Shock Testing




Experior Laboratories' MIL-STD-790 approved and ISO-17025:2005 accredited laboratory houses multiple state-of-the-art electrodynamic shaker and shock systems that can handle the most demanding test specifications.

Jet Propulsion Laboratory
California Institute of Technology

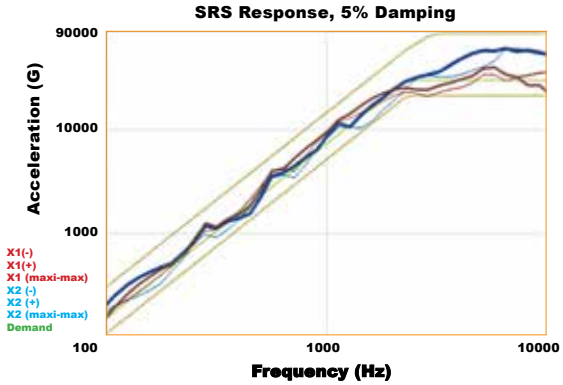
Mechanical shock testing helps determine whether a device can remain functional when subjected to sudden, abrupt motion changes associated with service environments like product handling, shipping/transportation, rocket stage separation, weapon firing, etc. These shocks can be specified with a classical shock profile, performed on Experior Laboratories' drop tables or electrodynamic shaker systems, or as pyroshock or SRS shocks, which can be performed on Experior Laboratories kinetic impact test system.

SRS Shock

SRS shock testing is commonly used to determine a test article's ability to tolerate the mechanical stress waves produced by a high frequency, High-G shock event, such as rocket stage separations. SRS shock specs are found in most aerospace hardware test procedures, given as a graph profile showing "response" acceleration (g) on the Y-axis and frequency (Hz) on the X-axis. The Y-axis acceleration values represent the profiled G-level measured by a set of analysis filters that have a specified gain, or Q factor (Q = 10 typical).

SRS Pyroshock

SRS Shock tests are often associated with High-G environments caused by violent metal-on-metal impacts, rapid acceleration, or explosive events. SRS (shock response spectrum) transient shocks incorporate a broad range of frequencies into the test pulse which better approximate the real mechanical event. SRS shock is sometimes called "Pyroshock" because the High-G environment being simulated is often generated by an pyrotechnic explosion.



Kinetic Impact Pyroshock Simulation (KIPS)

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. Our pneumatic system allows for quick setup and reset.

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 system boasts 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.

SRS Shock System - Pneumatic Horizontal

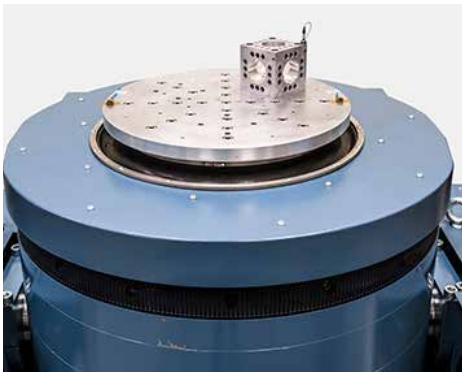
Experior Laboratories' horizontal shock system represents a dramatic increase in the size of units that can undergo SRS Shock testing. Parts mount to a 40"x40" platform that matches directly with slip tables on our high power T2000 electrodynamic shakers, allowing a seamless transition from vibration to shock. An internal compressor boosts impactor pressure high enough to reach 5,000G on parts over 500lb. Chromed precision guide rods ensure the platform travels only in the direction of the applied shock. Programmable electromagnetic clutch brakes grab the table after impact to allow resonance and prevent secondary impacts. The system allows adjustment of padding, pneumatic parameters, and brake timing to adjust knee frequencies between 250Hz and 3000Hz.

- Table Size: 40" x 40"
- Max. Load: 450lb+
- Max. SRS (Q=10): 10,000g

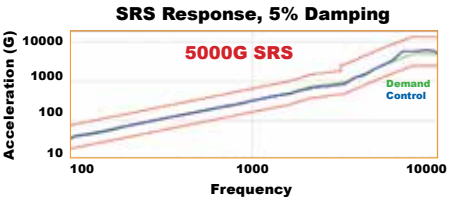
(Est. w/ Break Frequency: 250-2,000Hz & slope 6-9dB/oct)

- Response Spectrum: 50-10,000Hz
- Max. Duration of Effective Wave"
- ≤20ms (Adjustable)

SRS Shaker Shock



Experior Laboratories uses Unholtz-Dickie T-2000 vibration systems optimized for high G shaker shock up to 5,000G. Unholtz-Dickie vibration systems have inductively coupled solid metal coil armatures to prevent driver coil failure. Shakers with 3" stroke and 180 in/s of velocity allow for high G shock tests with large displacement requirements or short transients.



Classical Shock

Classical Shock tests such as half-sine, sawtooth, and trapezoidal pulses are associated with product handling events (drop impacts) and transportation induced events (road bumps, pot holes, etc.) and are performed using our AVCO pneumatic shock table or any of our Unholtz-Dickie electrodynamic vibration systems. These shock tests are specified in the Time Domain (acceleration vs. time). Classical shock pulses up to 1,500G can be accommodated for a wide range of test payloads.

High-G Classical Shock

The Lansmont P30 shock system can produce half sine or haversine shocks in excess of 10,000G. Dual elastic accelerators boost the max velocity change to 600in/s or higher. The system comes with pneumatic brakes and a floating seismic base to allow durations as short as .15ms. Data is captured at 1MHz, with shock pulse amplitude and duration reported automatically. SRS plot generation is available.

Experior Laboratories….helping customers ensure the reliability of their products and reduce the overall time-to-market.

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TESTING • CERTIFICATION • QUALIFICATION

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