EOS/ESD Manufacturing Symposium in Korea COEX in Seoul, KOREA March 19-23, 2018 EOS/ESD Association, Inc.

Korea ESD Association www.esd.or.kr

March 19-20, 2018 EOS/ESD Association, Inc. Tutorials March 21-22, 2018 EOS/ESD Manufacturing Symposium and Exhibition March 23, 2018 EOS in Automotive Industry Tutorial March 23, 2018 Professional Program Manager Certification Exam (Optional)



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EOS/ESD Association, Inc. brings ESD Program Manager Certification to Asia!

Professional Program Manager Certification ensures the understanding of the standard practices and problem solving techniques used to create an ESD protection program in the workplace.

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- The ANSI/ESD S20.20 Standard and official ANSI/ESD S20.20 Facility **Certification Program was developed** and is maintained by EOS/ESD Association, Inc.
- The ESD Program Manager **Professional Certification was** developed and is maintained by EOS/ **ESD** Association, Inc.
- **EOS/ESD** Association, Inc. instructors who developed the ANSI/ ESDA and IEC ESD Standards bring you today's current information and developments.



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Setting the Global Standards for Static Control! EOS/ESD Association, Inc. 7900 Turin Rd., Bldg. 3 Rome, NY 13440-2069, USA PH +1-315-339-6937 • Email: info@esda.org • www.esda.org



FC100: ESD Basics For The Program Manager MARCH 19 • 9:00 AM - 5:00 PM

Instructor: Terry Welscher, Dangelmayer Associates, LLC

Certification: PrM

This tutorial provides the foundation material for understanding electrostatics and ESD and their role in the manufacturing and handling of ESD sensitive devices. The fundamental properties of charge, electric fields, voltage, capacitance, and current are discussed with a view towards understanding key electrostatic

phenomena and electrical processes. These include charge generation and decay, material properties, and induction. An overview of device failure mechanisms is presented, including how these models impact ESD control programs. Finally, the course provides an overview of ESD control procedures during handling and manufacturing and an overview of ANSI/ESD S20.20 program requirements. This full day course is required for those in-plant auditors and program managers who are working toward professional ESD certification. The presentation includes many in-class demonstrations, videos, and animated slides.

Some sample topics covered in this course are:

- · Definitions and relationships among important electrical and mechanical properties
- · Causes of charge generation and decay
- · Field effects and voltages
- Role of capacitance in ESD (Q=CV)
- · Overview of key measurements including common pitfalls of some measurements
- · Review of ESD failure models
- · Understanding and demonstrating electrostatic induction
- Utility and limitations of air ionization
- Basic goals of ESD controls
- · Properties of effective ESD control products and materials
- · Overview of ANSI/ESD S20.20 ESD program development requirements

This class qualifies for ESDA Program Manager Certification. Details on the Professional Certification Programs offered by ESDA are on our website at www.esda.org/certification/

FC101: How To's of In-Plant ESD Auditing and Evaluation Measurements

MARCH 20 • 9:00 AM - 5:00 PM

Instructor: Terry Welscher, Dangelmayer Associates, LLC

Certification: PrM

Compliance verification is one of the most important elements of ESD program management and there are many technical and administrative pitfalls that can be avoided. The attendee will learn not only how to make valid auditing measurements in accordance with ESD TR53 – Compliance Verification of ESD Protective Equipment and Materials, but also how to recognize and avoid common pitfalls. Common instruments will be explained as well as the invalid test results that can result when they are used incorrectly. Advanced auditing techniques will also be covered that enable Class 0 devices to be handled successfully. There are many ways to administer effective compliance verification programs. Two successful examples will be presented that were developed independently by different companies. Hidden administrative pitfalls that often result in poor compliance will also be discussed. This tutorial will be highly interactive with live demonstrations, in-plant photographs, and compelling video clips. Students will be encouraged to ask questions and to participate in the discussions.

This class qualifies for ESDA Program Manager Certification. Details on the Professional Certification Programs offered by ESDA are on our website at www.esda.org/certification/

EOS/ESD Association, Inc. Tutorials

FC340: ESD Program Development and Assessment (ANSI/ESD S20.20 Seminar) MARCH 19-20 • 9:00 AM - 5:00 PM

Instructor: Kevin Duncan, Seagate Technology; David E. Swenson, Affinity Static Control Consulting, LLC

Certification: PrM

This seminar provides instruction on designing and implementing an ESD control program based on ANSI/ESD S20.20. The course provides participants with the tools and techniques to prepare for an ESD facility audit.

