MARSHALL DAY Acoustics

100 mm ACE-WALL PANEL ACOUSTIC OPINION

Rp 001 20230775 | 19 October 2023

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Project: **100 mm ACE-WALL PANEL**

Prepared for: **Ace Wall Group Pty Ltd**
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Report No.: **Rp 001 20230775**

Document Control

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1.0 INTRODUCTION

Ace Wall Group Pty Ltd has requested that Marshall Day Acoustics Pty Ltd (MDA) provide an opinion with regard to a newly developed wall panel '100 mm Ace-Wall Panel', hereafter referred to as 'the panel'.

We understand the panel is intended to be used as part of wall systems in the construction of service risers, corridors and inter-tenancy partitions within adjoining residential dwellings and apartments. As such it requires an acoustic opinion to establish if and how various panel wall systems can achieve the applicable acoustic rating for these uses.

Ace Wall Group has commissioned MDA to assess the panel in six different partition systems and predict its sound transmission loss performance.

This report provides the predicted sound transmission loss performance of the six proposed systems provided by the client and some additional recommended wall systems suitable for the above stated intended use. The predicted sound transmission loss performance of all partition systems has been calculated using MDA's sound insulation prediction software program INSUL.

Acoustic terminology used throughout this report is provided in Appendix A.

2.0 DESIGN CRITERIA

Inter-tenancy, corridor and riser partitions within adjoining residential dwellings / Sole-Occupancy Units (SOUs) are required by the National Construction Code (NCC) to achieve compliance with relevant acoustic criteria outlined in Part F7 of the Building Code of Australia (BCA).

Relevant acoustic requirements appliable to service risers and walls under BCA Part F7 has been summarised in Table 1.

Table 1: BCA Part F7 Acoustic Requirements

Building Element	Description	Acoustic Requirement	
		Impact	Airbourne
Services	A duct, soil, waste, water supply pipe and stormwater pipe located in a wall or floor cavity, serves or passes through more than one SOU if the adjacent room is a kitchen[(1)] or any other room.	-	$R_w + C_{tr} \geq 25$
	A duct, soil, waste, water supply pipe and stormwater pipe located in a wall or floor cavity, serves or passes through more than one SOU if the adjacent room is a habitable room, other than a kitchen[(1)].	-	$R_w + C_{tr} \geq 40$
Walls	Separating Sole Occupancy Units (SOUs).	-	$R_w + C_{tr} \geq 50$
	Separating a habitable room of a SOU from a bathroom, sanitary compartment, laundry, or kitchen in an adjacent sole occupancy unit.	Discontinuous Construction[(2)]	$R_w + C_{tr} \geq 50$
	Separating a SOU from a stairway, public corridor, public lobby or the like, or a part of a different classification.	-	$R_w \geq 50$
	Separating a sole occupancy unit from a plant room and lift shaft.	Discontinuous Construction[(2)]	$R_w \geq 50$

(1) If the kitchen is open to the living area, the $R_w + C_{tr} \geq 40$ criterion is applicable rather than the $R_w + C_{tr} \geq 25$ criterion.

(2) Discontinuous construction is defined such that walls are to have a minimum 20 mm gap between separate leaves. Cavity masonry walls are to have resilient wall ties or no wall ties. For other walls there are to be no mechanical linkages between wall leaves except at the wall periphery. A staggered stud wall is not deemed to be discontinuous.

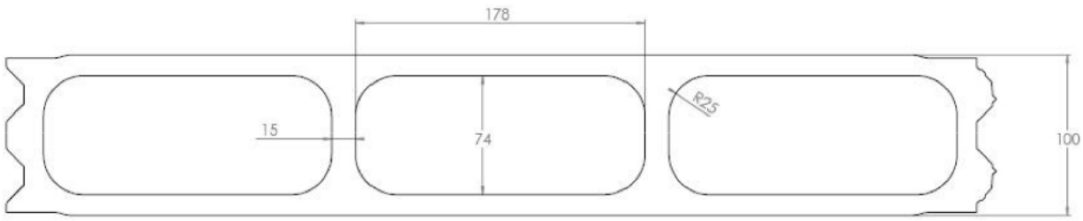
3.0 WALL DATA AND MATERIALS USED FOR ASSESSMENT

We understand the panel is:

- Made from glass re-enforced gypsum, achieve a density of 970 kg/m^3,
- Nominally 100 mm thick and 600 mm wide, with varying lengths available, 21.5 kg/m^2
- Assembled into a continuous partition by gluing together panels with cornice cement, sealing the tongue and groove joints on either side.

See Figure 1 for cross section schematic of the subject panel.

