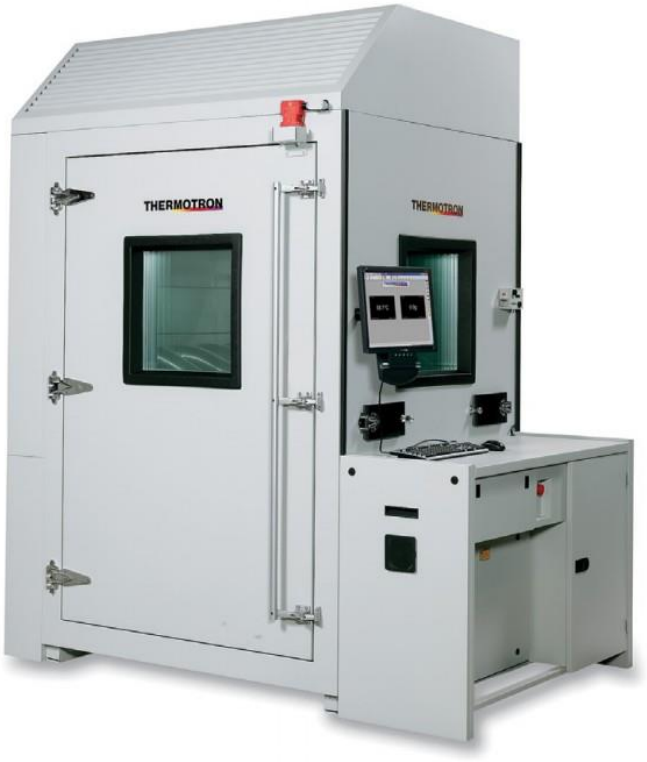
Halt and Hass Improve Product Reliabolity



Thermotron's innovative Accelerated Stress Testing systems for Highly Accelerated Life Testing (HALT) and Highly Accelerated Stress Screening (HASS) find product failures fast with patented industry-leading technology. Performing HALT and HASS improves product reliability by maximizing lab efficiencies, all while reducing costs associated with warranties and recalls.

Features

Adjustable Air Ducts
optimizes airflow to the product(s) under test

Convenient Product Access
maintain visual and physical access to products under test
through windows, doors, and ports

Data Acquisition (DAQ) System
optional, allows control and monitoring of product under test

Door Interlocks
prevent the door(s) from opening while operating, and prevents operation when the doors are open

Internal Thermocouple Junction Box
enables convenient multi-point temperature monitoring

Oxygen Monitor and Alarm
interfaces with the chamber's LN_2 system to ensure safe oxygen levels

Product Temperature Change Rates
up to 70°C/minute heating and cooling

Proportional Control Liquid Nitrogen System
maximizes cooling change rates while reducing LN_2 consumption

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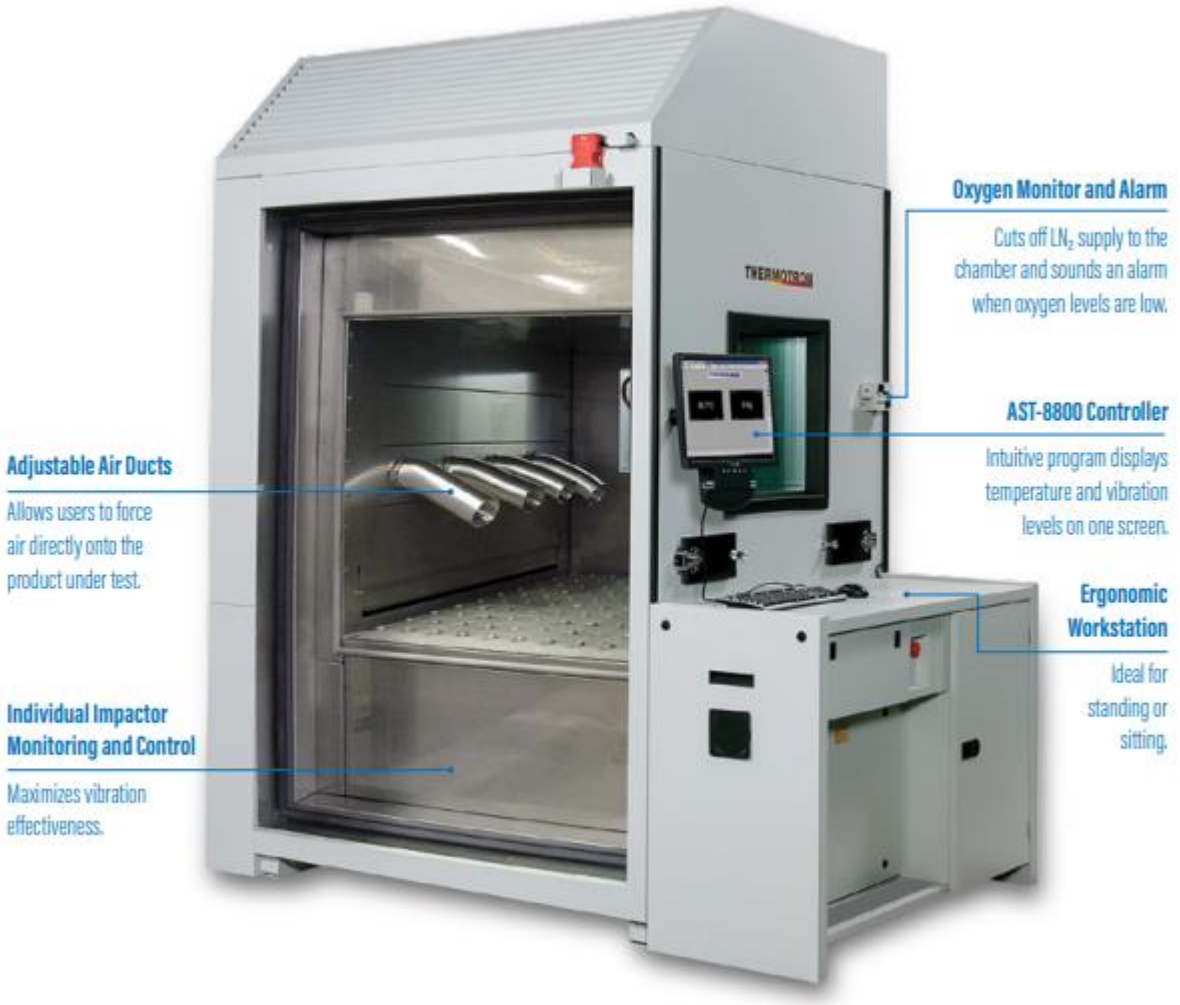
Safety Stop Mode
automatic purge and reset protects operators, products, and the equipment

