vitrabond
ALUMINIUM COMPOSITE PANEL
BY FAIRVIEW

TECHNICAL INFORMATION

VITRABOND PE, FR & A2

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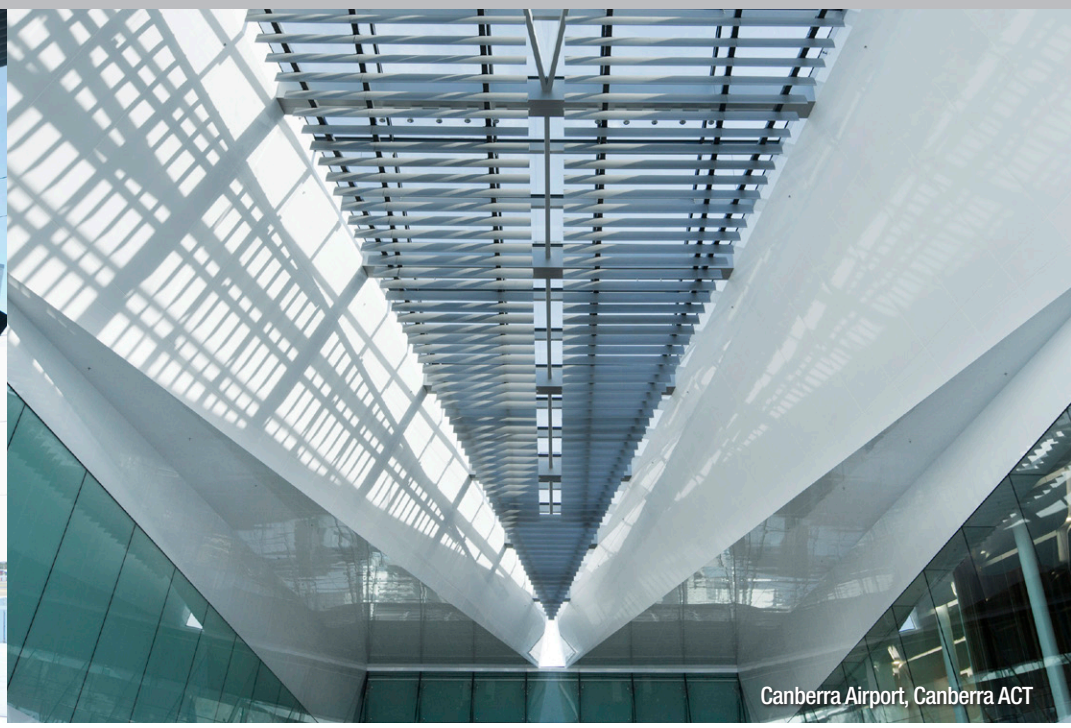
CONTENTS

Canberra Airport, Canberra ACT

1.0 ABOUT THIS MANUAL



Canberra Airport, Canberra ACT

This manual has been developed to effectively assist fabricators and contractors to work with VITRABOND. Due to the uncontrollable conditions and methods of job scope, as well as the variable skills and judgment of users/installers and the quality of equipment, tools, etc., the suggestions and recommendations contained in this manual are provided without warranty.

The information and recommendations contained herein are believed to be correct at time of publishing 01/07/2013. FAIRVIEW ARCHITECTURAL reserves the right to revise the contents of this manual without prior notice.

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2.0 INTRODUCTION

2.1 PREFACE

Radical reappraisals of the form and function of buildings are leading to questions being asked of traditional cladding systems. The emergence of new materials and manufacturing technologies are challenging pre-conceived notions of the engineered facade. The growing popularity of composite panels in recent years is due to the increasing desire for panels that not only look clean and modern, but also offer rapid installation and provide reliable long-term performance.

VITRABOND Aluminum Composite Panel (ACP) by FAIRVIEW ARCHITECTURAL addresses these changing requirements, enabling a modern and high quality envelope construction to be achieved, within the strictest time frame and budget.

2.2 COMPANY AND BACKGROUND

Fairview Architectural specializes in the design, manufacture and distribution of a range of quality façade products and components throughout Australia, North America and the United Kingdom. With over 25 years' experience in the façade industry, we have established a leading position in the Australian market and are now the preferred company by Architects, Builders and Fabricators.

