

Cladding Product Safety Panel

Report 1: initial endorsed products and systems for Project Remediate

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1. Executive Summary

The NSW Cladding Product Safety Panel (CPSP) was established as an expert panel to support the [Cladding Taskforce](#) and advise Government on suitable products and systems to remediate combustible cladding. This independent and expert advice is provided in consideration of the latest and evolving standards to determine suitable, safe, tested and high-performance replacement products and systems. Advice from the CPSP will inform the cladding rectification works undertaken through [Project Remediate](#).

Combustible cladding on buildings presents a considerable challenge to the community, industry and governments internationally, including in Australia and NSW. The first major fire involving building cladding occurred in Australia in 2014 and since then the NSW Government has been working to address these risks, including:

- identifying affected buildings
- supporting owners and local councils to ensure they have been assessed, and
- addressing short-term safety risks.

Many buildings have been cleared. Remaining buildings are now entering a stage of readiness for long-term remediation.

This is the CPSP's first report. It outlines the findings and recommendations related to cladding products and systems endorsed for use in Project Remediate. The way in which the CPSP's recommendations will be implemented in Project Remediate is detailed in Section 4.2.

The CPSP has adopted a very low risk approach for replacement products and systems for Project Remediate. This is in acknowledgement of the unique risk characteristics of residential apartment buildings, the 'unsophisticated customer' characteristics of their owners and strata bodies, and the Government's involvement in delivering the program. For non-residential buildings, the CPSP does not expect that these exact requirements will necessarily apply where owners have a more sophisticated knowledge base for the renovation and management of their buildings. The CPSP notes the Cladding Taskforce opinion in Attachment 1, that non-residential buildings do not share the same risk characteristics nor the same barriers to remediation faced by residential building owners.

Before building components, products and systems can be used in Project Remediate the CPSP requires that fire testing be carried out by a facility accredited by the National Association of Testing Authorities (NATA). Testing of products and systems to other performance criteria must be done with regard to the individual buildings in accordance with guidelines issued by a Principal Façade Designer appointed under Project Remediate.

For buildings that are eligible for inclusion in Project Remediate, the CPSP recommends that composite panels with a core comprised of greater than 8 per cent combustible material mass need replacement.

For replacement cladding products and systems for Project Remediate the CPSP is recommending requirements beyond the Building Code of Australia (BCA). The CPSP applied the following criteria for the first tranche of products recommended in this report:

- Products and systems that are non-combustible according to the BCA, i.e. not deemed combustible as determined by AS 1530.1 – Combustibility Tests for Materials, or
- Products and systems that can be used where a non-combustible product is required as permitted by the deemed to satisfy provisions of the BCA, excluding bonded laminate products.

Bonded laminate products are not included in this report as more detailed consideration of this product category is required.

Four product categories are considered acceptable replacement options for Project Remediate, subject to additional design requirements. These categories are:

- solid aluminium
- solid metal sheets
- fibre cement
- non-combustible cement render.

The following design and installation requirements apply:

- Insulation and any other materials forming the cladding systems and external walls are also to be non-combustible, except where otherwise permitted by the BCA.
- Cavity barriers are to be installed in appropriate locations and need to be effective in mitigating or minimising fire spread within cavities formed in the external walls.
- Fire-proof mechanical fixing for external wall panels is required to prevent large pieces of debris falling off a building in a fire.

Cladding replacement systems need to be fully designed for each building, taking into account performance elements such as structural loads including wind loading, weatherproofing, condensation, thermal performance, durability, acoustics and aesthetics. For Project Remediate, a Principal Façade Designer will collaborate closely with the CPSP and provide design guidelines to be followed across the program.

The CPSP is continuing to evaluate products and expects to include additional recommended products and systems in later reports, subject to receiving acceptable evidence of independent testing as outlined in section 6.

2. About this report

2.1 Purpose

This is the CPSP's first report to Government. It covers the CPSP's findings and recommendations to date in relation to Project Remediate. A particular approach has been taken to formulating these recommendations because of the Government's direct involvement facilitating and overseeing this remediation work, as discussed at section 4.2

The recommendations in this report are not intended to apply to non-residential buildings or buildings not involved in Project Remediate. Nevertheless, interested parties are encouraged to review the report's findings and consider their relevance as an advisory resource.

2.2 Defined terms

The following terms used in this report are defined to mean:

External wall	Outer wall of the building including all components incorporated therein including the cladding product, cladding system, framing and insulation. A reference to an external wall is a reference to the entire wall system.
Cladding product	The cladding material used or proposed to be used as the outer layer of the external wall.
Cladding system	Incorporates the cladding product, support framing, joints, sealant, fixings and other components.

2.3 Staged (tranche) approach to recommendations

The CPSP's work plan seeks to balance the benefits of providing timely advice with the need for thorough investigation and consideration of the performance, testing and safety of cladding products and cladding systems. The CPSP and the Government note that providing prompt advice and findings allows building owners, councils and the remediation industry to access and act on the CPSP's advice sooner. It also allows cladding suppliers

to respond or adapt to the CPSP's criteria for product performance, testing and documentation. The CPSP also notes that thorough investigation of the performance and safety of particular products and systems is required. Further it allows rectification work to safely commence, takes positive steps toward reducing risk and does not hold up the commencement of remediation works.

Consequently, the CPSP will provide its advice in tranches, delivering advice on categories of products and systems and other matters as soon as it is settled and available.

This report, Report 1, contains the CPSP's initial advice on the removal or retention of cladding products for Project Remediate. It also contains the first tranche of types of endorsed products and systems for use in the program.

Subsequent later reports will provide any additional endorsed products and systems for Project Remediate as and when they are endorsed by the Panel. Later reports may also contain recommendations for buildings not in scope for Project Remediate, likely from 2022.

