EXTREME AST

Extreme Thermal Performance

Intuitive 8800 Controller includes Impactor Monitor System and PSD

Multi-Zone Vibration Control (patent pending)

Highest acceleration performance of 100 Grms and 1,500+ Gpk shock

Individual Impactor Control for Three Modes of Vibration

Dual Strike Impactors (patented)

Industry Changing Innovations for HALT and HASS

Thermotron's innovative EXTREME AST system finds product failures faster than traditional AST equipment because of its patented RSL SCI table, dual strike impactors, rapid product temperature change rates, and unparalled control system. The EXTREME AST can maximize lab efficiencies and reduce costs associated with warranties and product recalls.

What is HALT and HASS?

Highly Accelerated Life Testing (HALT) applies increasingly higher levels of stress to force product failures. HALT uses multi-axis vibration and high thermal ramp rates significantly beyond the product's normal use environment to expose product weaknesses quickly. Using high levels of stress causes a significant time compression and exposes the same failures experienced during normal use over a product's lifetime.

Highly Accelerated Stress Screening (HASS) is a production quality screen that applies similar, but lower stresses, to those used in HALT. HASS aims to verify that production units are manufactured as designed and quickly detects component or manufacturing irregularities. This screen is "tuned" so that it detects weak products while still leaving expected field life in the shipped product.

Why EXTREME AST?

While step stressing in HALT, it is common to reach the limits of the system before finding all the weak points of the product under test. The EXTREME AST solves this with unique high stress modes, to take HALT to a higher level. In addition to the low frequency mode, the high frequency mode allows testing up to 100 Grms and the synchronized shock mode provides shock to 1,500 Gpk.

HASS testing with the EXTREME AST system provides advances in test consistency. Users are able to test more than one product in different table zones with Thermotron's multi-zone vibration control. The RSL SCI table can be run in three independent, selectable modes of operation for HASS testing.

Thermotron's EXTREME AST system is designed and built to find product failures faster with exceptional low frequency energy and uniformity across all axes. Testing will be more effective with a smooth spectrum and higher displacement levels.

EXTREME AST Chamber Features

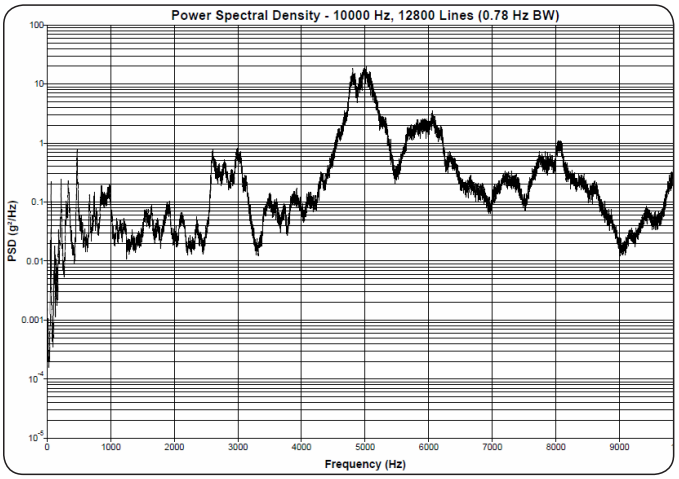
Standard Features	Benefits
EXTREME Product Temperature Change Rates	Maximizes thermal stress and accelerates failure rates up to 70°C/min. heating and cooling change rates *(depending on the product load and temp. range)*
High Capacity, Staged Heaters	EXTREME heating change rates on demand as required
High Volume Air Circulation System	High airflow = industry-leading product change rates
Air Distribution Through Adjustable Ducts or Slot	Optimizes configurable and adjustable airflow to the products
Proportional Control Liquid Nitrogen System	Maximum cooling change rates while reducing LN_2 consumption
Multi-point Door Latch	Provides positive seal to minimize heat leak and moisture migration
Sound Deadening Insulation	Minimizes noise during operation
Windows, Doors, and Ports	Provide easy visual and physical access to products under test
Internal T/C Junction Box	Enables convenient multipoint temperature monitoring and control
Standard Safety Features	**Benefits**
Safety Stop Mode w/ Automatic Purge and Reset	Protects operators, products, and equipment
Oxygen Monitor and Alarm	Interfaced to chamber LN_2 system to ensure safe oxygen levels
Door Interlocks with Programmable Features	Prevents door openings during operation, protecting operators

