NATSPEC
Product Partners

Quality Reputation Support

2017

Case Studies and Technical Articles

Welcome

If it were not for the NATSPEC Product Partners, NATSPEC would not be the organisation it is today. As a not-for-profit organisation, NATSPEC is constantly looking for ways to help improve the construction quality and productivity of the built environment.

The Product Partners have enabled the investment of resources into the development of free information on BIM and digital information, and the launch of the National Construction Product Register (www.ncpr.com.au) to assist in the minimisation of non-conforming products. Due to the Product Partners' continuing support, NATSPEC has been able to minimise the cost of its specification systems and services; if you were subscribing in 2005, you are still paying the same subscription fee today, equating to a 39% reduction in price.

NATSPEC continues to develop branded worksections with the Product Partners, using the latest regulations and standards for inclusion in the National Building Specification. Branded worksections include a wide range of products and systems and are freely available to NATSPEC subscribers and non-subscribers to use as part of a project specification.

The NATSPEC Product Partners support you. Consider supporting them and their products in your next project. Branded worksections can be downloaded for free from www.natspec.com.au.

Richard Choy
Chief Executive Officer
NATSPEC//Construction Information

Product Partners Program

The NATSPEC Product Partners program was developed to provide manufacturers with an opportunity to place a branded worksection in the National Building Specification. The objective is to allow design and construction industry professionals to easily access a proprietary specification from manufacturers, offering reputation, quality to Australian Standards, and support. Selection of products is also easier, saving you time and reducing your risk.

NATSPEC is the trading name of Construction Information Systems Limited, ABN 20 117 574 606.

NATSPEC, founded in 1975, is a not-for-profit organisation that through professional associations and government property groups, is owned by the design, build, construct, and property industry. It is impartial and is not involved in advocacy or policy development.

NATSPEC's major service is the comprehensive national specification system endorsed by government and professional bodies. NATSPEC, the National Building Specification, is for all building structures with specialist packages for architects, interior designers, landscape architects, structural engineers, service engineers, and domestic owners. AUS-SPEC is the Local Government specification system for the life-cycle management of assets. Packages include Urban and Open Space, Roadworks and Bridges, Public Utilities, and Maintenance. NATSPEC is also responsible for the National BIM Guide and its associated documents.

NATSPEC's objective is to improve the construction quality and productivity of the built environment through leadership of information.

Stakeholders

Air Conditioning and Mechanical Contractors' Association of Australia

Australian Elevator Association

Australian Institute of Architects

Australian Institute of Building

Australian Institute of Building Surveyors

Australian Institute of Quantity Surveyors

Chief Minister, Treasury and Economic Development Directorate (ACT)

Construction Industry Engineering Services Group

Consult Australia

Department of Finance (Federal)

Department of Finance (WA)

Department of Housing and Public Works (QLD)

Department of Infrastructure, Planning and Logistics (NT)

Department of Planning, Transport and Infrastructure (SA)

Department of Treasury and Finance (TAS)

Department of Treasury and Finance (VIC)

Engineers Australia

Master Builders Australia

Department of Finances, Services and Innovation (NSW)

Standards Australia

NATSPEC//ProductPartner

Branded Worksections have been completed by NATSPEC and our Product Partners using the latest regulations and standards. Download for free at www.NATSPEC.com.au

NATSPEC Branded Worksections

01 General

0181p BOSTIK in adhesives, sealants and fasteners
0181p MAPEI in adhesives, sealants and fasteners
0184p ENSYSTEX termite management
0184p FMC termite management
0184p TERMGUARD termite management
0191p ACCULINE sundry items
0191p GERFLOR sundry items
0192p ANCON structural components
0194p RAVEN door seals and window seals
0195p DTAC tactile indicators and stair edgings

02 Site, urban and open spaces

0252p LAWN SOLUTIONS in landscape - natural grass surfaces
0279p PASCO BUZON in paving - on pedestals

03 Structure

0310p AFS wall systems in concrete - combined
0310p DINCEL in concrete - combined
0310p MAX FRANK in concrete - combined
0311p FIELDERS KingFlor in concrete formwork
0325p DEFLECTA concrete protection
0341p FIELDERS SlimFlor in structural steelwork
0341p GALVASPAN steel purlins and girts in structural steel
0341p LYSAGHT purlins and girts in structural steel
0345p DULUX steel protective paint coatings
0345p PPG COATINGS steel - protective paint coatings
0345p VALSPAR - WATTYL in steel protective paint coatings
0381p TLB TIMBER in structural timber
0383p TLB TIMBER in sheet flooring and decking

04 Enclosure

0411p MAPEI in waterproofing - external and tanking
0411p PARCHEM waterproofing - external and tanking
0423p ASKIN XFLAM performance panel roofing
0423p COLORBOND steel and ZINCALUME steel in roofing
0423p FIELDERS roofing - profiled sheet metal
0423p KINGSPAN in roofing - profiled sheet metal
0423p LYSAGHT roofing - profiled sheet metal
0423p REVOLUTION ROOFING in profiled sheet metal
0424p FIELDERS roofing - specialised sheet metal
0428p DANPALON roof glazing
0434p ASKIN XFLAM performance panel cladding
0434p DANPALON translucent façade cladding
0434p KINGSPAN insulated panel cladding
0436p COLORBOND steel and ZINCALUME steel in cladding
0436p FIELDERS cladding - profiled sheet metal
0436p LYSAGHT cladding - profiled sheet metal
0436p REVOLUTION ROOFING wall cladding
0437p FIELDERS cladding - specialised panels
0451p ALSPEC aluminium windows and doors
0451p AWS aluminium windows and doors
0451p CAPRAL ALUMINIUM windows and doors
0453p CS Cavity Sliders in doors and access panels
0453p RONDO in doors and access panels
0454p EZI ROLL DOORS AUSTRALIA overhead doors
0456p SAFETYLINE JALOUSIE louvre windows
0461p VIRIDIAN glazing
0471p CSR BRADFORD in thermal insulation and pliable membranes
0471p KINGSPAN in thermal insulation and pliable membranes
0472p CSR BRADFORD in acoustic insulation
0473p DAMTEC acoustic floor underlays
0473p REGUPOL acoustic floor underlays

05 Interior

0511p KEYSTONE ACOUSTICS in lining
0522p RONDO in partitions - framed and lined
0528p ASKIN XFLAM performance panel partition system
0531p ASKIN XFLAM performance panel ceilings
0531p CSR HIMMEL in suspended ceilings - combined
0531p RONDO in suspended ceilings - combined
0541p TATE access floors
0552p CON-FORM in metalwork and platforms - fabricated
0554p MODDEX steel handrails, guardrails, balustrades and other barriers
0574p QUATTRO SHADING in window coverings

06 Finish

0612p MAPEI in cementitious toppings
0612p POLYFLOR KIESEL self-leveling cementitious toppings
0621p MAPEI in waterproofing - wet areas
0621p PARCHEM waterproofing - wet areas
0651p GERFLOR in resilient finishes
0651p KARNDEAN in resilient finishes
0651p POLYFLOR in resilient finishes
0651p REGUPOL in resilient finishes
0651p TARKETT resilient finishes
0652p TARKETT carpet tiles
0654p GERFLOR engineered sports flooring
0657p PARCHEM resin based seamless flooring
0671p DULUX painting
0671p HAYMES painting
0671p RESENE painting
0671p TAUBMANS painting
0671p VALSPAR - WATTYL painting
0672p VALSPAR - GRANOSITE textured and membrane coatings

07 Mechanical

0731p FANTECH fans
0735p AIROCLE natural ventilation and smoke management
0745p FANTECH attenuators and acoustic louvres
0751p VICTAULIC in mechanical piping
0752p ARMAFLEX FRV in mechanical piping insulation
0762p ASKIN XFLAM performance panels in cool rooms

09 Electrical

0943p ERICO CRITEC in switchboard components
0979p ERICO in lightning protection
0981p FERMAX electronic security

Branded Worksections can be downloaded for free from ***www.natspec.com.au***

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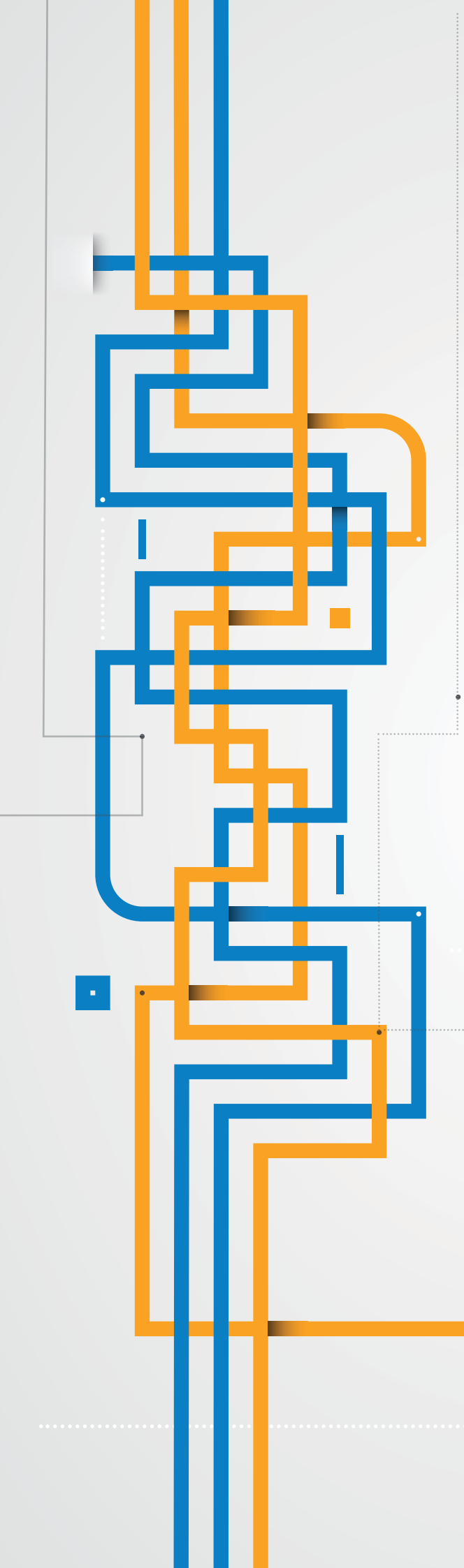
National Construction
Product Register

NCPR



RAISING AWARENESS OF PRODUCT CONFORMITY

The National Construction Product Register is:

- Freely accessible online
- Growing everyday
- A source for readily available **verified** information
- A source for manufacturer information on conformity in a **standard format**
- Designed to increase awareness and understanding of the importance of **conformity**

This sharing of information will lead to improved **quality** of construction in the Australian industry, and improved **safety** for the Australian public.

www.ncpr.com.au

DO YOUR PRODUCTS COMPLY?

The importance of using complying products on projects

"Materials and products move through multiple organisations before they are finished in a built project. Time and cost pressures mean that there is no single body in a position to be responsible for all conformity and compliance checking of the final project."

- Richard Choy, CEO, NATSPEC

Product compliance and conformity in the built environment have recently been propelled into the global spotlight by the Grenfell Towers fire in the United Kingdom, resulting in up to 80 deaths. In recent years, there have been increasing reports of construction products entering the Australian market with inadequate or false evidence of conformity to applicable standards (non-conforming), and products and materials which have not been used in accordance with applicable regulation (non-complying). This has affected the quality of Australian buildings. Whether it be faulty electrical cables, inappropriate use of combustible cladding, products containing asbestos, or exploding glass, non-compliant products are a significant issue and have fostered community disenchantment with the building industry.

The minimum standard of quality for performance for buildings being constructed in Australia is the National Construction Code (NCC), which has legal effect through the state and territory Building Acts. For construction work not covered by the NCC, designers, architects, and engineers are responsible for nominating standards to which the selected products and materials should conform. Product standards should refer to relevant Australian standards; where there are no relevant Australian standards available, relevant international standards or authoritative industry sources should be referenced.

Products that do not conform to relevant standards, or do not comply with the NCC, have been found in the Australian construction industry, putting users at risk and lowering the overall safety and quality of the built environment. A survey conducted by the Australian Industry Group found that 92% of respondents were aware of non-conforming products being used in their industry. Significant costs also ensue from non-conforming products - one constructor estimated that re-work due to non-conforming products cost 0.25%-2.5% of the overall contract value. User injury or death, litigation, and resulting long-term social costs only add to this figure.

It is crucial for designers to use their construction specification to succinctly define the minimum required technical properties and level of quality for products and materials used in their projects, in order to protect their clients and the end users of the built environment. If not, they may become complicit, and susceptible to legal action. The required evidence of conformity should also be specified to ensure that the building products used conform to the specified requirements.

The specification provides a standardised record of requirements for all parties to refer to, so that the products comply with applicable regulations and are of the desired quality. Safety for all users is hence improved and the risk of early failure or defect is minimised, reducing costs from rectification, emergency repairs, or replacement, and costs from litigation.

To raise awareness of the importance of conformity, many organisations have called for the development of a national register of construction products. In response to this demand, NATSPEC has developed the National Construction Product Register (NCPR) as a central register of construction products which have NATSPEC authenticated evidence of conformity to relevant Australian and international standards. This evidence includes test reports, test certificates, appraisals, product certification or CodeMark, or other evidence of suitability from a National Association of Testing Bodies (NATA) or Joint Accreditation System of Australia and New Zealand (JAS-ANZ) accredited testing organisation.

The NCPR promotes understanding and awareness of the importance of product conformity, and compliance among designers, specifiers, contractors, and manufacturers. By providing a freely accessible platform to search for products which have NATSPEC authenticated evidence of conformity, the NCPR supports organisations contributing to Australia's built environment. This is a significant step towards increasing safety for the Australian public and the much needed improvement of the quality of the built environment.

GETTING HELP

INTRODUCTION

This TECHnote summarises the variety of ways in which NATSPEC provides help to specification writers.

NATSPEC *Guidance*

NATSPEC worksections include extensive *Guidance* text with suggestions on filling in prompts, alternatives, and background material. *Guidance* is in Microsoft Word hidden text format which can be turned on or off, and appears like this:

> NATSPEC does not recommend the use of SCOPE OF WORK clauses. If you wish to include such a general description you may add it here, or in the corresponding location of selected worksections.

If you work with an office master, you may find it convenient to add your own guidance notes using NATSPEC's hidden text styles.

Hidden text and other features that can help you in your specification writing are accessed via the NATSPEC toolbar. See sidebar.

NATSPEC *Optional style text*

Some worksections include *Optional style text* in this font (blue with a grey background) that covers items specified less frequently. It is also a Microsoft Word hidden text format which can be incorporated into *Normal* style text, where it is applicable to a project, by highlighting the text and changing the style and format.

NATsource

NATsource lists in excess of 1200 documents cited in the specification packages. Use it to check document titles, currency, content and publishers. Access *NATsource* via SPECbuilder Live/Resource material/Standards Information. Changes to cited standards are summarised in *Standards revising NATSPEC and AUS-SPEC* which is available on the NATSPEC website under Technical Resources/Standards.

NATSPEC TECHnotes, TECHreports and AUS-SPEC TECHguides

TECHnotes provide guidance of a more general nature that either relates to several worksections, or does not fit into the normal worksection structure, TECHreports provide more detailed information on specification issues and TECHguides provide guidance on compiling contract documentation for local government projects.

All these documents continue to be developed and updated. The latest versions are available in the Technical Resources area of the NATSPEC website or via the Resource material link in SPECbuilder Live.

NATSPEC Website

NATSPEC's website has a range of material including:

- Details of NATSPEC specification packages, including abstracts of worksections.
- A link to SPECbuilder Live.
- Links to Product Partners' websites arranged by worksection.
- Notification of latest changes to standards affecting NATSPEC worksections.
- Information on publications relating to specification writing.
- Answers to frequently asked questions (FAQs) on specification writing, purchasing NATSPEC, getting started with NATSPEC and word processing.

NATSPEC BIM Portal

The BIM Portal is home to the *NATSPEC National BIM Guide* and related documents. It also includes resources and tools to assist the implementation of BIM in the construction industry. To go to the BIM Portal click on the *NATSPEC BIM* logo on the NATSPEC website.

NATSPEC Training

NATSPEC provides training in specification writing-related subjects.

For details of monthly *Getting started with NATSPEC* webinars and annual training courses in venues around Australia see www.natspec.com.au.

Videos of previous courses are also available on the website.

Subscribers are notified of upcoming training courses.

Relevant Publications

Specifying Architecture - a guide to professional practice

NATSPEC toolbar

The NATSPEC toolbar lets you, among other things, turn *Guidance* text on and off with a click of your mouse, or delete it altogether. For instructions on installing it, see FAQs at www.natspec.com.au .

NATSPEC assistance

NATSPEC does not provide a design or specification service but we can assist with specification writing techniques and dealing with problems using SPECbuilder Live and NATSPEC in Microsoft Word.

If you have problems finding what you want, feel free to contact us directly.

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SPECIFYING QUALITY

INTRODUCTION

Communicating the requirements for quality is the main technical function of the specification. This TECHnote outlines how the NATSPEC specification system may be used to promote quality in construction projects.

DEFINING QUALITY

Quality must be defined; it cannot be managed if it is not defined. Quality can have different meanings for different people in different situations. In construction this problem is amplified as the responsibility for a project is divided between many different people, within many organisations. Therefore, agreement on a defined quality level between all parties, and how it is to be measured, is key to achieving the desired quality and the satisfaction of the principal.

QUALITY LEVEL

Several factors drive the desired quality level of a project and its components; the main factor being anticipated life. It would be a false economy to poorly construct something which must last for many years or over design something which may only be required to last a number of weeks.

Other factors that influence the desired quality level include:

- The purpose of the building - Prestige or utility, flexibility or permanence.
- Required functional performance - Design repetition or one-offs, environmental.
- User perception - Convenience, comfort, ease of maintenance and repair.

WHEN CAN QUALITY BE ACHIEVED?

There is a common misconception that the quality of a project can be completely controlled during the construction stage. However, the level of quality that can be demanded during construction cannot be higher than that which is specified in the contract documentation, without additional cost.

The quality of a project is therefore dependent on documentation and supervision. The contract documentation includes the conditions of contract, the specification, the drawings and the schedules.

To achieve quality, care must be taken in material selection, documentation, workmanship and supervision. This does not necessarily increase time and cost, however these factors must be considered and balanced when defining the quality level required. Failure to take care may lead to poor quality and increased costs with greater rework, repair and maintenance required.

ROLE OF THE SPECIFICATION

Whilst the specification is a multi-purpose document, its primary role is to define precisely and succinctly the quality required and the processes necessary for achieving it. This also includes, but is not limited to, defining clear acceptance criteria for any item of work.

If specified acceptance criteria match the agreed defined quality level, then ultimately, conformance with the specification will achieve quality.

USING NATSPEC TO ACHIEVE QUALITY

The NATSPEC worksection *Templates* include the construction processes required for each particular item of work and also define clear industry standard acceptance criteria in the form of tolerances, performance requirements and testing requirements. All can be modified if necessary to suit the defined quality levels agreed for each individual project and its components.

NATSPEC promotes the achievement of quality through coordination of the contract documents. Guidance text discourages duplication of information included on the drawings within the specification, to avoid potential discrepancies and ambiguity. Duplication of information within the specification is minimised by reference to relevant worksections.

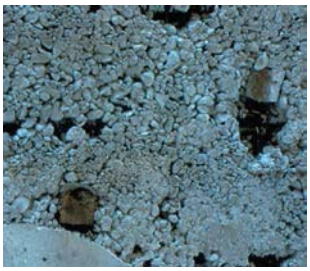
NATSPEC references and monitors updates to relevant Australian and International standards, including those cited within the BCA. Where standards define alternative levels of service, NATSPEC provides prompts to be completed by the specifier. It is essential that the specification defines the requirement, as blanket references to standards may not achieve the desired quality.

NATSPEC and AUS-SPEC also cover the requirements of project Quality Management Systems based on AS/NZS ISO 9001 and the provision of project Quality Plans in the **Relevant worksections** listed in the sidebar.

Poor quality timber construction – Split base-plate used.

"….If the building contract documents permit a sow's ear then all the quality control in the world cannot demand a silk purse……"

Inspection to confirm quality level achieved.



Poor quality concrete – Honeycombing and timber.

Relevant worksections

0010 Quality requirements for design (AUS-SPEC).

0160 Quality.

0161 Quality Management (Construction) (AUS-SPEC).

0162 Quality (Supply) (AUS-SPEC).

0163 Quality (Delivery) (AUS-SPEC).

Quality documentation is one of the most important aspects for ensuring a project finishes on time, on budget, and meets the client's expectations of quality.

Without the guidance of NATSPEC and the inclusion of quality project specifications, there is an increased risk that projects will not achieve positive outcomes in terms of cost, quality, effectiveness, and timeliness of construction.

The NATSPEC Object Standards for Building Information Modelling represents another key contribution to the construction industry that will be highly sought after upon release.

Grant Warner, Chief Executive Officer, AIQS

Acculine Architectural Systems specialise in Building Protection from the Inside Out. Australian owned and operated, Acculine is small enough to care, while offering manufacturing, supply, and installation capacities for larger, more complex projects. Products include indoor wall, door and corner protection, handrails, signage systems, cubicle tracks and fabrics, and expansion joints from InProCorp. For outdoor protection, contact Acculine for specifications on a full range of louvres, sunshades, and ventilation grilles from our in-house manufacturing division, allowing scope for custom products to meet specific design requirements. **www.acculine.com.au**

For over 20 years, AFS' innovative propriety wall systems, afs logicwall® and afs rediwall®, have facilitated the speedy and cost-efficient installation of load-bearing walls in multi-residential and commercial projects throughout Australia, New Zealand, the US, UK, and Canada.

As part of CSR Limited's stable of leading building products that include Bradford, Gyprock, Hebel, Monier, PGH Bricks, and Viridian, AFS is committed to conducting ongoing research and development to create new, innovative, and superior construction solutions that bring time and cost-saving efficiencies whilst maintaining construction quality and sustainability standards. **www.afswall.com.au**

For over 90 years, AIROCLE has provided the building industry with effective and environmentally friendly solutions for natural building ventilation and smoke hazard management. AIROCLE has substantial expertise, experience, and an absolute dedication to satisfying ventilation and smoke hazard management needs and expectations to deliver a comprehensive range of natural air, smoke, heat, and pressure ventilation, and smoke hazard management. The result is some of the most reliable, effective, and energy efficient solutions available for commercial, industrial, and community projects. **www.airocle.com.au**

Established in 1974, ALSPEC is the market leader in the design and distribution of innovative, high performance aluminium systems to the architectural, industrial, and home improvement markets. Our extensive range of window and door systems is suitable for all commercial applications and is complemented by our Carinya residential range and our Invisi-Gard Stainless Steel Mesh Security System. ALSPEC is synonymous with excellence in design and superior performance. **www.alspec.com.au**

Harnessing the power of nature in the workplace

Natural ventilation is best described as the process of using natural methods to supply and remove air, through an interior space. It uses the pressure difference between the building and its surroundings to provide ventilation without the use of a powered ventilation system. Natural ventilation has been used for centuries, though the methods used to supply natural ventilation have advanced significantly through continued developments.

The Importance of Natural Ventilation in the 21st Century

In the current era, energy usage has reached staggering amounts and shows absolutely no signs of abating. In most developed countries like Australia, it is undeniable that natural ventilation will gradually gain its prominence in the face of increasing demand for alternative ventilation methods. As a matter of fact, a significant proportion of most businesses' energy usage consists of air-conditioning in summer and heating in winter to keep workplaces comfortable. The use of non-renewable energy will not only have a detrimental effect on the environment, but will also be extremely costly to maintain in the workplace in the long run.

The financial cost and the environmental impact from energy usage needs to be addressed immediately. By increasing renewable energy usage – for example, drawing more of our energy requirements from solar, and implementing innovative design principles that empower us to harness the power of nature, we ultimately reap the benefits from incorporating sustainability into our businesses.

Using Renewable Resources

Passive design principles such as the natural airflow principles, enable the utilisation of renewable resources in a natural manner by harnessing the power of nature without the use of electrical ventilation systems. When natural airflow principles are combined with extensive research and development, highly-effective wall and roof ventilation solutions become more relevant to a wider range of businesses.

Rotary roof ventilators, or 'whirlybirds,' are a highly-effective, environmentally-friendly solution and have been popular for many years. However, businesses are yet to discover the long-term benefits that this will bring, hence many corporations are still not seeking a green alternative to generate sustainable ventilation for their workplace.

Natural ventilation methods designed with natural airflow principles (including whirlybirds), high capacity roof vents, louvres (fixed and operable), and ventilators (slope and ridge) offer many benefits for business organisations, including:

- Reduced energy usage (both cooling and heating)
- Increased fresh air and natural light indoors
- Minimised building construction costs

When carefully designed and implemented, natural ventilation solutions are extremely cost effective and empower architects to create aesthetically appealing properties, free of space-consuming ventilation units that inhibit ceiling height, and unsightly pipes and ducts to transfer air to and from air-conditioning units. On the other hand, installing electrical ventilation systems with the wiring, ducts, and units required is a costly project.

The structural cost savings that can result from using natural ventilation methods are enormous. With Airocle's natural ventilation system, savings of up to $75/m^2 are enabled. Adam Gillet, Structural Engineer at Gilcon, said, "I advocate the use of natural ventilation. If you take into account the reduced internal pressures, the vents can pay for themselves."

In an era of excessive and unsustainable energy consumption, commercial organisations that implement innovative natural ventilation solutions position themselves as industry leaders by reducing construction and operational costs, providing employees with healthy and sustainable workplaces, and reducing their carbon footprint. Governments should also exercise their authority to provide incentives to businesses that use natural ventilation instead of air-conditioning where possible as a responsibility of all, in the mitigation of climate change.

Rotary roof ventilators (whirlybirds) are an effective, environmentally-friendly solution

Coomera Indoor Sports Centre Gold Coast, QLD

A new sports centre built to showcase Australian athletes is also showcasing the technical superiority of two of Alspec's unique building products: Hunter Evo 150mm DG Flush Glazed Framing, and ProGlide High Performance Sliding Door.

With 14 metre high glass façades, the recently completed Coomera Indoor Sports Centre on Queensland's Gold Coast provided the perfect application for Alspec's architectural grade aluminium framing product, Hunter Evo 150 acoustic. As well as being highly resistant to the elements and corrosion, Hunter Evo 150 is the material of choice when acoustic considerations are important, such as in the sporting complex environment.

As well as its sound-reducing properties, Hunter Evo 150 has the ability to span large working spaces, as required for this project. Frequently utilised in commercial shopfronts, showrooms, and high-end residential projects, the Hunter Evo 150 was able to span the space thanks to the maximum width of mullions available, and the exceptional strength of the framing materials from which they are made. Mullions are the vertical elements which provide structural support in larger window constructions. The framing is fabricated from architectural grade aluminium, which not only is exceptionally strong, but has certified credentials which meet or exceed the design specifications needed to cope with the extremes of Queensland weather.

Builder: Hansen Yuncken

Architect: Peddle Thorpe Architects and BDA Architecture

In addition to the window framing, Alspec's high performance ProGlide sliding doors were utilised in the construction of the building. Featuring double and triple track options, with the capacity for thicker glass and double glazing, the ProGlide doors have the ability to be easily replaced if damaged. An added benefit is the flush gutter sills which incorporate stainless steel grates to drain away surface water. Being an extremely versatile product, the ProGlide sliding doors were able to be specifically tailored to the requirements of the construction of the sports facility.

Specially commissioned for the 2018 Commonwealth Games, the 2016 *Gold Coast/Northern Rivers Regional Architecture* 'Building of the Year' award-winning Coomera Indoor Sports Centre will be used by a mix of sporting codes including gymnastics, netball, volleyball, and basketball. During the Games it will be used primarily for gymnastics and the netball finals, potentially hosting up to 7500 people daily. Built with State and Federal funding, the centre is now owned and operated by the City of Gold Coast.

While athletes will be hoping for outstanding performances during the Games, by utilising Alspec's high end products, the owners of this facility can take comfort in the knowledge they have constructed a world-class facility which will give its own outstanding performance well into the future.

Ancon Building Products designs and manufactures high integrity steel products for use in masonry and concrete construction, and has earned a reputation for quality and technical expertise. The company operates from advanced manufacturing facilities and supplies projects worldwide ranging from small-scale residential developments to major infrastructure projects. **www.ancon.com.au**

Armacell is a global innovator in foam technologies and the world leader in the market for flexible technical insulation solutions. Our market coverage is second to none, with 19 manufacturing sites in 13 countries, including a facility located in Dandenong, Victoria.

Half a century ago, Armacell was the first to develop an elastomeric insulation product. Armacell since then has had a focus on continuous innovation, supported by research and development teams across the globe, ensuring the ARMAFLEX range continues to deliver excellence in performance and quality.

