Ansell

ESD / ATEX

DISCOVER THE IMPORTANCE OF ELECTROSTATIC DISSIPATIVE GLOVES IN ATEX ENVIRONMENTS

SAFETY BRIEFING

HOW ELECTROSTATIC DISSIPATIVE GLOVES REDUCE RISK IN ATEX ENVIRONMENTS?

Eliminating workplace hazards is crucial, but electrostatic discharge isn't often seen as a high priority.[1] Yet it can prove damaging, disruptive, and potentially hazardous to workers in certain industries. So when do electrostatic dissipative (ESD) gloves[2] become a necessity? And what precautions should you take?

WHAT IS ELECTROSTATIC DISCHARGE AND WHAT ARE THE DANGERS OF STATIC ELECTRICITY?

Electrostatic discharge occurs when two objects with different electric potentials come into contact or close proximity, causing a rapid generation and transfer of static electricity. One extreme form of static electricity is lightning – where ice crystals and cold water collide inside clouds to form an electrostatic charge. We understand the damaging effects in stormy weather, but static shocks are rarely seen as more than a minor inconvenience in other settings.

> **"Electrostatic discharge occurs when two objects with different electric potentials come into contact or close proximity, causing a rapid generation and transfer of static electricity."**

But it can be a serious threat to operations and personnel when it comes to electronics and medical device manufacturing, cleanrooms, automotive, aviation, plastics, packaging and other industrial settings.

That's why ESD gloves are a PPE staple for many operations. But they're especially critical in ATEX environments.

1. *In Compliance Magazine | Fundamentals of Electrostatic Discharge – Part Three: Basic ESD Control Procedures and Materials*
2. *Ansell | What are ESD Gloves?*

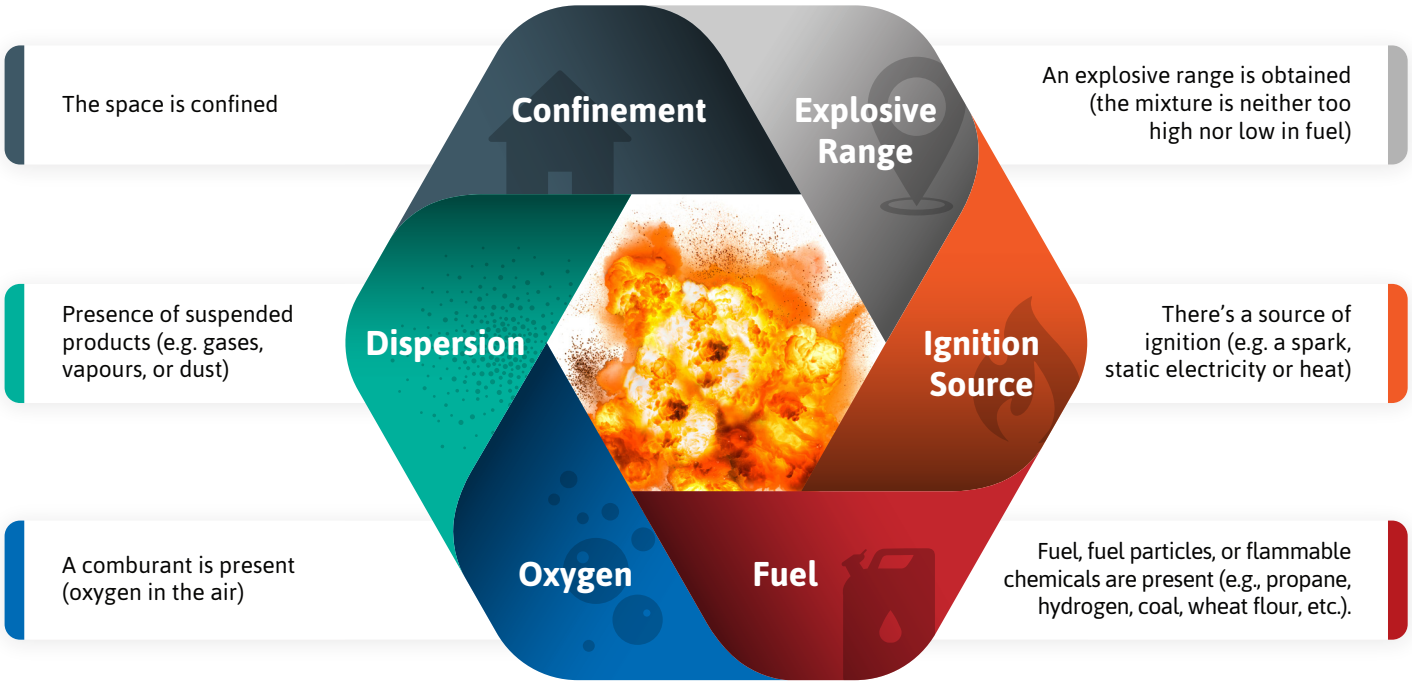
HOW CAN ESD GLOVES HELP REDUCE THE RISKS OF ELECTROSTATIC DISCHARGE IN ATEX ENVIRONMENTS?

