



DRAFT SUMMARY RECORD OF DISCUSSIONS

STATE AND TERRITORY ADMINISTRATIONS' MEETING 2010-1

Date: 15 March 2010 (1:00pm – 5:00pm)
17 March 2010 (8:30am - 10:30am)

Venue: Hobart Function and Conference Centre
Elizabeth St Pier
Ph: 03 6230 8979
www.hfcc.com.au

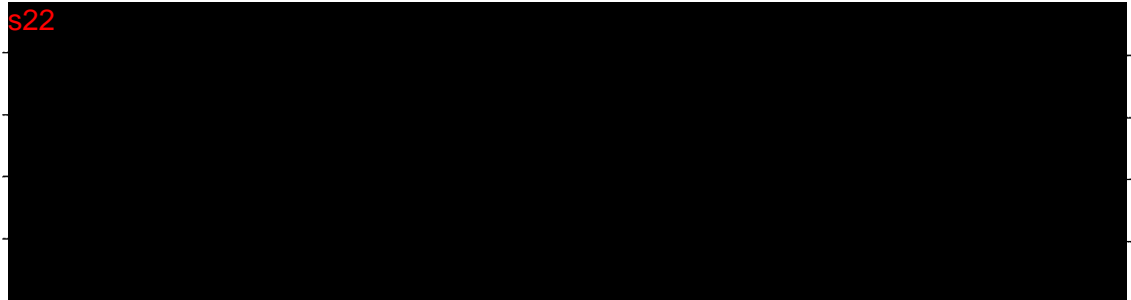
AGENDA

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7. National Advisory Note on Non-Compliant Walling Systems (VIC Item)

s22



Attendance:

s47F	ABCB Office (Acting Chair) NSW Administration NT Administration QLD Administration TAS Administration (Part) ABCB Office (Secretariat) VIC Administration ACT Administration WA Administration SA Administration (17 March) ABCB Office (17 March) ABCB Office (17 March)
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Guests:

s47F	Australian Elevator Association Australian Elevator Association Australian Elevator Association
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Apologies:

s47F	Australian Government
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Observers:

s47F	ABCB Office
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AGENDA ITEM 7 National Advisory Note on Non-compliant Walling Systems (VIC Item)

The Victorian Representative commenced discussions and advised members of the work undertaken by the Victorian Building Commission to date on developing a national advisory note on non-compliant walling systems.

The NT representative suggested that a more generic requirement be introduced into the BCA regarding the installation of walling systems rather than just singling out polystyrene in an advisory note. Rammed earth and metal walling aren't mentioned in the BCA and the same problem exists.

The Administrations agreed that the words 'non compliant' should be removed from the advisory note and that members provide feedback to the Vic representative for finalisation as an advisory note. Once the advisory note is agreed by all administrations it will be placed on the ABCB website as a national advisory note. The Vic representative agreed to circulate the revised electronic advisory note to members for comment.

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s22s22**AGENDA ITEM 12 Other Business**s22

The NSW representative raised the matter of expanded foam panels and concerns regarding its performance in a fire, and made reference to representations from the Minister for Emergency Services in NSW to Minister Carr regarding this matter, which he had been made aware of in recent times. It has been reported that the expanded foam panels are often used for structural support but during a fire will delaminate. Members noted that Standards Committee FP 18 is currently reviewing the test method which may address the issue. s47F undertook to consult with Standards Australia Committee FP18 on the status of a revised test method for composite materials and report back to members.

The NSW representative also raised the issue of insulation combustibility, and in particular the issue relative to the combustibility of 'non bulk' insulation products which are currently being installed. The NSW representative indicated that this matter had been raised by practitioners associated with the installation and certification of these products. The Office undertook to provide advice to the 'non-bulk' insulation industry (bulk insulation manufacturers have already been consulted) on the requirement for insulation installed in Type A and B construction to be non-combustible. It was also noted that the Administrations would consider the development of a National Advisory Note on the installation of insulation, and the requirements of the BCA for the use of 'non-combustible' materials in certain situations.

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ADMINISTRATIONS MEETING 2010-1: ACTIONS ARISING REPORT

Agenda Item	Action	Responsibility	Status
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7. National Advisory Note on Non-compliant Walling Systems (VIC Item)	Circulate to all members the draft national Advisory Note on 'Non-compliant walling systems' for their input and agreement including the agreed changes.	Victorian Representative	Done
	Publish national Advisory Note on ABCB web site (when agreed to by all Administrations).	ABCB Office	Awaiting advice from Admins that agreement has been reached
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12. Other Business Expanded Polystyrene Panels	Consult with Standards Australia Committee FP-018 on the status of a revised test method for composite materials and advise Administrations.	ABCB Office	Done. Update to be provided at meeting.
Non- combustibility of insulation	Confirm whether the 'non-bulk' insulation industry was consulted on the requirement for insulation installed in Type A and B Construction to be non-combustible.	ABCB Office	Confirmed consultation was undertaken. Update to be provided at meeting.
	Consider the development of a national Advisory Note on the matter of non- combustible insulation.	All Administrations	

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Outstanding Actions from Previous Meetings			
Administrations Meeting 2009-3			
s22	[Redacted]		
Administrations Meeting 2009-2			
s22	[Redacted]		

STATE & TERRITORY ADMINISTRATIONS MEETING

DRAFT SUMMARY RECORD OF DISCUSSIONS

STATE AND TERRITORY ADMINISTRATIONS' MEETING 2010-2

Date: 21 July 2010
Time: 9:00am – 5:00pm
Venue: Stamford Grand Adelaide
2 Jetty Rd Glenelg SA 5045
(08) 8376 1222
www.stamford.com.au

AGENDA

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6. Fire Resistance of Composite Panel Wall Facings (ACT Item)
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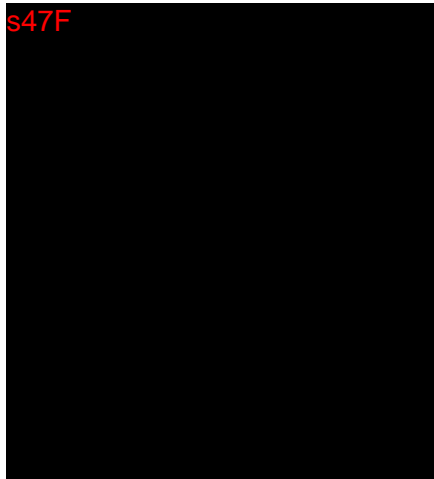
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STATE & TERRITORY ADMINISTRATIONS MEETING

Attendance:

s47F



SA Administration
ABCB Office (Acting Chair)
NSW Administration
NT Administration
QLD Administration
TAS Administration
ABCB Office
VIC Administration
ACT Administration
WA Administration
ABCB Office
ABCB Office (Secretariat)
Australian Government

Guests:

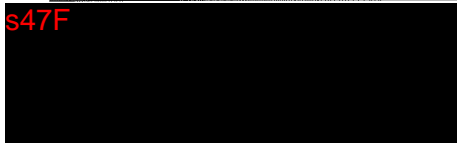
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Human Rights Branch Commonwealth Attorney-
General's Department (Agenda item 4)

Apologies:

s47F



ABCB Office
SA Administration
QLD Administration

Observers:

STATE & TERRITORY ADMINISTRATIONS MEETING

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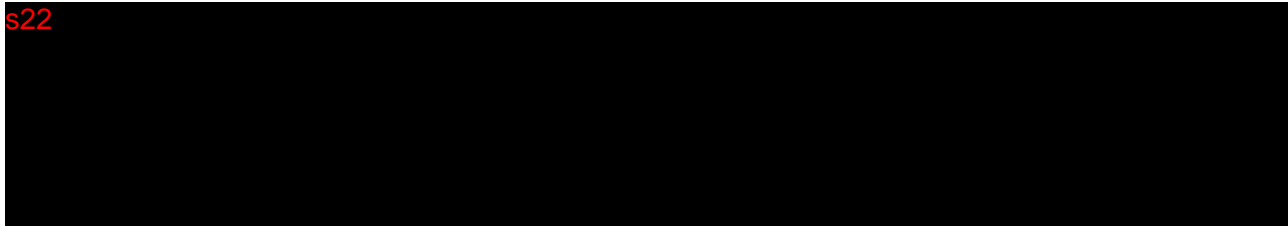


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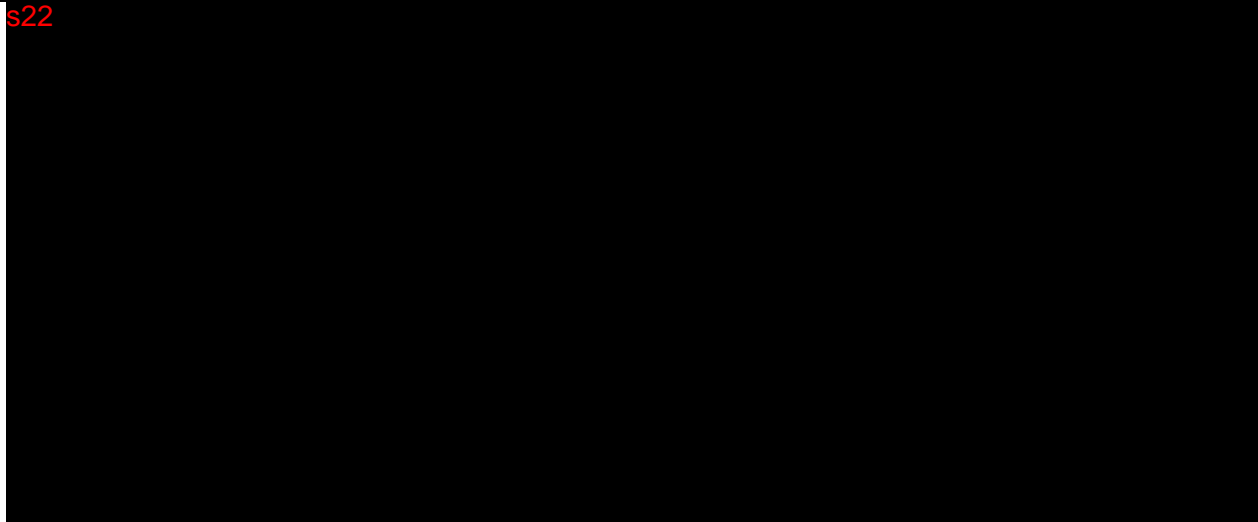


STATE & TERRITORY ADMINISTRATIONS MEETING

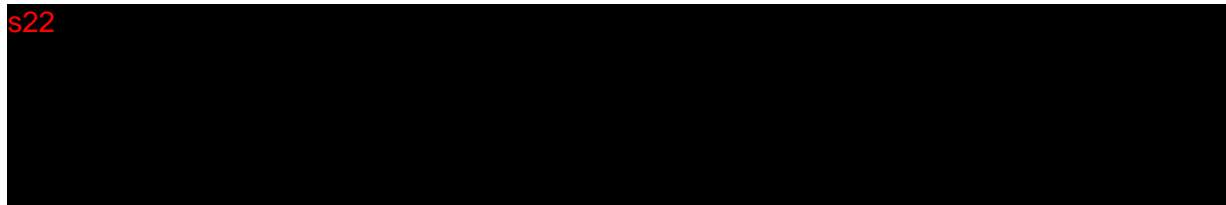
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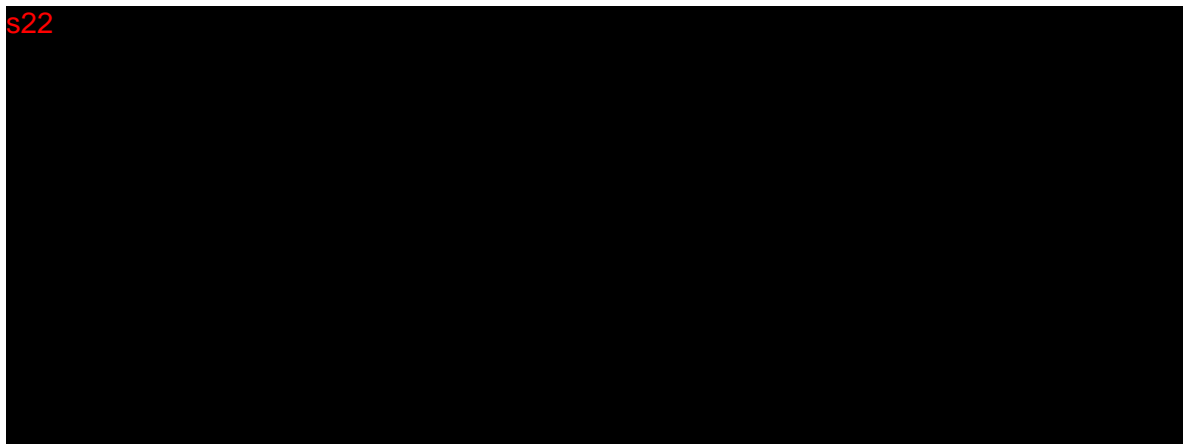
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12. Other business

A report on Standards Australia's FP-018 committee's progress on the development of a test method for composite materials, would be provided under agenda item 6.

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STATE & TERRITORY ADMINISTRATIONS MEETING

AGENDA ITEM 3 Board Outcomes

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STATE & TERRITORY ADMINISTRATIONS MEETING

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STATE & TERRITORY ADMINISTRATIONS MEETING

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AGENDA ITEM 6 Fire Resistance of Composite Panel Wall Facings (ACT Item)

The ACT representative provided members with an overview of the issues outlined in the ACT paper and circulated a report on regulatory comparisons for aluminium composite panels, commissioned by a product manufacturer.

The report from a fire engineering consultant provided an opinion that the product would be unlikely to comply with the BCA as it could not satisfy the requirements of the required combustibility tests. The ACT representative stated a number of existing buildings in the ACT contained this product, and if this interpretation was correct it may prevent buildings coming out of defect liability periods. He had also been approached by industry (certifiers), who were seeking an interpretation of whether the product did or did not meet the BCA requirements by way of an advisory note.

The Queensland representative questioned the need for the product to meet the combustibility requirements if the external wall was non-combustible and the product in question is used as a finish or lining as a concession exists under Spec C1.1 Clause 2.4.

The NSW representative stated the combustibility can be verified under the BCA and there is a need to distinguish when the product is deemed part of the wall to qualify for

STATE & TERRITORY ADMINISTRATIONS MEETING

the concession for combustible linings. However, the difficulty lies in identifying if the material unduly encourages the spread of flame.

The NT representative expressed the view the product needs to meet the requirements of the code and suggested no comment should be provided on the product's individual performance as it was not the responsibility of members to provide this. However the NSW representative stated a duty of care to provide advice back to industry existed which has precedence with the committee. Members agreed to work through the diagrams in the ACT paper.

For the purposes of the discussion, members agreed consideration of the question of whether the attachment constituted a part of the wall, would only be based on requirements for Fire Resistance. Members agreed where the material was installed configurations in Attachment A Figures 1 and 1b could be acceptable under the exemption provided in Spec C1.1. However, Figure 2 would not qualify for the concession as an attachment to a wall as the material would form part of the wall. In arriving at these interpretations, members agreed specific project consideration would need to be given to-

- The FRL of the wall
- The combustibility of the wall
- Whether the material encouraged the spread of flame
- Whether the material would impair the use of an exit.

It was acknowledged that a level of judgement would need to be exercised and each case should be assessed on its merits, as 'undue risk of fire spread' and 'impairing an exit' are not quantified in the BCA.

In the context of these discussions the ACT representative offered to develop a National Advisory Note on a generic product advising on the requirements of the BCA relating to fire resistance for circulation to all Administrations. This would include how to interpret whether the element is part of the external wall. When consensus is achieved, the note will then be circulated to BCC members, (out of session if necessary) for technical approval before being posted on the ABCB website.

The ACT representative also raised a matter which related to applying a concession under Spec C1.1 Clause 2.4, which only allowed a material determined combustible when tested to 1530.1, as the concession refers to the use of a '*combustible*' material (as determined by the Australian Standard)

Combustible Applied to a material – *combustible* as determined by AS1530.1.

The ACT representative explained that by extension, if the concession could only be applicable to a material which has been proven to be combustible when it is determined by testing to AS 1530.1, this would subject manufacturers to the costs of testing to prove a product is combustible. Members agreed this may be unnecessary and requested the ABCB office review the Clause, and the use of the defined term in the concession.

STATE & TERRITORY ADMINISTRATIONS MEETING

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STATE & TERRITORY ADMINISTRATIONS MEETING

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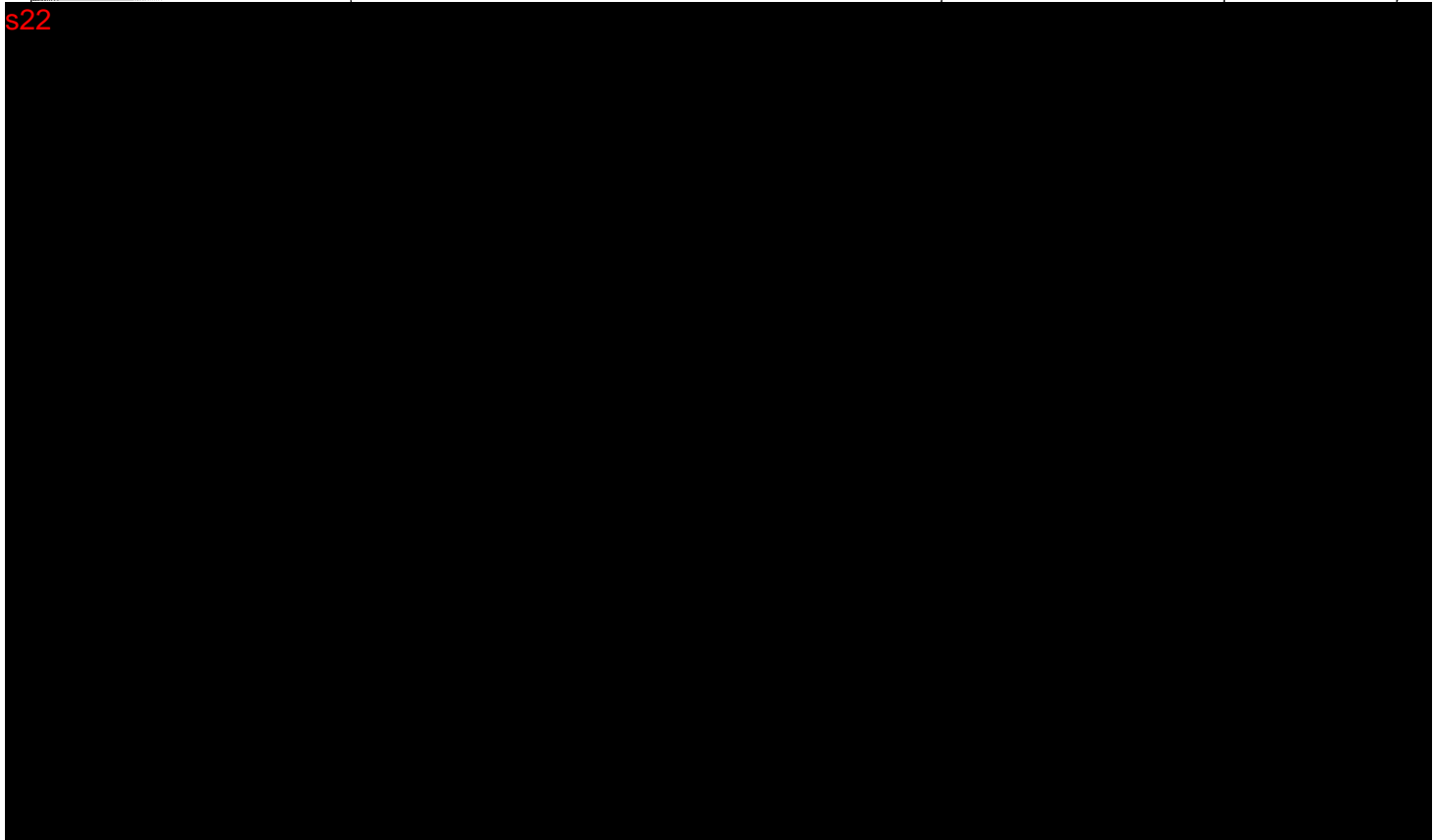
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ADMINISTRATIONS MEETING 2010-2: ACTIONS ARISING REPORT

Agenda Item	Action	Responsibility	Status
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6. Fire Resistance of Composite Panel Wall Facing	Develop a National Advisory Note on a generic product advising on the requirements of the BCA relating to Fire Resistance including how to interpret if the element is part of the external wall and circulate to all Administrations for approval.	ACT Representative	
	When agreed to by all Administrations circulate the National Advisory note on Fire Resistance to BCC members (out of session if necessary) for technical approval.	ABCB Office	
	Review Clause 2.4 of Spec C1.1 to determine if use of the defined term ' <i>combustible</i> ' results in the exemption only applying to a product tested to AS 1530.1 and if this is the intent of the provision.	ABCB Office	
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Outstanding Actions from Previous Meetings
Administrations Meeting 2010-1

s22			
7. National Advisory Note on Non-compliant Walling Systems (VIC Item)	Recirculate the National Advisory note on Non-compliant Walling Systems.	VIC Representative	
	Publish National Advisory Note on ABCB web site (when agreed to by all Administrations).	ABCB Office	Awaiting advice from Admins that agreement has been reached



DRAFT SUMMARY RECORD OF DISCUSSIONS

STATE AND TERRITORY ADMINISTRATIONS' MEETING 2010-3

Date: 12 October 2010
Time: 1.00pm – 5.00pm
Venue: Meeting Room: G.022
Ground Level, Industry House
10 Binara Street
Canberra ACT 2601

AGENDA

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2.

Confirmation of Record of Administrations 2010-2

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Attendance:

s47F [Redacted]

ABCB Office
ABCB Office – Chairman
NSW Administration
QLD Administration
NT Administration
QLD Administration
TAS Administration
ABCB Office (Secretariat)
TAS Administration
ABCB Office
VIC Administration
ABCB Office
ACT Administration
WA Administration
SA Administration

Guests:

s47F [Redacted]

ABCB Office (Agenda Item 4)
ABCB Office (Agenda Item 8)
ABCB Office (Agenda Item 8)

Apologies:

s47F [Redacted]

Australian Government
ABCB Office

Observers:

s47F [Redacted]

ABCB Office
ABCB Office

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AGENDA ITEM 2 Confirmation of Record of Admins 2010-2

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The Victorian representative advised comments had been received in response to the National Advisory Note on external wall cladding systems from s47F representing Consult Australia and it was intended these matters be discussed as other business at the BCC meeting.

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AGENDA ITEM 8 Other Business

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Information on Alucobond – ACT

The ACT representative advised members a meeting had taken place between his Administration, manufacturers and a local fire engineer and they are now satisfied that the product in question does not comply with the BCA DTS requirements for combustibility. The NSW fire Brigade also now believe a problem existed and he advised jurisdictions to be aware the approval problems encountered in his jurisdiction may spread. The Tasmanian representative requested the advisory note be forwarded as soon as it was available.

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ADMINISTRATIONS MEETING 2010-3: ACTIONS ARISING REPORT

Agenda Item	Action	Responsibility	Status
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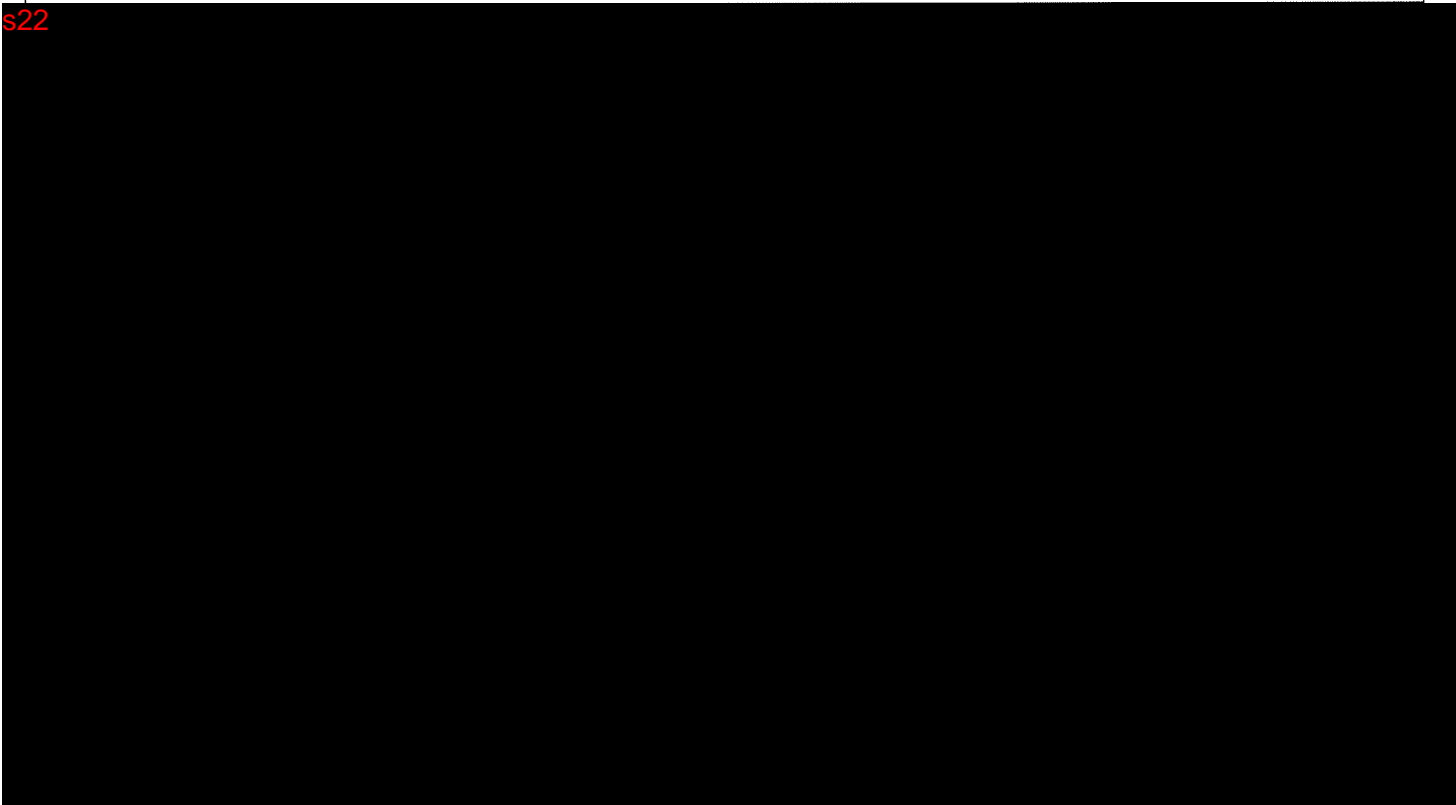
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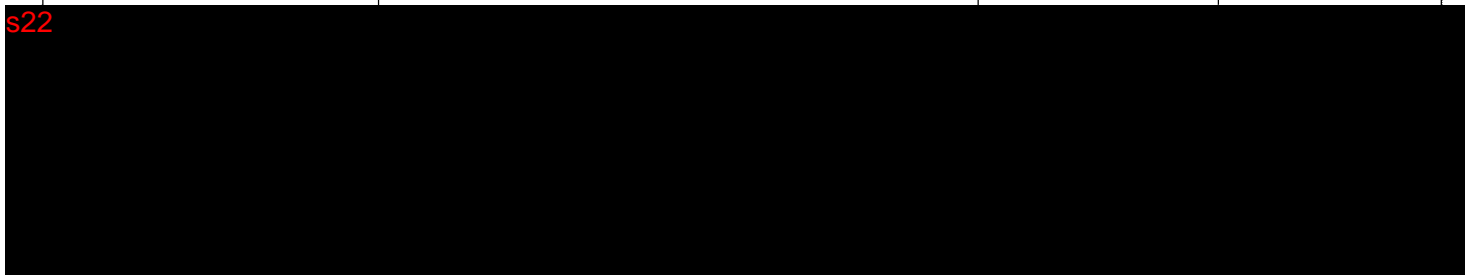
Outstanding Actions from Previous Meetings

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Administrations Meeting 2010-1			
7. National Advisory Note on Non-compliant Walling Systems (VIC Item)	Publish National Advisory Note on ABCB web site (when agreed to by all Administrations).	ABCB Office	Awaiting advice from Admins that agreement has been reached

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DRAFT SUMMARY OF DISCUSSIONS



STATE AND TERRITORY BUILDING ADMINISTRATIONS MEETING 2011-1

Date: 4 April
Time: 8:30am – 12:00 noon
Venue: Novotel Perth Langley
221 Adelaide Terrace
Perth WA 6000
Tel (08) 9221 1200
www.novotelperthlangley.com.au

AGENDA

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2. Confirmation of Record of Administrations 2010-3

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ATTENDANCE*Attendees*

s47F	ABCB Office NSW Administration ABCB Office - Chair NT Administration SA Administration Qld Administration ABCB Office (Secretariat) Tas Administration ABCB Office Vic Administration ABCB Office ACT Administration Australian Government WA Administration
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Guests

s47F	Timber EDservices (<i>on behalf of the CTS</i>)
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Observers

s47F	Victorian Administration
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Apologies

s47F	Qld Administration
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AGENDA ITEM 2 Confirmation of Record of BCC 2010-3 and Actions Arising

The NSW representative requested minor changes to clarify the record of discussion on Agenda Item 2, which the Chairman agreed would be incorporated. Members confirmed the record of the previous meeting.