Armacell provides insulation solutions for mechanical piping, and tanks in both commercial and industrial applications including solar, ducting, refrigeration, and hot or cold water. **www.armacell.com.au**

ASKIN® is a leading manufacturer and installer of insulated architectural facade systems, roofing systems, and temperature controlled facilities in Australasia. We embrace a customer first approach in delivering sustainable lifetime value. With a network of 12 sites throughout Australia and New Zealand, ASKIN®'s vast experience has been built upon a strong foundation dating back to 1964. ASKIN®'s culture of customer first, constant improvement, quality, and safety assurance is supported with our technical expertise and ISO 9001 accreditation. **www.askin.net.au**

Architectural Window Systems (AWS), is one of Australia's leading suppliers of aluminium window and door systems. AWS offers an extensive range of locally designed aluminium window and door suites for residential and commercial applications. AWS designs, tests, finishes, and supplies aluminium window and door systems under the Vantage and Elevate™ brands to more than 130 licenced manufacturers throughout Australia.

Vantage Aluminium Joinery is the residential aluminium systems brand which has become the preferred choice of residential Architects and Building Designers. The innovative performance and design features of the Vantage range deliver outstanding outcomes in residential construction. **www.awsaustralia.com.au**

BlueScope is a leader in the provision of high quality metallic coated and painted steel products for the building and construction sector in Australia. Our most notable brands are COLORBOND® steel and ZINCALUME® steel.

BlueScope products are now an integral part of both new and retrofit housing, commercial, and industrial projects. **www.bluescopesteel.com.au**

The Centenary Library
Brisbane, QLD

Ancon designed and manufactured the stainless steel support and restraint system for the intricate brick façade of the Centenary Library at the heart of the Anglican Church Grammar School.

This ambitious project, designed by Brand + Slater Architects, was a key part of the school's master plan to provide a technology-rich, world-class centre for its 1800 students. Comprising four levels, the library features an extensive range of learning spaces including a 250 seat lecture theatre, teaching and meeting rooms, and over 80 individual learning areas.

The progressive purpose of the building needed a design to match. Ancon's specialist knowledge, manufacturing agility, and project management services proved invaluable to the contractor, Rohrig, when building the detailed façade of decorative arches and corbelled brickwork with all structural steelwork now unseen.

Shelf Angle Brick Support

Ancon masonry support systems enabled the large-scale brick cladding installation on this impressive education facility to be completed to the highest safety standards while showcasing its architectural brickwork features.

The MDC and CFA continuous shelf angle support systems carry the intricate brick façade, consisting of complicated archways and projected brickwork. The MDC stainless steel angles are fixed to the reinforced concrete frame, span a 40mm cavity, and create a horizontal shelf to provide the necessary support for up to 3 metres of brickwork. MDC systems can be manufactured by Ancon in a variety of configurations to suit the specific load and cavity of individual applications, and support special features like the suspended brickwork on this project.

Cast-In Channel

Ancon's 30/20 cast-in horizontal channels were used to provide the fixing between the concrete frame and shelf angles. The channel enabled the necessary horizontal adjustment for the installer, and its compact size eliminated the issue of potential clashes with the reinforcement steel in the floor slabs.

Nail holes aided the fixing of channels to timber formwork and an infill prevented the ingress of concrete during casting. Cast-in fixings do not generate expansive forces in the concrete. They can therefore be used at close centres and can often be used closer to the edges than expansion fixings.

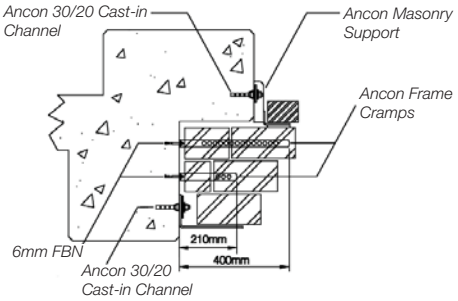
Wall Ties and Restraint Fixings

To restrain the distinctive brickwork details to the reinforced concrete structure, stainless steel L-shaped SPB and SDB frame cramps were fixed into the reinforced concrete using 6mm FBN expansion bolts.

FBN Single Expansion bolts fix into a hole similar to the diameter of the bolt. This allows the hole to be drilled through the hole in the item to be fixed. The Single Expansion bolt is a cost-effective anchor, available in grade 1.4401 stainless steel in a wide range of sizes.

Technical Expertise

As part of Ancon's free design service, plans were produced illustrating the location and reference of all the fixings required. Ancon's early involvement with the structural engineers, Bligh Tanner, on the project enabled a workable and cost effective design to be agreed upon prior to the build of the complex masonry features. Sharing Ancon's expertise with the clients at this stage of the project meant installation difficulties, sites delays, and unnecessary remedial measures could be avoided.



Ancon Section Detail

Photos Copyright:
Christopher Frederick Jones

Mitigating the risk of fire spread from pipe insulation

armacell

Since the introduction of minimum mandatory requirements for energy efficiency, the use and proliferation of pipe insulation materials in buildings has grown exponentially, highlighting shortcomings in existing test methods to adequately assess the fire hazard properties. Key research findings with respect to the evaluation of surface fire spread in vertical pipe risers/chases prompted the proposal to adopt the NFPA 274 standard test method as a replacement to AS/NZS 1530.3 for these applications.

What is NFPA 274?

National Fire Protection Association standard NFPA 274 (Standard Test Method to Evaluate Fire Performance Characteristics of Pipe Insulation) is a full-scale test method designed to represent the behaviour of pipe insulation installed in vertical pipe chases. The test method consists of a short horizontal section and a longer vertical section designed to determine the fire spread by pipe insulation in a common vertical configuration. The behaviour of different insulation materials has been defined by comparative testing over a period of thirteen years.

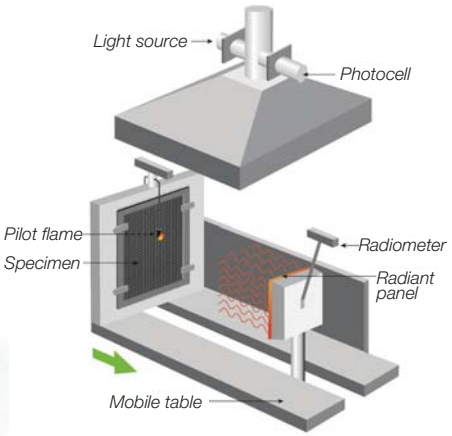
The UMC, American National Standards Institute (ANSI), Chapter 12, Hydronics, 1201.2.1.8 Insulation, specifies limiting values for the key test measurables identified in NFPA 274 as:

- Peak heat release rate (HRR max.) does not exceed 300 kW.
- Total heat release (THR) at 10 minutes does not exceed 50MJ.
- Total smoke release (TSR) does not exceed 500m^2.
- Flames do not extend more than 0.3m (1ft) past the top end of the test apparatus.

NFPA 274 versus AS/NZS 1530.3

The NFPA 274 standard test method requires pipe insulation material to be tested as installed, around a pipe, in the critical vertical orientation commonly found in buildings. An important test feature is the location of the fire source below the test specimen, ensuring any weakness in highly flammable materials is exposed (the ability to shrink or melt away from a small heat source is effectively removed as a means of achieving regulatory compliance). This method is recognised as a more applicable standard test method to determine regulatory fire indices.

National Construction Code (NCC) references AS/NZS 1530.3 results for pipe insulation and other materials. This standard describes a test method for the determination of ignitability, flame propagation, heat release, and smoke release by exposing a small scale vertically oriented flat specimen to a radiant heat source where the test specimen is sandwiched between a solid substrate and a wire mesh.



NFPA 274 Test vs AS/NZS 1530.3 Test

Armacell Products and Polyethylene Insulation Performance under NFPA 274

Armacell conducted tests at Exova Warringtonfire, which is an independent laboratory in Melbourne, in accordance with NFPA 274 on Armaflex FRV and non-cross-linked polyethylene, with and without foil facing. Results identify differences in fire hazard properties of materials that are otherwise indistinguishable by AS/ NZS 1530.3.

AS/NZS 1530.3 allows thermoplastic test specimens to melt and escape from the heat-affected area prior to ignition which results in good assessment results. However, the same thermoplastic material, tested to NFPA 274 showed extensive flame spread and failed to meet the pass criteria.

Testing to the vertical pipe chase test method (NFPA 274) has exposed the inability of current small scale test methods (AS/NZS 1530.3) to accurately determine the fire performance of combustible thermoplastic materials installed as pipe insulation. As stated in the AS/NZS 1530.3 test certificate, “it should be recognised that a single test method will not provide a full assessment of fire hazard under all fire conditions.”

Armacell recommends that designers specify dedicated pipe insulation tests such as NFPA 274 (vertical) and FM 4924 (horizontal) when assessing fire hazard risk and to specify insulation materials that have been tested to meet the pass criteria of NFPA 274.

Melton Christian College Gymnasium
Melbourne, VIC

Melton Christian College, based in Melbourne, required a double court gymnasium with additional facilities including:

- Protected outdoor areas
- Spectator seating
- Toilets and change rooms
- Meeting rooms
- Staff rooms
- Store rooms
- Class rooms

However, a key requirement for the college was for the building to be as environmentally friendly and sustainable as possible. Architect Director, Damian Summers, was tasked with designing the gymnasium to meet the brief.

The college now has an indoor facility that allows generations of school children to use the impressive basketball, netball, volleyball, and badminton courts. The basketball and netball court sizes, which were built to Olympic standards, dictated the size of the gymnasium, with the other facilities being built around this.

Not only has the brief been achieved with the gymnasium facilities, but an energy efficient building was delivered. It uses minimal electricity for lighting and has no need for heating or cooling, ensuring the key sustainability requirement for the college was met.

Increasingly today, commercial building designs need to be aesthetically pleasing while having environmental benefits. To fulfil this criteria, the ASKIN XFLAM Panel was chosen.

XFLAM panel was the building product that was specified and supplied for the interior and exterior walls, ceiling, and roofing. It was selected for its qualities:

- Fire performance
- Energy efficiency
- Unlimited colours and finishes

Due to the thermal values of the XFLAM Panel, the facility can maintain a stable temperature from summer to winter without any mechanical heating. As a result, the gym is highly energy-efficient and environmentally friendly, while saving money on heating and cooling. The panel is also pre-finished and structural, so no additional carpentry, plaster, or paint contractors were required during construction.

“The XFLAM panel was quite efficient in the construction process, able to cover large areas of walls and roofing in such a short amount of time,” said Summers.

In this instance, the college used:

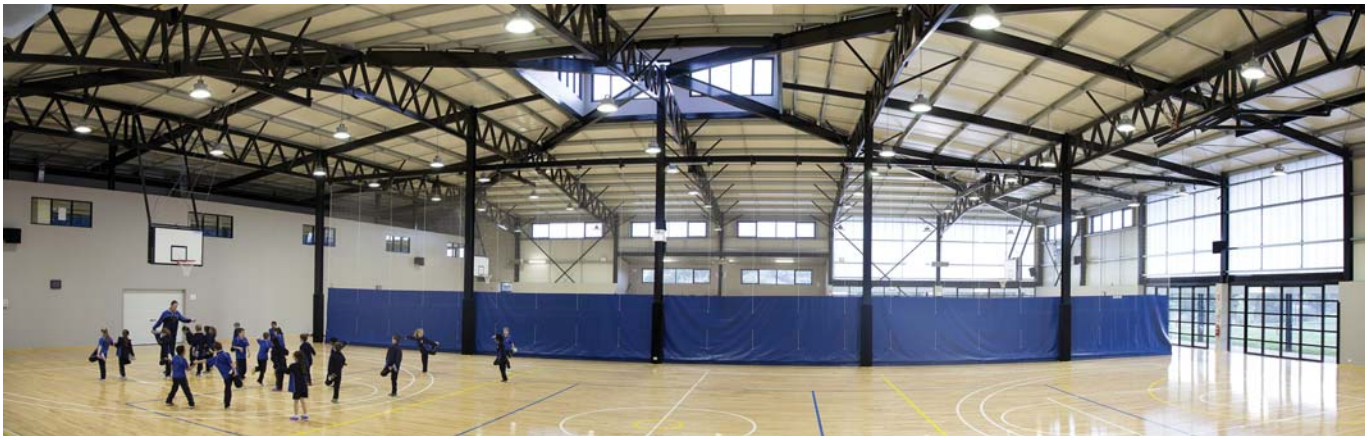
- Roofing – XFLAM Colorbond steel in Shale Grey with a Metric 4 Rib profile
- Exterior walls – XFLAM Colorbond Shale Grey in Silkline profile

“The panel also has an aesthetic appeal within the architectural design,” said Summers. “We used it with a translucent roofing and façade system. Together they worked really well.”

One of the challenges faced during construction was building approvals and permits processes due to the Southbank-Docklands apartment fire which occurred not long before this project. Because of this, the process was more stringent. ASKIN however, was able to address concerns and demonstrate to the building surveyors that XFLAM easily met the requirements for Australian standards.

“ASKIN was extremely helpful throughout this process,” stated Summers.

XFLAM panels have been installed in many schools and sporting facilities throughout Australia and New Zealand. In each case the thermal values, high fire performance, multitude of style options available, and the fast and efficient installation during construction have been major advantages.



Top: Gymnasium exterior

Bottom: One of the new gymnasium’s sporting courts

Manly Skiff Sailing Club
Sydney, NSW

Sail on over to the spectacular Manly Skiff Sailing Club, where a water's edge view of Manly is framed by beautiful bi-fold doors by AWS.

The Manly Skiff Sailing Club is situated in Manly Cove, the ideal location for a seafood platter by the water. The brief given was to extend the existing clubroom opening onto the harbour foreshore. This would give the venue highly regarded natural light and a lot more space, ultimately making it more desirable for special events. The makeover was to add some more modern features while also ensuring it retained its historical charm.

The architect, Simon Burgess from Sutech, and the builder, Fluid Building, had some considerations that needed to be accounted for due to its proximity to the water. High wind and water ratings needed to be considered when specifying aluminium windows and doors, along with finish durability. This is why AWS' commercial range Elevate™ was chosen for the job.

Views from the venue with the newly installed Elevate™ bi-fold doors
Photographer: Andrew Warn
AWS Fabricator: MidCity Windows

AWS Series 411 bi-fold doors were installed behind a glass balustrade, completely showcasing the view of the harbour. Bi-fold doors protrude into the outdoor space so that from the water, the bi-fold doors look as though they are floating in the air. From the inside, customers can't see any door tracks; it gives the illusion that they are also floating on water, giving the venue unique charm and marking it as an impressive event space.

Series 411 has been successfully tested to resist 450Pa water and is suitable for air-conditioned buildings, making it an ideal product choice for this demanding coastal application.

AWS Series 400 102mm CentreGLAZE™ Commercial Framing was also used. It has been tested to resist 600Pa maximum water and was similarly suited to the application.

Features of the Elevate™ Series 411 bi-fold doors include:

- Hung on Centor™ twin stainless steel bearing rollers running in heavy duty dual overhead tracks. Can be manufactured with compliant panels up to 3000mm high.
- The standard E2 rollers on our bi-fold doors will carry door panels up to 40kg.
- Heavy duty E3 rollers will carry bi-fold door panels up to 80kg.
- The snap-on jamb adapter accommodates an extensive range of jambs to cover almost any situation.
- A variety of lever and lock options are available including multi-point locking on our bi-fold doors for added security.
- Can be configured to incorporate single or double entry doors so access can be achieved without opening the whole unit.

CONSULT AUSTRALIA

NATSPEC fulfils a critical role in the building and construction industry in the provision and dissemination of information, which not only assists those in the supply chain to conduct their day to day activities, but also assists in the standardisation of practices across the industry that produce better building quality outcomes, as well as outcomes in value for money delivery, health and safety, and innovation. I congratulate NATSPEC on the quality provision of service it has delivered for the last 40 years, and look forward to working collaboratively with NATSPEC to continue to provide value driven services for our combined membership for many years to come. Consult Australia takes great pride in our founding membership of NATSPEC, and highly recommends NATSPEC documents to our industry.

Megan Motto, Chief Executive Officer, Consult Australia

Bostik smart adhesives

Bostik Australia is supported by a worldwide research and development resource, keeping it at the forefront with new and innovative technologies. The company is committed to providing sustainable and innovative solutions that combine technological performances, ease of use, cost effectiveness, and respect for the environment.

Bostik actively integrates green building initiatives through developing products that have minimal impact on the built and natural environment. Bostik Australia has over 100 products that meet Green Building Council Australia low VOC criteria. **www.bostik.com.au**

Bradford™ more than insulation

Celebrating 80 years, CSR Bradford has been helping Australians live comfortable, more energy efficient lives through our knowledge, experience, and innovative, energy-saving products. We're also backed by CSR, founded in 1864 and the name behind some of Australia's most trusted and recognised building product brands. CSR Bradford provides thermal and acoustic solutions for residential, commercial, and industrial applications including glass wool, rock wool, foil, ventilation, and specialty products designed for commercial buildings. **www.bradfordinsulation.com.au**

CAPRAL ALUMINIUM

Capral Aluminium was established in 1936 and is Australia's largest manufacturer and distributor of aluminium profiles. Our comprehensive range of Commercial Residential Security and Industrial products has an enviable reputation for quality, style, and high performance. As a local systems designer and NATA approved tested authority with innovative R&D capabilities, we are well positioned to take advantage of changing building regulations in Australia and technically support our brands including ARTISAN, Urban, Futureline, Amplimesh, Intrudaguard, and AGS. **www.capral.com.au**

Con-form® GROUP
value engineering

Con-form Group is an energetic team dedicated to providing Australian designed and value engineered products that are quick to assemble, lightweight, and affordable platform systems with a 20 year warranty standard. Con-form's growing series of structurally unique aluminium products are creating a new dimension in the approach to surface mounted platforms, and are designed to eliminate the need for any cutting or welding, providing excellent flexibility and error free assembly, unlike traditional engineering methods. **www.con-formgroup.com.au**

Tile Stains – A Quick Guide

Tiles are one of the most common and adaptable elements of modern architecture. Whether used to take a residential kitchen from ordinary to extraordinary, or as a functional feature of commercial spaces such as pool areas and kitchens, tiling plays an important role in the life of architects and designers.

Just as essential as any tiling is the accompanying grouting. When done right, a tile-grout combination is not only functional, but also adds unique aesthetic qualities. By its very nature though, grouting is highly susceptible to staining, which can quickly turn it from an accent to an eyesore.

One of the most common staining issues relating to tiles is the appearance of efflorescence. While extremely difficult to predict, and even more difficult to treat, efflorescence can be prevented.

Cause

Efflorescence staining has been an issue for as long as masonry has been used to construct buildings.

Efflorescence is a crystalline deposit of water-soluble salts that forms on the surface of concrete, masonry, or any cement-based materials. Water is driven out as a result of the heat of hydration. As the water evaporates, salt is left behind. It is typically white, but can also be brown, green, or yellow, depending on the type of salt.

Any product that contains cement can produce efflorescence under certain conditions. This statement applies equally to masonry, concrete, screeds, fibre cement sheeting, tile adhesives, and tile grouts. It is an unsightly nuisance for architects, builders, and building owners. As tile grouting is on the top layer of the assembly, it is often one of the most common areas for efflorescence to form.

While efflorescence has long been considered a maintenance issue, it has more recently been classed as a defect, with liability resting with the designer or builder. This has increased the pressure on designers and builders to provide an efflorescence free solution.

Treatment

The level of treatment required for the removal of efflorescence can vary significantly. While a simple hand-wash with water and a brush may occasionally suffice, more often than not, a much more thorough removal process is required.

The most common cleaning process involves using an acid such as phosphoric or hydrofluoric acid solutions, or chemical cleaning compounds, in conjunction with high pressure hot water.

It must be noted that cleaning efflorescence may only be a temporary solution, as it may not prevent efflorescence from re-occurring and merely removes the visible symptoms.

Prevention

Made from epoxy resins and a filler powder, epoxy grouts have long been used for their hardness, durability, and almost completely stain proof qualities.

By design, epoxy grouts are completely resistant to the effects of efflorescence.

Epoxy grouts are common in commercial applications, particularly in the food production and service industries, and other areas where hygiene is of the utmost importance. AS4674 Australian Standard (Construction and fit-out of food premises) dictates that grout used for ceramic floor tiles in any commercial food premises areas must use epoxy due to its high chemical and abrasion resistance, and hygienic qualities.

These long-lasting and almost stain and maintenance free qualities have seen the use of epoxy grout increasing in commercial applications, and others like residential and industrial buildings.

Efflorescence staining

Epoxy grouts are ideal for commercial applications including pool areas

Darling Harbour Live Theatre
Sydney, NSW

Aerial view of the theatre in Darling Harbour

The new Darling Harbour Live Theatre is the latest example of how Bradford and Martini are delivering effective thermal, acoustic, and fire protection solutions to the new face of Sydney Harbour.

To meet the high design criteria of the Darling Harbour Live Theatre, a selection of specialty Bradford and Martini products were used in the wall and roof applications. Martini Omega and Martini Absorb were specified for their neutral aesthetic for wall and ceiling applications. Omega's Flametex Fabric facing provides a durable, cleanable surface in high traffic areas, as well as superior sound absorption and thermal performance when combined with Bradford Acoustigard.

Theatres and venues need to be designed for high acoustic performance to provide audible, high quality sound to audiences. Martini Absorb was selected by the audio system and acoustic designers as the best option to provide the levels of broadband sound absorption required for world-class internal sound quality. The versatility of Martini Absorb meant that it could be made in a black finish, which gave the architects and interior designers a modern finish for the theatre walls and ceilings, at the front and back of house.

Another consideration for surface lining acoustic products like Martini Absorb, is that they must comply with high standards for fire safety. All of Martini's surface lining materials have been tested to AS/ISO 9705 full room corner burn test, and have achieved a Group 1 classification, which is the highest rating achievable.

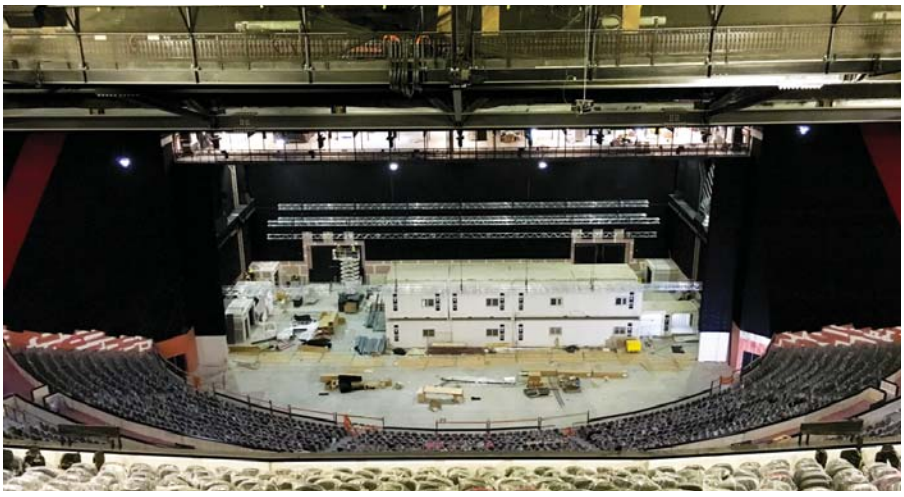
Bradford's Acoustigard partition rolls are specifically made in various densities and thicknesses to suit different cavity in-fill applications, and to concurrently provide acoustic and thermal performance. Acoustigard contains up to 65% recycled glass content and is non-combustible, hence does not add to the fuel load in the building.

In conjunction, Bradford's Fireseal Curtain Wall Batts were specified to provide passive fire protection between floors. They are made from bio-soluble Rockwool with remarkable resistance to shrinkage at temperatures typical of fire conditions. Fireseal Curtain Wall Batts can be used to provide up to two hours of fire protection in a curtain wall system; they act as a fire barrier, slowing the progress of fire, smoke, and heat between the floors of multi-storey buildings.

The modular roof system was constructed with a unique combination of Bradford Gold Batts to provide bulk thermal and acoustic insulation between roof sheets and straw panel boards, and Martini Absorb beneath all the roof layers to provide high-performance sound absorption across a broad range of frequencies.

Bradford Gold Batts are specially stiffened and treated to provide moisture resistance and deliver optimal performance in exterior cavity walls. Moreover, Bradford Gold Batts are 100% bio-soluble and do not pose a health risk. Bradford is the only insulation partner of the National Asthma Council Australia's Sensitive Choice program and is recommended as a better choice for people with asthma and allergies.

Bradford and Martini are both iconic brands part of CSR, one of Australia's most respected building material companies, and are market leaders in the Australian construction industry.



The 8,000 seat theatre will host both plenary sessions and major entertainment acts

North Kellyville Square
Sydney, NSW

Architect: Scott Carver
Consulting Engineer: Henry & Hymas
Builder: ADCO Constructions

The brand new North Kellyville Square consists of a Woolworths, BWS, and numerous specialty stores. ADCO were successful in securing this tailored project, designed by Scott Carver in conjunction with Henry and Hymas.

One of ADCO's challenges was to enclose more than 560m^2 of mechanical plant equipment on five platforms, whilst providing acoustic treatment to meet the demanding specifications, with the site being in very close proximity to residential dwellings.

Con-form Series 3 (raised) platform system was chosen over traditional methods for a number of reasons, including:

- Fully engineered/certified system with ratings of 2.5kPa, 5.0kPa, and greater if required.
- Less structural steel required as innovative platform design spreads load more cleverly and evenly.
- Reduced crane lifts and no welding required.
- Surface mounted design; zero penetrations into the roof sheeting.
- Minimum start height flexibility ranging from 300mm -1000mm.
- Speed of build, taking two to three days per platform.
- All aluminium construction with stainless steel fixings boasting a 20-year warranty standard.
- Future proofing of roof; all modular (600mm increments), allowing platforms to grow or reduce in size as demand changes into the future.
- Acoustic treatments that are part of proprietary systems that are industry leading.
- Cost effective when compared with traditional structural steel solutions.

The decision was simple in the end and the clean lines and contemporary feel of the Con-form platforms blend into the surroundings seamlessly while providing their important functionality at the same time. Both Con-form Group's Standard Screen wall and Acoustic+ were used in conjunction to meet the noise mitigation requirements.

Surfmist, a very popular colour, was chosen to best match the roof sheeting whilst being sympathetic to the surroundings.

The minimum start height of 700mm was required on all platforms, allowing for additional airflow to ensure optimum performance of the large condenser units, while providing adequate access for installation of pipework, as well as future maintenance.

As with all supermarket platform requirements, the use of Con-form Group's AVANT (Anti Vibration, Anti-Noise Technology) was an ideal choice in addressing sound and vibration transference through to the roof, providing an average vibration reduction factor of 70 times.

Con-form Series 3 raised platform system was installed to enclose the mechanical plant equipment in North Kellyville Square

CS Group started out in 1986 manufacturing CS Cavity Sliders. Our mission is to engineer and manufacture the best and most innovative door solutions. Over the years we have continued to rapidly develop new products, including track systems, wardrobe sliders, aluminium door leaves, and most recently, automated cavity sliders. **www.cavitysliders.com.au**

DAMTEC is part of the KRAIBURG Group (Est. 1947), an organisation rich in tradition with over 2000 employees worldwide and an annual sales volume of approximately $500 million. It is an internationally acknowledged and recognised manufacturer of ready-to-install products for impact sound reduction. **www.damtec.com.au**

Danpalon is a patented glazing snap-connection system with concealed fasteners that provides for 100% watertightness; free structural and thermal movement within a flexible system; structural properties that allow for a significantly reduced substructure; quick and easy installation; the elimination of gaskets and sealants; the elimination of fixing penetrations through the sheet; and 99.9% UV protection with the protection coating co-extruded with the sheeting, eliminating any chance of delamination. **www.danpal.com.au**

In Melbourne, Deflecta Crete Seals develops and manufactures protection products for concrete. Designed specifically to kill bacteria on and within the concrete matrix is DEFLECTA ANTIMICROBIAL®, Australia's only Government Certified and Registered product for bacteria control. Deflecta's product range also targets moisture control, hydrostatic pressure, mould, mildew, fungi, dust, and slip resistance for Industry Sectors such as Health, Food Processing, Warehousing and Manufacturing, Freezer and Chillers, Car Parks, Schools and Sports Centres, Animal Husbandry, Equine, and Kennel facilities. **www.deflecta.com.au**

Dincel Construction Systems is a lightweight, 'snap together' modular formwork that is suitable for constructing virtually any type of load bearing structural wall. Architects and building designers can enjoy complete creative freedom by specifying Dincel to build straight, curved, slanted, and cantilevered concrete structures. Dincel walls are also complete waterproof, fire resistant, and can be finished in a range of external wall finishes. **www.dincel.com.au**

DTAC is an Australian company with over twelve years' experience in design and manufacturing excellence, all backed by industry leading support. DTAC comprises a specialist team of professionals that prides itself on offering beautiful, BCA compliant, architectural tactile ground surface indicators and stair and joinery edging products. DTAC's range also includes urban landscape edge protection and more. DTAC's unequalled attention to detail enables architects, designers, and builders to make the right choice for aesthetic and functional conformance in every project. **www.dtac.com.au**

Timber Tots Child Care
Brisbane, QLD

CavitySliders
Innovative Door Solutions

The team at CS Cavity Sliders prides themselves on being able to supply customised cavity sliders to suit the detailing on any project. Their flagship model, the CS Timberformed, has been specified in projects throughout Australia and New Zealand for over 30 years.

