ACOUSTIC PERFORMANCE ASSESSMENT

Company Name

AFS Systems Pty Ltd

Product Name

AFS LogicWall NZ STC

ID: PKA-A144

20 August 2019

Prepared For:
AFS Systems Pty Ltd

2/34 Anzac Avenue,
Smeaton Grange NSW 2567

Email: josh.hamilton@afswall.co.nz

DOCUMENT INFORMATION

Author: Joel Parry-Jones

ID: PKA-A144

Version: 4

Date	Version	To	Email
20/08/2019	4	Josh Hamilton	josh.hamilton@afswall.co.nz

Prepared By:
PJ Knowland Pty. Ltd.
t/a PKA Acoustic Consulting

PO Box 345, Lane Cove NSW 1595

ABN 87 256 407 546, ACN 621 896 204

T (02) 9460 6824 · **E** admin@pka.com.au

CONTENTS

1.0 CLIENT REQUEST 4

2.0 NZ BUILDING CODE SOUND INSULATION 4

3.0 PRODUCT FOR ASSESSMENT 5

3.1 Product Installation Notes 5

4.0 ACOUSTIC ASSESSMENT 6

4.1 AFS LogicWall – Bare or Direct Fixed Plasterboard 6

4.2 AFS LogicWall – Furring Channel One Side, Standard Plasterboard 7

4.3 AFS LogicWall – Furring Channel One Side, Sound-Rated Plasterboard 8

4.4 AFS LogicWall – Resilient Channel One Side, Sound-Rated Plasterboard 9

4.5 AFS LogicWall – Furring Channels Both Sides, Standard Plasterboard 10

4.6 AFS LogicWall – Furring Channels Both Sides, Fire-Rated Plasterboard 11

5.0 ASSESSMENT INFORMATION 12

6.0 COMPLIANT MATERIAL OPTIONS 12

7.0 CONDITIONS OF ASSESSMENT 13

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.

1.0 CLIENT REQUEST

PKA Acoustic Consulting (PKA) has been commissioned by AFS Systems to predict the acoustic performance of various AFS LogicWalls.

The relevant sound insulation requirements are contained in New Zealand's Building Code Clause G6 Airborne and Impact Sound Insulation requirements.

This assessment is an updated version of PKA-A144 acoustic assessment prepared by PKA [Ref: 215 020, dated 2017-05-04].

2.0 NZ BUILDING CODE SOUND INSULATION

New Zealand's Building Code (NZBC) Clause G6 Airborne and Impact Sound provisions, from Building Regulation 1992 states the following with regards to common walls between occupancies:

G6.1 Objective

"The objective of this provision is to safeguard people from illness or loss of amenity as a result of undue noise being transmitted between abutting occupancies."

G6.2 Functional Requirement

"Building elements which are common between occupancies, shall be constructed to prevent undue noise transmission from other occupancies or common spaces to the habitable spaces of household units."

G6.3.1 Performance

"The Sound Transmission Class (STC) of walls, floors and ceiling, shall be no less than 55."

The NZBC's airborne sound insulation requirements can be summarised as follows:

NZBC G6 Airborne Sound	Sound Transmission Class
Walls separating occupancies	STC ≥ 55
Walls separating occupancies and common spaces	STC ≥ 55

3.0 PRODUCT FOR ASSESSMENT

The AFS Designer LogicWall brochure states the following regarding the product under assessment:

> *The AFS LogicWall is a permanent formwork system for concrete walling for external and internal walls. It consists of lightweight sandwich panels created by bonding hard-wearing fibre cement sheets to galvanised steel stud frames. … The fibre cement sheeting remains in place as sacrificial formwork.*

The AFS LogicWall product types are as follows:

Product	Overall Thickness	Concrete Thickness	Filled Wall Mass	Example Graphic
AFS120	120mm	108mm	290kg/m^2	
AFS150	150mm	136mm	360kg/m^2	
AFS162	162mm	150mm	394kg/m^2	
AFS200	200mm	188mm	480kg/m^2	
AFS200D	200mm	188mm	480kg/m^2	
AFS262D	262mm	250mm	630kg/m^2	

The AFS LogicWall's permanent formwork consists of a 6mm fibre cement sheeting either side. The AFS wall systems can incorporate furring channels to allow the installation of concealed services such as electrical and hydraulic. Various configurations are provided in our acoustic assessment.

3.1 Product Installation Notes

If direct fixed plasterboard is applied, the linings must be in continuous contact with the LogicWall. This can be achieved using a notched applicator with continuous glue (e.g. comb screed) to the entire sheet or wall. This installation method is suitable for any plasterboard type, such as min. 10mm standard or lightweight plasterboard.

