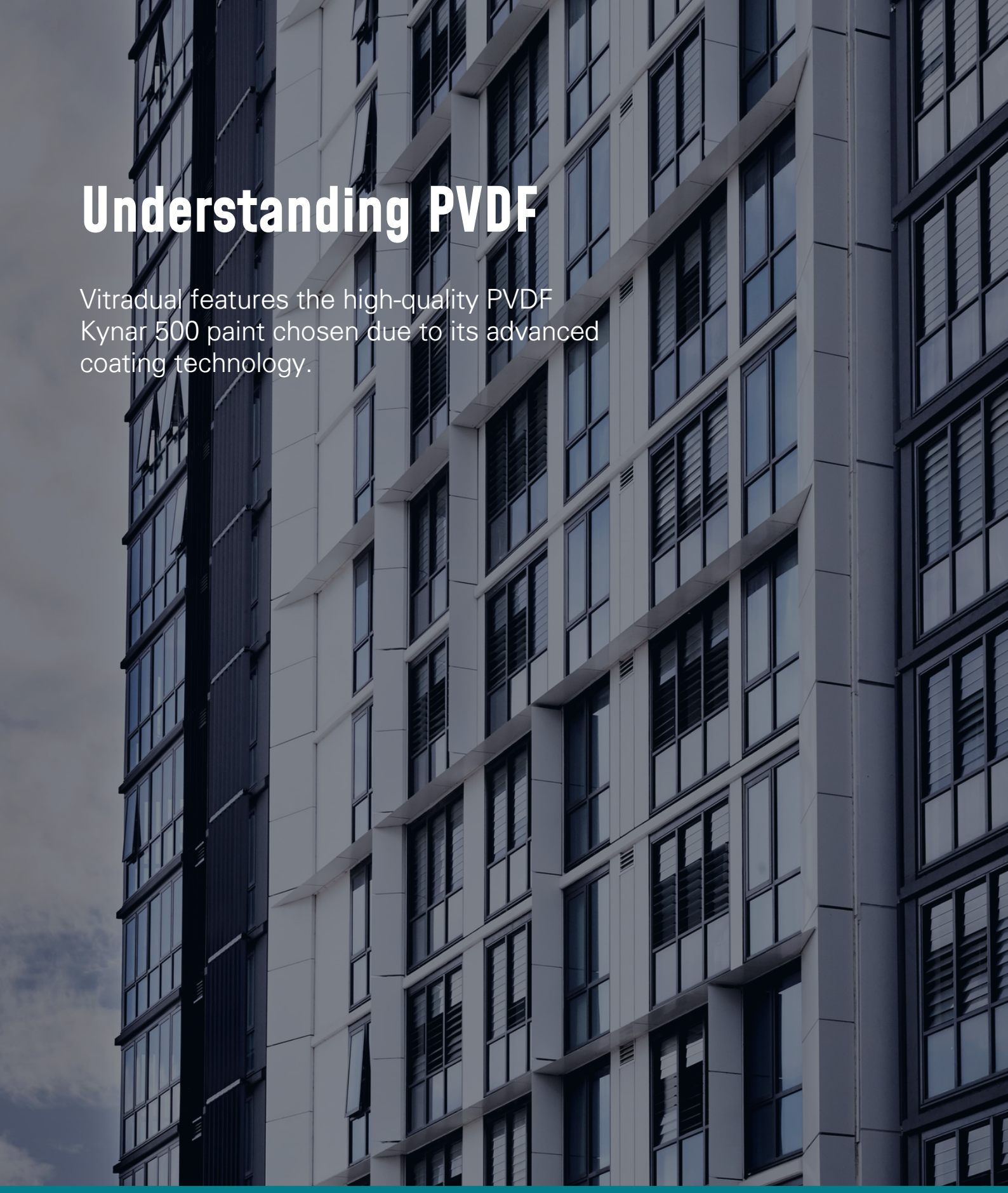


Understanding PVDF

Vitradual features the high-quality PVDF Kynar 500 paint chosen due to its advanced coating technology.

FAIRVIEW™

DEFINING ARCHITECTURE SINCE 1963

The Marq & Icon residential towers, located at Discovery Point in Wolli Creek, were designed by GroupGSA.

Vitradual was used to help create the modern and distinctive triangular-shaped landmark tower, with its elegant, streamlined appearance and sleek façade.

