



CSIRO ACOUSTIC MEASUREMENT REPORT

Commonwealth Scientific and Industrial Research Organisation, Infrastructure Technologies
Acoustics Testing Laboratory, Gate 5, 2 Normanby Road, Clayton, Vic 3168 Australia

Report No:
TL602-01-1

Client: Fireproof Cladding Facades Pty Ltd (FCF)
2/1 Laser Drive, Rowville, Victoria 3178

Measurement Type: Airborne Sound Insulation

AS 1191-2002 "Acoustics – Method for laboratory measurement of airborne sound insulation of building elements"

AS/NZS 1276.1:1999 (ISO 717-1:1996) "Acoustics – Rating of sound insulation in buildings and of building elements. Part 1: Airborne Sound Insulation"

Test Specimen [Specimen area: 3.60 m (w) x 3.0 m (h) = 10.8 m², nominal thickness overall: 280 mm]

Description: Intertency wall with UltraMgO™ - Partition 20 (20 mm magnesium oxide central core), between 90 x 45 mm timber stud frames, each filled with 90 kg/m³ rock wool batts; each side clad with a single layer of Knauf Spanshield plasterboard.

Materials:

- FCF UltraMgO™ - Partition 20, 21 kg/m², 20 mm thick (2700 x 610 sheet size)
- UltraMgO™ ancillaries ("C" and "H" section tracks for top/bottom mounting and joining, panel brackets for attachment to wall framing, glass fibre mesh inserts for under panel brackets)
- FCF MW90 mineral (rock) wool batts, 90 kg/m³, 90 mm thick (1200 x 600 batt size)
- 90 x 45 mm MGP12 timber framing
- Knauf Spanshield plasterboard, 6.8 kg/m², 10 mm thick (1200 sheet width)
- Boral jointing compound and tape, and Fuller Firesound sealant

Installation:

- A timber stud frame [item d], with studs at 450 mm nominal centres and noggins at 1/3 and 2/3 wall-height was erected in one half of the laboratory specimen aperture, close to the structural break between the chambers.
- UltraMgO™ - Partition 20 [item a] was installed 30 mm from the stud frame with ancillaries [item b].
- A second timber stud frame [item d] was erected in the other half of the laboratory specimen aperture (structurally independent), 30 mm from the UltraMgO™ - Partition 20.
- A full complement of brackets was used to tie the UltraMgO™ - Partition 20 to the first stud frame; with the second stud frame having brackets at the top plate only, in accordance with the manufacturer's instructions.
- Mineral wool batts [item c] were cut to size and inserted into both timber stud frames. The hand-cut edges of the batts left gaps to the studs in some places; such gaps were covered with mastic.
- Both sides of the wall were clad with plasterboard [item e], hung horizontally and screw-fixed.
- Plasterboard joints were finished with jointing compound and tape, and the perimeter of the finished wall was caulked both sides [item f], and the wall was painted immediately prior to testing.

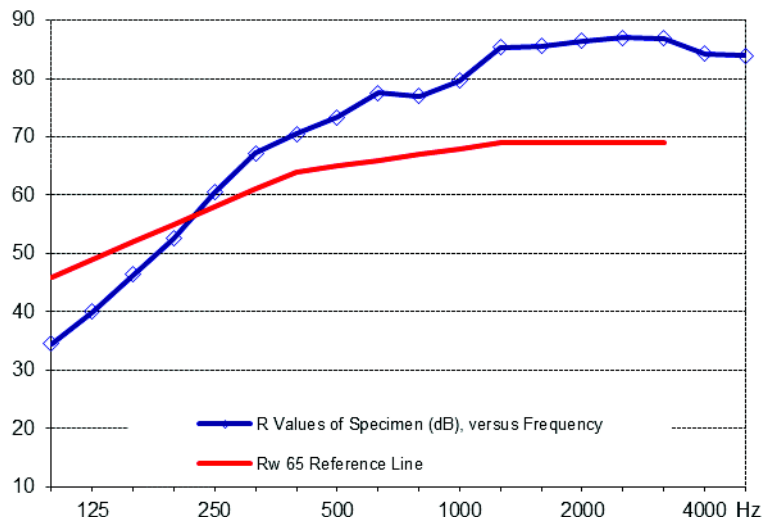
Illustrations of wall construction, provided by the client, are given overleaf.



