

Cladding Product Safety Panel Report 2:

update on CPSP undertakings and
additional replacement cladding
materials for Project Remediate

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Author details

Name: Mark Hoffman	Position: CPSP Chair
Email: CPSP@customerservice.nsw.gov.au	

Contact details

CPSP Secretariat
Email: CPSP@customerservice.nsw.gov.au

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1. Executive Summary

The NSW Cladding Product Safety Panel (CPSP) provides expert advice to support the [Cladding Taskforce](#) and the NSW Government's [Project Remediate](#) on the suitability of cladding replacement products and external wall assembly methods. This advice will inform the approach to cladding rectification work carried out under Project Remediate. The CPSP considers current building compliance requirements under the National Construction Code (NCC) and evolving standards to determine suitable, safe, tested and high-performance replacement products and systems. The CPSP recommends using materials and systems that achieve best practice results in terms of quality and compliance.

In April 2021, CPSP Report 1 was released which endorsed an initial list of 4 materials which can be used within Project Remediate. These initial materials are all currently recognised as non-combustible and reflect the low risk tolerance of the NSW Government in remediating residential apartment buildings.

Following the release of Report 1, Project Remediate has commenced on-site triage activities in advance of the removal of combustible cladding from the first tranche of the high-risk residential apartment buildings. Concurrently, the CPSP has taken steps towards reviewing and endorsing additional cladding products and systems.

CPSP Report 2 provides a status update on the various activities of the panel since the publication of CPSP Report 1 and, most importantly, informs the industry and the public about the additional cladding materials that are now determined to be suitable for use in Project Remediate. This report will provide an update on the following:

- Engagement with suppliers to gather detailed information on materials proposed for use in Project Remediate;
- Publication of a consolidated list of materials that have been proposed and are currently under CPSP consideration;
- Consultation with suppliers and the development of a 'reference' material test to inform the CPSP's assessment of bonded laminated materials proposed for use in Project Remediate;
- Findings of 'reference' material testing, and recommendations related to additional cladding materials endorsed for use in Project Remediate.

This report also demonstrates the NSW Government's commitment to inform the industry about the ongoing work of the CPSP. The panel is constantly reviewing submitted materials and will continue to provide evidence-based advice to support Project Remediate.

2. About this report

1.1 Background

This is the CPSP's second report. It provides a progress update and reports on the activities that the CPSP has performed since the publication of Report 1, including development of reference material testing and endorsement of additional replacement cladding materials for Project Remediate.

The CPSP emphasises the importance of considering the entire *cladding system* when evaluating cladding remediation options. This encompasses not only cladding materials but the combination of materials including external wall assembly methods that form the façade of a building. In its first report, the CPSP endorsed 4 material categories for replacement of cladding products and systems for use within Project Remediate, subject to design and installation requirements:

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

CPSP Report 1 outlined the following criteria for endorsing replacement cladding materials for Project Remediate:

- Products and systems that are non-combustible (Australian Standard (AS) 1530.1 test) according to the National Construction Code (NCC)
- Products and systems that can be used where a non-combustible product is required as permitted by the Deemed-To-Satisfy (DTS) provisions of the NCC, excluding bonded laminated products which required further consideration.
- 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.

Report 1 highlighted that cladding replacement systems need to be fully designed for each building, taking into account performance elements such as but not limited to structural loads including wind loading, weatherproofing, condensation, thermal performance, durability, acoustics and aesthetics. Full design needs to be informed by a clear understanding of the building framing and structure, undertaken in advance of remediation works commencing. Report 1 also highlighted the importance of product testing which will be discussed further in this report.

One of the recommendations of CPSP Report 1 was for the Global Façade Consultant (GFC) for Project Remediate to develop a 'pattern book' of design guidelines that will set minimum standards across the program. ACOR Consultants Pty Ltd has been appointed as the GFC for Project Remediate. Preparation of a 'pattern book' of cladding replacement solutions, is underway.

1.2 Objective

This CPSP Report 2 provides an update on the ongoing CPSP undertakings and confirms additional replacement cladding materials for use in Project Remediate. It will provide an update on the following:

- Engagement with suppliers to gather detailed information on materials proposed for use in Project Remediate;
- Publication of a consolidated list of materials that have been proposed and are currently under CPSP consideration;
- Consultation with suppliers and the development of a 'reference' material test to inform the CPSP's assessment of bonded laminated materials proposed for use in Project Remediate;
- Findings of 'reference' material testing, and recommendations related to additional cladding materials endorsed for use in Project Remediate.