This two-day course is an ESDA certification requirement for in-plant auditors and program managers who are working toward professional ESD certification.

The following topics are covered in this course:

- Overview of ANSI/ESD S20.20
- How to approach an assessment
- Administrative elements
- ESD program assessment
- ESD program techniques for different applications
- Technical elements
- Overview of the assessment process
- The audit checklist and follow-up questions

This class gualifies for ESDA Program Manager Certification. Details on the Professional Certification Programs offered by ESDA are on our website at www.esda.org/certification/

What Information Needs to be Exchanged for Potential EOS Problem? FRIDAY, MARCH 23, 2018 · 9:00 AM - 12:00 PM

Instructor: Reinhold Gaertner, Infineon Technologies

EOS-like damages represent a significant percentage of components returned by the OEM's to tier1 and semiconductor manufacturers for comprehensive failure analysis in the automotive industry. There is generally a requirement from the OEM to conduct a detailed investigation to determine the root cause of the failure; however, commonly this cannot be done due to missing information and poor communications but blocks a lot of capacity. This tutorial presents information based on case studies why it is not possible to find the root cause for an EOS-like damage without an information sharing between all tier levels. Based on the new guideline (to be published by WG27) a two level support will be introduced based on an information sharing between the OEM, tier1 and semiconductor manufacturers that can lead to a higher chance to identify the root cause of the damage and allows to focus on the important topics.

TUTORIAL INSTRUCTORS



Kevin Duncan is currently the Corporate ESD Program Manager for Seagate Technology located in Bloomington, MN; where he has been actively involved in ESD at Seagate since 2005. He is responsible for controlling factory level ESD processes in the ultra-sensitive Slider, head gimbal assembly (HGA), head stack assembly (HSA), and drive manufacturing, as well as research and development locations. Kevin has been a member of the ESD Association since 2000 and is currently a member of the standards committee. He serves as the working group chairman for WG 3 - Ionization, and participates in several other working groups. Kevin has also been presented with the Joel P. Weidendorf award for recognition of his significant contributions, service, leadership, and achievements in the field of EOS/ESD standards development.

Kevin is a technical expert of the United States National Committee, where he represents the United States participating in International Electrotechnical Commission (IEC) Technical Committee 101 - Electrostatics. He currently serves as convenor of maintenance teams 7 - Ionization and 9 -Flooring. He is an ESD certified

professional program manager and an iNARTE certified ESD engineer.

TUTORIAL INSTRUCTORS



Reinhold Gaertner received his diploma in physics from the Technical University of Munich in 1987. Then he joined the Federal Armed Forces University Munich, where he was working on measurement techniques for ESD protective packaging materials. After working as an independent ESD consultant, he joined Siemens Semiconductors in 1996; which is now Infineon Technologies. He is responsible for all problems regarding external ESD protection at Infineon worldwide and also for problems in customer production, as well as for ESD device testing for qualification. Since 1989, he has lectured on static control and since 1991, he has been an active member of the German ESD Association, where he has been acting as vice president for the last couple of years. Since 1995, he has worked in the ESD standardization of IEC TC101, where he is currently convener of two working groups (static decay and device testing). In 2009, he received the outstanding contribution award of the ESDA and in 2011 he joined the ESDA board of directors.



David E. Swenson retired in 2003 after 35 years of service from 3M. While at 3M he had responsibility for new packaging material development and application, training of 3M personnel worldwide and providing application assistance to users of static control products globally with particular emphasis on Asia Pacific and Japan. Dave and his wife Geri established a new company, Affinity Static Control Consulting, L.L.C. in 2003.

Dave has been a member of the ESD Association since 1984 and has served in many capacities including 1997 Symposium General Chair and president of the Association in 1998 and 1999 and again in 2008 and 2009. He was re-elected to the Board of Directors for a 5th term from 2014 to 2016, and serves as Membership and Volunteer Activity Business Unit Manager. Dave was presented with the highest award of the ESD Association, the "Outstanding Contributions Award" in 2002, the Standards Committee "Joel P. Weidendorf Memorial Award" in 2004 and the Association "Edward G. Weggeland" Memorial Award in 2014 He is a member of the Standards Committee serving on the Technology and Administrative Support Team and the ANSI/ESD S20.20 Standard Task Team. Dave also serves as Treasurer and Information Liaison of the Texas Chapter of the ESD Association; he is a member of the Electrostatic Society of America, the UK Institute of Physics and is a US Expert to IEC TC101, Electrostatics. In addition, he is the convener of Joint Working Group 13 between TC101 and TC40 (Capacitors and Resistors).



