



Work Instruction (WI)

DIRECTIVE NO. 270-WI-6400.1.9D
EFFECTIVE DATE: 03/16/2016
EXPIRATION DATE: 03/16/2021

APPROVED BY Signature: Original Signed By
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COMPLIANCE IS MANDATORY

Responsible Office: 270/Information and Logistics Management Division

Title: Process for Electrostatic Discharge (ESD) Control

PREFACE

P.1 PURPOSE

This procedure defines activities for controlling electrostatic discharge against electrical, electronic and electromechanical (EEE) components in accordance with 300-PG-8730.6.1, GSFC Electrostatic Discharge (ESD) Control Plan.

P.2 APPLICABILITY

This procedure applies to all Code 270/279 personnel responsible for handling Electrostatic Discharge Sensitive (ESDS) items.

P.3 REFERENCES

- a. [270-FORM-0057, Quality Control of ESD Facilities Chart Form](#)
- b. [270-WI-4520.2.1, Receiving Project Parts](#)
- c. [300-PG-8730.6.1, GSFC Electrostatic Discharge \(ESD\) Control Plan](#)
- d. Equipment Calibration Record
- e. Facility and Bench Certification
- f. GPR 5340.2, Documentation and Control of Process Non-conformances and Customer Complaints
- g. GPR 5340.4, Problem Reporting and Problem Failure Reporting
- h. Humidity Recording Charts

P.4 CANCELLATION

270-WI-6400.1.9.C, Process for Electrostatic Discharge (ESD) Control

P.5 TOOLS, EQUIPMENT, AND MATERIALS

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- a. ESD Protective Materials: Conductive or static dissipative materials capable of one or more of the following characteristics: limiting the generation of electrostatic charges; dissipating electrostatic charges over its surface or volume; or providing shielding from electrostatic discharges or fields.
- b. ESD Workstation: Workstations equipped with appropriate ground system to limit ESD voltages and allow for handling of electronic devices sensitive to ESD.
- c. Continuous Monitoring Station: Ground station that continuously monitors the operator's wrist strap ground efficiency.

ESD Conductive Surface Work Bench
Impulse Sealer 12," 20"
Electrostatic Survey Meter
ESD Pen-Vacuum w Conductive Cup
Air Ionizer
Wrist/Foot Strap Tester
Metal Speidel Wrist Strap w One Megohm Coilcord 5'
Humidity Meter
Humidity Chart Reader
Humidifier

ESD Dissipative Gloves
ESD Finger Cots
ESD Dissipative Tape
ESD Dissipative Lotion
ESD Wipes
ESD Conductive Cleaner
ESD Environment Signs
Static Shielding Bags
ESD Precaution Label

P.6 SAFETY PRECAUTIONS AND WARNINGS

- a. The ESD controlled areas, where ESDS items are to be processed, shall be clearly identified by prominently placed signs.
- b. Grounding devices shall be used by all personnel coming within 1 meter (3.3 feet) of exposed ESDS items.

The relative humidity shall be maintained in ESD-protected work areas at 40% to 60%. At levels below 30%, additional precautions shall be employed (e.g., air ionizers, humidifiers). If other precautionary methods are not available, work shall be halted until the required level is obtained.

P.7 TRAINING

- a. All personnel performing material handling activities in the Project Parts Receiving and Warehousing Section shall be trained and certified in accordance with 300-PG-8730.6.1. Re-certification shall be required every 2 years.
- b. Certification is required in order to handle any material classified as Electrostatic Discharge Sensitive (ESDS), as guided by 300-PG-8730.6.1.

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P.8 RECORDS

Record Title	Record Custodian	Retention
Form 270-FORM-0057	Project Parts Technician/Lead	* <u>NRRS 8/36.5C1</u> - Handle as permanent pending retention approval.
Humidity Recording Charts	Project Parts Technician/Lead	* <u>NRRS 8/36.5C1</u>
Employee ESD Certification to 300-PG-8730.6.1	Personnel Office	* <u>NRRS 3/33C</u> – Destroy or delete 5 years after separation of employee or when no longer needed, whichever comes first.
Facility and Bench Certification	Code 300	* <u>NRRS 8/36.5C1</u>
Equipment Calibration documentation	Project Parts Warehouse Supervisor	* <u>NRRS 8/103</u> – Destroy/Delete between 5 and 30 years after program/project termination.

* *NRRS 1441.1 NASA Records Retention Schedule*

P.9 MEASUREMENT/VERIFICATION

Monthly Lab inspections using ESD Control Verification Form Rev A 06-06-2012 per 300-PG-8730.6.1 GSFC Electrostatic Discharge (ESD) Control Plan

Instructions

In this document, a requirement is identified by “shall,” a good practice by “should,” permission by “may” or “can,” expectation by “will,” and descriptive material by “is.”

1. GENERAL RULES

- a. Workstations shall be kept clean at all times.
- b. All work surfaces shall be static dissipative and grounded to a common point ground.
- c. Floor surfaces will only be cleaned or waxed with static dissipative cleaners.
- d. Cleaning of work surfaces shall be done only with static dissipative cleaners and cleaning materials. Cleaning shall not be done when ESDS devices are exposed.

