

## BUILDING CODE OF AUSTRALIA (BCA) ASSESSMENT OF AFS LOGIC WALL – AUGUST 2014

**No Certifier, Engineer, Architect, Builder, Construction Manager (Supervisor), or Formwork Trade are immune from their responsibilities when they provide a service in the Australian Construction industry.** The Work Health and Safety Act 2011 (mandatory since 1<sup>st</sup> January 2012) states that “responsibilities are not transferable”.

The following schedules of BCA compliance requirements and issues are presented below.

COMPLIANCE	ISSUE
<p><b><u>BCA Product Compliance:</u></b></p> <p>BCA Performance Requirement            → (1) <b>Deemed to Satisfy</b> → <span style="border: 1px solid black; padding: 2px;">Clause A2.2 Evidence of Suitability</span></p> <p>→ (2) <b>Alternative Solution:</b></p> <ul style="list-style-type: none"> <li>• <span style="border: 1px solid black; padding: 2px;">Clause A2.2 Evidence of Suitability</span></li> <li>• Verification Method</li> <li>• Comparison to Deemed to Satisfy</li> <li>• Expert Judgement</li> </ul> <p>→ <span style="border: 1px solid black; padding: 2px;">Clause A2.2 Evidence of Suitability</span></p>	<ul style="list-style-type: none"> <li>• <b>DOES AFS LOGIC WALL COMPLY WITH:</b> <ul style="list-style-type: none"> <li>➤ AS3600 Durability – DEEMED TO SATISFY CONDITION.</li> <li>➤ Alternative Solution Requirement.</li> <li>➤ AS3600 Fire Compliance.</li> <li>➤ Delamination of Fibre Cement Sheets.</li> <li>➤ Insurance requirement for mould/mildew.</li> <li>➤ Construction Safety – Heavy Lifting.</li> <li>➤ Environment               <ul style="list-style-type: none"> <li>• CO<sub>2</sub></li> <li>• Thermal Bridging/Condensation</li> <li>• Ongoing Maintenance</li> </ul> </li> </ul> </li> </ul>

**IMPORTANT NOTE:** Question the Test Certificates

Building Code of Australia (BCA), Clause A2.2 – Evidence of Suitability may be based on the test results – Avoid pit falls by reading [\(download\) Potential Liability for Engineers/Certifiers.](#)

Currently N.A.T.A. registered testing laboratories are only producing test results for the given material by the party of interest. They do not provide product certification. Hence they assume no responsibility for where and how the product is used.

COMPLIANCE	ISSUE
<p><b><u>AS3600 – 2009 Section 4</u></b> <b><u>AFS Logic Wall Durability Compliance</u></b></p> <p><a href="#"><u>(Download) AS3600 Durability Compliance Assessment of AFS Logic Wall.</u></a></p> <p><a href="#"><u>(Download) Dulux Protective Coating Technical Document No: 1:3:8</u></a></p>	<ul style="list-style-type: none"> <li>• AS3600 – 2009 states that the “Deemed to Satisfy” condition must have concrete cover.</li> <li>• AFS Logic Wall has no concrete cover over the metal ‘C’ sections.</li> <li>• AFS argues (Unisearch, UNSW Report dated 5<sup>th</sup> May 2014) that the protective coating in lieu of concrete cover can be used.</li> <li>• The Dulux – Acratex render referred to as a protective coating by Unisearch states that their protective coating must have concrete cover.</li> </ul>
<p><b><u>AS3600 – 2009 Section 5</u></b> <b><u>AFS Logic Wall Fire Compliance</u></b></p> <p>AS3600 requires:</p> <ul style="list-style-type: none"> <li>• Minimum concrete cover over metallic embedments and reinforcing bars.</li> <li>• Concrete must be free of excessive air voids.</li> </ul> <p><a href="#"><u>(Download) AFS Logic Wall Structural Engineering Assessment, Pages 12 to 16</u></a></p>	<p>AFS Logic Wall has no concrete cover over the metal ‘C’ sections.</p> <ul style="list-style-type: none"> <li>• Concrete cover over metallic components / reinforcing bars is required to act as an insulator to reduce/eliminate concrete spalling. Excessive spalling during a fire event, particularly under heavy loads can cause catastrophic fire failure.</li> <li>• Excessive air voids mean reduction in concrete thickness. <ul style="list-style-type: none"> <li>➢ Smoke/heat passing through the fire wall.</li> <li>➢ Can result with catastrophic structural failure.</li> </ul> </li> </ul>

**Common misunderstandings by the majority of certifiers and some engineers are as follows:**

- (i) FRL means structural/adequacy/integrity Fire Resistance Level during a fire event. For example, for a structural concrete wall, FRL of 90/90/90 is required for a Type “A” Class 2 Building. The fire resistance levels for the “Deemed to Satisfy” condition are determined in accordance with AS3600 – 2009, Concrete Structures Code.

