LASER CLADDING | SYSTEMS

Laser cladding

FST is official supplier of Coherent laser systems. Coherent is the producer of high-end laser systems which, among other things, can be used for laser cladding, heat treatment, welding and cutting. As a provider of surface solutions, FST focuses to support its customers on cladding and heat treatment applications.

FST adds value as a system integrator of complete turn-key solutions by offering the laser safety cabinet including component and laser head handling equipment (robotics), the material powder feeder, the water chiller and fume collector. Each of these components is carefully selected by FST to fit the application requirements and assure a safe and stable operation of the laser equipment.

Besides the delivery of state of the art turn-key solutions, FST also provides application know-how support and most to all laser materials. Therefore FST is not only a supplier of turn-key hardware but an excellent supporter of your laser application(s).

**LASER CLADDING IN A NUTSHELL**

Cladding is the process of adding a layer of surface material on a part with a different composition than the part itself. Cladding is used to selectively enhance the wear characteristics or corrosion resistance of a part without changing its bulk mechanical properties. Cladding is also employed to resurface parts that have become worn or damaged through use.
LASER HEAT TREATMENT IN A NUTSHELL

In laser heat treating, a spatially well-defined laser beam is used to illuminate a work piece. This radiation is absorbed near the surface causing rapid, localized heating (about 1000K/s). Typical penetration depths into the bulk material are from 0.2 to 2.5 mm. The bulk heat capacity of the material acts as a heat sink thereby enabling self-quenching. Thus, no oil or water is needed for quenching, which is an advantage over traditional induction or oven heat treatments. However, the main benefits are rapid processing, precise control over case depth and point of application, and minimal part distortion. Part distortion is typically low enough to eliminate the need for post processing steps to restore dimensional accuracy, and compared to legacy methods, the laser induced surface transformation often creates a smaller grain structure due to the rapid quench, resulting in superior wear resistance.

INDUSTRIAL APPLICATIONS

Oil & Gas Drilling Industry
- Off-Shore rig shafts & drive components
- Stabilizers
- Reamers
- Wear and Kicker Pads/Wear Bands
- Drill Bit Components

Energy Industry
- Boiler Tubes and Water Wall
- Wind Turbine Components

Agriculture Industry
- Cutting Blades & Knives

Forestry Equipment Industry
- Mulcher Blades & Wear Plates
- Logging Equipment

Steel Industry
- Guides and Rollers
- Drawing Dies
- Wear Plates and Bar Receptor Plates

Heavy Equipment Industry
- Hydraulic Shafts
- Buckets/Teeth/Augers
- Wheels & Tracks

Mining Industry
- Specialized Drilling & Extraction Components
- Hydraulic Roof Supports (shaft cladding)
- Piping and Coupling Products

Steel Roller Industry
- Digital printing machine
- Paper mill
- Plastic film and textile
LASER SOLUTIONS TO PROBLEMS
Add/weld material to base material with true metallurgical bond
- High power laser (kW) melts base material
- Alloy material is welded to base material forming a metallurgical bond

Preventive Cladding
- A higher value layer/coating is added to base material
- Corrosion protection
- Wear and tear protection

Repair/Refurbishment
- A damaged part is machined
- Clad overlay added to the part
- Part is post clad machined to original dimensions
- Extends life time of expensive part

LASER CLADDING STRONG POINTS
- Metallurgical bond vs. mechanical bond
- Low dilution, typical 1 – 7% (about 1/3 dilution of PTA process)
- Highly controllable/repeatable and efficient process
- Smooth clad with very low porosity results in less post machining
- Small heat effected zone and less part distortion (~ 50% heat input of PTA)
- High quench rates results in finer grain structure and higher corrosion potentials
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STRONG POINTS FST – COHERENT LASER SOLUTIONS

- FST provides the full turn-key solution with technical support on equipment and materials
- Large area laser cladding with Coherent diode laser provides cost efficient metallurgical bonded and dense layer (0.3-3mm thick for single layer) at high area coverage/hour and low running cost, several layers are possible to apply
- Up to 10kW Direct Diode System for powder and wire laser cladding enables high throughput large area processing and 3-D cladding with up to 15kg/h
- Flexible and quick exchange beam shaping optics optimal for a job shop day to day business
- Complete technology package for laser cladding and/or heat treating provided by one supplier FST training and process support.

Note: for more information, please contact your local sales contact or visit www.fst.nl.