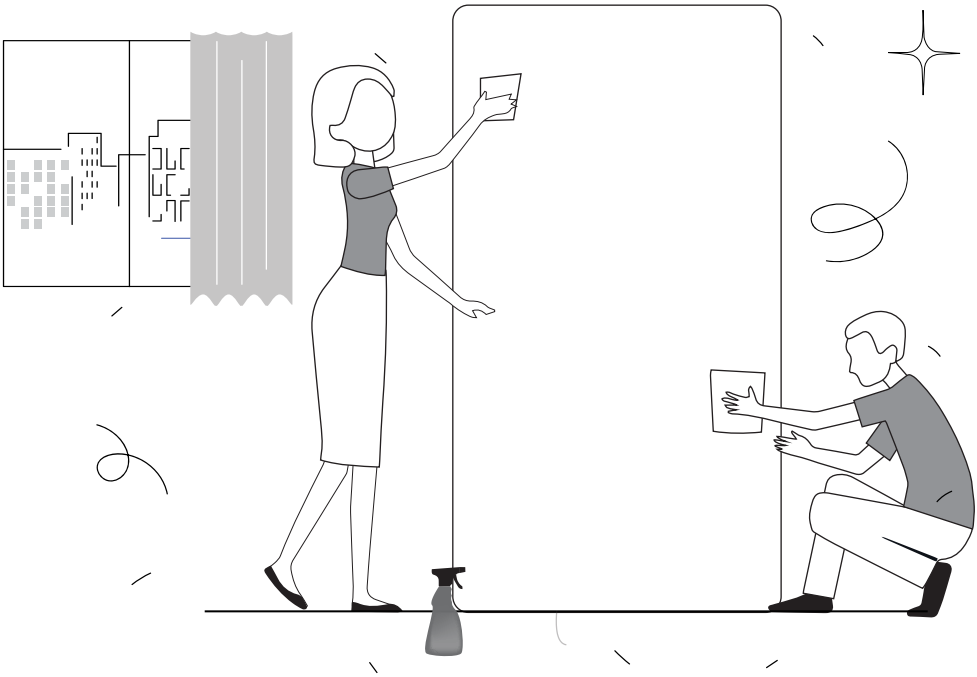
MILLIMETRE FABRICATION MANUAL

MILLIMETRE

MAINTENANCE & CLEANING



MAINTENANCE

Millimetre™ Laminate surfaces do not require any particular maintenance.

- All normal household cleaning products or disinfectants are well.
- For routine cleaning, use a soft melamine foam sponge.
- The use of non-aggressive aromatic solvents (acetone) is suggested for stubborn stains like paint marks etc.

CLEANING

CARE & CLEANING

- To clean the surface, use a damp cloth or a melamine sponge (and a mild soap or detergent only if required).
- Difficult “stains” such as coffee or tea can be removed using a mild household cleaner/detergent and a soft-bristle brush, repeating as necessary.
- Products with a high content of acid or very alkaline solutions should be avoided as they could stain the décor surface.
- While using solvents, use a clean cloth so as not to leave marks on the décor surface.
- Warning: Prolonged exposure of the laminate surface to bleach will cause discoloration.

ABRASIVES

- Abrasive pads, scouring powders or cleaners may permanently dull and scratch the laminate surface making it susceptible to staining.

ABRASIVES

- Harsh chemicals such as oven cleaner, toilet cleaner, or drain cleaner will etch and discolor the decorative surface. Some of the cleaners and chemicals that may cause surface damage are:

- Toilet bowl cleaners and Drain cleaners
- Hydrogen Peroxide or Chlorine bleach
- Oven cleaners
- Metal cleaners and polishes
- Coffee pot cleaners
- Hard water stain removers
- Fruit and berry juice and tub and tile cleaners.

CARE & CLEANING

- Do not place hot frying pans or dishes directly from the oven or cooktop on the laminate surface. Even though Millimetre™ Laminate has high heat resistance, exposure to temperatures greater than 150°C it is not recommended.
- As a precaution, protect the surface from heat-generating appliances such as pressing irons, toasters, curling irons, and electric slow cookers by using a trivet or insulated pad. Prolonged exposure to high temperatures from these sources may damage the décor surface, cause blisters and surface dulling or result in separation of the laminate from the substrate.

SHARP OBJECTS

- Never use knives or other sharp objects directly on the decorative surface. A chopping block or counter saver is recommended.

IMPACT

- Do not abuse the high-pressure decorative laminate by dropping heavy objects such as cans, dinnerware, or glasses or deliberately hammering directly on the surface. Even though decorative laminate have excellent impact resistance, chipping or cracking may occur.

STORAGE & TRANSPORT

TRANSPORTATION STORAGE & HANDLING

- To avoid damage while transportation/shipping, Millimetre™ Laminates should be kept flat. Avoid keeping laminate sheets in bundles for long periods of time.
- Storage and usage of material are best kept in cool/dry areas only. Excessive temperature exposure may lead to cracking and warping.
- Store Millimetre™ Laminates flat/horizontally and off the floor and on pallets or warehouse racking system; top sheet facing down in order to protect the material from damage and reduce the chance of warpage.
- Millimetre™ Laminates should be stored internally where conditions and temperatures are consistently between 25°C & 45°C and 45% to 65% relative humidity levels.
- Good circulation and air movement are recommended around stored sheets.
- Proper handling of material should be conducted by carrying the sheet on its side – Not Flat. Four people to lift and carry sheets in all situations.

PRECONDITIONING FOR FABRICATION

The most important factor in achieving stability when working with Millimetre™ Laminates is during the fabrication preparation; it is always recommended to acclimatize Millimetre™ Laminates within the same area as the substrates it will be bonded to. Again, the optimum temperature is approximately 25°C & 45°C, for both.