Our stock holdings have grown to be one of the largest in Australia ensuring consistent supply to our dedicated installer network. Fairview is continuing to develop its range of Façade solutions and maintain a high level of service and support to the construction industry.

OUR MISSION

Fairview Architectural is an innovative organization, dedicated to assisting its partners by providing distinctive façade solutions that meet current market trends – at affordable price and with unrivaled service!

OUR VISION

To become the leader in architectural facades, with quality brands, innovative design and unrivaled service.

Cajaput Mining Accommodation – Wickham WA

2.3 PRODUCT DESCRIPTION – VITRABOND

VITRABOND is composed of two Aluminum cover sheets sandwiched with a special homogeneous core material. It is a simple concept resulting in outstanding surface flatness and high workability, with an excellent strength-to-weight ratio.

Three different core materials are available to suit a variety of applications: a polyethylene (PE) core, or a Fire Retardant (FR) mineral compound core, or EN13501 approved non-combustible (A2) core material.

VITRABOND is well suited for both exterior and interior architectural applications, as well as for industrial and specialty product designs. Applications include exterior cladding, signage, corporate ID, column covers, interior partitions, canopies, equipment enclosures and kiosks. The creative possibilities of VITRABOND have really no limits.

This versatility combined with the availability of different panel fixing and jointing methods for vertical and horizontal joints, angles, and curves result in a smooth building envelope with no reduction in surface integrity. VITRABOND ACP offers a unique combination of features and benefits that no other product can match.

2.4 ADVANTAGES OF VITRABOND

Throughout its history, VITRABOND has been proven to have excellent characteristics in many applications, such as exterior wall cladding, building envelopes, facades, louvers and feature walls. Based upon careful analysis, the key advantages of VITRABOND are listed below:

- Industry leading stock levels and lead times
- Cost effective
- Low maintenance
- Robust durability & strength
- Lightweight
- Over 60 standard colors
- Unlimited color range available
- 20 Year warranty available!
- Optional FR core, complying with test standards worldwide
- Available in Natural Zinc, Stainless Steel, Natural Aluminum and Natural Copper

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3.0 QUALITY

3.1 MANUFACTURING QUALITY

A dedication to the total fulfillment of our client's and customer's expectations is reflected by a complete quality control system, beginning at the point of specification and continuing through to delivery of the guaranteed products. All activities are carried out in a manner which:

- Uses the framework of ISO 9000 Quality Standards to verify the quality of our systems
- Ensures that our products and services are of the highest standards
- Create continuous improvements to our product through the application of the best quality practices.

3.2 ACCEPTABLE VARIATION

Width	±2.0mm (0.079in)
Length	±4.0mm (0.157in)
Thickness	±2% for 3mm & 4mm, ± 3% for 6mm
Bow	Maximum 0.5% of the length and/or width
Squareness	Maximum 0.197in
Surface defects:	The surface shall not have any irregularities such as dents, scratches and other imperfections in accordance with our quality assurance

3.3 WARRANTY

The VITRABOND coating warranty is issued on a project specific basis, and is available up to 20 years. Contact FAIRVIEW ARCHITECTURAL for warranty details.

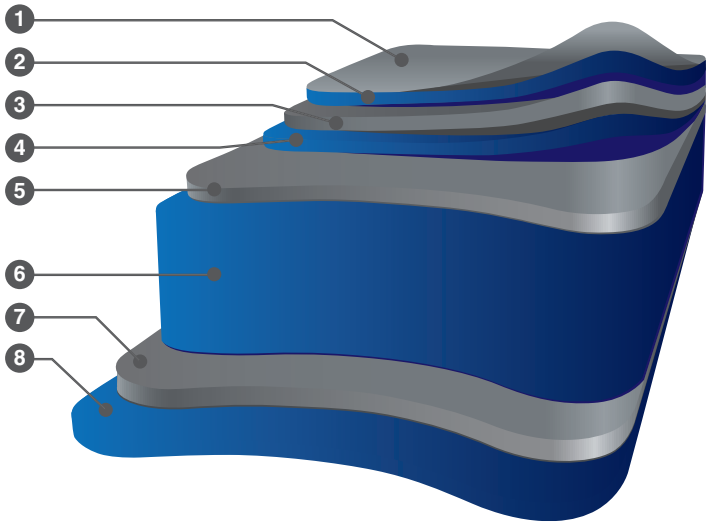

Star City Casino, Sydney NSW

4.0 MATERIAL PROPERTIES

4.1 TYPICAL COMPOSITION

1. Peel-off Protective Film
2. Clear Coating
3. PVDF Colored Coating
4. Primer Coating
5. 0.5mm Aluminum Skin
6. 3mm Polyethylene / FR / A2 Core
7. 0.5mm Aluminum Skin
8. Polyester Anti-corrosion Coating