Victoria Police Headquarters

ABOUT VITRADUAL

Vitradual is a 3mm non-combustible solid aluminium cassette cladding system that forms part of Fairview's range of BCA compliant, deemed non-combustible cladding solutions; perfectly suitable for Type A and B constructions where non-combustible products are required.

Vitradual is a high impact resistant, solid panel which can be fabricated, curved, and rolled. The prefinished large format cladding panels feature the same PVDF coating system as Fairview's leading bonded-aluminium panel Vitracore G2; well proven for its superior quality, extensive colour range and design integrity.

INTRODUCTION

The façade and cladding system is one of the most important aspects of a building from a design perspective. It is required to manage condensation, protect the building from inclement weather, resist the spread of fire and has a significant impact on energy efficiency. However, despite its critical role, façade and cladding design, specification and installation has been the subject of a variety of recent compliance issues in Australia.

A 2019 Australian study conducted by Deakin University in conjunction with Griffith University found that defects relating to building facades and cladding systems were commonplace in buildings across the country [1]. These defects ranged from ineffective weatherproofing to the use of flammable cladding. Not only are such defects costly to resolve, they impact property values and can make buildings unsafe.

Another key consideration regarding durability, that isn't covered under Building Code Compliance, is the coating longevity & durability. Vitradual, backed by the Fairview 360 Quality Assurance program, has been leading the industry quality standards since 2017.

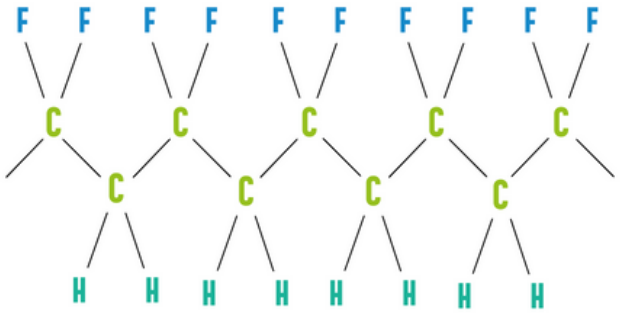
Starting from the very first step in the manufacturing process, the documentation and "on-line" assessments ensure that only the quality material that has met Fairview's meticulous standards make it into the hands of our customers.

Fairview's Total Quality Control process starts and ends with customer satisfaction: your satisfaction governs how we think, act and deliver from the design shop to the fabrication floor and from customer relations to product sureties.

Australian Technology Park

WHAT IS PVDF?

PVDF (PolyVinyliDene Fluoride) is a fluoropolymer-based resin used for coating in many industries and applications for their brilliant weather and UV resistance and unique flexibility.



Developed in the 1960's PVDF is regarded as the hardiest fluoropolymer-based resin available. Its utilisation of carbon-fluoride bonds (some of the strongest chemical bonds known to man!) allows this coating to be both flexible and resilient to the elements.

PVDF can be produced in solid bead or liquid form depending on its end use, mixed with a high boiling solvent, and blended with acrylic resins allow it to be used in a roller coat system. Once applied to the coil, it is then required to be baked (often referred to as "stove lacquering") in temperatures over 200 degrees celsius to harden. Generally, this process applies the liquid form of PVDF at a surface depth of 25-45 microns.

PVDF's main benefits are around its extreme resistance to UV, temperature cycling, salt spray and atmospheric fallout, it also has a wide colour range, allowing for most solid, metallic, and lightly textured finishes. When combined with multiple layers, imitation of other finishes such as zincs and woodgrains are extremely popular.

There are few limitations to PVDF, however there are some specifically related to architectural coatings. Due to the chemical bonding process to the acrylic resins, there are colour limitations around particularly bright and vibrant colours. Another restraint is the ability to apply this on site, as PVDF requires baking at such a high temperature, that it is unlikely to be able to reproduce these conditions on a building site.

University Of Wollongong, Molecular Life Sciences Building

PVDF 1, 2, 3, or 4... What do they mean?

There are many brands and application types for PVDF paints. Some of the coil coated products have begun to nominate some terms for different levels of PVDF coating such as "PVDF 1" or "PVDF 2", but what do they mean?

Well, the first thing you need to know is that there is no set standard to these at all, one brand's PVDF 2 could be made up of completely different thicknesses and components to another PVDF 2 for example.