Figure 1: Detail of the 100 mm Ace-Wall Panel cross-section



The transmission loss performance of the above detailed panel was tested at the University of Adelaide's Acoustic Laboratory in 2013. Measurements and calculations were conducted in line with standards AS 1191 and ISO 717.1. The sound reduction index of the materials determined as part of this testing was:

$$R_w (C ; C_{tr}) = 35 (-1 ; -3) \text{ dB}$$

See Mech Test's acoustic report '*Weighted sound reduction index ($R_w + C_{tr}$) measurement of a 100 mm Ace-Wall panel*', Report No. MT-13-1143, dated October 2013 for further details on acoustic testing conducted.

4.0 METHODOLOGY

4.1 Sound transmission loss predictions

MDA have determined estimated sound transmission loss performance levels using established theoretical and empirical methods, in conjunction with reference to other test results of similar constructions.

Estimations are provided using our in-house and world-wide distributed software, INSUL. INSUL is a program for predicting the sound insulation of walls, floors, ceilings and windows. The program uses prediction theory and comparisons to actual constructions to provide realistic estimates of the sound insulation performance.

The performance estimates provided below are intended to be equivalent to the product performance under test in a laboratory environment to the following standards:

- ASTM E90 - Standard method for laboratory measurement of airborne sound transmission loss of building partitions
- ISO 140-3:1995 *Acoustics – Measurement of sound insulation in buildings and of building elements* and ISO 717-1:2004 *Acoustics – Rating of sound insulation in buildings and of building elements*.

The estimated sound insulation performance has been predicted based on our knowledge of acoustic test data for similar systems and proprietary sound insulation prediction software with a quoted accuracy of +/- 3 dB for single cavity-double panel systems. Therefore, proposed wall systems should aim to achieve minimum 3 points higher than the required/desired acoustic rating.

5.0 PREDICTED ACOUSTIC RATINGS

5.1 Client Supplied Wall Systems

MDA have predicted the sound reduction 1/3rd octave values for six panel wall systems provided by the client. The overall results, R_w ($C;C_{tr}$), for each wall system has been summarised in Table 2. See Appendix B for detailed results and modelled construction of each wall system.

Table 2: Client Supplied Wall System's Predicted Sound Transmission Loss

100 mm Ace-Wall Panel Wall System			
#	**Tag/Name**	**Construction**	**Predicted Acoustic Rating $R_w(C;C_{tr})$(1)**
01	AWIT 300	- 1 x 100 mm ACE-Wall Panel	R_w 36 $R_w + C_{tr}$ 33
02	AWIT 310PB	- 1 x 100 mm ACE-Wall Panel - 1 x 10 mm standard plasterboard	R_w 37 $R_w + C_{tr}$ 34
03	AWIT 513PB-16C	- 1 x 100 mm ACE-Wall Panel - 1 x 16 mm furring channel - No insulation in cavity - 1 x 13 mm standard plasterboard	R_w 43 $R_w + C_{tr}$ 37
04	AWIT 513F-28C-25I	- 1 x 100 mm ACE-Wall Panel - 1 x 28 mm furring channel - 1 x 50 mm 14 kg/m^3 glasswool insulation in cavity - 1 x 13 mm fire rated plasterboard	R_w 50 $R_w + C_{tr}$ 41
05	AWIT 413F-64S-90I	- 1 x 100 mm ACE-Wall Panel - 20 mm air gap - 1 x 64 mm steel stud - 1 x 75 mm 14 kg/m^3 glasswool insulation in cavity - 1 x 13 mm standard plasterboard	R_w 59 $R_w + C_{tr}$ 47
06	AWIT 200-50I	- 1 x 100 mm ACE-Wall Panel - 50 mm air gap - 1 x 50 mm 14 kg/m^3 glasswool insulation in cavity - 1 x 100 mm ACE-Wall Panel	R_w 63 $R_w + C_{tr}$ 55

(1) All predicted sound reduction index ratings are calculated using INSUL and have a ± 3 dB tolerance. Therefore, proposed wall systems should aim to achieve minimum 3 points higher than the required/desired acoustic rating.

The panel wall system's acoustic performance in Table 2 demonstrates the following wall types will be acoustically acceptable for each of the respective BCA nominated acoustic requirement:

- $R_w + C_{tr} \geq 25$ — All above wall types
- $R_w + C_{tr} \geq 40$ — AWIT 413F-64S-90I & AWIT 200-50I
- $R_w \geq 50$ — AWIT 413F-64S-90I & AWIT 200-50I
- $R_w \geq 50$ + Discontinuous — AWIT 413F-64S-90I & AWIT 200-50I
- $R_w + C_{tr} \geq 50$ — AWIT 200-50I
- $R_w + C_{tr} \geq 50$ + Discontinuous — AWIT 200-50I

5.2 Recommended Wall Systems

In addition to assessing the acoustic performance of the provided wall types, a couple of additional wall systems have been developed and assessed with the aim or producing a set of recommended Ace-Wall Panel systems which would be acoustically acceptable for use as service riser, corridor and inter-tenancy partitions within adjoining residential dwellings / SOUs (I.e. wall systems that satisfy the relevant acoustic requirement nominated under Part F7 of the BCA).

