



HALT Testing

HALT Testing (Highly Accelerated Life Testing) is a proven method developed by QualMark to find design defects and weaknesses in electronic and electro-mechanical assemblies. These defects often appear in end-use applications, causing product failures after the product is released. As a result, the HALT Testing process can effectively increase product reliability.

HALT usually takes 3-5 days compared to weeks or months for traditional Design Verification Testing (DVT). HALT is a design tool designed to save money by increasing product reliability, reducing warranty costs, and reducing time to market for products.

How The HALT Testing Process Works

HALT pushes a product to its operating limits and beyond. Traditional methods simulate field environments and test products within specifications while HALT stresses products beyond specifications.

Stresses of temperature, rapid thermal cycle, and vibration (multi-axis, 6 degree of freedom) are used to rapidly facilitate and discover design weaknesses and production problems. After HALT has revealed product weaknesses, proper Root Cause of Failure Analysis and Reliability Improvement programs facilitate the corrective action necessary of to improve product design.

Benefits Of HALT Testing:

- Increase long term profits due to: Higher customer satisfaction and confidence, increase company image and reputation, and last but not least - repeat customers and increased market share.
- Increases product quality / reliability.
- Quickly discover product "weak links"
- Reduces R&D costs.
- Reduce development time
- Reduces time to market.
- Investigate and improve design margins
- Ability to find and correct defects before your product is released (and before your customers find the defects).
- Lowers field failures, in-warranty problems, and associated costs.
- Ability to confidently increase warranty coverage.
- Evaluate changes made to product (ECO implementation)

HASS Testing

HASS Testing (Highly Accelerates Stress Screening) is a proven test method developed to find Manufacturing /Production process induced defects in electronics and electro-mechanical assemblies, before those products are released to market. HASS is a powerful testing tool for improving product reliability, reducing warranty costs and increasing customer satisfaction.

After a product has undergone HALT Testing, HASS Testing can be deployed in the production process. The goal of a HASS is to induce failure modes that can be inherent or introduced in the production process. HASS have been proven to be effective in screening failures that may have gone undetected in the Burn-In Testing process. A Product that passes normal production tests but fails in a HASS would have probably failed early after product release increasing warranty costs.

There are 2 parts to HASS Testing:

- 1) HASS Development/Proof-of-screen (POS)
- 2) HASS Production Screen.

Since HASS levels are more aggressive than conventional screening tools, a POS procedure is used to establish the effectiveness in revealing production induced defects. A POS is vital to determine that the HASS stresses are capable of revealing production defects, but not so extreme as to remove significant life from the test item. Instituting HASS to screen the product is an excellent tool to maintain a high level of robustness and it will reduce the test time required to screen a product resulting in long term savings. Ongoing HASS screening assures that any weak components or manufacturing process degradations are quickly detected and corrected.

HASS is not intended to be a rigid process that has an endpoint. It is a dynamic process that may need modification or adjustment over the life of the product.

HASS Testing Benefits:

- Assures Manufacturing process and workmanship integrity.
- Verifies integrity of mechanical interconnects and component tolerance compatibility.
- Identify and preclude escape of potential early life product failures.
- Decrease product infant mortality, and increase reliability.
- Detect & correct design & process changes.
- Detect & correct component variation.
- Reduce production time & cost.
- Increase out-of-box quality & field reliability.
- Decrease field service & warranty costs.
- Find Manufacturing Process Problems
 - Component Placement (pick & place robotics)
 - Solder & Paste Processes
 - IC Vendor and or Process changes
 - Early Detection of Margin shifts
 - Accelerate Infant Mortality failures
 - Timing problems (that only occur under stress)
 - Assembly errors - connectors, screws/fasteners
 - Cable Routing - rubbing, pinched, solder connection