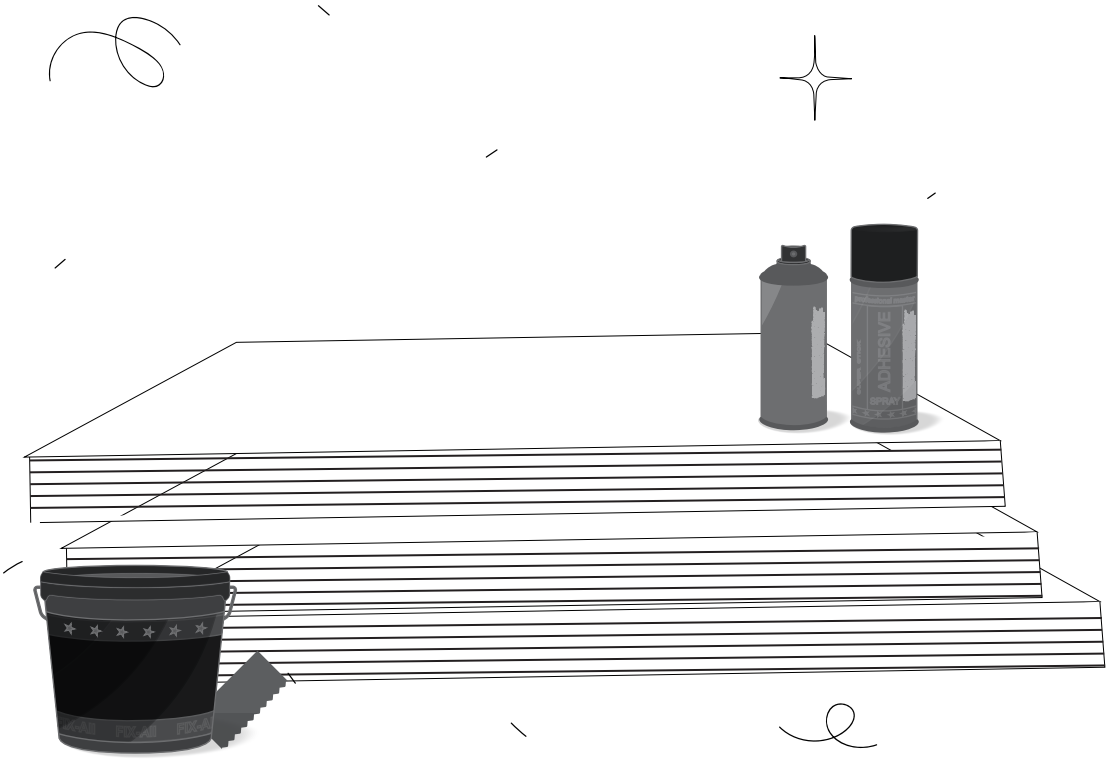
It is recommended to store Millimetre™ Laminate sheets as follows:

- Stack the sheets horizontally and flat in a face-to-face manner at a temperature range between 23˚ and 45°C and at a humidity between 45%- and 65%.
- The stacking must be done at least 4” above the ground on a board that covers the entire surface area of the sheet. Use sufficient and uniform supports under the board to prevent the bending of sheets.
- Never stack the sheets in direct contact with any type of floor.

If horizontal storage is not possible, or only where small stocks of Millimetre™ Laminate sheets are kept, these can be stacked on edge in slightly inclined (80° or thereabouts) vertical racks with support over the entire surface. A cover board should be used to prevent slipping.

Sheets as well as substrate should be allowed to acclimatize and stabilize in the same environment before fabrication for a minimum of three days.

ADHESIVES & SUBSTRATES



TYPES OF ADHESIVES

A general guideline about adhesives used for bonding laminates to different substrates is given below. The end user is, however, advised to check with the manufacturing specification of the adhesive while making the choice of application. The choice of adhesive is based upon the service for which the assembly is intended and upon the bonding facilities available.

Type of Adhesive	Urea/ Melamine Urea-Formalin system	Resorcinol-Formalin system	Epoxy systems	Polyvinyl Acetate based (PVAc)	Contact Adhesives	Hot Melt Adhesives
Description	These are rigid thermosetting adhesives. Curing is by polymerization when the recommended amount of catalyst is added to the resin. The rate of cure rapidly increases with the application of heat.			Aqueous emulsion adhesives which cured by dispersion of the solvent. Available in both single and double-part (catalyzed) varieties.	Poly-chloroprene-based adhesives. Available in solvent or water-based types. Also available with and without a hardener.	Available in pellet or cartridge form.
Information on typical applications and features of the adhesive	Used in flat lamination, hot or cold pressed to bond laminates to most wood-based substrates. Melamine/ Urea is useful for bonding to moisture-resistant core materials.	Used in flat lamination, hot or cold pressed to bond laminates to moisture-resistant wood-based substrates, some flame retardant substrates, and non-combustible substrates. Satisfactory bonds are produced at low pressure.	Used in flat lamination, hot or cold pressed to bond laminates to metal substrates after initial priming. Requires only low pressure.	Used in flat lamination, hot or, more usually, cold pressed to bond laminates to most wood-based substrates. Also used for producing post-formed components. Requires only low pressure. Easy wash down of equipment and removal of glue spillage.	Used for both flat bonding and post-forming. Can be used to bond laminates to a wide variety of substrates. Bond occurs when both coated surfaces are brought into contact. Requires only momentary but high uniform pressure. Can be applied by spray (hot or cold) or by hand application with the serrated spreader. Useful for on-site works.	Used exclusively for edge bonding applications. Will begin to soften under moderately elevated temperatures. Should not be used to edge materials for use near hot surfaces.
Information on typical applications and features of the adhesive	Poor gap filling properties but gives a good bond at relatively low pressures.	Good gap filling properties.	Excellent gap filling properties.	Poor gap filling properties.		
Information ontelegraph-ing with the adhesive			Minimal telegraphing due to high solids content (lack of shrinkage).	Requires carefully controlled glue spread to avoid	Minimal telegraphing providing laminating pressure is not excessive and the glue-line is kept free from debris.	