The composite material is rigid, resistant to blows, breakage and pressure, and has high bending, buckling and breaking strengths.



4.2 ALUMINUM SKINS

Surface material both sides: 0.5mm (0.020") Aluminum sheets of a minimum 3000 series grade.

4.3 CORE MATERIAL

- PE core material is a mixture of polyethylene (PE), resin and hardener.
- FR (Fire Retardant) core is a mineral filled core, the key component being the compound Aluminum Hydroxide.
- A2 (Non-Combustible) core is a mineral filled core (93%), the key components being Aluminum and Magnesium Hydroxide.

4.4 DIMENSIONS

- Available Thicknesses: Standard 3mm (0.118"), 4mm (0.157"), 6mm (0.236"). Custom thickness available.
- Panel Width: Standard: 40", 50", 62" Custom: 36"- 80"
- Panel Length: Standard: 122", 146", 196" Custom max 256"

4.5 WEIGHT

THICKNESS	WEIGHT (kg/m²)	
	PE CORE	FR CORE
0.118"	0.94 lb/ft²	1.19 lb/ft²
0.157"	1.15 lb/ft²	1.50 lb/ft²
0.236"	1.50 lb/ft²	2.17 lb/ft²

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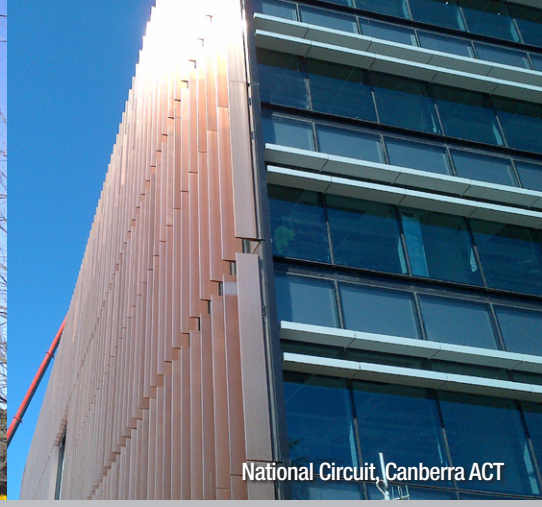
4.0 MATERIAL PROPERTIES

4.6 TECHNICAL DATA

Classification	Test Standard		Unit		4mm VITRABOND			
					PE Core		FR Core	
Panel Weight			Kg/m^2	lb/ft^2	5.6	1.15	7.3	1.50
Core Density	ASTM C271		Kg/m^3	lb/ft^3	914.3	57.08		
Limit of Application			°C	°F	-50 - +80	-58	+176	
Tensile Strength	ASTM E8		Kg/mm^2	psi	4.99	7097	5.15	7325
Yield Strength	ASTM E8		Kg/mm^2	psi	3.91	5561	12.7	18064
Elongation	ASTM E8		%		7.3		7.1	
Flexural Stiffness (200mm span)	ASTM C393		Kg/mm^2	psi	8.6	12,232	6.7	9530
Flexural Elasticity	ASTM C393		Kg/mm^2	psi	3222	4,582,800	3666	5,214,300
Deflection Temperature:	ASTM D648		°C	°F	115	239	116	241
THERMAL								
Thermal Expansion	ASTM D696		$x10^{-6}mm/mm°C$	$x10^{-6}in/in°F$	25	14	24	13
Thermal Conductivity	ASTM D976		Kcal/mhr°C	$Btu.ft/hr/ft^2/°F$	0.387	0.260	0.39	0.262 $Btu.ft/hr/ft^2/°F$
BOND INTEGRITY								
Vertical Pull	ASTM C297		N/mm^2	psi	12.37	1794	5.9	856
Drum Peel	ASTM D1781		mmN/mm	in ib/in psi	375.94	85	368.7	83
Flat Shear	ASTM D1002		N/mm^2	psi	8.55	1240	6.84	992
ACOUSTIC PROPERTIES								
Sound Insulation	ASTM E90	R=250Hz	dBA		19.7			
Aluminum SKIN								
Tensile Strength			N/mm^2	psi	Rm≥140		≥ 20,300	
0.2% Proof Stress			N/mm^2	psi	Rp0.2≥100		≥ 14,500	
Elongation (50mm)			%		A50≥1			