The recently completed Timber Tots childcare facility in Camp Hill, Queensland, is a family operated and privately owned childcare centre, committed to providing children with fun filled, educational experiences of the highest standard. This luxury state of the art facility features Smart-tech rooms, handmade furniture and toys, retractable shade, farms, beehives, veggie gardens, art rooms, and libraries. The Timber Tots name was inspired by the property's previous long history as a timber yard. Timber from the old mill and sheds was recycled as much as possible to create beautiful natural play elements throughout the centre, including forts and swings, as well as many other features.

CS Cavity Sliders were installed to fulfil the Client's effective space saving initiative

CS Cavity Sliders worked with S3 Architects to provide space saving cavity sliders throughout the whole building in line with the customer's building theme - a tangible sense of space. The CS TimberFormed cavities were manufactured to suit custom sized timber doors from Timberware. The cavity frames were supplied with custom jambs to suit the joinery throughout the project.

CS TimberFormed is a premium cavity slider, engineered to fulfil most interior sliding door requirements. The original design has been improved continuously since 1986 and many detailed options are available for customising this unit to create a specific look or provide a unique solution. This cavity slider is supplied pre-assembled, ready for quick and easy installation on site into standard 90mm framing. It is custom made to specification, up to 3000mm high and 3500mm wide, and can take doors up to 240kg.

CS provided advice throughout the tender and ordering process, enabling a quick turnaround on a tight schedule. They also assisted with onsite support to Hutchinson Builders throughout the installation, ensuring a great looking finish. Site Manager Scott Williams was impressed with the quality of the cavity sliders provided, and Timber Tots have a product that works well and saves space.

Timber Tots Child Care was recently completed in Camp Hill, Brisbane, to provide a luxury facility for fun, educational experiences of the highest standard

Byford Secondary College
Perth, WA

Inside the newly constructed Sports Hall, with Danpal rooflights and façade system, at Byford Secondary College

A key challenge for architects in recent years has been to design buildings that are compliant with BCA Section J requirements for energy efficiency, while also providing plenty of natural daylight. Danpal proved to be the ideal specification choice to meet this challenge in 2016 for the $38 million development at Byford Secondary College, built by Cooper Oxley. Donaldson and Warn in Western Australia specified Danpal translucent façade systems. The new facilities include a Performing Arts Building, a Sports Hall, an Educational Support building, and an extension to the Teaching and Education Block.

In particular, the specification required a translucent façade system that could:

- Transmit comfortably diffused light.
- Eliminate glare (a critical feature in sporting environments).
- Withstand force from sporting equipment.
- Provide insulation against excessive heat gains in summer.
- Span up to 6.8m vertically.

The structural frame supporting these spans needed to be curved into convex and concave shapes to create a playful and fluid visual effect.

All of these criteria were met using a Danpal Seamless Façade system, in which two layers of 1040mm wide translucent panels were supported by 150mm aluminium connectors. These connectors were fully concealed within a 500mm cavity, resulting in a flush finish both internally and externally. The lightweight nature of the panels made the installation of the wall panels relatively simple. Danpal rooflights in long lengths were also installed.

Since its completion in June 2016, the Sports Hall has proven enormously popular. During the day, there are no shadows or harshly lit spaces – just a comfortably well-lit environment with a calm and pleasing ambience. During the evening, light from inside the building radiates through the cellular panels, creating a unique lantern-like effect for passers-by.

The exterior of the Sports Hall

Box Hill Hospital
Melbourne, VIC

The Project
The Box Hill Hospital redevelopment comprises a new clinical services building, which spans approximately 52,000m^2 across ten storeys, incorporating capacity for an additional 200+ beds, a larger and more efficient emergency department, a new intensive care unit, 11 operating theatres, specialist cardiology services, a dedicated women's services facility, and a two-level basement car park. The hospital was officially opened by then Premier Denis Napthine, along with Health Minister David Davis and Box Hill State Liberal MP Robert Clark, in August 2014.

Product Requirement and Solution
DEFLECTA ANTIMICROBIAL® was applied to the concrete substrate at the time of pour, prior to the carpet and vinyl installation. The product is a penetrative water-based, non-toxic solution which is biodegradable and ideally suited as an effective pre-treatment for topical coatings within the health and food industry, which meet the requirements of the Client.

The key benefit of applying DEFLECTA ANTIMICROBIAL® is to prevent bacteria growth where it is able to spread under floor coverings. It was also applied to aid the suppression of moisture within the concrete, prevent body fluid ingress, and support the Clean/Facility Maintenance protocol for infection control.

HACCP Australia and HACCP International endorse DEFLECTA® products as suitable for food processing and handling environments in facilities that operate under the HACCP based Food Safety Programme.

With the application of the product, the Box Hill Hospital is sanitised throughout the facility including the operating theatres, clinical service areas, kitchens, wet areas, and bedrooms, providing the staff and patients with a safe working environment.

About DEFLECTA®
Research, development, and testing are critical factors for DEFLECTA® to develop innovative new products in response to ever changing market conditions and construction methods both in the Australian and Overseas markets; all testing conducted on DEFLECTA® products is verified in independent laboratories.

DEFLECTA® works closely with Architects, Commercial Contractors, End Users, and Architectural Specifiers, to develop product specifications and technical information, and provide the right product for the right project, based on the individual Client and unique Project requirements.

DEFLECTA ANTIMICROBIAL® was applied at the time of pour, before carpet and vinyl installation, and meets the requirements of the Client under Bacterial Control Management and HAACP Food Safety

Ceerose Apartments Sydney, NSW

Providing outstanding results for its customers is a key focus for Ceerose, one of Australia's leading property development and construction companies.

Not only must all projects be completed to a high calibre, but the builds need to be delivered in a cost-time efficient manner, and the finish should be virtually maintenance-free.

In developing its cutting edge Ceerose apartments at Pyrmont Bridge Road, Camperdown, Ceerose partnered with Dincel Construction Systems to meet these objectives, achieving an extensive 26 weeks, or 50 per cent, time savings on the projected build schedule. The project consisted of 133 units of three towers, seven storeys above the podium level, with one level of basement car parking.

Ceerose Construction Manager, Charbel Barakat, said Dincel Construction Systems was used extensively throughout the project, delivering great results.

"The build used 200mm Dincel in the basement, lift, stair, and service shafts, as well as for deep beams, blade columns, and façade walls. In other areas, 110mm Dincel walls were used for party walls in between apartments, supporting 170mm thick slabs," Barakat said.

"Utilising Dincel as a load-bearing wall system in lieu of conventional methods achieved a most cost-efficient floor system, with a 6 month time saving from our construction program allowance of 12 months for structural work. If the slab did not consist of elaborate double rebates and balcony edge downturns, this could have been increased by another month," stated Barakat.

According to Barakat, Dincel's use of PVC Polymer also yielded other important benefits for the project beyond time and cost savings: "A further advantage was Dincel's suitability for basement and water tank walls without needing a waterproof membrane. Dincel is also ideal for garbage and service rooms where mould and mildew is a common problem."

Despite Ceerose Apartments being the first project the company had utilised the Dincel product on, using the wall systems was straightforward and well supported by the manufacturer, according to Barakat.

"Dincel's site assistance was invaluable, allowing us to achieve simple and very fast installation. The supply service was timely and supported by Dincel's highly qualified engineers, who provided expert advice in all facets of the Building Code of Australia, and buildability, offering structural engineering assistance to the project's Engineer and Architect," Barakat said.

"The project was a great success even though it was our first time using Dincel – it's without doubt the most cost and time-effective way to build multi-storey apartment buildings. I highly recommend incorporating Dincel Construction Systems, particularly at the early architectural design stage, to maximise benefits. We would welcome the opportunity to further work with Dincel's highly innovative products."

Dincel Structural Walling offers various modules that allow the creation of curved, splayed, and straight walls, providing the flexibility for projecting cantilevered walls and encouraging creative architectural forms, unlike masonry alternatives. Strong and durable Dincel Structural Walling also offers outstanding performance in harsh applications such as tanks for sewer, oil, grain or petrol; sea walls, flood levees, and erosion or soil contamination control barriers; and culverts for roads, railways, drainage, and service ducts.

Ceerose chose Dincel's wall bearing system, which uses PVC Polymer, to be installed in the Ceerose Apartments in Camperdown, Sydney

Glen Street Library
Sydney, NSW

DTAC®
TACTILES, STAIR TREADS & EDGING SOLUTIONS

The new Glen Street Library in Belrose

When it comes to the design, supply, and installation of tactile indicators, stair treads, and edging, DTAC Pty Ltd is a world leading innovator and has been a trusted name in the industry for 15 years. DTAC pioneered the architectural floor tactile industry in Australia, taking a utilitarian product and transforming it into a feature that complements the aesthetics of any project.

One of DTAC's latest completed projects is the new Library on Glen Street in Belrose. The two storey building forms the second stage of the Glen Street Theatre and covers 650m^2. The project commenced in early 2016 and was completed in mid-May 2017. DTAC was specified by Brewster Hjorth Architects to design, supply, and install tactile ground surface indicators and stair edging to this project due to the high level of compliance and visual appeal of the products.

Among the products specified for the Glen Street Library was the Black Top TGSI's, of which over 18m^2 was installed. DTAC's popular Corduroy stair edging was also installed on steps throughout the site. These products were installed in accordance with the required building standards and regulations.

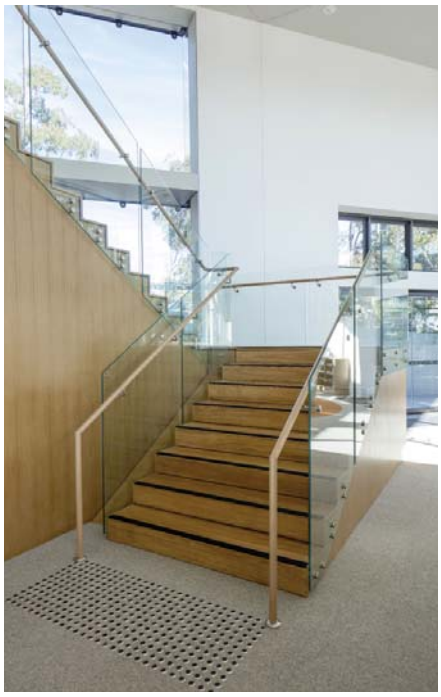
DTAC's Black Top TGSI is an aesthetically pleasing solution, tested and certified in accordance with the NCC, AS4586 and AS1428.4. The product achieves a slip resistance classification of R12 and utilises a superior pressure fit fixing method, ensuring performance and longevity.

Almost 120 lineal metres of DTAC's designer Corduroy edging in black anodised was also installed at the site. The popular profile achieves an R12 slip resistance classification and proves to be a cost effective, NCC compliant solution, tested to AS4586 and AS1428.1.

DTAC's specialist team designs its own superior quality products to meet the requirements of Australia's tactile, stair tread, and edging compliance regulations. All products are designed, manufactured, and installed in line with the latest Australian NCC standards. The products also conform to the Disability Discrimination Act (DDA) including slip and luminance requirements with test certification data available.

DTAC Operations Manager Michael Moulding explained, "As with most projects, but particularly those in a public area like the Glen Street Library, compliance and certification is of the upmost importance. Our products are tested and certified in accordance with the NCC, AS4586 and AS1428.4. All our installers go through an 18-step accreditation process before going onsite; our clients can be assured that our DTAC trained contractors have the expertise and knowledge when it comes to the compliance and overall aesthetics of tactile and edging installations."

In addition to the Glen Street Library, DTAC's work can be seen throughout Australia across a number of iconic projects, including but not limited to the Melbourne's RMIT University, the NAB building on Bourke Street, Hawthorn Town Hall, and Yarra Valley Water headquarters.



DTAC's practical and visually appealing products can be seen throughout the library

As one of the earlier members of NATSPEC, the Air Conditioning and Mechanical Contractors' Association (AMCA) have long recognised and supported NATSPEC's vision to improve the construction quality and productivity of the built environment, through leadership of information. Whether you are a home builder, local government, commercial contractor, or consultant, the range of products, training, and other resources available through this not-for-profit organisation is extensive and up to date.

We congratulate NATSPEC the organisation and all of its staff and industry supporters for its work and ongoing success.

Sumit Oberoi, National Executive Officer, AMCA

DuluxGroup is an Australian publicly listed company. The company has been involved with the manufacture and marketing of paint and related systems in Australia since 1918, and is the largest manufacturer of decorative paint products in Australia. DuluxGroup is the manufacturer of iconic Australian brands which consists of Dulux, Selley's, Yates and Cabot's, Feast Watson, Intergrain, and Toby. DuluxGroup is also Australia's largest manufacturer and marketer of surface coatings with well-known brands such as Dulux Decorative, Dulux Protective Coatings, Dulux Powder Coatings, Dulux Acratex Texture Coatings, Berger, British Paints, Levene, and Walpamur brands. **www.dulux.com.au**

Ensystex is a global research-based company with the vision to be '*the first choice for environmentally responsible, effective, long-term termite management solutions.*' The company's key brands for protecting new buildings are the NOVITHOR™ Pesticide-Free Termite Protection System and TRITHOR™ Termite Protection. Both Systems hold ABCB Codemark Accreditation. Ensystex has the largest technical sales support team of any innovation based termite protection company in Australia, and we are present in all States to assist you. **www.ensystex.com.au**

ERICO is a global manufacturer and marketer of electrical products and technical solutions for lightning protection, surge protection, and earthing. ERICO provides solutions in a wide range of market segments including Power Utilities, Telecommunications, Building Services, Water Utilities, Defence, and Government. Products are marketed under the ERICO product brand. **www.erico.com**

Ezi-roll Doors have been manufactured in Australia since 1974. The company's beginnings go back to 1954 when A.R. Steel Structural started its operations in Brisbane. In 1969, A.R. Steel Structural decided to diversify its business to meet the increasing demands of Queensland's growing economy. At this time, a gap in the market presented itself and an opportunity to expand into industrial steel roller shutters was identified. A four year research and development program was embarked upon - the result, a unique and innovative roller shutter design, which was patented and suitably named the ezi-roll roller shutter door. **www.eziroll.com.au**

Monash Translational Research Facility Precinct Melbourne, VIC

This $84 million state-of-the-art Translational Research Facility (TRF) was completed in October 2015. The TRF co-locates research, clinical, and technological platforms to facilitate the collaboration of researchers and clinical partners to accelerate and coordinate the translation of scientific breakthroughs.

Due to the high value research equipment to be located at the TRF, it was important to have a properly designed and installed lightning protection system for the facility.

As many Australian Lightning Protection installers can attest, the installation process can be a laborious task. Since the early days of lightning protection, Australia has generally followed the British form, which was the use of a 25x3mm flat copper conductor (tape). The use of copper for lightning protection has always been ideal, and dates back to a time when the price of copper was relatively low and most buildings were of a compatible masonry construction.

Flat copper tape had the benefit of lower impedance and inductance due to the larger surface area of the tape, when compared to a round conductor of the same cross section. The increase in copper prices, combined with the use of modern building materials such as Colorbond™ sandwich panel, and other anodised or plated metals, has led to a shift away from flat conductors and plain copper.

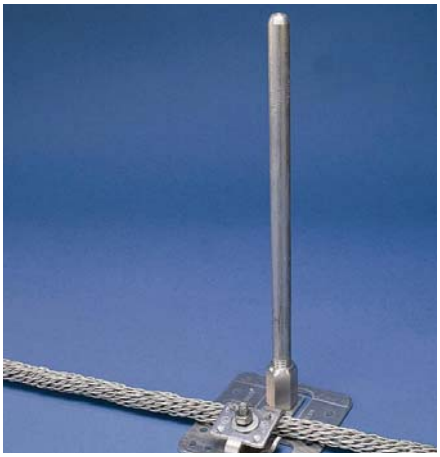
ERICO has felt that superior electrical properties such as high conductivity, low impedance, low inductance, and material compatibility are important; hence the decision to use copper, tinned copper, or aluminium conductors for its lightning protection range. Whilst stainless steel has good corrosion resistance, conductivity is very poor and it is incompatible for use with Colorbond steel and other similar products.

ERICO has developed the 'Smoothweave' range of Lightning Protection products, solving a number of problems that have plagued the lightning protection industry for some time. The conductor itself is made from an open stranded conductor configuration that is low in impedance, very flexible, and easy to install. Weight is reduced by almost half compared to an equivalent tape conductor, adding to the ease of installation. Smoothweave can be installed by using either traditional screw fasteners or construction adhesive. Having an option of a lightning protection system that does not require roof penetrations is a great advantage for modern roofs which may have membrane or other layers that should not be penetrated in order to guarantee water tightness.

Since the Monash Translational Building had been designed largely using Colorbond, designers were faced with the challenge of picking a suitable material that would both be compatible with the Colorbond, and have good electrical characteristics. The designers referred to BlueScope's™ own technical bulletin (CTB-12), which stated that aluminium was a compatible material for Colorbond. The Technical bulletin makes it clear that neither copper nor stainless steel is compatible, and cannot be used with Colorbond steel.

Since designers of the Monash Translational had wanted to ensure that the lightning protection system designed was installed as per the NATSPEC Lightning Protection specification, an independent third party was engaged to carry out the certification. Inspectors from Underwriters Laboratories (UL) ensured the use of appropriate materials, adherence to design, and material conformity to the AS1768 standard. Copies of the UL inspection certification can be found on UL's website.

ERICO's Smoothweave range of products is a UL listed product, meaning that the entire installation, including the installer, can carry the UL Master Label. The UL Master Label is granted when the Material, Installer, and Inspection have all been certified by UL.



Smoothweave Lightning Protection products installed in the Monash Translational Facility Precinct in Melbourne, Victoria

Tullamarine Airport
Melbourne, VIC

Ezi-roll Doors Australia was commissioned to manufacture, supply, and install a total of 380 motorised steel shutters for a $150 million, custom designed, 71,000m^2 freight sorting facility and corporate headquarters at Tullamarine Airport. This was a high profile project completed in 2016 and has had considerable media attention, as well as scrutiny from local government and WorkSafe Victoria.

Ezi-roll met not only the scope, but the day to day scheduling requirements needed on a site of this size, and its customers' requirements. Ezi-roll was one of many trades involved and needed to be able to work around the principle schedule and the constant changes that would occur on a day to day basis. It was challenging for Ezi-roll production to meet delivery dates, and for the Melbourne team to adapt to the site's constantly changing schedule.

Ezi-roll Project Manager Tony Bloxsom said, "Among the challenges we faced was meeting airflow percentage requirements for the site. This was done using our 3mm multi hole perforated door slat while maintaining functionality." Ezi-roll was to demonstrate its ability to deliver the project on time and meet the required scope.

"Several of the dock doors on site needed dock leveller integration. This is where the shutter will not operate unless the dock leveller is in its desired position. This was achieved using the Grifco motor coupled with its expansion board, which was wired up and connected by our electrician," Bloxsom continued.

Bloxsom said Ezi-roll had to follow strict safety and security procedures and implement many specific requirements of the client; "Some larger doors needed the ability to open/close via a centralised security control panel and connect to a fire inspection panel (FIP) system. This was also achieved through the Grifco motor, its expansion boards, and PE beams wired by our electrician.

"All doors on site needed to be the same colour and have powder coating to both sides of the door, with consistency maintained across all 380 doors. The profile of our door slat was appealing to the client due to its flat profile and inherent windlocks in every slat rather than every second or fourth like other branded doors. This allowed us to exceed wind ratings required for the area. With the site of the new complex in an open area that is often windy, this was a high priority of our client."

Bloxsom stated that the Grifco motor was the perfect choice for Ezi-roll during this project as, "Due to the sheer number of doors we needed, it is a motor that not only works well with our door, but has the type of quality control measures and after sales service to back us up, and in turn our client."

The client was impressed with the way Ezi-roll shutters were installed compared to conventional shutters, reported Bloxsom; "This showed them we could meet the targets we had set as far as installs per day. We also needed to show we could service and maintain these shutters during the defects liability period (DLP) and beyond, if required in a timely manner. All doors were made the exact same size to make changing of any future damages much easier."

The completion of the new freight and administration facility has allowed Toll to bring together 500 operational and administrative staff who were previously employed over three Melbourne sites, with a three-storey, 5,500m^2 State administration and national operations office, an 850m^2 operations office, a 20 room drivers' rest facility, truck workshop and wash, gatehouses, and other associated services.

The Ezi-roll shutters installed at the facility and headquarters, at Tullamarine on behalf of Melbourne Airport and Toll Holdings Ltd.

The quality and productivity of the building and construction industry is enhanced by the work of the National Building Specification (NATSPEC). For more than 40 years NATSPEC has provided professional and specialty packages for all sectors of the industry and all building structures. NATSPEC is highly regarded by industry stakeholders in both the private and public sectors and is strongly supported by Master Builders Australia (MBA).

Denita Wawn, Chief Executive Officer, MBA

Fantech has been at the forefront of fan and acoustics technology by developing and implementing new and innovative products of virtually every air movement and ventilation need, as well as noise attenuation. With AS/NZS ISO 9002 accreditation since 1992 and more recently, AS/NZS ISO 9001 accreditation, Fantech maintains high standards of manufacturing and a continuous improvement culture. With modern manufacturing plants in Melbourne, Sydney, and Brisbane, and warehouses throughout Australia and New Zealand, Fantech provides unmatched delivery performance and customer service. **www.fantech.com.au**

FERMAX Australia Pty Ltd is the Australian and New Zealand importer and distributor of the worldwide FERMAX range of products and has become an important security leader in Australia, providing intercom, access control, intruder alarm, surveillance systems, and secure door hardware to a range of industries. **www.fermaxaus.com.au**

Fielders has been synonymous with quality and strength for over 100 years in an industry where success is reliant on satisfaction. Initially providing roofing materials, the company has now extended its product range and reach across Australia to include purlins, door frames, carports, verandahs, fencing, sheds, and composite steel formwork. This ensures comprehensive product offerings and support for all aspects of building construction. Utilising their progressive culture, specialised resources, and market leadership position, Fielders has won a reputation for its innovative approach to manufacturing and installation.

Being at the forefront of international cold formed steel products, Fielders has attracted the loyalty of many architects, engineers, roofers, formworkers, and builders who have experienced the benefits of reduced logistical, labour, and time expenditures. With these and many other new developments, Fielders will continuously strive for growth through superior products, convenience, quality, and service. With Fielders, you will always 'Finish On Top'. **www.fielders.com.au**

FMC Australasia has been successfully providing quality pest and crop management products to both residential and industry markets in Australia since 1975. In 1994, FMC developed Biflex, which became Australia's most widely used and successful termite product. Well over one million Australian properties have now been successfully protected with Biflex. **www.fmcaustralasia.com.au**

Victorian Comprehensive Cancer Centre Melbourne, VIC

The search for better cancer treatments and cures is a step closer with the opening of the Victorian Comprehensive Cancer Centre (VCCC), a purpose-built centre of excellence for cancer research, treatment, education, and care. It is located in Melbourne's prestigious Parkville Biomedical Precinct.

The $1 billion, 130,000m^2 centre is home to cancer research, clinical services, and educational facilities for Peter MacCallum Cancer Centre, Melbourne Health, and the University of Melbourne.

Delivered under a public-private partnership, the Victorian Government contracted the Plenary Health consortium comprising Plenary Group, the Grocon/PCL joint builder venture, and facilities manager Honeywell to design, build, finance, and maintain the project under a 25 year concession. After more than four years of construction the VCCC opened to staff and patients on time and within budget in June 2016.

D&E Air Conditioning began working on the mechanical services contract in August 2012. Project Director Bob Harris immediately contacted the Elta group companies Fantech, Air Design, and Airepure Australia. "One of the benefits of working with the group is that we could set boundaries so that Air Design and Airepure worked together, thereby reducing the number of people we needed to deal with," Harris said. "The collaborative approach not only made better use of equipment and time, but ensured the job progressed smoothly."

According to Sales Manager Anthony Lamaro, Fantech supplied over 470 fans, including several 1800mm and 1600mm diameter supply air fans. Almost half of the fans in the benchmark project were smoke spill, ranging in diameter from 400mm to 800mm, plus a number of large 1250mm diameter roof units. Speed control correction data was supplied for each of the fans through Fantech's Fan Selection Program, providing vital information on how the fan would perform at lower speeds to reduce noise and energy consumption.

Air Design Air Handling Units were chosen for their quality and reliability and used throughout the whole facility for both clinical and research spaces, including operating theatres and PC3 suites. Over 480 units were supplied which comprised MODUtherm and SM Series units of various configurations.

Harris noted that as the VCCC is a clinical, research, and educational facility, a huge volume of specialist filters from Airepure Australia was required for the ventilation systems in the animal house, PC2/3 laboratories, isolation rooms, and operating theatres. These included bag-in bag-out units, six Focus 2000 laminar flow units for the operating theatres, and more than 500 terminal HEPA units.

Harris said the job was challenging, but thanks to the collaboration of companies within Elta Group, the HVAC component ran smoothly and was completed in time for the VCCC's completion in June.

The multi-purpose cancer centre was completed in June 2016, after over four years of construction and development

Settler's Cove
Noosa, QLD

fermaxaus.com.au

View from within Settler's Cove, the luxury residential complex in Noosa Heads on the Sunshine Coast, Queensland

Settler's Cove is a master planned residential development in the heart of Noosa Heads. Within the exclusive award winning apartment precinct, spacious and opulent single level apartments offer privacy, security, and the peace of mind.

Across every stage, Settler's Cove displays exceptional standards of design, superb finishes, and a surprising array of inclusions. "Flow-through" apartments with generous frontages and dual balconies are standard, as are finishes such as solid timber doors, and natural stone floor and wall tiling.

FERMAX LYNX was used to provide state-of-the-art communication and access control for this residential complex. As a full TCP/IP system that incorporates an audio and video intercom system and an integrated IP access control system with lift security standard, there is no need for any additional head-end or server equipment. Promoting increased accessibility and convenience, an app on the user's smartphone or tablet enables answering the IP video intercom from within the complex or remotely, as well as activating the door release.

The system allows for the management of an unlimited number of individual homes, apartments, and buildings, all on the same connected network. The easily expandable system operates over both copper and fibre networks, negating any distance concerns.

FERMAX Specs

- FERMAX's Lynx TCP/IP Video Intercom
- Integrated TCP/IP access control system
- Lift security integration

Iluka

- 9 no. skyline video IP intercom door station
- 14 no. 7" VIVO IP hands-free video monitors
- 26 no. IP proximity readers

Emerald

- 8 no. skyline video IP intercom door station
- 14 no. 7" SMILE IP hands-free video monitors
- 30 no. IP proximity readers

Crown Towers
Perth, WA

The Project
Fielders worked in collaboration with architecture firm, YWS; builder, Brookfield Multiplex; and engineers, AECOM and John A Martin; on the $750 million, 500 room expansion of the Crown Towers Perth, which saw the complex become the first 6-star hotel in Western Australia. Constructed from late 2014 until late 2016, Fielders was commissioned to supply the building with 20,000m² of KingFlor® KF70® steel formwork, which was used for its lightweight large span profiles.

The state-of-the-art development has been designed to transform the Crown Towers into a premium tourist destination to bring the hotel's total capacity to 1200 rooms, while also certifying it as the largest hotel complex the city has ever seen. The project extension additionally offers numerous dining and retail options, a full-service spa and fitness centre, a business centre, a large convention and meeting complex, a multi-tiered pool, and private gaming salons.

The Solution
Fielders KingFlor® KF70® was the solution of choice and specified by engineers AECOM for its cost efficient composite steel formwork system, due to its longer span, deeper profile, and easy installation, in comparison to other existing formwork options.

The Process
One of the major benefits of using Fielders KingFlor® KF70® was the ability to install the sheets in a small space restricted by scaffolding as well as the significant cost savings the profile offers. Due to the restricted installation space, the contractors were able to lay the sheeting from the underside of the platform and then crimp the sheets once the area above was clear.

