



Laminex™ Laminate

Laminex™ Laminate HPL Technical Data Sheet

Laminex™ laminate is a fashionable cost effective surface technology, with the majority of decors having the capability to be postformed or matched with ABS edgetape giving a range of edge profile options.

Applications

Laminex™ laminate is widely used for benchtops, countertops, vanity units, cabinet doors, store fixtures, bars, partitions and wall linings (applied to substrate) and other applications where good appearance, durability and resistance to stains are required.

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 external applications or interior applications with prolonged exposure to direct sunlight.

When specifying

Surfacing shall be Laminex™ or Laminex™ Formica® laminate as distributed by Laminex New Zealand®. Colours and/or patterns shall be..... in finish

Laminex™ laminate is an ecospecifier Global GreenTag™ GreenRate Level B certified product and can contribute to Green Star® points.

General HPL Product Performance

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 New Zealand®.	
Surface finish	When inspected at different viewing angles, there shall be no significant difference from the approved reference sample held by Laminex New Zealand®.	
Visual inspection	Dirt, spots and similar	Maximum 1mm ² /m ² 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 ² 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.

Dimensional tolerances, ISO 4586-3:2018 Clause no.)

Typical properties	Clause	Units	Values
Edge defects	6.4.3	Mm	≤10mm
Broken corners	6.4.4	-	≤10mm – no more than 1 per sheet
Flatness	6.4.6	mm (max)	Length – 75mm Width – 10mm
Length and width	6.4.7	Mm	+ 10mm / -0mm
Straightness of edges	6.4.8	mm/m (max)	1.5mm/m
Squareness	6.4.9	mm/m (max)	1.5mm/m

High pressure decorative laminates

Performance properties (ISO 4586-2:2004, Clause no.)

Typical properties	Clause	Attribute	Units	Values
Resistance to surface wear	6	Revolutions (min)	Revolutions (min)	Initial wear ≥ 150
				Average wear ≥ 350
Resistance to impact by small diameter ball	12	Force	N (min)	≥ 20
Resistance to scratching	15	Force	N (min)	≥ 20
		Rating		3 – Textured finishes
Resistance to dry heat at 180°C	8	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	9	Appearance	Not worse than	4 – Slight change of gloss and/or colour, only visible at certain viewing angles
Resistance to steam	10	Appearance	Not worse than	3 – Moderate change of gloss and/or colour
Resistance to immersion in boiling water	7	Mass increase	% (max)	≤19
		Thickness increase	% (max)	≤22
		Appearance	Not worse than	3 – Moderate change of gloss and/or colour
Dimensional stability at elevated temperature	11 Method A	Cumulative dimensional change	% (max) L	0.7% with grain
			% (max) T	1.2% across grain
Resistance to staining (See STAINING AGENT -chemical group listings section)	16 Method A	Appearance	Rating (min)	Groups 1 & 2 5 – No visible change
				Groups 3 & 4 3 – Moderate change of gloss and/or colour
Lightfastness When tested in contrast with Blue wool 6 Ref: ISO 105-A02	17 Method A	Contrast	Grey scale rating	4 to 5
Resistance to cigarette burns	18 Method A	Appearance	Rating (min)	3 – Moderate change of gloss and/or moderate brown stain
Resistance to cracking under stress	14	Appearance	Not worse than	4 - Hairline cracks only visible under x6 magnification
Formaldehyde emissions (gas analysis method)	EN717 part 2	Panel emission	mg/m2hr	≤1.0

High pressure decorative laminates

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 <ul style="list-style-type: none"> • 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)		
Cola beverages	16.1.5.1 Procedure A Apply staining agent at ambient temperature	
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		

High pressure decorative laminates		
STAINING AGENT – Chemical group listing Performance Properties (ISO 4586-2:2004, Clause 16, Method A)		
Staining agent	Test conditions	Contact time
GROUP 3*		
*Sodium hydroxide (25% solution)	16.1.5.1 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)		

* If the product under test meets the specification requirements when tested with each of the 6 staining agents marked with an asterisk, then it is deemed to comply with the specification for stain resistance.

