

# Laminex® Redback® with Protec+®

Laminex® Redback®, with Protec+® antimicrobial surface technology, has enhanced machine directional postformability to provide fabrication yield benefits, with the majority of decors having the capability to typically bend down to an 8mm internal radius (IR) for solid colours and 4.5mm IR for stones, abstract patterns and woodgrains.



## APPLICATIONS

Laminex® Redback® with Protec+® is widely used for benchtops, countertops, vanity units, partitions, store fixtures, bars, wall linings 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.

## WHEN SPECIFYING

Surfacing shall be Laminex Redback laminate as manufactured by Laminex. Colours and/or patterns shall be ..... in ..... finish.

## PRODUCT CHARACTERISTICS

<b>Sizes (Nominal)</b>	3600mm x 1500mm 3600mm x 1200mm 3600mm x 900mm 3600mm x 750mm
<b>Thickness:</b>	0.7mm (nominal)
<b>Weight:</b>	1.0kg/m <sup>2</sup> approx.
<b>Finish:</b>	Natural, Spark, Nuance.
<b>Colours and Pattern Range:</b>	Refer to current Product Availability Chart.

## 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: ISO22196:2011, JIS Z2801 and ASTM G21, which measure antibacterial activity and fungal resistance.

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



## 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.	
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 4586-1:2004, Clause no.)					
Typical Properties	Clause	Units	Values		
Thickness	6.3	mm (max)	0.63 mm tolerance $\pm 0.03$ mm (span of 0.06mm) In-sheet tolerance $\pm 0.015$ mm (span of 0.03mm)		
Edge Defects	6.4.3	mm	$\leq 10$ mm		
Broken Corners	6.4.4	-	$\leq 10$ mm – no more than 1 per sheet		
Sanding Defects	6.4.5	-	Slight chatter marks (i.e. Surface undulations due to the sanding process) are allowed.		
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		
Performance Properties (ISO 4586-2:2004, Clause no.)					
Typical Properties	Clause	Attribute	Units	Values	
Resistance to Surface Wear (See product limitations section for Nuance Finish performance)	6	Wear Resistance	Revolutions (min)	Initial Wear $\geq 150$	
				Average Wear $\geq 350$	
Resistance to Impact by Small Diameter Ball	12	Force	N (min)	$\geq 20$	
Resistance to Scratching *AS/NZS 2924.1 & 2 1998	14	Force	N (min)	$\geq 2.0$	
		Index #		3 – Textured finishes	
Resistance to Dry Heat at 180°C	8	Appearance	Rating (min) (Not Worse than)	Gloss Finish	3 – Moderate change of gloss and/or colour
				Other Finish	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)	$\leq 19$	
		Thickness Increase	% (max)	$\leq 22$	
		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 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/m <sup>2</sup> hr	$\leq 1.0$	

\*Test method used to determine Resistance to Scratching

## PRODUCT PERFORMANCE Cont.

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
<b>GROUP 1</b>		
*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)		
<b>GROUP 2</b>		
*Coffee (120g of coffee per litre of water)	16.1.5.1 Procedure A Apply staining agent at approx. 80°C	
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	16 hours
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		

## PRODUCT PERFORMANCE Cont.

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
<b>GROUP 3<sup>a</sup></b>		
*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)		
<b>GROUP 4</b>		
*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.

<sup>a</sup> 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.

## PROTEC+<sup>®</sup> ANTIMICROBIAL SURFACE

Laminex Redback, with Protec+<sup>®</sup> antimicrobial surface technology, prevents growth of bacteria and inhibits fungus on decorative surfaces.

Laminex Protec+<sup>®</sup> provides enhanced antimicrobial protection for the expected life of the laminate surface, backed by a 7-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+ <sup>®</sup> 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 $\leq$ 1 1 = Traces of growth (less than 10%) 0 = None <b>Fungal Strains tested:</b> 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

Fire Resistance AS/NZS 1530.3:1999				
Attribute	Range		Typical Values	
			Solid Colour	Stone, Pattern, Woodgrain
Indices (laminate un-adhered)	Ignitability	0-20	9	9
	Spread of Flame	0-10	8	9
	Heat Evolved	0-10	3	4
	Smoke Developed	0-10	5	5
Fire Resistance AS/NZS 3837: 1998 (Irradiance of 50kW/m <sup>2</sup> )				
Cone Calorimeter (laminate un-adhered)	Group Number	1-3	2	2
	Average Heat Released	kW/m <sup>2</sup>	56.8	56.9
	Average Specific Extinction Area	m <sup>3</sup> /kg	74.5	64.3

**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 2 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.

## FABRICATION

### – PREFORMING PROCEDURES

#### BOARD SUBSTRATE

#### BEND PROFILE

Laminex Redback should be fully supported by substrate when glued. 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 (especially high gloss due to the highly reflective surface). To minimise this effect the following recommendations may assist to provide the best results.

#### Contact Adhesives

Trade Essentials Sprayable 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 fracture the laminate when pressure is applied during bonding and forming.

Contact adhesives are not recommended for Gloss products.

#### 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, or cause blistering during post-forming.

#### Poly Urethane glue (PUR)

PUR contains no water and hence will provide a better result.

#### 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 Redback has very good operating tolerance between the heat required to bend and the additional heat exposure required before the laminate blisters. The average tolerance between heat exposure time to bend is approximately 24 to 28 seconds referencing time taken to reach 163°C. The time to blister is an additional >15 seconds.

Determining the heat-up rate control and heating stability becomes more important the thinner the laminate and the tighter the radius. Laminex manufactures postformable laminate in accordance with AS/NZS 2924.1 & 2 and ISO 4586.1 & 2. 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 ± 2 seconds.

