“T1-138
Basic Standard for Implementation of Countermeasures against Electrostatic Damage”

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Rev 2.02

PRODUCTION DEPARTMENT
PE SECTION

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① Purpose of “Basic Standard for Implementation of Countermeasures against Electrostatic Damage”

brother at your side

Purpose

To standardize methods for preventing electro-static damage to electronic parts.

To achieve stable product quality.

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② Definition of Terms

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In-process grounding device

- A device provided in a process requiring anti-static countermeasure to make an equipotential connection with the ground.

ESD (Electro-Static Discharge)

- An instantaneous transfer of electrostatic charges between objects at different potentials.

Countermeasure against electrostatic damage

- A countermeasure taken to protect parts from harmful impacts of electrostatic discharge on quality and performance.

Antistatic shoes

- A pair of shoes that remove static charges from the human body by continuously discharging through a ground plane.

Relative humidity

- The weight of aqueous vapor contained in the air at a certain temperature divided by that of saturated aqueous vapor at the same temperature.

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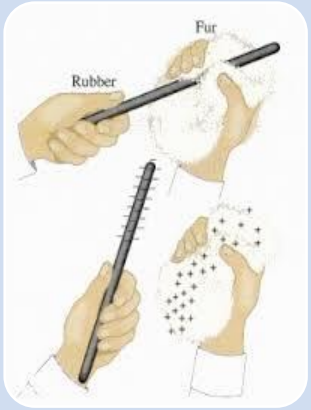

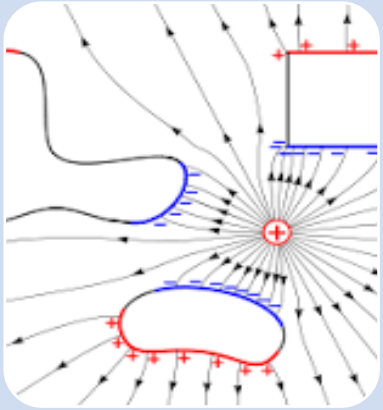

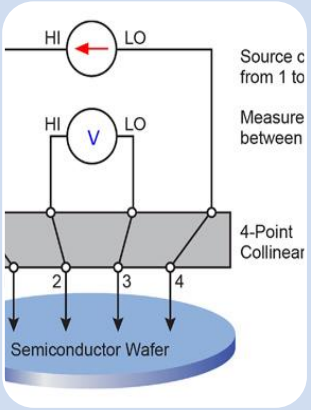

Class D grounding

- The groundings for lightings, wall sockets, ventilating fans and refrigerators in a residential or industrial facility.

Frictional charging

- Electrical charging resulting from surface contact or separation of two solids, liquids, or powdery materials in transit.

Electrostatic induction

- A phenomenon where an object is electrified (with positive or negative charges) by another approaching electrified object (with positive or negative charges).

Surface resistivity

- The electrical surface resistance measured between opposing sides of a square and expressed in Ω.

Conductive material

- A rubber, plastic or similar material mixed with carbon to improve the electric conductivity and used for electrically conductive polyethylene bags, returnable containers, etc.

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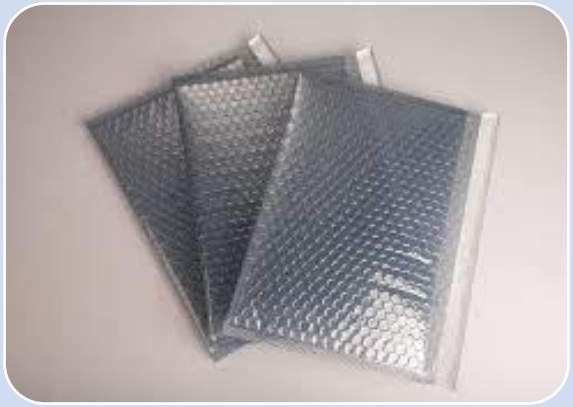

Antistatic material

- A film or another material coated with an organic compound to make its surface hydrophilic and ionic.

Printed wired board

- A board on which a circuit is printed. It is also called a printed circuit assembly.