National Circuit, Canberra ACT

5.0 FINISHES

5.1 STOVE LACQUERING

VITRABOND only uses the highly recognized PVDF KYNAR 500, FEVE or VITREFLON V700 paints known for their high durability. These premium paints provide an optimum resistance to weather and industrial pollution. More than 40 years of South Florida Exposure Testing is continuing to confirm the superior chemical and physical properties of fluoro polymer coatings.

For a full list of standard VITRABOND colors, refer to the latest VITRABOND Color Chart. VITRABOND has unlimited color. We are able to color match any color, from any other color range.

5.2 ANODIZING

VITRABOND panels come in a range of Anodized finishes, offering both standard and customized colors and textures.

5.3 NATURAL FINISHES

FAIRVIEW ARCHITECTURAL offers the following natural finished panels.

- VITRABOND/ZN – Natural zinc composite panel
- VITRABOND/CU – Natural copper composite panel
- VITRABOND/SS – Stainless Steel composite panel
- Natural Aluminum VITRABOND – uncolored Aluminum finishes

5.4 OTHER COATING OPTIONS

The VITRABOND range also offers the following finishes:

- REPEL® - A self-cleaning surface coating
- STATIC DISSIPATIVE (very low out gassing) Surface Coating – Designed for IT industries.
- ANTI-BACTERIA Coating - to meet food handling & storage requirements.
- SCREEN PRINTING for personalized design and imagery

For an ultra-durable vitreous enamel coated panel, please refer to ‘VITRANAMEL’, another FAIRVIEW ARCHITECTURAL product.

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5.0 FINISHES

5.5 TECHNICAL DATA OF KYNAR 500 PVDF COATING

Classification	Test Standard	Result	Remarks
Substrate	ASTM D1005	Pass	Aluminum
Flexibility	ASTM D4145 ECCA T7 NCCA11-19	Pass	1~2T – No Cracking
DFT	ASTM D1400 ASTM D1005 NCCA11-13,14,15	Pass	Primer 0.2 + Top 0.8 = 1 mil minimum
Color Difference	ASTM 2244	ΔE<5	4000hrs
Gloss Meter	ASTM D523	Pass	
Gloss Retention	ASTM 2244	85%	4000hrs
Chalking Resistance	ASTM 2244	<8 units	4000hrs
Pencil Hardness	ASTM D3363	HB	
Dry Film Adhesion Wet Adhesion Hot Adhesion	ASTM D3359	Pass Pass Pass	 100°F, 24hrs 212°F, 24hrs
Reverse Impact Resistance	ASTM D2794	No Cracking	0.5" x 1.1 lb x 19.7"
Bending/Gardner Impact	ASTM D3281	Pass	Normal
Solvent Resistance	ASTM 2794	Pass	MEK double rubs
Acid Resistance	ASTM 1308	Pass	7 days soaking in 10% H2SO4
Alkali Resistance	ASTM 1308	Pass	7 days soaking in 10% NaOH
Detergent Resistance	ASTM D2248	Pass	72 hrs soaking in 3% detergent
SALT RESISTANCE	ASTM B117	Includes the following:	
Gloss Retention	ASTM D523	0.8% change	5000hrs
Color Retention	ASTM 2244	ΔE=0.68	5000hrs
Chalk Resistance	ASTM 4214	Rating: 10	Top rating – no chalk (5000hrs)
HUMIDITY RESISTANCE	ASTM D714	Pass	2000hrs
	ASTM B117	Includes the following:	
Gloss Retention	ASTM D523	No Visible Change	5000hrs
Color Retention	ASTM 2244	ΔE=0.52	5000hrs
CHALK RESISTANCE	ASTM 4214	Rating: 10	Top rating – no chalk (5000hrs)
WEATHERING RESISTANCE	ASTM G53	Includes the following:	
Gloss Retention	ASTM D523	6.2% Change	5000hrs
Color Retention	ASTM 2244	ΔE=0.27	5000hrs
Chalk Resistance	ASTM 4214	Rating: 10	Top rating – no chalk (5000hrs)
CHEMICAL RESISTANCE	ASTM C207	Pass	Mortar, 24hrs
	ASTM D1308	Pass	10% Hcl, 15 min
		Pass	70% HN03 Vapors, 30 min
		Includes the following:	
Gloss Retention	ASTM D523	6.2% Change	16hrs
Color Retention	ASTM 2244	No Change	16hrs
Chalk Resistance	ASTM 4214	Rating: 10	Top rating – no chalk (5000hrs)

