Combustible Facade Materials

Fire Risk Identification and Reporting Protocol

Insurance Council of Australia

FPA AUSTRALIA Fire Protection Association Australia

ENGINEERS AUSTRALIA | Society of Fire Safety

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Introduction

In recent years, a number of multi-level building fires in Australia and overseas have resulted in governments inquiring into risks arising from both the non-conforming and non-compliant use of building products. The actions of governments have been particularly focused on the potential risks caused by the inappropriate use of some types of Combustible Façade Materials (CFMs – see Explanatory Note), including aluminium composite panels.

In providing insurance cover for a building, insurers set premiums according to a variety of factors including the residual risk (considering effective risk mitigation measures implemented for the building), of damage occurring and a claim being made against the policy.

Through the Insurance Council of Australia (**ICA**), insurers have developed a Residual Hazard Identification Protocol (**Protocol**) for the identification of residual risk presented by the use of CFMs. The Protocol and the information it contains is intended for general information and guidance; it is not intended as providing professional or legal advice to any person or organisation.

Critically, the evaluation of exposure relative to a building where CFMs are present needs to be conducted on a case-by-case basis. That evaluation should only be performed by competent building practitioners, including fire safety engineers, assessing the most critical exposures, safety to life and compliance to the National Construction Code (NCC).

Building owners and other stakeholders should consider working closely with their insurer to ensure that the identification and evaluation process adopted for the building, including those engaged to undertake the evaluation process, will be considered sufficient for ongoing underwriting of the building.

Purpose

The purpose of this Protocol is to provide a recommended methodology which can be used consistently in circumstances where CFMs are present, for assessment and reporting of the residual risk, suitable for both building owners and underwriters to make decisions.

Intent

The use of this Protocol will support the production of reports that are consistent across all jurisdictions and will be meaningful to fire safety engineers, building owners and their insurers. We suggest that this Protocol should be referenced by all stakeholders involved in assessing building risk posed by CFMs and is only intended for application to existing buildings.[1]

[1] All external wall materials for new buildings must comply with the mandatory requirements of the NCC. Where a Performance Solution is proposed to use CFM that does not comply with the Deemed to Satisfy Provisions, then a clearly documented Performance Based Design Brief with a holistic fire safety engineering assessment, must be provided and accepted by all relevant authorities and stakeholders.

Regulatory Information

Since the Protocol was first published in 2019, governments in various jurisdictions and some regulatory/cladding authorities have implemented different regulations and published requirements equivalent or additional to this Protocol for the rectification of buildings identified as having non-compliant CFMs. Observance of this Protocol does not ensure compliance with the legal and regulatory requirements of each state or territory. **It is therefore incumbent upon any individual or entity who choose to use this Protocol to make the necessary enquiries of the relevant jurisdiction's legal and regulatory requirements. Note that this Protocol may require assessments or implementations that exceed that required in a particular state or territory.**

Approach

The approach suggested in this Protocol includes both the identification of the material used and the installation methodology - the whole wall assembly. This will enable assessment of the risks posed by use of the materials, which may then trigger consideration of remedial actions to lower a building's residual risk.

Fire performance of the external wall cladding is the primary indicator of the risk of fire spread. However, the insulation, moisture control barriers and presence of a cavity barrier, etc, can also affect the potential of fire spread.

Fire Risk Identification and Reporting Protocol: Four Steps

Overview

1

Identify Material

The identification and quantification of CFMs is the critical first step in the process to determine the potential hazard to life and property. The purpose is to accurately classify and quantify the materials present including the insulation and sarking, in order to determine the fire load and combustibility along with its location and proximity to ignition sources. Representative, appropriate and documented sampling and observations to assist a Certified/Accredited [2] Fire Safety Engineer's Risk Assessment is required. Once identification and quantification is achieved, this enables respective parties to consider Steps 2 and 3 of this Protocol.

