

# Laminex® AbsoluteMatte®

Laminex AbsoluteMatte, a part of the Laminex Absolute Series, is a next generation surfacing material. Created using advanced technology, it offers a super matte, soft touch finish that is coupled with fingerprint resistance that will enhance any space with a touch of elegance

## APPLICATIONS

Laminex AbsoluteMatte is ideal for high traffic areas such as cafes, restaurants, hotels, retail, healthcare, commercial offices and residential kitchens, bathrooms, laundries and other surfaces where good appearance, durability and resistance to stains are required. It is widely used for benchtops, countertops, vanity units, furniture, tables, doors, store fixtures, bars, partitions and wall linings (applied to substrate).

The anti-microbial properties of AbsoluteMatte make it a hygienic choice for medical/aged care facilities, food preparation/service areas, communal spaces such as sports centres/libraries and education projects.

Note: The supermatte finish of AbsoluteMatte will cause a colour shift from standard laminate. Request a sample for true colour representation.

Note: Laminex AbsoluteMatte

## PRODUCT PERFORMANCE



laminex has good colour retention and dimensional stability in normal interior applications. However; prolonged exposure to sunlight may cause shrinkage and/or some change in colour: Laminex AbsoluteMatte is therefore not recommended for external applications or interior applications with prolonged exposure to direct sunlight. AbsoluteMatte should not be used where temperatures exceed 135°C for prolonged periods of time.

## HIGH PRESSURE LAMINATE PANELS

Where panels are pressed for uses such as wall panels or cabinetry, panels should be balanced by bonding laminate of the same thickness to the rear of the panel to minimise bowing.

## WHEN SPECIFYING

Surfacing shall be Laminex AbsoluteMatte laminate as distributed by Laminex Australia. Colours and/or patterns shall be .....

## 3rd PARTY CERTIFICATIONS

Laminex Protec+® has been independently tested in accordance with a number of leading standards, including: ISO22196:2011, JIS Z2801 and ASTM G21, which measure antibacterial activity and fungal resistance.

## PRODUCT CHARACTERISTICS

Sizes (Nominal)	3000mm x 1200mm
Thickness:	0.7mm (nominal)
Weight:	1.0kg/m <sup>2</sup> approx.
Finish:	AbsoluteMatte
Colours and Pattern Range:	Refer to current Product Availability Chart.

High Pressure Decorative Laminates		
Inspection Requirements		
Attribute	Requirement	
General Inspection	Viewing Distance	750 to 900mm
	Lighting Conditions	Intensity 800 – 1000 lux over the whole area
	Lighting Type	Overhead white fluorescent lights, of colour temperature approximately 5000K
Colour and Pattern Consistency	When inspected in daylight or under D65 standard illumination, and under tungsten illumination, there shall be no significant difference from the approved reference sample held by Laminex.	
Surface Finish	When inspected at different viewing angles, there shall be no significant difference from the approved reference sample held by Laminex.	
Visual Inspection	Dirt, spots and similar	Maximum 1mm <sup>2</sup> /m <sup>2</sup> and is proportional to the sheet size. Total admissible area of contamination may be surface defects concentrated in one spot or dispersed over an unlimited quantity of smaller defects.
	Fibres, hairs and scratches	Maximum 10mm/m <sup>2</sup> and is proportional to the sheet size. Total admissible area of contamination may be surface defects concentrated in one spot or dispersed over an unlimited quantity of smaller defects.

PRODUCT PERFORMANCE Cont.

High Pressure Decorative Laminates					
Dimensional Tolerances (ISO 4586-3:2015, Clause no.)					
Typical Properties	Clause	Units	Typical Values		
Thickness	6.3	mm (max)	0.67 mm tolerance $\pm 0.03$ mm (span of 0.06mm)		
			In-sheet tolerance $\pm 0.015$ mm (span of 0.03mm)		
Edge Defects	6.2.5.2	mm	$\leq 10$ mm		
Broken Corners	-	-	$\leq 10$ mm - no more than 1 per sheet		
Sanding Defects	6.2.4	-	Slight chatter marks (i.e. Surface undulations due to the sanding process) are allowed.		
Flatness	6.3	mm (max)	Length – 75mm Width – 10mm		
Length and Width	6.3	mm	+ 10mm / -0mm		
Straightness of edges	6.3	mm/m (max)	1.5mm/m		
Squareness	6.3	mm/m (max)	1.5mm/m		
Performance Properties (ISO 4586-2:2015, Clause no.)					
Typical Properties	Clause	Attribute	Units	Typical Values	
Resistance to Surface Wear	11	Wear Resistance	Revolutions (min)	Initial Wear $\geq 150$	
				Average Wear $\geq 350$	
Resistance to Impact by Small Diameter Ball	24	Force	N (min)	$\geq 20$	
Resistance to Scratching	29	Force	N (min)	$\geq 2.0$	
		Rating		3 – Textured finishes	
Resistance to Dry Heat	18	Appearance	Rating (min) (Not Worse than)	4 – Slight change of gloss and/or colour, only visible at certain viewing angles	
Resistance to Wet Heat at 100°C	42	Appearance	Not Worse Than	4 – Slight change of gloss and/or colour, only visible at certain viewing angles	
Resistance to Steam	15	Appearance	Not Worse Than	4 – Slight change of gloss and/or colour, only visible at certain viewing angles	
Resistance to Immersion in Boiling Water	13	Mass Increase	% (max)	$\leq 20$	
		Thickness Increase	% (max)	$\leq 23$	
		Appearance	Not Worse Than	4 – Slight change of gloss and/or colour, only visible at certain viewing angles	
Dimensional Stability at Elevated Temperature	20	Cumulative Dimensional Change	% (max) L	0.75% with grain	
			% (max) T	1.25% across grain	
Resistance to Staining (See STAINING AGENT - Chemical Group Listings section)	30	Appearance	Rating (min)	Groups 1 & 2	5 – No visible change
				Groups 3	4 – Slight change of gloss and/or colour, only visible at certain viewing angles
Lightfastness When tested in contrast with Blue wool 6 Ref: ISO 105-A02	32	Contrast	Grey scale rating	4 to 5	
Resistance to Cracking Under Stress	27	Appearance	Not Worse Than	4 - Hairline cracks only visible under x6 magnification	
Formaldehyde Emissions (Gas Analysis Method)	ISO12460-3	Panel Emission	mg/m <sup>2</sup> hr	$\leq 1.0$	