Australian National University, Canberra

6.0 FIRE RESISTANCE

The Fire Resistance standards achieved with standard VITRABOND are as follows.

PE CORE			
AS 1530.3	Pass	Ignitability Index	0
		Heat Evolved	0
		Spread of Flame	0
		Smoke Developed	0-1
BS BBA 4901	Pass		
BS 476.6	Pass	Index of overall performance	0.0
BS 476.7 class 1	Pass	Spread of Flame	0
EN 13501-1	Class B, s1, d0		
ASTM E 84	Class 2 or B	Flame Spread Index	45
		Smoke Development	250
FR CORE			
NOTE: FR Core attains all the standards of PE Core, as well as the below			
ASTM E 84	Class 1 or A	Flame Spread Index	10
		Smoke Development	20
AS ISO 9705	Group 2		
NFPA 285	Pass		
Specification C1.10 of BCA 2010	Can be used as an attachment to the external walls in compliance with the specification. This is on the basis that the product is not used near or above an exit.		
A2 CORE			
NOTE: A2 Core attains all the standards of PE & FR Core, as well as the below			
EN 13501.5	A2, s1, d0		
AS ISO 9705	Group 1		

For an entirely non-combustible Aluminum composite panel, see VITRACORE. This is an Aluminum Honeycomb Panel by Fairview Architectural, assessed to achieve AS1530.1.

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7.0 WINDLOADING

The deflection of VITRABOND panel under load is demonstrated by the following charts. The charts are developed to show the amount of spacing between supports running lengthwise to the panel in comparison to the panel deflection. Deflections in excess of 2" are not allowed as this may stress the Aluminum skin beyond tolerance limits.

VITRABOND panels can be stiffened by various means to resist wind loads and reduce panel deflection. All stiffeners should be a maximum of 24" (600mm) apart.