Everyday PPE is not always suitable for environments where static electricity poses a risk. Mechanical gloves are typically made from a variety of materials that may not be effective at dissipating electrostatic discharge. And most chemical gloves, because they're made of materials like natural rubber, will have an insulating effect and a high electrical resistance. This means static charges can accumulate on the glove's surface, and they're unlikely to dissipate quickly.

ESD gloves are designed to diffuse static electric charges. They typically contain conductive materials or special coatings that facilitate easier discharge through the glove, toward the user's body, and to the ground.

These gloves are commonly used in environments where protection against static electricity is necessary, such as electronic assembly or areas where an explosive atmosphere conditions may occur (ATEX environments[3]).

In an ATEX environment, an explosion occurs when six conditions are met simultaneously:



Research on the role of static electricity in coal mine explosions[4] indicates that even minimal electrostatic discharge from human bodies can ignite explosive gases. Simulations have demonstrated how electrostatic discharge acts as a potent ignition source in confined, gas-rich environments, emphasising the need for specialised PPE and strict procedures to protect workers and facilities.

3. European Commission | Equipment for Potentially Explosive Atmospheres (ATEX)
4. Journal of Physics: Conference Series | Research on Simulation of Human Body Electrostatic Discharge on Detonating Gas in Coal Mines

MANAGING STATIC ELECTRICITY RISKS IN ATEX ENVIRONMENTS

Because static electricity can provide the small spark that could cause a big explosion in an ATEX zone, its risk must be mitigated. To improve worker safety and asset protection, a holistic approach should be adopted, covering each of the following points.

ELECTRICAL GROUNDING

It's important to ensure that workers, equipment, and PPE are properly grounded to dissipate static charges. Grounding cables and wrist straps can be used to achieve this.

CONDUCTIVE FOOTWEAR

Wearing conductive footwear that allows static charges to dissipate through the soles and into the ground can help keep your workers safe.

CHOOSING ESD GLOVES

For ATEX environment glove need to comply with EN 16350

PROPER TRAINING

Anyone working in ATEX environments should be trained to understand the dangers of static electricity and how to minimise them. We also recommend training workers on the differences between standard chemical or mechanical hand protection and ESD gloves to avoid mix-ups.

AVOIDING INSULATING MATERIALS

It is imperative to avoid using or wearing materials that do not successfully dissipate static charges, such as clothing or gloves made of materials that are highly insulating.

Illustration of an operator working in an ATEX environment, wearing a glove that does not dissipate electrical charges. These charges accumulate on the surface of the glove, which could lead to the formation of an electrostatic discharge near the metal tank. This could trigger a spark and cause an explosion.

REAL-WORLD CONSEQUENCES OF STATIC ELECTRICITY

Chemical plant explosions in South Korea

In South Korea, an explosion at a chemical plant[5] claimed seven lives and highlighted the potential dangers of static electricity in hazardous environments. Investigations pointed to poor safety protocols and inadequate grounding as factors that may have allowed static charges to ignite volatile chemicals.

Another explosion also killed seven at an SK geo centric petrochemical plant[6] in Ulsan, South Korea. The company is said to be liable under the country's Serious Disasters Punishment Act.

Toner facility explosion in Nagano, Japan

In 2021, an explosion occurred at a Konica Minolta toner production facility in Nagano. The blast, believed to have been caused by static electricity on production equipment, damaged machinery and part of the building's exterior. While no injuries were reported, the incident disrupted global printer toner supply, highlighting the broader impact of industrial dust explosions.

Oil refinery explosion in South Killingholme, England

In 2001, static electricity ignited vapors in a liquid petroleum tank at one of the UK's largest oil refineries, causing a major explosion. Two workers were injured, and flames reportedly reached 200 feet high, with the shockwave shattering windows half a mile away. The incident emphasized the dangers of static buildup in environments containing flammable vapors.[7]

Firefighters examine the scene after a massive explosion ripped through a chemical plant in Yeosu, South Jeolla Province on Thursday.

The potential dangers of static electricity in hazardous environments:

Investigations pointed to poor safety protocols and inadequate grounding as factors that may have allowed static charges to ignite volatile chemicals.

MAKING ESD GLOVES A PRIORITY

With even the smallest spark capable of triggering a large explosion in sensitive ATEX environments, it's crucial to mitigate the effects to avoid seriously compromising your operations. To avoid being caught out, **we recommend a comprehensive approach to electrostatic discharge hazards and including ESD gloves in your health and safety strategy.**

5. Business & Human Rights Resource Centre | Chemical Plant Explosion in South Korea Kills Seven
6. Hazardex | Explosion Injures Seven at Korean Petrochemical Plant
7. NFPA Journal | One Spark

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