ESD Open Forum

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Provided by the ESD Association
By: Craig Zander

ESD Control Flooring

Provided by the ESD Association

Q:

We are moving into a new facility and are considering an ESD control floor. What are the main points we should consider when selecting a floor?

A:

There are a few major points to consider when selecting an ESD control floor. The first and foremost is whether you want a conductive or static dissipative floor. Many manufacturers offer both options, with the dissipative floor being the lowest cost option. If you plan to use the floor for a primary ground for people and carts, a conductive floor would be the choice. ANSI/ESD S20.20 (S20.20) requires a system resistance of a person through the floor and to ground of less than 3.5×10^7 ohms (35 megohms) when you use the floor as the primary ground. Many dissipative floors have resistance ranges above 35 megohms before considering operator resistance. Static dissipative floors are usually effective for reducing the amount of charge that is generated on people and equipment, but may not efficiently drain charge that has accumulated. S20.20 allows static dissipative floors as long as the resistance to ground from anywhere on the floor is less than 1×10^9 ohms and personnel do not generate greater than 100 volts using the ANSI/ESD S97.2 test method (*Floor Materials and Footwear – Voltage Measurement in Combination with a Person*).

Another factor to consider is the installation of the floor. Most ESD control floor manufacturers have a list of certified installers for their floor. The installers need to consider a number of factors that a general floor installer may not consider. For all new base floors and in particular, those at grade-level, the installer needs to run a moisture content test. Excess moisture will cause considerable problems, such as bubbling of epoxy or poured floors or loose tiles in the future if it is undetected before installation. The installation of the conductive layer, or conductive adhesive in the case of tiles, is critical to assure correct adhesion and electrical properties. When selecting a poured ESD control floor, the application of the top coat is extremely critical. The procedure for finishing the top coat ensures that the conductive elements make contact with the conductive layer to provide a path to ground. Do not try to reduce the cost of the flooring project by hiring a general floor installer that is not approved by the vendor.

Another factor to consider is the floors performance when combined with the selected footwear. Some floors perform differently with different foot grounding products. ESD

control shoes and foot grounders should be tested with the floor to assure acceptable resistance readings. ANSI/ESD STM97.1 is a standard test method that describes how to verify the electrical resistance of personnel while using the footwear and flooring system. Charge generation may be evaluated using ANSI/ESD STM 97.2 . The latter method is needed, as mentioned above, to help qualify a floor system for use in an S20.20 program if the resistance to ground from a person is over 35 megohms.

Q:

Some international standards note the ESD floor mat is optional, is this accurate?

A:

All of the major ESD Program Standards (JESD 625A, IEC61340-5-1 and ANSI/ESD S20.20) all say the same thing about floors and floor mat type applications. These are considered optional. A wrist strap grounding system is considered the main type of grounding system for personnel but a floor and footwear system can be used - if the resistance to ground for personnel is the same as for wrist straps. If personnel are sitting down to do their work then a wrist strap type system must be used.

If the base floor has resistance to ground values that are acceptable for your program then you may use that for grounding of personnel through ESD rated shoes or shoe grounding straps for all standing or mobile applications. Again, for the floor and footwear system to be considered the primary grounding system for personnel, the resistance to ground from their hand through their feet to the floor to ground has to be the same as for wrist straps - generally <35 megohms (<3.5×10^7 ohms). Be careful with this because it is often difficult to get the same or lower resistance value through the floor and footwear system. ANSI/ESD S20.20 (and IEC61340-5-1) allows static dissipative floors as long as the resistance to ground from anywhere on the floor is less than 1×10^9 ohms and personnel do not generate greater than 100 volts using the ANSI/ESD S97.2 test method (*Floor Materials and Footwear – Voltage Measurement in Combination with a Person*).

A footwear system or shoe straps along with the ESD control floor provide a very good back-up system in the event that people forget to put on the wrist strap right away at their work station and for people that walk by or deliver materials.

There are other considerations as well, including cost, maintenance and durability. If you do your homework and assure proper installation and care, an ESD floor will provide you with added flexibility within your ESD Protected Area (EPA).

About the Author

Craig Zander, Restronics Company Inc. Craig is the Marketing & Communications Business Unit Manager, responsible for the *Threshold* newsletter, the Association's website, and marketing activities of the Association. Craig has been active in Standards Committees for many years.

About the ESD Association

Founded in 1982, the ESD Association is a not for profit, professional organization directed by volunteers dedicated to furthering the technology and understanding of electrostatic discharge. The Association sponsors educational programs, develops ESD Standards, holds an annual technical symposium, and fosters the exchange of technical information among its members and others. Additional information may be obtained by contacting the ESD Association, 7900 Turin Rd., Bldg. 3 Rome, NY 13440-2069 USA, Phone 315-339-6937, Fax 315-339-6793. Email info@esda.org.
Website://www.esda.org.