

TEST ENGINEERING



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YOUR CHALLENGE

The definition of a dedicated test procedure comes from the need to verify whether the component can perform the operational function for which it was designed, without encountering malfunctions or damage, which could alter the correct mode of operation.

The intention is to identify possible critical points in the design, which may be related to the interaction of material-geometry-function and to investigate, if necessary, the main cause for a component behaviour that doesn't fulfil the design requirements.

The engineering- and the research and development departments and the technical offices of manufacturing and/or design companies have both the objective of verifying the effect of a possible design modification of the component, and obtaining experimental evidence of the correct operating of the component, before starting a production or proceeding to the delivery to the final customer.

OUR SOLUTION

To correctly set up a Test Engineering activity, it is necessary to start from a detailed screening phase of the request, defining punctually constraints and objectives of the test path. At this stage, TEC Eurolab can support the customer in the co-design of the test procedure, analysing the existing standards and drafting test procedures dedicated to the specific need.

What does the custom test plan consist of?

If the tests according to the customer's specifications are not defined by any internationally recognized standard, and there is the need to define a new, tailored test procedure, TEC Eurolab is able to provide a test customisation service, which includes the design and analysis phases, to guarantee to the customer the analysis of its components, simulating the real conditions of use, both at room temperature or under environmentally extreme conditions.



ACCREDITATIONS

- **EN 9100:2018 - UNI EN ISO 9001:2015** (SAI GLOBAL)
- **UNI CEI EN ISO/IEC 17025:2018** - testing laboratory (ACCREDIA)
- **Riconoscimento MIUR (Ministero Istruzione Università e Ricerca)** - Laboratorio approvato n° 222 dell'Albo Fornitori per l'Emilia Romagna.
- **ART- ER** - Accreditamento Attrattività Ricerca Territorio



EXPERIMENTAL TESTS, PROTOTYPING AND SIGNAL ANALYSIS

The experimental tests carried out at the Test Engineering department consist of:

- Strain-gauge measurements
- Signal acquisition in the laboratory and on the field
- Design and implementation of experimental test setups
- Drafting of custom test specifications.

The Test Engineering department of TEC Eurolab can perform activities within fluid dynamic, pneumatic, hydraulic, thermal and mechanical fields, providing support for the definition and the implementation of test specifications dedicated to the customer needs, based on the product requirements to be tested, as reported in the provided documentation. At the same time, a dedicated Test Plan is formulated and agreed with the customer, which forms the backbone of the operational test instruction to be carried out.

During the test bench trial and component testing, it is possible to carry out acquisitions using strain gauges, accelerometers, position-, temperature-, pressure- and flow sensors to monitor, in real-time, the behaviour of the component while performing the test.

TEC Eurolab technicians can support the customer in the initial, mapping phases regarding the positioning of strain gauges and sensors, evaluating and proposing the selection of the most suitable ones for the specific application, as well as suggesting the best test path, from the application and initial verification phases to the post-processing of the data obtained.

ENVIRONMENTAL AND FUNCTIONAL TESTS

The environmental tests carried out in the test engineering department consist of:

- Thermal shock
- Climatic chambers
- Accelerated ageing tests (UV test)
- Salt spray tests
- Corrosion simulation tests
- Stress corrosion cracking tests

To verify the characteristics of a component, in addition to testing the materials used and the compliance of the object with the design, it may be necessary to assess its operational functionality when it operates in non-standard environmental conditions.

By combining different testing devices, a team of specialized technicians can build test set-ups that can reproduce and possibly aggravate the real environmental service conditions of the component, allowing accelerated assessments of performance degradation when subjected to cyclical thermal stress.

In addition to temperature variations, it is possible to expose the component to atmospheres that accelerate possible corrosion phenomena, to assess the degradation of coatings, seals, and threaded connections, or to assess the effect of solar radiation on polymeric materials, rubbers, and paints.

✓thermal, mechanical, or combined fatigue tests, also using dedicated climatic chambers to set up test environments at temperatures other than ambient.