Typical curing times for the adhesives	Cure time typically 1 to 3 hours at room temperature depending on hardener system.	Cure time typically 5-8 hours at room temperature.	Wide range of room temperature cure times depending on the hardener.	Fast curing at Room temperature giving quick press turn round (20-40 minutes).	Should only be used in warm dry conditions.	
Typical Temperature Resistance	Upto 120°C.	Upto to 150°C.	Upto to 100°C.	Standard up to 80°C. Catalyzed upto 120 °C.	Standard upto 60°C. Catalysed upto 100 °C.	Upto to 50°C.
Typical EN 204 Durability class	D3 – D4	D4	D4	D2 – D3	D1 - D2	D1

Interpretation of Durability Class: Adhesives' grading are part of the BS 2046: 1995 governing the classification of wood glues for non-structural applications.

D1- Interior areas, where the temperature only occasionally exceeds 50°C for a short time and the moisture content of the wood is 15% maximum.

D2- Interior areas, with occasional short-term exposure to running or condensed water and/or to occasional high humidity provided the moisture content of the wood does not exceed 18%.

D3- Interior areas, with frequent short-term exposure to running or condensed water and/or to heavy exposure to high humidity. Exterior areas not exposed to weather.

D4- Interior areas with frequent long-term exposure to running or condensed water. Exterior areas exposed to weather.

TYPES OF SUBSTRATES

GENERAL

Millimetre™ Laminates, up to a thickness of 1.5mm, are surfacing materials that are essentially required to be bonded to a substrate. Thus the bonded assembly acquires the necessary structural rigidity for further fabrication. While there are plenty of choices in Millimetre™ HPL ranges that would match the end user's requirements, following overview of substrates is provided for general understanding. The end user, however, is advised to check with detailed intrinsic properties of the substrate of choice while finalizing its fitness for use.

The basic purposes of substrates are:

- To support the laminate.
- To resist bonded assembly from warping.
- To satisfactorily meet the performance criteria like moisture/humidity resistance, good screw holding capacity, mechanical strength and many such application aspects.

Plywood, Particleboard, Medium, or High-Density Fiberboards are commonly used substrates across the globe due to ease of availability, variety of sizes, and thicknesses, and since they possess the degree of rigidity needed to support the laminate and offer a suitable face for bonding. Plywood and Chipboards are also used in certain geographies as substrates for furniture.

It is essential that the surface of the substrate should be sufficiently smooth to prevent the transfer of surface undulations through to the decorative laminate surface (commonly known as telegraphing). The dimensional movement of these substrates is similar to Laminates. Steel, aluminum, and fiber reinforced plastic (FRP) may be used in some applications, but their dimensional movement is significantly different than high-pressure decorative laminate. This may result in potential panel warpage, stress cracking, open seams, and certain field-related issues.

Plasterboard, Gypsum board, plaster, concrete, and similar materials are not recommended for bonding with Laminates because their internal bond strength is not sufficient for this application.

Certain industrial applications call for specialized substrates such as mineral boards, metal sheets, honeycomb cores, and plastic foams, and these will require special bonding and fabrication techniques.

The commonly used substrates and their overview, are listed below:

Aspects	Plywood	MDF	Particle Board
Substrate construction and production method	Plywood is an engineered wood product made up of sheets of wood veneer. These veneer layers are impregnated with resins and are pressed and bonded together to obtain a consolidated board.	MDF is an engineered wood composite made up of wood fibers. Because the MDF is composed of small wood fibers, there is no visible wood grain, rings, or knots.	Particle board is a wood product made by heat pressing resin coated wood chips, sawmill shavings, or even sawdust and resin together.
General Advantages	• Available in various thicknesses • Strong Material • Less Susceptible to Water Damage • Stainable and Paintable • Holds Screws Well • Possible to Purchase with Low or No VOCs.	• Low Cost • Very Smooth, No Splinters • Easy to Paint • Easy Cutting • Denser and Stronger than Particle Board • Composed of Small Wood Fibers So There is No Wood Grain	• Low Cost • Light-Weight • Perfect for Ready-Made Furniture
General Disadvantages	• More Expensive • Have to Finish Edges Because Layers Show • Plywood Often Splinters • Difficult to Cut	• MDF is Dense, making it Heavy • Cannot Be Stained • Can Dull Blades Quickly	• Low Strength - Cannot Support Heavy Loads • Not as Eco-Friendly as Wood Furniture • Expands or Discolors Due to Moisture
Fire rating	Substrates are made available in flame-retardant grades, which can be used to produce composite panels conforming to various fire performance requirements of Transport, Building or Furniture guidelines and respective regulations. Fire-rated substrates are essentially bonded to Fire rated Laminates to conform to the fire-rating specifications of the respective regulations.		

Information about uses and end product features	High grades can be used for cabinets and shelving.	Generally denser than plywood, the substrate is a stronger material for building.	Most home and commercial builders use OSB particle board for floor and wall bases.
	Those with narrow core strips, less than 10mm in width and edge glued, are excellent substrates for decorative laminates for cabinetry and high class carcass work.	Provides an excellent surface for Laminates bonding, and its excellent machining properties allow finely molded and smooth edge finishes. Primarily used in furniture cabinet work, post forming etc., where its properties are well suited to the needs of these industries	

OTHER SUBSTRATES

BLOCK BOARDS- only suitable as substrates for decorative laminates if their core batons are fairly narrow and edge glued, with double or extra thick surface veneers. Otherwise they are unsuitable because the cores may shrink unevenly in dry conditions, resulting in surface undulations (Telegraphing), or cause physical damages to the Laminates surfaces on a longer run.

