

THERMAL PERFORMANCE

MD&A Turbine-Generator Engineering & Outage Services

Mechanical Dynamics & Analysis offers thermodynamic analyses, performance testing, and steam path audits for all makes, models, and types of steam and gas turbines. Our thermodynamic analyses account for every BTU of energy and show how fuel costs can be reduced. A steam path audit can be performed during the overhaul without impacting the outage schedule and results in a detailed analysis of the turbine condition. MD&A offers performance testing per ASME test codes for accurate heat balance information and performance guarantee assurances.

Thermal Analyses:

The heat balance provided by the manufacturer was made for a new and clean turbine. MD&A determines how a turbine is operating today, identifies where and why losses are occurring and helps to restore performance back to original specifications. We also help owners repurpose a turbine to operate differently than design by calculating how extractions, flow, pressure, and temperature effect performance and efficiency.

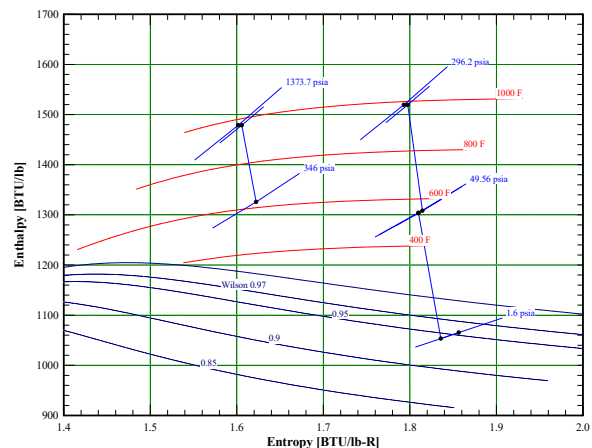


Steam Path Audits:

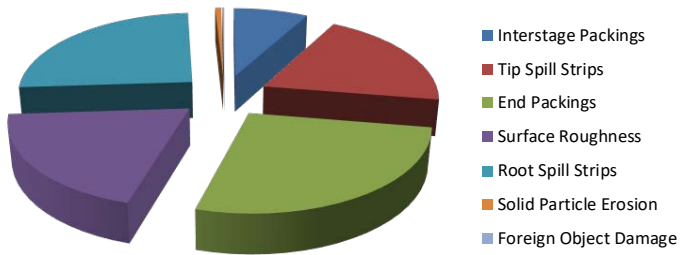
From the moment the turbine is commissioned it begins to deteriorate. MD&A conducts a full steam path audit inspecting every seal, blade, and nozzle to determine losses on a stage by stage basis.

Performance Testing:

MD&A offers a variety of performance tests to meet the need and budget of every customer, from a full ASME acceptance test to a casual station performance monitoring test.

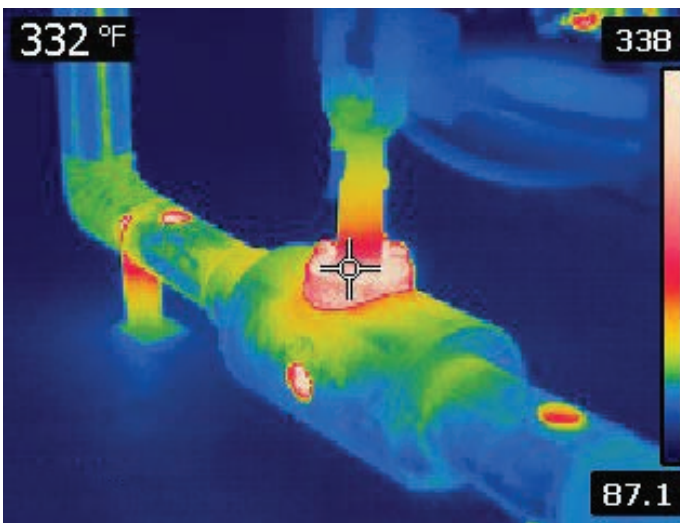


LOSSES HP Results As-Found



Detailed Report Breakdown:

MD&A experts provide a detailed report to show losses in each section of the turbine and their overall contribution towards output and heat rate. The report includes tools and calculators to determine the best return on investment for each repair option.



Thermographic Survey:

MD&A engineers are certified thermographers and use advanced thermal imaging cameras to ensure that correct isolation is maintained throughout the plant. MD&A has identified numerous instances where leaking valves and traps are dumping high energy steam away from the turbine causing excessive performance losses. Thermographic surveys are included with performance testing, or can be offered individually.

MD&A's Thermal Performance Services allow customers to:

- Identify causes of lost capacity.
- Locate sources of heat rate deterioration.
- Decrease fuel costs.
- Reduce emissions.
- Invest maintenance funds with the highest return.
- Return performance to like-new conditions.
- Recover costs for testing in a few months.
- Stay on outage schedule.
- Better preparation for future maintenance needs.
- Allocate thin repair budget more effectively.
- Better understand operational changes to improve performance.
- Provide feasibility studies for changing steam conditions.
- Provide a quality control check of maintenance activities.
- Reduce water consumption by identifying and eliminating leakage.
- Establish a monitoring program to track and trend performance.
- Witness guaranteed third party performance testing.