✓thermal shock tests from -80°C to 220°C, with a dual chamber system and a transition time of less than 10 seconds

✓salt mist tests, both on coupons and on real components, including electrically powered ones





ENDURANCE AND FLUID DYNAMICS TESTS

The endurance and fluid-dynamic tests performed by TEC Eurolab's test engineering department are:

- Burst tests
- Static hydraulic / pneumatic tests
- Cyclic hydraulic / pneumatic tests
- Fluxing tests at different temperatures

TEC Eurolab can perform static and cyclic pressurisation tests, both in air and with fluids, such as water and hydraulic oil. At TEC Eurolab, a team of specialized technicians can create test circuits according to specific customer specifications or propose design solutions to be able to expose the component to burst tests for overpressure or cyclic pressure tests, also setting up test environments at temperatures other than ambient. With the available instrumentation, it is possible to perform static and dynamic pressurisation tests with air fluid up to 40bar and in oil up to 350bar, with dynamic stress regime up to 10Hz.

For pulsating pressure tests, using a cup multiplier, it is possible to significantly increase the test frequency if necessary.

The test cycles can be monitored continuously, and the pressure/temperature data reported graphically. In parallel with the pressurisation tests, it is possible to carry out leak testing with helium or nitrogen, either in Vacuum Leak Detection mode, with the help of sensors, or with the help of leak detection sensors (Sniffing Probe).

Pressure leak testing is carried out on components such as pipes, fittings, exchangers, tanks, valves and sealing cases for the protection of electrical components.

DYNAMIC TESTS

The dynamic tests carried out at TEC Eurolab's Test Engineering department are:

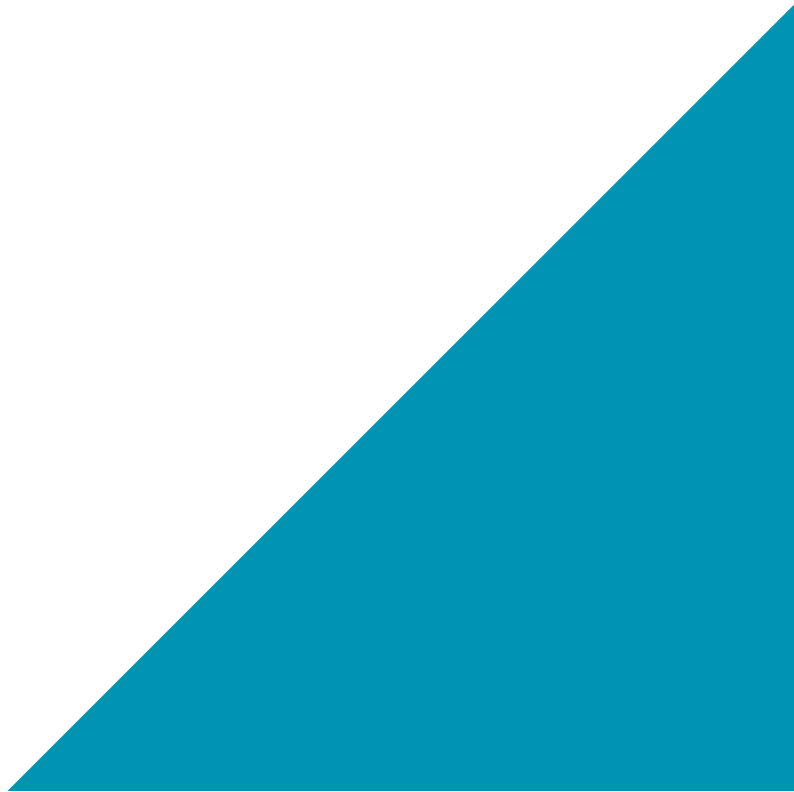
- Custom tests for wear simulation
- Impact tests
- Mechanical tests on real components
- Flexion, traction, compression tests with experimental setup
- Multi-axial fatigue tests up to 25kN
- Vibration tests
- NVH (Noise-Vibration-Harshness) acquisition and analysis

If the functionality of the part to be tested is related to the ability to withstand and distribute mechanical loads, it is possible to set up dedicated rig tests; using pneumatic and electromechanical actuators, it is possible to configure a test set-up that faithfully reproduces the state of stress that the component will face during its operating life.

By exploiting the modularity of the available benches, any test configuration can be set up to simulate all modes of mechanical stress. Furthermore, by interfacing auxiliary control systems to the benches, it is possible to set up torsion tests and functional wear simulation tests.

The laboratory also has various acquisition systems with sensors, to be able to guarantee the acquisition of the greatest quantity of information to provide a detailed picture of the distribution of stresses and deformations on the component.







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