

Environmental Testing

What is Stimulation and Simulation Testing?



Environmental testing using stimulation and simulation can help to reduce costs associated with warranties and recalls.

STIMULATION

Stimulation testing uses environmental stresses to uncover a product's weakness and limits, often stressing the product to failure.

"Test to FAIL"

HALT

Highly Accelerated Life Testing (HALT) is a combination of testing techniques that uses both aggressive temperature cycling and multi-axis repetitive shock vibration to quickly develop more robust products. This process precipitates defects by inducing product fatigue and failure.

pros Finds failure modes fast
Creates a robust product

cons Systems are expensive and require additional utilities
Does not correlate the failures to the point in the product's lifecycle that the failure would actually occur

HASS

Highly Accelerated Stress Screening (HASS) is a production process used to rapidly screen out defective products prior to shipment.

pros Reveals latent defects not detected by other testing methods

cons More expensive than other stimulation testing systems
May require additional utilities

SIMULATION

Simulation testing mimics the conditions a product would undergo in its normal use environment.

"Test to PASS"

Environmental Stress Screening

A process that identifies weaknesses in manufacturing materials and processes while in production. Stress screening eliminates products that would fail early in use to reduce product infantile mortality rates.

pros Reduces infant mortality rates
Identifies weakness in materials and processes

cons Long test times

Burn-In Testing

A traditional form of testing when large batches of products tested together at an elevated temperature.

pros Easy to implement
Lower cost

cons Low screening effectiveness
Long test times

Temperature Cycling

Features rapid change rates between predetermined temperature extremes for multiple cycles, which provides the expansion and contraction necessary to stress the product.

pros More effective than Burn-in.
Faster change rates result in shorter test times

cons More complex test to set up
Need to ensure that the programmed test is actually stressing the product

Thermal Shock

Thermal Shock is a variation of temperature cycling in which products are exposed to severe and extreme temperature changes, almost instantaneously, by moving products between hot and cold zones of preconditioned air or fluid, several times.

pros Quicker/shorter testing version with temperature cycling
Cost effective way to screen defects at the component level

cons Generally more expensive than traditional temperature cycling solutions
Difficult to apply power to the product to monitor its operation

Want to learn more about Environmental Testing Solutions?
Visit Thermotron.com

THERMOTRON®