## PRODUCT PERFORMANCE Cont.

Chemical and stain resistance (Based on ISO 4586-2:2015 Clause 30 Test method with recommended exposure time of 24 hours)		
	Chemicals	Rating
Acids	Acetic Acid (98%)	Excellent
	Acid Dichromate (5%)	Excellent
	Chromic Acid (60%)	Good
	Formic Acid (90%)	Failure
	Hydrochloric Acid (32%)	Excellent
	Hydrochloric Acid (10%)	No Effect
	Nitric Acid (20%)	Excellent
	Nitric Acid (30%)	Fair
	Nitric Acid (65%)	Failure
	Nitric Acid (70%)	Failure
	Nitric Acid 65% : Hydrochloric Acid 32% (1:3)	Fair
	Perchloric Acid (60%)	Good
	Phosphoric Acid (85%)	No Effect
	Sulphuric Acid (25%)	No Effect
	Sulphuric Acid (33%)	No Effect
	Sulphuric Acid (77%)	Good
	Sulphuric Acid (85%)	Fair
	Sulphuric Acid (95-98%)	Fair
	Sulphuric Acid 77% :Nitric Acid 70% (1:1)	Failure
	Sulphuric Acid 85%:Nitric Acid 70% (1:1)	Failure
Bases	Ammonium Hydroxide (28%)	No Effect
	Sodium Hydroxide (10%)	No Effect
	Sodium Hydroxide (20%)	Excellent
	Sodium Hydroxide (40%)	No Effect
	Sodium Hydroxide (solid - mini pearl)	No Effect
Biological Stains & Halogens	Aniline Blue (1%)	No Effect
	Basic Fuchsin (0.5%)	No Effect
	Carbol Fuchsin (1%)	Fair
	Azure Eosin Methylene Blue (1%)	Good
	Eosin Y (1%)	No Effect
	Gentian Violet (1%)	Excellent
	Congo Red (1%)	No Effect
	Malachite Green Oxalate (1%)	Excellent
	Methyl Violet (1%)	No Effect
	Methylene Blue (1%)	No Effect
	Safranin O (1%)	Good
	Sudan III (1%)	Excellent
	Wright Stain (1%)	Good
	Iodine (0.05N)	Good
	Iodine Crystal	Excellent
Tincture of Iodine (Betadine)	No Effect	
Salts	Iron (III) Chloride (10%)	No Effect
	Copper Sulphate (10%)	No Effect
	Potassium Iodide (10%)	No Effect
	Potassium Permanganate (10%)	Fair
	Silver Nitrate (1%)	No Effect
	Silver Nitrate (saturated solution)	No Effect
	Sodium Chloride (10%)	No Effect
	Sodium Hypochlorite (13%)	No Effect
	Zinc Chloride (saturated solution)	No Effect

PRODUCT PERFORMANCE Cont.

Chemical and stain resistance (Based on ISO 4586-2:2015 Clause 30 Test method with recommended exposure time of 24 hours)		
Organic Chemicals	Amyl Acetate	No Effect
	Dimethylformamide	No Effect
	Formaldehyde (37%)	No Effect
	Petrol, unleaded	No Effect
	Hydrogen Peroxide (30%)	No Effect
	Methyl Ethyl Ketone	No Effect
	n-Butyl Acetate	No Effect
	Phenol (90%)	Good
	Xylene	No Effect
Solvents	Acetone	No Effect
	Butanol	No Effect
	Dichloromethane	No Effect
	Ethanol	No Effect
	Ethyl Acetate	No Effect
	Hexane	No Effect
	Methanol	No Effect
	Naphthalene	No Effect
	Tetrahydrofuran	No Effect
	Toluene	No Effect
Commercial Cleaning Agents	Commercial cleaner (60% phosphoric and sulphamic acids)	No Effect
	Commercial cleaner (30% caustic)	Excellent
	Commercial cleaner (10% citric extracts)	No Effect
	Commercial cleaner (10% surfactant)	No Effect
	Commercial cleaner (10% ethanolamine, diethanolamine, sodium carbonate, 2-butoxyethanol )	No Effect
	Commercial cleaner (60% phosphoric and sulphamic acids)	No Effect
	Commercial cleaner (10% quaternary ammonium compounds)	No Effect
	Commercial cleaner (30% sodium hypochlorite)	No Effect
Household Stain Agents	Red Wine	No Effect
	Coffee	No Effect
	Curry Powder	No Effect
	Curry Paste	No Effect
	Grape Juice	No Effect
	Mustard	No Effect
	Salt or Sugar	No Effect
	Vinegar	No Effect
	Biro Ink	No Effect
	Cooking Oil	No Effect
	Eyebrow Pencil	No Effect
	Lipstick	Excellent
	Nail Polish	Excellent
	Shoe Polish	No Effect
	Tea	Excellent
	Whiskey	No Effect
	Crayon	No Effect
	Hair dye	Fair
	Sorbelene (hand lotion)	No Effect
	Pencil	No Effect
Soy Sauce	No Effect	
Tomato Sauce	No Effect	

PRODUCT PERFORMANCE Cont.

