COMPACT LAMINATES TECHNICAL GUIDE

www.merinolaminates.com

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INTRODUCTION

Merino Compact laminates are a robust, high quality surfacing solution recommended for use in a variety of interior applications.

Compact laminates are thick high pressure laminates that conform to EN 438 standards. They range from at least 2 mm in thickness and can go as high as 30 mm.One or both sheet surfaces have decorative colours or designs.Compared to most engineered products, compacts are highly homogenous and twice as dense as engineered Plywood and MDF boards.

For thicknesses above 5 mm,compact laminates are considered as self-supporting. Any laminates under 3 mm are typically bonded to rigid supports, while rigid supports are recommended at short intervals for self-supporting applications of 3-5mm compact laminates.

Manufacture and Composition

High Pressure laminate (HPL) compact is a versatile and sturdy laminate board which serves as a base product for a variety of MERINO furniture solutions like Restrooms, Lockers, Urinal Modesty Panels (UMPs), Internal & External Wall Cladding etc. The core of Merino Compact Board consists of several layers of cellulose fibrous material i.e.Kraft paper impregnated with thermosetting phenolic resins.The surface on both sides is formed with decorative paper impregnated with melamine resins.The entire layers of paper, upon proper stacking, is treated at high temperature and pressure for a definite time duration to form the final compact laminate.

General Grades

Compact laminates are available in the following grades

- CGS – Compact Grade /General purpose/Standard
- CGF – Compact Grade/General purpose/Fire retardant

Areas of Applications

Compact laminates are ideal for applications in Kitchen tops,doors,table-tops,office,laboratory worktops,various countertops such as front desks,office partitions nd wall-panels,wall and floor decoration materials, materials for interior decordecorations.protective screens against damp, frost rain ,sunlight and termites.

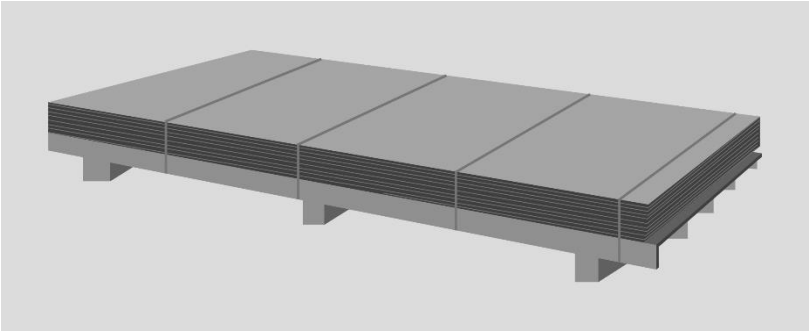
Compact laminates also find applications in railway compartments, switch boards,washroom partitions,washroom lockers and strips for decorative purposes.These products are well suited for wet area applications such as shower cubicles or swimming pool lockers but are not recommended for applications involving long term immersions.

HANDLING & STORAGE

Compact laminates are heavy owing to their high density and homogenous composition. They should be handled carefully to avoid damage or injury to the operator.

HANDLING

Use pallets to transport stacks of laminates. The pallets must be stable and adequately sized. Ensure the pallets do not deform under load. The pallets must be adequately sized without any unevenness or abrasive material.

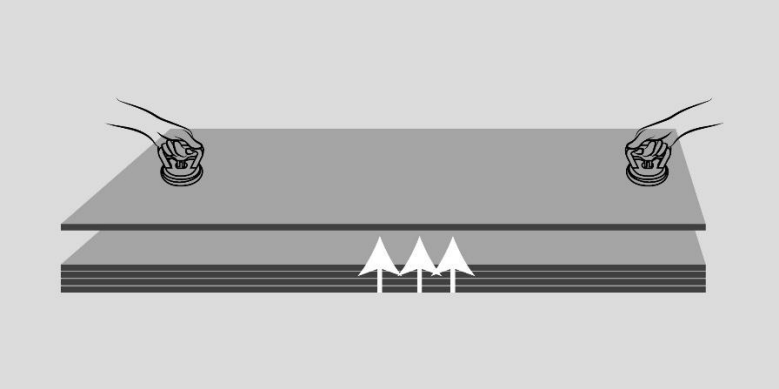


Whether the material is being moved within the warehouse or to a job site, special care must be taken while handling them. All operators transporting and handling laminates and other material should wear appropriate safety gear. Check the transportation guide for more details.

The laminates stack should always be kept on a packing board or a protective sheet, which must be placed first on the empty pallet. The top most laminate should have a protective board above it.

