

Smaller Electronic Devices Create Growing ESD Problems for Data Centers, Call Centers, and Other Mission-Critical Environments

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ESD (electrostatic discharge) has long been known as an “invisible and silent threat,” but it is now generating a bit of a stir in data centers, emergency call centers, and other mission-critical environments. The reason for this heightened attention is a dramatic new study conducted by NanoMarkets (www.nanomarkets.net); this study shows that smaller electronic components are creating much greater risks for electronic hardware manufacturers and many end users.

According to NanoMarkets, a leading analyst in the electronics industry, as electronic parts become faster and more powerful, circuits have become much smaller, decreasing from micron-sized to nano-sized. The continued miniaturization of PCBs and hard drives, coupled with even smaller devices on computer chips, reduces the room available for on-chip static protection. As a result, billions of dollars are at risk if factories and end users of electronic equipment don't create static-safe environments with fault-tolerant, static-control flooring.

The report asserts that the increased vulnerability of electronics, including networked computers and servers, has significantly increased the demand for better ESD control in the semiconductor industry, with sales of ESD products expected to exceed \$8 billion by 2015.

We in the ESD industry have been following this miniaturization trend for years, but the magnitude of the problem has been slow to register in the field. Now, we're hoping that this report will not only reinforce what we've been saying but that its findings will resonate with corporate decision makers who have the opportunity to justify static-safe worksites and to garner considerable savings at the same time.

Static in Mission-Critical Settings

Controlling static in real-world, mission-critical environments can be trickier than eliminating static in the controlled environments that produce servers, mainframe computers, and memory storage equipment. These settings lack static-control protocols like special static dissipative shoes and shoe-sole testers, employee grounding programs, and ESD training. Without static-control footwear, most static-control flooring generates static on people as they walk across the floor.

Independent testing has shown that most ESD flooring—including conductive vinyl; static dissipative SDT; anti-static, high-pressure laminate (HPL); and all types of epoxy coatings—generates significant static when people wear standard footwear. This phenomenon has accentuated the need for fault-tolerant flooring solutions. For instance, on the basis of testing at Fowler Labs, electrically conductive, fault-tolerant rubber mitigates static charges regardless of the footwear. This is good news for data centers, 911 call centers, flight control towers, R&D labs, and control rooms, where special footwear isn't a reasonable option.

A Perfect Storm

The last 40 years has created a perfect ESD storm that follows the thesis of Moore's Law, which maintains that the number of transistors in integrated circuits doubles every two years. We believe that the continuation of Moore's Law is inevitable, and this will intensify today's ESD problem, producing potentially devastating consequences to the semiconductor industry and mission-critical environments.

Electronic devices, which were once capable of withstanding several hundred volts of static electricity discharge, can no longer handle 50 volts or more. So, it takes much less than ever before to zap telephony devices, fry microprocessors, and knock out networked systems.

Without the correct anti-static flooring in place, manufacturers of data center equipment risk significant damage and lost revenue owing to latent ESD events. Latent damage causes partial product degradation at the factory level and accounts for end-user malfunctions such as data corruption and missed signals, product failure, product returns, downtime, and expensive warranty claims. How pervasive is this situation? Product losses among end users average 27% to 33% (Stephen Halperin, “Guidelines for Static Control”).

Faulty Specs, Costly Errors

Of particular concern are the numbers of floors in multiple environments that are installed with the wrong specs and that don't meet accepted international ESD standards, according to Ted Dangelmayer, CEO, Dangelmeyer Associates, a leading analyst in the ESD industry. A recent study by Dangelmeyer notes that circuit boards and systems may now be more vulnerable to ESD than the microelectronic components comprising them.

"There is a growing need for fault-tolerant products that provide Class-0 ESD protection," says Dangelmayer. "It is important for a floor to inhibit static charge generation as well as it can remove static from charged bodies."

According to Dangelmeyer, Staticworx's EC Rubber, as recognized by MIT Lincoln Laboratory and ESD Journal, is the only conductive, resilient flooring material that provides Class-0, fault-tolerant protection by inhibiting static generation on people wearing any type of footwear. "This is critical because it is unrealistic to expect employees in real-world environments to wear special, static-protected shoes," he says.

Designers of data centers, call centers, and other mission-critical operations are pursuing fault-tolerant ESD flooring solutions that include lifetime warranty, long-term durability, easy maintenance, and green product attributes. Staticworx EC rubber addresses these needs whether installed over bare concrete or laminated to raised access flooring panels.

The Need for Due Diligence

Well before the release of the NanoMarkets report, we at Staticworx have been concerned about the lack of reliable ESD knowledge in the marketplace. In particular, we have observed a serious disconnect among the major players involved in the ESD flooring equation: manufacturers, distributors, architects, subcontractors, and facility managers. Unfortunately, these parties typically don't speak the same language. Miscommunication leads to misdiagnosis, and misdiagnosis leads to costly problems that are often aren't discovered until it's too late.

Most ESD problems aren't controlled through product design; they are mitigated at the facility construction level. The best way to avoid needless facility investments and future headaches is to perform due diligence, get sound technical advice, and make the right flooring choice, whether you're considering new construction or renovations.

In the future, in the name of progress, electronic components will no doubt continue to become faster and more robust. But this progress comes at a price, since they will necessarily become even smaller as well, further compromising the precious real estate available for ESD protection on circuit boards and chips.

In this regard, it's important to consider the cost of inaction or continued wrong choices. This is even more paramount during this time of continued economic uncertainty, when companies need to contain expenses and also make sure that critical capital covers today's and tomorrow's needs.

Again, the solution starts with education. Indeed, it's time for all of us in the industry to study the facts, bring this insidious threat to light, and take measures to eliminate the risk of ESD.

About the Author



Dave Long is president and CEO of Staticworx, Inc. Named to the Inc. 500/5000, Staticworx (www.staticworx.com) is North America's largest manufacturer of electrostatic discharge (ESD) flooring products that protect work sites with custom, static-free solutions.