

BEYOND FACE VALUE: UNDERSTANDING REQUIREMENTS FOR EXTERNAL CLADDING



Boroondara Sports Complex – ASKIN Limitless with XFLAM –
Exteriors Panels in Colorbond Copper Penny with and Woodform timber overlaid

INTRODUCTION

A recent spate of high profile tower fires around the world has been the cause of dismay and concern throughout the design and construction industry. After thorough investigation, it was determined that both the 2014 Lacrosse¹ and 2017 Grenfell² tower fires were linked to combustible external wall systems. These disasters – which in the case of Grenfell resulted in over 70 fatalities³ – spurred a series of audits by Australian state and territory governments and increased scrutiny of national construction and building regulations. In New South Wales, numbers suggest that over 2,500 buildings were built with flammable cladding - a sobering look at the potential scope of the safety risk.⁴

Through careful specification of code-compliant external cladding, this type of disaster can be avoided. However, in practice, this is easier said than done. While the Lacrosse and Grenfell incidents have put a sharper focus on external cladding systems in recent years, the performance requirements that these systems must follow are a source of confusion within the global construction and insurance industries.

In Australia, the National Construction Code (NCC), which covers the Building Code of Australia (BCA) in Volume One and Two, provides the minimum performance standards for external cladding. In this whitepaper, we dispel industry confusion and provide a clear summary of the key requirements relating to external cladding, and what they mean for specifiers and designers in practical terms.



Our Lady of Mercy College – ASKIN Exteriors with XFLAM & Volcore
– Colorbond custom colours with Flat profile

DEFINING THE SCOPE OF THE REQUIREMENTS

WHAT IS “EXTERNAL CLADDING”?

External cladding is a non-loadbearing outer skin, layer or covering of an external wall system. While external cladding is a key aspect of the aesthetic appeal of a building,⁵ a key aspect relevant to its meaning under the NCC is that it provides functionality to the external wall, typically water resistance and protection from the effects of weather. Under Volume One of the NCC, “external wall” is defined as “an outer wall of a building which is not a common wall”.⁶

Based on a review of dictionary definitions and its usage in the BCA relative to other terms, the Victorian Building Authority (VBA) provides guidance that “external wall” includes the entire wall system separating the interior space from the outside space and encompasses the components and elements necessary for the external wall to meet its requirements for structural performance, thermal performance, weather tightness, non-combustibility and, where required based on type of construction, the required Fire Resistance Level (FRL) as well as any other functionality required by the NCC.⁷

This definition of external wall excludes:

- any linings, materials and assemblies complying with Specification C1.10 of the NCC Volume One; or
- attachments which are in compliance with Specification C1.1 Clause 2.4 of the NCC Volume One that may be applied to the inner or outer surface of the already fully compliant wall.⁸

Guidance from the CSIRO indicates that cladding can be considered an “attachment” if, when it is removed, the remaining wall system still functions as an external wall.⁹ If removal of the material or product results in the remaining wall system being unable to function suitably as an external wall with respect to performance requirements such as FRL and others, it is likely to be considered a component or integral part of the external wall.¹⁰

The performance requirements enshrined in the NCC apply to all types of external cladding. In Australia, cladding can be made from a wide range of materials including aluminium, wood, cement blends and recycled polystyrene.¹¹



UNDERSTANDING THE PROVISIONS

FIRE PERFORMANCE

Volume One of the NCC separates construction into three types specifically with respect to fire resistance provisions: Type A, Type B or Type C. Classification into these types is dependent on the building's class and rise in storeys.

High-rise construction is typically classified as Type A or Type B construction, meaning that it is at higher risk of fire and therefore requires the most fire resistance.¹² Complex cladding systems are more common in high-rise construction.