Always lift the sheets, either manually or by using a lifting system with suction caps. Merino recommends the use of two operators to lift the sheet. They should be lifted

equally from the corners, ensuring the sheet remains properly balanced. Protect the edges from impact while stacking the sheets for transport. During loading and unloading of material, never let the sheets slide over each other. The sheets should be lifted straight up.

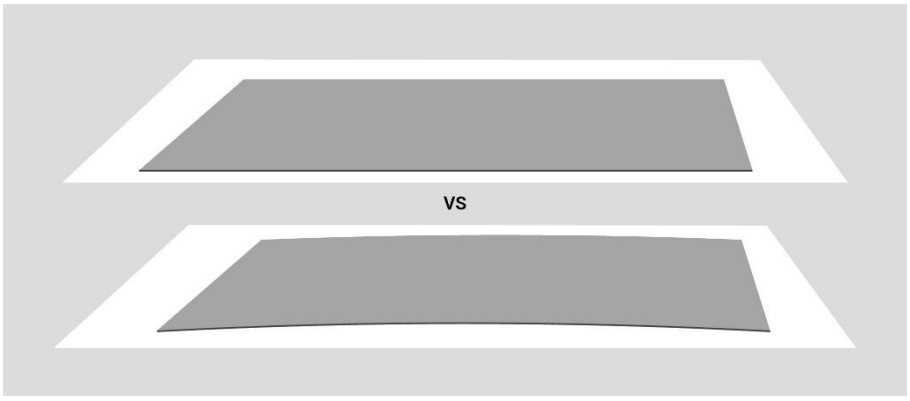


While moving individual laminate sheets, operators must walk at a steady pace, holding the sheet along its length.

Use mechanized loading & handling for laminates exceeding 10 mm thickness. Protect the surface and the edges from impacts and possible damage from falling debris. Any debris should not be allowed to get stuck within the stack, as the weight of the stack can cause damage to the decorative surface. Laminates with protective film shouldn't be exposed to direct sunshine for long periods of time.

STORAGE

Merino Compact laminates should be safely stored under controlled conditions. Compact laminates are thick sheets, and improper storage can cause them to warp or telegraph owing to their self-weight.



Horizontal Storage

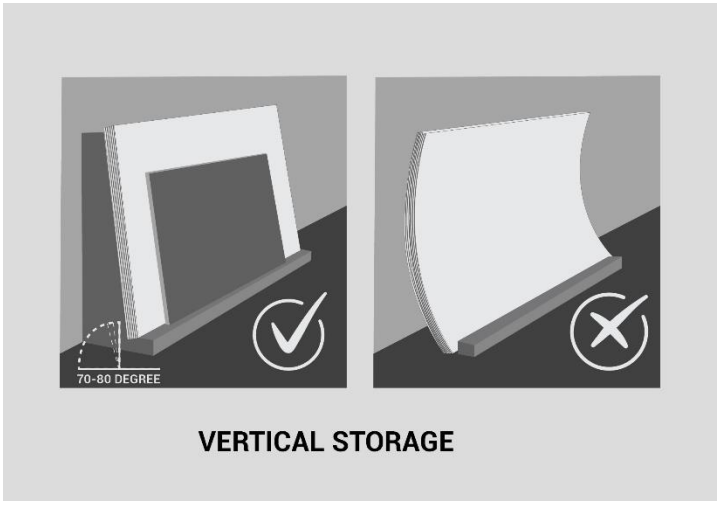
As a best practice, unpacked laminates should be stored laid flat and stacked horizontally. The stack should be placed on a level surface, with a protective laminated board on the top. Avoid contact between the bottom sheet and the floor. The edges should be lined up together, and the stack should always remain balanced and even.

HORIZONTAL STORAGE

To protect the material as well as operators from injury, ensure that the edges are protected at all times.

Vertical Storage

Vertical storage is not recommended for compact laminates. If space constraints do not allow for horizontal storage, they may be stored at an angle of 75–80 degrees.



VERTICAL STORAGE

The exposed sheet should be covered, and the edges secured from any accidental damage. A heavy board can be used at the free end to prevent slippage and damage.

If compact laminates are not stored horizontal and level for a prolonged period of time, deformations may occur. The thicker the sheets, the more difficult it is to reverse these deformations.

