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ADVANCED ESD

BY ELITE INDIGO

Equip yourself with essential knowledge and hands-on skills in Electrostatic Discharge (ESD) control and ANSI ESD S20.20 compliance.

REGISTERED HRD CORP TRAINING PROVIDER

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Advanced ESD

Program Overview

This 2-day Advanced ESD training program provides in-depth understanding of Electrostatic Discharge (ESD) control principles and ANSI ESD S20.20 Revision 2021 compliance requirements. Participants will learn key technical concepts including static charge generation, grounding, Faraday shielding, ionization, surface resistivity, and ESD testing methods. The course also covers Human Body Model (HBM), Charge Device Model (CDM), ESD protection systems, and practical implementation of ESD control programs through case studies, measurements, and hands-on activities in manufacturing environments.

Learning Objectives

By the end of the course, participants will be able to:

- Understand the fundamentals and causes of Electrostatic Discharge (ESD).
- Learn how ESD damages sensitive electronic components and systems.
- Identify effective ESD prevention, protection, and grounding methods.
- Gain practical knowledge on implementing and auditing ESD control programs.
- Understand ANSI ESD S20.20 Revision 2021 requirements and industry best practices.

Duration

Two (2) Full-Day Workshop (14 Hours)

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Course Schedule (Day 1)

DAY/TIME	DESCRIPTION
1 Hours	**Module 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?
3 Hours	**Module 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?
1 Hour	**Lunch**

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Course Schedule (Day 1 Continued)

DAY/TIME	DESCRIPTION
1 Hour	**Module 2: Fundamentals of ESD (Continued)** • 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
2 Hours	**Module 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
	Summary and End of Day 1

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Course Schedule (Day 2)

DAY/TIME	DESCRIPTION
2 Hours	**Module 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 heelstraps • 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?
2 Hours	**Module 5: ESD Testing & Measurements per ANSI ESD TR-53** • Understand ESD testing and measurement requirements based on ANSI ESD TR-53 • Identify suitable methods and equipment for ESD verification activities • Interpret measurement results to support ESD compliance and control effectiveness
1 Hour	**Lunch**

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Course Schedule (Day 2 Continued)

DAY/TIME	DESCRIPTION
2 Hours	**Module 6: Hands-on Training in Classroom and on Production Line** • Apply ESD control practices in practical working environments • Perform basic ESD handling, verification, and protection procedures correctly • Identify potential ESD risks during operational activities
1 Hour	**Module 7: ANSI ESD S20.20 Revision 2021 Standard Review** • Describe the key requirements of ANSI ESD S20.20 Revision 2021 • Recognize compliance expectations for establishing effective ESD control programmes • Summarize key learning points and apply them to workplace ESD practices
	Summary & End of Course

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ABOUT ELITE INDIGO

We are dedicated to empowering businesses to achieve their full potential. With a team of seasoned professionals and a wealth of industry experience, we offer tailored consulting services to help organizations overcome challenges and seize opportunities.

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