Actions arising

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- The ACT representative advised the National Advisory Note on fire resistance of composite wall panelling was still under development.
- The National Advisory Note on non-compliant walling systems was to be dealt with at the BCC meeting.

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ADMINISTRATIONS MEETING 2011-1: ACTIONS ARISING REPORT

Agenda Item	Action	Responsibility	Status
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Outstanding Actions from Previous Meetings

Agenda Item	Action	Responsibility	Status
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Administrations Meeting 2010-3

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Administrations Meeting 2010-2

6. Fire Resistance of Composite Panel Wall Facing	Develop a National Advisory Note on a generic product advising on the requirements of the BCA relating to Fire Resistance including how to interpret if the element is part of the external wall and circulate to all Administrations for approval.	ACT Representative	ACT rep to advise
	When agreed to by all Administrations circulate the National Advisory note on Fire Resistance to BCC members (out of session if necessary) for technical approval.	ABCB Office	Awaiting completion of above item

Administrations Meeting 2010-1

7. National Advisory Note on Non-compliant Walling Systems (VIC Item)	Publish National Advisory Note on ABCB web site (when agreed to by all Administrations).	ABCB Office	Awaiting advice from Admins that agreement has been reached
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DRAFT SUMMARY OF DISCUSSIONS

STATE AND TERRITORY BUILDING ADMINISTRATIONS MEETING 2011-2

Date: 26 July 2011

Time: 8:30am – 12:00 noon

Venue: The Marque Brisbane
103 George Street
Brisbane QLD 4000
(07) 3221 6044
www.MarqueHotels.com

AGENDA

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2. Confirmation of Record of Administrations 2011-1
-

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ATTENDANCE

Attendees

s47F	SA Administration ABCB Office (From 10am) NSW Administration (by teleconference) ABCB Office – Chairman ABCB Office (Secretariat) ABCB Office Tas Administration Qld Administration ABCB Office Vic Administration ABCB Office ACT Administration Australian Government WA Administration
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Guests

s47F	Department of Climate Change and Energy Efficiency (Agenda item 6.1) Department of Climate Change and Energy Efficiency (Agenda item 6.1)
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Observers

s47F	Victorian Administration Department of Innovation Industry Science and Research (Agenda Item 6.1)
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Apologies

s47F	NT Administration WA Administration SA Administration
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**AGENDA ITEM 2 CONFIRMATION OF RECORD OF
ADMINISTRATIONS 2011-1**

The Chairman thanked members for their comments which were included in the summary of the previous meeting, and members confirmed the record as true and accurate.

The Chairman requested members update any outstanding actions from previous meetings, and the ACT representative suggested the item relating to the fire resistance of materials and the development of a National Advisory Note could be removed.

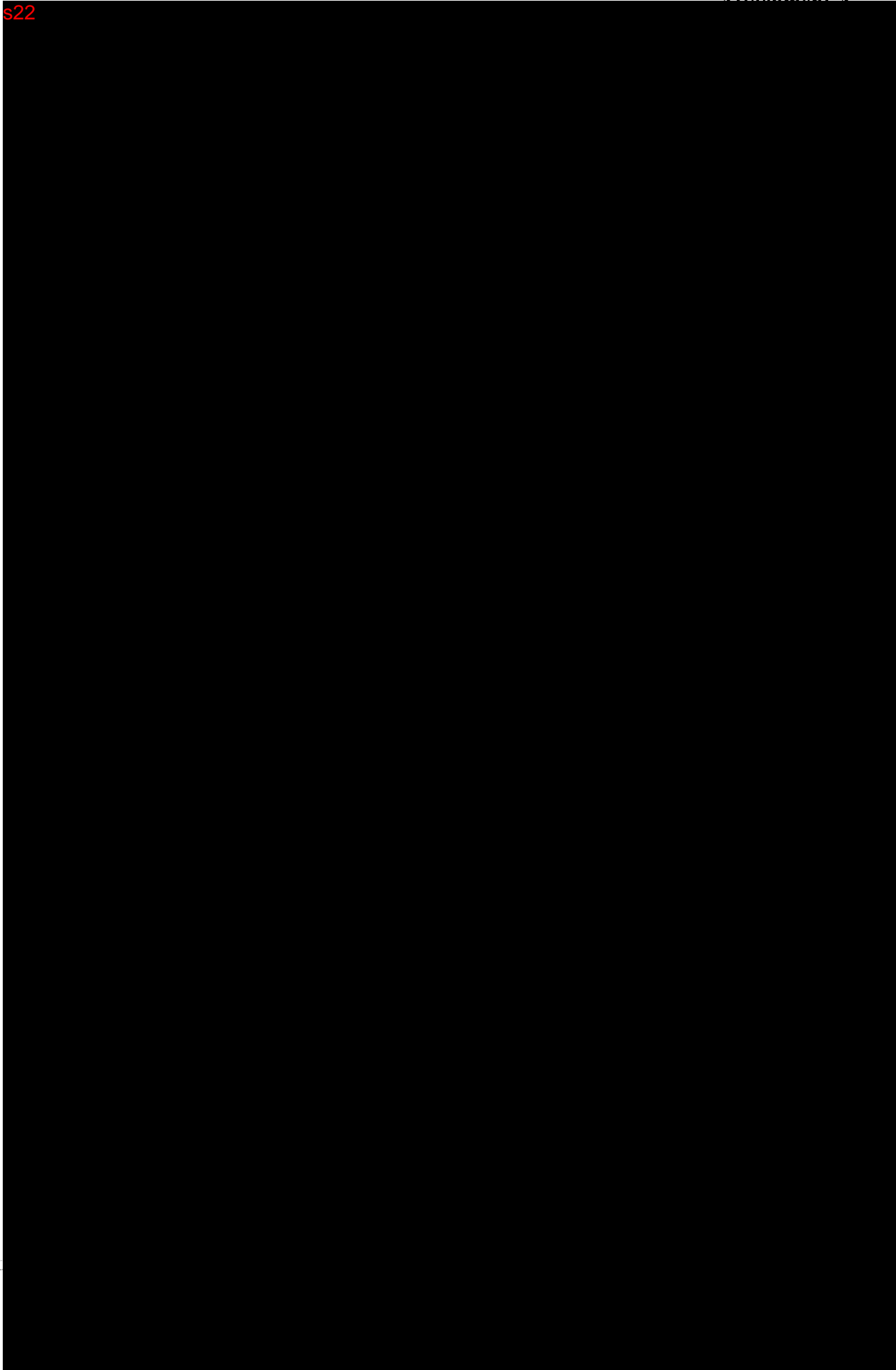
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**AGENDA ITEM 14 NATIONAL ADVISORY NOTE - WALL
CLADDING (*Vic item*)**

Contact Officer: s47F [REDACTED]

RECOMMENDATION

It is recommended members consider the attached draft National Advisory Note relating to Wall Cladding.



Assessing Polystyrene External Wall Cladding Systems

2011

Handbook

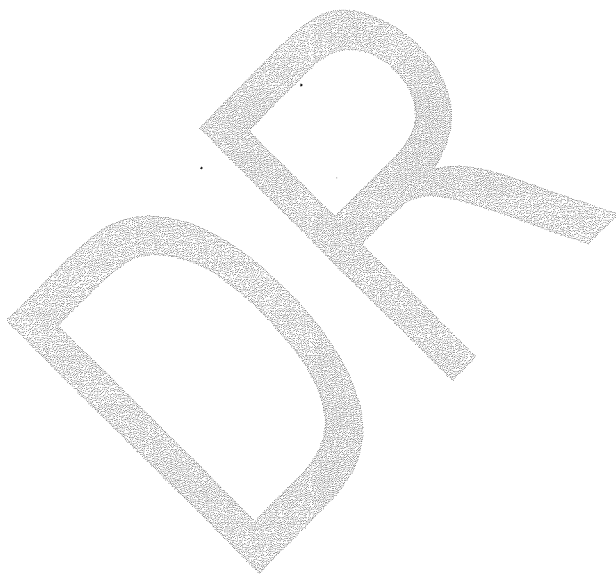
Non-Mandatory Document

Assessing Polystyrene External Wall Cladding Systems

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Preface

In residential buildings in Australia the use of external wall cladding systems such as those incorporating polystyrene have dramatically increased in recent years.

These systems are not referenced as a Deemed-to-Satisfy (DtS) solution in the **Building Code of Australia** (BCA). The cladding systems must therefore be presented as an Alternative Solution in a form that the approving authority (e.g. a building surveyor or building certifier) can assess and be satisfied that the material, form of construction or design meets the Performance Requirements of the BCA. The only DtS cladding systems covered by the BCA are masonry, weatherboard, fibre cement sheet and plywood sheet cladding systems.

The ABCB Building Codes Committee has considered this matter and has noted that any Alternative Solution must demonstrate compliance with the Performance Requirements of the BCA, or the solution must be at least equivalent to the DtS provisions. A combination of both methods may also be used.

The approving authority is required to ensure that the process outlined in the BCA is followed.

These requirements are set out in the following clauses:

- A0.8, A0.9 and A0.10 of BCA Volume One and,
 - 1.0.8, 1.0.9 and 1.0.10 of BCA Volume Two
- when considering an application for a building permit or building approval.

As part of A0.9 and 1.0.9 the approving authority may seek evidence to support that the use of the material, form of construction or design meets a Performance Requirement or a DtS as described in A2.2 of BCA Volume One and 1.2.2 of BCA Volume Two and the wording of both is identical.

Part 1.2.2 lists as evidence of suitability,

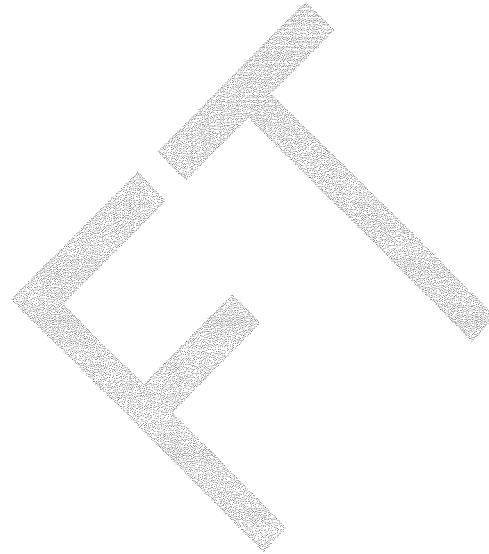
- (i) *A report issued by a Registered Testing Authority, showing that the material or form of construction has been submitted to the tests listed in the report, and setting out the results of those tests and any other relevant information that demonstrates its suitability for use in the building.....*
- (ii) *A current Certificate of Conformity or a current Certificate of Accreditation.*
- (iii) *A certificate from a professional engineer or other appropriately qualified person which-*
 - (A) *certifies that a material, design or form of construction complies with the requirements of the BCA; and*
 - (B) *sets out the basis on which it is given and the extent to which relevant specification, rules, codes of practice or other publication have been relied upon.*
- (iv) *A current certificate issued by a product certification body that has been accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ)*
- (v) *******
- (vi) *Any other form of documentary evidence that correctly describes the properties and performance of the material or form of construction an adequately demonstrates its suitability for use in the building*

It is important to check that appraisals, certificates and technical reports cover all relevant BCA Performance Requirements of the cladding system proposed. They must be current and relevant to the Alternative Solution. As this Handbook focuses mainly on housing, its main purpose is to promote weatherproof construction. This Handbook therefore, from herein refers only to BCA Volume Two.

If intending to use such a system for the external wall cladding of Class 2 – 9 buildings, reference should be made to the relevant provisions in Volume One of the BCA, and, in particular, the Performance Requirements relating to fire resistance and combustibility.

Architects and building designers should take care in selecting and specifying polystyrene or other rigid or flexible external wall cladding systems that they have at least been assessed in order to assist the approving authority in determining whether this form of construction is an acceptable Alternative Solution.

An approving authority, when assessing an application for a building permit or building approval must be satisfied that the applicant has provided appropriate evidence that all relevant Performance Requirements will be met. The approving authority must also give due consideration to the conditions or limitation of any material or system provided to them by the applicant. Expansion and construction joint provisions and flashing details may need to be determined using engineering principles in addition to bending, shear and fastening considerations. There have been significant issues with respect to leakage and frame deterioration with alternative systems in other countries, particularly New Zealand.



1. The use of polystyrene external wall cladding systems in residential buildings

1.1 Introduction

In residential buildings in Australia the use of external wall cladding systems such as those incorporating polystyrene have dramatically increased in recent years.

These systems are not referenced as a Deemed to Satisfy (DtS) solution in the *Building Code of Australia* (BCA). The cladding systems must therefore be presented as an Alternative Solution in a form that the approving authority can assess and satisfy itself that the material, form of construction or design meets the Performance Requirements of the BCA.

1.2 Background

Building legislation throughout Australia generally requires that the approving authority must not issue a building permit or building approval unless they are satisfied that the building approval and the building work will comply with the Commonwealth, State or Territory's specific Building Act and the Building Regulations (and therefore the BCA).

Monolithic polystyrene claddings systems are not a BCA DtS system and therefore the approving authority is required to follow the Alternative Solution assessment process outlined in the BCA.

The Alternative Solution must demonstrate that the solution complies with the Performance Requirements of the BCA, or the solution is at least equivalent to the DtS provisions. A combination of both methods may also be used.

The approving authority is required to ensure that the process outlined in 1.0.8, 1.0.9 and 1.0.10 of BCA Volume Two is followed. One of the Assessment Methods in 1.0.9 is Expert Judgement which therefore allows for the use of a report from an expert who has the qualifications and experience to determine whether a Building Solution complies with the Performance Requirements

Some manufacturers of polystyrene and other external wall cladding systems have opted to have their products assessed and reported on by a testing authority.

These reports may still be used as evidence to support that the use of a material, form of construction or design meets a Performance Requirement as identified in 1.2.2(a)(i) of BCA Volume Two .

The CodeMark product certification scheme also gives approving authorities and building practitioners confidence of legislative compliance. Certification bodies are accredited through the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) who in turn evaluate and certify building products. Approving authorities are obliged to accept CodeMark certified products. (ABCB; 2005). It should be noted that CodeMark Certificates may only cover selected BCA Performance Requirements and some may in fact not address weather-tightness of the system. Care is needed in reviewing the scope of the Certificate.

The approving authority must be aware of the conditions or limitation of any report. All relevant design issues must be considered, including articulation joints, bending, and shear strength, fasteners, flashings, weather-proofing, condensation, fire resistance levels and others.

Refer to the following information in this handbook for more details.

1.3 Duties of applicants/designers

State and Territory Building Regulations require applicants for building permits or building approvals to ensure an application contains sufficient information to show that the building work will comply with the relevant Building Act and the Building Regulations.

The approving authority should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. As far as practicable relevant certificates, reports and forms should be submitted at design stage including all details of Alternative Solutions.

The approving authority ought to be aware of the proportional liability provisions of the relevant jurisdiction. The approving authority that accepts less than adequate documentation and simple referencing (particularly in regard to Alternative Solutions) may find themselves open to a broader litigation claim than may otherwise be the case.

1.4 Potential consequences of failure of cladding systems

The cladding system must resist any actions it may be reasonably subject to (Performance Requirement P2.1 of BCA Volume Two). It must also resist the penetration of water that may cause unhealthy or dangerous conditions, loss of amenity for occupants and undue dampness or deterioration of building elements (Performance Requirement P2.2.2 of BCA Volume Two). Other Performance Requirements may also be relevant.

Moisture that has penetrated or collected on the inside face of the external cladding must be able to escape the building fabric, either by natural drainage or by ventilation of a cavity.

Water may accumulate around horizontal members (bottom plate, heads, sills, deck joists, nogging, and parapets) with potential to cause deterioration of the building elements.

Decks are of particular concern. Undetected decay of cantilevered and simply supported floors and polystyrene-clad timber framed balustrades have obvious and significant life safety concerns.

Hidden fungal growth may seriously affect the health of occupants causing respiratory and skin problems. The young and old are most at risk and those with weakened immune systems. Damp also encourages dust mites. (Consumerbuild¹, 2007).

If thermal insulation becomes damp, it will reduce in effectiveness, and, in turn, will make it harder to heat or cool rooms.

1.5 Sources of water penetration

Wind forces, even at low pressures, can be higher than those inside the building assisting rain water to enter through penetrations, gaps and joints. Localised pressure at corners and exposed edges require particular attention. Sealant systems must be guaranteed for the life of the building and must be maintained.

If proper consideration is not given to the placement of vapour barriers, condensation may occur in the external wall frame as the temperature gradient drop across the width of the wall. The moisture in warm air from inside the building may condense as it cools, forming moisture droplets in the insulation, framework surface, internal face of the cladding and elsewhere.

Condensation in the ACT, Victoria, Tasmania and in alpine areas is possibly more problematic than in other States and Territories. Proposals for the use of polystyrene cladding in these regions should account for the particular climate. Buildings in cooler climates tend to be closed and sealed over the winter period allowing for higher levels of air-borne moisture in the building. In warmer climates, buildings will tend to be aired more often and temperature differentials from inside to outside the building will not be as severe.

Experience of poorly designed cladding systems in various parts of the world, highlights the need for the systems to be designed correctly for watertightness, wind loading and potential condensation.

New Zealand experience with cladding systems (leaky building syndrome) suggests climates like the ACT, Victoria, Tasmania and New Zealand with similar precipitation, humidity and wind loading pose problems that are not evident in other States and Territories. It is estimated the cost to repair leaky buildings in New Zealand is in excess of \$ NZ11billion (Syft, 2007). Repair costs to some houses have been in the order of \$NZ300,000 (Consumerbuild², 2004). The New Zealand Building Code now

specifies a requirement for a narrow cavity behind monolithic polystyrene cladding to allow the wall to drain and breathe.

1.6 Conclusion

International experience over a number of years indicates special care and consideration is necessary in the use of considerations new products and that they should be strenuously tested before being released. It is incumbent on the approving authority that they be reasonably satisfied that the material, form of construction and design meets the Performance Requirements of the BCA.

Care must be taken that all issues have been addressed, including, where appropriate, further assessment by qualified experts.

Any system must be constructed in accordance with the specified details. Mixing and matching of systems will void reliance on test results and reports.

Documentation provided at completion of the project should include certification of the installation in accordance with specifications from a competent person.

1.7 Bibliography

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Building Standards and Regulation, (BSR); January 2007; "*Good Documents = Good Job*", Tas. www.wst.tas.gov.au/building/publications.

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Consumerbuild², Department of Building and Housing (NZ), 2004; "*Case study 2*"; www.consumerbuild.org.nz/publish/leaky/leaky-casestudy-2.php

CSIRO; October 2003; "*Technical Assessment 310, Unitex Thermal Wall Systems (Uni-TWS)*"; Highett, Vic. www.cmit.csiro.au/services/appraisals/test.cfm?id=310

Peter Nassau Consultant Regulatory Development, Building Commission, Victoria October 2010 Based on a paper by: Mick Galloway, *GRIFFITHS AND GALLOWAY BUILDING SURVEYORS, TASMANIA* 2007

Hunn, 2002; "*Report of the Overview Group on the Weathertightness of Buildings to the Building Industry Authority*"; Building Industry Authority (NZ), Wellington. <http://www.dbh.govt.nz/UserFiles/File/Weathertightness/Reports/pdf/bia-report-17-9-02.pdf>

Syft Technologies Ltd; 2007; "*An Overview of Leaky Building Syndrome*"; NZ, www.syft.com/?id=64.

Compliance Document for New Zealand Building Code Clause E2 External Moisture, Prepared by the Department of Building and Housing

(The highlighted text indicate footnotes which don't exist)

2. Acceptable construction

2.1 Scope

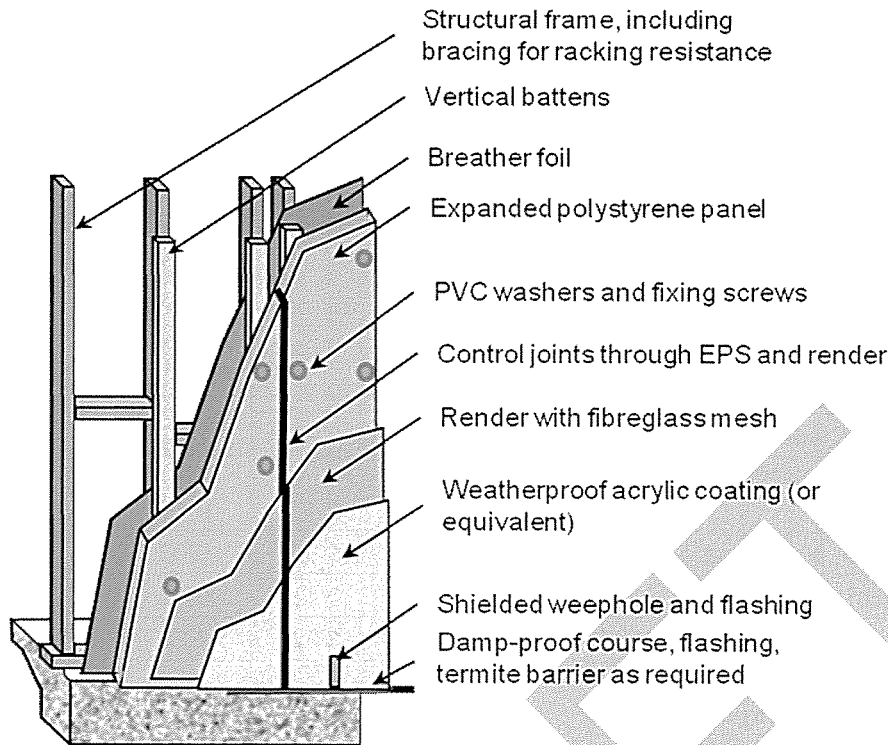
Set out below is a form of construction, satisfactory for EPS Cladding Systems in Wind Classes up to and including N3 (1.5 kPa net suction) and site Classifications A, S, M, M-D, H1, H1-D, H2, H2-D.

For other applications, the system design shall be based on test results and assessed against the Performance Requirements in the Appendix.

2.2 Form of construction

Acceptable EPS and XPS Cladding Systems shall consist of:

- A structural support system, which can resist applied permanent, imposed, wind and other loads, without distortion that could damage the cladding or other components
- Breather foil (building wrap), which minimises the build up of condensation
- Vertical cavity battens, 20 to 25 mm thick and the same width at the studs, fixed over the breather foil to the studs
- Flexible flashing tape around window and door penetrations (refer to NZBC E2/AS1 for guidance)
- Expanding foam air seals around the window trim cavity (refer to NZBC E2/AS1 for guidance)
- Expanded polystyrene panels (EPS) or extruded polystyrene (XPS), fixed through the battens and breather foil into the studs by a series of corrosion-resistant screws and PVC washers, which prevent the panels being sucked off the frames by extreme wind
- A render system, strengthened by a fibre glass mesh to prevent crazing and cracking
- Control joints, which are spaced and detailed to prevent cracking of the cladding when the building is subject to movement
- Weatherproof acrylic coating
- Shielded weepholes and flashing system, which enables any moisture to drain from the cavity to the outside of the building
- Damp-proof course, flashings, termite barriers, vermin-proofing and the like to prevent the ingress of rising damp, vermin and termites
- Flashings and jointing, which prevent the ingress of rainwater at inter-storey junctions, parapets, openings, doors, windows and penetrations.



2.3 Support

The supporting structure shall comply with the requirements of the BCA. Some relevant referenced documents for the applicable wind class in accordance with AS 4055 are listed below.

Table 1
Referenced BCA documents for the supporting structures

Supporting Structure	Relevant BCA Referenced document
Timber framing	AS 1684.2 and AS 1684.3 or AS 1684.4
Residential and low rise steel framing	AS 4600 NASH Standard Part 1
Masonry	AS 4773.1 and AS 4773.2
Structural steelwork	AS 4100
Concrete	AS 3600

2.4 Polystyrene board

Polystyrene board shall be:

- Expanded Polystyrene (EPS) Grade M, H or VH in accordance with AS 1366.3; or
- Extruded Polystyrene (XPS) Grade II, III or IV in accordance with AS 1366.4.

Note:

Care is needed with XPS, in particular the ability of the render to adhere to the panel.

Polystyrene board shall be not less than 60 mm thickness, fire retarded, vermin retarded, termite resistant.

The thickness of the Extruded Polystyrene (EPS) board shall be such that the energy efficiency requirements of the Building Code of Australia (BCA) are met. The following thermal resistances are

deemed to be achieved by EPS Cladding systems when used in conjunction with internal plasterboard and a stud wall system.

Table 2
Thermal Properties EPS Cladding Systems with Internal Plasterboard Lining

Material	Thermal resistance, R m ² .K/W		
	60 mm	80 mm	100 mm
EPS Class M Cladding System	60 mm	80 mm	100 mm
External air film	0.04	0.04	0.04
Render and coating	0.01	0.01	0.01
EPS Cladding Class M	1.44	1.92	2.40
70 mm Air Gap ^{See Note 5}	0.17	0.17	0.17
10 mm Gypsum plasterboard	0.06	0.06	0.06
Internal air film	0.12	0.12	0.12
Total	1.84	2.32	2.80
EPS Class H Cladding System	60 mm	80 mm	100 mm
Other components as listed above	0.40	0.40	0.40
EPS Cladding Class H	1.50	2.00	2.50
Total	1.90	2.40	2.90
EPS Class VH Cladding System	60 mm	80 mm	100 mm
Other components as listed above	0.40	0.40	0.40
EPS Cladding Class VH	1.54	2.05	2.56
Total	1.94	2.40	2.96
Notes:			
1. This table provides the thermal resistance of EPS (expanded polystyrene) clad veneer walls, without added insulation.			
2. Thermal resistance of EPS is based on AS 1366.3.			
3. Steel studs, if used, should incorporate a thermal break in accordance with BCA.			
4. Allowances for air films and air spaces are included. There is no allowance for reflective foil.			
5. 90 mm studs may be substituted for 70 mm studs. The most common studs are either 90 mm or 70 mm softwood. 75 mm is a hardwood equivalent.			
6. Similar calculations may be performed for XPS (extruded polystyrene) clad veneer walls using published data.			

2.5 uPVC beading and mouldings

uPVC beading and mouldings shall be polyvinyl chloride virgin material, mesh reinforced, UV stabilised, marine grade extruded to the specified shapes.

2.6 Fixing to supporting structures

The spacing of supports shall not exceed 600 x 600 mm

2.7 Screw fixings

Screw fixings shall be:

- Self drilling, counter-sunk ribbed head with, coarse threaded, Class 3 (except where varied below);
- Teflon-coated for applications within 1 km breaking surf;
- Fixed through 40 mm diameter PVC washers.

In Wind Classes N1, N2 and N3, screws shall be:

- At least 10 gauge (8 mm);
- Of length at least 25 mm longer than the thickness of the EPS board plus the cavity width;
- At centres not exceeding 450 mm horizontally and 300 mm vertically;
- At least 5 per square metre of wall; and
- At least 10 per square metre of wall within 1.2 metres of the end of the building.

2.8 Corrosion resistance of screws

- For applications at least 1 km from breaking surf or polluting industry, screws shall comply with AS/NZS 3566.2 Grade 3
- For applications within 1 km of breaking surf or polluting industry, Grade 304 or 316 stainless steel screws shall be used.

2.9 Fibreglass mesh

Fibreglass mesh shall be minimum 5 x 5 mm mesh, 150 g/m² mesh, and shall be alkali resistant; and laid over the whole surface.