° Acids and alkalis, in concentrations stronger than those shown in group 3, which can be contained in commercial cleaning agents, can cause surface damage or marking, even with very short contact times. Any spillage of such materials shall be washed off immediately.

Fire properties

The Group Number Classifications are generated from tests carried out and data reduced in accordance with the test procedure described in ISO 5660 2002-Reaction to fire test - Part 1: Heat Release and Part 2: Smoke Production Rate, for the purposes of determination of the Group Code Verification method C/VM2 Appendix A.

Laminex™ Laminex™ bonded to Lakepine® MDF or Superfine® Particleboard Group Number Classification:3.

Specific product performance

Laminex™ laminate with Protec+®

Applications

Laminex™ laminate with Protec+® is widely used for benchtops, countertops, vanity units, cabinet doors, store fixtures, bars, partitions and wall linings (applied to substrate) and other applications where good appearance, durability and resistance to stains are required. The antimicrobial properties make it a hygienic choice for medical/ aged care facilities, food preparation/ service areas, communal spaces such as sports centres/libraries and education projects.

Product Characteristics

Sizes (Nominal)	3600mm x 1500mm
	3600mm x 1200mm*
	See availability guide for cut sheet sizes
Thickness	0.7mm (nominal)
Weight	1.0kg/m2 approx.
Finish	Natural, Spark, Puregrain
	Postforming: solids 8mm, patterns 6mm

3rd party certifications

Laminex™ Protec+ has been independently certified as food contact safe, providing sustained antibacterial and antifungal protection which does not wash off or leach out of the surface. It is safe for use in food preparation and processing activities and can be in direct contact with food, provided that good hygiene practices are followed.

Laminex™ Protec+ has been independently tested in accordance with a number of leading standards, including: ISO 22196:2011, JIS Z 2801 and AS™ G21, which measure antibacterial activity and fungal resistance.

Protec+® antimicrobial surface

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

Laminex™ Protec+® provides enhanced antimicrobial protection for the expected life of the laminate surface, backed by a seven year warranty.

It is important to maintain a clean work surface so as not to compromise the effectiveness of the antibacterial and antifungal properties of the laminate.

High pressure decorative laminates		
Protec+® properties		
Attribute	Clause	Values
Antibacterial activity and effectiveness (28 hours)	JIS Z 2801:2012 Referred to in ISO 22196: 2011	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)	AS™ G21-09	Rating ≤ 1 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)
Compliance with the demands of food contact materials	Testing methods according to the rules and regulations of the EC and EU community	Certificate of compliance

Laminex™ Formica® textured laminate

Laminex™ Formica® textured laminate with Natural, Velour, Honed, Puregrain, River Wash, Naturelle, Etchings are a postformable high pressure decorative laminate. Internal or external curves can be formed down to a recommended minimum radius of 10mm for solid colours, while patterns and woodgrains can be formed to a radius of 6mm in the machine direction. Benchtops, breakfast bars, special shapes and other products can be manufactured by independent fabricators to individual specifications.

Applications

Laminex™ Formica® textured laminate can be used in a variety of applications*. These include: counters, bench and table tops, store fixtures, office furniture, vanity units, display work, reception areas, wall panelling, toilet partitions, and door and drawer fronts.

It is also suitable for medical, dental and food preparation areas.

**Naturelle finish is recommended for light-duty horizontal and vertical applications only.*

Paper Finish

Sizes	3600mm x1500mm
Thickness	0.7mm (nominal) (-0.1+ 0.1mm)
Laminate Weight	1.0kg/m ² approx.

Unable to be postformed. Laminex Paper Finish can not be postformed. It is suitable for benchtops, vanity units, furniture, tables, doors, store fixtures, partitions and wall linings (applied to substrate).