Each chemical or stain agent was tested for 24 hours exposure at room temperature, under a watch glass to minimise evaporation and maintain the correct stated concentration. After the exposure time, the test area was washed with water and wiped clean with a soft cloth. The specimen was inspected and evaluated at various angles and from a distance of 400mm, then graded according to the following classifications

Rating 24 hour exposure	
No Effect	No visible change of colour/gloss/corrosion or damage on the surface
Excellent	Very Slight change of gloss and/or colour only visible at certain viewing angles
Good	Slight change of gloss and/or colour
Fair	Moderate change of gloss and/or colour
Failure	Corrosion/damage on surface

PRODUCT PERFORMANCE Cont.

Chemical and stain resistance (Based on ISO 4586-2:2015 Clause 30 Test method with recommended exposure time of 24 hours)		
Staining Agent	Test Conditions	Contact Time
Group 3		
*Sodium hydroxide (25% solution)	6.1.5.1 Procedure A Apply staining agent at ambient temperature	10 mins
*Hydrogen peroxide (30% solution)		
Concentrated vinegar (30% acetic acid)		
Bleaching agents and sanitary cleaners containing them		
Hydrochloric acid based cleaning agents ( $\leq 3\%$ HCl)		
Acid-based metal cleaners		
Mercurochrome (2,7-dibromo-4-hydroxymercurifluorescein, disodium salt)		
*Shoe polish		
Hair colouring and bleaching agents		
Tincture of iodine (or 10% povidone iodine)		
Boric acid		
Lacquers and adhesives (except fast-curing materials)		
Amidosulfonic acid descaling agents (<10% solution)		
Group 4		
*Citric acid (10% solution)	16.1.5.1 Procedure B Uniformly bonded to PB	20 mins
Acetic acid (5% solution)		

PRODUCT PERFORMANCE Cont.

STAINING AGENT – Chemical Group Listing Performance Properties (ISO 4586-2:2004, Clause 16, Method A)		
Staining Agent	Test Conditions	Contact Time
Group 1		
*Acetone	16.1.5.1 Procedure A Apply staining agent at ambient temperature	16 hours to 24 hours
Trichlorethane		
Other organic solvents		
Toothpaste		
Hand cream		
Urine		
Alcoholic beverages		
Natural fruit and vegetable juices		
Lemonade and fruit drinks		
Meats and sausages		
Animal and vegetable fats and oils		
Water		
Yeast suspension in water		
Salt (NaCl) solutions		
Mustard		
Lyes, soap solutions		
Cleaning solution 23% dodecylbenzene sulfonate • 10% alkyl aryl polyglycol ether • 67% water		
Phenol and chloramine T disinfectants		
Stain or paint remover based on organic solvents		
Citric acid (10% solution)		
Group 2		
*Coffee (120g of coffee per litre of water)	16.1.5.1 Procedure A Apply staining agent at approx. 80°C	16 hours
Black tea (9g of tea per litre of water)		
Milk (all types)	16.1.5.1 Procedure A Apply staining agent at ambient temperature	
Cola beverages		
Wine vinegar		
Alkaline-based cleaning agents diluted to 10% concentration with water		
Hydrogen peroxide (3% solution)		
Ammonia (10% solution of commercial concentration)		
Nail varnish		
Nail varnish remover		
Lipstick		
Water colours		
Laundry marking inks		
Ball point inks		

PROTEC+® ANTIMICROBIAL SURFACE

Laminex AbsoluteMatte, with Protec+® antimicrobial surface technology, prevents growth of bacteria and inhibits fungus on decorative surfaces.

Laminex AbsoluteMatte with Protec+® provides enhanced antimicrobial protection for the expected life of the laminate surface, backed by a 7-year warranty.

High Pressure Decorative Laminates				
Protec+® Properties				
Attribute	Clause	Values		
Antibacterial Activity and Efficacy (24 hours)	JIS Z2801:2012 Referred to in ISO 22196	PASS = R value > 2.0 orders of magnitude difference between a treated sample and an untreated control or other inert surface Bacterial Strains tested: Staphylococcus aureus (ATCC 6538P) Escherichia coli (ATCC 8739) Methicillin resistant Staphylococcus aureus (NCTC 12493) Pseudomonas aeruginosa (ATCC 15442) Salmonella choleraesuis (ATCC 10708)		
Antifungal (Incubation condition: 30°C for 28 days at 90% relative humidity)	ASTM G21-09	Rating ≤ 2 1 = Traces of growth (less than 10%) 0 = None Fungal Strains tested: Aspergillus niger (ATCC 9642) Penicillium pinophilum (ATCC 11797) Chaetomium globosum (ATCC 6205) Gliocladium virens (ATCC 9645) Aureobasidium pullulans (ATCC 15233)		
Fire Resistance				
AS/NZS 3837: 1998 (Irradiance of 50kW/m <sup>2</sup> )				
Attribute	Range	Typical Values		
		Solid Colour	Stone, Patterns	
Cone Calorimeter (laminare un-adhered)	Group Number	1-3	3	3
	Average Heat Released	kW/m <sup>2</sup>	16.5	16.5
	Average Specific Extinction Area	m <sup>2</sup> /kg	39.1	39.1

Note: Due to test method inconsistencies, the fire resistant performance of this product can sometimes be better than the group number stated in the above table. As this product does not contain fire retarding additives, Laminex declares this product as a Group 3 laminate, even though test certificates may indicate better performance. Laminex takes no responsibility if this product is used in applications requiring a Group number of better fire resistant performance than that stated in this Technical Data Sheet.

