GE Power

Dense Pack*

Increasing Output and Efficiency While Reducing Maintenance Costs

Improving the Efficiency and

Dense Pack steam path redesign technologies can deliver:

- Improved efficiency
  - — Recovery of aging losses
  - — Accommodate uprates
  - — Advanced steam path technology
- Sustained performance
  - — Minimize SPE damage
  - — Minimize effect of steam path deposits
  - — Robust clearance controls
- Maintained reliability and availability
  - — New, improved components and materials
  - — Enhanced asset utilization

Utilizing the Existing Outer Shell to Maximize Cost-Effectiveness

A steam turbine's thermal performance is largely dictated by its steam path components. Minimizing aerodynamic losses and leakages within the steam path can significantly impact the efficiency of the entire power plant cycle.

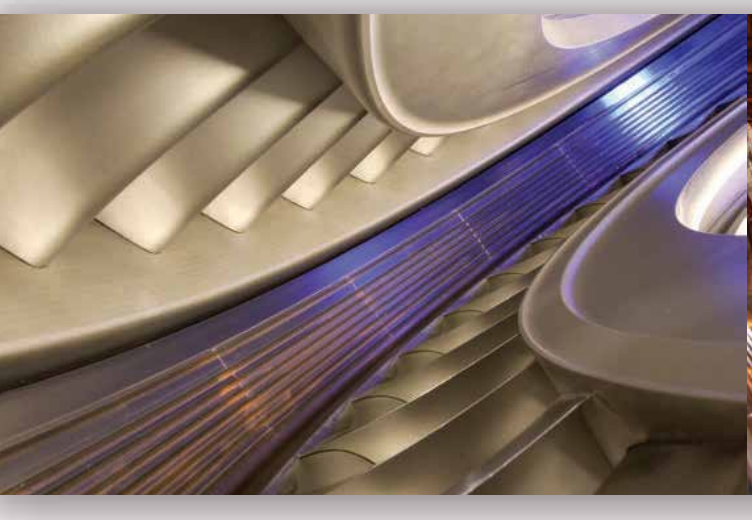
GE's Dense Pack™ steam path redesign technology can improve the efficiency of mature steam turbines, enhancing the plant's profitability and competitiveness, while extending the life of the turbine.

Delivering on innovation, GE's Dense Pack™ provides the most efficient steam path redesign within a turbine's outer shell. GE's high pressure (HP) or intermediate pressure (IP) steam path replacement sections operate at a lower heat rate and provide an increased output at the same inlet steam flow.

The Dense Pack redesign methodology is the result of more than 100 years of GE steam turbine evolution—drawing upon sophisticated modeling techniques, advanced technology, and a dedicated engineering team that determines the optimum design for each particular unit.

Customized Upgrade Opportunities to Fit Your Needs

GE's Dense Pack steam path replacement sections are customized to suit the particular needs of your existing steam turbine—providing the optimum redesign for increased output and efficiency, while reducing the total life cycle cost. Dense Pack™ steam path section replacements offer ideal upgrade opportunities for units 300 MW or larger that are scheduled for an outage within the next three years. They also provide economically attractive solutions for units with extensive maintenance needs. The steam path redesign package can be tailored to meet specific needs based on the desired level of operational flexibility, output, and budget.



Output of Mature Steam Turbines

The Dense Pack redesign approach delivers improved turbine performance by:

- Creating the most efficient steam path through stage optimization, advanced aerodynamic design, and enhanced sealing technology
- Reducing maintenance costs by:
  - — Increasing resistance to solid particle erosion (SPE)
  - — Increasing inspection intervals
  - — Eliminating rotor bore and associated maintenance

OEM Advantage Creates Simplicity

With access to the original equipment designs, fleet performance data, GE's Global Research Centers, and over 100 years of turbo machinery experience, GE can provide unmatched service.

Our global presence and field office staffing program enables GE to assist with your plant upgrade needs on short notice, helping to meet your tight schedules.

This availability eliminates the time and expense you might otherwise spend dealing with multiple third-party contractors—and allows you to deal directly with the team that not only has the most product experience, but can also be a single source provider for all installation and maintenance needs.

Validated Design for Real World Results

Our evolutionary redesign approach has been validated through our rigorous Design-of-Experiment process and extensive testing at GE's turbine development facilities.

With proven operating experience on a growing fleet of fossil units, GE's Dense Pack upgrades include the following design features:

- Advanced Aerodynamic Blades and Nozzles
- Advanced Sealing Technologies
  - — Brush Seals
  - — Elliptical Packing
  - — Enhanced Clearances
  - — Vernier Tip Seals
  - — Variable Clearance Packings
  - — Abradable Seals
- Modern Mechanical Designs
  - — Rugged Control Stage Blades
  - — Generation 2 Integral Covered Blades
  - — Increased Number Of Stages
  - — Reduced Blade/Nozzle Counts
  - — Improved Root And Tip Deflectors
  - — Enhanced Starting And Loading
  - — Reduced Exhaust Loss
  - — Advanced Inlet Nozzle Plate Or Box
  - — Steam Balance Hole Upgrade
  - — Wheel Space Re-Entry Flow Control

Improve your steam turbine with Dense Pack™ section upgrades.

Renewed Power for the Future

GE's Dense Pack™ section replacements can turn your mature turbine into a powerful competitor in today's market.

While improving efficiency and output, Dense Pack™ technology reduces SPE and extends inspection intervals.

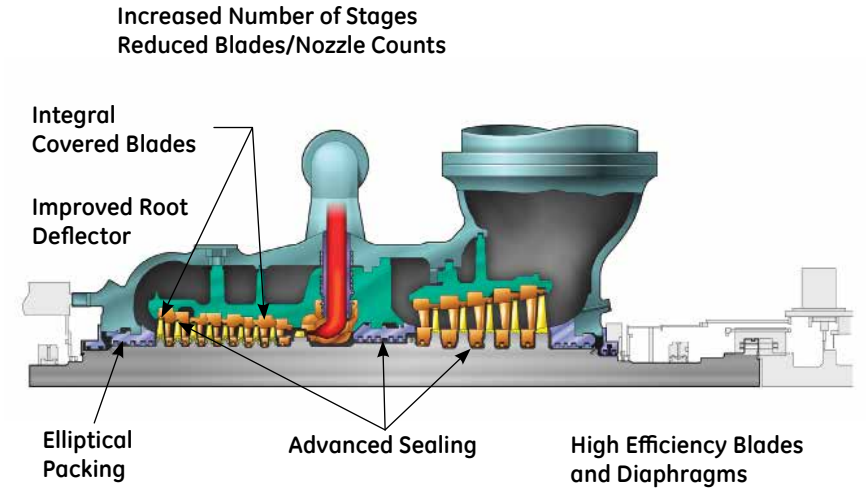
The result is a reliable high efficiency unit that enhances the value of your plant and provides improved performance into the future.

Dedicated Performance Engineering Group

With extensive background in GE turbine and generator technology, our performance engineering group can analyze the current efficiency of your plant or steam turbine to help identify additional gains in efficiency and output.

In addition, our specialists have the expertise to determine if your existing generator and retained components can handle the additional output that can be achieved from Dense Pack™ technology.

Dense Pack™ Design for Steam Path Performance Improvements



Cross section of typical Dense Pack Technology for combined HP/IP Section

To learn more about this offering, contact your GE sales representative or visit **powergen.gepower.com**.

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