Composite materials testing

Characterization of composite materials behavior for their optimum use in products and components

The incorporation of composite materials allows the manufacturing of lighter and more resistant products and components, two key parameters for improving competitiveness and differentiation in sectors such as aerospace, defense, automotive, railway or renewable energies.

As a result, manufacturers in these industries use an increasing amount and variety of composites in their products. Characterizing these materials will allow their configuration to be optimized during the design stage, choosing the most suitable manufacturing method for each application.

Accredited Composite Materials Laboratories

Applus+ Laboratories has a network of NADCAP and ISO/IEC 17025 accredited laboratories and an expert team in advanced composites and their applications in leading industries. We also have specific customer recognitions such as Airbus, Safran and Comac approvals for materials testing.

Our service scope covers:

- Support in RandD+I programs
- Characterization Testing
- Qualification Testing
- Manufacturing Quality Control

Our technical team performs standard tests (EN, ISO, ASTM, GB and MIL-STD, among others) or tests designed according to the client's specific regulations (AITM, SP, GD, among others) for any type of application. We test both commonly used materials and materials for advanced applications such as polymer matrix composites, reinforced
plastics, sandwich type materials (foam core, honeycomb core), carbon fiber composites, fiberglass composites

Test Specimen Preparation Capabilities

- CFRP specimens manufacturing
- Test sample machining and preparation
- Test tooling design and manufacturing

Composites Testing Capabilities

Composites Mechanical Testing (under different environmental conditions):

- Tensile Testing (Tensile Strength and Modulus, Flatwise, PT, OHT, FHT)
- Compression Testing (Compression Strength and Modulus, PC, OHC, FHC, CAI)
- Flexural/Bend Testing
- Shear Testing
- Fracture Toughness Testing ($G_{IC}$, $G_{IIC}$)
- Peeling Testing
- Impact Testing
- Fatigue Testing (S-N curves)

Composites Thermal Testing:

- Dynamic Mechanical Analysis (DMA)
- Differential Scanning Calorimetry (DSC)
- Thermomechanical Analysis (TMA)
- Thermogravimetric Analysis (TGA)

Composites Physical Testing:

- Resin/Fiber/ Void Content (FVC) on Cured Material
- Fiber Areal Weight (FAW)
- Prepeg Areal/Adhesive Film Weight (PAW)
- Resin Content (RC)
- Volatil Content (VC)
- Resin Flow (RF)

Composites Fractography and Metallography

- Macroscopic and Microscopic examination
- Determination of film thickness
- Fractography (SEM)
Composites Non-Destructive Testing (NDT)

- Automated Ultrasonics Inspections
- Manual Ultrasonics Inspections

Benefits

- Optimize the design of components with composite materials
- Ensure the structural integrity and reliability of the components
- Optimize the composites manufacturing process
- Predict the in-service behavior of composite materials