Daub fixing of plasterboard is not acoustically acceptable as it results in small air cavities which create undesirable mass-air-mass resonances, significantly degrading the acoustic performance of the AFS system.

4.0 ACOUSTIC ASSESSMENT

4.1 AFS LogicWall – Bare or Direct Fixed Plasterboard

Lining Side 1	No plasterboard or plasterboard direct fixed (not daub fixed) as per Section 3.1 installation notes
Core	AFS LogicWall system as per table below
Lining Side 2	No plasterboard or plasterboard direct fixed (not daub fixed) as per Section 3.1 installation notes

Product	Minimum Thickness	Sound Transmission Class STC	Complies with NZBC STC ≥ 55?
AFS120	120mm	50	No
AFS150	150mm	54	No
AFS162	162mm	55	Yes
AFS200	200mm	58	Yes
AFS200D	200mm	58	Yes
AFS262D	262mm	62	Yes

4.2 AFS LogicWall – Furring Channel One Side, Standard Plasterboard

Lining Side 1	min. 13mm standard plasterboard (min. 8.4kg/m^2)
Cavity Side 1	min. 28mm cavity consisting of: - 28mm furring channels (cc 600mm) - min. 50mm glasswool or polyester (min. 7kg/m^3) insulation
Core	AFS LogicWall system as per table below
Lining Side 2	No plasterboard or plasterboard direct fixed (not daub fixed) as per Section 3.1 installation notes

Product	Minimum Thickness	Sound Transmission Class STC	Complies with NZBC STC ≥ 55?
AFS120	161mm	58	Yes
AFS150	191mm	58	Yes
AFS162	203mm	58	Yes
AFS200	241mm	59	Yes
AFS200D	241mm	59	Yes
AFS262D	303mm	62	Yes

4.3 AFS LogicWall – Furring Channel One Side, Sound-Rated Plasterboard

Lining Side 1	min. 13mm sound-rated plasterboard (min. 12.4kg/m^2)
Cavity Side 1	min. 28mm cavity consisting of: - 28mm furring channels (cc 600mm) - min. 50mm glasswool or polyester (min. 7kg/m^3) insulation
Core	AFS LogicWall system as per table below
Lining Side 2	No plasterboard or plasterboard direct fixed (not daub fixed) as per Section 3.1 installation notes

Product	Minimum Thickness	Sound Transmission Class STC	Complies with NZBC STC ≥ 55?
AFS150	191mm	59	Yes
AFS162	203mm	60	Yes
AFS200	241mm	61	Yes

Lining Side 1	min. 2 x 13mm sound-rated plasterboard (min. 12.4kg/m^2, min. total 24.8kg/m^2)
Cavity Side 1	min. 28mm cavity consisting of: - 28mm furring channels (cc 600mm) - min. 50mm glasswool or polyester (min. 7kg/m^3) insulation
Core	AFS LogicWall system as per table below
Lining Side 2	No plasterboard or plasterboard direct fixed (not daub fixed) as per Section 3.1 installation notes

Product	Minimum Thickness	Sound Transmission Class STC	Complies with NZBC STC ≥ 55?
AFS150	204mm	61	Yes
AFS162	216mm	62	Yes
AFS200	254mm	64	Yes

4.4 AFS LogicWall – Resilient Channel One Side, Sound-Rated Plasterboard

Lining Side 1	min. 2 x 13mm sound-rated plasterboard (min. 12.4kg/m^2, min. total 24.8kg/m^2)
Cavity Side 1	min. 28mm cavity consisting of: - 28mm furring channels (cc 600mm) clipped to - Rondo STWC resilient mounts screw-fixed to LogicWall - min. 50mm glasswool or polyester (min. 7kg/m^3) insulation
Core	AFS LogicWall system as per table below
Lining Side 2	No plasterboard or plasterboard direct fixed (not daub fixed) as per Section 3.1 installation notes

Product	Minimum Thickness	Sound Transmission Class STC	Complies with NZBC STC ≥ 55?
AFS150	221mm	66	Yes
AFS162	233mm	67	Yes
AFS200	271mm	69	Yes

4.5 AFS LogicWall – Furring Channels Both Sides, Standard Plasterboard

Lining Side 1	min. 13mm standard plasterboard (min. 8.4kg/m^2)
Cavity Side 1	min. 50mm cavity consisting of: - 50mm furring channels (cc 600mm) - min. 50mm glasswool or polyester (min. 7kg/m^3) insulation
Core	AFS LogicWall system as per table below
Cavity Side 2	min. 50mm cavity consisting of: - 50mm furring channels (cc 600mm) - min. 50mm glasswool or polyester (min. 7kg/m^3) insulation
Lining Side 2	min. 13mm standard plasterboard (min. 8.4kg/m^2)

