



HALT & HASS Systems



TIME COMPRESSOR™ HALT & HASS CHAMBERS

Quickly Discover Design Weaknesses

CSZ HALT/HASS chambers provide extreme temperature change rates and multi-axis vibration conditions used during the product design and manufacturing cycles to reduce the time normally required to identify design and process weaknesses.

HALT (Highly Accelerated Life Testing) and HASS (Highly Accelerated Stress Screening) testing is currently in use by most major manufacturing organizations to improve product reliability in a variety of industries, including electronics, computer, defense, automotive, medical and others.

HALT/HASS Testing Benefits

- Reduce product development & design time
- Speed time to market
- Ensure product quality & reliability
- Increase customer confidence
- Reduce warranty costs
- Increase profitability



What is HALT?

HALT techniques are important in uncovering many of the weak links inherent to the design and fabrication processes of a new product. HALT is a method aimed at discovering and then improving weak links in a product during the design phase.

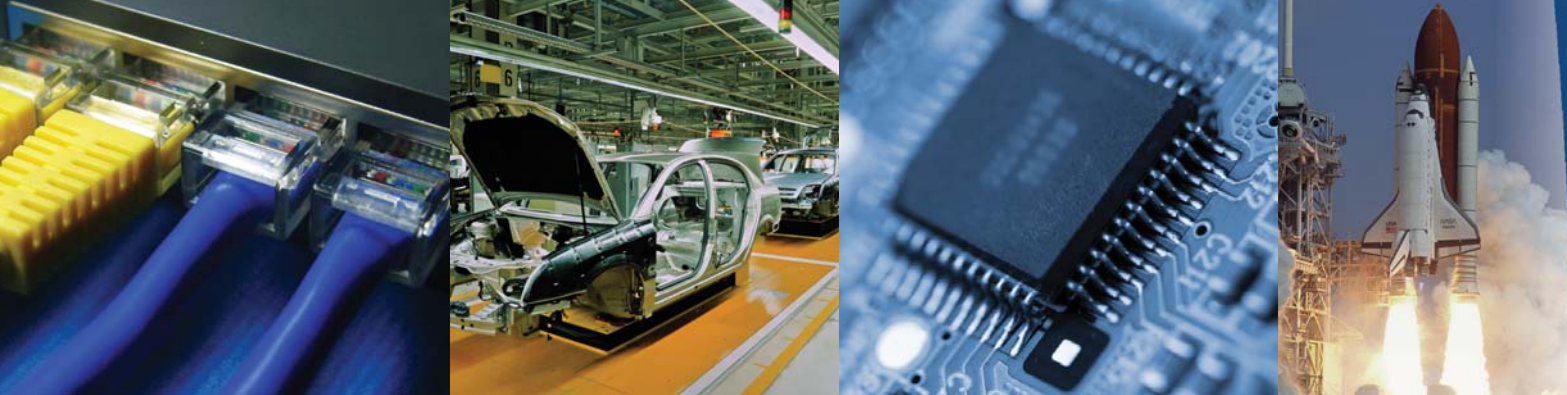
A HALT Test mainly consists of five steps

- Hot and Cold Temperature Steps
- Thermal Cycles
- Vibration Steps
- Combined Environmental Stress (Vibration, Thermal Cycles)

What is HASS?

HASS techniques are incorporated during the production phase to find manufacturing process defects that could cause product failures in the field. HASS uses accelerated stresses (beyond product specifications and as determined appropriate by earlier HALT testing) in order to detect product defects in manufacturing production screens. Many issues caused by process changes after HALT screening were previously seen only as early life failures in the field. With an appropriate HASS implementation, these defects can now be detected and corrected prior to customer shipment.





CSZ's HALT & HASS Time Compressor™ chambers incorporate the highest level of technology and quality for the optimum in reliability testing. The chamber design of CSZ and the vibration table design by Dr. Gregg Hobbs, inventor of HALT & HASS technology, combine to provide the broadest range of temperature and vibration capabilities in the industry which are key to both precipitation and detection of product defects.