3. About the CPSP

The CPSP comprises industry and government representatives with expertise in fire safety engineering, product testing, building surveying and certification, and construction and building insurance. Panel members were appointed by the Minister for Better Regulation and Innovation on 29 July 2020.

The CPSP is comprised of the following members:

- Professor Mark Hoffman (Chair)
- Dr Marianne Foley (Deputy Chair) - fire engineering, building and construction expert
- Mr Stephen Durnford - NSW Department of Customer Service
- Mr Allan Harriman OAM - fire safety engineering expert
- Mr Robert Marinelli - building surveying and building work certification expert
- Mr Stephan Netting - Fire and Rescue NSW
- Professor Bijan Samali - fire safety engineering expert
- Mr Corey Nugent - Insurance Council of Australia.

4. Role of CPSP

4.1 In general

The CPSP provides expert advice to government via the NSW Cladding Taskforce and the Cladding Support Unit on the suitability of cladding products and cladding systems including external wall assembly methods.

It does not have a regulatory or standard-setting role.

The CPSP's advice will be made publicly available as an advisory resource for building owners, councils, and industry stakeholders.

4.2 In supporting Project Remediate

Advice the CPSP is currently providing is intended to inform the cladding rectification work carried out under Project Remediate. Project Remediate is the NSW Government's three-year program providing interest-free loans and an assurance overlay to support the removal and replacement of high-risk combustible cladding on residential apartment buildings.

The CPSP has been tasked with considering the product mix and systems that could be utilised in cladding remediation projects, and related matters.

A key objective of the Panel's recommendations is to allow buildings remediated under Project Remediate to be fully insured in line with comparable buildings not affected by combustible cladding.

The assurance overlay of Project Remediate will include provisions to ensure that only products and systems recommended by the CPSP are used under the program. This will be primarily through the Managing Contractor and the Principal Façade Designer. The Managing Contractor will engage specialist capabilities to triage, design, install, superintend and verify compliance of the works on behalf of strata communities. The Principal Façade Designer will act as a bridge across the remediation program to provide program-wide guidelines that each project designer engaged under the program will follow when specifying products and designing replacement façade systems. The Principal Façade Designer will also maintain a repository or 'pattern book' of solutions that may be adopted for individual projects. Build-only, lump sum contracts will also give certainty that the preferred design solutions will be delivered as intended.

The CPSP acknowledges that the remediation processes constitute development under the *Environmental Planning and Assessment Act 1979*, and could be proposed, assessed and undertaken in accordance with the Development Application process. Additionally, councils have the opportunity to require the completion of this work through Fire Safety

Orders and/or Development Control orders. The orders process allows for a similar level of consideration, however without the, at times, lengthy assessment timeframes.

Within the Project Remediate context, it is anticipated that councils will generally utilise the orders framework which will deliver a more expeditious result. Further, the CPSP understands that the Office of Project Remediate will encourage councils to issue specific orders to address and require the removal of unsafe cladding, and address any other necessary rectification works through separate or separable orders. This approach will allow the façade and cladding remediation to progress early and achieve desirable reduction in fire risk to these buildings as a priority. This approach also enables councils to secure other remediation outcomes at timeframes that suit the urgency on a case-by-case basis. It is noted that the Fire Safety order provisions allow councils to require works that are different from the deemed-to-satisfy provisions of the BCA. For Project Remediate, councils will be encouraged to write order provisions in line with the high standards set for the works and described in section 8.

The CPSP notes that Project Remediate will set high standards for managing rectification work on site, including safety of scaffolding and hoardings (fire safety and structural), ensuring clear access to fire-fighting equipment, amenity to occupants, waste management, hours of work and obtaining necessary approvals such as road usage, waste management and hours of work.

5. Risk approach for Project Remediate

The NSW Government has an integral role supporting remediation work under Project Remediate, by facilitating interest-free loans and provision of an assurance overlay that includes expert coordination of all elements of the remediation project on behalf of building owners. For building owners that choose to join the program, these assurance measures support them through the contracting and build process. The Government is committed to providing owners and residents with the highest degree of confidence in the safety of their residential apartments following the façade remediation work.

This means the Government is adopting a low risk tolerance in relation to remediation decisions under the program and has asked the CPSP to provide recommendations in keeping with this risk approach. Project Remediate will be able to facilitate high quality and low risk remediation solutions by procuring the expertise of a managing contractor and Principal Façade Designer consultant at the program level to efficiently manage each project while leveraging the benefits of the entire program's scale. Project Remediate will also be able to limit risk by applying the CPSP's recommendations not only to product selection but to the design of entire cladding *systems*.

In developing this low-risk approach, the CPSP has sought to develop clear and well-evidenced criteria and principles for assessing cladding products and cladding systems for Project Remediate. It has done this by:

- Acknowledging that the buildings in question are multi-unit, multi-storey residential apartment buildings, which are occupied by a diverse range of people. Residential buildings pose unique fire safety risks in terms of fire ignition, sleeping or vulnerable occupants and evacuation challenges. These justify a low tolerance for risks to life safety.
- Requiring that risk is mitigated by design, not management measures. This means supporting holistic remediation solutions that do not require building owners or occupants to change the way they use the building or commit to long-term maintenance obligations.
- Providing recommendations that allow buildings remediated under the program to be insured without exclusions or increased premiums related to cladding by incorporating the advice of the Insurance Council of Australia (ICA) in the Panel's decision making. This includes incorporating relevant principles of the ICA's *'Aluminium Composite Panel and Other Combustible Façade Materials Residual Hazard Identification/Reporting Protocol'*.
- Setting robust standards for testing and documentation that products must meet to be considered by the Panel, to ensure independence and transparency of processes and results.
- Acknowledging that the Australian Building Codes Board (ABCB) is currently undertaking a review of the *fire safety requirements for external walls* as a two-stage project, which is looking to deliver certain outcomes for National Construction Code (NCC) 2022 (stage 1) and potential other outcomes for NCC 2025 (stage 2). The Panel is structuring decisions to recommend products and systems that are considered to minimise the likelihood of future compliance issues.

