

# Booth Muirie's Guide to Designing Approved Document B2 Compliant Multi Layered Walls Featuring Rainscreen Panel Systems Formed from Aluminium Composite Material (ACM).



**boothmuirie**  
Architectural Cladding Systems

Booth Muirie's Rainscreen cladding systems offer a wealth of options for new-build and renovation projects, bringing practical benefits and huge aesthetic flexibility. But these systems raise questions of building regulation compliance for fire safety when it comes to buildings with storey heights 18m or more above ground level.

Set out in Table 1 are the product options associated with the typical multi-layered wall constructions Booth Muirie commonly see used in connection with their ACM rainscreen systems. The insulation layer may or may not exist.

If the building is less than 18m in height, there is no restriction on the use of combustible materials and thus any option and combination of materials is possible.

Where the building has a storey 18m or more above ground level, the Building Control Alliance recommends four options for showing compliance with paragraph 12.7 of Approved Document B2.

## OPTION 1

The 1st and most straightforward way to design a rainscreen system compliant with AD B2 for buildings over 18m is to restrict all significant elements of each and every layer of the wall to non-combustible and/or limited combustibility materials.

Limited combustibility (Euroclass A2, or better) can be defined as materials which are classified as non-combustible or fulfilling the criteria detailed in AD B2 Tables A6 and A7 respectively.

This would therefore include: internal lining boards; insulation within the back wall (if any, except if the back wall is masonry cavity construction which is excluded); sheathing boards; insulation within the rainscreen cavity (if present); and rainscreen panels.

Put simply this means restricting your choice of materials to those highlighted in green in Table 1. If in doubt a copy of the products Declaration of Performance (DOP) should be obtained, which will clearly indicate the EN 13501-1/2 Reaction to Fire Classification. Gaskets, sealants and similar non-significant elements can be omitted from the 'Limited Combustibility' definition.

## OPTION 2

If the building is over 18m and products associated with any one of the layers is not one of those highlighted in green in Table 1, then a 2nd route to compliance is available. That is, to follow the procedure set out in 'BR135 Fire performance of external thermal insulation for walls of multi-storey buildings for cladding systems' using full scale test data from BS 8414-1 or BS 8414-2. This test is expensive and a positive result cannot be guaranteed.

It is important to note that where an insulant does not fulfil 'limited combustibility' criteria and claims to comply with testing to BS 8414 that this only refers to the specific build-up that has been tested to the methodology described in BR135. Notable, but not exclusive variances include rainscreen material type/brand, insulation thickness, multiple insulation layers and sheathing board type.

Whilst there have been positive tests associated with constructions featuring combustible elements, at the time of writing we are not aware of any BS 8414 tests having been carried out on multi layered wall constructions of any type featuring ACM rainscreen panels.

## OPTION 3

Whilst not supported by AD B2, BCA Technical Guidance Note 18 does offer a third option stating: 'If no actual fire test data exists for a particular system, the client may instead submit a desktop study report from a suitable independent UKAS-accredited testing body (BRE, Chiltern Fire or Warrington Fire) stating whether, in their opinion, BR135 criteria would be met with the proposed system. The report should be supported by test data which the test-house already has in its possession and so this option may not be of benefit if the products have not already been tested in multiple situations/arrangements. The report should also specifically reference the tests which they have carried out on the product.'

We are aware of a number of projects featuring 'FR' fire resistant and A2 grade ACM rainscreen panels in combination with various combustible insulation types that have achieved compliance via this route. As these are project specific they cannot be used as supporting evidence for other projects or as a design guide.

## OPTION 4

If none of the above options are suitable, the client may consider addressing this issue via a holistic fire engineered approach taking into account the building geometry, ignition risk, factors restricting fire spread etc. Such an approach would be expected to follow a recognised design code such as BS 7974 *Application of fire safety engineering principles to design of buildings* suite of documents and be supported with quantitative analyses where appropriate.