Table 3: Recommended Wall System's Predicted Sound Transmission Loss

Ace-Wall Panel Wall System		Predicted Acoustic Rating[(1)]	Satisfied BCA Acoustic Requirement
#	Construction		
07	AWIT 300 System (Non-habitable Area Riser) - 1 x 100 mm ACE-Wall Panel	R_w 36 $R_w + C_{tr}$ 33	$R_w + C_{tr} \geq 25$
08	Recommended WT-01 (Habitable Area Riser) - 1 x 13 mm fire rated plasterboard - 1 x 100 mm ACE-Wall Panel - 1 x 64 mm CH steel stud - 1 x 50 mm 14 kg/m^3 glasswool insulation - 1 x 25mm shaft liner	R_w 51 $R_w + C_{tr}$ 45	$R_w + C_{tr} \geq 40$
09	Recommended WT-02 (SOU to Corridor) - 1 x 100 mm ACE-Wall Panel - 1 x 64 mm steel stud - 1 x 50 mm 14 kg/m^3 glasswool insulation - 1 x 13 mm standard plasterboard	R_w 55 $R_w + C_{tr}$ 43	$R_w \geq 50$
10	AWIT 413F-64S-90I System (SOU to Lift) - 1 x 100 mm ACE-Wall Panel - 20 mm air gap - 1 x 64 mm steel stud - 1 x 75 mm 14 kg/m^3 glasswool insulation - 1 x 13 mm standard plasterboard	R_w 59 $R_w + C_{tr}$ 47	$R_w \geq 50$ + Discontinuous
11,12	Recommended WT-03 (SOU to SOU)	R_w 63 $R_w + C_{tr}$ 54	$R_w + C_{tr} \geq 50$

Ace-Wall Panel Wall System		Predicted Acoustic Rating[1]	Satisfied BCA Acoustic Requirement
#	Construction		
	- 1 x 10 mm standard plasterboard - 1 x 100 mm ACE-Wall Panel - 20 mm air gap - 1 x 92 mm steel stud - 1 x 75 mm 14 kg/m^3 glasswool insulation - 1 x 13 mm fire rated plasterboard	R_w 63 $R_w + C_{tr}$ 54	$R_w + C_{tr} \geq 50$ + Discontinuous

(1) All predicted sound reduction index ratings are calculated using INSUL and have a ± 3 dB tolerance. Therefore, proposed wall systems should aim to achieve minimum 3 points higher than the required/desired acoustic rating.

6.0 CONCLUSION

The modelled sound transmission index for six proposed wall systems and recommended wall constructions containing the 100 mm Ace-Wall Panel are outlined in Section 5.1 and Section 5.2 of this report respectively. Detailed INSUL reports outlining specific modelled construction and 1/3rd octave data has also been included in Appendix B.

It is important to note that all predicted sound reduction index ratings are calculated using INSUL and have a ± 3 dB tolerance. Therefore, in our opinion, proposed wall systems should aim to achieve at least 3 points higher than the required/desired acoustic rating.

Please also note variations in project sites, surrounding materials and adjoining constructions can significantly reduce the acoustic rating achieved by any wall system. As such, we recommend an acoustic specialist be consulted during any/all project design phases to ensure project specific flanking paths, materials and layouts paired with the proposed wall construction can achieve the required Part F7 BCA verification criteria as an overall system.