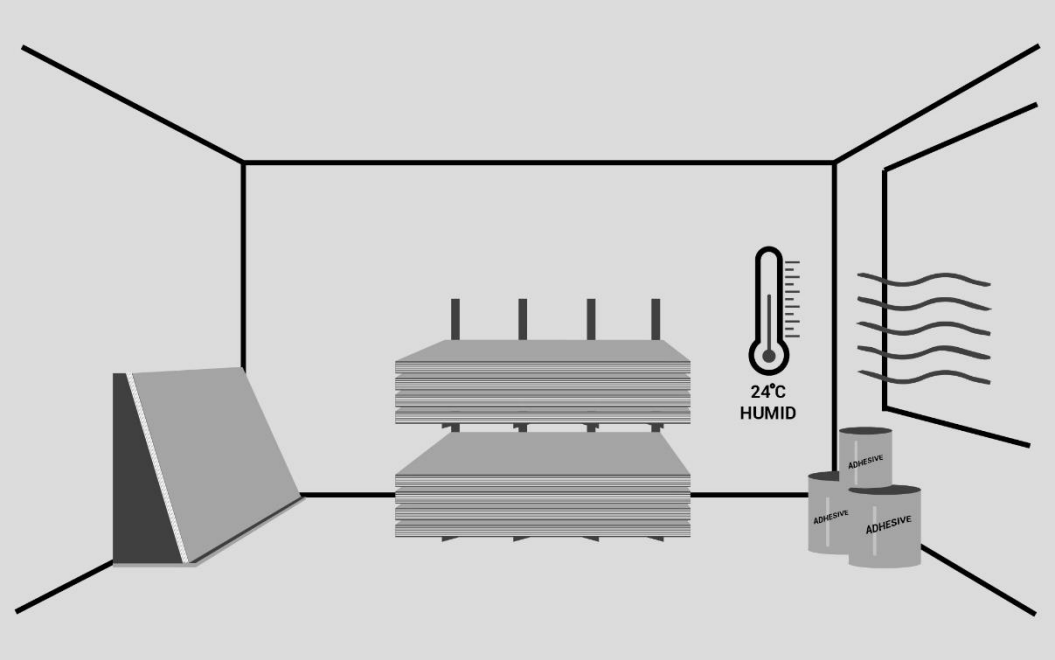
Before starting fabrication, inspect the material for any damage or impacts.

FABRICATION

PRECONDITIONING

Preconditioning is the process of minimizing differences between materials by controlling environmental conditions. This is applicable especially to materials like laminates which are influenced by environmental factors such as ambient humidity, temperature, air flow. Laminates shrink on losing moisture and expand on absorbing moisture, therefore preconditioning is a must before starting any fabrication work.

For this, compact laminates must be acclimatized to conditions that are similar to the final installation area. Store the Compact panels for at least 72 hours in the recommended environmental conditions (24C and 55% relative humidity), or in conditions which are similar to the ambient conditions at final job site.



The conditions can vary depending on general environmental conditions in the geographical area. In case of a significant difference in ambient conditions, preconditioning time ranges from 5-7 days.

The best approach is to make sure all the material to be fabricated is conditioned together. The stock should be kept in an area that allows for ventilation all around the stored material.

Compact laminates are dense material and must be machined using power tools. Circular saws, routers, CNC machines and drills are some tools typically used in their fabrication. Proper tools and materials should be selected for an effective product installation.

While handling power tools, it is recommended to wear appropriate clothing along with safety goggles, gloves and any other safety gear.

Cutting

Recommended tools for cutting include table saws, portable circular saws. As compact laminates have decorative surfaces on both sides, they require higher care during the cutting process. A properly-cut laminate has a clean, chip-free edge and a surface free of any burr or burn marks.

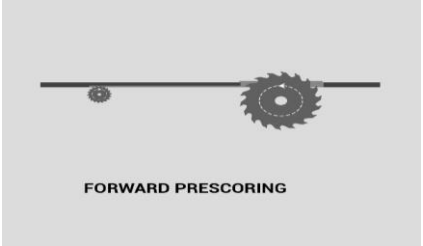
Slower feed speeds are recommended while processing thick laminates. Use dust extractors to reduce chances of overheating. Generally, the visible side of the laminate should remain upwards during cutting.

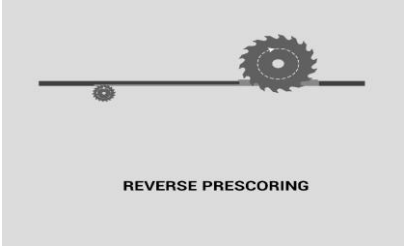
For rough sizing, a table saw with a carbide tipped blades is recommended. Compact laminates exert higher tool wear during processing, ensure blades are sharp and appropriate for the fabrication job. The saw blades must have 60 teeth or higher, and a cutting speed of 60 – 90 m/s is recommended. Generally compact sheets should be cut slower compared to decorative HPL.

