

THE BENEFITS OF INSULATED WALL PANELS IN COMMERCIAL PROJECTS

PERFORMANCE, PASSIVHAUS DESIGN AND COMPLIANCE
WITH THE NATIONAL CONSTRUCTION CODE 2019



INTRODUCTION

In early 2019, an updated version of the *National Construction Code* (NCC 2019) entered into force superseding the 2016 version. The NCC 2019 implemented a major overhaul of the Code with several overarching goals, including the simplification and clarification of the wording in the Code to make it easier to understand. The updated Code also introduced more flexible pathways to compliance and simplified the compliance assessment process. Furthermore, the NCC 2019 included measures to encourage the delivery of buildings with high performance in terms of fire safety, energy efficiency and reduced gas emissions.

As part of its effort to achieve elevated fire safety, energy efficiency and emissions outcomes, the NCC 2019 contains several significant changes to three sections, namely:

- Section C – Fire Resistance
- Section F Part F6 – Condensation Management
- Section J – Energy Efficiency

In this whitepaper, we take a closer look at the recent changes to these sections and highlight their practical implications for Australian designers and specifiers. We discuss how these stringent new requirements can be met by using high quality insulated wall panels from reputable suppliers. In addition, we explore the potential for insulated panels to contribute to Passivhaus design in commercial buildings.

THIS PAGE **Latrobe University Sports Stadium – ASKIN Roof & Walls**
Volcore Metric Roof & Vivid Walls with Acoustic Perf to internal skin & Bronze Rosanna Ribs to External

COVER **Sunbury Aquatic Centre – ASKIN Roof & Walls** XFLAM Metric Roof & Vivid Walls with Aquatic liner to internal skins & External Rainscreen overclad.

UNDERSTANDING THE 2019 NCC CHANGES

Section C – Fire Resistance

Against the backdrop of public and industry concern regarding the use of combustible building materials (especially for cladding), the NCC 2019 implemented changes to its fire safety requirements. The NCC 2019 introduced a new comprehensive fire safety verification method (VM) across all volumes. Volumes One and Two of the NCC 2019 acknowledge the increased risk posed drought and rising temperatures in bushfire prone areas, providing a new VM for construction in these locations.

The key changes in Volume One include new Deemed-to-Satisfy (or DTS) provisions for fire sprinklers in apartment buildings and other residential buildings four storeys and above and ≤25m in height. Generally, DTS provisions provide a set list of materials, components, design factors, and construction methods that, if used, are deemed to meet the NCC Performance Requirements.¹ These new DTS provisions were developed by the Fire Protection Association Australia and are more cost-effective than equivalent measures under previous versions of the NCC.²

The NCC 2019 also includes clarifying requirements for occupiable outdoor areas. Furthermore, there is a non-mandatory VM for fire safety that can be used to develop a performance solution for up to 24 Performance Requirements.³

Notably, the NCC 2019 also retains the concession from C1.9(e) (former C1.12) to use bonded laminate materials but prevents the use of Aluminium Composite Panels (ACPs) with a combustible core.⁴ Specifically, this concession only applies if each lamina (including any core) is non-combustible, each adhesive layer does not exceed one mm in thickness (with the total thickness of the adhesive layers not exceeding two mm); and the Spread-of-Flame Index and the Smoke-Developed Index of the bonded laminated material as a whole does not exceed 0 and 3 respectively.

These provisions must still be read in conjunction with AS 5113:2016 Fire propagation testing and classification of external walls of buildings under which combustible attachments, such as signage and awnings, can only be used on an external wall that is already compliant with the relevant NCC requirements. Accordingly, there is an ongoing need for designers and specifiers to be particularly mindful of facades and their materials and components.