Dr. Terry L. Welsher retired from Lucent Technologies-Bell Laboratories Engineering Research Center in 2001, as the director of the quality, test, & reliability department. He began his career in Bell Labs in 1978; where he worked on electrical conduction mechanisms in insulating polymers and electrolytic corrosion failure mechanisms in electrical interconnection materials. In 1984, he was appointed distinguished member of technical staff for his work in these fields. In 1986, he was promoted to technical manager to re-constitute the Bell Laboratories core expertise in electrostatic discharge (ESD). The newly formed group proceeded to produce a string of groundbreaking contributions to the field and played a key role in advancing industry standards. In 1994, he broadened his group's activities to all aspects of hardware reliability for Lucent Technologies with special emphasis in environmental stress testing (EST) and product reliability prediction and planning. In 1997, he was promoted to director of the quality, test & reliability center of excellence where he directed the development and deployment of product quality, test and reliability assurance practices for Lucent Technologies business units. This work included design for testability of integrated circuits, board and system level test and diagnosis and special techniques for testing of RF and optoelectronic systems and components. After leaving Lucent, he became reliability director for LaserSharp Corporation, an optical fiber laser amplifier company, where he was responsible for product quality, reliability, and compliance. Since 2004, he has been senior vice president of Dangelmayer Associates, LLC, an EOS/ESD consulting firm. Dr. Welsher was chairman of the ESD Association standards committee 1988-1989. He was technical program chair in 1991, vice general chair in 1992, and general chair in 1993 of the EOS/ESD Symposium. He served as member of the Symposium board of directors 1993-1995. He has also been active in quality standards and road mapping activities with Sematech, the EOS/ESD Association, and the JEDEC 14 quality and reliability committee. He served on the board of directors of JEDEC 1999-2001. He is currently cochair of the joint JEDEC/ESDA HBM and CDM ESD working groups, and member of the Board of Directors and Past President of the EOS/ESD Association. Recently, he has led the effort to harmonize and merge JEDEC and ESDA device testing standards. He holds a BS in chemistry from Florida State University and a PhD in chemical physics from the University of Texas at Austin. He is author or co-author of fifty papers in solid state physics, applied mathematics, organic chemistry, electronics reliability, and electrostatic discharge. For his contributions to the ESD Association, Terry was presented with the Outstanding Contribution award in September 2016.

SCHEDULE

TUTORIAL PROGRAM

MONDAY, MARCH 19, 2018

9:00 - 5:00 FC100: ESD Basics for the Program Manager

TUESDAY, MARCH 20, 2018

9:00 - 5:00 FC101: How To's of In-Plant ESD Auditing and Evaluation Measurements

FRIDAY, MARCH 23, 2018

8:00 - 12:00 What Information Needs to be Exchanged for Potential EOS Problem?

WEDNESDAY, MARCH 21, 2018

- 9:00 9:15 Welcome and Introduction
- 9:15 9:45 **1.1 Electrical Fields: What to Worry About?** David E. Swenson, Affinity Static Control Consulting, LLC
- 9:45 10:15 **1.2 Measuring Surface Voltages at Wafer** Level Inside Equipment Under Real Process Conditions

Thomas Sebald, Philipp Molkentin, ESTION Technologies GmbH

- 10:15 11:00 Coffee Break exhibits open
- 11:00 11:45 **1.3 IC Failure Analysis due to Charged** Board Events by Measurements and Modeling of Discharging Currents through IC Pins

Junsik Park, Jingook Kim, UNIST; Jongsung Lee, Cheolgu Jo, Byongsu Seol, Samsung

- 11:45 12:15 **1.4 EOS Surge Measurement from Various Types of Ionizers** Joshua Yoo, Ethan Choi, Elly Koo, Core Insight;
- 12:15 13:30 Lunch exhibits open
- 13:30 14:00 1.5 Development of a Perfectly Balanced Electrostatic Eliminator Utilizing An Intermittent Pulse AC Voltage Power Supply