Laminex™ Diamond Gloss®, Laminex™ Formica® Gloss Plus and AR Plus

Laminex™ DiamondGloss®, Laminex™ Formica® Gloss Plus and AR Plus is widely used for countertops, benchtops, vanity units, bars, store fixtures and other applications where good appearance, resistance to marking and scuffing, and resistance to stain and heat from ordinary sources is required. Laminex™ (Polar White) Diamond Gloss® can be postformed down to a radius of 8mm. DiamondGloss® can also be used for whiteboards provided instructions contained in the Laminex™ Factsheet - Care & Maintenance are followed.

Product Characteristics

Sizes (Nominal)	3595mm x 1395mm refer to Laminex™ HPL Availability Guide for cut sheet sizes
Thickness	0.7mm (nominal) (-0.1+ 0.1mm)
Weight	1.0kg/m ² approx.
Finish	High Gloss
Colours and Pattern Range	Refer to Laminex™ HPL Availability Guide

May be postformed to an 8mm radius

Scuff resistance

More than 95% gloss retention after being scrubbed with a 3M Scotch- Brite™ Heavy Duty scouring pad attached to a Sheen Model 903 Wet Abrasion Scrub Tester, using 800 gram applied weight and 30 scrubs.

ARtouch®

Formica® ARtouch® surfacing offers a super matte soft-to-touch finish that provides a beautiful look and feel with the added benefits of resisting fingerprints, Protec+® antimicrobial technology and chemical resistant properties. Laminex™ ARtouch® can be postformed to an 8mm internal radius, in the machine direction.

Applications

Laminex™ ARtouch® is ideal for both vertical and horizontal applications in low traffic areas such as residential kitchen tops, bathrooms, laundries, vertical panels and reception counter fronts and other surfaces where good appearance, durability and resistance to stains are required. It is widely used for benchtops, vanity units, furniture, tables, doors, store fixtures, partitions and wall linings (applied to substrate).

ARtouch® is NOT recommended for high-traffic areas such as reception counter tops, drink bars and commercial kitchens.

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

Note: The super matte finish of Laminex™ ARtouch® will cause a colour shift from standard laminate. Request a sample for true colour representation. This colour shift does not constitute a defect.

Product Characteristics	
Sizes (Nominal)	3050mm x 1300mm 3595mm x 1395mm
Thickness	0.7mm (nominal) 0.67+/- 0.03mm
Weight	1.0kg/m ² approx.
Finish	ARtouch High Gloss

Thermal healing

Thermal healing is to be performed by trained persons only.

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 ARtouch product for more than 5 seconds. Scratched and gouges that have penetrated the surface will not be able to be repaired using this process. Do not iron over any joins in the laminate as this may penetrate the join and affect the substrate below.

Additional ARtouch® cleaning notes

General surface cleaning	Due to the Nano technology and the moisture diffusion qualities, substances that have a high viscosity may require more diligence to clean.
	A damp cloth will remove spills and greasy spots. Rub with a clean dry cloth to bring back brightness.
	Occasionally clean with mild dishwashing detergent.
	To remove heavy build-up of dirt, use cleaners such as: Mr Muscle® glass cleaner or Ajax® Spray 'n' Wipe Baking Soda Stone Safe Multi-Purpose Spray.
	Ensure that cleaning solutions are removed from the laminate to allow the properties of Laminex™ ARtouch® to perform at their best.

180fx®

180fx® offers inspiration on a grand scale. Achieving an unprecedented large scale design, this high pressure laminate uses innovative printing technology that captures every nuance and detail.

Laminex™ 180fx® is available in a Matt, Satin and GlossPlus finish. GlossPlus is a high gloss laminate with improved mark and scuff resistance when compared to traditional laminates. Laminex™ 180fx® may be readily heat formed down to a radius of 8mm in the machine direction (MD), using special equipment without loss of durability or appearance.

