

STRUCTURAL TESTS

Static and fatigue tests

- Static and fatigue tests of complete structures or components,
- Functional tests of unloaded and loaded structures including load, displacement and strain measurements,
- Stiffness evaluation,
- Static and quasistatic tests of turboengine shafts or other axially symmetric structures (tension/torsion loads), also at elevated temperatures,
- Testing of composite structures.



Dynamic tests:

- High-cycle resonance fatigue tests and vibrations resistance tests (e.g. of turbine blades),
- Impact hammer modal tests of structural elements.



Other tests:

- Low-revolution wear testing of fan blades and discs - test rig "Windmill",
- High-energy impact tests of structures using an air gun (diameter of projectiles up to 220 mm, weight - up to 15 kg, velocity - up to 300 m/s) with high speed camera recording and strain measurement.

The Laboratory conducts tests according to test programmes designed by the client as well as providing comprehensive testing services which include:

- Developing test programmes including defining:
 - test objectives
 - test specimens,
 - test load spectrum (levels, frequency, number of cycles),
 - calibration of strain gauges,
 - load control mode,
 - inspection methods and intervals,
 - procedures for the evaluation and presentation of test results.
- Design and manufacturing of test rigs,
- Assembly and installation of test rigs and tested objects,
- Test instrumentation (strain gauges, displacement transducers)
- Calibration of strain gauges,
- Test execution,
- Test report preparation,
- Analysis of test results.



STRUCTURAL TESTS

Test type	Objects and elements tested	Basic parameters and load range	Test temperature	Equipment
Static and fatigue tests of aircraft engine shafts or other axi-symmetric elements	Length: up to 3.6 m Diameter: up to 1.2 m	Axial force: up to 1334 kN Torsion: up to 452 kNm Frequency: up to 1Hz	Up to 500°C (in tested area)	Test machine Schenck-Pegasus for simultaneous torsion and tension or compression loads
Static and fatigue tests according to individual requirements specified by the customer (including design and manufacturing of test rig). Functional tests of structures' mechanisms. Stiffness evaluation.	Objects up to: 20 m x10 m	Forces: up to 200 kN Displacements: up to 1000 mm Strain: up to 60000 µm/m Frequency: up to 50 Hz	Ambient temperature (possible local heating of the structure)	24 channel electro-hydraulic test system Edyz/MTS with MTS Aero 90 controller 3 single channel load frames (MTS) with controllers
High cycle resonance fatigue tests and vibration resistance tests	Turbine and compressor blades and other elements	Frequency: up to 5000 Hz. Force: up to 1350 kG. Acceleration: up to 120 g	Ambient temperature	2 electrodynamic shakers with control and data acquisition systems
Low cycle strength and fatigue tests of aircraft engines elements	E.g. fuel tubes (straight or bended) with diameter: up to 40 mm and other elements	Deflections: up to 200 mm. Force: up to 10 kN Frequency: up to 6 Hz.	Up to 200°C	3 single channel load frames (MTS) with controllers
Low-revolution wear testing of fan blades and discs of aircraft engines	A set of fan blades mounted on the disc. Diameter: up to 3 m.	Rotational speed: up to 50 rpm	Ambient temperature	Special test rig - Windmill