ExcelPlas
MATERIALS TESTING

NATA
ACCREDITED FOR
TECHNICAL
COMPETENCE

CLADDING

WE KNOW POLYMERS - WE KNOW TESTING

IS YOUR BUILDING CLADDING SAFE?

Cladding in buildings can be categorised as combustible and non-combustible depending on the composition and combustibility of its core material. Of concern is the use of combustible cladding material in buildings due to their increased propensity to propagate fires. Therefore, in order to evaluate cladding combustibility risks for buildings, guide risk mitigation strategies for all stakeholders, and determine compliance with combustible cladding regulations, a rigorous testing and inspection regime should be implemented.

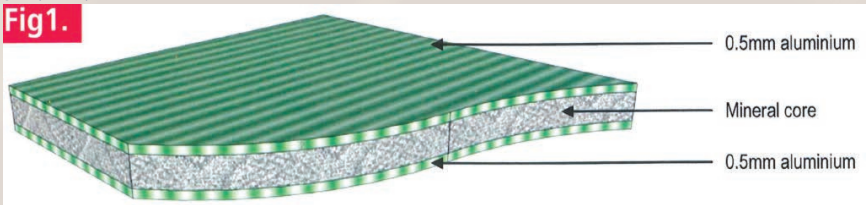
CLADDING CHARACTERISTICS

Cladding is typically used on the exterior of buildings primarily for environmental protection and aesthetics. There are different types of cladding available, some of the more common types of cladding material are:
Aluminium Composite Materials (ACM)
Aluminium Composite Panels (ACP)
Expanded Polystyrene Panels (EPS)
Polyisocyanurate Foam Panels (PIC)
and many others

Wall cladding is combustible when there is a high-medium percentage of polyethylene, or polyurethane, or polystyrene present. Alternatively, cladding can be non-combustible if there is a heavy mineral-filled flame-retardant core, mineral wool or other non-combustible compound present.

Figure 1 presents a typical structure of an Aluminium Composite Panel, which shows a polyethylene/mineral core sandwiched between two thin aluminium sheets.

Fig1.



GUIDE FOR EVALUATING COMBUSTIBILITY RISK

Excelplas suggests a three-step approach to evaluating the combustibility of cladding, so that an effective means of managing potential risks can be developed. Each step poses a series of questions that should be answered to assist in risk assessment. It should be noted that this is a guideline that can be utilized by all stakeholders and that Excelplas may not be able to offer services beyond what is stipulated in the Excelplas Testing Process.

Step 1 – Identification of Materials

The identification of ACPs is the critical first step in the process of identifying the potential hazard to life and property presented by the ACP. It must be undertaken with an almost 100 per cent confidence of the results.

The primary purpose is to accurately classify and quantify the materials present in order to determine the fire load along with its location and proximity to ignition sources. Once identification and quantification are achieved, this enables respective parties to consider Steps 2 and 3 of this protocol. ACPs in Australia typically come in four general categories defined by the composition of their core materials:
A. >50%-100% Polyethylene (PE, EVA Ethylene-vinyl acetate) –denoted as Category 3. These are considered the problem materials.
B. 30% PE and 70% inert materials –denoted as Category 2. Typically identified as FR (Fire Rated). Inert materials are typically mineral compounds.
C. 7% PE and 93% inert materials –denoted as Category 1 These are considered close to non-combustible
D. 0% PE -denoted as Category 1 Typically, an aluminium honeycomb or similar core. Also considered close to non-combustible.

Step 3 – Remedial Actions for Consideration

Remedial actions (if any are required) will be different from building to building and dependent on the category of ACP and insulation/sarking installed. Depending on the quantity of ACP installed, its configuration and installation, there is the potential for actions to be taken that would not necessarily involve 100 per cent replacement. The report submitted to the building's owners with regard to Step 3 should address, in detail if necessary, a response to the following question.

What remedial actions are necessary (if any) to address unacceptable risks to the building due to the presence of an unsuitable ACP? The acceptability of any such (alternative or 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. The importance of consulting with the relevant jurisdiction's building regulator and urban fire authority cannot be stressed enough in response to this question..

EXCELPLAS TESTING PROCESS

Excelplas can conduct immediate cladding material characterisation with a fast turnaround time, and are currently providing testing services for many industry clients.

The identification of cladding material is the fundamental first step in the process of determining the risks presented by ACPs.

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 necessary for samples of the ACP, along with sarking and insulation materials behind any ACP, to be subjected to testing to clearly identify the composition and combustibility of core material and the insulation/sarking. Importantly, visual examination of the ACP or small flame application of a sample, in these circumstances, is insufficient for identification purposes.

ExcelPlas Australia is a NATA accredited laboratory that can perform a series of controlled tests that will adequately identify the core composition of installed ACP materials (including an insulation) on a building.

Reports commissioned by a building owner using this protocol should answer the following questions for Step 1:

1. Who has carried out inspections and testing for the building owner, and testing of the cladding material, what are their relevant competencies, qualifications and experience and what testing laboratories were used to test the samples?
2. What category(s) of ACPs are present on the building (A, B, C or D)?
3. What quantity of the material is present and extent of coverage (m^2)?
4. What substrate or insulation is present behind the ACP?
5. What potential ignition sources exist for the ACP given the configuration of the building?