The following materials are NOT recommended as substrates for the application of decorative laminates:

- Plastered or cement-rendered wall surfaces Gypsum board (plain or paper-faced) Solid wood with rare exceptions these are unsuitable for direct bonding because of surface irregularities, low internal bond strength, and incompatible dimensional movement.

- Gypsum Board (plain or paper-faced): The paper surface affords little restraint to the dimensional movement of decorative laminate, and can lead to cracking from screw holes and apertures.

- Solid Wood: Not suitable except in very small sizes because of possible surface undulations caused by irregular dimensional movement.

PROCESSING MILLIMETRE LAMINATES

RECOMMENDED PASTING SEQUENCE FOR MANUAL WORKING AT SITES

- Laminate and substrate should be kept for preconditioning/ stabilizing at temperature 23˚-45˚C and humidity 4 5-65% for 72 hours before attempting to bond.
- Clean both plywood and laminate surfaces thoroughly to ensure a smooth, contaminant-free substrate for optimal adhesion.
- Use a Sprayer or Roller or a Carpenter's glue spreader to ensure uniform glue layer on the surfaces.
- Apply the adhesive first on the Laminate surface and allow to dry.
- Apply the glue on the plywood thereby.
- Wait until the laminate glue achieves a dry, non-adhesive state with a uniform semi-gloss appearance on the bonded surfaces.
- Align two edges of the laminate with plywood and bring the glued surfaces into contact.
- Nail the fixed edges to hold the sheet in position.
- Work from the middle portion of the sheet and start applying pressure, by using a wet cloth, and move towards the edge.
- Ensure that pressure has been applied in the whole bonded area.
- The edges will have to be pressed doubly.
- Leave a gap of at least 3.0mm between the bonded panels to allow for expansion.
- Once the bonding is completed fix the edges of the entire sheet by tape or nails.
- For panels larger than 2'x8', recommend using a central 60% support board for consistent pressure and contact.
- For 'L' shaped cutouts, use a router cutter or drill 6mm holes at corners to prevent stress cracking from right-angle cuts.
- Smoothen the all edges by using planer to avoid minor cut or chipping which tends to cracking in laminate at a later date.

GUIDELINES FOR SUCCESSFUL BONDING OF LAMINATES IN STATIC PRESSES

For better understanding of the situation involving bonding of Laminates using static presses, we are sharing our recommended process and the customer shall compare for better results:

- The substrates are calibrated and cleaned well to ensure any dust free surface before taking up bonding. Ensure no pits/dents post calibration. Repeat if pits persist.

- The glue application is done on both sides in an applicator and a suitable glue line thickness is maintained (customer to decide based on the substrate type and quality).
- The glue applied doors are allowed to dry (especially in humid conditions like now) and develop tackiness. With D3, it may reach tackiness in as high as 20 to 25 minutes based on the humidity in the plant.
- Caution must be exercised to ensure appropriate tackiness on the glued surface. Attempting to press before this would cause blisters as the volatiles get trapped.
- The laminate in this case does not require any glue to be applied and is placed on the flush doors directly.
- The assembly of Laminates + Flush door is hot pressed (Normally 3 to 4 minutes would suffice at 80°C). The pressure equivalent must be 2.0MT of a dead load or as specific pressure of 5 Kgs/ Sq.Cm.

  In the case where they are attempting cold pressing, it is all the more simple and the process remains same except last point above. In this case a satisfactory bonding would be accomplished after a minimum of 24 hours.

  Few Trouble shooting tips in order to resolve the issue with respect to each of the bonding related variables:

  - There is a suspicion that the solids in the glue are low and due to this the volatile matter would be proportionally higher. This is a potential reason for bubbles which is coinciding with the present situation.
  - The surface of plywood/ substrate could be hard and less porous which is not absorbing the glue content to enable necessary bonding.
  - The suggested pressing in case of such bubbling issue is to preheat the plywood for about 4 or 5 minutes, coat the glue and allow till tackiness is reached while it simultaneously gets cooled down. Match two perpendicular edges and place the sheet from these edges slowly to drive out the air. Run the hand all around the sheet by applying some pressure. Take the composite into press. Press for 100 to 110 seconds and release the pressure and let the press come down. Immediately, repress for an additional 80 to 90 seconds and unload the press.

FABRICATION/TOOLING TIPS:

Most of the conventional tools, machines and methods used in the fabrication of normal laminates apply, but some additional techniques are needed to take advantage of the full potential of Millimetre™ Laminates.

All saw blades and router bits used for cutting should be Tungsten Carbide tipped and must be sharp to avoid chipping while cutting. Feed rate should be slow and tool speed should be high. However, these aspects vary according to the machine specifications.

The circular cutting saw should be Diamond or Tungsten Carbide tipped. The number of teeth and speed must be chosen according to the machine design.

Use of a sacrificial panel is essential beneath.

The sheets require fine finishing after cutting.

For hand cutting Millimetre™ Laminates use a fine toothed saw, support the sheet well on both sides of the cut to prevent tearing.

Inside corners of cutouts for electrical outlets, sinks, etc., should have a minimum radius of 1/4" (6 mm) and be filed smooth. This reduces the likelihood of stress cracks. Best to use a 2-fluted carbide router bit for flush-trimming on 1/8" inside radius corners.

When nails or screws must be used, it is advisable to first drill an oversized hole through the laminate. This reduces the likelihood of stress cracks.

TYPICAL TROUBLE SHOOTING FOR MANUAL BONDING APPLICATIONS

It is a known fact that climate and environmental factors affect the behavior of all types of decorative laminates. Hence, different issues may be reported during different seasons.

The fabricator will have to be cautious to observe the possible reasons and adhere to recommendations listed here and follow them implicitly in order to avoid failures.

The basic fact is that as humidity rises there is an absorption of moisture by laminates as well as the substrates like plywood, particle board, etc. The absorption in a substrate is higher than laminate in all cases. At a later date, the substrate tends to stabilize itself and shed the excess moisture.

