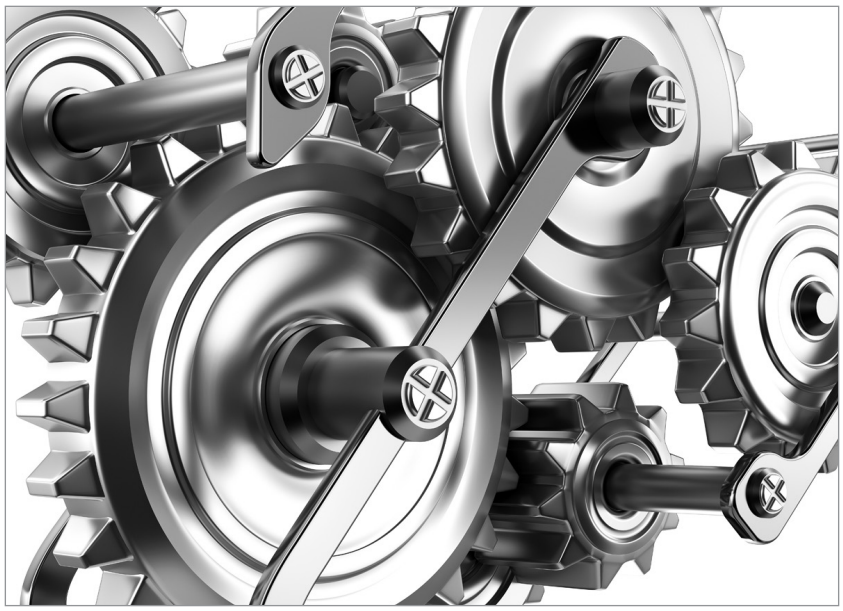
Keysight Technologies

Reliable and Long-lasting Products

Our instruments are designed for reliability which brings the most value and delivers the best results



Keysight Technologies designs and builds reliable technology into its products, for years of trouble-free operation. We begin with robust designs at the start of the product lifecycle and extend it throughout the supply chain.

Keysight employs skilled Quality and Reliability professionals to build dependability into new products by utilizing design ruggedization processes.

Reliability performance is also verified at each step of product development.

Keysight's unsurpassed focus on producing reliable, long-lasting products delivers a 45% improvement in annualized failure rates.*

- System and Subsystem Reliability Modeling
- Failure Modes and Effects Analysis (FMEA)
- High Temp Operating Life Testing (HTOL)
- Component Selection and Risk Analysis
- Highly Accelerated Life Testing (HALT)
- Environmental Stress Screening
- Component Stress De-rating
- Reliability Growth Modeling
- Physics of Failure Analysis
- Margin and Abuse Testing
- Design of Experiments
- Step-stress Testing
- Thermal Imaging
- Weibull Analysis
- Peer Reviews

* Probability of equipment failure within 1 year

KEYSIGHT TECHNOLOGIES

Design for Reliability— Important Terms & Definitions

HALT/Step-stress Testing: Highly Accelerated Life Testing and Step-stress Testing are methods to uncover weaknesses in design and material during the product development phase.

Component Selection and Risk Analysis: Procedure to identify high-risk parts (e.g. non-preferred suppliers) and track progress made toward minimizing their use during the NPI cycle.

Peer Reviews: Process where a design engineer reviews his/her design (e.g. a microcircuit or PCA) with a group of expert engineers to ask probing questions, get second opinions, and improve the robustness of the design.

Margin and Abuse Testing: Environmental testing of proto/pilot units at the extreme limits of the specs (or sometime beyond) to uncover weaknesses and limits of the design. Often times two stresses are applied simultaneously.

Thermal Imaging: Use of infrared camera technology to locate hot spots on PCAs, then verified with thermocouples. Design changes are then made to reduce component temperature/ junction temperature.

Accelerated Life Testing and High Temperature Operating Life: Subject assembly or component to elevated stress levels (typically temperature) to accelerate the age of the Device Under Test (DUT) so that expected operating life of the item can be calculated; design changes may be taken to increase operating life.

Physics of Failure (PoF): Analytical techniques (e.g. electron microscopy) employed to determine the root cause of a failure so that effective corrective action can be taken.

Failure Modes, Effects and Analysis (FMEA): Formal procedure to itemize list of expected failure modes, score them, and ultimately prioritize them for expenditure of resources.

Design of Experiments (DOE): Advanced statistical methods to efficiently conduct engineering experiments to quantify the impact of multiple variables on some attribute of interest (e.g. how does temperature, dwell time, and force affect the strength of a wire bond).

Weibull Analysis (pronounced Wy-bull): Statistical methods to calculate reliability metrics based on a set of field failure data. Environmental Stress Screening (ESS): Reliability procedures for creating a battery of environmental stress tests and then applying them to production units with the objective of detecting defective units before they get shipped to a customer.

Reliability Growth Modeling: Mathematical methodology to calculate the improvement of reliability of a product during the course of an NPI and to predict the eventual reliability of the product once it is in the field.

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Published in USA, October 15, 2014
5990-6267EN
www.keysight.com