HALT – HASS
Frühzeitige Optimierung von Zuverlässigkeits-Indikatoren

at AQL RBG 11 Reliability Engineering

Introduction

- Name: Edwin Dietel
- Department: Automotive Quality Labs - AQL RBG 11
  Reliability Engineering
- Age: 43
- Home town: Lauf / Nürnberg
  Germany

- 1989 Mechanician for Machines and Systems
- 1994 Engineer of Mechanican Technics
- 2002 Study of Software Engineering

- since 1995 at Continental Automotive GmbH
  - Employee of Reliability Engineering
  - perform HALT Test since 2004 at MCH and RBG

- Topics: ERIT , HALT / HASS

HALT
Why and When a HALT should be performed?

Highly Accelerated Life Testing

is done during the developmental phase

- **Apply stresses above specified limits in order to find design weaknesses in a compressed time**
- **Take responsible precautions with design changes to eliminate critical weaknesses**
- **HALT is to find out the most robust of different product designs**
- **Focus on the failure modes and failure mechanisms not the stresses applied on products**
- **Every failure found represents an opportunity for improvement No action means no improvement**
- **HALT is not a test to proof the product reliability (currently) it is a test to find the robustness of the product.**

HASS
Why and When a HASS should be performed?

Highly Accelerated Stress Screening

is done during the production phase

- **HASS is to find out a critical process fluctuations (drifts and combinations of fluctuations) during production phase**
- **Apply stresses above specified limits in order to find weakness points in a compressed time and eliminate it with process changes**

HALT - Test equipment at Continental AQL RBG

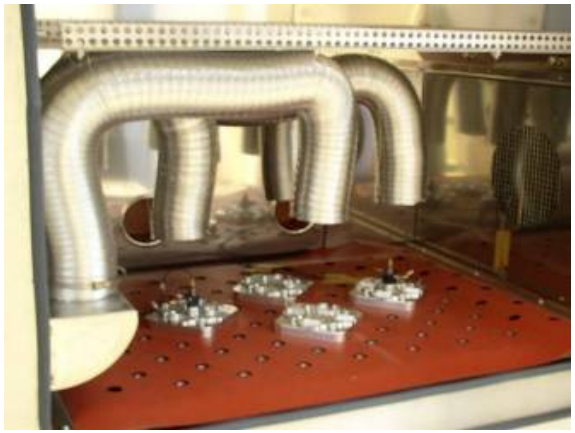
- **HALT Chamber Weiss**

- **Min Temp = - 100°C**
- **Max Temp = + 200°C**
- **with 60 Kelvin per minute**

HALT - Test equipment at Continental AQL RBG

6 direction hammers (frequency range 20 Hz to 10 kHz)