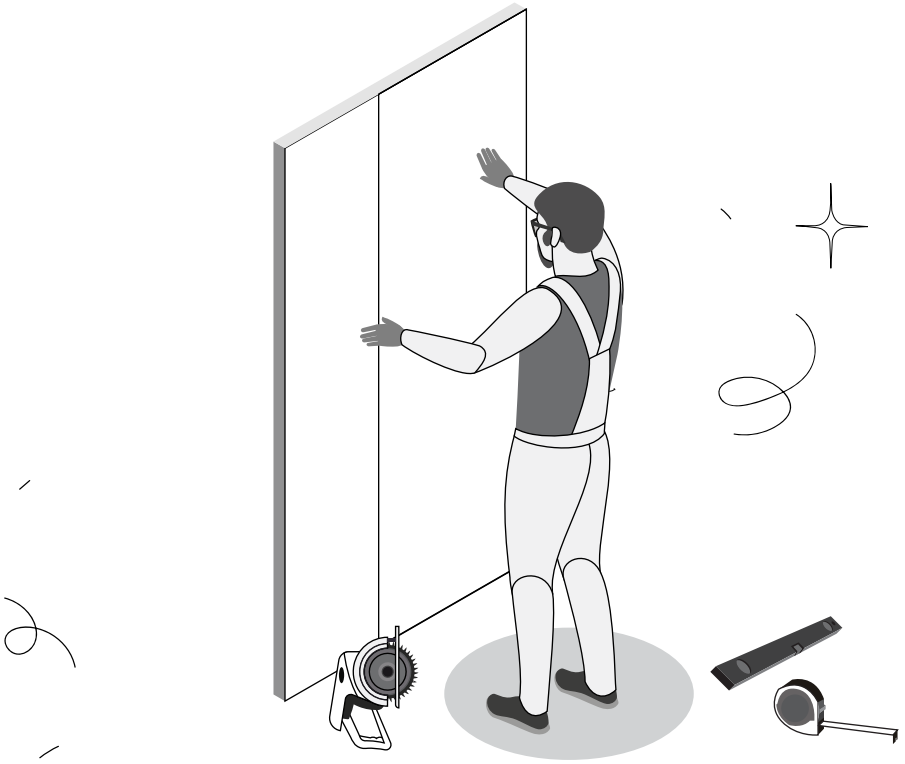
Due to this behavior, the following complications can arise on the bonded assemblies:

S.No	Type of complaint	Possible reasons	Recommendations
1	Air bubbles on bonded assembly	Improper drying of the glue either on the Laminate or on the substrate or both	The drying time of the glue varies depending on the temperature and humidity prevailing at the location. Always ensure that the glue is applied on Laminate first followed thereby on the substrate. The bonding can be done when the adhesive does not transfer to paper in a touch test. Over-drying or under-drying of the glue must be prevented.
		Wet Substrate or moisture absorbed by the substrate	The substrate would absorb moisture during monsoon and push the Laminate to form bubbles while losing the same over a period of time. Ensure that the substrate is dried sufficiently (by using a hot air blower if required) before applying the glue.
		Field bonding of oversized sheets	The maximum size of the sheet used for vertical bonding at the field must be limited to 610mm x 2440mm. Larger panels must be fabricated at workshops and installed to avoid the occurrence of air bubbles.

S.No	Type of complaint	Possible reasons	Recommendations
1		Non-uniform pressure is applied for bonding	After aligning the glue-applied Laminate to the glue-applied substrate, the contact can be made while applying uniform pressure. Work on the bonded surface to apply uniform pressure to ensure full contact. Pressure should be applied first in the middle portion of the assembly and work towards the edges to avoid air trapping. The edges must be pressed twice.
		Less gap between bonded panels to accommodate expansion	Sufficient spacing is required between panels to allow for movement and expansion.
2	Improper bonding of Laminate to substrate	Improper conditioning of the Laminate and the Substrate	Allow both Laminate and substrate to acclimatize for 48 hours at the location where bonding or fabrication is taking place. There must be proper air circulation at the location.
		Improper practices	Ensure complete bonding of the Laminate to the substrate, especially in the edges by adopting correct practices suiting the environment and location.
		Foreign particles entrapped while bonding	Thoroughly clean the substrate and the sanded side of the Laminate to remove any trapping of foreign particles.
		Non-uniform glue line	Ensure that the glue line in the bonded assembly is uniform by adopting the correct practices.
		Adhesive condition	The gluing temperature of the adhesive must be at least 27°C and must be thoroughly stirred before use.
3	Warping of the Laminate	Top few sheets in the stack or storage area warp	Ensure storage of Laminate horizontally with the top sheet turned décor face down. Place a caul board or a thick board like plywood or particle board to prevent warpage of Laminate. Rotate the sheet stack to ensure older sheets are taken to use first. Never store the Laminate in contact with floor. Always use a raised full size support. However, a warped laminate can always be taken for bonding unless the warp is so high that handling itself becomes very difficult. Warp in Laminate prior to bonding is not a cause for warp in the finished panel.

Using rollers rather than platens, are not recommended for bonding laminates to substrates. Such arrangements are designed for use after glue/ adhesive coating and prior to feed the laminate-substrate assembly into static press for accompanying bonding. Attempting to bond by using such machinery is purely at the user's risk since this process does not take care of the desired contact time that would result in satisfactory bonding.

HI.LAMM™



GUIDELINES FOR COMPACT LAMINATES

- Millimetre™ Hi.Lamm® is a thick and heavy sheet material. During transport, use pallets of sufficient size to support the whole of the sheet area. Pallets must be strong and stable enough to support their load without bending or buckling.

- The surface of each board must be free from debris, grit, or foreign bodies which, by getting embedded under the weight of the stack, can damage the laminate surface.
- When loading and unloading, do not push or drag boards over one another; lift cleanly by hand or suction device.