Project Specifics
20,000m² of KingFlor® KF70®
KF70® 1.0mm BMT

KingFlor® KF70®
The Fielders KingFlor® KF70® profile displaces 26mm of concrete from the total slab depth to achieve a lightweight slab, providing a significant saving in concrete, supporting framework, and foundation load costs. In addition, the KF70® has SquashCut™ ends and is available in pre-cut lengths with a 600mm wide cover, making this product easier and considerably faster to install.

Views of Crown Towers in Perth, the expansion of which has marked it the first 6-star hotel in Western Australia

For over 50 years, the FRANK Group has been developing, manufacturing, and distributing spacers, formwork, reinforcement, sealing, and acoustic products. This diversity of products makes Max Frank Australia the partner of choice for planners, architects, and construction companies.

Comprehensive technical service and assistance are of paramount importance to us. This includes providing application instructions, expert advice on detailed layouts and workshop drawings, technical documentation, and software programmes to provide solutions.

FRANK is ISO 9001:2008 approved. **www.maxfrank.com/au**

Gerflor Australasia Pty Ltd is a world leading manufacturer of door and wall protection systems, handrails, and accessories. Gerflor is an Australian company with more than 30 years' experience in diverse market sectors including health and aged care, education, indoor sports facilities, and assorted commercial projects. Colour, design, and innovation are hallmarks of the brand that offers sustainable products that complement current design trends. **www.gerflor.com.au**

Australian made and owned since 1935, our family run business is now in the hands of the fourth generation of Haymes. Over the years, each member has taken care to hand on the commitment and passion for crafting high quality products. With nationally accredited Ultra-Premium products and extensive project experience, you can be certain your coating solutions are in safe hands. **www.haymespaint.com.au**

CSR Himmel brings together Australia's widest range of ceiling tiles and accessories. The product portfolio includes high-quality products to make sure the design and functionality needs of any project are always met. Himmel distributes a range of ceiling tiles, including mineral fibre, timber, metal pan, and high acoustic tiles, along with ceiling accessories such as steel and aluminium grid, and lighting solutions. Himmel also offers a range of timber and high acoustic wall panelling options. **www.himmel.com.au**

Karndean Designflooring was founded back in 1973 and is a global supplier of commercial and residential luxury vinyl flooring.

Karndean International, Inc. is a UK based company, with operations in Australia, and has a reputation for creating unique vinyl floor designs that are inspired by natural materials such as ceramic, glass, slate, limestone, wood, and marble. **www.karndean.com**

For more than 40 years, Keystone Acoustics, an Australian owned and operated company, has been redefining its processes and machinery to create patterned, perforated, and slotted panelling solutions, engineered for optimum performance.

Showcased in many of Australia's iconic buildings, Keystone Acoustics' solutions combine the widest range of quality substrates with the latest in innovative finishes to deliver acoustic performance, durability, and design versatility. Panels are engineered to suit diverse applications - from contemporary office fitouts to exemplary facades. **www.keystoneacoustics.com.au**

Stremaflex® SIP Jointing Formwork with integral waterbar

Working joints are complicated to form due to the need to accommodate reinforcement and waterproofing systems, whilst at the same time producing a rough and scabbled surface. A practical alternative to traditional formwork that will speed up the construction process and lead to a safer working environment is Stremaflex®, a stay in-place formwork (SIP) with an integrated, coated, metal waterstop which solves all of the above problems for uses such as in floor slabs, ceilings, walls, and kickers.

Working joints divide structural components into manageable concrete pours. Their positioning is normally planned in accordance with work flow/ structural design requirements. Working joints must be formed carefully so that they transmit the required forces and, where required, are watertight. A main aspect of this joint type is that it is clean and free from laitance (the relatively soft surface layer that forms on most concrete surfaces) and any dust or debris. The joint surface should also have a rough texture to ensure a good bond/interlock between successive pours. Stremaflex® fulfils these needs.

Working joints with light reinforcement but without waterproofing can be formed with any type of traditional or SIP formwork. For more heavily reinforced elements with the need for the integration of effective waterproofing, only specially designed SIP jointing elements like Stremaflex® provide an effective solution.

Stremaflex® comprises two main components. The basic building block of the system is an expanded metal mesh that is welded between Grade 500 reinforcement bars. Maximum element dimensions are 2.4m in length and 6.0m in height. Depending on the height of the slab or the wall thickness, additional stiffening of the element with the use of lattice girders can be added. The standard elements are produced flat but options for the inclusion of one or more indents are available. The specially designed steel reinforcement mesh produces a rough surface that removes the need for subsequent scabbling of the concrete surface prior to a second pour. This surface forms an indented structure with the second concrete pour so that shear forces are transmitted across the working joint as if it were monolithic construction (proven by tests carried out at the IBMB Brunswick).

The waterproofing element consists of a 1.5mm thick and 150mm wide metal sheet welded to the reinforced expanded mesh at the appropriate position to suit waterproofing requirements. The metal is coated with a 50mm wide special adhesive that chemically bonds to the concrete. Single sided coating is standard, but double sided coating can be supplied upon request.

Accessories

For optimum site solutions, Stremaflex® accessories can improve the buildability and long term performance of joints:

- Spacer – to seal the gap between the formwork and the bottom layer of reinforcement. To prevent concrete from escaping at this interface, a special combination of MaxFrank extruded fibre concrete spacer, with glued in mesh combs of height and spacing to suit individual projects, may be used. Concrete spacers comply with the highest requirements of AS/NZS2425:2015.
- Support Anchor – for element heights over 0.5m, support anchors are used to maintain the positioning of SIP elements in the joint. They provide tensile and pressure resistant anchoring of the formwork during installation and concreting phases. Anchors can be welded or clamped in position.
- SCC concrete – where self-compacting concrete is used, an alternative finer expanded mesh may be used if deemed appropriate.

Stremaflex® has been awarded a general approval according to the guidelines of the German construction supervising authorities, issued by the Material Testing Institute at the Technical University of Munich.

Stremaflex® formwork elements for the sealing of working joints on site of construction

Victorian Comprehensive Cancer Centre Parkville, VIC

Advanced new technologies and surface treatments are inherent in Gerflor vinyl floor and wall surfaces found throughout the Victorian Comprehensive Cancer Centre, a purpose-built centre-of-excellence for cancer research, treatment, care, and education.

The majority of the approximately 100,000m^2 of Gerflor products installed is made up of new generation homogeneous Gerflor Symbioz. Its low maintenance features, together with market-leading stain resistance, equip it well for demanding settings including pathology and cytotoxic laboratories. Symbioz can be manufactured using bio plasticisers, earning valuable points for Green Star projects.

Introducing and gaining confidence in a new generation product was not without its challenges, according to Gerflor project leader, Andrew Fenner, who oversaw the installation of 400m^2 of Symbioz in a prototype building offsite, where the product and its capabilities were rigorously tested.

“After rigorous review and testing against comparative products, we were satisfied the product was the best application for the VCCC and we continued with the selection process,” said Grocon PCL Project Manager, Joseph Taouk, who saw first hand that confidence spread throughout the project team.

“While visually appealing, we were not going to compromise the operation of the facility with form over function. Gerflor made significant effort to ensure all our concerns were addressed,” Taouk added.

Design Manager for facilities manager, Honeywell, Ian McGrath was satisfied Gerflor Symbioz was the right flooring solution for the centre, rating the project as a career highlight.

“We had more confidence in what we were told and saw from Gerflor than any alternative. We did a rigorous risk assessment and still came out with confidence in the Gerflor product,” McGrath said.

As part of the Plenary Health consortium contracted to maintain the facility for the next 25 years, Honeywell has a vested interest in ensuring products and services are fit for purpose.

“There were many areas in the building that we insisted be changed to our specification. The surface technology of this flooring was one thing that really pointed us in the Gerflor direction because it extends the longevity of the surface. Symbioz doesn’t need buffing or polishing so delivers a less aggressive cleaning regime, with minimised disruption. That is particularly important in the clinical and research areas,” McGrath said.

The overall design aesthetic of the VCCC is one of beautiful organic finishes and light-filled spaces.

Cheryl House led the interior design team – part of the broader Silver Thomas Hanley, DesignInc and McBride Charles Ryan (STHDI+MCR) architectural team – that had the formidable task of choosing surfaces and finishes that would stand the test of time.

“The VCCC is a tremendous opportunity to deliver a quality public health facility that will perform well and be easy to maintain in the long term. We needed tried and tested products from established, reputable firms that will preserve their high standards,” House said, “The colours in the Gerflor’s Symbioz range are really beautiful – quite unique and not easily replicated.”

Gerflor wall vinyl adds to hygiene and aesthetics within the hospital, but was no off the shelf solution, insisted Fenner, “We worked with our design and manufacturing team in France to make 2mm wall vinyl in three special order colours to deliver a seamless finish on all welded joins to the floor vinyl.”

“This project is a true showcase of Gerflor capabilities and our preparedness to go the extra mile to deliver innovative solutions that tick all the boxes, not just for today but well into the future. It speaks to our capacity to supply and manage large scale projects,” concluded Fenner.

Gerflor provided a practical but stylish finish to the state of the art facility in Victoria
Photo: Peter Bennetts, courtesy of Plenary Group

PRODUCT SPECIFYING AND SUBSTITUTION

PROPRIETARY SPECIFYING

In NATSPEC *Proprietary means identifiable by naming the manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.*

GENERIC SPECIFYING

The aim of the specification writer in customising NATSPEC for a project is to describe performance as follows:

- Measurable outcomes in terms of:
  - Conformance to a standard.
  - Product tolerance.
  - Construction tolerance.
  - Delivery and energy use.
  - Durability.
  - Compatibility with existing systems.
- Comparable outcomes in terms of:
  - Colour and texture.
  - A benchmark description.

Evaluation criteria include:

- Type tests.
- Evidence of conformance to a recognised certifying body such as JAS-ANZ.

SUBMISSIONS

NATSPEC has provisions for specifying particular requirements for submissions. Provision is also made for specifying time and program constraints for submissions. The clause relating to information submissions for building products (under the 0171 *General requirements* worksection **SUBMISSIONS** heading) is:

Requirement

Products: Products and materials data, including manufacturer's technical specifications and drawing, evidence of conformance to product certification schemes, type test reports, performance and rating tables and installation and maintenance recommendations.

NATSPEC POLICY ON SUBSTITUTIONS

In order to maintain the contractor's contractual responsibility in regard to supply, NATSPEC allows for substitution within the 0171 *General requirements* worksection. The following italicised text is taken from the **PRODUCTS** clause:

Substitutions

Identified proprietary items: Identification of a proprietary item does not necessarily imply exclusive preference for the item so identified, but indicates the necessary properties of the item.

Alternatives: If alternatives to the documented products, methods or systems are proposed, submit sufficient information to permit evaluation of the proposed alternatives including the following:

- *Evidence that the performance is equal to or greater than that specified.*
- *Evidence of conformity to a cited standard.*
- *Samples.*
- *Essential technical information, in English.*
- *Reasons for the proposed substitutions.*
- *Statement of the extent of revisions to the contract documents.*
- *Statement of the extent of revisions to the construction program.*
- *Statement of cost implications including costs outside the contract.*
- *Statement of consequent alterations to other parts of the works.*

Availability: If the documented products or systems are unavailable within the time constraints of the construction program, submit evidence.

Criteria: If the substitution is for any reason other than unavailability, submit evidence that the substitution:

- *Is of net enhanced value to the principal.*
- *Is consistent with the contract documents and is as effective as the identified item, detail or method.*

Optional text (from *Guidance*):

Costs: Pay the cost of submissions and of evaluations and tests of proposed alternatives, whether subsequently accepted as a variation or not. The costs will be calculated at the current charge-out rates of the relevant consultant(s).

(Italicised text is from the NATSPEC *General requirements* worksection.)

ACUMEN ADVICE ON SUBSTITUTIONS AND VARIATIONS

An architect administering the contract should be aware that:

- *If the contractor proposes a substitution for materials specified in the contract documents, the architect should request approval from the owner for the substitution. If a substitution is made, the procedures set out in the contract for a variation of the works should be followed.*

(Italicised text is an extract from **Substitutions** in acumen.architecture.com.au, the Australian Institute of Architects' practice advisory subscription service.)

NATSPEC PRODUCT PARTNERS

A NATSPEC Product Partner is a building product manufacturer with an agreement with NATSPEC to include a purpose edited worksection in NATSPEC. See branded worksection.

A NATSPEC branded worksection is a technical worksection produced in NATSPEC format in conjunction with a Product Partner. Branded worksections provide specifiers with an alternative to the generic worksection where a particular product has been selected at the design stage.

The research prior to the selection of a product or system is filtered, both formally and informally, to eliminate inappropriate choices. The requirements of the client, regulators, standards, and the designer all affect whether the selection is presented as a generic or a proprietary item. The NATSPEC worksections facilitate the recording of both types.

All manufacturers are acutely aware of the problem of substitution by the contractor. It is being exacerbated by the lure of cheap and sometimes fake imports. Consultants are also affected as they spend considerable time and effort selecting a product, finish or electrical/mechanical system as part of their design responsibilities.

(Italicised text on the left is from the NATSPEC *General requirements* worksection.)

Relevant worksection

0171 General requirements

Related TECHnotes

GEN 014 Submissions and testing

BRANDED vs GENERIC WORKSECTIONS

BRANDED OR GENERIC?

The foundation unit of the NATSPEC specification system is the worksection. NATSPEC worksections are selected and customised by the specifier to produce a project specification. In some instances, the specifier can choose between a generic worksection and a branded worksection when compiling the specification. This TECHnote defines the alternatives and outlines their advantages.

BRANDED WORKSECTION	GENERIC WORKSECTION
Definition A NATSPEC branded worksection is developed by NATSPEC in conjunction with the manufacturer, known as a NATSPEC Product Partner. It is a MS Word document *Template* which follows NATSPEC style and format and can be customised by the specifier.	**Definition** A NATSPEC generic worksection is a MS Word document. It is a comprehensive *Template* which the specifier must customise by completing prompts, adding relevant material and deleting material which is not applicable to the particular project.
Classification Each branded worksection is based on the associated NATSPEC generic worksection and shares the same classification number.	**Classification** NATSPEC worksections are classified and sequenced in a logical order corresponding to common Australian construction industry sequence.
Advantages • Provides an alternative to a generic worksection where a particular product has been selected at the design stage. Associated generic material not manufactured by the Product Partner is still provided. • Minimal customising required as the *Template* has been approximately 90% pre-edited in conjunction with the Product Partner. • Current product information is readily available and accessible via hyperlinks between the *Template* and the Product Partner's website reducing research time and facilitating early decision making. • The possibility of product substitution by the contractor may be reduced as the unique performance characteristics of the product are clearly specified.	**Advantages** • Provides comprehensive coverage of a particular work area. • Adaptable for open proprietary specification where more than one brand or model number is acceptable. • Adaptable for closed proprietary specification where a branded worksection is unavailable. • Useful where the inclusion of brand names is not permitted. • The *Template* can be modified to create a new worksection where a NATSPEC worksection is not available.

Regulations, standards, client and designer requirements will all have some influence on whether a generic or branded worksection is appropriate.

SUBSTITUTION

Manufacturers are aware of the problem of substitution by the contractor. To maintain the contractor's contractual responsibility in regard to supply, NATSPEC allows for substitution. However, text in the *0171 General Requirements* worksection requires the contractor to provide the designer with the appropriate technical information to make an informed decision regarding the proposed substitution. See related TECHnote *Gen 006 Product specifying and substitution.*

Worksection Structure

Each worksection is divided into:

GENERAL - applies to the worksection as a whole and includes cross referencing, standards, interpretation, tolerances, submissions and inspections.

PRODUCTS - describes the basic materials, components and fabricated items.

EXECUTION - sets out the construction performance criteria to prepare the substrate, assemble materials to produce an installation and carry out the works.

SELECTIONS - contains schedules that refer to the selection of proprietary products or to generic products by their properties.

Open specifications, such as descriptive, performance or reference specifications, can be satisfied by more than one product. An open proprietary specification is where there is more than one acceptable brand or model number.

Closed specifications can be satisfied by only one product. A single brand or model number may be nominated. However, some specifications which seem open are actually closed as only one product on the market will satisfy the criteria specified.

Related TECHnotes

NATSPEC TECHnote *GEN 006 Product specifying and substitution* sets out the difference between proprietary and generic specifying, and explains the policy and means of managing contract variations related to requests for substitution.

Related Worksection

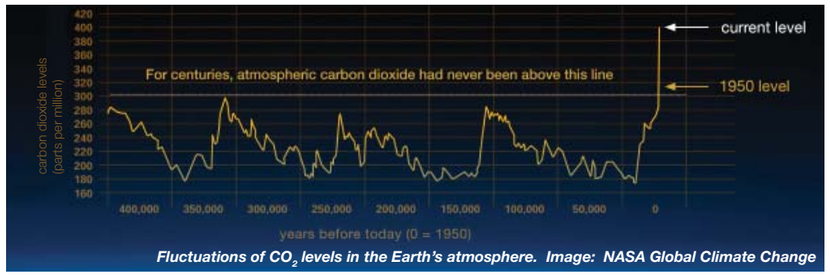
0171 General Requirements

Sustainability in a corrosive environment

NATSPEC// Construction Information

Change with the environment: selecting resilient and corrosion resistant materials to withstand an increasingly harsh environment

Climate change and global warming are phenomena that have a persistent and dynamic effect on the built environment. Only in the past decade or so has human activity's impact on climate change been widely recognised, gaining traction as a political and social movement. Increased greenhouse gas emissions, rising sea levels, more frequent and extreme storm events, increased rainfall, and rising atmospheric temperatures have resulted in increased moisture content, increased CO_2 levels, acid rain, and overall temperature increases.



Fluctuations of CO_2 levels in the Earth's atmosphere. Image: NASA Global Climate Change

The direct effect of this aggressive and corrosive environment on the built environment has seen manufacturers, builders, and architects respond through their designs and processes to protect materials against these harsh elements. To combat corrosion and early degradation, designers and builders have adapted to environmental and legislative changes, and new technologies, materials, and processes, by specifying materials according to the following properties:

- **Resilience:** Able to withstand wind, rain, salt (corrosion), and wave action.
- **Sustainability:** Be sourced from renewable suppliers and have minimal environmental impact.
- **Recyclable:** Made from, or able to be reused in a new or recycled manner.
- **Whole of Life (Life Cycle Analysis):** Sustainable in the long term (in its manufacture, installation, use, removal, reuse, and disposal).

CAUSES OF CORROSION

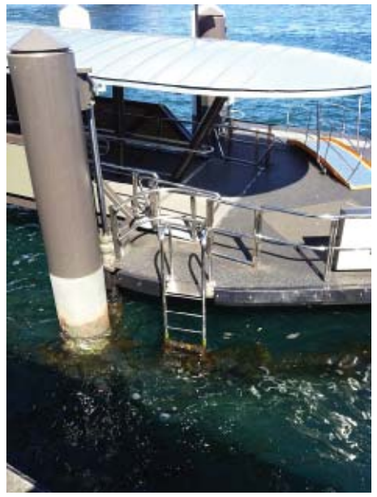
The relationship between the environmental and design factors contributing to corrosion of materials is critical in a humid and salt laden environment. Corrosion occurs when local conditions (like temperature, relative humidity, and the presence of corrosive substances, such as pollutants, on the material's surface) are too aggressive for the material in its installed condition. In selection and design of materials and surface finishes, the following factors should be considered:

- **Corrosive substances;** on surfaces of metals, such as stainless steel, corrosive substances are one of the major factors that cause corrosion. Sea salt stays wet at a very low relative humidity keeping the surface wet (and corroding) while the salt is present. The presence of industrial pollutants can also aggravate the conditions.
- **Atmospheric conditions;** high humidity and atmospheric temperature exacerbate corrosion. High humidity generates a film of moisture that dissolves the salt deposits, creating a corrosive solution on the surface of the material.
- **Surface orientation and design;** poor drainage promotes corrosion, such as in rain sheltered areas like the underside of sloping roofs, downpipes under eaves, or in a building's rain shadow. Designs with corners or crevices that trap water can lead to serious corrosion if not maintained properly. Combining several materials in humid and coastal environments where water is constantly present on the materials surface should also be avoided, or measures taken to separate them (particularly dissimilar metals) to minimise galvanic corrosion.
- **Surface roughness and penetrations;** deep grooves, metal folds, and unprotected edges to penetrations on a material's surface are more susceptible to corrosion as they can trap salts and pollutants. When the surface dries, the salts and pollutants become concentrated, allowing more aggressive corrosion. Deep grooves trap more water and salts, so the bottom of a groove is exposed to salt concentration above its resistance for longer, initiating corrosion. The critical surface roughness for stainless steel is approximately 0.5 µm Ra. Abraded stainless steel surfaces smoother than 0.5 µm Ra*, achieved by electropolishing or mirror finish, are much less susceptible to corrosion.
  *Recommendation from the Australian Stainless Steel Development Association (ASSDA)
- **Surface characteristics;** for the best corrosion performance, the material's surface should be clean, free of contamination, and have a continuous protection layer. These layers can be a paint finish (metallic, alkyd, or acrylic), galvanized finish, or passivation or electropolishing in the case of stainless steel.
- **Appropriate grade of material;** selection and use of the appropriate grade of material must consider the demands and requirements of its intended use and location
- **Maintenance;** materials left in a corrosive environment with little or no maintenance will corrode faster and are prone to early aesthetic degradation, or even early failure. Low maintenance materials are not necessarily maintenance free; the more aggressive the environment, the more rigorous the maintenance program.

CASE STUDY: SYDNEY FERRY WHARF UPGRADE

The upgrade of commuter ferry wharves in Sydney Harbour acknowledges many environmental issues in its design, material selection, and construction. Rising sea levels, a large tidal range, wave action, and the aggressive marine environment called for careful selection of materials and building processes:

- Materials such as zinc, for roofing, and stainless steel, for handrails, were selected for their corrosion resistance and whole of life attributes.
- Structural steel piles in the tidal zone of the harbour were protected with either anti-corrosive tape, or unprotected and allowed to corrode at a measurable rate to maintain structural integrity throughout design life with little or no maintenance.
- Glass screens and precast concrete slabs were specified and installed for their resilient properties, particularly for wave and ferry impact.
- The final location and orientation of each wharf were considered in assessment of the micro-environment and exposure conditions.



Milsons Point Ferry Wharf

HOLD POINTS AND WITNESS POINTS

INTRODUCTION

Hold points and *Witness points* are construction stages which may need additional inspection, verification and documentation to make sure of:

- The safety of the personnel, environment and the public, before proceeding.
- The technical quality and any legal requirements have been satisfied.
- The next stage in the construction process can be completed.

Verification measures will vary with the specification method. For performance specifying, verification involves testing. For specifying by reference, verification is to a standard, or through third-party certification to that standard. Verification procedures are documented in the specification as *Hold points* and *Witness points*.

HOLD POINT

A *Hold point* is a mandatory verification point beyond which a work process cannot proceed without authorisation by the contract administrator. *Hold points* are usually assigned to those critical aspects of the work that cannot be inspected or corrected at a later stage because they will no longer be accessible. The relevant work cannot proceed until the contract administrator is able to verify the quality of the completed work and releases the *Hold point*.

Hold points can be nominated by:

- The principal, in the contract documents.
- The contract administrator, with a Non-conformance or Corrective action report.

Use *Hold points* sparingly as each potentially affects project duration and cost.

WITNESS POINT

A *Witness point* is an identified point in the work process where the contract administrator may review, witness, inspect or undertake tests on any component, method or process of works. The contractor is required to notify the contract administrator who may or may not take the opportunity. The subsequent activity however, may proceed.

CONTRACTOR'S ROLE

The contractor is responsible for satisfying the documented contract requirements and planning, developing and maintaining a system assuring the detection of non-conformances and control of their resolution. The issue of a Non-conformance report or a Notice of non-conformance automatically creates a *Hold point*.

AUS-SPEC APPROACH

AUS-SPEC is a specification system for the life-cycle management of assets. In AUS-SPEC Templates, *Hold points* are part of:

- *0161 Quality Management (Construction)* and 0167 *Integrated management* worksections. The Quality plan for the works incorporates checklists, inspections, testing and documentation to make sure that the works comply with the contract documents. *Hold points* and *Witness Points* should be included in the checklists. Examples of submissions include a quality plan or soil compaction test results for a prepared sub-base.
- The summary of *Hold points* and *Witness points* in the annexure of each construction worksection provides a checklist for programming sequential activities and communication obligations.
- A Maintenance management plan combines the requirements of the Technical specifications, Quality manual and the Quality plan, for assuring quality in construction projects. The Maintenance management plan covers policy, organisation, selected procedures, maintenance planning and Activity specifications for maintenance activities. The Activity specifications form the core of the document which includes the nominated *Hold points*. For example, test results confirming compliance of materials like asphalt or requirements of the work order for the proposed maintenance work.

AUS-SPEC TECHguides provide further guidance on the use of *Hold points* and *Witness points* for the AUS-SPEC specifications. For more information on AUS-SPEC visit www.natspec.com.au.

NATSPEC APPROACH

NATSPEC *Templates* do not nominate *Hold points* in *Open* text. The **INSPECTION** clause in individual worksections includes *Guidance* text for nominating *Hold points* where they may be appropriate for inclusion in a project specification, e.g. inspecting formwork and reinforcement prior to placement of concrete, or waterproofing.

NATSPEC *Templates* use **INSPECTIONS, Notice** in lieu of *Witness points*.

AUS-SPEC definitions:

Hold point: A defined position in the different stages of the contract beyond which work cannot proceed without mandatory verification and acceptance by the Superintendent.

Witness Point: A nominated position in the different stages of the Contract where the option of inspection or review may be exercised by the Superintendent, after notification of the requirement.

Non-conformance report (NCR): A mandatory (standard format) report submitted by the contractor that details the nonconforming work and the contractor's proposed disposition of the non-conformance.

Notice of non-conformance (NNC): Formal instruction from the superintendent regarding product non-conformance to that specified.

Corrective action: Measures, including preventative measures, taken to rectify conditions which have caused or might cause nonconformity.

Corrective action request (CAR): A formal advice/instruction from the superintendent regarding departures from the Quality system or methods as approved in the Quality plan.

Disposition: Action to be taken to resolve non-conformance.

NATSPEC definitions:

Hold point: An activity cannot proceed without the approval of the contract administrator.

NATSPEC defines **Hold points** in *Optional* text in the *General requirements* worksection along with *Guidance* text on minimising contractor intervention of this kind to *accord with principles of quality assurance and risk allocation.*

Contract administrator: Has the same meaning as 'architect' or 'superintendent' and is the person appointed by the 'owner' or 'principal' under the contract.

Relevant documents

0134 General requirements (Supply) (AUS-SPEC)

0135 General requirements (Services) (AUS-SPEC)

0136 General requirements (Construction) (AUS-SPEC)

0161 Quality Management (Construction) (AUS-SPEC)

0167 Integrated management (AUS-SPEC)

0171 General requirements

AUS-SPEC TECHguides

Austroads AGPD03/14 Guide to project delivery – Part 3 Contract Management.

SUBMISSIONS AND TESTING

INTRODUCTION

This TECHnote addresses the specification of the submissions and tests by the contractor which may be required during the construction process.

SUBMISSIONS

Contractual

Submissions, requiring approval before work can proceed, create hold points in the contract. Submissions which typically create hold points include:

- Authority approvals.
- Calculations.
- Certification.
- Design documentation.
- Drawings.
- Execution details.
- Fire hazard properties.
- Operation and maintenance manuals.
- Products and materials.
- Prototypes.
- Records.
- Samples.
- Shop drawings.
- Subcontractors.
- Technical data.
- Tests.
- Warranties.

Requesting these submissions requires the contract administrator to perform a duty and accept responsibility for that duty.

For information only

If submissions are required for information only, they are witness points, intended to assist the contract administrator. Submissions which typically form witness points include:

- Non-contractual construction programs.
- Inspection and testing plans.
- Accident reports.
- Type test reports.
- Site photographs.
- Environmental management proposals.
- Product certification and manufacturers' data.

Do not request submissions indiscriminately. Fewer should be required under a quality assurance scheme.

Submission approval and acceptance

NATSPEC, as a generic technical specification, does not contain management systems to handle the approval process. If an approval is required before implementation, consider nominating a hold point, to eliminate ambiguity. Consider documenting approval criteria and the acceptance procedure.

TESTS

Inspection and testing of the works can be requested in the documentation.

Testing and laboratory services may be procured by one of the following methods:

- Principal appointment, employment and payment.
- Principal appointment and employment but contractor payment.
- Contractor appointment, employment and payment.

NATSPEC worksections, which address the contractor, assume the third option applies.

It is the prerogative of the contract administrator to call for an inspection that may involve a hold point. Indicate in the worksections which tests, if any, are hold points and make sure the affected parts are not concealed, until directed.