Shinichi Yamaguchi, Akira Goto, Tomokatsu Saito, Kensuke Sakamoto, Hidemi Nagata, Shishido Electrostatic, Ltd.; Katsuyuki Takahashi, Iwate University

- 14:00 14:30 **1.6 Developing a Contact Cleaning System** for the SMT Industry - A Case Study Sheila Hamilton, Teknek, UK
- 14:30 15:15 Coffee Break exhibits open
- 15:15 15:45 **1.7 System-Level ESD Noise Induced by** Secondary Discharges at Voltage Suppressor Device in a Mobile Product

Junsik Park, Jingook Kim, UNIST; Jongsung Lee, Cheolgu Jo, Byongsu Seol, Samsung

WEDNESDAY, MARCH 21, 2018

15:45 - 16:15 **1.8 System-Level ESD Failure Diagnosis** with Chip-Package-System Dynamic ESD Simulation with 3D ESD Gun

> Robert (Soung-Ho) Myoung, Norman Chang, ANSYS, Inc.; Cheol-gu Jo, Byong-su Seol, Sam sung Electronics Co., Ltd.

- 16:15 17:00 Coffee Break exhibits open
- 17:00 17:30 1.9 Die Attach & Wire Bonder ESD Risk Assessment & Considerations

Marcus Koh, Yohan Goh, Everfeed Technology Pte., Ltd.

17:30 - 18:00 **1.10 EMI-Generated EOS in a Wire** Bonder Tool

> Vladimir Kraz, OnFILTER; Icko Eric Timothy Iben, Michelle Lam, Dan Brown, IBM

18:00 - 18:30 Question and Answer Session: Open Discussion

MONDAY-TUESDAY, MARCH 19-20, 2018 9:00 - 5:00 ESD Program Development and As

OR 9:0

ESD Program Development and Assessment (ANSI/ESD S20.20 Seminar)

SYMPOSIUM PROGRAM

THURSDAY, MARCH 22, 2018

9:00 - 9:30	2.1 Patent Pending Dissipative Rubber in ESD Worksurfaces and Floor Matting
9:30 - 10:00	Andrew Mittermiller, Zeon Chemicals LP 2.2 Analysis of Flowing Water Charging Mechanism in a PFA Tube
	Daesung Jung, Jongmin Song, Sangyoon Soh, Samsung Electronics Co., Ltd.
10:00 10:45	Coffee Break - exhibits open
10:45 11:15	2.3 EOS/ESD in IC Manufacturing Process of GQFN 64L Device
	Bernard Chin, UTAC Headquarters Pte Ltd,; Marcus Koh, Everfeed Technology Pte Ltd.
11:15 11:45	2.4 Develop Robust Product & Process Through ESD PLC Management Review
	Yong-Rae Kim, Seong-Yun Kim, Continental
11:45 13:00	Lunch - exhibits open
13:00 13:30	2.5 Analysis for Thermal Effect and Burnout on Interconnect Metal Under ESD/EOS Stress
	Changhwi Lee, SK Hynix
13:30 - 14:00	2.6 Reducing EOS Current in Hot Bar Process in Manufacturing of Fiber Optics Components
	Vladimir Kraz, OnFILTER; Jeffrey Salisbury, Finisar
14:00 14:45	Coffee Break - exhibits open
14:45 15:15	2.7 ESD Risk Analysis using Pulsed AC Ionization Technology
	Joshua Yoo, Ethan Choi, Elly Koo, Core Insight
15:15 - 15:45	2.8 Characteristic of VUV Ionizer in a Vacuum Chamber of Flat Panel Displays DongSun Kim, LG Display
15:45 - 16:30	Coffee Break - exhibits open
16:30 17:00	2.9 Failure Analysis and Improvement for Assembly Failure in Antenna Pad of Smart Card IC for Banking
	ChangSu Kim, Han-Gu Kim, Samsung Electronics Co., Ltd.
17:00 - 17:30	2.10 Study on Discharge Characteristics of the ESD Protection Material and the Effect of ESD Protection TVS Device
	Takayoshi Ohtsu, Shinpei Ohishi, National Institute of Technology, Numazu College; Kouichi Sagisaka, Research and Development Center Yukadenshi Co., Ltd



Photo from the 2017 Manufacturing Symposium, Singapore



Photo from the 2017 Manufacturing Symposium, Singapore



Photo from the 2017 Manufacturing Symposium, Singapore

EOS/ESD Association, Inc. Technical Sessions

WEDNESDAY, MARCH 21, 2018

1.1 Electrical Fields: What to Worry About?

David E. Swenson, Affinity Static Control Consulting, LLC

ANSI ESD S20.20 originally required that process essential insulators with an electrical field greater than 2000 volts at 1 inch be kept >12 inches from ESD susceptible items: Is this adequate? Can a process essential insulator be put right on top of an ESD susceptible item if the electrical field is 1,999 volts at 1 inch? What is the risk from induction charging of ESD susceptible items?