Section F Part F6 – Condensation Management

The NCC 2019 introduces new provisions for Condensation Management in Part F6 of Volume One as well as in 3.8.7 in Volume Two. Insufficient weatherproofing may lead to moisture ingress, which in turn causes condensation that enables mould and mildew growth. This results in building conditions that can cause occupant health problems, including eye and throat irritation, headaches and fatigue.⁵ Insufficient condensation management can also lead to building damage.⁶

To combat this problem, FP1.4 in Volume One of the NCC 2019 mandates that all roofs and external walls, including openings around windows and doors, must provide sufficient protection against moisture penetration that may cause a risk to occupant health and dampness and deterioration of building elements.⁷ Given their continuous nature, high quality insulated panels are an effective solution for restricting the transfer of moisture in and out of a building. This results in better indoor air quality for occupants and reduces any risk of interstitial condensation.

Section J – Energy Efficiency

This part of the NCC 2019 almost entirely rewrites previous versions and incorporates stringent new energy efficiency requirements for commercial buildings. According to the Australian Building Codes Board and industry commentators, the energy efficiency measures in the new Section J, which include provisions covering thermal insulation, may reduce building energy consumption rates by up to 35%⁸ and make sustainable construction cheaper.⁹ Designers and specifiers should note the one-year transition period allowing the NCC 2016 requirements to be used until 1 May 2020.

A lack of adequate thermal insulation in a building can result in air leakage that undermines heating and cooling efforts. This can result in increasing reliance on artificial thermal control measures, which contribute to high operating costs and energy consumption. As such, designers and specifiers must be mindful of three updated requirements in the NCC 2019 (specifically J0.4, J0.5 and J1.2(e), which are discussed below) that are intended to resolve issues relating to poor thermal insulation in commercial construction. At the same time, they should also consider the general trend away from the traditional methods of insulating commercial buildings to continuous insulation systems which contribute to overall operational cost savings by creating more ambient internal environments.

In Section J of the NCC 2019, J0.4 and J0.5 mandate the use of thermal breaks between cladding units and the supporting structural frame. As discussed in more detail below, designers and specifiers should note that continuous insulated panels remove the need for these requirements. Section J also includes J1.2, which sets out general requirements which apply to insulating the building fabric so that the required thermal performance is achieved, including the testing needed to ensure the validity of insulation products.¹⁰ J1.2(e) specifies how Total R-Value (thermal resistance) and U-Value (thermal transmittance) for an insulation system, including allowance for thermal bridging, must be determined. These values must be:

- calculated in accordance with *AS/NZS 4859.2:2018 Thermal insulation materials for buildings – Design* for a roof or floor;
- determined in accordance with Specification J1.5a for wall-glazing constructions; or
- determined in accordance with Specification J1.6 with respect to soil or sub-floor spaces.

INSULATED PANELS: A HIGH PERFORMANCE CODE- COMPLIANT SOLUTION

It is critical for designers and specifiers to identify high performing solutions that sufficiently address the new requirements for fire performance, condensation management and energy efficiency. Insulated panels are a highly efficient cladding system that provide an effective path to compliance with the NCC 2019 while also complimenting Passivhaus design principles in commercial buildings.

NCC 2019 Compliance

Insulated panels are cladding systems that incorporate an insulated core encapsulated between non-combustible steel facers and an internal/external laminated skin typically fabricated from steel. Mineral wool cores are increasingly popular due to concerns regarding the combustibility of composite panels, offering a complete non-combustible solution. Other key benefits of insulated panels include large span capability of up to 8m, high thermal insulation properties and fire resistance. Depending on structure requirements, insulated panels can be up to 25m in length.

These characteristics enable insulated panels to meet the NCC 2019 requirements discussed earlier. Insulated panels offer the following advantages over other building materials:

- The mineral wool core meets the NCC DTS provisions in C1.9(e) for non-combustible building elements in Type A and B construction. This provision specifies materials which may be used wherever a non-combustible material is required.
- When sourced from reputable manufacturers and suppliers, insulated panels can achieve a Group 1 fire rating in accordance with AS 5637 – *Determination of fire hazard properties* as required by NCC Specification C1.10.
- The continuous nature of insulated panels enables elimination of the thermal break otherwise required by the aforementioned J.04 and J.05. It also eliminates the non-combustible complex thermal break otherwise required by J1.2(e). Lastly, it eliminates the variation of conductivity between wall and ceiling components, resulting in an airtight moisture barrier that prevents condensation build-up in line with the NCC Performance Requirements in FP1.4 for weatherproofing of a roof or external wall.