Product Characteristics	
Sizes	3595mm x 1395mm
Thickness	0.7mm (nominal) (-0.1+ 0.1mm)
Weight	1.0kg/m ² approx.
Finish	GlossPlus Matt Satin
Colours and Pattern Range	Refer to current Laminex™ Laminate brochure

Can Postform to 8mm diameter

Fabrication

Preforming Procedures

Board substrate bend profile

Laminex™ laminate should be fully supported by substrate when glued. Do not bond directly to plaster, plasterboard 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 New Zealand® can provide laminate postforming capability information. However, as there are a variety of processes and equipment available and used by our customers, each fabricator will need to determine the points of consistency and capability for their own installed processes and equipment.

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 one metre 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 and 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, ambient temperature, 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 extending 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™ laminate.

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 each individual heating element.

The most common method of heat up checking is by placing sample pieces of 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 five seconds or more, then adjust[™]ment of the heater bar may be necessary.

Refer to the machine manufacturer for guidance.

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™ laminate is manufactured in accordance with AS/NZS 2924.1 & AS/NZS 2924.2 and ISO 4586.1 & ISO 4586.2. Laminate postforming conditions are required to heat the laminate so that the time taken to reach 163°C is one second per 0.025mm of thickness accurate to ± 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.

For example

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

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 five 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 extending 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.

Ensure no adhesive lumps are wedged between the laminate and top of the profile that can cause fractures. The laminate and board should then be accurately located in the forming machine so that the bend is made in the correct position, not pulling the laminate around the profile under too much tension.

The sheet is formed immediately after the correct heat up procedure is completed and is then held in position while the area of the bend is allowed to cool down. Usually 15-20 seconds is sufficient to permanently set the laminate in position and shape.

Step 1. Temperature should have reached bend temperature along full bending length.

Step 2. If too much bar tension (ie. the benchtop core is placed in the machine too far forward) 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.

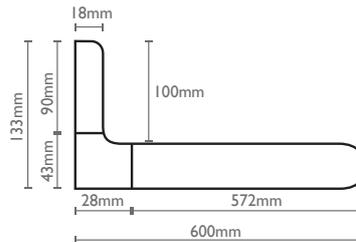
Step 3. Too little pressure will leave a gap between the laminate and the board, leaving this susceptible to impact cracking. Use of a hand roller may be required to press the moulded laminate onto the boards so that contact adhesive can bond properly.

Cove splashbacks or stand-ups

When a splashback or up-stand is required, it is necessary to lay out the top to determine the correct dimensions for each section of the benchtop.

Assuming the total width of the benchtop including splashback is 600mm with the overall height of the splashback being 100mm from the top of the benchtop.

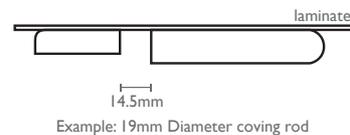
Fig. 1.



Having determined the dimensions of each component, prepare the blanks and laminate, then bond together ensuring that a spacer block is used to guarantee an exact dimension between the benchtop blank and splashback component.

Example: Use 14.5mm wide spacer for a 19mm diameter coving rod.

Fig. 2.



After bonding both components to the laminate, care should be taken when rolling to ensure edge cracking does not occur between the splashback and benchtop component. Should the splashback be of a different thickness to the benchtop, then accurate packers must be employed to ensure an even thickness between both components.

The top is now ready for post-forming. It is important that all other forming functions are completed prior to the coving operation. Premature forming of the cove section may result in insufficient room in the machine to carry out the front edge forming.

Forming the cove section

Once all other forming sections have been completed, heat up the cove rod on your machine.

Step 1. Invert the benchtop and align the 14.5mm grooved section with the machine indexers provided in the recessed aluminium channel, so the section to be coved will fall directly over the coving rod. Pull firmly so as to align the back edge of the benchtop component with the inside of the coving rod. This will ensure correct alignment of the benchtop. Remove the indexers before applying platen pressure.