WINDLOAD DATA CHARTS

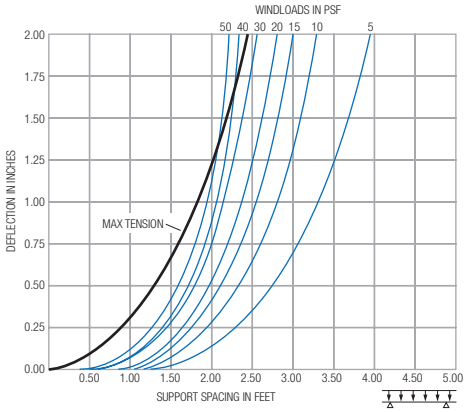

CHART 1 – WINDLOAD CHART: 3mm (0.118"), SINGLE SPAN

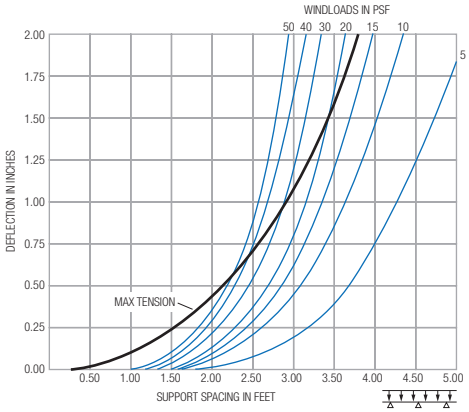

CHART 2 – WINDLOAD CHART: 3mm (0.118"), TWIN SPAN SIMPLY SUPPORTED

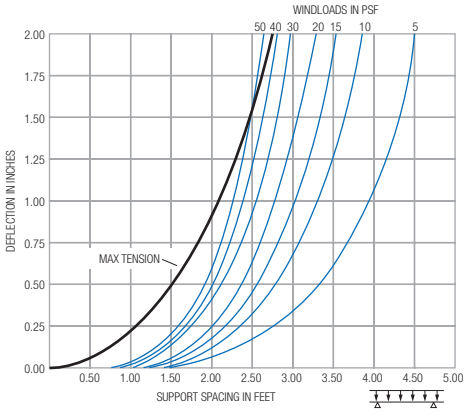

CHART 3 – WINDLOAD CHART: 4mm (0.157") MM, SINGLE SPAN

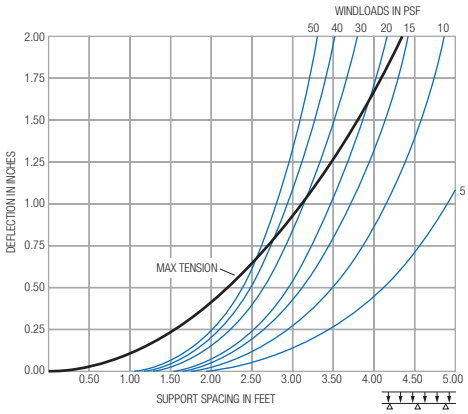

CHART 4 – WINDLOAD CHART: 4mm (0.157"), TWIN SPAN SIMPLY SUPPORTED

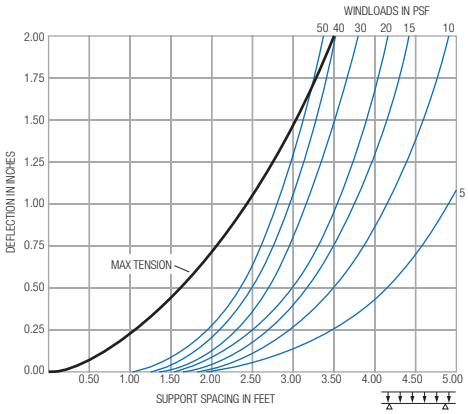

CHART 5 – WINDLOAD CHART: 6mm (0.236"), SINGLE SPAN

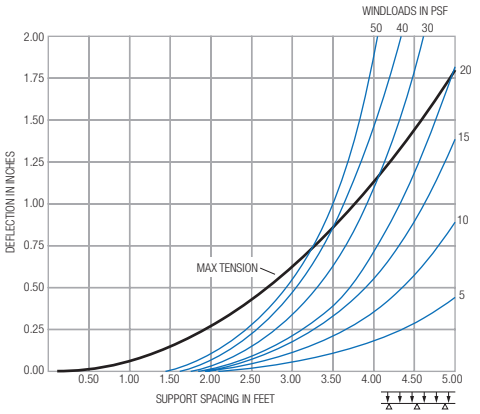

CHART 6 – WINDLOAD CHART: 6mm (0.236") MM, TWIN SPAN SIMPLY SUPPORTED


Elizabeth House, Wembley UK

8.0 THERMAL PERFORMANCE

8.1 THERMAL INSULATING PROPERTIES

Thermal Resistance (PE core)		
From -58°F to +176°F (-50°C to +80°C)		
Panel Thickness	Thermal Resistance ft².°F.s/Btu	Heat transmission Coefficient Btu/hr/ft²/°F
3mm (0.118")	141	0.10
4mm (0.157")	211	0.98
6mm (0.236")	352	0.94

8.2 AVERAGE EXPANSION

The expansion and contraction of VITRABOND is controlled by the Aluminum cover sheets.

