

Reliability Audit

The Reliability Audit is a comprehensive visual evaluation of a plant's rotating equipment to identify potential issues that contribute to low mean time between repair (MTBR), loss of containment, unsafe working conditions or production issues.

Flowserve methodology is based on reliability-centered maintenance (RCM) and failure mode and effects analysis (FMEA) fundamentals. Flowserve Reliability Audits are performed by Pump Systems Assessment Professionals (PSAPs) and will be applied to an agreed upon targeted selection of equipment – typically pumps that are known to be problematic, either from a maintenance or performance perspective.

Flowserve utilizes a cross-functional group of engineers with robust rotating equipment expertise to maximize effectiveness in executing audits. Flowserve PSAPs will audit reliability, safety and production processes and establish a detailed action plan for issue resolution and reliability improvement.

and protects the safety of employees, customers, the public and the environment.

Improve efficiency of operations

By evaluating the condition and performance of rotating equipment and establishing clearly defined operational procedures, plant equipment runs at its best efficiency point (BEP), contributing to overall efficiency of operations.

Reduce downtime and improve reliability

By ensuring proper PM/PdM practices are in place, plant equipment availability is improved, which drives increased productivity and profits.

Lower cost of ownership

By improving equipment reliability, maintenance costs decrease and equipment life span increases, resulting in a reduced total cost of ownership.

Objectives

- Perform data collection and visual equipment audit to identify areas for improvement regarding reliability, safety and production issues
- Provide a final report that includes issues identified and recommended improvement solutions

Value

Improve safety

By ensuring industry best practices are in place, plants use a 'Safety First' approach committed to operating responsibly, which prevents accidents



Reliability services offering matrix

Reliability Service Actions	Audit	Assessment	Program
Equipment Database Data Collection	✓	✓	✓
Field Walk-down of Asset(s)	✓	✓	✓
Progress Review Meeting	✓	✓	✓
Visual Observation Recommendations	✓	✓	✓
Vibration Data Collection		✓	✓
Flow Measurements		✓	✓
Failure History Review		✓	✓
Operational FMEA		✓	✓
Define Operating Control Limits (Operating Road Map)		✓	✓
Pump Performance Test		✓	✓
Energy/Reliability Review		✓	✓
Preventative and Predictive Maintenance Program Reviews		✓	✓
Gap Strategy Review (per Scope)		✓	✓
Final Recommendations Report With Applicable ROI		✓	✓
Sustainability Program and Training Recommendations			✓
Data Management (ERP/CMMS) Extraction and Flowstar Upload			✓
Industry Reliability Metrics Benchmarking Through Flowstar.net			✓
Implementation Plan Workshop			✓
	Transactional	Transactional	Contractual (3 – 5 yrs)

Reliability partnership

Flowserve

- Review equipment condition
 - Perform visual audit, noting corrective actions to be taken concerning the rotating equipment
 - Collect incomplete equipment data
- Progress meeting updates
- Supply a detailed report
 - Identify opportunities to improve equipment condition

Customer

- Supply access to available detailed information to review and understand current equipment performance
 - P&IDs
 - IOMs
 - Data sheets
 - Pump curves
- Support with appropriate permits for Flowserve PSAPs to access site equipment

Flowserve performs Reliability Services for the following industries and on the applicable machinery types listed, regardless of the OEM:

Industries served: Chemical Processing; Oil & Gas; Power Generation; Refining; Mining

Machinery types: API 610 Pumps; API 611 General Purpose Steam Turbines; API 612 Special Purpose Steam Turbines; API 614 Lubrication Shaft Sealing and Controlled Oil Systems; API 675 Positive Displacement – Controlled Volume Pumps; API 676 Positive Displacement – Rotary Pumps; API 677 General Purpose Couplings; API 682 Shaft Sealing Systems for Centrifugal and Rotary Pumps; API 685 Sealless Pumps