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- e. A copy of the referenced document, 300-PG-8730.6.1, shall be kept near the workstation for reference.
- f. All tools used within the station shall be static dissipative.
- g. No eating or drinking shall be permitted in ESD protected areas.
- h. Only ESD trained and certified employees shall handle ESD sensitive parts.
- i. The ESD protected areas, where ESDS items are to be processed, shall be clearly identified by prominently placed signs. Access to such areas shall be limited to trained and equipped personnel. Caution signs and closed entrance doors assist in prohibiting unauthorized and untrained personnel from entering the ESD protected area. All other personnel shall be escorted and equipped with standard protective clothing, as required.
- j. Grounding devices shall be used by all personnel working with or handling ESDS items to prevent accumulation of dangerous electrostatic charge levels. A grounding device shall be worn by all personnel coming within 1 meter (3.3 feet) of any exposed ESDS item.
- k. Prior to the use of a work station, the operator shall verify that the relative humidity level is within 40% - 60%. At levels below 30% work shall be halted and precautions employed (e.g., air ionizers, humidifiers) to achieve an acceptable level. At levels above 70% work shall be halted and dehumidifiers used until acceptable levels achieved. If precautionary methods are not available, work shall be halted until the required level is obtained.
- l. Form 270-FORM-0057 shall be completed daily upon start of the workday. This form should be kept in each ESD facility for recording humidity and equipment calibration checks.
- m. Non-static generating clothing or dissipative smocks will be worn in ESD-protected areas.
- n. Prior to starting any work, an electrostatic meter shall be used to detect the presence of electrostatic charges.
- o. Sensitive Electronic Device symbols shall be applied to all ESDS material received and shipped.
- p. ESDS material received via manufacturer/vendor with no Sensitive Electronic Device symbols or precaution label will be rejected and worked through the non-conformance process.

2. NONCONFORMANCE MANAGEMENT

The overall Corrective Action/Preventive Action (CAPA) Lead for the activities in this work instruction is the Code 273 Supply Team Lead. The CAPA serves as the principal point of contact within ILMD

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responsible for the management and proper functioning of the nonconformance process in this functional area. He/she provides technical oversight and identifies nonconformance trends that may require changes to existing policies or procedures, and reports significant issues to higher management. The CAPA Lead is also responsible for reviewing and processing the Problem Reports (PR's), Problem Failure Reports (PFR's), and Nonconformance Reports (NCR's) initiated in-house or received from any source as well as directing and documenting corrective actions taken in response to PR/PFR's and NCR's. The primary documentation for these activities shall be created in the automated Problem Reporting/Problem Failure Reporting (PR/PFR) system or the META System, which are accessed via the [GSFC MS website](#).

As determined by the appropriate 270/279 Functional Branch Head, some non-conformances will be managed outside of the PR/PFR and META systems. There is no single method for documenting and dispositioning these minor non-conformances. All minor non-conformances shall be recorded in an approved record, and the cognizant supervisor shall review the documentation and determine the most appropriate disposition. In those instances when a close out action is necessary, it will also be annotated in an approved record.

All PR/PFR's and NCR's shall be initiated, processed and dispositioned in accordance with GPR 5340.2, Documentation and Control of Process Non-conformances and Customer Complaints, and GPR 5340.4, Problem Reporting and Problem Failure Reporting.

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Appendix A – Definitions

- A.1 Electrostatic Discharge (ESD) – A transfer of electrostatic charge between bodies at different electrostatic potentials caused by direct contact or induced by an electrostatic field.
- A.2 Electrostatic Discharge Sensitive (ESDS) Items – Electrical and electronic parts, assemblies and equipment that are sensitive to ESD voltages.
- A.3 ESD Controlled Area – An area which is constructed and equipped with the necessary ESD protective materials and equipment to limit the ESD voltage below the sensitivity level of the ESD devices that are handled therein. ESD controlled areas exists in S200E and S200F of Building 16W.
- A.4 Static Dissipative Materials – ESD-protective materials having surface resistivities greater than 10^5 but not greater than 10^{12} ohms per square.
- A.5 Work Stations – A non-static generating workbench where ESDS components are handled, in an ESD-controlled area.

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Appendix B – Acronyms

- a. CAPA - Corrective Action/Preventive Action
- b. EEE – Electrical, electronic, and electromechanical
- c. ESD – Electrostatic discharge
- d. ESDS - Electrostatic discharge sensitive
- e. ILMD – Information and Logistics Management Division
- f. NCL – Nonconformance lead
- g. NCR – Nonconformance report
- h. NRRS – NASA Records Retention Schedule
- i. PR/PFR – Problem Reporting/Problem Failure Reporting
- j. WOA – Work Order Authorization

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CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	12/05/03	<ul style="list-style-type: none"> Initial Release
A	02/04/05	<ul style="list-style-type: none"> As directed during the FY04 Center Rules Review, the Responsible Office modified this document to remove requirements that were no longer needed and to clearly distinguish requirements from supporting information. Administrative changes were made throughout to correct responsible organization names and codes, and to re-title Goddard Procedures and Guidelines (GPG) to Goddard Procedural Requirements (GPR) and NASA Procedures and Guidelines (NPG) to NASA Procedural Requirements (NPR).
A	05/14/06	<ul style="list-style-type: none"> Administratively updated to reflect a change in the owning organization code from 230 to 270.
B	12/01/08	<ul style="list-style-type: none"> Updated document to most recent work instruction template Replaced all NASA-STD-8739.7 references with GSFC-WM-001 which contains new Center requirements for ESD control. Updated records retention guidance for calibration documentation to coincide with updates to the NRRS. Section 1 – Added requirement that only trained personnel will handle ESD sensitive materials. Section 2 – Process for handling non-conformances updated to coincide with new Center procedures
C	09/25/14	<ul style="list-style-type: none"> Updated to new Work Instruction template Replaced all references to GSFC-WM-001 with 300 PG-8730.6.1
D	03/16/16	<ul style="list-style-type: none"> Section 2 – revised language

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