Material	Expansion coefficient (x10 -6 in/in/°F)	Elongation per 1000in ΔT=90°F
VITRABOND	13.2	1.2
Aluminum	13.2	1.2
ZINC	14.8	1.3
STEEL	6.8	0.6
CONCRETE	6.7	0.6

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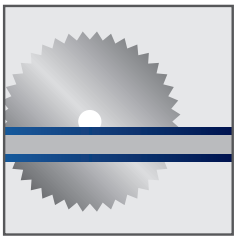
9.0 FABRICATION METHODS

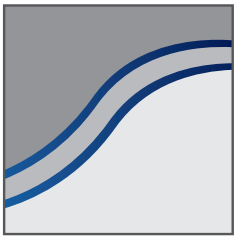


9.1 CUTTING

VITRABOND panel can be cut with a wall-saw, circular saw, bandsaw or jigsaw.

The requirements for a circular saw are as follows:

The cutting tool material to be carbide tipped, thickness 0.079”-0.157”.	
Tooth geometry:	Trapeze/flat.
Tooth pitch:	0.394” - 0.472”.
Rake Angle:	10° (positive)
Clearance Angle:	15°.
Max cutting speed:	1650 ft/min
Max feed speed:	100 ft/min

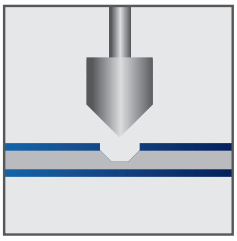


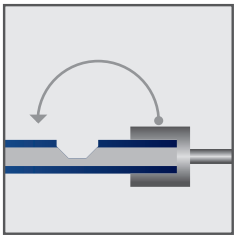
9.2 CONTOUR CUTTING

VITRABOND panel can be contour cut with water jets, CNC machines, copy routers and jigsaws.

Stockland Taroonga, VIC

9.0 FABRICATION METHODS



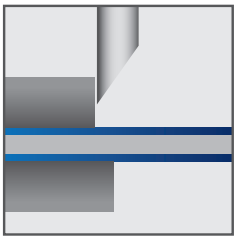


9.3 ROUTING / FOLDING

VITRABOND panel can be cold shaped, enabling it to form various shapes and sizes. A half-round bit is recommended for grooving to reduce stresses on the aluminum during bending, however a rectangular or v-groove can be routered on the back of the panel, following potential fold lines. A thin layer of core should remain at the base of the groove. The panel can then be hand folded along this groove, creating a precise and even fold. The outer radius of the fold can be determined by the shape and width of the routered groove.

There must be between 0.012” and 0.02” of core material left at the base of the routed groove. Too much material can cause core separation at the corner and result in a larger radius fold than desired.

For bold colors a half-round bit is recommended and a heated work table may be required to warm panels to reduce paint crazing at corners.



9.4 SHEARING

Shearing can be done with a guillotine. Ensure the blanking tools are padded. Shearing causes a slight roll down along the cut edge of the panel cover sheet.

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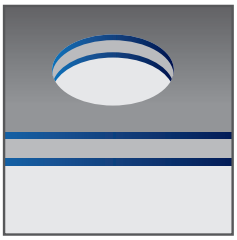
9.0 FABRICATION METHODS

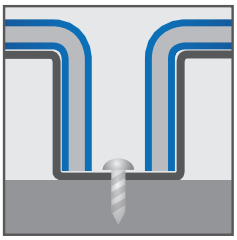


9.5 PUNCHING

The punching of flat formed parts from VITRABOND is performed the same way as solid Aluminum sheeting, using sharp tools and dies with minimal cutting clearance. Varying shapes may easily be punched with normal Aluminum punching machinery. As with shearing, a slight roll down may occur.

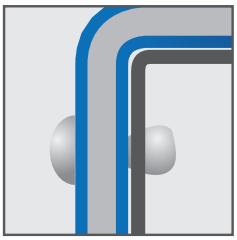
9.6 ROLL BENDING

VITRABOND panel can be bent with a roll-bending machine. Use polished rollers free of imperfections only.



9.7 SCREWING

Vitrabond can be screwed with conventional stainless steel or galvanised screws for wood and metal.
For outdoor use allow for thermal expansion.

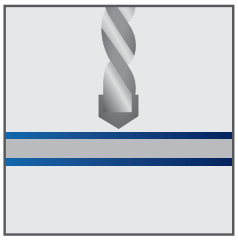


9.8 RIVETING

Riveting is possible with the usual equipment and solid rivets or blind rivets.
For outdoor use allow for thermal expansion.

