

## HIGHLY ACCELERATED STRESS SCREEN (HASS)

- ✓ Monitor and catch process shifts
- ✓ Monitor and catch supplier quality shifts
  - ✓ Reduce Field Failures
- ✓ Reduce Warranty Return Costs

HASS is a rapid, efficient, and effective manufacturing screen which catches weak products. HASS ensures defects and process shifts are caught prior to customer shipment. Properly developed screens age the product past the infant mortality stage while not taking significant life out of the product.

Ops A La Carte's extensive experience (over 10 years and 100's of products) implementing this technology ensures maximum Return on Investment from inserting HASS into a production process.

### HASS PLAN

Outlines the process from start to finish and analyzes the ROI on all variables to choose the best options. The Detailed HASS Plan includes analysis and recommendations on: Strategy to maximize throughput, Fixturing cost, Determining whether to screen at assembly or system level, Stress types and levels to apply, Screen percentage (all products or sample), Required specialized environmental and test equipment, and Location: in-house, CM, or test lab.

- Typical Product ~\$ 1,000 - 3,000

### HASS DEVELOPMENT

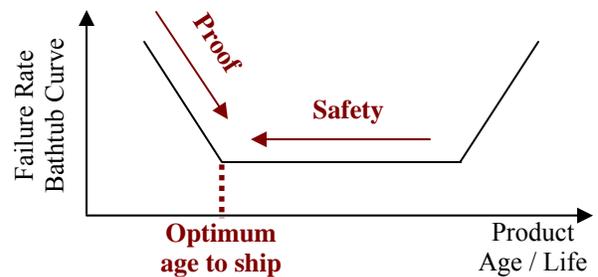
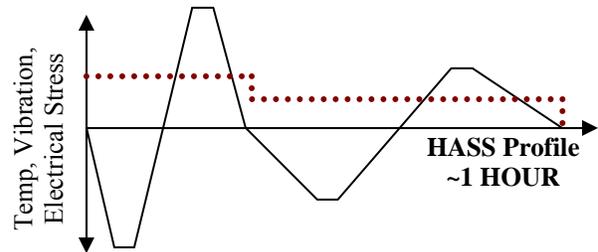
The thermal and/or vibration fixture is designed and qualified to assure it provides uniform temperatures and vibration energy across all products. Safety of HASS is performed to ensure that the screen leaves products with sufficient life to survive a normal lifetime of field use (see bathtub curve). Typically involves developing a HASS screen (see HASS Profile) from the HALT results and applying it repeatedly to one sample. If a failure occurs, stress levels are reduced/modified and the process repeated. Proof of HASS is performed to determine if the chosen screen is strong enough to find defects. Methods can include applying the HASS screen to "No Trouble Found (NTF)" samples or to samples which have been "seeded" with defects.

- Typical Product ~\$ 7,500 - 12,500

### HASS TUNING

Once the screen is in use, it is monitored and improved to further increase ROI. This is a continual process including monitoring field performance to ensure infant mortality failures are being caught and refining or "tuning" the screen if required. As production volume increases, a HASS audit or HASA can be implemented (if the process is stable and the defect rate is at its target). A detailed HASA Plan should consider Defect Rate, Detection Shift Level, Alpha and Beta Risk Levels, and Sample Size.

- Typical Product TBD



### REPORT AND PRESENTATION

Detailed Report ~\$ 500

Executive Summary format explains:

- ✓ The screen process
- ✓ Significance of the results
- ✓ Recommended product improvements

On-Site Presentation ~\$ 500

One to two hour review of results/recommendations, with What-If analyses of the effects of changes to the product.

### OTHER RELATED SERVICES

- ✓ Estimate product Failure Rate (MTBF) with Reliability Predictions at Component Level and System Level
- ✓ Establish risks associated with failures via Failure Modes Effects Analysis (FMECA)
- ✓ Maximize product robustness with Accelerated Stress Testing (HALT)
- ✓ Measure the product's reliability with Reliability Demonstration Tests (RDT)

### TERMS

Expedited (rush) service available at nominal fee  
 Formal quotes: Fixed Price or Time and Materials basis  
 Invoicing: On progress basis  
 Payment due: Net 15 days after invoice