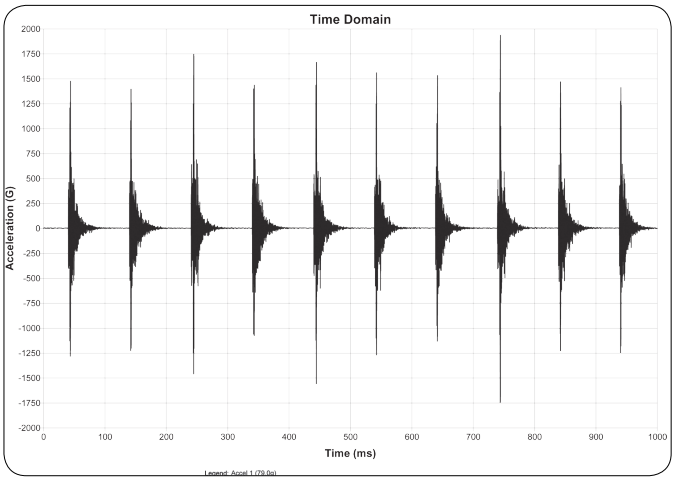
EXTREME RSL SCI Table

The patented RSL (Repetitive Shock Low Frequency) SCI (Solenoid Controlled Impactor) table can operate in three selectable, independent vibration modes in one table: low frequency, high frequency, and synchronized shock, all with a soft start feature.

Low frequency mode excites products with lower resonant frequencies. **High frequency mode** provides vibration levels up to 100 Grms. **Synchronized shock mode** allows the table to reach input vibration amplitudes to 1,500 Gpk. The table's soft start feature allows for accurate control of levels less than 1 Grms without a spike, effectively integrated in all three modes.

Three Modes of Vibration	Match Vibration to the Product
Low Frequency Mode	Significant energy below 500 Hz
High Frequency Mode	Up to 100 Grms levels, finds product failures in less time
Synchronized Shock Mode	1,500+ Gpk forces failures faster; accelerates rate of fatigue accumulation
Standard Features	**Benefits**
Soft Start	Allows accurate control of levels less than 1 Grms without a spike
Dual Strike Impactors	Provides impact in both directions, accelerates fatigue damage
Individual Impactor Control	Improves table response consistency and uniformity
XYZ Balance	Product tested more evenly; stimulates mechanical products
Displacement Levels	3 times more displacement with dual strike impactors than conventional systems
Solenoid Controlled Impactor	Reduces air consumption by 50%
Multi-Zone Vibration Control *(optional)*	Stresses products in tables zones at the same or different Grms level(s)





Up to 100 Grms Acceleration

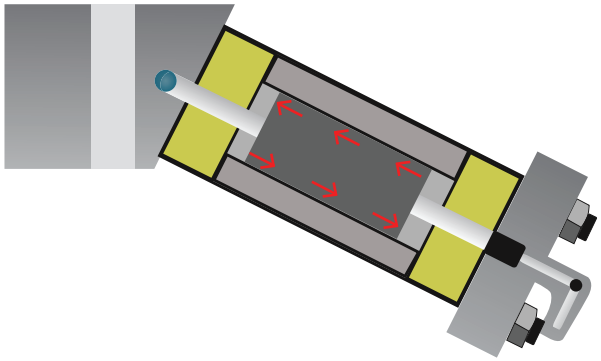
The patented RSL SCI table can operate at higher acceleration levels than other tables. Higher acceleration levels help induce product failures that otherwise might pass a traditional test.

1,500 Gpk Synchronized Shock Levels

Achievable amplitudes to 1,500 Gpk with the new RSL SCI table. Synchronized, repetitive high G-shock can be delivered in a wide range of discrete frequencies in all six axes simultaneously.

