

**Client:** Bailey Interiors Pty Ltd  
83-85 Boundary Road, Mortdale, NSW 2223

**Measurement Type: Sound Absorption**

AS ISO 354-2006 "Acoustics-Measurement of sound absorption in a reverberation room"  
AS ISO 11654-2002 (ISO 11654:1997) "Acoustics-Rating of sound absorption-Materials and systems"

**Test Specimen** [Specimen area: 3.6 x 3.0 m (10.8 m<sup>2</sup>), Test Configuration<sup>4</sup>: Type E-400]

**Description:** • Bailey "Open Cell" acoustic coffer tile with black scrim backing, • in 600 mm grid  
• with 20 mm Supertel glaswool behind

**Materials<sup>3</sup>**

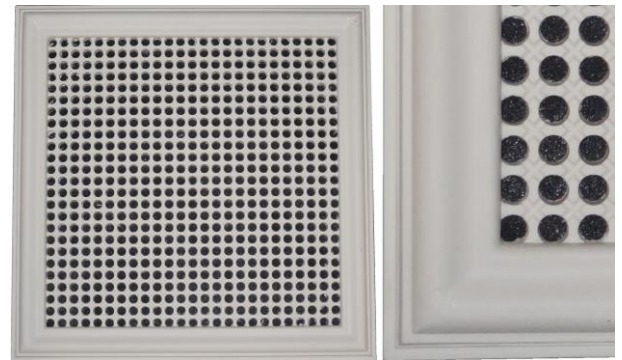
- a) Bailey "Open Cell" acoustic coffer tile: • perforated moulded plaster ceiling tiles, • with Pyrotek Sorbertextile P44FR fabric stapled to the back of the panel, • designed to drop into a standard 600 x 600 mm suspended ceiling grid (actual tile size approx 590 mm square), • thickness: 33mm overall (10 mm behind ceiling tee), • perforated with a set of 25 x 25 circular holes, • hole size 15 mm opening at the mouth, tapering to 13.5 mm at the rear; holes at 19.2 mm centres, • open area percentage in standard grid installation: 24.9% (based on 13.5 mm throat opening; 30.7% based on 15 mm mouth opening), • decorative effect of perforations supplemented by additional moulding details (raised coffer framing the perforated area which was also furnished with grooves between the perforations).
- b) Bradford Supertel 20 mm: • 20 mm thick semi-rigid glasswool board (32 kg/m<sup>3</sup>), • no facing fabric, • supplied in 550 x 550 mm panels (factory-cut).

**Installation**

- The test specimen was installed as an upside down ceiling on the floor of the chamber.
- A 400 mm deep enclosure (32 mm MDF timber, approx 23 kg/m<sup>2</sup>) was placed on the floor of the chamber, 12° off parallel with the walls. The enclosure was taped at all joints to prevent air leakage between the enclosed space and the outside.
- A system of steel wall studs/track was set up inside the enclosure to support the specimen panels. The cavity behind the panels was a single undivided cavity without internal partitions.
- A set of timber struts was installed in the metal support system to suspend the glasswool material [item b] immediately behind the perforated panels.
- Thirty (30) tiles [item a] were then installed (at 600 mm centres) against the glasswool.
- Tee sections were placed on top to cover the gaps between adjacent tiles and acoustically mimic a normal ceiling installation. At the perimeter of the test specimen, the gap between the enclosure and the edges of the tiles was covered with masking tape.
- Specimen installation was carried out by laboratory staff.



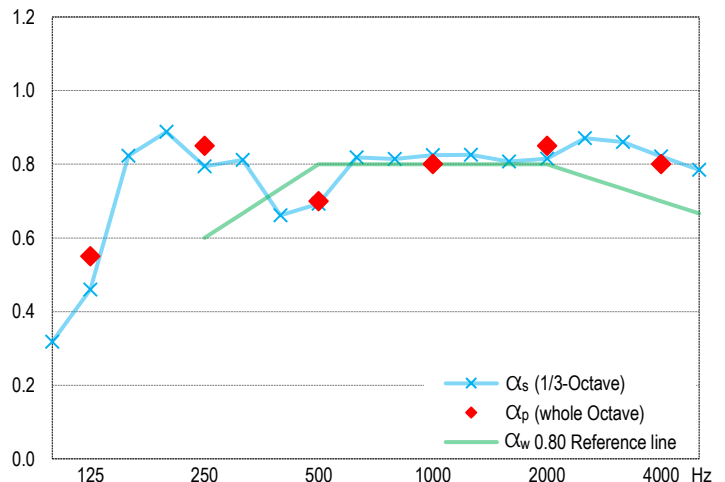
Test specimen installed for testing (image inverted to depict ceiling installation)