3. Material submissions to CPSP

The CPSP continues to assess the existing and emerging cladding products and systems that are available in the NSW market. In order to compile detailed information about materials for CPSP's consideration, an online [application form to supply cladding materials or systems](#) was published on 30th August 2021. The purpose of the form is to guide suppliers through the process of compiling and submitting specific information and required evidence regarding the performance of each material. The CPSP also announced the launch of the online application during the [Industry Briefing](#) held by Project Remediate on 1st September 2021 which was viewed by over 500 people.

Suppliers are encouraged to submit information about any cladding products and systems they wish to propose for consideration via the online application form. Applications will be reviewed by the GFC and the CPSP. Products representing endorsed cladding material type will then be considered by the designers of particular buildings for design and, subsequently, procurement.

As of 22nd March 2022, the CPSP has received 77 material submissions from 35 unique supplier companies via the online application form (see Appendix 1). The submissions consist of:

- 24 solid products (includes solid aluminium, fibre cement, ceramics, etc),
- 7 bonded laminate materials (BLM),
- 37 ancillary products (includes joint sealant, cavity barriers, sarking, etc) and
- 8 wall systems.

4. Publication of materials list

A [consolidated list](#) of cladding replacement products and systems submitted to the CPSP by direct email (prior to release of application form) or through the online application process has been published on the [CPSP page](#) on the NSW Government website. It is important to note that this list does not represent cladding replacement products/systems that have been endorsed. This information is published to provide transparency regarding the cladding products and systems that the CPSP will be considering further. The list includes certain information about each material based on the submission, or information obtained from other sources such as supplier websites.

The CPSP acknowledges the industry-wide support that has been provided by the cladding suppliers who have engaged with the CPSP and have provided information about their products and systems to date.

It is noted that the online application will remain open and the consolidated list on the website will be updated periodically.

5. Reference Material Testing

CPSP Report 1 noted that bonded laminated materials (BLM) were not endorsed at that time, and that they would be subject to further consideration by the CPSP. The CPSP has developed a reference material test methodology to assess the fire hazard properties of BLM type cladding systems. The NCC also requires that each lamina of a BLM, including any core, be non-combustible as determined by AS 1530.1, under the DTS pathway.

The following sections elaborate on the test methodology, the subsequent industry briefing with the bonded laminated material suppliers, and the findings of the critical test specimens.

5.1 Test methodology

For the reference material testing, Project Remediate commissioned testing for the following two representative types of BLM:

- aluminium skin - mineral core
- aluminium skin - aluminium core

The testing methodology is designed to assess the performance of samples inclusive of joints and perforations which would be applicable in real life wall installation. BLM (as a whole assembly) with surface finishes and joints and perforations shall be tested to determine Spread-of-Flame and Smoke-Developed indices in accordance with clause C1.9 (e) (vii)(C) and Schedule 6 of the NCC.

Project Remediate liaised with relevant bonded laminated materials suppliers to procure test specimens.

5.2 Industry consultation

Project Remediate conducted an industry briefing on its then proposed reference material testing with bonded laminated materials suppliers on 17 November 2021. Prior to the briefing, the test methodology was circulated to the suppliers for review and feedback. The suppliers were asked to provide their feedback on the methodology. One of the key aspects of the briefing was to confirm that the commissioned testing would include samples prepared with typical joints and typical perforations that would commonly be found in Project Remediate buildings.

Overall, the industry feedback received during the hybrid briefing session (in-person and Microsoft Teams online platform) was supportive of the proposed test methodology and the approach of Project Remediate to engage suppliers to develop the testing procedure. Feedback gathered through this process was incorporated into the test specification (see Appendix 2).

Based on the advice of the CPSP, Project Remediate arranged for test samples procurement and organised the testing through CSIRO, North Ryde (Sydney) which is a National Association of Testing Authorities (NATA) accredited test facility.

The CPSP would like to thank the industry for their participation in the consultation process.

5.3 Findings of reference material testing

The reference material tests commenced at CSIRO in early January 2022. Due to the volume of the test specimens and number of tests to be conducted, the testing of different specimens was scheduled in three batches – Batch A, Batch B and Batch C. To avoid delays in acquiring the complete set of test results, the following schedule was designed for reference material testing using the test procedures of AS/NZS 1530.3:

1. Batch A comprised specimens with joints and perforations and was tested first. The joints and perforations were as per the test specification in Appendix 2. This set of BLM specimens was tested with the front aluminium skin facing the heat source.
2. Batch B testing followed Batch A and comprised specimens with perforations. The perforations were as per the test specification in Appendix 2. This set of BLM specimens was tested with the rear aluminium skin facing the heat source.
3. Batch C was the final testing conducted. It consisted of specimens with no joints and no perforations. The testing of this batch was conducted with both front and rear aluminium skins facing the heat source.