2.10 Fibreglass mesh at joints

At joints between adjacent panels that have been meshed and rendered in the factory before despatch to site, install a layer of 200mm fibreglass mesh and render patching compound, ensuring that it overlaps the sheet by 100mm. This requirement does not apply to control joints.

At external corners, install mesh reinforced corner trim with extra 200mm mesh to the side where raw polystyrene is visible.

2.11 Construction adhesive

Construction adhesive shall be:

- Synthetic rubber-based thixotropic gunable heavy paste, of
- Viscosity approximately 110,000 cps at 25°C, Low odour,
- Colour beige (unless specified otherwise),
- Solids content 77% +,-/-. 5%,
- Specific gravity 1.16 +,-/-. 0.05 ,
- Flammability flashpoint approximately -20°C,
- Service temperature -30°C to +80°C, with
- High green strength,
- High initial grab,
- High flexibility,

- Temperature resistant,
- Slump resistant,
- Water resistant,
- Styrene safe,
- Working time 5 to 10 minutes depending on temperature,
- Open time 20 to 30 minutes depending on temperature,
- Maximum bond achieved within 12 to 72 hours depending on temperature and thickness,
- Compatible with the EPS or XPS material as appropriate.

2.12 Render

Render shall be pre-blended polymer modified cement render, suitable for mixing with water immediately before use to provide a smooth trowelable paste. Render should not be applied in temperatures above 35°C or below 5°C. Render should not be applied when there is dew, rain or frost on the cladding or it is expected within 24 hours. The specific render should be proven to be compatible with the EPS or XPS substrate. The appropriate tensile adhesion strength shall be determined and specified.

2.13 Sealants

Sealant shall be an acrylic based texture coating suitable for external application over cement rendered surfaces. Sealants shall comply with NZBC E2/AS1 or equivalent:

- Type F, Class 20LM or 25LML of ISO 11600, or
- Low modulus Type II Class A of Federal Specification TT-S-00230C.

2.14 Coatings

Coatings shall be a long-life, high-build, low profile acrylic based texture coating suitable for external application over cement rendered surfaces. Coatings shall comply with AS/NZS 4548.2, and are classified as paint Type 38 of AS 2311, and correspond generally to the Australian Paint Approval Scheme specification Type 3 of GPC-C-117. They shall be applied by airless spray or nap roller in accordance with the manufacturer's instructions to typically achieve a spreading rate of 1.5-6.5 m²/L (0.67-0.15 L/m²).

2.15 Control joints

Backing rod for control joints, expansion joints and articulation joints shall be expanded polyethylene tube or bead. Joint sealant shall be gun grade multi-purpose polyurethane sealant.

Where panels are fixed across wall frames and onto other framing systems such as a trussed gable roof, horizontal control joints shall be incorporated. All joints shall have cover moulds, fixed to the top panel (but not to the bottom panel) and incorporate flexible sealant.

At corners of the building, horizontal control joint shall be detailed and erected such that the joints line up around the corner. All joints shall have cover moulds.

2.16 Articulation and control joints

In clad walls over 5.0 m high, horizontal control joints shall be installed at centres not exceeding 3.0 m

In clad walls over 6.0 m long, vertical control joints shall be installed at centres not exceeding the following:

- (a) In straight, continuous walls having no openings, at centres not more than the values given in the Table below.
- (b) Where the height of the cladding changes abruptly by more than 20% of its lesser height, at the position of change in height.
- (c) Where openings more than 900 × 900 mm occur, at not more than 5000 mm centres.
- (d) Where cladding changes thickness.
- (e) At control or construction joints in footings or slabs.
- (f) Within 4500 mm of all corners.

Table 3
Spacing Of Articulation Joints For Cladding

Site Class	Maximum Articulation Joint Spacing, m		
	Up to 4 m high for 10 mm joints	4 m to 8.5 m high for 10 mm joints	4 m to 8.5 m high for 1015 mm joints
A, S	Not required	Not required	Not required
M, M-D	6.0	4.2	6.0
H1, H1-D	5.5	3.9	5.5
H2, H2-D	5.0	3.5	5.0
Note Site class is defined in AS 2870. For Class P sites, joints spacing shall be determined by consideration of the specific site conditions.			

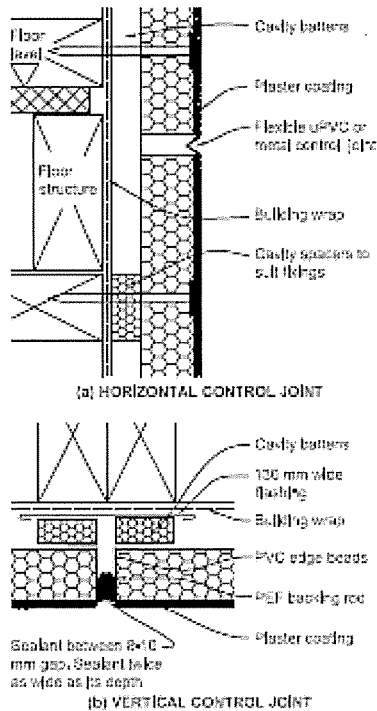
At window and door openings:

- Provide an 8 to 10 mm expansion gap between EPS panels and aluminium, timber or PVC window frames.
- Provide for a 1 in 6 slope at window sills.
- Install mesh reinforced corner trim

Specifications must include appropriate window and door joinery. Window joinery at wall junctions represent high weather-tightness risk, especially where the joinery has no facing.

Figure 124: Control joints for EIFS
Paragraph 9.9.4.3

NOTE: (1) Detail (a) is only suitable for drained cavities not exceeding 2 storeys in height.
(2) For drained cavities not exceeding 2 storeys in height – refer Figure 70.



2.17 Ground clearance

EPS Cladding shall be finished at least 100 mm clear of finished ground level.

2.18 Weather-proofing

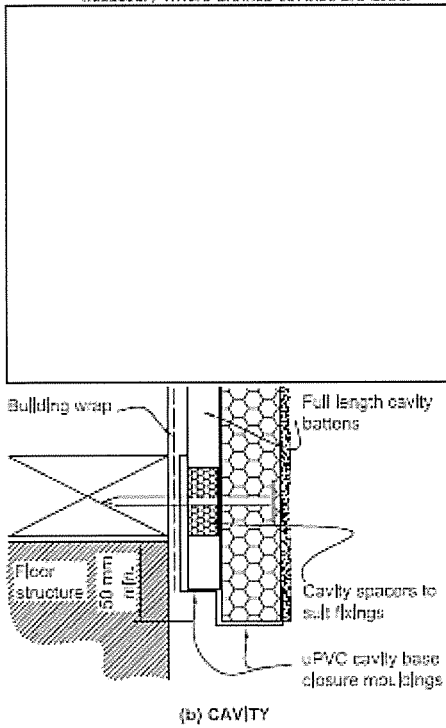
Flashing and damp-proofing components of an EPS cladding system shall be detailed to suit the specific requirements of the system, and shall comply generally with the following:

- Flashings shall be provided at the following locations:
 - External Corner Flashing
 - Internal Corner Flashing
 - Roof/parapet flashing
 - Window head flashing
 - Window Sill Flashing
 - Balustrades
 - Parapet capping
- Flashings shall comply with AS/NZS 2904.
- Flashings and capping shall be manufactured from galvanized zinc-coated steel with a thickness of not less than 0.6 mm
- Flat surfaces shall be installed with a minimum fall of 1 in 6.
- Flashings shall be lapped not less than 50 mm, sealed with a water-resistant sealant, and fixed with corrosion resistant screws. Flashings intended to drain accumulated moisture shall be securely fixed at least 25 mm under the cladding and extend over the ends and edges of framing of the openings to ensure that they maintain their position.

- Flashings shall hold their intended shape.
- Metal flashings shall be compatible with other metals with which they are in contact or spill water onto, or from which they receive water; to avoid galvanic corrosion. Lead flashings shall not be used on any roof that is part of a potable water catchment roof. The combination of lead with zinc aluminium alloy shall not be used.
- A cavity flashing shall be—
 - (a) turned up a minimum of 150 mm at the inner frame;
 - (b) fixed to the inner frame at 600 mm maximum centres;
 - (c) lapped at joints in a straight run by a minimum of 150 mm;
 - (d) lapped at corners by the width of the leaf and cavity or fanned; and
- Cavities should be drained by concealed/protected vent strips at the base of the wall, The minimum ventilation rate should be 1000 mm² per lineal metre of wall. Alternatively protected weepholes may be used.
- Where cavity flashings are penetrated, the flashing shall be punched through or cut from the inside of the wall, and be fitted around the penetration and sealed.
- In areas where termite management systems are required, all penetrations within the cavity walls shall be treated in accordance with AS 3660.1.

Figure 126: Bottom of cladding for EIFS
Paragraph 9.9.7

GENERAL: 6 mm offset of framing to foundation is not necessary where drained cavities are used.



Remove "direct fix" from diagram.

Figure 126: Penetration for EIFS
Paragraph 9.9.8 a)

NOTE: Refer Figure 68 for pipe sealing to building wrap.

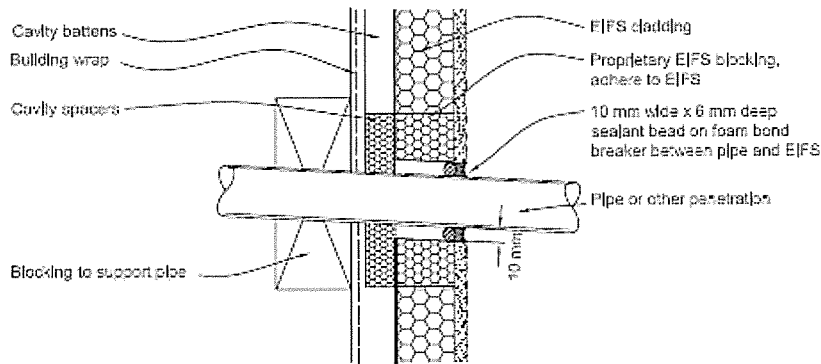
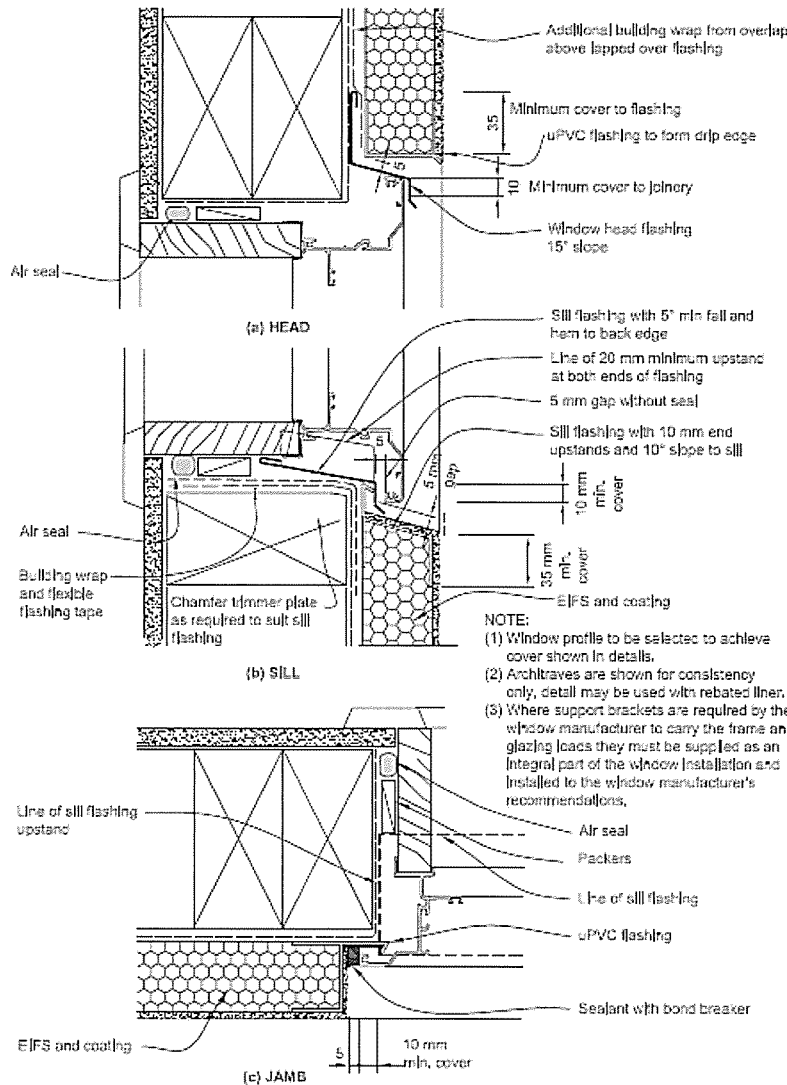


Figure 127: Windows for direct fixed EIFS
Paragraph 9.9.9 a)

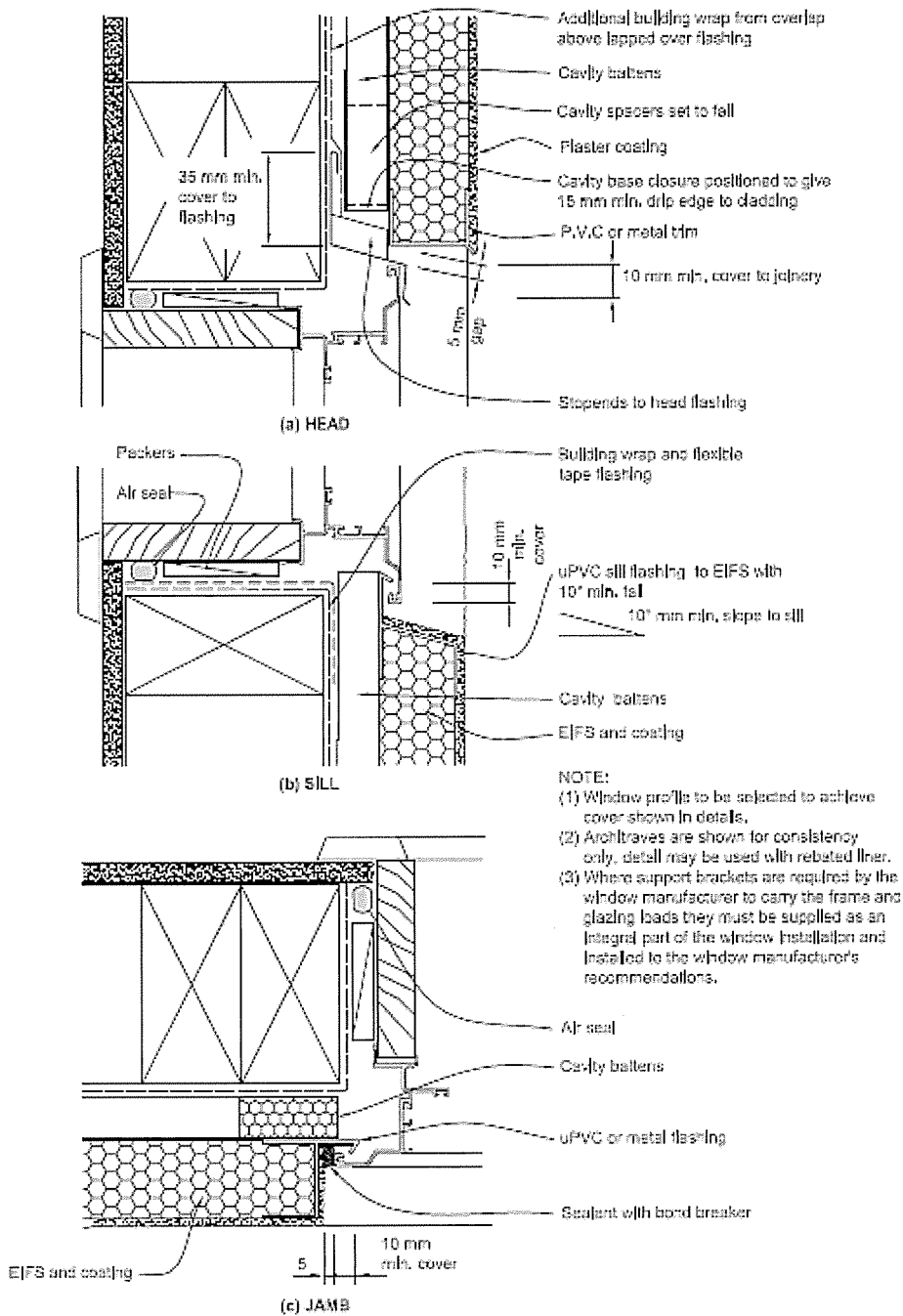
GENERAL: (a) Refer Figure 72 for wrapping of framed opening prior to window installation.
 (b) Sliding and bi-fold windows will require specific design.
 (c) A minimum of 8 mm effective cover at sills shall be permitted where necessary to allow for tolerances.



Australian window joinery does not look like this, i.e. there are typically no facings on the joinery. It would be ideal if facings were made compulsory, but until they are alternative solutions will need to be provided. The weather-tightness performance of the alternative solutions should be verified. As noted, the New Zealand Building Code is removing direct fixed EIFS from the scope of its Acceptable Solution E2/AS1.

Figure 123: Windows for EIFS on cavity
Paragraph 9.9.9 b)

- GENERAL: (a) Refer Figure 72 for wrapping of framed opening prior to window installation.
 (b) Sliding and bi-fold windows will require specific design.
 (c) A minimum of 8 mm effective cover at sills shall be permitted where necessary to allow for tolerances.



Australian window joinery does not look like this, i.e. there are typically no facings on the joinery. It would be ideal if facings were made compulsory, but until they are alternative solutions will need to be provided. The weather tightness performance of the alternative solutions should be verified.

Figure 129: Enclosed balustrade-to-wall junction for EIFS
 Paragraphs 6.6 c) and 9.9.10.2

NOTE: Refer Figure 11 to Figure 13 for framing and bridge over drained cavity.

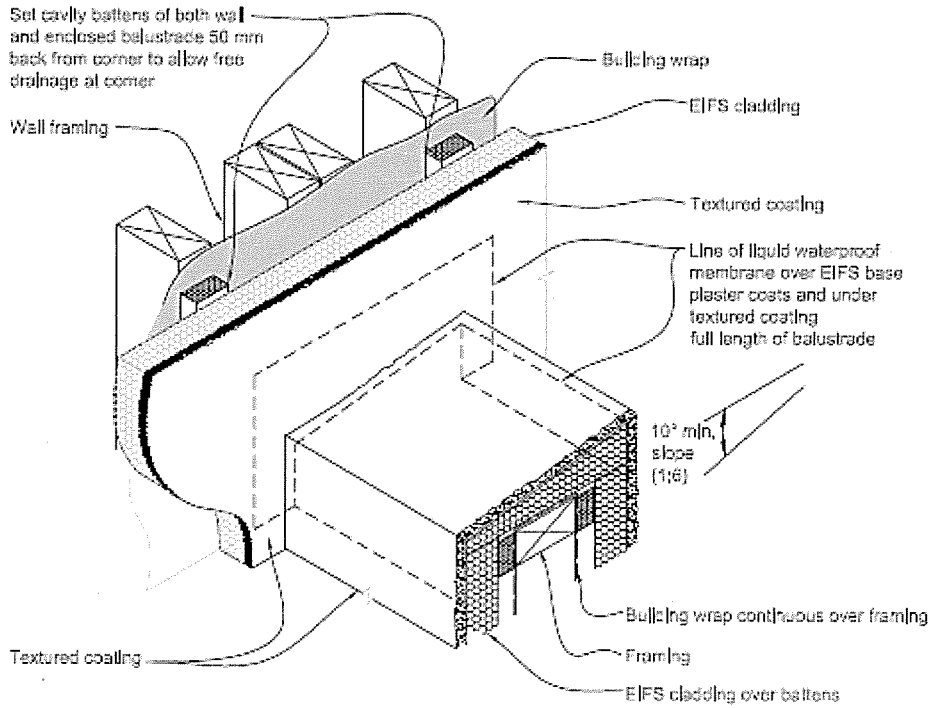
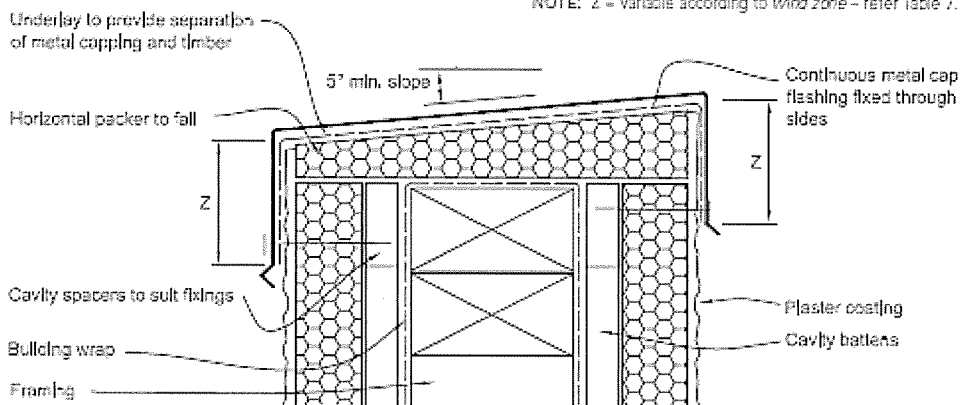


Figure 130: Parapet with metal capping for EIFS
 Paragraph 9.9.10.1

NOTE: Z = variable according to wind zone - refer Table 7.



Appendix - Meeting BCA Performance Criteria

The BCA provides performance criteria that must be met in order for a cladding to comply, e.g. structural, waterproofing and fire resistance. This Appendix offers guidance on specifications that outline how to meet the performance criteria of the BCA for EPS Cladding systems for use in houses. These criteria should be considered in the context of any proposed location and application.

A.1 Corrosion resistance

Specifications should state the acceptable proximity to sources of corrosion, such as breaking surf and polluting industries. BCA 2010 Volume 2 Table 3.3.3.2, provides criteria for corrosion resistance:

A.2 Wind, loads and deflections

Specifications should state the permissible Wind Classifications, as defined in AS 4055. They should also state the permissible in-plane (racking) forces and out-of-plane pressures and suctions.

As a general rule, cladding systems are not designed to resist racking forces due to wind, earthquake, foundation movement or differential heating and cooling. In order to prevent rupture of cladding systems in these circumstances,

- The structure should incorporate adequate bracing (or the like), with sufficient stiffness to minimise deflections; and
- The fixing should be such that local failure occurs at the fixing before panel rupture occurs.

AS/NZS 1170.0 Table C1 provides guidance on deflection limits for various building components. In the absence of more specific criteria, the deflection of the supporting structures should be limited as follows:

Mid height out-of-plane deflection	Height/200
Mid height in-plane deflection	Height/300

The deflection limits, acceptable bracing and fixing details should be included in the specification.

A.3 Fixings

Specifications should state the requirements for fixings and washers, giving consideration to the wind pressures in AS 4055. Additional fixings to cater for local suction at the corners of building should be provided in accordance with AS 4055.

Washers must be flexible but strong enough not to crack – too flexible will allow them to pull through the cladding.

The capacity of fixings and washers to fix the cladding without pulling through, may be determined from published engineering data and known material properties, or by tests in accordance with AS/NZS 1170.0 Appendix B.

Guidance on the suitability of fixings to hardwood, softwood and light gauge steel structural elements may be obtained from AS 1684 and AS/NZS 4600. For less common structural members, tests may be performed in accordance with AS/NZS 1170.0 Appendix B

Specifications should state the overall length, diameter and type of fixing, and the required structural support material and length of penetration.

A.4 Battens

Vertical battens may be used to provide additional support and/or provide physical separation for movement and drainage between the cladding and structural wall frame. Battens must be rigid enough to properly support the cladding (minimum AS 1366.3 Class H).

Horizontal battens shall not be used.

Specifications should state the batten dimensions, material, permissible span, fixings to the structure, drips (if required), location and laps (if required).

A.5 Moisture control at battens and bottom of wall

There shall be provision for the removal of moisture from the bottom of the wall. Acceptable systems include a combination of flashing and weepholes. Alternatively cavities may be drained by concealed/protected vent strips at the base of the wall. The minimum ventilation rate should be 1000 mm² per lineal metre of wall. Alternatively protected weepholes may be used, similar to those given in AS 4773.2 for masonry veneer.

A.6 Joins

Panels should be joined in a way that reduces relative movement when they are subjected to structure movement or face loading (perhaps due to a person or object leaning against the panel). Some methods include tongue and groove, back blocking, mesh and adhesive. Materials should be alkali resistant. Meshes should be sufficiently coarse to enable render or adhesive to penetrate and fully bind the strands.

Specifications should state how cladding panels are to be joined. When renders, adhesives, and meshes are used, full specification of the components should be included.

A.7 Articulation and control joints

All houses deflect, and the cladding system should incorporate articulation joints and control joints to cater for building movements caused by reactive foundations (such as clay soils); and expansion or shrinkage in the cladding and supports. The method of determining Site Classifications (accounting for reactivity of foundation soils) is set out in AS 28702870

Specifications should state how often and where articulation joints and control joints should be placed. This is influenced by the type of building support (masonry, mega anchors, concrete slab, timber pole, structural steel etc.), and such limitations should be included. Specifications should state any limitations in respect of the Site Classifications of AS 2870. They should also state the coefficient of expansion of the cladding materials and the framing materials.

Specifications should provide joints details, including the width of gap, the tolerance on the gap width, the type of jointing material, the type of backer rod and the type of bond-breaker tape (if required).

Specifications should also provide typical details covering:

- Situations where panels are fixed across wall frames and onto other framing systems, such as a trussed gable roof trusses;
- Precautions to be taken in regard to shrinkage of a timber frame particularly over a two or more storey building;
- Horizontal control joints at the base and frame interface;

A.8 Ground contact

No contact with the ground should be allowed in any circumstance

Note

In many locations, saline groundwater can damage some cladding systems. The groundwater may be drawn up the cladding and render by capillary action, and the salts may attack the materials, leading to deterioration or discolouration. Splash back of rain can also contribute to capillary action.

A.9 Weather-proofing

Direct fixed installations have limited capacity to deal with water entry and the scope of application should be limited. In some circumstances, moisture may collect on the inside surface of the cladding. This may originate from:

- Temperature differentials, causing condensation to form;
- Residual moisture in the cladding material; or
- Rainwater penetration due to breakdown of control joints, penetrations and flashings or exposed parapets.

The effectiveness of weather-proofing measures depends on the flashings, degree of protection by eaves and other overhangs, exposure to wind driven rain, wind speeds, joint sealing, corner mouldings, drips on sill, resistance to ultraviolet radiation, and the ability to withstand shock from doors slamming.

Specifications should provide:

- Details of flashings and sealing around windows and doors, other claddings, balconies, plumbing and electrical penetrations;
- Details of weep holes;
- Details of corner mouldings;
- Details of sills, including drip moulds if required;
- Compatibility and flexibility of joint sealants;
- Compatibility and flexibility renders and coatings;
- Whether the materials are suitable for use with aluminium or timber framework, cladding and the textured finish;
- The limiting Wind Classification (as per AS 4055) and corresponding velocity;
- Whether measures are required to protect from rain splashes and bounces behind laps and over flashings;
- Measures to ensure that the cladding system is able to “breathe”.
- Whether flexible fixings (or other measures) are required What is the long term effect of sliding doors, air conditioning units and other vibrations on seals – what system of isolation is used?

The weather resistance of most cladding systems can be assessed by careful consideration of the details and specifications. The following specification, based on AS 4773.2 for masonry veneer, is suitable for most claddings. For uncommon systems, a weather tightness test, developed by BRANZ (a recognized testing authority, preferably based on AS/NZS 4284) may be appropriate. The method must be suitable for determining the weather-tightness performance of a cladding system including penetrations. The weather-tightness verification method contained within the NZBC (E2/VM1) includes a stage which is designed to determine how a cladding system manages water entry behind the weatherproof layer. This should be considered a minimum requirement.

