ECONOMY ◆ EXCELLENCE ◆ ETHICS

CHEM+

# MERINO CHEM+ LAMINATES

## TECHNICAL GUIDE

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# 1 INTRODUCTION

Merino CHEM+ Laminates (HPL) are performance laminates intended for application in areas that need enhanced protection against chemicals. By using a special, non-porous EB-cured layer, is used on the surface resin formulation is applied to the laminate that imparts a high degree of bacterial growth resistance.

CHEM+ laminates are classified as HGS or VGS grade under EN438 standards, and are a recommended solution for high-performance surfaces that are highly decorative as well.

# 2 PRE-FABRICATION

CHEM+ laminates have a decorative layer with very low porosity that doesn't react with most chemicals. The laminate must be installed in suitable areas, avoiding extremes in humidity or temperatures over 275°F (135°C) for sustained periods of time.

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

## 2.1 TRANSPORT, STORAGE & HANDLING

All transport, storage and handling guidelines of Merino standard grade, decorative laminates are also applicable for CHEM+ laminates. Key points to consider-

- **TRANSPORT**

  CHEM+ laminates can be transported rolled up or laid flat.

  When rolled up, the decorative surface must remain on the inside. For laminates that are being transported in rolls, ensure that the rolled-up cylinder is at least 550 mm in diameter.

  Merino recommends that laminate sheets over 1 mm are transported flat, instead of being rolled up.

- **HANDLING**

  CHEM+ laminates should be handled carefully to avoid damage to the product- especially the edges. Decorative faces 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.

  Merino 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**

  Laminate sheets should be stacked in pairs, in a back-to-back configuration. The sheet at the bottom of the stack must be placed with the decorative face downwards, and a flat, protective board placed below it.

The topmost sheet of the stack should preferably be placed with the decorative side downwards. Additionally, a similar-sized board may be placed over the topmost sheet, to maintain a uniform pressure on the underlying sheets and prevent any warpage in bulk stock.

If space constraints don't allow for horizontal storage, laminates may be stacked at an angle close to the perpendicular. A heavy board should be used on the free end to prevent any slippage and damage.

## 2.2 PRECONDITIONING AND 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.

Stored stock of laminate should be rotated such that older sheets are used first. The place of storage should be well ventilated and protected from moisture. Laminates should never be in direct contact with the floor or outside walls.

All preconditioning should be performed at the fabrication site.

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

- 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,
- In environments such as chemical and biological laboratories, always follow the safety protocols and guidelines of the laboratory.
- Ensure that any dust, shavings and byproducts are collected and disposed of safely.

## 2.3 SUBSTRATES & ADHESIVES GUIDANCE

Most substrates that are recommended for standard grade decorative laminate can also be used for CHEM+ laminates. The choice of the substrate mostly depends on the chosen application area and any resulting limitations. Typically, most chemical laboratories have 3 types of areas- Working areas, Storage areas and Disposal areas. The substrate must be chosen keeping into account the unique needs of each of the area.

Common substrates recommended for laminates include- MDF, Particleboard, Plywood. The recommended substrates for Merino CHEM+ laminates are MDF and high-grade Particleboard (at least Type 1 – Medium Density as per CS 236-66). Plywood may be used provided at least one face of the substrate is A grade.

For best protection of the assembled panel, use similar CHEM+ laminate sheet or phenolic sheet as backer. This will prevent any spillage, runoff or fumes from damaging the substrate.

Urea, resorcinol, epoxy and specialized PVA based adhesives are recommended for CHEM+ laminates. To impart chemical resistance to seams, epoxy adhesive may be applied. Check with the adhesive manufacturer for recommendations for a particular adhesive product and its suitability in chemical environments.

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

CHEM+ laminates find applications in wide scenarios- from laboratories in universities & hospitals, to R&D centers in industries such as electronics, pharma and manufacturing. CHEM+ laminates have a decorative layer with very low porosity that doesn't react with most chemicals. Owing to its high density, CHEM+ requires some extra care during fabrication.

Proper fabrication of CHEM+ laminates allows for its safe and lasting use in most laboratory applications including storage, handling and disposal of chemicals.

## 3.1 CUTTING

Merino CHEM+ laminates can be cut with the cutting tools recommended for Merino's HGS grade laminates. Most woodworking equipment can be used, keeping in account the slightly higher hardness of laminates.