For fine quality cuts, a handheld circular saw can also be used. The quality of the cut depends on many factors, such as tooth shape, tooth pitch, proper saw blade projection, feed rate, rotational and cutting speeds. For detailed information, check the table below or refer to tool manufacturer's guidelines.

For an effective and clean cut, a prescoring blade is recommended. A smaller blade is used as a pilot to cut to limited depth on only one side of the sheet, following which the main blade cuts on both sides. Usually this blade is thicker than the main blade, leaving the main blade free to exit the other side without leaving splinters.

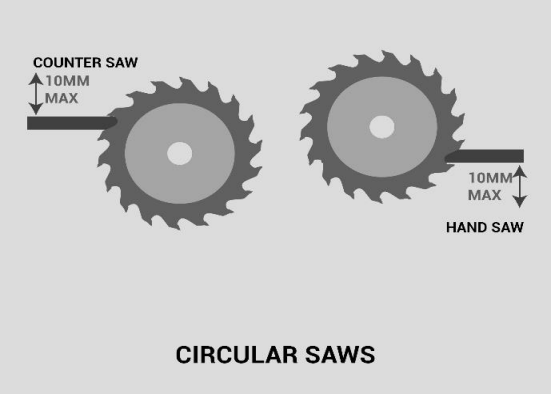
The prescoring blade is used in a climb cut configuration- this smaller blade cuts only up to 1/8" deep, and rotates in the opposite direction (along the direction of the feed) to that of the main blade. Usually the pre-scoring saw runs in a forward direction, regardless of whether the main blade runs in forward or reverse direction.





Care should be taken to prevent kickback or backlash. To further improve cut quality, a combination of a scoring blade and a sacrificial panel can be used. The sacrificial panel can be plywood, hardboard, or a similar base underneath the compact laminate sheet. Always cut along the length of the entire panel and avoid cutting more than 1/4" thickness of material in a single pass.

Circular saws can also be used to make cuts into the laminate sheets. Both bench and portable saws can be used.

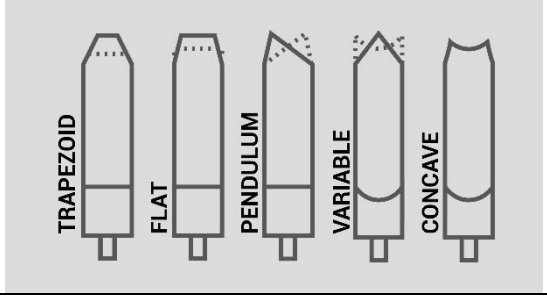


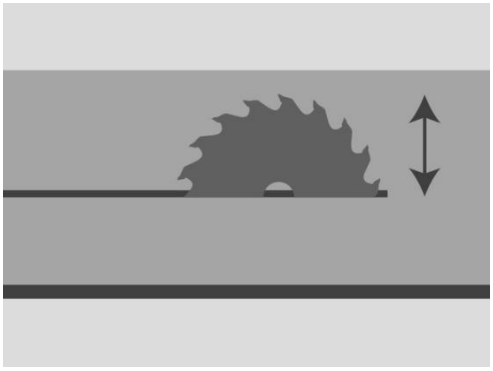
CIRCULAR SAWS

Bench saws will produce better results and higher reproducibility. Keep in mind the following specifications for cutting using circular saws:

- Feed Speed: 20–30 m/min
- Tool Speed: 3,000 to 4,000 rpm
- Tooth Pitch: 10 to 15mm
- Tip Speed: 60 to 100m/s

For details on factors impacting quality of the cut, see below-

Factor	Impact on Cutting Quality
Saw Blade Material & Geometry	Use of diamond-tipped tools whenever possible, with sharp, well-maintained blades. Recommended tooth shapes are alternate and hollow teeth. The trapezoidal flat tooth is used for ensuring longer tool life and consistently good cutting quality. 

Height of blade	To get a clean cut and maintain the look of both decorative faces, the quality of the cut edge can be controlled by adjusting the height of the saw blade. Depending on the saw blade projection, the entry and exit angle changes, which influences the quality of the cut edges. As the height of the blade increases, the quality of the top side improves while the quality of the lower side decreases.  If the uppercut edge quality reduces, the saw blade can be set higher. The saw blade should be set lower in case of an unclean cut to the bottom. The best height setting should be judged appropriately. Saw entry angle of 45° is considered as optimal. To achieve this, maximum 10 percent of the saw blade diameter should protrude over the workpiece.
Feed Rate, No of teeth, Tool Rpm	These interdependent factors are critical to quality. Generally, a feed distance per tooth between 0.03 and 0.05 mm has proven successful. Use a slower feed speed for thicker panels. For circular sawing, recommended cutting speed is 60 – 90 m/s The rpm of the tool also influences the quality of the final cut. If CNC is used for cutting and machining, it is suggested to use carbide blade, having rotation speed range from 20000–27000 rev/min.