The findings from all test batches are important to understand the relevant fire hazard properties of BLMs under consideration.

Based on the CSIRO test reports for Batches A, B and C, the CPSP notes that the representative BLM met the Spread-of-Flame and Smoke-Developed indices in accordance with clause C1.9 (e) (vii) (C) and Schedule 6 of the NCC.

These results provide a complete set of information about the relevant fire hazard properties of BLM under different configurations of testing.

6. Additional replacement cladding materials

The CPSP in collaboration with the Project Remediate team conducted extensive research, evaluation and review of wide range of material information, test results, professional test standards and industry best practices to put forward recommendations for additional replacement cladding materials as suitable for use in Project Remediate. Following are the second tranche of endorsed materials suitable for the project:

6.1 Metal sub-framing components

Metal sub-framing components are used as the structural support for buildings and façade cladding materials. The framing components are typically steel and aluminium. These products are key components in buildings and facades and have generally been deemed non-combustible in accordance with the NCC, with their fire resistance accepted subject to relevant structural design parameters.

Typically, these components include:

- Structural sections (Parallel Flange Channel, Square Hollow Section, etc)
- Top hats (galvanised steel, aluminium – mill finish/powdercoated/anodised)
- Anchors and fixings (stainless steel/galvanised/coated)

The CPSP endorses the use of metal sub framing components subject to compliance with the declared design requirements under the Design and Building Practitioners Act 2020 including sign off by an appropriate registered practitioner. It advises the GFC to provide further guidance to designers on the specific performance requirements of these products when it comes to structural, facade and durability designs.

Notwithstanding the endorsement of these materials, the CPSP is also mindful of the fact that packers are frequently used to adjust tolerances during installation of façade systems. Although plastic and nylon packers are commonly used, the CPSP advises that only non-combustible aluminium packers will be used for Project Remediate buildings.

Further, the CPSP notes that the corrosion resistance of these materials varies with composition and type of protective coating (if any). The use of the materials for packers must, therefore, also consider their environmental exposure classification and associated durability requirements and a consider compatibility with other metals which they may be in contact with to ensure that galvanic corrosion does not occur.

6.2 Engineered Ceramic Cladding Systems (ECCS)

The term 'Engineered Ceramic Cladding Systems' (ECCS) has been adopted specifically for Project Remediate to cover cladding systems that typically include proprietary

'engineered' sub-framing with typically terracotta or porcelain tiles as the cladding. The terracotta components of these systems are made of clay extrusions and fired in a kiln at temperatures of approximately 1,000 degrees Celsius. Porcelain is a similar material and is produced in the same manner. These cladding systems are similar to aluminium panel cladding systems in that they consist of a metal sub-framing system, sarking and insulation as backing layers.

The CPSP endorses the use of ECCS that have been determined non-combustible by way of testing to AS1530.1 according to CPSP requirements and for which the results have been made available to the GFC for a particular building design. These testing results are to be considered by designers with reference to the guidelines provided by the GFC and forming part of the pattern book.

In addition to the above prerequisites for the use of ECCS, the CPSP recommends two further conditions. One condition is that the fixings should be of the capacity and quality that suits the product system. The second condition is that the application of these cladding systems must have provisions for cavity barriers and non-combustible mechanical fixings.

6.3 Bonded laminated materials subject to Project Remediate reference testing

In Report 1, the CPSP identified four categories of cladding replacement materials that were considered appropriate for use in Project Remediate, in accordance with 'Deemed to Satisfy' provisions of the BCA and additional design and installation requirements specified in the report. Bonded laminated materials (BLM) were not included in the list of endorsed materials in Report 1. Since then, these materials have been the subject of further investigation and testing.

The safety of the public as well as the first responders are central to what the CPSP is envisioning to deliver in Project Remediate. The CPSP considers the thorough analysis of BLM as significant and the detailed investigation undertaken has ensured adherence to the low-risk tolerance principle for the program. The CPSP examined the BLM submissions by industry and designed a reference material test methodology that would include samples prepared with typical joints and typical perforations commonly to be found in Project Remediate buildings. The reference test was developed to align with the relevant BCA Deemed to Satisfy provisions.

In this Report 2, with the current evidence based on the material submissions and findings of reference testing (see section 5.3), the CPSP recommends the use of BLM materials in Project Remediate, *provided* they can demonstrate compliance to CPSP's reference material testing, which is set out at Appendix 2. As per all cladding systems, other requirements such as design and installation requirements will apply to the use of these materials on particular buildings.

