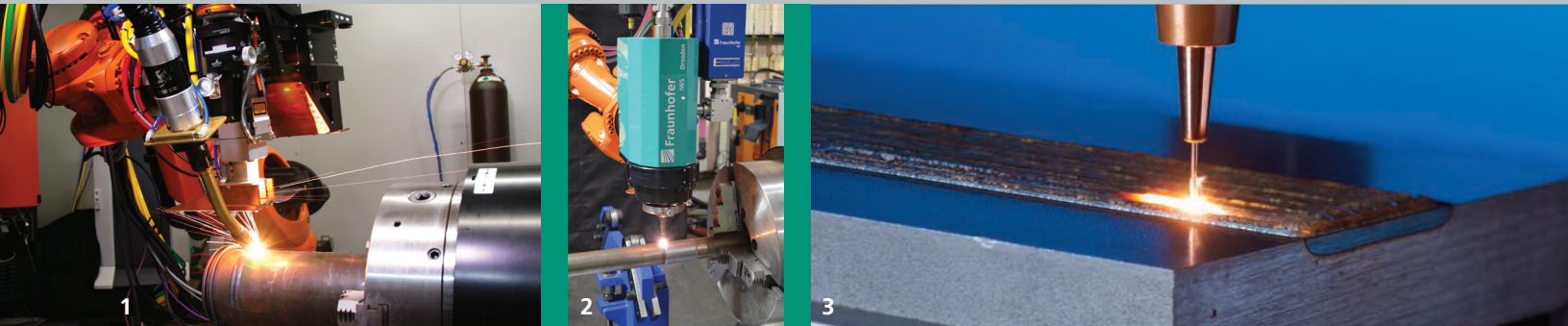




Fraunhofer USA

FRAUNHOFER USA CENTER FOR LASER APPLICATIONS CLA



1 Side Axis Wire Head

2 COAX® Wire Head

3 COAX® Wire Process

WIRE TECHNOLOGY

Hot Wire Cladding and Welding

Electrically preheating the filler wire helps to increase the efficiency and deposition rates of standard cold wire welding and cladding processes.

Side axis wire is good for high deposition rate cladding applications on symmetrical parts where unidirectional head movement is not required.

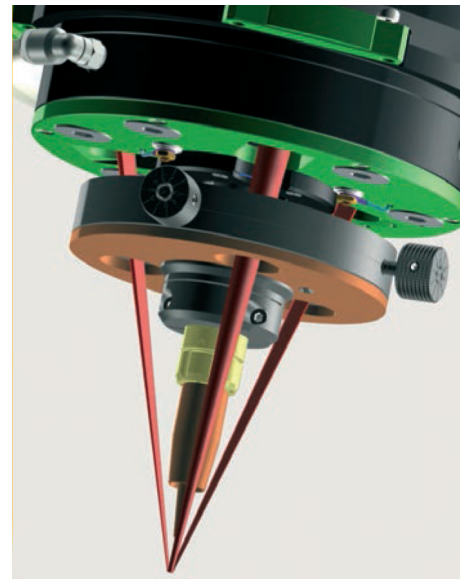
The hot wire version of our COAX® wire head enables increased deposition rates whilst retaining the ability to deposit freely in any direction for additive manufacturing using the direct metal deposition process.

COAX® Wire

The COAX® wire head can be used for cladding or additive manufacturing. The laser is split into three beams which come into focus at the tip of the wire enabling movement in any direction. Most commercially available wire alloys can be used and the process is close to 100% material efficient.