A.10 Workmanship

Specifications should clearly state the workmanship and construction requirements, including:

- The required level of skill of the applicator;
- Required training of the tradesperson in the technical specifications and their scope and limitations;
- How long has the cladding may be left prior to rendering, giving consideration to any water entrapment that has occurred, surface oxidisation, deterioration and UV exposure (will depend on time of year);

- Compatibility of render to cladding;
- Residual chemicals, and the possible need for their removal (Cladding & beading may have residual films from the manufacturing process);
- Effectiveness of sprayed on applications;
- Render shrinkage, and the use of mesh and render control joints to control it;
- Misalignment of sheets, affecting the thickness of render;
- Whether the render mixed on site or premixed, and the level of quality control;
- Whether over-screwing results in increased thickness of render at the washers and uneven stresses;
- Whether over-screwing on thin cladding sheets reduces the strength and performance of cladding;
- The best number of render coats - one thick coat is more prone to cracking – two or more coats may result in delamination;
- Increased reinforcement at the corners of openings;
- The effect of temperature on the material being applied;
- The effect of dew, rain or frost on the cladding when render is being applied;
- Detailing around parapets, box gutters, windows etc., and the skills of the roof plumber in fitting effective flashing systems.
- Roof plumber's knowledge of the compatibility of sealant systems.

A.11 Specifying polystyrene panels, accessories, sealants, renders and paints

Polystyrene is available in a variety of grades, each with different densities, strengths, moisture content and thermal resistance. AS 1366.3 includes specifications for various grades of expanded polystyrene and AS 1366.4 includes specifications for various grades of extruded polystyrene.

Flexible paint systems will bridge small cracks that may form in the panels and at the joints. Paint systems that “breathe” will reduce the tendency for condensation to form on the inside surface of the cladding. High-build paint systems with a “textured” finish may be more flexible, but also may hold dirt, containments and acids. Paint systems should be UV resistant, and prevent UV breakdown of the cladding system.

Specifications should state:

- The grade of polystyrene; including compliance with AS 1366.3 for expanded polystyrene and AS 1366.4 for extruded polystyrene;
- Whether the panels are to be pre-coated;
- Compatible adhesives;
- The ability of the material to resist insect, vermin and mould attack;
- Fire hazard properties.
- The following paint properties:
 - Flexibility;
 - Porosity;
 - Texture;
 - UV resistance.

The following specification is considered suitable for most domestic residential applications (subject to compliance with the other points noted in this document, including supports, fixings and the like). Other specifications may be used, subject to verification.

Extruded Polystyrene (EPS) board shall be M, H or VH Grade, fire retarded, vermin-retarded, termite resistant, in accordance with AS 1366.3, with the following properties:

- Thermal resistance at a mean temperature of 23° of a 50 mm sample in accordance with AS/NZS 4859.1 not less than 1.2 m².KW.

- Compressive strength in accordance with AS 2498.3 Method 3 not less than 105 kPa.
- Cross breaking strength in accordance with AS 2498.4 Method 4 not less than 200 kPa.
- Water Vapour Transmission in accordance with AS 2498.5 Method 5 not more than 520 mg/m².
- Dimensional stability in accordance with AS 2498.6 Method 6 not more than 1%.
- Flame Propagation Surface Ignition of Vertically Oriented Specimens in accordance with AS 2122.1 Method 6
- Residue for 2 second Ignition Median Percent not less than 30%, Standard Deviation not less than 27%,
- Flame duration 5 second Median Percent not more than 2 seconds, Standard Deviation not more than 3 seconds.

DRAFT

DRAFT SUMMARY OF DISCUSSIONS



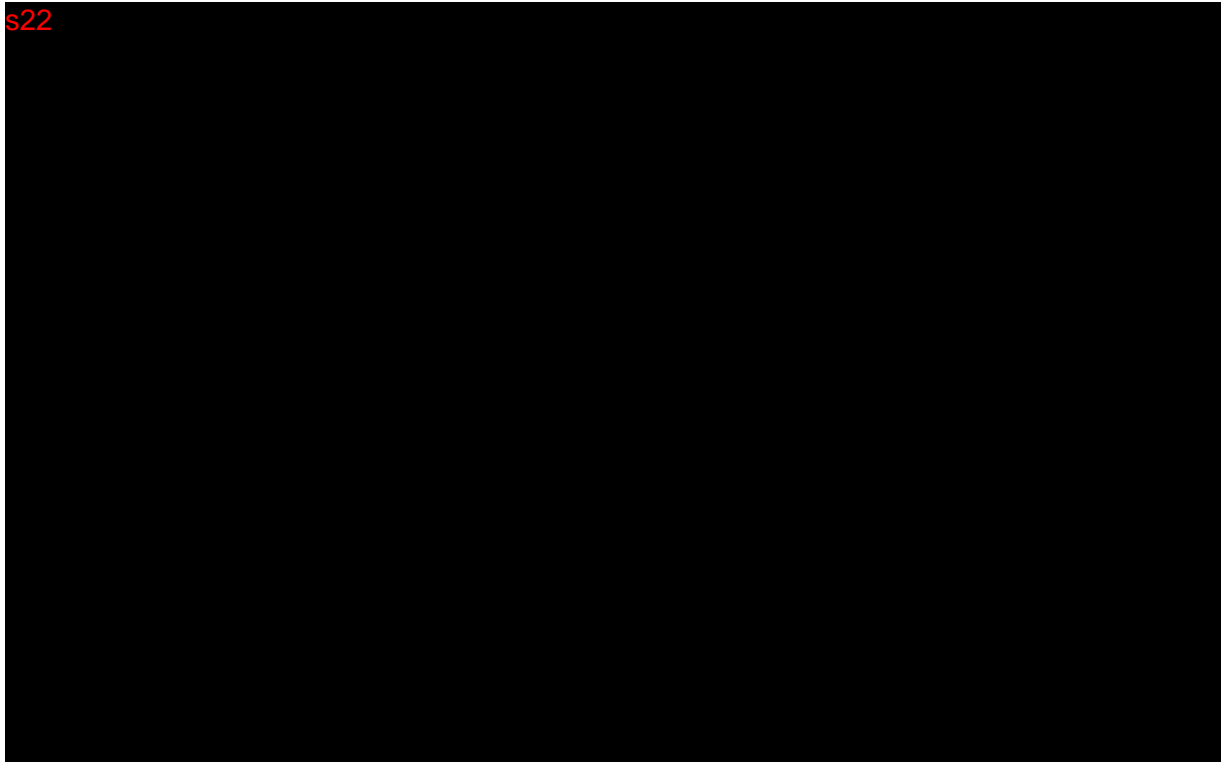
ABCB

BUILDING CODES COMMITTEE MEETING 2011-1

Date: 4 & 5 April 2011
Time: 4 April - 1.00pm – 5.00pm
5 April - 8.30am – 5.00pm
Venue: Novotel Perth Langley
221 Adelaide Terrace
Perth WA 6000
Tel (08) 9221 1200
www.novotelperthlangley.com.au

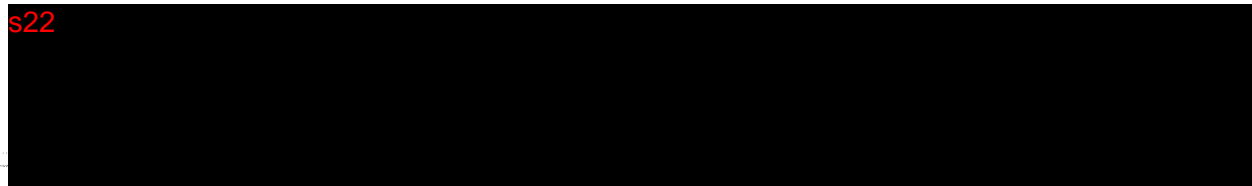
AGENDA

s22



14. National Advisory Note - Wall Cladding

s22



Attendees

s47F	<p>Master Builders Australia ABCB Office – Chair Australasian Fire and Emergency Services Authorities CSIRO NSW Administration ABCB Office NT Administration Building Products Innovation Council SA Administration Building Designers Association of Australia Property Council of Australia Housing Industry Association Qld Administration Association of Consulting Engineers Australia Building Research New Zealand ABCB Office (<i>Secretariat</i>) Tas Administration ABCB Office Australian Institute of Building Surveyors Australian Institute of Building Vic Administration ABCB Office Engineers Australia ACT Administration Australian Government (<i>Agenda items 6 & 8</i>) Standards Australia WA Administration</p>
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Guests

s47F	<p>Western Power - Representing Energy Networks Association (<i>Agenda Item 6</i>) Department of Climate Change and Energy Efficiency (<i>Agenda item 8</i>) Department of Climate Change and Energy Efficiency (<i>Agenda item 8</i>)</p>
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Observers

s47F	Vic Administration
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Apologies

s47F	<p>Property Council of Australia Department of Building and Housing New Zealand Australian Local Government Association Qld Administration Australian Institute of Architects</p>
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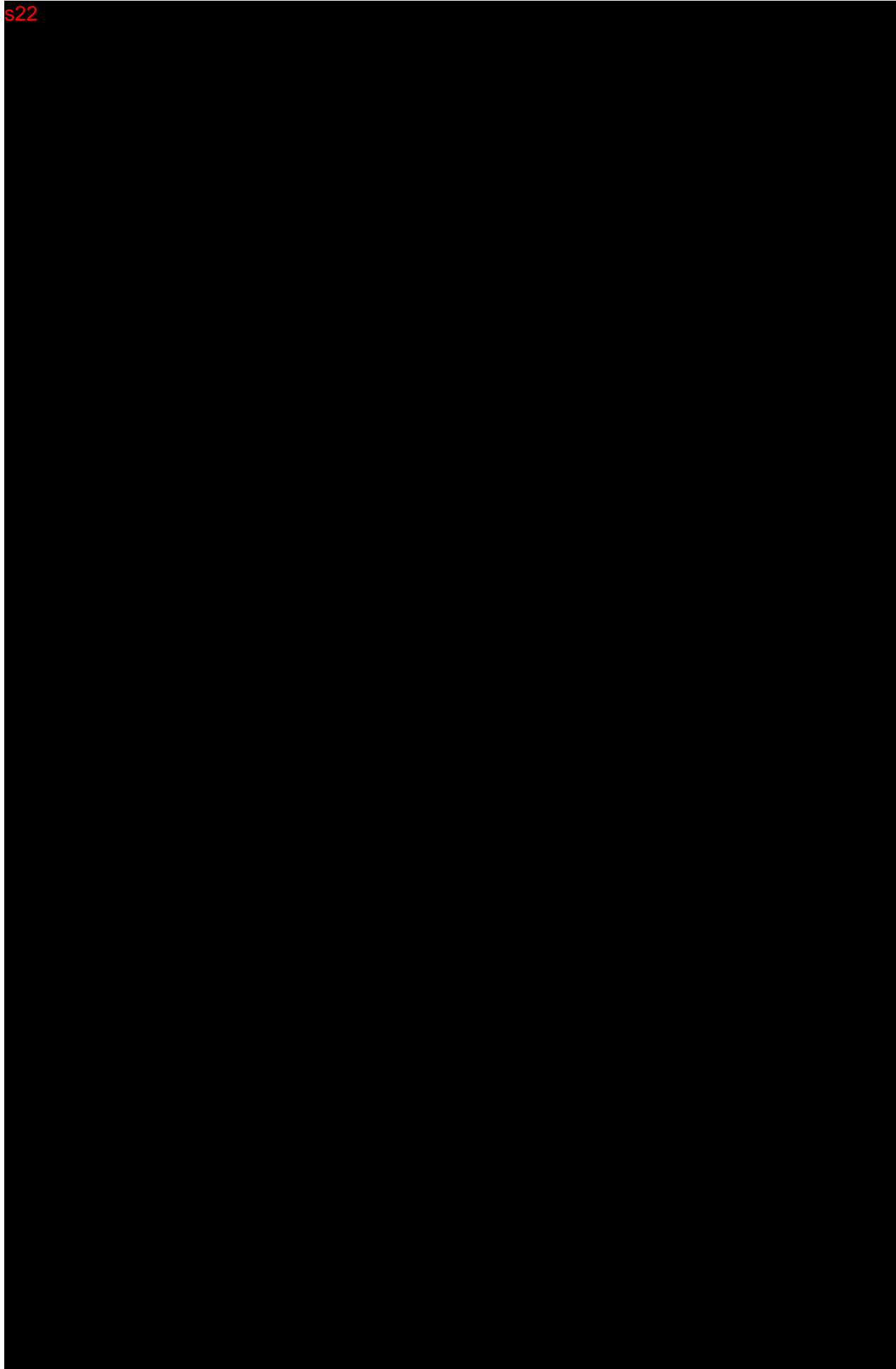
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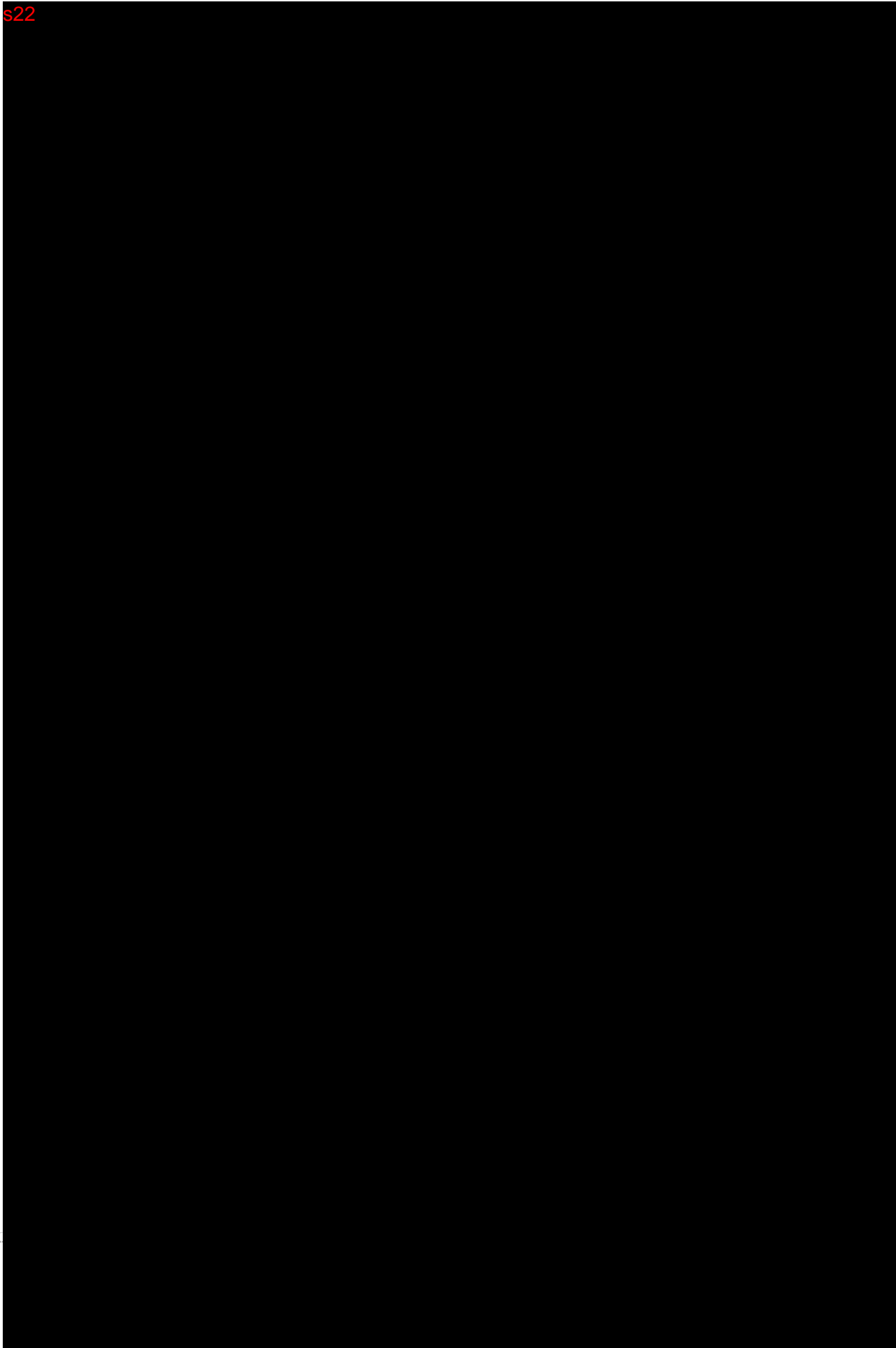
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AGENDA ITEM 14 National Advisory Note - Wall Cladding

The Vic representative introduced the item and provided members with a background to the document's development noting the efforts of a subcommittee consisting of Vic, CA, BRANZ, HIA & AIBS. The BCC were asked to reflect on the acceptability of the document, including decisions on the mandatory terms used.

s47F [REDACTED] stated if the document proceeded in its current form there may be a need for impact assessment, as it may be interpreted as quasi-regulation. The CA representative stated it had been his intention to provide guidance on performance and removing the D-t-S detail from the handbook may discourage use of these systems, to the detriment of manufacturers.

Members discussed the available options and recognised a duty of care existed to alert practitioners to issues associated with the use of these systems. Members agreed to a two stage approach whereby a National Advisory Note would be produced as the first stage and an assessment of the suitability of the D-t-S part of the document to be developed into a document for referencing in the BCA would be undertaken in consultation with industry as the second stage. The Vic representative undertook to redraft the National Advisory Note and circulate to all BCC members out-of-session for agreement, and make contact with manufacturers about the possibility of development of a BCA referenced document.

The Consult Australia representative was supportive of this approach provided information was forthcoming in a reasonable timeframe.

s22 [REDACTED]

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BCC 2011-1: ACTIONS ARISING REPORT

Agenda Item	Action	Responsibility	Status
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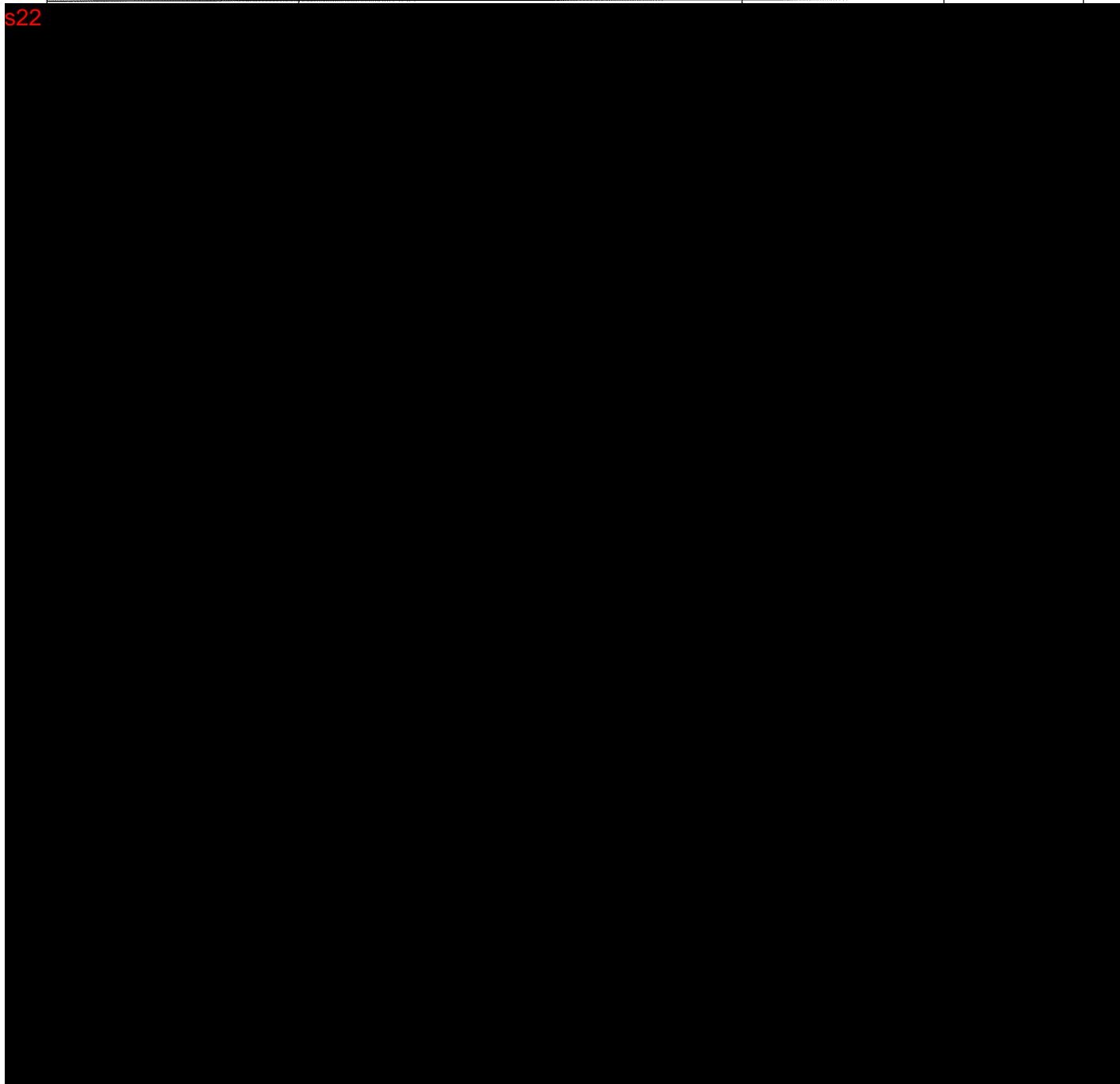


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14. Draft National Advisory Note.	Produce a draft National Advisory Note, highlighting the potential for a referenced document to be developed, circulate to the BCC out-of-session and discuss the proposal with affected cladding manufacturers.	Vic representative	Done
	Assess the appropriateness of a referenced document for Wall Cladding to be produced by Standards Australia.	Vic representative	

s22



OUTSTANDING ACTIONS ARISING

s22



**AGENDA ITEM 8 DRAFT NATIONAL ADVISORY NOTE – NON
DEEMED-TO-SATISFY EXTERNAL WALL
CLADDING SYSTEMS (Vic item)**

Contact Officer: **s47F** (Victorian Administration)

RECOMMENDATION

It is recommended that the BCC –

- note that the draft National Advisory Note has been amended in accordance with the comments received; and
- note that the focus of the draft National Advisory Note has now been expanded to deal with ALL non Deemed-to-Satisfy external wall cladding; and
- agree that the draft Advisory Note now be published by the ABCB Office.

BACKGROUND

The draft National Advisory Note on External Wall Cladding Systems including Polystyrene and other non-Deemed-to-Satisfy Materials is now submitted to the BCC for consideration for publication (**Attachment A**).

The document has been cut back considerably as an agreed outcome from the last BCC meeting in Perth. It is now dealing with this matter in a very general manner and is clearly drafted in non-mandatory language. It has also now been extended in its coverage to apply to ALL non Deemed-to-Satisfy (non DtS) external wall cladding systems and polystyrene is basically only mentioned specifically in the list of what constitutes a non DtS external wall cladding system.

After the last BCC meeting the draft Advisory Note was circulated to the BCC out-of-session, and to BRANZ and to a polystyrene external wall cladding manufacturer.

Comments were received from the Tas, Qld, SA & NSW Administrations as well as from BRANZ and from **s22** (polystyrene external wall cladding manufacturer).

Masterwall had a meeting recently with Standards Australia **s47F** and advice from **s47F** was that a new Australian Standard on this topic could be given priority and prepared and published expeditiously - in order to be referenced as an Acceptable Construction Manual in the BCA. Hence it appears that the life of the National Advisory Note would be limited to about one and a half years i.e. until the Standard is referenced in the BCA.

It is believed that the outcome/actions arising from agenda item 14 of the last BCC meeting (in Perth in April) have now been carried out.



Non Deemed-to-Satisfy External Wall Cladding Systems

2011

Advisory Note

Non-Mandatory Document

1. Introduction

In residential buildings in Australia the use of innovative, non Deemed-to-Satisfy, (DtS) external wall cladding systems has dramatically increased in recent years. The purpose of this Advisory Note is to provide advice as to the processes required to be undertaken when external wall cladding, not covered by the DtS provisions of the National Construction Code (NCC), Building Code of Australia (BCA), is proposed to be incorporated in the design of a building.

Any such cladding system should therefore be presented as an Alternative Solution in a form that the approving authority (e.g. a relevant building surveyor or building certifier) can assess and be satisfied that the material, form of construction or design meets the Performance Requirements of the BCA. The only DtS (Australian Standard) cladding systems currently covered by the BCA are masonry, weatherboard, fibre-cement sheet and plywood sheet. All other cladding systems should be presented as an Alternative Solution.

Non DtS products include, but are not limited to the following:

- A.A.C. (Autoclaved Aerated Concrete)
- A.C.P. (Aluminium Composite Panels)
- Architectural Insulated Panels
- External Insulation & Finish (rendered) Systems (E.I.F. Systems)
 - i. Expanded polystyrene panels (e.p.s.)
 - ii. Extruded polystyrene panels (x.p.s.)
 - iii. Phenolic insulation panels
 - iv. Polyisocyanurate panels (p.i.r.)
 - v. Polyurethane panels
- Metal Wall Cladding

This Advisory Note focuses on all building types (Class 1 –10 buildings). Its main purpose is to promote weatherproof construction methods. This Advisory Note therefore, from herein refers to both Volumes One and Two of the BCA.

If intending to use such a system for the external wall cladding of Class 2 – 9 buildings, reference should also be made to the relevant provisions in NCC series Volume One of the BCA, in particular, the Performance Requirements relating to fire-resistance and combustibility.

The approving authority is required to ensure that the process outlined in the BCA is followed.

2. Background

Building legislation throughout Australia generally requires that the approving authority must not issue a building permit or building approval unless they are satisfied that the proposed building design and the building work will comply with the Commonwealth, State or Territory's specific building legislation (and therefore the BCA).

Non DtS cladding systems are required to follow the Alternative Solution assessment process outlined in the BCA. The Alternative Solution should demonstrate that it complies with the Performance Requirements of the BCA, or the Alternative Solution is at least equivalent to the DtS provisions. A combination of both methods may also be used.

These requirements are set out in the following clauses:

- A0.5, A0.8, A0.9 and A0.10 of BCA Volume One and,
- 1.0.5, 1.0.8, 1.0.9 and 1.0.10 of BCA Volume Two

When considering an application for a building permit or building approval.

As part of A0.9 and 1.0.9 the approving authority may seek evidence to support that the use of the material, form of construction or design meets a Performance Requirement or a DtS provision as described in A2.2 of BCA Volume One and 1.2.2 of BCA Volume Two.

Part 1.2.2 lists as evidence of suitability,

- (i) *A report issued by a Registered Testing Authority, showing that the material or form of construction has been submitted to the tests listed in the report, and setting out the results of those tests and any other relevant information that demonstrates its suitability for use in the building.....*
- (ii) *A current Certificate of Conformity or a current Certificate of Accreditation.*
- (iii) *A certificate from a professional engineer or other appropriately qualified person which-*
 - (A) *certifies that a material, design or form of construction complies with the requirements of the BCA; and*
 - (B) *sets out the basis on which it is given and the extent to which relevant specification, rules, codes of practice or other publication have been relied upon.*
- (iv) *A current certificate issued by a product certification body that has been accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ)*
- (v) *******
- (vi) *Any other form of documentary evidence that correctly describes the properties and performance of the material or form of construction and adequately demonstrates its suitability for use in the building*

3. Duties of applicants/designers

State and Territory Building Regulations require applicants for building permits or building approvals to ensure an application contains sufficient information to show that the building work will comply with the relevant Building Act and Building Regulations.

Architects and building designers should take care in selecting and specifying non DtS external wall cladding systems and that have at least been assessed in order to assist the approving authority in determining whether this form of construction is an acceptable Alternative Solution.

They should submit documentation that is sufficient to enable proper assessment for compliance with the BCA. Relevant certificates, reports and forms should be submitted at the design stage including all details of the Alternative Solution concerned.

4. The approving authority

The approving authority is required to ensure that the process outlined in 1.0.8, 1.0.9 and 1.0.10 of BCA Volume Two is followed. One of the Assessment Methods in 1.0.9 is Expert Judgement which therefore allows for the use of a report from an expert who has the qualifications and

experience to determine whether a Building Solution complies with the Performance Requirements.

Some manufacturers of non DtS external wall cladding systems have opted to have their products assessed and reported on by a Registered Testing Authority (R.T.A).

These reports may still be used as evidence to support that the use of a material, form of construction or design meets a Performance Requirement as identified in both Volumes One and Two of the BCA.

The CodeMark product certification scheme also gives approving authorities and building practitioners confidence of legislative compliance. Certification bodies are accredited through the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) who in turn evaluate and certify building systems. Approving authorities are obliged to accept CodeMark certified cladding systems. The approving authority should also note that CodeMark Certificates applying to a product only (i.e. not a building system), is not in and of itself evidence of compliance to the BCA Performance Requirements, as they may not address weather-tightness of the building system. Care is needed in reviewing the scope of the Certificate.