1.2 Measuring Surface Voltages at Wafer Level Inside Equipment Under Real Process Conditions

Thomas Sebald, Philipp Molkentin, ESTION Technologies GmbH

With smaller feature sizes, thinner gate oxide layers and higher requirements on over-all uniformities, electrostatic charges at wafer level more and more comes into focus. ESD oxide-layer break-throughs during wet processes have been reported //1//. Nonuniform distribution of electron-work-function after cleaning process have been found with metrology tools //2// and could be correlated to electrostatic surface charges. To ensure stable process conditions and zero-defect trends it becomes mandatory to measure and control electrostatic charges at wafer level under real process conditions.

1.3 IC Failure Analysis due to Charged Board Events by Measurements and Modeling of Discharging Currents through IC Pins

Junsik Park, Jingook Kim, UNIST; Jongsung Lee, Cheolgu Jo, Byongsu Seol, Samsung

The CBE currents flowing through each ground or power pin of a DUT IC are measured and simulated at several different conditions of the discharging points, PCB structures, and decoupling capacitor placements. By investigating the current paths inside the IC, IC failure mechanisms are analyzed, and several strategies for IC protection are obtained.

1.4 EOS Surge Measurement from Various Type of Ionizers

Joshua Yoo, Ethan Choi, Elly Koo, Core Insight; Younchul Oh, Samsung Display; Evan Grund, Grund Technical Solutions

EOS Surges are one of known root causes of device failures in the manufacturing environment. High voltage Switching Ionizers are emitting a source of EOS surges and this may impact sensative devices. There are several types of ionizers which emitting EOS surge and non-EOS emitting type based on their design operation technology. This study focused on which type of ionizers generate EOS surges and emitt into power lines and ground wires.

1.5 Development of a Perfectly Balanced Electrostatic Eliminator Utilizing An Intermittent Pulse Ac Voltage Power Supply

Shinichi Yamaguchi, Akira Goto, Tomokatsu Saito, Kensuke Sakamoto, Hidemi Nagata, Shishido Electrostatic, LTD; Katsuyuki Takahashi, Iwate University

A perfectly balanced fan type electrostatic eliminator utilizing an intermittent pulse AC voltage power supply is developed. The short-term fluctuation range of the offset voltage (ion balance) is smaller than ± 2 V without a sensor feedback system. The performance is maintained in 2500 h continuous operation.

1.6 Developing A Contact Cleaning Machine for the Smt Industry which has both Highly Effective Cleaning and Compliance With Ansi/Esd S20.20

Sheila Hamilton, Teknek, UK

This Case study highlights the difficulties of combining two vital functional requirements, cleaning and static control, for the SMT industry and will outline the novel approaches taken to overcome these difficulties.

1.7 System-level ESD Noise induced by Secondary Discharges at Voltage Suppressor Device in a Mobile Product

Junsik Park, Jingook Kim, UNIST; Jongsung Lee, Cheolgu Jo, Byongsu Seol, Samsung

How to control the secondary discharge to reduce the systemlevel ESD noise in a mobile product?

1.8 System-level ESD Failure Diagnosis with Chip-Package-System Dynamic ESD Simulation with 3D ESD Gun

Robert (Soung-Ho) Myoung, ANSYS, Inc.; Byong-su Seol, Samsung Electronics Co., Ltd.

A comprehensive chip-package-system (CPS) electrostatic discharge (ESD) simulation methodology is developed for addressing IEC61000-4-2 testing conditions. An innovative chip ESD compact model is proposed, combined with full-wave models of the 3D ESD gun, ESD protection devices, PCB wires/vias and connectors for CPS analysis.

1.9 Die Attach & Wire Bonder ESD Risk Assessment & Considerations Seoul, South Korea

Marcus Koh, Yohan Goh Everfeed Technology Pte Ltd

ESD risk assessment considerations for two units of die attached and wire bonder machines were evaluated with reference to ANSI/ESD SP10.1. Modelling and simulation was proposed and discussed to evaluate the sensitivity of the automated handling equipment ESD performance.