APPENDIX A GLOSSARY OF TERMINOLOGY

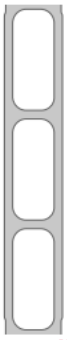
dB	Decibel. The unit of sound level.
Frequency	Sound can occur over a range of frequencies extending from the very low, such as the rumble of thunder, up to the very high such as the crash of cymbals. Sound is generally described over the frequency range from 63Hz to 4000Hz (4kHz). This is roughly equal to the range of frequencies on a piano.
Hertz (Hz)	Hertz is the unit of frequency. One hertz is one cycle per second. One thousand hertz is a kilohertz (kHz).
Octave band	Sound, which can occur over a range of frequencies, may be divided into octave bands for analysis. The audible frequency range is generally divided into 7 octave bands. The octave band frequencies are 63Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz and 4kHz.
Sound Insulation	When sound hits a surface, some of the sound energy travels through the material. 'Sound insulation' refers to ability of a material to stop sound travelling through it.
STC	Sound Transmission Class A single number system for quantifying the transmission loss through a building element. STC is based upon typical speech and domestic noises, and thus is most applicable to these areas. STC of a building element is measured in approved testing laboratories under ideal conditions.
Transmission Loss (TL)	The attenuation of sound pressure brought about by a building construction. Transmission loss is specified at each octave or third octave frequency band.
Sound Isolation	Complete acoustical separation between two spaces such that there is no sound transmitted from one to another.
R_w	Weighted Sound Reduction Index A single number rating of the sound insulation performance of a specific building element. Rw is measured in a laboratory. Rw is commonly used by manufacturers to describe the sound insulation performance of building elements such as plasterboard and concrete.
C_{tr}	A sound insulation adjustment, commonly used with Rw and $D_{nT,w}$. C_{tr} adjusts for low frequency noise, like noise from trucks and subwoofers. C_{tr} values typically range from about -4 to about -12. This term is used to provide information about the acoustic performance at different frequencies, as part of a single number rating system.

APPENDIX B INSUL RESULTS AND MODELLED CONSTRUCTIONS

Sound Insulation Prediction (v9.0.24)

Program copyright Marshall Day Acoustics 2017
Margin of error is generally within R_w +/- 3 dB
- Key No. 0004

Job Name: Ace Panel Acoustic Wall Systems
Job No: 20230775
Date: 17/10/2023
File Name: INSUL
Notes: Modelled results suggest the following wall system will be acoustically acceptable for use as a service riser partition in a non-habitable space where an acoustic rating of $R_w + C_{tr} \geq 25$ is required under Part F7 of the BCA.



AWIT 300 Wall System

Rw 36 dB
C -1 dB
Ctr -3 dB

Panel Size = 1.3 m x 1.6 m

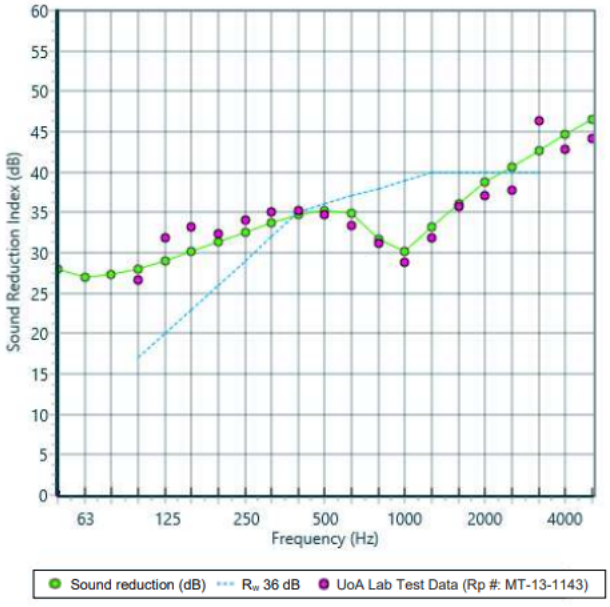
Partition surface mass = 96.0 kg/m²
Partition width = 100 mm

Mass-air-mass resonant frequency = N/A

System description

Panel 1 : 1 x 100 mm ACE Panel (unfilled)

freq.(Hz)	R(dB)	R(dB)
50	28	
63	27	27
80	27	
100	28	
125	29	29
160	30	
200	31	
250	33	32
315	34	
400	35	
500	35	35
630	35	
800	32	
1000	30	31
1250	33	
1600	36	
2000	39	38
2500	41	
3150	43	
4000	45	44
5000	47	



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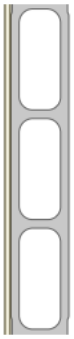


AWIT 310PB Wall System

Rw 37 dB
C -1 dB
Ctr -3 dB

Panel Size = 1.3 m x 1.6 m

Partition surface mass = 102.5 kg/m²

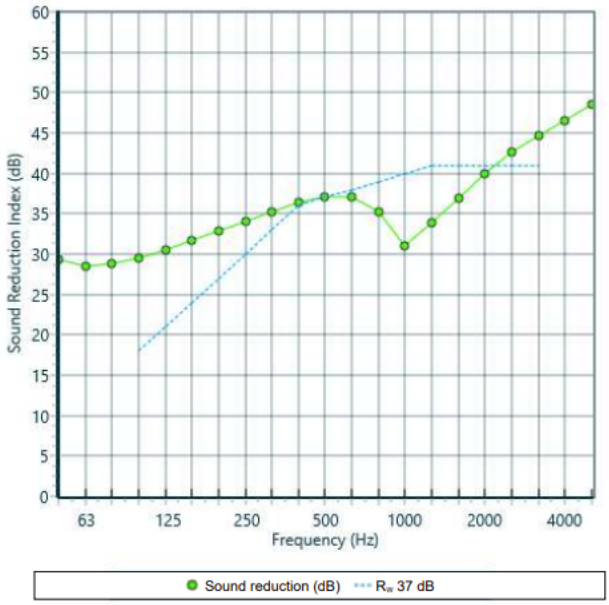
Partition width = 110 mm

Mass-air-mass resonant frequency = N/A

System description

Panel 1 : 1 x 10 mm CSR Gyprock standard plasterboard + 1 x 100 mm ACE Panel (unfilled)