Conductive mat

- An electrically conductive mat that removes electrostatic charges from the human body by continuously discharging through a ground plane.

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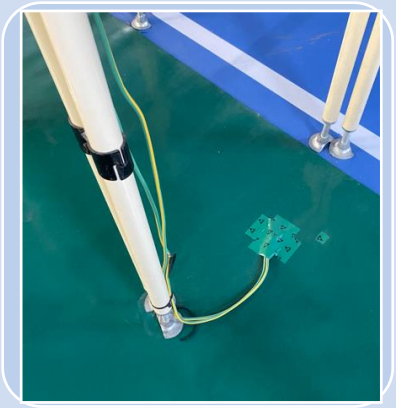

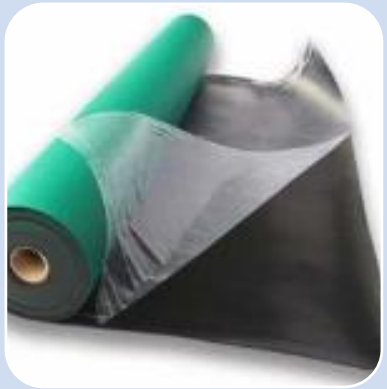

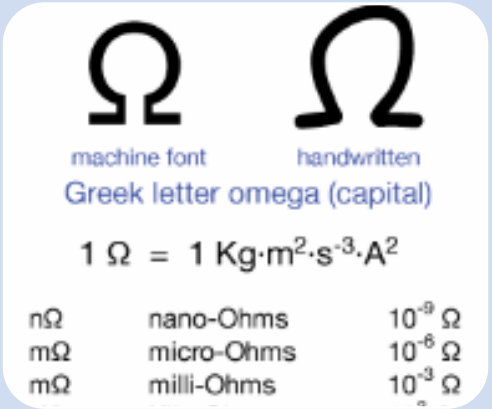

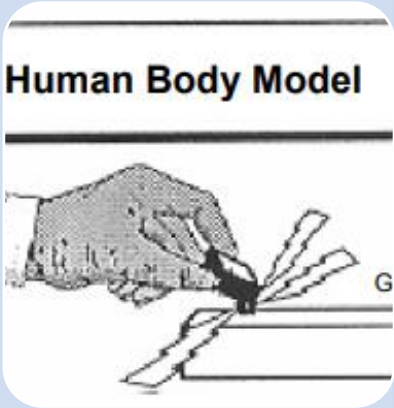

ESD Protective Grounding Line

- A grounding line installed to prevent ESD

Anti-Static Material

- A film or another material coated with an organic compound to make its surface hydrophilic and ionic.

Electrostatic Resistance

- An index indicating the strength of the electronic component to electrostatic breakdown. It is often indicated as the HBM sensitivity.

HBM Sensitivity

- This value indicates the static resistance at breakage voltage when testing electrostatic voltage using a circuit equivalent to the HBM (Human Body Model)

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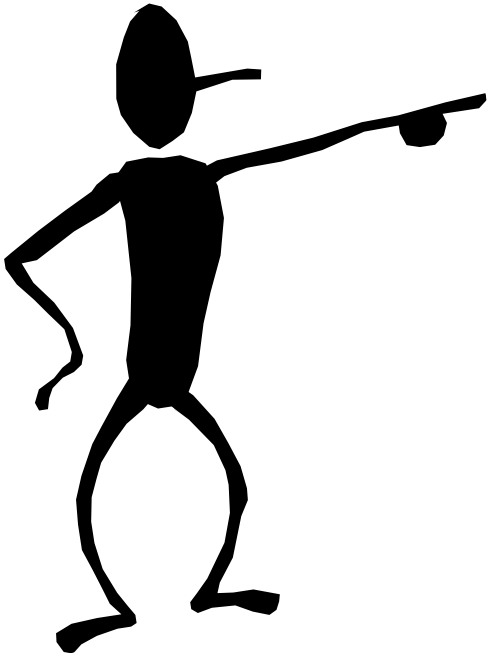
③ Basic Antistatic Countermeasures

The processes requiring antistatic countermeasures are identified by marking. The operators and the articles, tools and fixtures used by them are connected with an ESD protective grounding line to prevent charging.

