

The Laboratory of the Centre for Excellence and Quality (CEQ) began to supply specialized technical services in the field of transport mechanics within the cluster developed in Tuscany around AnsaldoBreda (now Hitachi Rail), thus providing a concrete, specialized response, flexibility to support demand, particularly for SMEs, on topics such as:

- **staff training and qualification:** welders, non-destructive measurement and control personnel, system and process auditors, industrial bonding operators and technicians, etc.
- **process qualification:** welding, brazing, bonding (including structural bonding), painting, heat and thermochemical treatments, electroplating and coatings, etc.
- **quality control of materials** (raw materials and semi-finished products) **and processes**
- **analysis of specific problems**, from welding to bonding, from corrosion to treatments, from static resistance to fatigue
- **traceable calibration** of mechanical, thermo-hygrometric, electrical, lighting engineering measuring instruments
- **development, implementation, maintenance and auditing of management systems** for quality, environment, welding, occupational safety, social accountability, etc.

Thanks to its long experience in the textile and furnishing sector, the CEQ also provides support for problems relating to vehicle interiors, seats, comfort, wear resistance, dirtiness and cleanability (from fabrics to coated fabrics, from upholstery leather to surfaces), in wood or resin for paneling, shelves, planks, flooring, etc.. Belonging to a Research Center and relying on a stable collaboration with a network of centers of excellence at national and international level, CEQ can offer an overall service approach to innovation, through the integration of different skills and technologies, so that a single interface can offer a complete, qualified and competitive service.

CEQ activities are managed within the Quality System of Next Technology Tecnotessile srl, which obtained the certification of conformity to ISO 9001: 2015 from



(Cert. No. 50 100 14364)

for the following scope:

- Design and provision of research and development and of technology transfer services
- Design and provision of training services
- Design and provision of consulting services on management systems
- Laboratory chemical, physical, mechanical, electrical and non-destructive testing
- Calibration of measuring and testing equipment



Testing and Calibration Laboratory  
Applied research and Technology Transfer  
Training, Consulting and Certification support



**Centre for Excellence and Quality**  
Testing and Calibration Laboratory  
Technological and Training Pole  
Applied research and Technology transfer

**Monsummano Terme Operating Unit**

Laboratory and Training  
Via L. Lama, 30 – IT-51015 Monsummano Terme (Italy)  
Tel.: +39-0572-954552  
e-mail: lab@ceq.it  
Website: www.ceq.it



in cooperation with



Camera di Commercio  
Pistoia



is a member of



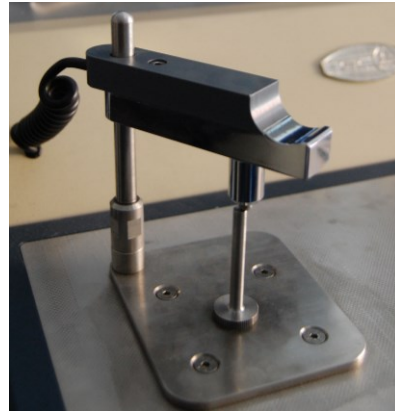
## Chemical and metallographic analyses

CEQ Laboratory is able to perform composition analyses of metal alloys such as carbon steels, alloy steels, stainless steels, light alloys, using an optical emission spectrophotometer (quantometer).

The result of the analysis also makes it possible to classify the alloy with respect to the different national and international regulations or with respect to a supply specification.

A complete metallographic laboratory allows sample preparation, from cutting to embedding, from polishing to any chemical attack, for a qualitative and quantitative analysis that includes:

- examination of the metallographic structure
- determination of austenitic grain
- detection of non-metallic inclusions and other structural defects
- hardness and micro hardness
- determination of the effective depth of thermal and thermochemical treatments
- determination of the thickness of galvanic coatings through section analysis
- determination of the thickness of the decarburization layer of the steels

