

AZTERLAN

TECHNOLOGICAL SERVICES

TECHNOLOGICAL

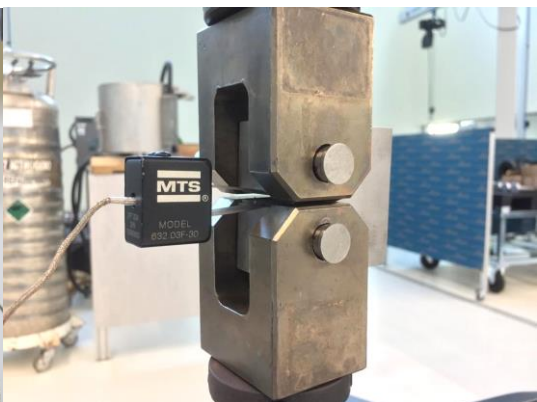
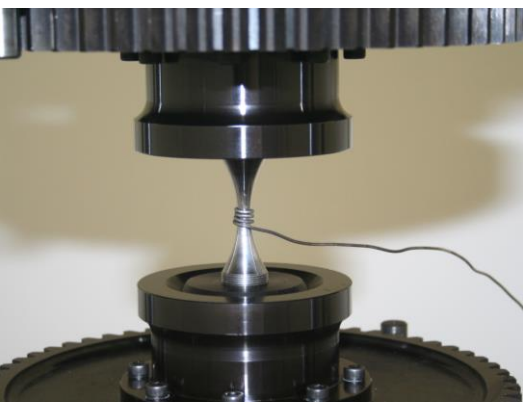
SERVICES

DETECTION,

CHARACTERIZATION,

AND EVOLUTION OF

FATIGUE CRACKS



A continued use, and the application of dynamic or static forces, cause stress and damage to components that can lead to their failure.

Knowing the properties of the materials and being able to predict their behavior onto these external actions, provides key information for the process of designing and manufacturing components, parts, and structures.

AZTERLAN's fracture and fatigue tests, allow characterizing the nucleation and growth of fatigue cracks (determination of the moment of their appearance and their evolution) in materials and components, as well as predicting their fatigue life by the observation of the external stress/strain conditions prior to catastrophic failures (without exhibiting previous plastic deformation).

AZTERLAN HAS THE TECHNICAL AND MATERIAL MEANS, AS WELL AS QUALIFIED PERSONNEL, TO RESPOND TO THE NEEDS OF THE INDUSTRY:

- ENAC CERTIFICATION (ISO 17025) FOR ADVANCED MECHANICAL CHARACTERIZATION TESTS.
- FATIGUE BENCH FOR MULTIAXIAL DYNAMIC TESTS (UP TO 50KN).
- AXIAL FATIGUE EQUIPMENTS (100KN AND 250KN).
- TEST CAPACITIES AT TEMPERATURES BETWEEN -70°C AND +1000°C.

TECHNOLOGICAL SERVICES

- MATERIALS CERTIFICATION
- DYNAMIC TESTS / FATIGUE STRENGTH
- FRACTURE TOUGHNESS TESTS (CTOD, K_{IC}, ΔK_{TH},...)
- FAILURE ANALYSIS, DEFECTOLOGY AND CUSTOM STUDIES



- ENAC accreditation
- Deadlines adjusted to customer needs
- Confidentiality guarantee
- Independent laboratory with more than 35 years of experience in the sector
- Highly trained and qualified team

COMPONENTS · STRUCTURES



SECTORS

TRANSPORT

Automotive, Railway, Marine, Aerospace

ENERGY GENERATION AND TRANSPORT

Wind, Solar, Oil&Gas, Combined Cycle, Nuclear

CIVIL WORK

Bridges, Viaducts, Structural elements

CHEMICAL INDUSTRY

EQUIPMENT GOODS

METALLIC TRANSFORMATION

ADVANCED PHYSICAL PROPERTIES TESTINGS

Mechanical characterization tests carried out at room temperature, high temperature or low temperature, according to international standards ASTM E399, ASTM E21, ISO 6892-2, ISO 6892-3, ASTM E466, ASTM E1820, ASTM E647, ISO 12135, UNE-EN ISO 15653, UNE-EN 10225 and customer specifications.

Main values offered by these test:

MECHANICAL PROPERTIES AT DIFFERENT TEMPERATURES

Determination of the Yield Strength and Young's Modulus at temperatures between -70°C and $+1000^{\circ}\text{C}$.

CTOD, CRACK TIP OPENING DISPLACEMENT

Fracture toughness parameter that is mainly determined in ductile materials. Defines the size of the plastic deformation of the crack-front in the direction normal to the plane generated by fatigue.

K_{IC}, CRITICAL STRESS INTENSITY FACTOR IN MODE I

Magnitude of fracture toughness in Linear-Elastic regime. It is the resistance of a material to the extension of the crack when plane strain conditions predominates at its end. It is mostly used for brittle materials.

J_{IC} AND THE INTEGRAL J

Characterization of the local stress and strain field in the area around the crack front. Toughness property determined in Elasto-Plastic regime.

CRACK GROWTH

Characterization of the extension of a crack in a previously cracked material. Determination of the Paris equation constants C and m, and the fatigue crack growth threshold factor, Δk_{th} .

S-N CURVES

Determination of fatigue curves of materials, their fatigue life limit, and the estimation of useful life cycles of a component.

OTHER SERVICES

- METALLURGICAL CHARACTERIZATION: ELEMENTARY COMPOSITION, STRUCTURE, MECHANICAL PROPERTIES.
- ENVIRONMENTAL CORROSION TESTS AND ACID MEDIA (SCC AND HIC).
- NON-DESTRUCTIVE INSPECTIONS: INTERNAL AND SUPERFICIAL DEFECTS.
- DEVELOPMENT AND DESIGN OF AD HOC TESTS.

WE EVALUATE THE BEHAVIOR OF MATERIALS SUBJECTED TO
EXTREME CONDITIONS OF USE.



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For more than 40 years, AZTERLAN has accompanied companies in the metal-mechanic industry with a comprehensive offer of metallurgical characterization services aimed at ensuring their quality and performance.

We have the most advanced means, with a robust quality system (accredited by ENAC) aimed at responding to the requirements of highly demanding sectors such as automotive, aerospace, naval, oil & gas or energy production. Our team is specialized and has profound knowledge in the transformations that are generated in the metallic alloys, as well as in the manufacturing processes of metallic components (casting, forging, stamping, lamination, additive manufacturing, joining processes , etc.).

The portfolio of metallurgical inspection and characterization services offered by AZTERLAN TECHNOLOGICAL SERVICES is complemented by the activity of AZTERLAN R&D&i, a member of the Basque Technology and Research Alliance (BRTA), the offer of which focuses on the development of new materials and on the optimization of manufacturing processes to produce advanced products of higher performance.

Under the same philosophy, AZTERLAN TECHNOLOGICAL SERVICES and AZTERLAN R&D&i shape together an advanced and innovative technological proposal for the companies that design, produce and use metallic components.

The logo for AZTERLAN, featuring the word "AZTERLAN" in a bold, sans-serif font. The letters "A", "Z", "T", "E", "R", "L", "A", and "N" are white, while the letter "I" is red. The logo is set against a white rectangular background.

AZTERLAN METALLURGY RESEARCH CENTRE

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