Minimise the number of these tests as late approval can lead to delay claims.

Testing authorities

If a registered testing authority is required for particular site tests, say so in the appropriate technical worksection. Otherwise, the contractor may carry out site tests. If the testing authority must also be independent, say so in the appropriate technical worksection or, in the *0171 General requirements* worksection if it is a global requirement. NATA publishes a register of accredited testing authorities.

Product certification schemes

JAS-ANZ has an online register of certified organisations, Conformity Assessment Bodies (CABs) and products.

If a JAS-ANZ CAB is required for a particular product or system, say so in the appropriate worksection.

Product certification schemes

Include:

- ActivFire Scheme
- The Australian Gas Association (AGA)
- The Australian Communications and Media Authority (ACMA)
- The CodeMark Product Certification Scheme
- Forestry Chain of Custody (AS 4707)
- WaterMark Certification Scheme (WMCS) (AS 5200.000)
- Water Efficiency Labelling and Standards (WELS) Scheme

Relevant websites

National Association of Testing Authorities, Australia
www.nata.asn.au/

Joint Accreditation System for Australia and New Zealand

www.jas-anz.com.au

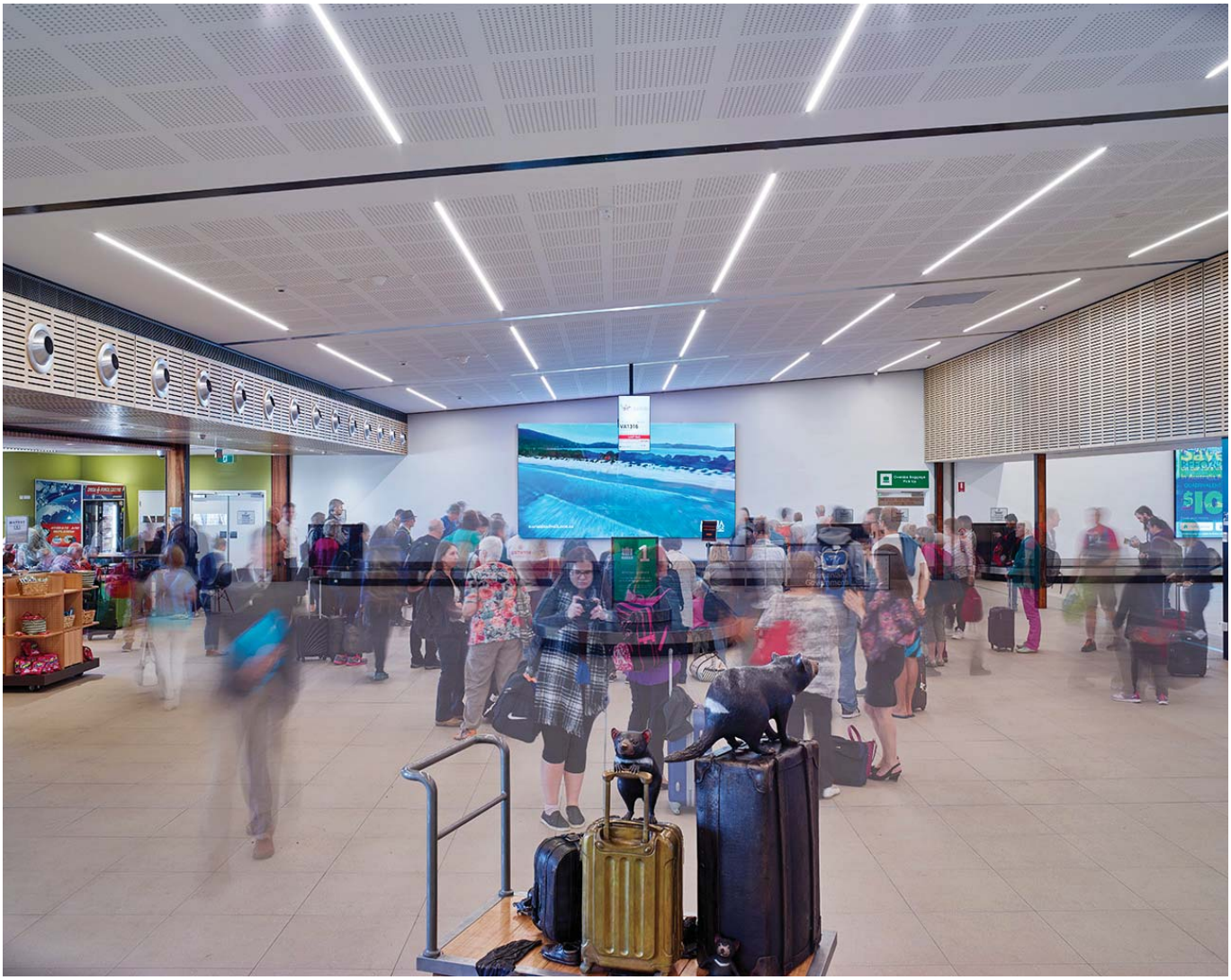
Related worksection

0171 General requirements

Related TECHnotes

GEN 006 *Product specifying and substitution*
GEN 009 *Hold points and witness points*

Hobart Airport
Hobart, TAS



Haymes paint was specified for the construction work at Hobart Airport, in Tasmania, to create a functional yet stylish finish

The mission for this project as detailed by Misho Vasiljevich, principal architect at Misho + Associates, was to "develop the existing terminal to cater with and for the changing nature of travellers and users of the airport."

A key challenge for all stakeholders including the builder, Vos Constructions, and painting contractor, Elite Painters, was the undertaking of major construction work without disrupting the movements of travellers and Airport operations. This was managed by partitioning the works into stages to enable continued airport activity.

Containing less than 1% volatile organic compounds (VOCs) while retaining high commercial performance characteristics, Haymes Ultra-Premium Paint was ideal in this heavily populated servicescape.

The end result is a project which delivers functionality, a welcoming and striking aesthetic, and epitomises the culture of Tasmania: forward thinking, while complementing heritage and the surrounding environment.

Architect: Misho + Associates
Builder: Vos Constructions
Painting Contractor: Elite Painters
Product: Haymes Ultra-Premium Paint

Mental Health Commission Office
Perth, WA

HIMMEL

CSR Himmel supplied custom Timber Wedge Panels, Timber Lay In Slotted Panels, and Himmel Steel Grid in Black, to the Mental Health Commission Office in Perth, Western Australia.

The Mental Health Commission strives to establish systems to manage mental health, alcohol, and other drug related issues and meet the needs of Western Australia's population, delivering quality outcomes for individuals and their families.

In a newly refurbished dual level facility, the new premises brings together the MHC and associated organisations under one roof:

- Western Australian Association for Mental Health (WAAMH)
- Western Australian Network of Alcohol & Other Drug Agencies (WANADA),
- Local Drug Action Groups (LDAG)
- Office of the Chief Psychiatrist (OCP)

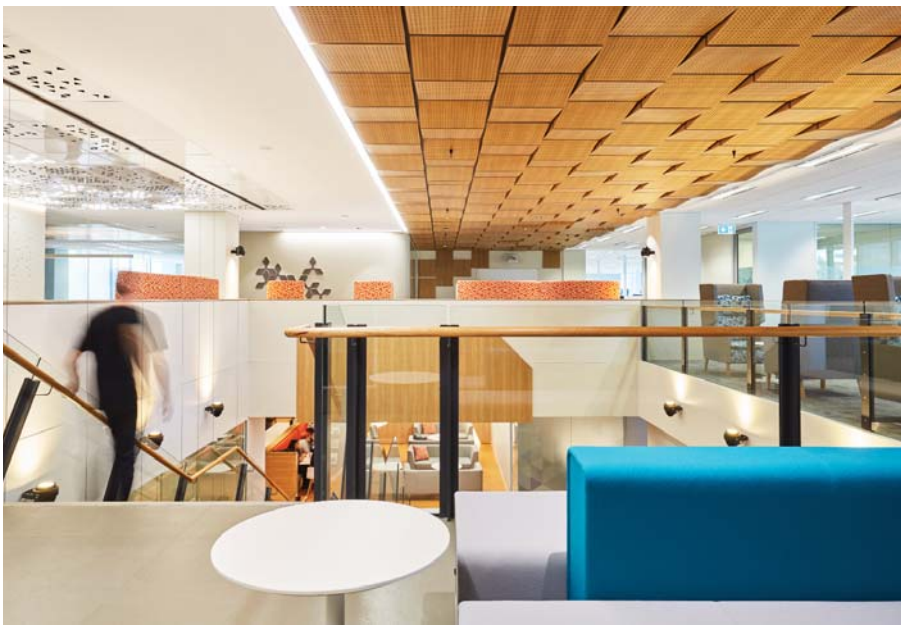
The new fit out of the office space ensured that Mental Health was at the forefront of the design process. HASSELL investigated the meaning of wellness within the workplace and how an individual's physical environment can have a significant effect on their capacity to thrive.

Four key interlinked components were implemented:

- Activity and Movement
- Choice and Control
- Identity and Expression
- Environment

These four components were used to give life to the workplace and enhance wellbeing. Adam Paikos-Coe, Senior Interior Designer at HASSELL provided insight into the concept behind the unique custom Timber Wedge Ceiling. Paikos-Coe described the importance of interior design capturing agile workplace design principles, encouraging movement within the workplace. References to the natural environment and Biophilia (the instinctive bond between human beings and other living systems) led to HASSELL's decision to use alternative and varying light sources and natural products to improve the wellbeing and workspace environment of employees.

The conclusion of the project produced a striking and unique ceiling centrepiece, achieving the delicate balance between HASSELL's concept and delivery. HASSELL's willingness to invest in locally manufactured products ensured an incredible custom finish.



CSR Himmel's custom suspended ceiling products were installed at the newly refurbished dual level facility in Perth, Western Australia

Bowl and Social Ten Pin Bowling Hamilton, New Zealand

Designed by CTRL Space, the newly refurbished Bowl and Social ten pin bowling alley, located at the SKYCITY Hamilton complex, offers a considered yet playful space for visitors to embrace the youthful pleasures of bowling, arcade games, and social functions.

Facing the exquisite Waikato River, the Bowl and Social interior draws on its exterior surroundings, bringing the outside in via the floor design.

"The concept came as a direct response to the distinctive location of the venue," commented Emily Cain, designer at CTRL Space.

"Thinking of the journey from the bush, to the scrub that hugs the river's edge, and to the river itself, the floor design changes and transitions throughout the venue and creates a flow that helps pull visitors through the reception and deeper into the space," Cain continued.

A combination of three designs from Karndean's new LooseLay Longboard collection was used to bring the 'outside-in' concept to life. The deep charcoal tones of Raven Oak embody the moody river in the herringbone laying pattern that characterises the flowing waves.

Raven Oak LLP302, Weathered Heart Pine LLP304. and Champagne Oak LLP310

On the river's edge, the reclaimed grey of Weathered Heart Pine intermittently hugs Raven Oak, while the earthy brushed tone of Champagne Oak denotes the bush scrubland.

"The flooring is a key element within the space and one of the largest surfaces that was treated in the fit-out," stated Cain. "It has made the biggest impact and succeeds in connecting it all together whilst providing an individual personality to each area."

In an environment commonly dominated by the use of carpet tiles due its acoustic insulation, Karndean LooseLay has proven to be an exciting and more attractive option. LooseLay's acoustic properties help deliver sound control and reduce background noise pollution within the alley, while offering a contemporary timber look finish.

Cain commented, "Karndean LooseLay works fabulously well, acoustically, when matched with our chosen ceiling solution. We're used to seeing overly patterned and dated carpets in bowling alleys. The use of LooseLay is the result of an evolved space that feels sophisticated for today's clients, who are looking for more from their entertainment experience."

Raven Oak LLP302 and Champagne Oak LLP310

Narellan Town Centre
Sydney, NSW

KEYSTONE
Architectural Linings & Acoustic Solutions

Keystone Architectural Linings and Acoustic Solutions has played an important role in the recently completed extensive re-development of the Narellan Town Centre in Sydney. The Centre required decorative wall and ceiling panels to suit varying areas, and Keystone provided wall and ceiling products Key-Beam, Key-Nirvana, Key-Lena, Key-Solid MDF, and Key-Endura to give it a perfect finish.

The expansion project aimed to revitalise the Narellan precinct by acting as a catalyst for high quality developments in the area and surrounding suburbs. The expansion has doubled the mall's floor space from 35,000m^2 to 70,000m^2. The Town Centre's external sky bridge, two entrance lobbies, and sweeping retail facade were designed to create a gateway landmark that embraces the restaurant precinct and civic plaza.

Keystone's work is visible throughout the project. Featured in the main escalator lobby's ceiling is Key-Beam custom manufactured in Balsawood, with Laminex Sublime Teak finish to the face and edge of the beams. Keystone's special clip system was used for the beams.

Perforated 9mm Fibre Cement - soffit panels custom shaped to follow curvature of external building

Custom sized and shaped feature ceiling beams – manufactured using Balsawood and finished in Laminex Sublime Teak

Key-Nirvana custom triangular panels in various finishes can be found in the fresh food precinct's feature ceiling. Key-Endura perforated external soffit panels were custom shaped to follow the curve of the building.

Custom feature Triangular ceiling manufactured in Laminex laminated material – solid and perforated panels

Key-Lena was also cut and shaped for the ceiling panels and finished in Dulux Natural White and Dulux Monument, in 100 per cent gloss. These panels feature insert recess in Natural Timber veneer 'Red Oak.' Key-Lena custom grooved panels are featured in skylight walls, finished in Dulux Tranquil Retreat.

Australasian design firm The Buchan Group provided architectural and interior design services to the project. The Buchan Group's project director Anthony Palamara said, "The new building will redefine Narellan Town as a new central hub and town centre for Sydney's south west. In terms of standout features, this adjoining sky bridge is the pinnacle of the centre's extraordinary design as it links the north and south retail precincts seamlessly and effortlessly for shoppers."

The Keystone team expressed great pride and joy at having been a part of this project. It is believed that the expanded Narallen Town Centre will create 1750 new jobs, rivalling other major shopping centres in the area.

KINGSPAN Insulated Panels is the global leader in the design, development, and delivery of advanced building envelopes. Its wide range of products includes insulated roof panels, BENCHMARK high end roof systems, and standing seam systems. KINGSPAN Insulated Panels is widely recognised in the industry for the high quality and performance of its products, as well as its commitment to excellent customer services and technical support. **www.kingspanpanels.com.au**

Kingspan Insulation manufactures AIR-CELL® thermo reflective insulation, and Kooltherm®, a CFC/HCFC-free rigid thermoset insulation with zero Ozone Depletion Potential (ODP). The Kingspan Insulation range delivers innovative, high performance solutions in roof, wall, and underfloor applications for both residential and commercial buildings. Kingspan Insulation's technical experts can provide thermal solutions for Section J, Green Star, and 6 Stars. **www.kingspaninsulation.com.au**

Lawn Solutions Australia is a wholly Australian owned and operated business with Australia's leading group of accredited turf growers coming together under a single banner to offer a range of exclusive turf brands and turf related products across a comprehensive national network.

Lawn Solutions Australia is setting a new benchmark for best practice in the turf industry with our industry-leading accreditation system. All our growers are AusGAP certified and adhere to the same stringent, nationally endorsed standards. **www.lawnsolutionsaustralia.com.au**

Lysaght's diverse product range now includes roofing and walling, gutters and downpipes, purlins, fences, structural formwork, and home improvement products. As a division of BlueScope, we can rely on the backing and support of Australia's largest steelmaker. Made from 100% Aussie steel, the products are extensively performance-tested, come with a BlueScope warranty, and offer customers confidence and peace of mind. For 150 years, customers have relied on Lysaght as the trusted experience in steel. Lysaght: the Australian steel people. **www.lysaght.com**

MAPEI is a world leader in the manufacture of innovative products for the construction industry. Products include adhesives, grouts, waterproofing membranes, levelling compounds, repair mortars, and quality related building products.

Numerous projects executed all around the world are testimony to the outstanding quality of Mapei products that are preferred by architects, designers and building contractors.

Mapei products are manufactured in Brisbane and distributed through an extensive network of distributors. **www.mapei.com.au**

MODDEX GROUP is Australia's leading developer and manufacturer of an extensive range of modular steel handrails, guardrails, balustrades, and other barrier solutions that ensure the safety of people and the protection of property. Moddex innovation is specified and sold throughout Australia and New Zealand. Moddex is recognised for its flexible, robust, cost effective and easy to install systems that simplify the installation of handrails and balustrades in all environments and for a broad range of applications within the Defence, Construction, Mining, Transport, and Education industries, as well as the Public Utilities sectors. **www.moddex.com.au**

Western Australia Institute of Sport
Perth, WA

Kingspan Insulated Panels

Kingspan's Insulated Panel and Façade System was used to create a contemporary, dynamic façade for the Western Australia Institute of Sport (WAIS) in Perth. The system was instrumental in bringing the Institute's award-winning, linear design to life using strong, streamlined materials that mirror the physiological elements and performance of the elite athlete's body.

Located at HBF Stadium within Perth's elite sports precinct, the $33.7 million building was constructed in 2014. It provides first-class training facilities to support Western Australia's elite athletes reach peak performance in the lead up to major national and international sporting events.

The project's design, which received a Public Architecture Award at the Australian Institute of Architecture (WA Chapter) Awards in 2016, was a collaboration between Sandover Pinder in Perth and DWP in Melbourne. Having used Kingspan Insulated Panels for past projects, the architectural team confidently specified four colours from the Evolution Axis panels range for the building's side façade and the Trapezoidal Roof System.

"The roofing material was a particularly important consideration for this project, particularly over the aquatics area where issues can arise due to the humid and corrosive environment," said Michael Chamberlain from Sandover Pinder.

"Unlike other roofing materials, which require a further soffit or ceiling treatment, the Kingspan Trapezoidal panels are finished on both sides. This means they could double as a roofing material and internal ceiling that met both thermal performance and aesthetic requirements. This not only delivered a clean, streamlined finish, but sped up the project timeline and allowed other trades to access the building sooner.

The newly installed façade system at the Western Australia Institute of Sport

"From there, we specified Kingspan panels for the Institute's dramatic exterior walling. The single panels allowed us to bring the design to life with fewer joints for a more streamlined finish and because the panels are manufactured offsite, installation was relatively quick," stated Chamberlain.

The combination of earthy and metallic coloured Kingspan panels created subtle variations in texture and character to lift the façade. This provides a modern complement to the site, characterised by parchment blockwork from the 1980's, big gum trees, and grassy sports ovals.

Kingspan's Insulated Panel and Façade Systems feature a proprietary PIR insulation core for superior, fire-safe thermal performance. The panels are finished with durable, high performance coatings and can be integrated with insulated gutters to create a completely air and water tight thermal envelope.

"The Kingspan Insulated Panels team are very proactive and proud of their product. During this project, they worked with the builder and installers to iron out any challenges and ensure proper installation," said Chamberlain.

The real value of space in commercial real estate

New research findings report a return on investment can be as high as 856 per cent when analysing the use of advanced slimline wall insulation solutions in new non-residential buildings, when compared with conventional solutions using glass wool fibre batts.

World-leading asset management and construction consultancies, Currie & Brown Australia and Sweett Group UK were commissioned by Kingspan Insulation to investigate the 'Real Value of Space in Commercial Real Estate.' The study was to quantify the potential financial benefits that result from insulating the external walls of new non-residential buildings using Kingspan's high performance slimline wall insulation solutions.

Currie & Brown and Sweett Group developed a research program to analyse the thickness differentials of various insulation systems and evaluate their impacts on costs and returns in a development. They then analysed three case study buildings to illustrate the outcomes of the analysis.

Concrete external wall constructions were examined and two Kingspan Kooltherm build-ups were compared against conventional steel stud and track wall systems using 90 mm glass wool fibre batts. The differential in thickness and cost were taken into account in the analyses.

The study found that Kooltherm K12 and K17's slimline design allowed for thinner external wall build ups, returning a greater internal floor area, and the potential for an improved return on investment.

The findings show that despite the requirement for an increase in capital expenditure of $18.03 per square metre for the wall build-up using Kingspan Kooltherm® K12 Framing Board, a positive return on investment was found for all scenarios with rental rates of $400 per square metre or greater, across all yield rates, the highest of which was 856 per cent. Finally, more than 70 per cent of the building scenarios analysed showed a positive return.

The study also found that because Kingspan Kooltherm® K17 Insulated Plasterboard is cheaper as an installed system than conventional steel stud-and-track wall systems incorporating 90 mm glass wool fibre batts, every square metre of additional space created with this system produced a net gain in value.

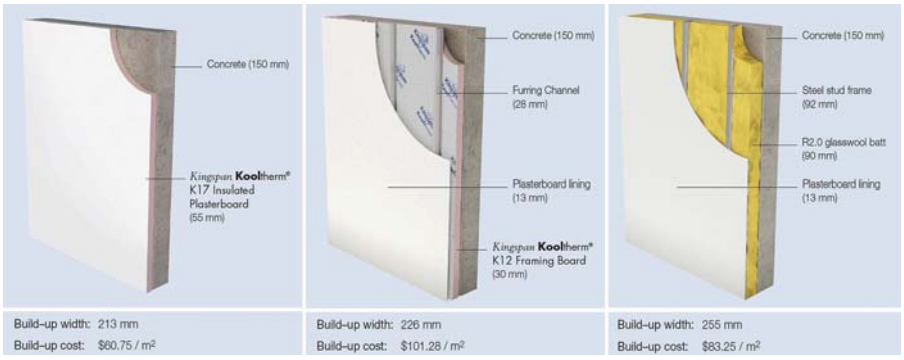
Kingspan Insulation Technical R&D Manager, Keith Anderson, attributes this in part to the lack of need for framing, "The rigid Kooltherm insulation board is already pre-bonded to plasterboard so it can be fixed directly to a solid wall without needing any framing, making it both quicker to install and thinner."

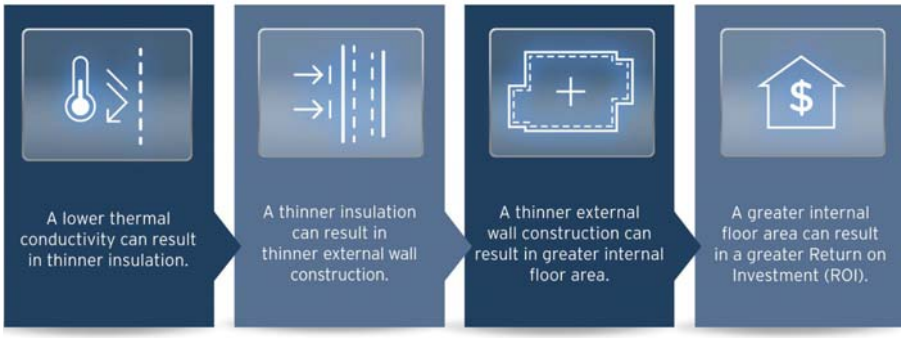
Anderson adds that both the Kooltherm K12 and K17 systems both facilitate internal space gains without having to increase the overall footprint of a building.

"The width of the external walls incorporating Kingspan's Kooltherm concrete wall insulation systems is up to 16 per cent slimmer than the built up width of concrete walls using glass wool fibre batts in a stud-and-track system," he said.

"Kingspan's Kooltherm wall insulation solutions feature ultra-low conductivity, which means they can achieve the same thermal performance as glass wool fibre batts in a much thinner profile.

"While commercial real estate values continue to be at a premium, Australian developers and their design teams will continue to be under increasing pressure to maximise usable internal areas to boost returns on their investment in new commercial buildings. These new research findings very convincingly demonstrate the first step," Anderson concludes.





Top: the three concrete wall build-ups as used in the study
Bottom: how making space boosts returns

MPavilion, Docklands Park Melbourne, VIC

Just what sets Lawn Solutions Australia apart was on show recently in Melbourne when a mix-up in turf-type for a Docklands Precinct project was rectified with dramatic results.

Amanda Levete Architects' 2015 MPavilion had been in the construction phase of relocation from the Queen Victoria Gardens to its permanent home in Melbourne's Docklands Park, in a new section of parkland designed by Melbourne Landscape Architecture firm MALA.

Speaking on the project, MALA director Campbell Morris said how well the move came together, however explaining the disappointment with the quality of what was thought to be Eureka Kikuyu turf, which was supplied to finish the job.

Following a phone call of complaint to the Lawn Solutions Australia Office, Morris said that it was quickly realised that the turf-type that had originally been specified for the project had been substituted, without MALA's knowledge, with an inferior grass type with poor appearance.

What was supplied to the project as Eureka Kikuyu was actually a common type of Kikuyu that doesn't offer the same appeal and benefits of Lawn Solutions Australia's Eureka Kikuyu, as originally specified by MALA for the relocation project.

With time constraints pressing like most jobs of this nature – continued wet-weather and only a couple of weeks to the official opening – the decision was made to replace the inferior turf with what was specified from the beginning. Exemplifying just what Lawn Solutions Australia can offer with their strict adherence to turf-quality, service, and on-ground performance, local Lawn Solutions Australia grower Lilydale Instant Lawn offered their assistance. Following the removal of the condemned-turf, Lilydale assisted with the ground preparation and the installation of the nearly 600m^2 of freshly supplied AusGAP Certified Eureka Kikuyu turf, with the difference in the end result plainly seen by all.

The repairs to the project demonstrated how Lawn Solutions Australia's turf-types, professionalism, and strict adherence to AusGAP's Turf Certification Program all came together to produce excellent results. In the face of a mix-up that could have also potentially damaged the Eureka Kikuyu brand for the 43 Lawn Solutions Australia member-turfgrowers Australia-wide, a prompt response was given.

An occasion where reputation was on the line, Lawn Solutions Australia stood strongly behind its claims of quality and professionalism, and went out of its way to ensure the utmost in customer and end-user satisfaction.

"The finish in the end was amazing," said Morris, on Lilydale Instant Lawn's completion of the job with the genuine Eureka Kikuyu turf, "This is a high-profile project...and it now looks a million bucks to what it was. It looks lush and green, just perfect for the opening and we're very happy now with what was a fairly-poor-result before. In the scheme of things; you get what you pay for."

Top: Before and after replacing the inferior grass type with the specified Eureka Kikuyu
Bottom: The turf installed at MPavilion at its new location in Melbourne's Docklands Park

Trinity Grammar School Shoalhaven, NSW

The Project
In line with Trinity Grammar School's vision for building first-class learning environments in which students can discover and develop their innate skills and talents, the school undertakes innovative projects which vastly increase its ability to provide the best possible educational environments.

One such project has been the Trinity Grammar Environmental Field Studies Centre at Woollamia in Shoalhaven, just south of Nowra on the NSW south coast.

Comprising an educational facility including classrooms, laboratories, student and teacher accommodation for up to 88 students and 10 staff, plus an outdoor field studies area, the new Environmental Field Studies Centre provides a unique and exciting opportunity for Year 7 and Year 8 Geography to be taught offsite.

The facility also enables the Year 9 Environmental Field Studies Programme to use geographical tools and skills in their surroundings to develop knowledge, understanding, communication, research, analysis, and group work skills.

The Solution
LYSAGHT LONGLINE 305® was specified by Building Studio, the Architect, for both the aesthetics and the durable performance of the thicker 0.7BMT material.

The two Living Room buildings and the main central Longhouse block utilised LYSAGHT LONGLINE 305® in ZINCALUME® steel as roofing, creating a central focal feature, and perfectly complementing the bush setting and stone, timber, and glass elements of the Longhouse.

On the two Accommodation blocks at the rear of the Living Room buildings, LYSAGHT LONGLINE 305® in COLORBOND® steel colour Woodland Grey® was chosen for the roof and outer wall systems. The roofs transition directly to the walls, as the buildings employ a gutterless design where the water flows to the ground and is collected in a perimeter spoon drain system.

The Process
Lysaght Batemans Bay was chosen to supply the LYSAGHT LONGLINE 305® to site, due to their experience working in partnership with Bay & Coast Metal Roofing on many other previous projects involving LYSAGHT LONGLINE 305®.

With the site and the buildings being quite extensive, careful attention was paid to the logistics of delivery by Lysaght, who ensured the correct sheeting loads were co-ordinated and placed at the appropriate site locations, to assist Bay & Coast Metal Roofing in simplifying the cladding process.

Lysaght Bateman's Bay also custom manufactured the specially designed flashings required for the project, ensured all material was delivered on time to meet the builder's and roofer's needs, and also maintained an onsite presence as required to ensure a quality product was provided.

LYSAGHT LONGLINE 305®
A favourite with architects, this distinctive and dramatic profile adds visual interest to large areas by casting evolving shadows which change the look of the roof throughout daylight hours.

For even greater design freedom and aesthetic interest, LYSAGHT LONGLINE 305® can also be fluted and tapered to create strong lines radiating out from a central design point across the expanse of the roofing structure.