3. 1 Processes requiring antistatic measures



- Production lines, equipment, jigs and tools needing grounding.
- Process that the above components can come in contact with during storage, transport, assembly or inspection including semiconductor diodes, IC and other electronic components and subassemblies requiring electrostatic measures.
- Process requiring antistatic measures clarified in the process control chart.

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3.2 Identification of processes requiring antistatic countermeasures

Compliance Item

- The processes requiring antistatic countermeasures should be identified with signs at conspicuous points.

A sign identifying an assembly process

A sign identifying a parts storing shelf

A sign on the floor of a parts storing room

A sign identifying pallets for ESD sensitive parts

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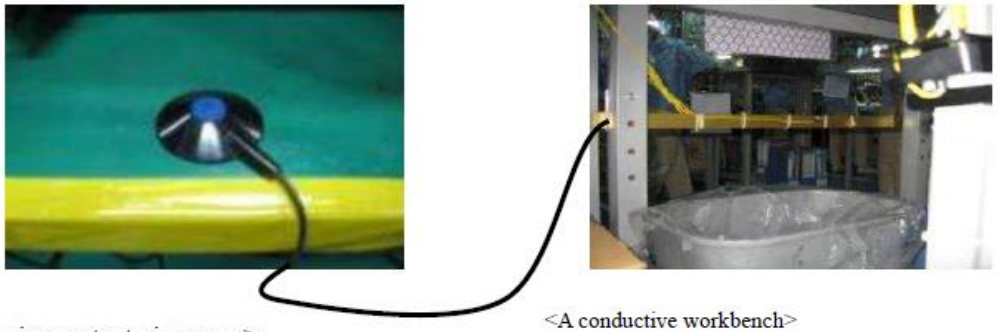
3.3 Antistatic countermeasures for workbenches

Compliance Item

1) A conductive mat should be spread over the workbench surface and connected with an ESD protective grounding line.
2) Conductive workbenches and conveyors made of aluminum should be connected with an ESD protective grounding line.

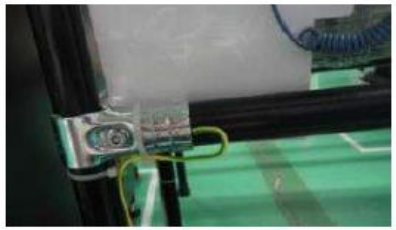
Examples:

<An example of connecting with an in-process grounding device (brass conductor)>



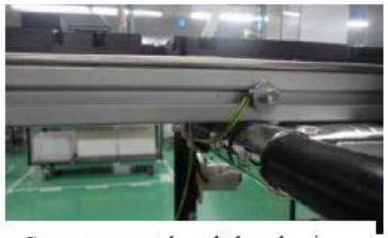
<An example of grounding in a parts storing room>

<A conductive workbench>



Connect a metallic portion with an in-process grounding device.

<A conveyor made of aluminum>



Connect a threaded aluminum portion of the conveyor with an in-process grounding device.

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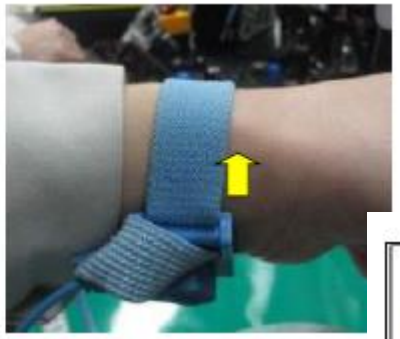
3.4 Antistatic countermeasures for operators

Compliance Item

(1) When wearing a wrist strap, it shall be connected with an ESD protective grounding line.
(2) When unable to wear a wrist strap, use both antistatic shoes and conductive mats together.
(3) Gloves and finger stalls, if used, should be antistatic.



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3.5 Antistatic countermeasures for tools, fixtures and articles

Compliance Item

Part boxes, tools and fixtures should be antistatic ones.

Use part boxes made of electrically conductive materials.

Use antistatic nippers.