Step 2. Lower the top platen of the press. Apply 163°C Tempilaq to a section of the groove, ensuring that a melt time of approximately 28 seconds is achieved. Once the Tempilaq commences to melt, slight hand pressure should be applied to the splashback component, it will usually fall down under its own weight. When the splashback component has formed to 90 degrees and is hard against the machine frame, clamp splashback in position with clamps provided with the machine.

This total operation should take no more than 45 seconds. Should the time be faster or slower, then adjustment of the heat setting on the coving rod will be required.

Step 3. Now fit the timber coving profile in position. Glue and fix in both directions with screws or staples ensuring the cover section remains hard against the machine frame. A gap filling adhesive like foaming PUR will help fill any voids.

Warning: It is essential there are no voids left between the laminate and cove rod as any impact will crack the laminate. Speed is essential during the fixing of the timber coving profile as extensive delay in removing the benchtop from the machine may result in scorching or blistering of the laminate. Should large tops be required for fabrication where long delays would be obvious, then it is suggested that a special table be constructed to enable the fixing of the timber coving profile away from the post-forming machine.

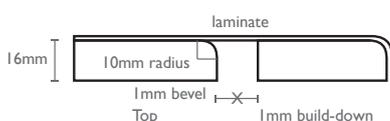
Step 4. Once the coving profile has been fixed into position, it is important to check that the splashback is square to the benchtop. Usually the cove section will want to fall away. Avoiding this will require the fixing of temporary plates to each end of the blank to hold it square until the adhesive dries along the timber coving profile and the laminate cools.

Extended drop-fronts benchtops

Some specifications require the fabrication of extended drop-down front edges usually between 200mm and 250mm deep. These applications are usually used in motel and hotel vanity units, reception counters, etc.

It is therefore important to be aware of the formula required to achieve this result. Details of the mathematical specification for 16mm and 33mm thickness benchtops are as follows:

a. 16mm thickness benchtop with 10mm radius.



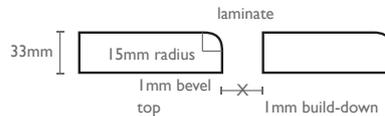
$$'X' = 2 \times \pi \times \text{Radius} + 4 + (\text{Substrate Thickness} - \text{Radius}) - \text{Radius}$$

Radius - Radius

$$\text{Example: } 2 \times 3.143 \times 10\text{mm} + 4 + 6 - 10 = 11.7 \text{ at 'X'}$$

Then allow 0.5 to 1mm for additional clearance which would give a suggested dimension at "X" of 12.5mm.

b. 33mm thickness benchtop with 15mm radius.



$$'X' = 2 \times 3.143 \times 15\text{mm} + 4 + 18 - 15 = 26.6 \text{ at 'X' say at 'X' of 27.5mm}$$

Warning: It is essential there are no voids left between the laminate and cove rod as any impact will crack the laminate. Speed is essential during the fixing of the timber coving profile as extensive delay in removing the benchtop from the machine may result in scorching or blistering of the laminate. Should large tops be required for fabrication where long delays would be obvious, then it is suggested that a special table be constructed to enable the fixing of the timber coving profile away from the post-forming machine.

In all cases it is important that the 1mm bevel be applied to the bottom of the front edge of the benchtop section. This bevel enables additional clearance for the drop-down component to clear when being bent into position.

Note: a. The rate of forming depends primarily upon the amount of energy fed in, the thickness of the laminate, the radius of curvature to be formed and whether the laminate is to be formed parallel to, or across, the direction of its sanding. But when a laminate must be formed around a 10mm radius across the direction of sanding, the bend time (of 60% of the blister time) should be adhered to. The laminate will always bend more easily in a direction parallel to the direction of sanding. b. The formed laminate must be cooled in its shape to prevent it from springing back. In electrically heated equipment this is achieved with a draught of cool air or by a wet sponge.