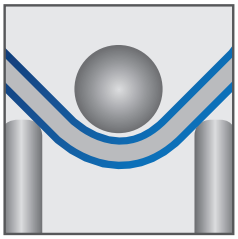
Quest Serviced Apartments, Campbelltown NSW

9.0 FABRICATION METHODS



9.9 DRILLING

VITRABOND panel can be drilled with centre point twist drills normally used for Aluminum and plastics or machines common for metals. Drill material: High-Speed Steel (HSS)



9.10 BENDING

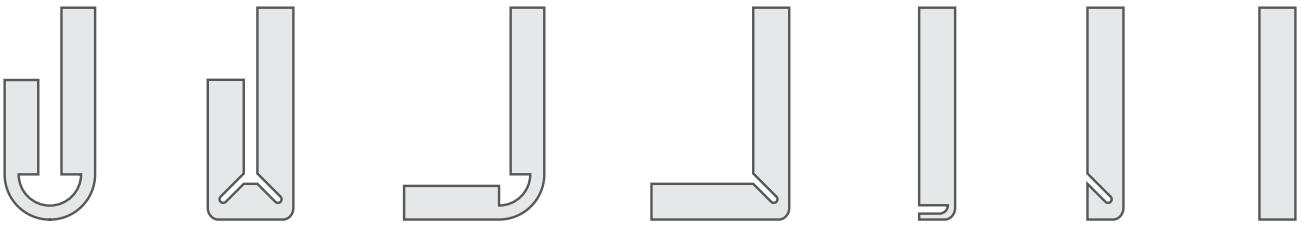
Bending is possible with a folding table or brake press. The inside bending radius is roughly 10 times the VITRABOND panel thickness. Use protective foils. There is more spring-back effect than with solid Aluminum sheet. For serial production tests should be made on sample panels.

9.11 GLUING

Usual metal adhesives or double sided 3M™ VHB™ tape should be used.
There is low adhesion to the core material.

10.0 EDGE CLOSE-OUT & TREATMENT DETAILS

VITRABOND panel edges can be closed out as below details.



vitrabond
ALUMINIUM COMPOSITE PANEL
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11.0 INSTALLATION

INSTALLATION GUIDELINES

- All sheets should be installed in the same direction as marked on the protective film to prevent possible finish variation
- As minor color variation can occur between production lots, it is recommended to place total requirement for a project in one order to ensure color consistency.
- Where Aluminum materials come in contact with dissimilar metals, a proper insulator or caulking tape should be applied to insulate between the dissimilar materials to avoid corrosive and electrolytic action.

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12.0 MISCELLANEOUS

12.1 PROTECTIVE FILM

- Make sure there is no risk of any kind of damage to the material that may take place on the job site prior to removal of the film.
- Remove protective film immediately after installation to avoid glue residuals on panel surface due to UV radiation.
- Do not stick, put or apply PVC tapes, polyurethane sealant and modified Silicone sealant onto VITRABOND protective film. The plasticizer contained in these materials can penetrate the protective film and cause a gloss change in the coating.

12.2. HANDLING AND STORAGE

- Considerable care should be taken in the handling of VITRABOND.
- VITRABOND panels are sensitive to impact, particularly shocks from small, hard objects, which can dent the Aluminum cover sheet.
- A minimum of two people should be used when sliding large sheets to avoid scratching.
- To prevent surface damage when stacking VITRABOND, there should be nothing between the panels.
- VITRABOND should be stored in a cool and dry area where temperature is relatively stable.
- Pallets of VITRABOND should be stored horizontally with adequate support to prevent sagging
- Stacked pallets should be identically sized and not more than six (6) pallets high.

12.3 RECYCLING

All VITRABOND ACP is 100% recyclable.

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ALUMINIUM COMPOSITE PANEL
BY FAIRVIEW

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PRODUCT RANGE BY FAIRVIEW

VITRABOND	Aluminum Composite Panel
VITRACORE	Non-Combustible Composite Panel
CERAMAPANEL	Prefinished CFC
EUROPANEL	Prefinished CFC
ARGETON	Terracotta Facade Tiles
VITRANAMEL	Vitreous Enamel Panel
SONICWALL	Autoclaved Aerated Concrete

NORTH AMERICAN VERSION