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④ Antistatic countermeasure for part packaging

Compliance Item

Antistatic returnable containers and/or bags should be used to transport electronic parts.

Conductive IC magazine

Corrugated fiberboard boxes

Antistatic bags

Odd printed wired circuit assemblies are messed up in a corrugated fiberboard box and protruding from antistatic sheets.

Printed wired circuit assemblies with FFCs attached are stacked in a box not protected from ESDs.

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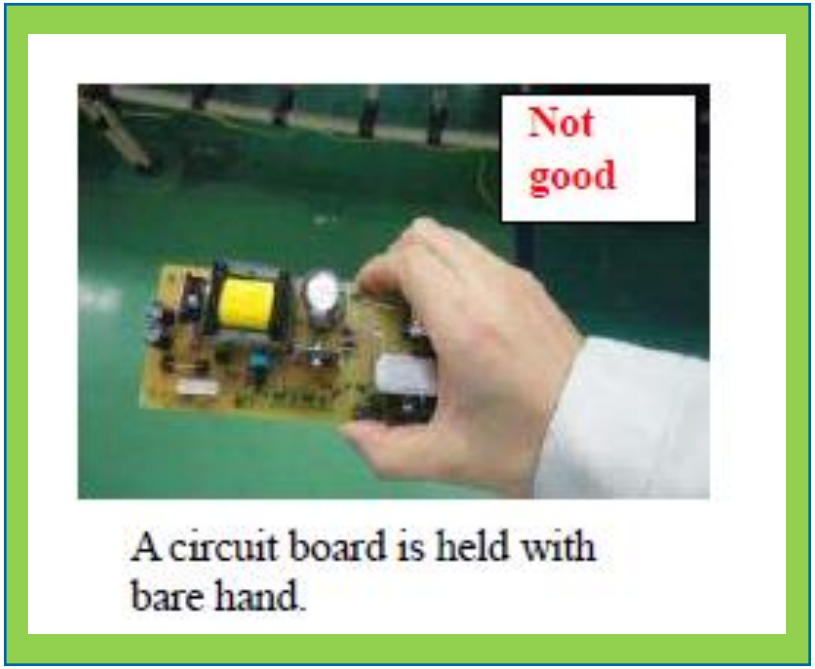
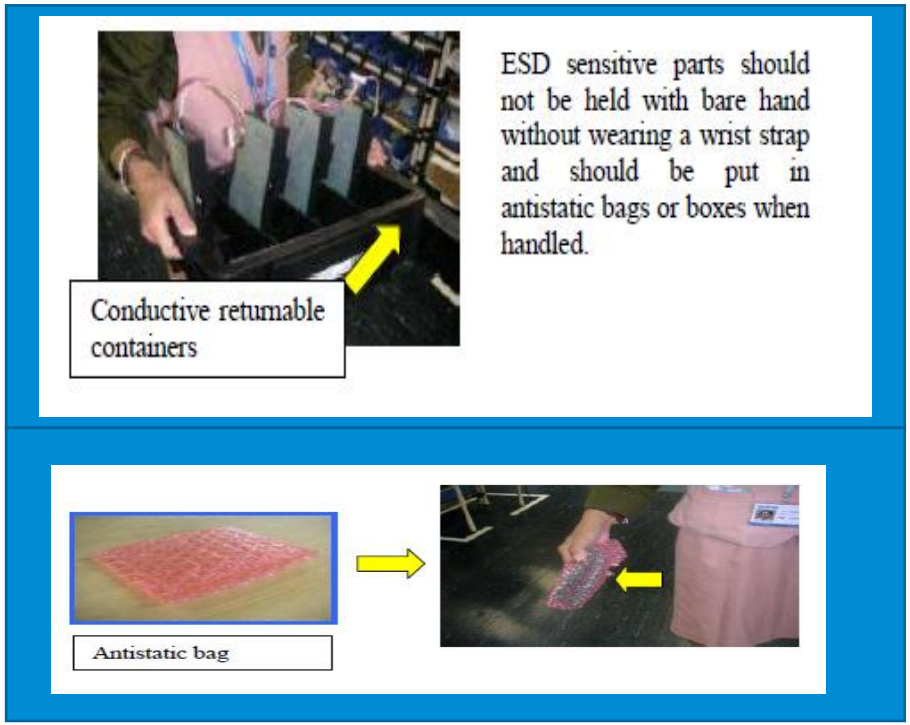
④ Antistatic countermeasure for part packaging

- **Antistatic returnable containers and/or bags** should be used to transport electronic parts.