The Deemed-to-Satisfy (DtS) provisions in the NCC include examples of materials, components, design factors, and construction methods which, if used, will result in compliance with performance requirements.¹³ According to DtS provisions, namely Specification C1.1 and Clauses 3.1(b) and 4.1(b) therein, external walls of Type A and Type B buildings must be non-combustible. "Combustible" in this context means:

- combustible as determined by the testing regime specified in AS1530.1 – Methods of fire tests on building materials, components and structures: combustibility test for materials with respect to materials; or
- constructed wholly or in part of combustible materials in relation to the construction or part of a building.¹⁴

Per industry guidance, if any part or component of an external wall is combustible, the entire wall is treated as combustible under the NCC.¹⁵ It is important to note that C1.1 of the NCC Volume One requires external walls and common walls (and the flooring and floor framing of lift pits) to be non-combustible in addition to the requirements for cladding. It is critical for designers to consider these requirements in conjunction with Performance Requirement CP2. According to the Australian Building Codes Board, CP2 prescribes, among other things, that a building must have elements that will avoid the spread of fire in a building and between buildings in a manner appropriate for that building.¹⁶ External cladding that is non-combustible can contribute to compliance with this requirement by inhibiting or not contributing to the spread of fire via the external face of a building.¹⁷

The DtS provisions also includes C1.9(e), which permits the use of certain materials that may contain some combustible elements but are within acceptable levels of fire safety. These materials include plasterboard, fibrous-plaster sheet, fibre-reinforced cement sheeting, Volcore (mineral wool), and other materials whose use should also not result in the spread of fire. The clause should be read within the conditions set by the general 'suitability' requirement in A2.2 of the NCC Volume One, which requires that every part of a building is to be constructed in an appropriate manner and with materials and construction methods that are fit for purpose.

THERMAL AND STRUCTURAL PERFORMANCE

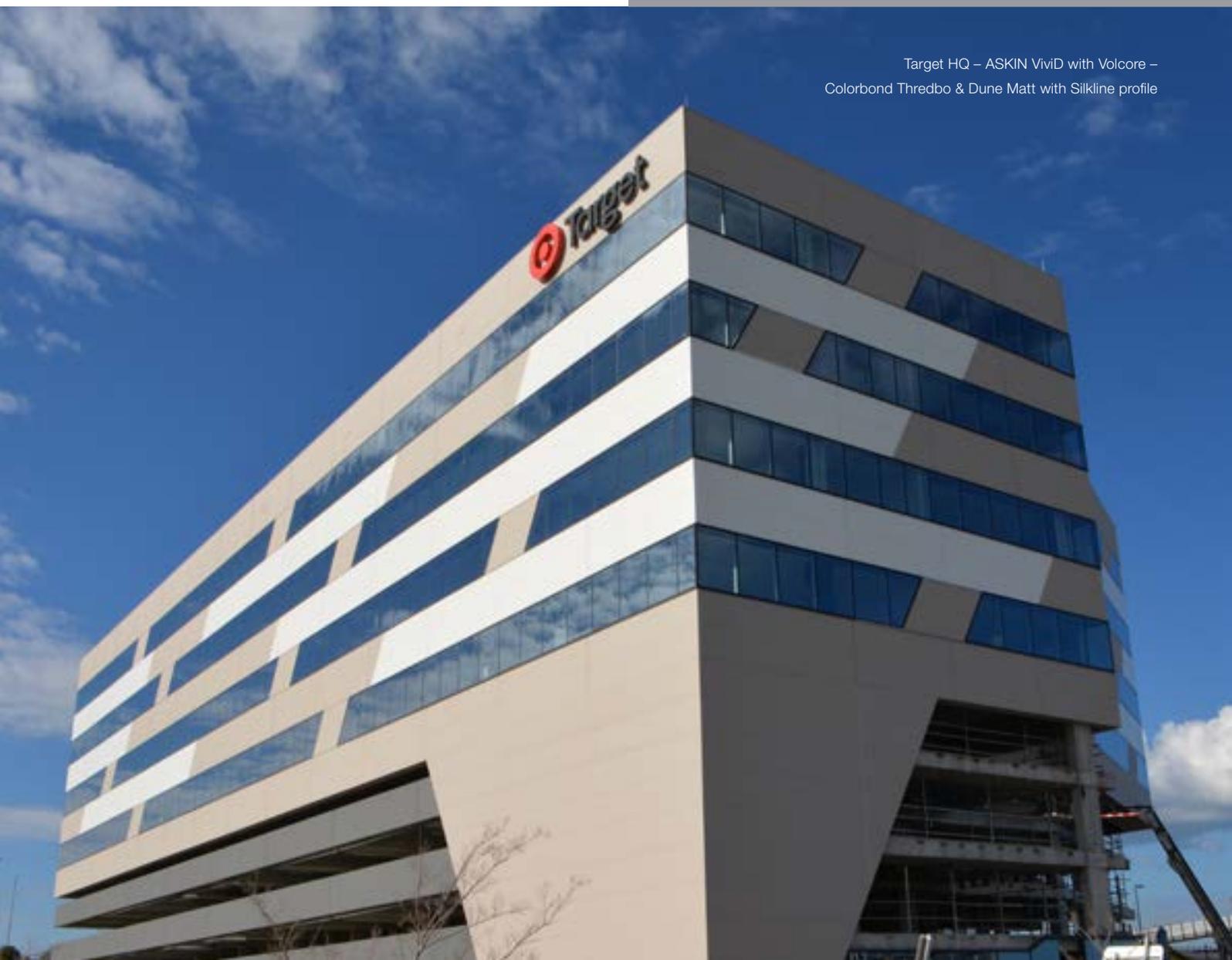
Related to the weatherproofing performance requirements discussed earlier, the VBA has explained that the NCC requires external cladding systems to resist actions to which they may be reasonably subjected such as live and dead loads, weather conditions (for example, rainwater, winds and earthquakes), and thermal actions.¹⁸ Accordingly, designers will need to not only consider water resistance when selecting cladding solutions, but they must also give due consideration to structural safety and thermal performance.