Step 2 : Evaluating the Exposure
Using the identification and quantification outcomes from Step 1, the purpose of this step is to provide a consistent report into the exposure of the building regarding the presence of ACPs. This output is dependent upon the category of the ACP determined in Step 1 and should make findings with regard to the following four questions:

6. What exposures exist to the safety of the occupants based on the Step 1 outcomes?
7. Is the building compliant, with regard to ACPs, with the National Construction Code and associated Australian Standards?
8. What are the exposures to the property and consequential business interruption risk of a fire involving the ACP?
9. What exposures exist to the reputation, image and market value of the building as a result of the ACP identified?

Making findings for each of the questions is necessarily complex. Each building with ACPs present will vary in terms of quantification, insulation materials, ignition scenarios, fire protection and suppression systems, as well as occupation type.

Reports commissioned by a building's owner to make findings on the exposure should consider the following factors identified by insurers:

- Identified 30%-100% PE or EVA Ethylene-vinyl acetate core ACP
  The exposure should be considered similar to that demonstrated by the Lacrosse Building fire (Melbourne), which was an ACP panel fire with fibreglass insulation and reflective foil insulation in the cavity and an internal building sprinkler system (combined sprinkler/hydrant system sharing a redundant water supply). The Grenfell fire had the added impetus of a combustible foam-based insulation material behind it and no internal sprinkler protection.

Where the quantity of 30%-100% PE 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.

- Identified <30% PE 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.
  Recently completed and published full-scale façade fire tests (BS 8414-1:2015) conducted by BRE Global (a fire testing laboratory in the UK) on behalf of the 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 Australian stakeholders is how much more severe the fire spread would have been without the cavity barriers.

  Where a quantity of <30 per cent PE 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 could be considered as low.

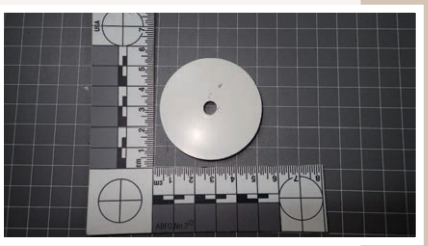
  Identified 7% or less PE core ACP: The fire risk presented by this material can be considered as LOW regardless of quantity, ignition scenarios and type of insulation.

With over 25 years in testing polymers and polymeric building materials, Excelplas has the extensive experience and the capability to perform reliable testing on cladding material with a quick turnaround time. Excelplas laboratories are NATA accredited, and equipped with a range of instruments required to meet the needs for cladding characterisation.

At Excelplas, this follows a three-stage process:

STAGE 1: SITE INSPECTION AND SAMPLE EXTRACTION
A representative from Excelplas Australia can conduct a site inspection and extract a number of cladding samples from different locations of the building walls. The samples extracted are 50mm in diameter, which are then sealed and sent to Excelplas Melbourne Laboratory for the next stage of testing.

STAGE 2: MATERIAL CHARACTERISATION – EXCELPLAS TESTING (NATA ACCREDITED)



Excelplas will conduct a number of tests on the sample cladding material, involving:

Metal analysis of the sheeting on either side of the core
X-Ray Diffraction (XRD) analysis of the core components
Infrared Spectroscopy (FTIR) to determine the polymeric composition of the core
Thermogravimetric Analysis (TGA) to determine the fillers and combustibility of the core

STAGE 3: ACP WALL CLADDING REPORT ON COMBUSTIBILITY
A report will be prepared based on the results of the tests, which includes details of the sample location, the material characterisation results, information on the level of combustibility identified and a pathway for action.
An electronic report will be provided.

CATEGORIES OF ACPs IN AUSTRALIA (as per Insurance Council of Australia guidlines)
ACPs in Australia 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.

Category	Polymer Percentage	Inert Filler Percentage
A	30-100%	0-70%
B	8-29%	71-92%
C	1-7 %	93-99%
D	0%	100%

The inert filler may be mineral fillers or other materials deemed non-combustible.

FACILITIES
ExcelPlas Pty Ltd is a premium NATA accredited laboratory for the identification and testing of polymeric materials, and is a leading provider of specialist analytical and technical capabilities for the building and construction industry in the area of polymer analysis. Our laboratories are located in Moorabbin, Melbourne, Victoria, with state-of-the-art instruments for a comprehensive range of analytical techniques. Excelplas experts can provide advice, guidance and analysis on cladding requests including aspects on flammability potential, composition, and toxicity. All work is performed promptly and reliably with a quick turnaround time.

EQUIPMENT
At Excelplas, a range of equipment is available to perform analysis of mechanical, thermal, physical and chemical properties of materials. This includes, but not limited to:

Stereographic Optical Microscopy (SOM)
Fourier Transform Infrared Spectroscopy (FTIR)
Differential Scanning Calorimetry (DSC)
Thermogravimetric Analysis (TGA)
Thermo Mechanical Analysis (TMA)
Tensile Testing (TT)
Impact Testing (IT)
Melt Flow Rate (MFR) Testing

COSTS
Our consultants at Excelplas will provide costs depending on your requirements.
Please contact us to determine scope of the task, timeframe and costings.

CONTACT
To begin testing of your cladding samples, please contact Excelplas Laboratories on (03) 9532 2207 to discuss your sampling and testing requirements.

contact: www.excelplas.com

ExcelPlas
MATERIALS TESTING

We Know Polymers - We Know Testing