Drilling and Fasteners

Drilling and cutouts allow for high level of customization in furniture and are an essential part of the fabrication process. While compact laminates are easier to drill compared to other surfacing and decorative materials, care must be taken to balance drill quality and tool wear.

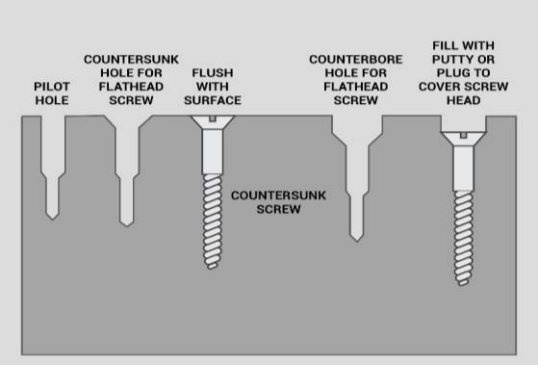
Choose a good quality electric drill which will maintain steady revs. By controlling the feed speed of the drill, the panel is less likely to be damaged. A drill feed speed of 0.03-0.05 mm per revolution is recommended.

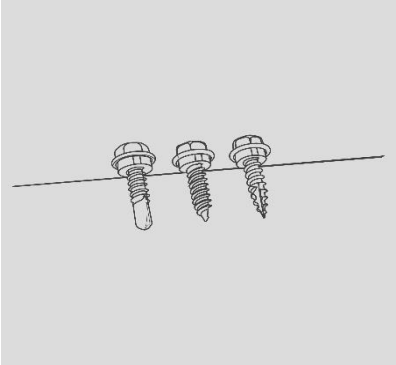
The other key to a successful fabrication is the choice of drill bit. The drill bit must be of the right material. Some of the common materials include- Carbon Steel, HSS, Cobalt Steel, PCD, Titanium Coated, Carbide tipped. While TCT bits

can prove to be economical due to their long life, Rectified HSS bits are sharper. Spiral drill bits for drilling metal or wood can be used as a last resort. Here, the rotational speed and feed rate should be reduced. In case of standard steel bit, ensure regular removal of the drilled material from the drill hole.

Whether the requirement is for blind holes or through holes (completely exits to other side), Merino compact laminates are well suited. Use self-tapping screws in case threads are needed in the holes.

When working on a project that demands high reproducibility, drilling templates should be used. For such mass production, reproducibility should be the most important factor during machining and fabrication. Merino recommends using a stationary drilling machine with an automatic feed.

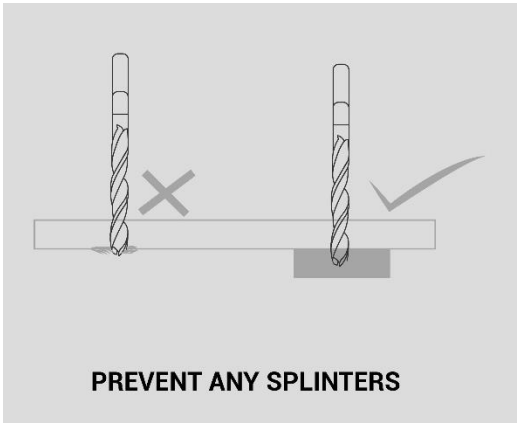




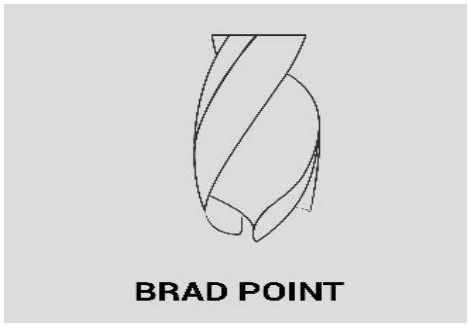
Drill bits with a point angle of 60-80degrees are recommended. Some special bits also have larger space for chip removal, which helps prevent stutter and burn marks during the drilling process.

While using handheld drills, the pressure applied needs to be carefully controlled. In the case of non-stationary drills, it is important to ensure the appropriate pressure is applied. The feed rate must be controlled as per the requirements of the task- closer to the exit, the feed rate must be decreased. Care must be taken to prevent breakout, and in case of blind holes, always leave at least 1.2 mm of thickness untouched.