The closest thing to the origin and benchmark of this relates to a note from PPG USA, called "Duranar ® PVDF Coating Layers".

This outlines PVDF 2 (two coat), PVDF 3 (three coat) and PVDF 4 (Four coat) systems and explains that solid and metallics are typically PVDF 2 while what Fairview would refer to as "sparkling" finishes are required to be PVDF 3 with a clear coat being used to suspend and protect a 'metallic flake' element.

What this does not specify is any detail around thickness, and as the focus is on the Duranar ® product here, there is also no mention of the priming recommendations or required thicknesses.

Vitadual's solid and metallic colours at their standard specification use what we refer to as a PVDF 2 system, this is 10-15 microns of primer, with 2 layers of Duranar XL ® coating, approximately. 30-35 Microns, bringing the total thickness to 40-45 microns on average.

For the high gloss, sparkling and chromatic finishes, Fairview use what is described in the note from PPG, the same as the standard product with an additional Coraflon® clear coating, and any metal flakes required for the finish.

The thing you need to remember with these types of coil coating products is that we are working with a total thickness less than a human hair (which is around 70 microns). There is such low tolerance for error, quality is not actually based at all on the thickness of the paint or the number of layers.

The accuracy of the application, temperature control and most importantly a quality paint & resin product are the factors that really make a difference to the durability and longevity.

So is PVDF 3 better than PVDF 2?

In one word, no. The only reason to use the clear coat required for PVDF 3 is to protect and suspend metal flakes, or to get a high gloss panel. In most circumstances, clear coats are significantly less durable than standard pigmented coats. Whilst there are products available that offer "superior UV resistance" or "increased durability" this is really in reference only to alternate clear coats, not compared to a pigmented coating.

But surely a thicker coating must be more durable than a thinner coating, right?

Well, that depends. Remember the coatings on pre-finished products like Vitracore G2 and Vitradual need to be flexible, as well as durable. And, the thicker the coating is, the more difficult it is for it to remain flexible. Think of how easily you can bend and stretch cling wrap compared to a plastic water bottle!

It is important that the right thickness of the overall system is chosen to both maintain durability against things like erosion, while also not cracking the coating when folded. The worst thing you could do is introduce breaks into the coating if you are looking for a façade which will continue to look great over the long term.

While 70% PVDF architectural coatings are created with similar quality resin systems, the remaining 30% of the formulation can vary in longevity and performance depending on the coating manufacturer.

Be sure to select a supplier who works with a credible coating manufacturer, who provides careful raw material selection, robust application properties, dependable colour consistency, innovative technical leadership, clear specifications, and responsive customer service, as well as the willingness to share its expertise and educational resources.

When working with designers, builders, installers or any influencer in industry, pre-finished 3mm solid aluminium is often mistaken as a category where competing products are basically equivalent to each other.

There are in fact several factors that heavily influence different performance aspects of these products and if not considered equally (or at all) it's unlikely the product will perform as expected.

These factors include,

- Coating type
- Coating application technology
- Grade
- Temper
- Guidelines and requirements
- Warranty

> *Vitradual's solid aluminium panels are pre-finished with high-quality PVDF Kynar 500® paints, tried and tested for proven vitality and durability.*

Before explaining each factor, there is some additional language that needs to be covered off. This isn't specific to pre-finished solid products but, is unlikely to be discussed with our other products;

Coating type:

- The coating type used, generally PVDF or FEVE is incredibly important to coating flexibility. It's not simply enough to use "PVDF", for the fold radii often seen on solid aluminium, good performance comes down to the brand of the PVDF used. Vitradual specifically only uses PPG Kynar 500 PVDF, this particular product appears to have the best in industry flexibility. There are cheap PVDF coatings available this will look similar, but are basically no more flexible than powdercoating, obviously these are MUCH cheaper than PPG products.

Coating Application Type:

- Most products will claim to be coil coated in their marketing material, this is due to most ACP type products being coated this way and they will 'copy paste' the brochures over. In reality, there are VERY few coil coating production lines available to 3mm solid in existence. The materials that are genuinely coil coated will always be cost comparable to Vitradual. Some suppliers for example, have had problems with coating failure on folds, colour inconsistencies within batches and likely other issues we aren't aware of, all of these problems are symptoms that can be easily associated with roller coating technology.

