



Industrial RB211 - Aero-Derivative Gas Turbines

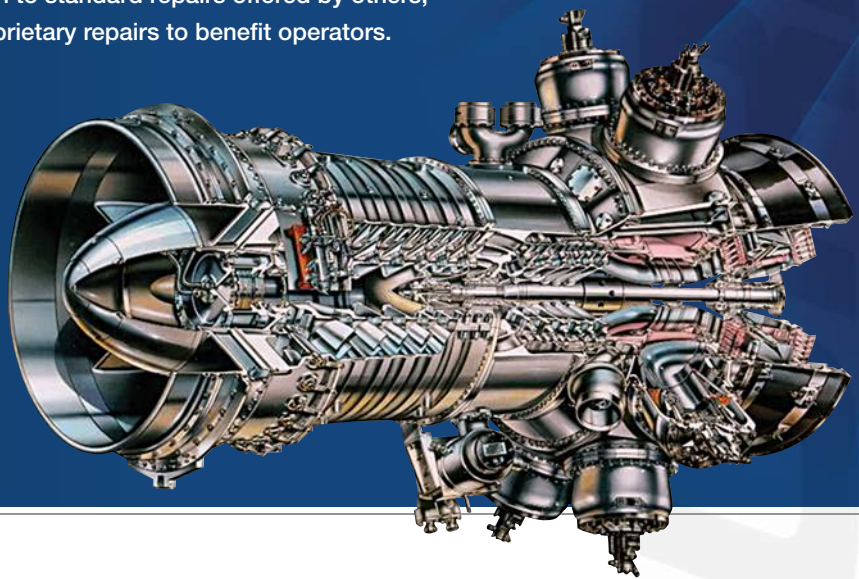
Major Oil & Gas and Power Generation Fleet Operators select Liburdi Turbine Services for their AeroDerivative Component Repairs

The Liburdi Advanced Repair Program offers:

- Extended Service Life – with demonstrated service 3 times conventional limits
- Reduced Maintenance Expenses through avoided new parts expense
- OEM Authorized Repair Source, with over 26 unique repairs for GG components

Liburdi Turbine Services have been providing Advanced Repairs for Industrial RB211 fleet owners for since 1995. In addition to standard repairs offered by others, Liburdi has developed a series of unique proprietary repairs to benefit operators.

Liburdi's Advanced Repairs enable components to be returned to service at a fraction of the cost of new replacement parts; maintaining or improving component integrity while creating significant savings for the operator.



Advanced Repairs – Proven Reliability

- More than 26 unique repairs – authorized by OEM, but available only from Liburdi
- HP and IP Turbine Blades, Nozzle Guide Vanes (NGV's), Seal Segments, Compressor Vanes
- Advanced technologies to restore and re-construct components for extended service
- Multiple service intervals – parts are achieving 130,000+ hours reliable service
- Avoid high expense of new replacement parts – main savings at time of overhaul.
- Applied on over 350 engines sets for some 20 customers worldwide including the major international oil companies.

Liburdi Advanced Industrial RB211 Repairs

HPT and IPT Blade Repairs and Life Restoration

- FSR® Full Solution Rejuvenation® heat treatments restore alloy microstructure and creep life to as-new properties, enabling sets to reliably achieve extended service
- Use of specialized L3667 weld alloy – proven in service to outperform conventional weld repairs in strength and oxidation resistance – even more durable than original blade alloy
- Demonstrated life extension of 130,000+ hours



HPT and IPT Nozzle Guide Vanes – Dimensional Reconstruction

- LPM® Liburdi Powder Metallurgy process is used to reconstruct thin airfoils and metal loss due to oxidation burning – parts previously declared not repairable
- Patented LPM® process used extensively on aeroderivative, industrial frame, and aircraft components over past 20 years – outperforms conventional weld repairs and fully authorised by OEM.

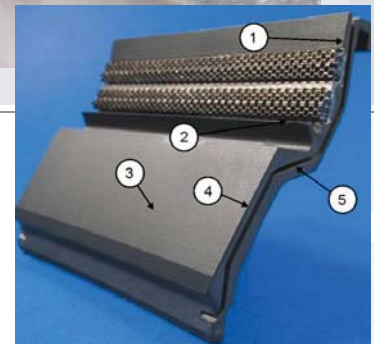
HPT and IPT Seal Segments – Full Reconstruction

- LPM® Liburdi Powder Metallurgy process used to re-construct thin walls and restore bowed backing plates for full restoration of dimensions – ensuring as-new fit up in engine
- Full restoration of abutment seal slots – to re-establish seal fit and retention.
- Parts are upgraded with LSR® aluminide coating to prevent oxidation in future service.

HPT NGV pre-repair: thin wall, oxidized burnt metal loss.



HPT NGV after LPM® Reconstruction Repair



HPC Compressor Vanes

- Restore worn platform faces and dimensions of Stages 1, 2, 3, 4
- Vanes previously declared not repairable are now able to be restored
- Stage 5 – replace inner stop for post Mod 1275
- Full coatings replacement included in repairs

Comprehensive Support for Industrial RB211 Fleet Operators

- Our list of Advanced Repairs is always growing, as we continue to invest in new repairs and repair processes, aimed at extended service for critical components.
- Contact us for a catalogue of the latest Advanced Repairs for Industrial RB211, or for more information on the past 15 years of Industrial RB211 operator experience and references for these services.

Liburdi Advanced Repairs utilize proven methods such as Full Solution Rejuvenation®, special oxidation resistant weld alloys, high strength LPM® powder metallurgy, and high performance coatings that extend service life after repairs. These processes also achieve extremely high yield rates. Parts often considered “non-repairable” become fully restored using Liburdi’s Advanced Repairs.

Liburdi Advance Repairs typically average \$600,000 to \$900,000 in net savings per major overhaul event.

Liburdi Turbine Services

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