The CPSP notes that Project Remediate is limited to Class 2 residential apartment buildings. The Cladding Taskforce has noted that both the risk profiles of these buildings and the capabilities of the owners differ to those of residential buildings; the panel needs to consider and protect an 'unsophisticated buyer' group with limited access to high level expertise in remediation and management of buildings. As noted in previous sections, the risk approach and the recommendations in this report do not relate to buildings outside the scope of Project Remediate for these reasons, although owners, industry and consent authorities may wish to refer to the report as an advisory resource.

6. Product and system testing

This section outlines the testing the CPSP considers appropriate for products and systems to be used in Project Remediate.

To ensure the safety of cladding products and cladding systems rigorous testing and demonstration of compliance with relevant standards including Australian and / or International standards is required. These tests can be divided into two major categories: (1) fire testing and (2) other testing, for example load testing, durability testing, wind tunnel testing, etc.

The CPSP requires any fire testing to be conducted in accordance with relevant Australian Standards, namely, AS 1530.1 for material combustibility and AS 5113 for system performance using testing facilities with National Association of Testing Authorities (NATA) accreditation.

There are relatively few fire testing facilities in NSW (and in Australia). The fire testing facilities identified generally perform combustibility tests in accordance with AS 1530.1. Eleven testing facilities with NATA accreditation have been identified to perform tests specified by the AS 1530.1 standard. Some of these facilities are able to perform fire tests according to European and International standards (e.g. ISO) as required by their clients. The other fire test which is more rigorous and involves testing of a large portion of a structure is testing according to AS 5113. Only two facilities, namely, CSIRO and Warrington fire testing facilities have NATA accreditation for these tests.

While it is known that certain universities have the necessary facilities, expertise and capability to perform AS 5113 and AS1530.1 testing, at this time none are NATA accredited. Generally speaking, universities do not seek NATA accreditation as many of their tests are non-standard and it is not feasible to maintain accreditation which is test specific in an environment where many tests are undertaken for research purposes. University facilities are generally well maintained and equipment well calibrated and operated to a high degree of skill to satisfy research needs. Universities' facilities are well placed for the second category of tests.

Most universities possess structural and material testing laboratories able to perform load tests as required. Some also offer wind tunnel testing which allows simulation of wind loads on the cladding systems. They are also able to undertake durability tests such as accelerated corrosion tests, etc. The CPSP is of the view that tests performed by universities are acceptable despite lack of accreditation as results can be considered independent and most perform self-accreditation by calibrating their equipment regularly. The level of Professional Indemnity insurance cover for the universities is also significant and adequate for the purpose. The Principal Façade Designer will stipulate the type of test results required for particular applications.

The CPSP is aware of some manufacturers and suppliers performing their own tests on their own products, and perhaps their competitors' products, particularly in relation to AS1530.1. Such results are not considered independent and suitable for the Panel's consideration.

In line with the panel's low risk approach for Project Remediate, the following criteria have been developed to evaluate test data:

1. Only test data from sources independent of the product supplier/manufacturer are acceptable.

This is to ensure no conflict of interest and credibility of the test results.

2. Current certificates from National Association of Testing Authorities (NATA) accredited laboratories are required to demonstrate products and systems meet the relevant BCA requirements and Australian Standards for fire safety.

NATA accreditation provides a means of determining, formally recognising and promoting the competence of facilities to perform specific types of testing, inspection, calibration, and other related activities. NATA accreditation benefits facilities by allowing them to determine whether they are performing their work correctly and to appropriate standards, and provides them with a benchmark for maintaining that competence. Fire testing is the only acceptable way of demonstrating compliance with BCA and other standards. Use of computational methods are time consuming and expensive and can also be non-conclusive. Therefore, NATA accredited certificates for the actual products are required for compliance.

3. No inappropriate exclusions, limitations or maintenance requirements

The products and systems need to be fit for purpose for the proposed use without any onerous maintenance measures for building occupants and owners. This means that the CPSP's approach to fire safety risk is that it should be minimised by appropriate design, rather than managing the risk through the manner in which occupants use the building. It is unreasonable to expect apartment residents to understand and remember special measures or restrictions on the way they can use a building in perpetuity, or to pay ongoing additional costs for maintenance or management to address design deficiencies. Building occupants will change over the lifetime of a building, and there is a high likelihood that such risk reduction measures could be lost or forgotten over time and the fire risk will again increase.

4. For other provisions e.g. wind loading criteria, durability etc., relevant testing for the façade system and for location must be demonstrated.

The cladding system to a building needs to be designed as a whole system as each building is bespoke. The cladding system needs to perform many functions including weatherproofing, thermal insulation, acoustic performance, condensation, and resistance to structural loads including wind, as well as aesthetics. These all need to

be specifically considered for each building in detail, and they form the requirements for the façade design.

The non-fire tests do not require NATA accreditation as they are bespoke tests for each building rather than a test that must follow a given Australian Standard. As such the laboratory cannot be NATA accredited for the test.

The CPSP notes that under Project Remediate, guidelines issued by the Principal Façade Designer will inform project designers how each of these performance elements are to be demonstrated. These guidelines will be developed in consultation with the CPSP.

