



ENVIRONMENTAL SIMULATION, COMPONENTS, TECHNOLOGY

HALT (Highly Accelerated Life Test)

Reliability is the benchmark for a product.

Potential weak points must be - if possible - already recognized and eliminated in the development phase.

This fact is known – at time the implementation is difficult.

There exist a chance: **HALT**

With HALT we search weak points

The HALT-method is able to detect failure characteristics of system units, which are assembled with electronical, electrical, mechanical, electro-mechanical, etc. components.

The units will be stressed by extreme thermal, mechanical and/or product specific stress situations,

- B independent of specification measures
 - B till to malfunction
 - B till to destruction

HALT allows in short time

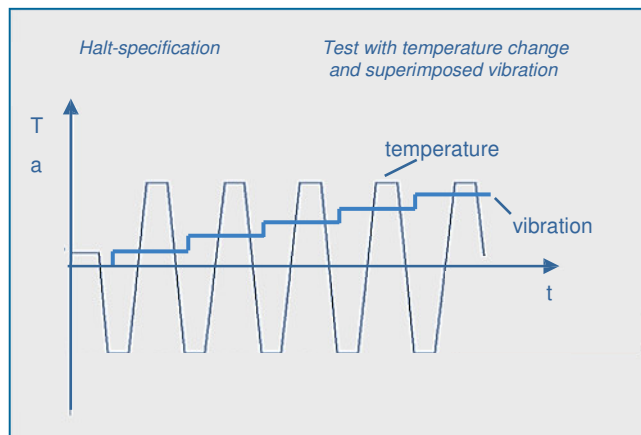
- B to recognize weak points
- B to optimize the product

HALT- and product-engineers together

- B define the tests
- B carry out the tests
- B work out improvements
- B find the way to a reliable product



Highly Accelerated Life Test (HALT) equipment



Combined test with temperature shock and vibration

We carry out tests

- ☒ by Qualmark-Standard
- ☒ by customer specific requirements

We consult and assist you in matters of

- ☒ questions to test planning
- ☒ preparation of the test setup
- ☒ selection of specific tests
- ☒ improvement measures



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HALT-Test Equipment

Technical Data

	Weight UUT	Dimensions H x B x T	Volume	Comment
Allowable dimension / weight of test item	max. 200 kg	760x760x939 mm ³	max. 0,537 m ³	chamber loadable through 2 doors
	Frequency spectrum	Accelerations	Excitation / process	Comment
Vibration	20 – 10.000 Hz	bis 50 g _{rms}	pneumatic frequency noise	test procedures programmable manual adjustable
	Temperature range	Temperature gradient	Excitation / process	Comment
Temperature	-100° bis +200°C	bis Δ T _{max} : 60 K/min	Nitrogen cooling Electrical heater	test procedures programmable manual adjustable

HALT-standard test procedure

- (1) Stress the product in a unlimited way to work out the “upper & lower operation limit” (UOL, LOL) and “upper & lower destruction limit“ (UDL, LDL), by
 - ☞ Thermal step stress (max. range: - 100°C/ + 250 °C)
 - ☞ Rapid thermal transitions (up to ΔT_{max}: 60 K/min)
 - ☞ Vibration step stress (up to 50 g_{rms})
 - ☞ Combined environment (thermal + vibration stress)
 - ☞ Product specific stresses (power cycling, load variations, etc.)
 - (2) Investigate the root cause for the **1st UDL & LDL**
 ☞ **1st weak point !**
 - (3) Find a solution for elimination of the weak point (implement it or repair it)
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- ▼
- ☞ Repeat steps (1) to (3) for **2nd UDL & LDL**
 ☞ **2nd weak point !**
 - ☞ Same for ☞ **...3rd, 4th, ... weak point**

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