The product is manufactured from 0.7mm ZINCALUME® steel or COLORBOND® steel and has a standard cover width of 305mm. Strong and durable, the water carrying properties of concealed-fixed LYSAGHT LONGLINE 305® make it suitable for roofing applications with a pitch as low as one degree.

The specially designed concealed-fix system not only maintains the clean, attractive lines of LYSAGHT LONGLINE 305®, but also allows for thermal expansion, while the absence of screw penetrations eliminates the potential for water ingress over time.

The new Trinity Grammar Environmental Field Studies Centre provides offsite opportunities for students to develop and practice their skills

Adelaide Aquatic Centre
Adelaide, SA

The Adelaide City Council together with the South Australian Government commenced refurbishment of the existing pools and areas with an estimated cost of $5 million

The Adelaide Aquatic Centre is a complex of indoor heated swimming pools operated by the Adelaide City Council. The Aquatic Centre is located in the northernmost extent of the Adelaide Parklands in North Adelaide. The centre opened on 20 December 1969 and is now almost 50 years old.

The Adelaide Aquatic Centre features a 50 metre Olympic-sized swimming pool and a smaller adjacent pool used for aqua aerobics, canoe polo, diving, underwater hockey, and water polo. These two pools are surrounded on three sides by raised seating for competition spectators. The wet areas also include an octopus-themed 'Octopool' for children's swimming lessons and recreational use, two leisure pools, two water slides, two spas, a dry sauna, and a steam room. The centre also offers a child minding area and a health club equipped with cardio machines, pin-loaded weight machines, and free weights. There are also shops providing swimming equipment and food, and an outdoor barbecue area.

Tectonic Tiling was awarded the tiling contract and commenced work on the 50 metre pool, dive pool, and leisure pools. Existing tiles were removed from the two leisure pools, which were then converted into one larger pool area. Contractors repaired the existing concrete walls and floors, as well as repairing and reinstalling the control joints using Kerapoxy (acid-resistant epoxy grout), Mapeband TPE (TPE tape for flexible sealing and waterproofing expansion joints and cracks subject to movement), and Eporip (solvent-free epoxy adhesive for sealing cracks in screeds).

Mapegrout Rapido (a fast-setting and drying, shrinkage-compensated, fibre-reinforced mortar for concrete repair) was applied to seal around the penetrations on the pool floors.

Planicrete SP (latex additive used in the preparation of high performance screeds and renders), sand, and cement were used to obtain a steadfast render which was applied to all areas, followed by two coats of Mapelastic Smart (highly flexible cementitious waterproofing membrane used to protect concrete structure and renders with hairline cracks). Mapetex Sel (non-woven, macro-holed, polypropylene fabric used to reinforce waterproofing membranes) was embedded into the Mapelastic Smart membrane to ensure that the integrity of the pool walls and floor was fully protected prior to the tiling installation.

Tectonic Tiling commenced with the installation of Metz 119mm x 244mm x 9mm slip-resistant pool tiles to the flooring areas. Additional tiles were also installed from the Metz pool tile range, including rebated finger grip tiles and grate support tiles to the wet decks, satin finish tiles to the wall areas, and step tread tiles to all steps and ladders. Contractors used Mapei's Kerabond Plus high performance adhesive, mixed with Isolastic (latex additive to improve the adhesion, deformability and impermeability to the substrate once hydration has occurred).

The pool tiling was grouted with Ultracolor Plus, specifically chosen for this project due to the grout's durability in immersed conditions, as well as the product's specific anti-efflorescent properties. Mapesil AC silicone sealant was selected to form a perfectly elastic gasket in the wall and floor expansion joints as it is an ideal sealant for pool environments, containing mould and mildew resisting properties, as well as providing protection from chemical agents found in pool water.

With over 3500m^2 of tiling, 2500m^2 of waterproofing, 1000m^2 of levelling, 440m^2 of render, 1060m^2 of cement screeds, and 2100 lineal metres of silicone joints required to complete all pools, contractors chose to install the final pool tiles using Mapei's Granirapid (fast setting adhesive) to accelerate the tiling process, ensuring the project was completed on time.

Works being completed at the state of the art aquatic and recreation centre

moddex

Oz Design Warehouse and Distribution Centre Sydney, NSW

Moddex worked closely with Full Tilt Construction to design, supply, and install proprietary disability handrail and balustrading systems for one of Australia's leading furniture and homeware brands, Oz Design.

Full Tilt Construction was able to provide on-site measurements for swift and accurate installation while eliminating time delays.

Project Background

As Oz Design continued to expand its operations, additional warehousing facilities were required. The impressive bulky goods warehouse and distribution centre was constructed in Rouse Hill, New South Wales, with a main warehouse floor area of 5000m^2.

The site consists of an elevated six metre mezzanine storage area with 1000m^2 of storage, and is optimised for large forklift access. Compliance with Australian Standard AS1170 and the National Construction Code on the raised mezzanine floors was a critical factor for this particular project.

Product Selected

Moddex was able to work with Full Tilt Construction to ensure compliance.

Some of the Moddex handrail and balustrading systems installed for Oz Design

The proprietary Moddex Conectabal system selected was engineered and tested to comply with the Australian Standard, and certification was able to be provided prior to works starting on site.

The Moddex Conectabal product was also able to be configured with the Moddex Assistrail product to create one system for both internal and external applications on this project.

Benefits

Full Tilt Construction has previously used standard steel pipe and tube manufactured according to specific site measurements for their various projects. Moddex however, presented a product that allowed them to modify installed items without major reconstruction. This was advantageous when alterations were made to the site or items required modification after delivery and installation.

By packaging all the components based on internal and external handrail and balustrade requirements, products arrived on-site in time with their respective project phases. Installation was able to be carried out exactly when the product was required, saving potential disruptions to productivity.

Moddex was able to provide a competitively priced solution and Full Tilt Construction was able to experience the following benefits:

- The no-weld construction system reduces corrosion and associated maintenance, resulting in long-term return on investment, and
- Enhanced safety conditions for installers, while saving hot works permits and fire spotter costs.

The Oz Design Warehouse and Distribution Centre in Rouse Hill

Parchem Construction Supplies is a leading manufacturer and supplier of products and equipment to the Australian and New Zealand concrete and construction markets. Through all of its divisions and heritage, Parchem has built over 50 years' experience in servicing the construction, civil, and concrete industries. Parchem brings experience and technical expertise in the supply and manufacture of construction and decorative concrete products, equipment, and tools. **www.parchem.com.au**

Pasco specialises in waterproofing and sealant products. With 30 years' experience, we can advise on any waterproofing or sealant application. With local and overseas suppliers, we offer a comprehensive product range for every situation. We are Victorian distributors for Latham Architectural Flooring products, including stair nosings, entry mats, and expansion joints. Pasco's range includes the award-winning Buzon Pedestal. Designed and manufactured in Belgium, it allows construction of paved and timber floors on balconies, podiums, and roof gardens. **www.pasco.net.au**

For over 50 years Polyflor has been providing Australia and New Zealand with resilient vinyl flooring, without comprising on design and functionality. Their floor coverings are suitable for a variety of commercial and domestic installations. Available in an array of colours and designs, Polyflor's ranges are hard wearing, durable, and low maintenance, offering both style and substance. Polyflor's environmentally friendly flooring is GreenTag certified and 100% recyclable. Polyflor really is 'flooring design for a better environment.' **www.polyflor.com.au**

PPG Industries' vision is to continue to be the world's leading coatings and specialty materials company. Through leadership in innovation, sustainability, and color, PPG helps customers in industrial, transportation, consumer products, and construction markets, and aftermarkets to enhance more surfaces in more ways than any other company. PPG operates in nearly 70 countries around the world. Reported net sales in 2014 were $15.4 billion. PPG shares are traded on the New York Stock Exchange. **www.ppgpmc.com**

Quattro Shading brings together a range of world class hardware systems, fabrics, and automation solutions to create innovative and high performance blind systems for commercial and premium residential projects. They are sold through a national dealer network. QUATTRO SHADING products create solutions without compromise, especially when it comes to roller blind products where they have the greatest specialisation. **www.quattroshading.com.au**

Raven is one of the most trusted brands in the building hardware industry, providing innovative, tested, and certified door and window sealing systems.

Raven's door and window sealing systems have become synonymous with quality, value, and reliability, backed by service excellence, which is why it is the brand that architects, specifiers, and builders can rely on.

Raven's world class testing facility means that we are constantly developing new ways to respond to the rapid advances in the building industry. **www.raven.com.au**

The Westin
Perth, WA

Located in Perth's tree-lined heritage precinct at the east end of the CBD, BGC's $500 million redevelopment of the former FESA headquarters site heralds a new era for the area. The project introduces exciting new accommodation, offices, and dining options for locals and visitors alike.

The jewel in the crown of this unique mixed-use development will be Perth's newest and most luxurious hotel – The Westin Perth, operated by Starwood Hotels & Resorts. A landscaped plaza will connect the hotel with 22 storeys of Premium Grade office space, as well as retail and dining, housed in lovingly restored heritage buildings. For more information about the facilities offered, visit www.480hay.com.au.

Following a ground report, the design team identified a need for a fully bonded waterproofing solution to protect the raft slab and lift pits that were constructed significantly below the water table in this two-level basement, linking to the diaphragm wall. Sealing the solution effectively to the diaphragm wall was also a key consideration for the designer, contractor, waterproofing applicator, and client. The area of the basement required 6500m^2 of Fosroc® Proofex® Engage, with ancillary products and Fosroc® Supercast® PVC Waterstops to protect the construction joints.

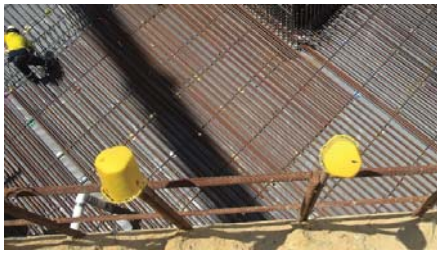
After an independent consultation, including an in-depth review of key performance properties of a number of below ground waterproofing systems, Fosroc® Proofex® Engage was selected as the optimum solution for this project. Fosroc® Proofex® Engage is a unique patented waterproof membrane system comprising a cell mesh bonded to a blended polyethylene/ polypropylene membrane. It allows poured concrete to interlock, forming a tenacious mechanical bond. Fosroc® Proofex® Engage provides water, water vapour, and gas protection to water excluding structures, protecting concrete from aggressive ground salts, chemicals, and hydrocarbons.

Works being completed at The Westin Perth, 480 Hay Street, Perth

As part of the independent consultation and review process, the following benefits of incorporating Fosroc® Proofex® Engage into the waterproofing strategy for the final project installation were considered:

- Ease and speed of application.
- Allowing the contractor to work between ongoing excavations and following steel fixers so as not to hold up work program.
- Robust; allowing ease of installation of reinforcing steel.
- Membrane composition provided excellent flexibility for detailing, combined with high durability and toughness for site trafficking.
- Fully bonded system preventing water tracking between membrane and concrete.
- A system approach with compatible Fosroc® Supercast® PVC Profile Waterstops.

The Fosroc® Proofex® Engage membrane system was installed during the last quarter of 2015 with the end result being a totally dry basement structure and a number of satisfied customers, including the client who has approved an official Fosroc® case study, and a waterproofing applicator who has continued to successfully use the Fosroc® Proofex® Engage system on other projects in and around Perth.



Top: Storing rolls of Proofex® Engage
Bottom: Reinforcement over Proofex® Engage prior to concrete placement

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Toorak Park
Melbourne, VIC

The Building
Adjacent to Toorak Park and Toorak Railway Station at 590 Orrong Road Armadale, Lendlease is developing the 2.5 hectare Toorak Park site as a luxury residential precinct, comprising 448 apartments and 18 townhouses divided across four leafy quarters. Residences range in size from 49m^2 to 145m^2 for 1 to 3-bedroom apartments, and are due for completion in late 2017. The development is targeting young families looking to enjoy local amenities, public transport, and a close proximity to the city while maintaining a relaxed suburban lifestyle.

The Design
Lendlease is working with architects Denton Corker Marshall, interior designers Carr Design Group, and landscape designers Tract to create the new neighbourhood.

Denton Corker Marshall, responsible for delivering the masterplan and architecture, built upon their globally awarded credentials and practices. Inspired by the local environment, Toorak Park represents an important and exciting undertaking for Armadale, and Melbourne as a whole. A third of the project is dedicated to open space, featuring communal gardens, and a direct route to Toorak railway station and Beatty Avenue is available through a publicly accessible, tree-lined boulevard.

Carr Design Group, a team of 35 architects and interior designers headed by Sue Carr, has continued their signature styling skewed towards elegance, refinement, and practicality. This is expressed in many ways, from well-proportioned kitchens and sleek bathrooms, to spacious bedrooms with extensive joinery and storage.

Tract Consultants, a recognised leader in landscape architecture in Australia led by Mike Stokes, Director of Landscape Architecture for the Melbourne office, has once again delivered the seamless open spaces envisaged in the original design. This is in a similar manner to other influential projects in their portfolio, including Stonnington Mansion and the Forrest Hill precinct in South Yarra.

The Product
Pasco's Buzon Screwjack Pedestals have been used to create raised timber and paved floor solutions on balconies, rooftop terraces, water features, and outdoor areas for 30 years. Buzon pedestals support external surfaces to allow designers to create a seamless flow between indoor and outdoor horizontal surfaces. They prevent water ponding and comply with requirements for the finished ground level to step-down, and fall away from the building.

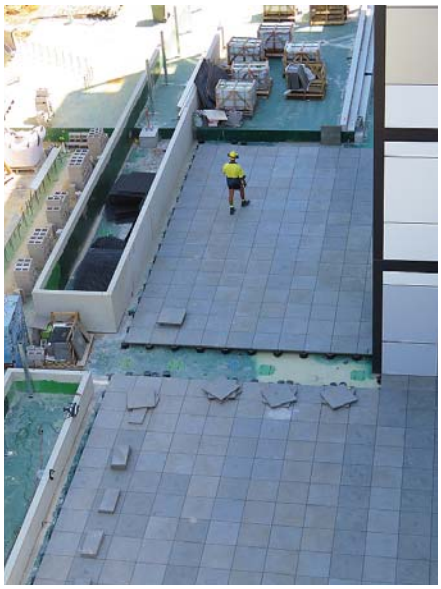
As a fully adjustable and patented solution to sloping substrates, Buzon Pedestals create a flat stable surface between heights of 17mm to 1070mm to conceal mechanical, electrical, and plumbing services while providing easy access for maintenance of waterproof membranes. The weight bearing loads on concrete slabs is reduced by eliminating screeding, and sand cement beds for pavers and tiles, hence improving structure borne impact noise resistance in multi-storey buildings. The head of the pedestal incorporates provision for a spacer tab allowing a gap between pavers of 2mm, 3mm, 4.5mm, 6mm, 8mm or 10mm, providing positive drainage without the need for grouting.

Buzon Pedestals have solid sustainability credentials: they are manufactured from 80% recycled polypropylene, and are 100% recyclable.

De Fazio Tiling Projects was engaged to install approximately 10,000m^2 of 600mm x 600mm granite and bluestone pavers on Buzon Pedestals ranging from 50mm to 150mm high, on all balconies, terraces, and common landscape walkways.

Designed, manufactured, and tested in Belgium, Buzon Pedestals can now add Toorak Park, Armadale to their portfolio of projects that includes the Epworth Hospital Geelong, Royal Children's Hospital (Melbourne), Overseas Passenger Terminal (Sydney), and Marina Bay Sands Resort (Singapore).

Buzon's History
Claude Buzon developed his patented pedestal over a period of 10 years. Only through sheer determination and belief in his unique and efficient support solution has he succeeded in bringing it to the attention of the rest of the world. Pasco is proud to continue this success and offer this, and many other unique solutions to the Australian building market.



Paving on Buzon Pedastals being installed at the luxury residential precinct in Armadale

An Industry Guide to Sustainable Safety Flooring

Safety compliance within public buildings may have its complexities but is never something to pay lip service to. The topic of safety and interior surfaces, more specifically the use of safety flooring, comes down to having solid assurance about the specific long-term slip resistance qualities of the flooring being installed. Setting clear expectations for slip resistant surfaces that are sustainable in terms of safety is essential when specifying a flooring solution.

Making ill-informed decisions about safety flooring has a tangible cost. This is especially true for heavy commercial settings, where wet surfaces are a given or the risk of spillages is ever-present. Slips, trips, and falls are the second most common work-related injury or illness, costing the Australian economy over 10 billion dollars a year, according to Safe Work Australia. These costs include workers' compensation, lost productivity, and public liability insurance claims. Worldwide, slips and trips are common, with a serious impact in terms of injuries and economically, so the choice of flooring to minimise the risks in key areas is critical.

With the life cycle of commercial vinyl flooring expected to span a significant number of years, genuine and sustainable safety credentials are a non-discretionary necessity. Whatever sector the flooring project is in – be it in healthcare or aged care, educational facilities, hospitality and kitchens, office, or retail – this points to the need for known and verifiable benchmarks.

Two characteristics that cannot be compromised on in the specification of safety flooring are:

- Ensuring flooring selected can stand the test of time and retain underfoot safety after being subjected to high foot traffic and heavy duress.
- Preserving the flooring's integrity in terms of its slip resistance despite the unavoidable likelihood of events like liquid spillage.

Products that aren't fit for purpose in terms of slip resistance over their life cycle, and which present performance issues, can quickly turn into slip risks and will not meet the duty of care requirements.

When it comes to details like slip resistance, selecting safety flooring can be confusing for both specifiers and clients. This is why adhering to stringent test procedures is so important.

The bottom line for ensuring compliance with required standards and legislation such as the National Construction Codes for slip resistance, or the Work Health and Safety Act 2011, begins and ends with safety flooring. This should be constructed with particles throughout the wear layer which can continually provide underfoot protection for the long term and pass the Pendulum Test requirements with flying colours.

A dedicated maintenance regime in accordance with the manufacturer's approved instructions is also paramount for safety flooring to be truly fit for purpose. This ensures the build-up of soiling on the floor doesn't impinge on the slip resistance.

Polyflor is the market leader and the experts when it comes to sustainable vinyl safety flooring. The company's comprehensive portfolio of Polysafe and Expona Control PUR ranges all have wet Pendulum Test values of 36+ for the guaranteed life of the product. They also meet international standards for particle based flooring, and key abrasion resistance sustainability tests.

In particular, the Polysafe Apex range achieves 55+, making this product an optimal choice for areas with extreme slip risk, such as commercial kitchens and food processing areas.

The Pendulum Slip Test can easily replicate the heel of a foot slipping on a floor and demonstrate the sustainability of safety flooring over many years

Polysafe Verona PUR sustainable safety flooring

Simonds Stadium
Geelong, VIC

PSX® 700 has over 20 years of case histories in Australia and internationally, protecting steel in the most extreme environments. PSX® 700 was chosen for Stage 4 of the upgrade to Simonds Stadium, home to Geelong Football Club.

The Project - Stage 4

The Simonds Stadium redevelopment will complete the transformation of the venue into Victoria's third national multi-purpose stadium, strengthening the region as a sports hub and providing the infrastructure required to attract a range of nationally significant events.

The Brownlow and Jennings stand replacement was completed and ready for use in May 2017. Seating capacity increased by 2,500, to a total of 36,000.

The PSX® 700 Solution

In order to meet the requirements of Simonds Stadium and the architects, the coating was chosen to protect the steel from corrosion over the long term, and also provide higher gloss and greater colour and gloss retention than acrylic polysiloxanes and traditional polyurethanes.

Aerial view of Simonds Stadium

Only epoxy siloxane offers three times the abrasion resistance of polyurethanes, two times the adhesion of epoxies, and reduces accumulation of dirt and mildew. The PSX® 700 system provided improved productivity using the two coat system in place of the standard three coat system for these types of projects. With an unlimited recoat window and 20+ years of proven performance, applied costs are lower and maintenance costs are reduced. The unlimited colour palette also gives it an aesthetic edge.

The Brownlow and Jennings grandstand replacement at Simonds Stadium

Collaborators

The Architect chosen was Populous, a global firm that designs large-scale event venues, like the Yankee Stadium and London Olympic Stadium. Over the last 30 years, the firm has designed over 2,000 projects worth $40 billion across emerging and established markets.

Following an ECI tender process, Kane was appointed as Design and Construct Head Contractor for the Main Works project. Kane was engaged from the initial ECI stage and as a result, successfully delivered an early works package prior to the appointment for the Main Works contract.

Geelong Fabrications, the applicator, successfully worked through the challenges of the project. Over 500 tonnes of structural steel including roof, entrance canopy, and beams were fabricated and painted in their facility. PSX® Geelong Cats Navy Blue, Bright White, and Charcoal were the colours chosen for the steel sections.

Populous Architects' innovative design and the PSX® 700 played a significant factor in the ease of application of the coating system. PPG Protective Coatings played an integral part in linking the Builder's and the Architect's requirements by providing a paint system solution which allowed Geelong Fabrications to deliver the required finish of the Architect's impression.

RAVEN
Door & Window Sealing Systems

Flinders University Adelaide, SA

Flinders University recently celebrated 50 years with the opening of the new Plaza and Student Hub in March 2016. The building is the University's biggest redevelopment to date and part of its progression for the next 50 years.

The new Plaza and Student Hub redevelopment was designed to accommodate the ever-changing needs of the university's students, teachers, and staff. It includes spaces for study, recreation and socialisation, and teaching and learning facilities. It also features collaborative group lounges, conference facilities, and food and beverage outlets.

To accommodate the mandatory NCC requirements for the new Student Hub, Raven Products supplied door sealing systems for acoustic separation in quiet spaces for study and learning. In addition, Raven sealing systems significantly reduce energy loss from rooms and prevent toxic smoke infiltration in a fire emergency.

Raven Products produce Australia's most comprehensive and innovative range of door and window seals and remains one of the most trusted brands in the building hardware industry.

Raven door and window sealing systems are designed and developed through decades of unrivalled industry knowledge. Together with Raven's extensive testing certification, it is easy to see why Raven Products was the supplier of choice for the Flinders University Plaza and Student Hub.

In addition to strict testing and certification, Raven's sealing systems are easy to install, made to withstand everyday commercial use, require minimal maintenance, and meet the aesthetic requirements demanded by interior designers and architects. Raven also provides vital technical support to architects and builders including engineers and certifying authorities as required.

Raven Products here in Australia first invented and developed door seals for the Australian and New Zealand market over 55 years ago. Raven continues to lead the industry with in-house NATA accredited testing facilities backed by a professional team of design engineers and support technicians. Certified to ISO9001, Raven can quickly develop new and innovative solutions to respond to the advances in the building industry both here in Australia, and around the world.

Inside and outside the new Student Hub and Plaza at Flinders University

AIBS
Australian Institute of Building Surveyors

The Australian Institute of Building Surveyors (AIBS) endorses The National Building Specification published by NATSPEC.

Concern with the emerging issues of non-conforming products in the market place gives our professionals and the community assurance that the quality, durability, longevity, and safety of products and systems used in the construction industry are inherited under adoption of minimum standards referenced in national specifications from the design, and into construction specification on site. These national specifications meet the minimum performance requirements in the National Construction Code adopted by the Australian and respective State and Territory legislation.

AIBS fully supports the National Building Specification from NATSPEC.

Tim Tuxford, National President, AIBS

Regupol
Australia

Regupol (Australia) Pty Ltd is the Australasian office and distribution network for the Regupol® and everroll® sustainable flooring product brands. The company has been operating in the region for over 25 years, offering solution based products and technical services for all kinds of sustainable flooring and soundproofing solution based projects. The company is conveniently located at Smeaton Grange, NSW, and offers nationwide distribution of the Regupol® and everroll® product lines.

www.regupol.com.au

Resene
the paint the professionals use

For over 60 years, Resene has forged a reputation of excellence and quality in manufacturing products designed to meet the demanding standards of architectural and building industry professionals. The Resene product range includes paint and specialist coatings for residential and commercial buildings. To help building professionals keep abreast of new developments in our product range, Resene has an innovative range of architectural services and reference materials, including technical and specification manuals, the Resene Total Colour System, samples, and online information. Sophisticated tinting technology enables Resene to produce durable colour options that remain true to colour long after they have been applied. Interlinked systems for decorative and high performance coatings allow you to achieve the same spectrum of colours in a wide variety of products. **www.resene.com.au**

REVOLUTION ROOFING

Revolution Roofing provides a range of steel roofing, walling, and building products for the Australian domestic, commercial, and industrial building industry. Using only BlueScope and Colorbond steel, our products are further backed by our extensive range of guarantees.

Since the opening of Revolution Roofing, our range has grown to include all the latest roofing profiles, gutters, fascias, ridge cappings, valleys, flashings, verandahs, and even a customised sheet metal fabrication department.

We are working with building professionals to further develop new and unique roofing and walling products, which is evident in our latest release of the exclusive True Oak series of profiles.

www.revolutionroofing.com.au

RONDO®

Rondo is a market leading manufacturer and supplier of wall and ceiling systems, and complementary accessories. Rondo is dedicated to providing the systems needed to realise visions effectively and in the most economical way possible, including systems where specific wind pressure, seismic design, or acoustic design is to be accommodated.

Rondo's commitment to providing market leading solutions, customer service, and high quality products has led it to being behind the best buildings throughout the world. **www.rondo.com.au**

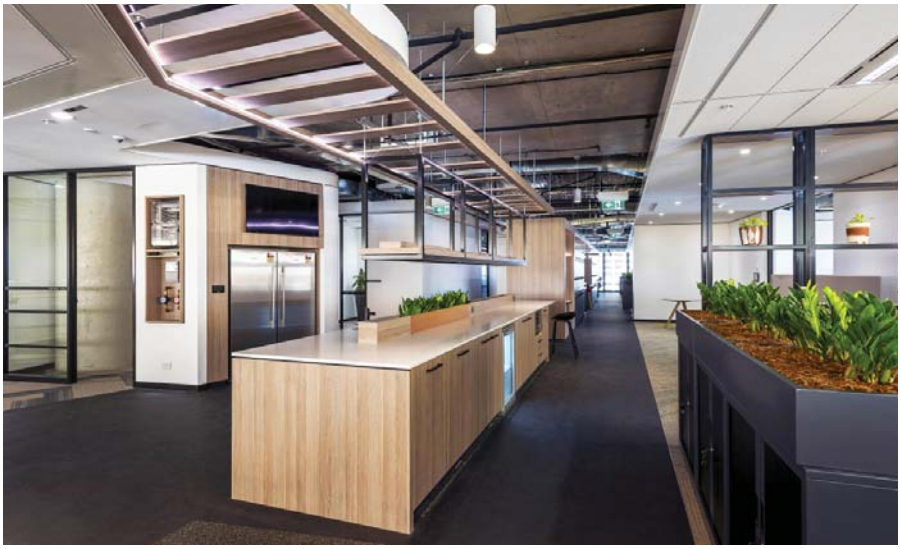
NATSPEC ProductPartner

Mirvac HQ Building
Sydney, NSW

The Mirvac HQ building at 200 George Street, Sydney utilized the WELL Building Institutes' innovative and evidence-based system for measuring, certifying, and monitoring the performance of building features. Through focusing on the health and well-being of occupants, the building achieved the prestigious Gold WELL Certification.

Mirvac's Group General Manager of Sustainability & HSE, Paul Edwards, said, "At Mirvac we are committed to creating a working environment for all our employees that is based on empowering them to achieve their potential in all areas of their lives. Achieving the WELL certification means our headquarters at 200 George Street will be at the forefront of global office development, creating a benchmark for innovative and healthy workplaces."

Creating beautiful commercial buildings requires quality products that share a similar ethos to that of its designers. Davenport Campbell & Partners, the Interior Design and Fitout architect, was conscious of the site on which it was built. Making use of quarried yellow block sandstone as seen in many of Sydney's historic buildings, and blending that with the natural materials of wood and stone, gave a certain warmth to the project.

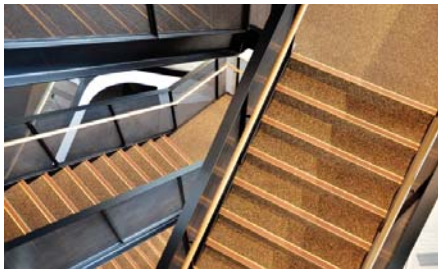


Regupol is the quicker, easier, smarter choice in commercial flooring

The earthy tones of everroll® Tone Kush and everroll® Core Mons not only helped to provide that warmth, but helped to tick some of the environmental boxes required by the WELL and Green Star Certifications.

Certified by the Good Environmental Choice Australia (GECA) Floor Coverings standard, the everroll® Rubber Flooring range has been assessed to meet stringent environmental, human health, and ethical criteria. This helped the building to obtain its 6 Star Green Star – Office Design v3 rating.