2

Evaluate Risk

Using the identification and quantification outcomes of Step 1, the purpose of Step 2 is to provide a consistent report into the exposure of the building regarding the presence of CFMs. This output is dependent upon the category of an aluminium composite panel (ACP) or identification of other CFM determined in Step 1, as well as its configuration on the building and any fire protection systems that reduce the overall building's risk.

3

Remedial Action

Remedial actions (if any are required) will be different from building to building and dependent on the quantity of CFM installation, its configuration, and extent and nearby substrates such as sarking and insulation and other elements such as cavity barriers. There is the potential for actions to be taken that would not necessarily involve 100 per cent replacement

4

Approvals

The removal and/or replacement of CFMs is generally considered to be building works that require a building approval. The approval process varies amongst the jurisdictions and it is necessary for individuals to familiarise themselves and comply with these requirements.[3]

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[2] Note certification/accreditation varies between the jurisdictions.

[3] The triaging of building risk by relevant jurisdictional authorities based on building classification and occupancy, in addition to other factors, may add to the consideration of the necessary extent of remedial action and in turn, the availability and cost of insurance.

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Report Questions

1. Who has carried out inspections, sampling and testing for the building owner; location of the sampling and tests carried out on the cladding and insulation material; company name, relevant competencies, qualifications and experience of testing laboratories used to test the samples?
2. What category(s) of ACPs or other CFMs, are present on the building and location of each type?
3. What quantity of the material is present and locations and extent of coverage (m^2)?
4. What substrate, cavity barriers or moisture control barrier configuration is present behind the CFM(s)?
5. What potential ignition sources exist for the CFMs given the configuration of the building?
6. What exposures exist to the safety of the occupants based on the Step 1 outcomes?
7. What is the likely extent of fire spread? This should be based on testing or verifiable calculation, not simply engineering judgment.
8. Are the CFMs compliant with the National Construction Code (NCC) and referenced standards?
9. What are the exposures to the property and consequential business interruption risk of a fire involving the CFM?
10. What exposures exist to the reputation, image and market value of the building as a result of the CFM?
11. What remedial actions are necessary (if any) to address risks to the building due to the presence of unsuitable CFMs?

1. Identify Materials

This Protocol can be applied to all types of CFMs and their accurate identification is the critical first step in the process of identifying the potential hazard to life and property. The purpose is to accurately classify and quantify the materials present including the insulation and sarking, in order to determine the fire load and combustibility along with its location and proximity to ignition sources. Representative, appropriate and documented sampling and observations to assist a Certified/Accredited Fire Safety Engineer's Risk Assessment is required. Once identification and quantification are achieved, this enables respective parties to consider Steps 2 and 3 of this Protocol.

ACP Risk Categories

ACPs typically come in four general categories defined by the composition of their core materials ranging from A – High fire risk, through to D – non-combustible[4] as follows:

(Inert materials are considered those that do not contribute to combustion.)

A. 30-100% Organic Polymer and 0-70% inert – ACPs in this category typically have organic polymer in their core and were identified by most manufacturers as PE (Polyethylene) core. Some core binders are polymers other than PE.

B. 8-29% Organic Polymer and 71-92% inert – Typically identified by ACP manufacturers as fr, FR, Plus or rated Class B per EN 13501 and typically have around 30% organic polymer in the core.

C. 1-7% Organic Polymer and 93-99% inert – Typically identified by ACP manufacturers as A2, rated as Class A2 per EN 13501. These are considered as having very limited combustibility. Testing to EN 13501 and obtaining class A2 is a valid alternative.

D. 0% Organic Polymer and 100% inert – Typically, panels tested or deemed non-combustible by the NCC with testing to AS 1530.1. These could be aluminium skins with low adhesive aluminium honeycomb cores, compressed fibre cement core or even compressed fibre cement panel. Steel panels with calcium silicate or similar core.