5. Test data is to be made available to designers, councils and decision makers.

To give confidence in products and systems proposed, and to allow designers to make decisions with the required factual information, simple pass/fail certifications for products and system tests may not be adequate, and detailed test reports, outlining testing methodology, set up and assumptions, should be made available from suppliers and manufacturers for use by designers and for approval authorities.

Furthermore, test data must be provided for the exact product and systems to be installed. Updated or revised versions of products and systems will require retesting. The Principal Façade Designer may also request retesting of products and systems if the test results are considered outdated.

7. Criteria for removal and replacement or retention of cladding products on existing buildings

The focus of the CPSP is on removal and replacement of unsafe cladding, and not broader or wholesale building remediation. The CPSP has reviewed the known cladding products available and in use within NSW. This has been done in consideration of the risk assessment methodologies for determining the level of fire safety risk posed by cladding products on existing buildings and the guidance of the Insurance Council of Australia on assessing insurance risk.

The CPSP has also taken into account the advice of Fire + Rescue NSW and potential changes to the BCA that may come to affect these buildings.

7.1 Recommended criteria for removal

The CPSP recommends that for Project Remediate, composite panels with a core comprised of greater than 8 per cent combustible material by mass need replacement.

The CPSP considers that performance solutions may be appropriate to retain composite panels with a core comprised of 8 per cent or less of combustible material by mass, *if* they meet the BCA Verification Method CV3 (an acceptable way to demonstrate performance permitted in the BCA). Such a solution must also be acceptable to the consent authority.

What do these terms mean?	
Verification method CV3	<p>A Verification Method means a test, inspection, calculation or other method that determines whether a Performance Solution complies with the relevant Performance Requirements of the NCC.</p> <p>Verification Method CV3 relates to avoiding the spread of fire via the external walls of a building (Performance Requirement CP2). Its main relevant requirements include:</p> <ul style="list-style-type: none"> • That the external wall system has been tested to AS 5113 and passed (classification EW) • That cavity barriers are installed • That the building is protected by a sprinkler system.
AS 5113	<p>An Australian Standard for testing and classifying external walls based on their fire performance. The test requires a large-scale model of the external wall assembly system including the cladding, fixings and cavity barriers if they are part of the proposed external wall system. The test subjects the external wall to a controlled fire resembling flames penetrating a window. It assesses temperature change, flaming, openings, flame spread, debris and flaming debris.</p>
Cavity barriers	<p>Material used to physically separate and seal off compartments of an external wall cavity to prevent the spread of flame and smoke, for example around windows or between storeys of the building.</p>
Performance solution	<p>A bespoke solution used to demonstrate how a proposal complies with the performance requirements of the BCA. A performance solution can be used as an alternative to, or in combination with, the prescriptive 'deemed to satisfy' provisions.</p>

Generally, product that is recommended for replacement should be removed in full. Any very minor areas that need to remain post-remediation for practical reasons would require a detailed risk assessment and performance solution. For example, small areas of cladding around balcony fixtures or tiling may be capped and left in place where full removal would require re-tiling or removing balcony fixtures. Retention of these minor areas must have no adverse effect on occupant safety, fire fighter safety, and must not give rise to fire spread between floors or units.

In addition combustible insulation and any other combustible component of the external wall should be removed, with the whole cladding system replacement undertaken using materials and systems as described in section 8 below.

7.2 Reasons

The removal of composite panels with greater than 8 per cent combustible content has been recommended based on several factors. These are:

1. The Insurance Council of Australia's guidance on managing and insuring risk. Products with greater than 8 per cent combustible content fall into either medium or high risk for insurance.
2. Fire and Rescue NSW has concerns both about fire spread and about the risk of falling debris from panels involved in a fire, and the Project Remediate advice is in line with their recommendations.
3. There have been several testing and research projects that indicate that products with 8-30 per cent combustible material (the so-called 'FR panels') have generally only achieved acceptable performance in large scale fire tests when combined with certain other fire spread inhibiting measures such as non-combustible insulation and cavity barriers. The paucity and poor accuracy of information for as-built cladding systems on buildings means that there can be little confidence that these measures have been installed, and as such there can be no guarantee that they are providing a low risk environment for occupants.
4. Panels with a low combustible content (generally up to approximately 8% and called A2 panels) contain a much lower quantity of combustible materials that could contribute to a fire. This is evidenced by a total calorimetry screening method developed for ACP in the UK, which ranks the core materials into three categories aligning with a European classification based on the energy release. This forms the basis of the Insurance Council of Australia, and several other, risk ranking protocols. A2 panels have also been seen to pass the BS8414 large scale test in certain system assemblies.

As such, these panels present a significantly lower risk than the polyethylene (PE) and FR core products. Whilst there may still be a fire risk, depending on construction methodology and if combustible insulation has been used, this has been considered to

be suitably low that retention of these panels is feasible.

A2 panels that have been tested as part of a system that meets AS5113 may be considered as part of the second tranche of endorsed products for Project Remediate, based on their low fire risk and performance. Suitable evidence will need to be provided by manufacturers and suppliers for assessment by the CPSP, and this will be further considered in later tranches for replacement products and systems.

8. Replacement products and systems

The initial CPSP recommendations reflect the low risk tolerance of Government in remediating residential apartment buildings.

The Panel's recommendations cover both cladding products and cladding systems associated with their installation. For example, there is little value installing a non-combustible cladding product if the fixation methods (i.e. clips, adhesives etc) involve materials which are combustible causing the system to fail in a fire.

8.1 Project Remediate's approach will exceed Building Code of Australia Requirements

The CPSP is recommending solutions to external wall systems in line with its low-risk stance that reflect best practice in cladding system replacement (which includes overseas practices where appropriate), as outlined in Section 5. This means the recommendations for rectification under Project Remediate require more than the minimum standard currently reflected in the BCA for external wall systems for high-risk multistorey residential buildings.