**Insulation:** AS3600 – Table 5.7.1 – FRL = 90 minutes; minimum concrete thickness of 100mm is required.

**Integrity:** If both insulation and structural adequacy is satisfied, AS3600 state that this condition is satisfied as well.

**Structural Adequacy:** This FRL level is NO LONGER determined by the concrete thickness alone.

The FRL for structural adequacy must be calculated by design engineers, including wall thickness, wall height, load on the wall, loading eccentricity on the wall and concrete grade. AS3600 – 2009 has adopted a less sophisticated EuroCode method in Table 5.7.2 AS3600 – 2009. Clause 5.3 also allows engineers to use a sophisticated EuroCode methodology called the Zone Method (this is available to all Australian structural engineers from Dincel & Associates Consulting Engineers) to be used for the “deemed to satisfy” conditions which is not applicable to the Alternative Solution.

- (ii) AFS Logic Wall does not comply with the “Deemed to Satisfy” condition. If AFS Logic Wall qualifies for the Alternative Solution, it cannot be designed and certified in accordance with AS3600 – 2009. The Alternative Solution for concrete walls can only be determined in accordance with test requirements stated in AS3600 – 2009, Clause B2.3.

The AFS Logic Wall’s certification by Unisearch, UNSW states that Dulux Acratex can be used as a protective coating (Note: Any system that relies on the protective coating CANNOT COMPLY with AS3600 – it can only be treated as an alternative solution). [\(Download\) Dulux Protective Coating Technical Document No: 1:3:8](#). Dulux own document states that their product cannot be used as a protective coating without concrete cover.

COMPLIANCE	ISSUE
<p><b><u>Structural Certification</u></b></p> <ul style="list-style-type: none"> <li>Provide the STRUCTURAL ENGINEERING CERTIFICATE (for the abovementioned durability and fire issues) which is appended at the last page of this document.</li> </ul>	<p>WHAT DOES THE CERTIFIER REQUIRE TO AVOID LIABILITY FOR DURABILITY AND FIRE ISSUES?</p>
<p><b><u>Insurance</u></b></p> <ul style="list-style-type: none"> <li>Insurance companies no longer offer insurance for Mould/Mildew.</li> <li>Thermal Bridging/Condensation.</li> <li>All professionals to check your insurance policy. Refer page 3 of the document titled <b>Leaky Buildings – Fibre Cement Sheet Suitability</b> <a href="https://www.dincelandassociates.com/theme_danda/static/production/documents/leaky-buildings-fibre-cement-sheet-suitability.pdf">https://www.dincelandassociates.com/theme_danda/static/production/documents/leaky-buildings-fibre-cement-sheet-suitability.pdf</a></li> </ul>	<ul style="list-style-type: none"> <li>Fibre cement sheets (due to the presence of organic fibres) are known to promote MOULD/MILDEW.</li> <li>Metal ‘C’ sections linking both faces of a concrete façade wall causes thermal bridging which is a known reason for condensation/mould/mildew.</li> <li>Commercial paints/renders are not acceptable “Protective coatings”.</li> <li>All façade walls made out of porous nature materials must have cavity construction unless the walls are “waterproof”.</li> </ul>
<p><b><u>Construction Safety</u></b></p> <p>Refer for information (read) <b>Construction Safety</b>. <a href="https://www.dincelandassociates.com/theme_danda/static/production/documents/leaky-buildings-fibre-cement-sheet-suitability.pdf">https://www.dincelandassociates.com/theme_danda/static/production/documents/leaky-buildings-fibre-cement-sheet-suitability.pdf</a></p>	<p><b><u>Liability</u></b></p> <ul style="list-style-type: none"> <li>AFS Logic Wall forms weigh 33kgs/m<sup>2</sup> which is equal to 118kgs for 3m x 1.2m typical panel.</li> <li>There is a legal limit for lifting depending on the lifting weight, height and repetition. This can be as low as 14kgs.</li> <li>Builders/Construction Managers shall be held responsible as per the Workers Health and Safety Act 2011 if they allow each labourer to lift more than 27 kg (less for repetitious load lifting).</li> </ul>

