Experior laboratories

SPACE HARDWARE TESTING

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SPACE HARDWARE TESTING FOR CRITICAL APPLICATIONS

Experior Laboratories specializes in creating high-performance and demanding vibration, shock and vacuum tests associated with rocket launches and space environments. As one of the leading independent test laboratories in North America, Experior Labs is recognized for its superior customer service, consistent on-time delivery, project management by experts and end-to-end accountability.

RANDOM VIBRATION

This PSD profile has reduced G^2/Hz demand in the 1,200 – 2,000 Hz band where most electrodynamic shakers exhibit armature resonance. As a result, the full "resonant boost" from the shaker armature that you can count on with a flat PSD profile is not present, when running this shape of PSD profile. To make up for this missing boost and to achieve the full 175 G rms level as shown, you must use a large KVA Power Amplifier to provide extra shaker drive.

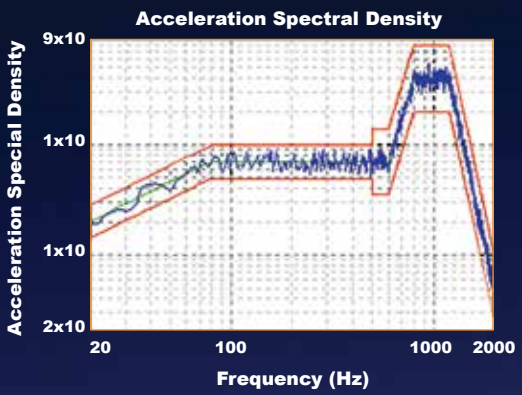
No Band Splitting Required

Experior Laboratories runs this complete profile without any band splitting, using one of several Unholtz-Dickie T2000 shakers, driven by a 240KVA power amplifier.

Most other test labs have to run this profile as a series of split frequency bands tests, due to the limitations of their shaker and /or power amplifier equipment.

For system-level testing of large payloads up to 8,000 lbs, Experior Labs offers Dual T4000 shaker capability with 3" pk-pk stroke. Each shaker is driven by a 360KVA power amplifier that provides a combined force output of 80,000 lbs sine / 80,000 lbs random/ 100,000 lbs sine burst / 200,000 lbs shock (classical or SRS). These T4000 shakers can deliver even the most demanding vibration and shock profiles for large payload testing.

Random PSD @ 175 G rms



40 G^2/Hz in mid-band

SINE & MIXED MODE VIBRATION

Utilizing high-G Unholtz-Dickie Induct-A-Ring armature, Experior Labs can provide swept sine testing in excess of 215 G pk. Additional sine modules include:

SINE

- Sine Dwell (fixed freq)
- Resonant Dwell (phase tracked)
- Sine Burst
- Windmilling

MIXED

- Sine-on-Random (fixed sine tones or swept)
- Gunfire
- Random-on-Random
- Sine-on-Sine

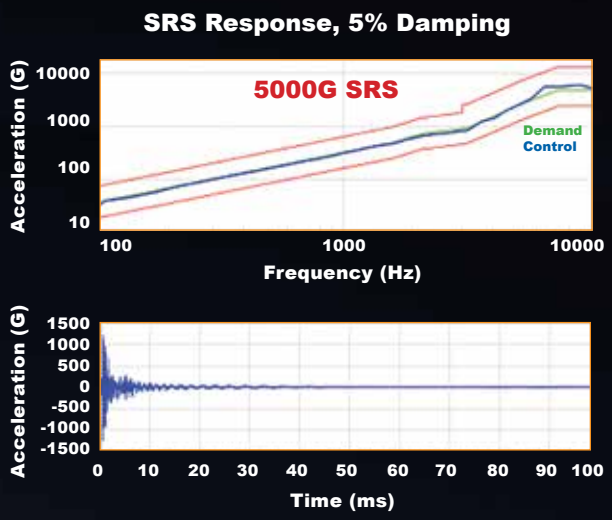
UNHOLTZ-DICKIE SHAKERS

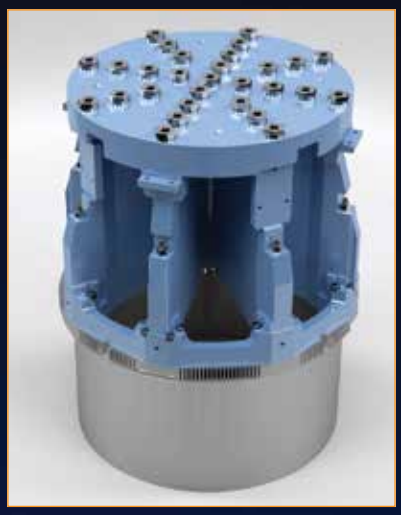
MODEL T4000	T4000 - 1	40,000 lbf	3" Stroke
	T4000 - 2	40,000 lbf	3" Stroke
MODEL T2000	T2000 - 1	25,000 lbf	3" Stroke
	T2000 - 2	25,000 lbf	3" Stroke
	T2000 - 3	20,000 lbf	2" Stroke
MODEL R16C	R16C - 1	13,000 lbf	2" Stroke
	R16C - 2	13,000 lbf	2" Stroke

Test Type	Maximum Test Level
Random Vibration (up to 4,000Hz)	> 175 G rms
Sine Sweep Vibration (up to 3,000Hz)	> 220 G pk
SRS Shaker Shock (up to 10 kHz)	> 5,000 G (SRS)
SRS Pyroshock Simulation (up to 20 kHz)	> 30,000 G (SRS)

SHAKER SHOCK

Experior Laboratories performs SRS Shock testing with levels up to 5000 G on the T2000 Shakers, making Experior Labs the industry leader in SRS Shaker Shock. Most test labs cannot offer Shaker Shock testing above 500 – 1,000 G SRS due to risk of shaker armature damage.