8.2 Fire safety criteria for replacement products and systems: initial tranche

In light of the considerations outlined above and the risk approach outlined in section 5, the CPSP has decided to nominate acceptable very low risk options in its initial tranche of endorsed products and intends to continue to evaluate and assess other products and systems for release in later tranches.

The CPSP's criteria are applied as follows for tranche 1:

- Products and systems that are non-combustible according to the BCA, i.e. not deemed combustible as determined by AS 1530.1 – Combustibility Tests for Materials, or

- Products and systems that can be used where a non-combustible product is required as permitted by the deemed to satisfy provisions of the BCA, excluding bonded laminate products.

Insulation and any other materials forming the cladding systems and external walls are also to be non-combustible, except where otherwise permitted by the BCA (e.g. gaskets, sealants and flashing).

In this initial tranche the following cladding products and cladding systems are considered acceptable replacement options:

- solid aluminium,
- solid metal sheets,
- fibre cement,
- non-combustible cement render.

The reasons for selecting these product categories are detailed below.

Solid aluminium

Installed as part of a suitable external wall system, solid aluminium is a low risk and compliant cladding product. Solid aluminium products are typically a flat sheet of aluminium, often 3mm thick, with an applied paint coating. The sheets are typically cut to size and the edges can be folded to allow mechanical (non-combustible) fixing. Solid aluminium products are known to pass the AS 1530.1 test for combustibility, but it will be necessary for each manufacturer to produce test report evidence of this.

The CPSP has noted concerns expressed about the use of solid aluminium as a cladding product, including suggestions that aluminium panels spread fire on a building in a manner comparable to combustible composite panels. These suggestions are false and unfounded.

Aluminium will melt at very high temperatures, like other metals, and has a very high combustion temperature. However, solid aluminium panels installed on a building do not spread flame in a building fire. This is in contrast to composite panels containing polymeric materials such as polyethylene which have low combustion temperatures and can contribute to rapid fire spread as seen in the Lacrosse and Grenfell Tower fires.

The aim of non-combustibility requirements in the BCA is to prevent the spread of fire between the compartments of buildings, i.e. between units or vertically between storeys. Non-combustible materials such as solid aluminium panels do not contribute to fire spread and are a suitable product as part of a compliant external wall assembly system. Consideration does need to be given to any gaps behind the aluminium panels that may

increase flame projection, and hence the use of cavity barriers form part of the design requirements considered by Project Remediate.

There is a risk that aluminium panels may fall away from a building in a fire if they are not affixed appropriately. The same can be said of many materials used in the construction of buildings. This risk is mitigated when panels are installed in accordance with the CPSP's guidance on cladding system design, which requires mechanical fixing.

Solid metal sheets

Solid metal sheets, in addition to aluminium, are compliant with the BCA when installed as part of an external wall. Typically these are steel-based, solid metal sheets with high melting and combustion temperatures.

Installed as part of a suitable external wall system, solid metal sheets are a low risk and compliant cladding product. Metal sheeting products come in many shapes and forms with varied fixing requirements and coatings. As such it will be necessary for each manufacturer to provide evidence that their product(s) comply with all relevant provisions of the BCA.

Fibre cement

Fibre cement sheets are compliant with the BCA when installed as part of an external wall. They may be used wherever a non-combustible material is required as per clause C1.9 of the BCA. As with all cladding products, fibre cements sheets need to be considered as part of the whole cladding system.

Fibre cement sheets contain a small amount of combustible organic fibre which is coated with the cement. These products perform well in fire tests. The BCA and previous building codes have allowed their use for over 45 years in NSW.

Non-combustible cement render

There may be scenarios where either there is not space for a replacement cladding system to be installed on a building, or where the current combustible cladding product is performing an aesthetic function only. In this case a simple painted non-combustible cement render solution may be the simplest, most cost effective or most practical solution.

8.3 System design requirements

Using these products, the full external wall systems must meet the Deemed to Satisfy (DTS) provisions under the BCA for fire safety, plus additional requirements, these being the installation of cavity barriers and mechanical fixing.

Cavity barriers

Cavity barriers are used where there are gaps behind cladding systems that could form a path for fire spread, like a chimney. This can happen even when the cladding system itself is non-combustible, from fire breaking out of a window or door of an apartment or other part of the building. Cavity barriers generally act to stop the floor-to-floor fire spread through the cavity formed between the cladding system and the remainder of the external wall of the building.

Cavity barriers in external walls need to be installed in appropriate locations and need to be effective in the context of mitigating or minimising fire spread within cavities formed in the external walls. Some examples of where they are to be used are as follows:

- Around windows, doors and other openings;
- At horizontal slab edges between storeys;
- Vertically where internal bounding walls (fire rated) between sole occupancy units and/or between sole occupancy units and common areas meet the façade.

Mechanical fixing

Mechanical fixing manufactured from fire-proof materials for external wall panels is required to prevent large pieces of debris falling off a building in a fire, which can happen more easily and at lower temperatures when panels are fixed by tape or adhesives.

Tape fixings and most pertinent adhesives soften below 120 degrees Celsius which could cause panels to fall from the building. Fire-proof mechanical fixings are not subject to failure at these temperatures.

Meeting the Deemed to Satisfy requirements

Full compliance with AS1530.1 is required for each cladding product and cladding system, apart from where a combustible product can be used where a non-combustible product is required and permitted under the BCA. Bonded laminates are subject to further consideration and are not proposed in tranche 1.