freq.(Hz)	R(dB)	R(dB)
50	29	
63	28	29
80	29	
100	29	
125	30	30
160	32	
200	33	
250	34	34
315	35	
400	36	
500	37	37
630	37	
800	35	
1000	31	33
1250	34	
1600	37	
2000	40	39
2500	43	
3150	45	
4000	47	46
5000	49	



Sound Insulation Prediction (v9.0.24)

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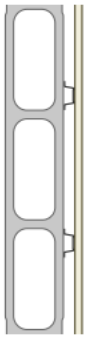
Notes: -

INSUL



AWIT 513PB-16C Wall System

Rw 43 dB
C -2 dB
Ctr -6 dB

Panel Size = 1.3 m x 1.6 m

Partition surface mass = 102.5 kg/m2

Partition width = 129 mm

Mass-air-mass resonant frequency = 178 Hz

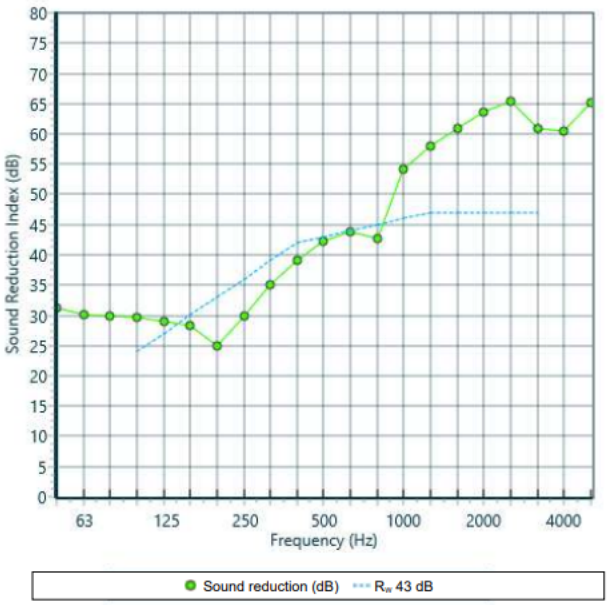
System description

Panel 1 : 1 x 100 mm ACE Panel (unfilled)

Frame : Furring Channel BMT 0.55 mm (16 mm x 36 mm), Stud spacing 600 mm, Cavity width 16 mm

Panel 2 : 1 x 13 mm CSR Gyprock standard plasterboard

freq.(Hz)	R(dB)	R(dB)
50	31	
63	30	30
80	30	
100	30	
125	29	29
160	28	
200	25	
250	30	28
315	35	
400	39	
500	42	41
630	44	
800	43	
1000	54	47
1250	58	
1600	61	
2000	64	63
2500	65	
3150	61	
4000	61	62
5000	65	



Sound Insulation Prediction (v9.0.24)

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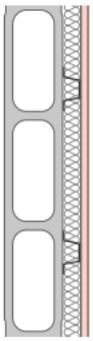
INSUL



AWIT 513F-28C-25I Wall System

Rw 50 dB
C -3 dB
Ctr -9 dB

Panel Size = 1.3 m x 1.6 m

Partition surface mass = 106.8 kg/m²

Partition width = 141 mm

Mass-air-mass resonant frequency = 108 Hz

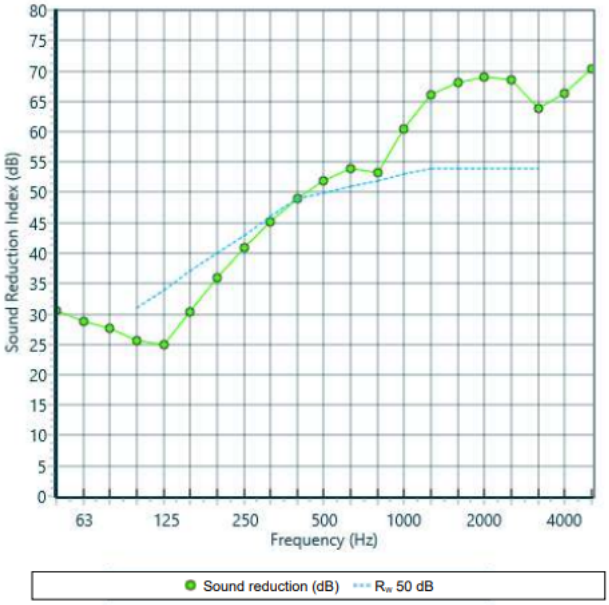
System description

Panel 1 : 1 x 100 mm ACE Panel (unfilled)