The majority of Laminex™ laminates have the capability, for fabricators with well maintained, high end precision post-forming equipment, to bend around prepared profiles of 8mm for solid colours and 4.5mm for stone, abstract and woodgrain designs in Natural Finish, 8mm in DiamondGloss 180fx® and ARtouch® finish, in the machine direction. Note: See the following table for postforming guidelines. Paper Finish can not be postformed.

Protective film

Laminex™ DiamondGloss and Gloss Plus grade and some other decors of Laminate is supplied with a Polyester protective film which provides a protective layer to the high gloss surface 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. Laminex New Zealand® recommends this as best practice as it allows for the most thorough inspection. The polyester film has a shelf life and can be difficult to remove after nine months from application to the laminate. This is the nature of the film.

High pressure decorative laminates

Postform bending performance Performance properties (ISO 4586-2:2004, Clause no.)

Typical properties	Clause	Attribute	Units	Values			
				Range	Solid colours	Stone, print, woodgrain	
Regular forming	19 Method A	Bending radius	mm (max)	Internal radius	MD	10mm	7mm
				Cove bend	MD	10mm	10mm
	Applicable décors: Solid Colours Pattern or Woodgrain: Blackstone, Ebony Oxide, Elemental Ash, Flinders Black, White Bardiglio						
Tight forming	19 Method A	Bending radius	mm (max)	Internal radius	MD	8mm	4.5mm
				Cove bend	MD	8mm	8mm
	Applicable décors: Perlato Granite, Etchings, Pietro Nero Velour, Planked Urban Oak Velour, Platinum Micro, Natural, Pure Mineralstone II Natural, Raw Nickel Natural, Refined Oak Velour, River Pebble Natural, Roman Marble Natural, Rural Oak Natural, Sand Pebble, Natural, Seasoned Oak Natural, Smoked Birchply Natural, Soft Maple Velour, Sublime Teak Natural, White Finestone Velour, White Valencia Natural, Zincworks Natural						
DiamondGloss,180FX ARtouch	19 Method A	Bending radius	mm (max)	Internal radius	MD	8mm	8mm
				Cove bend	MD	8mm	8mm
Applicable décors: Bianca Luna Matt, Bianca Luna Gloss Plus, Black Fusion Satin, Carrera Marble Gloss Plus, Carrera Marble, Matt, Ferro Grafite Gloss Plus, Ferro Grafite Satin, Jet Sequoia Gloss Plus, Jet Sequoia Matt, Weathered Cement Satin, Black ARtouch, Neo Cloud ARtouch, Nightshade ARtouch, Storm ARtouch, Warm White ARtouch, White ARtouch, Black Diamond Gloss, Black Marble Diamond Gloss, Crystal White AR Plus, Flinders Black Gloss Plus, Pure Mineralstone II Diamond Gloss, Snowdrift Gloss Plus, White Kashmir AR Plus, White Valencia, Diamond Gloss							
Resistance to blistering	20 Method A	Time to blister (Tempilaq to blister time)	sec	≥15			

Unable to be postformed - Tonal Paper Terrazzo

Trouble shooting / problem solving

Post-fabrication or post-installation 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	Ends of laminate sheet not filed smooth 8cm either side of bend centre line (edge crack propagation)
Incorrect grade (non-postformable)		
Laminate too old (poor stock rotation)		
Laminate exposed to extremes of temperature; moisture 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
		Contact adhesives left too long before contact and solvents have completely evaporated
	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 racking	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

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 New Zealand® 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™ laminate should have a shelf life of up to 12 months, however, it is strongly recommended that stocks be rotated as often as possible
Cross directional bending (CD)	Forming a profile in the cross direction (CD) /end roll is not recommended. As a guide, CD bending for solid colours 10mm. Stone, abstract and woodgrain designs 6mm. Choosing to form an end roll in the CD is the decision of the fabricator
Protec+	The Protec+ 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
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
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Protec+	The Protec+ 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

Special note: Bowl mounting options

There are two ways to mount bowls in High Pressure Laminate.

