

AST-20R Accelerated Stress Test System With Mechanical Refrigeration



THERMOTRON®

The Mechanical Alternative

The AST-20R Accelerated Stress Test System uses mechanical refrigeration instead of liquid nitrogen to achieve the rapid cooling rates required for HALT and HASS test profiles. Mechanical refrigeration may be the logical choice for installations where the infrastructure for liquid nitrogen is not yet established. Like any choice, there are pros and cons to consider.

Mechanical Advantages	LN2 Advantages
Safer	Quieter
Lower installation costs	Equipment costs less initially
Lower operating costs	Lower preventive maintenance costs
One less utility required	Fewer moving parts
Consumes no utilities when idle	Equipment occupies less floor space
	Low temperature range extends to -100°C

For applications requiring excess cooling capacity to meet short duration high load demands or to attain ultimate low temperatures down to -100°C , liquid nitrogen boost can be added to supplement the mechanical refrigeration system.

Benefits to Accelerated Stress Testing

The goal of accelerated stress testing is to quickly force products to fail, understand the failure modes and mechanisms, and take appropriate corrective action to optimize the design. Accelerated stress testing can reduce product development time, help get higher reliability products to market faster, and lower field failure and warranty costs. Once the design is optimized, accelerated stress screening can be implemented to optimize manufacturing processes and ship mature products with high confidence.

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High Performance – Aggressive Stress

Applications

- Portable electronics
- Communication devices
- Electrical components
- Compact automotive electronics
- Medical electronic devices
- Fiber optic or optical networking components
- Small switches and sensors
- Microelectromechanical devices

Rapid Thermal Transitions

Extreme thermal stresses are imparted to products through high rates of temperature change in excess of 50°C/min. High volume, high velocity airflow is configured through slots and adjustable ducts to maximize thermal stress directly on the product, which effectively accelerates product failure rates.

Six Axis Vibration

The AST-20R features a 24" x 24" (61cm x 61cm) multi-axis, repetitive shock vibration platform capable of producing acceleration levels in excess of 50 grms. The patented vibration system provides consistent power spectral density energy over a broad range. Direct coupling of the product under test to the vibration table transmits maximum dynamic stress into the product.

Control System

The graphical user interface control system is intuitive to operate. The monitor displays power spectral density, temperature and acceleration data all on one easy-to-read screen. Ramp rates for temperature and vibration are also displayed and easily accessed. The AST Control System 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 alert the operator that periodic maintenance is required.

Functional Testing and Continuous Failure Monitoring – A Cornerstone Issue

It is important to functionally test and continuously monitor the product(s) as accelerated stresses are being applied. Thermotron can provide a turn-key test solution based on a users unique set of test requirements. Thermotron's Product Test Solutions group is capable of meeting a variety of test equipment needs including system integration, custom electronic systems, or Thermotron's exclusive Product Test System. All solutions provide data relating product performance parameters to stress conditions at time of failure. This information is vital to performing a proper analysis of the failure mode.

EXTREME TRANSITION RATE CHAMBER

Workspace Dimensions	30" W x 30" D x 40" H (76 cm x 76 cm x 101 cm)
Temperature Range	-73°C to +200°C (-100°F to +392°F)
Temperature Change Rate	Greater than 50°C/min (90°F/min)*
Exterior Dimensions	70" W x 92" D x 100" H (178 cm x 234 cm x 254 cm)
Blower HP	3 3/4 HP
Heater Size	48 kW
Power	230v/3PH/60Hz 236 Amps Full Load, 250 Amp Minimum Service** 460v/3PH/60Hz 118 Amps Full Load, 150 Amp Minimum Service** 400v/3PH/50Hz 160 Amps Full Load**
Door Interlock	Mechanical Lockout
Control System	PC- Based with Lab View Interface
Hi/Low Limit	Therm-Alarm
CE or CSA Option	Available

* Dependent on range and chamber loading

**Other input voltages and frequencies available

MULTI-AXIS REPETITIVE SHOCK VIBRATION SYSTEM

Frequency Range	0 to >10,000 Hz
Acceleration Levels	Greater Than 50 grms Bare Table
Number of Impactors	Typically Four Impactors
Impactor Air Requirement	90 PSI Compressed Air
Axes Excited	3 Linear, 3 Rotational
Maximum Payload Support Capability	275 lbs. (125 Kg)
Table Size	24" x 24" (61 cm x 61 cm)
Grid Pattern	4" x 4" Grid (10 cm x 10 cm)