SINT Technology

Thermodynamic performance testing

Oil & Gas - Power Generation

Main features

- Test consultancy and procedure editing
- Robust testing methods according to the major international codes
- Proven reliability of measurements
- Test design
- Flexibility of intervention
- On-site & remote continuous diagnostics
- High-accuracy instrumentation and data acquisition systems
- Support for contractual requirements

Performance testing

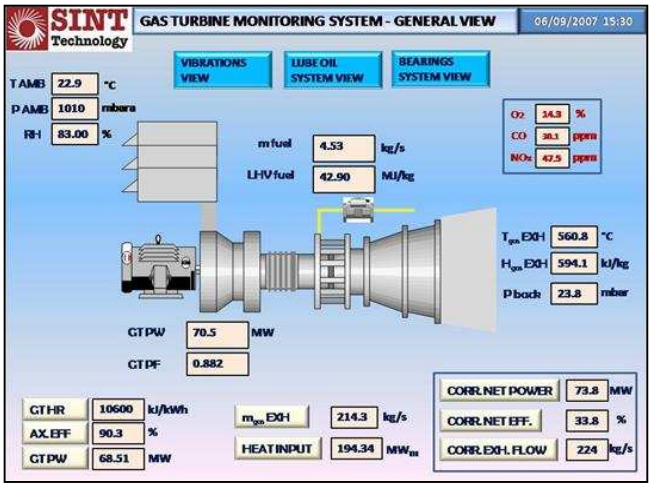
When a project involving the construction of a new plant or the installation of a new machine, reaches the final stages, the verification of guaranteed performances is indeed the ultimate goal before turning the plant over to commercial operation.

It is, therefore, necessary to check the compliance of the performances with the contractual requirements reliably and accurately in order to:

- Develop the industrial production plans, once the performances have finally been assessed
- Proceed with the final payments and fulfill the supply contract between the Parties
- Establish the payment of liquidated damages or make-good actions, in case of non-compliance of supply

Moreover, it is important to design the test for minimum impact on industrial production of the plant, both in terms of financial resources and machine downtime.

For all these reasons, performance testing is not limited to a set of measurements and calculations. It requires skilled and trained engineers to manage all the aspects involved in the machine or plant operation, starting from the thermodynamics to the legal/contractual requirements of the test.



Your partner in measurements and testing

SINT Technology is a leading company in mechanical and thermodynamic measurements, which provides its customers with independent and accurate testing services, ensuring the added value of flexibility of intervention, technical competence and costs containment.

Since 1990, SINT Technology has been carrying out worldwide thermodynamic performance tests on equipment and plants for the Power Generation and the Oil&Gas industries.

Our experience ranges from small turbogenerators (up to 5 MW) and cogeneration systems (paper mills, pharmaceutical factories) to large combined-cycle plants for power generation (more than 800 MW installed capacity) and multi-stage centrifugal compressors trains for the Oil&Gas industry. Our activities are not only performed on single components, but can be designed also to analyze overall plant performance.

We successfully support commissioning teams in the functional tests required on initial start-up of new installations.

Working in partnership with the major manufacturers and EPC contractors, SINT Technology has extensive, in-depth knowledge on every type of machine.

SINT Technology is a ISO 17025 Laboratory, accredited for conducing tests according to ASME PTC Codes (ACCREDIA certificate no. 0910).