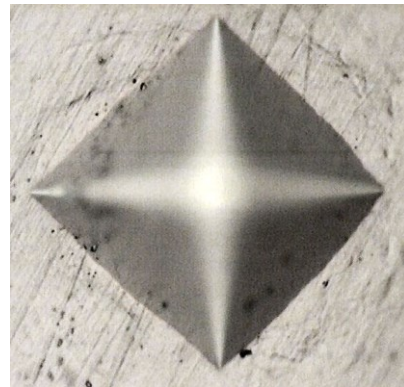


## Mechanical testing

CEQ Laboratory is equipped with dynamometers of different capacity (up to 250 kN) in class 05 for tensile, compression, bending, bending, etc. tests, even in conditions of fatigue, on the most varied materials, such as:

- metallic materials
- composite materials
- plastic materials
- elastomers
- welded joints
- joints with adhesive

The laboratory also performs resilience tests (from room temperature to  $-80^{\circ}\text{C}$ ), hardness tests and creep tests on both metallic materials (Rockwell, Brinell, Vickers and MicroVickers hardness) and plastic and elastomeric materials (Shore A and D).



## Tests on surfaces

The Laboratory is equipped with several devices for the evaluation of the surface characteristics of various materials: from scratch resistance to abrasion resistance, from the ability to retain dirt to oil repellency, from resistance to cold and hot liquids to the adhesion of the painting, from the porosity to the resistance to the immersion, up to the colour fastness to daylight and UV light, with and without spray. Further equipment are available for advanced analyzes such as scanning microscopy (SEM) and infrared (IR).

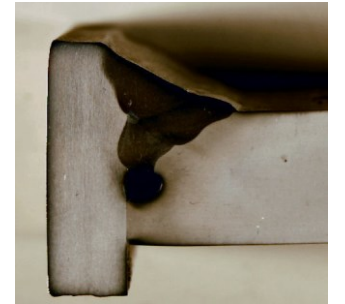


## Welded joints and weld process qualification

In transport vehicles, and especially in rolling stock, on one side welding technology plays a fundamental and often irreplaceable role, on the other it is a strong critical element for safety indeed.

To support companies in the development of these processes, CEQ Laboratory has equipped itself with equipment and skills for the qualification of processes. Among these:

- non-destructive testing (VT, PT, MT, RT, UT, etc.)
- macrographic and micrographic examination with computerized image processing
- identification of the heat altered zone (HAZ)
- identification of cracks or cavities
- identification of structural alterations
- tests of lateral traction, fold, fracture, resilience
- hardness and micro hardness tests in the joint section
- shear and cross tests on resistance joints
- macrographic analysis of spot resistance joints to check the core



## Composite material testing

Day after day composite materials offer features and opportunities, such as strength and lightness, which are of fundamental importance for those who create transport vehicles, as well as for those who are committed to creating vehicles that have an increasingly lower environmental impact. In order to make a correct and safe use of these materials, the availability of an equipped laboratory is absolutely mandatory. CEQ Laboratory is able to carry out a wide portfolio of tests on composite materials, from static to fatigue testing, from resistance to thermo-hygrometric cycles to corrosion tests.



## Corrosion testing

Also the evaluation of corrosion resistance and the simulation of the environmental conditions (hot, cold, damp, aggressive agents, etc.) is of great importance among CEQ testing activities. The availability of climatic and humidostatic chambers, cold rooms, salt spray (neutral, saline-acetic and cupric) and equipment for the evaluation and documentation of the effects are combined with the ability not only to carry out standard tests according to the regulations but also to develop *ad hoc* test specifications based on project needs.

More specific analyses can be performed with scanning electron microscopy (SEM), possibly with EDS, which is particularly useful, for example, for identifying surface alterations that would otherwise be difficult to decipher.

## Failure analysis

The laboratory is frequently involved in the analysis of mechanical failure events: the equipment and skills of the staff allow documents and findings to be examined systematically to formulate hypotheses on the causes of the breaks and to propose countermeasures. The analysis of the failure causes is never easy nor predictable, and the availability of different analytical methods, as well as the acquisition of reliable information on the production process and operating conditions, are all necessary ingredients for a useful diagnosis as well as for effective solution planning.