Test specimen under construction in laboratory

Measurement Details & Results

Freq (Hz)	Specimen R Value (dB)		Repeatability δ (dB)
	1/3 Octave	Whole Octave	
100	34.5		1.2
125	40.0	37.9	3.0
160	46.4		2.4
200	52.6		2.4
250	60.5	≥ 56.6	1.5
315	≥ 67.2		N/A
400	≥ 70.5		N/A
500	≥ 73.4	≥ 72.9	N/A
630	≥ 77.5		N/A
800	≥ 77.0		N/A
1000	≥ 79.6	≥ 79.5	N/A
1250	≥ 85.3		N/A
1600	≥ 85.6		N/A
2000	≥ 86.5	≥ 86.4	N/A
2500	≥ 87.0		N/A
3150	≥ 86.9		N/A
4000	≥ 84.3	≥ 84.9	N/A
5000	≥ 83.9		N/A



Performance Index Numbers

$R_w (C; C_{tr}) = 65 (-4; -12)$ dB
STC = 64
 $R_w + C_{tr} = 53$

Repeatability Estimates (AS 1191, App B, 95 % Confidence)

Measurement was carried out in both directions through the test specimen, using 3 loudspeaker positions in each chamber; giving 6 spatially independent sets of R values, from which average R values and repeatability estimates have been calculated (repeatability estimates rounded up to 1 decimal place).

Measurement Conditions

Date of measurement: 13 January 2017
200 m³ chamber (north): 24 °C, 55 % R.H.
100 m³ chamber (south): 24 °C, 60 % R.H.
Atmospheric pressure: 987 mBar

Notes, Deviations etc

- Physical characteristics of materials may be suppliers' nominal figures; not necessarily verified by CSIRO.
- ≥ indicates R values where measurability was limited by proximity to background level.
- Proximity to background level was limiting measurability in all frequency bands 315 Hz and higher, however the performance index numbers R_w and C_{tr} were governed entirely by performance in the lower frequency bands, and were not limited by proximity to background level.