To drill through-holes, a lower angle is preferred. Through holes must not sit tightly snug, some room must be left for dimensional movement of the material over time. When drilling, place a hardwood panel at the exit. This will prevent any splinters or shocks to the material surface as the drill exits the material.



Twist drills offer many tip styles for drilling. These varying tip styles allow for different kinds of drill points- such as Brad point and Fishtail point. Brad points have a sharp tip that allows for highly accurate positioning while drilling.



The fishtail point is can be commonly used as center drills in counterbores for furniture assembly where panels must be joined at right angles. The geometry of the drill tip allows for easy drilling at angles without walking.

If a fastener must be placed flush with the surface, we recommend using a countersink drill bit. Always use countersunk screws along with appropriate washers.

In case a fastener head needs to be concealed, a counterbore drill bit can be used. It is recommended to choose a counterbore with spurs on the outer edge, as that prevents chipping and splintering.

For screws that run parallel to the board surface, use chipboard/ screws, that have been fixed at least 20mm into the material. The screw must also have a clearance of at least 1.5mm each from the topside and bottomside.

A pilot hole should be used to ensure a clean drilling operation.

Edges of the hole should be smooth and clean after drilling.

TROUBLESHOOTING DRILLING ISSUES

Observation	**Possible Cause**	**Solution**
Exit splinters and material breakouts	Poor support to the panel Improper feed rate	Use a hardwood panel for support and ensure the drill is retracted after coming to a complete stop Reduce the feed rate
Drill wears out quickly or poor-quality holes after some time	High rpm	Reduce rpm
Smell, production of smoke or burn marks	Burn marks on material	Ensure drill is retracted without touching the surface or the sidewalls Check drill rpm

Cutouts

Cutouts in compact laminates are used to create openings for a variety of uses- access to the wall machines or for airflow. Cutouts for openings, e.g., ventilator grills or ingress openings, should be rounded since sharp corners can lead to the formation of cracks. These can be made directly with a router or pre-drilled with an appropriate radius and then sawn out from the drill hole to drill a hole. Necessary expansion gaps should be allowed for multiple components.

Right-angled cuts can cause breakage due to stress cracking of the material. To avoid damages, all the corners of the internal cut-outs should be evenly rounded, polished, and sanded to remove any chips. The inner radius of the rounded corner should be as large as possible. As a rule of thumb, all inner cutouts must be made with an inner radius of 3mm. Grooves and edges should also be routed smooth. To make smooth cutouts, use a router fitted with

appropriate accessories. Adequate gaps for dimensional movements should be allowed for integrated components.

Joining panels

Joints between compact laminate panels, capable of withstanding higher loads can be achieved with a combination of gluing and fixing devices, splines or biscuits (e.g. made of compact laminates), or grooves. Joints that are subjected to major stress, should be reinforced with mechanical connecting elements. Before the gluing process, the boards should be sanded, free of dust, grease, and dirt, and pre-treated according to the requirement.

If two compact sheets are connected with tongue and groove, groove width (a) and groove side thickness (b) must be at least 3 mm. Where the design allows, the groove side thickness (b) should be larger than the groove width (a). The groove depth should be kept as low as possible (max. 10 mm). As for the rest, the following guide values apply:

groove width a = 3 mm

groove side width b ≥ 3 mm (=a)

tongue width c < 10 mm

sheet thickness d = 10 mm

Due to the possible dimensional changes, the compact sheets have to be mounted with sufficient clearance between tongue and groove. Compact sheets with less than 10 mm thickness should not be connected with tongue and groove. A connection with a “false tongue” is also beneficial because it allows the full plate format to be used and simplifies processing.

EDGE PROFILING & FINISHING

Compact laminates have an attractive self-edge. By default, this edge doesn’t require any special protective coating or banding. In some cases such edges may not be desired, e.g. for ergonomics in public furniture. Such sharp corners and edges should be rounded or chamfered to eliminate the chance of injury and chipping.

Edges can be profiled using high power routers. Numerous edge-profiling options are available. For creating such rounding and other edge profiles, high quality routers should be used with appropriate routing bits. Check with Merino Technical Team for more details.

After routing the edges, a brief sanding & polishing should be carried out, followed by edge treatment with furniture oil.

FALSE EDGE

A very common demand in many application areas is the creation of a thick, false edge. These so called built up edges enhance the aesthetic appeal of the material and are easy to fabricate. For more details on false edges, please contact your local Merino distributor or the Technical Team.

