ESD: THE SHOCKING THREAT TO MANUFACTURING

Beneath the hum of activity in every factory lies a silent threat. Behind the whirring machines and flowing assembly lines, an invisible force lurks, just waiting to strike. Electrostatic discharge (ESD) is a nearly undetectable hazard that has the potential to cripple production, damage products, and cost manufacturers millions.

In this article, we spark an important conversation about the underestimated impact of ESD on safety and quality in your production facility.

THE EFFICIENC

EDG

The hidden shock factor

We all know that tiny jolt, commonly known as 'static', that you feel when you touch a metal doorknob or, sometimes, even another person. To us, it might be harmless but, in a factory, a much smaller discharge (one you might not even feel) can destroy an electronic component in an instant. Or damage it in such a way that leads to product failures over time.

ESD occurs when a charge imbalance between two objects suddenly equalises, often through a spark. For manufacturers, it is not only a quality issue but a safety issue too.

It is not just about damaged products; in some environments, ESD can even ignite flammable substances.

When it comes to ESD, here's why the following industries have no margin for error and cannot afford to be complacent:

- Automotive and EV manufacturing: Battery systems, sensors, and control units must be protected from electrostatic damage.
- Aerospace and defence: A single compromised circuit could jeopardise an entire system.
- Medical devices: Life-saving equipment must be free from defects caused by static electricity.
- Semiconductors and electronics: Microchips are extremely sensitive to even the smallest electrical discharges.



ESD

The cost of neglecting ESD protection

Strict ESD protection standards (such as ANSI/ ESD S20.20) for industry do exist. But the issue is bigger than regulatory non-compliance. For affected industries, neglecting ESD control as an important aspect of your manufacturing operations can lead to some serious issues.

While a damaged circuit board might not fail immediately, it could cause malfunctions and lead to product failures down the line, which ultimately hurts your brand reputation, customer relationships and bottom line.



Financial losses are keenly felt, with billions lost annually due to ESD-related defects and product recalls across the globe.

Ultimately, the safety risk for certain industries, where ESD can cause explosions or fires, cannot be overstated. The human factor and protecting employees should be of paramount concern.



Subscribe to our newsletter:

If you find this article useful and would like to see more content on smarter manufacturing solutions, don't forget to subscribe to our newsletter.



How factories must fight back

There are multiple tools and products available that manufacturers can invest in for effective ESD prevention.

In fact, in an increasingly digital world where electronics plays a central role, "the overall demand for ESD protection devices is projected to record a [compound annual growth rate] CAGR of 4.1% between 2023 and 2033, totalling around 3,965.5 million US dollars by 2033." (Report: Future Market Insights) Some examples include:

- ESD flooring: Conductive materials help to dissipate static safely.
- Grounding systems: Wrist straps, heel grounders, and conductive clothing keep workers and equipment grounded.
- Controlled humidity: Dry air increases static buildup; factories should maintain comfortable humidity levels to minimise risk.
- Employee training: Workers must be educated on how to handle sensitive components properly.





Anti-static mat

ESD-safe packing material





ESD wrist band

ESD-safe smocks

Eye-opening ESD facts

- The human body can generate up to 35,000 volts of static electricity - but we don't feel it unless the charge is over 3,000 volts.
- A tiny 100-volt discharge can permanently damage sensitive electronics.
- One of the first recorded ESD incidents occurred in the 1400s, where static electricity ignited gunpowder storage, causing massive explosions.

The bottom line

In the world of high-tech manufacturing, ESD isn't an afterthought - it's a mission-critical factor. Without proper protection, entire production lines could be compromised. As factories become more advanced, the need for ESD safety only grows. Investing in prevention today means securing product integrity, worker safety, and business continuity for the future.

Electrical safety is a particular concern when it comes to EV battery pack assembly. Read more about the testing and other critical assembly processes that Jendamark uses to ensure safer EV battery pack assembly here.

Learn more about Jendamark at jendamark.io