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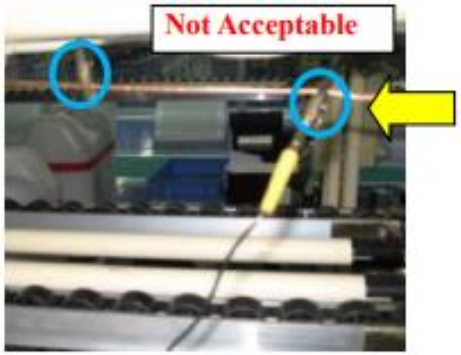
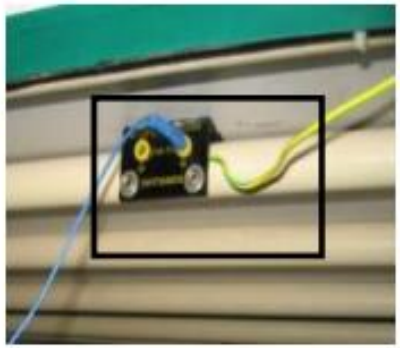
⑤ Grounding Connections

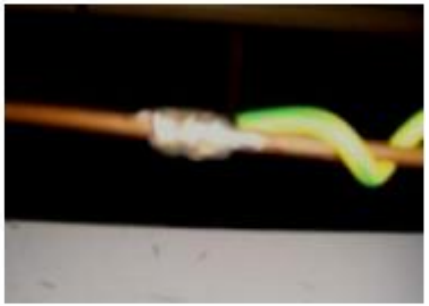
Connections with ESD protective grounding lines



No alligator clip should be used to connect an ESD protective grounding line (bare copper lead).



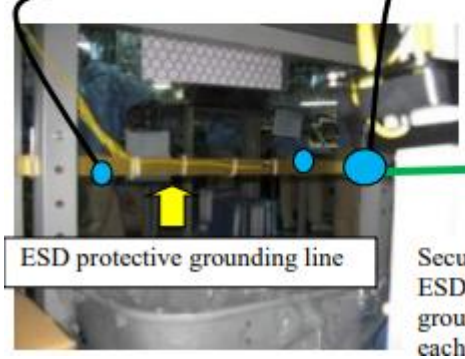
A snap connector is recommended.



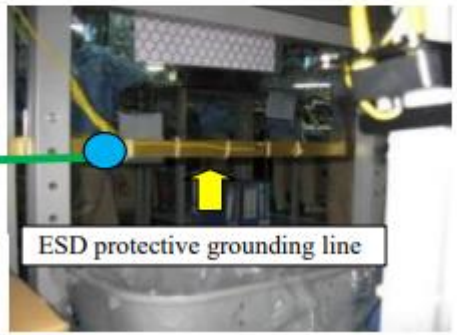
The grounding wire may be permanently connected to an ESD protective grounding line by soldering.

Wrist strap grounding system

The ESD protective grounding line for between processes requiring antistatic countermeasures shall use snap connectors or be permanently connected at the grounding terminal.



Securely connect the ESD protective grounding lines with each other.