CSZ Time Compressor Chambers are state-of-the-art HALT and HASS systems for simultaneously subjecting products to all-axis broadband vibration and rapid thermal cycling. CSZ HALT & HASS chambers offer industry-leading performance levels, including ramp rates up to $\pm 90^{\circ}\text{C}/\text{min}$ and broad range vibration levels of <3 to 90 GRMS. The Time Compressor table design provides unsurpassed x, y and z GRMS balance.

Four standard chamber sizes for HALT & HASS testing are available with front and back access doors; larger units have double doors for easy access.

- Superior reliability and thermal performance
- Door includes heated window and safety interlock switch to prevent the system from running with the door open.
- Cable ports located in the front & side for easy cable routing
- Significantly better high and low vibration limits (required for detection)
- Quiet operation
- Low LN2 and utility usage for greater ROI



Size	TC-1.5	TC-2.0	TC-2.5	TC-4.0
Temperature Range	-100°C to +200°C			
Temperature Ramp Rates	> 80°C per minute	> 80°C per minute	> 90°C per minute	> 80°C per minute
Vibration Levels	<3 - 90 GRMS			<3 - 80 GRMS
Table Size (cm)	18" x 18" (46cm x 46cm)	24" x 24" (61cm x 61 cm)	30" x 30" (76cm x 76cm)	48" x 48" (122cm x 122cm)
Workspace Dimensions W X D X H in (cm)	30" x 30" x 30" (76 x 76 x 76)	30" x 30" x 30" (76 x 76 x 76)	34" x 34" x 34" (86 x 86 x 86)	58" x 58" x 54" (147 x 147 x 137)
External Dimensions W X D X H in (cm)	62" x 41" x 80" (157 x 104 x 203)	62" x 41" x 80" (157 x 104 x 203)	65" x 48" x 84" (165 x 122 x 213)	86" x 71" x 102" (218 x 180 x 260)
Sound Levels*	70 dBA	70 dBA	72 dBA	76 dBA

*Measured 3' (1m) from chamber @ 30 GRMS



HALT & HASS Chamber Features

Vibration

- Large dynamic range shaker with 4 to 13 actuators and <3 GRMS to 90 GRMS with a bare table. High GRMS levels are used to enhance precipitation while low GRMS levels, with Modulated Excitation™, help to increase detection.
- A diaphragm is included to prevent vibration table temperature changes. It also provides better low-frequency vibration coupling than a bare table.

Instrumentation

- EZT-570i Controller comes preloaded with test profiles for faster program implementation.
- Factory preset mechanical over temperature limit. Separate user-adjustable electronic limits are also included for over and under temperature and vibration, providing fully redundant safety limits.
- Safety relay connection is provided to protect the device being tested by removing power supply when the chamber is not running.

Communications

- RS-232/485 serial communications and Ethernet control/monitoring offer a selection of communications options.
- EZ-View software for programming control, monitoring and data logging of multiple chambers from remote computer.

Optional Equipment

- O2 Monitor
- Spare Parts Kit
- Integrated Tool Box
- Additional Accelerometers
- Spectrum Analyzer/Monitor
- Other Options - CE, UL, CSA approval are available



Time-Saving Features to Test Faster

EZ→Programming EZ→Datalogging

EZ→To be Connected to Your Test World

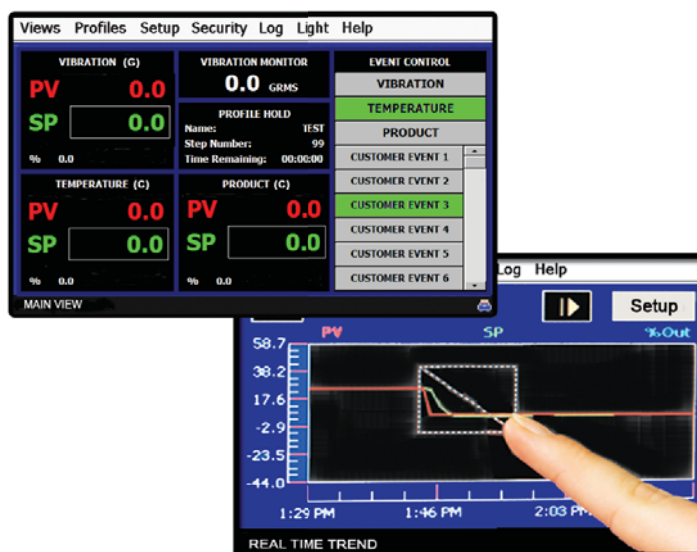
CSZ's EZT-570i controller offers latest in test chamber programming. Flexible configurations along with a full range of user-friendly features combine to simplify programming and save valuable time for greater return on your investment. Intuitive controller includes built-in data security & safeties to protect your chamber and product under test.