Thermal Healing

Tools needed: iron, paper towel, water.

Wet the paper towel and place on the burnished area. Iron 4-5 times with the iron on the highest setting. Remove paper towel and wipe dry. Do not iron directly on to the surface. Repeat as needed.

The formation of steam/heat is what creates the healing process. Once the steam is formed, the healing process is almost immediate. As long as the paper towel or cloth is wet and forming steam, the heat will not increase past the temperature of the steam and damage to the surface will not occur. However, once the steam is gone and there is no moisture left, then it is possible for damage to occur. Do not continue to iron past the point where the moisture is gone or leave the iron on the surface for long periods of time.

Note - The iron should not be held in one place on the paper towel but kept in motion at all times, the iron should not remain on the surface of the AbsoluteMatte product for more than 5 seconds.

Note - Scratches and gouges that have penetrated the surface will not be able to be repaired using this process.

## CUTTING

Laminex AbsoluteMatte has a special fingerprint resistant surface. We recommend the use of sharp, tungsten carbide-tipped cutting blades with low of negative hook profiles. Low feed speeds and high tool speeds are also suggested. A board should be clamped to the saw fence to hold the product down and prevent flutter/vibration while cutting.

## PROTECTIVE FILM

Laminex AbsoluteMatte is supplied with a Polyester protective film which provides a protective layer for transport and handling. The film can be heated when the laminate is subjected to post-forming processes and can be released afterwards. During film application some small particles may become trapped between the laminate and film. These particles can cause an indentation when the laminate is subjected to press bonding. It is recommended that the surface is inspected and any specks removed prior to pressing. Consequently the film may be removed and the laminate cleaned prior to pressing and post-forming and then the finished laminated work piece recovered for delivery to the worksite. The polyester film can be difficult to remove after nine months from application to the laminate.

## STORAGE

Laminex AbsoluteMatte laminate sheets should be stored horizontally, a cover board should be placed on top to protect the material from possible damage and reduce the chance of the top sheet warping. The material should be protected from light, heat and moisture and should never be stored in contact with the floor or an outside wall. It is important that Laminex AbsoluteMatte laminate sheets be stored at a temperature not less than 16°C and a relative humidity not less than 40%. Prior to fabrication, allow the Laminex AbsoluteMatte laminate sheets and the substrates to acclimatise for at least 48 hours at the same ambient conditions. Optimum conditions are approximately 24°C and relative humidity of 45% to 55%. Provisions should be made

for the circulation of air around the components.

Note: Stress cracking can result when high-moisture material is bonded and subsequently exposed to low humidity conditions. Excessively dry material may expand and cause bubbling if improperly glued.

## FABRICATION

### – PREFORMING PROCEDURES

#### BOARD SUBSTRATE

#### BEND PROFILE

Laminex laminate should be fully supported by substrate when glued. Do not bond directly to plaster, plasterboard, solid timber or concrete. The correct profile on particleboard or medium density fibreboard can be obtained by using specially shaped router blades. The profile should be uniform along the full length of the board with none of the following faults:

1. High spots
2. Bumps
3. Low spots
4. Ridges
5. No surface dust or chips.

For consistent results it is recommended the profile has some lead-in conditioning, be smooth and have a gentle taper and/or step leading into the profile from the board surface.

It is also generally good practice to pass a sanding block over the back of the laminate and the substrate to smooth and inspect for bumps and dents before proceeding to the next fabrication stage.

#### GLUING TIPS

For the best bonding result, always follow the adhesive manufacturer's directions for correct fabrication instructions.

Laminates have an inherent tendency to display undulations. To minimise this effect the following recommendations may assist to provide the best results.

#### Contact adhesives

Contact adhesives are suitable for gluing the laminate to the boards in conjunction with static post-forming

machines.

Glue line should be evenly applied to both contact surfaces avoiding lumps of glue, sawdust, chips, etc., as they may telegraph through or fracture the laminate when pressure is applied during bonding and forming.

#### Cross linking PVA (CPVA) system

CPVA is a water based adhesive that when applied to a substrate causes the fibre to swell. Adding heat to the process produces steam, which exacerbates the swelling. This swelling/unevenness can telegraph through to the surface of the laminate sheet.

Using too much glue will amplify unevenness because of the higher water content.

Avoid glue lumps, unevenly distributed glue, sawdust, chips etc, as they may telegraph through to the decorative surface, fracture the laminate when pressure is applied during bonding and forming.

Whether contact adhesive or CPVA, it is important to follow the instructions provided to the adhesive manufacturer.

#### BONDING TIPS

Low temperatures and pressures on the bonding press equipment will provide best results. The lower the pressure, the better the laminate surface appearance will be.

Keep press surfaces clean so dents and contamination are not transferred to the laminate's decorative surface. Using a flat surface or pad such as a 3mm MDF to press against the decorative surface provides for smoother results.