ACP Risk Category	Polymer Percentage	Polymer%	Inert Filer %
A	30-100% Polymer and 0-70% inert materials	30-100%	0-70%
B	8-29% Polymer and 71-92% inert materials	8-29%	71-92%
C	1-7% Polymer and 93-99% inert materials	1-7%	93-99%
D	0% Polymer and 100% inert materials or deemed non-combustible by the NCC	0%	100%

[4] Risk categories (A-D) are strictly only to be applied to ACPs and not to other cladding types, such as insulated sandwich panel, etc.

In cases where there is no documentation associated with the building's construction, or where available documentation lacks the necessary information to positively identify the ACPs that have been installed; or where there is sufficient doubt that the ACPs installed are not what is documented (substitution), it is recommended for samples of the ACP, along with moisture control barriers and insulation materials behind any ACP, to be subjected to testing by suitably equipped and reputable laboratories to clearly identify the composition and combustibility of core material and the insulation/moisture control barriers behind the panel. Importantly, visual examination of the ACP or small flame application to a sample, in these circumstances, is insufficient on their own for identification purposes. Note, it is common for documentation not to be correct. Sometimes similar looking panels will have different compositions, even if the documentation says there are the same.

Reports

Cladding inspection reports that document the extent and location of cladding on a building should be prepared by an appropriately qualified person. These reports should ideally inspect and collect information on the other fire safety systems/characteristics of the building, which are needed to inform a risk assessment such as active and passive fire safety features, occupant characteristics, exit paths and fire resistance.

Cladding testing reports should be on official laboratory letterhead/report and must clearly indicate sampling, submission, analysis, discussion and conclusions as well as positions of the signatories of the report.

Reports commissioned by a building owner using this Protocol should ideally answer the following questions:

1. Who has carried out inspections, sampling and testing for the building owner; location of the sampling and tests carried out on the cladding and insulation material; company name, relevant competencies, qualifications and experience of testing laboratories used to test the samples?

2. What CFMs are present on the building and what are the location(s) of each type?

3. What quantity of the material is present and extent of coverage (m2)?

4. What substrate, insulation or moisture control barrier is present behind the CFM(s) and are there cavity barriers? Is there timber or metal framing?

5. What potential ignition sources exist for the CFM(s) given the configuration of the building, such as balconies, height of cladding above publicly accessible spaces, electrical installations such as air-conditioning units and advertising signs, and above ground openly ventilated car parking?

Other Combustible Façade Materials (CFM)

Apart from ACPs, other façade materials of concern include:

1. Rendered expanded polystyrene (EPS). Where this material is identified on Type A or B buildings, its presence shall be reported. Identification is typically visual once a sample is taken. An exception is Conpolcrete® or QT® which is a mixture containing EPS yet, depending on its density may or may not be a risk.

2. Metal Composite Materials (MCM). Where this material is identified on facades of Type A and B buildings, the metal facing and core material needs to be identified as follows: a) The facing would typically be steel or aluminium but could also be plywood, fibreglass or plastic. b) The core material would typically be – Expanded polystyrene, phenolic encapsulating expanded polystyrene beads (XFLAM or Polyphen), polyurethane or polyisocyanurate.

3. Other known CFM include Bonded Laminated Materials (BLM) which may substitute in terminology for ACP, Exterior Insulation Finishing Systems (EIFS) and External Thermal Insulation Composite Systems (ETICS).

4. For the above materials, accurate identification of all components is required using a scientifically accepted method. This Protocol does not provide risk ranking for all the material types.

Testing Laboratories

ICA members, Engineers Australia (Society for Fire Safety), the Fire Protection Association of Australia and fire safety engineers have worked with laboratories to develop a series of recommended controlled tests that will identify the core composition of ACP materials. The compositions have been verified by providing known samples of each category of ACP. Each sample was coded and provided to independent laboratories for testing. Results were compared to ensure that the testing methods used provided results that accurately identified the ACP into the correct category.