The CPSP is also mindful of the NCC review agenda of the ABCB. The Panel notes the ABCB is currently undertaking a review of the *fire safety requirements for external walls* as a two-stage project, which is looking to deliver certain outcomes for NCC 2022 (stage 1) and other potential outcomes for NCC 2025 (stage 2).

In the initial tranche the CPSP is not recommending products which are proposed for further consideration at the national level, because more detailed review of these products is required before the CPSP makes any recommendations on them.

8.4 Future tranches

The CPSP will continue to evaluate and assess cladding products and cladding systems with a view to including any additional replacement cladding systems that are proven to be suitable in later tranches of endorsed products and systems. Outcomes will be released in the form of future reports. Any consideration of products and systems for endorsement will seek to reduce or minimise the risk of future non-compliance and ensure fire safety issues are not passed onto owners corporations and occupants.

This may include consideration of, for example:

- composite panels with a core comprised of less than 8% combustible material by mass capable in external wall systems that meet verification method CV3
- bonded laminate products.

The panel will consider submissions that are supported by independent testing of products and systems as outlined in section 6.

In terms of the testing and certification of products, it is noted that reliance on Codemark certificates alone is not acceptable because such an approach often does not consider the entire cladding system. The product and system as a whole must be tested for the Panel to consider endorsing its use.

9. Replacement systems

Cladding replacement systems need to be designed fully for each building by appropriate professionals. The Panel notes that it may not be possible to replace cladding systems with a like-for-like solution, however comparable or improved outcomes should be sought where possible for the building.

System design will need to take into account:

- Structure including wind loading
- Weatherproofing

- Condensation
- Thermal performance/energy efficiency
- Fire safety
- Durability
- Acoustics
- Aesthetics.

As noted in section 6, the panel requires that all data in support of the above properties and presented with submissions, must be from an independent testing facility, but unlike for fire testing a NATA-accredited test laboratory is not required.

The CPSP notes that to ensure remediation work under Project Remediate meets the program's performance and quality expectations, a Principal Façade Designer will be engaged. The Principal Façade Designer will be expected to develop a set of guidelines and overarching design principles to be used by design teams for the detailing of each project. These principles will include, but not be limited to, some or all of the properties outlined above, which are important to satisfy reasonable consumer expectations. Detailed designs developed for each project will be reviewed by the Principal Façade Designer .

10. Next steps

The panel is continuing to review the remaining and emerging cladding products and cladding systems available in the NSW market. As additional products and systems are considered following receipt of submissions from stakeholders, further recommendations will be made to Government on endorsed suitable products and systems.

11. Recommendations

The CPSP recommends:

1. The Government note the cladding product categories shown in Attachment 2, which are endorsed for use in Project Remediate subject to the stipulations of this report.
2. The Government note that the CPSP considers that the entire replacement *system*, i.e. in addition to the cladding product, must satisfy design requirements outlined in section 9 of this report.
3. That the product categories listed in Attachment 2 be used by the Managing Contractor, Principal Façade Designer and project designers to formulate cladding remediation solutions for Project Remediate, in addition to any products and systems that may be recommended in future reports.
4. That the Principal Façade Designer appointed under Project Remediate consults with and incorporates the advice of the CPSP in the guidelines it provides to project designers.
5. That Government make the Panel's advice publicly available to assist building owners, councils and other interested parties.

Attachment 1 - Background from the NSW Cladding Taskforce

The NSW Government has been addressing risks associated with combustible external wall cladding since 2014. The risks, and the context in which they have emerged, are complex. It is useful to recap here some of the key developments during this time and how this context led to the establishment of the CPSP and informs and influences its work.

The BCA has long required the external walls of certain multi-storey buildings to be non-combustible.

In November 2014 a fire occurred at the Lacrosse Building in Melbourne. The fire began from a cigarette discarded on a balcony and spread vertically via the building's cladding from the 8th floor to the top of the 21-storey building within 10-15 minutes. Legal proceedings apportioning liability between the tower's builder, architect, building surveyor and fire engineer concluded in February 2019.

In 2015 the (then) NSW Department of Planning and Environment (DPE) issued a Planning Circular to NSW councils, certifiers, builders, architects, building designers, industry practitioners and other stakeholders about the requirements in the BCA for the external walls of certain buildings to be non-combustible. DPE also wrote to local councils in 2016 asking them to consider buildings in their local areas that may be affected by combustible cladding.

Highlighting the complexity in this area, in 2016 the ABCB issued an Advisory Note providing guidance on interpreting the existing NCC provisions relating to the fire performance of external walls, to assist practitioners with product selection, installation and certification.

Separately in 2016 the ABCB noted: "There is a paucity of credible evidence about external cladding products used on high rise (Type A and B construction¹) buildings in Australia. There is no collected data series that show the number of relevant products, the extent and nature of testing of these products and the extent that these products are currently being used in a non-compliant manner".

Grenfell Tower

The Grenfell Tower fire occurred in London on 14 June 2017, starting in an apartment on the fourth floor before penetrating a window frame and spreading via the external wall cladding, reaching the top of the 24-storey building in a matter of minutes and spreading in

¹ The National Construction Code requires different types of construction depending on a building's size and usage. Type A and B require the highest fire resistance.

all directions to soon involve the entire façade. A UK Public Inquiry found in its Phase 1 report that the principal reason for the rapid fire spread was the presence of aluminium composite panel cladding with a combustible polyethylene core. Phase 2 of the Inquiry is ongoing.