It must be noted that this is a complex process. There are eight parts to BS 7974:2001:

1. Guide to design framework and fire safety engineering procedures.
2. Initiation and development of fire within the enclosure of origin.
3. Spread of smoke and toxic gases within and beyond the enclosure of origin.
4. Structural response and fire spread beyond the enclosure of origin.
5. Detection of fire and activation of fire protection systems.
6. Fire and rescue service intervention. Human factors. Life safety strategies.
7. Occupant evacuation, behaviour and condition.
8. Probabilistic risk assessment.

TABLE 1

## Layer 1 - External wall of compartment

Wall type	Non Combustible or Limited Combustibility
Steel frame structure with timber sheathing board	No
Timber skin SIP with foam based core	No
Steel skin SIP with foam core	No
Steel frame structure with cement particle sheathing board	No
Steel frame structure with calcium silicate sheathing board	Yes
Masonry Brick	Yes
Concrete Block	Yes
Concrete wall	Yes
Steel skin SIP with mineral wool core. e.g. Eurobond Rainspan Panel	Yes

## Layer 2 - Insulating Layer (may not be present)

Insulation Type		Non Combustible or Limited Combustibility
PIR & PUR foil faced foam boards	Celotex RS5000	No
	XtroLiner Rainscreen (XO/RS)	No
Phenolic foil faced foam boards	Kingspan K15	No
	Xtratherm Safe-R SR/RS	No
Rock mineral wool slab	ROCKWOOL RAINSCREEN DUO SLAB®	Yes
	Knauf Insulation Earthwool® Rainscreen Slab	Yes
Rock mineral/glass veil	Knauf Insulation Earthwool® Rainscreen Slab BGV	Yes

## Layer 3 - External Finish of ACM Rainscreen panels

ACM Material Type		Non Combustible or Limited Combustibility
PE Core ACM (Flammable)	Alucobond®	No
	Larson	No
	Etalbond	No
	Vitrabond	No
	Alupanel	No
	Reynobond	No
B1-s1, d0 Core ACM (Very low flammability)	ALPOLIC/fr	No
	Alucobond® Plus	No
	Larson fr	No
	Reynobond fr	No
	Vitrabond fr	No
A2 Core ACM (Limited combustibility)	Alucobond® A2	Yes
	ALPOLIC A2	Yes

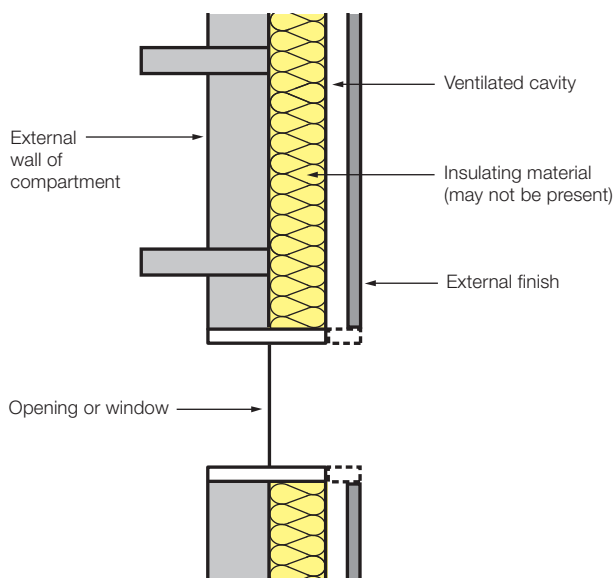


FIGURE 1  
Ventilated-cavity cladding system

## KEY NOTES

It is our opinion that options 2, 3 and 4 further illustrate that the easiest way to design a rainscreen system that is compliant with AD B2 featuring Booth Muirie's rainscreen panels is to only incorporate non-combustible and or limited combustibility products throughout the wall construction (Option 1).

This guidance is based upon information available at the time of issue and may be subject to change.

The Approved Documents should be consulted for full details in any particular case.

We would recommend that this is read in conjunction with BCA Technical Guidance Note 18.