COMPLIANCE	ISSUE
<p><b><u>Delamination of Glued Fibre-Cement Sheets in a Fire Event</u></b></p> <ul style="list-style-type: none"> <li>• BCA Specification C1.1, Clause 2.4 (a) (i) and (ii) must be considered.</li> </ul> <p><b><u>(Download) AFS Logic Wall Structural Engineering Assessment – Page 7</u></b></p>	<ul style="list-style-type: none"> <li>• The AFS Wall testing carried out by CSIRO states that delamination of fibre-cement sheets occur within 15 minutes.</li> <li>• This represents a potential problem for fire fighters responding to a fire (statistically within 20 minutes) or by passers-by as the delaminated façade sheets can become airborne and travel significant distances.</li> <li>• This potential problem is conventionally addressed by having mechanical fixing (rather than gluing) in the case of façade elements such as tiles, stones, etc.</li> </ul>
<p><b><u>Environment</u></b></p> <ul style="list-style-type: none"> <li>• CO<sub>2</sub> Production.</li> <li>• Thermal Bridging/Condensation.</li> <li>• Ongoing maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>• AFS Wall's extensive use of metal frames represents high <b>embodied energy usage</b>. This does not agree with sustainability principles of the Green Society.</li> <li>• Metal 'C' sections linking both faces of a concrete façade wall causes <b>thermal bridging</b> which is a known reason for condensation/mould/mildew.</li> <li>• The Unisearch, UNSW Report dated 5<sup>th</sup> May 2014 requires ongoing maintenance which must be provided for 50 years, +/- 20% in accordance with AS3600 structural life requirement. This means that for 60 years all AFS Logic Wall buildings must be re-coated in 7 to 10 years intervals (i.e. minimum 6 times re-coating). <b>There is no Australian legislative requirement to enforce building owners to have an ongoing maintenance program.</b> This suggestion of ongoing maintenance is against AS3600 as well as the Green-Sustainability principles.</li> </ul>
<p><b><u>Acoustic Compliance</u></b></p> <ul style="list-style-type: none"> <li>• 150mm thick SOLID concrete walls are accepted to comply with the "deemed to satisfy" condition for airborne sound.</li> <li>• 150mm thick solid concrete walls with finishes, paint, render or plasterboard with screed gluing comply with the acoustic definition of the "deemed to satisfy" condition.</li> <li>• Test results show that 150mm thick solid concrete walls only provide <math>R_w + C_{tr} = 47\text{dB}</math> which is less than the requirement of 50 dB of the BCA. The 47dB will be further reduced if daub glued plasterboard finishes are used.</li> </ul>	<ul style="list-style-type: none"> <li>• Ask an Acoustic Certifier if AFS Logic Wall would comply with the "deemed to satisfy" condition if clad with plasterboard on daub glues.</li> <li>• AFS Logic Wall would not comply with Acoustic requirements of the BCA when air voids exist as shown in Photo No: 1 and page 7 of <b><u>(download) AFS Logic Wall Structural Engineering Assessment.</u></b></li> </ul>

**WHEN CONSIDERING THE USE OF AFS LOGIC WALL THE FOLLOWING SAMPLE STRUCTURAL  
ENGINEERING CERTIFICATE SHOULD BE REQUIRED BY CERTIFIERS WHO ASK FOR AS3600 – 2009  
COMPLIANCE**

**Certifying (Company Letterhead)**

(Date)

(Client's Name)

(Client's Company)

(Client's Address)

Dear Sir

RE: (Project Title)

AT: (Project Address)

**CERTIFICATE OF DESIGN – STRUCTURAL FOR AFS WALL SYSTEM**

Pursuant to the provisions of Clause A2.2 of the current Building Code of Australia (BCA) and the Worker Health and Safety Act 2011, I hereby certify that the above design is in accordance with normal engineering practice and meets the requirements of the Building Code of Australia, Part 7 of the Environmental Planning and Assessment Regulations, relevant Australian Standards and relevant conditions of Development Consent. In particular the design is in accordance with the following:

- (1) B.C.A. Part B1 – Structural Provisions.
- (2) AFS Logic Wall does not comply with the “deemed to satisfy” provision of AS3600 – 2009, i.e. concrete cover over the metal ‘C’ sections is required to be able to comply with the “deemed to satisfy” conditions. Protective coatings cannot be relied upon without concrete cover.
- (3) AFS Logic Wall can be considered as an Alternative Solution provided the conditions given in AS3600 – Appendix B which requires:
  - (i) Durability testing for a period of 50 years, +/- 20% = 60 years.
  - (ii) The Fire Resistance Level determination test for AFS Logic Wall for the design applied loads, load eccentricities, wall height, wall thickness and concrete (commercially available – not purpose design concrete) strength. AFS Logic Wall as an Alternative Solution cannot be used above and beyond the Fire Resistance Level Test Limitations.

As Structural Engineers for the above referenced project, I have reviewed the testing and certification provided for the AFS Logic Wall and certify that:

- AFS Logic Wall is structurally adequate to satisfy the Durability requirements for a design life of 50 years, +/- 20%.
- AFS Logic Wall will not be loaded in excess of the Fire Resistance Level test limitation (including load, height, thickness and eccentricity).

I am an appropriately qualified and competent person in this area and as such can certify that the design and performance of the AFS Wall system complies with the above and which are detailed on the following drawings, Nos:.....

I possess indemnity insurance to the satisfaction of the building owner or my principal.

Full Name of Designer:

Qualifications:

Company:

Address of Company:

Yours faithfully

(Company Name)

(Certifying Person's Signature)

(Certifying Person's Name)