

ESD CONSULTING SERVICES PLT

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Course Title: Advance ESD

Training Course Objective:

To ensure the participants fully understand ESD requirements as well as ANSI ESD S20.20 standard requirements.

Course Description:

The course begins with an introduction to ESD. Advancement in the field of electronics has made gadgets more compact, faster and cheaper. This has resulted in indirectly resulted in electronic components that are becoming more and more sensitive to ESD. Fundamentals of ESD covers the important concepts of ESD such as concepts of Faraday caging, laws of induction etc. These concepts are critical in order to understand how ESD becomes a threat to our electronic industries. Armed with the important concepts of ESD, the course then focus on how to prevent and protect ESD sensitive components.

Course content:

Please refer to the later section of this letter.

Recommended participants:

This is open to all level of staff such as Technicians, Supervisors, Engineers, Officers, Managers, etc.

Course structure:

The course is practically orientated with numerous examples and demos in order to help the attendees understand the course. Participants are encouraged to participate and ask questions during the session. A pre and post tests will be held in order to assess the performance of the class. It is recommended that the size of the class be 25 or less participants in order to enable enough attention and time allocation for the subject matter to be well understood. Each participant will be provided a handout.

Duration:

This is 2 full days training which begins at 9.00am until 5.00pm.

Contents of ESD Course

1. Introduction to ESD

- What is ESD?
- Definition of ESD
- Why is ESD event often ignored?
- Concept of "cradle to grave" requirement
- What is the confusion of EOS over ESD?
- Differences between EOS and ESD
- Importance of ESD
- Difference between catastrophic versus latent failure
- What worsens ESD as technology advances?

2. Fundamentals of ESD

- Basics of static electricity
- Effects of grounding on insulators versus conductors
- Concepts of Faraday cage
- Law of induction
- Charge suppression
- Basic grounding requirements
- Relationship of charge, capacitance and voltage
- Methods of electrostatic voltage generation (contact and contactless methods)
- Triboelectric series
- Effects of humidity on ESD charges
- Helmoltz method of generating ESD charges
- How ESD damages sensitive components?
- Component/board direct and indirect charging
- Concept of virtual grounding
- ESD device susceptibility
- Level of sensitivity of device, board and system versus voltages
- How does dielectric breakdown and meltdown occurs?
- How to distinguish between EOS and ESD failures?
- Common causes of ESD
- Human negligence and poor ESD controls
- Proliferation of automated systems without proper ESD control considerations
- First case study of ESD damage caused by trim and form machine
- Second case study of ESD damage caused by plastic pick and place suction cup

3. ESD prevention and protection

- Understand your product sensitivities
- ESD Event Detection
- Classification of product sensitivities
- Human Body Model
- Charge Device Model
- Machine Model
- IEC 801-2 system model
- ESD protection schemes employed by integrated circuits
- Eliminate any potential electrostatic voltage sources
- Role of materials in ESD protection
- Classification of material ie conductive, dissipative and insulative materials
- How is surface resistivity measured?
- Surface resistance and resistivity classifications
- Surface resistivity versus discharge times
- Resistivity scale
- How to control unavoidable electrostatic voltage sources?
- Theory of ionization
- Concept of Faraday Shielding
- Use of antistaticity chemical agents

4. ESD Control Program

- Primary ESD controls which are absolutely necessary in order to ensure minimum ESD control
- Secondary ESD controls which are additional controls which will assist in further minimizing potential ESD damage
- How to accurately measure charges using Faraday Cup?
- Advantages and disadvantages of ESD shoes, booties and heel straps
- Use of wrist straps and safety requirements
- Conductive smocks
- Conductive flooring
- How to install an ESD protective workstation
- Use of air ionizers
- Requirements of ESD protective chairs
- Grounding of carts and trolleys
- Static safe packaging and handling material requirements
- Review of verification devices:
- How to implement a 7 steps ESD control in your facility?
 - Audit for potential sources of ESD
 - Ascertain level of problem and number of controls required.
 - Establish a person/group to manage this activity
 - Develop a specification to ensure compliance.
 - Built in the levels of controls required.
 - Conduct regular audits.
 - Ensure continuous training and improvements.

5. ESD Testing & Measurements per ANSI ESD TR-53.

6. Hands on training in classroom and on production line.

7. ANSI ESD S20.20 standard requirements review.