

MECHANICAL TESTING SERVICES

The Center for Composite Materials provides composite mechanical testing services to customers across the aerospace, automotive, infrastructure, manufacturing, medical, and materials industries with our world-leading facilities and experts. Testing services range from composite building blocks (fibers, resins, sizings, adhesives, and core materials) to thermoset and thermoplastic composites laminates, sub-components and full-scale components based on ASTM, SACMA or other composite industry standards. We also provide expertise and develop test methods for non-standard materials, geometries and configurations, as well as thermo-mechanical and cyclic loading tests. In parallel, we provide quality assessment services including non-destructive evaluation of samples, fiber volume fraction, void content, and optical microscopy and X-ray computer tomography (CT).

Mechanical Testing Capabilities

- High performance fiber tension and compression (filament level), sizing assessment (micro-droplet, fiber fragmentation) and polymer thermo-mechanical characterization.
- Tension and all varieties of compression tests, poisson's ratio, bearing, damage tolerance, compression after impact, v-notch shear/rail shear, lap shear, short beam shear, floating roller peel, climbing drum peel, etc.
- Elevated/Low Temperature Chamber for thermo-mechanical properties;
- Environmental Simulation/Conditioning for moisture and UV exposure;
- Large-scale drop tower for full-scale impact and damage tolerance tests;
- Test matrices to populate Finite Element Material Models for composites.
- Non-standard testing services – developing test methods for sub-component, component and full assembly structures, sensors and data acquisition systems, data reduction methods, and test reports.



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Equipment

Impact Towers

Dynatup 8250 Instrumented Impact Tester

Impact Energy: 0.6 to 303 Joules (gravity driven)
Impact Velocity: 1 to 3.66 m/sec (gravity driven)
Load Range: up to 400 N

Dynatup 8000 Instrumented Impact Tester

Impact Energy: 2150 Joules (gravity driven)
Impact Velocity: 1 to 5.2 m/sec (gravity driven)
Load Range: up to 1550 N

Full-Scale High-Energy Drop Tower

Impact Energy: 40000 Joules (gravity driven)
Impact Velocity: 1 to 9 m/sec (gravity driven)
Load Range: up to 10000 N

Dynamic Loading Test Frames

Instron 1331

Servo-Hydraulic Actuation
Load Capacity: up to 100 kN

Instron 1332

Servo-Hydraulic Actuation
Load Capacity: up to 250 kN

Strength Testing Load Frames

Instron 4484

Motor Actuated Column Screws
Load Capacity: 150 kN

Instron 5565

Motor Actuated Column Screws
Load Capacity: 30 kN

Instron 5567

Motor Actuated Column Screws
Load Capacity: 30 kN

Instron 5848

Motor Actuated
Capable of Testing Single Fiber Strength
Compatible load cells: 5 N, 100 N, 500 N

Instron 5985

Motor Actuated Column Screws
Load Capacity: 250 kN
Compatible load cells: 500 N to 250 kN
Extension Rate: 0.00005 to 1016 mm/min
Data acquisition Rate: 2.5 kHz

Instron 8562

Motor Actuated Concentric Screw
Load Capacity: up to 100 kN

Structure Testing System

MTS Servo-Hydraulic Test System

SilentFlo 505.30 Hydraulic Power Unit
4 Station Service Manifold
FlexTest 60 Controller
- 4 independent channels
- 4 stations

Many actuators available in the range of 20 to 150 kips
8 ft x 20 ft Reaction Floor
Fixtures to apply loads along any vector

Low and High Temperature Capabilities

Tenny BTRC Temperature and Humidity Test Chamber

Temperature Range -85 to 338 °F
Humidity Range 20 to 95%
Closed Cycle Cooling

Thermotron F-4-CH-LN2 Temperature Test Chamber

Temperature Range -94 to 338 °F
Open Cycle Cooling – CO₂, LN₂