Panel details – Left: whole panel. Right: perforations (exposed black fabric behind)

**Measurement Details & Results**

Freq Hz	Absorption coefficients			Reverberation times, T <sub>60</sub> (sec)	
	α <sub>s</sub>	α <sub>p</sub>	95% Conf (δ)	Empty room	with Specimen
100	0.32		0.09	5.73	3.57
125	0.46	0.55	0.13	6.75	3.33
160	0.82		0.09	6.87	2.39
200	0.89		0.09	5.98	2.17
250	0.79	0.85	0.07	5.22	2.20
315	0.81		0.08	5.87	2.28
400	0.66		0.06	5.98	2.59
500	0.69	0.70	0.03	5.92	2.51
630	0.82		0.05	5.72	2.24
800	0.81		0.03	5.41	2.20
1000	0.82	0.80	0.04	5.24	2.16
1250	0.83		0.04	4.78	2.07
1600	0.81		0.04	4.27	1.99
2000	0.81	0.85	0.04	3.82	1.87
2500	0.87		0.03	3.41	1.71
3150	0.86		0.02	3.00	1.61
4000	0.82	0.80	0.03	2.46	1.46
5000	0.78		0.04	2.03	1.31



**Performance Indices<sup>1,2</sup>**

α<sub>w</sub> = 0.80 (L)  
SAA = 0.80  
NRC = 0.80

The required 12 spatially independent decay curves came from ensemble averaging 10 successive decays with each of 3 different source loudspeaker positions, all sampled by 4 fixed microphones, using linear averaging.

Measurement Conditions		
	Empty room	with Test Specimen
Date of measurement:	4 Oct 2019	4 Oct 2019
Temperature & humidity:	16 °C, 63 % R.H.	17 °C, 56 % R.H.
Atmospheric pressure:	1011 mBar	1010 mBar

**Notes, Deviations etc**

1. Shape indicators (L, M, and H), if any, following the α<sub>w</sub> index, indicate α<sub>p</sub> values above the reference contour by ≥ 0.25 in the Low, Medium or High frequency ranges respectively; it is strongly recommended to use this single number rating in combination with the complete sound absorption coefficient curve.
2. SAA and NRC are defined in ASTM C423; laboratory requirements for which differ from AS ISO 354.
3. Physical characteristics of materials may be as per client or supplier's advice; not necessarily verified by CSIRO.
4. The E-400 mounting designation is based on the distance from the rear of the cavity to the exposed face of the ceiling grid.

**Issuing Authority**

Signed:   
Date: 8 October 2019

**Instrumentation**

Real time analyser: • Brüel & Kjær PULSE LAN-XI type 3160-A-4/2  
Microphones/preamps: • 2 x GRAS type 40AP and 2 x B&K type 4134 microphones, all on B&K type 2669 preamps, in 4 fixed positions as per AS ISO 354  
Noise source: • Room populated with three decahedron loudspeakers; 2 Norsonic NOR276 & 1 x B&K 4296), driven in turn by a Norsonic NOR280 power amplifier.  
Calibration: • Analyser: July 2018 (NATA cal)

**Laboratory Construction**

Reverb room: • 300 mm thick concrete (closed off from the adjoining room by an MDF Wall) • parallelepiped with dimensional proportions 1:1.3:1.6 for distribution of room modes • approx 202 m<sup>3</sup> total room volume • approx 215 m<sup>2</sup> surface area excluding diffusers  
Diffusers: • 20 stationary diffusers, approx 40 m<sup>2</sup> total surface area  
Absorption area: • in accordance with AS ISO 354, unless noted otherwise