T2000 SHAKER ARMATURE

The UD Induct-A-Ring armature uses a solid metal coil with no windings on the moving armature, allowing it to be driven at extreme G-levels without driver coil failure.

By comparison, conventional shaker armatures have a wound coil that's epoxy bonded to the armature. During high G-level operation, this attached driver coil is subject to mechanical failure. It is an accepted fact that conventional driver coil armatures are not well suited for high-G SRS testing.

The UD Induct-A-Ring armature solves this problem.

THERMAL VACUUM

Experior Laboratories' vacuum test chambers are designed to meet the harsh requirements of space conditions. Experior Labs is capable of simulated space along with repeated cycling between high and low temperature extremes - all while providing test data to better assess likely flight mission performance and function.

PYROSHOCK

Pyroshock testing simulates the high-G, high frequency shock environment associated with pyrotechnic events, such as rocket stage separations. These are sometimes called "SRS Shock" tests, as they are specified with a Shock Response Spectrum (SRS) profile. This profile is a representation of the maximum predicted acceleration of a system across a range of assumed natural frequencies.

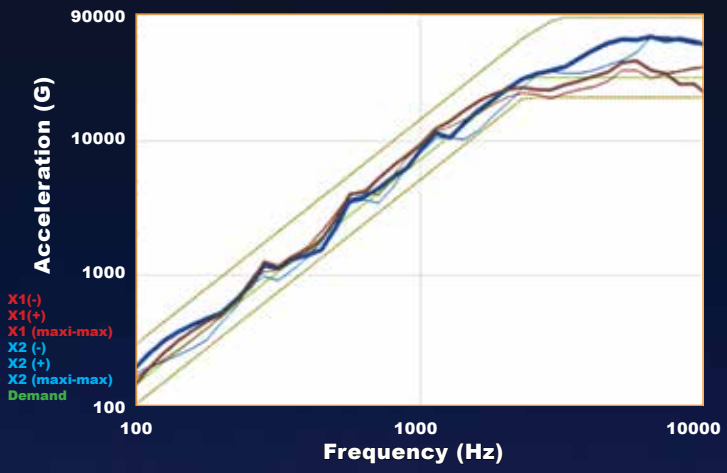
Experior Laboratories' Kinetic Impact Pyroshock Simulation (KIPS) test system is able to simulate near and mid-field Pyroshock, experienced by the parts closest to a pyrotechnic event, by using high speed impact to excite a tunable resonant beam. By adjusting the impact force, location and damping, this platform allows for highly customizable shock generation and the pneumatic system allows for quick setup and resets.

Adjustable resonance allows us to boost acceleration in only the desired frequency range. For shocks with a specified Te (event duration), adjustable muzzle velocity, impact mass, and custom damping materials allow us to customize shock duration, while meeting acceleration requirements.

The KIPS test system offers short transients, narrow differences between positive and negative SRS traces, and a uniform shock input that allows for near-equal measurements at multiple fixture mounting points. Experior Labs has designed a wide variety of custom shock platforms and fixtures, and we've used frequency analysis software to identify mode shapes and resonant frequencies, which lets us prevent cross-axis acceleration and ensure that units are not over-tested.

SRS Pyroshock Simulation

SRS Response, 5% Damping



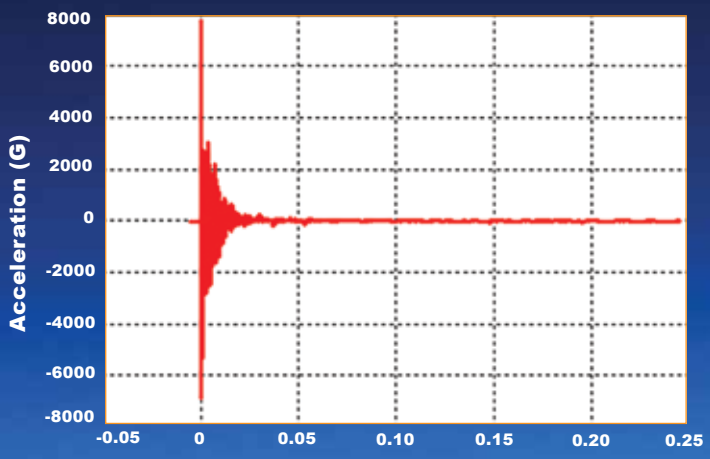
30,000G Shock, measured at two diametrically opposed accelerometer locations

ISO/IEC-17025: 2005 Accredited

ITAR Registered

MIL-STD-790 approved by the Defense Logistic Agency (DLA) Land and Maritime

Acceleration vs Time



Sample acceleration time history from shock on KIPS system

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TESTING • CERTIFICATION • QUALIFICATION

Headquartered in Oxnard, California, Experior Laboratories Inc. specializes in providing independent, third-party, design verification and qualification test and calibration services to component manufacturers, integrators and system providers within the telecom, datacom, military, aerospace, space and industrial markets.

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