Coil coating:

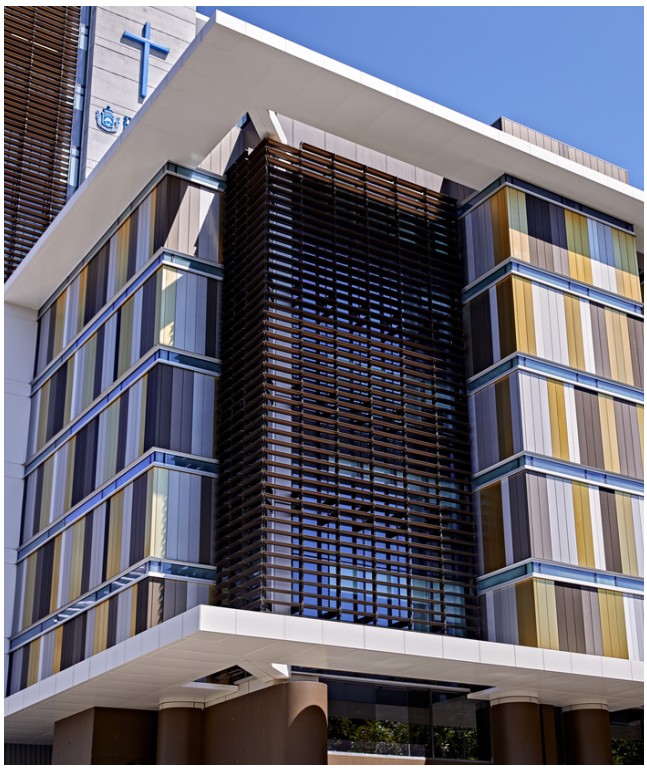
- Coil coating refers to the coating system that is genuinely continuous coating. Raw coil is loaded at one end of the line, this is cleaned, coated, cured, protective film applied and rolled back up as a "finished coil" at the other end of the line. Generally, this process also takes place in a sealed line, preventing any contaminants from falling onto the wet paint. This line is nearly 500m long, creating large MOQ's generally. It has amazing colour consistency and finish quality.

Roller coating:

- The roller coating process on the other hand is sheet by sheet as follows. Raw coil is flattened, cut into sheets, cleaned, coated, trimmed to size (depending on applicator) , cured, and protective film applied. Generally this process takes place in an 'open air' production, and it is far more possible to have contaminants in the finish. In addition it is also more difficult to control curing temperature as the ambient temperature effects panels greatly. This type of line is relatively inexpensive and has very low MOQ's. Due to the process of coating sheet by sheet, it's possible to have significant variation (colour & coating adhesion) within a batch.

Brake Press:

- Brake press refers to manually folding the panels by pressing the panel into a fold - with no routing taking place. Some facade engineers prefer this method as there is 3mm on a fold not 0.5-0.8mm and can be considered 'stronger'. However, this method creates a large radius on the fold (not a sharp fold) and stresses the paint - there are few coating type/technology combinations that can allow for this without causing failure. In addition brake pressing can damage the coatings at the impact area.



St Vincent's Private Hospital

Grade:

- Grade refers to the type of aluminium alloy used. Aluminium is rarely used on its own, generally its used as part of an 'alloy' this means the element of aluminium is combined with various other metals to achieve better or more specialised performance in different areas. For example, architectural grade - 3000-3999 is stronger, marine grade - 5000-5999 is more corrosion resistant.

- The grade of aluminium, whilst important, is something that is often blown out of proportion. 3000 series is considered architectural grade, this means that it's formulation is designed to withstand the elements, be corrosion resistant and have high strength. 5000 series (marine grade) is considered in some circles as superior for façade materials, however, 5000 is normally softer, with higher deflection, as well as decreasing the machinability. For some C5 corrosivity zones, 5000 series may have slightly better corrosion resistance (if installed as a raw sheet), but for general use, 5000 is of no benefit.

Temper:

- Temper is a alphanumerical designation that given to the speed the alloy is cooled down. This can affect the hardness of the alloy, and has a large effect on the machinability and strength of the product. For example, 'H14' is more malleable than 'H34', however H34 has better spanning performance. It's important to get the balance between rigidity and workability correct.
- The temper for façade products has the biggest impact on machinability.

Guidelines and Requirements:

- It's important to equally consider not only the product but the way a product may be required to be installed or how much support/guidance is available for things that may be out of the ordinary and/or effect warranties. For starters, installation requirements should always reflect the weatherproofing testing undertaken (if any) and if multiple installation guidelines are given, all should be tested.