Applications

- Gas and Steam Turbines
- Thermal Cycles
- Boilers / HRSG
- Steam condensers
- Centrifugal / Reciprocating Compressors
- Combined Cycle Power Plants
- Power Stations
- Cooling towers

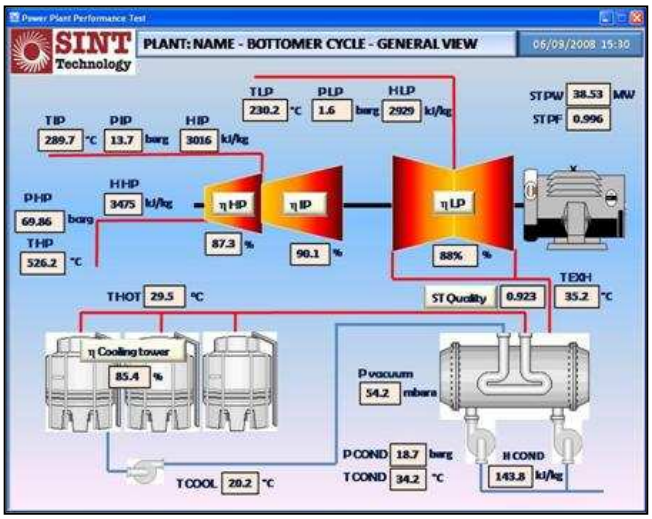
Service portfolio

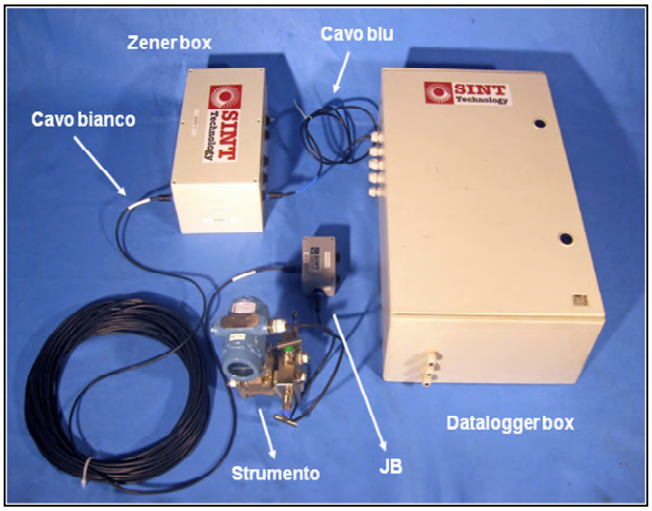
SINT Technology offers its customers a portfolio of testing and measurement-related services. Our approach to customer's requests is modular, so that each phase of testing can be supplied separately from the others. This enables us to offer a high level of flexibility providing the best solution for you.

Technical consultancy

SINT Technology can assist you from the early stages of a testing process:

- Verification of contractual requirements
- Technical documents review
- Consultancy for testing methodology and specification
- Tailor-made solutions and advice for metering systems





Test design

- Detailed test procedures editing, based on international codes requirements
- Review of customer testing procedures
- Plant thermodynamic model for performance curves mapping

Data acquisition system (DAS)

Accuracy, reliability and the minimum plant downtime. Our engineers will provide you with a complete acquisition system for your test:

- High accuracy temporary instrumentation provided and installed by SINT Technology
- Temporary instrumentation supplied according to international testing codes specifications
- Turnkey data acquisition system
- Data Acquisition Manager software for real time performance calculations
- Use of permanent plant instrumentation upon customer's request for cost reduction
- Plant instrumentation verification against test calibrated equipment

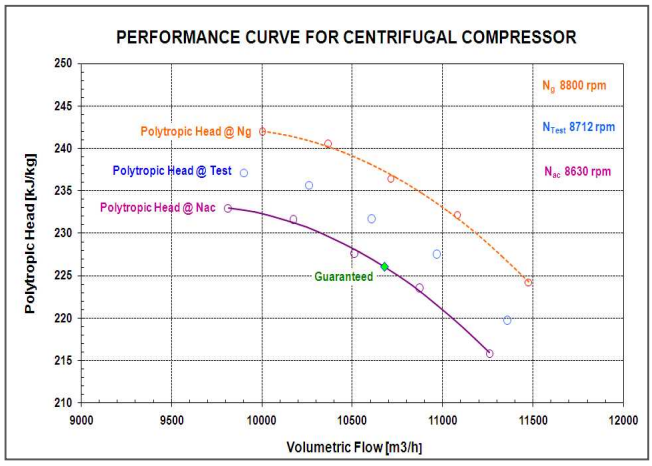
Scope of performance testing

A performance test consists in more than accurate measurements. We supervise the following activities:

- Meeting with final the customer and with the Parties involved in test coordination (Suppliers, Commissioning teams, Owners)
- Site personnel management for testing
- Plant/machine inspection for testing readiness
- Third-party supervision of Suppliers testing

Calculations and results analysis

- Performance calculation, corrected to contractual reference conditions
- Real gases equation of state (BWRS, GERG-2004, etc.) for thermodynamic properties
- Test uncertainty calculation
- Technical report editing, according to international testing codes specifications
- Support to customer and root-cause search in case of non-compliance of the component/plant



How we can help you

SINT Technology has tailored solutions for:

Gas turbine manufacturers

Calculation of the net/gross power output, heat rate and exhaust temperature of the turbine, corrected to contractual reference conditions. Airborne noise measurement. Exhaust gaseous emissions measurement at stack. Calculation of intake air mass flow via energy balance or oxygen balance at the turbine test boundaries. Axial compressor efficiency determination.

Steam turbine manufacturers

Calculation of the steam consumption and power output of the turbine, corrected to contractual reference conditions. Steam/water mass balance between turbine and boiler. Turbine enthalpy balance for steam quality determination at exhaust. Turbine isentropic efficiency and expansion line determination. Condenser test.

Boiler/HRSG manufacturers

Calculation of delivered steam mass flows, for each pressure level, corrected to reference conditions. Boiler backpressure measurement. Reheating system pressure loss. Steam/water mass balance.

Compressor manufacturers

Calculation of compressor polytropic/isentropic head and absorbed power on the guaranteed point. Drawing of actual compressor operative maps. Surge testing and determination of real Surge-Control-Line and Surge-Limit-Line, for a wider operative map. Determination of rotational speed to operate on the compressor guaranteed point.

EPC contractors and plant owners

Calculation of overall plant performance, exported electrical power to the grid (Power Generation applications). Auxiliaries consumption measurement. Plant components acceptance test (turbines, boilers, cooling towers) as a verification of suppliers compliance to contract. Consultancy for components matching.

On-site and Remote continuous diagnostics

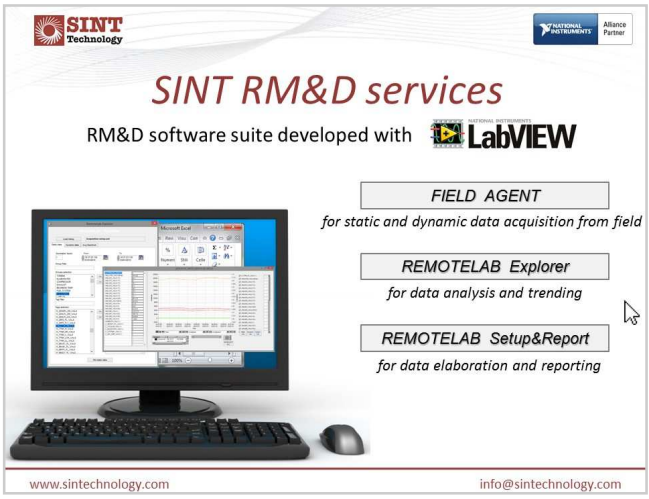
A performance test is an accurate and reliable way to assess the behaviour of a new plant or component, or to check improvements after a maintenance service, nevertheless it is tipically carried out only once or twice in the lifespan of a machine or plant.