Establishment of the NSW Cladding Taskforce

The NSW Government established the Cladding Taskforce immediately following the Grenfell Tower fire, to coordinate the NSW Government's ongoing work to identify and make safe any buildings in NSW that may be affected by combustible cladding. As the ABCB had noted previously, there was no available dataset identifying the types of cladding products installed on high-rise buildings. The Data Analytics Centre and the Department of Planning, Industry and Environment conducted data audits of Departmental records and a proprietary building approval dataset totalling 185,000 building records, to identify possible uses of flammable external wall cladding products. The data audit was combined with surveys of NSW councils, an online Cladding Register and inspections by Fire + Rescue NSW to identify potentially affected buildings. Over 4,000 properties were inspected by Fire + Rescue NSW officers to validate whether they had potentially combustible cladding installed. Of these, at the time of this report there were 372 residential and non-residential buildings with potentially combustible cladding under review, assessment or remediation.

The Taskforce's experience with inspecting buildings and identifying cladding products

When Fire + Rescue NSW officers conducted inspections they visually assessed the cladding on each building. Buildings were categorised as 'high-risk' if they appeared to have cladding of a type, amount and configuration that increased the risk of fire spread and risk to occupants or firefighters. From a visual inspection it is often not possible to distinguish a combustible cladding product from a non-combustible material. To manage this, Fire + Rescue NSW categorised buildings as potentially high-risk if there was any uncertainty about the material. The Cladding Taskforce adopted a process whereby Fire + Rescue formally referred all potentially high-risk buildings to the local council or consent authority using powers under the *Environmental Planning and Assessment Act 1979*, which required councils to investigate and report back on the building's fire safety provisions.

Fire + Rescue and the Taskforce monitored the investigations by councils and provided guidance on the standards of investigation and evidence required. For example, relying on building plans and documentation is not sufficient to identify the type of cladding installed, since it is not uncommon for products to have been substituted during the construction process. Relying on a previous assessment of a building's fire safety carried out by a consultant who was involved in the initial design and construction of the building was also not acceptable, nor was any assessment conducted against versions of the BCA earlier than 2016 Amendment 1, which commenced in March 2018. This is because the risks of

combustible cladding products were historically less well understood and this amendment introduced clearer requirements regarding the non-combustibility of external walls.

The composition and combustibility of cladding products often cannot be determined visually even with full access to the façade, and laboratory testing of core samples is required. Samples must be judiciously taken from multiple areas of the building to account for the potential use of different products in different locations. The experience of the Taskforce in overseeing the inspections by Fire + Rescue NSW and investigations by consent authorities highlights the importance of reliable product testing and robust risk assessment methodologies.

Related NCC changes 2018 to now

In March 2018 amendments were made to the NCC which featured a package of measures to address fire safety in high-rise buildings. The key changes included:

- A new clause C1.9 to consolidate the provisions relating to non-combustible building elements, clarify the components that form part of an external wall and introduce additional concessions for certain minor components.
- The amendment of an existing provision relating to ‘attachments’ and introduction of a new clause C1.14 which included a list of ancillary elements that could be attached to an external wall that is required to be non-combustible.
- A new Verification Method CV3 (Fire spread via external walls)
- Revision of the NCC’s evidence of suitability provisions.
- Clarification of provisions relating to the fire hazard properties of building elements.
- Increased stringency for the sprinkler protection of balconies (through referencing an updated Australian Standard)

Further to these changes, the ABCB also produced the Evidence of Suitability Handbook 2018 and a revised version of the Advisory Note 2016-3 Fire Performance of External Walls and Cladding.

In relation to the consideration of bonded laminate materials, the Public Comment Draft of NCC 2019 proposed the concession to be removed however due to issues raised in stakeholder feedback, the concession was retained.

In July 2020, the NCC was amended to introduce a new requirement for the labelling of Aluminium Composite Panel (ACP) Products.

These changes are important and demonstrate the responsiveness of the Code to changing understandings of fire safety risks associated with certain products and building elements. They also highlight the detailed nature of building code requirements in this area

and the need for the CPSP to take a thorough and cautious approach that is mindful of both the current requirements and potential reviews and amendments.

The NSW Building Product Use Ban

In 2018 the Commissioner for Fair Trading called for submissions on a possible ban of aluminium composite panels, polystyrene and similar cladding products. A wide range of submissions was received. This included submissions from cladding product suppliers against or in support of a ban on particular types of products. The Commissioner subsequently issued a prohibition on certain uses of aluminium composite panels with a core comprised of greater than 30 per cent polyethylene by mass, unless the product or external wall system passed specified fire tests. In making this decision the Commissioner noted that “at present, the NCC is not sufficient to regulate building products and cannot be relied on in isolation to address the safety risks associated with the use of ACP with a core comprised of greater than 30 per cent PE by mass” and that “misapplication of or non-compliance with the performance requirements of the NCC raises a significant risk and concern for the safety of buildings and the community”.

It is important that the CPSP similarly carefully considers whether the NCC in isolation is an adequate benchmark for the safety of cladding systems.

The NSW Cladding Register – requirement to register metal composite panels and insulated cladding systems

In 2018 the Department of Planning, Industry and Environment implemented amendments to the Environmental Planning and Assessment Regulation to require owners of class 2, 3 and 9 buildings to register the building’s details if it had metal composite cladding product or an insulated cladding system installed. This resulted in over 2,000 registrations, of which around 1,500 appeared to be buildings not previously assessed by the Taskforce. After each of these were inspected by Fire + Rescue officers, 1,000 were assessed as having no potentially combustible cladding. Of the approximately 500 that had some form of cladding, 178 were assessed as potentially high-risk.

The relatively low accuracy of the information registered by owners is partially due to the approach taken in publicising the register, which encouraged owners to register if they were not sure of their building’s type of cladding. This maximised the opportunity for the Taskforce to identify affected buildings. It also highlights an understandable lack of technical knowledge amongst many building owners and property and building managers when it comes to cladding products. As part of the assurance layer of Project Remediate, the CPSP will assist in resolving some of the technical complexity associated with potentially combustible cladding.