Designers should note the interrelationships between weatherproofing, structural performance and thermal performance, such as:¹⁹

- reduced effectiveness of bulk thermal insulation when exposed to moisture, which can negatively impact the building's energy efficiency;
- inadequate wind resistance may lead to water penetration via unsealed gaps and joints; and
- water penetration may lead to decay of timber structures which may in turn cause structural failure.

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Target HQ – ASKIN Vivid with Volcore –
Colorbond Thredbo & Dune Matt with Silkline profile



ASKIN

For over half a century, ASKIN has been the market leader in Australia and New Zealand for insulated, fire rated and architectural façade systems, roofing systems and temperature-controlled facilities. ASKIN provides an unparalleled focus on innovation, quality and safety assurance coupled with industry-leading technical knowledge, while delivering complete building solutions that exceed NCC requirements for all types of constructions.

ASKIN external wall panel systems are fully compliant with all NCC performance requirements including fire resistance, structural integrity, weather tightness and thermal performance, providing designers with flexibility and peace of mind. All ASKIN panels are also in compliance with International Quality and Environment standards and industry codes of practice.

ASKIN XFLAM and Volcore panel systems have been subjected to rigorous, thorough testing and deemed compliant with the relevant NCC performance requirements as well as having received international insurance approvals.

XFLAM insulated panels are a high performing, insurer endorsed, innovative product for fire resistant panelised construction. With a syntactic thermoset foam core, XFLAM has excellent fire properties, mechanical strength, superior thermal insulation, low toxicity and is completely recyclable. XFLAM panels can be manufactured into roofing, walls, ceilings and architectural facades with many accreditations including FM Approvals of 4880, 4881 and 4471, NCC Group 1 and AS1530.4 FRLs. Characteristics which are critical for meeting the performance requirements of today's Buildings.

Volcore Panels are a high performance, fire resistant panel suited for extreme, high risk environments such as multi storey developments, data centres and plant rooms. Volcore panel has a Mineral Wool core manufactured from Basalt Rock, which achieves high Fire Resistance Levels (FRL) and deemed non-combustible per the NCC. The Volcore panel achieved a best in class result under the test regime in AS1530.4 Methods for fire tests on building materials, components and structures for firewall penetrations, showcasing the product's industry-leading fire performance.²⁰

ASKIN provides an extensive catalogue of high performing, NCC-compliant products, supported by a full suite of services guiding customers through the building process; from specification, engineering, design, product manufacturing, and project management through to installation and warranties.



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