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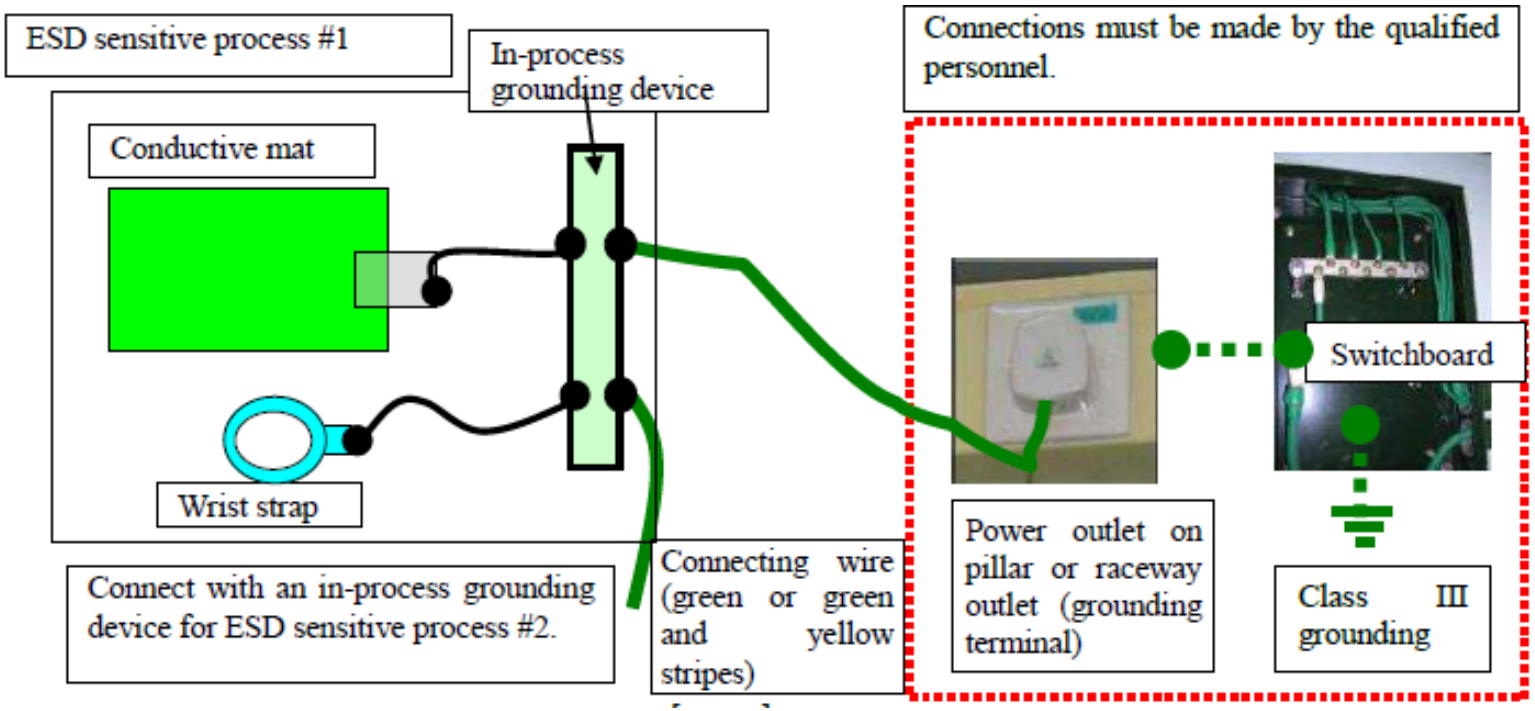
⑤ Grounding Connections

(1) The ESD protective grounding line for processes requiring antistatic countermeasures shall be connected to class D grounding.

(2) Connections with class D grounding must be made by licensed personnel.

(3) Grounding lines for products and equipment shall be connected to grounding lines connected by licensed personnel.



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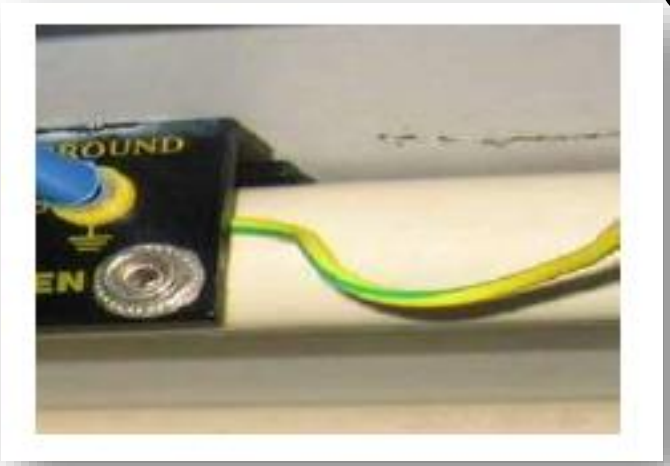
⑤ Grounding Connections

Insulation and diameter of ESD protective grounding wires

- The ESD protective grounding line should have green or green/yellow striped insulation and a diameter not less than 1.6 mm and a sectional area not less than 2mm2 (equivalent to AWG #14).