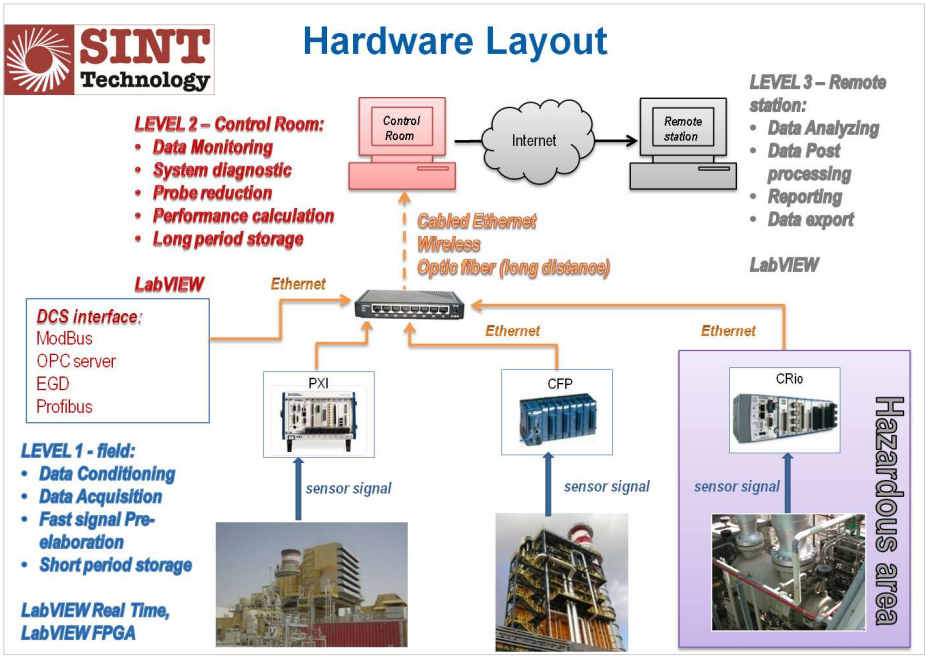
SINT Technology offers you the opportunity to check the performance of your equipment or plant daily, with our continuous diagnostics service. After data from your permanent instrumentation have been retrieved, they are post-processed with our proprietary calculation software for immediate results.

You can choose either to have a monitoring station installed in your control room or let our Remote Monitoring & Diagnostics centre collect your data for processing and report editing.

The scope of supply includes:

- Configuration of a computer station for data collection, from single units or a complete plant
- Additional instrument installation, with measurements collected by the DAS system
- Real time technical calculation for major performance parameters
- Customized performance monitor pages
- Local application or remote data transfer





TEST	CODE
General instructions	ASME PTC 1
Test uncertainty	ASME PTC 19.1
Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full	ISO 5167
Measurement of fluid flow — Procedures for the evaluation of uncertainties	ISO 5168
Gas turbines – Acceptance tests	ISO 2314
Gas turbines	ASME PTC 22
Steam turbines	ASME PTC 6
Steam turbines in Combined Cycles	ASME PTC 6.2
Procedures for Routine Performance Tests of Steam Turbines	ASME PTC 6 S
Thermal Acceptance test of Steam Turbines	DIN 1943
Rules for steam turbine thermal acceptance tests - Method B: Wide range of accuracy for various types and sizes of turbines	IEC 60953-2
Gas Turbine Heat Recovery Steam Generators	ASME PTC 4.4
Performance Test Code on Overall Plant Performance	ASME PTC 46
Turbocompressors – Performance Test Code	ISO 5389
Compressors and exhausters	ASME PTC 10
Centrifugal pumps	ASME PTC 8.2
Displacement compressors, Vacuum Pumps and Blowers	ASME PTC 9
Displacement compressors - Acceptance tests	ISO 1217

Contact us

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Recognitions

SINT Technology's test laboratory is accredited to standard ISO/IEC 17025:2005 by the Italian accreditation body **ACCREDIA with certificate no. 0910**

LAB N° 0910

Certification of conformity to the requirements of standard

UNI EN ISO 9001:2008

ISO 9001 = OHSAS 18001