This Protocol does not provide guidance on the types of test methods and accuracy for 'characterisation' of different types of façade materials, which ideally should involve:

- Specimen sampling and preparation
- Specific method of application for a range of alternative test methods
- Specify analysis/calculation methods
- Address accuracy and uncertainty
- Requirements for reporting

There is no standard for this purpose, however, there are a range of different material characterisation test methods that are applied by different laboratories in Australia. Different methods may be needed for different types of ACP or other CFMs and it will ultimately be for the regulatory authorities to be satisfied with these.

2. Evaluate Risk

Using the identification and quantification outcomes of Step 1, the purpose of this step is to provide a consistent report into the exposure of the building regarding the presence of CFMs. This output is dependent upon the category of the ACP or identification of other combustible façade material determined in Step 1 and should ideally make findings with regard to the following questions:

1. What potential ignition sources exist for CFMs given the configuration of the building?
2. What exposures exist to the safety of the occupants based on the Step 1 outcomes?
3. Are the CFMs compliant with the NCC and referenced standards?
4. What are the exposures to the property and consequential business interruption risk of a fire involving the CFMs?
5. What exposures exist to the reputation, image and market value of the building as a result of the CFMs identified?

It is recommended that reports commissioned by a building's owner to make findings on the exposure should consider all features and factors. Some examples are provided below for guidance only, noting these risk categories apply only to ACPs and no other types of CFMs.

Category A (30%-100% Organic Polymer core ACP). It is recommended that this exposure should be considered as being similar to that demonstrated by the Lacrosse Building fire (Melbourne), which was an ACP panel fire with fibreglass insulation and reflective foil sisalation in the cavity and an internal building sprinkler system (combined sprinkler/hydrant system sharing a redundant water supply). The Grenfell Tower fire had the added impetus of a combustible foam-based insulation material behind it and no internal sprinkler protection[i]. Where the quantity of 30-100% organic polymer ACP present is considered to be sufficient to sustain a fire, and relevant ignition scenarios exist, adverse findings to the four questions above should consider the risk as HIGH and Step 3 remedial action may be required.

Category B (8%-29% Organic Polymer core ACP). The evaluation of the exposure to this type of ACP is more complex, with the existence of a combustible or semi-combustible (fire retardant) insulation or sarking in the cavity being a defining factor. Published full-scale façade fire tests such as that in AS 5113 conducted in Australia or BS 8414-1:2015 conducted by BRE Global (a fire testing laboratory in the UK) on behalf of the former UK Department for Communities & Local Government showed this category of panel, when combined with a PIR or Phenolic insulation, with horizontal and vertical non-combustible cavity barriers (not typically provided in Australia), resulted in flaming above and to the top of the test structure respectively.

The prime concern for stakeholders is how much more severe the fire spread in the fire tests would have been without the cavity barriers. Where a quantity of 8-29% organic polymer ACP present is combined with combustible or semi-combustible insulation materials, and relevant ignition scenarios exist, adverse findings to the four questions above should consider the risk as HIGH and Step 3 remedial action may be required, unless appropriate internal fire suppression and protection systems exist to reduce the risk. Where the insulation is considered close to non-combustible - mineral wool or fibreglass, and the sarking has a flame spread rating of less than 5 to AS 1530.2, the risk might be considered as low.

Categories C and D (1% - 7% and 0% Organic Polymer core ACP or deemed as non-combustible) The fire risk presented by this material can be considered as LOW regardless of quantity, ignition scenarios and type of insulation.

3. Remedial Action

Remedial actions (if any are required) will be different from building to building and dependent on the category and quantity of ACP or other CFM, as well as insulation/sarking installed. Depending on the quantity of installation, configuration (e.g., vertically and horizontally discontinuous) and extent. This may result in the potential for actions to be taken that would not necessarily involve 100 per cent replacement. The report submitted to the building's owners regarding Step 3 should address, in detail if necessary, a response to the following question:

1. What remedial actions are necessary (if any) to address risks to the building due to the presence of unsuitable CFM?

It is recommended that any full or partial cladding retention solutions should be assessed in terms of cost and residual risk by comparison against full cladding removal as a base case for comparison.