Top mount:

This is when a cut out is made in the benchtop and the bowl is sealed around the perimeter and fixed in place normally with brackets under the substrate.

Benefits:

Simple to install either in the factory or onsite.

Provides a robust edge that will absorb impact from hard objects impacting on the edge. *Note: not all Stainless Steel bowls are of the same quality Steel.*

Easy to replace if the bowl requires changing.

Draw backs:

There will always be a lip which prevents wiping directly into the sink, this varies depending on sink material and manufacturer.

May not look as appealing as more sink visible on the surface.

Undermount:

The option of undermounting is at the discretion of the Benchtop manufacturer who may employ different undermounting options.

Bowl and drainer units:

HPL and bowl materials expand and contract at different rates.

A flexible adhesive is required at the intersection of the two to allow for movement.

A minimum 2mm thickness is requested by the adhesive suppliers.

Because this is not a rigid join there is some compression with the adhesive and if impacted will split the laminate.

Single bowls:

Due to the size of the bowl and flexibility of the sides these can be installed using a ridged adhesive. (at manufactures discretion)

This eliminates the flexibility at the intersection of bowl and HPL.

Benefits:

There is no lip or raised edge resting on the work surface.

Anything on the bench can be wiped directly into the sink.

Neat and tidy visual appearance.

Draw backs:

The edge of the Laminate can split or chip if impacted with a solid object.

In high use situations the edge of the laminate can show signs of wear.

Poor quality bowl edges may telegraph through the Laminate.

Difficult to replace if damaged.

Conclusion:

In high wear situations or where there is risk of damage to the edge of the laminate, a top mounted bowl is recommended.

Special note: oven and hot plate surrounds

The laminate outlined in this TDS can be used on benchtops around ovens or hot plates, however it is recommended that any cut outs for hot plates have an appropriate heat absorbing tape applied to the perimeter of the cut out to help avoid cracking.

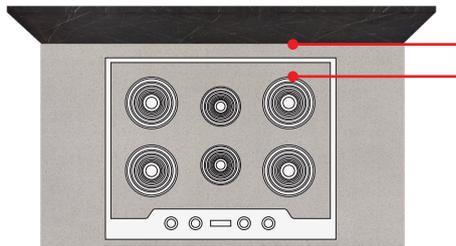
Regarding oven surrounds there are some basic requirements which need to be followed.

Splashback compliance

Laminex™ laminate is suitable to use as a splashback behind electric and gas cook tops when adhered to a suitable substrate.

Electric cook top:

Laminex™ laminate can be used as a splashback material behind an electric cook top provided that it is kept at a distance of at least 100mm from the periphery of the nearest heating element.

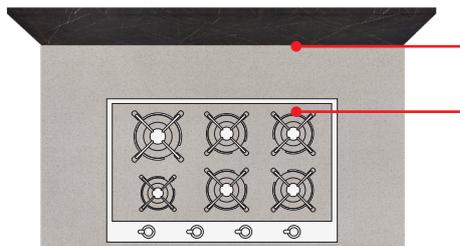


100mm
From outer
ring.

Gas cook top:

Laminex™ laminate can be used as a splashback material behind a gas cook top provided that it is kept at a distance of at least 200mm from the periphery of the nearest gas ring.

Note: 1. All gas appliance installations must comply with AS/NZS 5601.1: Gas Installations. 2. All electric cooktop installations must be in accordance with the cook top manufacturer's instructions.



200mm
From gas
trivet.

Concluding statements

- The expectation of appearance and decision of acceptability is that of the customer fabricator, not Laminex New Zealand®.
- Appropriate OH&S techniques and work practices are the responsibility of the fabricator.
- This information is intended as a guide and may not apply to all situations.
- 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.