



Learning about Electrostatic Discharge - Part 5: Choosing the Right Bag



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Choosing the Right Static Bag

Why does it matter?

Most people are aware of the effects of static electricity in general terms; for example, scuffing shoes on carpet whilst touching a person or metal door handle can produce a small shock. But few people are aware of the damage that the static electricity behind these common events can cause on modern electronic circuits and devices.

As electronic circuits and their connecting pathways have reduced in size over the years, their susceptibility to damage from static electricity has increased. Protective handling and packaging techniques have been adopted by the electronics industry from the chip foundry to the production floor to the field service arena.

What are the threats?

Electronic devices should be protected from 3 primary threats:

1. Direct Discharge (ESD):

A discharge directly to a bag can subject the device inside to a very high current, melting or fusing the circuit.

2. Static Fields:

Fields can induce destructive currents in circuit conductors. Field differentials can break down the circuit dielectric.

3. Tribocharging:

Friction between the bag and device can produce damaging static voltage and fields.

ESD packaging, such as antistatic bags and static shielding bags, are some of the most important safety products used in manufacturing environments. Without these specialised packaging solutions, it would be virtually impossible to safely transport products and components from the production line to their final destination.

Antistatic versus Static Shielding Bags

ESD-focused packaging is always classified in one of three levels:

- Intimate packaging: this is packaging that can safely come into contact with static-sensitive components
- Proximity packaging: is packaging that can enclose (but not come into direct contact with) the product
- Secondary packaging: is packaging which can only be used for protection against physical damage during the shipping process

Static shielding bags fall in to the categories of both intimate and proximity packaging. These bags protect ESD-sensitive products from static electricity that may build up inside or outside the bag. The way they do this is through their three layer construction.

Antistatic bags are much simpler containers and are classed as either proximity packaging or secondary packaging. These bags “will not generate or hold a triboelectric charge” and can be used to safely transport non static sensitive components into a static controlled environment without the threat of static discharge.

The standard test for shielding demonstrates the difference between the various bags: shield bags will generally stop 97% of a 1,000 volt pulse applied to the outside of the bag from reaching the inside and its contents. A black conductive poly will stop about 30%, a pink antistatic bag has no shielding ability.

In some cases the use of **moisture barrier bags** is required in addition to antistatic and static shielding bags. These are used in conjunction with desiccant and humidity indicator cards to ensure moisture is kept to a minimum.

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Bag Types

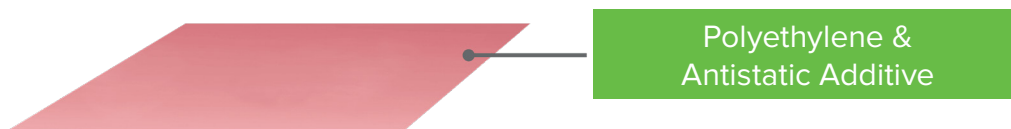
Pink Antistatic Bags or Dissipative Poly Bags

Pink antistatic bags are specifically designed to dissipate static charge to ground, preventing charge from building up on the package or device when rubbed against other materials.

The pink colour is a colourant added to differentiate static control materials from standard packaging. They are the only form of 'plastic' bags recognised as being suitable for use within an EPA; conventional plastic bags have the ability to generate and hold in excess of 10,000 volts, which would be disastrous in proximity to static-sensitive electronics. Pink poly's resistivity is in the dissipative range and is usually around 10^9 to 10^{11} .

Structure of a Pink Antistatic Bag

Our pink anti static bags are blow-molded with antistatic additives from LDPE.



Features & Benefits

- Ability to dissipate a static charge to ground preventing static charge building up on the package or device
- Will not generate a charge when rubbed against other materials
- Bag material allows visual identification of the items being stored
- Soft texture and flexible material
- Surface resistance of $10^7 - <10^{11} \Omega$

Uses:

For items that have no static susceptibility. Their primary use is to package support or processing materials that will be in close proximity to static sensitive devices. This keeps static generating packaging materials away from sensitive areas.

Note: these bags have no shielding ability. A static field or discharge occurring outside the bag can penetrate the bag and can damage electronics inside.

Black Conductive Poly Bags

Black Conductive bags are produced from blow moulded LDPE that is volume loaded with conductive carbon. The black material also ensures contents are shielded from view for additional security.

Black poly is conductive and does provide a small measure of shielding (<30%), however there is no dielectric layer to isolate a device inside. The charge may still be transferred through the volume of the material to the device instead of over the material to ground.

Structure of a Black Conductive Poly Bag

Our black conductive bags are constructed from a conductive material made out of a 4 Mil single layer of carbon loaded polyethylene, creating a Faraday Cage.



Features & Benefits

- Protects content from the damage of electromagnetic waves and static
- This product can be heat sealed and offers medium level static protection
- Surface resistance of $10^3 - 10^5 \Omega$
- Solid black material prevents contents from being visible
- Antistatic logo shows that contents are sensitive to the risks of ESD

Uses:

Black poly bags are a traditional method of packaging electronic devices and are normally used as a bridge between pink poly and shielding bags as they are slightly lower in cost and offer some shielding unlike the pink poly bags.

