



ELECTROSTATIC DISSIPATIVE

Airolam ESD+ Laminates
Technical Guide

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1 INTRODUCTION

Airolam ESD+ Laminates (HPL/HPDL) are performance laminates engineered to not allow static build up and safely dissipate any sudden influx of static charge on the surface. They also repel dust particles and are highly recommended for clean room applications.

ESD+ laminates are classified as HGS grade as per EN438 standards and their enhanced properties that make them suitable for use in application areas in high tech industries where sensitive electronics are stored, manufactured or processed.

2 PRE-FABRICATION

Please follow the pre-fabrication guidelines to ensure lasting performance of ESD+ laminates.

2.1 TRANSPORT, STORAGE & HANDLING

All transport, storage and handling guidelines of Airolam HGS grade, decorative laminates are also applicable for ESD+ laminates. Key points to consider-

TRANSPORT

Airolam recommends that ESD+ laminate sheets are transported flat.

While being transported, it is recommended to keep protective boards on the top and bottom of the stack. Use protectors on the edges, as cracked corners can cause issues during fabrication.

HANDLING

ESD+ laminates should be handled carefully to avoid damage to the product- especially the edges. Decorative face of the laminate may get damaged on sliding over other surfaces, including other laminate sheets. Therefore, sliding the sheets IS NOT recommended, the sheets need to be lifted instead.

Airolam recommends the use of 2 workmen to lift the sheet, especially if the sheets are sized over 3.5 feet. Always ensure the workmen walk at a steady pace, holding the sheet with limited slack, as excessive bowing can strain the surface of the laminate.

Never allow the laminates to touch the ground or the walls while they are being carried.

If forklifts and similar mechanized vehicles are used to load or unload a vehicle, ensure that the pallets are clean and structurally sound.

STORAGE

Airolam ESD+ laminates should be gently stacked over each other in a horizontal manner, in a back-to-back configuration. The sheet at the bottom of the stack must have the decorative face downwards, with a flat, protective layer.

Use a protective, flat board at top and bottom of the stack. This helps maintain a uniform pressure on the sheets and prevent any warpage in bulk stock. In case such a board is not readily available, the topmost sheet may be placed with the sanded side upwards instead.

To avoid risk of damaging edges, vertical storage is not recommended for ESD+ laminates.

2.2 PRECONDITIONING & THE ENVIRONMENT

Preconditioning is one of the most important considerations for achieving a quality product installation.

Follow the preconditioning guidelines as laid down in the document for standard grade High Pressure Laminates. The best approach is to make sure both sides of the laminate panel as well as the substrate experience the exact same conditions. In most cases the recommended conditions are storing the entire stock (liner, backer, adhesives, substrate) at 24C temperature and 55% relative humidity for 48 hours. These numbers may vary slightly depending on general environment conditions in the geographical area.

If working in sensitive areas, keep the following guidelines in mind-

- In environments such as chemical and biological laboratories, always follow the safety protocols and guidelines.
- Always use PPE as required by the fabrication site e.g. laboratory, as well as those defined in Building Codes, Municipal Laws, NEMA and other industrial standards,
- Ensure that any dust, shavings and byproducts are collected and disposed off safely.

2.3 SUBSTRATES & ADHESIVES GUIDANCE

Most substrates that are recommended for standard grade decorative laminate can also be used for ESD+ laminates.

Some of the substrates that can be considered include-

- Particleboard
- HDF/MDF
- Plywood

Both water and solvent based adhesives can be used for bonding ESD+ laminates. Choice of adhesives include- PVA, Contact Adhesive, Hot Melt and Epoxy.

In addition, care should be taken to ensure proper balancing of the final panel by opting for a high pressure balancing or high-pressure phenolic laminate known as Backer, on the other side of the substrate.

3 FABRICATION

Proper fabrication of ESD+ laminates for applications in various Electrostatic Protected Areas (EPAs) allows for a work environment that is safe for the user as well as the site operation. Please follow the guidelines closely-

3.1 BONDING AND TRIMMING ADVICE

Before bonding the laminate to the substrate, follow the Prefabrication checklist to ensure the right selection of substrate and adhesives for the project.

Some key points for bonding-

- Use dowels or separators to line up coated surfaces before allowing them to bond together.
- In case plywood is used as a substrate for laminates, check to see if the first coat of adhesives has been mostly absorbed by the plywood. In such a scenario, apply a second coat.