Broad band random vibration with six degrees of freedom

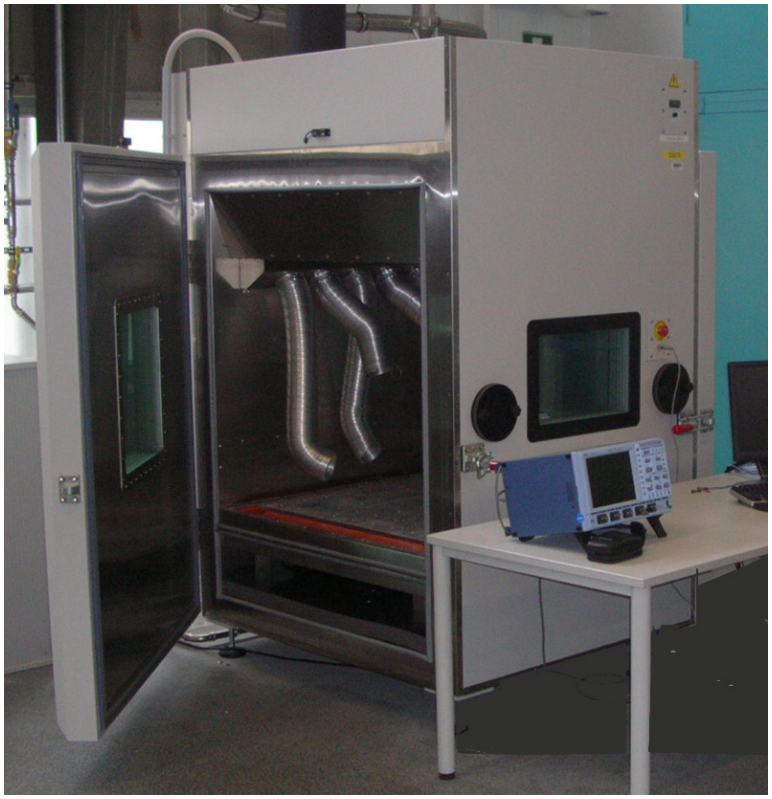


Segmented Base Plate

HALT - Test equipment at SGS Germany GmbH

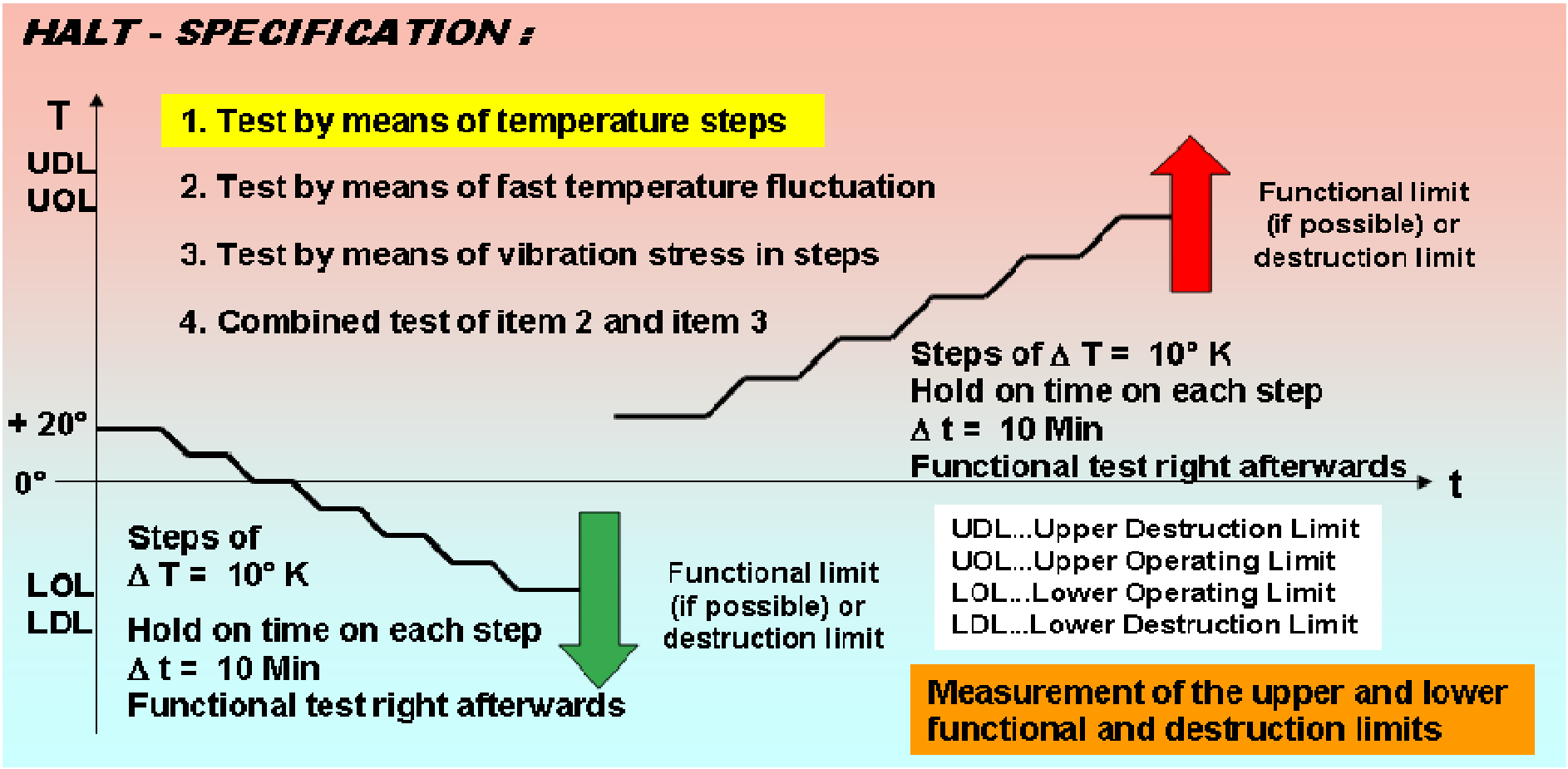
- **HALT Chamber QualMark**

- **Min Temp = - 100°C**
- **Max Temp = + 200°C**
- **with 60 Kelvin per minute**



6 direction hammers
(frequency range 20 Hz to 10 kHz)
Broad band random vibration with six degrees of freedom