Note: It is important to note that for a given press pressure the actual pressure applied to the work piece is dependent on the size of the piece. At the same gauge pressure, a large piece will be exposed to less pressure than a smaller piece.

To achieve a consistent finish, calculate the pressure requirement for each work piece size using information



available from the equipment supplier, or use spacer boards to ensure even pressure is distributed across the press platen and work piece. Maintain glue applicators to avoid contamination. Contamination may result in pressing imperfections, causing telegraphing through to the decorative surface of the laminate. Similarly, maintain pressing surfaces free of dints and lumps.

**POSTFORMING**

Laminex AbsoluteMatte can be formed similarly to conventional High Pressure Laminate. It is recommended that the laminate be preheated to 120°-140°C. Ideal postforming temperature is approximately 160°-185°C. Laminex AbsoluteMatte can be postformed to a minimum internal radius of 8mm, in machine direction.

Laminate Thickness (mm)	Required Heatup Rate to 163°C ± 2 sec
0.60	24
0.62	24.8
0.63	25.2
0.64	25.6
0.65	26
0.66	26.4
0.67	26.8
0.68	27.2

Laminex Laminate formability is tested in accordance with the conditions detailed in AS/NZS 2924.2, clause 19, method A and ISO 4586.2, clause 39. When forming at these conditions, a high yield can be maintained within the capability and condition of the forming equipment.

For those with equipment or processes unable to utilise the Laminex AbsoluteMatte tight radii capability, improved yield recovery can be achieved at radii within the capability of such equipment and processes. Control of common postforming variables using techniques such as: preforming processes, preconditioning, temperature control, elimination of drafts and proper equipment adjustment

and maintenance, can improve bending success.

Terminology describing postforming equipment as follows:

- Static post-forming relates to the work piece being held in a fixed position during the forming process.
- Flow-thru relates to the heating zone and pressure bending zone being in a fixed position and the work piece travelling past these zones during the forming process.

**POSTFORMING PROCESS GUIDELINES FOR EQUIPMENT CATEGORIES**

**SECTION 1: Precision control specialised tight radius postforming equipment**

Generally associated with:

- Flow-thru post-forming containing a bank of three or more individually thermally controlled heating lamps
- Glue applicators and precision constant pressure bending roller zone of more than 1 meter in length.
- Static post-forming using the precision Heat controlled bar with controllable positioning through the bend whilst maintaining consistent pressure to follow the profile.

**Profile tips**

If the heat-up rate of the laminate is too rapid, overshoots or if heat applied is variable, random failure due to blistering may occur. As a safeguard against this, it is recommended that regular heat up time checks are undertaken to track machine performance, temperature control fluctuations (i.e. overshoot, undershoot and stability). Similarly, if the forming machine doesn't follow the profile small cracks at the top and bottom of the profile will result. Cracks can also result if the laminate does not adhere uniformly to the profile.

The sheet thickness, as well as ambient temperature and drafts close to the work piece, board temperature or speed of movement of forming may affect uniform heating and overall heating time over the distance of the profile.

**Making the bend**

The ends of the laminate sheet 8cm either side of the centre line of the bend should be filed smooth to remove any edge chips or small cracks. Removal of these will help prevent any larger cracks from propagating into the sheet when bending.

Accurately locate the laminate and board in the forming machine so that the bend is made in the correct position, not attempting to pull the laminate around the profile under too much tension.

If too much tension is developed on the bend, tension cracks along both top and bottom radius may occur. This cracking is usually evident immediately after the top is removed from the machine. Too little pressure will leave a gap between the laminate and the board, leaving this susceptible to impact cracking.

**SECTION 2: Manual and semi-automatic (static) postforming equipment**

Generally associated with:

- Semi-automatic flow-thru post-forming equipment containing radiant heating elements, generally on/off control and fixed bending bars.
- Manual and Semi-Automatic Static post-forming equipment containing, a bank of radiant generally ceramic heating elements, sometimes an IR temperature sensor either manual or automatically activated bending bars or a mat to push laminate over the work piece profile.

Due to the diverse processes and equipment available within the category of manual and semi-automatic (static)

equipment, different heat-up rates and processes are mentioned within this section.

It is known that postforming a tight or small radius on a short bed flow-thru and semi-automatic or manual equipment is difficult to achieve or maintain performance consistency. For this reason it is the requirement of the fabricator to determine the capability and performance setting of their installed equipment and associated postforming processes to obtain consistency of yield.

## Forming

There are three main steps involved in bending Laminex laminates.

Step 1. Heat the area to be profiled to the required bending temperature.

Step 2. Bend immediately while still at the correct temperature.

Step 3. Cooling of laminate to set formed shape.

## Heating

The most common type of heater consists of a series of ceramic heater segments which are coupled together to form a continuous bar. In most cases these heaters are set up in banks to allow three heat zones along the machine.

Temperature variations during heating can affect the heat up time range and lead to possible failures when bending. As a safeguard against this, regular heat up time checks should be undertaken at the centre and both ends of the machine. The most common method of heat up checking is by placing sample pieces of Laminex laminate for example (250mm x 75mm) at the three stations mentioned above.

Apply Tempilaq to each piece, time to melt (should be approximately 30 seconds) and then time to blister. If there is a variation in blister time between any of the laminate samples of 5 seconds or more, then adjustment of the heater bar

## Heater setup procedure

Step 1. Elements must be centred over the bend to be made.

