DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION STANDARD

LIGHTNING AND SURGE PROTECTION,
GROUNDING, BONDING AND SHIELDING
REQUIREMENTS FOR FACILITIES AND
ELECTRONIC EQUIPMENT
black markings and lettering shall be posted that will be visible to anyone entering these areas. Signs shall include an ESD sensitive electronic device warning symbol and appropriate warnings and cautions.

4.1.3.4.7 Hard and Soft Grounds

4.1.3.4.7.1 Hard Grounds
Any item, material, or product that is a part of the ESD control system that is intentionally or unintentionally connected to an ESD ground, or directly to any SRS in the area served – except to a single point ground system – shall be considered to be hard grounded. Unless specified otherwise or justified by the OPR for this document, ESD control worksurfaces, cabinets, flooring, carpeting, test equipment, and any other items used for ESD control shall be hard grounded.

4.1.3.4.7.2 Soft Grounds
A soft ground is an intentional connection to ground through a series current limiting resistor. Soft grounding shall only be used in personnel grounding skin contact devices such as wrist straps, leg or ankle straps, conductive shoes, and heel or toe grounders. The nominal resistance of the resistor used for soft grounding of personnel shall be greater than 1.0 X 10⁶ ohms unless otherwise specified by the OPR for this document. All other elements of the ESD control system shall be hard grounded.

4.1.3.4.8 ESD Control Flooring and Floor Coverings
All ESD control floors and floor coverings shall have a point to point resistance and a surface to ground resistance of greater than 1.0 x 10⁶ ohms and less than 1.0 x 10⁹ ohms (ESD STM7.1). ESD control flooring and floor coverings include vinyl tile, vinyl sheet, carpet, carpet tile, carpet tile with positioning buttons and others but not to include applied coatings.

These control floors and floor coverings shall be installed, grounded, and initially tested only by trained installers. A representative ten-feet-square section of the floor system shall be tested and the results approved and accepted by FAA personnel, prior to installation of the full floor system.

ESD control floors and floor coverings shall be bonded to the nearest SRS at a minimum of four locations. The connections and method shall be recommended by the floor manufacturer and approved by the OPR. These connections shall utilize copper: strip, foil, conductive fabric ribbon, or stranded wire. Electrical contact shall be made with the underside of the floor material or connections may be embedded in the conductive permanent or releasable adhesive used to lay the floor. The ESD control flooring shall not be bonded to any single point ground system.

4.1.3.4.8.1 Surface Resistance (Rₛ)
Surface resistance (Rₛ - Resistance top-to-top or surface-to-surface) of ESD control floors, carpets or floor mats shall be greater than 1.0 x 10⁶ ohms and less than 1.0 x 10⁹ ohms (ANSI/ESD S7.1). A minimum of five readings shall be taken at different locations on the floor surface and averaged together for each 500 square feet (or fraction thereof) of floor surface. These readings shall be recorded in the FRDF.