Sound-deadening Insulation
minimizes noise during operation



Additional Optional Features

- Accumulated Fatigue, Transmissibility, and Peak Probability Distribution Software
- Additional Accelerometers
- Additional Access Ports
- Custom Finishes
- Data Acquisition System
- Gaseous Nitrogen (GN_2) Injection System

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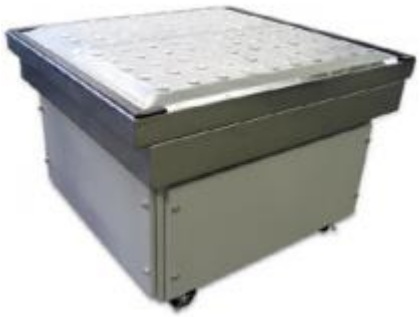
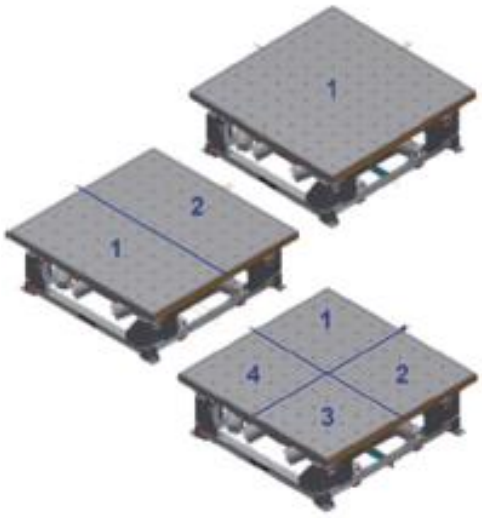
- Mechanical Refrigeration Options
- Multi-Zone Control, patented
- TestTools Communication Boards
- Vacuum Jacketed Valves
- Vibration Fixtures

Repetitive Shock Table



HALT and HASS are powered by repetitive shock vibration, which is achieved through a shaker table. Pneumatic impact hammers strike the bottom of the table, providing vibration in 3 axes and 3 rotations, simultaneously.
Thermotron's patented repetitive shock tables have a unique thermal isolation system that minimizes thermal loading on the chamber and provides a stable condition for impactor operation. Impactor cooling mechanisms help impactors last longer and reduce maintenance downtime for more effective and efficient testing. The shaker's standoff mounting design maximizes vibration transmissibility and provides accurate test results.

Multi-Zone Control



By nature, repetitive shock shakers are not uniform across the table's entire surface, nor can it control to one Grms level; this can produce inaccurate results because the vibration level the product actually experiences can be higher or lower, depending on accelerometer location. Thermotron's exclusive, patented Multi-Zone Control fixes this problem. This optional feature controls the repetitive shock table in one, two, or four table zones. Through the AST-8800, Multi-Zone Control automatically makes dynamic adjustments to each zone, compensating for system variability including table inconsistencies, impactor wear, air supply, fixtures, and product mounting to accurately test multiple products simultaneously. Multi-Zone Control guarantees superb uniformity to test products within 5% of each zone's control Grms making HALT and HASS testing more controllable and consistent. Each zone can also be set to a different Grms level or Multi-Zone Control can be turned off to control the entire table to one Grms level.