4. Specimen installation was carried out by the client.

Issuing Authority

Signed: David Truett
Date: 2 March 2017

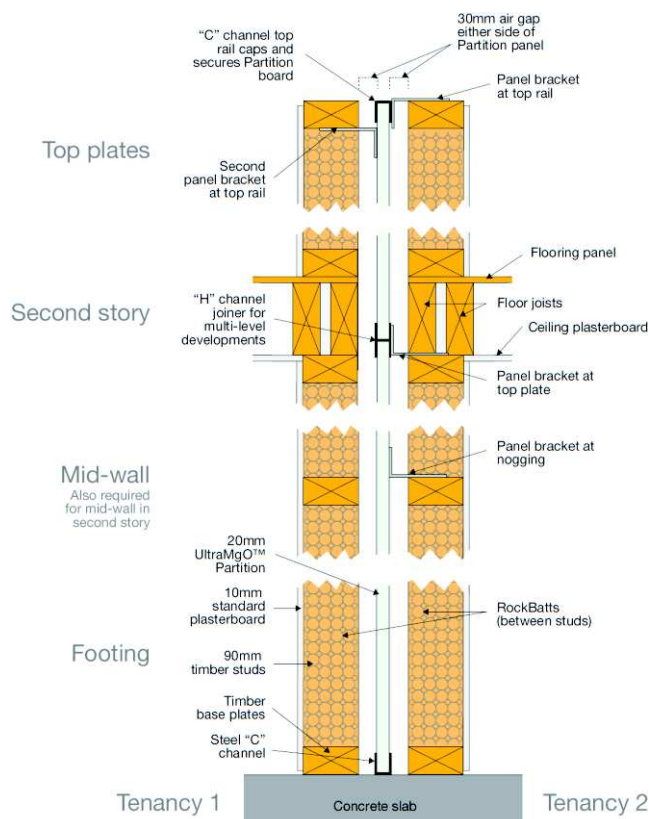
Instrumentation

Real time analyser: • Brüel & Kjær PULSE LAN-XI type 3160-A-4/2
Microphones/preamps: • GRAS type 40AP microphones on B&K type 2669 preamps, rotating simultaneously in both rooms with 33 sec period (1.65 m radius in 200 m³ room, 1.32 m radius in 100 m³ room).
Noise source: • Rola 12UX on flat 1m² baffle (up to 1.8 KHz)
• Brüel & Kjær type HP 1000 dodecahedron (from 1.8 KHz)
Calibration: • Brüel & Kjær type 4228 Pistonphone: Feb 2016 (NATA cal)
• Analyser: Feb 2016 (NATA cal)

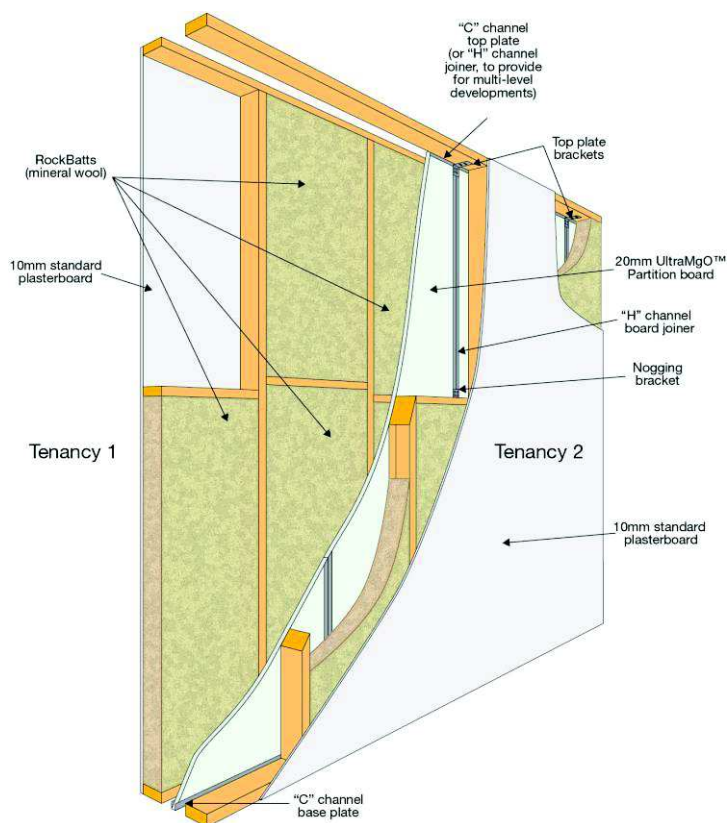
Laboratory Construction

Chambers: • 300 mm thick concrete • parallelepiped with dimensional proportions 1:1.3:1.6 for spectral distribution and overlap of room modes • northern room approx. 200 m³ vol (212 m² area); southern room 100 m³ vol (133 m² area).
Diffusers: • 200 m³ room: 20 diffusers (approx 40 m²) • 100 m³ room: none.
Isolation: • ≥ R_w 75; structurally separate (60 mm air gap), vibration isolated (11 Hz).
Specimen: • 3.60 m wide x 3.00 m high, each chamber having 25 mm thick steel plate aperture: lining its 300 mm deep portion of the test aperture, creating a total aperture depth of 660 mm, resilient foam sealing the 60 mm air gap.

Additional Test Specimen Details (illustrations provided by client)



Sectional illustration of intertenancy wall



Cutaway illustration of intertenancy wall