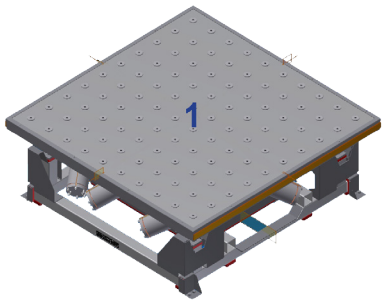
Patented Dual Strike Impactor

Our patented solenoid controlled, dual strike impactor is an industry first. Repetitive shock impactors have traditionally hit in only one direction, so the stress in the positive direction was much greater than the negative. Hitting on the upstroke and downstroke imparts stress in both the positive and negative directions in each of the three axes. Driving the table in both directions causes visible vibration table motion and displacement not achieved with other tables.

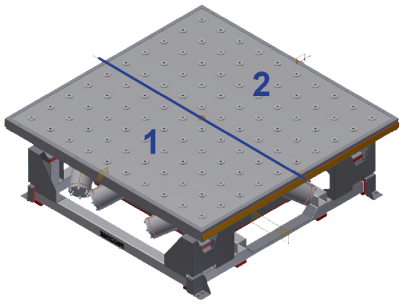


Dual strike impactors improve peak probability stress distribution with an increased number of high force impact occurrences and a more evenly distributed force profile. Test engineers will see increased product fatigue resulting in quicker product failures. The impactors can impart more fatigue damage while using less compressed air.

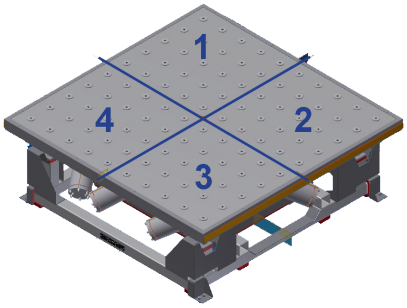
Multi-Zone Vibration Control* *(patent pending)*



One Zone



Two Zones



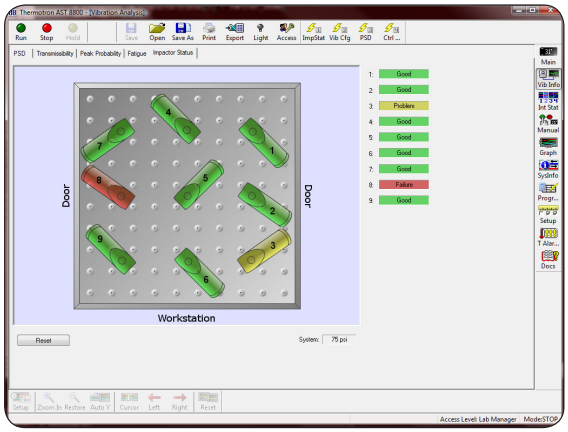
Four Zones

Thermotron's patent pending Multi-Zone Vibration Control is the first of its kind. Users can choose from one, two, or four table zones and test different-sized products at the same Grms level and stress same-sized products at different Grms levels.

Conventional systems control the entire table to only one Grms level, which can produce inaccurate results because the actual product vibration can be higher or lower than the table control. This feature makes dynamic adjustments automatically, compensating for system variability including inconsistencies in the table, impactor wear, air supply, fixturing, mounting, etc.