Frame : Furring Channel BMT 0.55 mm (28 mm x 36 mm), Stud spacing 600 mm, Cavity width 28 mm
1 x 50 mm Earthwool glasswool 14 kg/m³ Ultra Acoustic Wall Batt

Panel 2 : 1 x 13 mm CSR Gyprock Fyrchek plasterboard

freq.(Hz)	R(dB)	R(dB)
50	31	
63	29	29
80	28	
100	26	
125	25	26
160	30	
200	36	
250	41	39
315	45	
400	49	
500	52	51
630	54	
800	53	
1000	60	57
1250	66	
1600	68	
2000	69	69
2500	68	
3150	64	
4000	66	66
5000	70	



Sound Insulation Prediction (v9.0.24)

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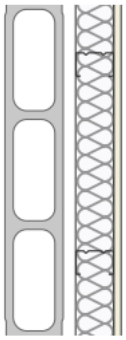
- Key No. 0004

Job Name: Ace Panel Acoustic Wall Systems
Job No: 20230775
Date: 17/10/2023
File Name: INSUL
Notes: Modelled results suggest the following wall system will be acoustically acceptable for use between a lift shaft or plant room and SOU where an acoustic rating of $R_w \geq 50$ + Discontinuous Construction is required under Part F7 of the BCA.



AWIT 413PB-64S-90I Wall System

Rw 59 dB
C -4 dB
Ctr -12 dB

Panel Size = 1.3 m x 1.6 m

Partition surface mass = 105.7 kg/m²

Partition width = 197 mm

Mass-air-mass resonant frequency = 67 Hz

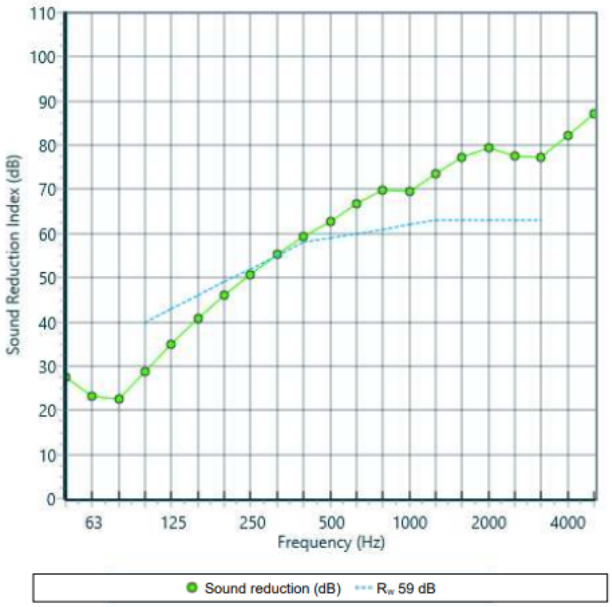
System description

Panel 1 : 1 x 100 mm ACE Panel (unfilled)

Frame : 1 x 64mm Steel stud BMT 0.55 mm + 20 mm air gap, Stud spacing 600 mm, Cavity width 84 mm
1 x 75 mm Earthwool glasswool 14 kg/m³ Ultra Acoustic Wall Batt

Panel 2 : 1 x 13 mm CSR Gyprock standard plasterboard

freq.(Hz)	R(dB)	R(dB)
50	27	
63	23	24
80	23	
100	29	
125	35	32
160	41	
200	46	
250	51	49
315	55	
400	59	
500	63	62
630	67	
800	70	
1000	70	71
1250	74	
1600	77	
2000	79	78
2500	77	
3150	77	
4000	82	80
5000	87	



Sound Insulation Prediction (v9.0.24)

INSUL

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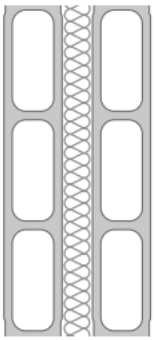
Date: 17/10/2023
File Name: INSUL
Notes: Modelled results suggest the following wall system will be acoustically acceptable for use as an inter-tenancy wall separating two SOUs where an acoustic rating of $R_w + C_{tr} \geq 50$ + Discontinuous Construction is required under Part F7 of the BCA.