In short, the use of everroll® Rubber Flooring provided the project with a durable hardwearing floor surface that worked seamlessly with the overall design and temperament of the project. This was achieved whilst also supporting the same environmental and human health ethos of a WELL Building.



Views of the finished Mirvac headquarters at 200 George Street, Sydney

Sri Selva Vinaykar Temple
Logan, QLD

Resene
the paint the professionals use

Before 1985, there were only a few Tamil families living in Queensland. By 1983, there was a need among Hindu families for an avenue for community worship, so monthly congregational prayer meetings were first conducted at homes, and then at the SWARA hall.

As the congregational worship continued to expand, the building of a traditional Hindu temple in Brisbane became a necessity. A convening committee was formed in April 1986, and the major task for the Management Committee from 1987 to 1990 was to raise sufficient funds to purchase a suitable block of land on which to build the temple. In 1990, they purchased 4.5 acres of elevated bushland in South Maclean – similar to the locations of Hindu temples in India. Construction started in 1994.

Selva Vinayakar Temple was built according to traditional Indian style, in conformity with ancient Sitpa Sastra and Agamas. Sri Selva Vinaykar Temple was rebuilt in the same location and the new temple was opened to devotees.

A Gopuram (monumental tower) and ornamental icons were constructed by temple builders and sculptors invited from South India

The temple also serves as a centre for various cultural and educational activities. The temple offers religious classes conducted for children, music and dance programs, and scholars and religious leaders are invited to address the devotees on special occasions.

All statues were handmade and carved on site and finished in a colour palette from the Resene range. The painters from India wanted to use solvent borne enamels, but were encouraged to use Resene Hi-Glo gloss acrylic instead, with Resene Enamacryl Metallic for the metallic colours. They were amazed with the results. All statues were painted with squirrel paint brushes, which are less than 20mm in width.

Resene Limelock was used throughout the interior and exterior. The exterior was then topcoated in Resene Lumbersider, with the exterior border artwork in Resene Enamacryl Metallic.

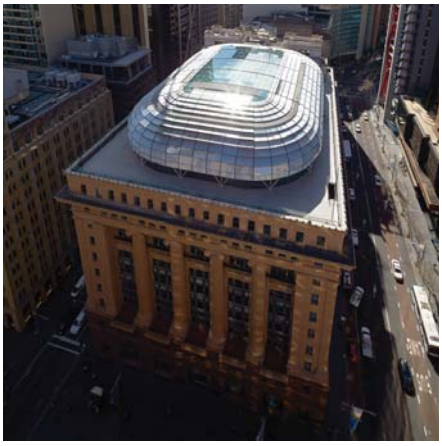
The Hindu Temple Building Project, South Maclean, by N. Ketheeswaran, AKVA Chem Consultant, won the Resene Total Colour Commercial Interior – Public + Retail Award 2016.

The judges said, “This project is iconic, memorable, and will continue to draw attention for many years to come. It’s a truly unique project with a historic application of colour teamed with the skilful application of paint. Modern paint and colour technology meets traditional artisans, who have worked their magic carefully, combining a multitude of colours for a striking effect.

“The attention to detail and the dedication to ensuring each colour is in its rightful place is both fascinating and inspiring. The colour brings all the elements to life and celebrates and showcases a culture bursting with pride.”

RONDO®

Macquarie Bank Headquarters Sydney, NSW



Aerial view of 50 Martin Place

As part of the extensive former state bank refurbishment, construction of the new Macquarie Bank Headquarters has been completed at 50 Martin Place, Sydney.

Builders' Brookfield Multiplex, with Contractors' Sydney Projects and JPW Architects, successfully constructed the $83 million award winning project. Their hard work and success was recognised when the project won the Harry Seidler Award, Australia's top award for commercial architecture.

Rondo has worked alongside Sydney Projects for 20 years, and was called on again for 50 Martin Place as according to Tony Pagliuca from Sydney Projects, "Rondo has always offered quality products, engineering design support, and excellent customer service."

Max Dessmann, Rondo's Technical Sales Representative, worked closely with Pagliuca to ensure the supply of Rondo Systems was timely and accurate. Pagliuca details this as one of the main ways Rondo really assisted on the project, explaining that there were "no issues with delivery, always in full and on time".

Pagliuca also credits Rondo's design support saying that "technical support was extensive and comprehensive." Dessmann and Rondo's engineers assisted with design requirements for both walls and ceilings.

On Level 1 of the building, Rondo produced a bulkhead design using Rondo Steel Studs to allow for the penetration of the air-conditioning risers, which required stud spacing of 1000mm. MDF was also incorporated to provide support for a 20kg flat screen TV.

On the same level, a Plenum Wall Framing design had to achieve wall heights of 2188mm, withstand pressures of 0.6kPa, and make allowances for fan units. This was achieved using Rondo Steel Stud and Track, installed to full height, and allowed for the support of a solid core door.

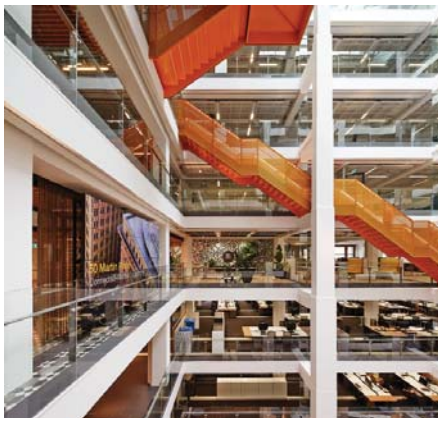
Rondo's engineers designed wall framing for other areas using Steel Stud and Track along with Rondo Top Hats to support 9mm CFC express wall and tiles to 50kg/m^2. The design considered the most cost effective Stud, Stud spacing, and Top Hat size to suit the nominated tile loads, internal pressures, and wall heights.

A wall design to support the combination of a glazed wall and plenum penetrating wall saw Rondo engineers designing to accommodate glazing with a weight of 100kg/m^2, wall deflection, and impact loads of doors using Rondo Steel Studs, Tracks, and Deflection Head Tracks.

When it came to ceilings, Rondo designed a curved ceiling system on level 10 that used Rondo's KEY-LOCK® Concealed Ceiling System with pre-curved Furring Channels, Steel Stud droppers as support bracing, and acoustic mounts to meet acoustic requirements.

Steel Stud was also used in the design of a Trafficable Ceiling System in the kitchen area where the horizontal studs had to be trafficable and able to support the 180kg/m^2 loads for kitchen equipment.

The project was managed and executed extremely well by Sydney Projects, who worked closely with Rondo to ensure the walls and ceilings in the award-winning project were finished to the highest degree.



Inside the Macquarie Bank headquarters

Safetyline Jalousie is a leading louvre window brand with a history of more than 50 years in Europe. Since its arrival in the Australian market in 2009, Safetyline Jalousie has quickly established itself as a high quality option for building specifiers looking for a louvre window system that delivers wide louvre spans (up to 1.4m), impenetrable building security, and weatherproof seals. Safetyline Jalousie is distributed by SMR Designs, who have been involved in the Australian home improvement and commercial building market for more than 20 years with its other external louvre product, Vergola. **www.safetylinejalousie.com.au**

Tarkett is a worldwide leader in innovative and sustainable flooring and wall covering solutions. Tarkett has a diverse portfolio of products in the global flooring industry, offering integrated, customised solutions for complex spaces and specific usages.

Tarkett sells globally 1.3 million m^2 of flooring everyday to residential and commercial customers for health care, aged care, education, housing, hospitality, office, retail, and sports projects. **www.tarkett.com.au**

Tate is an industry leader in the design, manufacture, and installation of Access Floors, Structural Ceiling systems, Aisle Containment solutions, and Airflow Panels for the commercial office and data centre markets. Tate Access Floors has been manufacturing since 1952, employing over 500 people globally, has six manufacturing sites, and has installed over 18 million m^2 of raised floor globally. Tate is a wholly owned subsidiary of Kingspan PLC Ireland. **www.tateaccessfloors.com.au**

Taubmans is one of the oldest paint brands in the market. Taubmans has been painting Australian homes for over 110 years. Back in the early 1900s, George Taubman built the company on a foundation of technical superiority. Since its inception, Taubmans has grown to become a major player in the Australian Architectural Coatings Market. It is also responsible for launching well known and innovative consumer paint brands such as Endure with Nanoguard, Living Proof Silk with Teflon, Easycoat with Microban, and All Weather with Dirt Shedding Technology. **www.taubmans.com.au**

The Termguard Reticulation Systems have been extensively tested and successfully used over the past two decades, and have been specifically designed to offer long-term termite management and damage prevention systems. Together with today's environmentally acceptable termite control agents, Termguard's termite reticulation systems have been the perfect partner to provide an effective replenishable barrier, yet minimise the total impact on the environment. **www.termguard.com.au**

Meriton Luna Apartments
Sydney, NSW

Objectives
Architectural firm PTW, along with window fabrication company Alutech, recommended Safetyline Jalousie to Meriton for their Luna Apartments project in Lewisham, NSW. Three defining requirements for the project were wide spans, adherence to strict Railcorp regulations, and an impressive acoustic performance. Safetyline Jalousie Louvre Windows were selected, meeting all this criteria.

Product Suitability
Architect Michael Yip was particularly impressed with the neat look of the larger span and the ability to customise the width to suit the overall building aesthetics. Strict DA conditions were imposed to protect the railway lines adjacent to the apartments from items being dropped from the building. Safetyline Jalousie's ability to limit the opening size of the window was key to meeting those conditions.

The close proximity to the railway line also meant that windows with strong acoustic performance were required. Safetyline Jalousie Louvre Windows, which use 6.38mm clear laminate glass, achieved a weighted sound reduction index of Rw (C;Ctr) = 33dB (0;-1) in tests carried out at the National Acoustic Laboratories, in accordance with Australian Standard AS 1191-2002.

In NSW, Safetyline Jalousie Louvre Windows have also been specified for the Meriton Altitude Apartments in Parramatta, the Meriton Botania Apartments at Olympic Park, and the Aqua Apartments in Bondi Junction. KANNFINCH architects, in association with DC Studio, with interiors by Koichi Takoda Architects, selected Safetyline Jalousie Louvre Windows to complement the overall glazing component of the building. Designed to maximise sun, fresh air, and views, the windows achieve efficient cross flow ventilation and meet regulatory safety standards.

Key features of Safetyline Jalousie louvre windows are:
- Extra wide spans of up to 1.4 metres.
- Inbuilt and impenetrable security.
- Weatherproof seals with superior acoustic, wind, and water performance.
- Removable, internal screens.

Project Specifications
- Quantity Supplied – 374 (supplied over 4 towers at the site)
- Height – 1414mm (10 Blades) and 1819mm (13 Blades)
- Width – 550mm to 1100mm
- Colour/Finish – Powder Coat Duratec Monument Satin
- Louvres – Glass – 6.38mm Grey Tint Laminate
- Operation – 1197 Turnhandles
- Architect – PTW

View of the Meriton Luna Apartments

Safetyline Jalousie Louvre Windows installed in the apartment complex

Bosch Head Office
Melbourne, VIC

Tarkett
THE ULTIMATE FLOORING EXPERIENCE

The Australian head office of Robert Bosch recently underwent a major overhaul. Under the guide of expert Architect, Peddle Thorpe Architects; and Interior Designer, PTID; the office space was transformed into an informal yet professional and polished space. The 3,000m^2 area includes open plan office seating, break out areas, meeting rooms, and staff facilities.

The chosen carpet tile for the base flooring was Desso Essence. The neutral grey tile was laid in quarter turn installation with bright lime, red, and cyan accents to complement the various office spaces.

The light entering the building reflects off the quarter turn pattern to provide a checkerboard effect on the floor. The quarter turn installation in this space shows the versatility of a plain carpet tile when installed in various directions and laying patterns. The chosen Desso Essence tile has an understated yet clean line floor finish. It not only looks professional, but creates a great base for the rest of the interiors features and finishes in the office.

Desso not only presents and maintains well, but is a Cradle to Cradle® product, ensuring the environment is not compromised in its manufacture. It is also PVC free.

The installation of Desso Essence in Bosch's head office has created the ultimate flooring experience, and their employees are welcomed by a stylish and refined workplace.

Architect: Peddle Thorp Architects
Interior Designer: PTID
Builder: Adco Constructions
Tarkett products:
Desso Essence A863-9501

The newly refurbished head office now offers employees and visitors an elegant and professional experience

200 George Street
Sydney, NSW

200 George Street has set a new benchmark in workplace technology with a high standard of 37 storeys, offering 39,200m^2 of premium grade office space. The building's distinctive design by Frances-Jones Morehen Thorp (FJMT) has been described as "shimmering, golden curves." The property is on the site of the former St. George building at the northern end of the Central Business District.

Mirvac's vision was to create a cutting edge workplace for leading organisations. Mirvac is in partnership with the International WELL Building Institute, where Mirvac's headquarters actively promote the health and wellbeing of its workforce.

Mirvac's Group General Manager of Sustainability, Paul Edwards said, "Technology will be used to monitor power and water usage, and air quality, enabling adjustment according to the needs of the building and its occupants. Data captured will be used to manage the headquarters, as well as inform how we can help our tenants build workspaces in the future, essentially creating a 'Living Lab.' In addition, a 'Smart' tenancy app will provide live information on usage and availability to employees. For example, the app will allow Mirvac employees to see which workspaces are available across Mirvac's floors."

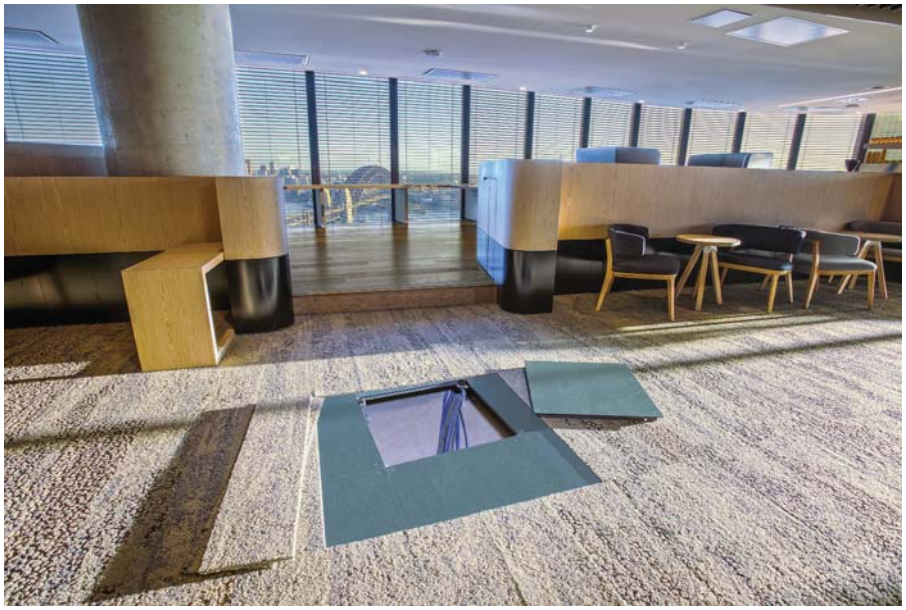
Gavin Lee, General Manager at Tate said, "We are proud to be involved with Mirvac and would like to congratulate Mirvac on the success of 200 George Street. Mirvac have really set a new benchmark for the future breed of smart buildings here in Australia. Tate installed 7,200m^2 of raised access floors to the Mirvac tenancy over six floors. The selected access floors will future proof the tenancy for services distribution while maintaining the open plan work space."

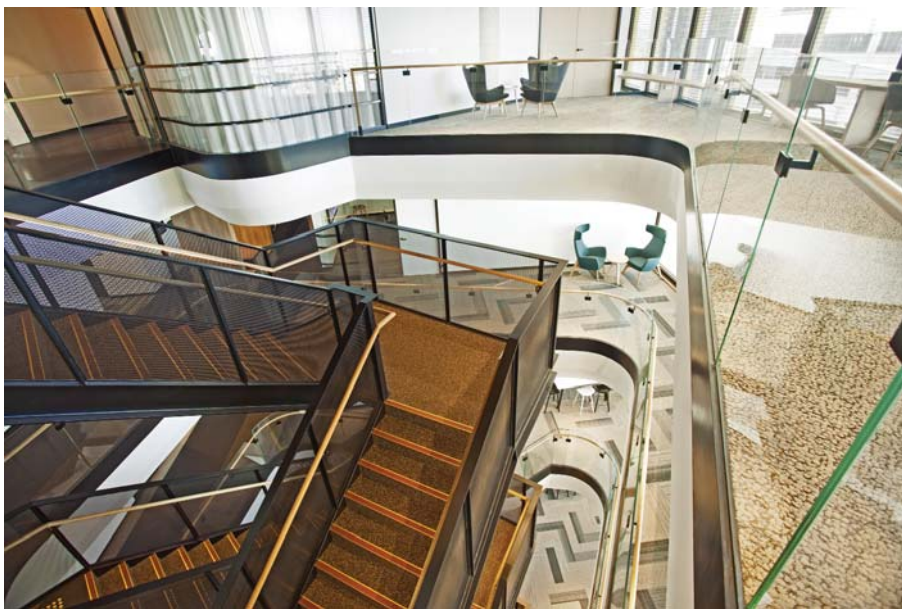
Lee continued, "We pride ourselves on leading the way through continual innovation of our product range, with raised access floors and special finishes in the general office, but also through our airflow management and services distribution solutions for the data centre space. The Tate Access Floors team looks forward to adding value to future smart building designs in Australia and the surrounding APAC region."

200 George has been awarded a 6 green star rating and a 5 star NABERS energy rating, making it one of Australia's most sustainable buildings.

Location: Levels 25-30, 200 George Street, Sydney
Panel/Product type: CF450CL-CF100
Sector: Commercial Office
Access Floors SQM: 7,200m^2

Installer: Tate Access Floors Pty Ltd
Tenancy Architect: Davenport Campbell and Partners Pty Ltd (Architects)
General Contractor: Mirvac Constructions Pty Ltd





Inside the Mirvac headquarters at 200 George Street, Sydney, completed in 2016

Sentinel
Gold Coast, QLD

TAUBMANS

A 30-storey luxury residential tower, Sentinel, stands tall in the heart of Surfers Paradise, on the foreshore of the iconic Budds Beach.

Sentinel was completed in 2001 and in the course of a planned regular maintenance cycle, it was recently given a full external repaint, from top to toe.

The challenges presented by the repainting of such a prominent tower were partly owing to the coastal location, and partly to the height and articulation of the building. Minimising disruption to residents, and completing the works without accessing apartment interiors was also essential.

In addition to these requirements, it was also important to have a product and application method that met certain criteria. This included limiting paint flick from the rollers due to wind, and preventing overspray during the painting process. Maintaining a 'wet edge' was also important, as was the need to limit visible bands or shadow lines, allowing for a smooth paint finish on all external surfaces – the majority of which were off-form concrete panels.

The project manager appointed by the body corporate, Integrity Coatings, in turn appointed Taubmans as the project paint and coatings partner as an extension of a three-year ongoing relationship. Integrity Coatings then engaged Higgins Coatings, the commercial painting contractor, to carry out the works. Taubmans was selected for two simple and compelling reasons: excellent and economical products, combined with excellent service to ensure the project was delivered efficiently, on time and on budget.

The Taubmans product selected and used for the exterior was Armawall Armashield. Armawall was an ideal product for the project due to the functional and aesthetic criteria. Its high resistance to carbon dioxide penetration and salt penetration was essential to the success of the project, and the aesthetic qualities ensured an attractive and durable finish.

In addition to Taubmans products meeting the project's high performance requirements, the service offered by the company was second to none. Paul Dolbel of Integrity Coatings said, "Taubmans was very diligent and took full ownership of the project."

The service included the assessment of a range of key criteria, and took the form of regular site attendance to ensure that the application standards were being met over the course of the fourteen-week project.

Taubmans' inspections and advice included quality control (QA) in general, workmanship of the painting application, cleanliness of the job site, assessment of dry film thickness, and the assessment of residual salt readings between coats. As reported by Dolbel and Higgins Coatings' project painter Matt Kennedy, Taubmans went out of its way to make the job as painless as possible for the painter, project manager, and ultimately for the body corporate management responsible for the building.

Maintenance repaints of modern architectural towers present unique demands for body corporate management, requiring them to deliver the best and most durable outcome with minimal disruption to residents. At Sentinel, a full repaint of the building has been executed successfully, negotiating all challenges to ensure the finish of the tower is fit for another ten years. The success of the project hinged on the application of the best product, combined with the best support service to ensure quality outcomes. Only Taubmans could meet this challenge, exceeding the expectations of the strata manager, project manager, and painter alike.

A full repaint of the Sentinel Hotel in Surfers Paradise has successfully enabled its finish to last the next ten years

Australian Institute of Architects

To be a registered Architect you are required to be proficient in documentation.

The NATSPEC system, owned by the Australia Institute of Architects (AIA), simplifies the process for all. It protects the interests of good architects and their clients.

Jennifer Cunich, Chief Executive Officer, AIA

TLB

TLB Timber specialises in supplying the Australian Timber Industry with high strength, low shrinkage, durable, fire and insect resistant hardwood timbers and plywood, which can be used in both internal and external applications. TLB Timber's extensive product range of tropical hardwoods includes merbau, kwila, hopea, rosewood, plantation mahogany, hardwood plywoods (CD Structural F14+ and appearance grade), and plantation sourced hoop pine plywoods (CD Structural F14+ and appearance grade). **www.tlbtimber.com.au**

Victaulic

VICTAULIC is a worldwide leader in mechanical piping solutions. Since pioneering grooved end technology for mechanical pipe joining in 1925, VICTAULIC has been providing customers all over the world with innovative, reliable piping systems solutions for multiple applications and markets. **www.victaulic.com**

Viridian we ♥ glass

Viridian is Australia's number one glass provider and the only manufacturer of float glass and hardcoat performance glass products in Australia. Being a part of CSR Building Products, with a long history of glass making in Australia, Viridian is able to offer comprehensive glass and glazing solutions across Australia and New Zealand.

Viridian was created in 2007 when CSR acquired Pilkington Australia and DMS Glass. This enabled CSR to strengthen its already impressive range of building and construction products by adding glass and glazing capabilities. Both Pilkington and DMS have proud histories of new and innovative ideas. Viridian continues that tradition of innovation, and our goal is to help the building industry to use glass in extraordinary ways.

The Viridian brand will continue the Pilkington and DMS tradition of providing ingenious and environmentally sustainable glass solutions for our truly unique environment. Viridian Glass, in all of its forms, will bring us light, views, warmth, and a sense of space. At the same time, it will offer protection from noise, dust, pollution, glare, intruders, and onlookers. Viridian offers glass that transmits light yet blocks heat, and glass that can clean itself. **www.viridianglass.com**

wattyl®

Wattyl Industrial Coatings specialises in high performance systems for use across a vast range of market segments. Wattle industrial coatings have been used in a full spectrum of exposure environments, including off shore, buried, coastal, and tropical. Our extensive project history is a testament to the enduring performance of our products. Valspar acquired the Wattle Group in 2010, further strengthening the Wattyl brand by bringing expertise and experience from one of the largest global coatings companies. Regardless of your project size, Wattyl Industrial Coatings can supply a coating system solution for you. **www.wattyl.com.au**

Merbau - one of the toughest materials available

Background

Merbau (Intsia bijuga, also known as Kwila) is a heavy hardwood that is recognised as one of the most versatile hardwood products in the world. It possesses specific characteristics which make it perfect for use in the Australian climate, and is highly durable above ground and in exposed weather conditions, being classified as durability 1 (over 40 years) in AS5604-2005 Timber-Natural Durability Ratings. The species also has high strength and low shrinkage, as well as excellent stability, making it ideal for use in construction. Its natural resistance to termites makes it ideal for construction and engineering applications. It is also one of only nine hardwood species listed in AS3959 Construction of buildings in bushfire prone areas as a Bushfire-Resisting Species suitable for use in BAL29 rated areas.

Use in Glulam

Glued laminated timber (glulam) is a value added product which utilises short pieces of timber of relatively small size, and joins them by gluing onto large structural timber. The process removes a number of natural defects which reduce the strength of timber, such as knots, sloping grain, and gum veins. This creates a product with known behavioural properties and less variability than solid timber. Glulam is now accepted world-wide as a high quality structural material.

As Merbau provides predictable and consistent strength and in-service performance, it is an ideal material for use in the structural glulam system, in domestic and commercial settings. The rich synthesis of reds and browns gives its appearance a unique depth, and when considered with its bushfire and termite resistant properties, it is an ideal material for outdoor or weather prone areas.

MagnaGlulam™

The MAGNA glulam products are renowned for their consistent high quality, with no visible putty marks, cracks, or delamination. MagnaGlulam™ laminated hardwood timber products are designed specifically for use in Australia. Manufactured with the popular Merbau species, MagnaGlulam™ is always supplied in appearance grade A, which means it is free of defects, dressed, and suitable for clear finishes. It is manufactured in accordance with AS/NZS1328 Glued laminated structural timber – Performance requirements, under a very strict third party audited quality assurance system provided by the Glue Laminated Timber Association of Australia (GLTAA).

All timber utilised in the manufacturing process is sourced from Rainforest Alliance and FSC certified operations. The process uses individually graded pieces of solid Merba timber which have been kiln dried to a consistent moisture content level, ensuring that the moisture content from core to surface is the same. This makes the glulam less prone to distortion and moisture sweating than solid timber in large sections. The products are finger jointed and laminated using Phenol-Resorcinol Formaldehyde (PRF), a strong and highly durable A-bond adhesive. Finally, the products are dressed to individual profiles in accordance with the relevant customer order. The products are regularly tested under the quality assurance regime to ensure continued compliance with the relevant standards. The natural properties of the timber carry through to the laminated product, retaining its natural strength and durability.

All products carry a certified structural rating of either GL17 or GL13.

MagnaGlulam™ finger jointed laminated Merbau products are distributed by local company TLB Timber.

Merbau, as used in the MagnaGlulam™ system, provides a strong and attractive finish

Arts Centre of Christchurch
Christchurch, New Zealand

Opened in 1877, the Arts Centre of Christchurch is a collection of 23 heritage buildings that cover a full city block. Damages sustained during the earthquakes that struck Christchurch in 2011 led to the Arts Centre closing its doors to enable a NZ$290 million restoration project.

While the original schematics of the buildings were not to change, services inside the buildings were to be retrofitted to utilise modern system designs that promote sustainability, reduce the impact of seismic movements, and make future maintenance faster and more efficient. The works needed to be completed within the confines of the existing historical spaces, challenging the design and installation of the systems and in particular, the layout of the mechanical rooms.

System Design and Prefabrication

The restoration project designated the historical library storage space as the new mechanical room for the heating and air conditioning systems of the library and other nearby buildings.

According to David Morley, site supervisor for Benmax, there was little flexibility in getting the system components into the space as it had a maximum ceiling height of three metres in the basement and only one narrow stairwell to access the room. Faced with this issue, Benmax planned to design the system and prefabricate most of the components and pipework before delivering to the site.

Victaulic CPS provided an overall design of the heating and cooling systems in the pump room, and then broke down the schematics into segmented spools that were small enough to meet the space restrictions of the site. Morley assessed, “The spool drawings provided by Victaulic were labelled, numbered, and essentially fool-proof – the team was able to quickly fabricate the spool pieces based on the information, and knew exactly where each assembly belonged on the site.”

Moreover, the modular nature of Victaulic mechanical piping products lent itself perfectly to prefabrication offsite. “We were limited to working in sections of pipe less than three metres long. If we had opted for a welded or flanged system, every three metres of pipe would have required welding onsite. With Victaulic, we just threw on a coupling and we were done,” Morley said. “Not to mention the time it takes to weld compared to using Victaulic. It might take an hour to weld on a bend, depending on the conditions. With Victaulic, it’s minutes. There’s no doubt about the time savings.”

Upgrades to the Cooling System

By utilising the artesian water from the natural subterranean water supply, the cooling system uses the constant energy from the water to maintain the correct temperature in the condenser pipework, greatly reducing energy consumption.

Because the artesian water system is integrated into the natural aquifers, which also serve as a drinking water supply, extra caution was taken to prevent contamination. The pipework in the plant room was specified to be fabricated from type 316 stainless steel to prevent any corrosion or rust. When the water is re-injected underground, it returns as clean and pure as when it came from the aquifers.

Welding stainless steel has been known to introduce contaminants to systems due to the chemical reaction taking place when the metal is melted. With the Victaulic system, Benmax was guaranteed a safe, clean solution.