1.10 EMI-Generated EOS in a Wire Bonder Tool

Icko Eric Timothy Iben, Michelle Lam, Dan Brown,IBM; Vladimir Kraz, OnFILTER

Previous study found EOS pulses on a wire bond tool (2013 ESDA Symposium, 2A.3, Iben et al). This Study Is To Survey The Wire Bonder Tool For Sources of EMI Using A Current Probe and Oscilloscope Attempt To Eliminate Any Measured EMI.

EOS/ESD Association, Inc. Technical Sessions

THURSDAY, MARCH 22, 2018

2.1 Patent Pending Dissipative Rubber in ESD Worksurfaces and Floor Matting

Andrew Mittermiller, Zeon Chemicals LP

Many electrostatic dissipating mats rely on conductive additives to dissipate static charge. These additives can migrate and bleed to the surface of the mat and then be removed by washing, use, or may simply degrade over time. These low-quality mats must be replaced or re-treated with the electrostatic dissipating additive to maintain their properties. The current mat technology is non-permanent and thus results in a high cost to the end user to maintain a static safe work area.

2.2 Analysis of Flowing Water Charging Mechanism in a PFA Tube

Daesung Jung, Jongmin Song, Sangyoon Soh, Samsung Electronics Co., Ltd.

For semiconductor process equipment, Perfluoroalkoxy alkanes (PFA) tubes are widely used for chemical transfer with good chemical robustness, low processing difficulty and low cost. However, the triboelectric characteristic of the tube blocks utilization of that in several applications. The property is severe enough to inducing arc from the chemical to the external GND which can cause a fire. Although it does not make a fire, process engineer needs to know the phenomena because the charged chemical can damage the device on the wafer in various semiconductor processing facilities. This presentation provides an empirical results and analysis of the phenomenon that can occur when transporting general water, DIW, and CO2 DIW through a PFA tube. It changes various factors including the initial charging state of the tube, flow rate, water flow time and it interprets the result from the ESD point of view.

2.3 EOS/ESD in IC Manufacturing Process of GQFN 64L Device

Bernard Chin, UTAC Headquarters Pte Ltd, Marcus Koh, Everfeed Technology Pte Ltd

This paper presents a case study of ESD/ EOS events causing low yield in trial lots prior to release of volume production. The use of line audits to check for static voltage, proper grounding and CDM discharge, voltage spike check and split-lot testing was used to determine the root cause.

2.4 Develop Robust Product & Process Through ESD PLC Management Review

Yong-Rae Kim, Continental

In recent years, the development period of automobiles has become shorter, automobile electronics are accelerating. Under such circumstances, it is not easy to strengthen the robustness of products and processes. Through this workshop, I would like to introduce & propose a robust design through PLC management.

2.5 Analysis for Thermal Effect and Burnout on Interconnect Metal Under ESD/EOS Stress

Changhwi Lee, SKhynix

This presentation explores the thermal effect and burnout on interconnect metal under EOS/ESD Stress through the discussion of electromigration, thermomigration, and stress migration

2.6 Reducing EOS Current in Hot Bar Process in Manufacturing of Fiber Optics Components

Jeffrey Salisbury, Finisar; Vladimir Kraz, OnFILTER

This presentation will analyze EMI-caused EOS exposure in the process. Also it will illustrate how measuring just ground impedance is not sufficient to assure safe EOS environmentTo demonstrate typical EOS test. To show how easy it is to mitigate EOS problem with instantly-verifiable solution.

2.7 ESD Risk Analysis using Pulsed AC Ionization Technology

Joshua Yoo, Ethan Choi, Elly Koo, Core Insight

There was ESD suspected failures in FPD industry. Steady-State DC type of ionizer solve problem initially and getting another ESD issue due to their lack of technology. Zebra effect – polarization issue within one glass panel and this can cause another type of ESD failures on panel. More uniform ion pattern requires to neutralize glass substrate within FPD processes. Pulsed AC (of fast bipolar switching) type of ionizers invented in early 2000 and used in many processes of FPD manufacturing areas and other application such as in-tool ionization due to their sizes are slim and compact.