7. Cavity barrier specifications

CPSP Report 1 outlined the requirement for cavity barriers where gaps (cavities) behind cladding systems could form a path for fire spread, like a chimney. This report will provide an overview of the cavity barrier specifications for Project Remediate.

Project Remediate aims to implement international best practice and therefore the CPSP specifies the use of cavity barriers behind external wall cladding to prevent the spread of fire. Cavity barriers are to be placed:

- 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.

Vertical barriers are to be “closed state” i.e., these types of barriers are to be filled permanently. Horizontal barriers are to be “open state” i.e., these types of barriers allow ventilation and drainage under normal conditions but block the gaps (cavities) in the event of a fire through, for example, the expansion of intumescent material. The current NCC provides limited guidance for cavity barriers behind external cladding, hence the CPSP suggests utilising the specification provided by the United Kingdom (UK) building code Approved Document B for performance and testing requirements.

Open-state cavity barriers are to be tested in accordance with the fire resistance test method specified in the UK ASFP Technical Guidance Document - TGD 19 and achieve the following as required in the Approved Document B:

- (i) Minimum 30 minutes’ integrity (E 30), and
- (ii) Minimum 15 minutes’ insulation (I 15).

Closed state barriers can be specified and tested under Australian Standards. The CPSP expects that these barriers have a minimum Fire Rating Level (FRL) of -/30/15 when tested in accordance with AS 1530.4:2014.

The CPSP advises that the Pattern book developed by the GFC should provide detailed information in relation to the design, installation and maintenance requirements of cavity barriers for Project Remediate.

The CPSP acknowledges the research work and technical drafting carried out by the GFC to formulate these specifications.

8. Material recycling program

Replacement of combustible cladding means a significant amount of material will be removed from buildings, including cladding panels as well as sub framing, fixings, sarking, tapes and sealants. It is estimated that circa 375,000m² of façade cladding will be remediated through Project Remediate. In terms of volume, this provides an opportunity to recycle ACP materials.

The CPSP, as well as the Project Remediate managing contractor and GFC, are advising Project Remediate on suitable, safe and efficient program-wide waste disposal and recycling arrangements to minimise the adverse impact on the environment and provide value for building owners.

9. Next steps

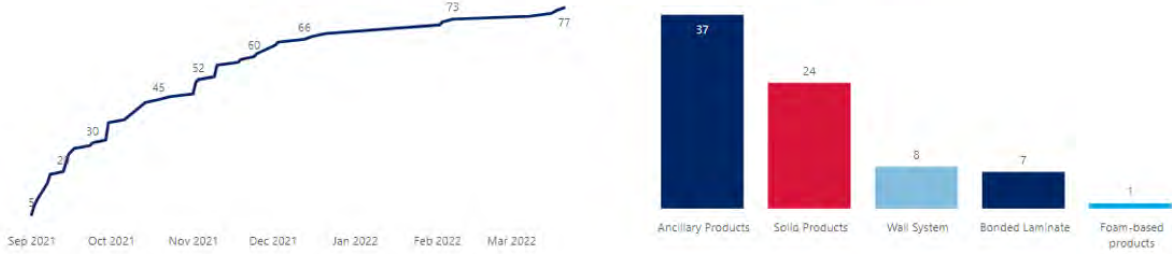
As outlined in CPSP Report 1, the CPSP's work plan seeks to balance the benefits of providing timely advice with the need for thorough investigation and consideration of the performance, testing and safety of cladding products and cladding systems. The CPSP note that providing trustworthy advice and findings allow building owners, councils and the remediation industry to access and act on the CPSP's advice appropriately. It also allows cladding suppliers to respond or adapt to the CPSP's criteria for product selection, performance, testing and documentation.

The CPSP will continue to update and consolidate the published materials list with new and emerging materials that are being submitted to the CPSP. CPSP will continue to work closely with the GFC to provide design guidance on structural loads including wind loading, weatherproofing, condensation, thermal performance, durability, acoustics and aesthetics.

Appendix 1 – Overview of material submissions

Material submission status as at 22 March 2022

77 cladding material submissions, from **35** companies



Appendix 2 – Project Remediate testing requirements for bonded laminate materials (BLM)

For BLM cladding replacement products to be used in Project Remediate, materials must demonstrate testing in accordance with the following requirements as part of demonstrating compliance with the 'Deemed to Satisfy' provisions of the Building Code of Australia. This testing includes specimens with joints and perforations. BLM (as a whole assembly) with surface finishes and joints and perforations are to be tested to determine Spread of Flame (SOF) and Smoke Developed (SD) indices in accordance with AS/NZS 1530.3 and Schedule 6 of the NCC.

