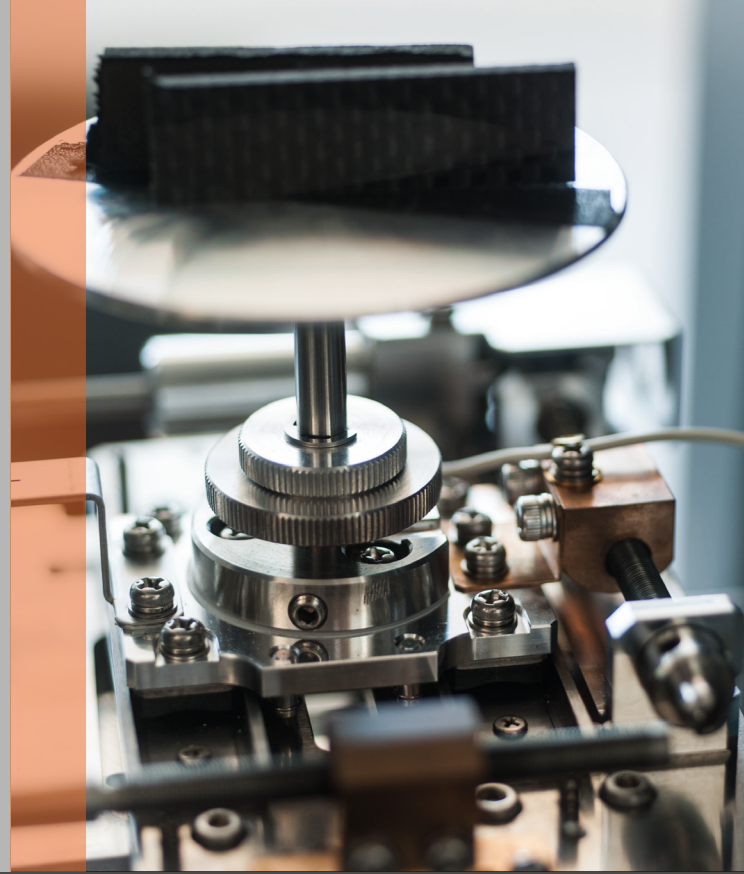




EXPERIMENTAL TEST LABORATORY

The laboratory is able to
accommodate testing of
aeronautical and space structures



Laboratory Manager: Ing. Paolo Rubini

DIPARTIMENTO DI
SCIENZE E TECNOLOGIE AEROSPAZIALI

Description

The laboratory is able to carry out several kinds of tests: from characterization tests on simple material coupons to full-scale tests on complete structures, i.e.:

- Material static, dynamic and fatigue characterization tests.
- Static tests; buckling tests; modal analysis tests; fatigue tests.
- Noise active control measure tests; low-energy impact tests.

Accredited Staff

- N° 2 technicians, Level 1 Certificate in the installation of strain gages.

Certifications

- Work in progress on UNI ISO 17025;
- Tensile Properties of Composite Materials ASTM D 3039 - 08.

References

AgustaWestland; Alenia Aermacchi; Brembo;
CGS; ADS International; Sinteal Plustek.

Laboratory Manager

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Instrumentation & Facilities

- MTS uniaxial servo-hydraulic, load from 15 to 250 kN, temperature from -129 to +316 °C.
- INSTRON uniaxial electromechanical, load 10 to -10000 N, temperature -100 to +350 °C.
- TA DMTA (Dynamical Mechanical Thermal Analysis), temperature -140 to +600 °C; frequency 0.001 to 100 Hz.
- Rheometrics RDAII rheometer, temperature -140 to +450 °C; frequency. 0.001 to 70Hz, shear rate 0.001 to 1000 s⁻¹, torque 2 to 2000 gcm.
- TA AR2000 rheometer, temperature -140 to +550 °C; frequency. 0.001 to 100Hz, shear rate 0.001 to 1000 s⁻¹, torque 0.2 to 2000 gcm.
- TA DSC (Differential Scanning Calorimetry), temperature -50 to +350 °C.
- Mettler TMA (thermo-mechanical analyzer), temperature -100 to +550 °C.
- LMS dynamics test system, Scadas III I/O hardware, electrodynamics exciters, accelerometer and instrumented hammer, piezoelectric load cells.
- Hitachi TM 3000, SEM microscope up to 30000 magnifications.

Activities

Material characterization tests, (MTS, Instron)

- Tensile test (ASTM D3039).
- Compressive test ASTM D3410).
- Flexural test (ASTM C293).
- In-plane shear test (ASTM C273).
- Lap-shear test (ASTM D1002).
- Bearing test (ASTM D5961).
- Short-beam strength (ASTM D2344).
- Mode I Interlaminar.

Thermal characterization, (DSC)

- Degree of polymerization (ASTM D3418).
- Glass-transition temperature T_g, melting point T_m, Crystallization T (-50°C/+350 °C) (ASTM D7426).

Thermo-mechanical analysis, (TMA)

- Coefficient of thermal expansion (ASTM E 831).

Dynamical Mechanical Analysis, (DMTA, RDAII, AR2000)

- Storage Modulus and Loss Modulus by flexural tests (ASTM D5023 – ASTM D5418).
- Shear Storage Modulus and Shear Loss Modulus by torsional tests (ASTM D4065).

Viscosity measurements, (RDAII, AR2000)

- Dynamic viscosity curve (plate or Couette geometry) (UNI EN ISO 3219/ISO 6721).
- Complex viscosity curve (plate or Couette geometry) (UNI EN ISO 3219/ISO 6721).
- Brookfield viscosity.

Dynamics tests, (LMS)

- Modal analysis tests.
- Noise and vibration measurement tests.