MILLING

Milling process can be used to Routers can be used to cut and mill the laminate. For best results, the finished edges of compact laminates should be routed or milled. Recommended router speeds range from 16000 rpm to 22000 rpm. Choose a router with adequate horsepower. In certain cases, the specific panel thickness, cutting sequence, and type/condition of the machine will require adjusting for the particular process. The sharpness of router cutters should be maintained. Use a router with a guide when cutting large lengths of laminate.

FINISHING

Machining edges will normally result in slight to moderate cutter/kerf marks. These edges can be finished by sanding using a random orbital sander to a smooth attractive appearance.

TYPICAL PROBLEMS AND PREVENTIONS

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1	Scratch	• Improper handling • Surface is rubbed with abrasive objects	• Follow prescribed handling instructions • Always lift the sheet from one point to another and carry vertically
2	Cracks in Cut-outs or inside corners	• Sharp corners can lead to cracks	• Inner corners should be made with an inner radii of at least 5mm • All edges must be smooth ,free of cracks and notches

3	Panel Warpage	• Panels should be cut with the long edge parallel to the length of the sheet • Ambient conditions should be same on each side of the panel	• All panel components should be acclimated to the same environment prior to fabrication • Cutting panels with the long dimensions running across the width of the sheet will greatly increase warpage tendency • In conditions that the panels are mounted on a wall or enclose a vanity unit or integrated plumbing system ,adequate ventilation must be provided to ensure that the temperature and humidity conditions at the backs of the panels are essentially the same

POST FABRICATION

During fabrication processes, the protective film should be left on. Once all the fabrication processes have been completed, and the worksite cleaned, it is recommended to remove the film.

CLEANING & CARE

Merino Compact laminates are resistant to heat, scratches, impact and moisture. While all Merino compact laminates are engineered to be a sturdy and durable product, regular cleaning and maintenance will prolong the life of the material.

CLEANING & SANITIZATION

Cleaning

Compact laminates should be cleaned regularly. For most purposes, a damp cloth and warm water can be used. In case of slight stains, mild detergents or mild soap can be mixed into the water. Normal household cleaning products, stain removal agents, or detergents can also be used, as long they are not abrasive or highly alkaline. Check the label of the cleaning agent for more information.

Cleaning agents should not be allowed to remain on the surface for long periods as it can damage the surface. Harsh abrasive chemicals or acids can cause discoloration or appearance change on the surface and should be avoided. Any spillage of such chemicals should be washed off with water immediately and the surface wiped clean with a damp microfiber cloth.

Merino decorative surfaces are resistant to stains classified in Group 1 and 2 but may take stains of reagents of Group 3 and Group 4.

Group 1 reagents include acetone, trichloro methane, toothpaste, urea, alcoholic beverage, natural fruit, fruit drink, urine, toothpaste, water, stain, or paint remover based on organic solvents and others.

Group 2 reagents include black tea, coffee, milk, cola beverages, nail varnish, nail varnish remover, lipsticks, watercolors ballpoint ink, and others.

Group 3 are sodium hydroxide (25% solution), hydrogen peroxide (30%) ,acid-based metal cleaners, shoe polish, boric acid, lacquers, Hair coloring, and bleaching agents, acid-based metal cleaners, and others.

Group 4 is citric acid (10% solution) and acetic acid (5% solution).

Group 3 and 4 reagents should not be allowed to spill on the surface, and in the case of spillage, it should be immediately wiped off.

Stubborn stains linked to Group 3 and Group 4 reagents that resist normal cleaning processes can require the use of undiluted household bleach or nail polish remover. Apply the bleach or nail polish remover to the stain. Do not allow it to stand for more than two minutes. Rinse thoroughly with warm water and wipe dry. This process can be repeated if the stain emerges to be disappearing and the color of the laminate has not been affected. However, it should be warned that prolonged exposure of the decorative surface to bleach will cause discoloration.

Sanitization and Disinfectants

A variety of aerosols, sprays and liquids are available in the market that are marketed as surface disnfectants. Merino compact laminates can be safely disinfected with most commercial sanitizing agents. Regular disinfecting practices will help maintain hygiene and clean surface.

The product landscape of disinfectants is vast and the list of active ingredients in these products is ever increasing. Therefore, Merino recommends carrying out a test on an isolated area of the surface before applying it on the whole material. For best results use EPA approved disinfectants in their recommended concentration. Avoid mixing chemical products during the process.

The process should start from the cleanest to the dirtiest area to limit the spread of the dirt to less dirty areas. During the disinfecting process, wipe all horizontal, vertical, and contact surfaces with a hygienic microfiber saturated with the disinfectant solution. The use of ethanol and isopropyl alcohol is recommended to disinfect the surface free of various viruses and microorganisms. Do not allow chemical residue to stay on the surface for too long.