AWIT 200-50I Wall System

Rw 63 dB
C -2 dB
Ctr -8 dB

Panel Size = 1.3 m x 1.6 m

Partition surface mass = 192.6 kg/m²

Partition width = 250 mm

Mass-air-mass resonant frequency = 54 Hz

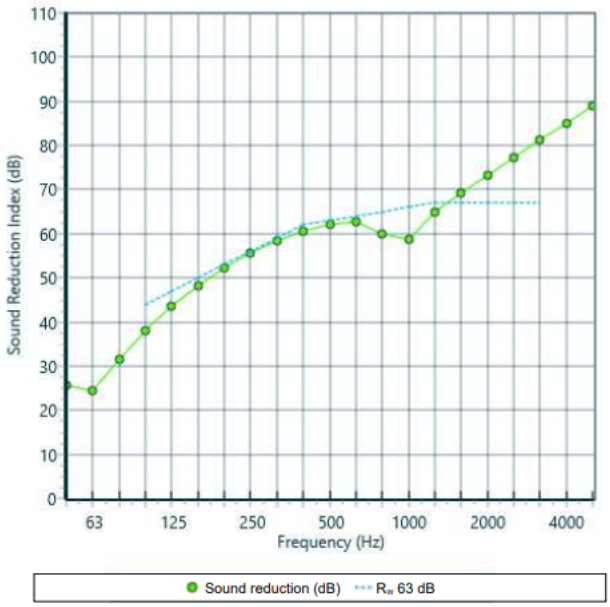
System description

Panel 1 : 1 x 100 mm ACE Panel (unfilled)

Frame : 50 mm Airgap, Cavity width 50 mm
1 x 50 mm Earthwool glasswool 14 kg/m³ Ultra Acoustic Wall Batt

Panel 2 : 1 x 100 mm ACE Panel (unfilled)

freq.(Hz)	R(dB)	R(dB)
50	26	
63	24	26
80	31	
100	38	
125	43	41
160	48	
200	52	
250	56	55
315	58	
400	61	
500	62	62
630	63	
800	60	
1000	59	61
1250	65	
1600	69	
2000	73	72
2500	77	
3150	81	
4000	85	84
5000	89	



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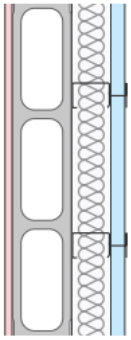
Notes: Modelled results suggest the following wall system will be acoustically acceptable for use as a service riser partition in a habitable space where an acoustic rating of $R_w + C_{tr} \geq 40$ is required under Part F7 of the BCA.



Recommended WT-01

Rw 51 dB
C -2 dB
Ctr -6 dB

Panel Size = 1.3 m x 1.6 m

Partition surface mass = 127.0 kg/m²

Partition width = 190 mm

Mass-air-mass resonant frequency = 54 Hz

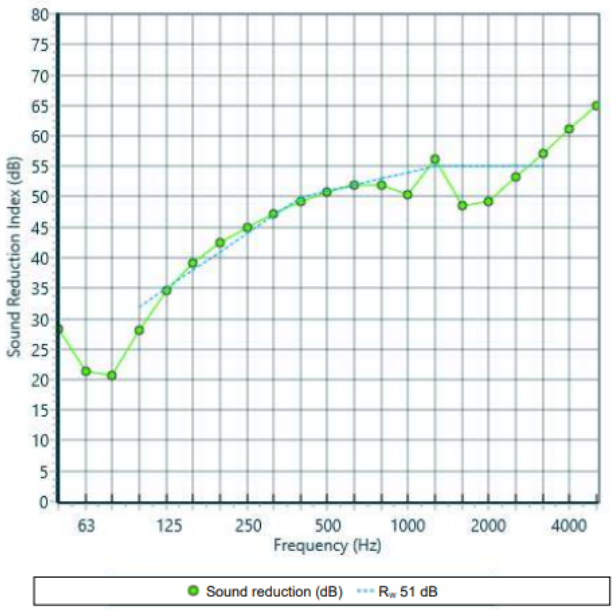
System description

Panel 1 : 1 x 13 mm CSR Gyprock Fyrchek plasterboard + 1 x 100 mm ACE Panel (unfilled)

Frame : 1 x 64mm CH stud BMT 0.55 mm, Stud spacing 600 mm, Cavity width 64 mm
1 x 50 mm Earthwool glasswool 14 kg/m³ Ultra Acoustic Wall Batt

Panel 2 : 1 x 25 mm CSR Gyprock Shaft Liner Panel

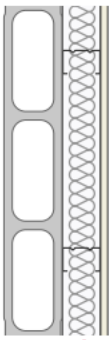
freq.(Hz)	R(dB)	R(dB)
50	28	
63	21	22
80	21	
100	28	
125	35	32
160	39	
200	42	
250	45	44
315	47	
400	49	
500	51	50
630	52	
800	52	
1000	50	52
1250	56	
1600	49	
2000	49	50
2500	53	
3150	57	
4000	61	60
5000	65	



Sound Insulation Prediction (v9.0.24)

Margin of error is generally within R_w +/- 3 dB
- Key No. 0004

Job Name: Ace Panel Acoustic Wall Systems
Job No: 20230775
Date: 17/10/2023
File Name: INSUL
Notes: -Modelled results suggest the following wall system will be acoustically acceptable for use as a corridor wall construction where an acoustic rating of $R_w \geq 50$ is required under Part F7 of the BCA.