- Do not slide the Compact boards when it is required to shift them. Always lift board by board by holding in two ends. This helps avoid scratches on surfaces and minimizes the risk of accidents.

STORAGE

- Ensure storage of Millimetre™ Hi.Lamm® in dry, clean, frost-free, and enclosed warehouses where normal interior conditions (18°C - 45°C and 50% - 65% relative humidity) are maintained.

- Cover the top board of each stack with a moisture barrier/cover board, with sufficient weight to remain flat and in contact with the whole surface area of the top Millimetre™ Hi.Lamm®.

- Try and let the Millimetre™ Hi.Lamm® remain in the original packing till the time of use.

- The pallets or Compact boards or cut panels must be stored on a rigid and leveled surface that ensures support all across the full surface area of the boards or panels as the case may be. Millimetre™ Hi.Lamm® will remain flat if stored horizontally in packs on a flat base board, with their edges flush with one another.

- Allow time for the stack of the Compact boards or the cut panels to condition at the fabrication site and allow them to reach equilibrium with the environment.

- Never let the Compact boards or panels rest on moisture-absorbing supports like paper, cloth, or gunny bags. The baseboard must be dry, and should ideally be covered with a material impervious to water, to act as a moisture barrier.

- Protection Peel coat:

  - As far as possible try to keep the protection peel coat film till the installation is complete to avoid scratches, surface stains, dust, etc.
  - In case it is required to remove the protection peel coat film, please ensure that the film applied on both sides has to be removed at the same time.
  - Never keep one side's film intact and remove the film from the other surface. This causes an imbalance in the panel and can lead to warp.

- Maintain this procedure throughout their storage (whether in a warehouse or site) and reinstate it whenever a sheet is removed from the stack.

- Failure to store Millimetre Hi.Lamm flat for any length of time can cause deformation which is almost impossible to rectify, particularly with thicker boards.

FABRICATION

GENERAL

- The greater thickness of Compact Grade Laminates imposes greater demands on cutting tools and causes greater wear & tear.
- Slower feed speeds are required. The degree of feed speed reduction depends on the thickness of the compact laminate and the quality of finish required.
- Consult tool manufacturers as to the type and quality of tungsten carbide tipping needed to provide the best performance. For long production runs, and where a high quality finish is required, please use PCD (Polycrystalline Diamond) tooling.
- In all machine processes, avoid localized heating caused by poorly maintained saws and cutters.
- Ensure that the fabrication is done by an experienced and well trained team.

SAWING

Circular Saw blades are normally suitable for cutting Millimetre™ Hi.Lamm®. Saws of less than 2mm in thickness are not recommended.

Break-out on the underside of Compact Laminates can be reduced by various methods:

- using a pre-scoring blade on the underside (recommended).
- using a base-board of plywood or hardboard beneath the sheet.
- altering the exit angle of the saw blade by adjusting the height setting.
- When sawing Compact Laminates with two decorative faces, the feed speed essentially governs the quality of the saw cut. A speed of between 0.03mm and 0.05mm per saw tooth has been found to be the most successful.

TYPICAL TOOL AND MACHINE PARAMETERS ARE GIVEN IN THE TABLE BELOW (FOR GUIDANCE ONLY):

S.No	Particulars	Units	Typical values
1	**Circular Saw Dimensions:**		
	• Diameter	mm	300-400
	• Material		Tungsten Carbide, Polycrystalline Diamond etc.
	• Thickness	mm	3.0 - 4.0
	• Speed of the saw	rpm	2500 – 6000
	• Teeth	nos.	72 - 108
2	**Scouring saw**		Recommended
3	**Pressurized holding beam**		Mandatory to prevent vibration of the board
4	**Cutting speed**	meters/min	8 to 16

Note :

The higher the saw blade, the better the top cut and the worse the bottom cut; and vice versa

PROFILE CUTTING AND EDGE FINISHING

- It is not necessary to apply edging strips or edge sealants to Millimetre™ Hi.Lamm®, and for many applications clean sawn edges are sufficient.
- To achieve a superior finish or a profiled edge, use a spindle molder or router. For this type of work PCD tooling is recommended. It is not possible completely to avoid cutter marks, but they can be minimized by feeding the work at a constant controlled speed with a mechanical power feed.
- Take care to avoid pausing during cutting and profiling, as burn marks which are difficult to remove may result. Where edges must be completely free from cutter marks, carry out a further sanding and scraping operation.
- Buffing with steel wool and applying silicone free oil enhances edges. Chamfering or profiling the edges of Compact Grade panels reduces the risk of edge impact damage.