Passivhaus

Insulated panels also compliment the principles of Passivhaus, a voluntary performance-based standard based on ISO 7730, the International Thermal Comfort Standard. A vital measurement tool in today's environmentally-conscious construction industry, Passivhaus design has similar focal points to the NCC 2019 including continuous insulation, airtightness, comfort ventilation and heat recovery.

Passivhaus buildings strive to deliver thermal comfort “solely by post-heating or post-cooling the fresh air flow required for a good indoor air quality, without the need for additional recirculation of air.”¹¹ Leading insulated panel systems enable a robust and durable building envelope and offer high thermal efficiency values, both of which are features critical for buildings to achieve Passivhaus standards.



Since 1964, ASKIN has led the Australasian market in high performance insulated panel systems that respond to evolving market needs and increasingly stringent regulatory requirements. With a network of 12 sites throughout Australia and New Zealand, the company is the largest regional manufacturer and installer of a broad range of high performance products, including insulated and fire-rated façade systems, roofing systems and temperature-controlled facilities. The extensive ASKIN product range is supported by the company's knowledgeable in-house technical team.

Striving to deliver construction solutions that exceed expectations and minimum standards for quality and safety, ASKIN applies the most advanced panel technology to deliver high performing and code-compliant insulated panel solutions. All insulated panel installations by ASKIN are governed by the IPCA (Insulated Panel Council Australasia) Code of Practice and exceed all minimum requirements of the NCC.

Volcore®

Volcore is a steel laminated insulated panel system with a non-combustible core that offers the added benefits of significant acoustic advantages and high thermal efficiency.

A market leading fire-rated insulated panel, this solution is suitable for cladding and exterior walls. It is also ideal for industrial applications with a significant risk of fire as it provides Fire Resistant Levels (FRL) up to 180 min. It is also easy and fast to install while offering design flexibility with a wide range of available profiles and colours, and lengths up to 13.5m.

The key benefits of ASKIN's Volcore Panel system include its exceptional structural performance, weather tightness, thermal values and non-combustibility conformance. These properties have been tested to Australian Standards and meet various NCC FRL requirements. This NCC Group 1 building product is non-combustible in accordance with the requirements of C1.9(e) of the NCC 2019, with key components tested to AS 1530.1 as required for Type A and B Construction. Furthermore, this panel system

achieved a best in class result under the test regime dictated by AS1530.4 for firewall penetrations.¹²

XFLAM

ASKIN's XFLAM Panel range is a fire resistant insulated panel made with syntactic foam. Delivering excellent mechanical properties, superior insulation values and low toxicity, this high performance panel is the best multipurpose panel available on the market. Available for interiors, exteriors, facades, roofing and ceiling applications, this solution offers a fire rating of up to 120 min and can be used for any application that requires a fire-safe and mechanically strong building product. It also provides high thermal performance with R values up to 8.0+, making it an ideal insulated panel solution for food processing facilities, distribution centres, cool rooms and freezers.

The XFLAM Panel is also 100% recyclable and sustainable, and is easy and fast to install reducing construction costs and waste. It also provides continuous insulation thereby eliminating the need for thermal bridging. It is available in lengths from 1.5m to 25m and a range of widths and thicknesses depending on project requirements. Enabling a wide variety of designs and applications, this solution is available in an endless range of colours, high quality finishes and many interior, exterior and roofing profiles.

The XFLAM Performance Panel is an NCC Group 1 building product and has been subjected to stringent testing, providing designers and specifiers with the peace of mind that they have selected a solution that is approved and conforming with the NCC and relevant Australian Standards including AS 1530.4 for fire walls, door and penetrations.

This solution has also completed the full range of FM Approvals in the United States including:

- FM Approved – 4471 Roofing Systems;
- FM Approved – 4880 Internal Walls and Ceilings;
- FM Approved – 4881 Exterior Wall Systems; and
- FM Approved – 4882 Smoke Sensitive Occupancies.

The Lights Community & Sports Centre –
ASKIN Exterior Walls Vivid with Volcore wall system and 12 Custom Colorbond colours



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