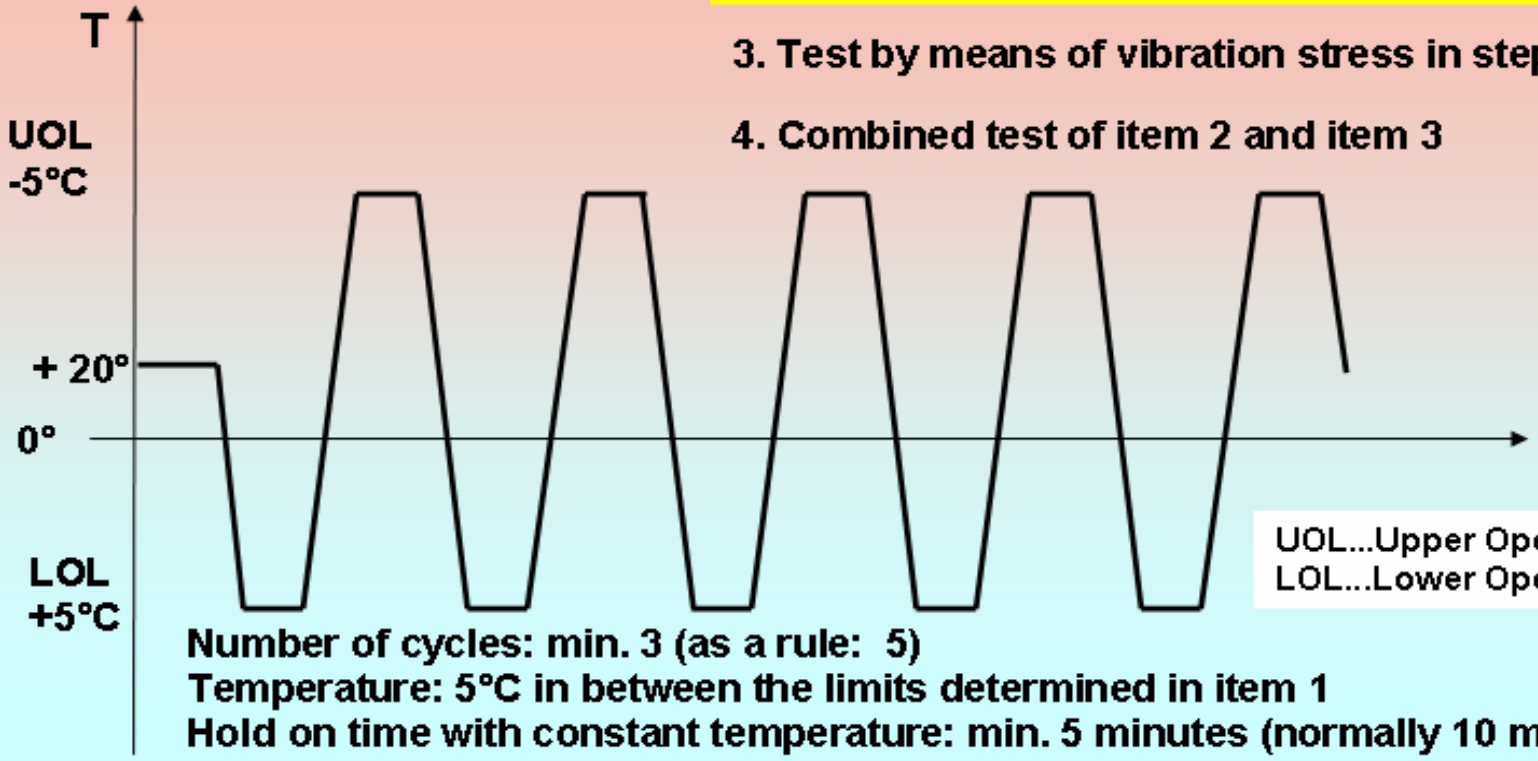
Step 1
Temperature steps



Step 2
Temperature changes

HALT - SPECIFICATION :

1. Test by means of temperature steps
2. Test by means of fast temperature fluctuation
3. Test by means of vibration stress in steps
4. Combined test of item 2 and item 3



Number of cycles: min. 3 (as a rule: 5)
Temperature: 5°C in between the limits determined in item 1
Hold on time with constant temperature: min. 5 minutes (normally 10 minutes)

Step 3
Vibration stress without temp.

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1. Test by means of temperature steps
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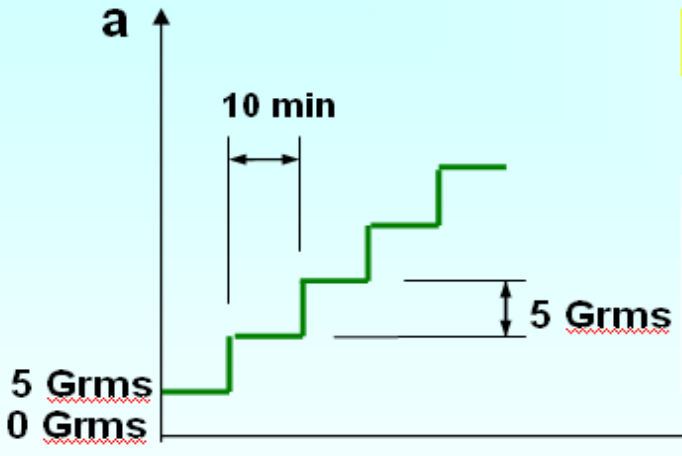