Recommended WT-02

Rw 55 dB
C -5 dB
Ctr -12 dB

Panel Size = 1.3 m x 1.6 m

Partition surface mass = 105.2 kg/m^2

Partition width = 227 mm

Mass-air-mass resonant frequency = 77 Hz

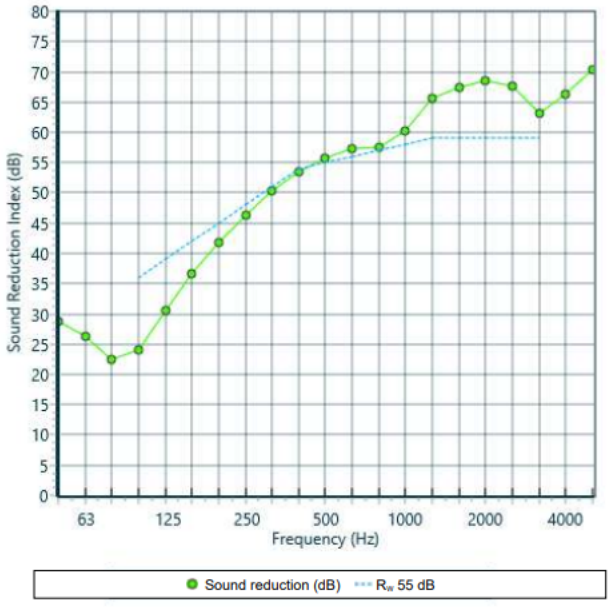
System description

Panel 1 : 1 x 100 mm ACE Panel (unfilled)

Frame : 1 x 64 mm Steel stud BMT 0.55 mm, Stud spacing 600 mm, Cavity width 64 mm
1 x 50 mm Earthwool glasswool 14 kg/m^3 Ultra Acoustic Wall Batt

Panel 2 : 1 x 13 mm CSR Gyprock standard plasterboard

freq.(Hz)	R(dB)	R(dB)
50	29	
63	26	25
80	22	
100	24	
125	30	28
160	37	
200	42	
250	46	45
315	50	
400	53	
500	56	55
630	57	
800	58	
1000	60	60
1250	66	
1600	68	
2000	69	68
2500	68	
3150	63	
4000	66	66
5000	70	

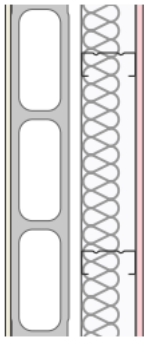


Sound Insulation Prediction (v9.0.24)

Margin of error is generally within R_w +/- 3 dB
- Key No. 0004

Job Name: Ace Panel Acoustic Wall Systems
Job No: 20230775
Date: 17/10/2023
File Name: INSUL
Notes: Modelled results suggest the following wall system will be acoustically acceptable for use as an inter-tenancy wall separating two SOUs where an acoustic rating of $R_w + C_{tr} \geq 50$ + Discontinuous Construction is required under Part F7 of the BCA.

INSUL



Recommended WT-03

Rw 65 dB
C -4 dB
Ctr -11 dB

Panel Size = 1.3 m x 1.6 m

Partition surface mass = 114.0 kg/m²

Partition width = 235 mm

Mass-air-mass resonant frequency = 52 Hz

System description

Panel 1 : 1 x 10 mm CSR Gyprock standard plasterboard + 1 x 100 mm ACE Panel (unfilled)

Frame : 1 x 92 mm Steel stud BMT 0.55 mm + 20 mm air gap, Stud spacing 600 mm, Cavity width 112 mm
1 x 75 mm Earthwool glasswool 14 kg/m³ Ultra Acoustic Wall Batt

Panel 2 : 1 x 13 mm CSR Gyprock Fyrchek plasterboard

freq.(Hz)	R(dB)	R(dB)
50	25	
63	24	25
80	30	
100	36	
125	42	40
160	47	
200	52	
250	56	55
315	61	
400	65	
500	70	68
630	74	
800	73	
1000	70	72
1250	74	
1600	78	
2000	81	80
2500	81	
3150	79	
4000	84	82
5000	89