Applications

- Additive Manufacturing
- Cladding and Welding
- Remanufacturing / Repair



Schematic of COAX® Wire Head Operation

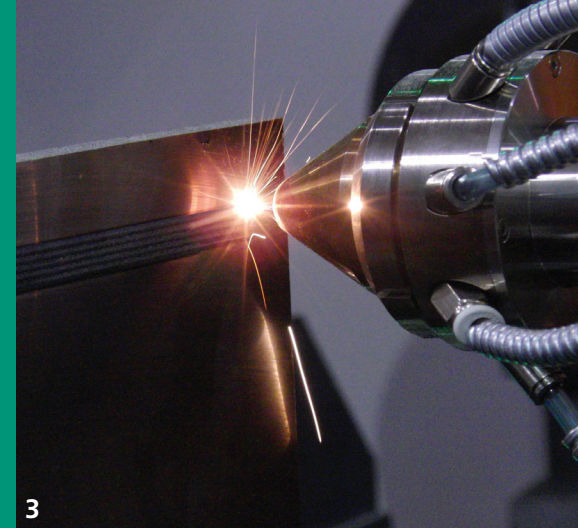
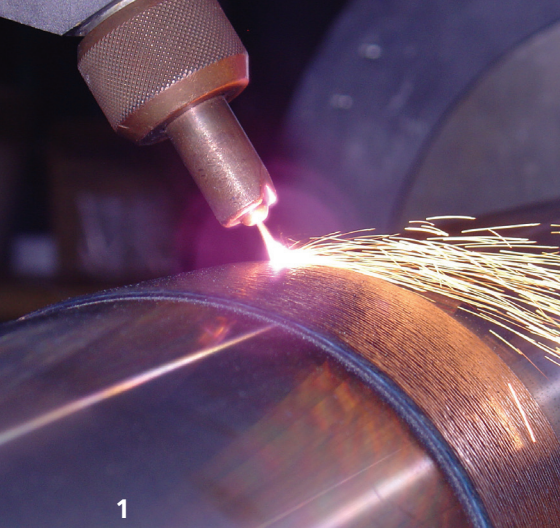
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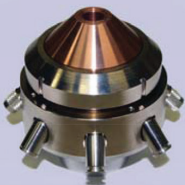
www.cla.fraunhofer.org



COAX® CLADDING AND ADDITIVE NOZZLE TECHNOLOGY



Fraunhofer COAX® 8 Nozzle for General Cladding, Repair & Remanufacturing



Fraunhofer COAX® 12 Nozzle for 3D Deposition



Fraunhofer COAX® Powerline for super high deposition rates



Fraunhofer COAX® 13 Nozzle for difficult to access areas



Fraunhofer Cyclone Nozzle with XYZ positioning unit

COAX® Series Powder Nozzles

Metal Powder is delivered coaxially and concentric to the laser beam. This allows multidirectional Cladding and additive manufacturing. Nozzle tips can be configured for fine deposition or for high deposition rates with large track widths.

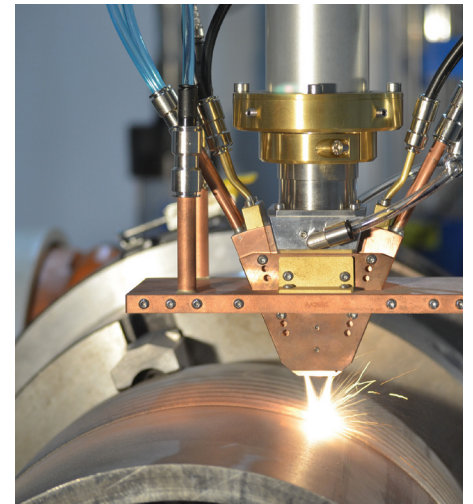
Fraunhofer Laser Cladding Technology

Over 20 years of experience has enabled us to develop many different laser cladding nozzles for a wide variety of applications. Basic configurations include coaxial powder feeding (COAX® series) and side axis feeding nozzles (Cyclone nozzle). The nozzles are suitable for CO₂, fiber, disk, and diode lasers. Nozzles can be customized for each application.

Laser Cladding System Integration

Fraunhofer offers its expertise in laser cladding and process equipment to perform system integration of turn-key pilot cladding or additive systems. We can provide you with the latest in laser technology for a cost-effective solution for coating or repair of your components. Systems can be

developed with CNC or robotic handling systems. Fraunhofer performs on-site training and support of your personnel, to help you master the process.



COAX® 11 Wide Beam Nozzle can produce clad tracks up to 45mm (1.8") wide.

- 1 Side Axis Cyclone Powder Nozzle
- 2 COAX® 8 Cladding Nozzle
- 3 Horizontal Laser Cladding Process with COAX12® Nozzle.