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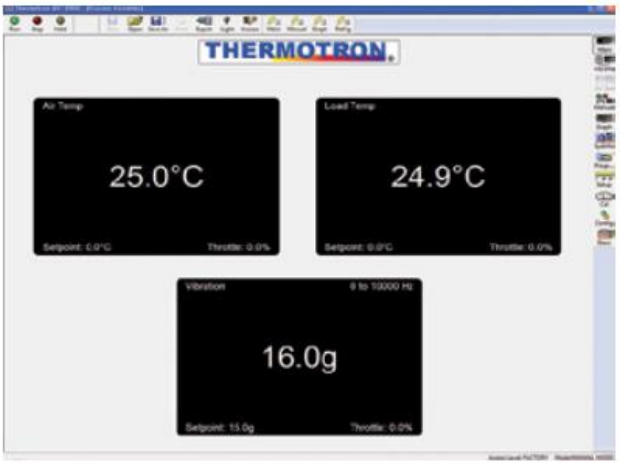
AST-8800 Controller

The AST-8800 Controller features an intuitive Windows®-based graphical user interface. The color monitor displays power spectral density, temperature, and vibration data on one screen. Users define how multiple accelerometers and thermocouples are used to control and monitor stresses delivered to the product under test. The AST-8800 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 multi-level, password-based security system protects sensitive data.



ThermAlarm
Independently prevents temperature from exceeding user-defined limits.

Product Temperature Control
Controls air temperature based on the temperature of the product.

Data Logging
Reports system events, temperature, and vibration levels.

Program and Data Storage
Available on a hard drive, DVD, USB, or a network drive.

Built-In Vibration Spectrum Analyzer
Displays table and product vibration response.

Product Vibration Control
Allows vibration control of up to 16 product locations.

System Monitor
Monitors the chamber's refrigeration pressures (mechanical refrigeration only).

Power Spectral Density Abort Limits
Prevents inconsistent vibration during HASS.

Multi-Channel Vibration Control
Monitors and controls accelerometers using maximum, minimum, mean, or median readings.

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Vibration Alarm and Abort Limits
Prevents vibration levels from exceeding user-defined limits.

On-Board Signal Generator Verification
Simplifies vibration calibration.

Impactor Monitor System (patented)
Illustrates the impactors' status on the screen. The controller monitors the air pressure of each impactor during tests, adjusting air pressure for more consistent and accurate results.

General Specifications

	AST-8	AST-18	AST-35	AST-70
Interior Dimensions—WxDxH Inches Centimeters (approx.)	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 40 107 x 107 x 102	54 x 56 x 40 137 x 142 x 102
Exterior Dimensions—WxDxH Inches Centimeters (approx.)	78 x 34 x 78 198 x 86 x 198	90 x 57 x 87 229 x 145 x 221	89 x 61 x 105 226 x 155 x 267	104 x 69 x 104 264 x 175 x 264
Temperature Range	-100°C to 200°C (-148°F to 392°F)	-100°C to 200°C (-148°F to 392°F)	-100°C to 200°C (-148°F to 392°F)	-100°C to 200°C (-148°F to 392°F)
Temperature Change Rate	Greater than 50°C/min (90°F/min) on products1		Greater than 70°C/min (125°F/min) on products1	
Blower HP	3/4 HP	3 HP	7.5 HP (5 HP CE)	10 HP
Airflow	370 SCFM (175 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] (102 kW at 400V)
Power[1] (Full Load/ Minimum Service) 230 / 3 / 60 [2,3] 400 / 3 / 50 [2,3] 460 / 3 / 60 [2,3]	 53 Amps / 60 Amps 33 Amps / 40 Amps 29 Amps / 30 Amps	 114 Amps / 125 Amps 65 Amps / 70 Amps 57 Amps / 60 Amps	 153 Amps / 175 Amps 134 Amps / 150 Amps	 164 Amps / 175 Amps 152 Amps / 175 Amps
REPETITIVE SHOCK TABLES				
Repetitive Shock Table Inches / Centimeters (Number of Impactors)	18 x 18 / 46 x 46 (4)	18 x 18 / 46 x 46 (4) 26 x 26 / 66 x 66 (4) 30 x 30 / 76 x 76 (5)	26 x 26 / 66 x 66 (4) 30 x 30 / 76 x 76 (5) 34 x 34 / 86 x 86 (9) 38 x 38 / 97 x 97 (9)	46 x 46 / 117 x 117 (16) 50 x 50 / 127 x 127 (16)
Frequency Range	2 to >20,000 Hz			
Acceleration Levels	50 Grms 2-10,000 Hz			
Maximum Air Consumption	90 PSI (6.2 BAR) Compressed Air 9.5 SCFM / Impactor Maximum (5.5 SCFM / Impactor Typical)			
Axes Excited	3 Linear, 3 Rotational			
Grid Pattern	4" x 4" Grid (100 mm available)			
Control/Monitor Channels	8 Accelerometer Input Channels (Up to 16 Available)			

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