- If using a liquid adhesive, ensure that the adhesive is homogenous. Always apply an even layer of adhesive, using a roller or brush. In case a spray adhesive is used, ensure an even spray all over the surface in a controlled fashion.
- When using contact adhesive, don't allow the coated surfaces to touch until both the surfaces have dried.
- Always lay the laminate onto the substrate with even pressure. Applying too much pressure may damage the surface or the bond.
- Complete the bond by using a J roller to force any air bubbles from between the two surfaces.

If adhesives come in contact with the decorative surface, remove them carefully using adhesive removers or hexane (only for contact adhesive). Use of thinner is not recommended.

Once bonding of the panel assembly is complete, trimming is needed to remove the oversized edges of the assembled panel. Follow the trimming advice of standard, decorative HPL.

Always trim the edges flush with the laminate surface. The tools used for trimming must be sharp and well maintained.

Routers are commonly used to trim the edges, though a hand trimer such as a bevel cutter can also be used. Generous bevels and radii up to 2.5 mm may be produced at the arrises, but it should be remembered that such large bevels and radii require more finishing to blend with the surrounding surface.

Following the trimming process, edges must be routed smooth.

3.2 CUT-OUTS, HOLES AND ADDING FASTENERS

For most applications involving ESD+ laminates, cut-outs, holes and other milling operations are quite important.

Do not use square-cut inside corners, otherwise stress cracking or breakage may occur. All internal corners and cut-outs should be rounded as far as possible. A radius of 3 mm (1/8") or larger in the corners is recommended to minimize stress cracking. For larger sized cuts, the radius must also be increased. All cut-outs should be routed or filed to ensure smooth edges.

The use of non-rigid, elastomeric adhesives such as contact adhesives may cause stress cracking. When contact adhesives are used, the minimum radius for inside corners must be 5mm.

3.3 DRILLING

- When it comes to tool selection, an electric drill with HSS bits is the tool of choice for most kinds of drilling applications. Another important selection to be made is the type of bits used in the drill. While TCT bits may prove to be economical due to their long life, Rectified HSS bits are sharper. Longer tool life helps improve reproducibility while sharper blades improve the quality of the cuts.
- In case of non-stationary drills, it is important to ensure the appropriate pressure is applied. Pressure should be scaled up and down in a gradual manner, especially during entering and exiting the laminate. By controlling the feed speed of the drill, the panel is less likely to be damaged.
- At least 1.5mm of material should be left while blind drilling. When drilling into the edge, at least 3mm clearance should remain on all sides of the hole.
- Screws and bolts should be slightly countersunk. Use a lower rotational speed to make countersunk holes. Drill oversize holes (at least 0.5 mm or 0.02" larger in diameter) for screws

and bolts. This allows the screw to adjust with the slight dimensional movements of both the laminate and the screw, preventing cracks around the hole.

- When drilling through-holes, ensure a hardwood panel is placed at the exit face. This prevents any splintering or shocks to the material surface when the drill exits the material.
- Edges of the hole should be smooth and cleaned after drilling. Otherwise stress cracking may occur.

3.4 EDGE PROFILING & FINISHING

ESD+ laminates are routinely used in application areas that require high ergonomics and ease of operation for the user.

Creating a sealed, ergonomic edge is highly recommended when installing panels made of ESD+ laminates. This helps promote safety at the workplace while also ensuring a long life for the decorative panel.

