

BCA / NCC Evidence of Suitability Acoustic Performance

Company Description

AFS Systems Pty Ltd, 2/34-38 Anzac Ave, Smeaton Grange

Product

AFS Logic Wall AFS162

Evidence of Suitability Number

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**This firm is a member of the Association of Australian Acoustical Consultants.
The work reported herein has been carried out in accordance with the terms of membership. We stress that the advice given herein is for acoustic purposes only, and that the relevant authorities should be consulted with regard to compliance with regulations governing areas other than acoustics.**

1 CLIENT

AFS Systems Pty Ltd, 2/34-38 Anzac Ave Smeaton Grange NSW 2567, Australia

2 PRODUCT FOR CERTIFICATION

AFS Logic Wall AFS162

3 PRODUCT DESCRIPTION

The AFS Logic Wall consists of lightweight sandwich panels created by bonding hard wearing fibre cement sheets to galvanized steel stud frames. The panels are quickly and simply hand erected on site and then core filled with concrete. The joints between the panels are then set, leaving the wall ready for applied finishes. The Logic Wall system is an advancement on the previous AFS wall system. The improvements include:

- Reinforced Fibre Cement Board – stronger, lighter, more durable and water resistant
- Polyurethane Adhesive System – universally renowned for product reliability
- Large oval holes in the steel studs enabling excellent concrete flow & compaction
- Glueless Site Joiner System creating a faster and cleaner site installation process

The sandwich panel is shown below.



4 CLIENT REQUEST

AFS Systems installed a basic AFS162 Wall for acoustic testing at the CSIRO Acoustic Laboratories, Highett, Victoria. The tests carried out in July 2006 were of the following configurations;

AFS162 Wall

Results **Rw 52**
Ctr -5
Rw + Ctr 47

AFS162 Wall complete with 29mm furring channels supported by resilient mounts. The furring channels were sheeted with 10mm CSR Gyprock Soundchek. A polyester insulation, Tontine TSB2 was included in the cavity.

Results **Rw 62**
Ctr -10
Rw + Ctr 52

AFS162 Wall with a 20mm gap to a 64mm 0.5 steel stud which was sheeted with 10mm CSR Gyprock Soundchek. The cavity included polyester insulation 75mm thick Tontine TSB4.

Results **Rw 64**
Ctr -8
Rw + Ctr 56

The acoustic performance of the AFS 162 Wall only achieved Rw 52 with a Ctr rating of -5 making a total of Rw + Ctr of 47. In principle this did not comply with the requirements of the BCA although the *Deemed-to-Satisfy* provisions for the wall construction type concrete allowed a 150mm thick concrete panel as being a *Deemed-To-Satisfy* construction.

The remaining AFS wall configurations tested all complied with the *Deemed-To-Satisfy* provisions.

The less than satisfactory performance of the standard AFS162 Wall has had a negative influence on potential sales of that wall system. The initial request was how could the AFS162 Wall be improved to comply with the BCA or was retesting at another acoustic laboratory an option.

An investigation was carried out of the performance of the standard AFS162 Wall which was compared to tests carried out elsewhere. The results of these investigations are mainly discussed in Part B of this document however a summary of the outcome is included in this document in Part 7 The Suitability Statement.

5 ACTION TAKEN BY PKA ACOUSTIC CONSULTING IN PREPARING THIS CERTIFICATION

It was also noted that a standard 150mm concrete panel tested at CSIRO Highett had a low acoustic performance and basically had an identical performance to that of the AFS162 Panel.

The AFS162 Logicwall Panel with a measured acoustic performance of R_w 52 plus a C_{tr} rating of -5 making a $R_w + C_{tr}$ of 47. The anticipated field measurements would be in the order of $D_{ntw} + C_{tr}$ of 44 which is below the verification condition required by the BCA. Various field tests that were carried out on a number of projects over at least a three year period by

Acoustic Logic Consultancy
PKA Acoustic Consulting
SLR Acoustic Engineers
Vipac Scientists

which clearly showed higher results than that predicted from the CSIRO Highett Acoustic Laboratory testing. The results were in the range of $D_{ntw} + C_{tr}$ 46 to 49 which were in excess of the $D_{ntw} + C_{tr}$ of 44 predicted by the laboratory measurements. These walls complied with the Verification Clause of the BCA.

