

## Reliability Assurance in Medical Electronics

1 Day Course

### ABSTRACT

From implantable pacemakers to complex radiological equipment, medical electronics experiences intense regulatory, business and public requirements for high reliability while continuing to provide leading edge technological performance in unique applications. These constraints require a thorough understanding of the physics of how electronics fail and the tools and methodologies available to meet all customer expectations. This session will use the experience of industry experts and lessons learned to provide guidance on how to select and control design, materials, and processes to ensure an optimum level of product reliability.

### OUTLINE

- Introduction to Reliability Assurance & Best Practices
- Supplier Selection: A Data-Centric Approach
  - Focus (Critical and Commodity Parts)
  - Derating
  - Part Qualification
  - Printed Boards
  - CTQs
  - Process Capability, Quality, and Relative Reliability (PCQR<sup>2</sup>)
- Failure Behavior
  - Dendritic Growth
  - Conductive Anodic Filament Formation (CAF)
  - PTH Fatigue
- HALT
  - Step Stress Testing
  - Cyclic and Combinatorial Stress Testing
- F/A vs. HALT
- Physics of Failure
- Solder Joint Reliability
- Product Qualification
  - Constant Temperature
  - Temperature-Humidity
  - Temperature Cycling
  - Vibration
  - Mechanical Shock
- Screening
  - Functional Testing (FCT)
  - Environmental Stress Screening (ESS)
  - Highly Accelerated Stress Screening (HASS)
  - Burn-in
  - Mechanism-specific
- On-going Reliability Testing
- Case Studies
- Conclusion

### Who Should Attend?

Recommended attendees include personnel responsible for or managers of new product introduction (NPI), component engineering, quality control, design and packaging, product and technology qualification, and failure analysis.