Step 2. Usually the heater elements are closer to the work surface at each end than at the centre. The reason for this situation is to compensate for the heat loss around each end of the machine.

Step 3. Heater height above the laminate surface is determined by the time it takes the laminate surface to reach a temperature of 163°C which should be between 24 to 28 seconds. Laminex manufacture postforming HPL in accordance with AS/NZS 2924.1

& 2 and ISO 4586. 2 & 3. Laminate postforming conditions are required to heat the laminate so that the time taken to reach 163°C is 1 second per 0.025mm of thickness accurate to  $\pm 2$  seconds. This can be controlled by either adjusting the element's temperature, the height above the laminate's surface or speed of motor drive conveyor. In the case of a continuous forming type machine the surface temperature can be determined by using a temperature indication crayon or liquid, eg. Tempilaq.

Step 4. For a wide bend, the elements can be gently moved backward and forward to give a greater heat spread and maintain a surface temperature to achieve 163°C in 24-28 seconds.

## Bending time

Bending times in the order of 30-50 seconds are generally accepted as practical. To establish bending time, use the following method:

Step 1. Taking an offcut from a part of the sheet adjacent to the area to be formed, determine the blister time (a bubble raised on the heated surface) with a stopwatch. (Normally around 40-60 seconds as a guide).

Step 2. Bend time (Time to obtain forming temperature.)

Bend time = 60% of blister time, eg. If

the blister time was 60 seconds then bend time would be  $60 \times 60\% = 36$  seconds.

If any tightness on bending is detected, there is the potential to increase the heating time but maintain below blister as determined above.

Note: The pattern colour, sheet thickness, as well as room, board temperature or speed of movement of forming (continuous type machine) may affect the heating time due to the differences in heat absorption.

Bend range is normally around 26 seconds if all previous steps have been performed. If no offcut of the material to be formed is available, then the bend time can be approximated by heating the area to be bent to the required bending temperature of 163°C at a heat up time to Tempilaq melt of 28 seconds. Allow a further 5 seconds for the core material to reach temperature then make the bend.

Again, if any tightness is detected, extend the heating time. The operating window can be widened if necessary by slowing the heating time such that a surface temperature of 163°C is reached in 40 seconds. The slower heating rate will lengthen the blister time and bending can be achieved at 47 seconds heat time.

## Making the bend

The ends of the laminate sheet 8cm either side of the centre line of the bend should be filed smooth to remove any edge chips or small cracks. These may start larger cracks leading into the sheet when bending. The laminate should then be glued flat and pressed down and rolled, leaving the laminate for the bend clear of the boards. If using a contact adhesive, ensure adhesive is sufficiently dry and all solvents evaporated before making the bend.

GENERAL SITE WORK NOTES & IN-SITU INSTALLATIONS

Topic	Guideline
Pre-conditioning	<ul style="list-style-type: none"> <li>• Prior to fabrication, laminate and substrate material should be allowed to reach moisture equilibrium under the same conditions for 48 hours.</li> <li>• The recommended environment to achieve this is 20-25°C and 50% relative humidity.</li> </ul>
Storage	<ul style="list-style-type: none"> <li>• Always store sheets face to face with a sheet of protective paper between the faces.</li> <li>• Bulk stocks should be stacked flat and completely supported.</li> <li>• Avoid low humidity &amp; extreme temperature.</li> <li>• Avoid prolonged daily exposure to sunlight as fading or colour change may occur. Use curtains or blinds to prevent direct exposure.</li> </ul>
Fabrication	<ul style="list-style-type: none"> <li>• Laminates can be bonded to a variety of substrates including particle board, medium density fibreboard, plywood, hardboard, core stock, paper honeycomb and aluminium.</li> <li>• The substrate surface must be of sound strength and free of sanding defects to ensure good adhesion to laminate and to minimise “telegraphing” of defects.</li> <li>• Do not bond thin laminates directly to plaster, plasterboard or concrete.</li> <li>• Laminates of less than 2mm thickness should be bonded fully supported to substrate.</li> <li>• For selection of the correct adhesive for your applications, refer to the Trade Essentials - Adhesive Selection guide.</li> <li>• To obtain maximum dimensional stability, unframed panels should have a backing sheet bonded to rear surface.</li> <li>• Ensure sufficient adhesive and mechanical pressure is used to provide a first class bond. We recommend a minimum pressure of 3kg/cm<sup>2</sup> for contact adhesives and 6kg/cm<sup>2</sup> for hard setting glues.</li> </ul>
Joins	<ul style="list-style-type: none"> <li>• Where two fabricated components are to be joined, lightly sand the ends of each component. Apply a complete spread of silicone adhesive to one surface of the components before clamping them together. Close the join and allow excess adhesive or sealant to squeeze out. Secure the join using work top connectors and clean away excess adhesive with appropriate solvent. If shrinkage of adhesive occurs, re-apply a second application to the outside of the join and wipe away excess.</li> <li>• Whenever possible, avoid placement of joins close to sink areas. This can minimise the risk of water damage to joins.</li> <li>• Where external joins are formed with postformed components, it is important to dull any sharp edges using fine sand paper to prevent injury from accidental contact.</li> </ul>
Handling	<ul style="list-style-type: none"> <li>• Keep work area clean to avoid marring and scratching.</li> <li>• Avoid contact with abrasive surfaces or grit. Lift sheets carefully, do not slide on the decorative surface.</li> <li>• Do not use as a work surface.</li> </ul>
Sawing	<p>Hand Sawing</p> <ul style="list-style-type: none"> <li>• A panel saw gives the best result because of the relatively small set of the teeth.</li> <li>• The back stroke should be light and the cutting stroke at approximately 45° to the face of the board. Keep the saw sharp.</li> </ul>
	<p>Machine Sawing</p> <ul style="list-style-type: none"> <li>• Circular saws with 3-4 teeth per 25mm with only a slight set and a saw blade tip speed of 3000 metres/minute will give a clean cut.</li> <li>• For long production runs tungsten carbide tipped blades 300mm to 350mm in diameter and operating at 3000 to 3500 RPM are recommended to achieve this.</li> <li>• Always cut with face up to minimise surface chipping.</li> </ul>
	<p>Jigsawing</p> <ul style="list-style-type: none"> <li>• A clean cut can be achieved with a jigsaw using hardened blades with average teeth and slow feed speed. Non-carbide blades will dull quickly.</li> <li>• Ensure sheet is adequately supported while cutting.</li> <li>• Jigsaws cut with an upward stroke, therefore, in this instance cut from the back of the sheet.</li> <li>• Metal cutting band saws with 32 teeth per 25mm are ideal for shapes.</li> </ul>
Drilling	<ul style="list-style-type: none"> <li>• High-speed twist drills, either hand or power operated, will cut clean holes.</li> <li>• Because of the hard melamine surface, a small pilot hole should be drilled for carpenter’s bits.</li> <li>• Fast cut types give the best results.</li> <li>• For larger holes, 18mm diameter and over, a centre bit should be used.</li> </ul>
Routing	<p>Portable Routing</p> <ul style="list-style-type: none"> <li>• Portable routers with twin fluted tungsten carbide cutters and replaceable tips are recommended for on-site edge trimming or cut-outs for sinks, basins, etc.</li> </ul>
Screwing	<ul style="list-style-type: none"> <li>• Where mechanical fixing of any laminate sheeting is required always use round head screws and cup washers.</li> <li>• Drill the hole slightly larger than the shank of the screw to allow for laminate movement.</li> <li>• Do not over tighten screws as this may cause the laminate surface to fracture.</li> <li>• Nails should never be used.</li> </ul>