Note also that there are a number of external wall cladding systems that have been accredited by the Victorian Building Regulations Advisory Committee acting in its capacity as an Accreditation Authority. The current list of such accredited systems can be found by referring to the Victorian Building Commission's website: www.buildingcommission.com.au (need full website link to accredited products – we couldn't find a list)

The approving authority should be aware of the conditions or limitations of any report. All relevant design issues should be considered, including articulation joints, bending, and shear strength, fasteners, flashings, weather-proofing, condensation, fire-resistance levels and others.

It is important to check that appraisals, certificates and technical reports cover all relevant BCA Performance Requirements of the cladding system proposed. They must be current and relevant to the Alternative Solution.

When assessing an application for a building permit or building approval an approving authority should be satisfied that the applicant has provided appropriate evidence that all relevant Performance Requirements will be met. The approving authority should also give due consideration to the conditions or limitation of any material or system provided to them by the applicant. Expansion and construction joint provisions and flashing details may need to be determined using engineering principles in addition to bending, shear and fastening considerations.

The approving authority should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. As far as practicable, relevant certificates, reports and forms should be submitted at design stage including all details of Alternative Solutions.

5. Potential consequences of failure of non DtS external wall cladding systems

The cladding system should resist any actions it may be reasonably subject to (Performance Requirement P2.1 of BCA Volume Two). It should also resist the penetration of water that may cause unhealthy or dangerous conditions, loss of amenity for occupants and undue dampness or deterioration of building elements (Relevant Performance Requirements P2.1, P2.2.2 and P2.6.1 of BCA Volume Two). (Relevant Performance Requirements are BP1.1, BP1.2, CP2 and FP1.4 in BCA Volume One). Other Performance Requirements may also be relevant – see A0.10 in BCA Volume One and 1.0.10 in BCA Volume Two.

Where the possibility exists that moisture will penetrate or collect on the inside face of the external cladding, this moisture must be able to escape the building fabric, either by natural drainage or ventilation of a cavity.

Water may accumulate around horizontal members (bottom plates, heads, sills, deck joists, noggings, and parapets) with potential to cause deterioration of the building elements.

Balconies may be of particular concern. Inadequately detailed, poorly weatherproofed, non DtS clad timber framed balustrades, for example, can lead to undetected decay of the timber structure with obvious and significant life safety concerns.

Hidden fungal growth may seriously affect the health of occupants causing respiratory and skin problems. The young and old are most at risk and those with weakened immune systems. Damp also encourages dust mites.

If thermal insulation becomes damp, it will reduce in effectiveness. This, in turn, will reduce the energy efficiency of the building concerned.

6. Sources of water penetration

Wind forces, even at low pressures, can be higher than those inside the building assisting rainwater to enter through unsealed penetrations, gaps and joints. Localised pressure at corners and exposed edges require particular attention. As exposed external caulking cannot be guaranteed for the life of the building, a regular maintenance program is therefore required. All non DtS external cladding systems should demonstrate adequate weather proofing details.

If proper consideration is not given to the placement of vapour barriers, condensation may occur in the external wall frame as the temperature gradient drops across the width of the wall. The moisture in warm air from inside the building may condense as it cools, forming moisture droplets in the insulation, framework surface, internal face of the cladding and elsewhere.

Condensation in the ACT, Victoria, Tasmania and in alpine areas is possibly more problematic than in other States and Territories. Proposals for the use of non DtS external wall cladding systems in these regions should account for the particular climate. Particular attention should be given as to where dew points occur within these systems regardless of the climate zone. Buildings in cooler climates tend to be closed and sealed over the winter period allowing for higher levels of air-borne moisture in the building. In warmer climates, buildings will tend to be aired more often and temperature and moisture differentials from inside to outside the building will not be as severe.

Experience of poorly designed and incorrectly installed cladding systems in various parts of the world, highlights the need for these systems to be designed correctly for watertightness, wind loading and potential condensation.

The Building Research Association of New Zealand (BRANZ) clearly states that buildings can leak regardless of levels of precipitation, humidity, wind loading or climate zone. It is estimated the cost to repair leaky buildings in New Zealand is in excess of \$NZ 11.0 billion. Repair costs to some houses have been in the order of \$NZ 300,000. The New Zealand Building Code will soon contain a requirement for a narrow (minimum 18 mm) cavity behind all DtS monolithic E.I.F. Systems and rendered fibre-cement cladding systems to allow such walls to drain and breathe.

7. What are the next steps?

It is intended to develop a document that could be referenced in the BCA as an Acceptable Construction Manual, which would meet the Performance Requirements as a DtS provision.

However, the adoption of such a reference document as part of the BCA is unlikely to eventuate before 1 May 2013 as part of BCA 2013.

8. Conclusion

International experience over a number of years indicates special care and consideration is necessary in the use of all external wall cladding systems, and that they should be strenuously tested before being released. It is incumbent on the approving authority to be satisfied that the material, form of construction and design meets the Performance Requirements of the BCA.

Care should be taken that all issues have been addressed, including, where appropriate, further assessment by qualified experts. Any system should be constructed in accordance with the specified details. Mixing and matching of systems will void reliance on available test results and reports. Documentation provided at the completion of the project should include certification of the installation in accordance with specifications from a competent person.



**DRAFT SUMMARY OF DISCUSSIONS
BUILDING CODES COMMITTEE
MEETING 2011-2**

Date: 26th July & 27th July 2011

Time: 12:00 noon – 4.30pm
9:00 am – 12.00 noon

Venue: Marque Hotel
103 George Street, Brisbane
(07) 3221 6044
www.MarqueHotels.com

AGENDA

s22

A large black rectangular redaction box covers the majority of the agenda content, starting below the word 'AGENDA' and extending down to the first visible item.

8. National Advisory Note - Wall Cladding (*Vic item*)

s22

A black rectangular redaction box covers the text immediately following item 8, starting with the label 's22' in the top left corner.

Attendees

s47F

SA Administration
 Master Builders Australia
 ABCB Office – Chair
 Australasian Fire and Emergency Services Authorities Council
 CSIRO
 Building Products Innovation Council
 Property Council of Australia
 Australian Institute of Architects (26th)
 Housing Industry Association
 Qld Administration
 Association of Consulting Engineers Australia
 Building Research New Zealand
 ABCB Office (Secretariat)
 Tas Administration
 ABCB Office
 Australian Institute of Building Surveyors
 Vic Administration
 ABCB Office
 ACT Administration
 NSW Administration
 Australian Government
 Standards Australia
 WA Administration
 Australian Institute of Building

*Guests**Observers*

s47F

Vic Administration
 Qld Administration - 26th
 Qld Administration - 26th
 Qld Administration - 26th
 Qld Administration - 27th
 Qld Administration - 27th
 Qld Administration - 27th

Apologies

s47F

ABCB Office
 NSW Administration
 NT Administration
 SA Administration
 Building Designers Association of Australia
 Engineers Australia
 WA Administration

s22



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s22



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AGENDA ITEM 8 **NATIONAL ADVISORY NOTE - WALL CLADDING (*Vic Item*)**

The Victorian representative sought feedback from members on the suitability of the document's release. Members provided a number of comments in respect of the documents drafting, and the Victorian representative undertook to include the agreed changes, and

COMMITTEE-IN-CONFIDENCE

forward a final draft to the ABCB Office for circulation to members for information prior to distribution by Administrations, and publication on the ABCB website.

In respect of a second stage to develop a referenced document, the Standards Australia representative noted representatives of the Autoclaved Aerated Concrete and Expanded Polystyrene Systems industries had been in discussions with his organisation.

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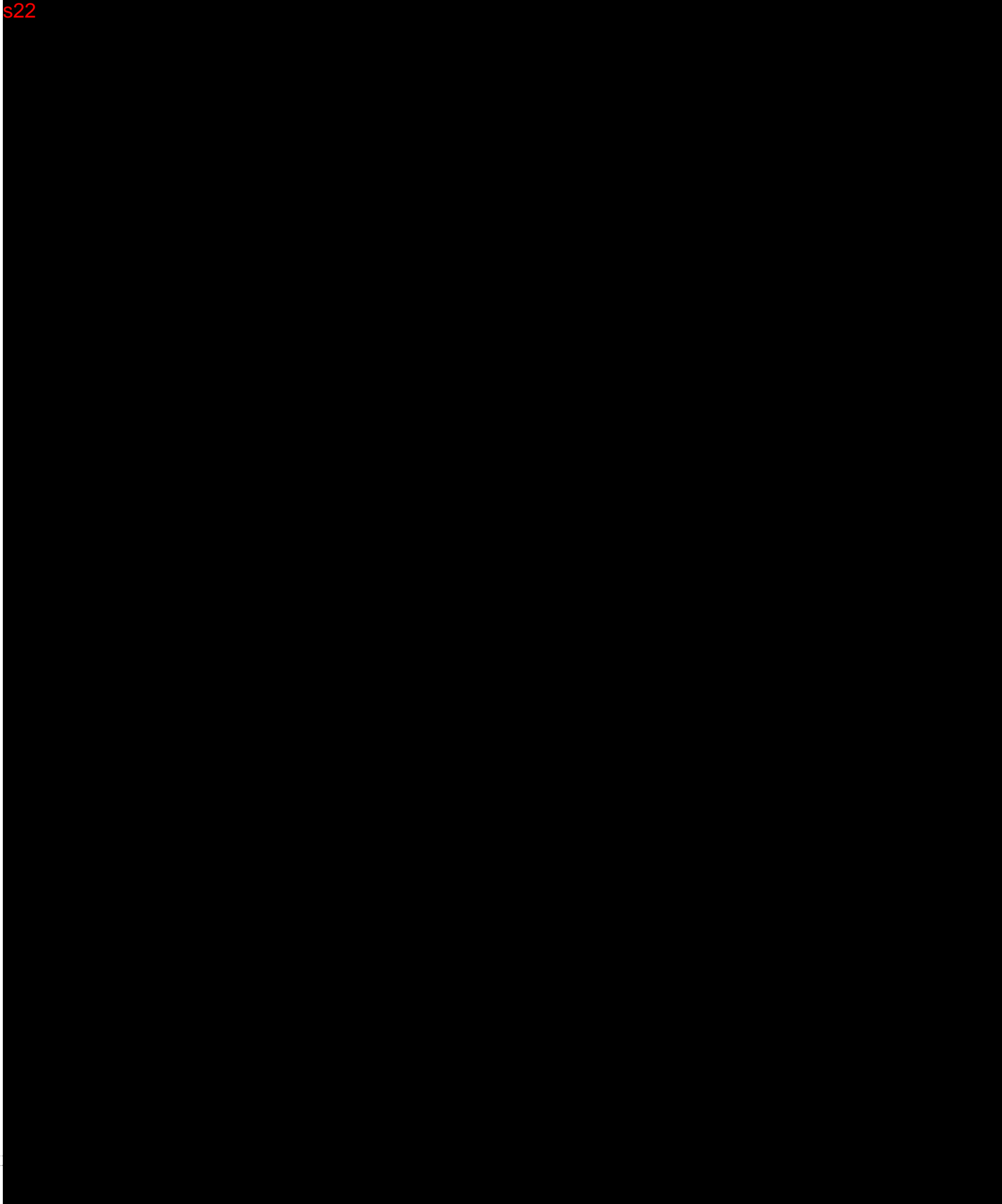


s22



BCC 2011-2: ACTIONS ARISING REPORT

Agenda Item	Action	Responsibility	Status
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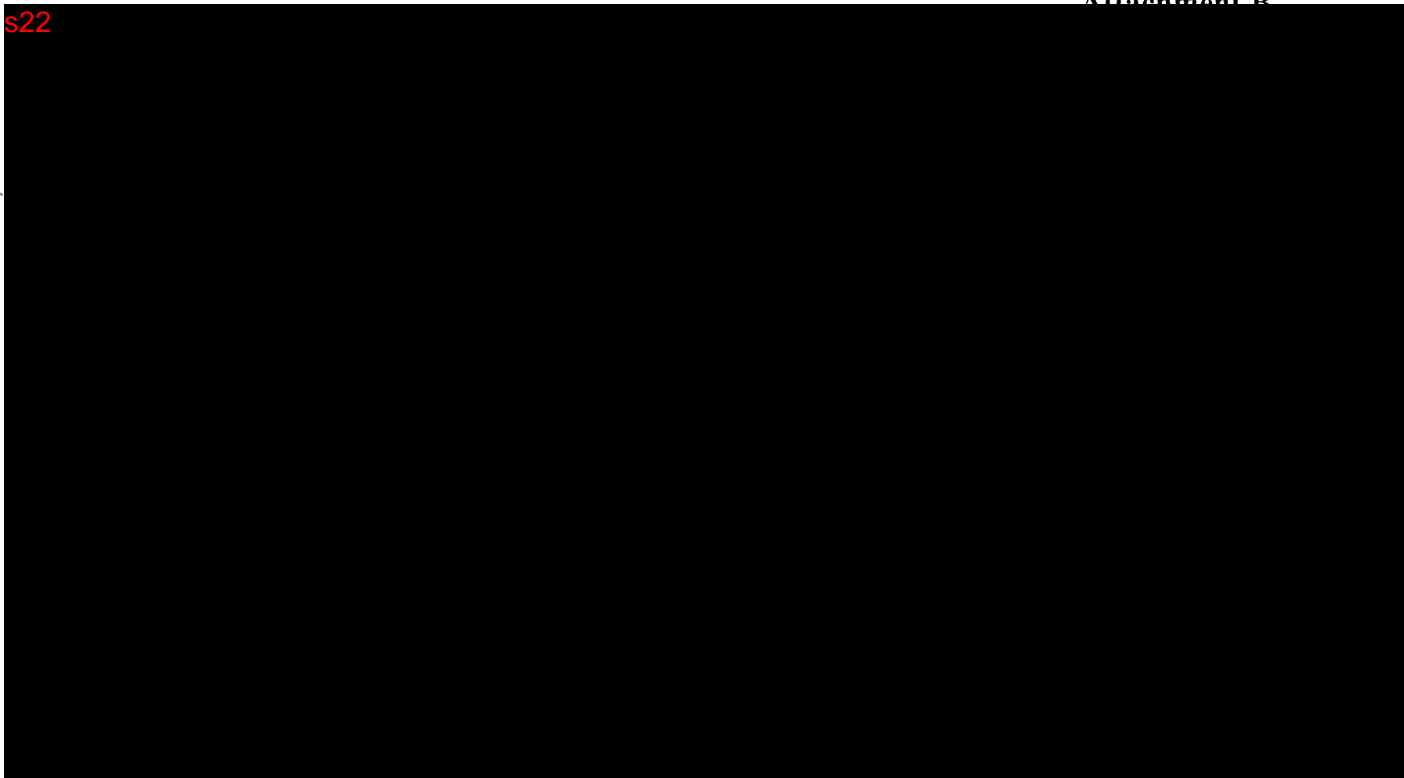


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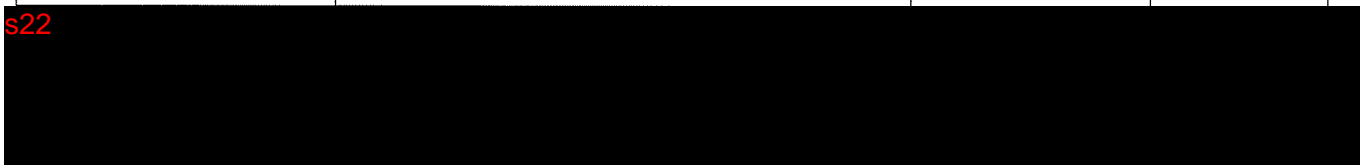


s22



8. National Advisory Note – Wall Cladding	Include agreed changes, and forward a final draft of the External Cladding Advisory Note to the ABCB Office.	Victorian representative	Done
	Circulate the Advisory Note to all members for information out-of-session.	ABCB Office	Update to be provided at meeting
	Circulate the External Cladding National Advisory Note to Administrations for distribution to their stakeholders, and publish the Note on the ABCB website.	ABCB Office	

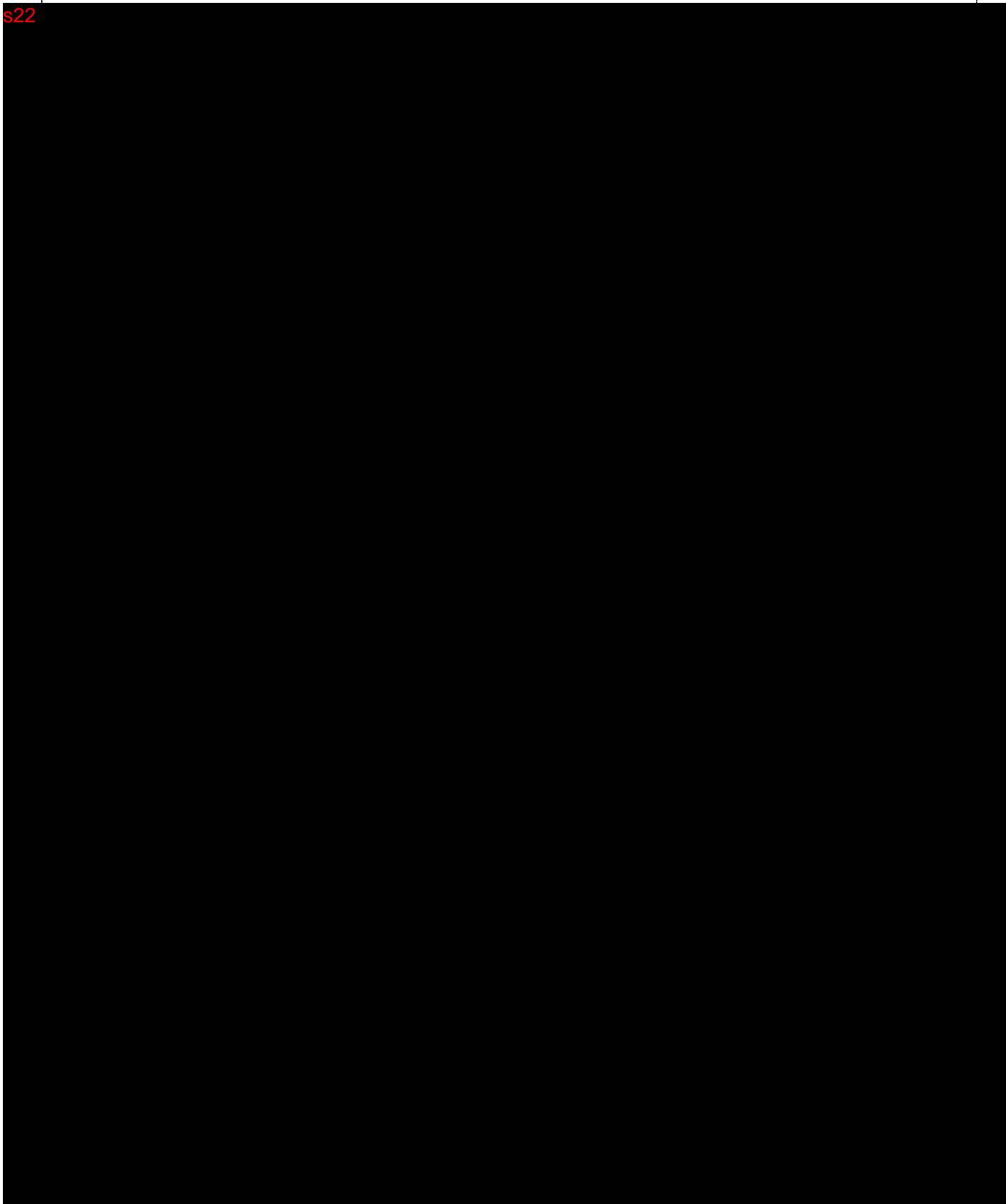
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OUTSTANDING ACTIONS ARISING

Agenda Item	Action	Responsibility	Status
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s22



BCC 2010-2

s22



DRAFT SUMMARY OF DISCUSSIONS



ABCB

BUILDING CODES COMMITTEE MEETING 2011-3

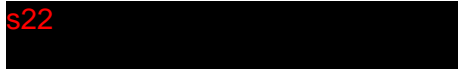
Date: 17 & 18 October 2011

Time: 17th: 1:00 pm – 5:00 pm
18th: 8:30 am – 5:00 pm

Venue: The Glebe Room
Crowne Plaza Hotel
1 Binara Street
Canberra ACT 2601
Ph: (02) 6247 8999
www.CrownePlaza.com.au

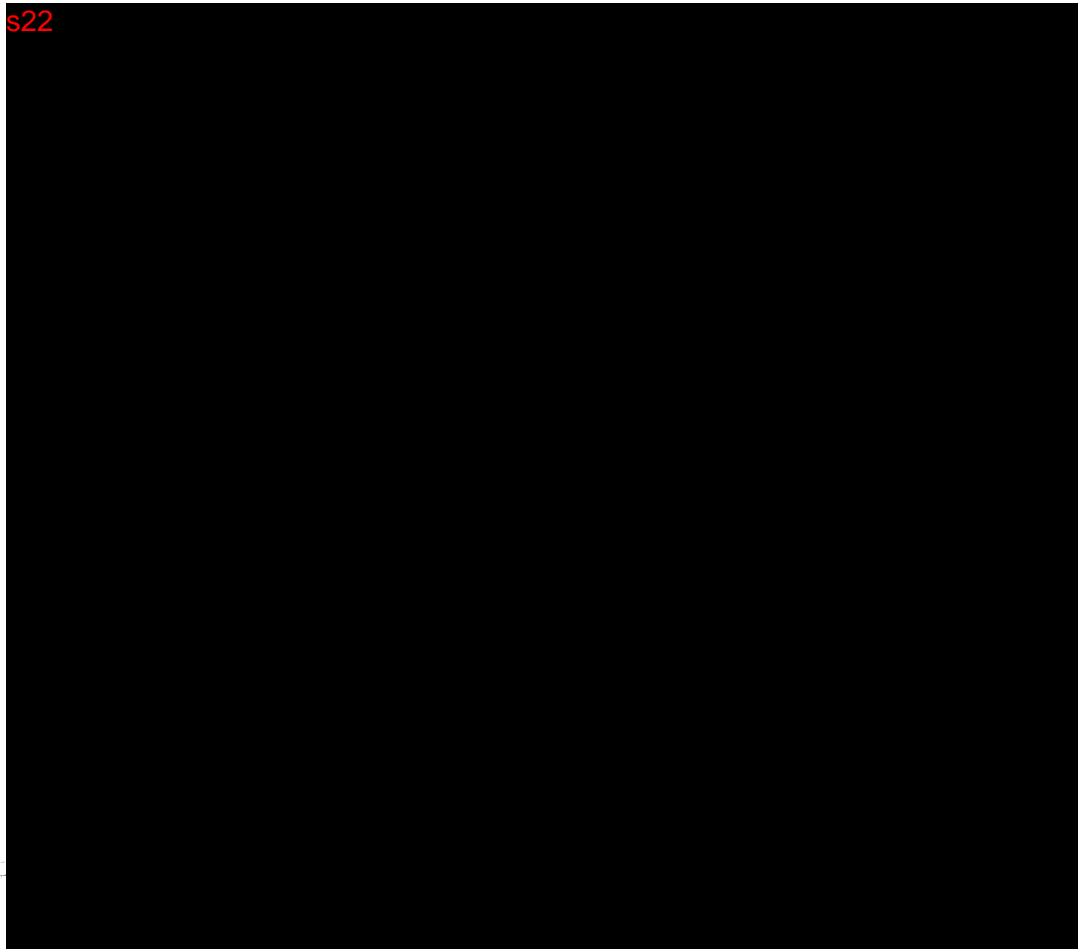
AGENDA

s22



-
2. Confirmation of Record of BCC 2011-2
-

s22



Attendees

s47F	Master Builders Australia ABCB Office – Chair Royal Institute of Chartered Surveyors (<i>Agenda Items 1-10 & 13</i>) Australasian Fire and Emergency Services Authorities Council CSIRO ABCB Office (<i>Agenda Item 3</i>) ABCB Office Property Council of Australia (<i>Agenda Item 1-7 & 13</i>) NSW Administration (<i>Agenda Items 1-10 & 13</i>) ABCB Office ABCB Office Qld Administration NT Administration Building Products Innovation Council SA Administration Building Designers Association of Australia Housing Industry Association ABCB Office Consult Australia ABCB Office (Secretariat) Tas Administration ABCB Office Australian Institute of Building Surveyors (18 th) ABCB Office Engineers Australia ACT Administration WA Administration Australian Government Building Research New Zealand Standards Australia ABCB Office Australian Institute of Building Victorian Administration
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Guests

s47F	Cyclone Testing Station (<i>Agenda item 13</i>)
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Observers

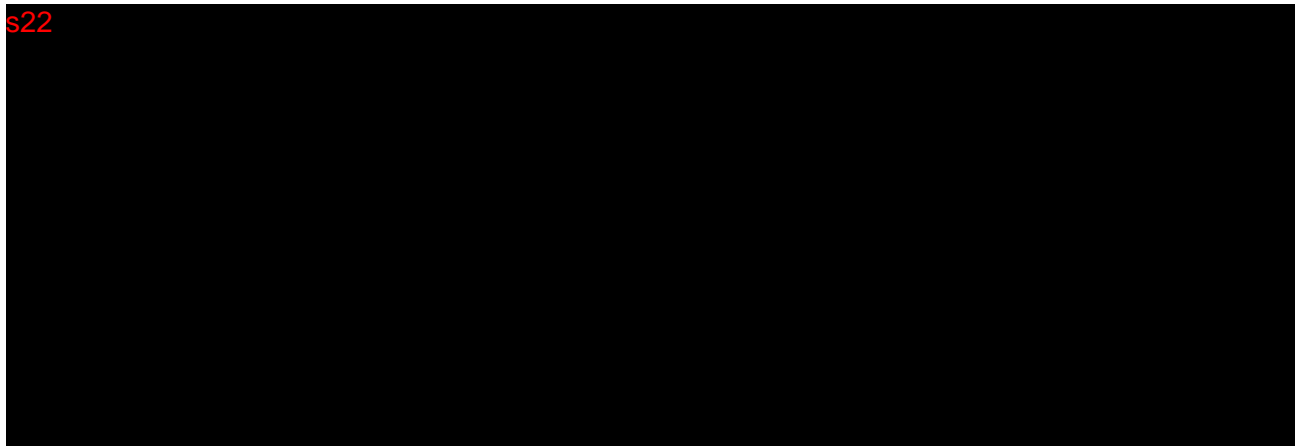
s47F	ABCB Office ABCB Office ABCB Office ABCB Office
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Apologies

s47F	Property Council of Australia Australian Institute of Architects Building Research New Zealand Australian Local Government Association Department of Building and Housing New Zealand WA Administration
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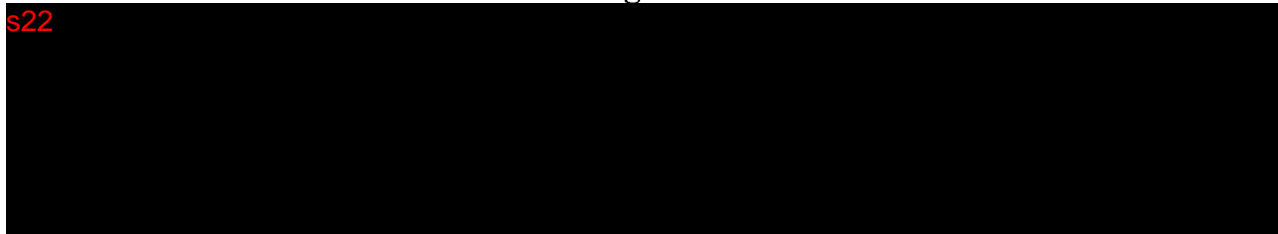
COMMITTEE-IN-CONFIDENCE

s22



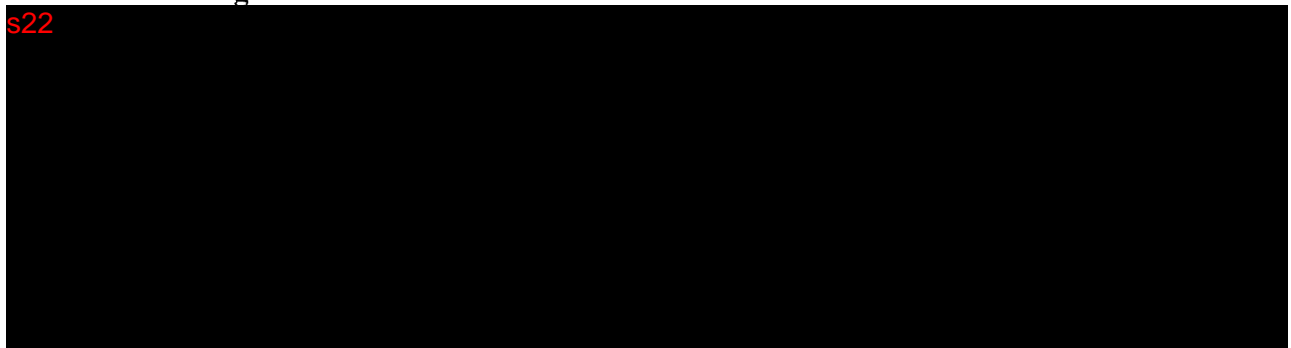
AGENDA ITEM 2 Confirmation of Record of BCC 2011-2 and Actions Arising

s22



Actions Arising

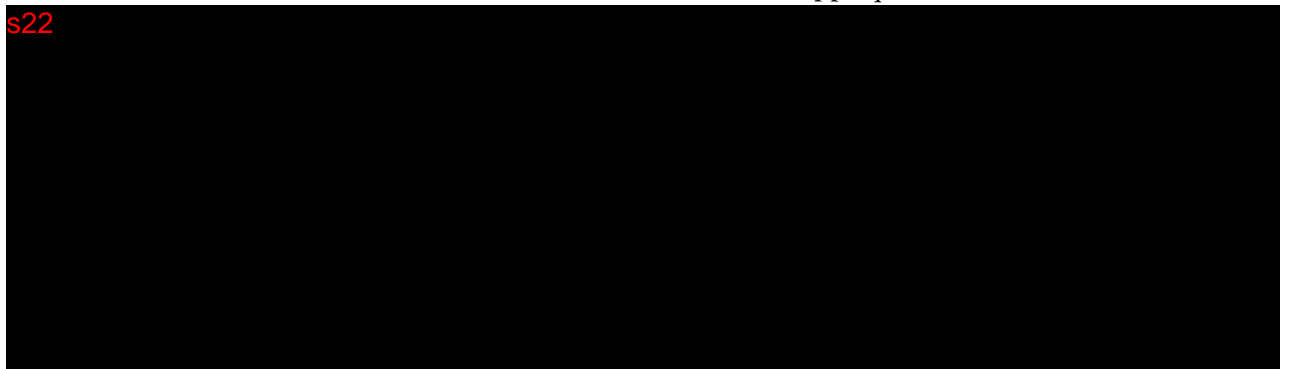
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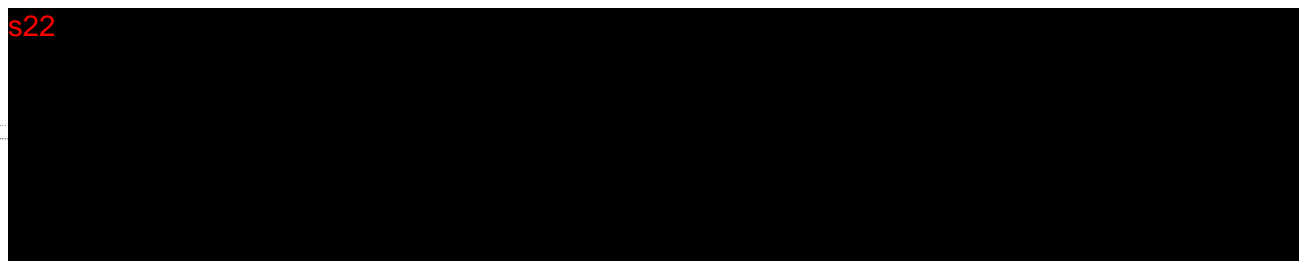
External Cladding National Advisory Note

s47F [redacted] stated that following a review of the Note, the ABCB Office had formed the view it could not be issued by the Office. However, the Note had been provided to States and Territories for distribution in their jurisdiction as appropriate.