The need for technical review and guidance

The Cladding Taskforce has heard from local councils and building owners that assessing cladding products is challenging. Consultant reports purporting to justify the retention of combustible cladding on buildings have been found by councils to be of variable quality, with some relying on insufficient investigation or testing, or defunct evidence of compliance. Councils and residential building owners have sought independent guidance on products and systems that are suitable to use in remediation projects, because the reliability of information available from suppliers and proponents is not guaranteed.

The NSW Government established the Cladding Support Unit and the CPSP to make dependable information and advice available. To ensure this is the case, the CPSP scrutinises available information before making recommendations.

The need for technical guidance was also a key reason for establishing Project Remediate. Cladding remediation often poses both a financial and technical challenge particularly to the owners of residential apartment buildings. The program will address both of these challenges. Non-residential building owners are far more likely to have:

- A 'single owner' ownership structure
- The financial capacity to fund remediation work
- Sophisticated building management and risk management capabilities
- The capacity to deploy or procure building assessment, fire engineering and remediation technical expertise.

As a result, the Taskforce has observed that non-residential buildings identified by the Taskforce are often remediated and made safe promptly and proactively by building owners in consultation with the consent authority. The Taskforce continues to track the status of these buildings as reported by councils and consent authorities, which issue the necessary orders or approval for interim safety measures and remediation work, and ensure compliance.

The Cladding Support Unit

Throughout the work of the Taskforce, local councils have been a critical partner in understanding and identifying risks and responses. As noted above, the statutory roles and powers granted to councils under NSW planning legislation make councils a critical element in working with fire authorities, the Taskforce, the construction industry and owners and communities. Both the Taskforce and councils faced similar challenges in responding to the risks and issues associated with assessment of cladding products and usage.

The Cladding Support Unit was established in August 2019 to provide a one-stop-shop for coordination, collaboration and information sharing between the Taskforce and councils. The Cladding Support Unit also established a direct and secure platform for sharing information between the Taskforce and councils to ensure that there was a single source of truth on affected buildings drawing on all sources available to councils and the Taskforce. This collaboration underpins the high degree of certainty and confidence that underpins Project Remediate about the identification, triaging and assessment of affected buildings.

Adhesives and tapes

The NSW Government recognises that it is not only cladding products but the whole system that needs to be considered when assessing fire safety and other performance elements of a building. In July 2020, Minister Anderson wrote to the then Chair of the ABCB, the Hon. John Fahey, AC, GCSG, highlighting the issues and potential risks associated with ‘bonded laminate materials’ and the use of adhesives and double-sided tapes.

In his letter, Minister Anderson asked the ABCB to prioritise consideration of bonded laminate materials, adhesives and double-sided tapes as part of the proposed review of fire safety requirements for external walls.

The ABCB is undertaking a review of the *fire safety requirements for external walls* as a two-stage project, which is looking to deliver certain outcomes for NCC 2022 (stage 1) and other potential outcomes for NCC 2025 (stage 2).

The CPSP was established with terms of reference that include assessing cladding products *and external wall assembly systems*. The Panel’s recommendations for Project Remediate cover both products and systems and assembly methods, as both are equally important.

Deficiencies in product literature

The Cladding Taskforce has taken a keen interest in the product literature made available by cladding product manufacturers and suppliers, including technical specifications and manuals as well as promotional brochures and website marketing. Accurate product information is important to enable building designers to make informed decisions when selecting and specifying products; in some instances information about the performance, testing, suitability and compliance of products has been incorrect, incomplete or potentially misleading. The Taskforce has written to the publishers of such material and required them to withdraw or correct it. Consequently, the CPSP takes a cautious approach to reviewing product literature and seeks evidence for claims by way of independent verification and/or testing.

Grenfell Tower Inquiry – product testing, certification and marketing

As noted above, Phase 2 of the Grenfell Tower Inquiry is ongoing. Module 2 of Phase 2 deals with the testing, certification, marketing and promotion of cladding products. While findings have not yet been issued, evidence and testimony to the Inquiry indicate serious problems with the testing and marketing of cladding products in the UK. This includes conduct by suppliers such as manipulating testing of their products and competing products, misusing testing certificates, and marketing their products for purposes for which they are not suitable. This is not evidence of the same conduct occurring in Australia. However, the building regulations, test requirements, product types and competitive marketplace are similar. Again, a cautious and conservative approach by the CPSP is warranted, and cladding products and systems should not be endorsed without thorough and independent review of their suitability.

Approaches in other jurisdictions - Victoria cladding prohibition & CSIRO report

Like NSW, other jurisdictions in Australia have taken steps to prohibit uses of certain cladding products. In addition to a previous Ministerial Guideline placing limitations on the use of aluminium composite panels with a core of greater than 30 per cent polyethylene, Victoria recently imposed a prohibition on certain uses of aluminium composite panels with a core of less than 93 per cent inert mineral filler and expanded polystyrene products. Victoria released a commissioned review by the CSIRO on types of aluminium composite panels, their composition, performance and treatment under the NCC and other Australian and international building regulation frameworks. The CPSP has considered the Victorian prohibition and the CSIRO report.

John Tansey

Chair, NSW Fire Safety & External Wall Cladding Taskforce

Attachment 2 - Tranche 1 endorsed products for use in Project Remediate

Product category	Recommendation
Solid aluminium	Recommended subject to design and testing requirements
Solid metal sheets	Recommended subject to design and testing requirements
Fibre cement	Recommended subject to design and testing requirements
Non-combustible cement render	Recommended subject to design and testing requirements

Office of the Building Commissioner

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