Use a micrometre when determining the panel thickness.

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

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

The majority of Laminex Redback 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 the machine direction. **Note:** See the following table for postforming guidelines.

For those with equipment or processes unable to utilise the Laminex Redback 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.

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
	<b>Applicable décors:</b> <b>Solid Colours:</b> Aquamarine, Black, Calypso Blue, Classic Beige, Empire, Flax, Fresh Sprout, Gun Metal, Iceberg, Lava Grey, Mandarin, Marl Beige, Oatmeal, Olympia Yellow, Parchment, Raw Linen, Seed, Sensation, Steel Blue, Super White & Vanilla, Winter Sky. <b>Stone, Pattern or Woodgrain:</b> Amari Oak, Blackened Elm, Blackened Linewood, Bleached Reed, Brescia, Bronzeworks, Cherry Riftwood, ChiChi, Ebony Macassar, Echelon Redwood, Elegance, Elegant Oak, Espresso Ligna, Evening Shale, Fox Teakwood, Greystone, Hydra Mesh, Jalapeno, Jordan Stone, Licorice Linea, Milano Walnut, Mocha Ash, Mushroom Linea, Natural Walnut, Nocturne Oak, Pesto Linea, Sassi, Scribe, Silver Riftwood, Starlight, Stipple Cocoa, Stipple Merlot, Stipple Smoke, Vulcan Stone, Wild Birch & Zincworks.						
Tight Forming	19 Method A	Bending Radius	mm (max)	Internal Radius	MD	8mm	4.5mm
				Cove Bend	MD	8mm	8mm
<b>Applicable décors:</b> All decors, except those nominated for "Regular Forming".							
Resistance to Blistering	20 Method A	Time to blister (Tempilaq to blister time)	sec	≥15			

Laminex can provide laminate postforming capability information. However, as there are a variety of processes and equipment available and used by Laminex 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 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 Redback grade.

**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 Redback 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 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 manufacture postforming HPL in accordance with AS/NZS 2924.1 & 2 and ISO 4586.1 & 2. 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 ± 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.

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.

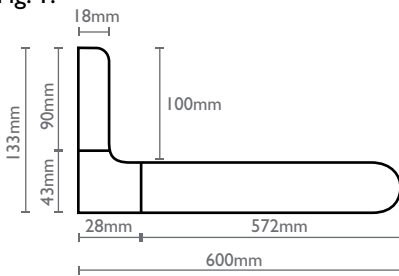


## COVE SPLASHBACKS OR STAND-UPS

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 splash-back being 100mm from the top of the benchtop.

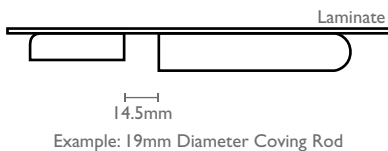
Fig. 1.



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 and fix in both directions with screws or staples ensuring the cover section remains hard against the machine frame.

**Warning:** 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.

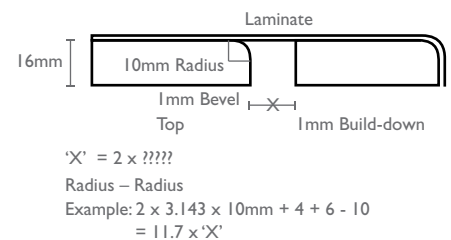
**Step 4.** Once the coving profile has been fixed into position, it is important to check that the splashback is square to the benchtop. Usually the cove section will want to fall away. Avoiding this will require the fixing of temporary plates to each end of the blank to hold it square until the adhesive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

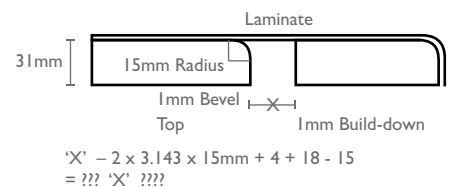
It is therefore important to be aware of the formula required to achieve this result. Details of the mathematical specification for 16mm and 33mm thickness benchtops are as follows:

a. 16mm thickness benchtop with 10mm radius.



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.



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.

## 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 joint and allow excess adhesive or sealant to squeeze out. Secure the joint 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 joint 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	<b>Hand Sawing</b> <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>
	<b>Machine Sawing</b> <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>
	<b>Jigsawing</b> <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	<b>Portable Routing</b> <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	Ends of laminate sheet not files 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 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 arised 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 Redback 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 Redback 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.
Nuance Finish in Horizontal Applications.	Nuance Finish does not meet AS/NZS 2924.1, Resistance to Surface Wear for HGP classification but does achieve Vertical grade classification. It is best suited to lower wear applications such as front panels for kitchen and bathroom furniture; wall coverings, office furniture and shelving.
Cutting Board	Do not cut directly on the laminate surface.
Laboratory Benchtop	Laminex Redback 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 Redback 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 Redback 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.
Gloss Laminate	Contact adhesives are not recommended for Gloss products.
Protect+®	The Protect+® 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
<b>General Maintenance Warning</b>	<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 as they dull the natural shine of the laminate.</li> </ul>
<b>General Surface Cleaning</b>	<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>
<b>Stubborn Surface Stains</b>	<b>Level 1</b> - 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.
	<b>Level 2</b> - 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.
<b>Surface Spills</b>	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).
<b>Surface Scratches</b>	High gloss surfaces and darker colours will show scratches more readily than lighter colours, hence require more care and maintenance than lighter colours or lower gloss finishes. <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>
<b>Surface Heat Resistance</b>	Don't place hot objects, electrical appliances or pots straight from the oven or cooktop onto the Laminex laminate surface.
<b>Cigarettes</b>	Don't place ignited cigarettes onto the laminate, as they can scorch and stain the 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.

