National Aeronautics and Space Administration

Structural Testing

Johnson Space Center (JSC) provides structural static and fatigue load testing for payloads and spacecraft structures. Tests range from mechanical properties testing of materials to full-scale verification testing of payloads and spacecraft structures. JSC is equipped with a variety of hydraulic and electromechanical load frames with maximum load capacities ranging from 10 to 220 kip. JSC also provides for nondestructive evaluation of hardware utilizing x-ray, ultrasonic, fluorescent penetrant, magnetic particle, infrared thermography, and eddy current techniques. Structural testing facilities provide capability to perform test and evaluation of both aerospace and nonaerospace hardware.

Services Provided

- Static and fatigue load testing using single or multiple actuators up to 220,000 lb
- Tension and compression testing – load or displacement control
- Cyclic testing up to 100 Hz
- Fracture mechanics property testing
- Tensile, lap shear, and compression testing of materials at low and elevated temperatures
- Fatigue/fracture coupon tests
- Nondestructive evaluation
  - Real-time, digital, and film x-ray
  - Automated ultrasonic (conventional and phased array)
  - Fluorescent penetrant
  - Magnetic particle
  - Infrared thermography
  - Eddy current

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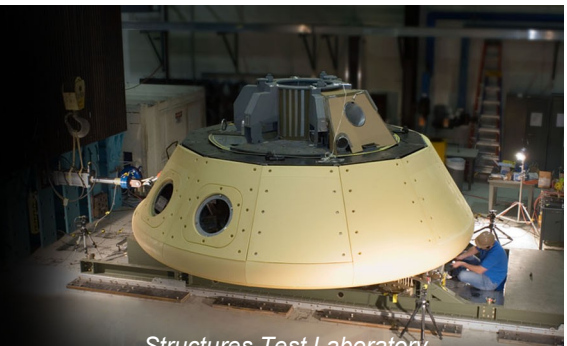
Structural Testing

Parameter	Structures Test Laboratory
Load capacity	Up to 220,000 lb_f
Actuator capacity	Up to 150,000 lb_f
Stroke range	6″ – 57″
Temperature range	-300 – 800 °F



Structures Test Laboratory

Ultrasonic testing

Features

- Twelve load frames can be operated in tension and compression and either load or displacement control.
- Cyclic testing up to 100 Hz, depending on the load and stroke
- Ten load frames can be configured for fracture mechanics property testing, including automated da/dN testing.
- Actuators are controlled up to 6 stroke or 32 load control channels or any combination of both.
- Tensile, lap shear, and compression testing of materials and components at low and elevated temperatures
- Sizable inventory of linear resistive deflection potentiometers, displacement/velocity transducers, LVDT deflection transducers, RVDT angular displacement transducers, thermocouples, and force washers

Nondestructive Evaluation

- Radiographic Testing
  - Computed Tomography
  - Digital Radiography
  - Standard Film Radiography
- Ultrasonic Testing (UT)
  - Phased Array Ultrasonic Testing
  - C-scan UT
  - Conventional UT
- Infrared (IR) Thermography Inspection
  - Flash Infrared Thermography Testing
  - IR Thermography Testing
- Remote Evaluation Techniques
  - Laser Shearography
  - High Speed Imagery
- Eddy Current Testing (ET)
  - Array Eddy Current Testing
  - Conventional ET
- Liquid Penetrant and Magnetic Particle Inspection
- – Fluorescent and visible mediums for both methods

We have developed customer-friendly agreements to streamline business relationships and are eager to share our unique facilities and expertise with new customers. We invite your inquiries regarding application or adaptation of our capabilities to satisfy your special requirements. Briefings on general or specific subjects of mutual interest can be arranged at JSC or at your business site.

Facility Testing Information
http://jsceng.nasa.gov

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