



Power Systems

Johnson Space Center (JSC) provides test facilities and skilled personnel for many of the fluid and energy conversion systems required for human exploration and development in space, including power generation and storage, fluid storage and distribution, and electromechanical and hydraulic actuation. Test capabilities include battery performance, abuse and life-cycle, power distribution system, fuel cell, high voltage and corona detection, connector and wire, and power quality.



Services Provided

- Battery systems design, test, and analysis
 - Variety of cell chemistries – Alkaline, Li-on, NiMH, Pb-Acid
 - Battery performance testing
 - Battery abuse testing
- Integrated power system verification testing
 - High-fidelity power emulators and load emulators
- Off nominal power testing
 - Envelope limit testing of hardware in system level test environment
 - Fault injection scenarios in true off nominal conditions
- Automated power quality testing
 - Rapid regression testing
 - Rapid test development using canned tests
- Fuel cell design, analysis, and test



Battery Performance Testing

Facility	Voltage Range	Temperature Range
Abuse Chambers	0 – 600 V	-200 – 350 F

Capabilities

- 12 systems ranging from low current/voltage to high current/voltage
- Constant voltage, current, and power modes provided
- Long- and short-term cycling
- Determination of optimal charge and discharge rates
- Thermal capacities/vacuum tolerance



Hazardous vibration test stand

Battery Performance Testing

Facility	Volume	Pressure Range
2' Chamber	2' dia x 36" L	0.001 torr – 100 psia
4" Chamber	4" Dia x 30" L	0.001 torr – 100 psia

Temperature Range	Overcharge/Discharge/Short Circuit
-300 – 500 F	12 Channel 30 V 15 A

Capabilities

- High temperature exposure and heat-to-vent testing
- Over charge and over discharge characterization
- Positive temperature coefficient failure testing
- Short circuit testing
- Crush, drop testing
- Destructive physical analysis

Facility	Frequency Range	Shaker Size Range	Load Direction	Displacement
Hazardous Vibration Test Stand	20 – 2, 000 Hz	11,000 lbf RMS Up to 16,000 lbf sine Up to 15,500 lbf random	x, y, or z	1" stroke

Fuel Cell Testing

- Two fuel cell test stands with unattended test capability
- Oxygen flow rates up to 8 scfm and hydrogen flow rates up to 16 scfm
- Reactant supply and distribution up to 300 psig
- Programmable DC load banks to dissipate fuel cell power up to 150 kW at up to 100V

Electrical Systems

- Electrical power quality testing of International Space Station loads, payloads, and equipment
- 208 Vac to 120 Vdc power supplies
- 208 Vac to 28 Vdc power supply
- Remote Power Controller Module Emulators
- Impedance Measurement System – Electrical loads (DC and electronics)
- Wire arc track testing (dry method using Abrader/wet method using saline drip)

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.



For the benefit of all

For more information:
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