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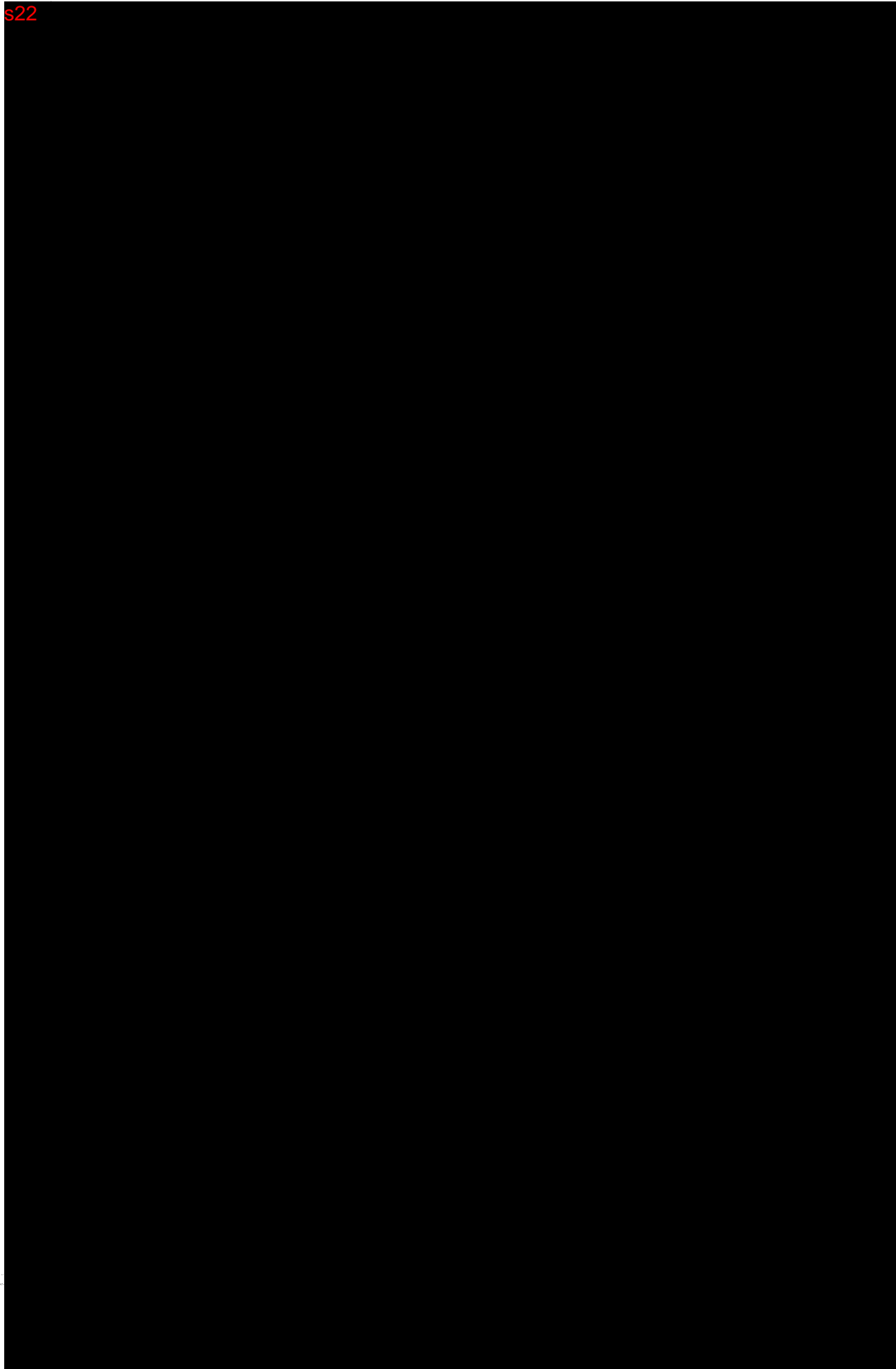
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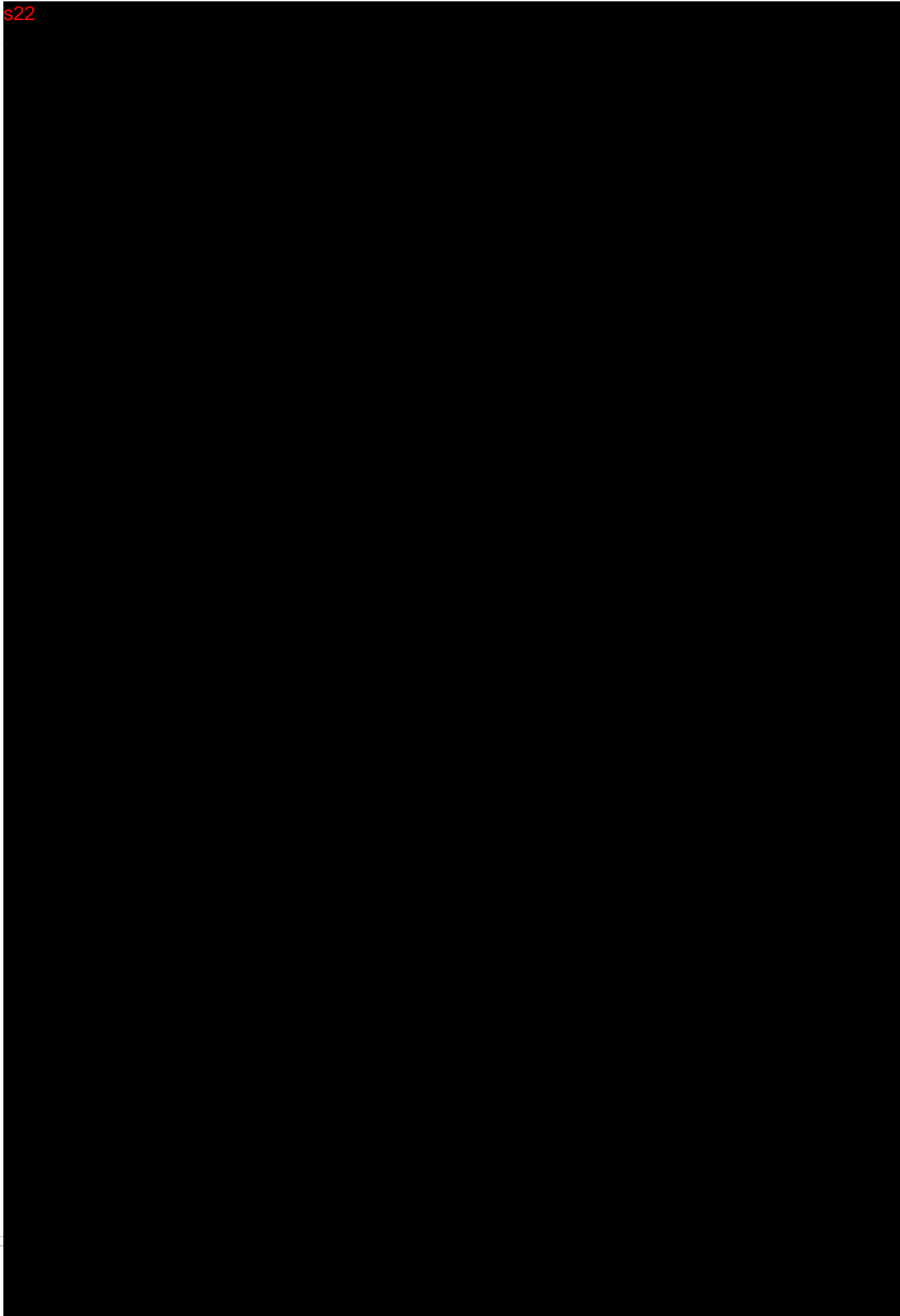
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COMMITTEE-IN-CONFIDENCE

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COMMITTEE-IN-CONFIDENCE

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COMMITTEE-IN-CONFIDENCE

s47F [redacted]

From: s47F [redacted]
Sent: Thursday, 28 July 2011 3:59 PM
To: s47F [redacted]
Cc:
Subject: Non DtS External Wall Cladding Advisory Note
Attachments: Polystyrene External Cladding Advisory Note -5 July.doc

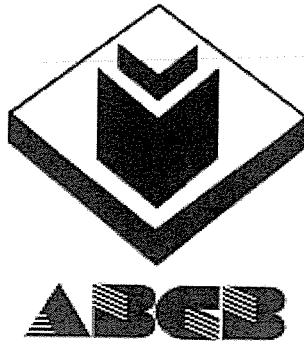
s47F [redacted]

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Cheers

s47F [redacted]

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Non Deemed-to-Satisfy External Wall Cladding Systems

2011

Advisory Note

Non-Mandatory Document

1. Introduction

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This Advisory Note focuses on all building types (Class 1 –10 buildings). Its main purpose is to promote weatherproof construction methods. This Advisory Note therefore, from herein refers to both Volumes One and Two of the BCA.

If intending to use such a system for the external wall cladding of Class 2 – 9 buildings, reference should also be made to the relevant provisions in NCC series Volume One of the BCA, in particular, the Performance Requirements relating to fire-resistance and combustibility.

The AHJ is required to ensure that the process outlined in the BCA is followed.

2. Background

Building legislation throughout Australia generally requires that the AHJ must not issue a building permit or building approval unless they are satisfied that the proposed building design and the building work will comply with the Commonwealth, State or Territory's specific building legislation (and therefore the BCA).

Non DtS cladding systems are required to follow the Alternative Solution assessment process specified in the BCA. The Alternative Solution should demonstrate that it complies with the Performance Requirements of the BCA, or the Alternative Solution is at least equivalent to the DtS provisions. A combination of both methods may also be used.

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Part 1.2.2 lists as evidence of suitability,

- (i) *A report issued by a Registered Testing Authority, showing that the material or form of construction has been submitted to the tests listed in the report, and setting out the results of those tests and any other relevant information that demonstrates its suitability for use in the building.....*
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- (vi) *Any other form of documentary evidence that correctly describes the properties and performance of the material or form of construction and adequately demonstrates its suitability for use in the building*

3. Duties of applicants/designers

State and Territory Building Regulations require applicants for building permits or building approvals to ensure an application contains sufficient information to show that the building work will comply with the relevant Building Act and Building Regulations.

Architects and building designers should take care in selecting and specifying non DtS external wall cladding systems and that have been assessed in order to assist the AHJ in determining whether this form of construction is an acceptable Alternative Solution.

They should submit documentation that is sufficient to enable proper assessment for compliance with the BCA. Relevant certificates, reports and forms should be submitted at the design stage including all details of the Alternative Solution concerned.

4. The Authority Having Jurisdiction (AHJ)

The AHJ is required to ensure that the process specified in 1.0.8, 1.0.9 and 1.0.10 of BCA Volume Two is followed. One of the Assessment Methods in 1.0.9 is Expert Judgement which therefore allows for the use of a report from an expert who has the qualifications and experience to determine whether a Building Solution complies with the Performance Requirements.

Some manufacturers of non DtS external wall cladding systems have opted to have their products assessed and reported on by a Registered Testing Authority (R.T.A).

These reports may still be used as evidence to support that the use of a material, form of construction or design meets a Performance Requirement as identified in both Volumes One and Two of the BCA.

The CodeMark product certification scheme also gives AHJ's and building practitioners confidence of legislative compliance. Certification bodies are accredited through the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) who in turn evaluate and certify building systems. AHJ's are obliged to accept CodeMark certified cladding systems. The AHJ should also note that CodeMark Certificates applying to a product only (i.e. not a building system), is not in and of itself evidence of compliance to the BCA Performance Requirements, as they may not address weather-tightness of the building system. Care is needed in reviewing the scope of the Certificate.

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The AHJ should be aware of the conditions or limitations of any report. All relevant design issues should be considered, including articulation joints, bending, and shear strength, fasteners, flashings, weather-proofing, condensation, fire-resistance levels and others.

It is important to check that appraisals, certificates and technical reports cover all relevant BCA Performance Requirements of the cladding system proposed. They must be current and relevant to the Alternative Solution.

When assessing an application for a building permit or building approval an AHJ should be satisfied that the applicant has provided appropriate evidence that all relevant Performance Requirements will be met. The AHJ should also give due consideration to the conditions or limitation of any material or system provided to them by the applicant. Expansion and construction joint provisions and flashing details may need to be determined using engineering principles in addition to bending, shear and fastening considerations.

The AHJ should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. As far as practicable, relevant certificates, reports and forms should be submitted at design stage including all details of Alternative Solutions.

5. Potential consequences of failure of non DtS external wall cladding systems

The cladding system should resist any actions it may be reasonably subject to (Performance Requirement P2.1 of BCA Volume Two). It should also resist the penetration of water that may cause unhealthy or dangerous conditions, loss of amenity for occupants and undue dampness or deterioration of building elements (Relevant Performance Requirements P2.1, P2.2.2 and P2.6.1 of BCA Volume Two). (Relevant Performance Requirements are BP1.1, BP1.2, CP2 and FP1.4 in BCA Volume One). Other Performance Requirements may also be relevant – see A0.10 in BCA Volume One and 1.0.10 in BCA Volume Two.

Where the possibility exists that moisture will penetrate or collect on the inside face of the external cladding, this moisture must be able to escape the building fabric, either by natural drainage or ventilation of a cavity.

Water may accumulate around horizontal members (bottom plates, heads, sills, deck joists, noggings, and parapets) with potential to cause deterioration of the building elements.

Balconies may be of particular concern. Inadequately detailed, poorly weatherproofed, non DtS clad timber framed balustrades, for example, can lead to undetected decay of the timber structure with obvious and significant life safety concerns.

Hidden fungal growth may seriously affect the health of occupants causing respiratory and skin problems. The young and old are most at risk and those with weakened immune systems. Damp also encourages dust mites.

If bulk thermal insulation becomes damp, it will reduce in effectiveness. This, in turn, will reduce the energy efficiency of the building concerned.

6. Sources of water penetration

Wind forces, even at low pressures, can be higher than those inside the building assisting rainwater to enter through unsealed penetrations, gaps and joints. Localised pressure at corners and exposed edges require particular attention. As exposed external caulking cannot be guaranteed for the life of the building, a regular maintenance program is therefore required. All non DtS external cladding systems should demonstrate adequate weather proofing details.

If proper consideration is not given to the placement of vapour barriers, condensation may occur in the external wall frame as the temperature gradient drops across the width of the wall. The moisture in warm air from inside the building may condense as it cools, forming moisture droplets in the insulation, framework surface, internal face of the cladding and elsewhere.

Condensation in the ACT, Victoria, Tasmania and in alpine areas is possibly more problematic than in other States and Territories. Proposals for the use of non DtS external wall cladding systems in these regions should account for the particular climate. Particular attention should be given as to where dew points occur within these systems regardless of the climate zone. Buildings in cooler climates tend to be closed and sealed over the winter period allowing for higher levels of air-borne moisture in the building. In warmer climates, buildings will tend to be aired more often and temperature and moisture differentials from inside to outside the building will not be as severe.

Experience of poorly designed and incorrectly installed cladding systems in various parts of the world, highlights the need for these systems to be designed correctly for watertightness, wind loading and potential condensation.

The Building Research Association of New Zealand (BRANZ) clearly states that buildings can leak regardless of levels of precipitation, humidity, wind loading or climate zone. It is estimated the cost to repair leaky buildings in New Zealand is in excess of \$NZ 11.0 billion. Repair costs to some houses have been in the order of \$NZ 300,000.

7. Conclusion

International experience over a number of years indicates special care and consideration is necessary in the use of all external wall cladding systems, and compliance with the BCA is established before being released. It is incumbent on the AHJ to be satisfied that the material, form of construction and design meets the Performance Requirements of the BCA.

Care should be taken that all issues have been addressed, including, where appropriate, further assessment by qualified experts. Any system should be constructed in accordance with the specified details. Mixing and matching of systems will void reliance on available test results and reports.

s47F [Redacted]

From: s47F [Redacted]
Sent: Friday, 29 July 2011 12:57 PM
To: s47F [Redacted]
Cc: [Redacted]
Subject: FW: Non DtS External Wall Cladding Advisory Note [SEC=UNCLASSIFIED]
Attachments: Polystyrene External Cladding Advisory Note -5 July.doc

Security Classification: UNCLASSIFIED

s47F [Redacted]

For action as discussed.

s47F [Redacted]

From: s47F [Redacted]
Sent: Thursday, 28 July 2011 3:59 PM
To: s47F [Redacted]
Cc: [Redacted]
Subject: Non DtS External Wall Cladding Advisory Note

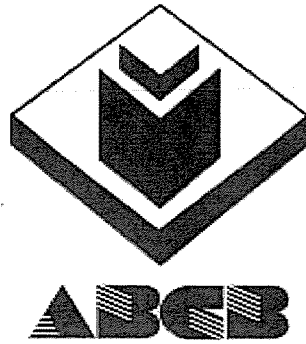
s47F [Redacted]

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Cheers

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Non Deemed-to-Satisfy External Wall Cladding Systems

2011

Advisory Note

Non-Mandatory Document

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s47F [Redacted]

From: s47F [Redacted]
Sent: Wednesday, 3 August 2011 2:53 PM
To: s47F [Redacted]
Cc: [Redacted]
Subject: Non DtS External Cladding Advisory Note
Attachments: Polystyrene External Cladding Advisory Note -5 July.doc

Hi s47F [Redacted]

I have been advised that people are going to have trouble finding our Victorian list of accredited products if we only provide the Building Commission's website address. I have therefore provided more detailed advice to this effect. Please discard my previous 'final' draft forwarded to you about a week ago.

Regards

s47F [Redacted]

PS s47F [Redacted] Thanks for drawing this matter to our attention.

Regulating for a safe, liveable and sustainable built environment

s47F [Redacted]

Consultant Regulatory Development
 Regulatory Development Division, Building Commission
 Building Commission
 Goods Shed North, 733 Bourke Street, Docklands, 3008
 P O Box 536, Melbourne, VIC 3001

s47F [Redacted]



buildingcommission.com.au

pic.vic.gov.au

makeyourhomegreen.vic.gov.au



Please consider the environment before printing this e-mail.



Non Deemed-to-Satisfy External Wall Cladding Systems

2011

Advisory Note

Non-Mandatory Document

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- (iii) *A certificate from a professional engineer or other appropriately qualified person which-*
 - (A) *certifies that a material, design or form of construction complies with the requirements of the BCA; and*
 - (B) *sets out the basis on which it is given and the extent to which relevant specification, rules, codes of practice or other publication have been relied upon.*
- (iv) *A current certificate issued by a product certification body that has been accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ)*
- (v) *******
- (vi) *Any other form of documentary evidence that correctly describes the properties and performance of the material or form of construction and adequately demonstrates its suitability for use in the building*

3. Duties of applicants/designers

State and Territory Building Regulations require applicants for building permits or building approvals to ensure an application contains sufficient information to show that the building work will comply with the relevant Building Act and Building Regulations.

Architects and building designers should take care in selecting and specifying non DtS external wall cladding systems and that have been assessed in order to assist the AHJ in determining whether this form of construction is an acceptable Alternative Solution.

They should submit documentation that is sufficient to enable proper assessment for compliance with the BCA. Relevant certificates, reports and forms should be submitted at the design stage including all details of the Alternative Solution concerned.

4. The Authority Having Jurisdiction (AHJ)

The AHJ is required to ensure that the process specified in 1.0.8, 1.0.9 and 1.0.10 of BCA Volume Two is followed. One of the Assessment Methods in 1.0.9 is Expert Judgement which therefore allows for the use of a report from an expert who has the qualifications and experience to determine whether a Building Solution complies with the Performance Requirements.

Some manufacturers of non DtS external wall cladding systems have opted to have their products assessed and reported on by a Registered Testing Authority (R.T.A).

These reports may still be used as evidence to support that the use of a material, form of construction or design meets a Performance Requirement as identified in both Volumes One and Two of the BCA.

The CodeMark product certification scheme also gives AHJ's and building practitioners confidence of legislative compliance. Certification bodies are accredited through the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) who in turn evaluate and certify building systems. AHJ's are obliged to accept CodeMark certified cladding systems. The AHJ should also note that CodeMark Certificates applying to a product only (i.e. not a building system), is not in and of itself evidence of compliance to the BCA Performance Requirements, as they may not address weather-tightness of the building system. Care is needed in reviewing the scope of the Certificate.

It may be of assistance to building practitioners in other States and Territories to note also that there are a number of external wall cladding systems that have been accredited by the Victorian Building Regulations Advisory Committee acting in its capacity as an Accreditation Authority. The current list of such accredited systems can be found by referring to the Victorian Building Commission website: www.buildingcommission.com.au. Once on the website, click on 'Statutory Boards and Committees', then click on 'Building Regulations Advisory Committee', then click on 'Building Product Accreditation'.

The AHJ should be aware of the conditions or limitations of any report. All relevant design issues should be considered, including articulation joints, bending, and shear strength, fasteners, flashings, weather-proofing, condensation, fire-resistance levels and others.

It is important to check that appraisals, certificates and technical reports cover all relevant BCA Performance Requirements of the cladding system proposed. They must be current and relevant to the Alternative Solution.

When assessing an application for a building permit or building approval an AHJ should be satisfied that the applicant has provided appropriate evidence that all relevant Performance Requirements will be met. The AHJ should also give due consideration to the conditions or limitation of any material or system provided to them by the applicant. Expansion and construction joint provisions and flashing details may need to be determined using engineering principles in addition to bending, shear and fastening considerations.

The AHJ should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. As far as practicable, relevant certificates, reports and forms should be submitted at design stage including all details of Alternative Solutions.

5. Potential consequences of failure of non DtS external wall cladding systems

The cladding system should resist any actions it may be reasonably subject to (Performance Requirement P2.1 of BCA Volume Two). It should also resist the penetration of water that may cause unhealthy or dangerous conditions, loss of amenity for occupants and undue dampness or deterioration of building elements (Relevant Performance Requirements P2.1, P2.2.2 and P2.6.1 of BCA Volume Two). (Relevant Performance Requirements are BP1.1, BP1.2, CP2 and FP1.4 in BCA Volume One). Other Performance Requirements may also be relevant – see A0.10 in BCA Volume One and 1.0.10 in BCA Volume Two.

Where the possibility exists that moisture will penetrate or collect on the inside face of the external cladding, this moisture must be able to escape the building fabric, either by natural drainage or ventilation of a cavity.

Water may accumulate around horizontal members (bottom plates, heads, sills, deck joists, nogging, and parapets) with potential to cause deterioration of the building elements.

Balconies may be of particular concern. Inadequately detailed, poorly weatherproofed, non DtS clad timber framed balustrades, for example, can lead to undetected decay of the timber structure with obvious and significant life safety concerns.

Hidden fungal growth may seriously affect the health of occupants causing respiratory and skin problems. The young and old are most at risk and those with weakened immune systems. Damp also encourages dust mites.

If bulk thermal insulation becomes damp, it will reduce in effectiveness. This, in turn, will reduce the energy efficiency of the building concerned.

6. Sources of water penetration

Wind forces, even at low pressures, can be higher than those inside the building assisting rainwater to enter through unsealed penetrations, gaps and joints. Localised pressure at corners and exposed edges require particular attention. As exposed external caulking cannot be guaranteed for the life of the building, a regular maintenance program is therefore required. All non DtS external cladding systems should demonstrate adequate weather proofing details.

If proper consideration is not given to the placement of vapour barriers, condensation may occur in the external wall frame as the temperature gradient drops across the width of the wall. The moisture in warm air from inside the building may condense as it cools, forming moisture droplets in the insulation, framework surface, internal face of the cladding and elsewhere.

Condensation in the ACT, Victoria, Tasmania and in alpine areas is possibly more problematic than in other States and Territories. Proposals for the use of non DtS external wall cladding systems in these regions should account for the particular climate. Particular attention should be given as to where dew points occur within these systems regardless of the climate zone. Buildings in cooler climates tend to be closed and sealed over the winter period allowing for higher levels of air-borne moisture in the building. In warmer climates, buildings will tend to be aired more often and temperature and moisture differentials from inside to outside the building will not be as severe.

Experience of poorly designed and incorrectly installed cladding systems in various parts of the world, highlights the need for these systems to be designed correctly for watertightness, wind loading and potential condensation.

The Building Research Association of New Zealand (BRANZ) clearly states that buildings can leak regardless of levels of precipitation, humidity, wind loading or climate zone. It is estimated the cost to repair leaky buildings in New Zealand is in excess of \$NZ 11.0 billion. Repair costs to some houses have been in the order of \$NZ 300,000.

