



# ASQ CRE Prep course

Lesson V. A. 2.

Test Environment

# Environmental Considerations

- **Isolated**
- **Waterfall**
- **Combined**
- **Nominal**
- **Specifications +**
- **To Failure**



# Combined Environments for Reliability Testing (CERT)

- **Use conditions have all stresses at once**
- **Testing can look for interactions**
- **Chambers and test conditions may take creativity to implement**





# Vibration Testing

- **Multiple axis**
  - **Frequency & Intensity**
  - **Random**
  - **Fixtures**
- 
- **Grms**
  - **$G^2/Hz$**



# Temperature Testing

- **Temperature Range**
- **Thermal Cycling**
- **Rate of change/  
Shock**
- **Condensation**
- **Self heating**
- **Heat build up**



# Electromagnetic Compatibility (EMC) Testing

- **Outside influence on system (robustness)**
- **System influence on external systems (emissions)**





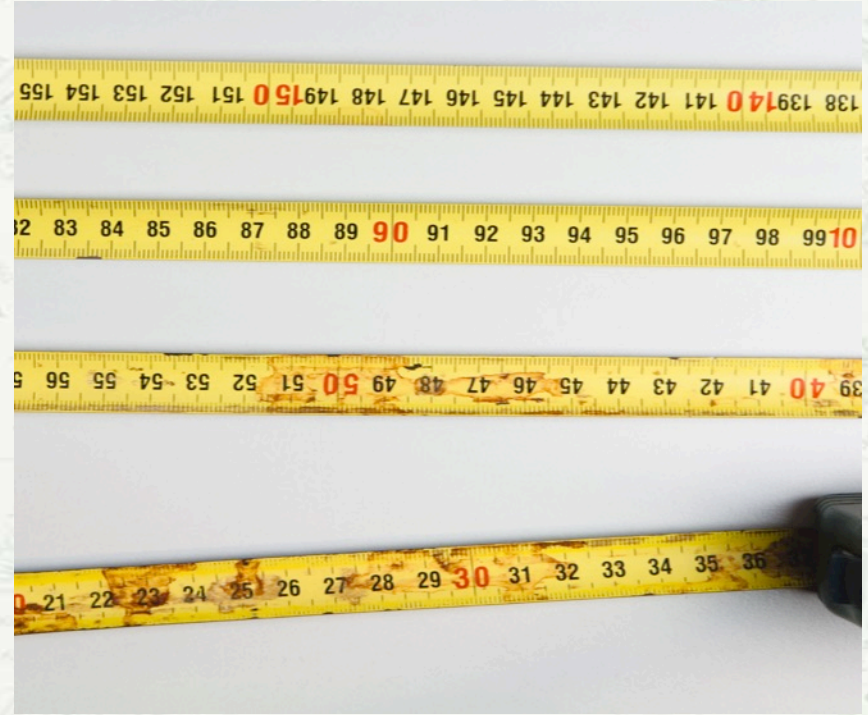
# Power Line Testing

- **Expected Range A & V**
- **Drops, sags, dips**
- **Spikes, transients, surges**
- **Start up / Shut down**



# Test Equipment Calibration

- Readings are true
- There also are elements of measurement error





What is it like  
for your  
product?



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Lesson V. B.

Testing During Development