**Optional Feature*

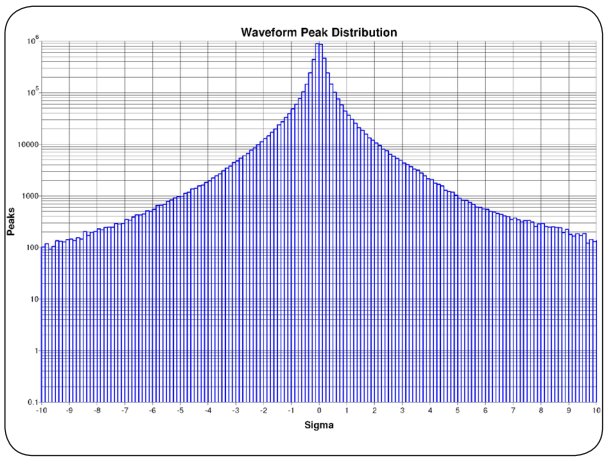
Patented Impactor Monitor System

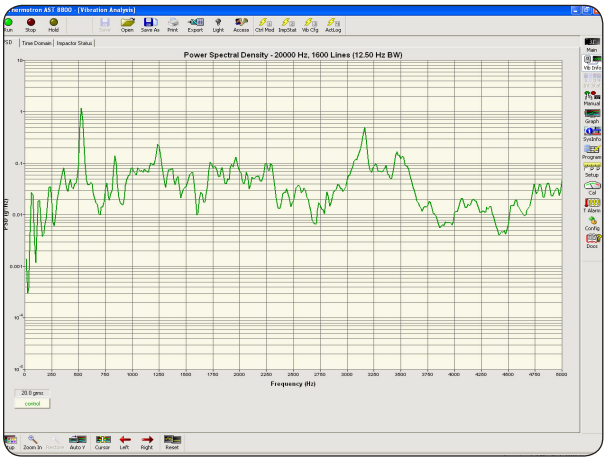


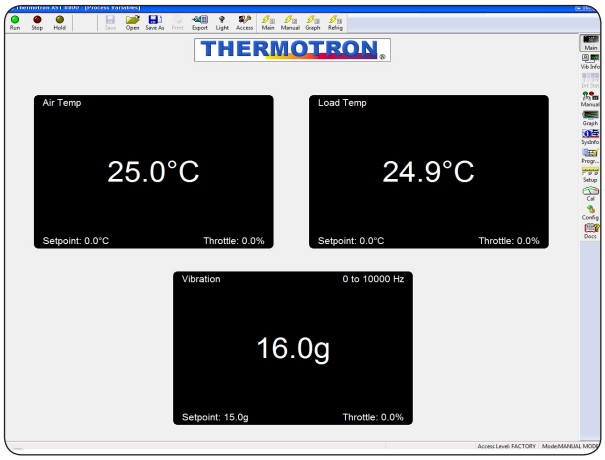
The Impactor Monitor System visually illustrates the impactors' status on the screen. A red impactor indicates the system cannot compensate enough air pressure and needs to be replaced. The AST-8800 monitors the air pressure to each impactor any time the system is running. The benefit of adjusting air pressure is that test results are more consistent and accurate.

AST Control System

The AST-8800 control system features a Windows®-based graphical user interface. The flat-screen color monitor displays power spectral density, temperature, and vibration data. The controller allows the user to define how multiple accelerometers and thermocouples are used to control and monitor stresses delivered to the product. The controller can be configured to monitor run-time on wear items and automatically alert the operator when periodic maintenance is required. The system is Ethernet-compatible and web-enabled for virtual anytime/anywhere access. Thermotron's extensive multi-level, password-based security system protects sensitive data and saves tamper-proof data.







Standard Features	Benefits
ThermAlarm® Over/Under Temperature Limit	Independent device prevents temperature from exceeding user-defined limits
Product Temperature Control	Software algorithm that controls temperature based on the product
Internet and Ethernet Connection	Provides access to the equipment via a network or over the Internet
Data Logging	Reports system events, temperature, and vibration
Program and Data Storage	Via hard drive, CD, USB, or to a network drive
Vibration Specific Features	**Benefits**
Impactor System Monitor	Monitors the airflow to each impactor
Built-In Vibration Spectrum Analyzer *(PSD vs. frequency)*	Displays table and product vibration response
Product Vibration Control	Allows vibration control up to 16 product locations
Time Domain Data Repsonse	Acceleration of real time data signature
Accumulated Fatigue Software	Displays product fatigue levels
Transmissibility Software	Displays ratio between control and product levels
Peak Probablility Distribution Function Software	Displays magnitude of stresses
Selectable Frequency Range and Resolution	Provide flexibility for various test conditions
PSD Abort Limits	Prevents inconsistent vibration during HASS
Multi-Channel Vibration Control	Maximum, minimum, mean, or median accelerometer readings
Vibration Alarm & Abort Limits	Prevents vibration levels from exceeding user-defined limits
On-Board Input/Output Verification and Calibration	Simplifies vibration calibration