## GENERAL SITE WORK NOTES & IN-SITU INSTALLATIONS Cont.

Topic	Guideline
Planing	<b>Hand Planing</b> <ul style="list-style-type: none"> <li>A perfect edge finish can be made with a hand plane. Specially hardened plane irons, such as the Titan high-speed type, which require less sharpening than standard irons.</li> </ul>
	<b>Machine Planing</b> <ul style="list-style-type: none"> <li>Vertical spindle moulding machines with tungsten-tipped cutters operating at 6000 RPM are ideal for edge finishing and for making perfect mitres without any edge chipping.</li> </ul>

## TROUBLE SHOOTING / PROBLEM SOLVING

Postforming Issues		
Issue	Problem	Cause
Cracking	Heat Source	Not enough heat
		Incorrect heater position.
		Inconsistent heat applied (cold spot)
		Incorrect heat up rate (did not use Tempilaq or similar)
		Heat up rate not adjusted in consideration of laminate thickness, room temperature or substrate temperature
	Substrate	Irregular profile radius
		Poor profile machining (high spots, low spots, bumps or ridges)
		Contamination (sawdust or chips)
		Cold substrate takes heat away from laminate
	Glue Line	Uneven glue application (glue lumps, contaminated with sawdust or chips)
	Equipment	Poor alignment
		Laminate under too much tension during bend
		Radius too tight for capability of equipment
Laminate	The ends of the laminate sheet may not have been filed smooth within 8cm either side of the bend centre line (edge crack propagation)	
	Incorrect grade (non-postformable)	
	Laminate too old (poor stock rotation)	
	Laminate exposed to extremes of temperature or humidity during storage	
Blistering	Heat Source	Too much heat
		Inconsistent heat applied (hot spot)
		Incorrect heat up rate (did not use Tempilaq or similar).
Glue Line Delamination	Adhesive	Not enough adhesive
		Inconsistent glue coverage (low spot)
		Incorrect adhesive used
		Contact adhesive not allowed enough drying time and solvents to evaporate
	Equipment	Not enough pressure applied to bend
		Not allowed to cool in position (spring back)
Change of Gloss	Heat Source	Too much heat

TROUBLE SHOOTING / PROBLEM SOLVING

Post-fabrication or Post-installation Issues		
Issue	Problem	Cause
Cracking	Cut out and internal L-shaped sections	Internal corners must have a small (2-3mm) chip free radius
		Ensure that machined edges of cut outs are sanded smooth and that the top edge of the laminate is arched to eliminate the possibility of stress
Impact Cracking	Gap between the laminate and the substrate	Too little pressure when bending
Surface Imperfections	Adhesive	Water based glue causes substrate fibre to swell
	Glue Line	Uneven glue application (glue lumps, contaminated with sawdust or chips)
	Indentations	Contamination under protective film pressed into laminate surface
	Telegraphing	Uneven glue application
	Equipment	Press pressure too high for work piece
Joint Gap (Shrinkage / expansion of laminate or substrate)	Environment	Laminate and substrate should be allowed to equilibrate for up to 72 hours before fabrication
		If installation location is to have air conditioning then this should be in operation before laminate is installed.
	Adhesive	Sufficient glue and pressure must be used to ensure a first class bond, or alternatively use a hard setting glue such as urea or epoxy both sides of any join and around each laminate panel perimeter.
	Fabrication	Avoid placement of joins close to sink areas to minimise the risk of water ingress and damage.
Sealant	Where two fabricated components are to be joined such as at a Mason's mitre, a complete spread of silicon sealant should be applied to one surface of the components before clamping them together.	