By June 2016, Benmax had installed, tested, and commissioned the library plant room systems, and points to the Victaulic grooved system as a major contributor to its success. Benmax notes that the spool drawings supplied by Victaulic could easily be prefabricated off site and then quickly bolted up in the plant room, leading to easier project coordination and tangible time savings. Morley found that the quality and durability of the Victaulic system was also a plus: “During the testing of the systems, out of the hundreds of couplings installed we only had one leak due to a nicked gasket. In a welded, flanged or screwed system, we always find a much higher percentage of leaks than with the Victaulic grooved system.”

Library plant room utilising Victaulic products

CADET Building, Deakin University Geelong, VIC

With a vision that their new CADET (Centre for Advanced Design and Engineering Training) building would change the way students and staff view their place of study and work, Deakin University set Gray Puksand Architects the ambitious task of delivering a space that would inspire and excite.

To create a transparent learning environment that fosters collaboration and connectivity, Puksand's team delivered a bright multi-storey building that boasts interactive learning spaces, purpose built labs, design studios, workshops, and open plan offices.

The building's internal flow and outdoor connection were critical elements of the plan, with glazed rooms and outdoor studios integrated to inspire teamwork and give students the opportunity to enjoy an outside learning environment. Glass was the key material used to achieve these design objectives – it was installed in every facet of the building including the facade, staircases, and above and below floors. A series of glass partitions was also introduced to enhance the flow within internal spaces.

The design team relied on the technology offered by high performance glass to overcome the challenges that were presented by this open plan and generously glazed building, such as noise and solar exposure.

"The way we have utilised glass so extensively and strategically really brings everyone together. It demonstrates a complete seamlessness between classrooms and tutorial spaces. This is one of the greatest achievements of CADET, to utilise glass in bringing people together," explained Puksand.

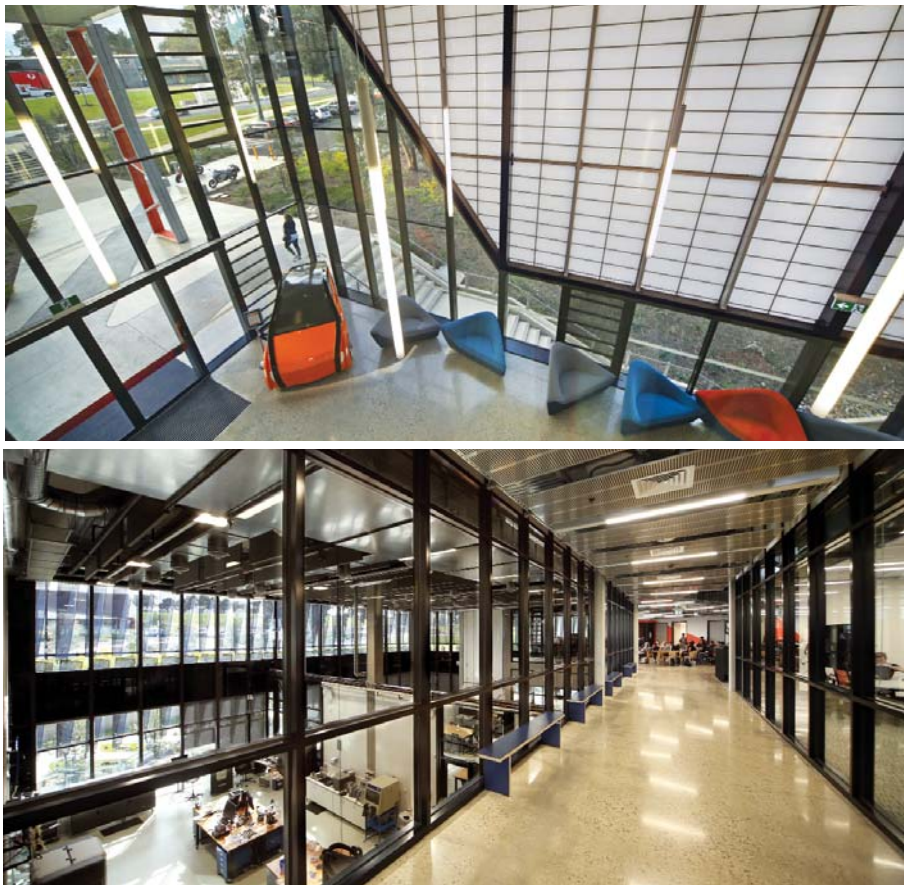
The acoustics within this building was another consideration. The shared spaces and extensive glazing meant exposure to internal and external noise would be an issue. To address this and ensure peaceful study spots, acoustic performance glass was essential.

"Viridian acoustic performance glass VLam Hush™ as internal partitions made a huge difference. The challenges were more about the spatial environments being created and activities within these spaces. One of our key discoveries was how student behaviour can be modified by the spatial qualities of a building. Within CADET is an environment that seems to promote calm student behaviour. They seem much less likely to raise their voices because they realise that they're very much on show in this building," said Puksand.

To create these naturally illuminated, visually impressive spaces with expansive indoor-outdoor connections, the glass that wrapped the building had to provide exceptional insulation and solar control. Viridian Double Glazed Unit using SolTech™ Grey was chosen as it features a Low E coating, providing increased thermal insulation, and reduces the solar heat gain whilst still providing high light transmission.

The design team were initially unsure about which glass applications could help achieve the final design, so they relied on Viridian to guide them on the glazing strategy. The result is an incredible and exciting space that Deakin's engineering community will benefit from for years to come.

"For us it's really about the level of service we get from Viridian. When we're first sitting down at the table, what we really find beneficial at the front end of a job is to be able to work collectively to understand and remove challenges, and transform them into opportunities," concluded Puksand.



A transparent learning space that inspires collaboration and creativity was created

Sofitel Hotel, Darling Square Sydney, NSW

Darling Square is a new residential and creative quarter that takes its place in one of Sydney's most economically and socially potent precincts.

It will be considered a hotbed for innovation; future living weaves its way into the fabric of the city, attracting a bustling community that can work, live, shop, and play, in a great new city neighbourhood.

Wattyl paint products were applied onto the recently completed Sofitel Hotel (ICC) at Darling Square.

Working with the Lendlease Design team, paint specifications were developed to suit the requirements of the building:

- Wattyl i.d Interior Design Advance on the walls and ceilings.
- Wattyl Aqua Trim water based enamel on the doors and trim.
- Granosite texture coating and Solagard paint on the façades.

Wattyl worked closely with the Painting Contractor (Tresamber) and the Lendlease construction team to ensure that paint was being supplied to suit the construction programmes.

A new product to Wattyl, i.d Interior Design Advanced was chosen because it suited the requirements for these premium apartments:

- Low VOC Emissions: minimal at <1gm/L and virtually no odour.
- Antibacterial; specially formulated to resist the growth of bacteria on the surface.
- Anti-mould and Mildew; for areas prone to contamination, and for those vulnerable to asthma attacks, i.d Interior Design Advance provides a new level of protection.
- Total Clean Technology; incorporates improved stain resistance and superior washability (an industry benchmark). Specially developed to cope with regular cleaning, it is ideal for use on walls that are subject to regular and intense scrutiny.

Top: Sofitel Hotel Function Centre
Bottom: Views of the Sofitel Hotel from Darling Harbour in Sydney

SPECIFYING NCC REQUIREMENTS

INTRODUCTION

This TECHnote explains how the requirements of the National Construction Code Series (NCC) are incorporated in NATSPEC worksection specification *Templates*.

THE NCC

The NCC includes Volume One - Building Code of Australia (BCA) Class 2 to Class 9 Buildings, Volume Two - Building Code of Australia Class 1 and Class 10 Buildings, and Volume Three - Plumbing Code of Australia (PCA).

> *The goal of the NCC (BCA and PCA) is to enable the achievement of nationally consistent, minimum necessary standards of relevant safety (including structural safety and safety from fire), health, amenity and sustainability objectives efficiently.*

The NCC is a performance-based code. To meet NCC Performance Requirements, designers may use Deemed-to-Satisfy Solutions and/or Performance Solutions (formerly known as Alternative Solutions). NCC conformance using Performance Solutions is set out in BCA clauses A0.3, 1.0.3 and PCA A0.4.

NCC DOCUMENTS ADOPTED BY REFERENCE

The referenced documents (listed in Volume One Specification A1.3, Volume Two Table 1.4.1 and Volume Three Table A3.1) support the technical provisions of the NCC and provide a detailed means of complying with its requirements. A document that is referenced by the NCC becomes part of the building regulatory framework.

SUPERSEDED EDITIONS REFERENCED BY THE NCC

As it can take years for the updated edition of a document to be adopted in the NCC and the documents referenced within the NCC are continually updated independently, the NCC may cite superseded documents.

HOW NATSPEC MAKES REFERENCE TO THE NCC

NATSPEC includes:

- Mandatory NCC specifications and referenced standards.
- Updates to the revised NCC requirements.

NATSPEC does not include:

- Administrative requirements of local government authorities.
- NCC state or territory variations or additions.

NATSPEC references the relevant NCC requirements within the appropriate technical worksection by the following methods:

- Direct reference: e.g. Service penetration fire-stopping systems: To BCA C3.15.
- Deemed-to-Satisfy document reference: Tactile indicators: To AS 1428.4.1.

NATSPEC is based on the Deemed-to-Satisfy Provisions of the NCC. If a *Performance* (*Alternative) Solution* is used, amend the NATSPEC generic text to align with the alternative performance solution.

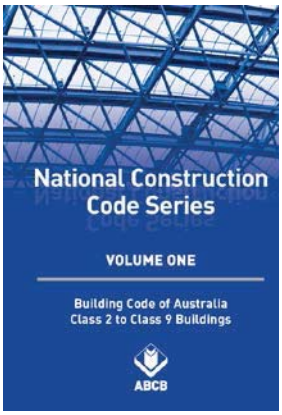
If the NCC references a superseded document, NATSPEC considers both the NCC referenced edition and the latest edition of the document. NATSPEC gives *Guidance* where a conflict exists between the NCC cited and current editions. The specifier may choose the Deemed-to-Satisfy superseded standard or the current standard as a Performance Solution.

NATSPEC REFERENCED DOCUMENTS

In *Guidance,* at the end of each worksection *Template*, NATSPEC lists all documents cited, including their number, date and title. These are grouped by their location either in the *Template* or *Guidance* text. If an NCC clause is cited within the worksection *Template* it will be included in this list.

Relevant NCC edition

The NCC takes effect on the 1st May and will be updated every 3 years. The specifier needs to comply with the relevant NCC edition at the time. Development Applications and Building Applications or Construction Certificates may rely on different NCC editions.



NCC on relevant references

A reference in a *Deemed-to-Satisfy Provision* to a document under A1.2 refers to the edition or issue, together with any amendment, listed in Specification A1.3 and only so much as is relevant in the context in which the document is quoted. BCA A1.3(a)

Similar in BCA 1.1.3(a) and PCA A1.3(a)

NCC on superseded editions

Where the BCA references a document under A1.2 which is subject to publication of a new edition or amendment not listed under Specification A1.3, the new edition or amendment need not be complied with in order to comply with the *Deemed-to-Satisfy Provisions*. BCA A1.3(d)

Similar in BCA 1.1.3(d) and PCA A1.3(d)

Relevant websites

www.abcb.gov.au

Relevant documents

NCC - Volumes One, Two and Three

Relevant worksection

0171 General requirements

LIST OF TECHNOTES

GENERAL

GEN 001 Getting help
Summarises the ways in which NATSPEC provides help to specification writers.

GEN 002 NATSPEC's use of standards
Discusses the use of Australian and other standards in specification writing.

GEN 003 Multiple contracts and 'work by others'
Suggests ways in which NATSPEC can be used for projects procured using multiple contracts, also called packaged contracts or multiple prime contracts.

GEN 004 Shop drawings and samples
Addresses the need for shop drawings and samples, their management and the documentation of requirements in a construction contract.

GEN 005 Specifications
Discusses the roles, forms and importance of specifications.

GEN 006 Product specifying and substitution
Reviews generic and proprietary specification and NATSPEC's procedure for substitution of specified products.

GEN 007 Making sure your specifications are up-to-date
Offers updating strategies relating to NATSPEC information.

GEN 008 Branded versus generic worksections
Defines both types of worksection and outlines their advantages.

GEN 009 Hold points and witness points
Defines hold points and witness points and explains their contractual implications in the context of both NATSPEC and AUS-SPEC worksections.

GEN 010 Mechanical commissioning strategies
Discusses alternative mechanical balancing and commissioning strategies which have a significant impact on the performance of mechanical services.

GEN 011 Specifying NCC requirements
Discusses specifying NCC compliance based on Deemed-to-Satisfy Provisions or by using a Performance (Alternative) Solution.

GEN 012 Door hardware scheduling
Outlines the two alternative approaches to specifying door hardware provided for in **SELECTIONS** in NATSPEC's *0455 Door hardware* worksection.

GEN 013 Specifying quality
Communicating the requirements for quality is the main technical function of the specification. This TECHnote outlines how NATSPEC is used to achieve quality in construction projects.

GEN 014 Submissions and testing
Addresses the specification of the various contractor's submissions and tests that may be required during the construction process.

GEN 015 Using the NATSPEC classification system to organise information
Discusses how the NATSPEC National classification system can be a useful means of organising construction information other than specification content.

GEN 016 Preliminaries and contract schedules
Aims to clarify items which are sometimes overlapping in the General conditions of contract and the specification's Preliminaries.

GEN 017 Using AUS-SPEC for asset management
Provides guidance on using the AUS-SPEC specification system for asset management.

GEN 018 Using AUS-SPEC for asset maintenance
Aims to describe the philosophy and components of the AUS-SPEC maintenance system for urban and open spaces, buildings and facilities, roadways, bridges and public utilities.

GEN 019 Using AUS-SPEC for contract documentation
Provides an overview on using AUS-SPEC for standard and period supply and service contract documentation for the life cycle management of assets.

GEN 020 Building commissioning
Provides information on the process of whole-building commissioning and the role of a Commissioning Authority on a project, discussing how NATSPEC can be used for whole-building commissioning.

GEN 021 Scope of works clauses
Discusses the benefits and risks of Scope of Works clauses and suggests approaches to writing an effective clause.

GEN 022 Using AUS-SPEC for asset delivery
Describes the benefits of using AUS-SPEC in providing a documentation system for the delivery of assets, to meet essential services required by the community.

INTRODUCTION

This is an index, with abstracts, of NATSPEC TECHnotes and TECHreports which are currently available.

TECHnotes are brief documents giving information on topics of interest to the design and construction industry.

TECHreports are in-depth reference documents on topics of interest to the design and construction industry.

CLASSIFICATION

Based on the classification system used for the Australian Institute of Architects (AIA) Environmental Design Guide, TECHnotes are grouped into three categories:

- General (GEN).
- Design (DES).
- Products (PRO).

AVAILABILITY

TECHnotes and TECHreports are available as follows:

- All TECHnotes and TECHreports, available at time of issue, are downloadable from **SPECbuilder Live** under Reference material and provided on Subscriber CDs in the Acrobat documents section.
- Current TECHnotes and TECHreports are placed in the Subscriber Access section of the NATSPEC website www.natspec.com.au
- Selected TECHnotes are distributed with SPECnotes.
- Selected TECHnotes are provided to the Australian Institute of Architects with a page of related questions and answers for their Continuing Education (CE) program.

LIST OF TECHNOTES

GEN 023 Using AUS-SPEC for management of unsealed roads
Provides guidance on using the AUS-SPEC specification system for the design, construction and maintenance of unsealed roads.

GEN 024 Using NATSPEC Selections schedules
This TECHnote summarises NATSPEC's use of schedules.

DESIGN

DES 001 Slip resistance performance
Raises awareness of the design and documentation requirements for optimising slip resistance of pedestrian surface materials.

DES 002 Moisture content in timber floors
Addresses the ways in which the natural movement of timber floors can be accommodated.

DES 003 Fire hazard properties of insulation and pliable membranes
Addresses the fire hazard properties of insulation materials as dealt with in both the BCA and in NATSPEC.

DES 004 Air, moisture and condensation
Outlines the factors that affect the selection and detailing of vapour barriers in buildings.

DES 005 Preventing condensation on ducts and air handling plant
Addresses the use of insulation to prevent condensation on ducts and air handling plant.

DES 006 Specifying concrete
Outlines the factors affecting the performance of concrete and how to specify it.

DES 007 Static control floors
Discusses electrostatic charges and the basic types of static control floors.

DES 008 Preparation of concrete substrates
Discusses preparation of concrete substrates for secondary finishes.

DES 009 Limit state design
Introduces this method for designing and evaluating structures, and for unifying structural codes and standards.

DES 010 Atmospheric corrosivity categories for ferrous products
Recommends a method for specifying atmospheric corrosion protection systems or products by referring to standards and the Corrosion Mapping System.

DES 011 Rainwater harvesting
Suggests ways in which a NATSPEC based specification can be used to specify a rainwater harvesting system.

DES 012 Using NATSPEC to specify BMS, building IT and controls
Suggests ways to use NATSPEC worksections to specify Building Management Systems (BMS), building IT and automatic controls.

DES 013 BCA Energy efficiency protocol and software for housing
Discusses rating software and tools to demonstrate compliance with the BCA.

DES 014 Voluntary environmental rating schemes for buildings
Outlines the national voluntary energy efficiency schemes.

DES 015 BCA - NCC Volume One Energy efficiency provisions
Outlines BCA energy efficiency provisions for Class 2-9 buildings.

DES 016 BCA - NCC Volume Two Energy efficiency provisions
Outlines BCA energy efficiency provisions for Class 1 and Class 10a buildings.

DES 017 Selection of sealants
Summarises sealant types and their use for different applications.

DES 018 Bushfire protection
Summarises the factors influencing bushfires and the planning, construction and maintenance requirements for bushfire protection.

DES 019 Pipe support spacing
Tabulates the pipe support spacings nominated by several Australian standards. It covers pipes of various materials and diameters, and carrying a range of liquids and gases.

DES 020 Fire behaviour of building materials and assemblies
Provides guidance on the BCA's classification of the fire behaviour of building materials and assemblies and where to specify in NATSPEC.

DES 021 Site electricity supply
Highlights design and construction issues for consideration and suggests suitable NATSPEC worksections for the documentation of electricity supplies.

ALPHABETICAL ORDER

Access for maintenance – TR 07

Air, moisture and condensation - DES 004

Airborne sound insulation - DES 032

Atmospheric corrosivity categories for ferrous products - DES 010

BCA - NCC Volume One Energy efficiency provisions - DES 015

BCA - NCC Volume Two Energy efficiency provisions - DES 016

BCA Energy efficiency protocol and software for housing – DES 013

Branded versus generic worksections - GEN 008

Building commissioning – GEN 020

Bushfire protection - DES 018

CCA (copper chrome arsenate) treated timber-PRO 001

Ceramic tile and adhesive selection - PRO 004

Door hardware scheduling - GEN 012

Duct leakage and leakage testing - DES 033

Fire behaviour of building materials and assemblies - DES 020

Fire hazard properties of insulation materials - DES 003

Formaldehyde - indoor air quality - PRO 005

Getting help - GEN 001

Glass types used in buildings – PRO 006

Grass seeding and turfing- DES 028

Hold points and witness points - GEN 009

Impact sound insulation – DES 027

Information classification systems and the Australian construction industry – TR02

Limit states design - DES 009

Living walls and roofs - DES 026

Making sure your specifications are up-to-date - GEN 007

Mechanical commissioning strategies - GEN 010

Mechanical design and install HVAC checklist - DES 025

Mechanical services pipe and vessel insulation - DES 023

Microbial control - DES 022

LIST OF TECHNOTES

DES 022 Microbial control
Discusses the requirement for microbial control in building services and how this is dealt with in NATSPEC.

DES 023 Mechanical services pipe and vessel insulation
Addresses the selection of appropriate levels of insulation for piping, vessels and heat exchangers with curved surfaces.

DES 024 Water sensitive urban design (WSUD)
Outlines the objectives and application of water sensitive urban design principles and suggests where they can be implemented in AUS-SPEC.

DES 025 Mechanical design and install HVAC checklist
Provides a checklist intended to assist the architect or building designer in the assessment of proposals for the design and installation of HVAC systems.

DES 026 Living walls and roofs
Highlights design and construction issues and suggests suitable NATSPEC worksections for the documentation of living walls and roofs.

DES 027 Impact sound insulation
Addresses the use of impact sound insulation in floor systems.

DES 028 Grass seeding and turfing
Provides guidance on the selection of grass seed mixes and turf species for general landscaping.

DES 029 Native grass lawns
Discusses several of the native grass species suitable for lawn applications.

DES 030 Seismic design actions on non-structural components
Discusses the requirements of AS 1170.4 for seismic restraint to the non-structural components of a building.

DES 031 Specifying R-Values
Describes the various meanings of R-Value and the ways in which designers and specifiers can document compliance with statutory requirements.

DES 032 Airborne sound insulation
Addresses the use of insulation to reduce the transmission of airborne sound between habitable rooms.

DES 033 Duct leakage and leakage testing
Discusses testing of duct systems to AS 4254.2 to reduce energy consumption and improve the quality of the service delivered.

DES 034 Pavement stabilisation for unsealed roads
Discusses factors affecting stabilisation of unsealed roads and provides basic procedure for binder selections.

PRODUCTS

PRO 001 CCA (copper chrome arsenate) treated timber
Discusses the issues and alternatives to this form of timber treatment.

PRO 002 Mineral wool
Discusses the manufacture, properties and safety issues related to the use of mineral wool.

PRO 003 Warranties for steel protective paint coatings
Discusses the requirements for and availability of warranties for steel protective coatings.

PRO 004 Ceramic tile and adhesive selection
Provides guidance to specifiers on the selection of ceramic tiling and adhesives used for fixing the tiles.

PRO 005 Formaldehyde - indoor air quality
Discusses the effects and control of formaldehyde emissions within a building and how NATSPEC can be used to meet the mandatory requirements for formaldehyde emissions.

PRO 006 Glass types used in buildings
Provides guidance on the types of glass used in buildings, their properties and the manufacturing processes involved.

PRO 007 Refrigerants
Discusses the background and implications of Australia's phase-out of chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) refrigerants and the phase-down of hydrofluorocarbon (HCF) refrigerants, in conformance with international protocols and market forces.

Mineral wool - PRO 002

Moisture content in timber floors - DES 002

Multiple contracts and 'work by others' - GEN 003

Native grass lawns - DES 029

NATSPEC for refurbishment, retrofitting and adaptive re-use – TR04

Making sure your specifications are up-to-date - GEN 007

NATSPEC's use of standards - GEN 002

Pavement stabilisation for unsealed roads – DES 034

Pipe support spacing (diameters, and carrying a range of liquids and gases - DES 019

Preliminaries and contract schedules - GEN 016

Preparation of concrete substrates - DES 008

Preventing condensation on ducts and air handling plant - DES 005

Procurement: Past and present – TR06

Product specifying and substitution - GEN 006

Rainwater harvesting - DES 011

Refrigerant Options - PRO 007

Selection and design of building IT systems – TR05

Selection of sealants - DES 017

Seismic design actions on non-structural components – DES 030

Shop drawings and samples- GEN 004

Site electricity supply - DES 021

Slip resistance - DES 001

Specifications - GEN 005

Specifying NCC requirements - GEN 011

Specifying concrete - DES 006

Specifying design and construct for mechanical services – TR03

Specifying ESD - TR01

Specifying quality - GEN 013

Specifying R-Values – DES 031

Static control floors - DES 007

Submissions and testing – GEN 014

Using AUS-SPEC for asset management - GEN 017

Using AUS-SPEC for asset maintenance - GEN 018

Using AUS-SPEC for contract documentation – GEN 019

LIST OF TECHNOTES

TECHreports

TR 01 Specifying ESD
Outlines how a NATSPEC-based specification can be used to give effect to ESD principles and opportunities in the building context.

TR 02 Information classification systems and the Australian construction industry
Provides an overview of the use of classification systems for organising construction information for various purposes.

TR 03 Specifying design and construct for mechanical services
Outlines how NATSPEC may be used to prepare Design and Construct mechanical specifications.

TR 04 NATSPEC for refurbishment, retrofitting and adaptive re-use
Outlines how a NATSPEC based specification may be used for refurbishment and adaptive re-use projects.

TR 05 Selection and design of building IT systems
Provides guidance on how the component parts can be configured and how a satisfactory overall IT installation can be achieved using NATSPEC worksections.

TR 06 Procurement: Past and present
Outlines the major procurement systems used in the construction industry today, and how procurement has evolved from past methods.

TR 07 Providing access for maintenance
Outlines the major procurement systems used in the construction industry today, and how procurement has evolved from past methods.

BIM Documents

NATSPEC Project BIM Brief Template
A Project BIM Brief documents the specific requirements of a project. It can be developed using the *NATSPEC Project BIM Brief Template*. In addition to identifying the project and members of the project team, it provides places to specify what BIM is to be used for on the project. It is also used to record what standards from the *NATSPEC BIM Reference Schedule* will apply. This arrangement allows the necessary flexibility for selecting references to suit the particulars of the project.

NATSPEC National BIM Guide
The Guide's core document is a reference document that defines roles and responsibilities, collaboration procedures, approved software, modelling requirements, digital deliverables and documentation standards. It documents a range of possible uses for BIM on projects.

NATSPEC BIM Reference Schedule
A list of documents and standards provided for consideration as references that can be cited in the *National BIM Guide*. The specific documents chosen to be applicable to a project are recorded in the Project BIM Brief.

BIM Management Plan Templates
The Templates are editable Word files that can be used to create a BIM Management Plan (BMP) aligned with the *NATSPEC National BIM Guide*.

NATSPEC BIM Paper 001: BIM and LOD
This BIM Paper provides an introduction to the concept of Level of Development (LOD) and its value in the management of the Building Information Modelling (BIM) process.
It includes recommendations about implementing LOD on projects and guidance on developing and interpreting LOD Tables.

NATSPEC BIM Paper 002: Getting Started with BIM
This BIM Paper is for those who have been seriously considering implementing BIM within their organisation and are now asking ‘What do we do next’? It covers the preparation and planning required by architectural or engineering personnel who want to make implementation happen. It provides generic guidance on the topic and discusses some of the decisions to be made and issues which need to be considered.

NATSPEC BIM Paper 003: BIM Project Inception Guide
This BIM Paper assists clients working with their Lead BIM Advisor to clarify and define their BIM requirements at project inception for the purpose of engaging the project team and with the goal of maximising the value of BIM to the project. It is designed to be used with the *NATSPEC Project BIM Brief Template* and *NATSPEC National BIM Guide*.

The clear definition of BIM requirements prior to engagement allows consultants to scope and price their services more accurately when preparing bids, reducing the risk of having to renegotiate them later.

NATSPEC BIM Scheduling Guidelines
These Guidelines summarise the findings of the 2010 NATSPEC BIM Scheduling project.

Part A sets out working principles for allocating properties to objects in digital models for scheduling purposes. The aim of these principles is to facilitate a consistent approach to scheduling and thereby improve information exchange in the construction industry.

Part B outlines general concepts associated with schedules that form the basis of the working principles set out in Part A.

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"The level of quality that can be policed in the construction stage cannot be higher than that which is spelt out in the contract. If the building contract documents permit a sow's ear then all the quality control in the world cannot demand a silk purse. True quality control starts with the documentation for a project and in the project specification in particular."

Bryce Mortlock
NATSPEC Founder
AIA Gold Medalist

"...Hence, the courts and others often look to the specification in particular to determine the message conveyed by the contract documents to those who work with them."

AIA Practice Note AN04.101 April 08

NATSPEC

the national building specification

Government departments and clients prefer NATSPEC

In the majority of Australian States and Territories, NATSPEC specifications are required for building projects. Government Departments and clients prefer NATSPEC specifications so that they are assured of a baseline level of project quality. Whilst drawings and schedules only provide the form and materials, it is a properly constructed specification that outlines the quality desired. For over 35 years NATSPEC has been trusted to deliver quality results.

Consultants prefer NATSPEC

The number of regulations that change each year continues to increase. Pressures on consultants' fees and the time required to design do not allow for individual organisations to monitor all the regulatory changes. NATSPEC provides the economies of scale to keep consultants up-to-date. Consultants know that NATSPEC is comprehensive and provides a clear outline of the quality of materials and tolerance of construction required. NATSPEC specifications save litigation and support the teams desire for successful projects.

Contractors prefer NATSPEC

It is a competitive world and as the industry continues to consolidate, greater emphasis is being placed on the cost of a project. Contractors want to compete on an even footing and a NATSPEC specification means that the job will not be lost to someone who will cut the quality of construction. NATSPEC is independent and does not favour one party over another.

Project managers prefer NATSPEC

When all parties are clear on the expected outcome, the project progresses quickly and without undue confrontation. NATSPEC's template specifications are written in simple plain English without duplication or contradiction so that Project Managers do not waste time clarifying project requirements.

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