Multiple Sizes to Suit your Needs

	AST-8	AST-18	AST-35	AST-70
Interior Dimensions—WxDxH Inches Centimeters	 24 x 23.5 x 24 61 x 60 x 61	 33 x 34 x 30 84 x 86 x 76	 42 x 42 x 40 106 x 106 x 101	 54 x 56 x 40 137 x 142 x 101
Exterior Dimensions—WxDxH Inches Centimeters	 78 x 34 x 78 198 x 86 x 198	 90 x 57 x 87 229 x 145 x 221	 89 x 61 x 105 227 x 154 x 266	 104 x 69 x 104 264 x 175 x 264
Temperature Range	-100ºC to +200ºC (-148ºF to +392ºF)	-100ºC to +200ºC (-148ºF to +392ºF)	-100ºC to +200ºC (-148ºF to +392ºF)	-100ºC to +200ºC (-148ºF to +392ºF)
Temperature Change Rate	Greater than 70ºC/min (125ºF/min) on products[1]			
Blower HP	3/4 HP	3 HP	7.5 HP (5 HP CE)	10 HP
Airflow	800 SCFM (375 liters/sec)	1,400 SCFM (660 liters/sec)	4,000 SCFM (1,880 liters/sec)	6,000 SCFM (2,830 liters/sec)
Heater Size	20 kW[2]	40 kW[2]	96 kW[2]	108 kW[2] (102KW CE)
Power[1] (Full Load/Minimum Service) 230 V / 3PH / 60 Hz 400 V / 3PH / 50 Hz 460 V / 3PH / 60 Hz	 61 Amps/75 Amps [2,3] 34 Amps/40 Amps [2,3] 31 Amps/35 Amps [2,3]	 100 Amps/125 Amps [2,3] 65 Amps/70 Amps [2,3] 58 Amps/60 Amps[2,3]	 153 Amps/175 Amps [2,3] 133 Amps/150 Amps [2,3]	 165 Amps/175 Amps [2,3] 152 Amps/175 Amps [2,3]
RSL Tables				
Repetitive Shock Table Inches / Centimeters (Number of Impactors)	 16 x 16/40 x 40 (4)	 16 x 16/40 x 40 (4) 24 x 24/61 x 61 (4) 28 x 28/71 x 71 (5)	 24 x 24/61 x 61 (4) 28 x 28/71 x 71 (5) 32 x 32/81 x 81 (9) 36 x 36/92 x 92 (9)	 44 x 44/112 x 112 (16) 48 x 48/122 x 122 (16)
Frequency Range	0 to >10,000 Hz			
Acceleration Levels	0-10,000 Hz 100 Grms High Frequency 1,500+ Gpk Synchronized Shock			
Average Air Consumption	90 PSI (6.2 BAR) Compressed Air 6.0 CFM/Impactor			
Axes Excited	3 Linear, 3 Rotational			
Grid Pattern	4" x 4" Grid (100 mm available)			
Control/Monitor Channels	8 Accelerometer Input Channels			

Custom sizes and performance configurations available. The addition of accessories may impact performance. Specifications subject to change without notice. Certain export limitations may apply - consult factory for details.

1 Dependent on range and chamber loading.
2 Smaller-size heating systems available, which reduces electrical service.
3 Other input voltages and frequencies available.

AST Patents

Thermotron is dedicated to new Accelerated Stress Testing technology. Since 1998, we have received six patents and one patent pending approvals.

- Multi-Zone Vibration Control, Patent Pending
- SCI Impactor, 7,861,594
- RSL Table, 7,784,349*
- Impactor Monitor System, 7,752,914
- Environmental Control in the Impactor Compartment, 6,446,508
- ACB Impactor Sleeve, 6,044,709
- RS Table, 5,804,732

ZL20088104673.4 Chinese Patent

Need A Custom Chamber?

Thermotron specializes in creating custom chambers to meet your specific testing needs. Whether it's unique test specifications, odd-shaped products, or particularly large products, we would be happy to help design a custom product and test profile for you.

If you have a special testing specification or product, call and speak with an application engineer today for more information.

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Additional Options Available

- Multi-Zone Vibration Control
- Additional Accelerometers
- Vacuum Jacketed Inlet Valve
- GN_2 Injection System
- Fixturing
- Mechanical Refrigeration
- Additional Access Ports
- TestTools Communication Boards and Data Acquisition

For more options please consult local sales representative or application engineer.

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***Features and specifications are subject to change without notice. PRINTED IN USA**