LIMITATIONS

Application	Recommendation
External Use	Not for External Use. Internal Use Only
Window Sills	Laminex laminate has good colour retention and dimensional stability in normal interior applications. However, prolonged exposure to sunlight may cause shrinkage and/or some change in colour. Laminex laminate is therefore not recommended for interior applications with prolonged exposure to direct sunlight.
Wall Linings	Do not bond directly to plaster, plasterboard or concrete.
Cutting Board	Do not cut directly on the laminate surface.
Laboratory Benchtop	Laminex laminate is not recommended for laboratory benchtops. However, Laminex does have a range of laboratory suitable chemical resistant products, specially designed for this application.
Cold Forming	Laminex laminate can be cold rolled to a 150mm radius. However, bonding the laminate requires support to prevent spring back. Adhesive failure can result in the laminate fracturing in situ, creating sharp and dangerous fragments similar to shards of glass. It is for this reason, cold forming is not recommended.
Shelf Life	Providing it is not exposed to extremes of temperature or high humidity, Laminex should have a shelf life of up to 12 months, however, it is strongly recommended that stocks be rotated as often as possible.
Protec+ <sup>®</sup>	The Protec+ <sup>®</sup> laminate surface is not a substitute for maintaining a clean work surface. Effectiveness of the antibacterial and antifungal properties is compromised if a layer of dirt or grime prevents direct contact between the bacteria or fungus, and the laminate surface.

## MAINTENANCE AND CLEANING GUIDELINES

General Care	Recommendation
General Maintenance Warning	<ul style="list-style-type: none"> <li>Do not use strongly acidic, alkaline cleaners or bleach for normal cleaning as these might etch the surface.</li> <li>Avoid commercial cleaning agents as they can contain higher concentrations of stronger potentially damaging chemicals.</li> <li>Keep waxes and polishes well away.</li> </ul>
General Surface Cleaning	<ul style="list-style-type: none"> <li>A damp cloth will remove spills and greasy spots. Rub with a clean dry cloth to bring back brightness.</li> <li>Occasionally clean with mild dishwashing detergent.</li> <li>To remove heavy build-up of dirt, use cleaners such as: Mr Muscle, Windex or Ajax Spray n Wipe.</li> </ul>
Stubborn Surface Stains	<p>Level 1 - If a stain cannot be removed with Extra Strength Windex, try Methylated spirits or dab the stain with a diluted bleach mixture (1 part bleach to 8 parts water); leave for 3 minutes then wash off with water and dry. Finish off with Extra Strength Windex.</p> <p>Level 2 - Only as a last resort if a stain persists, try 2 or 3 rubs with an abrasive cream cleaner or white toothpaste, wash and dry. Please note that bleach or abrasive cleaners may irreversibly damage the laminate surface.</p>
Surface Spills	Laminex laminate surfaces resist staining from most household chemicals. However, some spills require immediate action, such as: beetroot, grape and berry juices, first aid preparations, concentrated bleach, oven cleaners, dishwasher detergents, artificial dyes, hair colouring and solvent based pen ink. Specialty glues such as Super Glue must also be removed straight away with acetone (nail polish remover).
Surface Scratches	<ul style="list-style-type: none"> <li>Avoid scourers and abrasive cleaners as they will damage the surface.</li> <li>Do not cut directly on the laminate surface.</li> <li>Do not drag or slide objects (including: utensils, knives and unglazed pottery) across the laminate surface. Always place and lift objects from the surface.</li> </ul>
Surface Heat Resistance	Don't place hot objects, electrical appliances or pots straight from the oven or cooktop onto the Laminex laminate surface.

### SPECIAL NOTE: Oven and Hot Plate surrounds

Laminate can be used on bench tops around ovens or hot plates, however it is recommended that any cut outs for hot plates should have an appropriate heat absorbing tape applied to the perimeter of the cut out to help avoid cracking.

Regarding oven surrounds there are some basic requirements which need to be followed.

Gas appliances: The installation of gas appliances is covered by Plumbing code AG 601. Any vertical surface surrounding a cooktop extending between from 10mm below the hob, to 150mm above, if closer than 200mm from the burner, must be non-combustible.

Non-combustible means products like metal, ceramic tiles etc.

Laminates are combustible and

therefore not permitted.

Always install gas appliances as per manufacturer's instructions. When installed correctly, laminate products are suitable.

Electric appliances: There is no national regulation regarding the surrounds of electric appliances, however the appliance must conform to AS 3172 and part of this standard is the inclusion of installation instructions for each particular appliance.

Always install electrical appliances as per manufacturer's instructions. When installed correctly, laminate products are suitable. Therefore with electric appliances the manufacturers installation instructions become the standard and must be adhered to at all times. The only requirement for surrounding surfaces is that they can withstand temperatures up to 90°C which means that laminates are suitable

for this application with electric appliances.

However, in all instances it is the customers' responsibility to ensure that all regulations are adhered to when installing laminates in these applications.

### CONCLUDING STATEMENTS

- The expectation of appearance and decision of acceptability is that of the customer, not Laminex.
- Appropriate OH&S techniques and work practices are the responsibility of the fabricator.
- The data in this TDS is believed to be accurate to the best of our knowledge, but users should carry out their own assessment of the product to satisfy themselves that it is suitable for their requirements.