Note: Black poly bags are opaque in appearance and therefore the bag's contents need to be removed for identification purposes, creating opportunities for static damage.

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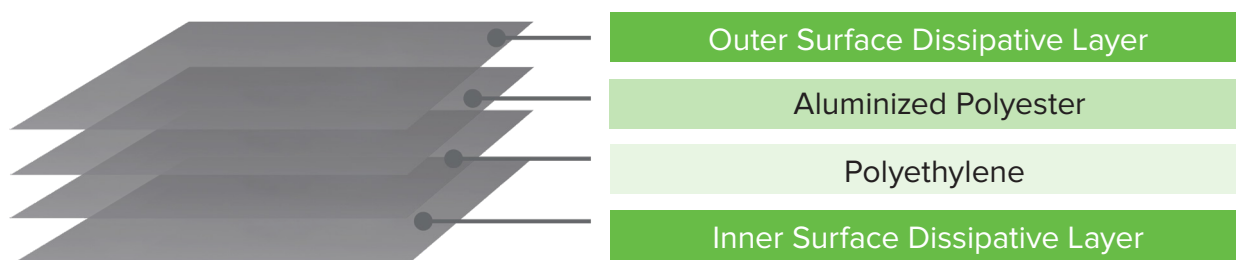
Static Shielding Bags

Shielding bags provide similar dissipative and antistatic properties to the poly bag but also add a metal shield to stop static from entering the bag.

Structure of a Static Shielding Bag

Static shielding or metal shield bags consist of several layers: a dissipative poly is laminated (glued) to aluminized polyester. The outside and inner dissipative layer has an antistat coating. This structure, with the metal between two layers of plastic, is called “buried metal” or “metal-in”.

The innermost layer of the bag is constructed from a static dissipative polyethylene. The intermediary layer is an aluminium vapour deposited sheet which offers additional protection against static damage. Finally, the outermost section of the bag is a static dissipative polyester covering that helps dissipate external static charges.



Our bags are manufactured from industry approved polyester and polyethylene laminates. The polyester dielectric works with the metal layer to provide a Faraday effect, the metal layer preventing penetration from damaging electrostatic fields. The specially processed polyethylene keeps tribocharging to a minimum.

Features & Benefits

- Surface resistance of $10^6 - 10^{10} \Omega$
- Semi transparent for easy content identification
- Metal “Faraday cage” layer shields products from electric energy inside and prevents static build-up
- Conforms to EIA 625, EIA 541, ANSI/ESD S-20.20 and EN61340-51-ESD and EN61340-53-ESD

Uses:

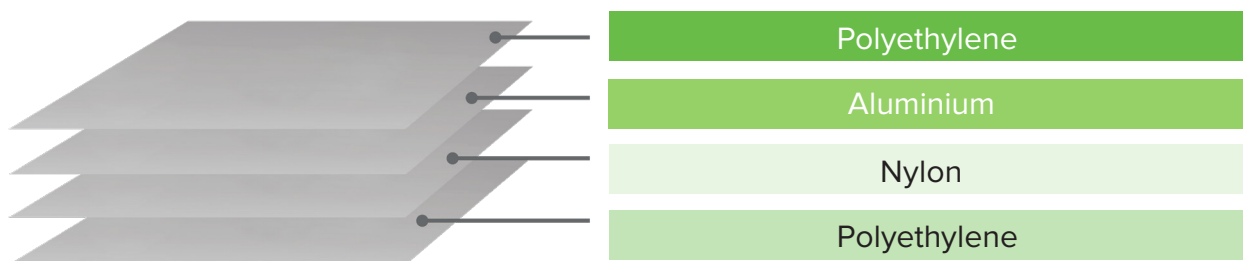
Static shielding bags should be used for all electronic components, boards and assemblies.

Moisture Barrier Bags

Moisture Barrier Bags protect electronics from moisture and static damage during storage and transportation*. The bags are opaque and light-tight ensuring the contents cannot be seen from the outside, adding a layer of operational security. Our moisture barrier bags are suitable for packing electronic products which are sensitive to moisture and static.

The puncture-resistant and moisture-proof packaging has a flexible structure and is suitable for vacuum-sealing.

Structure of a Moisture Barrier Bag



Features & Benefits

- Firm lamination and hot sealing offers superior resistance to vapour and oxygen
- Surface resistance of $10^6 - 10^{10} \Omega$
- Flat open top style with a printable surface
- Flexible structure, easy to vacuum seal
- Puncture resistant

Uses:

Moisture barrier bags should be used for all moisture sensitive equipment and products (e.g. PCBs or integrated circuits) protecting the contents from both ESD events and moisture damage during transportation and storage.

*For more information on moisture control, please check out Part 4 of our guides
Part 4 - Dry Packaging of SMDs

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Design Features

Ziplock

A recloseable bag simplifies access to parts.