2.8 Characteristic of VUV ionizer in a Vacuum Chamber of Flat Panel Display

DongSun Kim, LG Display

Materials that are characterized by their ability to allow movement of an electric charge. The laws of nature attempt to maintain a balance of positive or nagative charge. Why is static charge a problem? Contamination, ESD(electrostatic discharge).

2.9 Failure Analysis and Improvement for Assembly Failure in Antenna Pad of Smart Card IC for Banking

ChangSu Kim, Samsung Foundry Business; Han-Gu Kim , Samsung Electronics Co., Ltd.

Recently, the assembly equipment for antenna pads of smart card IC(Banking IC) was changed to high current welding machine. In some products, antenna related failures occurred at the newly adopted welding machine. Failure rate was very high for several products which has low ESD immunity level of antenna pads but needed to improve the problem without modifying IC. Through the detailed investigation about the welding machine and analyzing failure mechanism, final solution has been found.

2.10 Comparison of Discharge Characteristics of the ESD Protection Material and the Effect of ESD Protection TVS Device

Takayoshi Ohtsu, Shinpei Ohishi, National Institute of Technology, Numazu College; Kouichi Sagisaka, Research and Development center Yukadenshi Co., Ltd.

To compare the ESD protection materials with the ESD protection TVS devices in the same ESD condition, we developed ESD observation system. It was found that the discharge current of CNT is one-tenth lower than that of CF and the effect of ESD protection TVS device is same as CF of 107 Ohm.

EXHIBITS

Promote your company by exhibiting at the 2018 EOS/ESD Manufacturing Symposium in Korea.



Note: Support for 110VAC, compressed air, any water support for demonstrations is not available.



EXHIBITORS

Core Insight, Inc. Booth 9 Web Site: www.coreinsight.co.kr/

Estion Technologies GmbH Booth 4 Web Site: www.estion-tech.com

Hanwa Electronic Ind. Co., Ltd. Booth 5 Web Site: www.hanwa-ei.co.jp

iNARTE Korea Booth 2 Web Site: www.exemplarglobal.or.kr

Lubrizol Specialty Chemicals Manufacturing (Shanghai) Co., Ltd. Booth 3 Web Site: www.lubrizol.com

Jangbogo Corea Booth 1 Web Site: www.jbgcorea.com

Shishido Electrostatic, LTD & JNJ Tech Booth 6 Web Site: www.shishido-esd.co.jp/english

Stasys Korea Co., Ltd. Booth 8 Web Site: www.stasyskorea.com

STANDARD BOOTH

Yang Electronic Systems Co., Ltd. Booth 7 Web Site: www.yangsys.com



Promote your company by exhibiting at the 2018 EOS/ESD Manufacturing Symposium in Korea.

EXHIBITS OPEN 12:00 – 5:00 March 21, 2018 9:00 – 3:00 March 22, 2018

APPLICATION FOR EXHIBIT SPACE

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Count	try:			
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Name	on card:			Security code:
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ACCOMODATIONS ESD Tutorials & EOS/ESD Manufacturing Symposium in Korea March 19 – March 23, 2018 COEX in Seoul, KOREA



Manho Seung, SK Hynix Dongsun Kim, LG Display Byongsu Seol, Samsung Electronics Yongrae Kim, Continental Automotive Inderjit Singh, Innospectra Jerry Rivera, I-Con Tech Reinhold Gartner, Infineon John Kinnear, IBM Marcus Koh, Everfeed Technology

Korea ESD Association (local chapter) Suite 505, Banpo-Technopia, 513-3, Sangdaewon-dong, Jungwon-ku, Seongnam-City, Gyeonggi-do, 462-120, KOREA Phone: 82-31-750-9207 E-mail: info@esd.or.kr

www.esda.org/events/manufacturingsymposium/

www.coex.co.kr/eng/venue/venue conference south1 a.asp **COEX, Convention and Exhibition Center** 58, Teheran-ro 87-gil, Gangnam-gu, Seoul

From Incheon International Airport www.iiac.co.kr/eng/ Approximately 65~80 minutes (approximately 70km)

Seoulbus Limousine Bus (No. 6006)

Single fare: 10,000 won (adults) / 8,000 won (Children, 6~12 years) Bus stops: Inceon International Airport (1F) 5A, 11B Tickets: Seoulbus Limousine Bus Stops Telephone +82-2-577-1343-5

CALT Limousine Bus (City Airport, Logis & Travel, Korea)