Scientific studies have shown that improved surface cleaning and disinfecting reduce disease incidence. Center for Disease Control and Prevention (CDC)

recommends wearing disposable gloves when cleaning and disinfecting surfaces. Ensure any cleaning product is not used past its expiration date.

Recommended Cleaning Agents	Inappropriate Cleaning Agents
Common dishwashing liquids	Abrasive cleaning agents such as steel sponge, steel wool or stainless-steel scrubbing pads, sponges with a sanding fleece-like Scotch brite
Clean water	Abrasive creamy cleaners and cleaning powders
Soft microfiber cloth	Pointed or sharp objects like knives, blades or scrapers
Soft terry towelling cloth	The concentrated acids /alkalis
Isopropyl alcohol	Rust removers contain harsh chemicals
Organic solvents	Toilet bowl cleaners

Stain Type	Recommended Cleaning method	Mild marks	Stubborn marks
Tea , coffee, milk, lipsticks, water colours	• Damp cloth & warm water • Mild Detergents • Mild Soaps	Rinse, dry, and wipe with a microfiber cloth	A mild solution of bleach may be used but follow caution.
Iodine, Lacquers, Adhesives	• Nail polish remover • Organic solvents	Apply the bleach and do not allow it to stand on the surface. Rinse with warm water and wipe dry. Repeat carefully after observation	Use acetone on the surface. Initially rub gently, clean ,wipe dry using absorbent paper
Biological traces such as blood, urine	• Soft cloth • Sponge • Warm water	Clean with water and soap, Rinse and dry wipe with absorbent paper/microfiber .Use disinfecting agents to clean afterward.	Use acetone on the surface. Initially rub gently, clean ,wipe dry using

			absorbent paper
Silicone Sealants, Furniture polish	• Use silicone remover	Use a scraping instrument to remove the silicone and scrub the residual mark with a diluted solvent and rinse thoroughly. Clean, wipe dry using a microfiber cloth	Avoid long duration of contact with the substances on the surface.

Acetone or nail polish remover can be used for removing most kinds of stains from the surface. However, Acetone is a volatile chemical and therefore proper care should be taken while using it on the surface. Test the surface initially by rubbing the surface gently using acetone on a damp cloth, cotton, or wool. HPL surfaces are robust and durable but gentle care will prolong the life and durability of the surface.

Deep textured finishes are more difficult to clean than normal or smooth surfaces. Nylon brushes and a cleaning agent can be used to clean deep-seated marks on textured surfaces. The cleaning movement should be in the structure direction for the best results. Permanent stains can be cleaned using baking soda and water on the area. Baking soda is an abrasive product for the surface, and one should be careful while using it. Rubbing the surface with baking soda can cause discoloration of the surface. Wipe up the paste with a clean, damp nonabrasive microfiber, and then wash clean with water. Occasional application of a self-cleaning wax can help minimize future staining.

CARE

Important guidelines to care for the laminate surface-

- The protective film where applied should be removed as soon as the application is complete. It should be ensured that the protective films are removed from both sides of the board simultaneously.
- Merino Compact panels do not suffer from corrosion and oxidation.
- Avoid placing hot cooking vessels directly onto the decorative surface. Ensure to use a heat-resistant shield between the decorative surface and vessel.
- The surface of a decorative board is not recommended to sustain exposure to a temperature greater than 135°C.
- Avoid placing burning cigarettes directly on the decorative surface.
- Spilled liquids should be cleaned up immediately as prolonged exposure to the foreign substance can change the appearance of the decorative surface.

- Extended exposure of the decorative surface to bleach will cause discoloration. Always wash the decorative surface with clean water after cleaning and wipe immediately using a dry cotton cloth.
- Abrasive pads, scouring powders, or cleansers may be permanently dull and scratch the laminate surface making it prone to staining.
- Harsh chemicals such as oven cleaners, toilet cleaners, or drain cleaners will etch and discolour the decorative surface. Decorative laminates are not engineered to resist continuous contact with harsh chemicals. In case of any spills, remove immediately, rinse thoroughly and wipe dry.
- Do not abuse the decorative laminate surface by dropping heavy objects such as cans, dinnerware, or glasses or deliberately hammering directly on the surface. Although the boards have excellent impact resistance, chipping or cracking can occur.
- Never use knives or other sharp objects directly on the decorative surface.
- Merino decorative surface should not be used directly for cutting or chopping purposes. Always use a chopping board for this function.