Communications & Connectivity

- Ethernet capability to remotely monitor and control multiple test chambers. World Wide Web Ethernet connectivity provides anytime, anywhere access using a PC or PDA device.
- Alarm notification system sends email and/or text phone messages in the event of a test chamber alarm, saving valuable tests while reducing downtime.

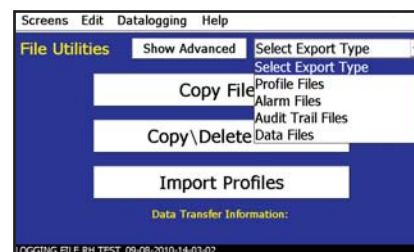
Data Logging

- Data logging with custom file names, batch & lot numbers, operator events & digital signatures.
- Automated "Ethernet" back-up of data files provides "hassle free" file management.
- Easily download profiles, alarm files, audit trail files and data files to USB memory stick in a compatible .CSV file format. Also import profiles to other chambers saving valuable profile entry time.
- Access data files directly from controller or PC.



User Convenience & Flexibility

- Real time & historical trend graphs. Print graphs directly to a printer.
- Profile status view provides details on the profile with stop date and time.
- Profile autostart allows profiles to begin at a date, day and time.
- Help menu provides text and voice assistance in multiple languages (English, Spanish, French or Chinese).



Enhanced Functionality

- Product control feature accelerates temperature cycling of the device under test.
- Product high/low limit protects product.
- Selectable power failure/recovery options.
- Fully configurable alarm settings.
- Full system security allows up to 30 different users with three different levels of security.

This screenshot shows the 'RUNNING PROFILE' screen in the EZT-570i controller interface. It displays a table with profile details:

Description	Value
PROFILE STATUS:	SOAKING
START DATE:	09/08/10-14:03
ESTIMATE STOP DATE:	09/10/10-08:04
CURRENT STEP:	2
STEP TIME LEFT:	00:30:27
WAIT FOR INPUT:	NOT WAITING
WAIT SETPOINT:	NOT WAITING
TEMPERATURE SP:	42.3
VIBRATION SP:	12.0
PRODUCT SP:	0.0

Below the table, it says 'EDITING PROFILE: TEST 04'.

The Experience you Rely on...

Cincinnati Sub-Zero (CSZ) Products, Inc. is an ISO-9001 certified company with over 70 years of industry experience designing and manufacturing temperature-controlled products of the highest quality, with a commitment to total customer satisfaction.

At CSZ, we offer a complete line of both standard and custom-designed environmental simulation chambers including:

- Temperature Cycling
- Humidity
- Stability Cabinets & Rooms
- Thermal Shock
- Stress-Screening
- Altitude
- AGREE Vibration
- Freezers
- Liquid Chillers
- Liquid Chillers
- Wind & Rain
- Sand & Dust
- Other Temperature Management Solutions

Sizes range from benchtop to full walk-in/drive-in chambers.

TESTING SERVICES

CSZ Testing Services is an A2LA Accredited Test Laboratory utilizing the latest test technology. CSZ is your one stop source for all of your environmental simulation testing needs. Our testing laboratory is here to help with your product qualification testing, overflow testing and /or third party product validation. Testing capabilities include Temperature, Humidity, and/or Vibration, Thermal Shock, Burn-in, Altitude, Vibration, Shock, Salt Spray, and Cyclic Corrosion test. Serving you from two locations in Cincinnati, OH and Sterling Heights, MI. For more information please call CSZ Testing headquarters at 513-793-7774 or visit www.csztesting.com.



CSZ is your one stop solution for ...

- Environmental Chambers
- Freezers
- System Upgrades
- Preventative Maintenance
- Calibration Services
- Contract Testing Services

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