DRILLING

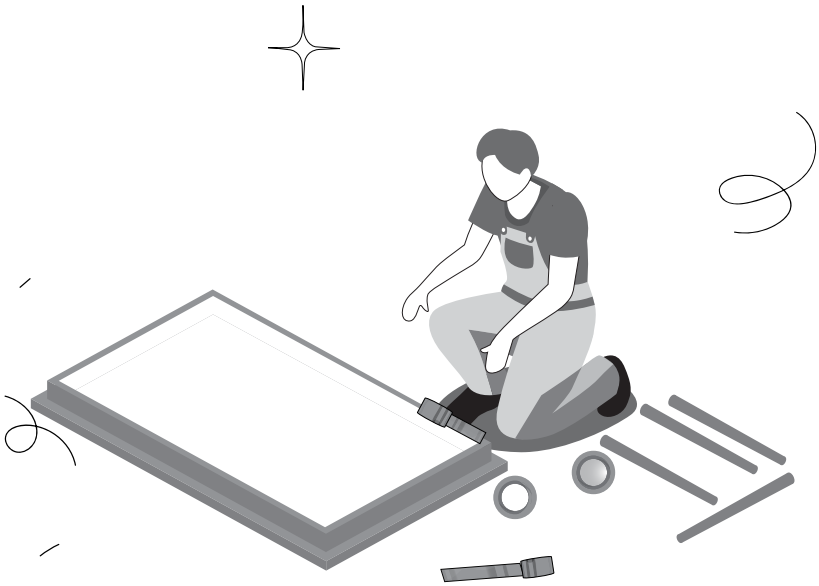
- The most suitable drills for use on Millimetre™ Hi.Lamm® are those designed for plastic sheet materials. These drills are Carbide tipped HSS and have a point angle of 60° - 80° instead of the normal 120° for drilling metal.
- To avoid break-out on the reverse side, gradually reduce the feed speed of the drilling head and the pressure applied when approaching the point of breakthrough.
- Working on a firm underlay, such as plywood or chipboard, also reduces the risk of break-out.
- For blind boring into the face, the depth of the hole should be such that at least 1.5mm of material remains between the bottom of the hole and the other side of the sheet.
- TCT lip and spur drills produce clean flat-bottomed blind holes, with less risk of point penetration on the reverse side. This allows maximum depth of material to be used for fixings. Compact Grade sheets less than 10mm thick are not suitable for blind fixing.
- When drilling parallel to the surface (edge drilling) at least 3mm of material must remain on either side of the hole. Threaded holes can be produced using engineer's screw cutting taps. Self-tapping screws or threaded brass inserts may also be used.

MAINTENANCE & CLEANING RECOMMENDATIONS

- Though, Millimetre™ Hi.Lamm® do not need special care, due to its resistant, hygienic and dense hard surface, as a general rule, clean immediately any spilled substances such as tea, coffee, wine etc., as the cleaning effort increases if they are left to dry.
- Cleaning agents must in particular not contain any abrasive components, as they may adversely affect the texture gloss or scratch the surface.
- As many kinds of soiling can occur, from slight and fresh to heavy and stubborn, and a huge range of different substances may be involved, it is essential to use the correct cleaning procedure.
- Placing burning cigarettes on the compact laminate surface leads to surface damage-Always use an ashtray.
- Millimetre™ Hi.Lamm® surfaces should not be used as a cutting surface, as this can leave cutting marks-Always use a chopping board.
- Placing hot cooking utensils such as saucepans, hot cookers and frying pans directly from the hob or oven onto the compact laminate surface should be avoided, as, depending on the heat exposure, a change in the gloss appearance or damage to the surface can arise-Always use heat resistant mats.
- Spilled liquids should always be cleaned up immediately, especially in the areas around cut-outs and joints, as prolonged exposure to some substances may cause a change in the appearance of the compact laminate surface.

BAND.EDGE®

— BETTER.FINISHED —



Millimetre™ Band.Edge® tape is a thermoplastic edge banding product with protective and decorative properties for finishing narrow areas on wood-based panels. Millimetre™ Band.Edge® is made of PVC (Polyvinyl Chloride) and is uniformly colored through. A universal bonding agent (primer) is applied to the reverse.

USES / AREAS OF APPLICATION

Millimetre™ Band.Edge® is used to finish open narrow areas of laminated wood-based materials such as chipboard, MDF, HDF and ply boards and provides the perfect finishing touch for all decorative surfaces. It can be used in a wide range of applications: furniture for kitchens, bathrooms, offices and bedrooms, living rooms, exhibition builds and shopfitting systems. Millimetre™ Band.Edge® is also suitable for finishing individually shaped freeform components. Due to the chemical properties of colored PVC, the effect of pressure and heat on dark and intense shades of color can have an influence on possible discolorations in the milled radius.

PROCESSING

Millimetre™ Band.Edge® can be processed on conventional edge banding machines using hot-melt glue systems, as well as on automated machining centers. The individual processing steps such as gluing, trimming, milling, scraping and buffing are all quite straightforward. Millimetre™ Band.Edge® is also suitable for cold glue activation processes using white PVA glue.

ADHESIVE / ADHESIVE APPLICATION

The primer coating on Millimetre™ Band.Edge® is configured for use with EVA, PVA and PUR hot-melt adhesives. Adhesives that are highly heat resistant should be used where the product is likely to be exposed to critically high temperatures, e.g. in the kitchen. Polyurethane hot-melt adhesives are particularly suitable for use in damp conditions. Always follow the instructions of the respective adhesive supplier. The amount of glue required varies depending on the type of adhesive (see manufacturer's specifications), the board density, the edge banding material and the feed rate. The adhesive should be applied evenly and in sufficient quantity so that small beads can be pressed out under the edge banding and any gaps in between the wood chips are filled. It is essential that the pre-melter contains a sufficient amount of adhesive to ensure that both, the glue spread and the temperature remains constant. Due to the precise pre-tensioning and plane-parallelism of Millimetre™ Band.Edge®, a tight, almost invisible seam is achieved.

Pre-tensioning also ensures optimum bonding by taking up any excess glue at midpoint on the back of the edge banding and the anchor points of the glue to the chipboard.

PROCESSING TEMPERATURE

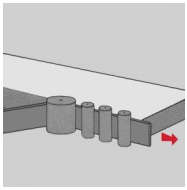
The work should be carried out at room temperature. Prior to processing, the edge banding tapes and substrates should be conditioned at normal room temperature. If the edge banding or boards are too cold (e.g. due to storage in unheated areas), the hot-melt adhesive applied will set before the edge banding is attached. Therefore, conditioning is essential and draughts should also be avoided. The processing temperature for the adhesive varies between 194°F (90°C) and 446°F (230°C) depending on the type of adhesive. Please refer to the individual manufacturer's specifications for the relevant processing temperatures.

WOOD MOISTURE

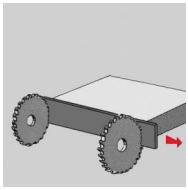
The optimum wood moisture for processing board material is between 7% and 10%.