4. Approvals

The acceptability of any Performance Solutions should be agreed by all parties involved – such as the appointed fire safety engineer, the owner, insurer, regulator and fire authority – before any work is carried out, and properly documented in a Performance Based Design Brief.

Prior to any work occurring, consultations will also need to be undertaken with the building regulator and fire authority in the relevant jurisdiction. In some jurisdictions this may be a mandated requirement.

The removal and/or replacement of CFMs is generally considered to be building works that require a building approval. The approval process varies amongst different jurisdictions in Australia and it is

beyond the scope of this Protocol to summarise these. It is therefore incumbent upon the individual or entity to familiarise themselves with the documentation and processes necessary to obtain approval in the relevant jurisdiction, best obtained through the relevant building regulator. Nevertheless, the following questions regarding Step 4 should be responded to at the completion of rectification:

1. Has a valid building approval been issued by the authority having jurisdiction that notes compliance of the specified replacement external wall material with the NCC and any additional state or territory requirements?

2. Has the installed replacement external wall material been inspected and confirmed as being the same as that specified in the building approval and correctly installed?

Other Resources

- Society of Fire Safety Practice Guide, Façade/External Wall Fire Safety Design
- National Fire Protection Association (USA), EFFECT Risk Assessment Tool
- BRE, Global ACP/Insulation Fire Tests
- CSIRO technical report EP196619 Rev D, Fire Performance and Test Methods for ACP External Wall Cladding

Conclusions

Inspections, assessments and reports commissioned by a building owner to determine the risk associated with the presence of CFMs on a building should be carried out by competent fire protection professionals and fire safety engineers.

A consistent methodology – yielding responses to the 11 questions above and able to be accepted by the broadest possible regime of underwriters and other building professionals – is essential.

Disclaimer

This Protocol is presented by the ICA for the purpose of improving the evaluation of the risk of CFMs where it is present in buildings. The Protocol and the information it contains is intended for general information and guidance; it is not intended as providing professional or legal advice to any person or organisation.

Each evaluation of CFMs should be conducted on a case-by-case basis and you should make your own enquiries and consult professional advisors as to the appropriateness and suitability of the information in the Protocol for your particular circumstances. You should not use the Protocol to replace advice by a professional. Nothing in the Protocol constitutes, or is meant to constitute, advice of any kind. Any reliance on the Protocol will be at your own risk.

The ICA provides the Protocol on an “as is” basis. While we endeavour to keep the information in the Protocol as accurate, complete and up to date as possible, the ICA does not represent or make any warranty in respect of the accuracy, reliability, completeness, currency or continuous supply of the Protocol.

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Explanatory Note

Combustible Façade Materials (CFM) – are a range of building materials and systems, installed as complete or portions of external wall assemblies, the fire characteristics of which when tested do not fulfill the National Construction Code’s Deemed-to-Satisfy Provisions for non-combustibility, for Type A and Type B construction.

CFMs include, but are not limited to:

- Aluminum Composite Panels (ACP or MCM)
- Insulated Sandwich Panels (ISP)
- Bonded Laminated Materials (BLM)
- Expanded Polystyrene (EPS)
- Exterior Insulation Finishing Systems (EIFS) or External Thermal Insulation Composite Systems (ETICS)
- Other combustible façade materials which may include timber, wood/polymer composites and any other combustible materials.

Further Jurisdictional Information

Cladding Safety Victoria is working with owners and owners' corporations to help them rectify non-compliant or non-conforming external wall cladding products on buildings. Further information at www.vic.gov.au/cladding-safety

Project Remediate (NSW) is a voluntary program to replace flammable cladding for eligible class 2 residential apartment buildings. Further information at www.nsw.gov.au/building-commissioner/replace-flammable-cladding-through-project-remediate

Safer Buildings (Qld) has been established to help identify buildings in Queensland that may have potentially combustible cladding. Further information. https://www.saferbuildings.qld.gov.au

Appendix

The following list of test laboratories is not exhaustive and those identified should not be regarded as being endorsed by the ICA.