7. Conclusion

International experience over a number of years indicates special care and consideration is necessary in the use of all external wall cladding systems, and compliance with the BCA is established before being released. It is incumbent on the AHJ to be satisfied that the material, form of construction and design meets the Performance Requirements of the BCA.

Care should be taken that all issues have been addressed, including, where appropriate, further assessment by qualified experts. Any system should be constructed in accordance with the specified details. Mixing and matching of systems will void reliance on available test results and reports.

s47F

From: s47F
Sent: Tuesday, 9 August 2011 4:26 PM
To: s47F
Subject: RE Advisory Note on - Non Deemed-to-Satisfy External Wall Cladding Systems

Hi s47F

Can you please provide an indication as to when this advisory note will be included on the ABCB website and out for publication.

Regards

s47F

Regulating for a safe, liveable and sustainable built environment

s47F


Senior Technical Advisor
Technical and Research Services

s47F

buildingcommission.com.au pic.vic.gov.au



makeyourhomegreen.vic.gov.au

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<http://www.mailguard.com.au/mg>

s47F [redacted] the FOI Act - DIIS

From: s47F [redacted]
Sent: Tuesday, 9 August 2011 5:28 PM
To: s47F [redacted]
Cc: s47F [redacted]
Subject: RE: RE Advisory Note on - Non Deemed-to-Satisfy External Wall Cladding Systems [SEC=UNCLASSIFIED]

Security Classification: UNCLASSIFIED

Hi s47F [redacted]

The Note is undergoing a final check against the outcomes of the meeting, and for consistency with ABCB drafting and terminology practice. The final note will be distributed to the Committee prior to upload with advice on its release. Notwithstanding any setbacks, I anticipate this process to be complete and the Final Note available around Monday week - 22 August.

Thanks

s47F [redacted]

Project Officer - NCC Coordination & Development
Australian Building Codes Board

GPO Box 9839
Canberra ACT 2601

s47F [redacted]

website: www.abcb.gov.au

ABN 74 599 608 295

This correspondence and any attachments or references are not intended to constitute any form of advice or recommendation for your specific building project. We recommend that you seek project specific advice from a qualified building certifier, local building authority or building administration in your State or Territory. The Participating Governments of the Australian Building Codes Board shall not be liable to any person or entities who relies upon this correspondence and any attachments or references for any purpose.

From: s47F [redacted]
Sent: Tuesday, 9 August 2011 4:26 PM
To: s47F [redacted]
Subject: RE Advisory Note on - Non Deemed-to-Satisfy External Wall Cladding Systems

Hi s47F [redacted]

Can you please provide an indication as to when this advisory note will be included on the ABCB website and out for publication.

Regards

s47F [redacted]

Regulating for a safe, liveable and sustainable built environment

s47F [redacted]

Senior Technical Advisor
Technical and Research Services

s47F [redacted]





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(24)

s47F [Redacted]

From: s47F [Redacted]
Sent: Tuesday, 6 September 2011 11:50 AM
To: s47F [Redacted]
Subject: External cladding advisory note [SEC=UNCLASSIFIED]
Attachments: Restructured Advisory Note for QA (4).doc

Security Classification: UNCLASSIFIED

s47F [Redacted]

Attached is a compilation of the editing done on the draft advisory note including, at the end, an attempt at rewriting (which we are still not happy with). I wanted you to see this before I contact the other States to see if they would be prepared to issue a note in their jurisdiction using the work done through BCC as a basis.

s47F [Redacted]

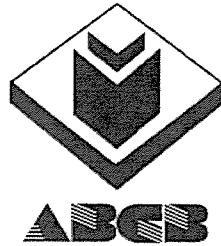
Manager
Australian Building Codes Board

**GPO Box 9839
Canberra ACT 2601**

s47F [Redacted]

Website: www.abcb.gov.au
ABN 74 599 608 295

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Non Deemed-to-Satisfy External Wall Cladding Systems

2011

Advisory Note

Non-Mandatory Document

1. Preface

The National Construction Code (NCC) is an initiative of the Council of Australian Governments (COAG) developed to incorporate all on-site construction requirements into a single code. The NCC comprises the Building Code of Australia (BCA), Volume One and Two; and the Plumbing Code of Australia (PCA), as Volume Three.

—This Advisory Note refers to the BCA Volumes One and Two.

This Advisory Note focuses on and focuses on all building types (Class 1 –10 buildings) with the purpose to promote weatherproof construction methods.

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4.2. Introduction

In recent years, residential and commercial buildings in Australia have seen a dramatic increase in the use of innovative, non-Deemed-to-Satisfy (DtS) proprietary external wall cladding products and/or systems. This increase has dramatically increased in recent years which do not form part of the Deemed-to-Satisfy (DtS) compliance method building solutions for the National Construction Code (NCC).

External cladding systems which are currently covered allowed by under a the Deemed-to-Satisfy approach include:

- Masonry
- Weatherboard
- Fibre-cement sheet
- Metal Wall Cladding
- Plywood sheet.

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The purpose of this Advisory Note is to provide advice as to the processes required to be undertaken when external wall cladding products and/or systems which are not covered by the DtS provisions building solutions, and of the National Construction Code (NCC), Building Code of Australia (BCA), are proposed to be incorporated into the design of a building. These are hereafter referred to as 'non DtS' cladding systems.

Examples of non DtS cladding systems include but are not limited to the following:

- A.A.C. (Autoclaved Aerated Concrete)
- A.C.P. (Aluminium Composite Panels)
- Architectural Insulated Panels
- External Insulation & Finish (rendered) Systems (E.I.F. Systems)
 - i. Expanded polystyrene panels (e.p.s.)
 - ii. Extruded polystyrene panels (x.p.s.)
 - iii. Phenolic insulation panels
 - iv. Polyisocyanurate panels (p.i.r.)
 - v. Polyurethane panels

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When external Any such cladding products and/or systems such as these mentioned above non DtS cladding systems are included in a design should be presented they are required to be presented to the authority having jurisdiction (AHJ) as an Alternative Solution. The Alternative Solution is to include information/evidence that allows the AHJ the ability to in a form that the Authority Having Jurisdiction (AHJ) (e.g. a relevant building surveyor or building certifier) can assess and be satisfied determine that the material, form of construction and design meets the Performance Requirements of the BCA. The only DtS (Australian Standard) cladding systems currently covered by the BCA are masonry, weatherboard, fibre cement sheet and plywood sheet. All other cladding systems should be presented as an Alternative Solution.

Additionally for Class 2 – 9 buildings, practitioners are also expected required to reference all relevant provisions of National Construction Code Volume One - BCA. Non DtS products include, but are not limited to the following:

This Advisory Note focuses on all building types (Class 1 – 10 buildings). Its main purpose is to promote weatherproof construction methods. This Advisory Note therefore, from herein refers to both Volumes One and Two of the BCA.

If intending to use such a system for the external wall cladding of Class 2 – 9 buildings, reference should also be made to the relevant provisions in NCC series Volume One of the BCA, in particular, the Performance Requirements relating to fire-resistance and combustibility.

The AHJ is required to ensure that the Assessment Method process outlined in the BCA¹ is followed to comply with the Performance Requirements.

2.3. Background

Building legislation throughout Australia generally requires that the AHJ must not issue a building permit or building approval unless they are satisfied that the proposed In Australia, building design and the building construction work must will comply with the Commonwealth, State and or Territory's specific building legislation, including the NCC Series. The AHJ may not issue a building permit or building approval unless they are satisfied the building design and construction meet these legislative requirements. (and therefore the BCA).

Non DtS Cladding systems cladding systems which are not covered by the DtS approach are required to follow the Alternative Solution assessment process specified in the BCA. The Alternative Solution should demonstrate that it complies with the Performance Requirements of the BCA, or that the Alternative Solution is at least equivalent to, or better than the DtS provisions. A combination of both methods may also be used. The AHJ may seek evidence to support that the use of the material, form of construction and design meets a Performance Requirement or a DtS provision as described in the BCA².

These requirements are set out in the following clauses:

- Volume One, Provisions A0.5, A0.8, A0.9 and A0.10 of BCA Volume One and,
- Volume Two, Provisions 1.0.5, 1.0.8, 1.0.9 and 1.0.10 of BCA Volume Two

¹ Volume One, Provision A0.9 and Volume Two, Provision 1.0.9

² Volume One, Provision A2.2 or Volume Two, Provision 1.2.2, Evidence of Suitability.

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As part of A0.9 and 1.0.9 the AHJ may seek evidence to support that the use of the material, form of construction or design meets a Performance Requirement or a DtS provision as described in A2.2 of BCA Volume One and 1.2.2 of BCA Volume Two.

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Part 1.2.2 lists as evidence of suitability,

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- (i) A report issued by a Registered Testing Authority, showing that the material or form of construction has been submitted to the tests listed in the report, and setting out the results of those tests and any other relevant information that demonstrates its suitability for use in the building.....
- (ii) A current Certificate of Conformity or a current Certificate of Accreditation.
- (iii) A certificate from a professional engineer or other appropriately qualified person which
 - (A) certifies that a material, design or form of construction complies with the requirements of the BCA; and
 - (B) sets out the basis on which it is given and the extent to which relevant specification, rules, codes of practice or other publication have been relied upon.
- (iv) A current certificate issued by a product certification body that has been accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ)
- (v) *****
- (vi) Any other form of documentary evidence that correctly describes the properties and performance of the material or form of construction and adequately demonstrates its suitability for use in the building

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3.4. Duties of applicants/designers

Architects and building designers should take care when specifying external wall cladding on DtS systems cladding systems that are not covered by DtS provisions.

Where an alternative is specified, ensure that it has been assessed in accordance with Volume One, Provision A2.2 or Volume Two, Provision 1.2.2, Evidence of Suitability. This will assist the AHJ in determining whether this form of construction is an acceptable Alternative Solution.

AHJ require applicants, for a building permits or building approvals to ensure an their application contains sufficient information/evidence/information to show that the building work will comply with the their relevant Building building Act and Building Regulations.

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To assist the AHJ in determining whether the non DtS system is an acceptable Alternative Solution, Documentation such as relevant certificates, reports and forms should be submitted -should be submitted- at the design stage, including all details of the Alternative Solution concerned.

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Architects and building designers should take care in selecting and specifying non-DtS external wall cladding systems and that have been assessed in order to assist the AHJ in determining whether this form of construction is an acceptable Alternative Solution.

They should submit documentation that is sufficient to enable proper assessment for compliance with the BCA. Relevant certificates, reports and forms should be submitted at the design stage including all details of the Alternative Solution concerned.

4.5. The Authority Having Jurisdiction (AHJ)

The AHJ is required to ensure that the process specified for an Alternative Solution³ the Assessment Method¹ and the relevant Performance Requirements⁴ of the BCA in 1.0.8, 1.0.9 and 1.0.10 of BCA Volume Two is followed.

Flexibility is provided in these provisions, such as Expert Judgement. One of the Assessment Methods in 1.0.9 is Expert Judgement which this therefore allows for the use of a report from an expert who has the qualifications and experience to determine whether a Building Solution complies with the Performance Requirements.

Or, some allowing manufacturers of non DTS cladding systems external wall cladding systems have to opt to have their products assessed and reported on by a Registered Testing Authority (R.T.A).

These reports may still be used as evidence to support that the use of a material, form of construction or design meets a Performance Requirement as identified described in both Volumes One and Two of the BCA the BCA.

Another option is the CodeMark product certification. This scheme also gives the AHJ's and building practitioners confidence of legislative compliance. Certification bodies are accredited through the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) who in turn evaluate and certify building products/systems. AHJ's are obliged to accept CodeMark certified cladding systems.

However, practitioners should note The AHJ should also note that CodeMark Certificates applying to a product only (i.e. not a building system), is not in and of itself evidence of compliance with the the BCA Performance Requirements of the BCA. A complying product by itself, as they may not provide address weather tightness proofing address weather tightness of an external the building cladding system the building system. Therefore, care is needed in when reviewing the scope of the certificate.

It may be of assistance to building practitioners in from other all States and Territories to note also that there are a number of external wall cladding systems that have been accredited by the Victorian Building Regulations Advisory Committee acting in its capacity as an Accreditation Authority. The current list of such accredited systems can be found by referring to the Victorian Building Commission website: www.buildingcommission.com.au.

Once on the website, click on 'Statutory Boards and Committees', then click on 'Building Regulations Advisory Committee', then click on 'Building Product Accreditation'.

The AHJ should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. As far as practicable, relevant certificates, reports and forms should be submitted at design stage including all details of Alternative Solutions.

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³ Volume One, Provision A0.8 and Volume Two, Provision 1.0.8
⁴ Volume One, Provision A0.10 and Volume Two, Provision 1.0.10

The AHJ should be aware of the conditions or limitations of any report presented. All relevant design issues should be considered, including but not limited to: articulation joints, bending, and shear strength, fasteners, flashings, weather-proofing, condensation, fire-resistance levels (FRL), bending and shear strength and others. Expansion and construction joint provisions and flashing details in addition to bending, shear and fastening considerations may need to be determined using engineering principles.

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It is important to check that appraisals, certificates and technical reports cover all relevant BCA Performance Requirements of the cladding system proposed. They must be current and relevant to the Alternative Solution.

When assessing an application for a building permit or building approval an AHJ should be satisfied that the applicant has provided appropriate evidence that all relevant Performance Requirements will be met. The AHJ should also give due consideration to the conditions or limitation of any material or system provided to them by the applicant.

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Expansion and construction joint provisions and flashing details may need to be determined using engineering principles in addition to bending, shear and fastening considerations.

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The AHJ should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. As far as practicable, relevant certificates, reports and forms should be submitted at design stage including all details of Alternative Solutions.

5.6. Potential consequences of failure of non DtS external wall cladding systems

External cladding systems should be able to resist any actions that it may be reasonably subject to (Performance Requirement P2.1 of BCA Volume Two), including but not limited to: live and dead loads, rainwater, wind, earthquake, thermal actions,

It should also resist in particular is the the penetration of water into a building that which may cause unhealthy or dangerous conditions, loss of amenity for occupants and undue dampness or deterioration of building elements⁵ risking the life safety of building occupants. (Relevant Performance Requirements P2.1, P2.2.2 and P2.6.1 of BCA Volume Two). (Relevant Performance Requirements are BP1.1, BP1.2, CP2 and FP1.4 in BCA Volume One). Other Performance Requirements may also be relevant see A0.10 in BCA Volume One and 1.0.10 in BCA Volume Two.

Where the possibility exists that moisture will penetrate or collect on the inside face of the external cladding, this moisture must be able to escape the building fabric, either by natural drainage or ventilation of a cavity.

Water may accumulate around horizontal members (bottom plates, heads, sills, deck joists, nogging, and parapets) with potential to cause deterioration of the building elements. Examples include:

- Timber framed balustrades to balconies may be of particular concern where inadequately detail detailed and poorly weatherproofed, non DtS clad timber framed balustrades, for example, can may lead to undetected decay of the timber structure causing structural failure with obvious and significant life safety concerns.
- Hidden fungal growth may seriously affect the health of occupants, causing respiratory and skin problems. The young and old are most at risk and those with weakened immune systems are most at risk. Dampness may also encourages dust mites.
- If When bulk thermal insulation becomes damp, it will reduce its effectiveness. This, in turn, will reduce the energy efficiency of the building concerned.
- Water may accumulate around horizontal members (bottom plates, heads, sills, deck joists, nogging, and parapets) with potential to cause deterioration of the building elements.

Where the possibility exists that moisture will penetrate or collect on the inside face of the external cladding, this moisture must be able to escape the building fabric, either by natural drainage or ventilation of a cavity.

6.7. Sources of water penetration

Wind Forces

Wind forces, even at low pressures, can be higher than those inside the building assisting rainwater to enter through unsealed penetrations, gaps and joints. Localised pressure at corners and exposed edges require particular attention. As exposed external caulking cannot be guaranteed for the life of the building, a regular

⁵ Volume One, Performance Requirement BP1.1 and Volume Two, Performance Requirement Two P2.1

⁶ Volume One, Performance Requirements BP1.1, BP1.2, CP2 and FP1.4, Volume Two, Performance Requirements P2.1, P2.2.2 and P2.6.1

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maintenance program is therefore required. Non DfS cladding systems should be able to demonstrate adequate weather proofing details.

Condensation

If proper consideration is not given to the placement of vapour barriers, condensation may occur in the external wall frame, as the temperature gradient drops across the width of the wall. The moisture in warm air from inside the a building may may condense as it cools, forming causing moisture droplets to form in the insulation, on the framework surface, and the internal face of the cladding and elsewhere.

Condensation is possibly more problematic in the ACT, Victoria, Tasmania and in alpine areas is possibly more problematic than compared to in other States and Territories. Proposals for the use of non DfS external wall cladding systems cladding systems, in these regions should account for the particular climate. Particular attention should be given as to where dew points occur within these systems regardless of the climate zone. Buildings in cooler climates tend to be closed and sealed over the winter period allowing for higher levels of air-borne moisture to be retained in the a building. Particular attention should be given to where dew points are likely to occur within these systems cladding systems. In warmer climates, buildings will tend to be aired more often and temperature and moisture differentials differences, from inside to outside the building will not be as severe, however practitioners should still use caution.

Poor design and installation

Experience of poorly designed and incorrectly installed cladding systems in various parts of the world, highlights the need for non DfS these systems cladding systems to be designed correctly for watertightness, wind loading and potential condensation.

The Building Research Association of New Zealand (BRANZ) clearly states that buildings can leak regardless of levels of precipitation, humidity, wind loading or climate zone. It is estimated the cost to repair leaky buildings in New Zealand is in excess of \$NZ 11.0 billion. Repair costs to some houses have been in the order of \$NZ 300,000.

7.8. Conclusion

International experience over a number of years indicates special care and consideration is necessary in the use of all external wall cladding systems, and compliance with the BCA is established before being released. There is an It is incumbent obligation on the AHJ to be satisfied that the material, form of construction and design meets the Performance Requirements of the BCA.

Care should be taken that all issues have been addressed, including, where appropriate, further assessment by qualified experts. Any system should be constructed in accordance with the specified details. Mixing and matching of systems cladding systems will void reliance on available test results and reports.

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Non Deemed-to-Satisfy External Wall Cladding Systems

This Advisory Note is relevant to the Building Code of Australia (BCA) which comprises Volume One and Two of the National Construction Code (NCC) Series.

1. Introduction

The purpose of this Advisory Note is to provide advice on consideration of proposals to use external wall cladding products and/or cladding systems that are outside the scope of the Deemed-to-Satisfy (DtS) Provisions in the BCA. These are hereafter referred to as 'non DtS' cladding systems.

External wall cladding systems that are currently covered by the DtS Provisions include:

- Masonry
- Weatherboards
- Fibre-cement sheets
- Metal sheets
- Plywood sheets

Examples of non DtS cladding systems include but are not limited to the following:

- Autoclaved aerated concrete
- Aluminium composite panels
- Architectural insulated panels
- External insulation & finish (rendered) systems:
 - Expanded polystyrene panels
 - Extruded polystyrene panels
 - Phenolic insulation panels
 - Polyisocyanurate panels
 - Polvurethane panels

2. Background

International experience over a number of years indicates special care and consideration is necessary in the use of all external wall cladding systems. In recent years, in residential and commercial buildings in Australia, there has been an increase in the use of innovative external wall cladding products and/or systems that are outside the scope of the (DtS) Provisions in the BCA.

An external cladding system must be able to resist actions that it may be reasonably subject to⁷, including but not limited to live and dead loads, rainwater, wind, earthquake and thermal actions.

In particular, the penetration or collection of water in a building may cause unhealthy or dangerous conditions, loss of amenity for occupants and undue dampness or deterioration of building elements⁸. For example-

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⁷ Volume One, Performance Requirement BP1.1 and Volume Two, Performance Requirement Two P2.1

⁸ Volume One, Performance Requirements BP1.1, BP1.2, CP2 and FP1.4. Volume Two, Performance Requirements P2.1, P2.2.2 and P2.6.1

- inadequate detailing and poor weatherproofing may allow water to accumulate around horizontal members (bottom plates, heads, sills, deck joists, nogging and parapets) leading to undetected deterioration of building elements and structural failure;
- hidden fungal growth may affect the health of occupants, causing respiratory and skin problems;
- dampness may encourage the presence of dust mites;
- when bulk thermal insulation becomes damp, its thermal insulating properties may be reduced. This, in turn, will reduce the energy efficiency of the building.

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Sources of water penetration or collection

Poor design and installation

Experience of poorly designed and incorrectly installed cladding systems in various parts of the world highlights the need for non DtS cladding systems to be designed correctly for watertightness, wind loading and potential condensation.

The Building Research Association of New Zealand (BRANZ) states that buildings can leak regardless of levels of precipitation, humidity, wind loading or climate zone. It is estimated the cost to repair leaky buildings in New Zealand is in excess of \$NZ 11 billion and repair costs to some houses have been in the order of \$NZ 300 000.

Wind forces

Wind forces, even at low pressures, can be higher than those inside the building assisting rainwater to enter through unsealed penetrations, gaps and joints. Localised pressure at corners and exposed edges require particular attention. As exposed external caulking cannot be guaranteed for the life of the building, a regular maintenance program may need to be specified.

Condensation

If proper consideration is not given to the placement of vapour barriers, condensation may occur in the external wall frame. Moisture contained in warm air inside a building may condense as it cools, causing moisture droplets to form in insulation, on the framework surface and the internal face of the cladding.

Condensation is possibly more problematic in the ACT, Victoria, Tasmania and in alpine areas compared to other States and Territories. Proposals for the use of non DtS cladding systems in these regions should account for the climate. Buildings in cooler climates tend to be closed and sealed over the winter period allowing higher levels of air-borne moisture to be retained in a building. Particular attention should be given to where dew points are likely to occur within these cladding systems. In warmer climates, buildings tend to be aired more often and temperature differences from inside to outside the building will not be as severe however, caution still needs to be exercised to ensure problems do not occur.

3. Assessment of non DtS cladding systems for compliance with the BCA

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Non DtS cladding systems are required to follow the Alternative Solution assessment process specified in the BCA. An Alternative Solution must comply with the relevant Performance Requirements of the BCA, or be shown to be at least equivalent to the DtS Provisions. A combination of both methods may also be used.

These requirements are set out in the following BCA provisions:

- Volume One, A0.5, A0.8, A0.9 and A0.10

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- Volume Two, 1.0.5, 1.0.8, 1.0.9 and 1.0.10

Duties of applicants/designers

When non DtS cladding systems are included in a design, they must be presented to the authority having jurisdiction (AHJ) as an Alternative Solution.

The Alternative Solution is to include information/evidence that allows the AHJ to determine that the material, form of construction and design meets the relevant Performance Requirements of the BCA.

To assist the AHJ in determining whether the non DtS cladding system is an acceptable Alternative Solution, relevant certificates, reports and forms should be submitted at the design stage, including all details of the Alternative Solution concerned.

Duties of the AHJ

When non DtS cladding systems are included in a design, they must be considered by the AHJ as an Alternative Solution.

When assessing an application for a building permit or building approval, an AHJ should be satisfied that the applicant has provided appropriate evidence that all relevant Performance Requirements will be met. The AHJ should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. Care should be taken to ensure that all issues have been addressed including, where appropriate, further assessment by qualified experts.

The AHJ should be aware of the conditions or limitations of any report presented. All relevant design issues should be considered, including but not limited to: articulation joints, fasteners, flashings, weather-proofing, condensation, fire-resistance levels (FRL), bending and shear strength. Expansion and construction joint provisions and flashing details in addition to bending, shear and fastening considerations may need to be determined using engineering principles.

It is important to check that evidence of compliance, such as appraisals, certificates and technical reports, covers all BCA Performance Requirements relevant to the non DtS cladding system proposed. They must be current and relevant to the Alternative Solution. For example, a CodeMark certificate applying to a product only, i.e. not to a building system as a whole, may not be sufficient evidence of compliance with all relevant Performance Requirements of the BCA. A complying product by itself may not address weather-tightness of the building system. Therefore, care is needed when reviewing the scope of a CodeMark certificate.

Any system should be constructed in accordance with the specified details. Mixing and matching of cladding systems will void reliance on available test results and reports.

DISCLAIMER:

This Advisory Note is provided for general information only and should not be taken as providing specific advice on any issue. In particular, this Advisory Note is not mandatory or regulatory in nature. Rather, it is designed to assist in making information on this topic readily available.

The ABCB and participating Governments do not accept any responsibility for the use of the information contained in the Advisory Note and make no guarantee or representation whatsoever that the information is an exhaustive treatment of the subject matters contained therein or is complete, accurate, up-to-date or reliable for any particular purpose.

The ABCB and participating Governments expressly disclaim all liability for any loss, damage, injury or other consequence, howsoever caused (including without limitation by way of negligence) which may arise directly or indirectly from use of, or reliance on, this Advisory Note.

The material in this Advisory Note does not constitute the provision of professional advice. Users should exercise their own skill and care with respect to their use of this Advisory Note and should obtain appropriate independent professional advice on any specific issues concerning them prior to relying on, or entering into any commitment based on material in this Advisory Note. In particular, and to avoid doubt, the use of this Advisory Note does not –

- guarantee acceptance or accreditation of a design, material or building solution by any entity authorised to do so under any law;
- mean that a design, material or building solution complies with the National Construction Code (NCC); or
- absolve the user from complying with any Local, State, and Territory or Australian Government legal requirements.

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s47F

From: s47F
Sent: Wednesday, 7 September 2011 4:05 PM
To: s47F
Subject: RE: Restructured Advisory Note for QA (4) (2).doc [SEC=UNCLASSIFIED]

Security Classification:
UNCLASSIFIED

Hi s47F

I wasn't intending to send the Admins an alternative to your document. The plan was to send the version resulting from the last BCC meeting, so will replace that one with your updated 1st version. I will however, remove the disclaimer because that was added by us and is based on the disclaimer the Office uses for handbooks. This will vary across States if they choose to issue the advisory note in their jurisdiction.

Regards

s47F

From: s47F
Sent: Wednesday, 7 September 2011 3:40 PM
Subject: Restructured Advisory Note for QA (4) (2).doc

Hi s47F

Thanks for forwarding 2 versions of the draft Advisory Note on Non-DtS External Wall Cladding Systems. I have made some changes - mostly minor, to the 1st version (as attached) and as such, I prefer that version. I would therefore suggest that you send both versions to the Admins & let them choose which they prefer.

Regards

s47F

Regulating for a safe, liveable and sustainable built environment

s47F


Consultant Regulatory Development
Regulatory Development Division, Building Commission
Building Commission
Goods Shed North, 733 Bourke Street, Docklands, 3008
P O Box 536, Melbourne, VIC 3001

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buildingcommission.com.au

pic.vic.gov.au

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s47F [Redacted]

From: s47F [Redacted]
Sent: Wednesday, 7 September 2011 3:40 PM
To: s47F [Redacted]
Cc:
Subject: Restructured Advisory Note for QA (4) (2).doc
Attachments: Restructured Advisory Note for QA (4) (2).doc

Hi s47F [Redacted]

Thanks for forwarding 2 versions of the draft Advisory Note on Non-DtS External Wall Cladding Systems. I have made some changes - mostly minor, to the 1st version (as attached) and as such, I prefer that version. I would therefore suggest that you send both versions to the Admins & let them choose which they prefer.

Regards

s47F [Redacted]

Regulating for a safe, liveable and sustainable built environment


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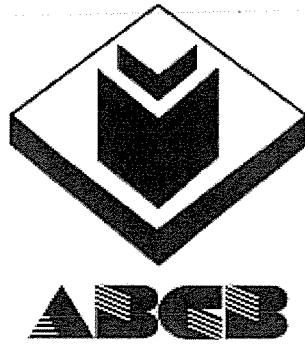
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Building Commission
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Non Deemed-to-Satisfy External Wall Cladding Systems

2011

Advisory Note

Non-Mandatory Document

1. Preface

The National Construction Code (NCC) is an initiative of the Council of Australian Governments (COAG) developed to incorporate all on-site construction requirements into a single code. The NCC comprises the Building Code of Australia (BCA), Volumes One and Two; and the Plumbing Code of Australia (PCA), as Volume Three.

This Advisory Note refers to the BCA Volumes One and Two and focuses on all buildings (Class 1 –10 buildings) with the purpose to promote weatherproof construction methods.

2. Introduction

In recent years, residential and commercial buildings in Australia have seen a dramatic increase in the use of innovative, external wall cladding products and/or systems which are not dealt with in the BCA as Deemed-to-Satisfy (DtS) building solutions.