Some guidelines to get best results and prolong tool life-

- Circular saws are recommended for cutting laminate sheets. Use sharp, TCT blades with a low or negative hook angle. High tool speeds and low feed speeds are recommended.
- CHEM+ laminates should always be cut slightly oversized. Keeping a margin helps achieve a better result while edge trimming.
- As far as possible, the tools should remain stationary while worktops are allowed to move. In case the worktop is fixed, take care to prevent laminates and substrate from sliding while being processed.
- When cutting the laminate to size using a stationary or table saw, ensure the sheet is flat on the saw table. The decorative face should face up, and the material should be aligned in same running direction. Use a sacrificial board and add a guide to serve as a fence, this helps reduce flutter during movement of the sheet through the saw blade. Always ensure that the blade cuts cleanly through the surface, and that the blade doesn't become too hot.
- The use of a scoring blade in a climb cut configuration can help improve the quality of the cut and reduce the possibility of damage to the laminate. Such a scoring blade is smaller in size than the main blade, cuts to limited depth and rotates in opposite direction (along the direction of the feed) to that of the main blade. Care must be taken to prevent kickback or backlash.

## 3.2 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.

## 3.3 Cut-outs, Holes and adding fasteners

CHEM+ laminates are routinely used in laboratories for working surfaces. In many of these surfaces. creating cut-outs and adding electrical/mechanical fittings is vital. Keep the following guidelines in mind while fabricating-

Do not use square-cut inside corners. Otherwise stress cracking or breakage may occur while replacing an electrical fitting later. 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.

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.

All cut-outs should be routed or filed to ensure smooth edges.

All attachments that are damaged or prone to damage/accelerated wear can be detrimental to the user and the laminate as well. Ensure that only high-quality fasteners and attachments are used.

## 3.4 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.

### 3.5 Edge Profiling & Finishing

For best resistance to chemicals, the laminate surface as well as the edges and seams need to non-porous, as any corrosive chemical can have a damaging effect on the substrate. Most substrate materials are not as non-porous as HPL, and can become, therefore, edge banding to seal any visible substrate is highly recommended.

The Seams between the edge and the surface should be sealed using an appropriate sealant that does not react to ordinary lab chemicals. Please contact the technical team for more details.

## 4 POST FABRICATION

Once the fabrication of CHEM+ laminates is completed, it is safe to remove the peel coat 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 CARE & MAINTENANCE

Merino Chem+ is resistant to a large number of strong chemicals used in laboratories, allowing it to be used in chemical, analytical, micro- biological, healthcare, pharmaceuticals & educational laboratories. However, ensure that CHEM+ surfaces are not exposed to harsh chemicals for *prolonged* durations.

- Care

As laminates have a long life, the fabricated panels would require periodic care to ensure the design and performance lasts equally long. CHEM+ laminates should not be subjected to extremes in humidity or to temperatures over 275F (135C) for sustained periods of time.

Ensure that any sources of heat such as Bunsen burners, Furnace lids, are not in direct contact with the surface of the laminate.

If any hot plates are to be set on a CHEM+ worktop, care must be taken to ensure that hot objects or hot liquids don't come into direct contact with the decorative surface for long duration.

- Cleaning

  In case of spills of chemicals that CHEM+ is resistant to, Merino recommends cleaning the surface as fast as possible. For more details, refer to the table below.

**Acids:**

Glacial Acetic acid 99%

Formic Acid 85%

Hydrochloric acid 36%

Phosphoric Acid 85%

Nitric Acid 65%(**)

Sulphuric Acid 96% (**)

Carbolic Acid (Phenol) 85%

Chromic Acid 60%

Citric Acid 10%

Perchloric Acid 60%

**Alkalis:**

Ammonium Hydroxide 28%

Potassium Hydroxide 15%

Sodium Carbonate (saturated)

Sodium Hydroxide 40%

Sodium Sulphide 15%

**General Reagents:**

Sodium Hypochlorite 5%

Hydrogen Peroxide 3%

Trisodium Phosphate 30%

Zinc Chloride

Sucrose 50%

Gasoline

Kerosene

Mineral oil

Vegetable oils

Sodium Chromate

Potassium permanganate (**)

Silver Nitrate (**)

Formalin

Copper sulphate

Petroleum jelly

Ethylene Glycol

Benedict's solution

Pine oil

**Stains and Indicators:**

Bromothymol Blue

Phenolphthalein

Methyl Red

Methyl Orange

Gentian violet

Methylene Blue

Karl Fisher reagent

Naphtha

Lysol

Nigrosine

Crystal violet

Cresol red

Thymol Blue

**Solvents:**

Acetone

Amyl Acetate

Benzene

Carbon Tetrachloride

Cresol

Ethyl Acetate

Methyl Ethyl Ketone

Mineral Spirits

Toluene

Xylene

For harsher chemicals (marked with ** in table above), there may be a need to first neutralize the spill as per OSHA and relevant lab guidelines before attempting a clean-up operation.