It was clear that the CSIRO Highett Acoustic Laboratory appeared to be giving lower results when data from field measurements were compared. Intensive research was then carried out by PKA Acoustic Consulting of acoustic testing of 150mm concrete panels on a world-wide basis. The investigation is discussed in Part B of this document. The investigation found that the measured results at CSIRO Highett for the frequency range of 100 to 500 Hz were below the average for elsewhere. It was clear that the AFS162 Wall Panel was capable of a higher performance than that indicated by the CSIRO Highett Acoustic Laboratory measurements.

The investigation and its results will be the subject of a Paper to be presented at the 2015 Conference of the Australian Acoustical Society.

CSIRO Highett Acoustic Laboratories have been advised of our investigations and conclusions.

6 RELEVANT APPLICABLE SECTION OF THE BCA / NCC

The relevant Sections are:

Part F5 Sound Transmission and Insulation – Deemed to Satisfy Provisions

F5.5 Sound Insulation of Walls

(a) A wall in a Class 2 or 3 building must-

- (i) Have a $R_w + C_{tr}$ (airborne) not less than 50, if it separates sole-occupancy units; and
- (ii) Have a R_w (airborne) not less than 50, if it separates a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or different parts of a different classification; and
- (iii) Comply with F5.3(b) if it separates:
 - (A) A bathroom, sanitary compartment, laundry or kitchen in one sole-occupancy unit from a habitable room (other than a kitchen) in an adjoining unit; or
 - (B) A sole-occupancy unit from a plant or lift shaft

VERIFICATION METHODS

FV5.2

Compliance with FP5.2(a) and FP5.3 to avoid the transmission of airborne sound through walls is verified when it is measured in-situ that-

- (a) A wall separating sole-occupancy units has a weighted standardised level difference with spectrum adaptation term ($D_{ntw} + C_{tr}$) not less than 45 when determined under AS/NZS 1276.1 or ISO 717.1 ; or
- (b) A wall separating a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification, has a weighted standardised level difference (D_{ntw}) not less than 45 when determined under AS/NZS 1276.1 or ISO 717.1

7 SUITABILITY STATEMENT

AFS 162 WALL SYSTEM**Principally used as a dividing wall between apartments**

It is assessed as having the following acoustic performance based on our research.

Rw 55-56
Ctr -5
Rw + Ctr 50-51

This complies with Part F5.5 of the BCA /NCC and also complies with FV5.2.

AFS162 Wall complete with 29mm furring channels supported by resilient mounts. The furring channels were sheeted with 10mm CSR Gyprock Soundchek. A polyester insulation, Tontine TSB2 was included in the cavity.

Results **Rw 62**
Ctr -10
Rw + Ctr 52

This satisfies the use as a dividing wall between apartments with the cavity behind the plasterboard wall suitable for the running of electrical or communication services.

These are measured results covered by CSIRO Report TL463(b).

AFS162 Wall with a 20mm gap to a 64mm 0.5 steel stud which was sheeted with 10mm CSR Gyprock Soundchek. The cavity included polyester insulation 75mm thick Tontine TSB4.

Results **Rw 64**
Ctr -8
Rw + Ctr 56

This satisfies the use as a dividing wall between a wet area and a habitable area, the system is considered to be a *discontinuous construction*.

These are measured results covered by CSIRO Report TL463(c).

8 BCA / NCC INFORMATION ON WHICH THE EVIDENCE OF SUITABILITY IS BASED

The research carried out of laboratory and field testing is extensive and for convenience a separate document which is Part B of this Evidence of Suitability has been prepared.

9 CONDITIONS

- This Certification above refers to acoustic measurements carried out in an acoustic laboratory together with predictions based on those measurements. The expected laboratory and/or field performances relate to the nominated products or systems in this document
- The product or system must be constructed and installed according to the material manufacturer's instructions for acoustic-rated construction and be installed with good workmanship.
- No allowance is made for sound flanking that may occur in a field installation. With appropriate design, good workmanship and attention to detail, and ideal site conditions, Field $D_{n,tw}$ performance can be broadly comparable to laboratory performance.
- This Certification is only valid for a period of 5 Years from the date of issue.
- Any changes to the construction of the material(s) used in the product or the system(s) can invalidate this assessment. If changes are made then they should be checked for compliance.
- The Certification is on the acoustic performance only, and that relevant authorities should be consulted in regards to the aspects of structural, fire, durability and all other areas of the products' or systems' performance.

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