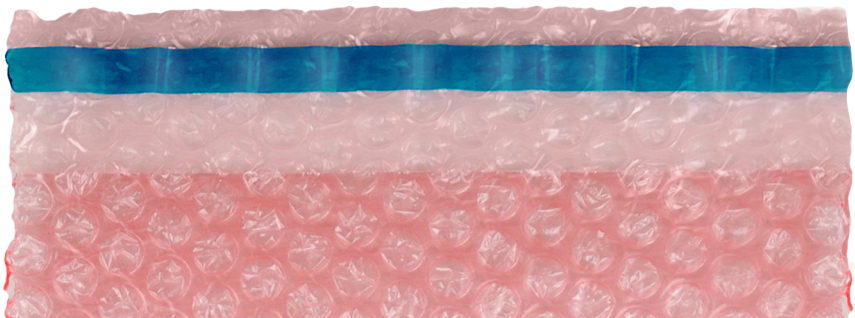
Tear Notch

If you heat seal the bag closed, a tear notch makes it easy for your customer to open it.



Extended Lip

An over sized lip at the opening improves part insertion, and is easy to close with a label.



Also available upon request:

Compartment Bags

A bag with 2 or more separate compartments allows paperwork to travel safely with parts. Or allows multiple parts and part kits to be shipped together.

Bottom Sealed Bags

A heat seal across the bag fold is helpful with locating the bag in some automated packaging equipment.

Printing and Labelling

Antistat uses flexo printing to mark stock bags with the appropriate industry standard ESD or Moisture warning and, on certain products, lot numbers for traceability. We also provide a variety of labelling products for specific needs.

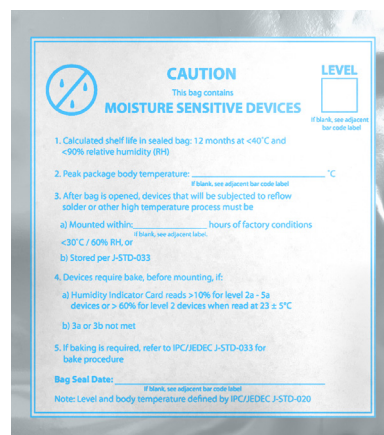
Flexo Printing

A method of printing ink to bags using a press plate. Produces higher quality marking that hot stamping.



Moisture Sensitive Device Labels

Used within the dry packaging process, makes it easier to write necessary information.



Cautionary Labels

Can be pre-applied to the bag, saving you labour time. Labels are available in a variety of languages with either selected or bespoke messaging (available on request).



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Summary

Static protective bags should be used as part of a static control program. Selecting the appropriate bag can help reduce static damage and save money on costly repairs and rework. The cost of static protective packaging is insignificant when compared to the protection it affords the costly items placed in the package.

Choosing the Right Bag

- Use static shielding or moisture barrier bags for all electronic circuits.
- Use pink poly for non-electronic parts and production goods that must be near electronics.

Bag Sourcing

Key things to remember when sourcing bags:

- The least expensive bag may not be the best investment. Look for a product that works for its application. Materials and bags should be tested by the manufacturer before shipping. Look at a supplier's quality program, material traceability, and test standards.
- Consider the supply chain; stability and delivery.
- A large selection of standard sizes, (more than 100) will keep you from paying for custom sizes.
- Look for technical depth to support the product.

Our Range

Pink Antistatic Bags

Pink Antistatic Bag (Grip Seal)



Pink Antistatic Bag (Open Top)



Pink Antistatic Bag (Bubble)



Black Conductive Bags

Moisture Barrier Bags

Pink Antistatic Bag (Gusset)



Black Conductive Bag (Open Top)



Moisture Barrier Bag (Open Top)



Static Shielding Bags

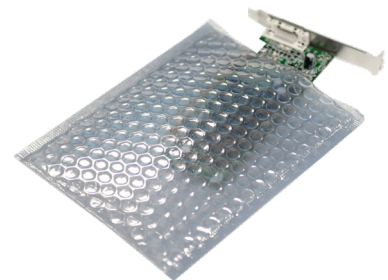
Static Shielding Bags (Grip Seal)



Static Shielding Bags (Open Top)



Static Shielding Bags (Bubble)



For all our Bags, follow the QR code to the left.
For bespoke bag features not included above please contact our team.

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Labels

Caution Labels (Logo Only)



Caution Labels (English)



Caution Labels (Multi-Language)



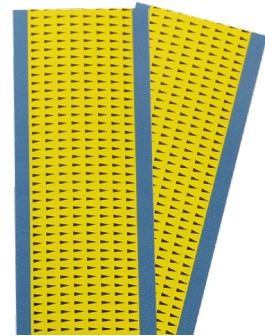
Caution Labels (Global)



Lead Free Labels



Self Adhesive Inspection Arrows



Moisture Sensitive Device Labels



For all our Labels, follow the QR code to the left.
For bespoke label information please contact our team.

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Updated 1 February 2024 1:22 pm