Use green or green/yellow striped cords for grounding.

Do not use red cords for grounding.

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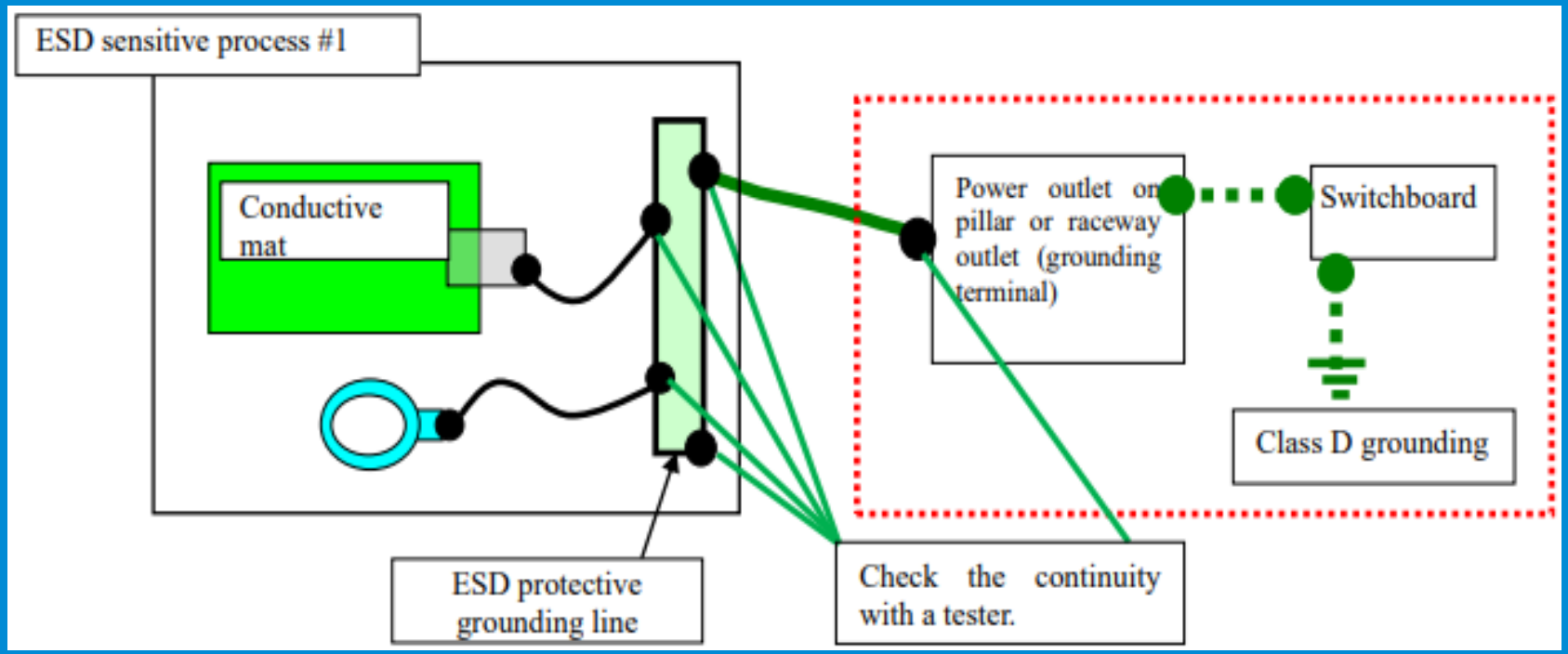
⑤ Grounding Connections

Checking the grounding circuit continuity

(1) The grounding circuit continuity should be checked by the qualified personnel.

(2) Visually check grounding wires for wear or damage.

(3) It should be checked more than once a month.



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