Testing procedure

AS/NZS 1530.3 requires nine (9) representative specimens each measuring 600 ±5 mm X 450 ±5 mm and of normal thickness. Six specimens will be tested initially. A further three specimens may be required as a part of supplementary testing as per clause 2.8 of the standard. Please refer to AS/NZS 1530.3 for the complete test method. In addition to the requirements of AS/NZS 1530.3 for determining SOF and SD indices, Project Remediate requires the specimen to be prepared in accordance with the types of joints and perforations applicable to the proposed use of the materials.

Joints

To test the performance of BLM with joints, a specimen including a combined horizontal and vertical 12 mm silicone-filled joint with backing rod is proposed. Figure 1 illustrates this.

Perforations

To test the performance of BLM with perforations, specimens shall be prepared with both a 20 mm x 20 mm penetration (e.g., electrical cable) and a 200 mm x 200 mm penetration (eg. cut-out for bathroom exhaust) with an edge of the perforation located at the centre of the specimen. The specimen shall be positioned within the testing apparatus such that the pilot flame aligns with an exposed edge of the perforation. Figure 2 illustrates this for the 200 mm x 200 mm scenario.

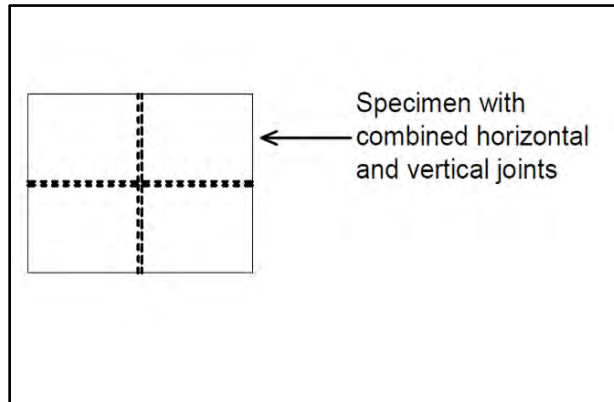


Figure 1. Illustration of joint to be tested

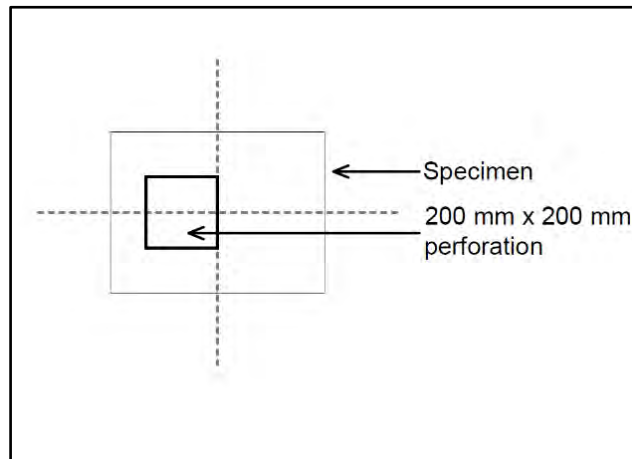


Figure 2. Illustration of 200 x 200 mm perforation. The intersection of the dashed line indicates the position of the pilot flame.

The following specimens shall comprise a sample for the reference material testing:

- 9 specimens of BLM with no perforations and no joints.
- 9 specimens of BLM with electrical cable-sized perforation (20 mm x 20 mm).
- 9 specimens of BLM with perforation such as bathroom exhaust (200 mm x 200 mm).
- 9 specimens of BLM prepared with intersecting horizontal and vertical joints.

In accordance with clause 4.4.9 of AS/NZS 1530.3, where both front and rear faces of BLM have different specifications (e.g., different thicknesses, different coatings), separate tests shall be conducted with both front and rear faces of the specimen exposed to the heat source/pilot flame. In this case, twice the number of specimens shall be required.

Table 1 below summarises the indicative samples for the proposed testing.

Indicative samples for the proposed testing	
Dimension of each specimen	600 ±5 mm X 450 ±5 mm
No. of specimens required (no perforation, no joint)	9
No. of specimens required with electrical cable-sized perforation (perforation is 20 mm x 20 mm)	9
No. of specimens required with exhaust-sized perforation (perforation is 200 mm x 200 mm)	9
No. of specimens required with both horizontal and vertical joints (12 mm silicone-filled joints with backing rod)	9

Table 1: Indicative samples for the proposed testing

Notes:

1. *The sample requirements are indicative only. This may vary depending on the requirements of the test facility and number of dissimilar faces of the BLM.*
2. *Please refer to AS/NZS 1530.3 for appropriate mounting procedure for the specimens.*