FEED RATE

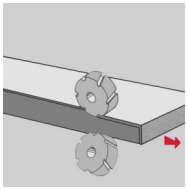
The feed rate is defined by the processing characteristics of the hot-melt adhesive and the method of application (spray nozzle or roller). Please follow the adhesive supplier's instructions. If the feed rate is too high, the hot-melt adhesive may become stringy in consistency, preventing full saturation of the board material. Furthermore, this can cause the application roller to jump and may lead to chatter marks during the subsequent edge banding milling process. If the feed rate is too low, the interval between adhesive glue application and affixing of the edge banding tape is too long. In this case, the temperature falls below the necessary processing temperature and the adhesive will harden before the two surfaces are joined.



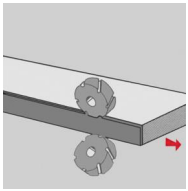
GLUING



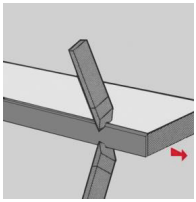
END TRIMING



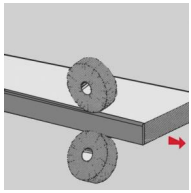
PRE-MILLING: PRE MILL HEAD AT 15-20 ANGLE



RADII / BEVEL MILING



SCRAPER FINISHING



BUFFING

PRESSURE ROLLERS

Whilst taking into account the specification of the machine, to achieve an optimum seam appearance there must be an adequate number of pressure rollers, which are adjusted to the correct setting.

END TRIMMING

The end trim cut is performed using standard set saw blades with pointed teeth. Saw blades with alternate tooth sets are only of limited use as they can cause splintering, particularly when working with thin edge banding.

MILLING

Four- to six-blade cutters with a diameter of approx. 2.75 inch (70 mm) and a rotational speed of between 12,000 and 18,000 rpm should be used. The exact choice depends on the characteristics of the cutter and the machine. Blunt tools running at incorrect speeds can damage the edge banding. If any smears should occur, the speed of the milling cutter should be reduced or the feed rate increased as necessary. To facilitate waste extraction, pre-milling can be carried out in up-milling mode. Precision milling should always be performed in down-milling mode.

SCRAPER PROCESSING

As PVC as a material tends to slightly fade in color after scraping, the scraper blade should not exceed 0.004 - 0.008 inch (0.1 - 0.2 mm). The process requires an almost precise milling accuracy (“without chatter marks”) which can be achieved with milling tools of high concentricity. DIA (diamond tipped) milling tools have proved to be particularly effective. Hot-air units can be used to further optimize scraper processing, particularly where the color is critical.

BUFFING

Millimetre™ Band.Edge® can easily be polished in a radius with buffing wheels. Any color fading resulting from the scraper finishing can simply be polished away using buffing wheels. Furthermore, buffing wheels remove possible contamination (adhesive residue) from the surfaces and/or deburr the edge banding. Adhesive glue remnants can easily be removed using electronically controlled separating agent spray units; this also reduces scraper blade wear.

MANUAL PROCESSING

Manual processing of Millimetre™ Band.Edge® can easily be carried out using glue press clamps or edge presses. However, this process requires the use of special adhesives, such as two component part dispersion adhesives, contact adhesive, glues suitable for lacquered or varnished surfaces or PU adhesives. The relevant types and guideline values should be obtained from the respective adhesive manufacturer. Alternatively, edge banding can be processed using small edge banding units or manual handheld edge banding devices.

CLEANING

Millimetre™ Band.Edge® is easy to clean using conventional cleaning agents suitable for plastic surfaces. The use of petrol, thinners, acetic acid, nail polish remover or similar solvent-based or alcohol-based substances may partially dissolve the surface and should therefore be avoided.

MONEY BACK GUARANTEE

ELIGIBILITY

The Money Back Guarantee applies to customers who have purchased laminate products directly from Lamitude/Authorised Distributors and have followed the specified installation guidelines.

DURATION

The Money Back Guarantee is valid for a period of 30 days from the date of purchase.

CONDITIONS OF REFUND

• Installation must have been carried out following the provided guidelines.

• Any damage caused by improper handling, installation, or misuse will void the Money Back Guarantee.

REFUND PROCESS

• Proof of purchase, including the original receipt, must be provided.

• A thorough inspection of the laminate and installation will be conducted before processing the refund.

REFUND AMOUNT

The refund will cover the cost of the laminate product only and does not include any additional charges such as installation, delivery, or other services.

INCLUSION

Moneyback guarantee is valid under the following conditions as a result of any manufaturing defects :

- Cracking of Laminate
- Negative Bending
- Blister Bubble
- De-lamination

Air bubble and 90° cracks are application errors hence no such claims will be entertained.

RETURN SHIPPING

Customers are responsible for the cost of return shipping unless the product is deemed defective or damaged upon receipt.

PROCESSING TIME

Refunds will be processed within 30 days after the laminate is received and inspected.

RESCINDING THE GUARANTEE

Lamitude reserves the right to rescind the Money Back Guarantee if there is evidence of fraud, misuse, or violation of the terms and conditions.

By purchasing laminate products from Lamitude, customers agree to abide by these Money Back Guarantee terms and conditions. Lamitude reserves the right to modify these terms at any time.

DISCLAIMER:

- Millimetre™ products and samples are produced within the specified color tolerances and the colors (of production batches) may differ, even if the same color is used. Customers and third parties must have a professional adviser inform them about (the suitability of) the Millimetre's products for all desired applications.
- Lamitude reserves the right to change (the specifications for) its products without prior notice.
- Lamitude is not liable (neither contractual nor non-contractual) for any damage arising from or related to the use of this document, except if and to the extent that such damage is the result of willful misconduct or gross negligence on the part of Millimetre™.
- Lamitude is not responsible for consequences arising due to
  - Non-recommended fabrication practices.
  - Improper storage and handling of the Millimetre™ products.
  - Product misuse.

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