External cladding systems which are currently allowed under a DtS approach include;

- Masonry
- Weatherboards
- Fibre-cement sheets
- Metal sheets
- Plywood sheets.

The purpose of this Advisory Note is to provide advice as to the processes required to be undertaken when external wall cladding products and/or cladding systems which are not DtS building solutions, and are proposed to be incorporated into the design of a building. These are hereafter referred to as 'non DtS' cladding systems.

Examples of non DtS cladding systems include but are not limited to the following:

- Autoclaved aerated concrete
- Aluminium composite panels
- Architectural insulated panels
- External insulation & finish (rendered) systems:
 - Expanded polystyrene panels
 - Extruded polystyrene panels
 - Phenolic insulation panels
 - Polyisocyanurate panels

When non DtS cladding systems are included in a design they are required to be presented to the authority having jurisdiction (AHJ) as an Alternative Solution. The Alternative Solution is to include information/evidence that allows the AHJ to determine that the material, form of construction and design meets the Performance Requirements of the BCA.

Additionally for Class 2 – 9 buildings, practitioners are also required to reference all relevant provisions of National Construction Code Volume One - BCA, in particular, Performance Requirements relating to fire-resistance and combustibility.

The AHJ is required to ensure that the Assessment Method outlined in the BCA¹ is followed to comply with the Performance Requirements.

3. Background

In Australia, building design and construction must comply with Commonwealth, State and Territory building legislation, including the NCC Series. The AHJ may not issue a building permit or building approval unless they are satisfied the building design and construction meet these legislative requirements.

Non DtS cladding systems are required to follow the Alternative Solution assessment process specified in the BCA. The Alternative Solution should demonstrate that it complies with the Performance Requirements of the BCA, or that the Alternative Solution is equivalent to, or better than the DtS provisions. A combination of both methods may also be used. The AHJ may seek evidence to support that the use of the material, form of construction and design meets a Performance Requirement or a DtS provision as described in the BCA².

These requirements are set out in the following clauses:

- Volume One, clauses A0.5, A0.8, A0.9 and A0.10
- Volume Two, clauses 1.0.5, 1.0.8, 1.0.9 and 1.0.10

4. Duties of applicants/designers

Architects and building designers should take care when specifying non DtS cladding systems. Where an alternative is specified, the AHJ will require that applicants for a building permit or building approval to ensure their application contains sufficient evidence/information to show that the building work will comply with the relevant building Act and Building Regulations.

To assist the AHJ in determining whether the non DtS system is an acceptable Alternative Solution, relevant certificates, reports and forms should be submitted at the design stage, including all details of the Alternative Solution concerned.

5. The Authority Having Jurisdiction (AHJ)

The AHJ is required to ensure that the process specified for an Alternative Solution³ the Assessment Method¹ and the relevant Performance Requirements⁴ of the BCA is followed.

Flexibility is provided in these provisions such as Expert Judgement. This allows for the use of a report from an expert who has the qualifications and experience to determine whether a Building Solution complies with the Performance Requirements.

Otherwise, allowing manufacturers of non DtS cladding systems will be allowed to opt to have their products assessed and reported on by a Registered Testing Authority (R.T.A).

These reports may be used as evidence to support that the use of a material, form of construction or design meets a Performance Requirement as described in the BCA.

¹ Volume One, Provision A0.9 and Volume Two, Provision 1.0.9

² Volume One, Provision A2.2 or Volume Two, Provision 1.2.2, Evidence of Suitability.

³ Volume One, Provision A0.8 and Volume Two, Provision 1.0.8

⁴ Volume One, Provision A0.10 and Volume Two, Provision 1.0.10

Another option is CodeMark product certification. This scheme gives the AHJ and building practitioners confidence of legislative compliance. Certification bodies are accredited through the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) who in turn evaluate and certify building products/systems. AHJ are obliged to accept CodeMark certified cladding systems.

However, practitioners should note that CodeMark Certificates applying to a product only (i.e. not a building system), is not in itself evidence of compliance with the Performance Requirements of the BCA. A complying product by itself may not address weather-tightness of the building system. Therefore, care is needed when reviewing the scope of the certificate.

It may be of assistance to building practitioners from all States and Territories to note that there are a number of external wall cladding systems that have been accredited by the Victorian Building Regulations Advisory Committee acting in its capacity as an Accreditation Authority. The current list of such accredited systems can be found by referring to the Victorian Building Commission website: www.buildingcommission.com.au.

Once on the website, click on 'Statutory Boards and Committees', then click on 'Building Regulations Advisory Committee', then click on 'Building Product Accreditation'.

The AHJ should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. As far as practicable, relevant certificates, reports and forms should be submitted at design stage including all details of Alternative Solutions.

The AHJ should be aware of the conditions or limitations of any report presented. All relevant design issues should be considered, including but not limited to; articulation joints, fasteners, flashings, weather-proofing, condensation, fire-resistance levels (FRL), bending and shear strength. Expansion and construction joint provisions and flashing details in addition to bending, shear and fastening considerations may need to be determined using engineering principles.

It is important to check that appraisals, certificates and technical reports cover all relevant BCA Performance Requirements of the cladding system proposed. They must be current and relevant to the Alternative Solution.

When assessing an application for a building permit or building approval an AHJ should be satisfied that the applicant has provided appropriate evidence that all relevant Performance Requirements will be met. The AHJ should also give due consideration to the conditions or limitation of any material or system provided to them by the applicant.

The AHJ should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA.

6. Potential consequences of failure of non DtS external wall cladding systems

External cladding systems must be able to resist actions that they may be reasonably subject to⁵, including but not limited to; live and dead loads, rainwater, wind, earthquake, thermal actions.

In particular is the penetration of water into a building which may cause unhealthy or dangerous conditions, loss of amenity for occupants and undue dampness or deterioration of building elements⁶ risking the life safety of building occupants.

Examples include;

- Timber framed balustrades to balconies where inadequate detailing and poor weatherproofing, may lead to undetected decay of the timber structure causing structural failure.
- Hidden fungal growth may affect the health of occupants, causing respiratory and skin problems. The young, old and those with weakened immune systems are most at risk. Dampness may also encourage dust mites.
- When bulk thermal insulation becomes damp, it will reduce its effectiveness. This, in turn, will reduce the energy efficiency of the building concerned.
- Water may accumulate around horizontal members (bottom plates, heads, sills, deck joists, nogging, and parapets) with potential to cause deterioration of the building elements.

Where the possibility exists that moisture will penetrate or collect on the inside face of the external cladding, this moisture must be able to escape the building fabric, either by natural drainage or ventilation of a cavity.

7. Sources of water penetration

Wind Forces

Wind forces, even at low pressures, can be higher than those inside the building assisting rainwater to enter through unsealed penetrations, gaps and joints. Localised pressure at corners and exposed edges require particular attention. As exposed external caulking cannot be guaranteed for the life of the building, a regular maintenance program is required. Non DtS cladding systems should be able to demonstrate adequate weather proofing details.

Condensation

If proper consideration is not given to the placement of vapour barriers, condensation may occur in the external wall frame. Warm air inside a building may condense as it cools, causing moisture droplets to form in insulation, on the framework surface, and the internal face of the cladding.

Condensation is possibly more problematic in the ACT, Victoria, Tasmania and in alpine areas compared to other States and Territories. Proposals for the use of non DtS cladding systems, in these regions should account for the climate. Buildings in cooler climates tend to be closed and sealed over the winter period allowing higher levels of air-borne moisture to be retained in a building. Particular attention should be given to

⁵ Volume One, Performance Requirement BP1.1 and Volume Two, Performance Requirement Two P2.1

⁶ Volume One, Performance Requirements BP1.1, BP1.2, CP2 and FP1.4. Volume Two, Performance Requirements P2.1, P2.2.2 and P2.6.1

where dew points are likely to occur within these cladding systems. In warmer climates, buildings tend to be aired more often and temperature differences from inside to outside the building will not be as severe, however practitioners should still use caution.

Poor design and installation

Experience of poorly designed and incorrectly installed cladding systems in various parts of the world, highlights the need for non DtS cladding systems to be designed correctly for watertightness, wind loading and potential condensation.

The Building Research Association of New Zealand (BRANZ) states that buildings can leak regardless of levels of precipitation, humidity, wind loading or climate zone. It is estimated the cost to repair leaky buildings in New Zealand is in excess of \$NZ 11.0 billion. Repair costs to some houses have been in the order of \$NZ 300,000.

8. Conclusion

International experience over a number of years indicates special care and consideration is necessary in the use of all external wall cladding systems. There is an obligation on the AHJ to be satisfied that the material, form of construction and design meets the Performance Requirements of the BCA.

Care should be taken that all issues have been addressed, including, where appropriate, further assessment by qualified experts. Any system should be constructed in accordance with the specified details. Mixing and matching of cladding systems will void reliance on available test results and reports.

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The material in this Advisory Note does not constitute the provision of professional advice. Users should exercise their own skill and care with respect to their use of this Advisory Note and should obtain appropriate independent professional advice on any specific issues concerning them prior to relying on, or entering into any commitment based on material in this Advisory Note. In particular, and to avoid doubt, the use of this Advisory Note does not –

- guarantee acceptance or accreditation of a design, material or building solution by any entity authorised to do so under any law;
- mean that a design, material or building solution complies with the National Construction Code (NCC); or
- absolve the user from complying with any Local, State, and Territory or Australian Government legal requirements.

Non Deemed-to-Satisfy External Wall Cladding Systems

This Advisory Note is relevant to the Building Code of Australia (BCA) which comprises Volume One and Two of the National Construction Code (NCC) Series.

1. Introduction

The purpose of this Advisory Note is to provide advice on consideration of proposals to use external wall cladding products and/or cladding systems that are outside the scope of the Deemed-to-Satisfy (DtS) Provisions in the BCA. These are hereafter referred to as 'non DtS' cladding systems.

External wall cladding systems that are currently covered by the DtS Provisions include;

- Masonry
- Weatherboards
- Fibre-cement sheets
- Metal sheets
- Plywood sheets.

Examples of non DtS cladding systems include but are not limited to the following:

- Autoclaved aerated concrete
- Aluminium composite panels
- Architectural insulated panels
- External insulation & finish (rendered) systems:
 - Expanded polystyrene panels
 - Extruded polystyrene panels
 - Phenolic insulation panels
 - Polyisocyanurate panels
 - Polyurethane panels

2. Background

International experience over a number of years indicates special care and consideration is necessary in the use of all external wall cladding systems. In recent years, in residential and commercial buildings in Australia, there has been an increase in the use of innovative external wall cladding products and/or systems that are outside the scope of the (DtS) Provisions in the BCA.

An external cladding system must be able to resist actions that it may be reasonably subject to⁷, including but not limited to live and dead loads, rainwater, wind, earthquake and thermal actions.

In particular, the penetration or collection of water in a building may cause unhealthy or dangerous conditions, loss of amenity for occupants and undue dampness or deterioration of building elements⁸. For example-

⁷ Volume One, Performance Requirement BP1.1 and Volume Two, Performance Requirement Two P2.1

⁸ Volume One, Performance Requirements BP1.1, BP1.2, CP2 and FP1.4. Volume Two, Performance Requirements P2.1, P2.2.2 and P2.6.1

- inadequate detailing and poor weatherproofing may allow water to accumulate around horizontal members (bottom plates, heads, sills, deck joists, nogging and parapets) leading to undetected deterioration of building elements and structural failure;
- hidden fungal growth may affect the health of occupants, causing respiratory and skin problems;
- dampness may encourage the presence of dust mites;
- when bulk thermal insulation becomes damp, its thermal insulating properties may be reduced. This, in turn, will reduce the energy efficiency of the building.

Sources of water penetration or collection

Poor design and installation

Experience of poorly designed and incorrectly installed cladding systems in various parts of the world highlights the need for non DtS cladding systems to be designed correctly for watertightness, wind loading and potential condensation.

The Building Research Association of New Zealand (BRANZ) states that buildings can leak regardless of levels of precipitation, humidity, wind loading or climate zone. It is estimated the cost to repair leaky buildings in New Zealand is in excess of \$NZ 11 billion and repair costs to some houses have been in the order of \$NZ 300 000.

Wind forces

Wind forces, even at low pressures, can be higher than those inside the building assisting rainwater to enter through unsealed penetrations, gaps and joints. Localised pressure at corners and exposed edges require particular attention. As exposed external caulking cannot be guaranteed for the life of the building, a regular maintenance program may need to be specified.

Condensation

If proper consideration is not given to the placement of vapour barriers, condensation may occur in the external wall frame. Moisture contained in warm air inside a building may condense as it cools, causing moisture droplets to form in insulation, on the framework surface and the internal face of the cladding.

Condensation is possibly more problematic in the ACT, Victoria, Tasmania and in alpine areas compared to other States and Territories. Proposals for the use of non DtS cladding systems in these regions should account for the climate. Buildings in cooler climates tend to be closed and sealed over the winter period allowing higher levels of air-borne moisture to be retained in a building. Particular attention should be given to where dew points are likely to occur within these cladding systems. In warmer climates, buildings tend to be aired more often and temperature differences from inside to outside the building will not be as severe however, caution still needs to be exercised to ensure problems do not occur.

3. Assessment of non DtS cladding systems for compliance with the BCA

Non DtS cladding systems are required to follow the Alternative Solution assessment process specified in the BCA. An Alternative Solution must comply with the relevant Performance Requirements of the BCA, or be shown to be at least equivalent to the DtS Provisions. A combination of both methods may also be used.

These requirements are set out in the following BCA provisions:

- Volume One, A0.5, A0.8, A0.9 and A0.10

- Volume Two, 1.0.5, 1.0.8, 1.0.9 and 1.0.10

Duties of applicants/designers

When non DtS cladding systems are included in a design, they must be presented to the authority having jurisdiction (AHJ) as an Alternative Solution.

The Alternative Solution is to include information/evidence that allows the AHJ to determine that the material, form of construction and design meets the relevant Performance Requirements of the BCA.

To assist the AHJ in determining whether the non DtS cladding system is an acceptable Alternative Solution, relevant certificates, reports and forms should be submitted at the design stage, including all details of the Alternative Solution concerned.

Duties of the AHJ

When non DtS cladding systems are included in a design, they must be considered by the AHJ as an Alternative Solution.

When assessing an application for a building permit or building approval, an AHJ should be satisfied that the applicant has provided appropriate evidence that all relevant Performance Requirements will be met. The AHJ should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. Care should be taken to ensure that all issues have been addressed including, where appropriate, further assessment by qualified experts.

The AHJ should be aware of the conditions or limitations of any report presented. All relevant design issues should be considered, including but not limited to; articulation joints, fasteners, flashings, weather-proofing, condensation, fire-resistance levels (FRL), bending and shear strength. Expansion and construction joint provisions and flashing details in addition to bending, shear and fastening considerations may need to be determined using engineering principles.

It is important to check that evidence of compliance, such as appraisals, certificates and technical reports, covers all BCA Performance Requirements relevant to the non DtS cladding system proposed. They must be current and relevant to the Alternative Solution. For example, a CodeMark certificate applying to a product only, i.e. not to a building system as a whole, may not be sufficient evidence of compliance with all relevant Performance Requirements of the BCA. A complying product by itself may not address weather-tightness of the building system. Therefore, care is needed when reviewing the scope of a CodeMark certificate.

Any system should be constructed in accordance with the specified details. Mixing and matching of cladding systems will void reliance on available test results and reports.

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- guarantee acceptance or accreditation of a design, material or building solution by any entity authorised to do so under any law;
- mean that a design, material or building solution complies with the National Construction Code (NCC); or
- absolve the user from complying with any Local, State, and Territory or Australian Government legal requirements.

s47F

From: s47F
Sent: Wednesday, 7 September 2011 6:01 PM
To: s47F
Cc:
Subject: RE: Restructured Advisory Note for QA (4) (2).doc [SEC=UNCLASSIFIED]

That's fine by me s47F

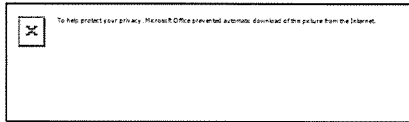
Regards

s47F

Regulating for a safe, liveable and sustainable built environment

s47F

Consultant Regulatory Development
Regulatory Development Division, Building Commission
Building Commission
Goods Shed North, 733 Bourke Street, Docklands, 3008
P O Box 536, Melbourne, VIC 3001




s47F

buildingcommission.com.au

plc.vic.gov.au

makeyourhomegreen.vic.gov.au

 Please consider the environment before printing this e-mail.

From: s47F
Sent: Wednesday, 7 September 2011 4:05 PM
To: s47F
Subject: RE: Restructured Advisory Note for QA (4) (2).doc [SEC=UNCLASSIFIED]

Hi s47F

I wasn't intending to send the Admins an alternative to your document. The plan was to send the version resulting from the last BCC meeting, so will replace that one with your updated 1st version. I will however, remove the disclaimer because that was added by us and is based on the disclaimer the Office uses for handbooks. This will vary across States if they choose to issue the advisory note in their jurisdiction.

Regards

s47F

From: s47F
Sent: Wednesday, 7 September 2011 3:40 PM
To: s47F
Cc:
Subject: Restructured Advisory Note for QA (4) (2).doc

Hi s47F

Thanks for forwarding 2 versions of the draft Advisory Note on Non-DtS External Wall Cladding Systems. I have made some changes - mostly minor, to the 1st version (as attached) and as such, I prefer that version. I would therefore suggest that you send both versions to the Admins & let them choose which they prefer.

s47F

Regulating for a safe, liveable and sustainable built environment


s47F

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Regulatory Development Division, Building Commission
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s47F

From: s47F
Sent: Friday, 23 September 2011 11:54 AM
To: s47F

Cc:
Subject: External cladding advisory note [SEC=UNCLASSIFIED]
Attachments: Advisory Note external cladding rev Sept 2011.doc

Contacts: s47F

Security Classification: UNCLASSIFIED

Dear Administrations

The Victorian Administration, with the assistance of other BCC members, has been developing a proposed Advisory Note on non-deemed-to-satisfy external wall cladding systems. The Advisory Note was discussed at the 2011-2 BCC meeting, following which further changes were made by the Victorian Administration in response to member's comments. The draft Advisory Note was subsequently sent to the ABCB Office for review with the intention that it be issued as a national Advisory Note by the ABCB and be published on the ABCB website.

The ABCB Office has reviewed the draft Advisory Note and has formed the view that it would not be appropriate for the document to be issued by the ABCB. However, individual Administrations may wish to use the draft that has been developed as a basis for advice to be issued within their jurisdictions. This approach would also allow individual Administrations to tailor the advice to suit their terminology and administrative processes if necessary. A copy of the most recent draft of the Advisory Note is attached should you wish to pursue that course of action.

On your behalf, I would like to thank s47F for his efforts in getting the document to this stage.

Regards

s47F
Manager
Australian Building Codes Board

GPO Box 9839
Canberra ACT 2601

s47F

Website: www.abcb.gov.au
ABN 74 599 608 295

Non Deemed-to-Satisfy External Wall Cladding Systems

2011

Advisory Note

Non-Mandatory Document

1. Preface

The National Construction Code (NCC) is an initiative of the Council of Australian Governments (COAG) developed to incorporate all on-site construction requirements into a single code. The NCC comprises the Building Code of Australia (BCA), Volumes One and Two; and the Plumbing Code of Australia (PCA), as Volume Three.

This Advisory Note refers to the BCA Volumes One and Two and focuses on all buildings (Class 1 –10 buildings) with the purpose to promote weatherproof construction methods.

2. Introduction

In recent years, residential and commercial buildings in Australia have seen a dramatic increase in the use of innovative, external wall cladding products and/or systems which are not dealt with in the BCA as Deemed-to-Satisfy (DtS) building solutions.

External cladding systems which are currently allowed under a DtS approach include;

- Masonry
- Weatherboards
- Fibre-cement sheets
- Metal sheets
- Plywood sheets.

The purpose of this Advisory Note is to provide advice as to the processes required to be undertaken when external wall cladding products and/or cladding systems which are not DtS building solutions, and are proposed to be incorporated into the design of a building. These are hereafter referred to as 'non DtS' cladding systems.

Examples of non DtS cladding systems include but are not limited to the following:

- Autoclaved aerated concrete
- Aluminium composite panels
- Architectural insulated panels
- External insulation & finish (rendered) systems:
 - Expanded polystyrene panels
 - Extruded polystyrene panels
 - Phenolic insulation panels
 - Polyisocyanurate panels

When non DtS cladding systems are included in a design they are required to be presented to the authority having jurisdiction (AHJ) as an Alternative Solution. The Alternative Solution is to include information/evidence that allows the AHJ to determine that the material, form of construction and design meets the Performance Requirements of the BCA.

Additionally for Class 2 – 9 buildings, practitioners are also required to reference all relevant provisions of National Construction Code Volume One – BCA, in particular, Performance Requirements relating to fire-resistance and combustibility.

The AHJ is required to ensure that the Assessment Method outlined in the BCA¹ is followed to comply with the Performance Requirements.

3. Background

In Australia, building design and construction must comply with Commonwealth, State and Territory building legislation, including the NCC Series. The AHJ may not issue a building permit or building approval unless they are satisfied the building design and construction meet these legislative requirements.

Non DtS cladding systems are required to follow the Alternative Solution assessment process specified in the BCA. The Alternative Solution should demonstrate that it complies with the Performance Requirements of the BCA, or that the Alternative Solution is equivalent to, or better than the DtS provisions. A combination of both methods may also be used. The AHJ may seek evidence to support that the use of the material, form of construction and design meets a Performance Requirement or a DtS provision as described in the BCA².

These requirements are set out in the following clauses:

- Volume One, clauses A0.5, A0.8, A0.9 and A0.10
- Volume Two, clauses 1.0.5, 1.0.8, 1.0.9 and 1.0.10

4. Duties of applicants/designers

Architects and building designers should take care when specifying non DtS cladding systems. Where an alternative is specified, the AHJ will require that applicants for a building permit or building approval to ensure their application contains sufficient evidence/information to show that the building work will comply with the relevant building Act and Building Regulations.

To assist the AHJ in determining whether the non DtS system is an acceptable Alternative Solution, relevant certificates, reports and forms should be submitted at the design stage, including all details of the Alternative Solution concerned.

5. The Authority Having Jurisdiction (AHJ)

The AHJ is required to ensure that the process specified for an Alternative Solution³ the Assessment Method¹ and the relevant Performance Requirements⁴ of the BCA is followed.

Flexibility is provided in these provisions such as Expert Judgement. This allows for the use of a report from an expert who has the qualifications and experience to determine whether a Building Solution complies with the Performance Requirements.

Otherwise, allowing manufacturers of non DtS cladding systems will be allowed to opt to have their products assessed and reported on by a Registered Testing Authority (R.T.A).

These reports may be used as evidence to support that the use of a material, form of construction or design meets a Performance Requirement as described in the BCA.

¹ Volume One, Provision A0.9 and Volume Two, Provision 1.0.9

² Volume One, Provision A2.2 or Volume Two, Provision 1.2.2, Evidence of Suitability.

³ Volume One, Provision A0.8 and Volume Two, Provision 1.0.8

⁴ Volume One, Provision A0.10 and Volume Two, Provision 1.0.10

Another option is CodeMark product certification. This scheme gives the AHJ and building practitioners confidence of legislative compliance. Certification bodies are accredited through the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) who in turn evaluate and certify building products/systems. AHJ are obliged to accept CodeMark certified cladding systems.

However, practitioners should note that CodeMark Certificates applying to a product only (i.e. not a building system), is not in itself evidence of compliance with the Performance Requirements of the BCA. A complying product by itself may not address weather-tightness of the building system. Therefore, care is needed when reviewing the scope of the certificate.

It may be of assistance to building practitioners from all States and Territories to note that there are a number of external wall cladding systems that have been accredited by the Victorian Building Regulations Advisory Committee acting in its capacity as an Accreditation Authority. The current list of such accredited systems can be found by referring to the Victorian Building Commission website: www.buildingcommission.com.au.

Once on the website, click on 'Statutory Boards and Committees', then click on 'Building Regulations Advisory Committee', then click on 'Building Product Accreditation'.

The AHJ should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA. As far as practicable, relevant certificates, reports and forms should be submitted at design stage including all details of Alternative Solutions.

The AHJ should be aware of the conditions or limitations of any report presented. All relevant design issues should be considered, including but not limited to; articulation joints, fasteners, flashings, weather-proofing, condensation, fire-resistance levels (FRL), bending and shear strength. Expansion and construction joint provisions and flashing details in addition to bending, shear and fastening considerations may need to be determined using engineering principles.

It is important to check that appraisals, certificates and technical reports cover all relevant BCA Performance Requirements of the cladding system proposed. They must be current and relevant to the Alternative Solution.

When assessing an application for a building permit or building approval an AHJ should be satisfied that the applicant has provided appropriate evidence that all relevant Performance Requirements will be met. The AHJ should also give due consideration to the conditions or limitation of any material or system provided to them by the applicant.

The AHJ should only accept documentation that is sufficient to enable proper assessment for compliance with the BCA.

6. Potential consequences of failure of non DtS external wall cladding systems

External cladding systems must be able to resist actions that they may be reasonably subject to⁵, including but not limited to; live and dead loads, rainwater, wind, earthquake, thermal actions.

In particular is the penetration of water into a building which may cause unhealthy or dangerous conditions, loss of amenity for occupants and undue dampness or deterioration of building elements⁶ risking the life safety of building occupants.

Examples include;

- Timber framed balustrades to balconies where inadequate detailing and poor weatherproofing, may lead to undetected decay of the timber structure causing structural failure.
- Hidden fungal growth may affect the health of occupants, causing respiratory and skin problems. The young, old and those with weakened immune systems are most at risk. Dampness may also encourage dust mites.
- When bulk thermal insulation becomes damp, it will reduce its effectiveness. This, in turn, will reduce the energy efficiency of the building concerned.
- Water may accumulate around horizontal members (bottom plates, heads, sills, deck joists, nogging, and parapets) with potential to cause deterioration of the building elements.

Where the possibility exists that moisture will penetrate or collect on the inside face of the external cladding, this moisture must be able to escape the building fabric, either by natural drainage or ventilation of a cavity.

7. Sources of water penetration

Wind Forces

Wind forces, even at low pressures, can be higher than those inside the building assisting rainwater to enter through unsealed penetrations, gaps and joints. Localised pressure at corners and exposed edges require particular attention. As exposed external caulking cannot be guaranteed for the life of the building, a regular maintenance program is required. Non DtS cladding systems should be able to demonstrate adequate weather proofing details.

Condensation

If proper consideration is not given to the placement of vapour barriers, condensation may occur in the external wall frame. Warm air inside a building may condense as it cools, causing moisture droplets to form in insulation, on the framework surface, and the internal face of the cladding.

Condensation is possibly more problematic in the ACT, Victoria, Tasmania and in alpine areas compared to other States and Territories. Proposals for the use of non DtS cladding systems, in these regions should account for the climate. Buildings in cooler climates tend to be closed and sealed over the winter period allowing higher levels of air-borne moisture to be retained in a building. Particular attention should be given to

⁵ Volume One, Performance Requirement BP1.1 and Volume Two, Performance Requirement Two P2.1

⁶ Volume One, Performance Requirements BP1.1, BP1.2, CP2 and FP1.4. Volume Two, Performance Requirements P2.1, P2.2.2 and P2.6.1

where dew points are likely to occur within these cladding systems. In warmer climates, buildings tend to be aired more often and temperature differences from inside to outside the building will not be as severe, however practitioners should still use caution.

Poor design and installation

Experience of poorly designed and incorrectly installed cladding systems in various parts of the world, highlights the need for non DtS cladding systems to be designed correctly for watertightness, wind loading and potential condensation.

The Building Research Association of New Zealand (BRANZ) states that buildings can leak regardless of levels of precipitation, humidity, wind loading or climate zone. It is estimated the cost to repair leaky buildings in New Zealand is in excess of \$NZ 11.0 billion. Repair costs to some houses have been in the order of \$NZ 300,000.

8. Conclusion

International experience over a number of years indicates special care and consideration is necessary in the use of all external wall cladding systems. There is an obligation on the AHJ to be satisfied that the material, form of construction and design meets the Performance Requirements of the BCA.

Care should be taken that all issues have been addressed, including, where appropriate, further assessment by qualified experts. Any system should be constructed in accordance with the specified details. Mixing and matching of cladding systems will void reliance on available test results and reports.