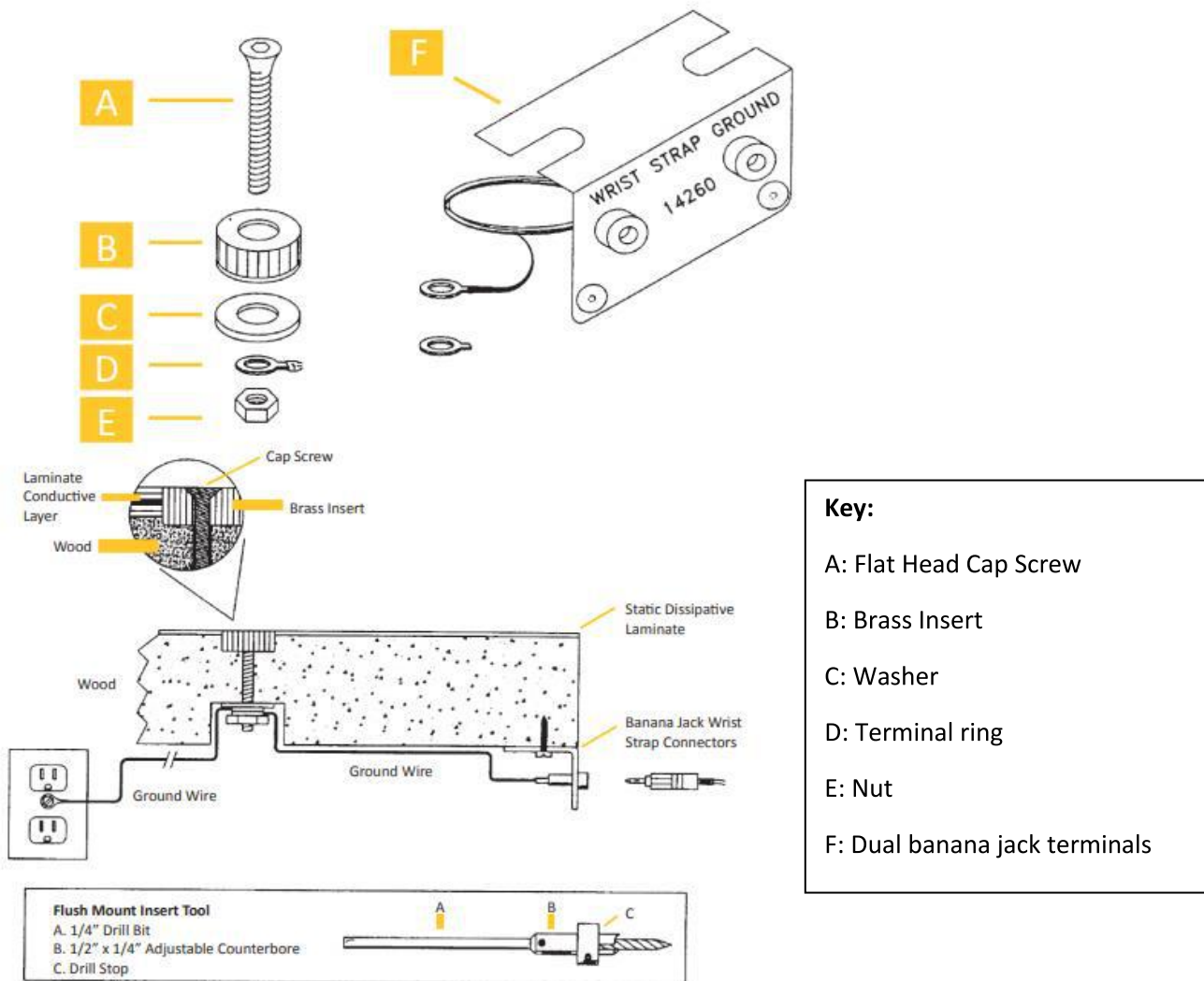
Airolam recommends using edge bands or end caps to cover the edges. Chamfering the edges into gentle profiles is also another option. Please get in touch with the technical team for more details.

Once the edges are complete, a final finishing may be done using use a sanding belt be no coarser than 100 grit, taking care to always work towards the substrate to prevent surface chipping.

3.5 ESD GROUNDING PROCEDURE

The recommended installation for best performance with ESD+ laminates involves using a screw insert that sits flush with the surface of the laminate. This screw is attached on the underside of the laminate using a nut with a terminal. To this terminal two wires are attached, one connecting to the common ground outlet, while the other provides the connection to the banana plug socket on the frontside.

A protruding ring made of brass is in contact with the conductive layer of the laminate.

