

# Combustion System Repairs - Industrial Gas Turbines

Industrial Frame Engines – GE, Siemens, Alstom – including “F” Class

## The Liburdi Advanced Repair Program offers:

- Extended Reliable Service Life
- Reduced Maintenance Expenses
- Upgraded Components that Eliminate Design Deficiencies

The unique Advanced Repairs program developed by Liburdi is being utilized in Power Generation and Oil & Gas applications around the world. These repairs, available only from Liburdi Turbine Services, fully restore critical turbine components at a fraction of the cost of new replacement parts; maintaining or improving component integrity while creating significant savings for the operator.



## Liburdi Advanced Combustion Repairs Bring Long-Term Benefits

### *Combustor Liners*

- Full strip of original coating and recoat - provides oxidation/corrosion protection
- Class C Thermal Barrier - with Chrome Carbide coating to improve wear resistance
- Standard, Dry Low NOx, and Single Nozzle capabilities
- Coating removal techniques include water jet
- Automated welding processes - improves uniformity
- Specialized fuel nozzle end cap seal repair

### *Transition Pieces*

- High quality weld repairs
- LPM® high strength powder metallurgy for repair of structural cracks and worn surfaces
- Precision machined and inspected in 360 degree fixture - ensures final fit in engine
- Specialized tooling - single piece, full set, Faro arm for precision measurements
- Ultrasonic mapping - determines critical wall thickness
- Class C Thermal Barrier Coating and Chrome Carbide coatings
- Diffusion aluminide coating upgrade of external surfaces available

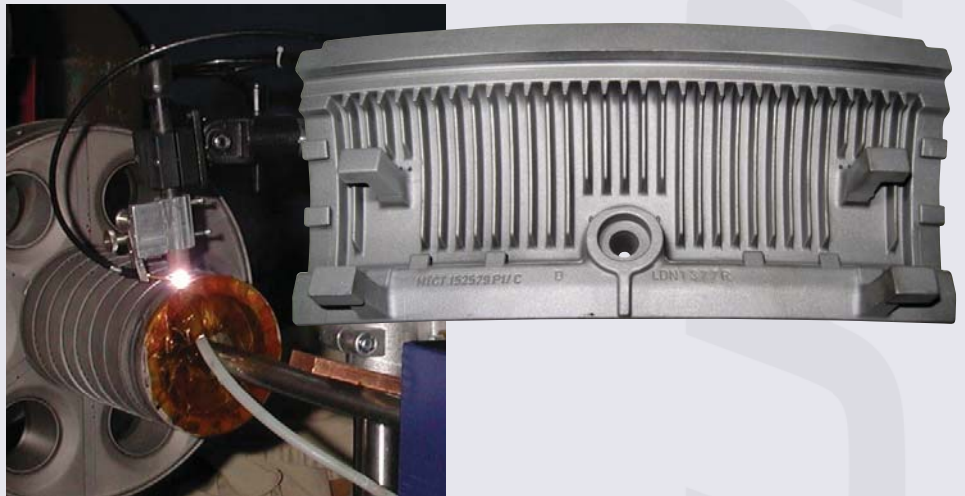
### *Bull-Horn Brackets and Cross-Fire Tubes*

- High quality weld repair
- Precision machining - restores dimensions
- Wear resistant coatings

## Restoration and Rebuild of Fuel Nozzles and Combustor Tiles

### *Fuel Nozzle Repairs*

- Cleaning of all internal passages
- Secondary swirler replacement with new
- Primary braze leak repair
- Restoration of wear damage
- Component replacement as required
- Flow testing for performance validation



### *Combustor Tile Repairs - Siemens and Alstom*

- Strip and recoat with high performance TBC coatings
- High strength LPM® process for heavy crack/missing material repairs – outperforms conventional welding
- Reform to eliminate distortion
- Re-establish cooling holes, hook fits, seal slots
- Optional oxidation resistant coating for non-gas path surfaces

Liburdi's engineering team leads the industry in the development and application of component upgrades that address original design deficiencies and yield improved durability and increased power and efficiency.

LPM® is a patented process of Liburdi Engineering Limited. LPM® has achieved a proven track record over the past decade and is approved by OEMs for both repair and the manufacturing of new parts.

Liburdi's extensive experience with heat treatment processes, combined with its unique stripping and coating capabilities, ensures that every repaired component meets or exceeds the original equipment performance and durability requirements in future service.

### **Liburdi Turbine Services**

#### **International Canada**

tel: 1-905-689-0734  
fax: 1-905-689-0739  
email: [liburdi@liburdi.com](mailto:liburdi@liburdi.com)

#### **USA**

tel: 1-704-230-2510  
fax: 1-704-230-2555  
email: [liburdi@liburdi.com](mailto:liburdi@liburdi.com)

#### **Liburdi Asia**

Shanghai, China

#### **LTS Russia**

St. Petersburg, Russia