Warranty:

- Pre-finished solid aluminium is quickly becoming more popular, however, consider that this product has really only existed as a façade material for a very short amount of time. In Australia, Fairview is the only large ACP brand to adopt a solid aluminium.

- ACP distributors such as CSP and HVG Facades have been unable to source equivalents from their ACP manufacturers.

- This results in them sourcing from little known companies, meaning warranties, more often than not, are held by an overseas company that is unlikely to be capable of handling a genuine warranty claim (if you can contact them at all) and/or being distributed through multiple parties that would never pay out warranty claims.

VITRADUAL

Thickness:	3mm
Coating:	PPG Kynar 500 PVDF
Application type:	Coil
Grade:	3003 / 5052
Temper:	H24 / H34

Australia's First and Best

As Australia's first coill coated 3mm solid aluminium panel, Vitradual has been the chosen cladding product for thousands of new build and rectification projects across Australia.

With the largest stock holding in Australia, and a virtually limitless range of colours and finishes, Vitradual is the choice product for cladding applications.

Fairview's comprehensive quality assurance process means that from product design to the fabrication floor, Vitradual has been built with performance in mind.

Extended Warranties

Due to their no-compromises manufacturing process, Fairview is also open to applications to extend our already exhaustive warranty duration. This of course requires a case by case assessment to ensure that our warranty provides a true protection to the building owners, without over promising.

Vitradual gives insurers, architects, contractors and building owners peace of mind on product specification.

Tried and Tested

Vitradual has been tested to all the minimum standards required for use in the commercial construction sector, as well as the additional testing required to meet and surpass Fairview's mission for quality assurance and information accessibility that professionals seek in the industry.

Testing:

- AS1530.1
- AS1530.3
- AS4284
- 4pt bending (for spanning performance)
- AAMA2605
- Salt spray resistance 4000hrs
- Hail impact
- UV testing 4000hrs

Assessments:

- Codemark
- Bal ratings
- FP1.4
- Windloadings/deflections
- NCC2019A1 Compliance
- Fold fatigue

When it comes to rectification, Vitradual is one of the only products available that can meet your sustainability, durability, and compliance goals.

vitradual™

NON-COMBUSTIBLE CASSETTE CLADDING / MANUFACTURED BY FAIRVIEW

FAIRVIEW

Fairview specialises in the design, manufacture and distribution of a suite of quality façade solutions throughout Australia, North America and the United Kingdom. With almost 30 years' experience in the façade industry, Fairview is dedicated to consistently facilitating the successful delivery of innovative facades that meet the requirements and vision of each project.

With one of the largest stock holds in Australia, Fairview have the ability to ensure a consistent and timely supply to our dedicated installer network. The company's flexible and innovative approach allows us to work closely with our clients to deliver the best possible project outcomes.

WEATHERPROOF AND COMPLIANT

Fairview supply cladding products that demonstrate proven performance, energy efficiency and minimal maintenance – products that are built for the future. Importantly, Fairview cladding products meet the requirements of AS/NZS 4284:2008 with test results demonstrating industry-leading performance. Test results are readily available for analysis of both serviceable and ultimate wind load pressures.

Under independent testing in NATA-approved testing laboratories, Fairview products, namely Stryüm, Vitracore G2 and Vitradual, exceeded the minimum testing requirements and outperformed its key competitors. Waterproof testing, which measures the cladding system's ability to prevent leakages under skyscraper-high wind pressures, proved that Fairview products performed above and beyond the 2.5kPA performance target set out in Verification Method FV1.1 of the NCC.

Fairview's innovations and solutions teams have delivered solutions that significantly exceed building code requirements giving project stakeholders peace of mind. Fairview products are also rigorously tested to meet fire performance requirements, with exceptional durability, longevity, and sustainability values.

Available in a range of profiles and customisable options, Fairview cladding combines its reliable and proven performance with limitless design flexibility to deliver modern sustainable cladding solutions ideal for Australian buildings.

REFERENCES

1. Johnson, Nicole and Sacha Reid. "An Examination of Building Defects in Residential Multi-owned Properties." Griffith University. https://www.griffith.edu.au/__data/assets/pdf_file/0030/831279/Examining-Building-Defects-Research-Report.pdf (accessed 25 October 2020).

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