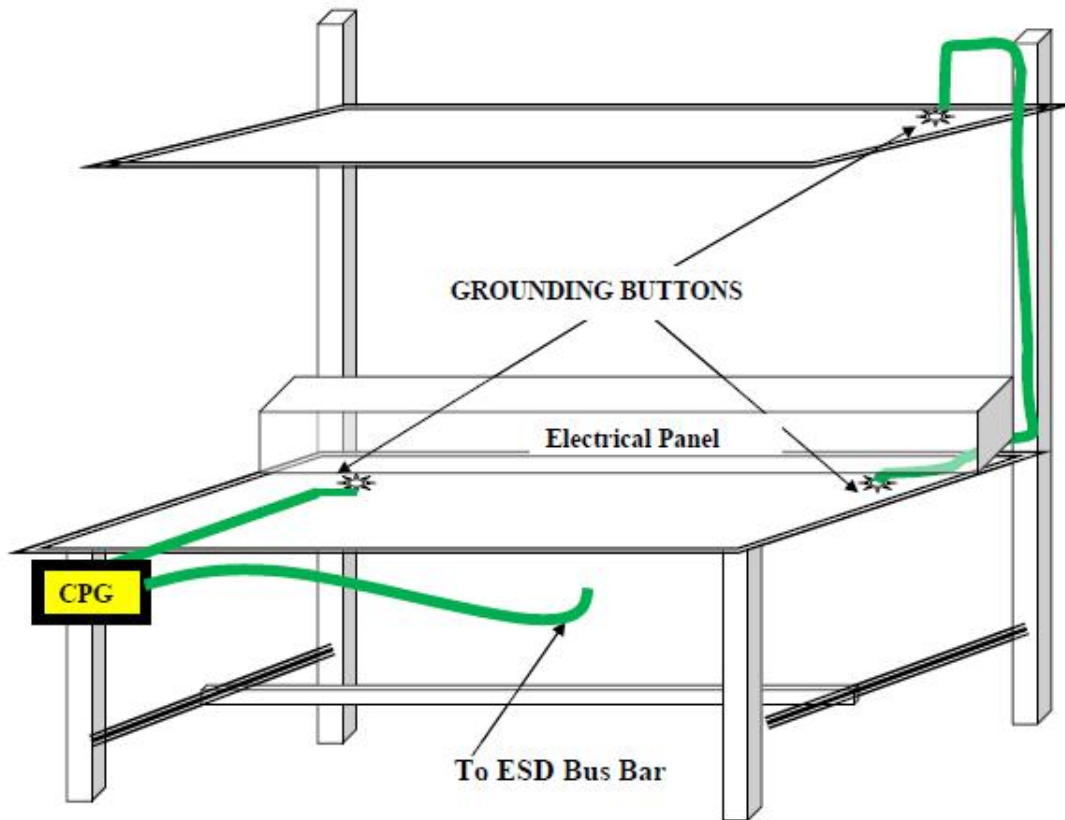


A high-quality lock-washer is used to give the screw a snug sit, preventing it from vibrating loose.

Alternative method used In India:

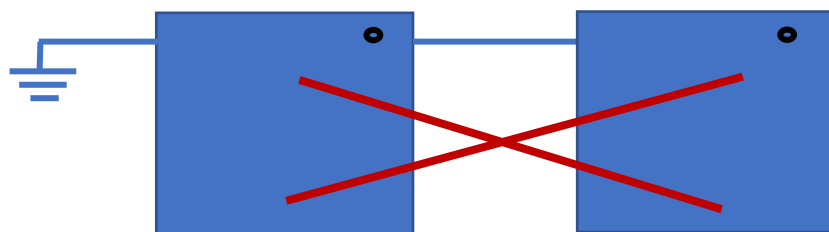
Generally, the pin which is put on the table, will have male shape top and grounding wire will have one cap having female groove in one end and other end will have crocodile pin which will connect to earthing point.

WORKSTATION GROUNDING

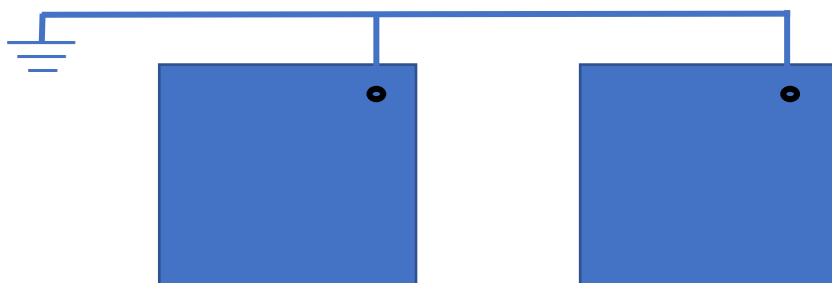


This female cap will just fit with the inserted pin head and will get the connection with the earthing point.

Grounding arrangement:



**Improper
grounding
arrangement**



**Proper
grounding
arrangement**

4 POST FABRICATION

Once the fabrication of ESD+ laminates is completed, it is safe to remove the peelcoat protective film. Please ensure the film doesn't stay on the surface beyond a few months as it may leave a residue on the surface that can become hard to remove with time.

5 MAINTENANCE & CARE

ESD+ laminates require similar maintenance and care compared to standard decorative and compact laminates.

- Care
Always follow the proper grounding arrangement for grounding ESD+ laminates.

No film or residue should be left on ESD laminate's top surface as it will reduce laminate's dissipative properties.

- Cleaning
When ESD+ laminates are used in highly sensitive areas such as hospitals and intensive care units, care must be taken to ensure that the regular cleaning protocols are followed.

In case of ordinary stains, AiroLAM recommends first cleaning the surface gently with a clean, damp, soft cloth. For stains belonging to Group 2 or otherwise stubborn stains like coffee or tea, use a mild cleaner/detergent followed by wiping with a clean cloth. A soft bristle brush can also be used.

Do not use scourers or cleaners containing abrasives or strong acids/alkalines at any time.