Single fare: 15,000 won (adults)/7,500 won (Child) Bus stops: Incheon International Airport (1F) platform east 4A, west 10B Tickets: CALT Limousine Bus stops Telephone +82-2-551-0790-2

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Via Taxi

Single fare: 50,000won (normal taxi), 90,000 won (luxury taxi)

From Gimpo Airport www.airport.co.kr/mbs/gimpoeng/ Approximately 45 ~ 55 minutes (approximately 35Km)

CALT Limousine Bus (City Airport, Logis & Travel, Korea)

Single fare: 7,000 won (adults)/ 4,000 won (Child) Bus stops: Gimpo Airport (1F) * Domestic Arrivals: Platform 3 * International Arrivals: Platform 6 Tickets: CALT Limousine Bus stops Telephone +82-2-551-0790-2

Via Taxi

Single fare: 40,000won (normal taxi), 80,000won (luxury taxi)



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Cheongdam Station



Hotel Reservation Form

Hetel PEYTO Summing has been chosen as the efficial hotel for 2018 EOS/ESD Manufacturing Symposium in Korea. Flease complete this form and kindly return to us via casal or for.

> 2018 EOS/ESD Manufacturing Symposium in Korea (March 19 – 23)

Recerction

Phone: +82 2 6936 8100 Email: <u>reservations@peytubatel.com</u> ur <u>ryan kim@peytubatel.com</u> Fax: +82 2 6936 8200

(Circle One) Mr./Ms./Mrs.	
First Name*:	Samane*:
Company:	Tille:
Address	Triphan*:
Fax Number*:	
E-mil*:	
Arrival Date*:	Flight/Time*:
Departure Dale *:	

Please circle your choice of accumulations:

Room Type	Room Rate	Bed Type	Breakfast	Benefit
Delaze Doable/Twin	n KRW108,080	o Double Bed o Twin Bed	olpan: o2pan:	In room Internet
Urhan Double	n KRW128,080	o Double Bed	olpan: o2pan:	2 Bottle of Water

* The above special rates are <u>subject to 10% tax.</u>

* Buffet breakfart is available at KRW 15,000 (subject to 10% tax) per person at PO:Z Kitchen & Bar.

* Check-in time - 3:00 pm, Check-out time - 12:00 noon.

* Fitness Center is available from 6:00 am to 00:00 am at 2 Flour.

A credit card number is required to guarantee your reservation.

Credit Card Type*:	-
Credit Card Number*:	-
Exnity Date*:	

Cardholder's Signature*

Cancelling your reservation

Any cancellation or amendment is required before 6PM (Seoul time) 7 days prior to the scheduled arrival date otherwise a room rate for the first night of the stay will be charged.

Please also be informed that advance settlement on total rate would be requested upon check-in.

REGISTRATION ESD Tutorials & EOS/ESD Manufacturing Symposium in Korea March 19 – March 23, 2018 COEX in Seoul, KOREA

REGISTER ONLINE AT www.esda.org

FC 340: ANSI/ESD S20.20 - Process Design Overview March 19-20, 2018	\$ 1,510 USD
FC100: ESD Basics for the Program Manager March 19-20, 2018 FC101: How To's of In-Plant ESD Auditing	\$ 1,020 USD
What Information Needs to be Exchanged for Potential EOS Problem? March 23, 2018	\$ 310 USD
Symposium Only Technical sessions, Invited Talks, and Workshops March 21-22, 2018	\$ 800 USD
Professional Program Manager Certification Exam (Optional) March 23, 2018 NOTE: You must initiate an official file in your name at EOS/ESD Association, Inc. headquarters, and complete all pre-requisite courses to be eligable to take the exam.	\$ 80 USD

Register 5 or more people from one company at the same time for a 10% registration discount per person!

Last Name:		_First Name:
Company Name:		
		0.1
Street:		_City:
State/Province:	Country:	Zip/Postal Code:
Phone:	_Email:	

Registration Information

For credit card payments: Register online at:

ESD Association

http://www.cvent.com/d/mtq3tl Phone: +1 (315) 339-6937 Other forms of payment Contact: Korea ESD Association (local chapter) Suite 505, Banpo-Technopia, 513-3, Sangdaewon-dong, Jungwon-ku, Seongnam-City, Gyeonggi-do, 462-120, KOREA Phone: 82-31-750-9207 E-mail: info@esd.or.kr