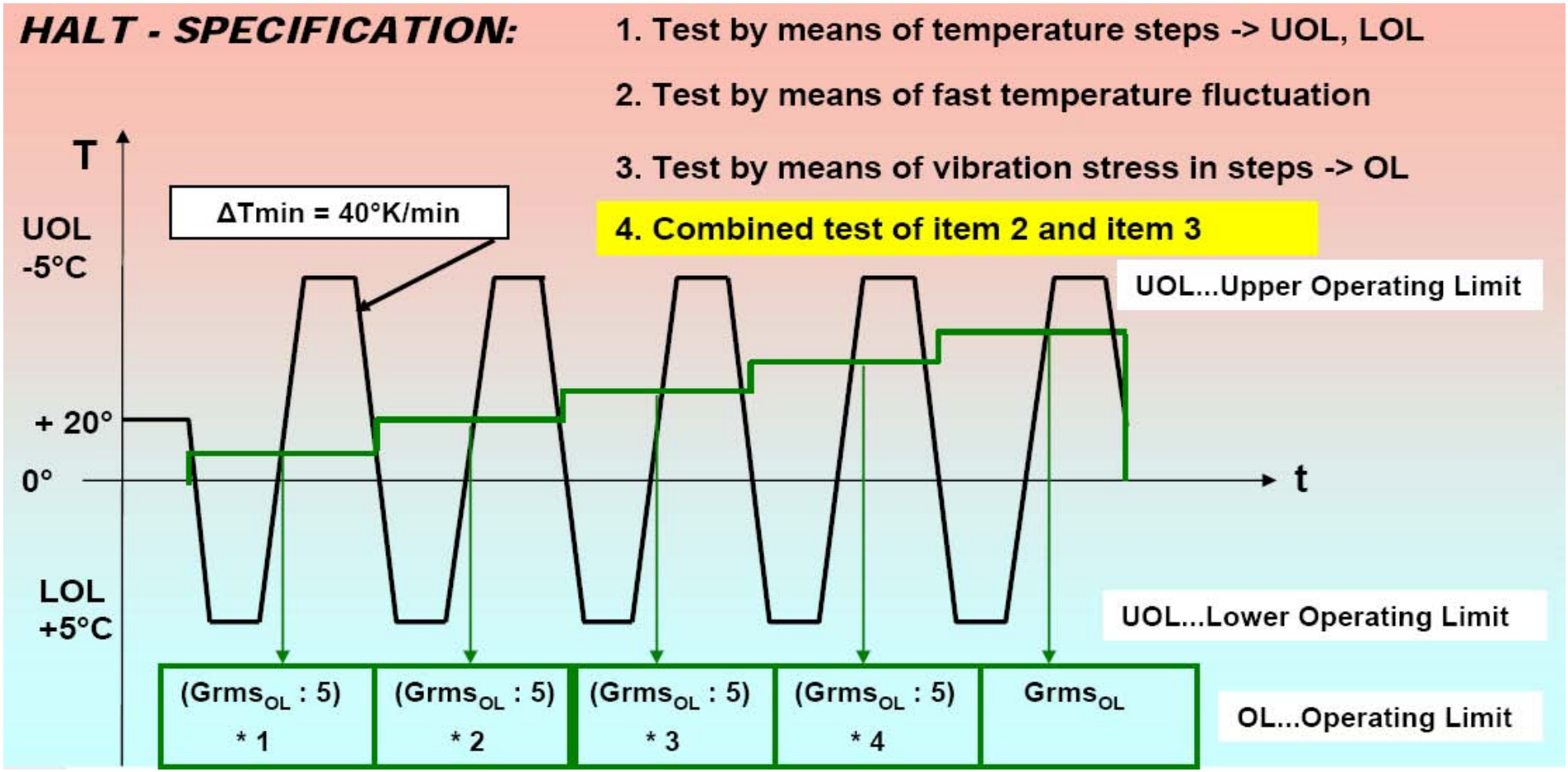
DL... Destruction Limit
OL... Operating Limit

Grms ... Acceleration rout mean squares over vibration frequeny 20 Hz - 10000 Hz

Start with a value: between 1 and 10 Grms (normally 5 Grms)
Steps in between 1 and 10 Grms (normally 5 Grms), technical limit is at 50 Grms
Hold on time on a constant vibration level: minimum 10 minutes

Measurement of the functional and destruction limits

Step 4
Vibration stress with temp.



Customers HALT strategy

BMW	PPQ	Project 5
		Kontinuierliche Zuverlässigkeitsabsicherung in der Serienphase
CNH	ENS0310	
Cummins	ESN 14252	
		Highly Accelerated Life Test (Halt)
		Performance Specification (Test Method)
Ford	CETP: 00.00-E-412	
		§ 5.21 HALT at DV/PV and IP
GM – Opel	GMW 8287	
		Highly Accelerated Life Test
		Highly Accelerated Stress Screening and Auditing
HMC	ES 9000-04	
Jaguar	Product specification	
PSA	SEE CMEE03 0388-D	
		Levée de risques

Contact

Contact person for further information, costs and test performance:

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NOTE:

SGS Germany GmbH

HALT / HASS Seminar - Workshop

26. – 27.10.2010 Munich