- **UQMP** has over 20 years history of providing an investigation and analysis service to industry in the science and engineering of materials. UQMP resides within the UQ Centre for Microscopy & Microanalysis Consulting and Research Expertise section. UQMP uses FTIR and SEM/EDS to identify the constituents of ACP and insulation samples. For difficult samples the extensive facilities at UQ can be utilized. Reports are designed for fire safety engineers to perform risk assessments and results are reported using both ICA and State Government criteria. Please contact Mr Jim Haig on 07 33653827 or projects@uqmp.uq.edu.au

- **Mark Wainwright Analytical Centre**, UNSW. Provides independent analytical testing using FTIR to identify the polymers in aluminium cladding, X-Ray Diffraction Spectroscopy to identify the mineral filler in the core and X-Ray Fluorescence Spectrometry to determine the percent composition of the mineral matter. The Centre provides a written report together with analytical results and interpretation of results to indicate the ICA Category of façade materials tested. Contact ccl@unsw.edu.au or 9348 1400.

- **CSIRO** is an NATA Accredited Testing Laboratory for a wide range of materials performance and fire tests. We have been offering specialist laboratory and engineering services to Australian industry, practitioners and building owners for over 60 years. This includes identification of cladding, insulation and façade materials; fire testing to the NCC requirements; full-scale evaluation to the AS 5113 test for external walls. Our fire safety experts can provide building audit and assessment, advice on structural fixing, regulatory compliance, help with selection of test methods, and independent third-party peer review. As an independent government organisation our extensive involvement has led to strong reputation for quality, accuracy and independence. Please contact us at firesafety@csiro.au call our enquiries team on 1300 363 400 and ask for Infrastructure Technologies - Building Cladding Identification. More information.

- **General Industry Surveillance** (GIS) offers a wide range of materials testing services to fire engineers, building owners, building insurers, and other stakeholders in Australian industry. We can accurately identify the flammability, composition and toxicity of ACPs and insulations, and provide ACP classification in accordance to the ICA categories. GIS labs use an extensive range of analytical techniques including FT-IR, XRD, XRF, and other facilities to identify polymers and mineral fillers compositions in aluminium claddings. Our materials experts, which are mostly PhDs in chemistry, are also specialized in phase and elemental analysis for minerals, metals, polymers, composites, and many other material types. GIS is a NATA-accredited laboratory and is ISO/IEC 17025 compliant. Please contact us by email lab@gisteks.com or by phone enquiry line on 0423 735 578. You could also visit our website at http://gisteks.com/ and submit enquiry forms.

- **ExcelPlas Pty Ltd** is an Australian specialist laboratory for the identification and testing of polymeric materials. With more than 30 years' experience, ExcelPlas is acknowledged as a leading provider of specialist analytical and technical capabilities for the building and construction industry in the area of polymer analysis. ExcelPlas Labs use a range of analytical techniques to assist building owners, building managers, building insurers, fire engineers and other stakeholders to provide advice relating to the flammability potential, composition and toxicity of cladding materials. It also provides investigative failure analysis and litigation. ExcelPlas is a NATA-accredited laboratory and is ISO/IEC 17025 compliant. Please contact our head office on 03 9532 2207, or email info@excelplas.com for further information.

- **CETEC Pty Ltd** is a technical and scientific risk management consultancy. With more than 30 years' experience, CETEC is acknowledged as a leading provider worldwide of specialist technical and scientific risk management solutions for the built environment. Through Foray Laboratories Pty Ltd, which is wholly owned by CETEC, we can use a range of sampling and analytical techniques to assist building owners, building managers, building insurers, fire engineers and other stakeholders to provide advice relating to the flammability potential, composition and toxicity of cladding materials and emissions. Foray Laboratories is a NATA accredited laboratory and is ISO/IEC 17025 compliant. Please contact our head office on +613 9544 9111 or email info@cetec.com.au for further information.