Product	Minimum Thickness	Sound Transmission Class STC	Complies with NZBC STC ≥ 55?
AFS120	246mm	66	Yes
AFS150	276mm	67	Yes
AFS162	288mm	68	Yes
AFS200	326mm	69	Yes
AFS200D	326mm	69	Yes
AFS262D	388mm	69	Yes

4.6 AFS LogicWall – Furring Channels Both Sides, Fire-Rated Plasterboard

Lining Side 1	min. 16mm fire-rated plasterboard (min. 12.4kg/m^2)
Cavity Side 1	min. 28mm cavity consisting of: - 28mm furring channels (cc 600mm) - min. 50mm glasswool or polyester (min. 7kg/m^3) insulation
Core	AFS LogicWall system as per table below
Cavity Side 2	min. 28mm cavity consisting of: - 28mm furring channels (cc 600mm) - min. 50mm glasswool or polyester (min. 7kg/m^3) insulation
Lining Side 2	min. 16mm fire-rated plasterboard (min. 12.4kg/m^2)

Product	Minimum Thickness	Sound Transmission Class STC	Complies with NZBC STC ≥ 55?
AFS120	208mm	62	Yes
AFS150	238mm	64	Yes
AFS162	250mm	64	Yes
AFS200	288mm	65	Yes
AFS200D	288mm	65	Yes
AFS262D	350mm	65	Yes

5.0 ASSESSMENT INFORMATION

This acoustic assessment is based on PKA's extensive experience calculating the acoustic properties of wall systems as well as the following sound transmission loss test data:

- CSIRO Acoustic Laboratories, Highett (VIC, Australia) test schedules TL463 and TL63 which include the AFS162 wall system with various linings, furring channels and resilient mounts, and separate studs configurations
- CSIRO Acoustic Laboratories, North Ryde (NSW, Australia) test schedules of generic concrete walls ranging from 95mm to 102mm thick
- In-situ (field) acoustic testing conducted by PKA Acoustic Consulting of AFS wall types in various NSW based projects.
- In-situ (field) acoustic testing conducted by other acoustic consulting firms in various NSW and VIC based projects.
- Inter-Laboratory Test of Sound Insulation Measurements on Heavy Walls (1999) - Schmitz, Meier, Raabe [Ref: 10.1260/1351010991501392]

6.0 COMPLIANT MATERIAL OPTIONS

The following tables provide acoustically compliant options that meet the properties listed in this assessment:

Table 6-1: Compliant Insulation Options

Insulation Type	CSR Insulation	Other Insulation
min. 50mm polyester (7kg/m^3)	50mm Martini MSB2	50mm Autex ASB2
min. glasswool (7kg/m^3)	50mm Bradford Acoustigard	50mm Fletcher Pink Partition Batts

Table 6-2: Compliant Lining Options

Lining Mass	CSR Gyprock Plasterboard	GIB Plasterboard
min. 8.4kg/m^2	13mm CSR Gyprock standard (8.5kg/m^2)	13mm GIB standard plasterboard (8.7kg/m^2)
	13mm CSR Gyprock Aquachek (9.8kg/m^2)	13mm GIB Aqualine plasterboard (10.2kg/m^2)
	10mm CSR Gyprock Soundchek (9.3kg/m^2)	10mm GIB Noiseline plasterboard (9.0kg/m^2)
min. 12.4kg/m^2	16mm CSR Gyprock Fyrchek (12.5kg/m^2)	16mm GIB Fyreline plasterboard (13.7kg/m^2)
	13mm CSR Gyprock Soundchek (13.0kg/m^2)	13mm GIB Noiseline plasterboard (12.4kg/m^2)

7.0 CONDITIONS OF ASSESSMENT

- This assessment refers to the expected acoustic laboratory performance of the wall system
- The wall system must be constructed and installed according to the manufacturer's instruction for acoustic-rated construction and be installed with good workmanship
- During installation care must be taken to ensure that the wall system is filled so that no air gaps exist at the periphery
- 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 FSTC performance can be broadly comparable to laboratory performance.
- Any changes to the wall construction or materials used can invalidate this assessment. If changes are made then they should be checked by a qualified acoustic consultant for compliance
- This assessment is for the acoustic performance only. Other relevant authorities should be consulted in regards to aspects of structural, fire, etc.
- This assessment is only valid for a period of 5 years from the date of issue

PO Box 345, Lane Cove 1595

+612 9460 6824 — admin@pka.com.au